Pega RPA

Note: For information about Pega Robotic Automation version 22.1, see Pega RPA product overview and Pega Robotic Automation build notes 22.1.

Use Pega RPA to build bridges between unrelated software systems and to automate tedious manual work, improving productivity and efficiency. Pega RPA is composed of several tools, including the following:

- Pega Robotic Automation
  - Pega Robot Studio
  - Pega Robot Runtime
  - Pega Package Server and Server Status tool
  - Pega Synchronization Server
  - Pega Robotic Automation Security Token Service (STS)
- Pega Robot Manager
  - Pega Automation Importer

You can use these tools and others to create automations, deploy those automations to your users, manage the automations, and execute the automations, either in an unattended or attended implementation.

Note: For more information, see the Pega RPA product overview.
Related external links
Pega RPA product page

Pega RPA product overview

Note: For information about Pega Robotic Automation version 22.1, see Pega RPA product overview and Pega Robotic Automation build notes 22.1.

Pega RPA (Robotic Process Automation) provides tools that you can use to automate repetitive work, so your employees can focus on your customers, and let the robots to do the repetitive, rote work. The automations that you create can bridge the gaps between the various software applications that you use, eliminating the time spent starting and navigating through those applications so you can integrate your legacy systems and avoid silos. With Pega RPA, you can speed up processes, eliminate errors, and get work done fast. For more information, see Pega RPA demo: Improve work faster.

Pega RPA consists of the following applications:

- Pega Robotic Automation - Use the robotic automation tools to create, distribute, update, and run the time-saving robots that you create. Pega Robotic Automation includes the following main modules:
  - Pega Robot Studio
  - Pega Robot Runtime
  - Pega Synchronization Server
  - Pega Package Server and Server Status page
  - Pega Robotic Automation Security Token Service (STS)
- Pega Robot Manager - Use Pega Robot Manager to manage the robots in your workplace. For more information, see Pega Robot Manager.
  - Pega Automation Importer

With Pega Robot Studio, you can automate commonly performed tasks and synchronize data across unrelated applications. Pega Robot Runtime executes those automations, either to assist users (attended) or to perform tasks independently (unattended). Pega Robot Manager, Pega Package Server, and Pega Synchronization Engine help you to deploy, update, and manage the automations that you create. Use the Pega Automation Importer to translate automation package definitions published from Pega Robot Studio into an organized, versioned inventory of robot connector instances for use in your Pega application.

Whether adjudicating claims, onboarding customers or employees, reconciling financials, or updating customer information in systems of record, you can create unattended robotic process automations to optimize the completion of these tasks across your enterprise. For example, when an automobile insurance claim is submitted, an automation can analyze the submitted information, look up and verify policy holder information, and then update web, cloud, or on-premise applications with the new information.

You can create attended automations that users can run as needed to efficiently perform their everyday tasks. For example, you can create an automation that starts the various systems an employee uses when the computer is turned on. The list of systems can include Pega applications, non-Pega programs, and URLs, and Pega Robot Studio automations. For example, in a call-center environment, you can create an automation that retrieves pertinent customer information and then updates all systems if changes are made, while providing an audit trail of the changes that took place during the customer interaction.

The unique technology and powerful features of Pega RPA provide a way to address pain points and maximize efficiency throughout your organization.

Pega Robot Studio

Pega Robot Studio provides a rapid visual development environment that lets you create attended and unattended automations. Pega Robot Runtime provides the environment to run these automations so you can complete tasks more efficiently. For example, with Robot Studio, you can create automations that perform the following tasks:

- Automate manual processes, such as copying and pasting between applications
- Provide a single user interface for interaction with multiple applications
- Display process guidance tips to assist users with the completion of workflow tasks

Pega Robot Studio provides base adapters for integrating applications without modifying the underlying software. By using the Robot Studio application adapters, you can select specific application targets (such as text-entry controls and web links) and then use the properties, methods, and events of the controls to design application automation and event-monitoring solutions.

Pega Robot Studio works within the Microsoft Visual Studio design environment. You can install it two ways:

- Robot Studio (stand-alone) -- Robot Studio is a complete stand-alone version built for developers who do not have Microsoft Visual Studio 2015 installed. As part of the Robot Studio installation, the Microsoft Visual Studio 2015 Isolated Shell is installed. This provides the Integrated Development Environment (IDE) foundation for Robot Studio and a familiar, feature-rich development environment.
- Robot Studio plug-in -- The Robot Studio Plug-in integrates with Visual Studio 2015, so you can leverage Microsoft developer tools to rapidly create Pega Robot Studio projects from within Visual Studio.

With either the stand-alone or plug-in version of Robot Studio, the design experience provides streamlined access to all the tools required for project design, debugging, and deployment.

For more information, see the following documents:

- For system requirements and installation instructions, see the Pega Robotic Automation Installation Instructions.
- To download Pega Robotic Automation, see Download Pega RPA software.

- Agile Desktop Implementation Guide
- Pega Robotic Automation Dump Utility User Guide
- Pega Robotic Automation version 19.1 Studio and Runtime Help

- Building Solutions
- Creating automations using the Screen OCR feature
- Creating UI Connectors
- Enhanced Interrogation Form
- Incorporating HTML Table Data in Projects
- Incorporating PDF files in your automation using Pega Robot Studio versions 8.0 and 8.0 SP1

- Incorporating PDF files in your automation using Pega Robot Studio version 19.1
- Integrating BeyondTrust with Pega Robotic Automation
- Integrating Credential Providers with Pega Robotic Automation
- Integrating CyberArk with Pega Robotic Automation
- Project distribution options
- Server Bot Framework
- Setting up a relying party in AD FS
- Understanding Threading
- Understanding Translators
- Using Automation Playback
- Using Citrix Contexts
- Using Data Components
- Using Match Rules
- Using the Automation Recording Feature
- Using the Microsoft Office Connectors
- Using the New Project Wizard
- Using the Robot Inspector
- Using the Siebel Adapter
- Using the Text Adapter
- Working with single-page web applications

Pega Robot Studio and Runtime Help system

Find detailed information about Pega Robot Studio and Pega Robot Runtime, as well as Agile Desktop, in the Pega Robot Studio and Runtime Help systems. These Help systems include reference information, such as information about properties, methods, and events, and examples for Robot Studio and Robot Runtime users. You will also find information about the various configuration files used by Robot Studio and Robot Runtime.

Use the table of contents, index, or search functions to find specific topics on using Robot Studio, Robot Runtime, and Agile Desktop.

Note: For information related to the Microsoft Visual Studio framework, refer to the Microsoft MSDN website.

- Pega Robot Studio and Runtime Help version 19.1

Pega Robot Runtime

Pega Robot Runtime is the thin-client environment that executes the automations that you create using Pega Robot Studio. These automations can be unattended automations or attended automations.

For attended robotic desktop automations, Agile Desktop can provide a framework for presenting the automations that you create using Robot Studio. This optional framework ensures a user-friendly and attractive design that brands your automation. For more information, see the Pega Robotic Automation Agile Desktop Implementation Guide.

For more information, see the following documents:

- For system requirements and installation instructions, see the Pega Robotic Automation Installation Instructions.
- To download Pega Robotic Automation, see Download Pega RPA software.

- Setting up Agile Desktop for Robot Runtime
- Setting up a relying party in AD FS
- Pega Synchronization Sever and Package Server User Guide
- Pega Robot Runtime / Agile Desktop flowchart
- Diagrams that show how Robot Runtime and Robot Manager work together

How Pega Robot Runtime and Pega Robot Manager work together

Architectural diagrams that show how Pega Robot Runtime and Pega Robot Manager work together to enable you to manage your robots are attached to this article. Additional diagrams also show how packages are deployed from Pega Robot Studio and how robots interact with Pega Platform. The diagrams show the following activities for unattended, attended, and Pega Robot Studio solutions.

In an unattended solution

- Starting the RPA Service
- Starting Pega Robot Runtime
- Stopping Pega Robot Runtime
- Terminating Pega Robot Runtime

In an attended solution

- Starting Pega Robot Runtime in an attended solution

Pega Robot Studio activities

- Deploying a package in Pega Robot Studio
- Robotic activity in Pega Robot Studio, Pega Platform, and Pega Robot Manager

How Pega Robot Runtime and Pega Robot Manager 8.7 and later work together

How Pega Robot Runtime and Pega Robot Manager 8.5 and 8.6 work together

How Pega Robot Runtime and Pega Robot Manager 8.4 and earlier work together

Pega Synchronization Server

With the Pega Synchronization Server, you control the software that is downloaded to your desktops. When a new version of a product is released, download and install the product in your test environment on a single, isolated machine. If you choose to take advantage of the new features or the hotfixes in the new version, you then download and import the new version into the product repository. Client machines then download this update as specified in server-side settings for each product.

Use the Pega Synchronization Server to store releases for the following Pega Robotic Automation products:

- Pega Native Foundation
- Pega RPA Service
- Pega Synchronization Engine
- Pega Robot Runtime

These product bundles are individually packaged within each Robot Runtime release. Download the Robot Runtime releases from Digital Software Delivery. For more information, see Download Pega RPA software. Once downloaded, you can load these bundles into the Pega Synchronization Server product repository.

The Pega Synchronization Server works with the Pega Synchronization Engine, which is the client-side application, to update your Pega Robot Runtime installations. Security is built into the process to ensure that only Pega-certified content is delivered by using this system.

For more information, see the following documents:

- Pega Robotic Automation Installation Instructions
- Pega Synchronization Server and Package Server User Guide
- Diagrams of how Robot Runtime and Robot Manager work together

Pega Robotic Automation Security Token Service (STS)

The Pega Robotic Automation Security Token Service (STS) is a web service that can be hosted in Internet Information Services (IIS). It serves as a minimalistic version of Active Directory Federation Services (AD FS) for authenticating the Pega Robot Runtime and Pega Robot Studio products with Pega Robot Manager. STS uses the domain user credentials of the user's Windows session.

Using the Robotic Automation Security Token Service (STS) lets you avoid the per-seat licensing cost of Microsoft's AD FS. By default, STS uses the name@domain or name of the user logged onto the machine, but it can optionally provide a secure token provider for authentication purposes using your Active Directory (AD) or Lightweight Directory Access Protocol (LDAP) user store.

For more information, see the following documents:

- Pega Robotic Automation Security Token Service User Guide
- Are there any types of certificates that are not supported by the Security Token Service?

Pega Package Server and Server Status tool

The Pega Package Server lets you store and retrieve packages (deployment files) from a location that you specify.

When you publish a package from Pega Robot Studio with the Publish to Server option selected, the package is sent to the Pega Package Server and the package metadata is sent to Pega Robot Manager. The package is then downloaded when Pega Robot Runtime starts, based on the credentials that are defined for the Robot Runtime instance.

The Pega Server Status tool provides information about the Pega Package Server and the Pega Robotic Automation Security Token Service (STS). The Server Status tool displays the following information about the Package Server:

- Server health status
- Selected configuration options
- Last 10 log lines
- List of stored packages
    - List of versions
        - Pega Robot Runtime version

The Server Status tool displays the following information about the Pega Synchronization Server:

- Server health status
- List of products
    - Product manifest for each product
    - Product version for each product

The Server Status tool displays the following information about the Security Token Service (STS):

- Server health status
- Selected configuration options
- Last 10 log lines

For more information, see the following articles and guides:

- For system requirements and installation instructions, see the Pega Robotic Automation Installation Instructions.
- To download Pega Robotic Automation, see Download Pega RPA software.

- Pega Synchronization Server and Package Server User Guide (version 19.1)
- Pega Robotic Automation Security Token Service User Guide

What's new in Pega Robotic Automation v19.1

Pega Robotic Automation 19.1 includes significant changes to the product infrastructure so that you no longer have to update the entire product each time a component changes. Additionally, the system now only downloads the actual changes, which means smaller, faster downloads. For more information on this and other changes, see the Pega Robotic Automation version 19.1 Release Notes.

- For system requirements and installation instructions, see the Pega Robotic Automation version 19.1 Installation Instructions.
- For additional information, see the Pega Robotic Automation version 19.1 Studio and Runtime Help.
- To download Pega Robotic Automation 19.1, see Download Pega RPA software.

Note: For information about what is new in version 22.1, see Pega Robotic Automation release notes 22.1. For information about Pega Robot Manager, see What's new in Pega Robot Manager.

For detailed information about all the changes in the version 19.1 builds, see Build Notes: Pega Robotic Automation 19.1.

Install the new Pega Browser Extension (PBE)

Build 19.1.115 adds the Pega Browser Extension (PBE). PBE replaces the individual Chrome and Edge extensions released in earlier 19.1 builds. PBE updates the Google Chrome and Microsoft Edge browser extensions to comply with the Chromium Project Manifest V3 specification.

In addition, we have improved the extension installation and update experience. The extension was previously included in the core Pega Robotic Automation installation process. PBE isolates the extension, and other pieces tied tightly to it, into a separate, installable component, similar to Pega RPA Service and Pega Synchronization Engine. For most automation packages, PBE is backward compatible and does not require a new version of Robot Studio or Robot Runtime.

For more information and a technical overview of PBE, see the Pega Browser Extension FAQ.

Additional Windows support

Build 19.1.108 adds support for Windows 11 and Windows Server 2022.

Download Manager component

Manage the downloading of files in your automations by using the Download Manager component. With the new Download Manager component, you can track when downloads start, stop, and fail so that you can take the appropriate action in your automation. The Download Manager component works with the Google Chrome and Microsoft Edge browsers by first retrieving a list of files to download and the IDs that are assigned to those files. Use Download Manager component methods to pause, terminate, and restart downloads. You can retrieve information that the component records, such as when the download starts and finishes, the size of the download, and the path to the download. Then, you can use the information in your automation.

The Download Manager component is included in build 19.1.104 and later. For more information, see Download Manager component.

Pega Community Events -- Microsoft is Changing the Browser Game - Are You Ready?

With Microsoft's official end-of-life date for Internet Explorer (IE) approaching in June 2022, it's essential that you migrate your existing IE web adapters into new Edge versions using the Universal Web Adapter. This Pega Community Events webinar provides an overview of best practices as well as a demo of new product features available from Pega to assist with this migration process.

Runtime Routing Service

For attended robotic automation implementations that are integrated with Pega Platform™ applications, use the new Runtime Routing Service to directly invoke robots. The new service directs communication between the Pega Platform application and attended Robot Runtime clients. Use this service when you have the following setup:

- A virtual machine server, such as a Citrix server or a Remote Desktop Service server, hosts the Pega Platform application and the Robot Runtime client, and
- The Pega application and Robot Runtime run in the same session.

The Runtime Routing Service is included in build 19.1.98 and later. For more information, see Runtime Routing Service.

Replacing controls in automations

The new Replace usages wizard guides you through the process of replacing the automation blocks of one control with that of another control. The controls are typically in different adapters, but you can use this wizard to replace components or other Toolbox items that are used within an automation. For example, you can use the Replace usages wizard to assist in migrating web adapter (Microsoft Internet Explorer) automations to Universal web adapter (Microsoft Edge) automations.The Replace usages wizard is included in build 19.1.95 and later. For more information, see Replacing controls in automations.

Tip: See also the Pega Community Events: Microsoft is Changing the Browser Game - Are You Ready? webinar.

Ask the Expert -- Pega Robotics

Want to talk to a real robotic automation expert? Learn tips and tricks from an automation pro? Join Thomas Sasnett, Lead System Architect, in this Ask the Expert session, which runs from 13 September through 24 September 2021. Thomas will be discussing all items pertaining to Pega Robotic Automation, including migrating to Edge or Chrome from Internet Explorer. If you miss the session, you can learn from the questions and answers that are captured on the Collaboration Center.

Support for IE compatibility mode in Microsoft Edge

Version 19.1.86 adds support for Internet Explorer (IE) mode for interrogation and automation in the Microsoft Edge browser. IE compatibility mode on Microsoft Edge makes it easy to access all of the sites your organization needs from a single browser. IE compatibility mode uses the Chromium engine for modern sites, and the legacy Internet Explorer 11 engine for legacy sites.

For more information, see Microsoft Edge (Chromium) Support in Pega Robotic Automation.

Windows Server 2019 support

In April 2021, the Robotic Automation team verified support for Microsoft Windows Server 2019 in build 19.1.51 and later. You must also install Pega Native Foundation 10.1.13.2004 or later to use Windows Server 2019. Pega Package Server and Server Status Page 3.1.3.0, Pega Synchronization Engine 3.1.13.0, and Pega Synchronization Server 3.1.13.0 have also been tested with Windows Server 2019.

.NET Core update

Version 19.1.77 updates the Pega Synchronization Server, the Pega Package Server, and the Server Status Page to use Microsoft .NET Core 3.1. There is no change in functionality. For more information, see the 19.1 build notes.

ActiveX support

Version 19.1.76 adds support for ActiveX applications to the UI Connectors functionality. In addition to .NET support, since the initial release of this feature we have added Java, Java FX, and now ActiveX support to UI Connector functionality. For more information, including limitations, see Creating UI Connectors.

X-ray Vision

Build 19.1.73 introduces X-ray Vision, an exciting new technology that makes interrogating an application much easier. With X-ray Vision enabled, when you begin interrogating an application screen, Robot Studio scans the screen, identifies the controls on the screen, and assigns a PegaId to each control. These PegaIds then serve as the match rules for the controls. While you can still interrogate and set match rules as before, X-ray Vision can make the interrogation much faster and more effortless. For more information, see Using X-ray Vision in Pega Robotic Automation.

Support for Microsoft Edge (Chromium)

Build 19.1.70 adds support for automating Microsoft Edge Chromium. Some things to keep in mind:

- Supports automating the Chromium version of Microsoft Edge.
- Uses the Universal Web Adapter (UWA) and is very similar to the existing Chrome support. To automate the Edge browser, you install an extension in the Edge browser and register our Messaging Host to that extension ID.
- Does not support pages running in Edge's compatibility mode (which is actually Internet Explorer 11 functionality).

For more information, see Microsoft Edge (Chromium) support in Pega Robotic Automation.

Support for Pega Robot Manager™ 8.5.1 and later

Build 19.1.61 adds support for the latest Robot Manager release. Pega Robot Manager versions 8.5.1 and later include the following major enhancements:

- Get the most out of your bot-force with auto-balancing. Robot Manager monitors the work groups and work queues and dynamically shifts resources so you get the greatest benefit out of your robots and virtual machines. For more information, see Auto-balancing the workload of stand-by robots across work groups.
- Pega Robot Manager now supports repositories for package storage, removing the need to use Pega Package Server. For more information, see Storing robotic automation packages in Pega Robot Manager.

For more information about the latest updates in Pega Robot Manager, see What's new in Pega Robot Manager.

New variable components

Build 19.1.54 adds new variable components, which include methods that operate directly on the values that are contained in those variables. Here are some examples of the new methods that you can use:

- Equals, GreaterThan, Add, Multiply for numeric variables
- Concat, Contains, StartsWith, Replace for string variables
- Compare, Now, AddDays for datetime variables

These new variables replace the variables previously in use on the Toolbox. This change also updates the String utils and Datetime utils to support the additional methods that are added to the String and Datetime variables. You can use Pega Robot Inspector to read values from and assign values to these variables.

Windows 10 version 2004

Build 19.1.49 adds support for automating 32-bit applications when running the 64-bit version of Windows 10 version 2004.

New Project Wizard

Build 19.1.43 adds the New Project Wizard, which you can use to create projects, add multiple project items, configure adapters, create global containers, and quickly add other standard objects to a project. With this wizard you can perform the following tasks:

- Right-click a project or a folder item to create new project items for all the projects and folders in your solution.
- Create templates for automations.
- Rename the project and project items.
- Delete project items.
- Drag and drop project items within the project.

For more information, see Using the New Project Wizard.

PowerBuilder version 19.0

Build 19.1.42 adds support for PowerBuilder 19.0 applications. PowerBuilder is an Integrated Development Environment that is primarily used for building business applications.

Toast-style notifications

Build 19.1.38 adds a ToastNotification component to the toolbox so that you can display toast-style notifications. A toast notification is a nonmodal window element that you can use to display brief messages that automatically expire:



A toast-style notification

In the toolbox, select Show to activate the ToastNotification component, and then enter the message and choose a severity icon to indicate whether this is an Info, Warning, or Error:



toastNotification component options

For more information, see ToastNotification component.

PowerPoint Connector

Build 19.1.38.0 adds a Microsoft PowerPoint connector to the toolbox so that you can automate the process of creating PowerPoint presentations.

Whitespace options for Text properties

Build 19.1.38 adds the TrimRegionText property to the Text adapter. You can now choose to leave leading and trailing whitespaces for the Text property of a region or field. For more information, see Text adapter properties, methods, and events.

OCR parameters and methods

Build 19.1.38 adds new occurrence parameters to existing OCR methods and also adds the following new OCR methods:

- GetLocationByOcr - Returns the location of the text found.
- GetValueAtLocationByOcr - Returns the text at a specified location.

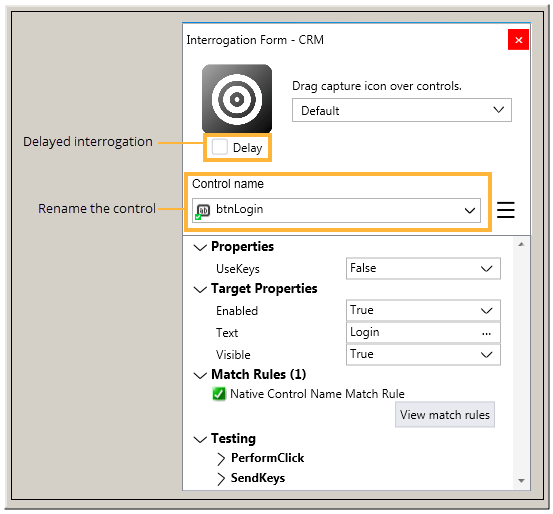
For more information, see Creating Automations Using the Screen OCR Feature.

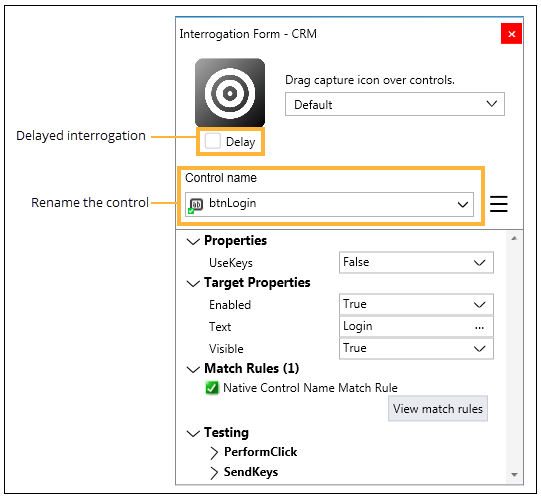
Interrogation Form

Build 19.1.34 streamlines the interrogation process by providing the most common functions directly on the Interrogation Form. Robot Studio minimizes when you begin an interrogation, so that you can focus on the Interrogation Form and the application. You can rename controls, highlight controls, delete controls, modify properties, and test modifying target properties and methods directly from the Interrogation Form. Only when you need to perform the most advanced features such as editing match rules or working with the Windows, Web or Virtual controls tab will you need to return to Robot Studio.

The Interrogation Form also adds a new delayed interrogation feature. You can start a timer and then navigate the application. When the timer expires, the currently selected control is then interrogated. This makes it easier to interrogate controls that hide automatically when they lose focus.

The following figure calls out two convenient features of the Interrogation Form.





Interrogation Form

Note: You can still complete all of these tasks in Robot Studio; however, the Interrogation Form can save time and mouse clicks as you complete these tasks. For more information, see Enhanced Interrogation Form.

Server Bot Framework

Build 19.1.32 adds the Server Bot Framework to fully utilize the resources of a Windows Server when running Robotic Process Automations. A Server Bot is a robotic process automation (RPA) running in its own Remote Desktop Protocol (RDP) session on a machine with Windows Server 2012 R2 or Windows Server 2016. An RPA becomes a Server Bot when you deploy it on the Server Bot Framework. This feature allows you to:

- Run multiple Server Bots in the same workgroup at the same time
- Run Server Bots in multiple workgroups at the same time
- Start, stop, and assign work to Server Bots from Robot Manager

For more information, see Server Bot Framework.

Ask the Expert -- Pega Robot Manager

Join Angel Hermira, Product Manager, Robotics, to learn more about integrating your robotic automations with Pega Platform applications in this Ask the Expert session, which runs from 02 March to 13 March, 2020. Angel previously led the Robotics services team in Europe, where he helped clients architect their solutions and extract the best of both Pega Platform and Robotic Automation capabilities to create truly intelligent automations. If you miss the session, you can learn from the questions and answers that are captured on the Collaboration Center.

BeyondTrust support and enhancements

Build 19.1.27 implements full support of the BeyondTrust credential provider for Robot Runtime. You can use your existing BeyondTrust portal to provide credentials for the registration operator, Windows user, Runtime user, ASO manager, and Credential Store.

Build 19.1.32 further enhances the existing BeyondTrust support. Pega Robotic Automation can now retrieve configuration values from BeyondTrust.

For more information, see Integrating BeyondTrust and Pega Robotic Automation and the Build Notes: Pega Robotic Automation 19.1.

Pega Synchronization Server support for Citrix

Build 19.1.30 enables you to use the Pega Synchronization Server in a Citrix mixed-mode environment on the Citrix server. Robot Runtime now passes parameters to the Pega.Loader.exe file so that the Synchronization Engine switches to the correct Robot Runtime version for the package that the client loads. For more information, see Using Citrix Contexts.

JavaFX support

Build 19.1.30 provides limited support for JavaFX applications. For more information, see JavaFX support in Pega Robotic Automation.

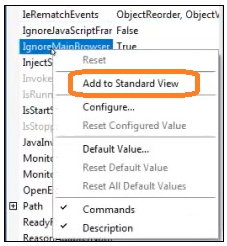
Standard Properties view

Build 19.1.22.0 introduces a new Standard view of the Properties grid. By default, Standard view filters to show only the most commonly used properties for each control. The Standard view is displayed by default, but you can select the Advanced view when you need to see the full complement of properties using the dropdown list at the top of the Property grid.

Working with properties is the same as in previous versions, except that you can now tab through the list of properties in the Standard view.

Adding additional properties to the Standard view

To add an additional property to the Standard view, right-click the control in Advanced view and then select Add to Standard View:



Add to Standard View menu option

To remove a property that you have added to the Standard view, right-click the control and select Remove from Standard View. You can only remove items that you have added.

Studio retains your choice of which view to display between editing sessions.

For more information, see Properties Grid.

SendKeys methods

Build 19.1.14.0 now includes support for the SendKeys method in both the Web and Universal Web Adapters. This works much like SendKeys in the Windows adapter. When you use this technique to create an automation, the system more closely mimics user interaction, so that you do not have to raise events to make the web page perform as expected. For more information about the new SendKeys methods, see the following topics:

- Universal Web adapter properties, methods, and events
- Web Adapter properties, methods, and events

PDF Connector 2.0

Build 19.1.14.0 greatly enhances your PDF processing capabilities. The new visual designer makes working with PDF files much easier because you can visually identify the items within the file that you want to automate. Once identified, these items appear in your Object Explorer so that you can use them directly in your automation. With this functionality you can now perform the following actions:

- Read and write to form objects (items that users can edit in a standard PDF editor) in your automation, similar to what you would do with an interrogated adapter control.
- Use Optical Mark Recognition (OCR) to detect whether an image-based document has any check marks, signatures, or both at known locations.
- Automatically detect tables within PDF files based on intersecting lines and extract the information in those tables into a data table for use in your automation.
- Use the reconciliation mode to quickly automate a workflow. In this mode, Runtime users can see the data elements that are extracted from a file and update those elements if required.

For more information, see Incorporating PDF files in your automation using Pega Robot Studio version 19.1.

Pega Robot Inspector

Build 19.1.14.0 introduces the new Robot Inspector for Pega Robot Runtime. The Robot Inspector lets you start and stop adapters, start automations with supplied parameters, provides live visibility into adapter matching, and lets you view and modify global variables, lookup tables and more.The Robot Inspector is available for every solution without having to add a component to the solution, and can be enabled through the Runtime icon menu.

For more information see Using the Robot Inspector.

Custom credentials provider API

Build 19.1.13.0 adds an API for connecting an in-house credentials provider to Pega Robotic Automation. Use this API to write your own C# extension to retrieve credentials. Pega provides a sample C# solution for you to use as a guide.

To set up a custom credentials provider, use the CredentialManager server options in the CommonConfig.xml file, and make corresponding entries in the CredentialManagerConfig.xml file.

For more information, see Common configuration settings.

Support for additional types of spreadsheets

Build 19.1.7.0 adds support for the following additional spreadsheet types when you use the Excel Connector:

- Microsoft Excel: .xlsx, xlsm, .xltx, .xltm, .xls, .xlt
- OpenDocument spreadsheet: .ods, .ots
- Character Separated Values: .csv, .tsv

This build also adds the following methods:

- FindRows
- FindColumns

Support for Adobe Flash and Adobe Flex applications

Note: Adobe ended support for Adobe Flash on December 31, 2020. For more information, see Adobe Flash Player EOL General Information Page.

Build 19.1.4.0 adds support for Adobe Flash® and Apache Flex applications that use the Google Chrome browser. The Adobe Flash and Apache Flex translator works with Universal Web Adapter. The Adobe Flash and Apache Flex (formerly Adobe Flex) software provides a development environment for building games and applications by using the ActionScript® language and the open-source Flex framework.

For more information, see, Adobe Flash and Flex application support.

What's new in the initial release

The initial release of Pega Robotic Automation 19.1 includes the following features:

Pega Synchronization Server

The Pega Synchronization Server is a new addition to the Pega Robotic Automation product suite that hosts the product repository, which stores bundled product versions. For more information, see the Pega Synchronization Sever and Package Server User Guide.

Pega Package Server

Version 19.1 includes enhancements to the Pega Package Server so that it works together with the new Pega Synchronization Server so you can easily distribute the automations that you create with Pega Robot Studio. For more information, see the Pega Synchronization Sever and Package Server User Guide.

CyberArk support

Version 19.1 adds support for CyberArk. For more information, see CyberArk support in Robotic Automation.

Microsoft Office 2019 support

Version 19.1 adds support for Microsoft Office 2019.

Pega Robotic Automation release and build notes

Release notes contain important information that you should know before you install a release of Pega Robotic Automation. Build notes describe the changes that are included in each build that is created for the various Pega Robotic Automation releases. A release is a major update to Pega Robotic Automation, such as 19.1. A build can include bug fixes and enhancements, such as 19.1.95, or it could include a new component, like the addition of the Pega Browser Extension (PBE) in build 19.1.115.

Note: For information about changes in version 22.1 builds, see Build notes: Pega Robotic Automation 22.1.

Before you install one of these builds, familiarize yourself with the changes, new features, and resolved issues that are listed in the following table.

To download a build, see Download Pega RPA software. For information on system requirements, review the installation instructions.

Build notes for the following products are available:

Robotic Automation 19.1 release and build notes

Product	Last updated on
Pega Robotic Automation 19.1 build notes	June 02, 2023
Pega Package Server and Server Status 3.1 build notes	April 25, 2023
Pega Runtime Router Service 19.1 build notes	December 04, 2021
Pega Robotic Automation 19.1 release notes	May 31, 2019

The following components are shared with Pega Robotic Automation version 22.1:

- Pega Native Foundation 10.1 build notes
- Pega Browser Extension 3.1 build notes
- Pega RPA Service 3.1 build notes
- Pega Synchronization Engine 3.1 build notes
- Pega Synchronization Server 3.1 build notes
- Pega Robotic Automation Security Token System (STS) build notes

Pega Robotic Automation release notes

Pega Robotic Automation includes tools to create robots and provides a runtime environment for those robots. The release notes contain important information that you should know before you install a release of Pega Robotic Automation.

Note: Build notes provide information about the incremental builds for each release. These build notes contain information about new features and other changes. For more information, see Pega Robotic Automation Build Notes.

Each release note contains information on the following topics:

- New features
- Changes in the release
- Migration information (if applicable)
- Deprecated features (if applicable)
- Resolved issues

Before you install a release, familiarize yourself with all of the changes listed in the release notes.

- Pega Robotic Automation version 19.1 Release Notes
- Pega Robotic Automation Studio and Runtime version 8.0 SP1 Release Notes

Build notes: Pega Robotic Automation 19.1

Build notes describe the changes that are included in each build that is created for Pega Robotic Automation 19.1. Before you install one of these builds, familiarize yourself with the new features, resolved issues, and other changes. For more information, see the Pega RPA product page.

Note: For information about changes in version 22.1, see Build notes: Pega Robotic Automation 22.1.

Summary of changes

The changes that are included in the various Robotic Automation 19.1 builds are listed in the following table:

The following 19.1 builds were released before the release of version 22.1.

Item number	Description
	Build 19.1.127.0 — June 21, 2023
EPIC-Z-57278	This build enhances dialog support when you interrogate while using the Universal Web Adapter. The system now supports dialogs in multiple languages with the use of match rules. In addition, the system now supports automating commonly used dialogs including, but not limited to, the Alert, Confirm, Prompt, and Authentication dialogs.
Included products	**Note:** To implement these enhancements, install Pega Browser Extension 3.1.14 or later. for more information, see Automating dialogs in Chrome and Edge. • Pega Native Foundation 10.1.37.2102 • Pega RPA Service 3.1.32 * • Pega Synchronization Server 3.1.24 * • Pega Synchronization Engine 3.1.30 * • Pega Package Server and Server Status 3.1.6 • Pega Browser Extension 3.1.14 * * Added in this build
	Build 19.1.126.0 — June 2, 2023
BUG-763878	This build adds the ExitMsaaThread key in the OpenSpan.ini file. Enter True (1) to avoid an issue that could cause Internet Explorer to silently exit when it was runs alongside the ZoomText application. The default is False (0).

BUG-798397	This build resolves an issue that could prevent Java SWT support from initializing successfully.	
US-Z-57770	This build adds the following methods for the PdfConnector and DocumentType components which you can use to redact information and flatten form fields: • FlattenFields -- Flattens the form fields in the document, so that you cannot edit any of the fields. • Redact -- Redacts all the information defined by redaction landmarks and flattens the form fields in the document. • RedactRectangle -- Redacts the information inside a rectangle that you define on a specific page and flattens the form fields in the document.	
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.37.2102 • Pega RPA Service 3.1.31 * • Pega Synchronization Server 3.1.23	• Pega Synchronization Engine 3.1.30 • Pega Package Server and Server Status 3.1.6 • Pega Browser Extension 3.1.13 * Added in this build
Build 19.1.125.0 — May 10, 2023		
BUG-799507	This build provides a fix for an issue introduced by the Microsoft Edge version 113 update. For more information, see Microsoft Edge update 113 prevents you from automating Edge with Pega RPA.	
GOAL-Z-54423	This build adds support for automating Electron applications that use the ASAR archive file format. For more information see Automating Electron applications.	
BUG-769070	This build resolves an issue that could prevent the Universal Web Adapter from connecting to the browser.	
BUG-791956	This build resolves an issue that could cause Internet Explorer to exit.	
ISSUE-110298	This change enhances diagnostics by ensuring that the system creates a log entry if a process is not hooked.	
ISSUE-112023 ISSUE-112068	This build resolves an issue that could prevent the Universal Web Adapter from connecting to the browser.	
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.37.2102 • Pega RPA Service 3.1.30 • Pega Synchronization Server 3.1.23	• Pega Synchronization Engine 3.1.30 • Pega Package Server and Server Status 3.1.6 • Pega Browser Extension 3.1.13 * * Added in this build
Build 19.1.124.0		
	The changes in this build were released in build 19.1.125.0.	
Build 19.1.123.0 — April 25, 2023		
EPIC-79781	This build includes the following enhancements: • Adds a RaiseEvent method that you can use to create a list of HTML events on a web control. • Adds a new implementation of the PerformClick, DoubleClick, and PerformRightClick methods that raise the mousedown, mouseup, and click events. The PerformRightClick method additionally raises the contextmenu event and the DoubleClick method raises the dblclick event. • Adds overloaded versions of the PerformClick, PerformRightClick, and PerformDoubleClick methods that you can use to simulate a list of keys when you raise events. • Renames the legacy implementation of the PerformClick, PerformDoubleClick, and PerformRightClick methods to SimplePerformClick, SimplePerformDoubleClick, and SimplePerformRightClick, respectively.	
BUG-753228	This build modifies the system to ensure that you can right-click Chrome web controls in table cells.	
BUG-776575	This build resolves an issue that could prevent tables in PDF documents from being located by the PDFConnector component.	
BUG-775940	This build resolves an issue that could prevent the system from applying log level settings.	
ISSUE-111814	This build resolves an issue that could occur when the system updates a cached property configuration file.	
ISSUE-111813	This build updates links on the Help menu, such as the links to the Collaboration Center, the What's new article, and the RPA home page.	

ISSUE-108136	This build enhances Pega Robotics logging to warn a user if they are logging to a network drive. Logging to a network drive can degrade performance.	
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.37.2102 • Pega RPA Service 3.1.30 • Pega Synchronization Server 3.1.23 *	• Pega Synchronization Engine 3.1.30 • Pega Package Server and Server Status 3.1.6 * • Pega Browser Extension 3.1.11 * * Added in this build
Build 19.1.122.0 — April 03, 2023		
BUG-757841	This build resolves issues that could affect the testing of a Robot Activity component when you use the Robot Inspector tool.	
BUG-773311	This build hides the Enter RPA Credentials menu option when you start Robot Runtime from Robot Studio. This option is only available for standalone Robot Runtime.	
BUG-764565	This build resolves an issue with a third-party JavaScript library that could prevent pages from displaying correctly when using the Pega Browser Extension.	
EPIC-81388	This build adds the ability to automate the main tree in the SAP Login dialog box.	
ISSUE-108901	This build resolves an issue that could prevent interrogation on computers that have both 19.1 and 22.1 installed.	
US-Z-54041	This build adds an entry to the ProcessName key in the IgnoreProcesses section of the OpenSpan.ini file to exclude the Pega Browser Extension MessagingHost from injection.	
BUG-738287	This build resolves an issue that could occur when you interrogate certain types of labels in Visual Basic and other native applications.	
BUG-744623	This build allows you to apply the AcceptedDomain property in the Universal Web Adapter to frame elements.	
BUG-790432	This build resolves an issue that could prevent Workforce Intelligence from gathering data after upgrading Runtime using Pega Synchronization Engine.	
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.37.2102 * • Pega RPA Service 3.1.30 * • Pega Synchronization Server 3.1.22 *	• Pega Synchronization Engine 3.1.30 * • Pega Package Server and Server Status 3.1.5 • Pega Browser Extension 3.1.10 * * Added in this build
Build 19.1.121.0 — March 06, 2023		
BUG-772108	This build includes support for the FocusCheckEvents and ChromeFocusEvents settings in the DesktopAnalyticsConfig.xml file, which is used by Workforce Intelligence. These settings disable the processing of focus events, which may be necessary to enhance the performance of certain web pages in Chrome browsers in Workforce Intelligence implementations. **Note:** Consult the Workforce Intelligence Service Delivery team if you need to enable these settings.	
BUG-754699	This build enhances the Database query components by preventing parameter properties from resetting to their default value when you edit the command text.	
BUG-776402	This build removes the Text Box SetValue and GetValue methods. If you have automations that use these methods, those automation will continue to run, however, these methods were not intended to be used in automation development. The correct way to get and set the text in a text control is to use the Text property.	
Assemblies	OpenSpan.Events.dll OpenSpan.Controls.Design.dll	OpenSpan.Controls.dll OpenSpan.Adapters.dll
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.35.2102 * • Pega RPA Service 3.1.29 • Pega Synchronization Server 3.1.20	• Pega Synchronization Engine 3.1.28 • Pega Package Server and Server Status 3.1.5 • Pega Browser Extension 3.1.08 * Added in this build
Build 19.1.120.0 — January 30, 2023		
BUG-759403	This build modifies the Universal Web Adapter browser support to ensure that it correctly handles webpage redirects.	
BUG-	This build makes the Universal Web Adapter browser support more resilient when you work with projects that contain a large number of Universal Web Adapters	

767508	that are being started and stopped.	
US-Z-46469	This build updates the Robot Studio and Robot Runtime installers to install the latest, provisioned RDA certificate for the local Runtime REST service. This certificate expires on October 20, 2023. For more information, see Certificate expiration dates.	
Assemblies	OpenSpan.Adapters.Web.Universal.dll localruntime.pega.com.pfx All Studio, Studio Plug-in and Runtime installers	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.34.2102 • Pega RPA Service 3.1.29 • Pega Synchronization Server 3.1.20 *	• Pega Synchronization Engine 3.1.28 * • Pega Package Server and Server Status 3.1.5 • Pega Browser Extension 3.1.08 * * Added in this build
Build 19.1.119.0 — December 23, 2022		
BUG-763641	This build enhances the PdfConnector component to enable it to import certain secure PDF files.	
BUG-758267	This build enhances Agile Desktop to make it more resilient to updates applied by using Pega Updater.	
US-506871	This build adds overloads for the ProcessTo methods of DocumentOcr. Use these overload methods to recognize the MICR line on checks. Set the scanMicr parameter to true to recognize the MICR line. In this mode, regular text is ignored or recognized as gibberish.	
ISSUE-Z-45540	This build improves the message that appears when you start Robot Studio without a CommonConfig.xml file.	
EPIC-78125	This build adds support for Oracle Java Runtime Environment versions 16 through 19.	
Assemblies	OpenSpan.Pdf.PdfConnector.dll OpenSpan.OCR.dll OpenSpan.DocumentOcr.dll	OpenSpan.Security.dll OpenSpanJavaBroker.class
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.34.2102 • Pega RPA Service 3.1.29 • Pega Synchronization Server 3.1.19	• Pega Synchronization Engine 3.1.26 • Pega Package Server and Server Status 3.1.5 • Pega Browser Extension 3.1.07 * * Added in this build
Build 19.1.118.0 — November 29, 2022		
US-500944	This build speeds the retrieval of managed accounts from BeyondTrust. Use the new Application, AccountName, accountLimit, and accountName options in the CredentialManagerConfig.xml file to implement the new retrieval method. For more information, see CredentialManagerConfig.xml file.	
BUG-749648	**Note:** If you are installing build 19.1.118.0 to use BeyondTrust's new functionality for retrieving managed accounts, ensure that you also have RPA Service 3.1.29 or later installed. This build enables you to automate web page elements that are outside the normal structure of a web page, a concept referred to as the shadow DOM.	
US-508195	This build ensures that when you are using Robot Runtime in Workforce Intelligence, Robot Runtime rechecks all working URLs after a DAC refresh, if no working URL is found.	
Assemblies	OpenSpan.Security.dll CredentialManagerConfig.xml lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi	OpenSpan.ApplicationFramework.dll OpenSpan.Events.dll OpenSpan.Runtime.Analytics.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll OpenSpan.dll
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.34.2102 * • Pega RPA Service 3.1.29 * • Pega Synchronization Server 3.1.19	• Pega Synchronization Engine 3.1.26 • Pega Package Server and Server Status 3.1.5 • Pega Browser Extension 3.1.06 * * Added in this build
Build 19.1.117.0 — November 02, 2022		
EPIC-77618	This build adds the GetColumnHeader and GetColumnIndexByHeader methods to SWT Table support.	
US-504221	This build ensures that screen titles are captured correctly to provide more accurate workflow information for Workforce Intelligence reporting.	
BUG-	This build ensures that older projects that automate PowerBuilder applications are updated to use the latest references and type.	

749686		
BUG-743718	This build resolves an issue that could prevent Pega Updater from loading new type library files.	
Assemblies	OpenSpanSWTTableTranslatorSWT.class OpenSpan.Events.dll OpenSpan.Transform.dll	Pega.Native.Remoting.x32.dll Pega.Native.Remoting.x64.dll
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.33.2102 • Pega RPA Service 3.1.28 * • Pega Synchronization Server 3.1.19	• Pega Synchronization Engine 3.1.25 • Pega Package Server and Server Status 3.1.5 • Pega Browser Extension 3.1.04 * * Added in this build
Build 19.1.116.0 — October 14, 2022 — To download a build, see the Download Pega RPA software article. For information on system requirements, review the 19.1 installation instructions**.**		
BUG-741994	This build adds support to X-ray Vision for interrogating the UltraWinToolbar and UltraButton controls.	
BUG-745192	This build corrects an issue that caused the Agile Desktop UI to fit incorrectly on the screen when your system display setting was not 100%.	
BUG-743722	This build adds support for setting cell values in SAP grids in SAP version 7.6, Patch 5 and later.	
BUG-743019	This build resolves a problem that could cause PowerBuilder to crash when creating automations.	
US-494789	This build removes references to DLL files that are no longer used.	
US-502806 US-494772	This build updates CefSharp to version 105.3.330 to enhance security.	
ISSUE-105711 BUG-748648	This build resolves an issue in Chrome and Edge that could cause the system to hang when you started the application through the Universal Web Adapter.	
BUG-724650	This build corrects an issue that could prevent the Universal Web Adapter from recognizing generated dialogs.	
BUG-729688	This build resolves an issue with Universal Web Adapter dialog support that could prevent dialog controls from matching.	
US-494791	This build updates the version of JQuery.js to version 3.6.1 to enhance security.	
US-494788	This build updates the version of moment.js to 2.29.4 to enhance security.	
Assemblies	OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.AgileDesktop.exe OpenSpan.AgileDesktop.CefSharp.dll CefSharp.dll CefSharp.Core.dll CefSharp.WinForms.dll CefSharp.BrowserSubprocess.Core.dll CefSharp.Core.Runtime.dll chrome_elf.dll libcef.dll libEGL.dll libGLESv2.dll vk_swiftshader.dll OpenSpan.Adapters.Web.Universal.dll	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll Pega.Brokers.Framework.DotNetWinForms.v20.dll Pega.Brokers.Framework.DotNetWinForms.v40.dll OpenSpan.AgileDesktop.exe OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.Translators.SAP.x32.dll Pega.Native.Remoting.x32.dll Pega.Native.Remoting.x64.dll OpenSpan.Adapters.Design.dll Pega.UIAutomation.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.adapter.Web.WebBase.dll OpenSpan.Adapters.Web.Universal.dll
Included products	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.33.2102 * • Pega RPA Service 3.1.27 * • Pega Synchronization Server 3.1.19	• Pega Synchronization Engine 3.1.25 * • Pega Package Server and Server Status 3.1.5 • Pega Browser Extension 3.1.03 * * Added in this build.

19.1 build notes

Item number	Description	Assemblies
Build 19.1.115.0 — September 20, 2022		

Item number	Description	Assemblies
	This build adds the Pega Browser Extension (PBE), which you can use to automate applications that run on Google Chrome and Microsoft Edge.	
US-493476	PBE complies with the new Chromium Project V3 Manifest files specification and makes it easier to update the extensions. The installation of PBE is incorporated into the Setup wizards for Robot Studio and Robot Runtime. You can also extract the PBE installation files from this build and install PBE on to existing installations of Robot Studio and Robot Runtime. For more information, see Pega Browser Extension FAQ.	Not applicable.
BUG-700441 BUG-734078	This build enhances Universal Web Adapter support by allowing you to change the browser's default user data directory.	OpenSpan.WebExtensionInstaller.exe OpenSpan.Adapters.Web.Universal.dll
BUG-725543	This build corrects an issue in the Automation Playback feature that prevented it from loading runtime logs.	OpenSpan.Automation.dll OpenSpan.PlaybackEngine.dll
BUG-720466	This build adds support for Siebel High Interactivity Framework (HI) version 811.11.822.4.	OpenSpan.Translators.Siebel.SiebelCommon.x32.dll OpenSpan.Translators.Siebel.SiebelCommon.x64.dll
US-496751	This build ensures that the Pega Browser Extension (PBE) works with Electron.	Pega.Translators.Web.Electron.x32.dll Pega.Translators.Web.Electron.x64.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.31.2102
- Pega RPA Service 3.1.26.0
- Pega Synchronization Server 3.1.19.0
- Pega Synchronization Engine 3.1.24.0
- Pega Package Server and Server Status 3.1.5.0
- Pega Browser Extension 3.1.02.0 *

* Added in this build.

Build 19.1.114.0 — September 01, 2022

BUG-721689	This build ensures that Edge browsers running in Internet Explorer compatibility mode correctly minimize and maximize.	OpenSpan.Adapters.Web.dll
BUG-725648	This build expands support for PowerBuilder controls, such as checkboxes.	OpenSpan.Adapters.PowerBuilder.dll
BUG-727774	This build ensures that the Universal Web Adapter correctly handles situations where web applications modify a JavaScript object and make it unavailable.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json
GOAL-24823	This build adds support for Siebel OpenUI TextArea controls.	OpenSpan.SiebelOpenUI.Utility.js lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json

Note: The Pega Chrome/Edge and Firefox extensions were updated to version 1.0.121 with the inclusion of these changes.

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.31.2102 *
- Pega RPA Service 3.1.26.0
- Pega Synchronization Server 3.1.19.0
- Pega Synchronization Engine 3.1.24.0 *
- Pega Package Server and Server Status 3.1.5.0

* Updated in this build.

Build 19.1.113.0 — August 05, 2022

BUG-728217	This build improves security for adapter properties.	OpenSpan.dll OpenSpan.Adapters.Windows.dll
BUG-719618	This build resolves an issue that could cause Java SWT support to load before an interrogated application was ready for it.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
BUG-711618	This build improves diagnostic logging for the Microsoft Outlook Connector.	OpenSpan.Office.dll
GOAL-24737	This build enhances Java SWT support: • Modifies the SWT Spinner support to now behave as a TextBox. • Adds the SetCellValue, SelectCell, PerformRightClick, and PerformDoubleClick methods for	OpenSpanSWTControlTranslatorSWT.class OpenSpanSWTSpinnerTranslatorSWT.class OpenSpanSWTSpinnerWrapper.class

	the Java SWT treeview.	OpenSpanSWTTreeTranslatorSWT.class
Item number	**Description**	**Assemblies**
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.30.2102 * • Pega RPA Service 3.1.26.0 • Pega Synchronization Server 3.1.19.0 • Pega Synchronization Engine 3.1.23.0 * • Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
	Build 19.1.112.0 — July 22, 2022	
BUG-730595	This build increases the amount of time the Universal Web Adapter browser extensions wait to receive the registration message to avoid entering a “not responding” state.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json
	Note: The Pega Chrome/Edge and Firefox extensions were updated to version 1.0.120 with the inclusion of these changes.	
BUG-726177	This build ensures that all locked resources are freed after an exception occurs in a .NET environment.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.Shim.dll OpenSpan.Translators.DotNet.v40.Shim.dll
BUG-726545	This build helps you diagnose configuration problems with the components in the solution's global container. An exception is now logged for any improperly configured components when you open a solution in Robot Studio. The remaining components in the global container are allowed to finish initializing. The log file only includes the exception.	OpenSpan.dll
BUG-710123	This build improves solution performance by reducing the number of messages that are sent between Robot Runtime and the application that you automated.	OpenSpan.Adapters.Windows.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.28.2102 * • Pega RPA Service 3.1.26.0 • Pega Synchronization Server 3.1.19.0 • Pega Synchronization Engine 3.1.22.0 • Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
	Build 19.1.111.0 — July 08, 2022	
BUG-710679	This build enhances the RogueWave translator by improving how the system tracks RogueWave controls.	OpenSpan.Translators.RogueWave.ObjectiveGrid.x32.dll
BUG-712712	This build adds support for PowerBuilder version 19.2.	OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
GOAL-24348	This build adds support for Baan ERP text fields.	OpenSpan.Adapters.Baan.Design.dll OpenSpan.Adapters.Baan.dll OpenSpan.Translators.Baan.x32.dll
BUG-715631	This build provides more accurate information on the StartMyDay dialog. The path now shows the StartPage for Universal Web Adapters and Web adapters, instead of the browser executable files for each.	OpenSpan.ApplicationFramework.dll
BUG-702794	This build resolves issues with registry checks and removing registry entries for the Chrome/Edge Messaging Host.	OpenSpan.WebExtensionInstaller.exe
BUG-724904	This build provides a way to extend the timeout interval if your BeyondTrust server responds too slowly to complete the request. In the CredentialManagerConfig.xml file, use the HttpClientTimeoutSeconds key to specify the length of the timeout interval that is used for all BeyondTrust connections. The default is 100 seconds. Also in the CredentialManagerConfig.xml file, you can enter the URL that you want to use as the BeyondTrust proxy in the proxyAddress key. Enter none or leave this key blank to disable the machine default proxy. This setting only applies to BeyondTrust connections.	OpenSpan.Security.dll CredentialManagerConfig.xml
	This build adds support for the following Java FX Standard Widget Toolkit (SWT) controls: • Group widget • Shell widget • Link widget	

Item number	Description	Assemblies
GOAL-22714	• Slider widget • ExpandBar widget • Browser widget • Button widget • Label widget • List widget • Combo widget This build also adds UI Connector support.	Adding support for SWT modified many assemblies. For more information, see Updated assemblies in 19.1 addendum.
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.27.2102 • Pega RPA Service 3.1.26.0 * • Pega Synchronization Server 3.1.19.0 • Pega Synchronization Engine 3.1.22.0 * • Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
	Build 19.1.110.0	
	The changes in this build were released in build 19.1.111.0.	
	Build 19.1.109.0 — May 27, 2022	
US-472932	This build changes Robot Runtime and the RPA Service to default to the %appdata% location if the path specified in the ConfigurationLocation key in the CommonConfig.xml file is invalid.	OpenSpan.Security.dll
BUG-708754	This build corrects an issue that could cause the Microsoft Edge browser to load slowly when started by Internet Explorer. This could happen when you go to a website that does not support Internet Explorer, or when you click a link in Internet Explorer that causes a file to open in Edge.	OpenSpan.Automation.dll
BUG-702984	This build ensures that when you cancel an activity within Interaction Framework, all threads that were started during that activity are also canceled.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
BUG-719244	**Note:** Be sure to install both this build and the Pega Native Foundation 10.1.27.2102 build to apply the correction. This build ensures that Robotic Automation JavaScript code does not conflict with JavaScript from other third-party Internet Explorer plug-ins.	OpenSpan.js OpenSpan.Adapters.Web.dll
BUG-710001	This build corrects a problem that could cause some Message Manifest options to display incorrectly.	OpenSpan.Automation.Design.dll OpenSpan.ApplicationFramework.dll
BUG-707359	This build adds the RestoreDefaultValues method to enhance Interaction Framework. Use this method to reset the property values in your interaction context to their defaults that are specified in the InteractionConfig.xml file.	OpenSpan.Interactions.dll OpenSpan.Interactions.Controls.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.27.2102 * • Pega RPA Service 3.1.24.0 * • Pega Synchronization Server 3.1.19.0 * • Pega Synchronization Engine 3.1.20.0 * • Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
	Build 19.1.108.0 — May 13, 2022	
BUG-713928	This build fixes an issue with interrogating the multiple file download dialog in Chrome.	OpenSpan.Adapters.Web.Universal.dll
BUG-705732	This change expands support for automating native Windows applications using UI Automation. Previously, only support for the .NET version of UI Automation was available. With this enhancement, you can also use the COM version of UI Automation. The following methods support both versions of UIA: • ClickByName/Text • DoubleClickByName/Text • GetValueByName/Text • SetValueByName/Text • ClickContextMenuByIndex/Text/Path Note that this feature should not be used with Workforce Intelligence.	OpenSpan.Adapters.dll
EPIC-72631	This build adds support for SAP v7.70.	Pega.Translators.HeuristicToolkit.x32.dll OpenSpan.Heuristics.SAP.x32.dll

Item number	Description	Assemblies
		OpenSpan.Translators.SAP.x32.dll
BUG-714272	This build adds the **DotNetAsyncCalls** key to the advanced configuration settings for the adapter. Use this key to perform asynchronous clicks on Windows Forms ToolStrip Menu Items. This allows Pega Runtime to continue without waiting for the action caused by the click to complete. For more information, contact Pega Support. **Note:** This build has a dependency with Pega Native Foundation 10.1.26.2102.	OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll Pega.Translators.DotNet.v20.WindowsForms.dll Pega.Translators.DotNet.v40.WindowsForms.dll
BUG-708427	This change enhances the RestClient component so that it can connect to more endpoints. Specifically, some endpoints do not recognize the Content-Type of an HttpRequest after the Microsoft .NET framework has appended the Charset value to it. This change adds a new property (RemoveContentTypeCharset) that allows removal of this Charset value so that the RestClient component can connect to these endpoints.	OpenSpan.Controls.dll OpenSpan.Interactions.Controls.dll
ISSUE-96452	This change adds support for Windows 11 and Windows Server 2022. This change has a dependency with Pega Native Foundation 10.1.26.2102.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
US-475187	This build adds support for you to configure multiple Workforce Intelligence server URLs in the CommonConfig.xml file.	OpenSpan.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.26.2102 * • Pega RPA Service 3.1.23.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
	Build 19.1.107.0 — April 28, 2022	
GOAL-24343	This build adds support for extracting information from the RSA SecurID authentication utility so you can automate the two-factor authentication process.	OpenSpan.Adapters.RSASecurID.dll OpenSpan.Translators.RSASecurID.x64.dll
BUG-679918	This build improves the efficiency of the Universal Web Adapter by optimizing the use of a Microsoft .NET synchronization method. When overused, this method could have a detrimental effect on real-time applications, like a soft phone, that are running on the same computer.	OpenSpan.Adapters.Web.Universal.dll
US-470603	This build updates the Robot Studio and Robot Runtime installers to install the latest, provisioned RDA certificate for the local Runtime REST service. This certificate expires on March 28, 2023.	OpenSpanRuntimeEntSetup.aip OpenSpanStudioVsxIsolatedSetup.aip OpenSpanStudioVsxSetup.aip cert_identification_use.txt localruntime.pega.com.pfx
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.25.2101 • Pega RPA Service 3.1.23.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0	
	Build 19.1.106.0	
	The changes in this build were released in build 19.1.107.0.	
	Build 19.1.105.0 — April 04, 2022	
BUG-681181	This build modifies the system to ensure that a third-party webpage cannot prevent the Pega Chrome and Edge extensions from initializing, when the web page overrides the window.setInterval function.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json
BUG-697072	This build ensures that the EnabledChanged event for Universal Web Adapter web controls fires.	OpenSpan.Adapters.Web.WebBase.dll lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
GOAL-24093	This build adds the Download Manager component to Universal Web Adapters. Use this component to automate downloads in Google Chrome and Microsoft Edge by using new methods and events such as the WaitForDownloads method and DownloadStatusChanged event. For more information, see Download Manager component.	OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Windows.Design.dll OpenSpan.Automation.dll OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.Virtual.Web.Interfaces.dll Pega.Remoting.dll Pega.Remoting.tlb Pega.UIAutomation.dll SetExtensionTraceOption.bat

Item number	Description	Assemblies
		lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json
Note: The Pega Chrome/Edge extensions were updated to version 1.0.119 with the inclusion of these changes.		
US-467403	This build modifies Robot Runtime for use in Pega Workforce Intelligence implementations to ensure that all shifts are generated.	OpenSpan.Events.dll
ISSUE-100235	This build resolves an issue that could prevent you from interrogating Electron applications.	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Translators.Web.MessagingHost.exe
US-434061 US-461166 US-434063	This build updates the following third-party DLL files to the following versions: • CefSharp version 95.7.141 • jQuery version 3.6.0 • Moment JavaScript libraries version 2.29.1	OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.AgileDesktop.exe CefSharp.WinForms.dll CefSharp.Core.dll CefSharp.dll CefSharp.Core.Runtime.dll CefSharp.BrowserSubprocess.exe CefSharp.BrowserSubprocess.Core.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.25.2101 • Pega RPA Service 3.1.23.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0		
Build 19.1.104.0		
	The changes in this build were released in build 19.1.105.0.	
Build 19.1.103.0 — March 21, 2022		
BUG-690141	This build ensures that Robot Runtime logs off from each virtual machine, so it can successfully start next time, even if an error condition is encountered during the Robot Runtime shutdown.	OpenSpan.Adapters.Web.Universal.dll OpenSpan.Runtime.Core.dll
BUG-679598	This build adds the IgnoreWindowPosition key to the advanced configuration settings for the adapter. Use this key to ensure correct matching when you are running on a multiple monitor setup that has different scale settings for each monitor. For more information, contact Pega Support. This build also resolves an issue that could occur when you open a new tab in Microsoft Edge.	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.Universal.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.25.2101 • Pega RPA Service 3.1.23.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0		
Build 19.1.102.0 — March 02, 2022		
BUG-700135	This build resolves an issue that could prevent a Pega Robot Runtime from connecting to a Pega server when you set the UseRobotManagerConnection key in the Case component to True.	OpenSpan.Interactions.Controls.dll
BUG-705115	This build enables you to match controls properly in a multi-project solution that uses the Universal Web Adapter to interrogate Microsoft Edge in IE compatibility mode.	OpenSpan.Adapters.Web.Universal.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.25.2101 • Pega RPA Service 3.1.23.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0		
Build 19.1.101.0 — February 18, 2022		
BUG-681439	This build adds support for interrogating Siebel OpenUI List and View controls when you are using the Universal Web Adapter.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json

Item number	Description	Assemblies
BUG-682812	This build corrects a problem caused by certain web applications interrupting Pega messaging events within the Universal Web Adapter.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json
BUG-701612	This build corrects a problem with interrogating certain web applications when using the Universal Web Adapter.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json
	Note: The Pega Chrome/Edge extensions were updated to version 1.0.118 with the inclusion of these changes.	
BUG-692741	This build adds support for using command-line arguments that exceed 255 characters when you start Robot Runtime on a Citrix server.	OpenSpan.Connecters.Citrix.dl WebInterfaceNavigation/OpenSpan.Connecters.Citrix.dll
BUG-699665	This build modifies the GetScreenShot method to avoid exceptions when you interrogate WebPage type targets.	OpenSpan.Adapters.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Windows.dl OpenSpan.Adapters.Web.WebBase.dll
BUG-695692	This build modifies the Universal Web Adapter to avoid rematching issues when you use multiple adapters that have different AcceptedDomain settings.	OpenSpan.Adapters.Web.WebBase.dll
BUG-699534	This build modifies the Universal Web Adapter to avoid Robot Runtime errors when you use StartMyDay control methods.	OpenSpan.Adapters.Web.WebBase.dll
US-455838	This build updates the ASP.NET libraries. These libraries are updated from Microsoft .NET version 4.0 to .NET version 4.6.1.	OpenSpan.Branding.dll OpenSpan.Controls.dll OpenSpan.Interactions.dll OpenSpan.Interactions.Controls.dll OpenSpan.Runtime.Core.dll OpenSpan.Security.dll Pega.ClientCredentialProvider.dll Pega.ConsoleTestRunner.exe Pega.IPC.Services.dll Pega.PackageDownloader.exe Pega.TestRunner.exe Pega.WPF.Controls.dll PkgDefSearchPathUpdater.exe PkgManifestUpdater.exe PkgMEFUpdater.exe OpenSpan.Connectors.Citrix.dll Pega.RdaRouter.Service.exe System.Net.Http.Formatting.dll System.Web.Http.dll System.Web.Http.SelfHost.dll System.Web.Http.WebHost.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.25.2101 • Pega RPA Service 3.1.23.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0	
	Build 19.1.100.0 — February 03, 2022	
BUG-678873	This build corrects a problem that can cause a VSFlxGrid8L control to interrogate as a generic control, instead of a grid control.	OpenSpan.Adapters.Windows.dll
EPIC-71496	This build extends UI Connector support so you can interrogate SWT Tree Controls that have child pop-up windows.	OpenSpanJavaReflection.class OpenSpanJavaUICHelper.class
EPIC-73291	This build adds support for a Pega Robot Manager 8.7.1 feature. Robot Runtime now performs the following tasks: • Sends the Robot Studio version when uploading a package. • Sends heartbeats from attended mode solutions to Robot Manager.	APISimulatorUI.exe OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.Studio.dll OpenSpan.dll OpenSpan.Server.Client.dll OpenSpan.Automation.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.25.2101 * • Pega RPA Service 3.1.23.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
	Build 19.1.99.0 — January 24, 2022	

Item number	Description	Assemblies
BUG-685632	This build allows you to integrate with the IBM Host on Demand emulator version 12.	OpenSpan.Adapters.Text.Host.dll
BUG-686670	This build resolves an issue that can occur when you manually remove the Edge extension from the Microsoft Edge browser.	OpenSpan.WebExtensionInstaller.exe
BUG-696389	This build changes the BeyondTrust API RequestId value to allow a 32-bit integer. If you are integrating with BeyondTrust, install Pega RPA Service 3.1.23 or later.	OpenSpan.Security.dll
ISSUE-97887	This build resolves an exception that can occur when you interrogate an Electron application.	OpenSpan.Adapters.Web.Universal.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.24.2101
- Pega RPA Service 3.1.23.0 *
- Pega Synchronization Server 3.1.18.0
- Pega Synchronization Engine 3.1.19.0
- Pega Package Server and Server Status 3.1.5.0

* Updated in this build.

Build 19.1.98.0 — December 23, 2021

BUG-668488	This build ensures that a component added to the Toolbox from a third-party assembly is successfully added to the project.	OpenSpan.dll
BUG-672007	This build adds support for the FocusIn and FocusOut events of HTML elements when you use the Universal Web Adapter in an automation. All HTML elements interrogated using the Universal Web adapter can now use these events in an automation.	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Virtual.Web.Interfaces.dll OpenSpan.Virtual.Web.Interfaces.tlb OpenSpan.Virtual.Interfaces.delegates.tlb
EPIC-71643	This build adds the Runtime Routing Service. Use this service in attended robotic automation in place of the Pega Platform application as a directly invoke robots. The new service directs communication between the Pega Platform application and attended Robot Runtime clients. For more information, see Runtime Routing Service.	OpenSpan.Adapters.SAP.Design.dll OpenSpan.Adapters.SAP.dll OpenSpan.Adapters.SAP.Interfaces.dll OpenSpan.Translators.SAP.x32.dll
EPIC-71781	This build adds support for the Grid Cell and Select Cell methods when automating a SAP 7.6 Grid control. **Note:** To install the Runtime Routing Service, see the Pega Robotic Automation 19.1 Installation Automation.	The following assemblies are only added or modified if you install the Runtime Routing Service: OpenSpan.Runtime.Core.dll PegaRuntimeRoutingServiceSetup.exe CommandLine.dll log4net.dll Microsoft.IdentityModel.JsonWebTokens.dll Microsoft.IdentityModel.Logging.dll Microsoft.IdentityModel.Tokens.dll Newtonsoft.Json.dll OpenSpan.dll Pega.RdaRouter.Service.exe Pega.RDAUtility.exe System.IdentityModel.Tokens.Jwt.dll System.Net.Http.dll System.Net.Http.Formatting.dll System.Net.Http.WebRequest.dll System.Web.Http.dll System.Web.Http.SelfHost.dll System.Web.Http.WebHost.dll
GOAL-23404	This build adds support for the File Open, File Save, and Print dialogs in Google Chrome and Microsoft Edge. For more information, see Automating dialogs in Chrome and Edge.	OpenSpan.Events.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Virtual.Web.Interfaces.dll Pega.UIAutomation.dll Interop.UIAutomationClient.dll StandardProperties.xml OpenSpan.Virtual.Web.Interfaces.tlb OpenSpan.Virtual.Interfaces.delegates.tlb

Note: The Pega Chrome and Edge extensions were updated to version 1.0.115 with the inclusion of this support.

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.24.2101
- Pega RPA Service 3.1.22.0
- Pega Synchronization Server 3.1.18.0
- Pega Synchronization Engine 3.1.19.0
- Pega Package Server and Server Status 3.1.5.0

Item number	Description	Assemblies
	Build 19.1.97.0 — December 08, 2021	
BUG-681390	This build adds the DpiAwareness key to the advanced configuration settings for the adapter. Use this key to resolve display scaling issues that can cause problems with .NET applications. For more information, contact Pega Support.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
BUG-680021	This build corrects a problem that could prevent matching when rematch is called in an automation that uses the Universal Web Adapter to automate Microsoft Edge running in Internet Explorer compatibility mode.	OpenSpan.Adapters.dll
BUG-651019	This build modifies the system to only initiate the Standard Widget Toolkit (SWT) and JavaFx support after the required toolkits and modules are loaded.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaBroker.class OpenSpanSWTBroker.class
US-441431	This build updates the Robot Studio and Robot Runtime installers to install the latest, provisioned RDA certificate. This certificate expires on 10/1/2022.	localruntime.pega.com.pfx cert_identification_use.txt OpenSpanRuntimeEntSetup.aip OpenSpanStudioVsxIsolatedSetup.aip OpenSpanStudioVsxSetup.aip
EPIC-70226	This build adds the ability to select multiple rows in a Siebel List control.	OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Siebel.Design.dll OpenSpan.Translators.Siebel.SiebelCommon.x32.dll OpenSpan.Translators.Siebel.SiebelCommon.x64.dll
EPIC-70218	This build adds support for a custom tree control.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Windows.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Adapters.TeamCenterMockup.dll OpenSpan.Adapters.TeamCenterMockup.Design.dll OpenSpan.Translators.TeamCenterMockup.x64.dll
ISSUE-96760	This build corrects a multi-project deployment issue that was introduced in build 19.1.95 (ISSUE-95976).	OpenSpan.dll OpenSpan.MPF.dll Pega.Xray.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Interactions.dll OpenSpan.Office.dll OpenSpan.Pdf.PdfConnector.dll OpenSpan.Pdf.PdfControl.dll OpenSpan.v35.Shared.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.24.2101 • Pega RPA Service 3.1.22.0 • Pega Synchronization Server 3.1.18.0 • Pega Synchronization Engine 3.1.19.0 • Pega Package Server and Server Status 3.1.5.0	
	Build 19.1.96.0	
	The changes in this build were released in build 19.1.97.0.	
	Build 19.1.95.0 — November 17, 2021	
	Note: The changes in this build are available in build 19.1.97. This build has been removed from Digital Delivery due to a bug related to ISSUE-95976. Please install build 19.1.97 or later.	
BUG-674125	This build resolves an issue that affected UI Connectors when you used them in multi-project solutions.	OpenSpan.Runtime.Core.dll OpenSpan.ExpressTranslators.dll
EPIC-71818	This build lets you use the new Replace usages wizard to quickly update all instances of an adapter control within a solution to a control from a different adapter. You can use the Replace usages wizard to assist in migrating web adapter (Microsoft Internet Explorer) automations to Universal web adapter (Microsoft Edge) automations. For more information, see Replacing controls in automations. **Note:** See also the Pega Community Events: Microsoft is Changing the Browser Game - Are You Ready? webinar.	OpenSpan.Automation.dll OpenSpan.Design.dll OpenSpan.IDE.dll OpenSpan.dll
ISSUE-95656	This build resolves an issue with the Toolbox displaying properly. The issue could occur after a Toast notification, when testing a method from the interrogation form.	OpenSpan.dll
ISSUE-95976	This build resolves an issue that could cause a solution to fail if you referenced a third-party DLL file in the solution.	OpenSpan.dll
	The Robot Runtime distribution for this build includes the following products:	

Item number	Description	Assemblies
	Pega Native Foundation 10.1.24.2101 Pega RPA Service 3.1.22.0 Pega Synchronization Server 3.1.18.0 Pega Synchronization Engine 3.1.19.0 Pega Package Server and Server Status 3.1.5.0	
Build 19.1.94.0 — October 27, 2021		
GOAL-23461	This build adds support for Oracle Forms 6.	OpenSpan.Adapters.OracleForms6.dll OpenSpan.Adapters.OracleForms6.Design.dll OpenSpan.Translators.OracleForms6.x32.dll
	The Robot Runtime distribution for this build includes the following products: Pega Native Foundation 10.1.24.2101 Pega RPA Service 3.1.22.0 * Pega Synchronization Server 3.1.18.0 Pega Synchronization Engine 3.1.19.0 * Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
Build 19.1.93.0 — October 21, 2021		
BUG-672882	Ensures that the Application Bar reserves the correct amount of space for the Application Bar window.	OpenSpan.dll
EPIC-69668	To enhance security, this build resolves some potential vulnerabilities and updates some assemblies to target .NET 4.6.1. **Note:** This Epic updates the TargetFrameworkVersion setting for robotic solutions within the OS project file. When you open a project in 19.1.93 or later, Robot Studio prompts you to make a one-way upgrade if you created that project in 19.1.92 or earlier.	These security-related changes modified many assemblies. For more information, see Modified assemblies in 19.1 addendum.
	The Robot Runtime distribution for this build includes the following products: Pega Native Foundation 10.1.24.2101 Pega RPA Service 3.1.21.0 Pega Synchronization Server 3.1.18.0 Pega Synchronization Engine 3.1.18.0 Pega Package Server and Server Status 3.1.5.0	
Build 19.1.92.0 — October 07, 2021		
ISSUE-91459	This build adds support for JavaFX in Java Runtime Environment (JRE) versions 9, 10, and 11. After you install this build, add the following arguments in the Arguments property of the JavaFX adapter: --add-opens javafx.graphics/com.sun.javafx.stage=ALL-UNNAMED --add-opens javafx.graphics/com.sun.javafx.tk=ALL-UNNAMED --add-opens javafx.graphics/com.sun.javafx.tk.quantum=ALL-UNNAMED --add-opens javafx.graphics/com.sun.glass.ui=ALL-UNNAME	OpenSpanJavaBroker.class OpenSpanJavaFxBroker.class OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
ISSUE-94148	This build corrects an issue that could hide some Universal Web Adapter properties, methods, and events.	OpenSpan.Adapters.Web.Universal.dll
BUG-664852	This build adds failure log trace messages when the messaging host fails to send control-created messages to Robot Runtime or Robot Studio.	OpenSpan.Adapters.Web.Universal.dll
BUG-656627	This build ensures that the Java translator module can find the necessary files in a self-hosting Robot Runtime implementation.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
BUG-667755	This build resolves an issue that could prevent Robot Runtime from loading the project if it could not connect to Robot Manager.	OpenSpan.Server.Client.dll
GOAL-22855	This build adds support for interrogating QuickBooks Premier Accountant grids. You can now use the typical grid-related properties, methods, and events, such as ColumnCount, DataTable, RowCount, GridCellClicked, ClickCell (all ClickCell methods with various arguments), GetCellValue (all methods), SetCellValue (all methods), and WaitForCreate.	OpenSpan.Adapters.QuickBooks.dll OpenSpan.Adapters.QuickBooks.Design.dll OpenSpan.Translators.QuickBooks.x32.dll
EPIC-70679	This build adds support for interrogating and automating IBM OnDemand version 10.5.0.2. **Note:** This change also modified the header in all OpenSpan Translator DLL files.	OpenSpan.Translators.IBM.ArsGui32.x32.dll OpenSpan.Translators.IBM.ArsGui32.x64.dll
	The Robot Runtime distribution for this build includes the following products: Pega Native Foundation 10.1.24.2101 * Pega RPA Service 3.1.21.0 *	

Item number	Description	Assemblies
	• Pega Synchronization Server 3.1.18.0 * • Pega Synchronization Engine 3.1.18.0 * • Pega Package Server and Server Status 3.1.5.0 * Updated in this build.	
Build 19.1.91.0 — September 16, 2021		
BUG-653526	This build improves security during the installation process.	OpenSpanRuntimeEntSetup.aip
ISSUE-92978	This build adds the GetWindowName method, which you can use when interrogating a Prof-UIS menu bar.	OpenSpan.Translators.ProfUIS.x32.dll
US-436556	This build removes some unnecessary assemblies from the installer.	OpenSpanRuntimeEntSetup.aip
US-434985	This build updates the installer and improves the installation experience.	OpenSpanRuntimeEntSetup.aip OpenSpanStudioVsxIsolatedSetup.aip OpenSpanStudioVsxSetup.aip
US-434009	To enhance security, this build updates the CefSharp.dll file (used for Citrix web navigation) to version 92.0.25.	libEGL.dll libGLESv2.dll
US-434052 US-434067 US-434093 US-434094	To enhance security, this build updates the following files: • log4net.dll to version 2.0.12 • Newtonsoft Json.NET framework to version 13.0 This build also removes the SharpZipLib from OSDump and the OpenSpan.Interactions RoboticsService and replaces this component with native .NET calls.	These security-related changes modified many assemblies. For more information, see Modified assemblies in 19.1 addendum.
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.23.2101 • Pega RPA Service 3.1.20.0 * • Pega Synchronization Engine 3.1.17.0 • Pega Package Server and Server Status 3.1.5.0 * * Updated in this build.	
Build 19.1.90.0 — September 01, 2021		
BUG-666733	This build adds the SetPropertyDescriptor method, which you can use to set the property descriptor value, even when the screen is locked. For more information, see Universal Web adapter properties, methods, and events. This build also adds the OnInput event to the RaiseEvent method.	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Virtual.Web.Interfaces.dll lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
BUG-661467	This build corrects a problem that could prevent Robot Runtime from loading when you used a SQL query component with a Citrix Context, This build updates the Chrome, Edge, and Firefox extensions to avoid an interrogation error that could occur if the webpage has overwritten console logging.	OpenSpan.Runtime.Core.dll
BUG-666949		lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
ISSUE-93664	**Note:** The Pega Chrome, Edge, and Firefox extensions were updated to version 1.0.114 with the inclusion of this fix. This build fixes benign errors that would show in the log for Java.	IJavaNativeObject.class OpenSpanJavaObjectWrapper.class
ISSUE-91893	This build fixes an issue caused by a corrupt TargetFactoryConfigurationCache.xml file that prevented Robot Studio from loading an adapter.	OpenSpan.Adapters.Design.dll
GOAL-23467	This build adds support for a custom AfxWnd120 grid control so you can retrieve text and select check boxes by the column/row within the grid.	OpenSpan.Adapters.CRIF.dll OpenSpan.Translators.CRIF.DFileMan.x32.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.23.2101 • Pega RPA Service 3.1.19.0 • Pega Synchronization Engine 3.1.17.0 • Pega Package Server and Server Status 3.1.4.0	
Build 19.1.89.0 — August 20, 2021		

Item number	Description	Assemblies
BUG-661877	This build corrects a problem that occurred when you highlighted Universal Web Adapter controls while interrogating and the Microsoft Windows Make text bigger option was larger than 100%.	OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Windows.dll
BUG-665104	This build corrects an indexing issue that affected the ReplaceTableAutoKey method.	OpenSpan.Controls.dll
BUG-660434	This build improves how the system recognizes and handles tables in PDF files.	OpenSpan.Pdf.PdfConnector.dll
ISSUE-92939	This build corrects a problem that could cause Robot Studio to crash when you disable X-ray Vision.	Pega.Xray.Design.dll
ISSUE-90386	This build corrects an issue that could cause unnecessary adapter modifications when you enable X-ray Vision.	OpenSpan.Adapters.dll
GOAL-23216	This build adds a translator that you can use to interrogate and automate custom list-box controls developed for the Rocket LegaSuite Web application.	OpenSpan.Adapters.LegaSuite.Design.dll OpenSpan.Adapters.LegaSuite.dll OpenSpan.Translators.LegaSuite.x32.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.23.2101
- Pega RPA Service 3.1.19.0 *
- Pega Synchronization Engine 3.1.17.0
- Pega Package Server and Server Status 3.1.4.0

* Updated in this build.

Build 19.1.88.0 — July 22, 2021

This build resolves an issue that prevented Robot Studio from interrogating XML document elements as HTML controls when using the Google Chrome browser.

BUG-651102		OpenSpan.Adapters.Web.WebBase.dll lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
BUG-658647	**Note:** The Pega Chrome and Edge extensions were updated to version 1.0.112 with the inclusion of this fix. This build updates the IBM OnDemand translator to support version 10.5.0.1.	OpenSpan.Translators.IBM.ArsGui32.x32.dll OpenSpan.Translators.IBM.ArsGui32.x64.dll
BUG-655370	This build resolves a timing issue that could occur when Robot Runtime attempts to initially inject into a Windows application.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.23.2101 *
- Pega RPA Service 3.1.17.0
- Pega Synchronization Engine 3.1.17.0
- Pega Package Server and Server Status 3.1.4.0

* Updated in this build.

Build 19.1.87.0 — July 7, 2021

ISSUE-83151	This build prevents HTML documents that are excluded from the accepted domains list from being processed by the Universal Web Adapter.	OpenSpan.Adapters.Web.WebBase.dll
BUG-653184	This build adds support for version 11 of the Java Runtime Environment (JRE) for the Standard Widget Toolkit (SWT) and JavaFX.	OpenSpanJavaBroker.class
BUG-659642	This build restores a fix that avoids installation failure due to a security restriction for Microsoft PowerShell.	OpenSpanStudioVsxIsolatedSetup.aip OpenSpanStudioVsxSetup.aip
BUG-639739	This build corrects an issue with the PDF Connector randomly returning incorrect values from optical marks (check boxes).	OpenSpan.Pdf.PdfConnector.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.22.2004
- Pega RPA Service 3.1.17.0
- Pega Synchronization Engine 3.1.17.0
- Pega Package Server and Server Status 3.1.4.0

Build 19.1.86.0 — June 25, 2021

BUG-649508	This build corrects an issue preventing the StartMyDayCompleted event from executing after StartMyDay completes, when initiated from Pega Platform.	OpenSpan.ApplicationFramework.dll
BUG-653223	This build fixes an issue with the PdfiumViewer.dll file failing to load for the PDFConnector, for environment configurations that use the Pega Synchronization Server.	PdfiumViewer.dll

Item number	Description	Assemblies
BUG-655052	This build corrects an issue with supported Facets controls producing exceptions during interrogation.	OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll
ISSUE-85783	This build introduces support for web pages run in compatibility mode with Microsoft Edge, for interrogation and automation using the Universal Web Adapter.	OpenSpan.Adapters.Web.dll
EPIC-66452	For more information, see Microsoft Edge (Chromium) Support in Pega Robotic Automation.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi OpenSpan.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Text.Design.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Design.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Windows.Design.dll OpenSpan.Runtime.Core.dll OpenSpan.Studio.dll OpenSpan.Transform.dll OpenSpan.Virtual.Web.Interfaces.dll OpenSpan.WebExtensionInstaller.exe Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll Pega.Xray.Design.dll

Note: The Pega Chrome and Edge extensions were updated to version 1.0.111 with the inclusion of this fix.

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.22.2004
- Pega RPA Service 3.1.17.0
- Pega Synchronization Engine 3.1.17.0
- Pega Package Server and Server Status 3.1.4.0

Build 19.1.85.0 — June 9, 2021

BUG-634191	This build corrects an issue where Robot Runtime could fail to receive context variable event changes when using multiple interactions and one of the interactions is closed prior to others.	OpenSpan.dll
BUG-650866	This build corrects an issue where an OnDemand application could issue an exception upon interrogation.	OpenSpan.Translators.IBM.ArsGui32.x32.dll OpenSpan.Translators.IBM.ArsGui32.x64.dll
GOAL-23006	This build adds support for a custom grid in an AFX application to be automated.	OpenSpan.Adapters.CRIF.dll OpenSpan.Translators.CRIF.AppMan.x32.dll OpenSpan.Translators.CRIF.OpsMan.x32.dll
EPIC-58724	This build moves Oracle's Siebel to the new Virtual IPC mechanism.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.SiebelOpenUI.Interfaces.dll OpenSpan.Translators.Siebel.SiebelCommon.x32.dll OpenSpan.Translators.Siebel.SiebelCommon.x64.dll
BUG-639960	This build corrects an issue where a WPF application could crash when opening a new window from the main window.	OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.Broker.dll

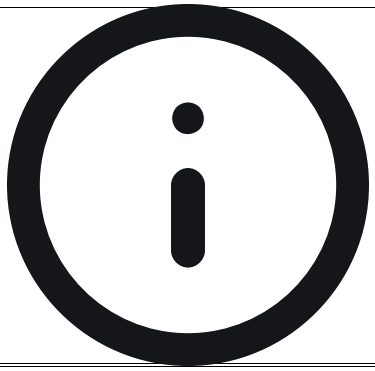
The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.22.2004
- Pega RPA Service 3.1.17.0 *
- Pega Synchronization Engine 3.1.17.0
- Pega Package Server and Server Status 3.1.4.0

* Updated in this build.

Build 19.1.84.0 — May 28, 2021

BUG-625495	This build corrects an issue where a customer's application could lock up when Pega sets the text in a Toolstrip field. The resolution was to set the text asynchronously so the customer's application could continue unimpeded.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.Virtual.dll Pega.Brokers.Platform.DotNet.v20.dll Pega.Brokers.Platform.DotNet.v40.dll
BUG-648388	This build resolves issue with caching events using the 64-bit Pega Robot Runtime.	OpenSpan.Events.dll System.Data.SQLite.dll x86\SQLite.Interop.dll x64\SQLite.Interop.dll
ISSUE-89816	This build ensures that OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe is always copied to the Robot Runtime cache folder.	None
EPIC-67811	This build updates the Facets translator to work with the Facets 5.70 release.	OpenSpan.Adapters.Facets.Design.dll OpenSpan.Adapters.Facets.dll OpenSpan.Adapters.Facets.Interfaces.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll OpenSpan.Adapters.Windows.dll OpenSpan.Translators.At000Win.x32.dll Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll OpenSpan.Translators.IBM.ArsGui32.x32.dll

Item number	Description	Assemblies
	This build updates the deprecated PowerBuilder Translator IPC to the supported Virtual IPC.	OpenSpan.Translators.IBM.ArsGui32.x64.dll OpenSpan.Translators.MFC.x32.dll OpenSpan.Translators.MFC.x64.dll
EPIC-58726		OpenSpan.Adapters.DataGrid.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll Pega.Translators.DotNet.v20.WindowsForms.dll Pega.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WPF.FocusPoint.dll Pega.Translators.DotNet.v40.WPF.FocusPoint.dll OpenSpan.Adapters.DotNet.WPF.FocusPoint.Design.dll OpenSpan.Translators.DotNet.v40.WPF.dll Pega.Translators.DotNet.v40.WPF.dll OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Adapters.InfragisticsOCX.dll OpenSpan.Adapters.PowerBuilder.dll OpsnSpan.Adapters.PowerBuilder.Design.dll OpenSpan.Adapters.PowerBuilder.Interfaces.dll OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll OpenSpan.Transform.dll
Note: This fix modifies the OS project structure (xslt), which requires updating the project. The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.22.2004 • Pega RPA Service 3.1.16.0 • Pega Synchronization Engine 3.1.17.0 • Pega Package Server and Server Status 3.1.4.0		
Build 19.1.83.0 — May 12, 2021		
BUG-634464	When retrieving fields using a RobotActivity or Case component in Robot Studio, this change allows you to review the URL and ensure that it is correct.	OpenSpan.Interactions.Controls.Design.dll OpenSpan.Interactions.dll
ISSUE-88750	This change ensures that the option to add a UI Connector appears when you right-click a virtual control.	OpenSpan.Adapters.Design.dll
GOAL-22659	This change adds support for label controls in grids in Baan applications.	OpenSpan.Adapters.Baan.Design.dll OpenSpan.Adapters.Baan.dll OpenSpan.Translators.Baan.x32.dll
ISSUE-88064	This change ensures that X-ray Vision correctly processes Windows Presentation Format (WPF) controls that are inside a Windows Forms application.	Pega.Brokers.Platform.DotNet.v20.dll Pega.Brokers.Platform.DotNet.v40.dll Pega.Brokers.Framework.DotNetWpf.v20.dll Pega.Brokers.Framework.DotNetWpf.v40.dll Pega.Brokers.Framework.DotNetWinForms.v20.dll Pega.Brokers.Framework.DotNetWinForms.v40.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.22.2004 • Pega RPA Service 3.1.16.0 • Pega Synchronization Engine 3.1.17.0 • Pega Package Server and Server Status 3.1.4.0		
Build 19.1.82.0 — April 30, 2021		
BUG-641325	This build corrects an issue where Pega Robot Runtime could fail to load the OpenSpan.Winhllapi.x32.dll for a Text Adapter when being hosted in a third-party application.	Pega.Winhllapi.Interop.dll
BUG-595249	This build fixes an issue where a Robot Runtime thread could hang while attempting to match an Internet Explorer page, causing controls to not match.	OpenSpan.Adapters.Windows.dll
BUG-645801	This build copies the assemblies Newtonsoft.Json.dll and OpenSpan.Connectors.Citrix.dll to the WebInterfaceNavigation folder, ensuring that these assemblies can be resolved correctly when using an external configuration file for a Citrix context.	Newtonsoft.Json.dll OpenSpan.Connectors.Citrix.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.22.2004 • Pega RPA Service 3.1.16.0 • Pega Synchronization Engine 3.1.17.0 • Pega Package Server and Server Status 3.1.4.0		
Build 19.1.81.0 — April 15, 2021		
BUG-642436	This build addresses an issue where the OpenSpan.WinHllapi.x32.dll could fail to load when running the solution in Pega Robot Runtime with the Pega Synchronization Engine.	OpenSpan.Controls.dll

Item number	Description	Assemblies
BUG-621202	This build changes the way the PerformClick method is invoked on an Oracle Text component so that special privileges are not required.	OpenSpanJavaAwtComponentWrapper.class OpenSpanOracleEwtTextComponentTranslator.class
BUG-642074	This build adds some options and screens that were missing when selecting to enable Robot Manager through the installation wizard.	OpenSpanRuntimeEntSetup.aip OpenSpanStudioVsxIsolatedSetup.aip OpenSpanStudioVsxSetup.aip
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.22.2004 • Pega RPA Service 3.1.16.0 • Pega Synchronization Engine 3.1.17.0 • Pega Package Server and Server Status 3.1.4.0		
Build 19.1.80.0		
	The changes in this build were released in build 19.1.81.0.	
Build 19.1.79.0 — April 1, 2021		
BUG-633471	This build corrects a potential error when adding a new Property Match Rule in a Universal Web Adapter, within some JavaScript frameworks. **Note:** The Pega Chrome and Edge extensions were updated to version 1.0.110 with the inclusion of this fix.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
BUG-631404	This build detects a PDF page that has a 90-degree rotation and repositions the characters appropriately.	OpenSpan.Pdf.PdfConnector.dll
BUG-632281	This build prevents tab characters in XML documents from being interpreted as space characters when loading solution files into Pega Robot Studio.	OpenSpan.dll
BUG-626839	This build prevents Studio from becoming non-responsive when interrogating a multi-list select element.	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.dll
BUG-604115	This build corrects an issue with the Cisco IP Communicator application. Upon transfer of a call, the call details (ANI / Caller Name) contained in the text were not updating correctly.	OpenSpan.Translators.CIPCommunicator.x32.dll
EPIC-66271	This build corrects an issue with using the DoubleClick method for an MFC TreeView control.	OpenSpan.Adapters.NiSource.dll OpenSpan.Translators.NiSource.KipCzCnr.x32.dll OpenSpan.Translators.NiSource.KipCzNb.x32.dll OpenSpan.Adapters.dll
GOAL-22471	This build adds support for an EVNSYS custom-application grid.	OpenSpan.Adapters.CRIF.Design.dll OpenSpan.Adapters.CRIF.dll OpenSpan.Adapters.CRIF.Interfaces.dll OpenSpan.Translators.CRIF.AppMan.x32.dll OpenSpan.Translators.Clarify.x32.dll OpenSpan.Translators.AWD.x32.dll OpenSpan.Translators.CSG.x32.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll OpenSpan.Translators.Farpoint.Spread25.x32.dll OpenSpan.Translators.Farpoint.Spread80.x32.dll OpenSpan.Translators.Farpoint.Spread30.x32.dll OpenSpan.Translators.Farpoint.Spread70.x32.dll OpenSpan.Translators.MFC.x32.dll OpenSpan.Translators.MFC.x64.dll OpenSpan.Translators.MSGridControl.x32.dll OpenSpan.Translators.MSCommonControls5.x64.dll OpenSpan.Translators.MSCommonControls5.x32.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.Siebel6.SscfUi.x32.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.22.2004 • Pega RPA Service 3.1.16.0 • Pega Synchronization Engine 3.1.17.0 • Pega Package Server and Server Status 3.1.4.0		
Build 19.1.78.0		
	The changes in this build were released in build 19.1.79.0.	
Build 19.1.77.0 — March 17, 2021		

Item number	Description	Assemblies
US-405032	This build removes the option to install Pega Robotic Automation Deployment Portal (formerly OpenSpan Management Console). This functionality is now handled by Robot Manager.	PegaRobotRuntimeSetup.exe PegaRobotStudioSetup.exe PegaRobotStudioPluginSetup.exe
EPIC-65129	This build adds a refresh capability to Desktop Analytics Config (DAC) settings, to enable refreshing DAC without restarting Robot Runtime.	OpenSpan.dll OpenSpan.Events.dll OpenSpan.Runtime.Analytics.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.22.2004
- Pega RPA Service 3.1.16.0
- Pega Synchronization Engine 3.1.17.0 *
- Pega Package Server and Server Status 3.1.4.0 *

* Updated in this build.

Build 19.1.76.0 — February 22, 2021

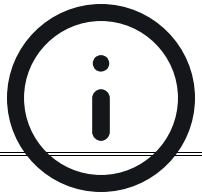
BUG-618149	This build corrects an issue where Robot Runtime could crash with an unhandled exception with HighLevelEvents enabled when handling a window without an accessible URL.	OpenSpan.Events.dll
BUG-621973 BUG-622012 BUG-622743 BUG-626467	This build adds additional error checking and logic when a document or window has been altered by a web application.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
EPIC-58056	**Note:** The Pega Chrome and Edge extensions were updated to version 1.0.109 with the inclusion of this fix. This build adds support for ActiveX applications with UI Connectors. There are known limitations for ActiveX UI Connectors: • The CreateInstance() method, supported in both .NET and Java, is not supported. • ActiveX controls with existing translators have priority. UI Connectors cannot be used in place of these translators. If an ActiveX control interrogates as a specific object type, then UI Connectors cannot be used. If a control interrogates as a generic object type, then it is a candidate for UI Connectors. For more information, see Creating UI Connectors.	OpenSpan.Automation.dll OpenSpan.Design.dll OpenSpan.Studio.dll OpenSpan.Adapters.DataGrid.dll OpenSpan.Adapters.DataGrid.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Windows.Design.dll OpenSpan.ExpressTranslators.dll OpenSpan.ExpressTranslators.Design.dll Pega.Native.Remoting.x32.dll Pega.Native.Remoting.x64.dll Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.Siebel.SiebelCommon.x32.dll OpenSpan.Adapters.ActiveX.dll OpenSpan.Adapters.ActiveX.Design.dll Pega.ActiveX.x32.dll Pega.ActiveX.x64.dll OpenSpan.Translators.ComponentOne.Todg7.x32.dll OpenSpan.Translators.ComponentOne.VSFlexGrid8.x32.dll OpenSpan.Translators.VideoSoft.VSFlexGrid7.x32.dll OpenSpan.Translators.CrescentText.x32.dll OpenSpan.Translators.CSG.x32.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Schemas.dll OpenSpan.Translators.Endsleigh.EGBasicCtls.x32.dll OpenSpan.Translators.Endsleigh.EGCompoundCtls.x32.dll OpenSpan.Translators.Endsleigh.EGRankingCtls.x32.dll
US-401581	This build enables the Robot Manager server package downloader to support solutions with multiple projects and multiple configuration files.	OpenSpan.Server.Client.dll
US-402365	This build enables the Local API runtime service for RDA to support large messages in the response content.	OpenSpan.Runtime.Core.dll
US-400724	This build removes .NET 3.5 SP1 as a prerequisite for installation.	PegaRobotRuntimeSetup.exe PegaRobotStudioSetup.exe PegaRobotStudioPluginSetup.exe
US-404212	This build makes Microsoft Visual C++ 2012 Redistributables an optional prerequisite for installation.	PegaRobotRuntimeSetup.exe PegaRobotStudioSetup.exe PegaRobotStudioPluginSetup.exe

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.22.2004*
- Pega RPA Service 3.1.16.0
- Pega Synchronization Engine 3.1.16.0
- Pega Package Server and Server Status 3.1.3.0

* Updated in this build.

Build 19.1.75.0 — February 10, 2021

Item number	Description	Assemblies
BUG-618642	This build adds additional error checking to prevent SAP from crashing while interrogating a Grid control.	OpenSpan.Translators.SAP.x32.dll
US-401578	This build ensures that the command line log in the Runtime application records a masked value for passwords.	OpenSpan.dll OpenSpan.Runtime.Core.dll OpenSpan.Connectors.Citrix.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.21.2004* • Pega RPA Service 3.1.16.0 • Pega Synchronization Engine 3.1.16.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.74.0	
	The changes in this build were released in build 19.1.75.0.	
	Build 19.1.73.0 — January 25, 2021	
BUG-586670	This build corrects an issue where Internet Explorer could not load a webpage while responding to a COM request for the source of a document.	OpenSpan.Adapters.Web.dll
ISSUE-78688	This build fixes a problem with not all UI Connector JSON files being updated.	Not applicable
EPIC-66178	This build introduces the new X-ray Vision feature. X-ray Vision is a new way of identifying controls that, when enabled, replaces the adding and configuring of match rules. The X-ray Vision Engine automatically adds a PegaId match rule that you don't need to configure or modify. This feature is for Windows Formss and WPF applications, starting in Build 19.1.73. For more information, see Using X-ray Vision in Pega Robotic Automation. 	X-ray Vision requires many new assemblies, as well as changes to existing assemblies. Click here to see a list of new and changed assemblies.
GOAL-22231	**Note:** Pega Robotic Automation 19.1.73 requires PNF 10.1.20.2004 and Pega Sync Engine 3.1.16. This build adds basic support for the Java Standard Widget Toolkit (SWT), in addition to support for some custom SWT-based tree controls.	OpenSpan.Adapters.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Translators.Java.Agent.x32.dll OpenSpan.Translators.Java.Agent.x64.dll OpenSpanJavaBroker.class OpenSpanJavaFxBroker.class OpenSpanJavaModel.class OpenSpanJavaObjectWrapper.class ISWTBroker.class
GOAL-22612	This build adds support for JavaFX UI Connectors.	OpenSpanJavaAwtComponentWrapper.class OpenSpanJavaBroker.class OpenSpanJavaFxNodeTranslatorFx.class OpenSpanJavaUICHelper.class TypePrototypeSlim.class
GOAL-22405	This build adds the ability to select one or more items from a custom List control. 	OpenSpan.Adapters.TvData.dll OpenSpan.Adapters.TvData.Design.dll OpenSpan.Translators.TvData.x64.dll
US-399744	**Note:** This build has a dependency with PNF 10.1.20.2004. This build corrects an issue with improperly sorted Enum values displaying in automation blocks.	OpenSpan.Automation.Design.dll
US-399277	This build adds a ValueChanged event for all variables. This event reports both old and new values.	Pega.Controls.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.20.2004 * • Pega RPA Service 3.1.16.0 * • Pega Synchronization Engine 3.1.16.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.72.0	

Item number	Description	Assemblies
	The changes in this build were released in build 19.1.73.0.	
Build 19.1.71.0 — December 24, 2020		
BUG-608725	This build prevents the SMTP component from initiating authentication when no credentials are specified.	OpenSpan.Controls.dll
US-372041	This build ensures the correct ObjectListView 3rd-party assembly is called. The ObjectListView 3rd-party assembly was updated from 2.8.1 to the latest 2.9.1.	ObjectListView.dll
BUG-615004	This build updates the base install to contain all the base Office support, and the cache folder to contain the most recent modified Office support DLL.	OpenSpan.ConsoleTestRunner.exe OpenSpan.Runtime.exe OpenSpan.Runtime.Host.dll OpenSpan.Runtime64.exe Openspan.Studio.dll OpenSpan.TestRunner.exe OpenSpan.EventHost.exe Pega.ConsoleTestRunner.exe Pega.PackageDownloader.exe Pega.TestRunner.exe
EPIC-66173	This build adds support to allow the user to click on the radio button in the JavaFX List View control items.	OpenSpanJavaFxListViewTranslatorFx.class
EPIC-66174	This build adds the ability to select check boxes in the JavaFX TreeView control.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaBroker.class OpenSpanJavaFxTreeViewTranslatorFx.class
EPIC-66175	This build adds the ability to close JavaFX tab panes.	OpenSpanJavaFxTabPaneHelperTranslatorFx.class
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.19.2004 • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.16.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.70.0 — December 11, 2020		
BUG-603726	This build corrects an issue where some windows were misidentified as top-level windows, making interaction difficult.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
BUG-603280	This build corrects an issue where pages could not be interrogated due to a custom dispatch event function.	OpenSpan.Translators.Web.MessagingHost.exe lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
BUG-603397	**Note:** The Pega Chrome and Edge extensions were updated to version 1.0.108 with the latest version of this fix. This build removes a limitation on the custom arguments that is passed to Citrix Server to start Runtime.	OpenSpan.Connectors.Citrix.dll
ISSUE-84176	This build addresses an incorrectly marked client data store.	OpenSpan.Security.dll
ISSUE-84185	This build addresses an issue with a WindowsForms control being disposed before processing.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
US-394795	This build corrects an issue where automation blocks that contain a plus button, such as an Entry point, would move when the automation was reopened.	OpenSpan.Automation.Design.dll
EPIC-64604	This build adds support for Microsoft Edge Chromium, version 87.0.664.52 and later. This support does not include pages running in compatibility mode. For more information, see Microsoft Edge (Chromium) Support.	OpenSpan.WebExtensionInstaller OpenSpan.Adapters.Web.Universal OpenSpan.Translators.Web.MessagingHost
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.19.2004 • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.16.0 • Pega Package Server and Server Status 3.1.3.0		

Item number	Description	Assemblies
	Build 19.1.69.0 — November 25, 2020	
BUG-592271	This build updates the Pega Chrome extension to correct an issue where certain webpages in Google Chrome could not be interrogated.  **Note:** The Pega Chrome extension was updated to version 1.0.107 with the inclusion of this fix.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
US-389264	This build prepares the way for the X-ray vision feature, by calling a command-line executable as a Sync System Pre-Load action to register X-ray .DLL files and install X-ray in the Global Assembly Cache.	Pega.RegisterXRayDlls.exe productsystem.manifest
BUG-600122	This build prevents an issue between matching and automation threads that could cause Internet Explorer to not close when you stop the Web Adapter.	OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Web.dll
US-392688	This build ensures that the encryption method is changed to base64 encoding and made backwards compatible, to enable encryption for DateTime, Integer, Font, and RichText variables. This change prevents these variables from producing an invalid XML that can fail to reopen the automation, throwing an exception.	OpenSpan.dll Pega.Controls.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.19.2004 * • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.16.0 * • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.68.0	
	The changes in this build were released in build 19.1.69.0.	
	Build 19.1.67.0 — November 17, 2020	
BUG-595761	This build corrects a problem that could cause Electron applications to display a Failure To Find Module Function error when integrating Pega Robotic Automation into the Electron applications.	Pega.Translators.Web.Electron.x32.dll Pega.Translators.Web.Electron.x64.dll
BUG-604104	This build corrects a matching problem that could occur when you interrogate Microsoft Internet Explorer 8.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
BUG-605372	This build modifies the way Robot Manager retrieves credentials when you use Kerberos or single sign-on to avoid a PackageDownloader crash.	OpenSpan.Runtime.Core.dll Pega.PackageDownloader.exe
EPIC-66029	This build corrects several SAP issues that were found during internal testing.	OpenSpan.Translators.MFC.x32.dll OpenSpan.Translators.MFC.x64.dll OpenSpan.Translators.SAP.x32.dll
GOAL-22365	This build adds support for selecting items from a combo box that is attached to a Search field in Salesforce Lightning. 	OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Virtual.Web.Interfaces.dll OpenSpan.Adapters.Web.SalesForceLightning.dll OpenSpan.Virtual.Web.SalesForceLightning.Interfaces.dll OpenSpan.Translators.Web.MessagingHost.exe lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
EPIC-36933 BUG-596471	**Note:** The Pega Chrome extension was updated to version 1.0.104 with the inclusion of this fix. This build enables Robot Runtime to access custom application models. These models are used in Workforce Intelligence implementations to read screen data. For more information, see the Workforce Intelligence release notes.	OpenSpan.ApplicationFramework.dll OpenSpan.Events.dll OpenSpan.Server.Client.dll, OpenSpan.dll OpenSpan.Runtime.Analytics.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.18.2004 * • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.14.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.66.0 — October 30, 2020	
ISSUE-83656	This build resolves an issue that prevented the system from properly matching reparented, nested WindowsForms.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
	This build adds the ssoUserIdRule key to the RuntimeConfig.xml file. When your authentication	

Item number	Description	Assemblies
US-386515	method is Kerberos, use this key to specify the Universal Principle Name (UPN) based on the Kerberos server. For example, when your authentication method is Kerberos, publishing to Robot Manager sends the user ID that you specified in the ssoUserIdRule key in the RuntimeConfig.xml file.	OpenSpan.Server.Client.dll OpenSpan.dll
BUG-599790	This build changes the Universal Web Adapter to only request the source of a webpage if you set logging to the Verbose log level.	OpenSpan.Adapters.Web.WebBase.dll
BUG-592173	This build improves the capacity to process very large PDF files, avoiding OutOfMemory exceptions.	OpenSpan.Automation.dll OpenSpan.DocumentOcr.dll OpenSpan.OCR.dll OpenSpan.Pdf.PdfConnector.dll
US-386513	This build removes from the StandardProperties.xml file all RaiseEvent entries that have no parameter entries.	StandardProperties.xml
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.17.2004 * • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.14.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.		
Build 19.1.65.0 — October 15, 2020		
BUG-596859	This build changes the system to now load the Infragistics translator when Infragistics assemblies that have no version information are detected.	OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.Broker.dll
US-381787	This build removes the ability to load XML entities from external sources.	OpenSpan.dll OpenSpan.Events.dll
US-36630 EPIC-63043	This build adds support for a grid control in the IBM Content Manager OnDemand application so you can retrieve the number of rows and double-click a row. The following methods are supported: • GetRowCount • GetColumnCount • GetColumnHeader • ClickCell • DoubleClickCell • GetCellValue	OpenSpan.Adapters.IBM.dll OpenSpan.Adapters.IBM.Design.dll OpenSpan.Translators.IBM.ArsGui32.x32.dll OpenSpan.Translators.IBM.ArsGui32.x64.dll
US-383233	This build ensures that Pega Robot Manager receives a robot's status. Robot Runtime now tries three times to send the Activate command. If all three attempts fail, Robot Runtime notes the failure in the log, signs off, and shuts down.	OpenSpan.Interactions.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.16.2004 • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.14.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.64.0 — October 01, 2020		
BUG-592158	This build ensures that the system does not add the context item when you press Esc while in the New Project Wizard.	OpenSpan.Studio.dll
BUG-592509	This build modifies the New Project Wizard so that it no longer logs an exception when you add an adapter after you delete an item.	OpenSpan.Studio.dll
BUG-588141	This build ensures that when the ReadyForRobotWork property is set to False for any project in an application, the application status is set to False in the Robot heartbeat payload.	OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll
BUG-591246	This build ensures that the MicrosoftExcel connector applies the DisplayAlert and AskToUpdateLinks properties before opening a workbook.	OpenSpan.Office.dll OpenSpan.Transform.dll
US-382753	This build adds instructions for the RobotManagerPackageServer key to comments in the RuntimeConfig.xml file. For additional information, see Runtime configuration settings.	RuntimeConfig.xml
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.16.2004 * • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.14.0 • Pega Package Server and Server Status 3.1.3.0		

Item number	Description	Assemblies
	* Updated in this build.	
	Build 19.1.63.0 — September 30, 2020	
US-367112	This build changes the system to always use the Equals method to compare strings.	OpenSpanJavaBroker.class
US-372175	This build disables the processing of Document Type Definitions (DTDs) to avoid the improper restriction of XML external entities.	OpenSpan.dll
EPIC-61913	This build provides an authentication solution for Pega Workforce Intelligence users who are migrating from the legacy Pega Deployment Portal product and want Runtime routes to continue to be authenticated. Runtime now authenticates with the WFI server to provide the security you need.	OpenSpan.ApplicationFramework.dll OpenSpan.Runtime.Analytics.dll OpenSpan.dll OpenSpan.Server.Client.dll
EPIC-63309	This build corrects the following issues: • Ensures that the Java translator releases allocated memory when applicable. • Ensures that the ActiveX Control Target Class Name string pointer is released when the control is destroyed. • Corrects a memory leak in the WindowsBroker. • Ensures that the JavaBroker releases event and message-processing handles when the process ends. • Ensures that the CEventCollection class properly handles a mutex failure. • Ensures that the NativeRemotingLeak Remoting Service releases internally allocated memory when appropriate. • Frees internal data structures when you create bitmaps (screen captures). • Ensures that the COpenSpanIUnknownWrapper CreateInstance method updates the pointer's reference counter when it returns a pointer. • Corrects issues that prevented translator-based brokers from being released and destroyed when appropriate.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll Pega.ActiveX.x32.dll Pega.ActiveX.x64.dll Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll Pega.Native.Remoting.x32.dll Pega.Native.Remoting.x64.dll OpenSpan.Translators.AWD.x32.dll
EPIC-63706	This build corrects a problem that prevented the PowerBuilder translator from performing a button click.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
GOAL-22247	This build adds support for Delphi Grid and List controls.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.15.2004 * • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.14.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	This build adds the ability to interrogate controls under the Shadow Document Object Models (DOMs) for Google Chrome and adds limited support for Salesforce Lightning data tables and combo boxes in Chrome. This build also adds the UnmatchOnZeroLocationAndSize property.	
	Build 19.1.62.0 — September 18, 2020	
GOAL-22149	When you automate Salesforce Lightning, if you want Robot Studio to unmatch a control when its size and location values are zero (0), set the UnmatchOnZeroLocationAndSize property to True. The default is False.	OpenSpan.Adapters.Web.SalesForceLightning OpenSpan.Adapters.Web.Universal OpenSpan.Adapters.Web.WebBase OpenSpan.Virtual.Web.Interfaces OpenSpan.Virtual.Web.SalesForceLightning.Interfaces OpenSpan.Translators.Web.MessagingHost.exe lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
BUG-595229	This build corrects a problem that prevented the Interaction Framework Activity from firing the ActivityCompleted event. **Note:** The Pega Chrome extension was updated to version 1.0.101 with the inclusion of this fix. This problem caused the current activity to remain in the InteractionManager queue and prevented the system from continuing to the next activity. The problem also prevented the StartAndWait method from relinquishing control.	OpenSpan.Interactions.Controls.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.14.2004 • Pega RPA Service 3.1.15.0 • Pega Synchronization Engine 3.1.14.0 • Pega Package Server and Server Status 3.1.3.0	
	Build 19.1.61.0 — September 14, 2020	
EPIC-62456 EPIC-63175 EPIC-	This build adds support for Pega Robot Manager 8.5 to Robot Studio and Robot Runtime. The support for Pega Robot Manager 8.5 updates the endpoints in all calls and adds Pega Package Server support, which allows Pega Robot Manager to function as a package server. This build includes a new log provider that is based on log4net. This log provider starts logging when a robot activity starts and stops logging when the system marks the robot activity as	RuntimeConfig.xml StudioConfig.xml OpenSpan.Server.Client.dll OpenSpan.dll OpenSpan.Events.dll

Item number	Description	Assemblies
62833	complete. The case result then includes the log as an attachment. For more information, see Pega Robot Manager.	OpenSpan.Interactions.Controls.Design.dll OpenSpan.Interactions.dll
US-365218	This build changes the system to validate command arguments and provide better overall security.	SignFile.dll OpenSpan.dll
ISSUE-81808	This build modifies the system so Robot Studio does not restore when you stop interrogating an application, provided the DisableAutoMinimize key in the AppSettings section of the StudioConfig.xml file is set to True.	OpenSpan.Adapters.dll
ISSUE-81497	This build corrects a problem that could cause Robot Studio to stop when you interrogate target applications.	OpenSpan.Adapters.Design.dll
US-356486	This build resolves an exception that could occur in the Infragistics WPF XamGrid translator.	OpenSpan.Translators.DotNet.v40.WPF.Infragistics.dll
US-377876	This build ensures that all automations and adapters added to the project are opened when you close the New Project Wizard. If you only added one item using the New Project Wizard, Robot Studio opens that item.	OpenSpan.Translators.DotNet.v40.WPF.Infragistics.dll
US-377877	This build ensures that you can open the project item form when you click the row of the project item, as well as when you click Add in the Project Item pane in the New Project Wizard.	OpenSpan.Studio.dll, Pega.WPF.Controls.dll
EPIC-62732	This build adds the ability to automate an Oracle Forms panel that is arranged as a table. Now you can interact with the VTextField items inside the panel as a LogicalGrid control.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Virtual.Interfaces.dll OpenSpanJavaBroker.class IJavaNativeScrollableControl.class IJavaNativeScrollablePanel.class OpenSpanOracleFormsUIDrawnPanelTranslator.class OpenSpanOracleFormsUIDrawnPanelWrapper.class OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Adapters.SAP.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Studio.dll Pega.WPF.Controls.dll
EPIC-63284	This build enhances LogicalGrid support to recognize background colors in the table cells and to allow you to scroll through the table and act upon the data that is added as you scroll.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Virtual.Interfaces.dll OpenSpanJavaBroker.class IJavaNativeScrollableControl.class IJavaNativeScrollablePanel.class OpenSpanOracleFormsUIDrawnPanelTranslator.class OpenSpanOracleFormsUIDrawnPanelWrapper.class OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Adapters.SAP.dll OpenSpan.Translators.SAP.x32.dll
EPIC-64721	This build adds the DisableAutoMinimize key to the AppSettings section of the StudioConfig.xml file. Enter True if you do not want Robot Studio to minimize when you start to interrogate an application. The default is False.	OpenSpan.Adapters.Design

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.14.2004
- Pega RPA Service 3.1.15.0 *
- Pega Synchronization Engine 3.1.14.0
- Pega Package Server and Server Status 3.1.3.0

* Updated in this build.

Build 19.1.58.0 — Build 19.1.60.0

	The changes in these builds were released in build 19.1.61.0.	

Build 19.1.57.0 — August 28, 2020

US-321657	This build corrects a problem that could prevent the system from selecting the correct version of the text adapter module.	OpenSpan.Adapters.Text.Host.dll

Item number	Description	Assemblies
EPIC-62730	This build adds the TextChanged event for Oracle Forms. This event occurs after you set text fields.	OpenSpanOracleEwtTextComponentTranslator.class
ISSUE-78855	This build prevents the DotNet Windows Forms translator from creating duplicate item translators.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll
ISSUE-80662	This build further enhances the system's ability to capture incoming phone call details from the Cisco CIP Communicator.	OpenSpan.Translators.CIPCommunicator.x32.dll
EPIC-64617	This build ensures that work items are directed to the correct automation when the automation project has multiple robot activities. If the robot activity that is mentioned in the work item is not used, the automation receives a DidNotComplete status.	OpenSpan.Interactions.Controls.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.14.2004
- Pega RPA Service 3.1.14.0
- Pega Synchronization Engine 3.1.14.0
- Pega Package Server and Server Status 3.1.3.0

Build 19.1.56.0 — August 20, 2020

BUG-575058	This build corrects an issue that could cause the ClickCell and ClickRow methods to select the wrong row if you enabled the Detail.Height.AutoSize property for the DataWindow.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
ISSUE-80533	This build corrects an issue that could cause Microsoft Internet Explorer to stop working when you open a new Internet Explorer window or tab.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
EPIC-62731	This build corrects an issue could prevent the SelectItem method from selecting the correct item.	OpenSpanOracleEwtLWDataSourceListTranslator.class

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.14.2004
- Pega RPA Service 3.1.14.0
- Pega Synchronization Engine 3.1.14.0
- Pega Package Server and Server Status 3.1.3.0

Build 19.1.55.0 — August 18, 2020

BUG-582485	This build corrects an issue that prevented the Pega Chrome extension from interrogating some webpages.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi

Note: The Pega Chrome extension was updated to version 1.0.97 with the inclusion of this fix.

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.14.2004
- Pega RPA Service 3.1.14.0
- Pega Synchronization Engine 3.1.14.0 *
- Pega Package Server and Server Status 3.1.3.0

* Updated in this build.

Build 19.1.54.0 — August 07, 2020

BUG-572971	This build adds the FlashAllowedDomains key to the CommonConfig.xml file. Use this key to list the domains that can automate Adobe Flash* applications. For more information, see Common configuration settings.	OpenSpan.Adapters.Windows.dll
BUG-573963	This build resolves an issue that could cause Pega Robot Studio to hang when reading factories on an adapter for the first time. * Adobe ended support for Adobe Flash on December 31, 2020. For more information, see Adobe Flash Player EOL General Information Page.	CommonConfig.xml OpenSpan.dll OpenSpan.Translators.Web.MessagingHost.exe Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
EPIC-63139	This build adds new variable components, which include methods that operate directly on the values contained in those variables. These new variables replace the variables previously in use on the Toolbox. This build also updates the String utils and Datetime utils to support the additional methods added to the String and Datetime variables. You can use Pega Robot Inspector to read values from and assign values to these variables.	Pega.RobotInspector.dll Pega.Controls.dll OpenSpan.Controls.dll OpenSpan.Automation.Design.dll OpenSpan.Design.dll PluginManifest.xml

Note: The Pega Chrome extension was updated to version 1.0.96 with the inclusion of this fix.

Item number	Description	Assemblies
EPIC-63203	This build updates the system to capture incoming phone call details from the Cisco CIP Communicator, such as Automatic Number Identification (ANI) and caller ID.	OpenSpan.Adapters.CIPCommunicator.Design.dll OpenSpan.Adapters.CIPCommunicator.dll OpenSpan.Translators.CIPCommunicator.x32.dll
EPIC-63049	This build modifies Robot Runtime to handle dynamically changing root class names. Robot Runtime uses the root class of an application to determine which application model to use.	Openspan.Events.dll
US-373208	This build ensures that the RobotActivity status, code, and message are reset before each robot runs.	OpenSpan.Automation.dll OpenSpan.Interactions.Controls.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.14.2004 • Pega RPA Service 3.1.14.0 • Pega Synchronization Engine 3.1.13.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.53.0		
	The changes in this build were released in build 19.1.54.0.	
Build 19.1.52.0 — August 03, 2020		
BUG-566935	This build adds the DriverInjectCheckOtherAdapters key to the advanced configuration settings for the adapter. Use this key to override the MonitorAll option and avoid a timeout that could break the connection to the Citrix server. For more information, contact Pega Support.	OpenSpan.Adapters.Windows.dll
EPIC-64026	This build ensures that the Robot Runtime immediately receives the STOP command, instead of waiting for the automations to complete.	OpenSpan.Interactions.dll
EPIC-64017	This build adds the userIdRule attribute to the PublishToServer section in the RuntimeConfig.xml file, which you can use to specify how Robot Runtime forms the UPN for the Pega Security Token Service (STS) server. You can set this attribute to the following values: • PartialUPN - Format the user ID as username@support. • FullUPN - Format the user ID as username@support.pega.com. • Username - Format the user ID as username. • OperatorId - Use the OperatorID when requested.	OpenSpan.dll OpenSpan.Server.Client.dll OpenSpan.Interactions.dll OpenSpan.Events.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.14.2004 * • Pega RPA Service 3.1.14.0 • Pega Synchronization Engine 3.1.13.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.		
Build 19.1.51.0 — July 23, 2020		
US-371625	This build adds .NET 4.7.2 and 4.8 to the list of recognized .NET versions in the TargetFrameworkConverter class to avoid exception messages.	openspan.dll
EPIC-63184	This build adds the PegaRPASimulatorSetup.zip file to the Extras folder for Robot Studio and the Robot Studio Plug-in. Use this simulator for training and for load testing a Robot Manager installation.	Not applicable
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.13.2004 • Pega RPA Service 3.1.14.0 • Pega Synchronization Engine 3.1.13.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.50.0 — July 17, 2020		
US-360856 US-360857	This build updates the Robot Studio and Robot Runtime installers to install the latest, provisioned RDA certificate. This certificate expires on 4/16/2022.	Not applicable
US-367978	This build updates the system to repel XML eXternal Entity (XXE) attacks from nefarious sources. The XML parser no longer tries to resolve external entities.	OpenSpan.dll

Item number	Description	Assemblies
US-365891	This build resolves a Vericode vulnerability.	OpenSpan.Adapters.Design.dll
BUG-554292	This build resolves a problem that could cause Microsoft Internet Explorer to crash when started.	OpenSpan.Adapters.Windows.dll Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll OpenSpan.Translators.Gupta.Tabli62.x32.dll OpenSpan.Translators.MSGridControl.x32.dll OpenSpan.Translators.Remedy.x32.dll OpenSpan.Translators.Remedy.x64.dll
US-370140	This build modifies the CredMgr.exe program to ensure that it includes the same functionality available from the CredMgr UI. The following changes were made: • The Robot index is no longer added if no robot index is passed. • Adds validation when you remove credential entries using the CredMgr.exe program. • Simplifies the requirements for removing entries.	OpenSpan.Security.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.13.2004 * • Pega RPA Service 3.1.14.0 * • Pega Synchronization Engine 3.1.13.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.		
Build 19.1.49.0 — July 06, 2020		
US-365382 US-361633	This build addresses a Vericode-identified potential rounding issue where a loss of precision could occur.	Pega.Native.Remoting.x32.dll Pega.Native.Remoting.x64.dll OpenSpan.Translators.Java.Profiler.x32.dll OpenSpan.Translators.Java.Profiler.x64.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.12.2004 * • Pega RPA Service 3.1.13.0 • Pega Synchronization Engine 3.1.13.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build. With this build, you can automate 32-bit applications when running the 64-bit version of Windows 10 version 2004.		
Build 19.1.48.0 — June 29, 2020		
BUG-559119	This build prevents handles from being leaked when you use the RetrieveEmails method with the Microsoft Outlook connector. The system now marks handles for release when the RetrieveEmails method is called.	OpenSpan.Office.dll
EPIC-62520	This build adds support High Level Events (HLEs) for the Microsoft Edge browser in Workforce Intelligence implementations.	OpenSpan.Events.dll
US-361556 US-361557	This build adds a note to the Robotic Desktop Automation (RDA) Integration page in the Setup wizard to tell you that a certificate is installed when you enable RDA integration. This certificate provides secure communications between Pega applications and Robot Runtime.	Not applicable
ISSUE-78023	This build prevents the Object Explorer hierarchy from breaking when an exception with a Java Swing MDI Child target occurs.	OpenSpan.Adapters.Virtual.dll
US-343390	This build prevents memory leaks in Windows Presentation Foundation (WPF) controls when those controls are hosted in Windows Forms in a WPF application.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
US-321658	This build ensures that the WinHLLAPIHost emulator loads the correct modules on startup.	Pega.WinHllapi.Interop.dll
EPIC-62773	This build changes the GetCellValue method to correctly extract text from the JavaFX HBox and StackPane formatting elements.	OpenSpanJavaFxTableViewTranslatorFx.class
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.11.1909 * • Pega RPA Service 3.1.13.0 • Pega Synchronization Engine 3.1.13.0 * • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.		

Item number	Description	Assemblies
	Build 19.1.47.0 The changes in this build were released in build 19.1.48.0.	
	Build 19.1.46.0 — June 16, 2020	
BUG-550438	This build adds the GetValueOnFocusChange key to the advanced configuration settings for the adapter. Use this key to prevent the system from querying window controls when focus changes to or from the window control. For more information, contact Pega Support.	OpenSpan.Adapters.Windows.dll
US-360467	**Note:** Setting this key to False renders the UserModified event non-functional, which can affect Workforce Intelligence. This build corrects an issue that could prevent Internet Explorer from rendering pages when you use a web adapter for an extended period of time.	OpenSpan.Translators.IntertnetExplorer.x32.dll OpenSpan.Translators.IntertnetExplorer.x64.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
US-356659	This build applies behavioral changes to the Interrogation Form.	OpenSpan.Adapters.Design.dll
EPIC-62351	This build adds support for subclassed controls in a JavaFX TableView control to allow the GetCellValue method to return the text in table cells.	OpenSpanJavaFxTableViewTranslatorFx.class
EPIC-61737	This build adds the FocusLost event so that the other UI actions can occur.	OpenSpanJavaFxTableViewTranslatorFx.class
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.9.1909 * • Pega RPA Service 3.1.13.0 • Pega Synchronization Engine 3.1.11.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.45.0 — June 05, 2020	
BUG-557701	This build resolves an issue that could prevent .NET virtual controls from matching when you enabled the WindowsFormsIdleTimeout key in the advanced configuration settings for the adapter. For more information, contact Pega Support.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.8.1909 * • Pega RPA Service 3.1.13.0 • Pega Synchronization Engine 3.1.11.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.44.0 — June 01, 2020	
BUG-554019	This build corrects a problem that could cause Robot Studio to fail when interrogating a PowerBuilder datagrid.	Not applicable
ISSUE-75262	This build modifies Robot Studio to ensure that a .NET system window is ignored.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
US-360654	This build ensures that the system suppresses the “Control Not Created” exception when it calls rematched children.	OpenSpan.Adapters.Web.dll
US-310635	This build ensures that the Robot Studio log file shows which method was called on a control or target.	OpenSpan.Adapters.Design.dll
EPIC-61735 EPIC-61736 EPIC-61738	This build modifies the GetCellValue method for a JavaFX TableView control to return the URL of the cell image or the text that is inside the cell. You can then use this URL or text in an automation.	OpenSpanJavaFxTableViewTranslatorFx.class
		OpenSpan.Adapters.dll OpenSpan.Adapter.Virtual.dll OpenSpan.Virtual.Interfaces.dll

Item number	Description	Assemblies
EPIC-61718	This build adds the CloseTab method so that you can close a JavaFX Tab control.	IJavaNativeTabStripEx.class OpenSpanJavaFxTabPaneDefaultModelTranslatorFx.class OpenSpanJavaFxTabPaneFordContextTabModelTranslatorFx.class OpenSpanJavaFxTabPaneHelperTranslatorFx.class OpenSpanJavaFxTabPaneTranslatorFx.class OpenSpanJavaFxTabPaneWrapper.class OpenSpanJavaSwingTabStripWrapper.class
EPIC-61734	This build adds support CheckBox and TextField controls inside a JavaFX TableView control. This build also corrects a problem that could cause the system to hang when a ListView contained many items.	OpenSpan.Adapter.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaBroker.class OpenSpanJavaFxCheckBoxTranslatorFx.class OpenSpanJavaFxListViewTranslatorFx.classView OpenSpanJavaFxTableViewTranslatorFx.class OpenSpanJavaFxTextInputControlTranslatorFx.class
EPIC-61731 EPIC-61729	This build changes Robot Studio so that you can now interrogate items in a pop-up window and adds the clickHeader method for the JavaFX Grid Control Header.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaFxTableViewTranslatorFx.class
EPIC-62794	This build changes the CyberArk and BeyondTrust credential providers to support all the parameters that are being passed by the GetCredentials overload method to call the AsoManager and credential store, with the exception of the Name and WorkGroup parameters.	OpenSpan.Security.dll
EPIC-62793	This build adds the defaultProvider attribute, which you can use to define a custom credential provider to override DPAPI as the default credential provider.	OpenSpan.Security.dll
EPIC-62444	This build adds the Timeout property to the RestClient and RobotManagerRestClient components. Use this property to control the timeout interval of the web request.	OpenSpan.Controls.dll OpenSpan.Interactions.Controls.dll
EPIC-62796	This build removes a reference to a .DLL file that was not used.	OpenSpan.Studio.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.7.1909
- Pega RPA Service 3.1.13.0 *
- Pega Synchronization Engine 3.1.11.0
- Pega Package Server and Server Status 3.1.3.0

* Updated in this build.

Build 19.1.43.0 — May 22, 2020

ISSUE-76305	This build corrects an issue that might prevent the Pega Chrome extension from properly destroying documents when you use the Universal Web Adapter.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
EPIC-62588	**Note:** The Pega Chrome extension was updated to version 1.0.95 with the inclusion of this fix. This build modifies the functionality of the Pega Robotic Automation options on the Help menu in Pega Robot Studio. For more information, see Studio's Help menu options.	OpenSpan.Studio.dll
US-337274	This build corrects a JavaScript error that could occur when tracking a page. This build adds the IgnoreChildWindows key to the advanced configuration settings for the adapter. Use this option to ignore the processing of child windows when you automate a Windows form application. For more information, contact Pega Support.	OpenSpan.js
BUG-551828		OpenSpan.Adapters.Windows.dll
EPIC-58367	**Note:** If you enable the IgnoreChildWindows option, the child windows do not appear on the Windows control tab. Instead, the system includes them on the Virtual Controls tab and you can interrogate them there. This build adds the New Project Wizard, which you can use to create projects, add multiple project items, configure adapters, create global containers, and quickly add other standard objects to a project. With this wizard you can perform the following tasks: • Right-click a project or a folder item to create new project items for all the projects and folders in your solution. • Create templates for automations. • Rename the project and project items. • Delete project items. • Drag and drop project items within the project. For more information, see Using the New Project Wizard.	OpenSpan.dll OpenSpan.MPF.dll OpenSpan.Studio.dll Pega.WPF.Controls.dll Microsoft.VisualStudio.TemplateWizardInterface.dll

Item number	Description	Assemblies
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.7.1909 • Pega RPA Service 3.1.12.0 • Pega Synchronization Engine 3.1.11.0 • Pega Package Server and Server Status 3.1.3.0	
	Build 19.1.42.0 — May 15, 2020	
BUG-549163	This build corrects a problem that prevented the configuration of a project if there was a space in the project name.	OpenSpan.Server.Client.dll
EPIC-62596	This build corrects a problem that prevented tabbing through the parameters on the Test methods form.	OpenSpan.Adapters.Design.dll
EPIC-61858	This build adds support for PowerBuilder 19.0.	OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll OpenSpan.Adapters.DataGrid.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.7.1909 • Pega RPA Service 3.1.12.0 • Pega Synchronization Engine 3.1.11.0 • Pega Package Server and Server Status 3.1.3.0	
	Build 19.1.41.0 — May 8, 2020	
EPIC-40963	This build adds parameters to the Web Extension installer.	OpenSpan.WebExtensionInstaller.exe
US-359065	This build disables the Configure context menu option for local variables and components in automations.	OpenSpan.IDE.dll
US-349273	This build launches the 19.1 Help when you click Help > Pega Robot Online Help. In addition, when you click Help > Pega Robot Developer Community, your default web browser launches the Pega Collaboration Center website.	OpenSpan.Studio.dll
US-351272	This build provides the following new functionality for the smtpClient component: • Set the securesocket option in the smtpClient component using a new overloaded Send method. • Add multiple attachments before sending an email.	OpenSpan.Controls.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.7.1909 • Pega RPA Service 3.1.12.0 • Pega Synchronization Engine 3.1.11.0 * • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.40.0 — May 1, 2020	
BUG-540685	This build ensures that Robot Studio detects all Java menu items so that they are available for interrogation.	OpenSpanJavaSwingMenu ItemWrapper.class OpenSpanJavaSwingTabStripWrapper.class
BUG-549138	This build removes the Instance Count property from the property list for the control. Automations that currently use the Instance Count property still function. However, if a new partial screen is identified after the initial count is determined, the Instance Count property does not correctly update the count of partial screens for the control. Going forward, use the new MatchedScreens property in your automations. This property correctly updates the count to provide an accurate count of partial screens when new partial screen instances are identified.	OpenSpan.Adapters.Text.dll
EPIC-60110	This build adds PerformClick support for an ActiveBar ActiveX toolbar control. With this change, you can treat each button or drop-down menu on an ActiveBar ActiveX toolbar as a control. Use the get_Buttons target test method to obtain the text for PerformClick.	OpenSpan.Adapters.ActBar2.Design.dll OpenSpan.Adapters.ActBar2.dll OpenSpan.Translators.ActBar2.x32.dll
EPIC-60106	This build adds support for the following methods in the Progress OpenEdge Grid control: • GetCellValue • ClickCell • DoubleClickCell • GetColumnCount • GetRowCount	OpenSpan.Adapters.Open Edge.Design.dll OpenSpan.Adapters.Open Edge.dll OpenSpan.Translators.Open

Item number	Description	Assemblies
	• GetColumnHeader • SelectRow • GetSelectedRow • EnsureVisible	Edge.Prow.x32.dll OpenSpan.Translators.Open Edge.Prow.x64.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.7.1909 • Pega RPA Service 3.1.12.0 • Pega Synchronization Engine 3.1.10.0 • Pega Package Server and Server Status 3.1.3.0	
	Build 19.1.39.0 — April 24, 2020	
BUG-552762	This build prevents an exception and potential crashes if you access properties in the Property viewer before Robot Studio opens the adapter.	OpenSpan.dll OpenSpan.Design.dll OpenSpan.IDE.dll
EPIC-61880	This build ensures that Citrix mixed-mode solutions work when using the WebInterface/NetScaler context configuration if your environment has only TLS 1.2 enabled.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe cef.pak CefSharp.BrowserSubprocess.Core.dll CefSharp.BrowserSubprocess.exe CefSharp.Core.dll CefSharp.dll CefSharp.WinForms.dll cef_100_percent.pak cef_200_percent.pak cef_extensions.pak chrome_elf.dll d3dcompiler_47.dll devtools_resources.pak icudtl.dat libcef.dll libEGL.dll libGLESv2.dll natives_blob.bin snapshot_blob.bin v8_context_snapshot.bin log4net.dll OpenSpan.Branding.dll OpenSpan.dll debug.log locales/.pak
EPIC-60817	This build adds JavaFX support for the check box, hyperlink, and combo box controls in a Grid. For more information, see JavaFX support in Pega Robotic Automation.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll Class files: OpenSpanJavaBroker.class OpenSpanJavaFxButtonBaseTranslatorFx.class OpenSpanJavaFxNodeTranslatorFx.class OpenSpanJavaFxTableViewTranslatorFx.class
US-357301	This build adds support for foreign characters in the Robot Runtime and Robot Studio Log4Net logs. The encoding is now UTF-8 (8-bit Unicode Transformation Format) in the Log4Net section of the RuntimeConfig.xml and StudioConfig.xml files.	RuntimeConfig.xml StudioConfig.xml
EPIC-62066	This build enhances credential provider support for Robot Runtime and the Robotic Process Automation (RPA) Service in several ways: • Ensures that all credential providers process requests with WorkGroups and replaceable system values in the same way. • Provides additional logging and a new domain attribute for CyberArk in the CredentialManagerConfig.xml file. • Updates the client credential provider to include all system parameters with each credential call. For more information, see Integrating a Client Credential Provider.	CredentialManagerConfig.xml OpenSpan.Security.dll OpenSpan.Application Framework.dll OpenSpan.Runtime.Core.dll OpenSpan.Adapters.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.7.1909 • Pega RPA Service 3.1.12.0 * • Pega Synchronization Engine 3.1.10.0 * • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.38.0 — April 13, 2020	
US-342525	This build ensures that when using the Pega Firefox extension and the Pega Synchronization Server, the extension is enabled the first time you start Firefox.	OpenSpan.WebExtensionInstaller.exe
	This build adds the TrimRegionText property to the Text adapter. You can now choose to leave	

Item number	Description	Assemblies
US-347417	leading and trailing whitespaces for the Text property of a region or field. If these whitespaces are important to your automation design, change this property to False. The default is True, which maintains the current behavior of automatically trimming leading and trailing whitespaces. This enhancement applies to all Text adapters, including mainframe emulators and console-based applications. For more information, see Text adapter properties, methods, and events.	OpenSpan.Adapters.Text.dll
BUG-552378	This build updates the web request to use the correct header value for Kerberos-enabled machines that are using the Pega RPA Service. This update ensures that Pega Robot Runtime downloads the correct RuntimeConfig.xml file.	OpenSpan.dll OpenSpan.Server.Client.dll
BUG-546317	This build prevents potential failed downloads of the RuntimeConfig.xml file from Pega Robot Runtime when using Kerberos authentication.	OpenSpan.Server.Client.dll
ISSUE-73165	This build adds security enhancements to resolve potential vulnerabilities.	OpenSpan.ApplicationFramework.dll
US-349134 BUG-545384	This build adds the Visual C++ redistributables to the installation package and removes support for installing the Visual C++ redistributables from the internet.	PegaRobotStudioSetup.exe PegaRobotStudioPluginSetup.exe PegaRobotRuntimeSetup.exe
US-349781 BUG-546038	This build ensures that Robot Runtime continues to send a heartbeat while waiting for an automation to finish after it receives a Stop command. This heartbeat prevents Robot Manager from sending a Kill command when all the following conditions are in place: • Robot Runtime receives a Stop command from Robot Manager • The WaitForAutomation key is enabled in the RuntimeConfig.xml file • A long-running automation is in progress	OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll
US-350538 ISSUE-73850	This build adds a Microsoft PowerPoint connector to the toolbox so that you can create PowerPoint presentations.	OpenSpan.Office.dll Microsoft.Office.Interop.Powerpoint.dll
US-347555	This build adds a ToastNotification component to the toolbox so that you can display toast-style notifications. A toast notification is a nonmodal window element that you can use to display brief messages that automatically expire. You can configure the following properties of toast-style notifications: • Message • Severity • Name: • Alignment • Background color • Display time • Exit style • Text color For more information, see ToastNotification component.	OpenSpan.dll OpenSpan.Controls.dll
US-350559	This build adds new occurrence parameters to existing OCR methods and also adds new OCR methods. • GetLocationByOcr - This method returns the location of text found. • GetValueAtLocationByOcr - This method returns the text at the given location. A new overload adds an occurrence parameter to these methods: • ClickByOcr • DoubleClickByOcr • HighlightByOcr • GetValueByOcr • SetValueByOcr Use these occurrence parameters to specify which occurrence of the specified text to search for. For more information, see Creating automations using the Screen OCR feature	OpenSpan.OCR.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Web.WebBase.dll
US-351610	This build prevents unnecessary build warnings in Robot Runtime by removing obsolete references to projects.	OpenSpan.Security.dll Pega.RobotInspector.dll
BUG-544384	This build ensures that the RogueWave translator detects when the mfc140.dll file is loaded to allow successful integration with the target application regardless of when this module loads into the process.	Not applicable
US-353879	This build corrects an issue in the Server Connectivity function that could cause Robot Studio to crash.	OpenSpan.dll
ISSUE-74066	This build enables the OK button after a deployment process fails so that you can exit the package deployment user interface.	OpenSpan.Studio.exe
EPIC-60896	This build removes the obsolete TranslaterIPC, and updates the internal DotNetBroker support for Infragistics versions.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll

Item number	Description	Assemblies
BUG-555798	This build ensures that Java applications or applets built on a Java runtime environment (JRE) lower than version 8 are supported. Java classes are now compiled with the correct Java development kit (JDK) version.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll All Java classes in the installation folder and OpenSpanJavaWrappers folder

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.7.1909
- Pega RPA Service 3.1.11.0 *
- Pega Synchronization Engine 3.1.9.0
- Pega Package Server and Server Status 3.1.3.0

* Updated in this build.

Build 19.1.35.0 Build — Build 19.1.37.0

	The changes in these builds were released in build 19.1.38.0.	

Build 19.1.34.0 — March 19, 2020

Note: The changes in this build are available in build 19.1.38. This build has been removed from Digital Delivery due to a bug related to compatibility with Java 6 and 7 and an unattended RPA robot configuration setting that was being ignored. Please install build 19.1.38 or later.

EPIC-60453	This build removes unused references to TranslatorIPC to make it easier to find and replace active references. This build is part of a larger effort to standardize all translators on the same virtual control stack. This standardization reduces development time, simplifies maintenance, and enables faster integration of the new IPC layer for Virtual Stack 2.0.	OpenSpan.Translators.FarpointGrid.x32.dll
BUG-538681	This build removes the web adapter settings to show or hide the Menu bar, Toolbar, and Address bar in Internet Explorer. Due to security changes, Microsoft no longer allows you to change the visibility of these bars in later versions of Internet Explorer. In older Pega Robotic Automation projects, you can still see the show and hide settings in the automation design, but the visibility of the bars does not change during the execution of Robot Runtime.	OpenSpan.Adapters.Web.dll
ISSUE-72920	This build adds JideSoft support to Robot Runtime, including new wrappers for custom parent controls and a new wrapper for the customized Swing.JComboBox. The new wrappers add ComboBox control methods to enhance data filtering. This build also prevents JSON parsing exceptions when you are working in Java applets that do not support UI Connectors.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaBroker.class OpenSpanJavaSwingButtonWrapper.class OpenSpanJavaJideSoftButtonWrapper.class
BUG-541197	This build provides a way to correct synchronization issues in some Siebel OpenUI configurations in which views reload after you add or remove a record in a ListApplet. The reloading causes control targets to become out of sync with the webpage. You can now set a new, optional RematchOnReload parameter to trigger a rematch when the view reloads. This trigger activates when the ViewLoaded event is fired on the same Siebel view two or more times. The new RematchOnReload parameter is available when you drag the Siebel.ViewReloaded Event to an automation.	OpenSpan.Adapters.Web.SiebelOpenUI.dll
EPIC-57190	This build enhances the interrogation process to make it easier for you to interrogate windows and controls. Rather than switching back and forth between the Interrogation Form and Robot Studio, you can now complete common tasks directly from the Interrogation Form, for example, renaming controls. The Interrogation Form also introduces a new time-delay feature. You can set a time delay to allow you enough time to move in the application and access the control that you want to interrogate. The Interrogation Form includes the following sections: • Properties • Target properties • Match rules • Testing For more information, see Enhanced Interrogation Form.	OpenSpan.dll OpenSpan.Design.dll OpenSpan.Studio.dll OpenSpan.IDE.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Text.Design.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.7.1909
- Pega RPA Service 3.1.10.0
- Pega Synchronization Engine 3.1.9.0
- Pega Package Server and Server Status 3.1.3.0

Build 19.1.33.0 — March 17, 2020

Note: The changes in this build are available in build 19.1.38. This build has been removed from Digital Delivery due to a bug related to compatibility with Java 6 and 7 and an unattended RPA robot configuration setting that was being ignored. Please install build 19.1.38 or later.

BUG-	This build prevents crashes that could occur when Robot Studio attempted to create hooks for embedded .NET controls in Internet Explorer pages. Embedded .NET controls are obsolete in	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll

Item number	Description	Assemblies
507911	later versions of Internet Explorer, which creates compatibility issues. In the IE section of the openspan.ini file, the DisableHookCreateElement key now disables these hooks by default.	openspan.ini
EPIC-61191	This build updates the TrustDesk translator from TranslatorIPC to VirtualIPC.	OpenSpan.Adapters.TrustDesk.dll
EPIC-61238	This build updates the Audatex translator from TranslatorIPC to VirtualIPC.	OpenSpan.Adapters.Audatex.dll
EPIC-58718	This build updates the CrescentText translator from TranslatorIPC to VirtualIPC.	OpenSpan.Translators.CrescentText.x32.dll

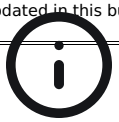
The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.7.1909
- Pega RPA Service 3.1.10.0
- Pega Synchronization Engine 3.1.9.0
- Pega Package Server and Server Status 3.1.3.0

Build 19.1.32.0 — March 7, 2020

Note: The changes in this build are available in build 19.1.38. This build has been removed from Digital Delivery due to a bug related to compatibility with Java 6 and 7 and unattended RPA robot configuration setting that was being ignored. Please install build 19.1.38 or later.

ISSUE-68584	This build adds the HookCreateEvents key to the Advanced configuration settings for the adapter. Use this key to avoid crashes when you hook into the 64-bit version of Internet Explorer. For more information, contact Pega Support.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
US-347593	This build ensures that the Pega Chrome extension does not issue an exception when Robot Studio interrogates certain types of Siebel pop-up dialog boxes. **Note:** The Pega Chrome extension was updated to version 1.0.94 with the inclusion of this fix.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
EPIC-60625	This build enhances support of the BeyondTrust credential provider for Robot Runtime and the Robotic Process Automation (RPA) Service in several ways: • Improves the accuracy of log messages by changing some messages mislabeled as critical level to info level. • Prevents Robot Runtime from sending a password if PegaAccessKey is empty. This build also adds support for retrieving configuration values from BeyondTrust, including PegaAccess, UseCurrentUserForASO, UseCurrentUserForCredStore, and NoRunAsUserPassword. This support includes the following specific changes: • If BeyondTrust defines a Pega attribute named UseCurrentUserForASO (not case-sensitive), Robot Runtime retrieves all ASO Manager credentials by using the user that is currently logged in. These credentials override the RunAs user specified in the CredentialManagerConfig.xml file. (The RunAs user allows you to run under a specific user name that is different from the one used to log in to the system. With this change, the credentials of the user currently logged in always override the credentials of the RunAs user.) • If BeyondTrust defines a Pega attribute named UseCurrentUserForCredStore (not case-sensitive), Runtime retrieves all Credential Store credentials by using the user that is currently logged in. These credentials override the RunAs user specified in the CredentialManagerConfig.xml file. • If BeyondTrust defines a Pega attribute named NoRunAsUserPassword (not case-sensitive), the BeyondTrust API call authorization header does not contain passwords. For more information, see Integrating BeyondTrust and Pega Robotic Automation.	OpenSpan.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.Security.dll Pega.PackageDownloader.exe
US-334325	This build provides Robot Runtime and RPA Service support for multiple Robot Runtime sessions on a single Windows computer if the computer supports remote desktop protocol (RDP) connections. To provide this support, this release includes the following changes: • The RPA Service passes a new /robotIndex command line argument to Robot Runtime to indicate that multiple Robot Runtime sessions are running. • To indicate the maximum number of robots that you want to register with Robot Manager, you can use the new maximumRobots option in the RobotManager section of the CommonConfig.xml file. • All credential providers, including DPAPI, CyberArk, BeyondTrust, and Custom, now support multiple Robot Runtime sessions. • Attribute names on the Server elements in the CommonConfig.xml file are no longer case-sensitive. For example, enabled="true" and Enabled="true" yield the same results. • The Package Downloader now displays an Enter RPA Credential pop-up dialog box when Robot Runtime is running in RPA mode, DPAPI is the credential provider, and the credentials are not already stored on disk. You can enter the DPAPI user name and password to store these credentials on disk for future use. • If you use the CredMgrUI.exe file or CredMgr.exe file, this build ensures that startup continues when the WindowsUser is configured with the default (empty) workgroup and Robot Manager does not pass a workgroup to the RPA Service at Robot Runtime startup. Robot Runtime uses the WindowsUser with the default (empty) workgroup and startup continues. For more information, see Server Bot Framework.	OpenSpan.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.Security.dll Pega.PackageDownloader.exe
	This build corrects an issue that prevented you from downloading Robot Runtime packages	

Item number	Description	Assemblies
BUG-543437	with configurations assigned from the Pega Robotic Automation Deployment Portal. You can now download these Robot Runtime packages.	OpenSpan.Server.Client.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.7.1909 * • Pega RPA Service 3.1.10.0 * • Pega Synchronization Engine 3.1.9.0 * • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.31.0 — February 26, 2020	
	 **Note:** The changes in this build are available in build 19.1.38. This build has been removed from Digital Delivery due to a bug related to compatibility with Java 6 and 7. Please install build 19.1.38 or later.	
EPIC-37448	This build enables you to use the Pega Synchronization Server in a Citrix mixed-mode environment on the Citrix server. Robot Runtime now passes parameters to the Pega.Loader.exe file so that the Synchronization Engine switches to the correct Robot Runtime version for the package that the client loads.	OpenSpan.dll OpenSpan.Connectors.Citrix.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.6.1909 • Pega RPA Service 3.1.9.0 • Pega Synchronization Engine 3.1.8.0 * • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.	
	Build 19.1.30.0 — February 21, 2020	
	 **Note:** The changes in this build are available in build 19.1.38. This build has been removed from Digital Delivery due to a bug related to compatibility with Java 6 and 7. Please install build 19.1.38 or later.	
BUG-542375	This build ensures the correct setup of certification paths when you install the system without internet access. The certificate package now includes chained certificates by default.	localruntime.pega.com.pfx
Goal-21546	This build provides limited support for JavaFX applications. For more information, see JavaFX support in Pega Robotic Automation.	OpenSpan.Adapters.Java.dll OpenSpan.Adapters.Java.Design.dll OpenSpan.Adapters.Java.Interfaces.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Translators.Java.Agent.x32.dll OpenSpan.Translators.Java.Agent.x64.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.6.1909 • Pega RPA Service 3.1.9.0 • Pega Synchronization Engine 3.1.7.0 • Pega Package Server and Server Status 3.1.3.0	
	Build 19.1.29.0 — February 18, 2020	
US-345550	This build ensures that you can extract data from PDF tables that use both spaces and line feeds to separate data.	OpenSpan.Pdf.PdfConnector.dll
US-346500	This build adds support for computers that use a comma to separate decimals rather than a period, based on the culture setting. This support ensures that PDF file parsing, table extraction, and document types function in the same way for all culture settings.	OpenSpan.Pdf.PdfConnector.dll
BUG-532484	This build resolves an issue where drop-down boxes in Internet Explorer were created in a new tab while using the Reparenting Container component.	OpenSpan.Adapters.Windows.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.6.1909 • Pega RPA Service 3.1.9.0 • Pega Synchronization Engine 3.1.7.0 • Pega Package Server and Server Status 3.1.3.0	
	Build 19.1.28.0	
	The changes in this build were released in build 19.1.29.0.	
	Build 19.1.27.0 — February 7, 2020	

Item number	Description	Assemblies
EPIC-58520 US-325968	This build provides new wrappers for custom parent controls and a new wrapper for the customized Swing.JComboBox. These new wrappers add ComboBox control methods to enhance data filtering.	OpenSpanJavaSwingComboBoxFavoritesModel.class OpenSpanJavaSwingComboBoxDefaultModel.class OpenSpanJavaSwingComboBoxWrapper.class OpenSpanJavaSwingComboBoxModelHelper.class OpenSpanJavaDashboardPanelWrapper.class OpenSpanJavaDashboardToolBarWrapper.class OpenSpanJavaJideSoftCommandBarWrapper.class
US-345320	This build ensures that the case results of a RobotActivity include the completion status, code, and message parameters when sent to Pega.	APISimulatorUI.exe OpenSpan.Interactions.dll
ISSUE-71875	This build corrects an exception that prevented you from adding and editing the DocumentType on the PDFConnector component when creating automations in Robot Studio. You can now add or edit the DocumentType.	OpenSpan.Pdf.PdfControl.dll PdfiumViewer.dll
ISSUE-71934	This build corrects a null reference exception created by a missing closing bracket in the default PluginManifest.xml file. The missing bracket was added to the file.	PluginManifest.xml
US-345576 BUG-516578	This build adds the Facets_SuppressControls key to the advanced configuration settings for the adapter. Use this key to disable support for TriZetto Facets 5.60 types that can add significant overhead. For more information, contact Pega Support.	OpenSpan.Adapters.Facets.Design.dll OpenSpan.Adapters.Facets.dll OpenSpan.Adapters.Facets.Interfaces.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll
US-334669	This build adds FarPointSpread 7.0 support for the Grid control.	OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Adapters.FarpointOCX.Design.dll OpenSpan.Translators.Farpoint.Spread25.x32.dll OpenSpan.Translators.Farpoint.Spread30.x32.dll OpenSpan.Translators.Farpoint.Spread70.x32.dll OpenSpan.Translators.Farpoint.Spread80.x32.dll
ISSUE-69500	This build adds support for absolute paths and environment variables for the ConfigurationLocation value in the CommonConfig.xml file. CredentialManagerConfigHelper now reads these value types without issuing an exception.	OpenSpan.Security.dll
EPIC-59156	This build adds security enhancements to resolve potential vulnerabilities.	OpenSpan.AgileDesktop.exe APISimulatorUI.exe OpenSpan.dll OpenSpan.ApplicationFramework.dll OSC.exe OpenSpan.Controls.dll OSD.exe OpenSpan.Interactions.dll OpenSpan.OCR.dll OpenSpan.Runtime.Core.dll OpenSpan.Security.dll OpenSpan.Service.dll OpenSpan.Studio.Shell.exe OpenSpan.Studio.Shell.UI.dll OpenSpan.Studio.dll OpenSpan.Transform.dll OpenSpan.dll PkgMEFUpdater.exe OpenSpan.ExpressTranslators.dll OpenSpanJavaDashboardPanelWrapper.class OpenSpanJavaDashboardToolBarWrapper.class OpenSpanJavaJideSoftCommandBarWrapper.class OpenSpanJavaSwingComboBoxDefaultModel.class OpenSpanJavaSwingComboBoxFavoritesModel.class OpenSpanJavaSwingComboBoxModelHelper.class OpenSpanJavaSwingComboBoxWrapper.class OpenSpan.Translators.InternetExplorer.x86.dll OpenSpan.Translators.InternetExplorer.x64.dll OpenSpan.Connectors.Citrix.Design.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.dll Pega.CTXOPSP.dll OpenSpan.Translators.CSG.x86.dll OpenSpan.Translators.LionScreens.x86.dll OpenSpan.Translators.LionScreens.x64.dll OpenSpan.DocumentOcr.dll OpenSpan.Translators.RogueWaveObjectiveGrid903.Shim.pdb ConfigUpdaterOffice.exe XmlUpdater.exe OSDump.exe OSDump.x64.exe OpenSpan.WebExtensionInstaller.exe
BUG-524369	This build checks the RuntimeConfig.xml settings before showing or hiding the Load Local Project, Load Web Project, and Unload Project context menu items. You can use the RuntimeConfig.xml file settings to hide these menu items for a Pega Workforce Intelligence™ implementation that does not use projects.	OpenSpan.Runtime.exe OpenSpan.Runtime.x64.exe
ISSUE-70538	This build prevents the DotNet translator from attempting to load an OutlookBar translator that no longer exists. The obsolete translator has been removed from the list of supported translators.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
EPIC-	This build adds support for the new version of Rogue Wave Objective Grid, a third-party grid	OpenSpan.Adapters.Clarify.Design.dll OpenSpan.Adapters.Clarify.dll

Item number	Description	Assemblies
59239	used by Clarify.	OpenSpan.Translators. Clarify.x32.dll
EPIC-56740	This build implements full support of the BeyondTrust credential provider for Robot Runtime. You can use your existing BeyondTrust portal to provide credentials for the registration operator, Windows user, Runtime user, ASO manager, and Credential Store.	CommonConfig.xml CredentialManagerConfig.xml OpenSpan.dll OpenSpan.ApplicationFramework.dll OpenSpan.Controls.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.Security.dll Pega.PackageDownloader.exe OpenSpan.Adapters.dll OpenSpan.Adapters. Windows.dll
EPIC-58759	This build implements the following updates to the Robot Inspector. • In the new Activities tab, you can start activities, start and activate new interactions, and also close selected interactions, with or without canceling the activity associated with the interaction. • The updated Interaction Manager Variables tab (formerly the Global Dictionary Variables tab) provides access to global dictionary variables and also context variables from the Interaction.xml file that are specific to the active interaction. • This build updates the way Robot Inspector saves and removes automation session data in a local persistent data store. Session data of the automation is stored after execution in a local data store that resides in your %appdata% folder. When you close this session and open a new session, you can see your previously executed session data in those automations. These changes add flexibility for how you work with and leverage automation data.	PluginManifest.xml OpenSpan.dll OpenSpan.Interactions.dll OpenSpan.Runtime.dll OpenSpan.Runtime.Core.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Web.WebBase.dll Pega.RobotInspector.dll
US-343786	This build checks 403 error messages from the Get Next Work call to determine if a pending Stop command is the cause. If yes, Runtime immediately sends a heartbeat to get the Stop command and initiate the robot shutdown process. Accelerating this robot shutdown process improves efficiency.	OpenSpan.Interactions.dll
US-344624	This buld ensures that when Robot Manager is not in use, the Runtime PackageDownloader creates a package manifest based on the StartUp project settings defined in the RuntimeConfig.xml file. In addition, the Sync Engine no longer rejects a manifest that does not have a JSON assignment. These changes allow you to launch products based on additional settings when Robot Manager is not connected.	Pega.PackageDownloader.exe Pega.ProductLoader.exe
EPIC-58722 US-310165 US-322949	This build moves InfragisticsOCX from the TranslatorIPC framework to the virtual control stack (VirtualIPC). This build is part of a larger effort to standardize all translators on the same virtual control stack. This standardization reduces development time, simplifies maintenance, and enables faster integration of the new IPC layer for Virtual Stack 2.0.	OpenSpan.Adapters.InfragisticsOCX.Design.dll OpenSpan.Adapters.InfragisticsOCX.dll OpenSpan.Translators.Infragistics.UltraGrid.x32.dll
ISSUE-65093	This build corrects the version in the v20 DotNet Broker and Windows forms assembly descriptions. The descriptions now show v20 instead of v40.	OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll
BUG-534025	This build prevents exceptions when opening PDF files that contain a signature field and attempts to assign a value to the signature field while processing the document.	OpenSpan.Pdf.PdfConnector.dll
US-341161	This build provides an Open method so you can control when the PdfConnector loads a file.	OpenSpan.Pdf.PdfConnector.dll PdfiumViewer.dll
US-335836	This build adds methods to extract rows that are filtered by one or more columns in an Excel spreadsheet and return a DataTable for easy processing within the automation. The new methods are: • FindRowsWithFilters • ExportToTableWithFilters (several variations) • RowFilter • FilterType	OpenSpan.Office.Excel.dll
ISSUE-63641	This build adds product assembly resolution code to make TestRunner compatible with 19.1. You can now use TestRunner to manually execute unit tests, when needed, in 19.1.	OpenSpan.TestRunner.exe
US-343389 BUG-502202	This build adds missing Siebel 6 checkbox-destroyed logic and corrects tracing inconsistencies.	OpenSpan.Adapters.Siebel.Design.dll OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Siebel6.Design.dll OpenSpan.Adapters.Siebel6.dll OpenSpan.Translators.Siebel6.SscfUi.x32.dll
US-335955 BUG-518345	This build suppresses a warning that is generated when the StartMyDay service tries to send messages from one subordinate context to another, when multiple Citrix contexts are in a solution. The build waits until all Runtime projects have fully loaded to evaluate if a warning is needed.	OpenSpan.Runtime.Core.dll

Item number	Description	Assemblies
ISSUE-71284	This build prevents an exception if you click a different component while a combo box remains open in the Standard view of the Properties grid.	OpenSpan.IDE.dll OpenSpan.Design.dll
ISSUE-71290	This build changes the system to validate the Path property only when you change its value. This logic prevents an exception if you click Cancel after opening the Path property in the Standard view of the Properties grid.	OpenSpan.IDE.dll OpenSpan.Design.dll
ISSUE-71285	This build changes the system to validate the last entry in a Property field when you select a new component. This logic also ensures a property change is not lost if you select a different component immediately after typing the change.	OpenSpan.IDE.dll OpenSpan.Design.dll
The Robot Runtime distribution for this build includes the following updated products: • Pega Native Foundation 10.1.6.1909 * • Pega RPA Service 3.1.9.0 * • Pega Synchronization Engine 3.1.7.0 * • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.		
Build 19.1.24.0 — Build 19.1.26.0		
	Changes in these builds were released in 19.1.27.0. There was an issue with the PDF Connector in build 19.1.25. If you installed that build, be sure to install 19.1.27.0 or later to avoid this issue.	
Build 19.1.23.0 — January 14, 2020		
Note: This build includes the following changes to Robot Runtime and only applies to Workforce Intelligence users. For more information, see Release Notes: Pega Workforce Intelligence.		
BUG-511195	This build changes Robot Runtime so that the Social Security Number (SSN) security rule no longer masks the duration of a step.	Openspan.Events.dll OpenSpan.Runtime.Analytics.dll
BUG-515059	This build ensures that the IdleStartTime is only masked when appropriate.	Openspan.Events.dll OpenSpan.Runtime.Analytics.dll
BUG-509371	This build changes the system so that, by default only key presses, mouse clicks, and mouse scrolls end an Idle period.	Openspan.Events.dll OpenSpan.Runtime.Analytics.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.5.1909 • Pega RPA Service 3.1.6.0 • Pega Synchronization Engine 3.1.5.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.22.0 — December 23, 2019		
EPIC-59238 US-334652	This build creates a new wrapper for the StatusBar control. It identifies the control as a textbox and gets the status message through the GetText method.	OpenSpanOracleEwtStatusBarWrapper.class OpenSpanOracleEwtStatusBarTranslator.class OpenSpan.Translators.Java.x32/x64.dll (Note that this may not be marked as modified in the manifest, only an include filter was added.)
US-331130 US-331129	This build adds pointer raise events to the RaiseEvent method for the Web adapter and Universal Web Adapter.	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.dll
US-327540	This build adds two overloaded ParseExact methods to the DateTimeUtils component. One method parses the input date, date format, and culture strings to a culture-specific DateTime object. The other method uses the CultureProvider parsing parameter.	OpenSpan.Controls.dll
US-336767	This build adds the following methods to the FileUtils component: • MoveFile moves a file to a new destination and overwrites the file, if it already exists. • CopyDirectory provides two overloaded methods to copy a directory from the source to a new destination. One method helps to overwrite the destination, if it is already present. • FindInFiles provides two overloaded methods to search for specific text in a directory of files. One method accepts wildcard searchPatterns along with searchText. • RenameDirectory renames a directory to the specified name. All these methods have an out string parameter, which includes any possible exception messages. For more information, see FileUtils component.	OpenSpan.Controls.dll
US-335801	This build adds a split method with a signature for selecting StringSplitOptions. This allows you	

Item number	Description	Assemblies
US-329086	to decide whether to keep or remove empty values.	OpenSpan.Controls.dll
EPIC-57714	This build adds a new view to the property grid. This view displays a shorter list of commonly used properties for easy use. For more information, see Properties Grid.	OpenSpan.Design.dll OpenSpan.IDE.dll OpenSpan.Studio.dll StandardProperties.xml
BUG-402506	This build makes sure that all applications are listed when showing the ASOManager credential dialog, regardless of whether the applications are loaded.	OpenSpan.ApplicationFramework.dll
US-328616	This build adds support for sending the following operational events to Robot Manager: • Usage Statistics - Automation, Public Automation, Activity, Robot Activity, RPA Robot Waiting, RPA Robot Not Ready • Health Statistics - PackageLoaded, UserLastLogin, RuntimeStarted, FatalError	APISimulatorCLI.exe (internal tool) APISimulatorUI.exe (internal tool) OpenSpan.dll OpenSpan.Automation.dll OpenSpan.Events.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll RuntimeConfig.xml
US-336917	This build sets the unified timestamps in Health Statistics Events to the expected format by server, regardless of the client machine culture.	APISimulatorCLI.exe (internal tool) APISimulatorUI.exe (internal tool) OpenSpan.dll OpenSpan.Automation.dll OpenSpan.Events.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll RuntimeConfig.xml
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.5.1909 • Pega RPA Service 3.1.6.0 • Pega Synchronization Engine 3.1.5.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.21.0 — December 16, 2019		
US-335949	This build resets the trigger's handle, when first setting up the AutoResetEvents, to guarantee that the WaitHandle is not prematurely signaled.	OpenSpan.Controls.dll
BUG-523696	This build addresses an issue where the Assisted Sign-On is not honoring the FileLocation setting that specifies where the ASO.db file is stored.	OpenSpan.Security.dll
US-333236	This build makes the Agile Desktop DPI scale correctly when Windows scaling is not 100%.	OpenSpan.AgileDesktop.exe
EPIC-58779	This build does the following: • Enables opening secured PDF files • Optimizes Optical Mark Recognition (OCR) for large documents • Initially hides old PDF methods on the PDF Connector • Adds PdfConnector methods to extract and insert pages • Splits and appends PDF files • Reconciles form update values • Adds annotation support for document type values For more information, see PdfConnector properties, methods, and events.	OpenSpan.Pdf.PdfConnector.dll OpenSpan.Pdf.PdfConnector.Design.dll PdfiumViewer.dll PdfiumViewer.resources.dll
EPIC-58268	This build adds support for SAP 7.6 Patch 2 and 3.	OpenSpan.Translators.SAP.x32.dll
EPIC-58717 US-310162	This build migrates the ComponentOneOCX Translator to the Virtual IPC Stack.	OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Adapters.ComponentOneOCX.Design.dll OpenSpan.Translators.ComponentOne.VSFlexGrid8.x32.dll
EPIC-56578	This build allows labels inside a VB6 panel to be interrogated.	OpenSpan.Adapters.SSTab.Design.dll OpenSpan.Adapters.SSTab.dll OpenSpan.Translators.SSTab.x32.dll
The Robot Runtime distribution for this build includes the following updated product: • Pega Native Foundation 10.1.5.1909 * • Pega RPA Service 3.1.6.0 • Pega Synchronization Engine 3.1.5.0 • Pega Package Server and Server Status 3.1.3.0 * Updated in this build.		

Item number	Description	Assemblies
Build 19.1.20.0 — December 4, 2019		
US-330958	This build adds a new log message to remind users to extend the package load timeout on Robot Manager.	OpenSpan.Interactions.dll
US-328602	This build adds support in Robot Runtime for the new robot profile endpoint, and will revert to the old endpoint if a new one does not exist.	OpenSpan.Interactions.dll
BUG-426215	This build updates the collection editor in a lookup table to support the Cancel button and revert to the original value.	OpenSpan.Controls.dll OpenSpan.Controls.Design.dll
US-313052	This build adds support to the PME selection editor for check/uncheck on the root and parent nodes.	OpenSpan.IDE.dll
US-314006-3	This build exposes methods to sort ranges in an Excel document.	OpenSpan.Office.Excel.dll
BUG-516796	This build updates a project reference to avoid an error with solutions after 19.1.13.0 that contain OCR.	19.1.0.3.xslt
US-321654	This build enables the OSDump utility to find and import the correct module and captures dumps.	OSDump.exe OSDump.x32.exe OSDump.x64.exe
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.3.1903 • Pega RPA Service 3.1.6.0 • Pega Synchronization Engine 3.1.5.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.19.0 — November 25, 2019		
US-334033	This build removes the SAP x64 translator from the installation and from any references within existing .osproj files, because SAP x64 is not currently supported.	OpenSpan.Translators.SAP.x64.dll (removed)
US-334713 BUG-516946	This build adds logic to raise the SolutionCreated event when a new solution is created and to copy the Microsoft Office files. This solves an issue where Office Connector DLL files are not copied into the base install folder when a solution is created, and the OnSolutionOpening event does not fire.	OpenSpan.Studio.dll
RLS-22186	This build adds support to the Universal Web Adapter to interrogate and automate Electron applications that use a package.JSON file for configuration. Electron 1.7.9 and later versions are supported, except in a Server 2012 R2 environment, where Electron 6.0.7 or later is required. PNF 10.1.4.1903 must also be installed to use this feature. For instructions on use and limitations, see Automating Electron applications.	openspan.ini StudioConfig.xml OpenSpan.Adapters.Design.dll OpenSpan.Adapters. Web.Electron.dll Pega.Translators.Web.Electron.x32/x64.dll OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.WebBase.Design.dll lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
BUG-503669	This build forces a repaint after making buttons visible, because Agile Desktop buttons were not being painted in the correct position after being made visible. **Note:** The Pega Chrome extension was updated to version 10.3.3 with the inclusion of this fix.	SlimShortcuts.js
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.3.1903 • Pega RPA Service 3.1.5.0 • Pega Synchronization Engine 3.1.5.0 • Pega Package Server and Server Status 3.1.3.0		
Build 19.1.18.0 — November 08, 2019		
EPIC-56192 US-323451	This build adds support for controls in SAP 7.6 and 7.6 Patch 1.	OpenSpan.Adapters.SAP.Design.dll OpenSpan.Adapters.SAP.dll OpenSpan.Adapters.SAP.Interfaces.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
EPIC-57781	This build changes the system so you can define UI Automation parsing instructions in JSON files (app models). If the UI Automation structures change for an application, you can now address the changes in the JSON file.	OpenSpan.Events.dll OpenSpan.Runtime.Analytics.dll
BUG-		

Item number	Description	Assemblies
BUG-484872 BUG-438753	This build corrects a problem that could cause an intermittent crash if you enabled wait time in Pega Workforce Intelligence.	OpenSpan.Events.dll
BUG-494904	This build corrects a problem that could prevent Runtime in Workforce Intelligence implementations from returning screen titles.	OpenSpan.Runtime.Analytics.dll
BUG-508595 US-327938	This build resolves an issue that prevented the system from working with Java 5.	OpenSpanJavaBroker.class
BUG-500924	This build modifies the system to prevent Runtime memory leaks when an automation called the SetWindowLong and GetWindowLong methods on windows where Runtime is not attached.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
BUG-512692 US-327939	This build resolves a problem that could cause Runtime to fail to stop the thread that sends heartbeats to Robot Manager when you use the WaitForAutomations option in an RPA (unattended) automation.	OpenSpan.Interactions.dll
BUG-512725 US-330888	This build corrects a problem that could cause an AmbiguousMatchException to be thrown.	OpenSpan.Translators.DotNet.Syncfusion.dll
BUG-503669	This build corrects a problem that prevented Agile Desktop buttons from being painted in the correct position.	SlimShortcuts.js
BUG-506339	This build resolves an issue that could cause a memory leak when you call the SetCellValue method on a PowerBuilder DataGridTarget.	OpenSpan.Adapters.DataGrid.dll
ISSUE-68055	This build corrects the version number assigned to the 32-bit FlexCell translator.	OpenSpan.Translators.FlexCell.x32.dll
BUG-514598	This build corrects a problem that could prevent the Save button from being activated when setting text on a GXWND grid.	OpenSpan.Translators.RogueWave.ObjectiveGrid.x32.dll

The Robot Runtime distribution for this build includes the following products:

- Pega Native Foundation 10.1.3.1903
- Pega RPA Service 3.1.5.0
- Pega Synchronization Engine 3.1.4.0
- Pega Package Server and Server Status 3.1.3.0

Build 19.1.17.0 — November 05, 2019

BUG-432109 US-315369	This build resolves an issue that could prevent other applications from using WinHllapi when Pega was using it.	OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Text.Host.dll
EPIC-57164 US-330784	This build adds support for the FlexCell Grid.	OpenSpan.Adapters.FlexCell.Design.dll OpenSpan.Adapters.FlexCell.dll OpenSpan.Translators.FlexCell.x32.dll
US-318413 EPIC-35501	This build adds support for the Uniface GridType control.	OpenSpan.Adapters.Uniface.dll OpenSpan.Adapters.Uniface.Design.dll OpenSpan.Adapters.Uniface.Interfaces.dll OpenSpan.Translators.Uniface.Umsw.x32.dll
BUG-435119 US-315554	This build resolves an issue that could cause the following error message: Application failed to start within given timeframe.	OpenSpan.Adapters.Windows.dll
BUG-489625 US-318412	This build ensures that the system finds the Microsoft .NET .dll files that it needs when working with WindowsForms applications.	OpenSpan.Translators.DotNet.v40.x32.dl OpenSpan.Translators.DotNet.v40.x64.dll
BUG-445304 US-315546	This build corrects a problem that could cause Robot Runtime to crash when cleaning up TableSection clones. This build also adds exception handling to prevent the crash and code to prevent the object hierarchy from getting corrupted.	OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll

Item number	Description	Assemblies
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.3.1903 • Pega RPA Service 3.1.5.0 • Pega Synchronization Engine 3.1.4.0 • Pega Package Server and Server Status 3.1.3.0	
	Build 19.1.16.0	
	Changes in this build were released in build 19.1.17.0	
	Build 19.1.15.0 — October 22, 2019	
EPIC-57472 US-316685 US-316681	This build adds support for a grid in IBM's OnDemand application.	OpenSpan.Adapters.IBM.dll OpenSpan.Adapters.IBM.Design.dll OpenSpan.Translators.IBM.ArsGui32.x32.dll
EPIC-57163 US-314525	This build adds support for VSFlexGrid7, a ComponentOne ActiveX-based grid control.	OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Adapters.ComponentOneOCX.Design.dll OpenSpan.Translators.VideoSoft.VSFlexGrid7.x32.dll
EPIC-58725 US-310166	This build updates the way the system supports ActiveX and TreeView controls.	OpenSpan.Adapters.MicrosoftOCX.dll OpenSpan.Adapters.MicrosoftOCX.Design.dll OpenSpan.Translators.MSCommonControls5.x32.dll OpenSpan.Translators.MSCommonControls5.x64.dll
	The Robot Runtime distribution for this build includes the following updated product: • Pega Native Foundation 10.1.3.1903 • Pega RPA Service 3.1.5.0 • Pega Synchronization Engine 3.1.4.0 • Pega Package Server and Server Status 3.1.3.0 * * Updated in this build.	
	Build 19.1.14.0 — October 11, 2019	
EPIC-19861	This build includes the following significant enhancements to the PDF Connector: • Adds support for reading and editing form fields. • Adds support for recognizing optical marks. • Adds support for handling tables with intersecting lines. • Improves the ability to extract text values based on landmark text. • Includes a new WYSIWYG designer that makes it easier to build automations that leverage PDF files. • Adds the Reconcile dialog, which Robot Runtime users can use to validate information extracted from a PDF. For more information, see Incorporating PDF files in your automation using Pega Robot Studio version 19.1.	OpenSpan.Pdf.PdfConnector.dll OpenSpan.Pdf.PdfControl.dll OpenSpan.OCR.dll OpenSpan.dll OpenSpan.x32.dll OpenSpan.Pdf.PdfConnector.Design.dll OpenSpan.Automation.Design.dll OpenSpan.Automation.Design.x32.dll
EPIC-57090 EPIC-57089	This build adds Sendkeys functionality to the Universal Web Adapter and Web controls so that SendKeys validation and SendKeys events are fired. This build also adds the ActivateTab method to the Universal Web Adapter and Web controls. Use this method to activate the tab for the control that it was executed for. For more information about the new SendKeys and ActivateTab methods, see the following topics: • Universal Web adapter properties, methods, and events • Web Adapter properties, methods, and events	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Siebel.Design.dll OpenSpan.Virtual.Web.Interfaces.dll
US-326862	This build adds the Pega Robot Inspector, a tool that helps you to understand the state of your automation solution while it is running. The Pega Robot Inspector provides visibility into global values, including variables and lookup tables, and real-time visibility of matching. It also allows you to do targeted testing of the automations within your solution. You can simulate input parameters and it will provide visibility into the output parameters. This allows you to test a complete work flow or the individual parts of a work flow without completing the entire use case or process. For more information, see Using the Robot Inspector .	RuntimeConfig.xml OpenSpan.dll OpenSpan.Runtime.exe OpenSpan.Runtime64.exe OpenSpan.Security.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Text.dll Pega.TestHarness.dll
US-313329	This build enables you to adds an authenticationType key for the Pega Dev Server in the CommonConfig.xml file. This value is used when the Pega Dev Server is enabled.	OpenSpan.Server.Client.dll

Item number	Description	Assemblies
US-317584	This build adds the Package Server Address field on the Server Connectivity panel in Pega Robot Studio. Use this field to view and modify the URL for the Pega Package Server. This URL is stored in the StudioConfig.xml file located in the %appdata% folder.	OpenSpan.dll
US-238222	This build adds the ImportFromTable method to the Excel File Connector that you can use with two, three, or four parameters to import headers from data tables into a Microsoft Excel spreadsheet. For more information, see Excel File Connector properties, methods, and events.	OpenSpan.Office.Excel.dll
BUG-483175 US-323456	This build resolves an issue that could prevent the Java translator from receiving messages from the adapter.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
BUG-500624 US-323452	This build changes the system to ensure that the CustomHeaders are added before the system executes the outgoing HTTP or HTTPS requests on the RobotManagerRestClient component.	OpenSpan.Interactions.dll OpenSpan.Interactions.Controls.dll
BUG-505033 US-326173	This build corrects a problem that could prevent you from downloading Citrix ICA file and connecting to the Citrix server.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe
BUG-512700	This build resolves an issue that could occur in the CommonConfig.xml file if you enabled the CredentialManager server and set the providerType to DPAPI.	OpenSpan.Security.dll
BUG-505711 US-323943 US-326155	This build changes the system to iterate through the child controls for better matching. This build adds the EnableFollowRedirects property to the openspan.ini file. The default is True, which sets the FollowRedirects property on the URL request to True. This allows requests to redirect before being locked on the ReadResponseBody, which ensures that all URLs are processed.	Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
BUG-511965		Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
US-315928 US-322329	**Note:** The Pega Chrome extension was updated to version 1.0.91 with the inclusion of this fix. This build removes unused Text Adapter options.	Openspan.Studio.dll
The Robot Runtime distribution for this build includes the following updated product: • Pega Native Foundation 10.1.3.1903 • Pega RPA Service 3.1.5.0 * • Pega Synchronization Engine 3.1.4.0 • Pega Package Server and Server Status 3.1.2.0 * Updated in this build.		
Build 19.1.13.0 — September 27, 2019		
US-323589	This build enables you to get and set custom credentials by using the IClientCredentialProvider interface. To set up custom credentials, use the CredentialManager server options in the CommonConfig.xml file, and make corresponding entries in the CredentialManagerConfig.xml file. For the credential provider, set the providerType attribute in the CredentialManagerConfig.xml file to Client and include values for the assemblyName and className attributes.	CredentialManagerConfig.xml OpenSpan.ApplicationFramework.dll OpenSpan.Controls.dll OpenSpan.Security.dll Pega.ClientCredentialProvider.dll
ISSUE-64446	This build ensures that the system correctly reads Java options in the openspan.ini file.	OpenSpan.Translator.Java.x32.dll OpenSpan.Translator.Java.x64.dll
BUG-501507	This build changes the system to ensure that URLs that are redirected are allowed a chance to redirect.	Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
BUG-485830	This build changes the system to ensure that grid controls are correctly redrawn when you are developing an RPA solution.	OpenSpan.Translators.FarpointGrid.x32.dll
The Robot Runtime distribution for this build includes the following updated product: • Pega Native Foundation 10.1.3.1903 • Pega RPA Service 3.1.4.0 *		

Item number	Description	Assemblies
	• Pega Synchronization Engine 3.1.4.0 Pega Package Server and Server Status 3.1.2.0 * Updated in this build.	
Build 19.1.12.0 — September 20, 2019		
BUG-508266	This build changes the system installers to avoid a problem that could cause the installation process to fail, depending on your Microsoft Windows security settings.	PNFtoStudio.bat
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.3.1903 * • Pega RPA Service 3.1.3.0 • Pega Synchronization Engine 3.1.4.0 • Pega Package Server and Server Status 3.1.2.0 * Updated in this build.	
Build 19.1.11.0 — September 16, 2019		
ISSUE-60376 US-315362	This build adds the VerifyURL property, which you can use to specify the number of times the system verifies the URL in a Citrix context.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.Design.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe
US-320186	This build adds support for the Adobe Flash * TreeView control.	Platforms/UI Connectors/Flash/DataGridControlExtension.design.json Platforms/UI Connectors/Flash/TreeViewExtension.cs Platforms/UI Connectors/Flash/TreeViewExtension.design.json Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
US-195934 US-315788	This build adds support for the Infragistics Data Tree control. This includes handling situations where the control is created before it is populated with data.	OpenSpan.Adapters.DotNet.Infragistics.Design.dll OpenSpan.Adapters.DotNet.Infragistics.dll OpenSpan.Translators.DotNet.v20.Infragistics.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll
US-319962	This build adds support for the GXWND Grid (RogueWave Objective Grid) control.	OpenSpan.Adapters.RogueWave.ObjectiveGrid.Design.dll OpenSpan.Adapters.RogueWave.ObjectiveGrid.dll OpenSpan.Translators.RogueWave.ObjectiveGrid.x32.dll
US-196216 US-315793	This build adds support for the Infragistics WPF Data Tree control. This includes handling situations where the control is created before it is populated with data.	OpenSpan.Adapters.DotNet.Infragistics.Design.dll OpenSpan.Adapters.DotNet.Infragistics.dll OpenSpan.Translators.DotNet.v20.WPF.Infragistics.dll OpenSpan.Translators.DotNet.v40.WPF.Infragistics.dll
BUG-500344 US-318416	This build corrects a problem that could cause an application to crash when it gets text from a ListBox item.	OpenSpan.Adapters.dll OpenSpan.Adapters.Windows.dll Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
US-321636	This build ensures that when the configuration file is downloaded from the Pega Package Server, it is only transformed from XML to JSON format once.	OpenSpan.Server.Client.dll
US-322791	This build adds the suppressNotificationsForRPA key to the RobotManager server entry in the CommonConfig.xml file. This key is set to True by default so that popup dialogs are suppressed when you are running RPA (unattended) robots. Information about the dialogs is added to the Runtime log file.	CommonConfig.xml OpenSpan.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll OpenSpan.Server.Controls.Design.dll
US-313283	This build ensures that the system does not add a second prefix to controls defined in the NamingRules.xml file. This build also adds commonly used adapter and web controls so you can create your own prefixes for these controls.	OpenSpan.Design.dll
	The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.2.1903 • Pega RPA Service 3.1.3.0 • Pega Synchronization Engine 3.1.4.0 • Pega Package Server and Server Status 3.1.2.0	
Build 19.1.10.0 — September 04, 2019		
US-318415	This build changes the system to allow you to add cookie headers to responses, and adds the GetResponseHeader method. Use this method to search for headers in the response, based on the key that you specify.	OpenSpan.dll OpenSpan.Controls.dll

Item number	Description	Assemblies
BUG-439554 US-315550	This build corrects a problem that could cause Java to crash if you opened a new window that included custom Java components.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
BUG-49625 US-318388	This build corrects a problem that could cause Studio to throw fatal object reference exceptions when you select an extracted proxy in Object Explorer or open the Configure Type window to select properties, methods, or events of the proxy. This error could also occur if you moved the proxy's properties, methods, or events to the Automation Designer.	OpenSpan.dll
BUG-488706 US-315565	This build corrects a problem that could cause an exception when you call the GetText method in Siebel 6.	Pega.Native.Remoting.x32.dll Pega.Native.Remoting.x64.dll OpenSpan.Translators.Siebel6.SscfUi.x32.dll
BUG-493167 US-315556	This build addresses logging issues that could degrade application performance.	OpenSpan.dll
BUG-439981 US-315358	This build corrects a problem that could prevent a translator from loading.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
BUG-488688 US-315557	This build corrects a problem that prevented the Runtime log files from being placed in the folder that you specified in the RuntimeConfig.xml file.	OpenSpan.dll
EPIC-36936 BUG-482778 BUG-446338 US-313191	This build adds support for the CER_FMT_LISTBOX control and ensures that Facets ListBox and ComboBox controls interrogate as their intended types.	OpenSpan.Adapters.Facets.Design.dll OpenSpan.Adapters.Facets.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll
BUG-483799 US-315376	This build adds support for WindowsForms controls that are created off the main UI and moved onto it later.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
BUG-439546 US-316715	This build optimizes the matching process when using JTabbed panes.	OpenSpanJavaObjectWrapper.java OpenSpanJavaSwingTabStripWrapper.java
BUG-482905 US-315555	This build ensures that the correct Microsoft Office assemblies are copied to the installation folder.	OpenSpan.Studio.dll
US-319259 US-311727	This build ensures that Robot Studio updates the package development status in Robot Manager to better show each step of the deployment process.	OpenSpan.dll OpenSpan.IDE.dll OpenSpan.Server.Client.dll OpenSpan.Studio.exe
EPIC-56579 US-310632	This build adds support for Sheridan DataGrid controls.	OpenSpan.Adapters.Sheridan.Design.dll OpenSpan.Adapters.Sheridan.dll OpenSpan.Translators.Sheridan.DataWidgets.x32.dll
EPIC-34456 US-31529 US-315365	This build adds support for Rogue Wave controls.	OpenSpan.Adapters.RogueWave.ObjectiveGrid.dll OpenSpan.Translators.RogueWave.ObjectiveGrid.x32.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.2.1903 • Pega RPA Service 3.1.3.0 • Pega Synchronization Engine 3.1.4.0 • Pega Package Server and Server Status 3.1.2.0		
Build 19.1.8.0 — 19.1.9.0		

The changes in these builds were published in build 19.1.10.0.

Item number	Description	Assemblies
	Build 19.1.7.0 — August 19, 2019	
BUG-502049	This build changes the system to ensure that the most current RuntimeConfig.xml file is used when it retrieves the PackageServer baseUrl value.	Pega.PackageDownloader.exe
BUG-502065	This build corrects a problem that could cause the Citrix Channel Driver to fail during installation.	PegaCitrixChannelDriver.msi
US-260110	This build adds support for the following additional spreadsheet types when you use the Excel Connector: • Microsoft Excel: .xlsx, xlsm, .xltx, .xltm, .xls, .xlt • OpenDocument spreadsheet: .ods, .ots • Character Separated Values: .csv, .tsv This build also adds the following methods: • FindRows • FindColumns The Open and Save methods have been enhanced to support CSVLoadOptions and CSVSaveOptions that let you specify the delimiters and other options. For more information, see MicrosoftExcel connector properties, methods, and events. In addition, this build adds the OutputName property. Use this property to specify one of the supported file types. If you include a Save method, the system uses the value entered for this property unless it is set to null. If set to null, the system uses the value for the FileName property.	OpenSpan.Office.Excel.dll
US-318440	This build changes the system so that the workgroup and operatorId command line option values now override the workgroup and operatorId values in the CommonConfig.xml file. These command line options are used by the Pega RPA Service and are passed to Package.Downloader and Robot Runtime.	OpenSpan.Runtime.Core.dll OpenSpan.Security.dll OpenSpan.dll Pega.PackageDownloader.exe
US-317809	This build verifies that Pega Robotic Automation supports Citrix XenApp 7.6 - 7.15 / Workspace App 1904.1 and later.	Not applicable
The Robot Runtime distribution for this build includes the following updated products: • Pega Native Foundation 10.1.2.1903 • Pega RPA Service 3.1.3.0 * • Pega Synchronization Engine 3.1.4.0 * • Pega Package Server and Server Status 3.1.2.0 * * Updated in this build.		
	Build 19.1.6.0 — August 12, 2019	
EPIC-34840 US-312350	This build enables support for MicrosoftOCX common controls, which support MSgrid control. Previously, the grid control was interrogated as a generic control with no methods to use for the grid.	OpenSpan.Adapters.MicrosoftOCX.dll OpenSpan.Adapters.MicrosoftOCX.Design.dll OpenSpan.Translators.MSGridControl.x32.dll
EPIC-56070 US-314707 GOAL-21261	This build implements the ability to check multiple items in MSTreeView and adds the following methods to TreeView controls: • ClickAllIconsByText • ClickAllIconsByRegex	OpenSpan.Adapters.dll
US-310708	This build adds the RuntimeHost.GetProjectPath method and the RuntimeHost.RobotReadyForWork event to the toolbox.	PluginManifest.xml OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll
US-315532	This build updates the default RuntimeConfig.xml file.	RuntimeConfig.xml
US-314345-1	This build updates third-party licenses.	ThirdPartyLicenses.txt
The Robot Runtime distribution for this build includes the following updated product: • Pega Native Foundation 10.1.2.1903 * • Pega RPA Service 3.1.2.0 • Pega Synchronization Engine 3.1.3.0 • Pega Package Server and Server Status 3.1.1.0 * Updated in this build.		

Item number	Description	Assemblies
	Build 19.1.5.0 — August 06, 2019	
GOAL-9033 US-315559 ISSUE-61766	This build adds support for the following SGGrid OCX grid controls: • ClickCell • DoubleClickCell • GetCellValue • GetColumnCount • GetRowCount • GetColumnHeader • GetSelectedColumn • GetSelectedRow	OpenSpan.Adapters.SharpGrid.Design.dll OpenSpan.Adapters.SharpGrid.dll OpenSpan.Translators.SharpGrid.x32.dll
BUG-40770 US-316347	This build corrects a problem that could cause an shared memory exception when you were running a local Citrix context.	Openspan.Runtime.Core.dll
EPIC-34488 US-312359	This build adds support for check boxes when you interrogate an MS Common Control TreeView.	OpenSpan.Adapters.MicrosoftOCX.dll OpenSpan.Adapters.MicrosoftOCX.Design.dll OpenSpan.Translators.MSCommonControls5.x32.dll OpenSpan.Translators.MSCommonControls5.x64.dll
BUG-444489 US-315364	This build corrects a problem that disabled the OK button when you were trying to configure an int variable.	OpenSpan.IDE.dll
BUG-430965 US-315375	This build corrects a problem that prevented Microsoft Excel processes from closing after you called the Close method in an automation.	OpenSpan.Office.dll OpenSpan.Office.Design.dll
US-195907	This build adds support for the Infragistics UltraGauge control.	OpenSpan.Translators.DotNet.v20.Infragistics.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll
BUG-445307 US-315359	This build adds support for dynamically-created WindowsForms controls that are hosted in Windows Presentation Foundation (WPF).	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.Broker.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.1.1809 • Pega RPA Service 3.1.2.0 • Pega Synchronization Engine 3.1.3.0 • Pega Package Server and Server Status 3.1.1.0		
Build 19.1.4.0 — August 02, 2019		
EPIC-37207	This build changes the system so that you can interrogate a menu bar in the Kinaxis RapidResponse application and add menu items.	The OpenSpanJavaComJidesoftAction CommandBarWrapper.class was removed from the OpenSpanJavaWrappers.
US-245205	This build adds a confirmation dialog that displays before the system deletes an EntryPoint from an automation.	OpenSpan.Automation.Design.dll
US-315552	This build ported support for the Adobe Flash * and Apache Flex applications using the Google Chrome browser. The Adobe Flash and Apache Flex translator works with Universal Web Adapter. The Adobe Flash and Apache Flex (formerly Adobe Flex) software provides a development environment for building games and applications by using the ActionScript language and the open-source Flex framework. For more information, see, Adobe Flash and Flex application support. * Adobe ended support for Adobe Flash on December 31, 2020. For more information, see Adobe Flash Player EOL General Information Page.	OpenSpan.Adapters.Audatex.dll OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Adapters.Delphi.Design.dll OpenSpan.Adapters.Delphi.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.TrustDesk.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.VisualBasic6.Design.dll OpenSpan.Adapters.VisualBasic6.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Windows.dll OpenSpan.ChromeExtensionInstaller.exe OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe OpenSpan.Translators.AWD.x32.dll OpenSpan.Translators.Clarify.x32.dll OpenSpan.Translators.Clarify.x64.dll OpenSpan.Translators.CrescentText.x32.dll OpenSpan.Translators.CSG.x32.dll OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll OpenSpan.Translators.FarpointGrid.x32.dll

Item number	Description	Assemblies
		OpenSpan.Translators.FarpointList.x32.dll OpenSpan.Translators.Gupta.Tabli62.x32.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Translators.MhTab.x32.dll OpenSpan.Translators.MSFlexGrid.x32.dll OpenSpan.Translators.MSHFlexGrid.x32.dll OpenSpan.Translators.NiSource.KipCzCnr.x32.dll OpenSpan.Translators.NiSource.KipCzNb.x32.dll OpenSpan.Translators.ProfUIS.x32.dll OpenSpan.Translators.SSTab.x32.dll OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.Virtual.Interfaces Pega.Remoting.dll Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi
BUG-496586	This build ensures that clicking the Cancel button on the JsonUtils Collection Editor discards changes before closing the editor.	OpenSpan.Controls.dll OpenSpan.Controls.Design.dll
US-245205	This build adds a confirmation dialog that displays before the system deletes an EntryPoint from an automation.	OpenSpan.Automation.Design.dll
EPIC-34768 US-312351	This build adds support for the ComponentOne OCX True DBGrid v7 control. This change supports a standard grid interface and includes the following properties: • ColumnCount • RowCount • ColumnHeaders Also included are the following methods: • *ClickCell* • *DoubleClickCell* • *GetCellValue* • *SelectRow* For more information, see ComponentOne OCX True DBGrid v7 controls.	OpenSpan.Translators.ComponentOne.Todg7.x32.dll OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Adapters.ComponentOneOCX.Design.dll
GOAL-9091 US-315355	**Note:** The Pega Chrome extension was updated to version 1.0.90 with the inclusion of this fix. This build adds support for the BeCubed MhTab control.	OpenSpan.Adapters.MhTab.Design.dll OpenSpan.Adapters.MhTab.dll OpenSpan.Translators.MhTab.x32.dll
EPIC-33999 US-315353	This build adds support for CIS Application Notebook, Table, and List Tree controls.	OpenSpan.Adapters.NiSource.Design.dll OpenSpan.Adapters.NiSource.dll OpenSpan.Translators.NiSource.KipCzCnr.x32.dll OpenSpan.Translators.NiSource.KipCzNb.x32.dll
ISSUE-31305	This build removes unnecessary logging information and changes an unnecessary error to a warning.	OpenSpan.dll
US-311702	This build adds support for downloading the RuntimeConfig.xml file from Pega Robot Manager.	OpenSpan.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll Pega.PackageDownloader.exe
The Robot Runtime distribution for this build includes the following updated product: • Pega Native Foundation 10.1.1.1809 • Pega RPA Service 3.1.2.0 • Pega Synchronization Engine 3.1.3.0 * • Pega Package Server and Server Status 3.1.1.0 * Updated in this build.		
Build 19.1.3.0 — July 15, 2019		
US-265355	This build updates the System.Net.Mail dll files for the SMTP component.	RuntimeConfig.xml StudioConfig.xml THIRDPARTYLICENSES.TXT OpenSpan.Controls.dll OpenSpan.Studio.exe OpenSpan.dll MailKit.dll MimeKit.dll
ISSUE-30923	This build changes the Help information for the ShutdownRuntime utility. To display the Help information, enter the following command at a prompt: `ShutdownRuntime.exe /help`	ShutdownRuntime.exe
US-	This build changes the system so that toolbox items now appear in alphabetical order.	PluginManifest.xml

Item number	Description	Assemblies
309875	This build also adds the Reset Toolbox option, which you can use to re-sort the toolbox items. To re-sort, right-click the toolbox items and choose Reset Toolbox.	OpenSpan.Studio.exe
US-311218	This build adds the SaveAsType parameter to the Microsoft Excel Connector SaveAs overload method so you can specify the file format.	OpenSpan.Office.dll
BUG-435831	This build changes the system to return an empty string instead of an exception when a Textbox control has a blank value.	OpenSpan.Translators.PowerBuilder.x32.dll
BUG-434682	This build changes the OSDump utility to ensure that it captures the dump of a 64-bit process if the msg argument contains a space in the message.	OSDump.exe
BUG-437098	This build ensures that formulas are imported correctly when you use the Microsoft Excel File Connector.	OpenSpan.Office.Excel.dll
ISSUE-63025	This build adds to the Runtime install folder a Licensing folder and the THIRDPARTYLICENSES.txt file.	THIRDPARTYLICENSES.txt
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.1.1809 • Pega RPA Service 3.1.2.0 • Pega Synchronization Engine 3.1.1.0 • Pega Package Server and Server Status 3.1.1.0		
Build 19.1.2.0 — July 02, 2019		
US-307757	This build changes the system so that users of CyberArk and DPAPI can retrieve Registration Operator, Windows User, and Runtime User credentials based on the current workgroup. For more information, see CyberArk support in Pega Robotic Automation.	OpenSpan.Security.dll OpenSpan.Interactions.dll OpenSpan.ApplicationFramework.dll OpenSpan.Controls.dll OpenSpan.Server.Client.dll OpenSpan.Adapters.dll
ISSUE-61432	This build changes the system to properly handle Kerberos authentication in RPA mode.	OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll Pega.PackageDownloader.exe
The Robot Runtime distribution for this build includes the following updated product: • Pega Native Foundation 10.1.1.1809 • Pega RPA Service 3.1.2.0 * • Pega Synchronization Engine 3.1.1.0 • Pega Package Server and Server Status 3.1.1.0 * Updated in this build.		
Build 19.1.1.0 — May 31, 2019		
Not applicable	This is the initial released build of Pega Robotic Automation 19.1. For more information about the features and enhancements in the initial release of version 19.1, see the Pega Robotic Automation Release Notes. This initial release includes the following components: • Pega Robot Runtime 19.1.1.0 • Pega Robot Studio 19.1.1.0 • Pega Robot Studio Plugin 19.1.1.0 • Pega Native Foundation 10.1.1.1809 • Pega RPA Service 3.1.1.0 • Pega Synchronization Engine 3.1.1.0 • Pega Synchronization Server 3.1.1.0 • Pega Package Server 3.1.1.0 • Pega Server Status 3.1.1.0 • Pega Robotic Automation Security Token Service 3.1.1.0 • Pega OCR Essentials 19.1.1.0 • Pega Citrix Channel Driver 19.1.1.0 • Pega Chrome extension 1.0.86	Not applicable

Modified assemblies in 19.1 addendum

The security-related changes included in the following Pega Robotic Automation 19.1 builds modified the assemblies shown in the corresponding tables:

- 19.1.111
- 19.1.93
- 19.1.91

19.1.111

This build adds complete support for the Java Standard Widget Toolkit (SWT).

Assemblies modified in build 19.1.111

Item	Assemblies	

Item	Assemblies	
GOAL-22714	OpenSpan.dll OpenSpan.Studio.dll OpenSpan.Transform.dll OpenSpan.Adapters.Java.dll OpenSpan.Adapters.Java.Design.dll OpenSpan.Adapters.Java.Interfaces.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Translators.Java.Agent.x32.dll OpenSpan.Translators.Java.Agent.x64.dll IJavaNativeExpandBar.class IJavaNativeGroupBox.class IJavaNativeLinkLabel.class IJavaNativeWebView.class ISWTBroker.class ISWTButton.class OpenSpanJavaBroker.class OpenSpanJavaFxWebViewTranslatorFx.class OpenSpanJavaObjectWrapper.class OpenSpanJavaReflection.class OpenSpanJavaUICHelper.class OpenSpanSWTBroker$1.class OpenSpanSWTBroker$2.class OpenSpanSWTBroker$ShellActivationTracker.class OpenSpanSWTBroker.class OpenSpanSWTBrowserTranslatorSWT.class OpenSpanSWTBrowserWrapper.class OpenSpanSWTButtonTranslatorSWT.class	OpenSpanSWTButtonWrapper.class OpenSpanSWTCLabelTranslatorSWT.class OpenSpanSWTCLabelWrapper.class OpenSpanSWTComboTranslatorSWT.class OpenSpanSWTComboWrapper.class OpenSpanSWTCompositeTranslatorSWT.class OpenSpanSWTControlTranslatorSWT.class OpenSpanSWTCTabFolderTranslatorSWT.class OpenSpanSWTCTabFolderWrapper.class OpenSpanSWTExpandBarTranslatorSWT.class OpenSpanSWTExpandBarWrapper.class OpenSpanSWTGroupTranslatorSWT.class OpenSpanSWTGroupWrapper.class OpenSpanSWTLabelTranslatorSWT.class OpenSpanSWTLabelWrapper.class OpenSpanSWTLinkTranslatorSWT.class OpenSpanSWTLinkWrapper.class OpenSpanSWTListTranslatorSWT.class OpenSpanSWTListWrapper.class OpenSpanSWTSliderTranslatorSWT.class OpenSpanSWTSliderWrapper.class OpenSpanSWTSxSyTreeTranslatorSWT.class OpenSpanSWTTabFolderTranslatorSWT.class OpenSpanSWTTableTranslatorSWT.class OpenSpanSWTTableWrapper.class OpenSpanSWTTextTranslatorSWT.class OpenSpanSWTTextWrapper.class OpenSpanSWTTreeTranslatorSWT.class TypePrototypeSlim.class

19.1.93

To enhance security, this build resolves some potential vulnerabilities and updates some assemblies to target .NET 4.6.1. The following assemblies were modified in this build:

Assemblies modified in build 19.1.93

Item	Assemblies	
	APISimulatorCLI.exe APISimulatorUI.exe ExcelDump.exe OSDump.exe Office2007\OpenSpan.Office.Design.dll Office2007\OpenSpan.Office.dll Office2010\OpenSpan.Office.Design.dll Office2010\OpenSpan.Office.dll Office2013\OpenSpan.Office.Design.dll Office2013\OpenSpan.Office.dll Office2016\OpenSpan.Office.Design.dll Office2016\OpenSpan.Office.dll Office2019\OpenSpan.Office.Design.dll Office2019\OpenSpan.Office.dll OpenSpan.Adapters.AWD.dll OpenSpan.Adapters.ActBar2.Design.dll OpenSpan.Adapters.ActBar2.dll OpenSpan.Adapters.ActiveX.Design.dll OpenSpan.Adapters.ActiveX.dll OpenSpan.Adapters.Audatex.dll OpenSpan.Adapters.Baan.Design.dll OpenSpan.Adapters.Baan.dll OpenSpan.Adapters.CIPCommunicator.Design.dll OpenSpan.Adapters.CIPCommunicator.dll OpenSpan.Adapters.CRIF.Design.dll OpenSpan.Adapters.CRIF.Interfaces.dll OpenSpan.Adapters.CRIF.dll OpenSpan.Adapters.CSG.Design.dll OpenSpan.Adapters.CSG.dll OpenSpan.Adapters.Clarify.Design.dll OpenSpan.Adapters.Clarify.dll OpenSpan.Adapters.ComponentOneOCX.Design.dll OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Adapters.Crescent.Design.dll OpenSpan.Adapters.Crescent.dll OpenSpan.Adapters.DataGrid.dll OpenSpan.Adapters.Delphi.Design.dll OpenSpan.Adapters.Delphi.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.DotNet.Design.dll OpenSpan.Adapters.DotNet.WPF.FocusPoint.Design.dll OpenSpan.Adapters.DotNet.WPF.FocusPoint.Interfaces.dll OpenSpan.Adapters.DotNet.WPF.FocusPoint.dll OpenSpan.Adapters.DotNet.dll OpenSpan.Adapters.Facets.Design.dll OpenSpan.Adapters.Facets.Interfaces.dll OpenSpan.Adapters.Facets.dll OpenSpan.Adapters.FarpointGrid.Design.dll OpenSpan.Adapters.FarpointGrid.dll OpenSpan.Adapters.FarpointList.Design.dll OpenSpan.Adapters.FarpointList.dll OpenSpan.Adapters.FarpointOCX.Design.dll OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Adapters.FlexCell.Design.dll OpenSpan.Adapters.FlexCell.dll OpenSpan.Adapters.Gupta.Design.dll OpenSpan.Adapters.Gupta.dll OpenSpan.Adapters.IBM.Design.dll OpenSpan.Adapters.IBM.dll OpenSpan.Adapters.InfragisticsOCX.Design.dll OpenSpan.Adapters.InfragisticsOCX.dll OpenSpan.Adapters.JWalk.Design.dll OpenSpan.Adapters.JWalk.dll	OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.WinHLLAPIHost.x32.exe OpenSpan.Adapters.WinHLLAPIHost.x64.exe OpenSpan.Adapters.WinInet.dll OpenSpan.Adapters.Windows.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.dll OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.AgileDesktop.Framework.dll OpenSpan.AgileDesktop.Toolbar.dll OpenSpan.AgileDesktop.exe OpenSpan.ApplicationFramework.dll OpenSpan.Automation.Design.dll OpenSpan.Automation.dll OpenSpan.Build.Tasks.dll OpenSpan.Connectors.Citrix.Design.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe OpenSpan.Connectors.Citrix.dll OpenSpan.ConsoleTestRunner.exe OpenSpan.Consulting.WindowMgmt.BrowserManager.dll OpenSpan.Consulting.WindowMgmt.TabbedReparentContainer.dll OpenSpan.Consulting.WindowMgmt.dll OpenSpan.Controls.Design.dll OpenSpan.Controls.dll OpenSpan.Design.dll OpenSpan.DocumentOcr.dll OpenSpan.EventHost.exe OpenSpan.Events.dll OpenSpan.ExpressTranslators.Design.dll OpenSpan.ExpressTranslators.dll OpenSpan.IDE.dll OpenSpan.IniUpdater.exe OpenSpan.Interactions.Controls.Design.dll OpenSpan.Interactions.Controls.dll OpenSpan.Interactions.dll OpenSpan.MPF.dll OpenSpan.OCR.dll OpenSpan.Office.Excel.Design.dll OpenSpan.Office.Excel.dll OpenSpan.Pdf.PdfControl.dll OpenSpan.Pdf.PdfConnector.Design.dll OpenSpan.Pdf.PdfConnector.dll OpenSpan.PlaybackEngine.dll OpenSpan.Recording.Design.dll OpenSpan.Recording.dll OpenSpan.Runtime.Analytics.dll OpenSpan.Runtime.Core.dll OpenSpan.Runtime.Host.dll OpenSpan.Runtime.exe OpenSpan.Runtime64.exe OpenSpan.SSO.ADFS.dll OpenSpan.Script.Design.dll OpenSpan.Script.dll OpenSpan.Security.dll OpenSpan.Server.Client.dll OpenSpan.Server.Controls.Design.dll OpenSpan.Server.Controls.dll OpenSpan.Service.Design.dll OpenSpan.Service.dll

EPIC-69668 **Item**	OpenSpan.Adapters.Java.Design.dll OpenSpan.Adapters.Java.Interfaces.dll OpenSpan.Adapters.Java.dll OpenSpan.Adapters.LegaSuite.Design.dll OpenSpan.Adapters.LegaSuite.dll OpenSpan.Adapters.MFC.dll OpenSpan.Adapters.MSFlexGrid.Design.dll OpenSpan.Adapters.MSFlexGrid.dll OpenSpan.Adapters.MSHFlexGrid.Design.dll OpenSpan.Adapters.MSHFlexGrid.dll OpenSpan.Adapters.MhTab.Design.dll OpenSpan.Adapters.MhTab.dll OpenSpan.Adapters.MicrosoftOCX.Design.dll OpenSpan.Adapters.MicrosoftOCX.dll OpenSpan.Adapters.NiSource.Design.dll OpenSpan.Adapters.NiSource.dll OpenSpan.Adapters.OpenEdge.Design.dll OpenSpan.Adapters.OpenEdge.dll OpenSpan.Adapters.PowerBuilder.Design.dll OpenSpan.Adapters.PowerBuilder.Interfaces.dll OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Adapters.ProfUIS.Design.dll OpenSpan.Adapters.ProfUIS.dll OpenSpan.Adapters.Remedy.Design.dll OpenSpan.Adapters.Remedy.dll OpenSpan.Adapters.RogueWave.ObjectiveGrid.Design.dll OpenSpan.Adapters.RogueWave.ObjectiveGrid.dll OpenSpan.Adapters.SAP.Design.dll OpenSpan.Adapters.SAP.Interfaces.dll OpenSpan.Adapters.SAP.dll OpenSpan.Adapters.SSTab.Design.dll OpenSpan.Adapters.SSTab.dll OpenSpan.Adapters.SharpGrid.Design.dll OpenSpan.Adapters.SharpGrid.dll OpenSpan.Adapters.Sheridan.Design.dll OpenSpan.Adapters.Sheridan.dll OpenSpan.Adapters.Siebel.Design.dll OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Siebel6.Design.dll OpenSpan.Adapters.Siebel6.dll OpenSpan.Adapters.SiebelOpenUI.Interfaces.dll OpenSpan.Adapters.Text.Console.dll OpenSpan.Adapters.Text.Design.dll OpenSpan.Adapters.Text.Host.dll OpenSpan.Adapters.Text.Windows.dll OpenSpan.Adapters.Text.dll OpenSpan.Adapters.TrustDesk.dll OpenSpan.Adapters.TvData.Design.dll OpenSpan.Adapters.TvData.dll OpenSpan.Adapters.QuickBooks.dll OpenSpan.Adapters.QuickBooks.Design.dll OpenSpan.Adapters.Uniface.Design.dll OpenSpan.Adapters.Uniface.Interfaces.dll OpenSpan.Adapters.Uniface.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.VisualBasic6.Design.dll OpenSpan.Adapters.VisualBasic6.dll OpenSpan.Adapters.Web.Design.dll OpenSpan.Adapters.Web.Electron.dll OpenSpan.Adapters.Web.SalesForceLightning.dll OpenSpan.Adapters.Web.SiebelOpenUI.Design.dll OpenSpan.Adapters.Web.SiebelOpenUI.dll	**Assemblies**	OpenSpan.Studio.Shell.exe OpenSpan.Studio.dll OpenSpan.TestRunner.exe OpenSpan.Threading.dll OpenSpan.Transform.dll OpenSpan.TranslatorIpc.dll OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.DevExpress.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v40.DevComponents.dll OpenSpan.Translators.DotNet.v40.DevExpress.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll OpenSpan.Translators.DotNet.v40.Shim.dll OpenSpan.Translators.DotNet.v40.WPF.FocusPoint.dll OpenSpan.Translators.DotNet.v40.WPF.Infragistics.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.UI.dll OpenSpan.UnitTesting.Design.dll OpenSpan.UnitTesting.dll OpenSpan.Virtual.Web.Interfaces.dll OpenSpan.Virtual.Web.SalesForceLightning.Interfaces.dll OpenSpan.Virtual.Web.SiebelOpenUI.Interfaces.dll OpenSpan.WebExtensionInstaller.exe OpenSpan.dll OpenSpan.v35.Shared.dll PdfDump.exe Pega.Brokers.Framework.DotNetWinforms.v20.dll Pega.Brokers.Framework.DotNetWinforms.v40.dll Pega.Brokers.Framework.DotNetWpf.v40.dll Pega.Brokers.Platform.DotNet.v20.dll Pega.Brokers.Platform.DotNet.v40.dll Pega.Controls.dll Pega.PackageDownloader.exe Pega.RegisterXRayDlls.exe Pega.Remoting.dll Pega.RobotInspector.dll Pega.Translators.DotNet.Virtual.dll Pega.Translators.DotNet.v20.DevExpress.dll Pega.Translators.DotNet.v20.WPF.dll Pega.Translators.DotNet.v20.WindowsForms.dll Pega.Translators.DotNet.v40.DevComponents.dll Pega.Translators.DotNet.v40.DevExpress.dll Pega.Translators.DotNet.v40.Infragistics.dll Pega.Translators.DotNet.v40.WPF.FocusPoint.dll Pega.Translators.DotNet.v40.WPF.Infragistics.dll Pega.Translators.DotNet.v40.WPF.dll Pega.Translators.DotNet.v40.WindowsForms.dll Pega.WinHllapi.Interop.dll Pega.Windows.Broker.Interop.dll Pega.Xray.Design.dll Pega.Xray.DictionaryEditor.exe Pega.Xray.DotNet.DictionaryGenerator.exe Pega.Xray.dll ProjectUpgrader.exe ShutdownRuntime.exe VeracodeAttributes.dll VeracodeAttributesv35.dll XmlUpdater.exe

19.1.91

The updated log4net and Newtonsoft Json.NET framework files are typically not included in an automation package and would therefore pose no security risk when you distribute packages throughout your organization. It is possible, however, to include these files in an automation package, though best practice is to exclude them. The following assemblies were modified in this build:

Assemblies modified in build 19.1.91

Item	**Assemblies**	
US-434052 US-434067 US-434093 US-434094	OpenSpan.AgileDesktop.exe OpenSpan.dll OpenSpan.ConsoleTestRunner.exe OpenSpan.EventHost.exe OpenSpan.Interactions.dll OpenSpan.Runtime.exe OpenSpan.Runtime64.exe OpenSpan.Runtime.Core.dll OpenSpan.Runtime.Host.dll OpenSpan.Studio.dll OpenSpan.TestRunner.exe Pega.ConsoleTestRunner.exe Pega.PackageDownloader.exe Pega.RegisterXRayDlls.exe Pega.TestRunner.exe ShutdownRuntime.exe OpenSpan.Adapters.Virtual.Design.dll Pega.Xray.dll Pega.Xray.Design.dll Pega.Xray.DictionaryEditor.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe Pega.Brokers.Platform.DotNet.v20.dll Pega.Brokers.Platform.DotNet.v40.dll Pega.Xray.DotNet.dll Newtonsoft.Json.dll log4net.dll OpenSpan.Adapters.WinHLLAPIHost.x32.exe	ImageAnalyzer.exe OSDump.exe OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Windows.dll OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.ApplicationFramework.dll OpenSpan.Connectors.Citrix.dll OpenSpan.Controls.dll OpenSpan.Events.dll OpenSpan.ExpressTranslators.dll OpenSpan.Interactions.Controls.dll OpenSpan.Recording.dll OpOpenSpan.Runtime.Analytics.dll OpenSpan.Script.dll OpenSpan.Security.dll OpenSpan.Server.Client.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.DevExpress.dll OpenSpan.Translators.DotNet.v20.Shim.tlb OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v40.DevExpress.dll OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Virtual.Interfaces.delegates.tlb

Item	Assemblies	
	OpenSpan.Adapters.WinHLLAPIHost.x64.exe Pega.Robot.Diagnostics.exe Pega.AssemblyAnalysis.dll Pega.ImageAnalysis.dll AssemblyAnalyzer.exe	Pega.IPC.Services.dll Pega.Remoting.dll Pega.RobotInspector.dll Pega.Translators.DotNet.v20.DevExpress.dll Pega.Translators.DotNet.v40.DevExpress.dll Pega.Translators.DotNet.Virtual.dll

Build notes: Pega Runtime Router Service 19.1

Build notes describe the changes that are included in each build that is created for the Pega Runtime Router Service. Before you install one of these builds, familiarize yourself with the new features, resolved issues, and other changes. For more information, see Runtime Routing Service.

To download a build, see Download Pega RPA software. For information about system requirements, see Pega Robotic Automation 19.1 Installation instructions.

Summary of changes

The changes that are included in the various Pega Runtime Router Service builds are listed in the following table:

Item number	Description	
Build 19.1.2.0 — December 04, 2021 — bundled with Pega Robotic Automation 19.1.98.0		
BUG-721689	This build ensures that Edge browsers running in Internet Explorer compatibility mode correctly minimize and maximize. This build ensures that Edge browsers running in Internet Explorer compatibility mode correctly minimize and maximize.	
BUG-721689	This build ensures that Edge browsers running in Internet Explorer compatibility mode correctly minimize and maximize. This build ensures that Edge browsers running in Internet Explorer compatibility mode correctly minimize and maximize.	
Assemblies	OpenSpan.SiebelOpenUI.Utility.js lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Adapters.Web.dll	OpenSpan.SiebelOpenUI.Utility.js lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi manifest.json OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Adapters.Web.dll
The Robot Runtime distribution for this build includes the following products: • Pega Native Foundation 10.1.31.2102 • Pega RPA Service 3.1.26.0 • Pega Synchronization Server 3.1.19.0 • Pega Synchronization Engine 3.1.24.0 • Pega Package Server and Server Status 3.1.5.0 • Pega Browser Extension 3.1.02.0 * * Added in this build.		
Build 19.1.1.0 — December 03, 2021 — bundled with Pega Robotic Automation 19.1.97.0		
Not applicable	This build is the initial released build of the Pega Runtime Router Service for Pega Robotic Automation 19.1.	Not applicable

Build notes: Pega Package Server and Server Status Page 3.1

Build notes describe the changes that are included in each build that is created for the Pega Package Server and Server Status. Before you install one of these builds, familiarize yourself with the new features, resolved issues, and other changes. For more information, see Pega Synchronization Server and Package Server User Guide.

To download a build, see Download Pega PRA software. For information on system requirements, review the installation instructions.

Summary of changes

The changes that are included in the various Pega Package Server and Server Status builds are listed in the following table:

Pega Package Server and Server Status 3.1 Build Notes

Item number	Description	Assemblies
Build 3.1.6.0 — April 25, 2023 — bundled with Pega Robotic Automation 19.1.123.	This build adds support for Microsoft .NET 6. There are no changes to the Pega Package Server functionality. This update only updates the prerequisites.	
US-537847 US-537604		All assemblies changed.

Item number	Description	Assemblies
	Build 3.1.5.0 — September 16, 2021 — bundled with Pega Robotic Automation 19.1.91.	
US-434088 US-436445	To enhance security, this build updates the following files: **Note:** If you are using .NET Core 3.1, you should upgrade to .NET 6. Note that .NET 6 is the Long Term Support version and has an end of support date of 11/24/2024. For more information, see Microsoft's .NET and .NET Core Support Policy. • JQuery.JavaScript.library.to.version.3.6.0 • Newtonsoft Json.NET framework to version 13.0	ServerStatus.exe PackageServerClient.exe newtonsoft.json.dll
	Build 3.1.4.0 — March 17, 2021 — bundled with Pega Robotic Automation 19.1.77.	
US-325594	This build updates the Package Server and Server Status to use .NET Core 3.1.	All assemblies for Package Server and Server Status
	Build 3.1.3.0 — October 22, 2019 — bundled with Pega Robotic Automation 19.1.15.	
BUG-513556	This build changes the system to ensure that information about the Security Token Service (STS) is correctly displayed on the Server Status page.	ServerStatus.dll
	Build 3.1.2.0 — August 19, 2019 — bundled with Pega Robotic Automation 19.1.7.	
US-311932-1	This build adds more descriptive server error messages to help you resolve any issues that might occur.	PackageServer.dll
	Build 3.1.1.0 — May 31, 2019 — bundled with Pega Robotic Automation 19.1.1.	
Not applicable	This is the initial released build of the Pega Package Server and Server Status for Pega Robotic Automation 19.1.	Not applicable

Build notes: Pega Robotic Automation 8.0 SP1

Build notes describe the changes that are included in each build that is created for Pega Robotic Automation Studio and Pega Robotic Automation Runtime version 8.0 SP1. Before you install one of these builds, familiarize yourself with the new features, resolved issues, and other changes. For more information, see the Pega RPA product page.

For more information, see Download Pega RPA software. For information on system requirements, review the installation instructions.

Summary of changes

The changes that are included in the various Robotic Automation version 8.0 SP1 builds are listed below. For more information about the features and enhancements in the initial release of version 8.0 SP1, see the Pega Robotic Automation Studio/Runtime Release Notes.

8.0 SP1 Build Notes

Item number	Description	Assemblies
	Build 8.0 SP1 2063 — RLS-23166 — July 24, 2020	
US-360856 US-360857	This hotfix updates the Robotic Automation Studio and Robotic Automation Runtime installers so that they install the latest provisioned RDA certificate. This certificate expires on 4/16/2022.	Not applicable
US-361558 US-361559	This hotfix adds a note to the Robotic Desktop Automation (RDA) Integration page in the Setup wizard to tell you that a certificate is installed when you enable RDA integration. This certificate provides secure communications between Pega applications and Robot Runtime.	Not applicable
	Build 8.0 SP1 2062 — RLS-23104 — June 05, 2020	
BUG-542122 US-362258	This hotfix corrects a problem that could prevent input elements from receiving the correct amount of padding.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll openspan.ini
	Build 8.0 SP1 2061 — RLS-23076 — May 15, 2020	
BUG-538985	**Note:** The Pega Chrome extension version 1.0.95 is included in this build. This hotfix ensures that the system suppresses the “Control Not Created” exception when it calls rematched children.	OpenSpan.Adapters.Web.dll
BUG-554129	This hotfix changes the Pega Chrome Extension to ensure that documents are properly destroyed when you use the Universal Web Adapter.	lajjpilliikppcbaghjehndpfdiiphbe_main.crx lajjpilliikppcbaghjehndpfdiiphbe_main.xpi

Item number	Description	Assemblies
	Build 8.0 SP1 2060 — RLS-22959 — May 08, 2020	
BUG-506515	This hotfix corrects an issue that could potentially prevent Internet Explorer from rendering pages when you use a web adapter for an extended period of time.	OpenSpan.Translators.IntertnetExplorer.x32.dll OpenSpan.Translators.IntertnetExplorer.x64.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
	Build 8.0 SP1 2059 — RLS-22862 — April 06, 2020	
US-352159	This hotfix prevents potential Robot Studio crashes by resolving an exception in the XamGrid translator.	OpenSpan.Translators.DotNet.v40.WPF.Infragistics.dll
	Build 8.0 SP1 2058 — RLS-22843 — March 07, 2020	
BUG-541197	This hotfix corrects a problem that could, in some Siebel OpenUI configurations, cause control targets to become out-of-sync with the webpage. To resolve this problem, this hotfix adds the ViewReloaded event, which fires when the ViewLoaded event fires on the Siebel view two or more times: ViewReloaded {RematchOnReload} If this problem occurs, set the RematchOnReload argument to True to trigger a rematch when the view reloads.	OpenSpan.Adapters.Web.SiebelOpenUI.dll
	Build 8.0 SP1 2057 — RLS-22791 — February 26, 2020	
BUG-536824	This hotfix ensures the proper setup of certification paths when you install the software on a system without internet access. The certificate package now includes the certificate chain by default.	localruntime.pega.com.pfx
US-324344	This hotfix updates the local runtime certificate to extend the expiration date. The previous certificate expires on April 30, 2020. The new certificate expires on March 12, 2021.	localruntime.pega.com.pfx
	Build 8.0 SP1 2056 — RLS-22781 — February 14, 2020	
BUG-533664	**Note:** The Pega Chrome extension version 1.0.94 is included in this build. This hotfix ensures that the Pega Chrome Extension does not issue an exception when Studio interrogates certain types of Siebel pop-up dialog boxes.	Chrome Extension lajjpilliikppcbaghjehndpfdiiphbe_main.crx manifest.json
	Build 8.0 SP1 2055 — RLS-22617 — February 10, 2020	
BUG-516578	This hotfix prevents sporadic crashes when automating the TriZetto Facets 5.60 application. Updates include better handling of control creation and destroyed events and the following new Advanced Configuration items: • TabularCombo • FmtListText • FmtListTextItem You can use these Advanced Configuration items to disable target creation for unnecessary control types that add significant overhead.	OpenSpan.Adapters.Facets.Design.dll OpenSpan.Adapters.Facets.dll OpenSpan.Adapters.Facets.Interfaces.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dl
BUG-538894	This hotfix corrects an issue where the Load Local Project, Load Web Project, and Unload Project menu display settings in the RuntimeTrayMenu section of the RuntimeConfig.xml file were not being honored. These menu items are now shown or hidden during runtime, based on the RuntimeConfig.xml file settings.	OpenSpan.Runtime.exe OpenSpan.Runtime.x64.exe
	Build 8.0 SP1 2054 — RLS-22599 — December 13, 2019	
BUG-502202	This hotfix adds missing Siebel 6 Checkbox-destroyed logic and corrects tracing inconsistencies.	OpenSpan.Adapters.Siebel.Design.dll OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Siebel6.Design.dll OpenSpan.Adapters.Siebel6.dll OpenSpan.Translators.Siebel6.SscfUi.x32.dll
ISSUE-67968	This hotfix cleans up WPF controls when hosted in WindowsForms on a WPF application.	OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll

Item number	Description	Assemblies
	Build 8.0 SP1 2053 — RLS-22584 — November 27, 2019	
US-334297 BUG-369382	This hotfix sets Health Statistics events data timestamps to the same format as expected by the Pega Robotic Automation Deployment Portal (formerly known as OpenSpan Management Console), regardless of the client-machine culture.	OpenSpan.Events.dll
BUG-522467	This hotfix causes the Collection Editor in lookup tables to support the Cancel button correctly, reverting to the original value.	OpenSpanControls.dll OpenSpan.Controls.Design.dll
BUG-404995	This hotfix causes the CredentialStore component to respect the location after a new location is set.	OpenSpan.Controls.dll
	Build 8.0 SP1 2052 — RLS-22538 — November 25, 2019	
BUG-518345	This hotfix suppresses a warning that displays when the StartMyDay service tries to send messages from one context to another, when multiple Citrix Contexts are in a solution. The hotfix waits until all Runtime projects have fully loaded to evaluate whether a warning is needed.	OpenSpan.Runtime.Core.dll
BUG-510616	This hotfix resets the ParallelProcessWaitHandles before executing the threads. This addresses an issue where the ParallelProcess component does not honor the Timeout property when executing the component more than once. The completed event fires immediately, since the WaitHandle was signaled on a previous usage of the component and not reset.	OpenSpanControls.dll
ISSUE-68578	This hotfix adds a null check to prevent a JavaScript error in a page from being tracked.	OpenSpan.js
	Build 8.0 SP1 2051 — RLS-22524 — November 08, 2019	
BUG-514436	This hotfix modifies the system to prevent Runtime memory leaks when an automation calls the SetWindowLong and GetWindowLong methods on windows where Runtime attaches.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
BUG-516946	This hotfix changes the system to ensure that the Microsoft Office Connector files are copied into the installation folder when you first create a solution.	OpenSpan.Studio.dll
ISSUE-68204	This hotfix corrects the version number assigned to the 32-bit FlexCell translator.	OpenSpan.Translators.FlexCell.x32.dll
	Build 8.0 SP1 2050 — RLS-22508 — November 04, 2019	
EPIC-57164 US-315108	This hotfix adds support for the FlexCell Grid.	OpenSpan.Adapters.FlexCell.Design.dll OpenSpan.Adapters.FlexCell.dll OpenSpan.Translators.FlexCell.x32.dll
BUG-512725	This hotfix resolves an exception that could occur when you call methods on a Syncfusion grid.	OpenSpan.Translators.DotNet.Syncfusion.dll
	Build 8.0 SP1 2049 — RLS-22449 — October 28, 2019	
ISSUE-64021	This hotfix corrects a problem that could prevent you from installing the Citrix Channel Driver on machines that had the Citrix Workspace app installed.	PegaCitrixChannelDriverSetup.msi PegaCitrixChannelDriverSetup.x64.msi PegaCitrixChannelDriverSetup.exe PegaCitrixChannelDriverSetup1.cab
BUG-502202	This hotfix adds translator code that allows you to interrogate the Siebel 6 Checkbox control.	OpenSpan.Adapters.Siebel.Design.dll OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Siebel6.Design.dll OpenSpan.Adapters.Siebel6.dll OpenSpan.Translators.Siebel6.SscfUi.x32.dll
BUG-511965	This hotfix adds the EnableFollowRedirects property to the openspan.ini file. The default is True, which sets the FollowRedirects property on the URL request to True. This allows requests to redirect before being locked on the ReadResponseBody, which ensures that all URLs are processed.	Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
	Build 8.0 SP1 2048 — RLS-22423 — October 10, 2019	
BUG-	This hotfix corrects a problem that could prevent document form fields from being	

511991	highlighted correctly in the Document Type editor.	OpenSpan.Pdf.PdfConnector.dll
Item number	**Description**	**Assemblies**
BUG-508595	This hotfix resolves an issue that could prevent you from interrogating Java 5 applications.	OpenSpanJavaBroker.class
BUG-512692	This hotfix resolves an issue that could prevent the Pega RPA Service from allowing Robot Runtime to shut down when the WaitForAutomations option is used in the RuntimeConfig.xml file.	OpenSpan.Interactions.dll
Build 8.0 SP1 2047 — RLS-22393 — September 27, 2019		
BUG-508009	This hotfix adds the ScheduledTaskStartBoundary configuration setting to the RpaService.config.xml file. Use this setting to ensure that the start boundary does not occur before the scheduled task.	OpenSpan.WinLogon.Scheduler.dll
BUG-505033	This hotfix corrects a problem that could prevent the system from downloading the Citrix ICA file and prevent you from connecting to a Citrix server. This hotfix also changes the WebInterfaceNavigation.exe program so that it now creates its own log file instead of using runtimelog.txt file.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe
Build 8.0 SP1 2046 — RLS-22360 — September 20, 2019		
BUG-501507	This hotfix modifies the system to ensure that HTTP and HTTPS requests redirect appropriately in Adobe Flash applications. **Note**: Adobe ended support for Adobe Flash on December 31, 2020. For more information, see Adobe Flash Player EOL General Information Page.	Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
BUG-505711	This hotfix modifies the system to ensure that it correctly identifies and interrogates Adobe Flash child controls.	Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
Build 8.0 SP1 2045 — RLS-22334 — September 12, 2019		
EPIC-57116 US-306452 US-306456	This hotfix adds support for controls in SAP version 7.6 and version 7.6, Patch 1.	OpenSpan.Adapters.SAP.Design.dll OpenSpan.Adapters.SAP.dll OpenSpan.Adapters.SAP.Interfaces.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
BUG-500624	This hotfix ensures that the system adds CustomHeaders to outgoing HTTP or HTTPS requests on the RobotManagerRestClient component.	OpenSpan.Interactions.Controls.dll OpenSpan.Interactions.dll
ISSUE-64446	This hotfix modifies the system to ensure that the Java translator reads the options in the java section of the openspan.ini file.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
ISSUE-64459	This hotfix removes code that allowed you to add custom classes within a global script that did not include circular referencing.	OpenSpan.Studio.dll
BUG-501171	This hotfix adds a file format check to ensure that XML configuration files are only transformed into JSON format once.	OpenSpan.Server.Client.dll
BUG-483175	This hotfix resolves an issue that could prevent the Java translator from being ready to receive messages from the adapter.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
Build 8.0 SP1 2044 — RLS-22306 — September 04, 2019		
US-315928	This hotfix removes unnecessary Text Adapter options.	Openspan.Studio.dll
US-255358	This hotfix adds support for the Adobe Flash TreeView control.	Platforms/UI Connectors/Flash/DataGridControlExtension.design.json Platforms/UI Connectors/Flash/TreeViewExtension.cs Platforms/UI Connectors/Flash/TreeViewExtension.design.json Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
US-313562 RLS-9438 US-320960 EPIC-	This hotfix changes the system so that you can define UI Automation parsing instructions in JSON files (app models). If the UI Automation structures change for an application, you can now address the changes in the JSON file.	OpenSpan.Events.dll

Item number	Description	Assemblies
56733		
	Build 8.0 SP1 2043 — RLS-22249 — August 26, 2019	
US-260110	This hotfix adds support for the following additional spreadsheet types when you use the Excel Connector: • Microsoft Excel: .xlsx, xlsm, .xltx, .xltm, .xls, .xlt • OpenDocument spreadsheet: .ods, .ots • Character Separated Values: .csv, .tsv This hotfix also adds the following methods: • FindRows • FindColumns The Open and Save methods have been enhanced to support CSVLoadOptions and CSVSaveOptions that let you specify the delimiters and other options. In addition, this hotfix adds the OutputName property. Use this property to specify one of the supported file types. If you include a Save method, the system uses the value entered for this property unless it is set to null. If set to null, the system uses the value for the FileName property.	OpenSpan.Office.Excel.dll
US-311218	This hotfix adds the SaveAsType parameter to the Microsoft Excel Connector SaveAs overload method so you can specify the file format.	OpenSpan.Office.dll
BUG-48530	This hotfix ensures that Farpoint grid controls are drawn correctly.	OpenSpan.Translators.FarpointGrid.x32.dll
EPIC-43937 US-304605	This hotfix adds support for the GXWND Grid (RogueWave Objective Grid) control.	OpenSpan.Adapters.RogueWave.ObjectiveGrid.Design.dll OpenSpan.Adapters.RogueWave.ObjectiveGrid.dll OpenSpan.Translators.RogueWave.ObjectiveGrid.x32.dll
BUG-496257	This hotfix corrects a problem that could cause Studio to throw fatal object reference exceptions when you selected an extracted proxy in Object Explorer or opened the Configure Type window to select properties, methods, or events of the proxy. This error could also occur if you moved the proxy's properties, methods, or events to the Automation Designer.	OpenSpan.dll
	Build 8.0 SP1 2042 — RLS-22231 — August 12, 2019	
BUG-489625	This hotfix uses alternative files to determine if the DotNet translator should load. The DotNet translator can temporarily fail to match controls after Windows updates.	OpenSpan.Translators.DotNet.x32.dll OpenSpan.Translators.DotNet.x64.dll
EPIC-35501 GOAL-8773 EPIC-35502 EPIC-56538	This hotfix adds a translator for a customer-specific Uniface application.	OpenSpan.Adapters.Uniface.dll OpenSpan.Adapters.Uniface.Design.dll OpenSpan.Adapters.Uniface.Interfaces.dll OpenSpan.Translators.Uniface.Umsw.x32.dll
BUG-426215	This hotfix configures the JsonUtils component's JSONKeys property collection editor to discard changes when you cancel a dialog.	OpenSpan.Controls.dll OpenSpan.Controls.Design.dll
BUG-488089	This hotfix updates the base RestClient to allow utilizing cookies.	OpenSpan.Controls.dll
BUG-500344	This hotfix corrects a callback cleanup issue.	OpenSpan.Adapters.dll OpenSpan.Adapters.Windows.dll Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
	This build includes Pega Native Foundation 10.0.19030. For more information, see Build notes - 10.0 Pega Native Foundation.	
	Build 8.0 SP1 2041	
	The changes in this build were published in 8.0.SP1 2042.	
	Build 8.0 SP1 2040 — RLS-22190 — July 31 2019	
BUG-407707	This hotfix corrects a problem that could cause a local Citrix context to crash.	Openspan.Runtime.Core.dll

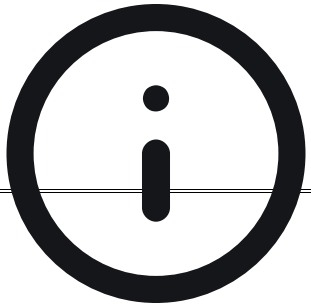
Item number	Description	Assemblies
BUG-439546	This hotfix provides faster response when matching and automating Java controls.	OpenSpanJavaObjectWrapper.java OpenSpanJavaSwingTabStripWrapper.java
EPIC-56070	This hotfix expands the support for Microsoft OCX TreeView so that the system now adds all nodes that match the search criteria. You can add search criteria using plain text or regex.	OpenSpan.Adapters.dll
Build 8.0 SP1 2039 — RLS-22156 — July 22, 2019		
BUG-494904	This hotfix corrects a problem that could prevent Runtime in Workforce Intelligence implementations from returning screen titles.	OpenSpan.Runtime.Analytics.dll
US-260546 US-309875	This hotfix changes the system so that toolbox items now appear in alphabetical order. This hotfix also adds the Reset Toolbox option, which you can use to re-sort the toolbox items. To re-sort, right-click the toolbox items and choose Reset Toolbox.	PluginManifest.xml OpenSpan.Studio.exe
BUG-488706 BUG-491732	This hotfix corrects a problem that could cause an exception when you called the GetText method in Siebel version 6.3.	Pega.Native.Remoting.x32.dll Pega.Native.Remoting.x64.dll OpenSpan.Translators.Siebel6.SscfUi.x32.dll
EPIC-37207	This hotfix changes the system so that you can interrogate a menu bar in the Kinaxis RapidResponse application and add menu items.	OpenSpanJavaJideSoftDockBarContainerWrapper.class
Build 8.0 SP1 2038 — RLS-22125 — July 15, 2019		
	Note: The Pega Chrome extension version 1.0.90 is included in this build.	
BUG-488688	This hotfix corrects a problem that prevented the Runtime log files from being placed in the folder that you specified in the RuntimeConfig.xml file.	OpenSpan.dll
BUG-493558	This hotfix corrects a problem that could cause Facets to crash after several automation iterations in a ListText control.	OpenSpan.Translators.Facets.CerlCtl.x32.dll
BUG-435119	This hotfix corrects a problem that could cause the following message: The Process iexplore.exe failed to start within the given timeframe.	OpenSpan.Adapters.Windows.dll
EPIC-37207	This hotfix adds support for Java JIDE nested sub-menus.	OpenSpanJavaWrappers\OpenSpanJavaJideSoftDockBarContainerWrapper.class
BUG-482905	This hotfix ensures that the Microsoft Office Connector files are copied to the installation folder and the RuntimeConfig.xml and StudioConfig.xml files include the correct version information in the OfficeVersion parameter.	OpenSpan.Studio.dll
BUG-493167	This hotfix addresses logging issues that could degrade application performance.	OpenSpan.dll
ISSUE-62354	This hotfix improves the log message that displays when the heartbeat is not properly configured on platform side.	Pega.RpaService.Service.exe
BUG-482905	This hotfix ensures that the correct Microsoft Office Connector assemblies are copied into the installation folder.	OpenSpan.Studio.dll
ISSUE-61766	This hotfix ensures that all COM pointers are released.	OpenSpan.Adapters.SharpGrid.Design.dll OpenSpan.Adapters.SharpGrid.dll OpenSpan.Translators.SharpGrid.x32.dll
	This hotfix adds support for the Adobe Flash and Apache Flex applications using the Google Chrome browser. The Adobe Flash and Apache Flex translator works	OpenSpan.Adapters.Audatex.dll OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Adapters.Delphi.Design.dll OpenSpan.Adapters.Delphi.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.TrustDesk.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.VisualBasic6.Design.dll OpenSpan.Adapters.VisualBasic6.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Windows.dll OpenSpan.ChromeExtensionInstaller.exe OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe

Item number	Description	Assemblies
GOAL-5359	with Universal Web Adapter. The Adobe Flash and Apache Flex (formerly Adobe Flex) software provides a development environment for building games and applications by using the ActionScript language and the open source Flex framework. For more information, see Adobe Flash and Apache Flex application support. **Note**: Adobe ended support for Adobe Flash on December 31, 2020. For more information, see Adobe Flash Player EOL General Information Page.	OpenSpan.Translators.AWD.x32.dll OpenSpan.Translators.Clarify.x32.dll OpenSpan.Translators.Clarify.x64.dll OpenSpan.Translators.CrescentText.x32.dll OpenSpan.Translators.CSG.x32.dll OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll OpenSpan.Translators.FarpointGrid.x32.dll OpenSpan.Translators.FarpointList.x32.dll OpenSpan.Translators.Gupta.Tabli62.x32.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Translators.MhTab.x32.dll OpenSpan.Translators.MSFlexGrid.x32.dll OpenSpan.Translators.MSHFlexGrid.x32.dll OpenSpan.Translators.NiSource.KipCzCnr.x32.dll OpenSpan.Translators.NiSource.KipCzNb.x32.dll OpenSpan.Translators.ProfUIS.x32.dll OpenSpan.Translators.SSTab.x32.dll OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.Virtual.Interfaces Pega.Remoting.dll Pega.Translators.Web.ChromeAdobeFlash.x32.dll Pega.Translators.Web.ChromeAdobeFlash.x64.dll
Build 8.0 SP1 2037 — RLS-22098 — June 28, 2019		
BUG-489334	This hotfix corrects a problem that could cause Java to crash if you opened a new window that included custom Java components.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
Build 8.0 SP1 2036 — RLS-22068 — June 24, 2019		
BUG-445304	This hotfix corrects a problem that could cause Runtime to crash when an automation was removing TableSection clones.	OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll
US-245205	This hotfix adds a confirmation dialog that displays before the system deletes an EntryPoint from an automation.	OpenSpan.Automation.Design.dll
BUG-484361	This hotfix adds UrlReload properties that allow you to reload a webpage after a specified time if the LoadCompleted event does not fire. This helps you to avoid the following error in Citrix environments: ICA file creation failed	OpenSpan.Connectors.Citrix.Design.dll OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe
This build includes Pega Native Foundation 10.0.18099. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2035 — RLS-22058 — June 17, 2019		
BUG-483799	This hotfix adds support for WindowsForms controls that are created off the main UI and moved onto it later.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
EPIC-34840	This hotfix adds support for the Microsoft OCX MS Grid Common control. Support for the following properties was added: • ColumnHeaders • ColumnCount • RowCount Support for the following methods was added: • ClickCell • DoubleClickCell • EnsureVisible • GetCellValue • SelectCell For more information, see Microsoft OCX MS Grid Common controls.	OpenSpan.Adapters.MicrosoftOCX.dll OpenSpan.Adapters.MicrosoftOCX.Design.dll OpenSpan.Translators.MSGridControl.x32.dll
BUG-430965	This hotfix corrects a problem that prevented Microsoft Excel processes from closing after you called the Close method in an automation.	OpenSpan.Office.dll OpenSpan.Office.Design.dll
ISSUE-61426	This hotfix adds a /Public Automations folder to the template that is used when you create an empty Pega Robotics project.	OpenSpan.Studio.exe
Build 8.0 SP1 2034 — RLS-22019 — June 12, 2019		
BUG-483749	This hotfix adds a Public Automations folder to project if it is missing.	OpenSpan.Studio.exe
	This hotfix adds support for the ComponentOne OCX True DBGrid v7 control. This change supports a standard grid interface and includes the following properties:	

Item number	Description	Assemblies
EPIC-34768	• ColumnCount • RowCount • ColumnHeaders Also included are the following methods: • ClickCell • DoubleClickCell • GetCellValue • SelectRow For more information, see ComponentOne OCX True DBGrid v7 controls.	OpenSpan.Translators.ComponentOne.Todg7.x32.dll OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Adapters.ComponentOneOCX.Design.dll
EPIC-34624	This hotfix adds logical grids. Logical grids allow the system to interrogate as a grid control and its child controls that are presented in a grid structure. This eliminates the need to interrogate the child controls. For more information, see Logical grid properties, methods, and events.	OpenSpan.Adapters.dll OpenSpan.Translators.Java.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll
Build 8.0 SP1 2033 — RLS-22006 — June 7, 2019		
BUG-432109	This hotfix changes the system to allow other applications read-only access to WinHllapi when Pega is using it.	OpenSpan.Adapters.Design.dl OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Text.Host.dll
BUG-484872	This hotfix corrects a problem that could cause an Intermittent crash if wait time is enabled.	OpenSpan.Events.dll
EPIC-37207	This hotfix changes the system so you can interrogate the menus and buttons inside the Java CommandBar and CommandMenuBar controls.	OpenSpanJavaComJidesoftActionCommandBarWrapper.class was removed from the OpenSpanJavaWrappers.
ISSUE-60910	This hotfix changes the system to avoid an error that could occur when you added an empty Pega Robotic Automation Project.	OpenSpan.Studio.exe
This build includes Pega Native Foundation 10.0.18098. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2032 — RLS-21990 — May 17, 2019		
US-268185	This hotfix changes the system to ensure that Runtime honors the enabled attribute of the Credential Manager server. If you set enabled to False, the system ignores the providerType attribute and uses the default security provider DPAPI.	CommonConfig.xml CredentialManagerConfig.xml SchedulerDefinitions.xml OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.dll OpenSpan.WinLogon.Common.dll OpenSpan.WinLogon.Launcher.exe OpenSpan.WinLogon.Scheduler.exe OpenSpan.WinLogon.Service.exe CredMgr.exe CredMgrUI.exe
US-305212	This hotfix adds support for retrieving RPA WindowsUser and RuntimeUser credentials based on the robot workgroup. This hotfix adds the Workgroup option to the Credential Manager (CredMgr.exe and CredMgrUI.exe). This option uses DPAPI as the security provider. This hotfix also adds the Workgroup option to the DPL security provider. You can configure the DPL workgroup in the CredentialManagerConfig.xml file.	CommonConfig.xml CredentialManagerConfig.xml SchedulerDefinitions.xml OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.dll OpenSpan.WinLogon.Common.dll OpenSpan.WinLogon.Launcher.exe OpenSpan.WinLogon.Scheduler.exe OpenSpan.WinLogon.Service.exe CredMgr.exe CredMgrUI.exe
EPIC-34456 BUG-482778 BUG-446338	This hotfix adds support for the Facets CER_FMT_LISTBOX control, which interrogates as a grid control. This hotfix also corrects a problem that caused the CER_USERDEF_LISTBOX and CER_TABULAR_COMBO controls to interrogate as generic controls.	OpenSpan.Adapters.Facets.Design.dll OpenSpan.Adapters.Facets.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll
US-304542	This hotfix changes the RPA Service web calls to always use the basic authentication method.	CommonConfig.xml CredentialManagerConfig.xml SchedulerDefinitions.xml OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.dll OpenSpan.WinLogon.Common.dll OpenSpan.WinLogon.Launcher.exe OpenSpan.WinLogon.Scheduler.exe OpenSpan.WinLogon.Service.exe CredMgr.exe CredMgrUI.exe

Item number	Description	Assemblies
ISSUE-60796	This hotfix corrects a problem that prevented sessions from ending as expected.	CommonConfig.xml CredentialManagerConfig.xml SchedulerDefinitions.xml OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.dll OpenSpan.WinLogon.Common.dll OpenSpan.WinLogon.Launcher.exe OpenSpan.WinLogon.Scheduler.exe OpenSpan.WinLogon.Service.exe CredMgr.exe CredMgrUI.exe
ISSUE-60797	This hotfix changes the system so that if a WindowsUser domain that is retrieved from a security provider is null or empty, the system uses the machine name as the default domain. This allows the scheduler to unlock and log onto local Windows systems.	CommonConfig.xml CredentialManagerConfig.xml SchedulerDefinitions.xml OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.dll OpenSpan.WinLogon.Common.dll OpenSpan.WinLogon.Launcher.exe OpenSpan.WinLogon.Scheduler.exe OpenSpan.WinLogon.Service.exe CredMgr.exe CredMgrUI.exe
BUG-444489	This hotfix corrects a problem that could prevent you from configuring variables with a single configuration file.	OpenSpan.IDE.dll
This build includes Pega Native Foundation 10.0.18097. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2031 — RLS-10931 — May 12, 2019		
BUG-482569	This hotfix corrects a problem that could prevent the Universal Web Adapter from unmatching.	OpenSpan.Adapters.Web.Universal
ISSUE-60376	This hotfix adds the VerifyURLAttempts property in the Citrix context. Use this property to specify the number of times the system tries to verify the URL in a Citrix context.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.Design.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe
BUG-439981	This hotfix corrects a problem that could prevent a translator from loading.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
BUG-445307	This hotfix adds support for dynamically-created WindowsForms controls that are hosted in Windows Presentation Foundation (WPF).	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
BUG-446258 BUG-446258	This hotfix corrects a project reference issue that could occur when you used the script component.	OpenSpan.Studio.dll
GOAL-9033	This hotfix adds support for the following SGGrid OCX grid controls: • ClickCell • DoubleClickCell • GetCellValue • GetColumnCount • GetRowCount • GetColumnHeader • GetSelectedColumn • GetSelectedRow	OpenSpan.Adapters.SharpGrid.Design.dll OpenSpan.Adapters.SharpGrid.dll OpenSpan.Translators.SharpGrid.x32.dll
Build 8.0 SP1 2030 — RLS-10926 — April 29, 2019		
GOAL-8650	This hotfix adds the following MS Common Control TreeView methods, which add support for check boxes: • ClickIcon (path) • ClickIconByRegEx (regex) • ClickIconByText (text to search for) For more information, see TreeView control properties, methods, and events.	OpenSpan.Adapters.MicrosoftOCX.dll OpenSpan.Adapters.MicrosoftOCX.Design.dll OpenSpan.Translators.MSCommonControls5.x32.dll OpenSpan.Translators.MSCommonControls5.x64.dll
US-272255	This hotfix changes the Pega Package Server to ensure that it rejects any package that the Pega Robot Manager rejects.	PackageServer.exe
This build includes Pega Native Foundation 10.0.18096. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2029 — RLS-9896 — April 22, 2019		

Item number	Description	Assemblies
BUG-437098	This hotfix ensures that when you import formulas from a data table, those formulas are used to calculate data, instead of being added as plain text.	OpenSpan.Office.Excel.dll
GOAL-8578	This hotfix adds a new class of automations that make it easier to invoke attended robotic desktop automations from within Pega 8.2 applications. With this new class of automations, called public automations, you can map input and output parameters to Pega class fields within Pega Dev Studio as you create the Pega application that invokes the attended robotic desktop automation. For more information, see Public automations.	CommonConfig.xml OpenSpan.dll OpenSpan.Adapters.dll OpenSpan.ApplicationFramework.dll OpenSpan.Automation.Design.dll OpenSpan.Automation.dll OpenSpan.MPF.dll OpenSpan.Runtime.Core.dll OpenSpan.Server.Client.dll OpenSpan.Studio.dll OpenSpan.Transform.dll
GOAL-8960	This hotfix adds support for CIS Application Notebook, Table, and List Tree controls.	OpenSpan.Adapters.NiSource.Design.dll OpenSpan.Adapters.NiSource.dll OpenSpan.Translators.NiSource.KipCzCnr.x32.dll OpenSpan.Translators.NiSource.KipCzNb.x32.dll
GOAL-9091	This hotfix adds support for the BeCubed MhTab control.	OpenSpan.Adapters.MhTab.Design.dll OpenSpan.Adapters.MhTab.dll OpenSpan.Translators.MhTab.x32.dll
BUG-431504	This hotfix adds support for Transport Layer Security (TLS) 1.2.	OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe
BUG-434682	This hotfix corrects a problem that could cause the OSDump utility to fail if there is whitespace in the message that you provided by using the msg parameter.	OSDump.exe OSDump.x64.exe
BUG-433399	This hotfix changes the system to avoid a hang when you use the WaitForAutomations option when shutting down Runtime.	OpenSpan.Runtime.Core.dll
Build 8.0 SP1 2028		
	The changes in this build were published in 8.0.SP1 2029.	
Build 8.0 SP1 2027 — RLS-9874 — April 16, 2019		
BUG-437908	This hotfix changes the system to ensure that when the value for the ReadyForRobotWork property changes, the system correctly handles it for RPA robots.	OpenSpan.dll OpenSpan.Adapters.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll
CR-54370	This hotfix changes the system to ensure that documents that create multiple URIs are handled correctly by the Synchronization Host.	OpenSpan.Adapters.Web.Universal.dll
This build includes Pega Native Foundation 10.0.18095. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2026 — RLS-9839 — April 08, 2019		
EPIC-34456 EPIC-34457 EPIC-34464	This hotfix adds a translator to support Rogue Wave controls.	OpenSpan.Adapters.RogueWave.ObjectiveGrid.dll OpenSpan.Translators.RogueWave.ObjectiveGrid.x32.dll
BUG-435831	This hotfix changes the system so that it returns an empty string when you attempt to get the text from an empty PowerBuilder DataGrid text field.	OpenSpan.Translators.PowerBuilder.x32.dll
CR-54479	This hotfix corrects a memory leak and incorporates some other performance enhancements.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll
Build 8.0 SP1 2025 — RLS-9818 — March 26, 2019		
BUG-432852	This hotfix corrects a problem that prevented you from editing the RuntimeConfig.xml file.	Pega Runtime installer
ISSUE-31057	This hotfix changes the system to ensure that the Pega RPA Service starts correctly.	OpenSpan.WinLogon.Common.dll OpenSpan.WinLogon.Service.exe

Item number	Description	Assemblies
BUG-428591	This hotfix changes the Domain field's readOnly property to False when a domain is required for Assisted Sign-On.	OpenSpan.Cli
BUG-431504	This hotfix updates support for Transport Layer Security (TLS) version 1.2 to avoid a TLS mismatch error that could occur when using the Citrix context.	OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe
Build 8.0 SP1 2024 — RLS-9807 — March 22, 2019		
US-266247	This hotfix changes the system to ensure that COM references in Microsoft Internet Explorer are managed correctly.	OpenSpan.IHTMLDocument.dll
EPIC-37265	This hotfix includes the following enhancements to lookup tables: • Adds the ImportDelimitedText method, which you can use to import delimited text files. • Adds support for importing fixed column width files. • Adds the Lookup Table RowCount property. • Ensure that the Add record for AutoIncrement table returns key. • Changes field collection to now list field names. • Adds the clearTable parameter to the Import functions. This hotfix also adds the following methods that you can use to save a workbook in XLSB format: • SaveAsXLSB(string fileName) - Use this method to save the open workbook, specified in the fileName parameter, in XLSB format. If the operation fails, there is no message. • SaveAsXLSB(string fileName, out string message) - Use this method to save the open workbook, specified in the fileName parameter, in XLSB format. If the operation fails, the system returns False and the message you specified with the out string message parameter. For more information, see LookupTable component.	OpenSpan.Controls.dll OpenSpan.Controls.Design.dll
US-267152	This hotfix corrects a problem with the Microsoft Excel component's SaveAs method that prevented it from correctly changing the file format.  **Note:** These changes do not apply to Microsoft Office 2002 and 2003.	OpenSpan.Office.dll
US-256490	This hotfix refactors the DotNetBroker and moves logic related to the DotNetBroker ToolBar and DotNetBroker Menu to the applicable translators.	OpenSpan.Adapters.Virtual.dll OpenSpan.Translatos.DotNet.v20.DevComponents.dll OpenSpan.Translatos.DotNet.v40.DevComponents.dll OpenSpan.Translatos.DotNet.v20.DevExpress.dll OpenSpan.Translatos.DotNet.v40.DevExpress.dll OpenSpan.Translatos.DotNet.v20.Infragistics.dll OpenSpan.Translatos.DotNet.v40.Infragistics.dll OpenSpan.Translatos.DotNet.v20.WPF.Infragistics.dll OpenSpan.Translatos.DotNet.v40.WPF.Infragistics.dll OpenSpan.Translatos.DotNet.v20.Broker.dll OpenSpan.Translatos.DotNet.v40.Broker.dll OpenSpan.Translatos.DotNet.Virtual.dll OpenSpan.Translatos.DotNet.v20.WPF.dll OpenSpan.Translatos.DotNet.v40.WPF.dll OpenSpan.Translatos.DotNet.v20.WindowsForms.dll OpenSpan.Translatos.DotNet.v40.WindowsForms.dll
CR-54438	This hotfix corrects a problem that could cause an automation to display an error that said OpenSpan.Automation.Design could not be found. This hotfix also includes the following new properties that you can use in the Citrix context: • Verify URL - Set this property to True if you want the system to verify that the URL is valid before it loads the page in the Web Navigation Form. If an error occurs, such as a 404 or 500 error, the system logs the error on the Logs tab of the form. The system attempts to verify the URL up to three times. • Verify URL Interval - Use this property to specify the amount of time in milliseconds between each attempt to verify the URL.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.Design.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe
Build 8.0 SP1 2023 — RLS-9787 — March 11, 2019		
US-261592	This hotfix adds support for future enhancements to credential management.	CommonConfig.xml CredentialManagerConfig.xml CredMgr.exe OpenSpan.WinLogon.Scheduler.exe OpenSpan.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Text.Host.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Design.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Windows.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.WinLogon.Common.dll

Item number	Description	Assemblies
BUG-432349	This hotfix changes the system to avoid displaying warning messages after you update and rebuild PDF Connector projects.	OpenSpan.Pdf.PdfConnector.dll
EPIC-35998	This hotfix adds the following methods to the Windows TreeView control: • FindNodeByText (string text, int column) • FindNodeByText (string text, string columnName) For more information, see TreeView control properties, methods, and events.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Adapters.SAP.dll
BUG-419163	This hotfix corrects a problem that could cause the automation to hang.	OpenSpan.IDE.dll
US-264003	This hotfix corrects a problem that could prevent Robotic Automation Runtime from polling for work from Robot Manager when in RPA mode.	CommonConfig.xml CredentialManagerConfig.xml CredMgr.exe OpenSpan.WinLogon.Scheduler.exe OpenSpan.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Text.Host.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Design.dll OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Windows.dll OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.WinLogon.Common.dll
	This hotfix changes the default for the Shutdown key in the RuntimeConfig.xml file to Immediate. • Prior to build 2019, this key defaulted to Immediate. • In builds 2019-2021, the default was changed to WaitForAutomation. If you installed Robotic Automation Runtime build 2019-2021 for a new user, ensure that the Shutdown key is set correctly for your implementation.	RuntimeConfig.xml
Build 8.0 SP1 2022		
	The changes in this build were published in 8.0.SP1 2023.	
Build 8.0 SP1 2021 — RLS-9767 — March 05, 2019		
BUG-414848	This hotfix enhances the system so that you can now see all of the solution configurations in Robot Manager.	OpenSpan.Common.dll OpenSpan.Studio.dll OpenSpan.dll OpenSpan.Server.Client.dll
BUG-415254	This hotfix corrects a problem that could cause a crash when PowerBuilder ToolBar windows are destroyed.	OpenSpan.Translator.PowerBuilder.x32.dll OpenSpan.Translator.PowerBuilder.x64.dll
Build 8.0 SP1 2020 — RLS-9731 — February 22, 2019		
EPIC-34078	This hotfix adds the DesktopAnalyticsConfig.xml file, which contains all of the configuration information for Workforce Intelligence implementations of Runtime. Placing all of this information in a single file makes it easier to manage for Workforce Intelligence administrators.	OpenSpan.ApplicationFramework.dll Openspan.Events.dll OpenSpan.Runtime.Core.dll OpenSpan.dll OpenSpan.Server.Client.dll
CR-54492	This hotfix addresses a problem that could cause an Oracle forms application to hang randomly and not recover.	OpenSpanJavaModel.class OpenSpanJavaModel$WrappedObject.class OpenSpanJavaModel$1.class
BUG-414593	This hotfix modifies the system to recognize the control class CER_USERDEF_LISTBOX_CNFG and identify it as a ListBox.	OpenSpan.Translators.Facets.CerlDlg.x32.dll
BUG-425257	This hotfix addresses a situation with SAP applications that could result in slow scrolling. Set the SAP_SuppressControls key in the advanced adapter configuration to enhance the speed at which scrolling occurs. The following code is an example: SAP_SuppressControls="GraphStatic, ListIcon"	OpenSpan.Translator.SAP.x32.dll OpenSpan.Translator.SAP.x64.dll
Build 8.0 SP1 2019 — RLS-9711 — February 07, 2019		
EPIC-26295	This hotfix is required to support new functionality in Pega Robot Manager version 6. The RPA Service included in this hotfix communicates with Robot Manager 6 for starting, stopping, moving, and scheduling robots.	OpenSpan.WinLogon.Service.exe

	For more information, see Pega Robot Manager 6.	
Item number	**Description**	**Assemblies**
US-244701	This hotfix adds the following methods to the FileUtils component: • GetFilesInDirectory (2 parameters) • GetFilesInDirectory (3 parameters) For more information, see FileUtils component methods.	OpenSpan.Controls.dll
US-258702	This hotfix updates the ShutdownRuntime utility to make the parameters case-insensitive. It also updates the information that displays when you run the command with the /Help parameter. For more information, see Shutting down Runtime in a Citrix implementation.	ShutdownRuntime.exe
ISSUE-30624	This hotfix removes some internal loader settings from the openspan.ini file. These settings are now located in the native.ini file and should not be modified except under the direction of Pega Support.	openspan.ini
US-232739 US-232742	This hotfix adds the following properties and event to the adapters. Use these properties to set the state of applications that are required in an automation created for an unattended RPA robot that is connected to Robot Manager. You can also use these properties and events to report that an application is not ready. Properties: • ReadyForRobotWork • ReasonRobotNotReady Events: • OnRobotReadyStateChanged • RobotNotReadyForWork For more information, see the Help for the adapter.	OpenSpan.Interactions.dll OpenSpan.Runtime.Core.dll OpenSpan.dll OpenSpan.Adapters.dll
Build 8.0 SP1 2018 — RLS-9700 — February 04, 2019		
CR-52923	This hotfix corrects a problem that could prevent the OSDump utility from capturing a 32-bit dump on a 64-bit machine.	OSDump.exe OSDump.x64.exe
BUG-411641	This hotfix corrects a problem that could prevent screen names from being reported correctly by Robotic Automation when using the Google Chrome browser.	Openspan.Events.dll
This build includes Pega Native Foundation 10.0.18092. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2017 — RLS-9637 — January 28, 2019		
EPIC-36471	This hotfix adds support for Windows 10 version 1809. Requires Pega Native Foundation 18091.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
US-249890	This hotfix adds support for SAP 7.5. Requires Pega Native Foundation 18091.	OpenSpan.Adapters.SAP.Design.dll OpenSpan.Adapters.SAP.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll OpenSpan.Translators.MFC.x32.dll OpenSpan.Translators.MFC.x64.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Adapters.SAP.Interfaces.dll
US-260324	This hotfix changes the system to ensure that machine information is included in the log files.	OpenSpan.Studio.dll OpenSpan.dll
EPIC-35483	This hotfix corrects a problem that prevented the PowerBuilder RightClickRow and RightClickCell methods from working correctly.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
EPIC-34462	This hotfix adds support for interrogating PowerBuilder DataWindows RadioButtons as RadioButton controls. Previously, these controls were interrogated as generic controls.	OpenSpan.Adapters.DataGrid.dll OpenSpan.Adapters.DataGrid.Design.dll OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
This build includes Pega Native Foundation 10.0.18091. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2016 — RLS-9605 — January 17, 2019		
US-159198	This hotfix corrects a problem that could prevent the Navigator window from opening.	OpenSpan.Studio.dll

Item number	Description	Assemblies
US-268603 US-159354	This hotfix enhances the system so that it can now query WinHLLAPI sessions and related methods.	OpenSpan.Controls.dll
US-256938	This hotfix adds the ProcessToXml method, which you can use to extract text from an image or document and export that text in XML format. This hotfix also adds the GetProcessToXmlConfig method, which you can use to produce information about the XML configuration. You can then pass that configuration information to the configXml parameter of the ProcessToXml method. For more information, see DocumentOcr Component.	OpenSpan.dll OpenSpan.DocumentOcr.dll
BUG-411899	This hotfix modifies the system so that Microsoft Internet Explorer loads pages more quickly.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
BUG-409694	This hotfix modifies the system to ensure that events are properly triggered for mouse clicks on Oracle Forms TextBox controls.	OpenSpanJavaObjectWrapper.java OpenSpanOracleLWComponentTranslator.java OpenSpanJavaInvocationHelper.java
US-248981	This hotfix modifies the system to interrogate an SAP MatchCodeFix control as a TextBox control.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
Build 8.0 SP1 2015 — RLS-9584 — January 03, 2019		
EPIC-34320	This hotfix corrects a problem that prevented Japanese text from displaying correctly in Robotic Automation Studio.	Pega.ActiveX.x32.dll OpenSpan.Adapters.VisualBasic6.x32.dll OpenSpan.Adapters.Designer.VisualBasic6.x32.dll OpenSpan.Translator.VisualBasic6.x32.dll
BUG-407002	This hotfix adds the UpdateChildren method, which you can use to refresh PowerBuilder ToolBar Items. After you call the UpdateChildren method, the Items that you interrogate on the ToolBar rematch.	OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Translators.AWD.x32.dll
EPIC-32096	This hotfix adds support for the Gupta ChildTable and ProfUis ExtMenuBar controls.	OpenSpan.Adapters.Gupta.Design.dll OpenSpan.Adapters.Gupta.dll OpenSpan.Translators.Gupta.Tabli62.x32.dll OpenSpan.Adapters.ProfUIS.Design.dll OpenSpan.Adapters.ProfUIS.dll OpenSpan.Translators.ProfUIS.x32.dll
US-251552	This hotfix adds Active Directory Federated Support (AD FS) to Pega Robot Manager connections so you can use AD FS-based single sign-on (SSO) in Pega Robot Manager implementations.	OpenSpan.SSO.ADFS.dll OpenSpan.Server.Client.dll
US-246670	This hotfix adds support for the CSG SysTreeView32 control.	OpenSpan.Adapters.CSG.Design.dll OpenSpan.Adapters.CSG.dll OpenSpan.Translators.CSG.x32.dll
Build 8.0 SP1 2014 — RLS-9520 — December 11, 2018		
US-234808	This hotfix adds support for a version of the Facets application that was built with MFC14.	OpenSpan.Adapters.Facets.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll OpenSpan.Adapters.FarpointGrid.dll OpenSpan.Translators.FarpointGrid.x32.dll
BUG-409202	This hotfix corrects an assembly versioning issue that affected the Gupta and ProfUIS translators.	OpenSpan.Translators.Gupta.Tabli62.dll OpenSpan.Translators.ProfUIS.dll OpenSpan.Translators.VideoSoft.VSFlexGrid7.dll, OpenSpan.Translators.Endsleigh.EGMotorCtls.dll OpenSpan.Translators.FarpointGrid.dll OpenSpan.Translators.VisualBasic6.dll
SR-54369	This hotfix corrects a problem that caused a Microsoft Internet Explorer task bar button to display even though Internet Explorer was hidden.	Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
US-253992	This hotfix changes the system to trim the package metadata if it exceeds 255 characters before sending that metadata to Pega Robot Manager. This makes sure that the metadata values fit in the database.	OpenSpan.Server.Client.dll
Build 8.0 SP1 2013		
	The changes in this build were published in 8.0.2014.	
Build 8.0 SP1 2012 — RLS-9487 — November 26, 2018		

Item number	Description	Assemblies
SR-53036	This hotfix corrects a problem that prevented package solutions with multiple configurations that had the same name from being deployed to Pega Robot Manager. This hotfix also modifies Robotic Automation Runtime to verify that the correct configuration name is written to the extract directory.	OpenSpan.Common.dll OpenSpan.Studio.dll OpenSpan.dll OpenSpan.Server.Client.dll
SR-54296	This hotfix changes the system to ensure that it does not prematurely disconnect the Microsoft Office connector during automation.	OpenSpan.Office.dll
SR-35457	This hotfix removes duplicate wrapper and connector files from the application and JavaWrappers folders.	OpenSpan.Translator.Java.dll
SR-52970	This hotfix corrects a problem that could cause a matching failure when you used the Universal Web Adapter.	OpenSpan.Adapters.Design
Build 8.0 SP1 2011 — RLS-9448 — November 19, 2018		
US-232733	This hotfix enables lookup tables to automatically increment the key value whenever you add a record. Use these new methods to work with lookup tables and fields: • GetTableWithoutKey -- Use to return the data table without the primary index keys. • ReplaceTableAutoKey -- Use to replace the underlying data table and add an auto increment index key value to each row. The following methods have different parameters when you enable the AutoIncrement property for a lookup field or lookup table: • The AddRecord method has no key parameter, only field parameters. • The ReplaceRecords and GetRecords methods only take integers. The system sets the ReplaceOnDuplicateAdd and AddOnMissingReplace properties to False when you set the AutoIncrement property to True. For more information, see LookupTable.	openspan.controls.dll
US-248778	This hotfix adds the following new methods and properties which you can use in SAP automations to scroll a cell into view. Methods: • ScrollDown – Scrolls the view down a specified number of lines. • ScrollUp – Scrolls the view up a specified number of lines. Properties: • ScrollMaximumVertical – Sets the minimum value for vertical scrolling. • ScrollMinimumVertical – Sets the maximum value for vertical scrolling. • ScrollPositionVertical – Gets or sets the current scroll position or line number. For more information, see SAP GUI Controls.	OpenSpan.Virtual.Interfaces.dll OpenSpan.Adapters.SAP.dll OpenSpan.Adapters.SAP.Design.dll OpenSpan.Adapters.SAP.Interfaces.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
EPIC-25867	This hotfix changes the system to find missing URL titles when possible.	OpenSpan.Events.dll
US-246918	This hotfix adds support for the PowerBuilder Button Click in DataWindow control.	OpenSpan.Adapters.DataGrid.dll OpenSpan.Adapters.DataGrid.Design.dll OpenSpan.Translators.PowerBuilder.x32.dll
SR-54469	This hotfix changes the system so that it no longer deletes miscellaneous files listed in the manifest during runtime.	OpenSpan.dll
Build 8.0 SP1 2010 — RLS-9395 — October 31, 2018		
	Note: The Pega Chrome extension version 1.0.86 is included in this build.	
EPIC-33957	This hotfix enhances the MicrosoftExcel Connector by adding new properties and methods that you can use when automating Excel. The methods include new cell, row, column, range, workbook, worksheet, and cast helper methods. In addition, there are new import and export methods, new save and save as methods, and a new open method. For more information, see MicrosoftExcel Connector.	OpenSpan.Office.dll
SR-53071	This hotfix corrects a problem that could cause fatal exceptions when shutting down Pega Robotic Automation Runtime.	OpenSpan.Runtime.Core.dll
US-238851	This hotfix corrects a problem that could cause crashes in PowerBuilder applications. This hotfix corrects a problem that could prevent you from capturing events when automating Google Chrome.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll openspan.ini

Item number	Description	Assemblies
CR-51081		lajjpilliikppcbaghjehndpfdiiphbe_main.crx OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.Adapters.Web.WebBase.dll
US-235677	**Note:** You must have installed the Chrome extension 1.0.86 or later. This hotfix adds support for Delphi controls so you can interrogate labels and other controls.	OpenSpan.Adapters.Delphi.dll OpenSpan.Adapters.Delphi.Design.dll OpenSpan.Translators.LionScreens.x32.dll
ISSUE-25785	This hotfix ensures that the correct icon displays in automations with child projects.	OpenSpan.IDE.dll
EPIC-32887	This hotfix refactors the DotNetBroker.config logic and incorporates it into the codebase to avoid duplicated entries.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
CR-54409	This hotfix changes the system to avoid an OpenSpan.Automation.Design not found error.	OpenSpan.dll
Build 8.0 SP1 2009 — RLS-9379 — October 15, 2018		
SR-54400	This hotfix resolves a memory leak that affected .NET applications.	OpenSpan.IPC.dll OpenSpan.Translators.DotNet.v20.Infragistics.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll
SR-54453	This hotfix corrects a problem that prevented the system from recognizing a SAPALV Grid control.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
EPIC-25867 EPIC-34710	This hotfix corrects a problem that prevented the system from capturing task details when interrogating Google Chrome. This hotfix adds an Open Design Component option to the context menu of EntryPoint Execute automation blocks. Use this option to open the original automation file of the execution block.	OpenSpan.Events.dll
EPIC-33935	This hotfix adds support for COM UIA by using a new local DesktopAnalytics configuration file. This hotfix also adds an Open Design Component button to component automation blocks. Use this button to open the top level containing file of the component.	OpenSpan.Events.dll Interop.UIAutomationClient.dll
US-243189 US-243292	 **Note:** This option does not display if the current file is the destination file.	OpenSpan.Automation.Design.dll OpenSpan.Design.dll OpenSpan.IDE.dll
This build includes Pega Native Foundation 10.0.18032. For more information, see Build notes - 10.0 Pega Native Foundation.		
Build 8.0 SP1 2008 — RLS-9337 — September 27, 2018		
SR-54465	This hotfix corrects a problem that prevented SSTab controls from matching.	OpenSpan.Translators.SSTab.x32.dll Pega.Windows.Broker.x32.dll Pega.Windows.Broker.x64.dll
BUG-401449 ISSUE-26601	This hotfix removes null characters that were incorrectly appended to retrieve text when you used the PdfViewer to view PDF files that had been processed by the DocumentOcr component.	PdfiumViewer.dll
ISSUE-27333	This hotfix changes the Excel File Connector so that Excel ranges can include an empty sheet name when the connector opens the file.	OpenSpan.Office.Excel.dll
BUG-398850	This hotfix corrects an indexing issue with the Excel File Connector.	OpenSpan.Office.Excel.dll
BUG-54453	This hotfix corrects a problem that prevented SAP Grid controls from being interrogated correctly.	Openspan.translators.Sap.x32.dll
US-243958	This hotfix corrects a problem that prevented the PerformClick method from working on Oracle Forms buttons.	OpenSpanOracleAbstractButtonTranslator.java
SR-	This hotfix corrects a problem that prevented the system from matching DotNet	OpenSpan.Translators.DotNet.v20.x32.dll OpenSpan.Translators.DotNet.v20.x64.dll

Item number	Description	Assemblies
54429	controls.	OpenSpan.Translators.DotNet.v40.x32.dll OpenSpan.Translators.DotNet.v40.x64.dll
SR-54361	This hotfix corrects a problem that could cause Studio to hang when you tried to drag and drop an adapter control into an automation.	OpenSpan.IDE.dll
Build 8.0 SP1 2007 — RLS-9277 — September 17, 2018		
BUG-391568	This hotfix changes the system to ensure that Start My Day dialogs are always topmost and are brought to the front.	OpenSpan.ApplicationFramework.dll
US-232730	This hotfix adds support to the RestClient and RobotManagerRestClient components so you can dynamically set parts of the ServerUriPath property. For example, if the ServerUriPath property is "/version/2.0/data", you can use the new SetUriPathWithParameters method to dynamically set the version number. In the ServerUriPath property, use curly braces {} to include variables. For example, using "/version/{versionID}/{type}" as *"ServerUriPath"* generates the SetUriPathWithParameters method with *versionID* and *type* as inputs. This hotfix also changes the system to include the full URI in the Automation log category for the RestClient and RobotManagerRestClient components when you specify verbose logging.	OpenSpan.dll OpenSpan.Controls.dll OpenSpan.Interactions.Controls.dll
US-241563	This hotfix adds support for the following operating systems to the SchedulerDefinitions.xml file for both domain and local users. • Windows 8.1 • Windows 10 • Windows Server 2008 • Windows Server 2016	SchedulerDefinitions.xml SchedulerDefinitions-Local.xml
EPIC-34135 US-240348	This hotfix adds the Excel File Connector, which you can use to expand Excel functionality in Robotic Process Automation (RPA) scenarios. Use the Excel File Connector in RPA scenarios where there is no interaction between the user and the Microsoft Excel workbook. The Excel File Connector provides these benefits: • You can create, modify, and read from Excel workbooks by using robotic automation without having the Excel application installed in the environment. The system uses the Open Office XML format to create Excel workbooks. • The Excel File Connector includes additional methods that enhance your ability to work with an Excel workbook. • The Excel File Connector lets you define ranges of data to work with, such as a table. You can define the range during design in Studio or by using an automation during Runtime. For more information, see Excel File Connector Overview. **Note:** The Microsoft Excel Connector, included in this build and in prior versions, lets you get or set cell values and export or import data as data tables. The Microsoft Excel Connector is typically used in Robotic Desktop Automations (RDA) where the automation interacts with the user.	OpenSpan.Events.dll
EPIC 24157		Framework/OpenSpan/Design/IExtendedComponentContainer.cs Framework/OpenSpan/Design/IExtendedComponentTrayName.cs Platforms/Office/ThirdPartyBinaries/GemBox.Spreadsheet.dll ConfigurationFiles/PluginManifest.xml Framework/OpenSpan.Automation.Design/ScopedComponentTray.cs Framework/OpenSpan/SafeList.cs OpenSpan.Office.dll OpenSpan.Office.Excel.dll OpenSpan.Office.Excel.Tests.dll OpenSpan.Office.Excel.Design.dll Openspan.Design.dll Pega.ActiveX.x32.dll Pega.Native.Remoting.x32.dll Pega.Windows.Broker.x32.dll Gembox.Spreadsheet.dll
BUG-54439	This hotfix corrects a problem that prevented the Runtime installer from exiting if the NativeFoundationSetup.msi file was missing from the install folder.	none
Build 8.0 SP1 2006 — RLS-9160 — August 28, 2018		
SR-54310	**Note:** The Pega Chrome extension version 1.0.85 is included in this build. This hotfix adds a helper class so you can manage a menu item's label and availability by using the RuntimeConfig.xml file.	OpenSpan.Runtime.exe OpenSpan.Runtime64.exe
SR-54348	This hotfix changes RDA Runtime so it now loads the cached automation package when there is a connection error with the server. This applies to all authentication methods. **Note:** RDA Runtime does not load the cached package when there is a connection issue with the server.	OpenSpan.dll OpenSpan.Server.Client.dll
US-209151	This hotfix corrects a problem that prevented Infragistics controls from honoring and correctly registering sub-class hierarchies when handling events.	OpenSpan.Translators.DotNet.v20.Infragistics.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll
ISSUE-26006	This hotfix corrects a problem that could create GetAncestorTypeNames Java class exceptions.	OpenSpanJavaBroker.class
US-212690	This hotfix adds Google Chrome support for capturing tasks for the Pega Customer Service Interaction Portal.	OpenSpan.Events.dll

Item number	Description	Assemblies
US-227012	This hotfix adds the InvokeMenuItem method that you can use to specify the text of the context menu item that you want to be clicked. This item is defined on the Panel control (Java). You supply the name of the item in a parameter.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpan.Virtual.Interfaces.dll
SR-54359	This hotfix corrects an issue that could cause an Adobe popup window to incorrectly display in a Workforce Intelligence implementation.	OpenSpan.events.dll
SR-53105	This hotfix adds settings to the RuntimeConfig.xml file that are used by Workforce Intelligence.	RuntimeConfig.xml
SR-54228	This hotfix resolves an issue that could cause Facet to crash when started.	OpenSpan.Translators.Facets.CerlDlg.x32.dll
SR-53051	This hotfix resolves an issue that could prevent you from interrogating Facet controls.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
SR-54336	This hotfix adds fallback options that include pulling the URL from the Address bar and from the IHTMLDocument2 interface to avoid the URL Not Accessible error in Microsoft Internet Explorer.	Openspan.Events.dll
SR-54373 SR-54374	This hotfix resolves an issue that could cause an exception when you use the Add Constructor or Type option for Mozilla Firefox version 52 and later. For more information, see Mozilla Firefox support in Pega Robotic Automation.	OpenSpan.Automation.dll OpenSpan.dll OpenSpan.Server.Controls.dll OpenSpan.Adapters.dll
EPIC-26480	This hotfix adds support for Mozilla Firefox versions 52 and later. For more information, see Mozilla Firefox support in Pega Robotic Automation. **Note:** If you plan to automate Firefox and enable the extension in Firefox before you begin interrogation, ensure that you select the Install Mozilla Firefox Extension check box on the Browser Extension Installation panel in the Setup wizard.	OpenSpan.Translators.Web.MessagingHost.exe OpenSpan.WebExtensionInstaller.exe
BUG-391867	This hotfix corrects a problem that caused the GetValueByOCR method to include the Web Adapter in the result. This feature uses the Universal Web Adapter and sets the browser type to Firefox.	OpenSpan.dll
SR-52965	This hotfix addresses an issue that could prevent you from saving an automation that has missing design block members that are in between Try/Catch blocks. This issue can occur when you import an automation from another solution.	OpenSpan.Automation.Design.dll
SR-52697	This hotfix adds support for numeric cells in PowerBuilder versions 10 and 10.2 so you can retrieve values from these cells.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
SR-54324	This hotfix adds the ability to run custom Javascript by using a Citrix Context. This capability lets you create solutions for Citrix environments that can navigate through different Citrix landing pages.	OpenSpan.Connectors.Citrix.Design.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.dll OpenSpan.Connectors.Citrix.dll
SR-54260	This hotfix resolves issues that affected the Universal Web Adapter.	OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Translators.Web.Chrome.MessagingHost.exe OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
SR-54092	This hotfix corrects a problem that could prevent you from selecting project adapters when reparenting.	OpenSpan.Controls.Design.dll
SR-54287	This hotfix corrects a problem that could cause an error when you tried to add an excluded process to an adapter.	OpenSpan.Adapters.dll
SR-52940	This hotfix corrects a problem that could cause touchscreen computers to crash.	OpenSpan.Automation.Design.dll OpenSpan.Automation.dll OpenSpan.Design.dll
US-234544	This hotfix adds support for the MSHFlexGrid control.	OpenSpan.Translators.MSHFlexGrid.x32.dll OpenSpan.Adapters.MSHFlexGrid.dll OpenSpan.Adapters.MSHFlexGrid.Design.dll
US-142558	This hotfix resolves a problem with the IsCreated property and WaitforCreate method that could cause an exception.	OpenSpan.Automation.dll OpenSpan.dll OpenSpan.Server.Controls.dll OpenSpan.Adapters.dll

Item number	Description	Assemblies
SR-52501	This hotfix corrects a problem with the Add Constructor For Type method that could cause an ArgumentNullException error.	OpenSpan.dll
SR-53080	This hotfix enhances Java Tree event handling to ensure that the adapter keeps in sync with the target tree.	OpenSpan.Adapters.Virtual.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaSwingTreeWrapper.java OpenSpanJavaWorkingListPaneWrapper.java OpenSpan.Translators.AWD.x32.dll OpenSpan.Translators.DotNet.v20.DevExpress.dll OpenSpan.Translators.DotNet.v40.DevExpress.dll OpenSpan.Translators.DotNet.v20.Infragistics.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
SR-52984	This hotfix changes the system to now validate the configuration changes that are sent to Deployment Portal or Robot Manager.	OpenSpan.dll
US-208328	This hotfix adds the DocumentOcr component with which you can convert a document that contains images into text that you can manipulate in an automation. The input document can be an image, such as a faxed document, or a document that contains both text and images. This component works with image files (.png, .jpeg, .tff), PDF files, and Microsoft Word documents. For more information, see DocumentOcr component. **Note:** You must install the Pega OCR Essentials before you can use the DocumentOcr component. For more information, see the installation guides.	OpenSpan.dll OpenSpan.DocumentOcr.dll Gembox.Document.dll qpdf21.dll libstdc++-6.dll libgcc_s_dw2-1.dll libwinpthread-1.dll
US-237637	This hotfix adds support for numeric cells in PowerBuilder versions 10 and 10.2.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
US-218635	This hotfix removes the ability to use window text as a default source for the document URL in Microsoft Internet Explorer and Google Chrome.	Openspan.Events.dll
SR-54247	This hotfix changes the system to better handle toolbar-based structural differences in Microsoft Internet Explorer so it can locate the URL and avoid URL not accessible errors.	Openspan.Events.dll
SR-52028	This hotfix adds the ExpandAllSync method that you can use to expand all nodes in a SAP TreeView control.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Windows.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Adapters.dll OpenSpan.Adapters.InfragisticsOCX.dll OpenSpan.Translators.DotNet.WindowsForms.dll OpenSpan.Translators.DotNet.WPF.dll OpenSpan.Translators.DotNet.Infragistics.dll OpenSpan.Translators.AWD.dll
US-357438	This hotfix modifies the SqlQuery component to ensure it returns the output parameters correctly and also prevents an exception from displaying when you edit parameters.	OpenSpan.Controls.dll OpenSpan.Controls.Design.dll
US-235152	This hotfix changes the system so that it can read Citrix Context properties from an external file. For more information, see Robotic Automation WebInterface Property Manager utility.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.WebInterfaceNavigation.exe OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe
SR-54368	This hotfix adds the advanced configuration DetectPageCaching key to the RuntimeConfig.xml file. Use this file to allow the system to match and unmatch on PageHide/PageShow events in Microsoft Internet Explorer 11. The default is True.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll OpenSpan.js
SR-54401	This hotfix ensures that the settings in the AppSettings section of the RuntimeConfig.xml file are applied after the file is downloaded from Pega Robotic Automation Deployment Portal.	OpenSpan.Runtime.Core.dll OpenSpan.dll
US-238159	This hotfix corrects a problem that could cause a build error in Citrix projects.	none
SR-54345	This hotfix changes the system to ensure that it includes base classes when you search for extension types.	OpenSpan.dll
Build 8.0 SP1 2004 - 8.0 SP1 2005		
	The changes in these builds were published in 8.0 SP1 2006.	

Item number	Description	Assemblies
	Build 8.0 SP1 2003 — RLS-8920 — July 26, 2018 Initial released build for 8.0 SP1	
		

Note: The Pega Chrome extension version 1.0.65 is included in this build.

Build notes: 10.0 Pega Native Foundation (for 8.0 SP1)

Build notes describe the changes that are included in each build that is created for Pega Native Foundation. Pega Native Foundation contains the operating system-specific injection technology for Pega Robotic Automation Studio and Pega Robotic Automation Runtime 8.0 SP1. By separating these technologies from the features that you use to develop solutions, the Robotic Automation development team can more quickly respond to operating system changes from Microsoft. For more information about Pega Native Foundation, contact your Support Representative by using the Pega Product Support portal.

Before you install one of these builds, familiarize yourself with the new features, resolved issues, and other changes. For more information, see Download Pega RPA software. For information on installation and system requirements, see the installation instructions.

Summary of changes

The following table lists the changes that are included in the various Pega Native Foundation builds. For more information about the features and enhancements in the various builds of version 8.0 SP1, see the Pega Robotic Automation 8.0 SP1 Build Notes.

Pega Native Foundation 8.0 SP1 Build Notes

Build number	Description
Version 10.0.19031.0 — May 8, 2020 Available in 8.0 SP1 2060 and later	This build corrects an issue that could potentially prevent Internet Explorer from rendering pages when you use a web adapter for an extended period of time
Version 10.0.19030.0 — August 12, 2019 Available in 8.0 SP1 2042 and later	This build corrects a conflict with Sophos antivirus software.
Version 10.0.18099.0 — June 24, 2019 Available in 8.0 SP1 2036 - 2040	This build adds entries to the native.ini file that allow the system to interrogate the OnDemandClient application.
Version 10.0.18098.0 — June 07, 2019 Available in 8.0 SP1 2033 - 2035	This build corrects a problem that could cause the system to crash when you interrogated the IBM Access Client Solutions application.
Version 10.0.18097.0 — May 17, 2019 Available in 8.0 SP1 2032	This build includes the following changes: • Removes unnecessary address checks. • Modifies the system to avoid FileVersion issues. • Validates the vtable. • Generates .TMF files.
Version 10.0.18096.0 — April 29, 2019 Available in 8.0 SP1 2030 - 2031	This build corrects a problem that prevented the system from injecting into Windows 8.1 to interrogate the Facets application.
Version 10.0.18095.0 — April 17, 2019 Available in 8.0 SP1 2027 - 2029	This build includes the following changes: • Updates heuristics for Internet Explorer and Ldr functions to prevent crashes. • Adds support for additional Windows 10 functions. • Adds an option to the native.ini file so the system can find and hook to FireEvents when using 64-bit Windows 10 v1709. • Changes the system to avoid a crash when using 64-bit Internet Explorer and Windows 10. • Corrects a problem that could prevent the system from injecting into 32-bit Internet Explorer. • Corrects a problem that could cause a proprietary app to crash. • Corrects a problem that could cause .NET applications to crash when you open a window that has an embedded WebBrowser component. • Corrects a problem that could prevent you from interrogating web applications.
Version 10.0.18092.0 — February 04, 2019 Available in 8.0 SP1 2018 - 2026	This build corrects a problem that could cause Microsoft Internet Explorer to run slowly on Windows 10, version 1709.
	This build includes the following changes:

Build number	Description
Version 10.0.18091.0 — January 27, 2019 Available in 8.0 SP1 2017	• Adds support for Windows 10 version 1809. • Adds support for SAP 7.5. • Adds the native.ini file. This file contains the calculated addresses of the symbols addresses. These addresses were previously stored in the openspan.ini file. The native.ini file is overwritten each time you update Pega Native Foundation and should only be modified when you are directed to do so by the Robotic Automation support team.
Version 10.0.18032.0 — October 15, 2018 Available in 8.0 SP1 2009 - 2016	This build includes the following changes: • Corrects errors in the App-V detours modules that caused exceptions. • Fixes a problem that occurred when you injected into the Google Chrome browser. • Updates the injection strategy for web-based technologies.
Version 10.0.18031.0 — July 26, 2018 Available in 8.0 SP1 2003 - 2008	This is the initial released build of Pega Native Foundation.

Pega Robotic Automation extended support

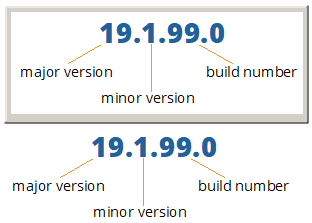
Pega provides support for the following Robotic Automation products for the current major version and the major prior version. See Version numbering for a definition of the major version. By following the available migration paths, you can move to the latest major version and use all the new features and capabilities for the following products:

- Robot Studio v22.1
- Robot Runtime v22.1

- Robot Studio v19.1
- Robot Studio Plug-in v19.1 for Microsoft Visual Studio 2015
- Robot Runtime v19.1

Version numbering

Each Pega Robotic Automation release is identified with a numerical version comprising four sets of digits separated by decimal points. The number to the left of the first decimal point represents the major version. The digit to the right of the first decimal point represents the minor version. Finally, the last two sets of numbers combined represent the maintenance build version. Every release, including the initial version of a new major release, contains all four sets of digits.



Robotic Automation version numbering

Incremental product changes

The maintenance builds provided within a release stream are cumulative, which means that all changes from earlier builds in the same release stream are included in the current build. For example, changes made in Pega Robotic Automation build 19.1.99.0 are carried forward to build 19.1.100.0.

If issues are identified in a build, those issues are researched and resolved. If changes are required, those changes are released in the next available build. For example, if a client identifies an issue in 19.1.99.0 and, once resolved, the next scheduled build is 19.1.103.0, the resolution is included in 19.1.103.0.

Product support

Pega supports each Robotic Automation Generally Available (GA) release as follows:

- Every major release is supported for a minimum of eighteen (18) months from the initial GA release date.
- Pega provides technical support and free software updates are available to the two most current Pega Robotic Automation major releases.

For this purpose, support is defined from two perspectives:

- Technical compatibility -- Pega does not automatically provide software updates for software versions that are past the 18-month support period, nor does it test these older versions with new technologies and third-party software.
- Client support -- Our technical support engineers might not be able to diagnose or resolve issues that occur in unsupported versions of Pega Robotic Automation. To take advantage of improved security, usability, functionality, and integration, you should always use the latest Pega Robotic Automation major and minor version.

Note: After a minimum of 18 months, the product enters extended support. If a production issue arises when a product is in extended support, Pega researches the issue and determines whether any updates will be made. If you are using a version of Pega Robotic Automation that is in extended support, contact Pega to learn how you can update to a supported version.

Software support schedule

Support schedule

Version	GA date	Entered extended support
22.1	September 22, 2022	Still supported
19.1	May 31, 2019	Still supported
8.0 SP1	July, 26 2018	January 13, 2023
8.0	August 10, 2016	May 31, 2019
7.1	April 02,2015	May 31, 2019

Note: Clients and partner support contact administrators receive an extended support announcement at least ninety (90) days before the last support date. Extended support for version 8.0 SP1 was announced via email on October 14, 2022.

For more information, see Pega Robotic Automation Release and Build Notes.

Component support

Support for the following versioned components, is available as long as the core product is supported. For example, Pega Native Foundation version 10.1.x is supported as long as version 19.1 is supported.

Component support

Component	Pega Robotic Automation	
	19.1	22.1
Pega Native Foundation	Version 10.1.x	Version 10.1.x
Pega RPA Service	Version 3.1.x	Version 3.1.x
Pega Synchronization Server	Version 3.1.x	Version 3.1.x
Pega Synchronization Engine	Version 3.1.x	Version 3.1.x
Pega Browser Extension	Version 3.1.x	Version 3.1.x
Pega Package Server *	Version 3.1.x	Not available
Pega Runtime Router Service	Version 3.1.x	Not applicable
Pega Robotic Automation Security Token Service (STS)	Version 3.1.x	Version 3.1.x

* Use Pega Robot Manager or Package Server to manage packages in version 19.1. For version 22.1, use Pega Robot Manager.

Related external links
Pega Robotic Automation Release and Build Notes

Build notes: Pega Robotic Automation 8.0

Build notes describe the changes that are included within each build that is created for Pega Robotic Automation Studio and Pega Robotic Automation Runtime version 8.0. Before you install one of these builds, familiarize yourself with the changes, new features, and resolved issues that are listed in the following table.

To request a build, go to Digital Software Delivery. For information on system requirements, review the installation instructions.

Summary of changes

The changes that are included in the various Robotic Automation 8.0 builds are listed in the following table. For more information about the features and enhancements in the initial release of version 8.0, see the Pega Robotic Automation Studio/Runtime Release Notes.

The following builds include changes to the initial system requirements:

- Version 8.0.1053 and later builds require Microsoft Visual Studio 2015 Update 3 for the stand-alone and plug-in versions of Pega Robotic Automation Studio.
- Version 8.0.1053 and later builds require Microsoft .NET version 4.6.

Pega Robotic Automation 8.0 Build Notes

Item number	Description	
	Build 8.0.1122 — RLS-22901 — July 24, 2020	
US-360856 US-360857	This hotfix updates the Robotic Automation Studio and Robotic Automation Runtime installers so that they install the latest provisioned RDA certificate. This certificate expires on 4/16/2022.	
US-361560 US-361561	This hotfix adds a note to the Robotic Desktop Automation (RDA) Integration page in the Setup wizard to tell you that a certificate is installed when you enable RDA integration. This certificate provides secure communications between Pega applications and Robot Runtime.	
	Build 8.0.1121 — RLS-22606 — March 17, 2020	
BUG-540648	This hotfix ensures the correct setup of certification paths when you install Robotic Automation without internet access. The certificate package now includes chained certificates by default.	
BUG-545650	This hotfix resolves an exception that could cause the application to crash when you navigate to a screen that contains an Infragistics WPF XamGrid.	Ope
	Build 8.0.1120 — RLS-22193 — December 3, 2019	
US-324345	This hotfix adds a new RDA certificate to the product install, to replace an expired certificate.	
	Build 8.0.1119 — RLS-9875 — July 22, 2019	
BUG-419163	This hotfix corrects a problem that could cause Studio to hang when you tried to close an automation.	
BUG-494904	This hotfix corrects a problem that could prevent Runtime in Workforce Intelligence implementations from returning screen titles.	

Item number	Description	
	Build 8.0.1114 - Build 8.0.1118	
	The changes in these builds were published in 8.0.1119.	
	Build 8.0.1113 — RLS-9595 — April 02, 2019	
US-269648	This hotfix adds the DesktopAnalyticsConfig.xml file, which contains all of the configuration information for Workforce Intelligence implementations of Runtime. Placing all of this information in a single file makes the information easier to manage for Workforce Intelligence administrators.	
	Build 8.0.1112	
	The change in this build was published in 8.0.1113.	
	Build 8.0.1111 — RLS-9557 — December 17, 2018	
US-251552	This hotfix adds Active Directory Federated Support (AD FS) to Pega Robot Manager connections so you can use AD FS-based single sign-on (SSO) in Pega Robot Manager implementations.	
	Build 8.0.1110 — RLS-9476 — December 06, 2018	
BUG-411641	This hotfix corrects a problem that prevented Robotic Automation Runtime from reporting the screen name when using Google Chrome.	
BUG-409202	This hotfix corrects an assembly versioning issue that affected the Gupta and ProfUIS translators.	C C
	Build 8.0.1109 — SR-54496 — November 05, 2018	
EPIC-32096	This hotfix adds support for the Gupta ChildTable and ProfUis ExtMenuBar controls.	
SR-54296	This hotfix modifies the system to make sure it does not prematurely disconnect from Microsoft Office.	
US-224632	This hotfix adds support for the PowerBuilder Button Click control.	
SR-53071	This hotfix makes sure that Robotic Automation Runtime and Agile Studio shut down correctly.	
EPIC-25867	This hotfix resolves an issue that prevented Robotic Automation Runtime from capturing the URL or browser window title.	
	Build 8.0.1108 — SR-54483 — October 19, 2018	
SR-34098	This hotfix adds support for SAP MatchCodeFix controls. The system interrogates these controls as a text box with get/set text functionality.	
EPIC-32887	This hotfix changes the system to now refactor DotNetBroker.config logic in the application.	
SR-32348	This hotfix adds support for the SysTreeView32 control.	
EPIC-34710	This hotfix corrects a problem that prevented the system from capturing task details when you interrogate Google Chrome.	
	Build 8.0.1107 — SR-54466 — October 04, 2018	

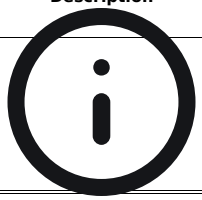
Item number	Description	
SR-53071	This hotfix corrects a problem which could cause fatal exceptions when you shut down Pega Robotic Automation Runtime.	
SR-54361	This hotfix corrects a problem that could cause Pega Robotic Automation Studio to hang when you dragged and dropped an adapter control onto an automation.	
SR-52557	This hotfix adds licensing information for EasyHook, a third-party component.	
	Build 8.0.1106 — SR-54455 — September 26, 2018	
SR-54354	This hotfix corrects a problem which could cause Visual Basic labels return incorrect text in applications with non-default codepages.	
US-232730	This hotfix enhances the RestClient and RobotManagerRestClient components to support dynamically setting parts of the ServerUriPath property. For example, if the ServerUriPath property is "/version/2.0/data", you can now set the version number dynamically. The changes include the following: • Adds the SetUriPathWithParameters method. • Adds support for variables in the ServerUriPath property. In the ServerUriPath property, use curly braces {} to include variables. For example, using "/version/{versionID}/{type}" as "ServerUriPath" generates the SetUriPathWithParameters method with "versionID" and "type" as inputs. • Adds the logging of the full URI to the verbose log in the Automation log category for the RestClient and RobotManagerRestClient components.	
SR-54429	This hotfix corrects a problem which could prevent the system from matching .NET controls.	
SR-54434	This hotfix corrects a problem which could prevent you from interrogating a top-level window in a Visual Basic version 6 application.	
US-243394	This hotfix corrects a problem which could prevent the PerformClick method from working on an Oracle Forms Button.	
	Build 8.0.1105 — SR-54446 — September 10, 2018	
US-216629	This hotfix adds support for Delphi label controls.	
EPIC-34135 US-240346	This hotfix changes the system to avoid CPU spikes when you right-click the task bar and open Windows Explorer.	
SR-54400	This hotfix resolves a memory leak that affected solutions that involved .NET applications.	C C Op Op
	Build 8.0.1104 — SR-54423 — September 05, 2018	
EPIC-31970	This hotfix adds the ScrollDown and ScrollUp methods, which you can use to scroll the view in SAP Grid controls.	
BUG-357438 BUG-387843 BUG-391008	This hotfix changes the SQLQuery component to set output parameters before returning results and to only update the dynamically-generated Execute method when you close the Parameters Editor dialog.	
US-207932	This hotfix adds the ability to interrogate Pega Customer Service to get the Task Label and Task ID.	
BUG-391568	This hotfix makes sure that Start My Day dialogs are brought to the forefront.	

Item number	Description	
	Build 8.0.1103 — SR-54408 — August 13, 2018	
SR-52028	This hotfix adds the ExpandAllSync and ExpandAll methods, which you can use to expand all nodes for SAP TreeView controls.	C
SR-54401	This hotfix changes Robotic Automation Runtime to make sure the system loads the AppSettings section of the RuntimeConfig.xml file after this file is downloaded from Deployment Portal.	
SR-54345	This hotfix changes the system to make sure it includes base classes when it searches for extension types to avoid deserialization errors for subclassed type extensions.	
	Build 8.0.1102 — SR-54399 — August 01, 2018	
US-203387	This hotfix adds support for Delphi's TrustDesk ComboBox and Button controls.	
US-220799	This hotfix adds support for the MSHFlexGrid control.	
SR-54368	This hotfix adds support for the DetectPageCaching option in the web adapter's AdvancedConfiguration property. This option defaults to False. To make sure that web page controls match and unmatch on PageHide/PageShow events, add this option and set it to True.	
US-235152	This hotfix changes the system so that Citrix Client machines can now get certain properties from an external file, as opposed to getting them from the solution file.	Open OpenSpa
Issue-26134	This hotfix updates the End User License Agreement (EULA) that is displayed by the Setup wizard to include language for the ABBYY Finereader software, which is used in the Screen OCR feature.	
	Build 8.0.1101 — SR-54365 — July 20, 2018	
SR-54310	This hotfix adds a helper class so you can manage a menu item's label and availability using the RuntimeConfig.xml file.	
SR-54348	This hotfix changes RDA Runtime so it now loads the cached automation package when there is a connection error to server. This applies to all authentication methods. **Note:** RPA Runtime does not load the cached package when there is a connection issue with the server.	
US-209151	This hotfix corrects a problem which prevented Infragistics controls from honoring and correctly registering sub-class hierarchies when handling events.	C C
CR-54330	This hotfix corrects a file path to make sure the appropriate Syncfusion .dll files are installed and updates Syncfusion support to work for .NET versions 2 and 4.	C C
US-212690	This hotfix adds Chrome support for capturing tasks for the Pega Customer Service Interaction Portal.	
SR-53080	This hotfix enhances Java Tree event handling to make sure the adapter keeps in sync with the target tree.	O O C C Op Op

Item number	Description	
	Build 8.0.1100 — SR-54358 — July 09, 2018	
US-227012	This hotfix adds the InvokeMenuItem method which you can use to specify the text of the context menu item that you want to be clicked. This item is defined on the Panel control (Java). You supply the name of the item in a parameter.	
SR-54359	This hotfix corrects an issue that could cause an Adobe popup window to incorrectly appear in a Workforce Intelligence implementation.	
SR-53105	This hotfix adds settings to the RuntimeConfig.xml file that are used by Workforce Intelligence. For more information, see Runtime Configuration Setttings.	
SR-54228	This hotfix resolves an issue that could cause Facet to crash when started.	
SR-53051	This hotfix resolves an issue that could prevent you from interrogating Facet controls.	
SR-54336	This hotfix adds fallback options that include pulling the URL from the Address bar and from the IHTMLDocument2 interface to avoid the URL Not Accessible error in Internet Explorer.	
SR-54373	This hotfix resolves an issue that could cause an exception when you use the Add Constructor For Type option or when you included an out parameter in a script.	
EPIC-32366	This hotfix adds support for the Facet Grid, ComboBox, and AfxWnd140 controls.	
	Build 8.0.1098 — Build 8.0.1099	
	The changes in these builds were published in 8.0.1100.	
	Build 8.0.1097 — SR-54311 — June 25, 2018	
SR-51968	This hotfix addresses an issue that can cause a PowerBuilder-based automation to crash.	
SR-52965	This hotfix addresses an issue that could prevent you from saving an automation that has missing design block members that are in between Try/Catch blocks. This issue can occur when you import an automation from another solution.	
SR-52697	This hotfix adds support for numeric cells in PowerBuilder versions 10 and 10.2 so you can retrieve values from these cells.	
SR-54324	This hotfix adds the ability to run custom Javascript by using a Citrix Context. This capability lets you create solutions for Citrix environments that can navigate through different Citrix landing pages.	Oper
	Build 8.0.1096 — SR-54288 — June 11, 2018	
US-142558	This hotfix resolves a problem with the IsCreated property and the WaitforCreate method that could cause an exception.	
SR-52501	This hotfix corrects a problem with the Add Constructor For Type method that could cause an ArgumentNullException error.	
SR-52501	This hotfix changes the system to now validate the configuration changes that are sent to Deployment Portal or Robot Manager.	
SR-54247	This hotfix changes the system to better handle toolbar-based structural differences in Microsoft Internet Explorer so it can locate the URL and avoid URL not accessible errors.	

Item number	Description	
210825	This hotfix removes the ability to use window text as a default source for the document URL in Microsoft Internet Explorer and Google Chrome.	
	Build 8.0.1095 — SR-54201 — May 29, 2018	
SR-54260	This hotfix resolves issues that affected the Universal Web Adapter.	Oper
SR-54092	This hotfix corrects a problem that could prevent you from selecting project adapters when reparenting.	
SR-54287	This hotfix corrects a problem that could cause an error when you tried to add an excluded process to an adapter.	
SR-52940	This hotfix corrects a problem that could cause touchscreen computers to crash.	
	Build 8.0.1094 — SR-54177 — May 18, 2018	
US-223893	**Note:** The Pega Chrome extension version 1.0.69 is included in this build. This hotfix corrects a problem that could cause a conflict in Workforce Intelligence implementations between Runtime and Adobe Reader.	
SR-52904	This hotfix corrects a problem that prevented Script component methods from displaying in the Object Explorer.	
SR-52511	This hotfix corrects a problem that could prevent the Google Chrome extension from loading web pages that were trying to access OpenSpan_JSON.	Oper
SR-52414	This hotfix corrects the buffer size for the Siebel 6.3 translator.	
BUG-369980	This hotfix changes Robotic Automation Runtime to better handle busy situations when connecting to Deployment Portal.	
BUG-369382	This hotfix modifies the way that timestamps are handled to ensure that timestamps match the machine's locale settings and ingest correctly when sent to Deployment Portal.	
	Build 8.0.1093 — SR-53087 — May 14, 2018	
SR-52727	This hotfix removes the Rename option, which previously let you rename scripts. Scripts are automation dependent and should not be renamed.	
SR-52696	This hotfix addresses a Pega Robotic Automation Runtime memory issue that could hinder performance.	
ISSUE-23457	This hotfix corrects some problems that could occur when Pega Customer Service calls the StartMyDay SMD_GET_APPS activity.	
US-217392	This hotfix changes Pega Robotic Automation Runtime so that it periodically sends RPA automation results even if the internet connection is lost.	
SR-53104	This hotfix changes Pega Robotic Automation Runtime so that it no longer requires authentication by the config server (Deployment Portal) when it is connecting to the Workforce Intelligence server.	
SR-53089	This hotfix changes Pega Robotic Automation Runtime to make sure that High Level Event (HLE) components do not touch Adobe Acrobat Reader elements with UIA.	
US-217606	This hotfix adds Siebel 6.3 support. For more information, see Siebel 6.3 support.	

Item number	Description	
BUG-362983	This hotfix modifies High Level Events (HLE) so browser monitors can better handle the ForegroundChanged event.	
	Build 8.0.1091	
	The changes in these builds were published in 8.0.1092.	
	Build 8.0.1090 — SR-53059 — April 24, 2018	
SR-52546	This hotfix corrects a problem that prevented the AWD Virtual control from working in version 8.0.	
SR-51061	This hotfix corrects a problem that could cause a deadlock when you started a block from an IntereactionActivated event, ran it through a parallel process, and then had a segment of that process start an activity.	
US-218157	This hotfix adds the SetValueInJSON method, which you can use to set a value for a JSON key in a JSON string.	
SR-52607	This hotfix adds the AWD translators to the installer packages.	
	Build 8.0.1089 — SR-53031 — April 17, 2018	
US-174630	This hotfix changes the system to now look for exception messages that have a benign impact and omit them from the Runtime log file so you can more easily focus on the messages that matter.	
US-217118	This hotfix improves performance when tracking high level events (HLEs), particularly in Citrix and Terminal Server environments.	
US-212263	This hotfix changes the WinLogon Scheduler to log in or unlock users on multiple operating systems by using the information that is entered on the login or unlock screens. Screen configuration information is now stored in the SchedulerDefinitions.xml file, which is located in the CommonConfig folder. The WinLogon Scheduler uses the information in this file to determine how to process login or unlock screens.	
SR-53050	This hotfix corrects a problem that prevented the SetValueByOcr method from detecting some characters. Now, if the system cannot map a character to the keyboard, it instead calls the SendKeys method.	
	Build 8.0.1088 — SR-52987 — April 06, 2018	
EPIC-29932	This hotfix adds support for four custom Java components.	
SR-52786	This hotfix corrects a problem for some Combo Box implementations to make sure that the value for ValueMember does not overwrite the value for DisplayMember.	
SR-52576	This hotfix corrects a problem where you were unable to use a proxy from a chart component in an automation.	
BUG-363391	This hotfix corrects a problem that could cause an exception when you used the PerformClickXY or ClickByOCR methods on some controls, such as certain types of ToolbarButton controls.	
	Build 8.0.1087 — SR-52966 — April 01, 2018	
US-214385	This hotfix modifies the AnalyticsConsumer regex rule so you can apply rules to the restricted fields that you specify by using the fieldNames attribute. For example, you can use this modified rule to mask the High level Events (HLE) MACAddress event metadata field.	
SR-52927	This hotfix corrects a problem that could cause errors in Studio when you used the Dev options with the PdfConnector and PdfViewer components.	
SR-52954	This hotfix modifies the PowerBuilder translator's SetValue method to make sure that an ItemChanged event occurs when you set new text in a column.	
US-173363	This hotfix adds support for a new child item in the DevExpress DockBarControl - BarEditItem control. It also adds a type extension for the DockBarControl to support the RepositoryItemComboBox GetSelected and SetSelection methods, and support for the RepositoryItemButtonEdit control to open a popup.	O O U
BUG-	This hotfix adds a TimeZone Change System event. The System now clears the time zone cache as needed to make sure that the correct time This hotfix adds support for creating automations by using OCR screen scraping and by using the UI Automation feature. The new methods for OCR screen scraping include ClickByOCR, DoubleClickByOCR, GetValueByOCR, SetValueByOCR, and HighlightByOCR.	

Item number	Description	
360582	The new methods for UI Automation include ClickByText, ClickByName, DoubleClickByText, DoubleClickByName, GetValueByText, GetValueByName, SetValueByText, and SetValueByName.	
US-196093 US-197148 US-196257	 **Note:** To support the OCR screen scraping feature, you must separately install the PegaRobotOCREssentials module. This module is included in your Pega Robotic Automation Runtime / Studio bundle. An install wizard guides you through the install process. You must also have a valid license to use the ABBYY OCR software. If you are unsure about the license, contact your account executive.	
US-215395	This hotfix changes the way that the system monitors heartbeats in RPA (Robotic Process Automation) implementations. Now the system only tries different versions of heartbeat endpoints at the beginning of a session and then remembers which endpoint to use throughout the session.	
US-200731	This hotfix adds a RestClient component that can perform RESTful HTTP web requests. It also includes a RobotManagerRestClient component that can perform RESTful HTTP web requests that you can use to share Pega Robot Manager authentication and connection information from Pega Robotic Automation Runtime.	
US-204043	This hotfix adds a JsonUtils component that can serialize and deserialize objects into JSON format, it can also parse values out of JSON string.	
EPIC-30401	This hotfix integrates Pega Robotic Automation’s Assisted Sign-on functionality into the Pega Customer Service platform for use in robotic desktop automations (RDA).	
EPIC-30363	This hotfix integrates Pega Robotic Automation’s Start My Day functionality into the Pega Customer Service platform for use in robotic desktop automations (RDA).	
SR-52499	This hotfix adds the ability to detect when the Citrix client application (wfica32) is restarted and reconstructs the state data that is in the virtual channel driver.  **Note:** Reinstall the Pega Citrix Virtual Channel Driver.	
SR-52500	This hotfix corrects a problem that could leave the Citrix-side login session open in a mixed-mode solution when Pega Robotic Automation Runtime shuts down. This hotfix also corrects a problem that could cause the Pega Virtual Channel Driver to crash.	
	Build 8.0.1085 — SR-52898 — March 12, 2018	
SR-52820	This hotfix resolves a problem that could cause Internet Explorer 11 to crash if high level events were enabled for Pega Workforce Intelligence Wait Time reporting.	
US-215005	This hotfix resolves a problem that could cause Pega Robotic Automation Runtime to crash if high level events were enabled for Pega Workforce Intelligence Wait Time reporting.	
SR-50675	This hotfix resolves a problem that could prevent OSDump from capturing a memory dump of an Agile Desktop process if you included the -dumprt parameter.	
US-213884	This hotfix corrects a problem that could cause Pega Robotic Automation Studio to crash when a very long string is inspected in a property grid.	

Item number	Description	
	Build 8.0.1084 — SR-52863 — March 05, 2018	
BUG-353977	This hotfix resolves a problem that prevented you from hiding the Connecting to Server prompt. Use the DisplayConnectionStatus key in the RuntimeConfig.xml file to control whether this prompt displays. The default is True. For more information, see Runtime Configuration Settings.	
SR-52701	This hotfix resolves an issue that could prevent the Scheduling service from unlocking the screen after a manual login.	
US-208560	This hotfix adds support for the new Heartbeat and Sign off endpoints in Pega Robot Manager.	
SR-52753	This hotfix corrects a problem that could prevent Pega Robotic Automation Studio from matching Infragisitcs UltraGrid controls during interrogation.	Op Op
SR-51944	This hotfix resolves a problem that could prevent you from setting cell values in a grid application if the computer was locked.	Op Op
US-240089	This hotfix improves the password strength for authentication between RPA robots and Robot Manager version 5. The system now generates a 20-character password with at least 1 uppercase letter, 1 lowercase letter, and 1 number.	
	Build 8.0.1083	
	The changes in these builds were published in 8.0.1084.	
	Build 8.0.1082 — SR-52767 — February 16, 2018	
BUG-350955	This hotfix changes the system to treat the OpenUI version 16 Navigation control as a child of the view in Object Explorer even though it is technically not a descendant of the DIV element that represents the view. This allows the automation control to get destroyed and created when changing views.	
SR-52542	This hotfix adds the MatchedScreenCount text adapter property, which you can use after a screen update to get a count of matched partial screens.	
SR-45765	This hotfix resolves a problem that could cause Siebel.CellPerformClick to throw an exception after it advances to a new page.	
	Build 8.0.1081 — SR-52783 — February 12, 2018	
SR-52707	**Note:** The Pega Chrome extension version 1.0.65 is included in this build. This hotfix enhances security checks when loading .dll files.	
SR-52505	This hotfix resolves an issue that could cause Internet Explorer to crash when using Pega Robotic Automation 8.0.1067.	
US-192769	This hotfix adds Cut, Copy, Paste High Level Events (HLEs) that are derived from key press (Ctrl+X, Ctrl+C, and Ctrl+V) raw events.	
US-209997	This hotfix adds support for Siebel OpenUI16 in Google Chrome by using a Universal Web Adapter. This hotfix adds High Level Event (HLE) support for MDI focus changes. This hotfix also contains the Pega Robotic Automation Chrome extension 1.0.65, which includes additional improvements. You must install this extension version to automate Chrome.	
EPIC-28581	This build only includes support for Chrome's View, List, and Navigation controls. None of the other Siebel controls are supported.	O

Item number	Description	
EPIC-22774	This hotfix adds several features that enhance support for reaching hierarchies and matching single-page web applications. **Note:** The AdvancedConfiguration > RematchOnViewLoaded property is deprecated in this and subsequent builds. Solutions that use Chrome with interrogated controls in OpenUI are not supported. These controls would have been interrogated as regular web controls under the webpage with a different hierarchy than the one created with OpenUI supported controls. For more information, see Working with single-page web applications.	
BUG-351903	This hotfix includes code that is necessary for connection in new environments by using Kerberos.	
	Build 8.0.1080 — SR-52746 — February 02, 2018	
SR-52782	This hotfix resolves a problem that arose if you had installed Microsoft Windows Update KB 4056894. This problem caused 64-bit processes that had the HookChildProcess option set to True to crash when a child process was launched.	
	Build 8.0.1079 — SR-52643 — February 02, 2018	
BUG-291762	This hotfix adds a 60-minute interval timer to Pega Robotic Automation Runtime. This interval timer tells Pega Robotic Automation Runtime to check with Pega Workforce Intelligence to determine if the Expected Hours dialog should be displayed.	
US-173409	This hotfix adds support for the DevExpress DockBar control.	
SR-52698	This hotfix corrects a problem in the IDriverEventService.	
SR-52700	This hotfix corrects a problem that could cause an error when you interrogate express translator controls.	
	Build 8.0.1078 — SR-52612 — January 26, 2018	
US-201830	This hotfix adds a FileUtils component that lets you find paths and delete, move, and copy files and directories from within Pega Robotic Automation Studio. Add the FileUtils component to the Studio toolbox. You can add the FileUtils component to automations or global containers.	
US-192712	This hotfix adds support for the list check boxes control in SAP.	
SR-51787	This hotfix corrects a problem that could cause the system to crash after you start interrogation when you close the Universal Web Adapter tab.	
US-196222	This hotfix adds support for the Infragisitics WPF Color Picker control.	
SR-51816	This hotfix enhances the UI Connector to detect parent controls in addition to child controls.	
SR-30698	This hotfix adds support for multiple configuration items in multiproject solutions.	
SR-52642	This hotfix enhances your ability to blur sensitive data in screenshots when interrogating applications and recording automations.	
	Build 8.0.1077 — SR-52583 — January 12, 2018	
SR-52558	This hotfix corrects a problem that could prevent the Citrix context NetScaler/WebInterface startup from working on 64-bit machines.	Open
SR-52532	This hotfix corrects a problem that could prevent the login page from including a Domain field when starting a Citrix mixed-mode solution. The login would then fail and the project would not start.	Open

Item number	Description	
SR-52547	This hotfix corrects a problem that could prevent dialogs from being dismissed when starting a Citrix mixed-mode solution.	
SR-52551	This hotfix corrects a problem with the Navigate method that could occur when using the Universal Web Adapter with a Chrome browser.	
SR-52101	This hotfix adds support for the ActiveX ToolBar in SAP.	
SR-52559	This hotfix changes the system to only register a translator one time for each technology.	C C
BUG-340970	This hotfix changes the system to lessen the chances that Microsoft Internet Explorer, Google Chrome, or Mozilla Firefox generate a URL value of 'URL Not Accessible' if the browser is unable to pull that value from the underlying object model.	
SR-52539	This hotfix corrects a problem that could cause the DevExpress translator to initialize incorrectly.	O O
SR-52088	This hotfix corrects a problem that could cause the PdfConnector component to return incorrectly formatted strings.	
	Build 8.0.1076 — SR-52526 — January 08, 2018	
US-203386	This hotfix adds support for a custom Java TreeView applet.	
EPIC-29317	This hotfix adds support for an Audatex Gridlist control.	
	Build 8.0.1075 — SR-52494 — January 08, 2018	
SR-52018	This hotfix changes the system to prevent interactions with IBM Lotus Notes classes. This technology is not currently supported.	
US-195930	This hotfix adds support for the Infragistics Color Picker.	C C
US-193182	This hotfix adds support for the DevExpress NavBar control.	O O
US-195913	This hotfix adds support for the Infragistics Grid Bag Layout Panel control.	C C
EPIC-28801	This hotfix adds support for the Microsoft Visual Basic SSTab control.	
BUG-290776	This hotfix changes the system so that when Pega Robotic Automation Runtime captures High Level Events (HLEs), it no longer prepends “www” to URLs that were missing the “www” prefix.	
SR-51597	This hotfix changes the system so that it now checks the adapters in all of the loaded projects instead of only the adapters in the current project. This change resolves a problem that could prevent the MonitorAll and Start adapters from starting if you were using these adapters in separate projects.	
SR-51999	This hotfix corrects a problems that could prevent syntax highlighting from working after you updated to the new .cs based script in the stand-alone version of Pega Robotic Automation Studio.	
SR-52530	This hotfix enhances logging to make it easier to resolve issues.	

Item number	Description	
SR-52529	This hotfix adds some assemblies to provide support for Citrix NetScaler.	
US-201024	This hotfix adds an Equals method to the StringUtils component. This method takes two strings and a StringComparison option and returns a Boolean value.	
US-201102	This hotfix adds a Format method to the StringUtils component. This method lets you include any number of string inputs by clicking the + icon on the automation block.	
US-201101	This hotfix adds a IsDBNullOrEmpty method to the StringUtils component. This method lets you check to see if a given value is a DBNull or empty string.	
SR-52411	This hotfix adds support for the PerformClick action of the SAP tree control.	O O C C Op Op
SR-52023	This hotfix resolves an issue that could prevent Microsoft Internet Explorer and other applications from functioning correctly with Pega Robotic Automation Studio after you installed the Windows 10 Fall Creator's Update.	
EPIC-29595	This hotfix adds support for PowerBuilder 2017.	
EPIC-25636	This hotfix ports the port UltraGrid Translator to version 8.0.	Op
	Build 8.0.1073 — Build 8.0.1074	
	The changes in these builds were published in 8.0.1075.	
	Build 8.0.1072 — SR-52488 — December 13, 2017	
US-186729	This hotfix adds support for the SAGESS3 DockedBarControl control.	O O
US-195923	This hotfix adds support for the Infragistics UltraCalendarComboEditor control.	C C
BUG-339493	This hotfix changes the system to make sure the setting for the LimitData key in the RuntimeConfig.xml file is used by the system.	
	Build 8.0.1071 — SR-52029 — December 06, 2017	
US-191810	This hotfix adds support for the Infragistics XamMultiColumnComboEditor control.	Ope
US-195924	This hotfix adds support for the Infragistics WindowsForms UltraColorPalette control.	C C
US-195925	This hotfix adds support for the Infragistics WindowsForms UltraZoomPanel control.	C C
EPIC-25934	This hotfix adds support for the following DevComponents controls: • Bar (only ButtonItem) • ButtonX • CheckboxX • ComboBoxEx • DataGridViewX • RibbonBar • TabStrip • TextBoxX	Ope Ope

Item number	Description	
US-198435	This hotfix corrects a problem that prevented the VSFlexGrid translator from working correctly.	OpenS
SR-51956	This hotfix corrects a problem that could cause Pega Robotic Automation Studio to crash when you interrogated a Java application.	
SR-52486	This hotfix changes the system to avoid the following exception when using dynamic translators: Value was either too large or too small for an Int32	
SR-52487	This hotfix corrects a problem that could cause an exception when working with a XamComboEditor control.	Ope Ope
	Build 8.0.1069 — Build 8.0.1070	
	The changes in these builds were published in 8.0.1071.	
	Build 8.0.1068 — SR-51969 — November 21, 2017	
SR-51918	This hotfix changes the system to handle a problem that could make the Save Note button in Agile Desktop unresponsive.	
SR-52020	This hotfix adds the LogonDisclaimer option in the AppSetting section of the OpenSpan.WinLogon.Service.exe.config file. If the Windows disclaimer screen is enabled, to make sure that the WinLogon service logs in correctly, set this option to True.	
SR-51338	This hotfix corrects a problem that could prevent Agile Desktop images from being loaded.	
	Build 8.0.1067 — SR-51923 — November 10, 2017	
US-191808	**Note:** The Pega Chrome extension version 1.0.50 is included in this build. This hotfix adds support for the Infragistics WPF XamComboEditor control.	Ope Ope
EPIC-25349	This hotfix changes the DevExpress translator to make this translator version independent.	O O
US-178745	This hotfix adds support for the Infragisitics XamDateTimeEditor control.	Ope Ope
SR-51384	This hotfix makes sure that generated operational events that do not have user IDs are discarded.	
SR-51802	This hotfix adds the AdvancedConfiguration > RematchOnViewLoaded option. When set to one (1), the document target subscribes to the View Loaded event. When the system detects the new view, the event handler unmatches and rematches the WebPage controls.	
EPIC-28737	This hotfix includes the following enhancements to the Pega Robotic Process Automation Scheduling service: • Enhances the ability to recover from an abnormal Runtime shutdown • Lets you invoke LogOn\Start and LogOff\Stop from a command line utility • Improves Runtime shutdown resiliency • Adds support for Windows Server 2012 R2	
SR-51926	This hotfix corrects a problem that could occur when you renamed a script.	
EPIC-28791	This hotfix adds support for using Kerberos authentication when you connect to Pega Robot Manager in a Pega Robotic Process Automation (RPA) implementation.	
US-197623	**Note:** To disable system default proxy settings, in the CommonConfig.xml file, for the proxyAddress attribute for servers, enter None. This hotfix adds an overload method to the AddCase method in the case component. The overload method returns the newly created case's ID as an output parameter.	
US-194119	This hotfix adds the robotName attribute in the RobotManager section of the CommonConfig.xml file. Use this attribute to change the Robot Name for Pega Robotic Process Automation (RPA) at registration time. The following is an example of this attribute: <Server name="RobotManager" baseURL="https://mybase/prweb/" enabled="true" proxyAddress="" RPA="true" authenticationType="" workgroup="Customer service" robotName="myRobot_{machinename}" />	

Item number	Description	
	Build 8.0.1065 — Build 8.0.1066 The changes in these builds were published in 8.0.1067.	
	Build 8.0.1064 — SR-51845 — October 31, 2017	
SR-51878	This hotfix corrects a problem that prevents the expand/collapse arrow from functioning correctly on Event blocks.	
SR-51445	This hotfix changes the system so that it no longer ignores a client-specific application.	
SR-51070	This hotfix changes the system to avoid a hang when starting an on-demand recording client.	
US-191373 BUG-334541	This hotfix corrects the screen mapping behaviors in the AnalyticsConsumer.	
SR-49980	This hotfix adds the FarpointGrid30 translator.	
	Build 8.0.1063 — SR-51772 — October 20, 2017	
SR-51553	This hotfix updates a trace statement to correctly log DotNet translator values.	
SR-51750	This hotfix replaces the hard-coded timeout interval value for the messaging host with the StartTimeout property for the Universal Web Adapter. Use this property to prevent unwanted timeouts on slow machines.	
SR-50894	This hotfix addresses a problem that prevented the PerformDoubleClick method for Windows Presentation Foundation (WPF) DataGrid from raising the correct events in an application.	
BUG-332018 US-187609	This hotfix corrects a problem that could cause the system to show incorrect version numbers.	Open
SR-51601	This hotfix adds the ability to call the state, method, and properties from UI Connectors and extensions.	
SR-51412	This hotfix adds a SectionList UI Connector to automate the SectionList control that is used for date time picker.	
SR-51821	This hotfix corrects a problem that could prevent the RaiseEvent method from working for web controls when you use mouse events such as MouseDown and MouseUp.	
US-192779	This hotfix adds the Clarify translator to version 8.0.	
SR-50317	This hotfix adds a check to make sure that when the interaction.xml file is updated, the proper events fire.	
US-182167, 182169, 181788, 181549, 181337, 180114, 180112, 180110, 180109, 180108, 179994, 179992, 179993, 179991, 179990, 179988,	This hotfix adds the following enhancements to the Automation Recording feature: • The ability to blur regions of recording step screenshots and adapter control screenshots by drawing rectangles over regions of screenshots. • Recording input form is now scrollable after a certain number of inputs are added. • Removed the dialogue that displays when stopping or exiting a recording. • Copy and input copy steps now display the control or input that was copied from and the associated paste steps now specify where the data was copied to. • Displays only the properties, methods, and events that are applicable to recording automations. • Adds more messages to the recording toolbar. For a full list, see the table in US-180112. • To pause a recording playback, use the Pause button. To resume playback, click Pause or Play. • To stop a recording playback, use the Stop button. • The Recording Input form now stays in front of any open applications. • The system displays the name of the adapter that contains the control associated with the step above the control name in the step list. • During a recording session, the system now displays the current step in the recording toolbar. • The recording toolbar now displays a message after each step is recorded.	

Item number	Description	
179987, BUG-300616, 313523, 313288	• The recording toolbar is pinned by default. • You can now delete individual steps from recordings by clicking the three vertical ellipses on the right of each step in the step list. • Pega Robotic Automation Studio is minimized when you begin a recording session and is restored when you end the recording session. • Corrected a problem with the Save dialogue. • Corrected a problem that could prevent you from exporting to Word or PDF format recordings that contain steps without screenshots. • The Recording studio window now resizes correctly when you change the type of steps displayed in the step list.	
SR-51654	This hotfix adds the WpfIdleTimer property so you can control how often WPF controls are tracked in the application. To set this property for an adapter, expand the adapter's AdvancedConfiguration property. Enter a value in milliseconds, from 0 (zero) to 2000 (2 seconds).	
US-194637	This hotfix corrects a problem that could prevent login information from being sent to the Pega Robotic Automation Deployment Portal. It also provides a performance enhancement to Pega Robotic Automation Runtime.	
US-191801	This hotfix adds support for the Infragistics UltraRadioButton control.	C C
US-191804	This hotfix adds support for the Infragistics WPF XamRichTextEditor control.	Ope Ope
US-192780	This hotfix adds support for the SAP TextEditCtrl control.	
BUG-329085	This hotfix changes the value that the system assigns to the UserEmail HLE metadata field when a user's email address is unavailable to be an empty string.	
	Build 8.0.1062	
	The changes in this build were published in 8.0.1063.	
	Build 8.0.1061 — SR-51603 — October 03, 2017	
SR-51423	This hotfix adds checks to find controls that are added to a parent control when that control is not visible.	
SR-50013	This hotfix addresses a problem that could cause Agile Studio to crash.	
SR-51039	This hotfix changes the system to better handle combo boxes that have a large number of items.	
SR-51289	This hotfix changes the system so that it no longer uses the -nohangrecovery flag when starting Internet Explorer. If you need to use this flag, contact Pega Robotic Automation Support.	
SR-51752	This hotfix corrects a problem that could cause Pega Robotic Automation Runtime to hang when you stop running a project or interrogating an application.	
SR-51410	This hotfix adds support for the ClickCell and DoubleClickCell methods when used with the Infragistics WPF XamDataGrid control.	Ope Ope
SR-51652	This hotfix corrects a problem with the Script component to make sure that all methods are available.	
SR-51411	This hotfix corrects a problem that could prevent you from clicking Windows Presentation Foundation (WPF) context menu items.	
US-187609	This hotfix adds the following properties that you can use to allow a Citrix adapter to connect to a WebInterface environment. Use these properties to also specify how to automatically dismiss pop-up dialogs during the authentication process. In the Misc section, the following properties were added: • Dialog Dismissal List – Use this property to define a list of the dialogs that you want to dismiss. The system displays a dialog where you can enter the information that is required to define a dialog. • Dismiss Dialogs – If you want the system to dismiss the dialogs that are listed in the Dialog Dismissal List property, enter True. The default is False. In the XenApp WebInterface/NetScaler section, the following properties were added: • Show Navigation UI – If you are having problems connecting to a Citrix machine, enter True. The system then shows the WebInterface login page in a window and provides information that can help you to determine the problem. The default is False. • URL Is NetScaler – If the implementation uses Citrix NetScaler to balance loads, enter True. The default is False. • Use Web Interface – If the implementation uses the Citrix Web Interface to provide access to XenApp applications and content, enter True. The default is False. • Web Interface URL - If you entered True in the Use Web Interface property, enter the URL to which you want to connect.	Open

Item number	Description	
SR-51105	This hotfix changes the system so that it correctly handles forms that changed from top-level to nested after being created.	
SR-51389	This hotfix resolves an issue that could cause an error when you used a script to reference a ServiceClient .dll file that was in an imported project.	
US-184166	This hotfix adds support for the PowerBuilder PFC Calendar control.	
US-186722	This hotfix adds methods for selection items for the PowerBuilder DropDown DataWindow control.	
SR-51035	This hotfix corrects a problem that could prevent Studio from interrogating applications after you install the Windows 10 Creators Update.	
SR-51313	This hotfix corrects a problem that could affect the display when you interrogate text adapter controls on non-standard sized screens.	
SR-51637	This hotfix corrects a problem that could occur when you interrogate an unsupported Java control.	
SR-51651	This hotfix corrects a problem that could cause Pega Robotic Automation Runtime to hang when you call TerminateRuntime from a button on a Pega WindowsForm.	
SR-51636	This hotfix corrects a problem that could prevent you from adding properties, methods, and events from the Explore Component Properties pane in Object Explorer.	
	Build 8.0.1060	
	The changes in this build were published in 8.0.1061.	
	Build 8.0.1059 — SR-51547 — September 21, 2017	
SR-51539	This hotfix corrects an error that could cause the following error when you run a solution that contains a Script component: Unknown Script Environment	
SR-51535	This hotfix corrects a problem that could disable the Windows Forms Idle Timer.	
SR-51449	This hotfix corrects a problem that could cause saplogon.exe to crash.	
ISSUE-18228	This hotfix lets you remove credentials when managing Windows sessions. Here is an example of the command that you would use to remove a Pega Robotic Automation Runtime user: CredMgr.exe -r --runtime Include the -help switch to view information about the switches that you can include when running this program.	
ISSUE-18230	This hotfix changes the system so that you can schedule RPA robots to work across the midnight boundary.	
SR-51576	This hotfix corrects a problem that could cause errors when you create virtual controls in native applications.	Aff
SR-50743	This hotfix adds support for SAP docking windows.	
SR-51373	This hotfix corrects an issue that prevents you from selecting controls from the current adapter. This could affect, for instance, the Assisted Sign On login button or the password and user name fields.	
	Build 8.0.1058 — SR-51479 — September 01, 2017	
US-185987-1	This hotfix adds support for Transport Layer Security (TLS 1.1 and TLS 1.2) cryptographic protocols, which you can use to provide communications security when making web connections.	

Item number	Description	
ISSUE-17733	This hotfix changes the way that the Robotic Automation Runtime works with the CommonConfig.xml file. Previously, Pega Robotic Automation Runtime would read from and write to the CommonConfig.xml file. Now it only reads from the CommonConfig.xml file.	
US-187885 US-187886	This hotfix adds the ProductVersion and UserEmail metadata fields into the HLE events section of the RuntimeConfig.xml file. This information is used by PegaWorkforce Intelligence to track the version of Pega Robotic Automation Runtime that individual users are using and to match the user's email address to the network ID for identification purposes in environments where multiple users share a network ID.	
SR-51201	This hotfix corrects a problem that could occur when you launch multiple instances of the Fujitsu adapter. This problem prevents the File menu from displaying in every emulator window.	
SR-51023	This hotfix updates the openspan.ini configuration file with information that is needed to inject in Windows 10.	
SR-51500	This hotfix adds support for ComboBoxes in SAP version 7.4, patch 7.	
US-188287	This hotfix includes the following methods that you can use to Invoke a control instead of simulating a click: • ClickChildByName • ClickChildByText • DoubleClickChildByName • DoubleClickChildByText There are also overload versions of these methods that only require two parameters. For more information, see Windows Adapter Properties, Methods, and Events.	
SR-51520	This hotfix corrects a problem that could cause the following error: Extension object should not be null	
SR-51516	This hotfix corrects a problem that could cause the following error: Could not get reference to OpenSpan.DynamicMembers.Extensions.IExtensionTypeService	
SR-51528	This hotfix changes the system to make sure that Intellisense is available for extensions.	
US-188294	This hotfix lets you add the DeploymentSecurity section to the CommonConfig.xml file. Pega Robotic Automation Runtime uses the DeploymentSecurity values in the CommonConfig.xml file if you add them there. If you do not add them into the CommonConfig.xml file, Pega Robotic Automation Runtime uses the DeploymentSecurity values in the RuntimeConfig.xml file.	
US-184207 US-184206 US-184196 US-184210 EPIC-23192 EPIC-23188 EPIC-23199	This hotfix adds the Pega Robotic Processing Automation Scheduling service, which you can use to schedule RPA sessions. This service allows you to log on to a virtual machine (VM) and start sessions for Pega Robotic Automation Runtime as any Windows user. For (VM) and station, see Pega Robotic Automation Settings. ~~You can now specify daily schedules for a group of robots, which can help you to better manage production systems whose applications are not available all day and every day.~~ For more information, see Robotic Processing Automation (RPA) Scheduling service processing flow. This hotfix includes changes that allow Pega Robotic Automation Runtime and Pega Robotic Automation Studio to work with Pega Robot Manager to authenticate and manage packages. This includes the following changes: • User authentication support for Pega Robot Manager for Pega Robotic Desktop Automations (RDA) • The ability for users to upload, assign, and download packages for Pega Robotic Desktop (RDA) and Pega Robotic Processing (RPA) automations by using Pega Robot Manager **Note:** The Scheduling service only works on Windows 7.	
Build 8.0.1057 — SR-51448 — August 25, 2017		
US-174516	**Note:** With this change, Microsoft .NET version 4.5 is now required. This hotfix adds the following methods for the JWalk translator and adapter: • string GetCellValue(int row, int column) - (row and column are 0-based) • void SetCellValue(int row, int column, string value) - (row and column are 0-based) To add these methods to a solution, first re-interrogate the control. This changes the control type from ListBox to JWListBoxControl. Including these methods is optional; your solutions should work fine without modifications.	
SR-	This hotfix resolves an issue that could prevent you from matching a nested ToolStripMenuItem control.	Op

Item number	Description	
SR-51368		
SR-51473	This hotfix resolves an issue that could prevent you from using the UI Connector to create virtual controls.	
	Build 8.0.1056 — SR-51397 — August 18, 2017	
SR-51429	This hotfix corrects a problem that could cause an exception to be thrown and the datasource to be blank when you add the tableview component.	
SR-51415	This hotfix resolves an issue that causes both instances of a property to appear in the grid instead of the lowest class. This could occur if a control has a property that hides a property that has the same name as an ancestor class plus the new keyword.	
SR-51395	This hotfix resolves an issue that causes an exception when you drop an XmlDocument component from the toolbox onto an automation.	
SR-51405	This hotfix resolves an issue that could prevent scripts without parameters from correctly updating.	
	Build 8.0.1055	
	The changes in this build were published in 8.0.1056.	
	Build 8.0.1054 — SR-51378 — August 18, 2017	
BUG-318010 BUG-316947 BUG-316394 BUG-318323 BUG-318479	This hotfix corrects several problems that could prevent the system from generating expected IE Focus events.	
US-184077	This hotfix adds support for the Infragistics WPF XamDataTree control.	
US-187336	This hotfix adds support for the Infragistics WinForms UltraToolbarsDockArea panel control.	
US-187135	This hotfix adds support for the Infragistics UltraTabbedMdiManager control.	
EPIC-26064	This hotfix adds translators for the VSFlexGrid8 DAO, port VSFlexGrid8 Light, and VSFlexGrid8 Unicode translators.	
EPIC-22773	This hotfix addresses several UI Connector issues.	
SR-48466	This hotfix corrects a problem that could cause an error when you use the recording feature.	
US-182214	This hotfix adds a UI Connector for the QzSourceGrid QzVirtualGrid control.	
	Build 8.0.1053 — SR-51326 — August 01, 2017	
US-181166	This hotfix adds High Level Events (HLEs) to track the ProcessWaitStarted/ProcessWaitEnded and WebPageLoadStarted/WebPageLoadEnded events. This information is used by Workforce Intelligence to do wait time analysis.	
US-174744	This hotfix adds the ability to discover simple methods, properties, and events on .NET controls.	
EPIC-22773	This hotfix adds the ability to create UI Connectors for .NET controls.	

Item number	Description	
186202	This hotfix enhances the Script editor. If your deployment uses a script component, open your solution in Studio, rebuild it, and redeploy it.	
	This hotfix adds the UI Connectors feature, which can be used to develop translators for .NET applications and extend support for additional controls.	Open Ope Ope Ope Ope Open O O Open C O Op Open Ope Oper
	This hotfix adds support for the following controls: • DevExpress.XtraPivotGrid.PivotGridControl • Infragistics.Controls.Editors.XamColorPicker • Infragistics.Controls.Grids.XamGrid • Xceed.Wpf.Toolkit.DropDownButton • Xceed.Wpf.Toolkit.DoubleUpDown • Infragistics.Win.UltraWinTree.UltraTree • Infragistics.Controls.Editors.XamComboEditor • Infragistics.Windows.Controls.XamTabControl • Infragistics.Windows.Editors.ValueEditor	Platforms/Ex Platforms/Expres Platforms/Exp Platforms/E Ope Ope C C Trans Tran Translato Ope Ope Tra Tra Transla Trans

Item number	Description	
	• Infragistics.Windows.Editors.XamMonthCalendar • Infragistics.Controls.Editors.XamNumericSlider • Infragistics.Windows.Editors.XamMultiColumnComboEditor • Infragistics.Windows.Editors.XamComboEditor • Infragistics.Windows.DataPresenter.XamDataPresenter • Infragistics.Windows.DataPresenter.XamDataGrid • Infragistics.Controls.Menus.XamMenu • Infragistics.Windows.Ribbon.XamRibbon • DevExpress.XtraEditors.ListBoxControl	Trans Translato Trans Trar Translato Translators Translator Translators\Inf Transl Trans Translato
Build 8.0.1046 — 8.0.1052		
	The changes in these builds were published in 8.0.1053.	

Build 8.0.1045 — SR-51258 — July 21, 2017		
SR-51270	This hotfix adds the Screen WaitForInputAllowed(int timeout) TextAdapter functionality	OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Text.Host.dll
EPIC-25807	This hotfix adds support for the DevComponents ButtonX, DataGridViewX, TabStrip, and ToolBar controls.	OpenSpan.Translators.DotNet.v20.DevComponents.dll OpenSpan.Translators.DotNet.v40.DevComponents.dll
Build 8.0.1044 — SR-51196 — July 13, 2017		
SR-51111	This hotfix corrected a problem that could cause an error after you update from version 7.1 to version 8.0.	OSC.exe OpenSpan.dll
SR-50871	This hotfix changes the PdfViewer component so that you can now specify the text for a segment even if the field on the form has no data in it.	OpenSpan.Pdf.PdfConnector.dll OpenSpan.Pdf.PdfControl.dll
SR-50872	This hotfix changes the PdfConnector and PdfViewer components to make sure that updated data displays in the PdfViewer and is saved by the PdfConnector.	OpenSpan.Pdf.PdfConnector.dll OpenSpan.Pdf.PdfControl.dll
SR-50920	This hotfix changes the adapter IeRematchEvents properly to now use all of the possible events to cause a webpage rematch.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
SR-50680	This hotfix changes the system to use the adapter-level SendMessageTimeout property to read the Focused property of a web control as it is being detached. If Internet Explorer does not respond with the Focused value within this time limit, the control detach continues.	OpenSpan.Adapters.Web.dll.dll
SR-51164	This hotfix corrects a problem that could prevent the EventHost.exe file from starting if English was not the selected language.	OpenSpan.EventHost.exe OpenSpan.Events.dll
SR-51136	This hotfix corrects an issue that could prevent the Brokers diagnostics utility from working correctly.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
SR-49552	This hotfix corrects a shared memory leak that could occur when using PowerBuilder.	OpenSpan.Adapters.DataGrid.dll
SR-50871 SR-50872	This hotfix adds the HasFormFields and IsDocXfaFormat properties to the PdfConnector. Use the HasFormFields property to specify an open PDF file that contains form fields which can be written to. The IsDocXfaFormat property indicates if the opened PDF file is in XFA (XML Forms Architecture) format. There is only limited support for XFA format PDF files. The PdfViewer may be able to display these files, but you cannot edit XFA formatted files.	OpenSpan.Pdf.PdfConnector.dll
Build 8.0.1043 — SR-51167 — July 06, 2017		
SR-51102	This hotfix adds support for the CER_SQL_COMBO and CMC_MCTR_COMBO Facets controls.	OpenSpan.Adapters.Facets.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll
SR-51100	This hotfix improves performance with the Facets application. For more information, contact Pega Robotic Automation Support.	OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll
Build 8.0.1042 — SR-51090 — July 06, 2017		
SR-50896	This hotfix improves focus processing and adds an accessibility handshake between Chrome, High Level Events (HLEs), and Robotic Automation Runtime.	OpenSpan.Events.dll
EPIC-32180	This hotfix adds another later of security for Robotic Desktop Automation connections from Pega applications to Robotic Automation Runtime: Robotic Automation Runtime now acquires a public key from Pega Server and verifies the signature and claims of the JSON Web Token (JWT).	OpenSpan.Runtime.Core RuntimeConfig.xml
US-172157	This hotfix adds support for non-global Chrome webpages.	OpenSpan.Adapters.Web.WebBase.Design.dll
SR-50902	This hotfix changes the system to correct an issue that could prevent forms from matching when EnableMatchInProcess is set to True.	OpenSpan.Adapters.Web.dll
SR-50741	This hotfix adds support for the use of types from a dynamic assembly (.DLL) in a Script component. This includes adding the SetRequestHeader and GetResponseHeader methods for HTTP-based bindings and fixing a service compilation issue. The MessageEncoding property was added to ServiceClient HTTP, HTTPS, and WS bindings.	OpenSpan.Script.Design.dll OpenSpan.Script.dll OpenSpan.Service.dll
SR-50845	This hotfix adds support for combo boxes in SAP version 7.4, patch 8.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
SR-	This hotfix adds SAP exports to support PerformClick with ToolBar buttons in SAP version 7.4, patch 10 and	OpenSpan.Translators.SAP.x32.dll

50917	later.	OpenSpan.Translators.SAP.x64.dll
SR-48474	This hotfix corrects a problem that prevents WPF controls in a Windows form application from being located correctly in the adapter hierarchy.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
SR-42380	This hotfix changes the system to avoid a problem that could cause Agile Desktop to hang temporarily when you click a button.	OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.Automation.dll OpenSpan.Runtime.Core.dll
SR-45179	This hotfix adds the FileLocation key in the RuntimeConfig.xml file, which you can use to specify the StartMyDay file. Here is an example: <StartMyDay> <AllowLocalApplications value="true"/> <ShowPathColumn value="true"/> <FileLocation value=""/> </StartMyDay> Enter the location of the StartMyDay file. You can include environmental variables, special folder names, and full paths. If this key is missing or is empty, the system looks for the StartMyDay file in the config location that you specified in the CommonConfig.xml file.	OpenSpan.ApplicationFramework.dll RuntimeConfig.xml
SR-48253	This hotfix adds a RichTextBoxPlus control that provides all of the same functionality as the Microsoft RichTextBox control. The new RichTextBoxPlus control does not handle UserPreferenceChanged system events. Add this control to the Visual Studio Toolbox so you can then drag it onto the Windows Forms Designer.	OpenSpan.Controls.dll
SR-48909	This hotfix adds the GetRuntimeVersion static method to the RuntimeHost .dll file. You can add this method to the Toolbox and then drag it onto an automation. The method tells you the version of the RuntimeCore assembly.	OpenSpan.Runtime.Core.dll
SR-48389	This hotfix changes the system so you can use the SendKeys method through the WebDocument.	OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll
SR-48715	This hotfix changes the system to avoid excessive logging.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
SR-46805	This hotfix adds limited support for the AWS (MFC 4.2) SECTreeCtrl tree control.	OpenSpan.Translators.AWD.x32.dll OpenSpan.Translators.AWD.x64.dll
SR-49688	This hotfix removes an unused library call.	OpenSpan.Adapters.Windows.dll
SR-39259	This hotfix changes the system to make sure it ignores Stop events from unsupported text adapters.	OpenSpan.Adapters.Text.Host.dll
SR-49682	This hotfix modifies the IgnoreProcesses setting to correct an issue that could prevent it from matching process names.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
SR-44759	This hotfix corrects a problem that could cause an overflow error message when Robotic Automation Studio is injected.	OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll
SR-49987	This hotfix addresses several customer-reported issues with Siebel support.	JavaScript/*.j OpenSpan.Adapters.Siebel.dll
SR-48232	This hotfix lets you configure how the system creates Windows forms controls. For instance, if necessary, you can delay how the system processes these controls to make the user interface load faster. Only use this new functionality under direction of Pega Robotic Automation support.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
SR-46293	This hotfix adds support for Visual Basic 6 labels.	OpenSpan.Adapters.VisualBasic6.Design.dll OpenSpan.Adapters.VisualBasic6.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.dll OpenSpan.Translators.VisualBasic6.x32.dll
SR-45025	This hotfix adds support for a FarPoint Spread 8.0 grid control.	OpenSpan.Adapters.FarpointOCX.Design.dll OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Translators.Farpoint.Spread80.x32.dll
SR-46258	This hotfix resolves some matching issues with FarPoint Spread 2.5.	OpenSpan.Adapters.Windows.dll
SR-49386	This hotfix resolves an issue that could cause a crash in SAP version 7.4.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
SR-48065	This hotfix adds support for the Crescent Mask Text control.	OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Adapters.Crescent.Design.dll OpenSpan.Adapters.Crescent.dll OpenSpan.Translators.Farpoint.Spread25.x32.dll OpenSpan.Translators.Farpoint.Spread25.x64.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll OpenSpan.Translators.CrescentText.x32/x64.dll
Build 8.0.1040 — 8.0.1041		
	The changes in these builds were published in 8.0.1042.	
Build 8.0.1039 — SR-51062 — June 12, 2017		
SR-50522	This hotfix changes the system so that it allows non-English characters, such as Kanji characters, while still filtering out punctuation and other non-alphanumeric characters. This change can be useful when you select fields in robotic process automations.	OpenSpan.Interactions.dll
SR-47796	This hotfix corrects a problem that could cause Robotic Automation Runtime to hang when you display the Robotic Automation Runtime menu.	OpenSpan.ApplicationFramework.dll OpenSpan.Runtime.exe
BUG-308754	This hotfix corrects a problem that could occur if an application removed a Windows forms control and then reinserted it into the user interface. This could prevent the system from correctly tracking the control's children and being automated.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
SR-50892	This hotfix changes the system to make sure that you can inject into processes by using MonitorAll when the processes are started through an automation.	OpenSpan.Adapters.Windows.dll

SR-49862	This hotfix adds support for the MSFlexGrid and MSCommonControls5 controls.	OpenSpan.Adapters.MicrosoftOCX.Design.dll OpenSpan.Adapters.MicrosoftOCX.dll OpenSpan.Adapters.MSFlexGrid.Design.dll OpenSpan.Adapters.MSFlexGrid.dll OpenSpan.Translators.MSCommonControls5.x32.dll OpenSpan.Translators.MSCommonControls5.x64.dll OpenSpan.Translators.MSFlexGrid.x32.dll
~~Build 8.0.1038 — SR-50798 — June 01, 2017~~		
		
BUG-300590 BUG-300595	**Note:** The Pega Chrome extension version 1.0.38 is included in this build. This hotfix makes sure the WindowsForm TabStrip SelectedIndexChanged event is properly sent from the translator to adapter.	OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Adapters.dll
SR-50578	This hotfix creates a list of fields for the system to exclude from regexing. This allows these fields to remain unmasked so that they can be used by Workforce Intelligence. The excluded fields include: AppName, UserName, MachineName, WebDomainName, MACAddress, ProcessId, and DomainName.	OpenSpan.Runtime.Analytics.dll
SR-50830	This hotfix corrects several issues with the Project Properties page that could cause a crash, a failure to refresh the user interface, and the incorrect display of user interface elements.	OpenSpan.MPF.dll OpenSpan.Studio.dll
SR-50517	This hotfix adds support for clicking a check box in a cell of a ListViewItem in a Windows Presentation Foundation (WPF) ListView.	OpenSpan.Adapters.Virtual.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
SR-48397	This hotfix changes the system so that you can use AddContextMenuItems when the control that is displaying the context menu is on a webpage that has been interrogated by using the Global Web Pages option. The system now also logs a message that tells you to interrogate the IEFrame control.	OpenSpan.Adapters.Windows.Design.dll
SR-50149	This hotfix changes the system so the translator can get icons from JTabbedPane.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
SR-49625	This hotfix makes sure the AllProjectsStarted event only fires once.	OpenSpan.Runtime.exe
EPIC-22892	This hotfix adds support for frames in the Chrome browser. Previously, automations could only interact with web controls immediately under the top-level document. Now you can interrogate and automate the content document and other web controls within frames, including nested frames. Every interrogated content document of a frame displays as a direct child of the web adapter even if the documents are nested within other frames. If the AcceptedDomains property contains criteria that prevents a top-level document from being interrogated, then any child frames of that document are also excluded. If you set the BrowserStopMethod property to StopMatchedDocument, then closing a matched child frame closes its top-level document even if the top-level does not match. Only global webpages are supported.	OpenSpan.Adapters.Virtual.dll OpanSpan.Adapters.dll OpanSpan.Adapters.Web.dll OpanSpan.Adapters.WebBase.dll OpanSpan.Adapters.Universal.dll OpenSpan.Virtual.Web.Interfaces.dll
EPIC-23945	This hotfix adds a RaiseEvent method that raises the event directly on the element at the JavaScript level. The original RaiseEvent method remains so there are no changes to automations that include it. You can use the new RaiseEvent method in new automations and when you modify existing automations.	OpenSpan.Adapters.Web.dll
Build 8.0.1037 — SR-50726 — April 24, 2017		
SR-50445	This hotfix adds a translator for the TriZetto Facets ComboBox control.	OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Adapters.Facets.dll
EPIC-23874	This hotfix adds 32- and 64-bit versions of WinHllapiHost. The system determines the bitness of the WinHllapi DLL during interrogation or runtime and launches the correct version of WinHllapiHost. Use the Text adapter's new SetRegionTextWithSendkey property to control how text is copied to the screen when you set the region's Text property. The default is False, which tells the system to copy the contents of the Text property into the region on the screen. Most emulators support this method of directly entering data into a specific location on the screen. If your emulator does not support this method, enter True. When you enter True, the system updates the screen by automatically setting the cursor position and sending text to the host by using a WinHillapi function. To apply the latest transformation, be sure to open your solutions in Robotic Automation Studio, then redeploy those solutions.	OpenSpan.WinHllapi.x64.dll OpenSpan.Adapters.WinHLLAPIHost.x32.exe OpenSpan.Adapters.WinHLLAPIHost.x64.exe OpenSpan.Adapters.Text.Host.dll OpenSpan.Adapters.Text.dll OpenSpan.NativeInterop.dll OpenSpan.Transform.dll
SR-50611	This hotfix adds support for the TriZetto Facets Listbox/Grid control.	OpenSpan.Adapters.Facets.Design.dll OpenSpan.Adapters.Facets.dll OpenSpan.Translators.Facets.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll
	This hotfix adds support for ToolStripMenuItems. If you have automations that use ToolStripSplitButton or ToolStripDropDownButton, perform the following steps. These controls have changed from ComboBoxes to MenuBars so you must update them to the new type or they will no longer match.	

SR-49709	1. Open the original solution in this version and locate the adapter for any application that contains a ToolStripSplitButton or ToolStripDropDownButton that is used in the automation. 2. Note the names of the ToolStripSplitButton or ToolStripDropDownButton controls. 3. Save the adapter in Robotic Automation Studio. 4. Right-click the adapter designer name tab. Click Open Containing Folder. The folder that contains the adapter .os file opens with the .os file selected. 5. Right-click the adapter .os file and open it in a text editor. 6. Search for the controls identified in step 2. 7. Change these things for each control: the opening tag, the TargetTypeString, and the closing tag. In this opening tag example, change: <OpenSpan.Adapters.Controls.ComboBox Name="cmbtoolStripSplitButton" Id="ComboBox-..."> to <OpenSpan.Adapters.Virtual.VirtualControls.VirtualMenuBar Name="cmbtoolStripSplitButton" Id="ComboBox-..."> In this TargetTypeString example, change: <TargetTypeString Value="OpenSpan.Adapters.Virtual.VirtualTargets.VirtualComboBox, OpenSpan.Adapters.Virtual" /> to <TargetTypeString Value="OpenSpan.Adapters.Virtual.VirtualTargets.VirtualMenuBar, OpenSpan.Adapters.Virtual" /> In this closing tag example, change: *</OpenSpan.Adapters.Controls.ComboBox>* to *</OpenSpan.Adapters.Virtual.VirtualControls.VirtualMenuBar>* If you have automations that use ToolStripMenuItems that are under a ToolStripSplitButton or ToolStripDropDownButton, perform these tasks in Object Explorer: • If the ToolStripMenuItem is a direct child of the ToolStripSplitButton or ToolStripDropDownButton and is not on a sub-menu, update the ToolStripSplitButton or ToolStripDropDownButton control type as outlined in the previous steps. • If the ToolStripMenuItem is on a sub-menu and is not a direct child of the ToolStripSplitButton or ToolStripDropDownButton, re-interrogate the ToolStripMenuItem and update any automations to use the new control.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll

Build 8.0.1031 — 8.0.1036		
	The changes in these builds were published in 8.0.1037.	
Build 8.0.1030 — SR-50661 — April 06, 2017		
SR-49709	This hotfix lets you interrogate controls on a .NET form inside a panel. Before this hotfix, you could not interrogate the controls on the inner Windows form.	OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll
SR-49715	This hotfix changes the system to omit unnecessary logging information.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
SR-49722	This hotfix changes the system so that if a .NET form is not visible when the system initially tries to match, the system tries again more quickly.	OpenSpan.Adapters.Windows.dll OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll OpenSpan.Adapters.DotNet.dll
BUG-297807	This hotfix changes the system so that when you are using the PdfConnector and PdfViewer components, it only throws an exception if the service is not found at runtime.	OpenSpan.Pdf.PdfControl.dll
BUG-297854	This hotfix resolves issues that could occur during automation design when using the PdfConnector and PdfViewer components.	OpenSpan.Pdf.PdfControl.dll OpenSpan.Pdf.PdfConnector.dll
BUG-298074 BUG-298103	This hotfix includes minor changes to the Toolbar section of the PdfViewer component's user interface, such as adding a tooltip for the Print button.	OpenSpan.Pdf.PdfControl.dll
Build 8.0.1029		
	The changes in this build were published in 8.0.1030.	
Build 8.0.1028 — SR-50613 — March 29, 2017		
SR-50084	**Note:** The Pega Chrome extension version 1.0.22 is included in this build. This hotfix updates TreeGrid control methods to use DataTables and adds the following interface methods: • ClickCell(string expression, int column, string path) • ClickCell(string expression, string columnName, string path) • DoubleClickCell(string expression, int column, string path) • DoubleClickCell(string expression, string columnName, string path) • EnsureVisible(string expression, int column, string path) • EnsureVisible(string expression, string columnName, string path) • FindRows(string expression, string path) • GetCellValue(string expression, int column, string path) • GetCellValue(string expression, string columnName, string path) • RightClickCell(string expression, int column, string path)	OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Virtual.Interfaces.tlb OpenSpan.Translators.DotNet.v20.Virtual.dll OpenSpan.Translators.DotNet.v40.Virtual.dll

	• RightClickCell(string expression, string columnName, string path) • SelectCell(string expression, int column, string path) • SelectCell(string expression, string columnName, string path) • SelectRow(string expression, bool value, string path) • SetCellValue(string expression, int column, string value, string path) • SetCellValue(string expression, string columnName, string value, string path)	
SR-50432	This hotfix corrects a problem that could prevent the IgnoreProcess setting in the RuntimeConfig.xml file from ignoring processes.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
US-159359	This hotfix adds the UsePassthroughAuthentication property. To enable Passthrough Authentication in Citrix 7.x, set this property to True. Keep in mind that if you supply on the Citrix context and passthrough authentication is enabled, the system ignores the credentials that you supplied. If the Show Password Dialog option is enabled and passthrough authentication is used, the system does not display the password dialog.	
SR-49460	This hotfix resolves Web adapter exceptions that could occur during interrogation due to control highlighting.	OpenSpan.js OpenSpan.Adapters.Web.Design.dll
EPIC-21257	This hotfix adds support for running multiple Universal Web Adapters simultaneously to automate the Google Chrome browser. Here are some additional benefits: • Chrome can be running when you start a Chrome Universal Web Adapter. The adapter catches up with the top-level documents that are already running. • There are now multiple ways to close a document within a Chrome browser. For instance, you can stop the browser, stop just matched documents, stop all tracked documents, or do nothing. For more information, see the BrowserStopMethod property. • Tabs are now accurately tracked while interrogating and at runtime. Controls correctly highlight the selected tab's controls as the interrogation cursor moves over each Chrome window. • Because all documents are visible to all Chrome Universal Web Adapters, use the new AcceptedDomains property to specify which domains the adapter should recognize. This lets you focus the adapter on only the documents that you want it to process. Note these other changes: • The List Browsers and Frames button is now the List Windows and Documents button. When you click this button, the system displays all tracked documents with the parent for each tracked document as the browser form that the document resides in. This indicates that the relationship between a top-level document and its form is dynamic. You can tear off a tab into a new form or drag a tab from one form onto another and join it to that form. • To implement this feature, Studio/Runtime no longer injects native modules into the Chrome process. Instead, the Pega Robotic Automation Chrome extension is loaded in Chrome. This means that the following form-level functions, which require native injection, are no longer supported for the Chrome browser: ◦ Reparenting ◦ PerformClick ◦ SendKeys ◦ Focus/Focused ◦ GetFormAbove/GetFormBelow/GetActiveForm ◦ All events	OpenSpan.ChromeInstallerAdapter.dll OpenSpan.ChromeLauncher.exe
Build 8.0.1027 — SR-50585 — March 27, 2017		
SR-50574	This hotfix resolves a problem that could cause Internet Explorer to occasionally crash when using a Microsoft Dynamics application.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
EPIC-21540	This hotfix adds the PdfConector and PdfViewer components so you can manipulate and display PDF files in automations. • Use the PdfConnector component in an automation to search for text, extract text and images, and annotate PDF files. You cannot use the PdfConnector component to view, create, or modify PDF files, other than to annotate them. • Use the PdfViewer component to display a PDF file to a Robotic Automation Runtime user on a Windows form. The Robotic Automation Runtime user can interact with the PDF file or you can interact with the PDF file on behalf of the user via automation code. For more information on these components, see PdfViewer Component Properties, Methods, and Events and PdfConnector Properties, Methods, and Events.	OpenSpan.Pdf.PdfConnector.dll OpenSpan.Pdf.PdfControl.dll PdfSharp.dll PdfiumViewer.dll nl\PdfiumViewer.resources.dll x64\pdfium.dll x86\pdfium.dll
Build 8.0.1026 — SR-50141 — March 21, 2017		
SR-49529	This hotfix adds support for Infragistics' UltraGrid control.	OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Virtual.Interfaces.tlb OpenSpan.Translators.DotNet.v40.Infragistics.dll OpenSpan.Translators.DotNet.v20.Infragistics.dll OpenSpan.Translators.DotNet.v20.Virtual.dll OpenSpan.Translators.DotNet.v40.Virtual.dll DotNetBroker.config
SR-49270	This hotfix implements a workaround provided by Microsoft to handle a bug in their Isolated Shell.	OpenSpan.Automation.dll OpenSpan.DebugEngine.dll OpenSpan.Events.dll OpenSpan.IDE.dll OpenSpan.Runtime.exe OpenSpan.Studio.Shell.exe OpenSpan.Studio.dll OpenSpan.dll
SR-49326	This hotfix resolves an issue that could cause Internet Explorer to crash when using OpenUI.	OpenSpan.Native.IPC.x32.dll OpenSpan.Native.IPC.x64.dll
SR-50483	This hotfix makes sure that the build number increments when building Pega Robotic Automation projects.	OpenSpan.Build.Tasks.dl
SR-		

50273	This hotfix makes sure you can get values from an activity when you use the StartNowAndWait method.	OpenSpan.Interactions.dll
SR-49892	This hotfix makes sure the Chrome adapter handles all shutdown tasks if an exception occurs so that it can be easily restarted.	OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Web.Universal.dll
SR-50435	This hotfix adds support for the Fujitsu Hosttalk IclHllapi emulator. This new project item displays as one of Studio's Text adapters. Set the following properties: • DllName – Enter the path to the iclhll32.dll file. • EmulatorType – Specifies the type of emulator. The default is VT7561. • Path – Enter the path to the executable that you want to use to launch the emulator. • SessionPath – Enter the path to the file that contains the session information. This file must be created by the emulator when configuring the session. It must be saved in a location that the Pega user has privileges to access. • RefreshTimeout – Specifies how often a refresh occurs in milliseconds. The default is 5000. To speed up processing, you can set it to a lower value, such as 100. • ScreenDefinition – Do not change the default value, which specifies a 25x80 screen because the emulator has one more than the standard 24 rows.	OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Text.Host.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.WinHLLAPIHost.exe OpenSpan.Common.dll OpenSpan.WinHllapi.x32.dll
Build 8.0.1025 — SR-49932 — February 09, 2017		
SR-49665	This hotfix corrects a problem that could prevent you from clicking a link embedded in a WPF textBlock.	OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
SR-49548	This hotfix adds support for the PowerBuilder version 12.6 tab control.	OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
SR-49679	This hotfix corrects a problem that could cause Robotic Automation Studio to crash on some AMD chipsets.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
SR-49810	This hotfix makes sure that when you define a robot activity, the activity completion status set by using setCompletionStatus is sent to the Pega Platform.	OpenSpan.Interactions.dll
SR-49812	This hotfix changes the system to avoid issues when an Internet connection is lost while a robotic process automation is running.	OpenSpan.Interactions.dll
Build 8.0.1024 — SR-49652 — January 24, 2017		
SR-44932	This hotfix corrects a problem that could occur when you are using a web adapter with the StartMethod set to Start and another web adapter with a StartMethod set to MonitorAll. In this scenario, you would get the following message: Unable to start process iexplore.exe. Start process injected C:\Program Files (x86)\Internet Explorer\iexplore.exe failed	OpenSpan.Adapters.Windows.dll
SR-48804	This hotfix corrects a problem that could occur when you are using multiple text adapters. If Winhllapihost logging is enabled, the problem could cause Winhllapihost to crash.	OpenSpan.Adapters.WinHLLAPIHost.exe
SR-48173	This hotfix corrects issues with the innerHTML match rule that could prevent it from matching.	Openspan.Adapters.Web.dll
SR-43404	This hotfix addresses an issue that could prevent the content of a webpage from loading.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
SR-48826	This hotfix corrects a problem that could prevent Japanese character strings from being converted correctly. If you have adapters for Java applications that use foreign languages, make sure the match rules still work as you intended.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
SR-48227	This hotfix modifies the system to lessen the chance of a Windows application crash when a null pointer exception occurs.	OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll OpenSpan.Translators.MSCommonControls5.x32.dll OpenSpan.Translators.MSCommonControls5.x64.dll
SR-48825	This hotfix addresses a situation where the StartAndWait method could fail when starting and waiting for the same process. This would occur, for instance, when the Path property is set to the location of a .jar file and the TargetPath property is set to javaw.exe.	OpenSpan.Adapters.Windows.dll
SR-45817	This hotfix adds the GetSelectedRow method to the OpenSpanJavaCoffeeTableGridPanelWrapper class.	
SR-48817	This hotfix adds rules to handle exceptions and a UI flicker when using a reparenting container.	OpenSpan.Adapters.Windows.dll
SR-48332	This hotfix changes Robotic Automation Studio to make sure that it waits until a script is needed before injecting it.	OpenSpan.Adapters.Web.dll
SR-48443	This hotfix makes sure the system cleans out an internal collection in a DotNet translator.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
SR-48149	This hotfix adds a new translator for SyncFusion.	OpenSpan.Adapters.dll OpenSpan.Adapters.DotNet.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.Syncfusion.dll
		OpenSpan.Adapters.DotNet.dll

SR-48445	This hotfix adds support for clicking context menu items in WPF. To click a context menu item, show the context menu for the WPF control — for controls such as ListView, you have to first select an item. Once the context menu displays, you can call the ClickContextMenuItem method.	OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.DotNet.Interfaces.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.Syncfusion.dll
SR-48145	This hotfix adds support for the SyncFusion MDI Tab Panel control.	OpenSpan.Translators.Syncfusion.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v40.WPF.dll
SR-48158	This hotfix adds support for the SyncFusion TreeViewAdv control.	OpenSpan.Translators.Syncfusion.dll
SR-49469	This hotfix adds support for Citrix XenApp version 7.6. Note that this does not include support for pass-through authentication.	OpenSpan.Connectors.Citrix.dll OpenSpan.Connectors.Citrix.Design.dll
SR-49739	This hotfix corrects a problem that could prevent High Level Events (HLEs) from firing for Internet Explorer.	OpenSpan.Events.dll
SR-48524	This hotfix adds event monitors to track High Level Events (HLEs) when using the Mozilla Firefox and Google Chrome browsers. Note that when using Firefox, if a tab is un-docked and then re-docked, events are no longer received for that tab.	OpenSpan.Events.dll
US-147489	This hotfix changes Robotic Automation Runtime so that it sends additional information for the operational health reporting features in the Robotic Automation Deployment Portal (formerly known as the Management Console). This includes the user's last login, last Robotic Automation Runtime version, last package version, and fatal exception information. This hotfix also adds the HealthStatistics key to the RuntimeConfig.xml file to enable or disable information gathering for the health reports. For more information, see Runtime Configuration Settings.	RuntimeConfig.xml OpenSpan.Runtime.Core.dll OpenSpan.Events.dll OpenSpan.dll
US-152397	This hotfix changes Robotic Automation Runtime so that in response to an ingest request, Robotic Automation Runtime now only accepts JSON requests. This hotfix also adds more logging to web request results.	OpenSpan.Events.dll OpenSpan.Server.Client.dll
Build 8.0.1019 — 8.0.1023		
	The changes in these builds were published in 8.0.1024.	
Build 8.0.1018 — SR-49560 — December 03, 2016		
SR-46295	This hotfix makes sure keys are set before data is passed.	OpenSpan.Automation.dll
SR-47935	This hotfix adds an ignore mechanism to prevent interrogation from failing because of an embedded Chrome processes.	OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Web.Universal.dll
SR-46614	This hotfix changes the system to make sure that it parses all of the characters and sends a KeyPress event for each one when working with WPF applications.	OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
SR-48292	This hotfix adds support for a custom Java grid.	OpenSpanJavaAwtPVTableWrapper.java OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
SR-45819	This hotfix changes the system to make sure it relocates windows to their original position after a Move event.	OpenSpan.Consulting.WindowMgmt. TabbedReparentContainer.dll
SR-44440	This hotfix adds null checking when reparenting the PCOMM emulator.	OpenSpan.Consulting.WindowMgmt. TabbedReparentContainer.dll OpenSpan.Controls.dll
SR-46217	This hotfix changes how the system counts the time between login attempts and how it responds when credentials are re-entered.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
SR-43662	This hotfix adds support for Oracle Forms menu Items.	OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaObjectWrapper.java OpenSpanOracleEwtLWMenuBarTranslator.java OpenSpanOracleEwtLWMenuItemTranslator.java OpenSpanOracleEwtLWMenuSeparatorTranslator.java OpenSpanOracleEwtLWMenuTranslator.java
SR-49415	This hotfix changes event subscriptions so the WPF translator recognizes when a control was unloaded and tells the adapter to unmatch it.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll

Build 8.0.1017 — SR-49375 — November 14, 2016		
SR-48803	This hotfix corrects a problem that should prevent an application from logging in when you were using Robotic Automation Studio. This hotfix also changes the default for the ThinAppSupport key in the RuntimeConfig.xml file from enabled to disabled. If you are using ThinApp support and you update to this or a later version, enable this key.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll openspan.ini
SR-49255	This hotfix adds the AdvancedConfiguration property to the Windows and Web adapters. This property has a designer that lets you add key/value pairs, as directed by the Robotic Automation Studio Support staff. Native translators have also been changed so that you can access the values in this new property.	OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Common.dll OpenSpan.IPC.dll OpenSpan.Utilities.x32.dll OpenSpan.Utilities.x64.dll OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
SR-49256	This hotfix adds a configurable queuing mechanism so an element changed event is only sent after a 200 millisecond timeout interval. If multiple events occur, a single element changed event is sent after an absolute timeout interval of two seconds. For example, if the IE translator intercepts a lot of changed events that occur less than 200 milliseconds apart, it waits for a 200 millisecond period when no events fire. One element changed event is then sent when the 200 millisecond idle period occurs. If the events continue firing without any idle periods, one element changed event is sent after two seconds. The IE translator then waits another two seconds, or for the 200 millisecond idle period, before it sends the next element changed event. Since this can be risky, the default is to send every element changed event, which is how the system worked previously. To configure the queuing behavior, use the AdvancedConfiguration property on the adapter to add a specific key/value. To get more information on which value to add, contact Pega Robotic Automation Support.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
Build 8.0.1016 — SR-49334 — October 20, 2016		
SR-49264	This hotfix changes the way process memory is mapped to avoid an issue that could occur after you installed Microsoft KB 3185911. This issue prevents Robotic Automation Studio from injecting into Internet Explorer version 11.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
Build 8.0.1015 — SR-49142 — September 30, 2016		
SR-49144	This hotfix adds changes made to version 7.1 for the AnalyticsConsumer and Assisted Sign-on features.	OpenSpan.ApplicationFramework.dll OpenSpan.Runtime.Analytics.dll OpenSpan.Runtime.Core.dll OpenSpan.dll
US-139096	This hotfix adds a splash screen for Agile Desktop. Use the OpenSpan.AgileDesktop.exe.Config file to control the display of the Agile Desktop splash screen. By default, the splash screen is disabled. For more information, see OpenSpan.AgileDesktop.exe.Config File.	OpenSpan.AgileDesktop.exe
SR-45942	This hotfix revises the way that the system determines screen coordinates and creates screen bitmaps to make sure screenshots display correctly when you interrogate Internet Explorer.	OpenSpan.dll
SR-47749	This hotfix improves the way that the Universal Web Adapter determines the height and width of elements to make sure that the highlighting rectangle works correctly when you interrogate elements in Chrome.	OpenSpan.HTMLElementTranslator.js
SR-48879 SR-48853	This hotfix adds support for Windows 10. For information on interrogating web applications on Windows 10, see How do I interrogate web applications in Windows 10?	All assemblies
US-146784	This hotfix makes sure that the Exit option on the Robotic Automation Runtime menu is the last option. It also adds the following item to the RuntimeTrayMenu section in the RuntimeConfig.xml file: <MenuItem item="RPACredentials" label="Enter RPA Credentials..." show="false" /> Use this option to add RPA credentials. If you want this item to display on the menu, be sure to set show to True.	ConfigurationFiles/RuntimeConfig.xml OpenSpan.Interactions.Controls.dll OpenSpan.Runtime.exe OpenSpan.Runtime.x32.exe OpenSpan.Runtime64.exe
US-141832	This hotfix changes Robotic Automation Runtime to use the new API flow used for Robotic Process Automation (RPA) and allows integration with the Pega Platform.	OpenSpan.Interactions.x32.dll OpenSpan.Interactions.dll
US-141830	This hotfix adds a robotic case definition component for RPA integration with the Pega Platform. For more information, see Using Robotic Case Definition and Robotic Activity Components.	OpenSpan.Interactions.Controls.Design.dll OpenSpan.Interactions.Controls.dll OpenSpan.dll
Build 8.0.1013 — 8.0.1014 — September 30, 2016		

	The changes in these builds were published in 8.0.1015.	
Build 8.0.1012 — August 10, 2016		
	~~Initial released build for version 8.0.~~ 	

Note: The Pega Chrome extension version 1.0.12 is included in this build.

Cumulative Build Notes: Pega Robotic Automation 7.1

Build notes describe the changes included within each build created for Pega® Robotic Automation Studio/Runtime version 7.1. Before you install one of these builds, familiarize yourself with the changes, new features, and resolved issues listed in the following table.

Note: Agile Desktop files were last updated in version 7.1.63.0.

To request a build, contact your Support Representative. You can contact Support using the Pega Product Support portal. For information on system requirements, review your installation instructions:

- Pega Robotic Automation Studio 7.1 Installation Instructions
- Pega Robotic Automation Studio 7.1 Plug-in Installation Instructions
- Pega Robotic Automation Runtime 7.1 Installation Instructions

Summary of changes

This table summarizes the changes and updates included in the various Customer Requests (CRs) resolved in Pega Robotic Automation Studio/Runtime version 7.1. For more information on the features and enhancements in the initial release, see the Release Notes.

CR	Description	Assemblies
Build 7.1.98 — CR 51484 — February 07, 2018		
BUG-318010 BUG-316947 BUG-316394 BUG-318479	This hotfix corrects several problems that could prevent the system from generating expected IE Focus events.	OpenSpan.Events.dll
CR-51060	This hotfix changes the system to prevent a deadlock when using the ParallelProcess component with an InteractionFramework event.	OpenSpan.Interactions.dll
CR-52741	This hotfix resolves a problem which arose if you installed Microsoft Windows Update KB 4056894. This problem caused 64-bit processes that had the HookChildProcess option set to True to crash when a child process was launched.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
Build 7.1.97 — CR 51374 — August 30, 2017		
US-185987	This hotfix adds support for Transport Layer Security (TLS 1.1 and TLS 1.2) cryptographic protocols, which you can use to provide communications security when making web connections.	OpenSpan.dll
50013	This hotfix adds additional logging and exception handling to help resolve Agile Desktop issues.	OpenSpan.Events.dll OpenSpan.Runtime.Core.dll
51201	This hotfix corrects a problem which could occur when you launched multiple instances of the Fujitsu adapter. This problem prevented the File menu from appearing in every emulator window.	OpenSpan.Adapters.Text.Host.dll
51197	This hotfix resolves an issue which could cause shared memory exceptions when you had a large number of items in a combo box. 	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
51289	**Note:** Redeploy any solutions that use Java after you install this hotfix. This hotfix corrects a problem which could cause Internet Explorer to hang when downloading a file.	OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Windows.dll
Build 7.1.96 — CR 51063— August 04, 2017		
51136	This hotfix corrects a problem which could cause a diagnostics utility to return an incorrect value. This could then cause an exception in the injected application.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
49552	This hotfix corrects a SharedMemory leak which could occur when working with PowerBuilder.	OpenSpan.Adapters.DataGrid.dll
US-153205	This hotfix adds High Level Events (HLEs) to track the ProcessWaitStarted/ProcessWaitEnded and	OpenSpan.Events.dll

CR	Description	Assemblies
US-182165	WebPageLoadStarted/WebPageLoadEnded events. This information is used by Pega Workforce Intelligence to do wait time analysis.	OpenSpan.NativeInterop.dll
50013	This hotfix corrects a problem which could cause Agile Desktop to crash when run from Studio and you were using Operational Events.	OpenSpan.Events.dll OpenSpan.Runtime.Core.dll
Build 7.1.94 — 7.1.95		
	The changes in these builds were published in build 7.1.96.	
Build 7.1.93 — CR 50942 — June 02, 2017		
50332	This hotfix adds support for RightClickRow on VSFlexGrid.	OpenSpan.Translators.VideoSoft.VSFlexGrid7.x32.dll
50680	This hotfix changes the system to avoid a problem which could occur when Internet Explorer was unresponsive while web controls were destroyed. This led to an exception that prevented the control from rematching correctly.	OpenSpan.Adapters.Web.dll
50578	This hotfix unmasks several fields so they can be used by Workforce Intelligence, including the following fields: AppName, UserName, MachineName, WebDomainName, MACAddress, ProcessId, and DomainName.	OpenSpan.Runtime.Analytics.dll
50896	This hotfix improves focus processing in Runtime and adds an accessibility handshake between Chrome, High Level Events (HLEs), and Runtime.	OpenSpan.Events.dll
Build 7.1.92 — CR 50632 — May 08, 2017		
47824	This hotfix corrects a problem which could cause Siebel OpenUI control types to break when you interrogate a text box.	OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Siebel.Design.dll JavaScript\OpenUI\OpenSpan.SiebelControlType.js
50578	This hotfix lets you create a list of the fields in the event metadata to unmask for use in Workforce Intelligence. This includes the following fields: AppName, UserName, MachineName, WebDomainName, MACAddress, and DomainName.	OpenSpan.Runtime.Analytics.dll
49392	This hotfix adds support for the Infragistics .NET2 v11.2 UltraGrid control. If you have already interrogated the UltraGrid as a generic control, you will need to interrogate it again to get a Grid control.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Virtual.Interfaces.dll DotNetBroker.config OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.DotNet.v20.Infragistics.dll
43945	This hotfix adds support for the Infragistics .NET2 v10.1 UltraTabControl. If you have already interrogated the UltraTabControl as a generic control, you will need to interrogate it again to get a Tab control.	OpenSpan.Adapters.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Virtual.Interfaces.dll DotNetBroker.config OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.DotNet.v20.Infragistics.dll
50517	This hotfix adds support for clicking a check box in a cell of a ListViewItem in a WPF ListView control.	OpenSpan.Adapters.Virtual.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
48397	This hotfix corrects a problem which could prevent ContextMenuItems from being interrogated and which could also log a warning that the IEFrame Control should be interrogated.	OpenSpan.Adapters.Windows.Design.dll
50149	This hotfix changes the system to let the translator get the icon from JTabbedPane.	OpenSpan.Virtual.Interfaces.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Accessibility.dll IJavaNativeTabStrip.class OpenSpanJavaSwingTabStripWrapper.class OpenSpanOracleFormsEwtTabBarTranslator.class OpenSpanSymantecTabPanelWrapper.class
47796	This hotfix corrects a problem which could cause Runtime to hang when you clicked the Runtime tray icon to display the Runtime menu.	OpenSpan.ApplicationFramework.dll OpenSpan.Runtime.exe
Build 7.1.91 — CR 50487 — March 24, 2017		

CR	Description	Assemblies
49987 49988 50113 50115 50269	This hotfix changes the way Cell Focus Events are handled to make sure these events are properly handled when you update from Siebel 8.1.1.11 to 15.11.	Javascript.js OpenSpan.Adapters.Siebel.dll
Build 7.1.90 — CR 50351— March 02, 2017		
EPIC-21257	This change adds support for running multiple Universal Web Adapters to simultaneously automate the Google Chrome browser. Here are some additional benefits: - Chrome can be running when you start a Chrome Universal Web Adapter. The adapter will catch up with the top level documents already running. - There are now multiple ways to close a document within a Chrome browser. For instance, you can stop the browser, stop just matched documents, stop all tracked documents, or do nothing. For more information, see the BrowserStopMethod property. - Tabs are now accurately tracked while interrogating and at runtime. Controls correctly highlight the selected tab's controls as the interrogation cursor moves over each Chrome window. - Because all documents are visible to all Chrome Universal Web Adapters, use the new AcceptedDomains property to specify which domains the adapter should recognize. This lets you focus the adapter on only those documents you want it to process. Note these changes: - The List Browsers and Frames button is now the List Windows and Documents button. When you click this button, the system shows all tracked documents with the parent for each tracked document being the browser form the document resides in. This shows you that the relationship between a top-level document and its form is dynamic. You can tear off a tab into a new form or drag a tab from one form onto another and join it to that form. - To implement this feature, Studio/Runtime no longer injects native modules into the Chrome process. Instead, the Pega Robotic Automation Chrome extension is loaded in Chrome. This means these form-level functions, which require native injection, are no longer supported for Chrome: -- HideApplicationAtRuntime -- Reparenting -- PerformClick -- SendKeys -- Focus/Focused -- GetFormAbove/GetFormBelow/GetActiveForm -- All events See Using multiple Chrome adapters within a Studio solution for more information.	OpenSpan.ChromeInstallerAdapter.dll OpenSpan.ChromeLauncher.exe
BUG-291754	This hot fix corrects a version numbering issue with the XSLT transformation which could occur when you updated to a Studio solution that was created between builds 7.1.49.0 and 7.1.88.0.	OpenSpan.dll OpenSpan.Studio.dll OpenSpan.Transform.dll
Build 7.1.89 — CR 50145		
	The changes in this build were published in build 7.1.90.	
Build 7.1.88 — CR 49742 — February 13, 2017		
49715	This hotfix changes the system to omit excess logging information for Windows Presentation Foundation (WPF).	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
49682	This hotfix corrects a problem which could cause .NET applications to crash.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
45752	This hotfix changes the system so that it will remove whitespace to make sure it correctly matches process names.	SlimShortcuts.js
48232	This hotfix lets you configure how the system creates WindowsForms controls. If necessary, you can delay processing these controls so the UI loads as quickly as possible. Only use this capability under the direction of Robotic Automation Studio support.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
49973	This hotfix corrects an issue which could prevent you from injecting into an application when running Windows Server 2003.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
Build 7.1.87 — CR 49672— February 13, 2017		
49688	This hotfix removes some redundant code.	OpenSpan.Adapters.Windows.dll
39259	This hotfix changes the system to make sure it ignores Stop events from unsupported text adapters.	OpenSpan.Adapters.Text.Host.dll
49385	This hotfix corrects a problem which could cause a crash in SAP version 7.4.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll

CR	Description	Assemblies
48443	This hotfix makes sure the system cleans out an internal collection in a DotNet translator.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
46998	This hotfix adds an adapter to let you control an ICL emulator, such as the Fujitsu HostTalk emulator version 3.5 and higher. This new project item will appear as one of Studio's Text adapters. You will need to set these properties: DllName – Enter the path to the iclhll32.dll file. EmulatorType – Specifies the type of emulator. The default is VT7561. Change this to VT320 to test the VT320 emulator. Path – Enter the path to the executable you want to use to launch the emulator. Note that the VT320 emulator has a different path than the VT7561 emulator. SessionPath – Enter the path to the file that contains the session information. This file must be created by the emulator when configuring the session. It must be saved in a location that the Pega user has privileges to access. RefreshTimeout – Specifies how often a refresh occurs in milliseconds. The default is 5000. To speed up processing, you can set it to a lower value, such as 100. ScreenDefinition – Do not change the default value, which specifies a 25x80 screen since the emulator has one more than the standard 24 rows.	OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Text.Host.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.WinHLLAPIHost.exe OpenSpan.Common.dll OpenSpan.WinHllapi.x32.dll
Build 7.1.86 — CR 49655 — December 08, 2016		
US-152397	This hotfix changes the system to make sure event consumer requests are correctly handled by the Deployment Portal (formerly Management Console), regardless of whether you have the Analytics Consumer turned on in Workforce Intelligence. It also adds more logging information to help with debugging.	OpenSpan.dll OpenSpan.Events.dll OpenSpan.Server.Client.dll
48158	This hotfix adds support for the SyncFusion TreeViewAdv control.	OpenSpan.Translators.Syncfusion.dll
48145	This hotfix adds support for the SyncFusion MDI Tab Panel control.	OpenSpan.Translators.Syncfusion.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v40.WPF.dll
48253	This hotfix adds the RichTextBoxPlus control which provides all of the functionality as Microsoft's RichTextBox control but does not handle UserPreferenceChanged system events. To use this control, add it to the Visual Studio Toolbox, then drag it onto the Windows Forms designer.	OpenSpan.Controls.dll
46358	This hotfix resolves matching issues with FarPoint Spread 2.5.	OpenSpan.Adapters.Windows.dll
48909	This hotfix adds the GetRuntimeVersion method, which you can use to retrieve the Runtime version number. To use the GetRuntimeVersion method, add it to the Visual Studio toolbox, then drag it onto the Automation Designer surface.	OpenSpan.Runtime.Core.dll
48445	This hotfix adds support for clicking context menu items in WPF. To click a context menu item, show the context menu for the WPF control — for controls such as ListView you have to first select an item. Once the context menu appears, you can call the ClickContextMenuItem method.	OpenSpan.Adapters.DotNet.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.DotNet.Interfaces.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.Syncfusion.dll
48365	This hotfix resolves an issue that could prevent the GetItemContent method from working for WPF ListViews.	OpenSpan.Adapters.DotNet.dll
46495	This hotfix resolves an issue that could prevent a WPF control hosted inside a DotNet container from being correctly situated in the Object Explorer hierarchy.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.Syncfusion.dll
46293	This hotfix adds support for Visual Basic 6 labels.	OpenSpan.Adapters.VisualBasic6.Design.dll OpenSpan.Adapters.VisualBasic6.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.dll OpenSpan.Translators.VisualBasic6.x32.dll
45710	This hotfix adds support for a custom Visual Basic control.	OpenSpan.Adapters.ActiveX.dll OpenSpan.Adapters.Endsleigh.Design.dll OpenSpan.Adapters.Endsleigh.dll OpenSpan.Adapters.FarpointGrid.Design.dll OpenSpan.Adapters.FarpointGrid.dll OpenSpan.Translators.Endsleigh.EGBasicCtls.x32.dll OpenSpan.Translators.Endsleigh.EGCompoundCtls.x32.dll OpenSpan.Translators.Endsleigh.EGRankingCtls.x32.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll OpenSpan.Translators.FarpointList.x32.dll

CR	Description	Assemblies
48389	This hotfix changes the system to make sure SendKeys works for text fields when used through the IE Frame.	OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll
Build 7.1.84 — 7.1.85		
	The changes in these builds were published in build 7.1.86.	
Build 7.1.83 — CR 49192 — December 08, 2016		
48065	This hotfix adds support for the Crescent Mask Text control.	OpenSpan.Adapters.FarpointOCX.Design.dll OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Adapters.Crescent.Design.dll OpenSpan.Adapters.Crescent.dll OpenSpan.Translators.Farpoint.Spread25.x32.dll OpenSpan.Translators.Farpoint.Spread25.x64.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll OpenSpan.Translators.CrescentText.x32.dll OpenSpan.Translators.CrescentText.x64.dll
49159	This hotfix changes the system so that a custom Java Grid translator now returns the total row count instead of the visible row count.	OpenSpanJavaAwtPVTableWrapper.class OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
US-147489	This hotfix changes Runtime so that it sends additional information for the operational health reporting features in the Deployment Portal (formerly Management Console). This includes the user's last login, last Runtime version, last package version and fatal exception information. Also adds the HealthStatistics key to the RuntimeConfig.xml file to enable or disable information gathering for the health reports. See the Runtime Configuration Settings XML File topic in Help for more information.	RuntimeConfig.xml OpenSpan.Runtime.Core.dll OpenSpan.Events.dll OpenSpan.dll
Build 7.1.82 — CR 48958 — October 11, 2016		
48825	StartAndWait method could fail when starting and waiting for the same process. This would occur, for instance, when the Path property is set to the location of a .jar file and the TargetPath is set to javaw.exe.	OpenSpan.Adapters.Windows.dll
45817	This hot fix adds the GetSelectedRow method to the OpenSpanJavaCoffeeTableGridPanelWrapper class.	OpenSpanJavaCoffeeTableGridPanelWrapper.class
48817	This hot fix adds rules to handle exceptions and a UI flicker when using a reparenting container.	OpenSpan.Adapters.Windows.dll
48149	This hot fix adds the SyncFusion translator so you can interrogate a GroupBar control.	OpenSpan.Adapters.dll OpenSpan.Adapters.DotNet.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.Syncfusion.dll
45179	This hot fix adds the FileLocation key to the StartMyDay section in the RuntimeConfig.xml file. Use this key to set the location of the StartMyDay file. Here is an example. <StartMyDay> <AllowLocalApplications value= "true"/> <ShowPathColumn value="true"/> <FileLocation value=""/> </StartMyDay> When you enter an empty string as the value, the StartMyDay file is set to the config location specified in CommonConfig.xml file. This location is also used if this key is missing from the RuntimeConfig.xml file. This was the location used before this key was added. You can enter environmental variables, special folder names, and full paths.	OpenSpan.ApplicationFramework.dll RuntimeConfig.xml
48803	This hot fix adds resolves an exception and disables ThinApp support — previously on by default — as it is not usually needed. Use the new Virtualization section in the openspan.ini file to enable or disable support for VMware's ThinApp product. The default is zero (0) or disabled. Here is an example that shows the option enabled. [Virtualization] ThinAppSupport=1 Previously, support was enabled and you could not change it.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll openspan.ini
48332	This hot fix changes Studio to make sure it waits until a script is needed before injecting it.	OpenSpan.Adapters.Web.dll
48957	This hot fix adds the AdvancedConfiguration property to the base Windows and Web adapters. This property has a Designer that lets you add key/value pairs as directed by Pega Support. Native translators have also been changed to now access the values in this new property. This lets us add properties to the adapters to control certain customer-specific behaviors.	OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Common.dll OpenSpan.IPC.dll OpenSpan.Utilities.x32.dll OpenSpan.Utilities.x64.dll OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll

CR	Description	Assemblies
	Build 7.1.81 — CR 48523 — September 29, 2016	
48292	This hotfix adds support for a custom Java grid that was embedded in a webpage.	OpenSpanJavaAwtPVTableWrapper.java OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
48173	This hotfix corrects issues with the innerHTML match rule which could prevent it from matching.	Openspan.Adapters.Web.dll
48804	This hotfix corrects a problem which could occur when you were using multiple text adapters. If Winhllapihost logging is enabled, the problem could cause Winhllapihost to crash.	OpenSpan.Adapters.WinHLLAPIHost.exe
43404	This hotfix addresses an issue which could prevent the content of a webpage from loading.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
42380	This hotfix changes Agile Desktop to make calls to automations asynchronous. This prevents Agile Desktop from having to wait until automations finish before performing the next function.	OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.Automation.dll OpenSpan.Runtime.Core.dll
48826	This hotfix corrects a problem which could prevent Japanese character strings from being converted correctly.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
48227	This hotfix modifies the system to lessen the chance of a Windows application crash when a null pointer exception occurs.	OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll OpenSpan.Translators.MSCommonControls5.x32.dll OpenSpan.Translators.MSCommonControls5.x64.dll
46805	This hotfix adds limited support for the AWD (MFC 4.2) SECTreeCtrl tree control.	OpenSpan.Translators.AWD.x32.dll OpenSpan.Translators.AWD.x64.dll
	Build 7.1.80 — CR 48376 — September 06, 2016	
45819	This hotfix changes the system to make sure it relocates windows to their original position on a Move event.	OpenSpan.Consulting.WindowMgmt. TabbedReparentContainer.dll
44440	This hotfix adds null checking to prevent a .NET exception thrown by OpenSpanSplitContainer when reparenting the PCOMM emulator.	OpenSpan.Consulting.WindowMgmt. TabbedReparentContainer.dll
46217	This hotfix corrects the way the system counts login attempts and changes how it responds when the same credentials are re-entered to avoid an Assisted Sign-On “Failed Login Attempts” error.	OpenSpan.Adapters.dll OpenSpan.ApplicationFramework.dll OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
43662	This hotfix adds support for Oracle Forms menu items.	OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaObjectWrapper.java OpenSpanOracleEwtLWMenuBarTranslator.java OpenSpanOracleEwtLWMenuItemTranslator.java OpenSpanOracleEwtLWMenuSeparatorTranslator.java OpenSpanOracleEwtLWMenuTranslator.java
46746	This hotfix fixes a potential issue with resource data that could cause Internet Explorer to crash.	All native assemblies
48524	This hotfix adds high level event monitors for the Chrome and FireFox browsers. In FireFox, if a tab is un-docked and re-docked, events are no longer received for that tab.	OpenSpan.Events.dll OpenSpan.Common.dll OpenSpan.dll OpenSpan.Events.dll Launcher.exe OpenSpan.Runtime.Analytics.dll
45843	This hotfix resolves a memory leak in the DOS Console Manager.	OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll
32074	This hotfix adds the ScrollIntoView method to web controls.	OpenSpan.Adapters.Web.dll
44932	This hotfix corrects a problem which could occur when you were using a web adapter with the StartMethod set to Start and another web adapter with a StartMethod set to MonitorAll. In this scenario, you would get the following message: Unable to start process iexplore.exe. Start process injected C:\Program Files (x86)\Internet Explorer\iexplore.exe failed	OpenSpan.Adapters.Windows.dll
48474	This hotfix makes sure WPF controls in a Windows forms application are correctly located in the adapter hierarchy.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll

CR	Description	Assemblies
	If you have already interrogated a control which was affected by this issue, you will need to interrogate the control again.	
39043	This hotfix modifies the TextAdapter Screen WaitForInputAllowed method. Previously, the system would stop waiting if input was not allowed. Now it will wait until the screen is ready for input, up to the timeout interval you specified using this method. The behavior of existing automations which use the WaitForInputAllowed method will not be affected. For new automations only the updated WaitForInputAllowed method will be available for use.	OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Text.Host.dll
Build 7.1.79 — CR 48293 — August 26, 2016		
48335	This hotfix updates the system to handle new DotNet styles so you can use these styles on Windows forms.	OpenSpan.dll
48291	This hotfix removes the duplicate LogoUrl tag in the RuntimeConfig.xml so you can add a custom logo in Agile Desktop.	OpenSpanRuntimeEntSetup.aip
44759	This hotfix corrects a problem that could occur when an application throws an overflow error message when Studio is injected.	OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll
48292	This hotfix corrects a problem that could prevent custom Java wrappers from working with some static and non-static classes.	OpenSpanJavaReflection.class OpenSpanJavaReflection$ReflectionHelper.class
45025	This hotfix adds support for the FarPoint Spread80 Grid.	OpenSpan.Adapters.FarpointOCX.Design.dll OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Translators.Farpoint.Spread80.x32.dll
Build 7.1.77 — 7.1.78		
	The changes in these builds were published in build 7.1.79.	
Build 7.1.76 — CR 48013 — August 05, 2016		
48021	This hotfix corrects a problem which could cause Agile Desktop's Extended View to be blank.	OpenSpan.AgileDesktop.CefSharp.dll
46295	This hotfix changes the system to make sure keys are set before the data is passed.	OpenSpan.Automation.dll
47935	This hotfix resolves an issue which made the system think Google Chrome was running.	OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Web.Universal.dll
46614	This hotfix changes the system to better handle certain Windows Presentation Foundation (WPF) applications which send a string of characters as an input text event instead of a single character. The system now parses all of the characters and sends a KeyPress event for each one.	OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
Build 7.1.75 — CR 47793 — July 21, 2016		
46618	This hotfix changes the system so that it no longer calls an activity complete before all the actions in the activity were finished.	OpenSpan.Automation.dll
46993	This hotfix makes sure the App bar can no longer be used as a drop point for files.	OpenSpan.AgileDesktop.CefSharp.dll
Build 7.1.74 — CR 46476 — July 18, 2016		
45597	This hotfix removes a restriction which limited the Siebel.Text property to 1024 characters.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
45666	This hotfix corrects a problem which could prevent the system from matching the main Siebel view.	OpenSpan.SiebelOpenUI.Utility.js
45038	This hotfix adds the GetContextMenuItems method to window targets that can be accessed through an automation. Use this method to retrieve a list of the context menu items.	OpenSpan.Adapters.dll OpenSpan.Adapters.Windows.dll
43018	This hotfix corrects the versioning of Facet and FarpointGrid translator files.	OpenSpan.Translators.Facets.x32.dll Openspan.Translators.FarpointGrid.x32.dll
46105	This hotfix changes the system to make sure the AppLostFocus high-level event captures the target URL when Internet Explorer is shutting down.	OpenSpan.Events.dll
		OpenSpan.Adapters.Java.dll OpenSpan.Adapters.Java.Interfaces.dll

CR	Description	Assemblies
45594	This hotfix corrects a problem which could occur when you stored a large string in shared memory. The system now breaks the string into pieces to avoid the issue.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaSwingJEditorPaneWrapper$ OpenSpanDocumentListener.class OpenSpanJavaSwingJEditorPaneWrapper.class
46751	This hotfix corrects a problem which could cause an exception when you close an interaction.	OpenSpan.Interactions.dll
Build 7.1.73		
	The changes in this build were published in build 7.1.74.	
Build 7.1.72 — CR 45984 — June 23, 2016		
46051	This hotfix corrects a problem which could prevent the Assisted Sign-On (ASO) manager from returning the correct value for the credentialsModified property. Furthermore, the credentials were not being saved to ASO.db when you used ShowCredentialDialog with no parameters.	OpenSpan.ApplicationFramework.dll
41452	This hotfix updates the version number on the Runtime splash screen.	OpenSpan.dll
43018	This hotfix corrects a problem which prevented you from retrieving the correct text from a ListBox in a Facet application.	OpenSpan.Translators.FarpointGrid.x32.dll OpenSpan.Translators.Facets.x32.dll OpenSpan.Adapters.FarpointGrid.dll OpenSpan.Adapters.FarpointGrid.Design.dll OpenSpan.Adapters.Facets.dll OpenSpan.Adapters.Facets.Design.dll
41578	This hotfix changes the system to make sure custom assemblies are referenced in all automations.	OpenSpan.Studio.dll
45767	This hotfix corrects a problem which could occur when using the Assisted Sign-On feature. The problem prevented the UserID and Password fields from appearing in the Credentials property when interrogated.	OpenSpan.Adapters.SAP.dll
44885	This hotfix changes the system so that it now converts all user IDs to lowercase when it retrieves them. This prevents case differences from creating duplicate users in Workforce Intelligence.	OpenSpan.dll
41467	This hotfix resolves an exception that could occur when using the CancelActivity method.	OpenSpan.Automation.dll
45843	This hotfix resolves a memory leak in the DOS Console Manager.	OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll
32074	This hotfix adds the ScrollintoMethod method to web controls.	OpenSpan.Adapters.Web.dll
Build 7,1.71 — CR 45795 — June 09, 2016		
45768	This hotfix corrects a problem which could cause Internet Explorer version 11 to crash when you updated from build 7.1.68 to build 7.1.69.	penSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
45665	This hotfix corrects a problem which could prevent Agile Desktop from loading if there was an octothorpe (#) in the path to the local files from the URI.	OpenSpan.AgileDesktop.CefSharp.dll
Build 7.1.70 — CR 45408 — June 02, 2016		
44734	This hotfix corrects a problem which prevented the IdleStarted event from retaining SessionId or UserName data.	OpenSpan.dll
43970	This hotfix enhances Updater by letting you execute post update tasks, such as the Chrome and Firefox Extension installers. The new tasks for running the Chrome and Firefox Extension installers are defined in the PostUpdateTasks section of the RuntimeConfig.xml file. Be sure to set the enabled attribute to True to activate the task. You must have version 1.1.360 of Updater installed to use this feature.	Openspan.dll OpenSpan.ChromeExtensionInstaller.exe OpenSpan.ChromeMessagingHostInstaller.exe OpenSpan.Translators.Web.FirefoxExtensionInstaller.exe
43666	This hotfix corrects an error that could cause this message to appear when you ran Runtime: Could not get reference to OpenSpan.Automation. IExecutionTracker	OpenSpan.Adapters.dll
41468 41469	This hotfix changes the system so that credentials are now saved before the dialog appears. The system now also checks to see if any values have changed. Based on this information, it sets the CredentialsModified value.	OpenSpan.ApplicationFramework.dll
45050	This hotfix corrects an issue that could cause an error when you included special characters, like a plus sign (+) or a space, in the name of a Studio project file. Studio was changing special characters into underscores when you deployed the project.	OpenSpan.Runtime.Core.dll

CR	Description	Assemblies
44333	This hotfix enhances the system to let you dynamically identify environmental variables.	OpenSpan.dll
43086	This hotfix corrects a problem which could prevent controls from matching because windows had not yet reparented.	OpenSpan.Adapters.Windows.dll
43931	This hotfix enhances the system so you can now use the WpfIdleTImeout property for Windows Presentation Foundation (WPF) controls in a web application.	OpenSpan.Adapters.Windows.dll
41907	This hotfix corrects a problem which could prevent an embedded active X control from being matched.	OpenSpan.Adapters.Web.dll
41197	This hotfix corrects a problem which could prevent an application with a VSFlexGrid8 from working after it displayed the grid.	OpenSpan.Adapters.Windows.dll OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll Common/OpenSpan.Scout.x32.dll Common/OpenSpan.Scout.x64.dll OpenSpan.Translators.ComponentOne.VSFlexGrid.x32.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll
Build 7.1.69 — CR 45294 — May 25, 2016		
45210	This hotfix corrects a problem which could prevent Siebel radio buttons from matching when the application is hidden or minimized.	OpenSpan.Translators.Siebel.SiebelCommon.x32.dll OpenSpan.Translators.Siebel.SiebelCommon.x64.dll
44182	This hotfix corrects a problem which could prevent Siebel lists from expanding or collapsing when the application is hidden or minimized.	OpenSpan.Translators.Siebel.SiebelCommon.x32.dll OpenSpan.Translators.Siebel.SiebelCommon.x64.dll
44742	This hotfix corrects a problem which prevented DOM mutation events (dynamically-generated HTML controls) from matching when these events were within a framed page.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
44428	This hotfix corrects a problem which could cause some Java applications to hang the UI while working. the system would then regard this as a hang and unwind the operation it was performing. If your project has a Java application that hangs the UI while performing a task, you can now use the new JavaInvokeTimeout property to define, at the adapter level, how long the system should wait for the Java application to complete its task before unwinding. You can increase the time-out interval or set it to zero (0) to make the system wait indefinitely. Keep in mind that setting the system to wait indefinitely increases the risk of a hang in the system if the application is actually hung and not just working for a long time on the UI thread.	OpenSpan.Adapters.Windows.dll OpenSpan.Common.dll OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll AdapterMessageHelper.h
	This hotfix corrects a problem with IeRematchEvents.	OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Windows.dll OpenSpan.Common.dll OpenSpan.IPC.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll AdapterMessageHelper.h
Build 7.1.68 — CR 45035 — May 11, 2016		
44149	This hotfix corrects a problem which could prevent Agile Desktop toolbar images from displaying in multi-project solutions.	OpenSpan.AgileDesktop.exe OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.AgileDesktop.Framework.dll OpenSpan.AgileDesktop.Toolbar.dll
43086	This hotfix corrects a problem which could prevent controls from matching because windows had not yet reparented.	OpenSpan.Adapters.Windows.dll
44380 42361	This hotfix includes these Agile Desktop Start My Day changes: - The StartMyDay adapter setting can change through an automation, however, the StartMyDay dialog always displays adapters that are set to Manual > Automatic at the start of the run. In other words, if an automation developer switches the setting to *None* , it will still appear on the dialog. - Lets you specify the order in which applications appear during an automation before the StartMyDay dialog opens. This overwrites the persisted user settings when showing the list, but this information is not set to the file so the end user can still change the order and those changes would persist. - Lets you add applications to the StartMyDay list via an automation. These items would be added to the StartMyDay file (if not already there) and would appear in the list as if the end user added them. Applications should be added as *enabled* . If an application is added with a friendlyName that is already in use for this package, it should not be added. Instead, the method should return False. This hotfix includes the following Assisted Sign-On changes: - Lets you add a comma-delimited list of categories into the Credential Collection Editor within the adapter. Include this list in the Optional section. This lets you create categories and assign credentials to those categories. The categories you enter into adapters that are present in the loaded solution will appear in the	OpenSpan.ApplicationFramework.dll

CR	Description	Assemblies
	Credential dialog when the solution loads. - Lets you select multiple categories when viewing the Credential dialog.	
	- Lets you display the Credential dialog via automation and have it automatically filter to the passed in category or list of categories. - Lets Runtime users easily see all categories at once.	
Build 7.1.67 — CR 44529 — May 03, 2016		
38880	This hotfix adds a class that provides an off line fallback feature that is available when you are using shared drives and a web server. This is useful when you are using the AllowRunOffline option in the RuntimeConfig.xml file to determine how Runtime behaves when server connectivity fails. The XML file that tracks cached projects is located in DeploymentConfiguration.PackageDownloadPath.	OpenSpan.Runtime.Core.dll
43640	This hotfix enhances the support for the VSFlexGrid7 control from ComponentOne by adding support for the datagrid component. If you have existing OpenSpan.Translators.ComponentOne.VSFlexGrid8 translators in your solution, you may need to manually change your .os files to replace that translator with these new OpenSpan.Translators.VSFlexGrid.x32/x64 assemblies.	OpenSpan.Adapters.VideoSoftOCX.dll OpenSpan.Translators.VSFlexGrid.x32.dll OpenSpan.Translators.VSFlexGrid.x64.dll
32089	This hotfix adds the GetHandle method, which you can use to return the handle of a window. This method returns an IntPtr window handle of this target. It has no parameters. This method was added to all Windows controls.	OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.dll
33840	This hotfix adds support for the OutlookBar control used in Northwoods' Compass Pilot and modifies the PerformClick(buttonText) method to work with this control.	OpenSpan.Translators.DotNet.v40.OutlookBar.dll OpenSpan.Translators.DotNet.v40.Farpoint.dll OpenSpan.Translators.DotNet.v20.Farpoint.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenpSpan.Adapters.Virtual.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Windows.dll DotNetBroker.config
43145	This hotfix modifies the system so that it now ignores blank sections in the Interaction.xml file.	OpenSpan.Interactions.dll
28973	This hotfix enhances the system so you can now add multiple attribute value match rules. This provides a more robust matching capability.	OpenSpan.Adapters.Web.dll
43343	This hotfix changes the system so that when you are running a Citrix solution and you encounter a null key, the system will pull the key information another place to make sure it is not null and no error is created.	OpenSpan.Automation.dll
43348	This hotfix corrects a problem which could cause an exception to be shown when the Runtime splash screen appeared.	OpenSpan.dll
43186	This hotfix changes the system so that Test Target Methods are shown as an option in the Match Rule Designer when you are interrogating. When you are not interrogating, Test Control Methods are now shown as an option in Object Explorer.	OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Text.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.dll
36677	This hotfix enhances the system to better track email address data in Outlook for analytical reporting purposes.	OpenSpan.Adapters.dll OpenSpan.Adapters.Windows.dll
44502	This hotfix corrects a problem that could cause Studio to crash when you interrogated a window which had been recreated in error.	OpenSpan.Adapters.Windows.dll
42306	This hotfix corrects a problem that could prevent the Navigate To options from working with variables in a global container.	OpenSpan.Automation.Design.dll
43086	This hotfix corrects a problem which could prevent controls from matching because windows had not yet reparented.	OpenSpan.Adapters.Windows.dll
Build 7.1.66 — CR 44466 — April 14, 2016		
44514	This hotfix corrects an issue in Runtime where analytics events were not being sent to cloud storage. This build is a required update for all Workforce Intelligence customers who have updated past 7.1.59.	OpenSpan.Runtime.Analytics.dll
Build 7.1.65 — CR 44412 — April 12, 2016		
41923	This hotfix corrects an issue causing Microsoft Internet Explorer version 11 to crash when a subscribed	OpenSpan.Adapters.Web.dll

CR	Description	Assemblies
37576	web browser event fired.	
43719	This hotfix adds the IeRematchEvents property to the web adapter to address an issue where webpages did not automatically rematch after a menu was expanded. Ask Robotic Automation Studio support for assistance when modifying this property.	OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Windows.dll OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
44149	This hotfix addresses an issue in Agile Desktop where images failed to display correctly when multiple projects were part of a Studio solution.	OpenSpan.AgileDesktop.exe
44217 44404	This hotfix corrects an issue where control destroyed notifications were not being sent for Windows Presentation Foundation (WPF) controls. To address this issue, the system will now track the top-level container handle (hWnd) property of each WPF control, and use it to send the control destroyed notification.	OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.Broker.dll OpenSpan.Translators.DotNet.v40.WPF.dll
44294	This hotfix changes how execution time, used in system reports, is recorded for an automation which connects to a sub-automation using a Jump To block. Prior to this change, the sub-automation's execution time was recorded twice — first for the sub-automation and a second time for the parent automation.	OpenSpan.Automation.dll
Build 7.1.64		
	The changes in this build were published in build 7.1.65.	
Build 7.1.63 — CR 44000 — March 29, 2016		
30142	This hotfix adds support for the 32- and 64-bit versions of Microsoft Office 2013 and Office 2016. It also adds support for 64-bit versions of Office 2010. You can select support for these versions of Office when you install this update via the Setup wizard or via the command line installation options. See the applicable installation instructions for more information.	OpenSpan.Office.Design.dll OpenSpan.Office.dll
42619	This hotfix adds the RuntimeMenuTray section to the RuntimeConfig.xml file. You can use the options in this section to configure the menu that appears when you click the Runtime icon in the system tray. For instance, Workforce Intelligence associates can use this option to open the Enter Expected Hours window. Here is a summary of the items you can place on the menu: - LoadLocalProject - Loads local projects. - LoadWebProject - Loads a web projects. - Unload - Unloads projects. - RecentProjects - Loads recently accessed projects. - LoadMostRecent - Loads the most recently accessed project. - About - Displays the About box. - ReportProblem - Lets you report a problem. - DiagnosticConfiguration - Displays the Diagnostic Configuration dialog. - TestConnection - Lets you test connections with with the Deployment Portal (formerly Management Console). - ShowOutputWindow - Displays the Output window. - ExpectedHours - Display the Enter Expected Hours window. - Exit - Exits Runtime. - LoadedProjects - A placeholder where a list of the currently running projects appears. - Separator- Adds a separator line. You can add separator lines anywhere you like to group items and improve readability. For more information on these options, see this Help topic: Runtime Configuration Settings XML File	RuntimeConfig.xml
42617 42618 42638 43161	This hotfix includes these Agile Desktop changes: - Adds Clickable support to the 360 View plug-in items. This lets you click on an image or other context item to start an automation, activity, or go to a URL. - Lets you use a criteria expression to enable or disable buttons on the Shortcut plug-In. - Lets you configure the padding of images in the 360 View plug-in. This is controlled in the Images section of the Interaction.xml file. - Lets you adjust the visibility of Shortcut Items. For information, see the Using the Interaction.xml File topic in Help.	OpenSpan.AgileDesktop.CefSharp.dll OpenSpan.ApplicationFramework.dll OpenSpan.AgileDesktop.exe OpenSpan.ApplicationFramework.dll OpenSpan.Runtime.exe
38028	This hotfix modifies Runtime so that it can now aggregate and send data to the Deployment Portal (formerly Management Console). This data will be used in the usage report which will be included in a future release of the Deployment Portal.	OpenSpan.IPC.dll OpenSpan.Native.IPC.dll
42336	This hotfix adds support for 64-bit Internet Explorer version 11.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll OpenSpan.Scout.x32.dll
39497 41262	This hotfix corrects a shared memory issue that could prevent the system from creating virtual controls.	OpenSpan.IPC.dll OpenSpan.Native.IPC.dll
Build 7.1.61 — 7.1.62		
	The changes in this build were published in build 7.1.63.	

CR	Description	Assemblies
	Build 7.1.60 — CR 43560 — March 21, 2016	
39630 41936 43207	This hotfix corrects a problem which occurred when you used the text adapter and would trigger this error message: The function failed due to a system error. This message occurred because two WinHLLAPI function calls were being made simultaneously to the emulator. This hotfix also addressed an issue which could cause WinHllapiHost to crash during start up. The crash occurred while trying to invoke onto the form thread or while writing to the log during initialization. Make sure automations *do not* send commands to the emulator while the adapter is responding to a screen changed event. You can avoid this by not sending commands when the state of the screen is unknown. For example, only do this after waiting for or receiving an event that a screen was created. Or, use WaitForInputAllowed to make sure the screen is ready for input.	OpenSpan.Adapters. WinHLLAPIHost.exe
43552	This hotfix corrects a problem that could prevent you from interrogating Oracle Forms.	OpenSpan.Translators.Java.x32.dll OpenSpanJavaBroker.class
41864	This hotfix adds support for a custom Java label. If you have already interrogated this control, re-interrogate the control to have it recognized as a label.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaAwtGUIMultiLineLabelWrapper.java
43639	This hotfix corrects a problem which could prevent the CSG translator from loading.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
40828	This hotfix corrects a problem which could occur when you tried to collect events from a WPF ComboBox.	OpenSpan.Adapters.dll OpenSpan.Adapters.DotNet.dll OpenSpan.Adapters.DotNet.Interfaces.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
43672 43252 42357 42800 43534 42356 42930	This hotfix addresses these issues: Studio could not interact with icons in an OpenUI list that expanded rows. You can use the new CellExpandCollapseRow method to expand and collapse rows. In legacy Siebel, this method performs the same function as CellPerformClick. In OpenUI, there is a DIV element within this cell that is identified because it contains a specific classname. Clicking on this DIV causes the rows to toggle expanding and collapsing. - Studio did not recognize the first column of list if the cell had an Expansion Icon. Now Studio determines whether the first column is visible and change the index accordingly. - An exception was thrown when using GetSelectedRows on the OpenUI list. The way the system handles switching between events in the same view has been changed to avoid this error. The CellControlLostFocus event was not triggered in OpenUI when users tabbed out of a cell. Now the system looks for both mouse and keyboard events when the lost focus event fires. - The CellLinkClick event was not being captured. The CellLinkClick event now fires correctly and is captured. - Some OpenUI controls were not being recognized during interrogation, which could result in web controls instead of Siebel controls. The interrogation process has been changed to correct this problem.	OpenSpan.IOpenUISiebelApp.js OpenSpan.JavaScriptBroker.js OpenSpan.ObjectTranslatorMapManager.js OpenSpan.SiebelOpenUI.ListTranslator.js OpenSpan.SiebelOpenUI.Utility.js OpenSpan.SiebelOpenUI.ViewTranslator.js OpenSpan.TranslatorBase.js OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.SiebelOpenUI.Interfaces.dll OpenSpan.Adapters.SiebelOpenUI.Interfaces.tlb
	Build 7.1.59 — CR 43341 — March 08, 2016	
42828	Microsoft security updates KB 3126593 and higher contain changes that prevent Studio from interrogating applications. This update modifies Studio to be compatible with these Microsoft changes.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll OpenSpan.Sinon.x64.dll OpenSpan.Sinon.x32.dll
	Build 7.1.58 — CR 43184 — March 03, 2016	
42828	This hotfix removes changes introduced in build 7.1.56.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll OpenSpan.Sinon.x32.dll OpenSpan.Sinon.x64.dll
39116	This change affects Workforce Intelligence. This hotfix adds the testUser key to the RuntimeConfig.xml file. This key tells the system if the user is a test user. The default is False.	OpenSpan.Runtime.Analytics.dll
39780	This change affects Workforce Intelligence. This hotfix lets you create rules for the running of applications. These rules are stored in the RuntimeConfig.xml file	OpenSpan.Runtime.Analytics.dll
39625	This change affects Workforce Intelligence. This hotfix lets you remove sensitive data using regex rules in the RuntimeConfig.xml file. Use the new fieldNames and eventNames keys to list the fields and events you want the system to inspect to	OpenSpan.Runtime.Analytics.dll

CR	Description	Assemblies
	determine if a rule should apply to a given event.	
39117	This change affects Workforce Intelligence. This hotfix lets Runtime import screen rules and categorize screens into a collection of known screens. All screens for which a rule is not applied are grouped together and categorized as *Unknown* . For more information on these new keys, see Runtime Configuration Settings XML File.	OpenSpan.Runtime.Analytics.dll
Build 7.1.57 — CR 43071 — February 24, 2016		
43117	This hotfix corrects a problem which, when debugging a project in Studio, could prevent Runtime from starting if Studio was connected to the Deployment Portal (formerly Management Console) via ADFS or STS.	OpenSpan.dll
42828	Microsoft security updates KB 3126593 and higher contain changes that prevent Studio from interrogating applications. This update modifies Studio to be compatible with these Microsoft changes.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll OpenSpan.Sinon.x64.dll OpenSpan.Sinon.x32.dll
Build 7.1.56		
	The changes in this build were published in build 7.1.57.	
Build 7.1.55 — CR 42102 — February 08, 2016		
41673	This hotfix modifies the system to make sure sensitive data is not logged by global variables.	OpenSpan.Interactions.dll
41200	This hotfix corrects a problem which could cause match in process to fail. Now if match in process fails, the system lets the matching service handle matching out of process.	OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll
40696	This hotfix adds the WPFIdleTimeout property to the dotNet translator so you can now search for and create WPF controls in a more controlled manner. This can prevent a target application from hanging when working with a screen that contains WPF controls which change frequently. The WPFIdleTimeout property only applies to adapters that are used with WPF applications. The default is zero (0), which means the WPFIdleTimer is not used and the previous behavior is maintained. If, for instance, you set the WPFIdleTimer property 300, the dotNet translator will wait for the WPF user interface to be idle for 300 milliseconds before it searches for and creates new WPF controls. If the WPF user interface does not become idle within two seconds, the system times out and then searches for and creates new WPF controls.	OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Windows.dll OpenSpan.Common.dll OpenSpan.IPC.dll OpenSpan.dll OpenSpan.Translators.DotNet.v20.Broker.dll OpenSpan.Translators.DotNet.v40.Broker.dll
Build 7.1.54 — CR 41668 — January 22, 2016		
40612	This hotfix corrects a problem which could prevent you from adding context menu items when interrogating a website. Keep in mind that if Studio cannot get the text of owner-drawn menu items it assigns *[OWNER DRAWN]* to the control that is created to represent them. The position of the menu items must remain consistent for Studio to correctly identify them.	OpenSpan.Adapters.Windows.dll
40797	This hotfix modifies the system to make sure high level events include the Deployment Portal (formerly Management Console) user ID value.	OpenSpan.dll
40892	This hotfix adds a Help option to the command line parameters for the ShutdownRuntime utility. Append *?* or *Help* to see information about all available parameters. Here is an example: ShutdownRuntime.exe help	ShutdownRuntime.exe
41617	This hotfix corrects a problem which prevented server SSL certificates for web requests from being validated after the first analytics payload was sent.	OpenSpan.Runtime,Analytics.dll
Build 7.1.53 — CR 41552 — January 07, 2016		
41560	This hotfix corrects a problem that could occur when using Updater to restore an earlier version of Runtime. For instance, this could cause a failure to authenticate and force a Runtime user into off line mode when downgrading from versions 7.1.51 or 7.1.52 to 7.1.49 or earlier.	OpenSpan.Server.Client.dll
Build 7.1.49 — 7.1.52		
	The changes in these builds were published in build 7.1.53.	
Build 7.1.49 — CR 40910 — December 16, 2015		
	This hotfix adds support for the Chrome browser using the Universal Web Adapter. This includes a new Chrome extension. Keep in mind these limitations:	

CR	Description	Assemblies
	- You can interrogate cells within simple tables but the table designer is not available for the Universal Web Adapter. Complex tables cannot be matched based on the table schema. ~~Property changed events are not supported.~~	
40974	- Cancellable events are not supported. - Plug-ins, such as Java and Flash, are not supported. - When uninstalling Runtime or Studio, the Firefox/Chrome extensions will be left in place, however these extensions cannot be used. - There is no utility for converting a legacy Web Adapter into a Universal Web Adapter. - The Universal Web Adapter does not support event collection for Workforce Intelligence. Chrome-specific limitations: - Multiple concurrent adapters are not allowed. If you try to start a second Chrome adapter, Runtime throws an exception. Even if you use a new profile, it will still fall under the top-level process, which is the process you injected into. - Frames are not supported. This implementation only works with the top-level document in web applications. - Non-global webpage interrogations are not supported. - When installing the Chrome extension and running for the first time on a Runtime machine, end users must respond to a prompt which asks if they would like to enable or uninstall the Chrome Extension. End users must enable the extension for Runtime to inject. If an end user does not enable the extension, a manual process must be run to recover and install the extension again. - Extensions allowed to run in the background can prevent the adapter from being able to start Chrome. If any chrome.exe process is running when the adapter is launched, you will not be able to inject (interrogate or automate). As with all releases, follow best practices when migrating to a new version of Studio/Runtime. Always back up existing solutions before opening the solution in the new version.	OpenSpan.ChromeExtensionInstaller.exe OpenSpan.ChromeMessagingHostInstaller.exe OpenSpan.Translators.Web.Chrome.MessagingHost.exe lajjpilliikppcbaghjehndpfdiiphbe_main.crx
Build 7.1.48 — CR 40802 — December 14, 2015		
40642	This hotfix corrects a problem which could occur when interrogating a grid within PowerBuilder.	OpenSpan.Translators.PowerBuilder.x32.dll OpenSpan.Translators.PowerBuilder.x64.dll
Build 7.1.47 — CR 40788 — December 10, 2015		
33943	This hotfix adds the DisplayConnectionError key to the CommonConfig.xml file. The default is True, which tells the system to display any connection errors.	CommonConfig.xml
Build 7.1.46 — CR 39087 — December 10, 2015		
39115	This hotfix enhances performance by removing and replacing system calls that adversely affected performance in high process count environments.	OpenSpan.Events.dll
34699	This hotfix adds options to the ShutdownRuntime utility which can help speed the shutting down of Runtime implementations. These options include: -noKill — Include this option if you want the tool to simulate the shutdown process but not actually shut down Runtime. This option is for testing purposes only. -useWMI — Include this option to get the process user name via Windows Management Instrumentation instead of via native calls. -useThreadPool — Include this option to shut down thread pool threads instead of the current thread. -CompareSessionIDs — Include this option to use the session ID instead of the process user name when shutting down a specific Runtime instance.	ShutdownRuntime.exe
33943	This hotfix changes the default for the DisplayConnectionError key in the CommonConfig.xml file from True to False.	CommonConfig.xml
Build 7.1.45 — CR 39725 — November 23, 2015		
39043	This hotfix addresses concurrency and simultaneous matching issues which could produce exceptions when automating a HllApi emulator.	OpenSpan.Adapters.Text.Host.dll OpenSpan.WinHllapi.x32.dll
Build 7.1.44 — CR 39276 — November 18, 2015		
39591	This hotfix updates the translators to handle changes implemented in a new version of CSG.	OpenSpan.Translators.CSG.x32.dll
Build 7.1.43 — CR 39039 — November 13, 2015		
38823	This hotfix changes the way Siebel SetCellValue handles values. Previously, values were truncated to 95 characters. Now there is no limit to the length of the value.	OpenSpan.Adapters.Siebel.dll OpenSpan.Translators.Siebel.SiebelCommon.x32.dll OpenSpan.Translators.Siebel.SiebelCommon.x64.dll

CR	Description	Assemblies
39228	This hotfix corrects a problem which caused an error when you navigated to applications displayed in compatibility mode in Internet Explorer version 11.	OpenSpan.js
37292 39186	This hotfix resolves issues with the grid and toolbar interrogation of SAP applications.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
Build 7.1.42 — CR 38546 — November 06, 2015		
	This hotfix changes a default in the installation wizard. Enabling Intelligence now is unchecked by default.	Installation files
37548	This hotfix adds the NoteCharacterLimit attribute in the Notes plug-in Config sections which you can use to specify the maximum number of characters which a user can enter in the Notes plug-in. Here is an example: <Config> <LineBreak>\r\n</LineBreak> <NoteCharacterLimit>140</NoteCharacterLimit> </Config> This example sets the maximum number of characters to 140 and tells the system to count the Enter key as the number of characters specified in the LineBreak attribute. For example, by setting LineBreak to \r\n, an Enter key will count as two characters — \r and \n count as one character each.	AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/Notes/Notes.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/Notes/Notes.html
37937	This hotfix adds the InnerLabel attribute to the Information section. You can use this attribute to change the default label, *Contact Information* , to something else. Also, value labels now wrap in the Information section.	AgileDesktop/OpenSpan.AgileDesktop. UserInterface/stylesheets/starterkit.less AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.html AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.html
37938	This hotfix increases the width of label in the Eligibility section in Agile Desktop.	AgileDesktop/OpenSpan.AgileDesktop. UserInterface/stylesheets/starterkit.less AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.html AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.html
37940	This hotfix adds tooltip support to show the full text of a context value if the value is truncated.	AgileDesktop/OpenSpan.AgileDesktop. UserInterface/stylesheets/starterkit.less AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.html AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.html
38112	This hotfix decreases the line spacing when context values are displayed on multiple lines in the 360AppBar.	AgileDesktop/OpenSpan.AgileDesktop. UserInterface/stylesheets/starterkit.less AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBar.html AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.coffee AgileDesktop/OpenSpan.AgileDesktop. UserPlugins/360AppBar/360AppBarEx.html
30050	This hotfix changes the system to make sure the RuntimeLoader.AllProjectStarted event fires even if Runtime/Agile Desktop is not connected to the Deployment Portal (formerly Management Console).	OpenSpan.Runtime.Core.dll OpenSpan.Runtime.exe
36480	This hotfix adds support for the FarPoint Spread 2.5 COM control.	OpenSpan.Adapters.FarpointOCX.Design.dll OpenSpan.Adapters.FarpointOCX.dll OpenSpan.Translators.Farpoint.Spread25.x32.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll
Build 7.1.41 — CR 38088 — October 27, 2015		
		These assemblies were added: OpenSpan.Adapters.Web.Universal.dll OpenSpan.Adapters.Web.WebBase.dll OpenSpan.Adapters.Web.WebBase.Design.dll

CR	Description	Assemblies
	This hotfix adds support for interrogating and automating Firefox. An extension to Firefox is used to add this functionality via the new Universal Web Adapter. This version will work for Firefox versions from 31 to 39 and for Firefox ESR versions from 31.6.0 to 38.3.0 (expected to work until Firefox ESR 38.8.0 that is due for end of life in May 31, 2016). The Setup wizard now gives you the option of installing the FireFox plug-in. You can also use the new INST_FIREFOX=1 command line option to install the Firefox plug-in from the command line. If omitted, the Firefox plug-in is not installed. Keep in mind these limitations: - You can interrogate cells within simple tables but the table designer is not available for Firefox. Complex tables cannot be matched based on the table schema. - Property changed events are not supported. - Cancellable events are not supported. - Plug-ins, such as like Java and Flash, are not supported. - Multi-tab functionality for Firefox is not supported during interrogation. Multi-tab functionality will work with automations, however, tabs cannot be pulled apart from the original window when Studio is injected. - Multiple top-level windows are not supported when Studio is injected. - Multiple concurrent Firefox processes cannot be automated under the same user profile. The Universal Web Adapter will always open under the default user profile. If you need to have multiple concurrent Firefox processes, use the Windows adapter instead and specify the user profile within the Arguments property. - If Studio loads Firefox in a user profile that is actively running, the current process will request to shut down. Because of this, it is a best practice to start Firefox adapters at the project start and to not close them throughout the automation. - The Universal Web Adapter does not support event collection for Workforce Intelligence. As with all releases, follow best practices when migrating to a new version of Studio/Runtime. Always back up existing solutions before opening the solution in the new version.	OpenSpan.Translators.Web.Firefox. ExtensionInterop.xpcom.x32.dll OpenSpan.Translators.Web.Firefox. ExtensionInterop.xul.32.dll OpenSpan.Translators.Web.Firefox.x32.dll OpenSpan.Translators.Web. FirefoxExtensionInstaller.exe OpenSpan.Virtual.Web.Interfaces.dll OpenSpan.Virtual.Web.Interfaces.tlb ObjectListView.dll JavaScript* BrowserExtensions* These assemblies were modified: OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Windows.Design.dll OpenSpan.Adapters.Centura.dll OpenSpan.Adapters.Clarify.dll OpenSpan.Adapters.CSG.dll OpenSpan.Adapters.MSDataGrid.dll OpenSpan.Adapters.MSFlexGrid.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.AgileDesktop.UserPlugins.dll OpenSpan.Brokers.Windows.x32/x64.dll OpenSpan.Common.dll OpenSpan.IPC.dll OpenSpan.Native.IPC.x32/x64.dll OpenSpan.Scout.x32/x64.dll OpenSpan.Transform.dll OpenSpan.WER.x32/x64.dll OpenSpan.Controls.dll OpenSpan.DeployUtility.dll OpenSpan.Studio.dll OpenSpan.Translators.DotNet. Virtual.x32/x64.dll OpenSpan.Translators.InternetExplorer. x32/x64.dll
29358		
Build 7.1.39 — 7.1.40		
	The changes in these builds were published in build 7.1.41.	
Build 7.1.38 — CR 37807 — October 13, 2015		
37525	This hotfix removes a logging dialog which could prevent Runtime/Agile Desktop from connecting to the Deployment Portal (formerly Management Console).	OpenSpan.dll
37790	This hotfix corrects a problem that affected PowerBuilder's DataGrid CheckBoxColumn.	OpenSpan.Adapters.DataGrid.dll
	This hotfix improves logging in the Java Translator.	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll
27671	This hotfix corrects a problem which could prevent a Click event from being raised when an UltraTreeNode was clicked by a Studio automation.	OpenSpan.Translators.DotNet.v40. Infragistics.dll
37326	This hotfix makes sure WPF ComboBox SelectedItems return the item text instead of an object description.	OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
37327	This hotfix makes sure WPF ListBox SelectedItems return the item text instead of an object description.	OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
33281	This hotfix makes sure UserModified events fire for WPF controls.	OpenSpan.Adapters.DotNet.dll OpenSpan.Adapters.Virtual.dll
33455	This hotfix makes sure the ParentObjectId is available when the Created event for WPF controls fires. The Created event now fires after the parent has been set, to make sure the ParentObjectId is available.	OpenSpan.Adapters.Virtual.dll
Build 7.1.37 — CR 37223 — October 02, 2015		
34984	This hotfix corrects a problem which could occur when you moved execution links from one automation block to another instead of deleting and recreating the execution links. This could cause the loss of key information.	OpenSpan.Automation.Design.dll
36164	This hotfix adds an entry in the CommonConfig.xml file to facilitate communication between the Runtime/Agile Desktop and Workforce Intelligence servers. The entry should look similar to this example: <Server name="Intelligence" baseURL="https://wfi.openspan.com/" enabled="true" proxyAddress=""/> The Off Computer Time and Expected Work Hours dialog rely on this setting.	OpenSpan.dll

CR	Description	Assemblies
	Build 7.1.36	
	The changes in this build were published in build 7.1.37.	
	Build 7.1.35 — CR 36606 — September 18, 2015	
36775	This hotfix adds the Agile Desktop settings for ViewType and CustomImagePath into the RuntimeConfig.xml file. - ViewType - Use this key to define the initial toolbars view. You can choose from normal, slim, normal_only, and slim_only. If you choose normal or slim, the user can resize the toolbar after it initially appear. - CustomImagePath - Use this key to specify the path to custom images used in the 360AppBar plug-in's Images section. Here is an example: <ViewType value="normal_only"/> <CustomImagePath value=""/> Normally, when you want to include a custom image in the 360AppBar Image section, you would add the image to the startup automation project as misc files and specify the image name in Interaction.xml file. Alternatively, you can put all of the custom image files in a folder and specify that folder's path as the value to CustomImagePath key.	None
	This hotfix corrects a problem which could cause SuperTrace to log the same information twice.	OpenSpanJavaTracing.class
35819	This hotfix corrects a problem which could cause hangs when using Java. Since there was a change to Java class files, you must rebuild and redeploy your solution to make sure your deployment contains the latest java classes.	OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Java.dll OpenSpanJavaBroker.class OpenSpanJavaInvocationHelper.class
35819	This hotfix enhances the system so you can enable SuperTrace for a list of users. Use the AutUsers key in the SuperTrace section to enable SuperTrace for a particular user or users. Simply add a comma-delimited list of user logon names in this key.	OpenSpan.SuperTrace.x32.dll OpenSpan.SuperTrace.x64.dll openspan.ini
33918	This hotfix corrects a problem that could cause Internet Explorer to crash after applying updates.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
	Build 7.1.34 — CR 35514 — September 02, 2015	
34326	This hotfix adds the DropdownMenu type for the ShortcutType attribute in the Interaction.xml file. You can use this new option in Agile Desktop to display a pop-up menu when it is clicked.	Shortcuts.coffee Shortcuts.html starterkit.less
34904	This hotfix makes the <section> tag names in the interaction.xml file case insensitive.	Interaction.coffee
33380	This hotfix corrects a problem that prevented the StartInteraction plug-in from correctly passing input strings to its corresponding automation project entry point and from correctly receiving output from the automation's exit point.	OpenSpan.Automation.dll
34550	This hotfix adds support for the Visible attribute on the 360AppBar items. You can enter a criteria expression for the value of Visible. This lets you indicate which items in the 360AppBar are visible, based on Context and Global values.	360AppBar.coffee 360AppBarEx.coffee 360AppBar.html 360AppBarEx.html starterkit.less
34069	This hotfix adds support for buttons with two rows of label text.	Shortcuts.coffee Shortcuts.html starterkit.less
	Build 7.1.33 — CR 34949 — August 11, 2015	
34045	This hotfix corrects a problem which could prevent the Start My Day feature from launching non adapter web applications.	OpenSpan.Application.Framework.dll OpenSpan.Common.dll
33623	This hotfix changes how table elements are added to a control to enhance performance. Previously, Studio sometimes appeared to be hung when you used HTML Table Designer with very large HTML tables.	OpenSpan.Adapters.Web.Design.dll
34699	This hotfix enhances performance in situations where you have a high user load in Citrix environments.	OpenSpan.dll
		OpenSpan.Adapters.DotNet.dll OpenSpan.Adapters.dll

CR	Description	Assemblies
32126	This hotfix refactors how the system retrieves items from virtual List controls to require less shared memory. This can prevent application crashes when working with a virtual List control that contains an extremely large number of items.	OpenSpan.Adapters.Virtual.dll OpenSpan.Common.dll OpenSpan.Adapters.DotNet.Interfaces.dll OpenSpan.Virtual.Interfaces.dll openspan.ini OpenSpan.Translators. DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40. WindowsForms.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
34722	This hotfix corrects a problem which could cause excessive memory use in the JVM when processing the UserModified event for a custom Swing table.	OpenSpanJavaSwingTableWrapper.class
32543	This hotfix adds support for the SysTreeView32 control.	OpenSpan.Adapters.CSG.Design.dll OpenSpan.Adapters.CSG.dll OpenSpan.Adapters.Virtual.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll OpenSpan.Translators.CSG.x32.dll
35345	This hotfix corrects a problem which could occur if you tried to change global values from a different global values changed event.	OpenSpan.Interactions.dll
Build 7.1.32 — CR 34317 — July 23, 2015		
34266	This hotfix corrects a problem which could prevent an activity from starting.	OpenSpan.Interactions.dll
32542	This hotfix adds support for the CSG LIstbox control.	OpenSpan.Adapters.CSG.dll OpenSpan.Adapters.CSG.Design.dllOpenSpan. Translators.CSG.x32.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll
32544	This hotfix adds support for the CSG Grid control.	OpenSpan.Adapters.CSG.dll OpenSpan.Adapters.CSG.Design.dllOpenSpan. Translators.CSG.x32.dll OpenSpan.ActiveX.x32.dll OpenSpan.ActiveX.x64.dll
26213	This hotfix corrects a problem which could prevent the system from getting the executable path for some processes during Events logging.	OpenSpan.Events.dll
Build 7.1.31 — CR 34024 — July 15, 2015		
33384	This hotfix corrects a problem with hooking which could occur when you navigated to a specific page in SAP version 7.4.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
33450	This hotfix changes the system to now recognize xButtons as options in Studio's mouse event handlers.	OpenSpan.Virtual.Interfaces.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll
28666	This hotfix adds limited support for the JWLISTLIST and JWLISTBOX controls.	OpenSpan.Adapters.JWalk.dll
Build 7.1.30 — CR 3972 — July 09, 2015		
33292	This hotfix changes the default for the ShowDialogOnStart option in the RuntimeConfig.XML file from True to False. This affects Assisted Sign-on.	This is an installer/RuntimeConfig change. No assemblies or Agile Desktop files were affected.
33024	This hotfix changes the system to make sure Agile Desktop plug-ins that are designated as hide-able no longer appear on the Gear menu. There is a setting in the Interaction.XML file that determines if a plug-in is hide-able.	This change requires a new release of the Agile Desktop files.
33025	This hotfix adds a Closing event to the InteractionManager component. You can cancel this event in an automation to keep the Interaction open, if necessary.	OpenSpan.Interactions OpenSpan.Interactions.Controls
33031	This hotfix adds the solution and version number to the Agile Desktop About box.	OpenSpan.AgileDesktop.CefSharp
33041	This hotfix changes the isActive setting for the Notes plug-in. Now if you set isActive to True, the note will appear and if you set it to False, the note will be hidden. Previously, these settings were reversed. This change could affect your solutions.	This change requires a new release of the Agile Desktop files.
33046	This hotfix changes the AddNote method passed in the InteractionKey from type Object to type String. This change could affect your solutions.	OpenSpan.Interactions OpenSpan.Interactions.Controls
	This hotfix changes the behavior of the mouse cursor when an automation responds to the	

CR	Description	Assemblies
33154	RuntimeLoader.Exiting event with a Do you want to close? message box. The mouse cursor no longer gets stuck in a spinner cursor when over the desktop or message box.	OpenSpan.AgileDesktop.exe
33157	This hotfix makes sure un-synced notes are deleted when you close the interaction.	This change requires a new release of the Agile Desktop files.
33175	This hotfix makes sure MessageManifest.ShowMessage always moves to the top level.	OpenSpan.Controls OpenSpan.ApplicationFramework
32322	This hotfix adds the Globals section to the Interaction.XML file. Items you add in this section can be referenced in automations using the GlobalDictionary component. This lets you share values across non-referenced projects. You add global items just as you would context items.	OpenSpan.Interactions OpenSpan.Interactions.Controls
32323	This hotfix lets you display Global Dictionary values in the 360 View plug-in.	OpenSpan.AgileDesktop.CefSharp
32325	This hotfix provides ways to emphasize important data displayed on the Agile Desktop toolbar.	OpenSpan.AgileDesktop.Cefsharp OpenSpan.Interactions.dll
30778	This hotfix adds the DeleteASOFile method to the AssistedSignOn component which can be called from an automation. This lets you remove the Assisted Sign-On ASO.db file even when no passwords are stored in the file.	OpenSpan.ApplicationFramework.dll
33185	This hotfix changes the Notes plug-in so the user is prompted to sync any un-synced notes when he or she closes an interaction.	This change requires a new release of the Agile Desktop files.
33298	This hotfix adds the following events to the default toolbar: - RuntimeLoader.AllProjectsStarted — Indicates that all projects are started and ready to go. - RuntimeLoader.Exiting — Indicates that Runtime/Agile Desktop is closing. These events are not added to existing installations but will be included in the default toolbar.	This change requires a new release of the Agile Desktop files.
33328	This hotfix expands the contact information available to the plug-ins to include up to three email addresses and three phone numbers.	This change requires a new release of the Agile Desktop files.
28147	This hotfix standardizes the use of case and verbiage throughout the Interaction.XML file to make it easier to understand and use. Items that do not meet this standard will still be supported.	Interaction.XML
33295	This hotfix corrects a problem which prevented shortcut buttons from working if you minimized the toolbar before opening an interaction and then maximized the toolbar.	This change requires a new release of the Agile Desktop files.
33036	This hotfix changes Agile Desktop to enable shortcut buttons when there is no active interaction, as long as those activities are set to run without an interaction.	OpenSpan.AgileDesktop.CefSharp OpenSpan.Interactions
32345	This hotfix enhances the Agile Desktop toolbar by providing ways for you to alert users of error conditions or other changing values. This hotfix adds dynamic styling and conditional formatting so you can call attention to displayed data that is outside of range or is not an expected value.	OpenSpan.AgileDesktop.Cefsharp OpenSpan.Interactions.dll
32273	This hotfix resolves an issue which could prevent projects that had spaces in their names from detecting idle time correctly.	OpenSpan.Events.dll
2008	This hotfix adds a translator for the Farpoint WinSpread Grid control.	OpenSpan.Translators.DotNet.v20.Farpoint.dll OpenSpan.Translators.DotNet.v40.Farpoint.dll
33121	This hotfix insures that Studio can match all clones, regardless of how many clones it encounters.	OpenSpan.dll
Build 7.1.29 — CR 33859 — July 01, 2015		
32222	This hotfix corrects an issue which prevented Internet Explorer from being properly injected in Virtual Desktop Infrastructure (VDI) environments.	Too numerous to list.
Build 7.1.28 — CR 33858 — July 01, 2015		
33799	This hotfix ports a Windows Management control from Studio/Runtime version 5.x to version 7.1.	OpenSpan.Adapters.Windows.dll OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll OpenSpan.Common.dll OpenSpan.dll DevExpress.Data.v9.1.dll DevExpress.Utils.v9.1.dll DevExpress.XtraEditors.v9.1.dll DevExpress.XtraGrid.v9.1.dll OpenSpan.Consulting.WindowMgmt. BrowserManager.dll OpenSpan.Consulting.WindowMgmt.

CR	Description	Assemblies
		TabbedReparentContainer.dll OpenSpan.Consulting.WindowMgmt.dll
Build 7.1.27 — CR 33018 — June 29, 2015		
32042	This hotfix corrects an issue which could cause an exception when a user logged out of an application.	OpenSpan.Adapters.Web.dll
29861	This hotfix corrects a problem which could prevent Runtime from starting because of an authentication failure.	OpenSpan.dll OpenSpan.Server.Client.dll
29814	This hotfix resolved a WinHllapiHost issue which could cause Runtime to become unstable. In addition, this hotfix adds logging to capture details when WinHllapiHost crashes and modifies logging in WinHllapiHost so it can be enabled through the RuntimeConfig.xml file. This key has been added to the RuntimeConfig.xml file: <add key="WinHllapiHostLoggingEnabled" value="false"/>	OpenSpan.Adapters.Text.dll OpenSPan.Adapters.Text.Host.dll OpenSpan.Adapters.WinHLLAPIHost.exe RuntimeConfig.xml
32045	This hotfix corrects a problem which prevented the system from matching correctly. This problem occurred when a web element changed while they system was already matching. Now, If there are webpage changes while the system is matching, it will match again once the page becomes idle.	OpenSpan.Adapters.Web.dll OpenSpan.dll
32565	A bug in the Java Runtime Environment (JRE) between versions 1.7_u25 and 1.7_u65/1.8_u11 causes SwingUtilities.invokeLater to fail with a NullPointerException. If you encounter this JRE bug, a new AppContext in the System thread group is created so subsequent calls to SwingUtilities.invokeLater will succeed. Since this is a JRE issue, the preferred resolution is to update your JRE to a version which does not have this issue. For more information, see JRE Bug JDK-8019272 .	OpenSpan.Translators.Java.x32.dll OpenSpan.Translators.Java.x64.dll OpenSpanJavaBroker.class OpenSpanJavaBroker$BrokerInvokeThread.class
Build 7.1.26 — CR 32347 — June 29, 2015		
31329	This hotfix corrects a problem which could prevent automatic matching from occurring on dynamically generated pages.	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll
32348	This hotfix adds these new rules to make it easier to match in-process with the web adapter: - WebControlChildrenMatchRule - InnerHtmlMatchRule - ElementClassMatchRule	OpenSpan.Adapters.dll OpenSpan.Adapters.Web.dll
32306	This hotfix corrects a type resolution issue with the GetItemContent method so all WPF properties, methods, and events are available.	OpenSpan.Adapters.DotNet.dll
32284	This hotfix adds support for the Label match rule with .NET WindowsForms and WPF targets.	OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll
32478	This hotfix corrects a problem which could cause a fatal exception when you used high level events because an unexpected window was created in the EventHost process.	OpenSpan.EventHost.exe
Build 7.1.25 — CR 32211 — May 25, 2015		
30133	This hotfix adds support for ComponentOne VSFlexGrid controls.	OpenSpan.Adapters.ComponentOneOCX.dll OpenSpan.Translators.ComponentOne. VSFlexGrid8.x32.dll OpenSpan.Translators.ComponentOne. VSFlexGrid8.x64.dll
31587	This hotfix adds the following keys to the StudioConfig.xml file so you can configure time-out interval values for HTTP web requests. This helps you avoid situations where package uploads fail in the Deployment Portal (formerly Management Console or OMC) because the client timed out. Use these keys to modify package upload HttpWebRequests: - UploadTimeout - Use this key to specify the maximum amount of time, in milliseconds, the request has to complete. The default is 100000, or 10 minutes. - UploadReadWriteTimeout - Use this key to specify the maximum amount of time, in milliseconds, the client has to read or write responses to the server. The default is 300000, or 30 minutes. - UploadKeepAlive - Use this key to specify whether the client should keep open the connection to the server. The default is False. Use these keys to modify HttpWebRequests: - WebRequestTimeout - Use this key to specify the maximum amount of time, in milliseconds, the request has to complete. The default is 100000, or 10 minutes. - WebRequestReadWriteTimeout - Use this key to specify the maximum amount of time, in milliseconds, the client has to read or write responses to the server. The default is 300000, or 30 minutes. - WebReqestKeepAlive - Use this key to specify whether the client should keep open the connection to the server. The default is False.	OpenSpan.dll StudioConfig.xml

CR	Description	Assemblies
31193	This hotfix adds support for SAP version 7.4.	OpenSpan.Translators.SAP.x32.dll OpenSpan.Translators.SAP.x64.dll
31483	This hotfix updates the WPF translator to make sure it correctly responds to combo box selection changes.	OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll
Build 7.1.24 — CR 31989 — May 14, 2015		
31377	This hotfix provides an easy way to start a single Start My Day application by adding these methods: - StartApplication(string applicationName) - Use this method to start a single application. - StartApplications(params string[] applicationName) - Lets you add more than one application to connection block inputs so you can start multiple applications. - StartApplicationList(string applicationName) - Lets you start all of the applications you include in the list. - ShowStartDialog() - Shows a list of applications that have not been started. You can select one application from list to start.	OpenSpan.AutomationFramework.dll
28148	This hotfix provides a way to prevent or ask for confirmation when user exits Agile Desktop via the gear icon. This hotfix adds a static Exiting cancellable event to the RuntimeLoader. You can use this event in an automation to present a confirmation dialog and, optionally, prevent Agile Desktop or Runtime from shutting down.	OpenSpan.AgileDesktop.exe OpenSpan.Runtime.Core.dll OpenSpan.Runtime.exe OpenSpan.Runtime64.exe
31087	This hotfix provides a way to determine the last time a user changed the password for an application by adding these methods to AsoManager: - Nullable<DateTime> GetDatePasswordChanged(string applicationKey, out bool passwordSet) - Returns the last date the password changed for an application. passwordSet is false if the user has never entered a password for the application. - in GetDaysSincePasswordChanged(string applicationKey) - Gets the number of days since the last password change for a given application. - bool IsPasswordSet(string applicationKey) - Indicates if the user has ever set the password for a given application.	OpenSpan.ApplicationFramework.dll
31370	This hotfix adds the VisibleRows key to the Shortcuts plug-in section of the Interaction.xml file. Use this setting to specify the number of shortcut rows you want to appear.	OpenSpan.Interactions.Controls.dll
29556	This hotfix adds support for additional UltraGrid (ActiveX control) properties, methods, and events.	OpenSpan.Adapters.InfragisticsOCX.dll OpenSpan.Adapters.DataGrid.dll OpenSpan.Translators.Infragistics.UltraGrid.x32.dll
Build 7.1.23 — CR 30985 — May 07, 2015		
26315	This hotfix adds support for the AWD List Control.	OpenSpan.Adapters.dll OpenSpan.Adapters.AWD.dll OpenSpan.Translators.AWD.x32.dll
31031	This hotfix resolves a handle leak which could occur when running OpenSpan Services. After installing this build, restart your computer.	OpenSpan.x32.sys OpenSpan.x64.sys
26841	This hotfix corrects a problem which could cause an exception when a CellLinkPerformClick was used.	OpenSpan.Adapters.Siebel.dll
30957	This hotfix adds MessageDetails to list of parameter types you can select from the Type drop down.	OpenSpan.Automation.Design.dll OpenSpan.ApplicationFramework.dll
24262	This hotfix makes sure the OSDump utility reads the RuntimeConfig.xml file from the EnviromentProperties.UserPath location.	OSDump.exe
28423	This hotfix adds the IgnoreProcesses key to the RuntimeConfig.xml and StudioConfig.xml files. Use this key to list the processes you want Studio and Runtime/Agile Desktop to ignore. Separate each process with a comma. The list of process names is case insensitive.	OpenSpan.Adapters.Windows.dll OpenSpan.Brokers.Windows.x32.dll OpenSpan.Brokers.Windows.x64.dll OpenSpan.Common.dll OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll OpenSpan.Services.exe RuntimeConfig.xml StudioConfig.xml
Build 7.1.22 — CR 30761 — April 17, 2015		
30006	This hotfix resolves a hooking issue in Internet Explorer which could cause Internet Explorer version 11 to crash on certain pages after you installed Microsoft KB 3003057 or one of its successive KBs. These KBs are known to exhibit this issue: - KB3003057 - KB3008923 - KB3021952	OpenSpan.Translators.InternetExplorer.x32.dll OpenSpan.Translators.InternetExplorer.x64.dll

CR	- KB3034196 ~~Description~~ KB3033359	Assemblies
29706	This hotfix updates the system to handle the use of a single interaction context variable. Multiple interaction contexts were already handled.	OpenSpan.Interactions.dll
29991	This hotfix resolves a conflict between Studio/Runtime and a third party product which could cause Internet Explorer version 11 to crash.	OpenSpan.Scout.x32.dll OpenSpan.Scout.x64.dll
Build 7.1.21 — April 02, 2015		
	This was the initial build of version 7.1.	

Robotic Automation supported technologies

Note: For information about Pega Robotic Information version 22.1, see Supported technologies.

In Pega Robotic Automation, Pega Robot Studio and the Robot Studio plug-in support a wide variety of popular 32- and 64-bit applications and technologies, which you can review by using the Application support matrix. Other articles provide detailed information about support for individual technologies and applications.

For information about the various properties, methods, and events that are supported for each technology or application, see Pega Robotic Automation Help.

Support matrices

- Application support matrix
- Operating system support matrix

Note: For information about Pega Robot Manager, see Component matrix.

Application support

- Citrix support in Pega Robotic Automation
- FIPS support in Pega Robotic Automation
- JavaFX support in Pega Robotic Automation
- Microsoft Office support in Pega Robotic Automation
- Microsoft Visual Studio support in the Robot Studio plug-in
- PowerBuilder support in Pega Robotic Automation

Browser support

- Google Chrome support in Pega Robotic Automation
- Internet Explorer support in Pega Robotic Automation
- Microsoft Edge support in Pega Robotic Automation
- Mozilla Firefox support in Pega Robotic Automation

Credential support

- BeyondTrust support in Pega Robotic Automation
- Client credential provider support in Pega Robotic Automation
- CyberArk support in Pega Robotic Automation

Adding support for additional applications and technologies is an ongoing process. These articles discuss the technologies that Pega Robot Studio automates by using injection. You can also automation other technologies that are not listed here. For example, support for Optical Character Recognition (OCR) and Accessibility are included and do not depend on injection techniques. For more information or for information about applications and technologies that are not included in these articles, contact Pega Support.

Pega Robotic Automation application support matrix

In Pega Robotic Automation, Pega Robot Studio and the Studio plug-in support the 32- and 64-bit applications and technologies that are listed in the following table.

Note that adding support for additional applications and technologies is an ongoing process. The following is a list of technologies that Pega Robotic Automation automates by using injection. Other technologies, not listed here, can also be automated. For example, support for Optical Character Recognition (OCR) and Accessibility are included and do not depend on injection techniques. For more information, contact Pega Support.

- For specific information about Pega Robot Studio and these applications, see the Help for your version of Pega Robot Studio.
- For information and limitations on individual application version support, see the Release and Build Notes.
- For more information about system requirements, including a list of the supported versions of Windows, see the Installation Instructions.

Note: Best practice is to turn off automatic updates of your applications, including the browsers that you automate. Only deploy new versions after you have had time to smoke test your automations.

In some cases, support for an application or technology can be limited. Accordingly, the links below might provide additional information.

Application / Technology	Pega Robotic Automation version	
	19.1	22.1
BeyondTrust	✔	✔
Chrome	limited	limited
Citrix server / client		
XenApp 5.0 / Online Plug-in 11.2	✔	✔

Application / Technology	Pega Robotic Automation version	
	19.1	22.1
XenApp 5.0 / Online Plug-in 12.1	✔	✔
XenApp 6.0 / Online Plug-in 11.2	✔	✔
XenApp 6.0 / Online Plug-in 12.1	✔	✔
XenApp 6.5 / Citrix Receiver 12.1 - 14.12	✔	✔
XenApp 7.6 - 7.15 / Citrix Receiver 14.1 and later	✔	✔
XenApp 7.6 - 7.15 / Workspace App 1904.1 and later *	✔	✔
* Refer to the build notes for specific build requirements.		
Clarify		
version 7.5.0.10 (WoW64)	limited	limited
version 12.0.0.0 (WoW64)	limited	limited
Console Adapter	limited	limited
Control Regions	✔	✔
CyberArk	✔	✔
DevExpress		
version 3.2.4	limited	limited
version 7.1.2	limited	limited
version 8.3.8	limited	limited
Edge (Chromium)	limited	limited
Electron		
Version 1.7.9 and up, except for a Server 2012 R2 environment, where Electron 6.0.7 or higher is required. PNF version 10.1.4.1903 must also be installed to use this feature.	✔	✔
Emulators		
HLLAPI-compliant, CAIL, Fujitsu, and DOS	limited	limited
Firefox		
versions 52 and later	limited	
ESR versions 52 and later	limited	
Infragistics UltraTree		
version 11.1	limited	limited
version 11.2	limited	limited
version 13.2	limited	limited
version 14.1	limited	limited
Internet Explorer *		

Application / Technology	Pega Robotic Automation version	
	19.1	22.1
version 8 x86	✔	
version 9 x86	✔	
version 10 x86	✔	
version 11 x86	✔	✔
version 11 x64	✔	✔
* For more information about supported versions and limitations, see Robotic Automation support for Internet Explorer.		
Java *		
6 x86	✔	✔
6.0 x64	✔	✔
Java 1.4 x86	✔	✔
Java 5 WoW64	✔	✔
Java 5x86	✔	✔
Java 6 WoW64	✔	✔
Java 6 x86	✔	✔
Java 6 x64	✔	✔
Java 7 (1.7)	✔	✔
Java 8 (1.8)	✔	✔
Java 11	✔	✔
* Given the many Java tools and technologies, always test with the tools that you plan to use to discover any additional limitations.		
Microsoft Office (64-bit)		
Office 365 Apps client (desktop version, not the browser version)	✔	✔
Office 2019	✔	✔
Office 2016	✔	✔
Office 2013	✔	✔
Office 2010	✔	✔
Microsoft Office (32-bit)		
Office 2019	✔	✔
Office 2016	✔	✔
Office 2013	✔	✔
Office 2010	✔	✔

Office 2007 **Application / Technology**	**Pega Robotic Automation version**	
	19.1	22.1
MS Common Controls		
V.5 TreeView, status bar	✔	✔
.NET		
version 2.0 x86	✔	✔
version 2.0 x64	✔	✔
version 2.0 (WoW64)	✔	✔
version 3.0 x86	✔	✔
version 3.0 x64	✔	✔
version 3.0 (WoW64)	✔	✔
version 3.5 x86	✔	✔
version 3.5 x64	✔	✔
version 3.5 SP1 x86	✔	✔
version 3.5 SP1 x64	✔	✔
version 3.5 (WoW64)	✔	✔
version 4.0	✔	✔
version 4.5	✔	✔
version 4.6	✔	✔
version 4.7.2	✔ *	✔
version 4.8	✔ *	✔
* Requires build 19.1.51 or later.		
PowerBuilder		
version 7.0 - 12.5	limited	limited
version 2017	limited	limited
version 19.0	limited	limited
version 19.2	limited	limited
Remedy		
version 7.0.1.11	✔	✔
version 7.0.1.11 (WoW64)	✔	✔
version 7.1.0.7	✔	✔

Application / Technology	Pega Robotic Automation version	
version 7.1.0.7 (WoW64)	✔	✔
version 7.5	19.1	22.1
version 7.5 (WoW64)	✔	✔
version 7.6.04.0	✔	✔
SalesForce Lightning *	limited	limited
* Included in Pega Robotic Automation 19.1.67 and later. Refer to the build notes for specific limitations.		
SAP		
version 6.2	✔	✔
version 6.2 (WoW64)	✔	✔
version 7.1	✔	✔
version 7.1 (WoW64)	✔	✔
version 7.2	✔	✔
version 7.2 (WoW64)	✔	✔
version 7.3	✔	✔
version 7.3 (WoW64)	✔	✔
version 7.4	✔	✔
version 7.4 (WoW64)	✔	✔
version 7.5	✔	✔
version 7.7	✔	✔
Siebel		
version 6.3	limited	limited
version 7.7	✔	✔
version 7.7 (WoW64)	✔	✔
version 7.8	✔	✔
version 7.8 (WoW64)	✔	✔
version 8.0	✔	✔
version 8.0 (WoW64)	✔	✔
version 8.1.11 (Open UI)	✔	✔
For more information, see Using the Siebel Adapter.		

Operating system support matrix

Pega Robotic Automation runs on several versions of Microsoft Windows operating systems to support automating applications such as Microsoft Office, Microsoft Edge, Google

Chrome, and more. Reference the following table to see which versions of Windows our Quality Assurance team uses when testing Pega Robotic Automation. For more information, see Pega Robotic Automation 19.1 build notes.

To download a build, see Download Pega RPA software. For information about system requirements and installing Pega Robotic Automation, see Pega Robotic Automation 19.1 Installation instructions.

Note: Best practice is to turn off automatic updates of your Windows operating system. Only deploy new versions after you have had time to smoke test your automations. We also recommend turning off automatic updates for the applications that you automate, including browsers.

Microsoft Windows versions supported by Pega Robotic Automation

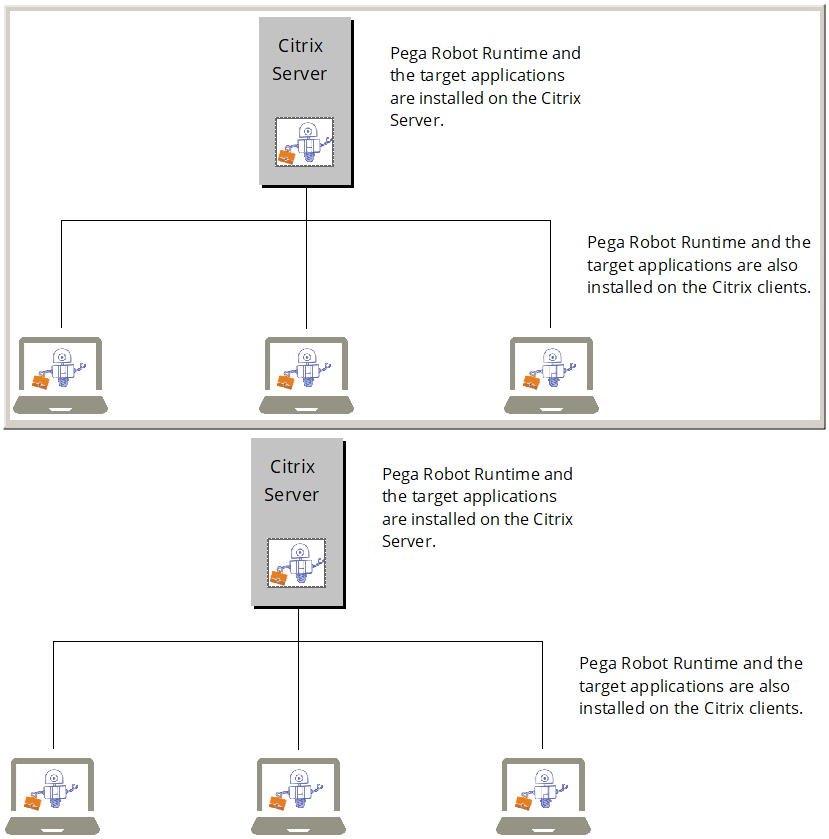
Microsoft Windows version	Pega Robotic Automation builds	
	Robotic Automation 19.1	Native Foundation 10.1
Our Quality Assurance team tests on the following versions of Windows 11:		
Version 22H2	19.1.116 and later	10.1.33.2102
Version 21H2	19.1.108 and later	10.1.26.2102
Our Quality Assurance team tests on the following versions of Windows 10 (32- and 64-bit):		
Version 22H2	19.1.119 and later	10.1.34.2102
Version 21H2	19.1.95 and later	10.1.24.2101
Version 21H1	19.1.83 and later	10.1.23.2101
Version 20H2	19.1.65.and later	10.1.23.2101
Version 2004	19.1.69 and later	10.1.17.2004
Version 1909	19.1.48 and later	10.1.5.1909
Version 1903	19.1.12 and later	10.1.2.1903
Version 1809	19.1.1 and later	10.1.1.1809
Our Quality Assurance team tests on the following versions of Windows Server (64-bit):		
Server 2022 version 21H2	19.1.108 and later	10.1.26.2102
Server 2019 version 1809	19.1.51 and later	10.1.13.2004
Server 2016 version 1607	19.1.34 and later	10.1.7.1909

Note: 16-bit Windows-based applications are not supported by Pega Robotic Automation

Creating automations for a Citrix environment

You can use Pega Robotic Automation to create solutions that run in a Citrix environment. By using custom Citrix contexts within Robot Studio solutions, you can integrate applications running on the Citrix server with those running on Citrix client machines. In Robot Studio, you use the Context project item to designate the adapters, automations, and other project items to be launched from the Citrix server.

Target applications can reside entirely on the Citrix server or can be distributed between the server and clients. The following example shows a typical setup.



For detailed configuration information and a hands-on exercise for using Robot Studio with Citrix, see Using Citrix Contexts.

See also the Pega Academy course, Robotic Solution Development for Citrix.

Note: Before you create automations that run in a Citrix environment, ensure that Citrix App Protection is not enabled in your environments. Citrix App Protection is an add-on feature for the Citrix Workspace app that provides enhanced security when using Citrix Virtual Apps and Desktops published resources. This add-on interferes with the ability to automate some applications and is currently not supported. After disabling this add-on, you can use Citrix Contexts in Robot Studio to get started.

Adding a Pega virtual channel to the allow list

Ensure that there are no communication disruptions by adding a Pega virtual channel to the list of allowed settings. To use Robot Runtime in a Citrix environment, you must add it to the virtual channel allow list.

Before you begin

The virtual channel allows communication between the server and client runtime. The Citrix Virtual channel allow list feature is enabled by default, so that only Citrix virtual channels are allowed to open in virtual apps and desktops sessions. Beginning with Citrix Virtual Apps and Desktops 7 2109, Citrix enables the virtual channel allow lists by default. On the Citrix server, Pega.Loader is the published application, and Robot Runtime is the application that runs and communicates as the virtual channel.

1. In Citrix, navigate to the Virtual channel allow list policy setting.
2. Enter the name of the virtual channel followed by a comma, and then the path to OpenSpan.Runtime.exe.
   The following code shows an example custom virtual channel policy:

   ```
   CTXOPSP,C:\Program Files (x86)\Pegasystems\Pega Robot Studio\OpenSpan.Runtime.exe,C:\Program Files (x86)\Pegasystems\Pega Robot Studio Plug-In\OpenSpan.Runtime.exe,C:\Program Files (x86)\Pegasystems\Pega Robot Runtime\Ope
   ```

   Note: For more information, see the Citrix documentation on adding virtual channels to the allow list.

Citrix setup and implementation

When you create a Pega Robotic Automation solution, the setup differs based on whether the applications that you want to automate are served up by a Citrix server or if you have applications that need to interact with applications that exist on the client machine and are also served up by a Citrix server.

- Desktop published on Citrix server – With this setup, you do not require the Citrix Channel Driver installation. You only need to install Robot Runtime in the published desktop.
- All applications are published on Citrix server – With this setup, you do not require the Citrix Channel Driver installation or the use of Citrix contexts in your solution. You only need to install Robot Runtime on the Citrix server and add it as a published application. You will not be able to use Monitor All for adapters because the published application could be started on a different server than the server on which Robot Runtime is running.
- Applications published on the Citrix server and installed on the client – This scenario is called *mixed mode*. In mixed mode, you install Robot Runtime on both the Citrix server where the applications reside and on the client machines. You must also have the Citrix Channel Driver installed on the client, and your solution must contain a Citrix context that is configured for the Citrix environment that the applications are hosted on.

This article discusses the mixed mode scenario.

Publishing Robot Runtime on the Citrix server

1. Add Pega.Loader.exe as a published application on the Citrix servers that you want to automate the applications for.
2. Assign to it an application name, the file path to the Robot Runtime executable, and the following command line argument: “%**”.

The application name that you assign here is used as the Published Application Name in the solution’s Citrix context.

Creating your solution

When working in a mixed mode scenario, add a Citrix context to your solution for the Citrix server environment that contains the applications that you want to automate. You can add items such as adapters, automations, and Windows forms under the Citrix context. Add an adapter for each application that you want to automate that is hosted on the Citrix server under its Citrix context. Automations are added under the Citrix context if the initiating event belongs to a control for an adapter under the context.

Also note that when you are using exit points in your automation, parameter values cannot be transferred across the context. If you need to pass information from an exit point, use a variable stored in the global container.

More information on Citrix contexts and how to use them can be found here: https://community.pega.com/knowledgebase/documents/using-citrix-contexts.

Configuring the Citrix context for your Citrix environment

Depending on how your Citrix environment is set up, you must configure certain properties for the Citrix context. For more information, see Citrix Context properties.

Required properties

You must set the following properties regardless of which Citrix environment you are using.

Required Citrix properties

Property	Description
Run Local	Set to True when debugging the solution locally without a connection to the Citrix server. When you deploy a solution, you will want to set this to False. Remember that when you debug locally, all applications must be on the machine that you are debugging on.
Project To Load	This is the path of the solution located on the Citrix server.
Published Application Name	This is the name assigned to the published Robot Runtime on the Citrix server.
Login Section (Domain, Login, Password)	Provide a value for these items if you want to use a specific set of credentials to launch the published Robot Runtime on the Citrix server. If you want to use pass-through authentication, you do not need to enter these values.
Client Location	This is the path to the Citrix receiver installation on the client. By default, the Citrix receiver is installed on the client in this location: C:\Program Files\Citrix\ICA Client. If this is the case on the client machine, this setting does not need to be filled in. If the Citrix receiver is installed in a different location, set this value to that location.

Properties for specific Citrix environments

XenApp 6.5 to 5.0 (without Netscaler) – This applies if your Citrix server is XenApp version 6.5 to 5.0 and Netscaler web front end is not used. In addition to the required properties listed in the previous section, modify the properties in the XenApp 6x and Older section on the Citrix context. If there is only one Citrix server that you are connecting to, you can just add the IP address of this server.

If there are multiple Citrix servers in a farm, set the Http Browser Addresses property to add the IP addresses for your Citrix zone data collectors. If you want to use a specific login, enter the credential information under the Login section under the Citrix context.

If you want to use pass-through authentication, leave this section blank.

XenApp 7.x with Storefront enabled (without Netscaler) – This applies if your Citrix server is XenApp version 7.x and Netscaler web front end is not used and Storefront is enabled in your Citrix environment. In addition to the required properties listed in the previous section, modify the properties in the XenApp 7x section. Enable this method by setting the Use Storefront Web property to True. Also provide the Storefront URL in the Storefront Web Url property. And, if pass-through authentication is enabled in your Citrix environment and you want to use it with Robot Runtime, set the Use Passthrough Authentication property to True. To use a specific login instead, supply the credential information in the Login section for the Citrix context.

WebInterface/Netscaler – This applies when your Citrix environment has a Netscaler web front end or Storefront is not enabled in your Citrix environment. Using this method launches an executable that contains an embedded Chromium browser that navigates to obtain the ICA file that is needed to launch the published Robot Runtime application.To enable this, set the Use Web Interface Citrix context property to True. Also enter the URL of the Citrix Web interface website for the Web Interface URL property. If you use Netscaler as a front end, also set the URL Is Netscaler property to True.

The executable that navigates to obtain the ICA file is enabled to navigate generic cases where the web interface path to start a published application has not been modified. However, to account for cases where the web interface path has been modified, you may need to provide JavaScript content so that the executable with the embedded browser can navigate from the web interface landing page to obtain the ICA file. If this is needed, set the Run Custom JavaScript property to True and add the custom JavaScript in the Custom JavaScript Content property.

When developing the custom JavaScript, you can use variables defined in the Citrix context:

%username%: – The username property

%password%: – The password property

%domain%: – The domain property

%publishedapppath%: – The path (including folders) to the desired published application.

Other scenarios

These properties need to be set based on certain scenarios.

- You have Windows dialog messages that pop up in the Citrix session when launching a published application that need to be dismissed to continue. In this situation, you will need to define these dialogs and set the Dismiss Dialogs property in the Citrix context Misc section to True. To define the windows to be dismissed, add them by clicking the Dialog Dismissal List property. This displays a window where you can add the class name of the window, the window title, and the x,y coordinates of the control to click to dismiss the dialog. To get the class name and window title, use a third party tool such as Spy++ or Inspect. The x,y coordinates are based off the upper left corner of the window.
- If you do not want to use pass-through authentication but want to use different credentials to launch the published Robot Runtime application per Citrix server, you can use the external property file. To create this file, run the OpenSpan.Connectors.Citrix.WebInterfacePropertyManager executable that resides in the Robot Studio installation directory. Here you can set the credentials (user name, password, domain) and can also set the published application name and project to load. To use this file, on the Citrix context set the Use External Property File property to True and set the External Properties File Path property to the path where this file resides. If you do this, the settings are read from that location and are used instead of the settings that are configured in the Citrix context.

Note: The resulting generated file is encrypted using the machine algorithm. Therefore, it must be created on each of the client machines. You cannot copy it across environments.

Interrogating applications

Robot Studio must be installed on a Citrix server that hosts the applications that you want to automate to interrogate those applications. You must create the solution and interrogate the client side applications and then move and open this solution in Robot Studio on the Citrix server that hosts the Citrix applications that you want to automate. After you finish interrogating the applications that reside on the Citrix server, you can transfer the solution back to be opened in Robot Studio on the client machine to work on automations and the rest of the solution.

Installing the Citrix Channel Driver

Install the Citrix Channel Driver that is included along with the product installation on every client machine that runs the mixed mode solution.

Deploying the solution

When you deploy the solution, make sure that the Run Local property for the Citrix context is set to False. After the deployment is finished, copy the solution file to the location on the Citrix server that you set with the Citrix context's Project To Load property.

Creating automations that are Federal Information Processing Standard (FIPS) compliant

Pega Robotic Automation 19.1 and later is compliant with Federal Information Processing Standard (FIPS) 140-2 standards. FIPS is a set of cyber security standards that are defined by the National Institute of Standards and Technology (NIST) and are used by the United States and Canadian governments. The FIPS standard defines the minimum security requirements for securing sensitive but unclassified information. FIPS is mandated in some government agencies and is optionally followed in commercial and non-governmental organizations.

The FIPS 140 standard defines the approved cryptographic algorithms that you can use and establishes the requirements for generating and managing keys. For more information about FIPS, see the National Institute of Standards and Technology website. For more information about how Microsoft operating systems handle FIPS validation, see FIPS 140 Validation.

Note: You do not have to make any changes to Pega Robotic Automation to create automations with FIPS support.

To enable FIPS-compliant encryption on Windows, log in as an administrator and apply a local group policy setting or by editing a registry key.

- Enable the system cryptography use FIPS-compliant algorithms for encryption, hashing, and signing in the Local Policy security options.
- Change the HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Lsa\FipsAlgorithmPolicy Windows registry entry to '1'.

Automating applications that run on Google Chrome

Note: The following information is for the legacy Pega Chrome extension, called 'Pega Robotic Automation for Browsers'. For information about the Pega Browser Extension component (PBE), included in 19.1.115 and later, see Pega Browser Extension FAQ.

Interrogate and automate applications that run in the Google Chrome browser by using the legacy Chrome extension with the Universal Web Adapter in Pega Robotic Automation.

The legacy Chrome extension is backwards compatible; the newer versions of the legacy extension work with older versions of Pega Robotic Automation. To see when versions of the legacy extension were released, see the Pega Robotic Automation build notes.

Note: The legacy Chrome extension version 1.0.50 and later is signed with CRX version 3. CRX version 3 is not compatible with Google Chrome version 59 and earlier. For versions of Chrome that are signed with CRX version 2, use legacy Chrome extension versions 1.0.12 - 1.0.49. For more information, see Pega Robotic Automation version 8.0 build notes.

Installing the legacy extension

You can use the Setup wizard for Robot Studio and Robot Runtime to install the legacy Chrome extension, but the best practice is to install the newer Pega Browser Extension component (PBE), included in 19.1.115 and later. To update users from the command line, use the command line installation with the INST_Chrome=1 parameter to install the extension. For more information, see the installation instructions for your version of Robot Studio or Robot Runtime.

If you install Robot Studio or Robot Runtime without the legacy Chrome extension and later want to install the extension, use the web installer utility. This utility is located in the Robot Studio or Robot Runtime installation folder. The following is an example of the command you would enter to install the legacy extension and update the messaging host for Chrome.

```
OpenSpan.WebExtensionInstaller.exe Chrome -i
```

Note: For help information about additional parameters that you can include, append the -h parameter to the command.

Enabling the legacy extension

After installing the legacy Chrome extension, the first time any user starts Robot Runtime, that user must decide whether to enable or uninstall the legacy Chrome extension. In Chrome, the name of the legacy extension is Pega Robotic Automation for Browsers. Automation developers, of course, would enable the legacy extension. Automation end users must enable the legacy extension too, so the automation can automate the browser. If automation end users do not enable the legacy extension, you must perform a manual process to recover and re-install the extension. For more information, contact Pega Support.

Note: In Chrome, the PBE extension is called Pega Robotics Automator.

Automating Chrome with the legacy extension

Keep in mind the following considerations when you automate applications that run in the Chrome browser:

- Best practice is to turn off automatic updates of your browsers. Only deploy new browser versions after you have had time to smoke test your automations.
- To support multiple concurrent adapters, you must have version 8.0.1028 or later. For more information, see Using multiple Chrome adapters within a Studio solution.
- To support frames, you must have version 8.0.1038 or later.
- To have access to the properties, methods, and events of a frame or top-level Windows form in your automation, use non-global webpages. To interrogate non-global webpages, you must have version 8.0.1042 or later.
- Property changed and Cancellable events are not supported in Chrome, but are supported in Internet Explorer.

Automating dialogs in Chrome

To automate the File Open, File Save as, and Print dialogs in Chrome in applications that use the Universal Web Adapter, use Pega Robot Studio version 19.1.98 or later. For more information, see Automating dialogs in Chrome and Edge.

Automating tables in Chrome

You can interrogate rows of data and cells within those rows. Use cloning to work with tables. For more information, see Interrogating HTML tables with the Universal Web Adapter.

Working with the shadow DOM

If your solution interrogates and automates controls that are under Shadow Document Object Models, use Pega Robotic Automation 19.1.62 or later and version 1.1.101 of the Chrome extension, or later.

Using Microsoft Group Policy to control Chrome policies when using the legacy extension

If you use a Microsoft Group Policy Object (GPO) to control Chrome policies, and you enable the Configure native messaging block list setting in the Native Messaging section to block all extensions, perform the following steps to provide Robot Studio and Robot Runtime with the access they need to function correctly.

1. Start the Microsoft Local Group Policy Editor.
2. Select Computer Configuration > Administrative Templates > Google > Google Chrome > Native Messaging.
3. In the Configure native messaging allowlist setting, add the following messaging-host executable so that messaging host is not blocked:

```
openspan.translators.web.messaginghost
```

4. Save your changes and close the Local Group Policy Editor.

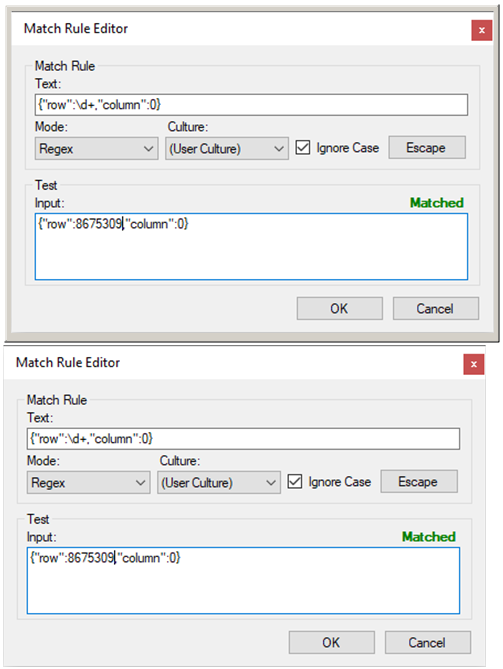
Also, if you enable the Control which extensions cannot be installed setting in the Extensions section to block all extensions, add the Extension ID to the Allow specific extensions to be installed setting so that the extension can be installed.

Interrogating HTML tables with the Universal Web Adapter

Automate HTML tables in Chrome or Edge using the Universal Web Adapter. Follow these steps to interrogate an HTML table for the Universal Web Adapter.

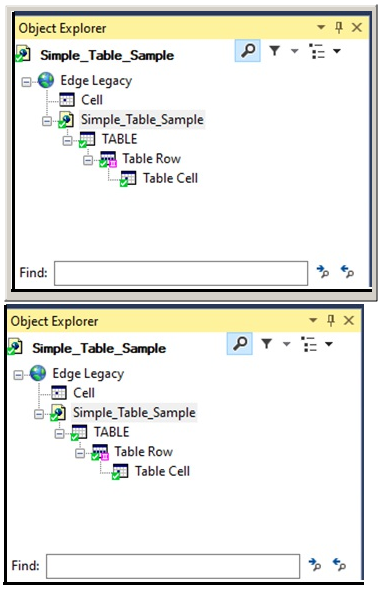
1. On the interrogation form, select Select Element from the drop down menu.
2. Drag and drop the bullseye over the table and select the table element from the list.
3. Click Create Container.
4. Drag and drop the bullseye over a row in the table and select the row element from the list.
5. Click Create Container.
6. Modify the match rules for the table row in the Object Explorer until all the rows show as available targets.
7. Enable UseKeys on the row object in the property grid.
8. Drag and drop the bullseye over the cell in the table and select the cell element from the list.
9. Click Create Container.
10. Modify the match rules for the table cell so that the cell matches each parent row.

The cell is assigned a RowCellColumn match rule by default. Best practice is to change the cell to use Regular Expression (regex) and change the Row part of the string to `\d+`. This allows the system to match on all rows, but only in that specific column.



Match Rule Editor

The following is an example table structure:



Example HTML table structure

Automating dialogs in Chrome and Edge

To automate the File Open, File Save as, and Print dialogs in Google Chrome and Microsoft Edge in applications that use the Universal Web Adapter, use Pega Robot Studio version 19.1.98 or later. You can also automate Edge permission dialogs such as the Allow multiple files to be downloaded and Allow website to use your location dialogs.

Notice: You can automate only the English versions of Google Chrome and Microsoft Edge.

For optimal results when designing your solution, keep the following best practices in mind:

- Use only one Universal Web Adapter in your solution to automate the dialogs. If your use case demands (or might demand in the future) that multiple applications automate the dialogs, create one adapter for each browser type. Use only that adapter for the interrogation and automation of dialogs across all the Chrome or Edge applications that are included in your solution.
- Except for the expected nested dialogs, such as when the Print dialog opens the File Save As dialog, when you choose to save as a PDF file you can only match one dialog at a time. If two non-nested dialogs appear, the system does not match the second dialog. Be sure to plan for this situation when you create your automation.
- You can automate only the dialogs that open after Pega Robot Runtime starts.
- Use Windows 10 version 1909 or later or Windows Server 1909 or later. Earlier versions of Windows are not supported for automating Chrome or Edge dialogs.
- Do not try to automate the File Open, File Save as, and Print dialogs concurrently in Edge and Chrome as unexpected results might occur. Plan for this situation when you create your automations.
- Include an asterisk wildcard (*) after the printer name when you use the SelectItem method on the Printer Selection combobox because Edge displays the status of the printer after the printer name.

For optimal results when interrogating dialogs, keep the following best practices in mind:

- Wait up to 10 seconds after displaying the dialog before interrogating a control. This gives the dialog time to fully load and time for Pega Robot Studio to recognize all controls.
- Ensure that the dialog is active when you interact with dialog controls.
- Move the second dialog that displays so that it does not overlap its parent dialog when you interrogate nested modal dialogs. This is only relevant during interrogation and does not apply when the automation runs.

For optimal results when automating dialogs, keep the following best practices in mind:

- If you update the File Name textbox in the File Save As dialog, place the text in the textbox control that is a child to the combobox control.
- If a dialog is redrawn dynamically, such as when you automate changing the printer in the Print dialog or selecting the More settings option on the Print dialog, be sure to call rematching on the parent dialog to ensure that the system has rematched the newly created controls and those control are ready for you to interact with.
- If you print from Edge to a PDF file, use the Save as PDF option instead of the Microsoft Print to PDF option to avoid starting another print job while one print job is still spooling.

Note: The system expects combo boxes to expand and collapse when you apply properties or methods because the content is dynamic. For more information, see ComboBoxDynamic properties, methods, and events. For more information on interrogation, see Introduction to the Interrogation Form.

Automating applications that run on Internet Explorer

Pega Robotic Automation includes support for interrogating and automating the 32- and 64-bit Microsoft Internet Explorer browser, versions 7 and later. This functionality is built into the web adapter.

Note: For the latest news about Internet Explorer, be sure to watch this Pega Community Events webinar: Microsoft is changing the browser game - Are you ready? Pega Robotic Automation version 8.0 does not support Internet Explorer 11 (64-bit) on Windows 8.1 or Server 2012. For specific version information, see the Application Support Matrix.

Consider the following additional points.

- When you use versions 9-11 with Siebel, enable the Compatibility View feature in the browser. Compatibility View helps websites that are designed for earlier versions of Internet Explorer to display correctly. This functionality can affect Pega Robot Studio matching. For more information, see Setting up Internet Explorer to use Siebel.
- If you interrogate Internet Explorer 8 under Windows 7 SP1, keep in mind that applications that run in Internet Explorer 8 spawn multiple processes. In Windows 7 SP1, set the HookChildProcesses property to True for the web adapter. For more information, see Interrogating a Windows application.
- To handle embedded .NET applications, set the correct permissions. Otherwise, attempts to load the Pega Robot Studio .NET translator inside Internet Explorer either function incorrectly or cause Internet Explorer to crash or hang. To avoid this problem, the .NET translator is not loaded into Internet Explorer even when the .NET runtime is detected. Because of this, Robot Studio treats the controls inside of the .NET application as regular Window controls. For more information, see Configuring .NET permissions for .NET controls hosted in Internet Explorer.
- Pega Robotic Automation does not support the TabProcGrowth registry entry. This setting limits the number of tabs that Internet Explorer can open on a single process.
- Pega Robotic Automation supports Protection Mode in Internet Explorer, but does not support Enhanced Protection Mode (EPM), which is available in Windows 8, Internet Explorer 10, and later. Disable Enhanced Protection Mode in Internet Explorer's advanced security settings when you develop robotic automations.

Automating Java applications

Pega Robotic Automation 19.1.30 and later provides limited support for JavaFX applications. Java versions 8 and 11 are supported.

Build 19.1.87 expands Java support by adding support for version 11 of the Java Runtime Environment (JRE) for the Standard Widget Toolkit (SWT) and JavaFX.

Note: For more information, see the Pega Robotic Automation build notes.

Support for Java Standard Widget Toolkit

Pega Robotic Automation 19.1.111 and later provides support for the following Java Standard Widget Toolkit (SWT) controls:

- Group widget
- Shell widget
- Link widget
- Slider widget
- ExpandBar widget
- Browser widget
- Button widget
- Label widget
- List widget
- Combo widget
- Spinner
- SxSyTree

- Tabs
- Table (Grid)
- Text
- Tree

Support for JavaFX

The following restrictions apply to JavaFX support:

- UI Connectors are not supported.
- JavaFX support is not verified for applications that mix JavaFX controls with Swing components.

The following table provides details on the specific support in Pega Robotic Automation 19.1.30 and later. A check mark indicates support for the feature. A blank space indicates no support for the feature.

	Pega Robotic Automation	
	19.1.30 to 19.1.38	**19.1.39 and later**
Properties (All controls)		
Name { get }	✔	✔
Text { get & set }, TextBuffer { get }	✔	✔
Id { get }	✔	✔
Bounds { get }	✔	✔
ClientRectangle { get }	✔	✔
ScreenRectangle { get }	✔	✔
Top { get }, Bottom { get }	✔	✔
Left { get }, Right { get }	✔	✔
Width { get }, Height { get }	✔	✔
Visible { get & set }	✔	✔
Enabled { get & set }	✔	✔
Focused { get }	✔	✔
Value { get }	✔	✔
Bounds { set }		
Top { set }		
Left { set }		
Width { set }		
Height { set }		
Methods (All controls)		
Activate( )	✔	✔
Focus( )	✔	✔

PerformClick( )	✔	✔
PerformClick(int x, int y)	✔	✔
Show( )	✔	✔
Hide( )	✔	✔
PerformDoubleClick( )		
PerformDoubleClick(int x, int y)		
PerformRightClick( )		
PerformRightClick(int x, int y)		
SendKeys(String keys)		
Events (All controls)		
Click, Clicking		
DoubleClick, DoubleClicking		
RightClick, RightClicking		
EnabledChanged		
GotFocus		
LostFocus		
KeyUp		
KeyDown		
KeyPress		
TextChanged		
VisibleChanged		
Hidden		
Shown		
MouseUp		
MouseDown		
Button, Menu Button, Toggle Button, and Hyperlink		
PerformClick( )	✔	✔
PerformClickXY(int x, int y)	✔	✔
Text { get }	✔	✔
PerformSynchronousClick( )		

Check Box and Radio Button	Pega Robotic Automation	
PerformClick( )	✔ 19.1.30 to 19.1.38	✔ 19.1.39 and later
PerformClickXY(int x, int y)	✔	✔
Text { get }	✔	✔
AutoCheck { get }		
Checked { get and set }		
CheckState { get and set }		
ThreeState { get }		
CheckedChanged		
CheckStateChanged		
Combo Box		
Items { get }	✔	✔
SelectedIndex { get and set }	✔	✔
Count { get }	✔	✔
SelectedItem { get and set }	✔	✔
SelectedIndexChanged	✔	✔
Updated		
Label		
Text { get }	✔	✔
List View		
Count { get }	✔	✔
SelectedIndex { get and set }	✔	✔
Selected { set }	✔	✔
Items { get }	✔	✔
SelectedIndices { get }	✔	✔
MultiSelect { get }	✔	✔
EnsureVisible(int index)	✔	✔
PerformClick(int index)	✔	✔
PerformDoubleClick(int index)		
ItemsActivated		

Updated	**Pega Robotic Automation**	
ItemClicked	**19.1.30 to 19.1.38**	**19.1.39 and later**
ItemDoubleClicked		
ItemSelected		
Tab Pane		
Tabs { get }	✔	✔
SelectedIndex { get and set }	✔	✔
SelectedIndexChanged		
Table View		
RowCount { get }	✔	✔
ColumnCount { get }	✔	✔
GetCellValue(int row, int column)	✔	✔
SelectCell(int row, int column)	✔	✔
SelectRow(int row, boolean selected)	✔	✔
EnsureVisible(int row, int column)	✔	✔
SelectedRow { get }	✔	✔
SelectedColumn { get }	✔	✔
GetColumnHeader(int column)	✔	✔
GetColumnIndexByHeader(String header)	✔	✔
ShowContextMenu( )	✔	✔
SetCellValue(int row, int column, String value)		
ClickCell(int row, int column)		
DoubleClickCell(int row, int column)		
ShowContextMenu(int x, int y)		
GridCellClicked		
GridCellDoubleClicked		
GridCellSelected		
Embedded Check Box		
ClickCell		✔

	GetCellValue		✔
Embedded Combo Box		**Pega Robotic Automation**	
	SetSelectedIndex	**19.1.30 to 19.1.38**	**19.1.39 and later** ✔
	GetCellValue		✔
	ClickCell		✔
	SetCellValue		✔
Embedded Hyperlink			
	ClickCell		✔
Text Field			
Text { get and set }		✔	✔
AppendText(String text)		✔	✔
Clear( )		✔	✔
IsPassword { get }		✔	✔
MaxLength { get and set }			
ReadOnly { get and set }			
TextLength { get }			
Append			
IsPassword { set }			
PasswordChar { get and set }			
Text			
Text { get }		✔	✔
Tree View			
SelectedNode { get }			
NodeText { get }			
NodeExpanded { get }			
NodeSelected { get }			
Collpase( )			
Expand( )			
EnsureVisible( )			
PerformClick( )			

PerformDoubleClick( )	**Pega Robotic Automation**	
PerformRightClick( )	~~19.1.30 to 19.1.38~~	~~19.1.39 and later~~
~~ShowContextMenu( )~~		
Nodes { get }		
SelectNode(NodeId id)		
NodeClicked		
NodeDoubleClicked		
NodeSelected		
Web View		
ExecuteScript(String javaScript)	✔	✔
Source { get }	✔	✔
Url { get }	✔	✔

Automating applications that run on Microsoft Edge (Chromium)

Note: The following information is for the legacy Pega Edge extension, called 'Pega Robotic Automation for Browsers'. For information about the Pega Browser Extension component (PBE), included in 19.1.115 and later, see Pega Browser Extension FAQ.

Interrogate and automate applications that run on the Microsoft Edge browser by using the legacy Edge extension with the Universal Web Adapter in Pega Robotic Automation. legacy Edge extension was added to Robot Studio in build 19.1.40. For best results and additional Edge support, install build 19.1.105 or later.

The legacy Edge extension is backwards compatible; the newer versions of the extension work with older versions of Pega Robot Studio 19.1. To see when versions of the legacy extension were released, see the Pega Robotic Automation build notes.

Installing the legacy extension

Use the Setup wizard for Robot Studio and Robot Runtime to install the legacy Edge extension. To update users from the command line, use the command line installation with the INST_Edge=1 parameter to install the extension. For more information, see the installation instructions.

If you install Robot Studio or Robot Runtime without the legacy Edge extension and later want to install the extension, use the web installer utility. This utility is located in the Robot Studio or Robot Runtime installation folder. The following is an example of the command you enter to install the extension and update the messaging host for Edge.

```
OpenSpan.WebExtensionInstaller.exe Edge -i
```

Note: For help information about additional parameters that you can include, append the -h parameter to the command.

Enabling the legacy extension

After installing the legacy Edge extension, the first time any user starts Robot Runtime, that user must decide whether to enable or uninstall the legacy extension. In Edge, the name of the legacy extension is Pega Robotic Automation for browsers. Automation developers, of course, would enable the legacy extension. Automation end users must enable the legacy extension so Robot Runtime can automate the browser. If automation end users do not enable the legacy extension, you must perform a manual process to recover and re-install the extension. For more information, contact Pega Support.

Note: In Chrome, the PBE extension is called Pega Robotics Automator.

Automating Edge with the legacy extension

Keep in mind the following considerations as you use Robot Studio to interrogate and automate Microsoft Edge.

Turn off automatic updating

Best practice is to turn off automatic updates of your browsers. Only deploy new browser versions after you have had time to smoke test your automations.

Automating dialogs in Edge

To automate the File Open, File Save as, and Print dialogs in Edge in applications that use the Universal Web Adapter, use Pega Robot Studio version 19.1.98 or later. You can also automate Edge permission dialogs such as the Allow multiple files to be downloaded and Allow website to use your location dialogs. For more information, see Automating dialogs in Chrome and Edge.

Automating multiple adapters

You can include multiple concurrent adapters. For more information, see Using multiple Chrome or Edge adapters within a Robot Studio solution.

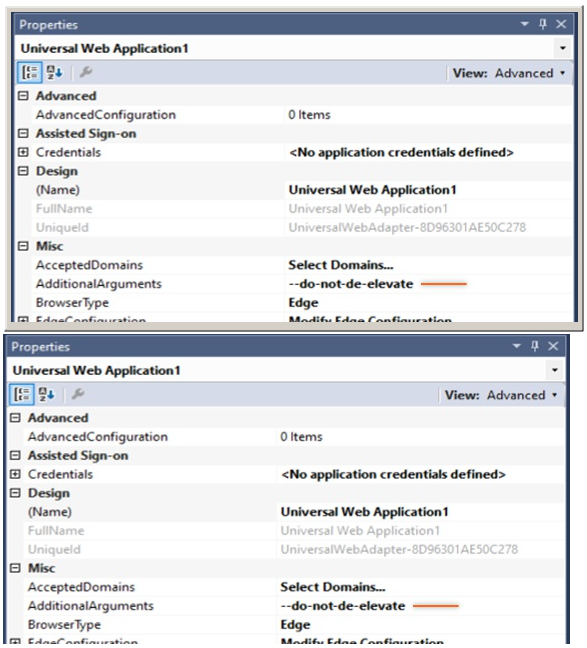
Automating tables in Edge

You can interrogate rows of data and cells within those rows. Use cloning to work with tables. For more information, see Interrogating HTML tables with the Universal Web

Adapter.

Running Robot Runtime and Edge in administrator mode

If you plan to run Robot Runtime in administrator mode, you must also run Edge in administrator mode. For example, if the target application that you are automating is running with elevated privileges, then you must run Robot Runtime with similar privileges. To ensure that Edge runs with elevated privileges, in the AdditionalArguments property of the Universal Web Adapter in Robot Studio, add the following parameter: --do-not-de-elevate



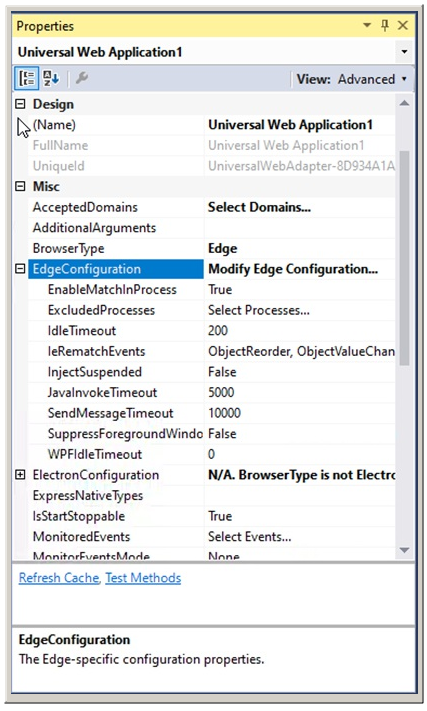
Universal Web Adapter properties

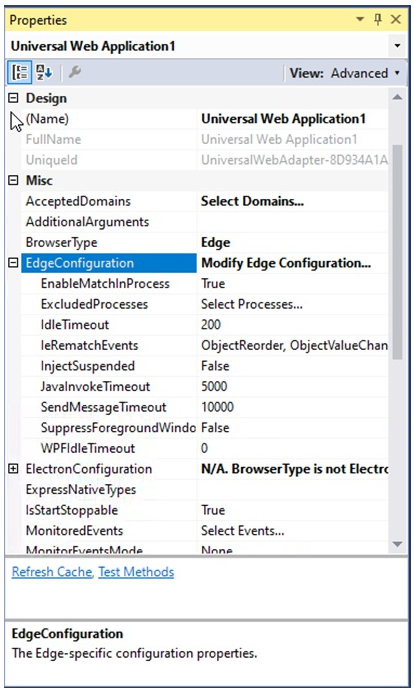
Automating applications that are running in Internet Explorer compatibility mode

The following additional considerations apply when you interrogate Microsoft Edge running in Internet Explorer (IE) compatibility mode. Microsoft designed Internet Explorer mode for situations where you need Internet Explorer 11 to retain compatibility with legacy websites and applications, but also need a modern browser for more modern websites and applications. To automate Microsoft Edge running in IE compatibility mode, use Pega Robotic Automation 19.1.86 or later.

Note: Any automation control that you previously interrogated can only match the mode in which it was created. For example, if you interrogate a webpage in non-IE compatibility mode, Robot Studio creates regular Universal Web Adapter controls. If you reload that page in compatibility mode, those controls no longer match. This also applies to frames and other types of nested controls.

- Interrogate and then stop each Edge adapter before you begin interrogating another Edge adapter. Attempting to interrogate two different Edge adapters simultaneously results in errors.
- Shut down all Edge processes before you interrogate IE compatibility-mode pages.
- When you run an automation that contains a Universal Web Adapter with IE compatibility-mode pages, shut down all Edge processes before you start Robot Runtime.
- The controls that you interrogate on an IE compatibility-mode page generate legacy web automation controls and match rules.
- To have access to the properties, methods, and events of a frame or top-level Windows form in your automation, use non-global webpages.
- When you use multiple Universal Web Adapters with Edge and IE compatibility-mode pages, ensure that the Edge Configuration properties for each Edge adapter are the same.





Microsoft Edge configuration properties

Using Microsoft Group Policy to control Edge policies when using the legacy extension

If you use a Microsoft Group Policy Object (GPO) to control Edge policies, and you enable the Configure native messaging block list setting in the Native Messaging section to block all extensions, perform the following steps to provide Robot Studio and Robot Runtime with the access they need to function correctly.

1. Start the Microsoft Local Group Policy Editor.
2. Select Computer Configuration > Administrative Templates > Microsoft Edge > Native Messaging.
3. In the Control which native messaging hosts users can use setting, add the following messaging-host executable so that messaging host is not blocked:

openspan.translators.web.messaginghost

4. Save your changes and close the Local Group Policy Editor.

Also, if you enable the Control which extensions cannot be installed setting in the Extensions section to block all extensions, add the Extension ID to the Allow specific extensions to be installed setting so that the extension can be installed.

Automating Microsoft Office applications

Pega Robot Studio includes a set of connectors that leverage the Microsoft Office .NET interfaces for Word, Outlook, PowerPoint, and Excel. These connectors target the most common use cases for these applications.

- MicrosoftExcel – Allows you to work with Microsoft Excel.
- Excel File – Allows you to create, modify, and read from Excel workbooks without having the Excel application opened or installed in the environment.
- MicrosoftOutlook – Allows you to work with Microsoft Outlook.
- MicrosoftOutlook Appointment – Focuses on the Calendar function of Outlook.
- MicrosoftOutlookMail – Focuses on the Mail function of Outlook.
- MicrosoftOutlook Contact – Focuses on the Contact function of Outlook.
- MicrosoftOutlook Task – Focuses on the Task function of Outlook.
- MicrosoftPowerPoint – Allows you to integrate Microsoft PowerPoint 2019 presentations into your solution. You can create, modify, and run a presentation. Available in 19.1.38 and later.
- MicrosoftWord – Allows you to interface with Microsoft Word.

For use cases that fall outside of these components, you can still leverage Microsoft Office in Robotic Automation solutions by using the Microsoft Office .NET interfaces in a script or component.

For more information, see Using the Microsoft Office connectors.

Using the Pega Robot Studio plug-in with Microsoft Visual Studio

The Pega Robot Studio plug-in for Visual Studio versions 8.0, 8.0 SP1, and 19.1 is compatible with the Community, Professional, and Enterprise editions of Microsoft Visual Studio 2015.

Note: Pega Robot Studio 22.1 does not require Visual Studio and therefore, no plug-in is available.

The Pega Robot Studio plug-in for Visual Studio versions 5.2, 5.3, 6.1, 6.2, 7.0, and 7.1 is compatible with the Standard, Professional, and Team System editions of Microsoft Visual Studio 2010.

The Pega Robot Studio plug-in for Visual Studio versions 4.5 and 5.1 is compatible with the Standard, Professional, and Team System editions of Microsoft Visual Studio 2008.

Note: The Microsoft Visual Studio Express edition is not supported.

Automating applications that run on Mozilla Firefox

Pega Robotic Automation includes support for interrogating and automating the Mozilla Firefox browser. An extension to Firefox adds this functionality by using the Universal Web Adapter, which is also available in versions 7.1.41.0 and later.

The versions of Pega Robotic Automation that work with Firefox versions are listed in the following table:

Supported versions of Firefox	Corresponding versions of Pega Robotic Automation	Applicable extension

31-39	7.1.41.0 - 8.0.1100	1.0.36
52+	8.0.2006 and later	1.0.85 and later
52-73	19.1.1 and later	1.0.85 and later

Supported versions of Firefox ESR	Corresponding versions of Pega Robotic Automation	Applicable extension
31.6.0 - 38.3.0	7.1.41.0 - 8.0.1100	1.0.36
52+	8.0.2006 and later	1.0.85 and later
52+	19.1.1 and later	1.0.85 and later

Installation

Use the Setup wizard for Robot Studio and Robot Runtime to install the install the Firefox extension. You can also use the INST_FIREFOX=1 command line option to install the extension from the command line. If omitted, the Firefox extension is not installed. For more information, see the Installation Instructions.

When starting the Firefox extension for the first time on a Robot Runtime machine, end users must decide whether to enable or uninstall the Firefox Extension. End users must enable the extension for Robot Runtime to automate the browser. If an end user does not enable the extension, you must run a manual process to recover and install the extension again. For more information, contact Pega Support.

Automating Firefox

Keep in mind the following considerations when automating the Firefox browser:

- You can interrogate cells within simple tables, but the table designer is not available for Firefox. Complex tables cannot be matched based on the table schema.
- Property changed and Cancellable events are not supported.
- Plug-ins, such as Java and Flash, are not supported.
- You must have version 8.0.2006 or later to support multiple concurrent adapters.
- You must have version 8.0.2006 or later to support multi-tab functionality for Firefox during interrogation. Multi-tab functionality works with automations, however, tabs cannot be pulled apart from the original window when Robotic Automation Studio is injected.
- You must have version 8.0.2006 or later to support multiple top-level windows when Robot Studio is injected.
- You must have version 8.0.2006 or later to automate multiple concurrent Firefox processes under the same user profile. The Universal Web Adapter opens under the default user profile. If you are using a version prior to version 8.0.2006 and you need to have multiple concurrent Firefox processes, use the Windows adapter and specify the user profile within the Arguments property.
- In versions prior to version 8.0.2006, if Robot Studio loads Firefox in a user profile that is actively running, the current process requests to shut down. Because of this action, it is a best practice to start Firefox adapters at the project start and to not close them throughout the automation.
- When uninstalling Robot Runtime or Robot Studio, the Firefox registry entries are left in place. This files that comprise the extension, however, are removed.
- Version 19.1 does not support Firefox versions 31 - 39 and ESR versions 31.6.0 – 38.3.0.

Automating PowerBuilder applications

Pega Robotic Automation includes support for the PowerBuilder DataWindow control, which interrogates in Pega Robot Studio as a DataGrid control.

A DataWindow control is a grid-like control that looks like a form. It has various controls, such as text fields, buttons, radio buttons, and so on, which do not have to be positioned next to each other on a horizontal dimension and can repeat vertically an indefinite number of times. Accordingly, a DataGrid in PowerBuilder must always have at least one row (starting with row number 1).

The following files are deployed:

- OpenSpan.Translators.PowerBuilder.dll
- OpenSpan.Adapters.PowerBuilder.dll

Version support

Pega Robotic Automation supports DataWindow versions 6.0 through 2017 and all common DataGrid properties and methods, such as Name, GetCellValue, SetCellValue, and so on. Events are supported only for versions that display under the Events support column in the following table:

PowerBuilder version	Module watched	Events support	Notes
6.0	pbdwe60.dll	none	n/a
7.0	pbdwe70.dll	7.0.0.5031	Supported events: CellValueChanged
8.0	pbdwe80.dll	none	n/a
9.0	pbdwe90.dll	none	n/a
10.0	pbdwe100.dll	10.0.0.4510	Supported events: CellValueChanged
10.2	pbdwe100.dll	10.2.1.9731	Supported events: CellValueChanged

PowerBuilder version	Module watched	Events support	Notes
10.5	pbdwe105.dll	10.5.0.4500 10.5.1.6602	Supported events: CellValueChanged
11.0	pbdwe110.dll	11.0.0.6525	Supported events: CellValueChanged
11.5	pwdwe115.dll	11.5.1.4608	Supported events: CellValueChanged
12.0	pwdwe120.dll	12.0.0.5530	Supported events: CellValueChanged
2017 *	pbdwe170.dll	17.0.0.1666	Supported events: CellValueChanged

* PowerBuilder changed their versioning to reflect the year. Robotic Automation Studio's support for PowerBuilder 2017 is the same as for PowerBuilder 12.

Pega Robotic Automation installation instructions

Pega Robotic Automation provides the tools you need to create attended and unattended robots and provides a runtime environment for those robots. The following installation instructions show you how to install and configure a licensed copy of Pega Robotic Automation, by using either the Setup wizard or the command line. For a trial version, and to learn more about Pega Robotic Automation, see Robotics System Architect and Pega Robotic Process Automation Overview.

Note: For information on downloading the software, see Download Pega RPA software.

- Pega Robotic Automation 19.1 Installation instructions
- Pega Synchronization Server and Package Server User Guide
- Pega Robotic Automation Security Token Service User Guide

Note: For information on installing Pega Robotic Automation version 22.1 and running Robot Studio version 19.1 and 22.1 on the same computer, see Running Robot Studio 19.1 and 22.1 on the same computer.

Download Pega RPA software

Pega RPA includes tools that you can use to create, implement, and manage robots that automate daily tasks in your work environment. Pega RPA consists of the following downloadable components:

- Robot Studio
- Robot Studio Plug-in
- Robotic Automation OCR Essentials
- Robot Runtime
- Robot Manager

Tip: For a trial version, and to learn more about Pega Robotic Automation, see Robotics System Architect and Pega Robotic Process Automation Overview.

Use Robot Studio and the Robot Studio Plug-in to create, test, and deploy robotic automations. Robot Runtime provides a runtime environment for the robots that you create. Use Robot Manager to manage the robots and automations throughout your organization. Download the Robotic Automation OCR Essentials if you use the screen-scraping technique to automate applications.

Note: Robot Studio requires either Microsoft Visual Studio 2015 or the Microsoft Visual Studio 2015 Isolated Shell, with each requiring Microsoft Visual Studio 2015 Update 3. If you already have Microsoft Visual Studio 2015 with Microsoft Visual Studio 2015 Update 3 installed, you can simply download the Robot Studio Plug-in and install it. If you plan to use the Microsoft Visual Studio 2015 Isolated Shell, which is installed with Robot Studio, or have Microsoft Visual Studio 2015 installed but do not have Microsoft Visual Studio 2015 Update 3 installed, create a support ticket on My Support Portal to get Update 3. Microsoft Visual Studio 2015 Update 3 is no longer available directly from Microsoft.

1. Open My Pega in a new tab.
2. Hover over the Software tab, and click My Software.
3. From the top-right corner of the screen, under the Organization field, verify the company affiliation. If needed, click the arrow to select a different company.
4. In the Search field, enter robot.
5. Select the components that you want to install.
6. Under My Download List, click Next.
7. In the Version field, select the version that you want to install.
8. In the Release field, select the latest build for that version.
9. Click Submit Request, and then click Download.

The My Software site downloads the components that you selected. Pega also sends an email with a link to the software download page. You can use this link to download the software again, if needed. If you use Robotic Automation OCR Essentials to create your automation, you need this component and Robot Runtime to run the automation.

For information about the system requirements and installation instructions for Pega Robotic Automation components, see the installation guides, available from the Robotic Automation product page.

Note: For more information about the My Software site, click Tour My Software.

Best practices when updating Pega Robot Runtime

When updating Pega Robot Runtime, it is best to perform these steps before you update:

1. Back up all of your solutions.
2. Use Windows Control Panel to uninstall the earlier version of Robot Runtime.
3. Download the update from My Software. For more information, see Download Pega PRA Software.

The Setup wizard checks for required prerequisites and installs any needed software. For more information, see the following articles:

- What are the prerequisites for Pega Robotic Automation version 19.1?
- What are the prerequisites for Pega Robotic Automation version 8.0 and 8.0 SP1?

Review the release notes and installation instructions for your version of Robot Runtime for additional information on the changes implemented in the release.

- Pega Robotic Automation Release Notes version 19.1
- Pega Robotic Automation Release Notes version 8.0 SP1
- Pega Robotic Automation Release Notes version 8.0

Best practices when updating Pega Robot Studio

When updating Pega Robot Studio, either the stand-alone or plug-in version, it is best to perform these steps before you update:

1. Back up all of your solutions.
2. Use Windows Control Panel to uninstall the earlier version of Robot Studio.
3. Download the update from My Software. For more information, see Download Pega PRA Software.

The Setup wizard checks for required prerequisites and installs any needed software. For more information, see the following articles:

- What are the prerequisites for Pega Robotic Automation version 19.1?
- What are the prerequisites for Pega Robotic Automation version 8.0 and 8.0 SP1?

Review the release notes and installation instructions for your version of Robotic Automation Studio for additional information on the changes implemented in the release.

- Pega Robotic Automation Release Notes version 19.1
- Pega Robotic Automation Release Notes version 8.0 SP1

Note: Pega Robot Studio automatically updates your solutions when you open the solution in the new version. For solutions that use the UI Connector, however, there is an additional task when you update from version 8.0 to version 8.0 SP1 or to version 19.1. For more information, see updating UI Connector files in Robotic Automation.

Types of robotic automations

From a licensing perspective, you can create two types of automations with Pega Robot Studio and run them with Pega Robot Runtime

- Unattended automations
- Attended automations

You use Robot Studio to create both types of automations and the development process is almost entirely the same.

With unattended automations, the work is performed automatically, without human intervention. Typical use cases involve automating repetitive back-office tasks, where you submit work to a queue and RPA robots process the work in a batch mode.

With attended automations, users interact with the automation on their desktop. In a customer-service scenario, a typical automation would consist of the following steps:

- Retrieve customer information from various applications
- Present the information to the service representative
- Allow the representative to change the information as needed
- Update the original applications with those changes

.For more information about licensing Pega RPA, contact your Pega sales representative.

Unattended robotic automations

You can use unattended automations to automate repetitive and unattended back-office activities directly from your Pega Platform™ application. Using unattended automations can help you to process large volumes of cases in batches faster and with fewer errors compared to manual handling.

For example, you can queue an automation to process one or more stages of an automobile insurance claim. After a claim is submitted, the claim can immediately be routed to a robot, which runs an automation that analyzes the information submitted with the claim, looks up and verifies policy holder information, and updates web and desktop applications with case information.

When you use automations with your case type, case assignments are first routed to robotic work queues. A robot retrieves the assignment from the queue, obtains the case data associated with the assignment, and performs the specified automation. After it processes the assignment, any modified data is sent back to the case, and the robot retrieves the next assignment to process.

Any information that you want to share between your Pega Platform application and the automation must be marked as relevant records.

Robotic Processing Automation (RPA) Service

Pega Robotic Automation includes a scheduling service that you use to schedule unattended Robotic Processing Automation (RPA) sessions. Use the Pega RPA Service to perform the following tasks:

- Provide a connection between the robot and Robot Manager. This allows you to start robots from Pega Robot Manager manually or by using a schedule, and terminate robots that are not behaving as expected.
- Create a Windows session and log in a robot.
- Schedule a robot when not connected to Pega Robot Manager by using a scheduling file.

To specify the login information to use to identify the Windows system user when starting the virtual machine, use the Pega Robotic Automation Credentials Manager utility. The Pega RPA Service only works under the following scenarios:

- You are logged in as the user that you specified in the Credentials Manager.
- No users are logged in.

Before you can use the Pega RPA Service, complete the following tasks:

1. Installing the Pega RPA Service
2. Enabling the Pega RPA Service to simulate a Secure Attention Sequence
3. Configuring Pega Robot Runtime:
    - For Robotic Automation 19.1 and later, see Configuring Robot Runtime and Robot Manager in RPA implementations.
    - For Robotic Automation 8.0 SP1 2019 and later, see Configuring Robotic Automation Runtime and Robot Manager 6 in RPA implementations. For best results, update to version 8.0 SP1 2025 or later.
    - For Robotic Automation 8.0 SP1 2018 and earlier, see Configuring Robotic Automation Runtime in RPA implementations.
4. Scheduling when a RPA robot runs

Installing the Pega RPA Service

Use the Pega RPA Service to schedule Robotic Processing Automation (RPA) sessions. These sessions determine when RPA robots can run. With the Pega RPA Service, you can specify schedules for your RPA robots to better manage production systems whose applications are not available all day and every day.

This service is available for Windows 7, Windows 8.1, Windows 10, Windows Server 2008 R2, Windows Server 2012 R2, and Windows Server 2016. Support for Windows 8.1, Windows 10, Windows Server 2008 R2, and Windows Server 2016 requires build 8.0 SP1 2007 or later.

In version 19.1 and later, the Pega RPA Service is a separate installation when you install Pega Robot Runtime, Pega Robot Studio, or the Pega Robot Studio plug-in from the command line.

Note: In version 8.0 SP1, the Pega RPA Service was included when you install Pega Robot Runtime. The service was placed in the Robotic Automation Runtime installation folder.

This service runs as a LocalSystem account, which means it runs standard least-privileged services and only accesses the network as an anonymous user.

After you have installed the Pega RPA Service, you must enable it. For more information, see Enabling the Pega RPA Service to simulate a Secure Attention Sequence.

Enabling the Pega RPA Service to simulate a Secure Attention Sequence

Before you begin

Perform the steps in Installing the Pega RPA Service.

Use the Microsoft Windows Local Group Policy Editor to enable the Pega RPA Service to simulate the Crtl+Alt+Del key press so that it can log off a Pega Robot Runtime user when that user session ends.

1. On the Windows task bar, click Start and enter gpedit.msc in the Search box.
2. In the Local Group Policy Editor, click Computer Configuration > Administrative Templates > Windows Components > Windows Logon Options > Disable or enable software Secure Attention Sequence.
3. On the Disable or enable software Secure Attention Sequence dialog, click Enabled.
4. In the Options column, click the list and select Services.
5. To close the Local Group Policy Editor, click Apply and then click OK.
6. Start the Regedit program and expand HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > Policies > System.
7. Add a DWORD type value key called SoftwareSASGeneration and set it to 1 (one).
8. From the installation folder, copy the RpaSchedule.json file into the C:\programdata\Pegasystems folder. In version 8.0 SP1 and earlier, the folder is C:\programdata\OpenSpan.

Restart the service any time you change the credentials, the RPAService.config file, or the RpaSchedule.json file settings.

After you enable the Pega RPA Service, to use this service, you must configure Pega Robot Runtime.

- If you are using Pega Robotic Automation version 19.1 or later, see Configuring Pega Robot Runtime to work with Robot Manager 6 in RPA implementations. For best results, install the latest build of version 19.1.
- If you are using Pega Robotic Automation version 8.0 SP1 2019 or later, see Configuring Robotic Automation Runtime to work with Robot Manager 6 in RPA implementations.
- If you are using Pega Robotic Automation version 8.0 SP1 2018 or earlier, see Configuring Robotic Automation Runtime in RPA implementations.

Configuring Pega Robot Runtime in RPA implementations

After you perform the steps in Enabling the RPA Scheduling service to simulate a Secure Attention Sequence, the next task is to configure Robot Runtime to work in an unattended RPA implementation. The steps differ depending on which version of Robot Runtime you have installed.

If you are using Pega Robotic Automation	See the following article
Version 19.1 or later	Configuring Robot Runtime 19.1 and later to work with Robot Manager 6 in RPA implementations
Version 8.0 SP1 2019 or later	Configuring Robot Runtime 8.0 SP1 2019 and later to work with Robot Manager 6 in RPA implementations
version 8.0 SP1 2018 or earlier	Configuring Robot Runtime 8.0.SP1 2018 and earlier in RPA implementations

Note: For best results, install version 19.1 or later.

Configuring Robot Runtime 19.1 and later to work with Robot Manager 6 in RPA implementations

If you are using Pega Robotic Automation version 19.1 or later, to configure Robot Runtime, complete the following instructions.

If you are using a different version, see Configuring Pega Robot Runtime in RPA implementations.

Before you begin

Perform the steps in Enabling the Pega RPA Service to simulate a Secure Attention Sequence.

To run Pega Robot Runtime in Robotic Process Automation (RPA) implementations as a user who differs from the currently logged in Windows user, you must relocate and modify the configuration files. Although the default location for configuration and logging files is the user-specific %AppData%\Pegasystems folder, instead use the %ProgramData%\Pegasystems folder, which is accessible to all Windows users.

1. From the %ProgramFiles%\Pegasystems folder, copy the RuntimeConfig.xml file into the C:\programdata\Pegasystems folder.
2. From the C:\programdata\Pegasystems folder, open the CommonConfig.xml file and change the ConfigurationLocation key. For example:

```
<ConfigurationLocation>CommonApplicationData</ConfigurationLocation>
```

3. Save and then close the CommonConfig.xml file.
4. From the C:\programdata\Pegasystems folder, open the RuntimeConfig.xml file and make the following changes:
   - In the fileName key for Log4Net files, specify the appropriate file names.
   - In the packageServer key, set the baseUrl to the location of the Package Server.
   - In the Shutdown section, set the Behavior value key to WaitForAutomations. For more information, see Runtime configuration settings.
5. Save and then close the RuntimeConfig.xml file.
6. From the C:\programdata\Pegasystems\RPAService folder, open the RPAService.config file and confirm the following entries:
   - The enabled key for Pega RPA Service, is set to true.
   - For the Mode key, if you use schedules provided by Pega Robot Manager 6, it should be set to OnDemand. If you use schedules that are defined locally in the RpaSchedule.json file, it should be set to Scheduled.
   - The authorizedGroup key should specify who is granted access. The default is Everyone, which does not restrict access.
7. If you made changes, save and then close the RPAService.config file.
8. From the C:\programdata\Pegasystems\RPAService folder, open the SchedulerDefinitions.xml file and ensure that the LogonDisclaimer key is set to False. The enabled key is configured in the appropriate operating system section in the SchedulerDefinitions.xml file. For example:

```
<MatchSet name="Disclaimer" mode="SignIn" matchSuccess="Continue" matchFailure="Stop" enabled="true">
  <Match type="PushButton" name="OK">
    <Action type="execute" />
  </Match>
</MatchSet>
```

9. If you made changes, save and then close the SchedulerDefinitions.xml file.
10. Add WindowsUser credentials by using the Credentials Manager (credmgr.exe or credmgrui.exe). For more information about the Credentials Manager, see Pega Robotic Automation Credentials Manager utility.
11. Add RegistrationOperator credentials by using the Credentials Manager.
12. Start the Pega RPA Service.

Note: The install folder contains the default version of the RPAService.config file. You must manually move this file to the C:\programdata\Pegasystems folder.

For more information on the configuration files discussed in this topic, see Main Robotic Automation Configuration Files.

For information on how to use the Pega RPA Service to schedule when Pega Robot Runtime can run RPA robots, see Scheduling when a Robotic Process Automation robot runs.

Configuring Robot Runtime 8.0 SP1 2019 and later to work with Robot Manager 6 in RPA implementations

If you are using Pega Robotic Automation version 8.0 SP1 2019 or later, to configure Robot Runtime, complete the following instructions.

If you are using a different version, see Configuring Pega Robot Runtime in RPA implementations.

Before you begin

Perform the steps in Enabling the Pega RPA Service to simulate a Secure Attention Sequence.

To run Pega Robot Runtime in Robotic Process Automation (RPA) implementations as a user who differs from the currently logged in Windows user, you must relocate and modify the configuration files. Although the default location for configuration and logging files is the user-specific %AppData%\OpenSpan folder, instead use the %ProgramData%\OpenSpan folder, which is accessible to all Windows users.

1. From the %ProgramFiles%\OpenSpan folder, copy the RpaSchedule.json file into the C:\programdata\OpenSpan folder.
2. From the %ProgramFiles%\OpenSpan folder, copy the RuntimeConfig.xml file into the C:\programdata\OpenSpan folder.
3. Copy the SchedulerDefinitions.xml file to the appropriate folder:
   - If this computer is part of a domain, from the %ProgramFiles%\OpenSpan folder, copy the SchedulerDefinitions.xml file into the C:\programdata\OpenSpan folder.
   - If this computer is part of a workgroup, from the %ProgramFiles%\OpenSpan folder, copy the SchedulerDefinitions-local.xml file into the C:\programdata\OpenSpan folder and rename it to SchedulerDefinitions.xml.
4. Open the SchedulerDefinitions.xml file and ensure that the LogonDisclaimer key is set to False. The enabled key is configured in the appropriate operating system section in the SchedulerDefinitions.xml file. The following is an example:

```
<MatchSet name="Disclaimer" mode="SignIn" matchSuccess="Continue" matchFailure="Stop" enabled="true">
  <Match type="PushButton" name="OK">
    <Action type="execute" />
  </Match>
</MatchSet>
```

5. Open the CommonConfig.xml file and change the ConfigurationLocation key. For example:

```
<ConfigurationLocation>CommonApplicationData</ConfigurationLocation>
```

6. Ensure that there is an RPAServiceOperator value in the RobotManager key the CommonConfig.xml file. For example:

```
<Server name="RobotManager" enabled="true" baseURL=https://MyPegaServer.com/prweb RPA="true" workgroup="Savings accounts" robotName="{MachineName}" authenticationType="Basic" RPAServiceOperator="{MachineName}_RPA" />
```

7. Save and then close the CommonConfig.xml file.
8. Open the RuntimeConfig.xml file, and then make the following changes:
   - In the fileName key for Log4Net files, specify the appropriate file names.
   - In the packageServer key, set the baseUrl to the location of the Package Server.
   - In the Shutdown section, set the Behavior value key to WaitForAutomations. For more information, see Runtime configuration settings.
9. Save and then close the RuntimeConfig.xml file.
10. From the install folder, copy the RPAService.config file into the %ProgramData%\OpenSpan folder.
11. Open the RPAService.config file that is located in %ProgramData%\OpenSpan folder. Make the following changes:
    - In the enabled key for Pega RPA Service, enter true.
    - In the Mode key, if you use schedules provided by Pega Robot Manager 6, choose OnDemand. If you use schedules that are defined locally in the RpaSchedule.json file, choose Scheduled.
    - In the authorizedGroup key, specify who is granted access. The default is Everyone, which does not restrict access.
12. Save and then close the RPAService.config file.
13. Add WindowsUser credentials by using the Credentials Manager (credmgr.exe or credmgrui.exe). For more information about the Credentials Manager, see Pega Robotic Automation Credentials Manager utility.
14. Add RegistrationOperator credentials by using the Credentials Manager.
15. Start the Pega RPA Service.

Note: The install folder contains the default version of the RPAService.config file. You must manually move this file to the %ProgramData%\OpenSpan folder.

For more information on the configuration files discussed in this topic, see Main Robotic Automation Configuration Files.

For information on how to use the Pega RPA Service to schedule when Robot Runtime can run RPA robots, see Scheduling when a Robotic Process Automation robot runs.

Configuring Robot Runtime 8.0 SP1 2018 and earlier in RPA implementations

If you are using Pega Robotic Automation version 8.0 SP1 2018 or earlier, to configure Robot Runtime, complete the following instructions.

If you are using a different version, see Configuring Pega Robot Runtime in RPA implementations.

Before you begin

Perform the steps in Enabling the RPA Scheduling service to simulate a Secure Attention Sequence.

To run Pega Robot Runtime in Robotic Process Automation (RPA) implementations as a user who differs from the currently logged in Windows user, you must relocate and modify the configuration files. Although the default location for configuration and logging files is the user-specific %AppData%\OpenSpan folder, instead use the %ProgramData%OpenSpan folder, which is accessible to all Windows users.

1. Copy the %AppData%\OpenSpan\RpaSchedule.json file from the user-specific %AppData%\OpenSpan folder into the C:\programdata\OpenSpan folder.
2. Copy the %AppData%\OpenSpan\RuntimeConfig.xml file from the user-specific %AppData%\OpenSpan folder into the C:\programdata\OpenSpan folder.
3. Depending on the 8.0 build you are running, the next step differs:
   - If you are running Robot Runtime version 8.0.1088 or earlier, open the OpenSpan.WinLogon.Service.exe.config file and ensure that the LogonDisclaimer key is set to False.
   - If you are running Robot Runtime version 8.0.1089 or later, the enabled key is configured in the appropriate operating system section in the SchedulerDefinitions.xml file. For example:

```
<MatchSet name="Disclaimer" mode="SignIn" matchSuccess="Continue" matchFailure="Stop" enabled="true">
  <Match type="PushButton" name="OK">
    <Action type="execute" />
  </Match>
</MatchSet>
```

4. Open the CommonConfig.xml file and change the ConfigurationLocation key. For example:

```
<ConfigurationLocation>CommonApplicationData</ConfigurationLocation>
```

5. Save and close the CommonConfig.xml file.
6. Open the RuntimeConfig.xml file and make the following changes:
   - In the fileName key for Log4Net files, specify the appropriate file names.
   - In the startupProject key, specify the name of the project that you want the system to initially start. Ensure that this project is accessible to all users.
7. Save and close the RuntimeConfig.xml file.
8. Start the Pega Windows Auto-Logon Service.

For more information on these configuration files, see Main Robotic Automation Configuration Files.

For information on how to use the RPA Scheduling service to schedule when Robot Runtime can run RPA robots, see Scheduling when a Robotic Process Automation robot runs.

Scheduling when a Robotic Process Automation robot runs

Use the Pega RPA Service to schedule when unattended robots start and stop. The schedule is stored in the RpaSchedule.json file.

The RpaSchedule.json file is located in the C:Programdata\Pegasystems folder in version 19.1 and later and in the C:\Programdata\OpenSpan folder in version 8.0 SP1 and earlier. In this file, there is a JSON element for each day of the week. In each JSON element, you specify when the robot starts and how long its session lasts. You can schedule one session per day.

Note: There are two methods for scheduling when robots perform work: Scheduled and OnDemand. This article discusses the Scheduled method. For information on the OnDemand method, see Configuring Pega Robot Manager version 6. You must have Robotic Automation version 8.0 SP1 2019 or later to work with Robot Manager version 6. If you are using version 8.0 SP1, update to version 8.0 SP1 2025 or later. For best results, update to version 19.1 or later.

Before you begin

In the local RPAService.config file, set the Mode key to Scheduled. Also, make sure the RpaSchedule.json file is located in the correct C:\Programdata folder.

To specify an unattended robot's schedule, perform the following steps:

1. Open the RpaSchedule.json file in a text editor.
2. Set the Enabled property to `True` for the days on which you want the robot to run.
3. In the StartTime property, specify the time in HH:MM format at which you want the Pega RPA Service to start looking for jobs to send to the robots.
   The Pega RPA Service uses a 24-hour clock. For example, to start the service at 1:30 pm, set the StartTime property to 13:30.
4. Set the DurationMinutes property to the number of minutes you want the Pega RPA Service to look for jobs. The following code is an example that shows how you set up a robot to run on Tuesday from 1 a.m. until 5 am:

```
},
"Tuesday": {
  "Enabled": true,
  "StartTime": "01:00",
  "DurationMinutes": 240
},
```

5. Save and then close the file.

Note: Restart the Pega RPA Service any time you change the RpaSchedule.json file settings.

When the Pega RPA Service detects that a robot should be started, the service performs the following tasks:

- Logs in to Windows by using the Windows credentials that are supplied by the Credentials Manager (credmgr.exe) utility. For more information about the Credentials Manager, see Pega Robotic Automation Credentials Manager utility.
- Starts Robot Runtime as the user specified by the Credentials Manager utility by using the --Runtime flag. If you do not supply Robot Runtime credentials, the Pega RPA Service starts Robot Runtime as the user who is logged in to Windows.

It can take up to three minutes to complete the Windows login and Robot Runtime startup process.

When Robot Runtime detects that the scheduled session has ended, it performs the following tasks:

1. Completes the current work item, if any work is in progress.
2. Shuts down Robot Runtime.
3. Logs off Windows.

Understanding the SchedulerDefinitions.xml file for managing login pathways

With the Pega Robotic Process Automation (RPA) Service, you can log in to a virtual machine as a Windows user and start or stop Pega Robot Runtime. You can also specify the daily schedules for an unattended robot to better manage production systems that have applications that are not always available.

The RPA Service uses the SchedulerDefinitions.xml file to complete its tasks. This file includes the information that the service requires to handle Windows 7 and Windows Server 2012 login pathways. For other operating systems, use this file to define the sequence of login screens and the actions that the system must take to start the virtual machine.

Note: Support for Windows 8.1, Windows 10, Windows Server 2008, and Windows Server 2016 was added in Pega Robotic Automation 8.0.2007.

The RPA Service is included in all 8.0 SP1 builds. For Pega Robotic Automation 19.1 and later, the RPA Service is a separate installation.

Pega Robotic Automation 8.0 SP1

Before you can work with the SchedulerDefinitions.xml file, learn the following basic information for Pega Robotic Automation 8.0 SP1.

File location

When you first install Robot Studio and Robot Runtime, the setup wizard copies the SchedulerDefinitions.xml file to the \Programdata\OpenSpan folder and the Studio/Runtime installation folder. The RPA Service uses the SchedulerDefinitions.xml file that is located in the \Programdata\OpenSpan folder. The Studio/Runtime installation folder contains a template version of the SchedulerDefinitions.xml file.

Updates to Robot Studio or Robot Runtime

When you update Robot Studio or Robot Runtime with a newer build, the system checks for a SchedulerDefinitions.xml file in the \Programdata\OpenSpan folder.

If the SchedulerDefinitions.xml file exists in the folder, the installer does not replace this file. Your changes to this file remain available. However, an update always overwrites the template version of the SchedulerDefinitions.xml file.

Configuring local account login support

By default, the SchedulerDefinitions.xml file supports only domain logins. The file does not support local account logins. The installer also installs the SchedulerDefinitions-Local.xml file in the Studio/Runtime installation folder. If you need to support local account logins, for example, for testing purposes in a production environment, you can choose from the following methods:

- Copy and rename the file:

a. Copy the SchedulerDefinitions-Local.xml file into the \Programdata folder.
b. Rename the file to `SchedulerDefinitions.xml`.

- Cut and paste the applicable sections from the SchedulerDefinitions-Local.xml file into the SchedulerDefinitions.xml file.

Pega Robotic Automation 19.1 and later

Before you can work with the SchedulerDefinitions.xml file, learn the following basic information for Pega Robotic Automation 19.1 and later.

File location

When you install the RPA Service, the setup wizard copies the SchedulerDefinitions.xml file to the \Programdata\Pegasystems\RPAService folder. The RPA Service uses the SchedulerDefinitions.xml file that is located in this folder.

Updates to Robot Studio or Robot Runtime

When you update Robot Studio or Robot Runtime with a newer build, the system checks for a SchedulerDefinitions.xml file in the \Programdata\Pegasystem\RPAService folder.

If the SchedulerDefinitions.xml file exists in the folder, the installer does not replace this file. Your changes to this file remain available. However, an update always overwrites the template version of the SchedulerDefinitions.xml file.

Local account logins

The SchedulerDefinitions.xml file contains entries for both domain and local account logins.

Matchsets

The SchedulerDefinitions.xml file includes entries, or matchsets, for Windows 7, Windows 8.1, Windows 10, Windows Server 2008 R2, Windows Server 2012 R2, and Windows Server 2016 login sessions. The RPA Service determines which matchset to use based on the operating system of the computer or the virtual machine on which the robot runs.

If a machine is not logged in and the robot is scheduled to run, the RPA Service reads the appropriate matchset from the SchedulerDefinitions.xml file. The RPA Service searches for the screens and controls that are displayed based on the order in which the matchsets are listed in the SchedulerDefinitions.xml file.

Example:

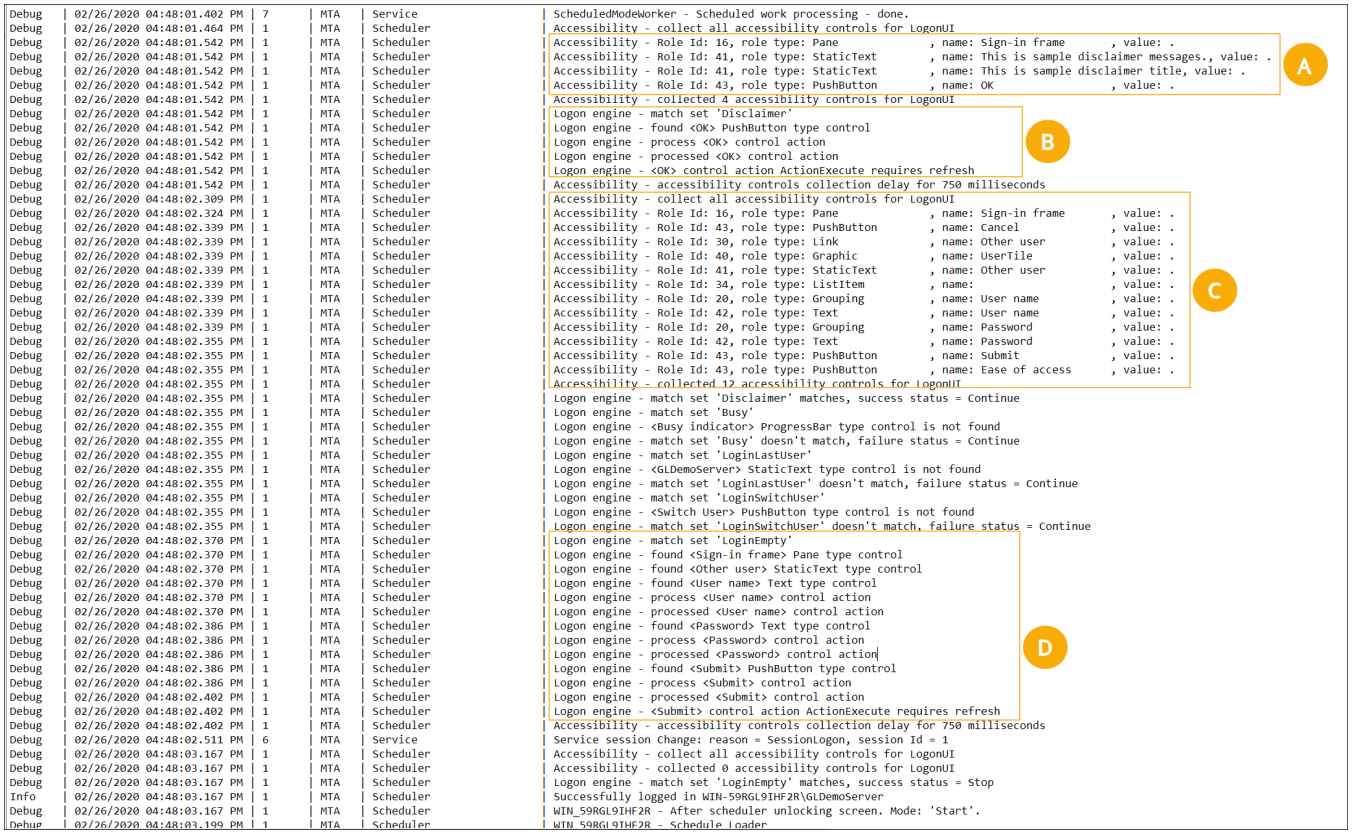
If the robot runs on a Windows 7 computer, the RPA Service executes the instructions in the following order:

1. The RPA Service checks for the disclaimer screen.
   - If no OK button is displayed, the RPA Service stops the login attempt because the matchFailure key is set to Stop.
   - If an OK button is displayed, the RPA Service clicks the button and continues to the next section.
2. The RPA Service checks to see whether the Username and Password fields exist.
   - If the Username and Password fields are available, the RPA Service retrieves and enters the user name and password from the Pega Credentials Manager utility (CredMgr.exe file), clicks the OK button, and then stops.
   - If the user name and password do not match, the RPA Service moves to the next matchset.

Interpreting log entries

To add a matchset and define the actions that the system performed during the login sequence, review the RPAService.log file for Pega Robotic Automation 19.1 and later or the WinLogon.Scheduler.log file for Pega Robotic Automation 8.0.1089 to the latest 8.0 SP1 build. Use the Accessibility log entries in this file to determine which controls are displayed on the various screens.

The following figure is an example of the RPAService.log file, which is located in the \Programdata\Pegasystems\RPAService folder by default:




```
Debug   | 02/26/2020 04:48:01.402 PM | 7      | MTA   | Service              | ScheduledModeWorker - Scheduled work processing - done.
Debug   | 02/26/2020 04:48:01.464 PM | 1      | MTA   | Scheduler            | Accessibility - collect all accessibility controls for LogonUI
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 16, role type: Pane              , name: Sign-in frame       , value: .
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 41, role type: StaticText        , name: This is sample disclaimer messages., value: .
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 41, role type: StaticText        , name: This is sample disclaimer title, value: .
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 43, role type: PushButton        , name: OK                  , value: .
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Accessibility - collected 4 accessibility controls for LogonUI
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'Disclaimer'
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Logon engine - found <OK> PushButton type control
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Logon engine - process <OK> control action
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Logon engine - processed <OK> control action
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Logon engine - <OK> control action ActionExecute requires refresh
Debug   | 02/26/2020 04:48:01.542 PM | 1      | MTA   | Scheduler            | Accessibility - accessibility controls collection delay for 750 milliseconds
Debug   | 02/26/2020 04:48:02.309 PM | 1      | MTA   | Scheduler            | Accessibility - collect all accessibility controls for LogonUI
Debug   | 02/26/2020 04:48:02.324 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 16, role type: Pane              , name: Sign-in frame       , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 43, role type: PushButton        , name: Cancel              , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 30, role type: Link              , name: Other user          , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 40, role type: Graphic           , name: UserTile            , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 41, role type: StaticText        , name: Other user          , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 34, role type: ListItem          , name:                     , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 20, role type: Grouping          , name: User name           , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 42, role type: Text              , name: User name           , value: .
Debug   | 02/26/2020 04:48:02.339 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 20, role type: Grouping          , name: Password            , value: .
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 42, role type: Text              , name: Password            , value: .
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 43, role type: PushButton        , name: Submit              , value: .
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Accessibility - Role Id: 43, role type: PushButton        , name: Ease of access      , value: .
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Accessibility - collected 12 accessibility controls for LogonUI
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'Disclaimer' matches, success status = Continue
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'Busy'
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - <Busy indicator> ProgressBar type control is not found
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'Busy' doesn't match, failure status = Continue
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'LoginLastUser'
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - <GLDemoServer> StaticText type control is not found
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'LoginLastUser' doesn't match, failure status = Continue
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'LoginSwitchUser'
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - <Switch User> PushButton type control is not found
Debug   | 02/26/2020 04:48:02.355 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'LoginSwitchUser' doesn't match, failure status = Continue
Debug   | 02/26/2020 04:48:02.370 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'LoginEmpty'
Debug   | 02/26/2020 04:48:02.370 PM | 1      | MTA   | Scheduler            | Logon engine - found <Sign-in frame> Pane type control
Debug   | 02/26/2020 04:48:02.370 PM | 1      | MTA   | Scheduler            | Logon engine - found <Other user> StaticText type control
Debug   | 02/26/2020 04:48:02.370 PM | 1      | MTA   | Scheduler            | Logon engine - found <User name> Text type control
Debug   | 02/26/2020 04:48:02.370 PM | 1      | MTA   | Scheduler            | Logon engine - process <User name> control action
Debug   | 02/26/2020 04:48:02.370 PM | 1      | MTA   | Scheduler            | Logon engine - processed <User name> control action
Debug   | 02/26/2020 04:48:02.386 PM | 1      | MTA   | Scheduler            | Logon engine - found <Password> Text type control
Debug   | 02/26/2020 04:48:02.386 PM | 1      | MTA   | Scheduler            | Logon engine - process <Password> control action
Debug   | 02/26/2020 04:48:02.386 PM | 1      | MTA   | Scheduler            | Logon engine - processed <Password> control action
Debug   | 02/26/2020 04:48:02.386 PM | 1      | MTA   | Scheduler            | Logon engine - found <Submit> PushButton type control
Debug   | 02/26/2020 04:48:02.386 PM | 1      | MTA   | Scheduler            | Logon engine - process <Submit> control action
Debug   | 02/26/2020 04:48:02.402 PM | 1      | MTA   | Scheduler            | Logon engine - processed <Submit> control action
Debug   | 02/26/2020 04:48:02.402 PM | 1      | MTA   | Scheduler            | Logon engine - <Submit> control action ActionExecute requires refresh
Debug   | 02/26/2020 04:48:02.402 PM | 1      | MTA   | Scheduler            | Accessibility - accessibility controls collection delay for 750 milliseconds
Debug   | 02/26/2020 04:48:02.511 PM | 6      | MTA   | Service              | Service session Change: reason = SessionLogon, session Id = 1
Debug   | 02/26/2020 04:48:03.167 PM | 1      | MTA   | Scheduler            | Accessibility - collect all accessibility controls for LogonUI
Debug   | 02/26/2020 04:48:03.167 PM | 1      | MTA   | Scheduler            | Accessibility - collected 0 accessibility controls for LogonUI
Debug   | 02/26/2020 04:48:03.167 PM | 1      | MTA   | Scheduler            | Logon engine - match set 'LoginEmpty' matches, success status = Stop
Info    | 02/26/2020 04:48:03.167 PM | 1      | MTA   | Scheduler            | Successfully logged in WIN-59RGL9IHF2R\GLDemoServer
Debug   | 02/26/2020 04:48:03.167 PM | 1      | MTA   | Scheduler            | WIN_59RGL9IHF2R - After scheduler unlocking screen. Mode: 'Start'.
Debug   | 02/26/2020 04:48:03.199 PM | 1      | MTA   | Scheduler            | WIN_59RGL9IHF2R - Schedule Loader
```

RPAService.log file

In this example, review the log file to see which screens are displayed during a login sequence and to determine how to modify the SchedulerDefinitions.xml file to handle these screens:

A. The disclaimer screen is displayed.

B. The login engine finds and clicks the OK button on the disclaimer screen.

C. The login engine collects all controls for the login screen.

D. The login engine pushes the static user name to the Username field. The login engine then enters the password supplied from Pega Credentials Manager in the Password field before clicking the Submit button.

RPA Service processing flow

This article describes what happens when you use the Pega RPA Service and is provided for informational purposes. By using the RPA Service, you can schedule Robotic Processing Automation (RPA) sessions when you are using Pega Robotic Automation versions 8.0 SP1 2019 and later. If you are using version 8.0 SP1, update to version 8.0 SP1 2025 or later. For best results, update to version 19.1 or later.

Note: If you are using Pega Robotic Automation versions 8.0 SP1 2018 and earlier, you must use the RPA Scheduling Service. For more information, see RPA Scheduling Service processing flow. You must have Pega Robotic Automation 8.0 SP1 2019 or later to use Pega Robot Manager version 6. For more information, see Pega Robot Manager version 6.

The following steps describe how the RPA Service works:

1. The system administrator uses the Pega Robotic Automation Credentials Manager utility (credmgr.exe or credmgrui.exe) to store user credentials. These credentials are used to log in to the Pega Robot Runtime virtual machine.
   - Windows session user credentials are used to log in to the virtual machine.
   - Pega Robot Runtime session user credentials are used to define the user who starts the openspan.runtime.exe application.
   - Registration Operator credentials are used to communicate with Robot Manager.
2. If you set the mode to Scheduled, the system administrator configures the RpaSchedule.json file. This file contains the information that the RPA Service needs to schedule one RPA Runtime session per weekday.
3. The system administrator ensures that the Pega RPA Service (OpenSpan.WinLogon.Service.exe) is running. Restart the service any time you change the credentials, the RPAService.config file, or the RpaSchedule.json file.
4. The system administrator leaves the virtual machine on the Windows lock screen.
5. The system uses the user credentials that are defined in the Credentials Manager to log in to this session:
   - If you set the mode to Scheduled, at the time specified in the RpaSchedule.json file, the Pega RPA Service logs the virtual machine in to a Windows session.
   - If you set the mode to OnDemand, Pega Robot Manager uses the RPA Service to start and stop the robots.
6. The RPA Service creates a task in the Windows Task Scheduler to start the Pega Robot Runtime session within the next few minutes as the Pega Robot Runtime user that is specified in the Credentials Manager.
7. Pega Robot Runtime starts. As with any RPA session, the Registration Operator is used to begin the registration process. Pega Robot Runtime uses the robotName value in the CommonConfig.xml file as its operator ID. Pega Robot Runtime retrieves the work group information from the CommonConfig.xml file. For more information, see Common Configuration Settings.
8. Pega Robot Runtime registers with the Pega Robot Manager.
9. Pega Robot Runtime gets its package assignment.
10. Pega Robot Runtime retrieves the package from the Package Server.
11. vRuntime begins to process work assignments.
12. The RPA Service notifies Pega Robot Runtime when it is time for its session to end. The RPA Service retrieves information about how long the session lasts from the RpaSchedule.json file.
13. Pega Robot Runtime finishes processing its current work assignment and then shuts down.
14. The RPA Service logs out of the Windows session user.

RPA Scheduling Service processing flow

This article describes what happens when you use the Pega RPA Scheduling Service and is provided for informational purposes. By using the RPA Scheduling Service, you can schedule Robotic Processing Automation (RPA) sessions when you are using Pega Robotic Automation versions 8.0 SP1 2018 and earlier.

Note: If you are using Pega Robotic Automation versions 8.0 SP1 2019 and later, the Pega RPA Service provides additional features, such as the ability to use Pega Robot Manager version 6 and later and run RPA robots in OnDemand mode. For more information, see Pega RPA Service processing flow.

1. The system administrator uses the Pega Robotic Automation Credentials Manager utility (credmgr.exe) to store user credentials. These credentials are used to log in to the Robotic Automation Runtime virtual machine.
   - Windows session user credentials are used to log in to the virtual machine.
   - Robotic Automation Runtime session user credentials are used to define the user who starts the openspan.runtime.exe application.
2. The system administrator configures the RpaSchedule.json file. This file contains the information that the RPA Scheduling Service needs to schedule one RPA Runtime session per weekday.
3. The system administrator ensures that the Pega Windows Auto-Login Scheduling service (OpenSpan.WinLogon.Service.exe) is running. This service must be restarted after you make changes to the RpaSchedule.json file.
4. The system administrator leaves the virtual machine on the Windows lock screen.
5. At the time specified in the RpaSchedule.json file, the RPA Scheduling Service logs the virtual machine in to a Windows session. The system uses the user credentials that are defined in the Credentials Manager to log in to this session.
6. The RPA Scheduling Service creates a task in the Windows Task Scheduler to start the Robotic Automation Runtime session (within the next few minutes) as the Robotic Automation Runtime user that is specified in the Credentials Manager.
7. Robotic Automation Runtime starts. As with any RPA session, the RPA master registration credentials are used to begin the registration process. Robotic Automation Runtime uses the computer name as its operator ID. Robotic Automation Runtime retrieves its work group from the CommonConfig.xml file. For more information, see Common Configuration Settings.
8. Robotic Automation Runtime registers with the Pega Robot Manager.
9. Robotic Automation Runtime gets its package assignment.
10. Robotic Automation Runtime retrieves the package from the Package Server.
11. Robotic Automation Runtime begins to process work assignments.
12. The RPA Scheduling Service notifies Robotic Automation Runtime when it is time for its session to end. The RPA Scheduling Service retrieves information about how long the session lasts from the RpaSchedule.json file.
13. Robotic Automation Runtime finishes processing its current work assignment and then shuts down.
14. The RPA Scheduling Service logs out of the Windows session user.

For more information, see Pega Robot Manager version 5.1.

Pega Robotic Automation Credentials Manager utility

Use the Robotic Automation Credentials Manager utility to store the user names and passwords that are used when the Robotic Automation Scheduling service schedules Robotic Processing Automation (unattended) sessions.

With the Scheduling service, you can specify daily schedules for robots and manage your production systems. The Scheduling service can log on to a virtual machine and start or stop Pega Robot Runtime as any Windows user. Use the Credentials Manager utility to manage the login credentials that the Scheduling service gets from the repository. For more information, see Robotic Processing Automation Scheduling service.

The Credentials Manager utility is a command line program (CredMgr.exe) that is installed with Pega Robot Studio or Pega Robot Runtime. In version 19.1 and later, this utility is installed in the Pega RPA Service installation folder. In version 8.0 SP1 and earlier, this utility is installed in the Robotic Automation Runtime installation folder.

Note: Run the Credentials Manager utility as a user with administrator rights.

The user names and passwords are encrypted using DPAPI (Data Protection Application Programming Interface) encryption and are stored in the following location:

- %programdata%\Pegasystems\RPAStartup.info (19.1 and later)
- %programdata%\OpenSpan\RPAStartup.info (8.0 SP1 and earlier)

For more information, see DPAPI settings for Pega Robot Studio.

The following table shows the parameters that you can include when you run the Credentials Manager utility:

Task	Parameter to include
Display a list of the parameters you can include.	--help

Task	Parameter to include
List all of the credential store entries for the session.	-l
Add credentials to the Windows session credential store.	-a
Remove credentials from the Windows session credential store.	-r
Indicate that the credentials are for a Windows session.	--windows
Indicate that the credentials are for a Pega Robot Runtime user.	--runtime
Indicate that the credentials are for the Robot Manager Registration Operator.	-registrationoperator
Enter the user name for the credential entry.	-u
Enter the password for the credential entry.	-p
Enter the domain associated with the credential entry. The default is '.', which indicates the local computer.	-d

The following examples show how to perform specific tasks by using the Credentials Manager utility:

Task	Input
Add a Robot Manager Registration Operator	CredMgr.exe -a --registrationoperator -u <username> -p <password>
Add a Pega Robot Runtime user	CredMgr.exe -a --runtime -u <username> -p <password>
Add a Windows user	CredMgr.exe -a --windows -u <username> -p <password>
List all users in the storage	CredMgr.exe -l
Remove a Robot Manager Registration Operator	CredMgr.exe -r --registrationoperator
Remove a Pega Robot Runtime user	CredMgr.exe -r --runtime
Remove a Windows user	CredMgr.exe -r --windows

Note: When storing credentials, if you do not specify a domain, the utility uses the local machine name.

What type of security does the CredentialStore component use?

The CredentialStore component uses the Microsoft Data Protection API (DPAPI). You can find more information about DPAPI at the Microsoft Developer Network.

For more information, see Encryption settings for Pega Robotic Automation.

Pega Robotic Automation Credential Store

Note: The legacy Credential Store functionality has been extended in the ASO Manager component. The ASO Manager integrates directly with adapters to provide you with automated login capabilities. Additionally, the ASO Manager provides dialogs so that you can edit stored credentials, which accelerates the development of automations. For best results and quicker development cycles, use the ASO Manager for new automation projects. For more information, see Assisted Sign-On component.

The Credential Store is based on the Windows Data Protection API (DPAPI). DPAPI encrypts data using a private key derived from a user's Windows identity. Once encrypted, data can only be decrypted by the same Windows user. For more information, see the Windows Data Protection article on the Microsoft website.

For more information about DPAPI and the encryption settings used by Pega Robot Studio and Pega Robot Runtime, as well as the SHA version that is used for your version of Windows, see Encryption settings for Pega Robotic Automation.

The following sections detail some frequently asked questions about the Credential Store:

Where are credentials stored?

Credentials are stored locally on the machine in an encrypted file in the user's application data directory. The Credential Store does not use a central server.

For example, the path for credentials that are stored in version 19.1 and later is:

C:\Users\John Doe\AppData\Pegasystems\Pega Robot Studio\AppInfo

The following is an example path for credentials that are stored in version 8.0 SP1 and earlier:

C:\Users\John Doe\AppData\Roaming\Pegasystems Inc\OpenSpan Studio\AppInfo

How are credentials stored?

The Credential Store component persists the following strings: application name, user name, password and domain. DPAPI initially generates a strong key called a MasterKey, which is protected by the user's password. DPAPI uses a standard cryptographic process called Password-Based Key Derivation, described in the Password Based Encryption Standard (PKCS) #5, to generate a key from the password. This password-derived key is used with Triple-DES to encrypt the MasterKey, which is stored in the user's profile directory.

The MasterKey, however, is not used explicitly to protect the data. Instead, a symmetric session key is generated based on the MasterKey, some random data, and an additional hard-coded entropy string that Pega provides. The session key is never stored. Instead, DPAPI stores the random data it used to generate the key in the opaque data blob. When the data blob is passed back in to DPAPI, the random data is used to re-create the key and unprotect the data.

For security reasons, MasterKeys expire, which means that after a period of time, the hard-coded value being three months, a new MasterKey is generated and protected in the same manner. This expiration prevents an attacker from compromising a single MasterKey and accessing all of a user's protected data.

Can anyone view or decrypt stored credentials?

No. Only the user whose Windows identity was used to encrypt the data can decrypt it. Moreover, the additional entropy string supplied by Pega helps prevent other applications from decrypting the credential data.

Where is the software installed?

The Credential Store component is installed with Pega Robot Studio and Pega Robot Runtime. Pega Robot Studio is installed on developer desktops. Pega Robot Runtime is installed on solution user desktops.

How are passwords managed?

The Credential Store component is used by Pega Robot Studio developers when they create automations which are then deployed to the end-user desktop and executed by Pega Robot Runtime. Automations run independently on each end-user desktop and are not connected to a central management server following deployment. Developers can choose to enforce password management functions within their automations, but there is no server that centrally manages password rules.

How often does the user have to input their credentials?

The Credential Store component can persist credentials indefinitely. However, developers can choose to enforce password management functions within their automations, including periodically prompting for the re-entry or clearing of stored passwords. For instance, a developer can create an automation that initially prompts users for credentials the first time they log on. For subsequent logons, the automation automatically logs in the user until it detects that a login failed. Once a login has failed, the automation prompts the user to re-enter their credentials.

Does the software log who accessed credentials or who accessed the tool?

The client can enable local logging of the Pega Robot Runtime environment, which provides general log details. Optionally, you can use events to log extended or custom events. These events can be written to a central repository and can contain only the specific items that you want to see.

Is this software commonly deployed by other clients?

Yes. We have deployed this capability to several other clients. Implementation of the credential store varies from account to account depending on project requirements, internal security policies, and the infrastructure already in place.

Integration of unattended robots with Pega Platform

Distribute work among a pool of unattended robots, that is, robots that work independently of human attention. These robots can handle simple, tedious tasks that are prone to automation. By automating tasks in your application, you can reduce errors and release your staff to focus on more valuable tasks.

You assign work to a robot through Case Management. Unattended robots can also monitor outlook folders, network directories, or external queues for work.

This article covers the following topics:

- Automation development
- RPA deployment model
- Methods for integrating unattended robots with your application
  - Robotic assignment
  - Data page integration

Automation development

Use Pega Robot Studio to create automations that are integrated with your Pega application. The automation developer must configure the Robotic Activity with the following information:

- Case type class
- Robotic activity name
- All fields required to get or set data as part of the automation.
  All names must match those from the Flow action or Data Page.

For example, your Pega application might contain fields that users can edit and whose values you want to send to the automation to fill other fields. The automation receives the required values (for example, First name, Last name, and Email address), and then feeds the information to all the required applications that are running on the desktop, performs the required steps and gets the required fields from these applications (for example, Credit Score and National Insurance Number). These fields must be marked as relevant records.

Fields that you add in Case Designer or Data Designer are automatically marked as relevant records. You can also add other fields (properties) that were created in Designer Studio on the Relevant Records landing page.

For more information, see Marking records as relevant records.

After the Pega Robot Studio developer specifies a class name, the automation retrieves the fields that are marked as relevant records, and the developer can select which of those fields are to share. You can share scalar data only between your application and automation.

For more information, see Configuration of robotic automation for Pega Platform applications.

RPA deployment models

In Robot Manager, you can configure your robots to subscribe to work groups which are associated with work queues. A robot subscribes to one or multiple work groups (through the candidate work group list) and this way accesses work queues that contain automation tasks to complete.

One of the common use cases involves a robot that subscribes to a single work group and performs robotic assignments within a single work queue. Such configuration is typical to single-purpose robots.

To address senarios that require versatile robots that can perform various types of tasks, you can assign a single robot to a work group in which it can perform assignments from multiple work queues.

Finally, you can assign a robot to multiple work groups in which that robot can perform tasks as part of a single or multiple work queues. Use this model for advanced, multi-purpose, multi-task robots.

An example of unattended automation might involve processing one or more stages of an automobile insurance claim. After a client submits a claim, that claim can immediately be routed to a robot, which runs an automation that analyzes the information submitted with the claim, looks up and verifies policyholder information, and updates web and

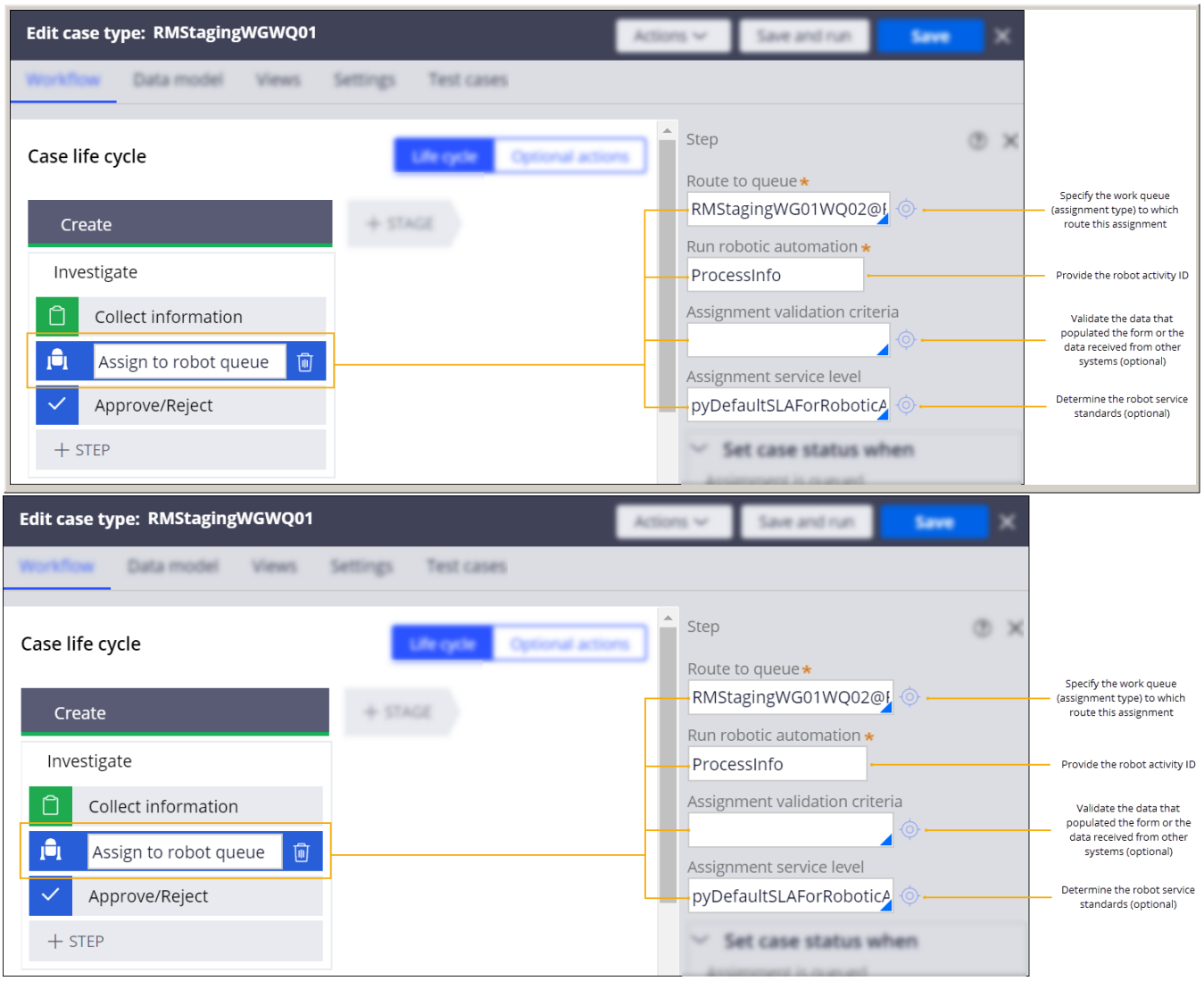
desktop applications with case information.

Methods for integrating unattended robots with your application

You can source automations in your application through the Assign to robot queue smart shape or by means of data pages.

Robotic assignment integration

Integration of unattended robots with Pega Case Management takes effect through the Assign to robot queue smart shape, as shown in the following example:



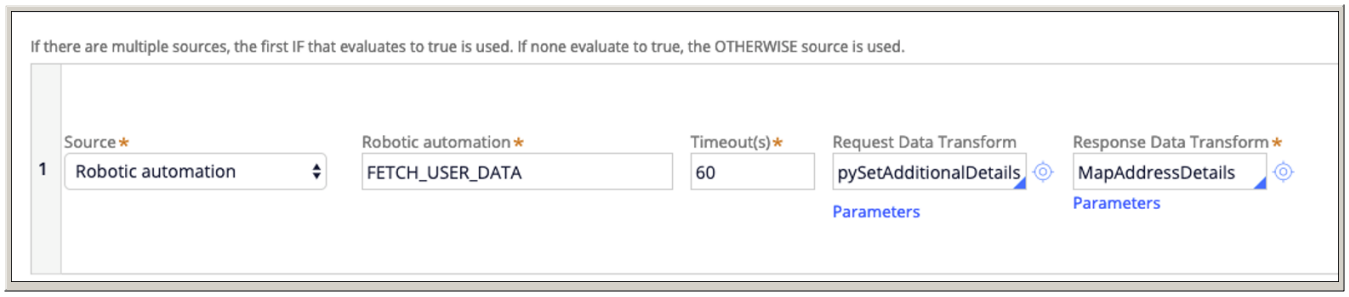
Integrating unattended robots through the Assign to robot queue smart shape

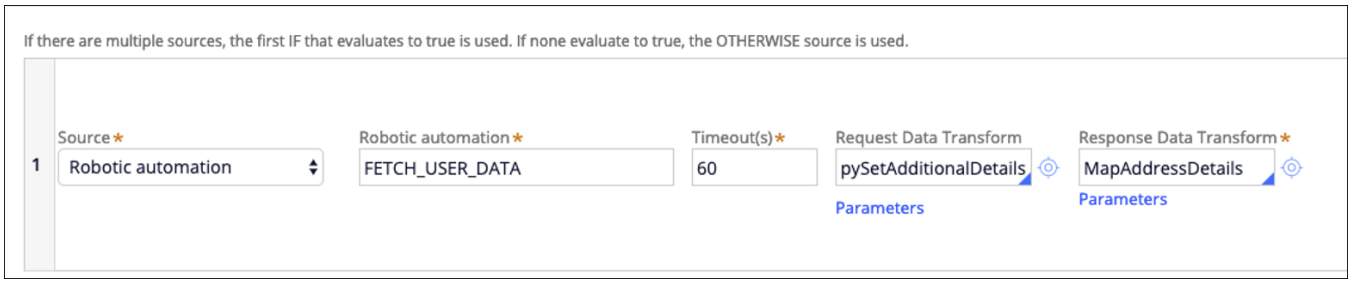
For more information, see Assigning a task to a robotic work queue.

Data page integration

You can also configure your automations to source data pages in your application. Data pages provide automatic access to data by populating page and page list properties with relevant data, depending on the circumstances and your business use case.

For example, see the following figure:





Integrating an unattended automation through a data page

Because Data Pages are typically used online, a robot might take a prolonged time period to complete a task. This means that the assignment completion halts until the robot completes the work and returns the data to the data page. You can adjust the data page and the robot completion time by configuring the data page timeout.

For more information, see Creating a data page.

Attended robotic automations

You can use attended robotic automations, formerly known as robotic desktop automations (RDA), to integrate and automate processes on the desktop. With attended automations, the user interacts with the automation. The following are some of the tasks that you can automate with an attended automation:

- Synchronize all your desktop applications with a customer's account information.
- Automatically launch or close applications on the desktop.
- Send updated customer account information from your Pega Platform application to one or more web or desktop applications.
- Streamline users' workspaces. By automating communication among various desktop applications, users do not need to switch among many applications to update information.

Automations that run on the desktop are run from a flow action on a connector, modal, or overlay in your application. You can run an automation during preprocessing to get information from desktop applications to display it in a form in the application.

In an example Call Center application, when a customer service representative (CSR) accepts a call from a customer, an automation runs on the CSR's desktop. It retrieves the customer account information from a legacy application that is running on the CSR's desktop and returns and displays the account number and related information in a window in the Call Center application.

You can also run a postprocessing automation when you want to send information that users enter in your Pega Platform application to an the automation, which then sends the information to applications that are running on the user's desktop.

For example, a customer can dispute a transaction. The dispute information can be automatically sent to the legacy application, which acts as the system of record for disputes and in which back-end workers work to investigate and resolve billing disputes.

Any fields that you want to share between your Pega Platform application and desktop applications must be marked as relevant records.

Configuration of attended automations with your Pega application

You can use Pega Robotic Automation to add automation capabilities to your Pega 8 application. Pega Robotic Automation consists of Pega Robot Studio and Pega Robot Runtime. With Pega Robot Studio, you can create a unified desktop experience by automating routine tasks on the user’s desktop. Pega Robot Runtime provides an environment for executing the automations that you create with Pega Robot Studio. Examples of common desktop automations include:

- Synchronizing all your desktop applications with a customer’s account information.
- Automatically launching or closing applications.
- Propagating updated account data from your Pega 8 application into one or more web or desktop applications.

The minimum requirements for building a robotic automation are:

- Pega 8.x
- Pega Robot Studio 19.1

This article assumes that you have successfully installed and configured Pega Robot Studio and Pega Robot Runtime. For more information, see Configuring Pega Robot Manager 6 for Pega Platform 7.4. This article discusses the following topics:

- Desktop automation architecture overview
- Design principles
- Invoking automations from your Pega application
- Automating activities in Pega Robotic Studio

Desktop automation architecture overview

Desktop automations are designed and built in Robot Studio. The compiled automations then run in Robot Runtime on the local desktop. Automations are invoked directly from the Pega client through a REST service running in Robot Runtime. After receiving an invocation request, Robot Runtime is responsible for starting the automation, performing the automation logic, and returning an appropriate response to your Pega 8 application.

Automation security

The REST service inside Robot Runtime honors the cross-origin resource sharing (CORS) security model to determine whether to accept or reject incoming automation requests. Only requests from approved domains are accepted; non-approved domains are rejected. You can configure the list of approved domains in the **RuntimeConfig.xml** file. Invocation requests from other computers are also rejected.

For more information about the **RuntimeConfig.xml** file, see Runtime configuration settings.

Because Pega 8 applications are hosted over SSL (HTTPS), and browsers do not allow an SSL application to make a call to a non-SSL service, the Robot Runtime REST service must be SSL-enabled. To create an SSL REST service, Robot Runtime uses (and includes) a CA-issued SSL certificate. The certificate points to localruntime.pega.com. A global DNS entry has been configured that resolves localruntime.pega.com to 127.0.0.1 or to localhost. This setting allows your SSL-enabled Pega 8 application to make secure invocations to the SSL-enabled local REST service.

Design principles

All automations invoked through Pega 8 applications are executed synchronously. This means that your Pega 8 application waits for an automation to be completed before proceeding to the next step in the flow. For this reason, you should design automations that are relatively short and fast, and have a single focus or purpose. As a best practice, break down larger blocks of functionality into smaller automations to avoid the appearance of an unresponsive or slow application.

Automations can take input such as a customer name and account number, and return output, such as the amount of a transaction. Configuring data input and output is discussed in detail below. At this time, only scalar Pega 8 Platform properties can be passed between your Pega 8 application and an automation. Hierarchical structures and lists of data are not yet supported.

When designing an automation, you must coordinate the following items between Pega 8 Platform Designer Studio and Pega Robot Studio development environments:

- The automation identifier that is created in Robot Studio and uniquely identifies your automation
- The fully qualified class name of the case that will be invoking the automation (for example, MyOrg-MyApp-Work-OpenTicket)

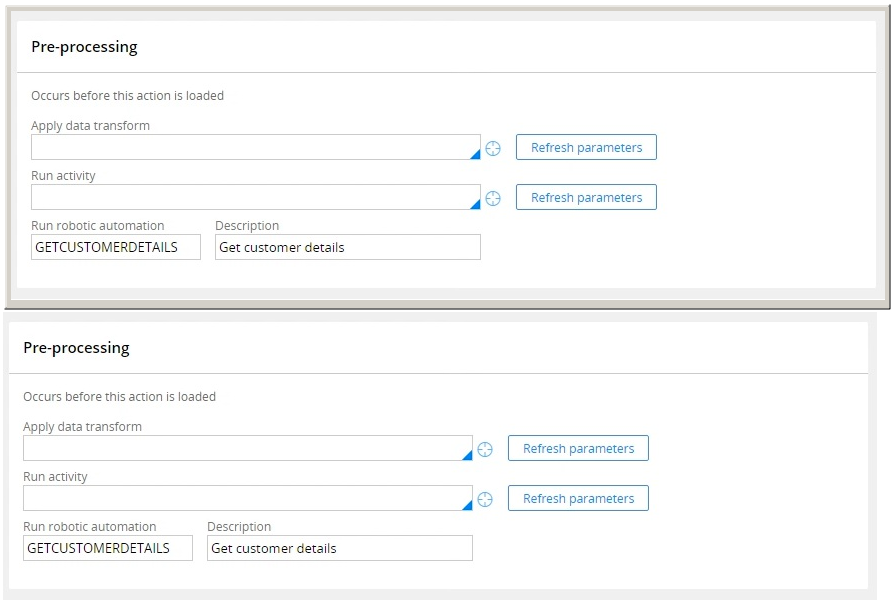
- The format of the data as it is received by the automation
- The required format of any data that is returned from an automation to your Pega 8 application

Invoking automations from your Pega 8 application

You can invoke automations from any flow action that runs as part of a standard flow, modal dialog box, or overlay. The automation identifier assigned to your automation in Robot Studio must be referenced on the flow action. Automations can be invoked from either a pre-action or post-action. The decision of where to invoke your automation depends on your business requirements.

Preprocessing automations

Invoke a preprocessing automation when you want to fetch data from an automated process that will ultimately be rendered on the next immediate (or future) UI screen. The preprocessing actions are performed in the order shown on the Flow Action rule form.



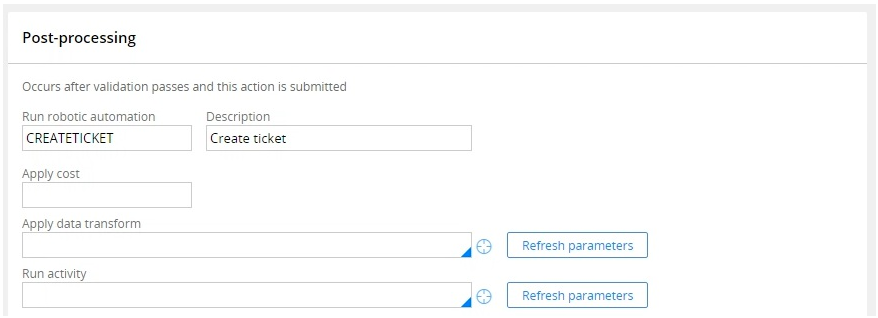
Pre-processing section in the Flow Action rule form

Pre-processing actions are performed in the following sequence:

1. A data transform is applied.
2. An activity is run.
3. Robotic automation is invoked.
4. The UI is rendered.

Post-processing automations

Invoke a post-processing automation when you want to collect information from your user that will ultimately be used as input into your automation process.



Post-processing section of the Flow Action rule form

Post-processing actions are performed in the following sequence:

1. The user submits the form.
2. Input data is validated on the server.
3. Robotic automation is invoked.
4. The automation returns, and the clipboard is updated with return values.
5. Clipboard data is revalidated on the server.
6. A data transform is applied.
7. An activity is run.
8. The flow action is submitted and completed.

Passing input data to automations

A subset of properties defined on your case is automatically bundled with each automation invocation request. The exact set of properties to include is governed by the set of relevant property records defined for your case type. You can change the set properties that are bundled in each automation request by modifying the relevant records defined for your case type.

All fields created in the Case Designer or Data Designer are automatically marked as relevant. However, relevant records can be curated and modified for your specified case from the Relevant Records landing page (**Designer Studio > Application > Inventory > Relevant Records**).

Each relevant record property is accompanied by its current clipboard value. Only scalar properties are included in your invocation request. Page properties, page groups, and page lists are not supported at this time.

Retrieving output data from automations

After an automation is invoked, the automation uses the case data included in the request. For example, an automation could use an account number to update a customer account in a mainframe system. The invoked automation keeps track of the incoming values of all properties. If any of these values change during execution, the modified values are automatically included in the response back to your Pega 8 application. Updated property values are automatically posted back to the clipboard page that your flow action is running against. If an automation is invoked as a pre-action, the values are posted to the clipboard before the associated section is rendered. If the automation is invoked as a post-action, the clipboard is updated as part of the flow action submission process.

Depending on the validation criteria defined on your flow actions, your case processing can halt if an automation returns invalid data. Check your automation logic and ensure that your automations are returning valid data to your Pega 8 application.

Automation invocation responses include a return code as well as a status message that reflects the success or failure of the automation. The return statuses are used for informational purposes and do not affect the processing flow of your Pega 8 application. An automation developer can return one of the following messages:

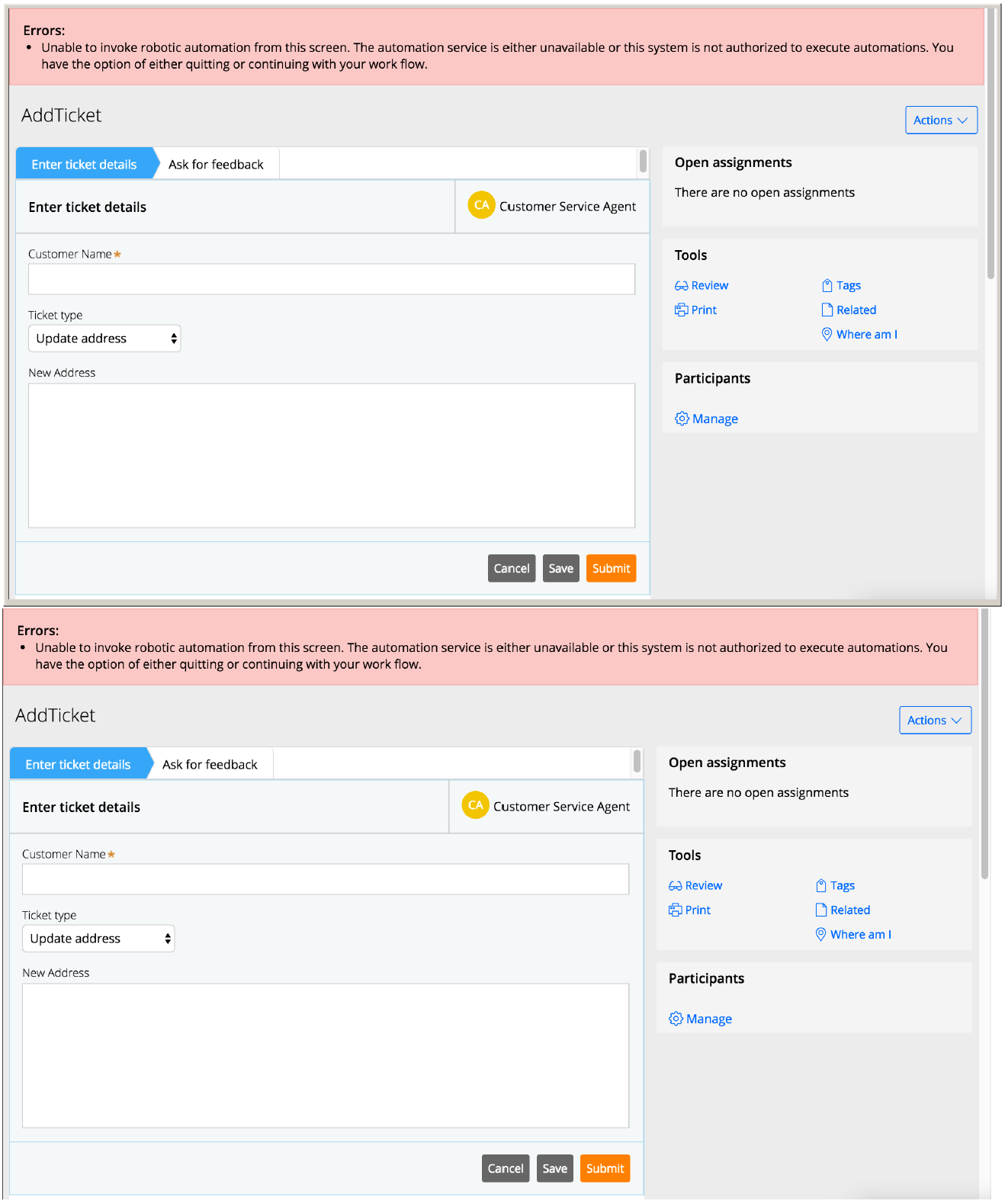
Message	Description
Completed	The automation ran to completion and did not encounter any errors.
Completed with errors	The automation ran to completion but encountered an error that might have prevented the successful processing of the intended automation task. For example, this error can occur if the automation is unable to look up a specific customer account because of an incorrect account ID. Actual use of this message is dependent on the automation and implementation. Communication of these errors to the end user is handled before the automation is completed by using, for example, a Windows dialog box or an overlay.
Did not complete	This is the default return status. The automation developer is required to overwrite this return code on exiting the automation. If this code is displayed, most likely an error occurred in the automation that prevented a clean run.

However, some error conditions affect your case processing flow. Your Pega 8 application automatically handles environmental errors, including:

Message
The Pega Robotics Runtime is unavailable.
The Pega Robotics Runtime is available, but no package is loaded.
The Pega Robotics Runtime is available, but the specified automation cannot be found.
The automation was invoked but timed out (the time-out is currently set to 60 seconds).
The automation was invoked but was canceled.

If any of these scenarios is detected, a page message that describes the problem is displayed automatically. The user can do either of these actions:

- Quit (cancel)
- Ignore the message and continue the workflow



An environmental error that is displayed as a page message

An environmental error that is displayed as a page message

When one of these environmental errors is detected on a postprocessing automation invocation, the Submit button label changes to Ignore and continue. The user must decide whether to quit or continue their workflow. Button labels do not change if an environmental error is detected on a preprocessing automation invocation. In addition, button labels do not change if the default case action buttons are overridden by selecting Customize the action section button labels on your flow action.

You can also add custom error-handling logic by specializing the pyProcessAutomationFailure extension point activity. For example, you might want to send an email to your case administrator or technical support team whenever an automation request fails.

Automating activities in Robot Studio

Robot Studio 19.1 and later has a Robot Activity component. This component is based on the activity component that is a part of the Robot Studio Interaction Framework. This component is used most similarly to an activity that does not require an active interaction.

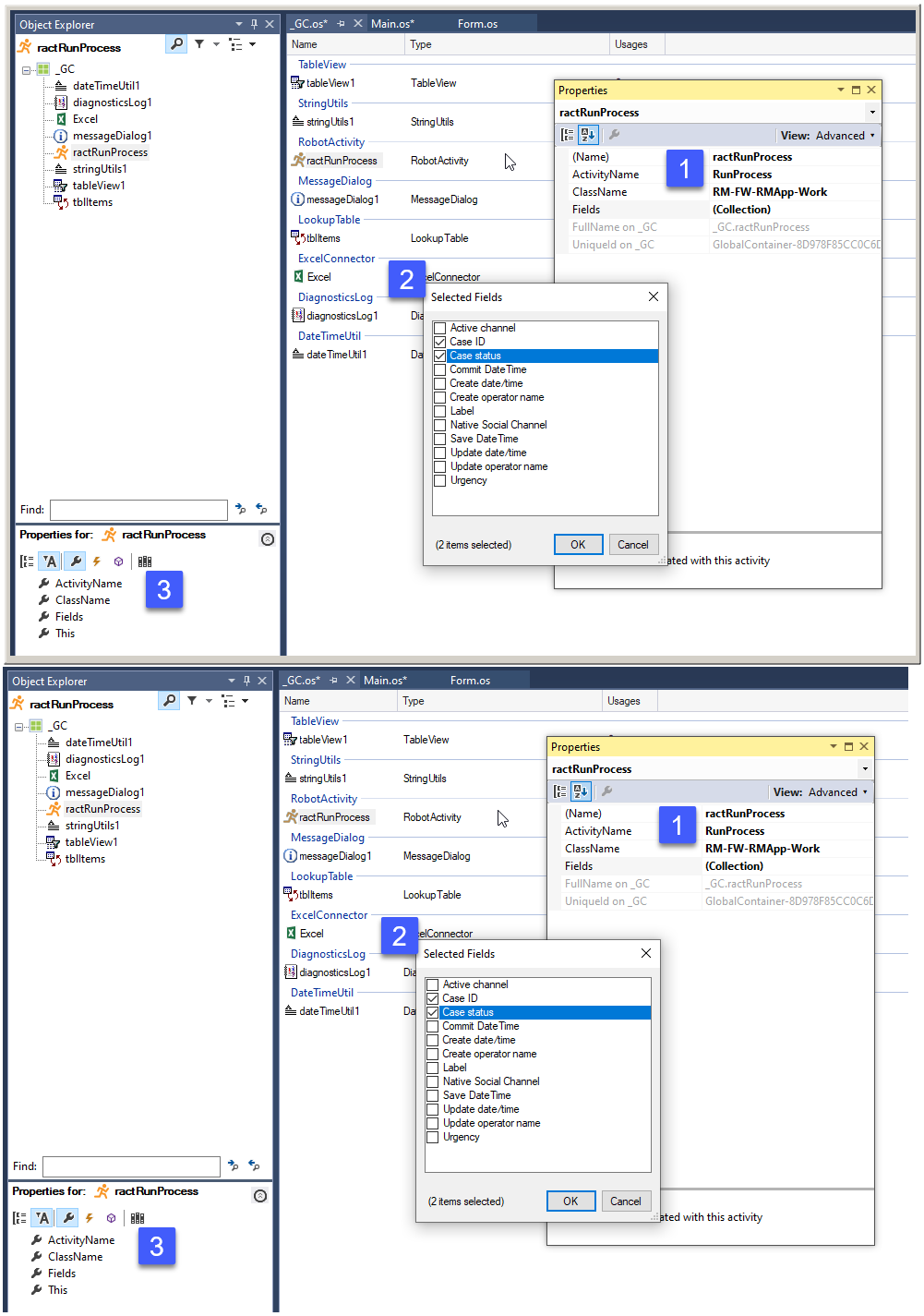
Configuring the component

To configure the Robot Activity component, place the component in a Global Container. An Interaction Manager component is not required. The property grid contains these

items:

- **ActivityName** – The activity name is a string used to identify the automation. This is the automation identifier that is referenced in the Pega flow action as the robotic automation name.
- **ClassName** – The Pega case type that supplies data to the automation. The class name is verbally communicated between the Pega developer and the automation developer, for example: MyOrg-MyApp-Work-OpenTicket or MyOrg-MyApp-Work-OpenTicket-OpenSubTicket.
- **Fields** – After a class name is provided, Robot Studio can programmatically retrieve a list of all available relevant record fields that can be used by automations. An automation developer can choose a subset of these fields to appear as properties on the Robot Activity component.

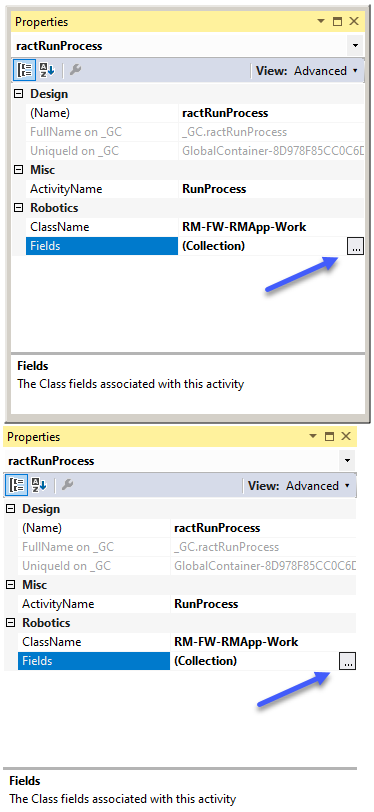
The following example shows a fully configured Robot Activity component.



A Robot Activity component

The numerals in the image above highlight the following items:

1. The Property Grid shows the Pega properties as described above
2. The Property Grid has the Fields (Collection) opened. This is the Selected Fields dialog box. Open the Selected Fields dialog box by selecting the Fields property and clicking the ellipsis button, as shown in the following figure:

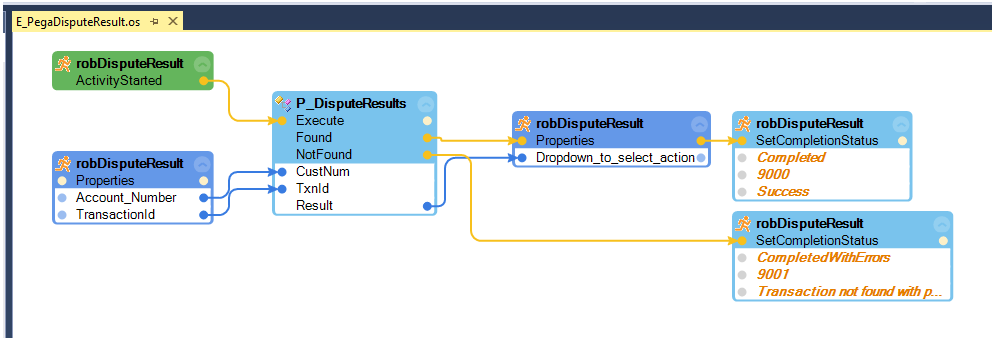


Ellipsis button in the Properties dialog box

3. The Object Inspector shows the properties that have been selected on the Selected Fields dialog box. Changes to the Selected Fields dialog box are reflected after that dialog box is modified and submitted. You can place these properties on an automation surface.

Using the component

A Robot Activity component contains an ActivityStarted event. This event starts when a Pega 8 application flow is configured to invoke an automation with the corresponding name. You can only access an activity's properties when the activity is active—from the start of the ActivityStarted event until its completion.



An example of an ActivityStarted event

As discussed in the error handling section, call the SetCompletionStatus method at the end of the processing of the activity to return the appropriate result. The return status is used for informational purposes and does not affect the processing flow of your Pega 8 application. You can also assign a return code and message when calling the SetCompletionStatus method to communicate status with the application. The return code can identify the error type for quick reference and is arbitrary. You can customize the return message as needed. Use the Message Manifest to hold the strings.

Related external links
Enabling the Messaging Service for attended automations

Integration of attended automations with Pega Platform

Automate and integrate processes on the desktop to reduce errors and to give your staff more time to focus on higher-value, customer-oriented tasks.

By using Pega RPA to create attended automations, you can:

- Synchronize all your desktop applications with customer account information.
- Automatically launch or close applications on the desktop.
- Send updated customer account information from your Pega Platform™ application to one or more web or desktop applications.
- Streamline user workspaces. By automating communication among various desktop applications, users do not need to switch among several applications to update information.

For example, customers can submit a request to change their account information in your application. Automation can retrieve customer account information from an application that is running on a case worker's desktop and display it in an application form. Another automation can send the updated account information from your application to the case worker's desktop application.

This article covers the following topics:

- Automation development
- Methods for integrating automations with your application
  - Flow action integration
  - Data page integration

Automation development

Use Pega Robot Studio to create automations that are integrated with your Pega application. The automation developer must configure the Robotic Activity with the following information:

- Case type class
- Robotic activity name
- All fields required to get or set data as part of the automation.
  All the names must match those from the Flow action or Data Page.

For example, your Pega application might contain fields that users can edit and whose values you want to send to the automation to fill other fields. The automation receives the required values (for example, First name, Last name, and Email address), and then feeds the information to all the required applications that are running on the desktop, performs the required steps and gets the required fields from these applications (for example, Credit Score and National Insurance Number). These fields must be marked as relevant records.

Fields that you add in Case Designer or Data Designer are automatically marked as relevant records. You can also add other fields (properties) that were created in Designer Studio on the Relevant Records landing page.

For more information, see Marking records as relevant records.

After the Pega Robot Studio developer specifies a class name, the automation retrieves the fields that are marked as relevant records, and the developer can select which of those fields are to share. You can share scalar data only between your application and automation.

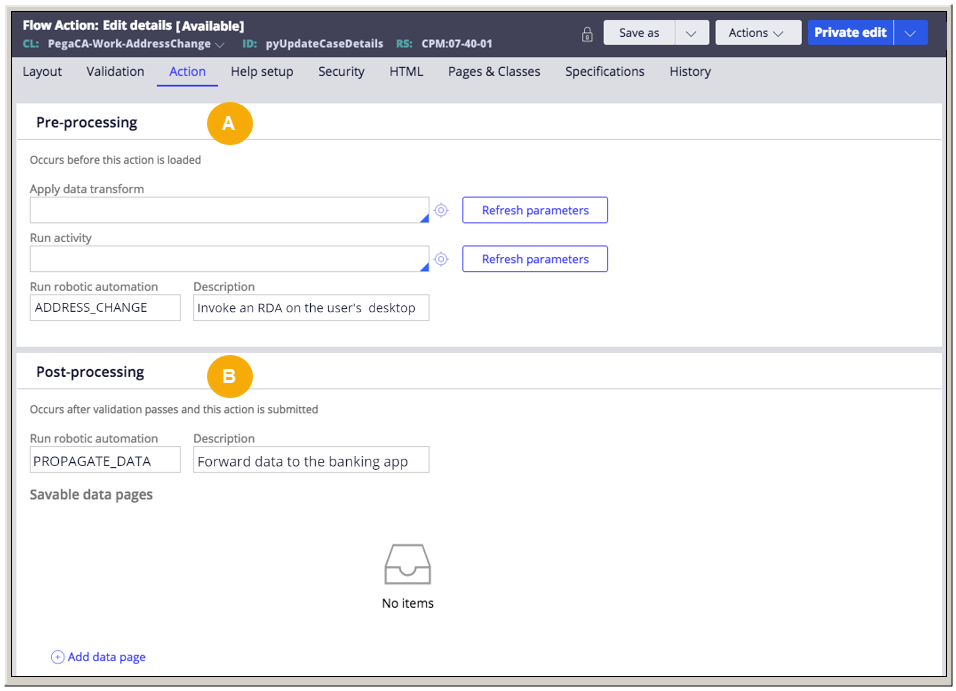
For more information, see Configuration of robotic automation for Pega Platform applications.

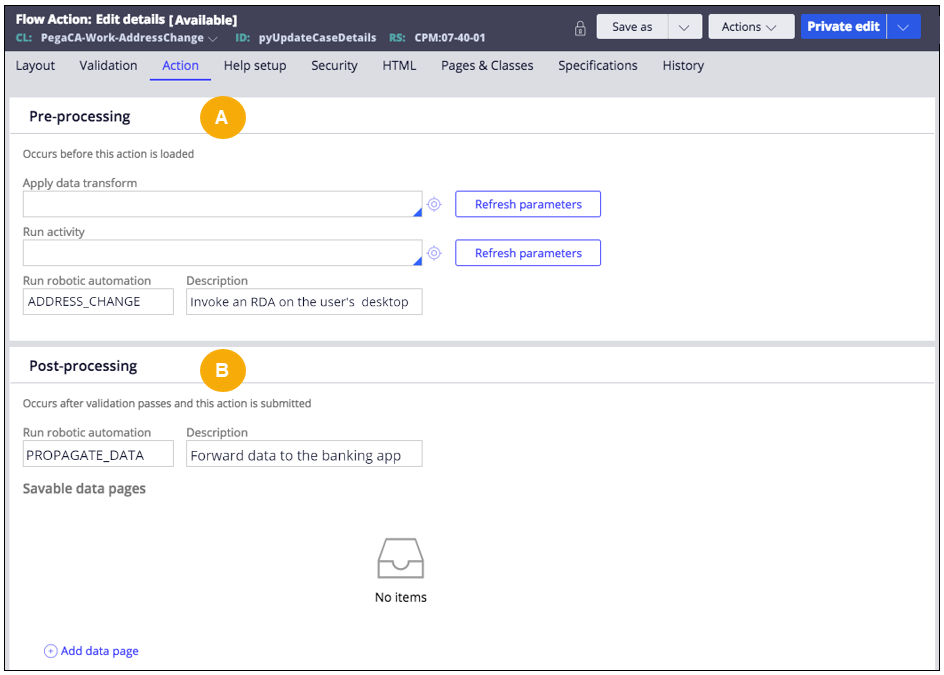
Methods for integrating automations with your application

You can source automations in your application through flow actions or by means of data pages.

Flow action integration

Use the flow action method to automatically collect information from a legacy system before displaying it to the user by means of a preprocessing action. You can also retrieve information from a user before sending it to the automation logic for further processing in other applications through a postprocessing action. The following figure shows the flow action method and the preprocessing and postprocessing actions:





Configuring preprocessing and postprocessing actions in a flow action

This figure shows the following activities:

A - Running an automation to update the user address.

B - Forwarding the data to other applications in the system.

Note: The Flow Action integration has a 60-second timeout that you cannot increase. This timeout prevents users from waiting for a prolonged period of time for the automation to load the screens.

Preprocessing automations

You can run automations from a flow action to retrieve information from an application that is running on a user's desktop and display that information in a window in your application.

In an example Pega Customer Service application, when a customer service representative (CSR) accepts a call from a customer, an automation runs on the CSR's desktop. The automation retrieves the customer information (for example, the address, name, phone number, and so on) from a legacy application that is running on the CSR's desktop and displays the account number and related information in Pega Customer Service.

Postprocessing automations

You can run a postprocessing automation to send information that users enter in your application to the applications that are running on the user's desktop.

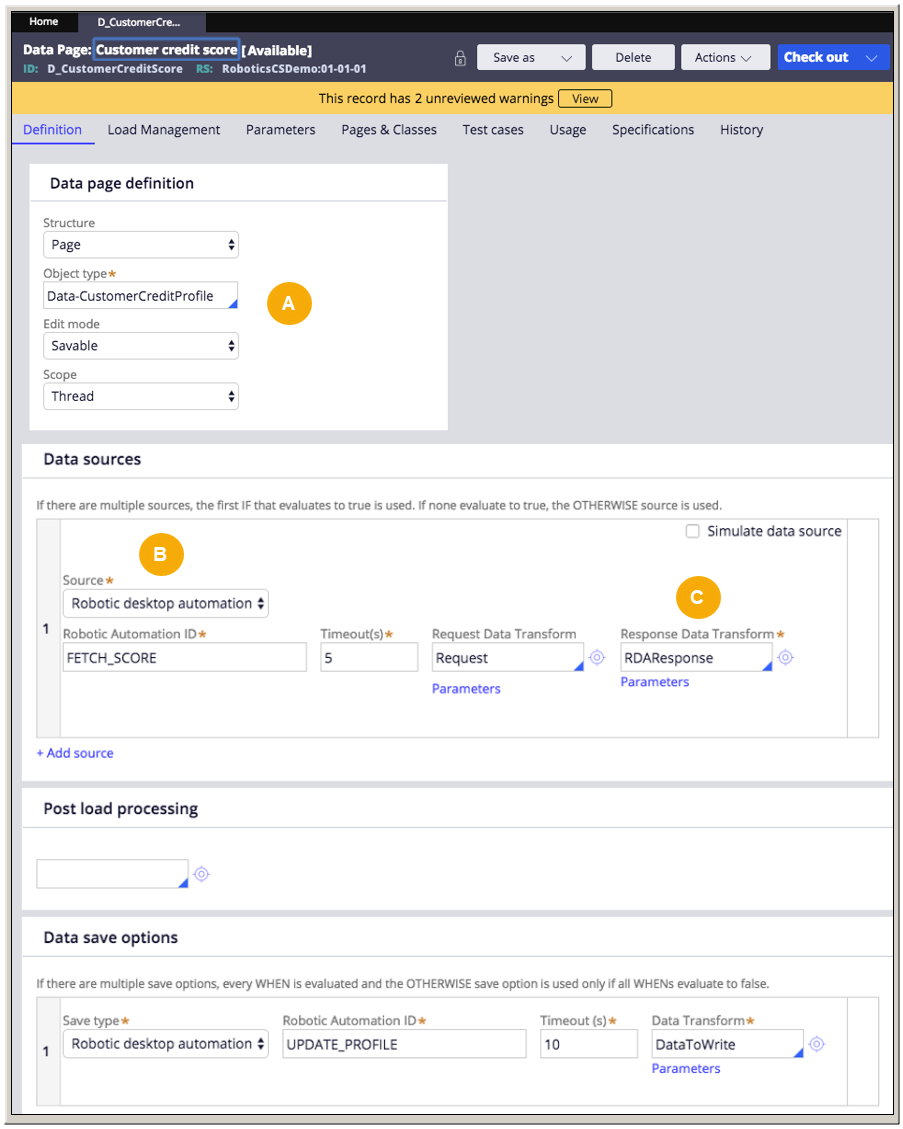
For example, a postprocessing action can send the updated address to another application running on the CSR's desktop. In another example, a customer can dispute a transaction in your application. A postprocessing action can send such dispute details as the transaction name or dispute reason to a legacy application.

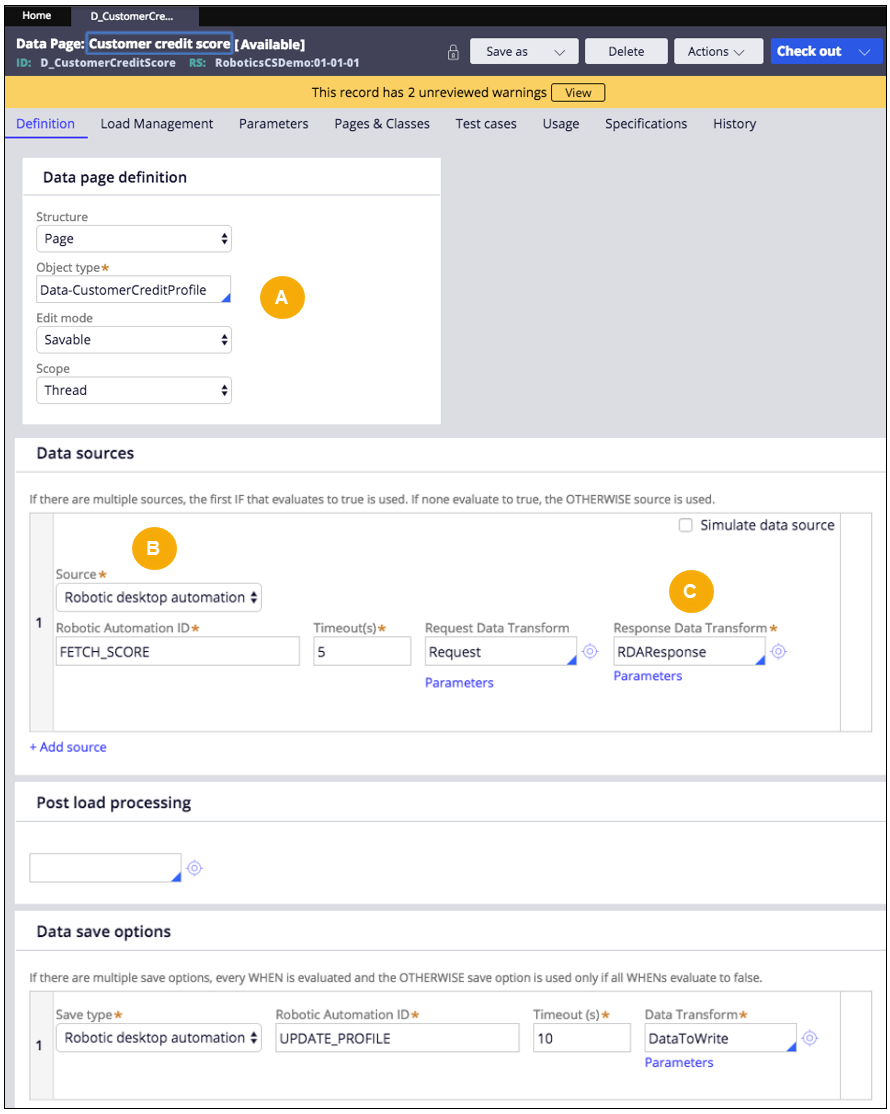
Data page integration

You can also source your automation from a data page in your application. Data pages provide automatic access to data by populating page and page list properties with relevant data, depending on the circumstances and your business use case.

For example, you can configure your automation to pull the customer FICO score from another application. The automation can load the score onto the data page and then populate fields in the CSR’s application.

See the following figure for example:


Home
D_CustomerCre...
Data Page: Customer credit score [Available]
ID: D_CustomerCreditScore RS: RoboticsCSDemo:01-01-01
Save as
Delete
Actions
Check out
This record has 2 unreviewed warnings
View
Definition
Load Management
Parameters
Pages & Classes
Test cases
Usage
Specifications
History
Data page definition
Structure
Page
Object type*
Data-CustomerCreditProfile
A
Edit mode
Savable
Scope
Thread
Data sources
If there are multiple sources, the first IF that evaluates to true is used. If none evaluate to true, the OTHERWISE source is used.
Simulate data source
B
Source*
Robotic desktop automation
C
1
Robotic Automation ID*
FETCH_SCORE
Timeout(s)*
5
Request Data Transform
Request
Parameters
Response Data Transform*
RDAResponse
Parameters
+ Add source
Post load processing
Data save options
If there are multiple save options, every WHEN is evaluated and the OTHERWISE save option is used only if all WHENs evaluate to false.
1
Save type*
Robotic desktop automation
Robotic Automation ID*
UPDATE_PROFILE
Timeout (s)*
10
Data Transform*
DataToWrite
Parameters



Sourcing automations by using a data page

This figure shows the following activities:

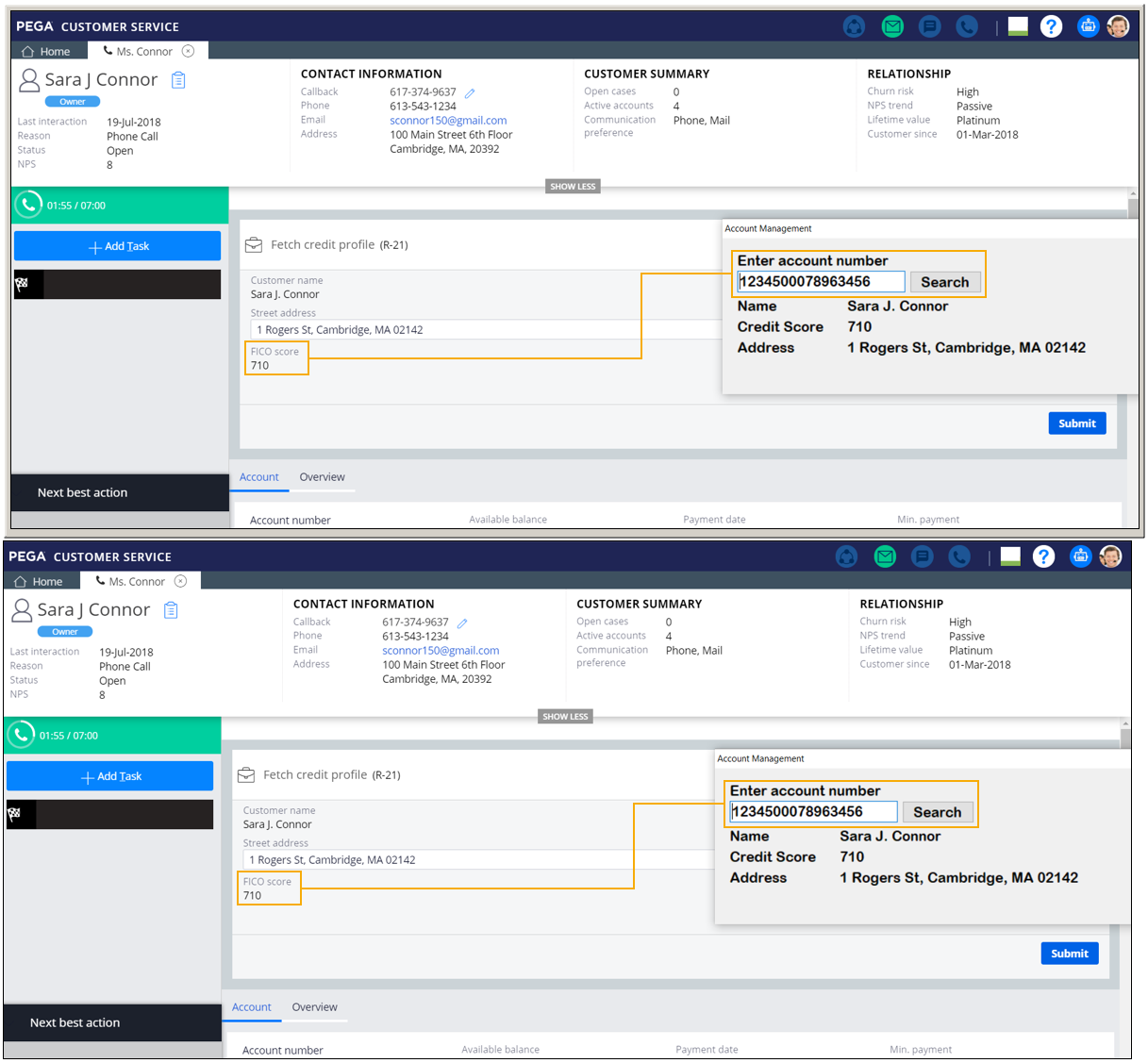
A - Configuring the data page by defining your data model and the edit mode.

B - Selecting Robotic desktop automation as the automation source and specify the automation activity ID for the robot to invoke. This value must match the ActivityName in the Robot Activity form in Robot Studio.

C - Mapping data into the robot by using the request transform. Map outputs back to your data model by using the response transform.

Note: Processing of Data Pages might take a prolonged time period to complete because assignment completion halts until the robot completes the work and returns the data to the data page. You can adjust the data page and the robot completion time by configuring the data page timeout.

In the preceding example, the automation pulls the customer's FICO score from a legacy application and loads it onto the data page. Then, the data populates the CSR's screen through a UI request, as shown in the following figure:



Displaying customer's FICO score by using an automation

Public automations

Public automations created in Pega Robot Studio can be easily invoked from within Pega Platform 8.2 (or later) applications. Use Dev Studio to create the Pega Platform application that invokes the automation, and then map the input and output parameters to Pega class fields. With public automations, you do not need to know class names when you develop automations using Pega Robot Studio.

Requirements

- Pega Robotic Automation 8.0 SP1 2029 or later
- Pega Platform 8.2 or later
- Pega Robot Manager 8.2 or later
- A compatible repository, such as Jfrog, S3, or Artifactory, for storing the published automation packages.

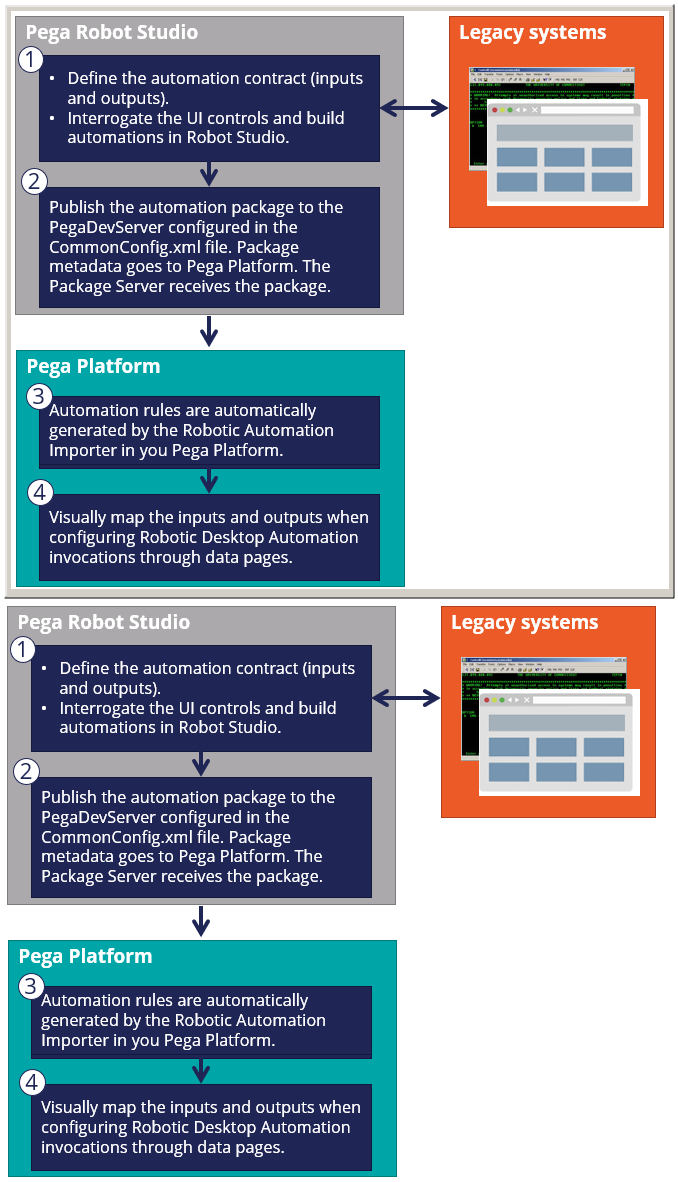
Before you begin

To use public automations, you must enable the PegaDevServer server type in the CommonConfig.xml file for Pega Robot Studio. Enabling the PegaDevServer server type sends package metadata to the PegaDevServer server instead of the RobotManager server. The CommonConfig.xml file is located in the C:\ProgramData\OpenSpan folder.

Note: When you update Robot Studio, the installer does not overwrite the CommonConfig.xml file. If you are updating from 8.0 SP1 2018 or earlier to version 8.0 SP1 2029 or later, before you update, you must manually add this server type or delete the C:\ProgramData\OpenSpan folder. For more information, see Common Configuration Settings.
The following line is an example:
<Server name="PegaDevServer" baseURL="https://DevPegaInstance.com/prweb" enabled=true" proxyAddress="" /> .

Automation creation

Use public automations to pass and return inputs and outputs. Creating a public automation generally follows the same process as any other automation, with a few exceptions. For more information, see the following illustration, which details the process of creating the automation and publishing it to the Pega Platform:



Pega Robot Studio
1
Define the automation contract (inputs and outputs).
Interrogate the UI controls and build automations in Robot Studio.
2
Publish the automation package to the PegaDevServer configured in the CommonConfig.xml file. Package metadata goes to Pega Platform. The Package Server receives the package.
Legacy systems
Pega Platform
3
Automation rules are automatically generated by the Robotic Automation Importer in you Pega Platform.
4
Visually map the inputs and outputs when configuring Robotic Desktop Automation invocations through data pages.

Creating public automations

Best Practices

When creating public automations in Robot Studio, keep in mind the following best practices:

- The name that you assign to public automations cannot include spaces.
- Public automations can only have one entry point and one exit point.
- You cannot move public automations outside of their folder.
- You can invoke public automations by using Robotic Desktop Automation (RDA) mechanisms from the Pega Platform.
- If, in a project, a RobotActivity and a public automation have the same name, the public automation takes priority when invoked through RDA.

Unattended vs. attended robots: Which robot to use?

When integrating robotics into your Intelligent Automation solution, you should carefully consider the right type of robot to use – attended or unattended. These are important considerations for architecting your overall solution because using the wrong type of robot can have a negative impact on the overall deployment. If a Pega Customer Service user is waiting too long for data to return from an unattended robot, or the Pega Customer Service user is having to wait too long for an attended robot to finish, it could lead to reduced satisfaction for the overall Pega implementation.

Ways to invoke an attended robot

1. Pre/post processing flow action step
    - Easily falls into the Pega application UI screens.
    - Has a 60-second time-out, which is the maximum reasonable amount of time to expect an attended user to wait.
2. Data page
    - Separates data access from the application rules, for a better overall design.
    - Has the ability to enter a custom time-out and this can be abused by developers and create an environment that is not realistic for a Runtime user.

Ways to invoke an unattended robot

1. Using the unattended robotic smart shape
    - Embeds the data access within a Pega application
2. Data page

- Allows for a modular approach to the Pega application.
- Note that this uses a one-stage, one-step case flow within the Robot Manager application.

Considerations for choosing between an attended or unattended robot

Is the automation collecting data that is needed in real-time or writing data to a legacy system?

If the automation collects data that is needed in real-time, then attended robots are best for the use case.The attended robot is always there for the user and no queueing (on Robot Manager) is involved.

If the automation writes data to a legacy system, consider an unattended robot. This allows the legacy application to be updated without slowing down the Runtime user. If the unattended robot should raise exceptions while processing, create a Pega work flow that allows the exceptions to be handled at another time.

How long does the automation take? Is the user of the automation working directly with a customer?

If the automation takes a long time to complete (60 seconds or more), then it is not a good practice to ask an attended Runtime user to sit by and wait for the automation to be done. Consider breaking up this automation or sending it to an unattended robot.

Can the applications be automated in the background?

In other words, what automation techniques need to be used? Are SendKeys/OCR involved that will take the mouse or keyboard away from the user?

If the application can be performed in the background using Deep Robotics methods only, and does not require any OCR or SendKeys calls, then this is a great attended use case. If OCR and SendKeys are required, consider doing this as an unattended automation.

Rethinking work flows to minimize any negative impact to the attended user

- Navigate applications to screens that may be needed as the call begins. For example, search for customer in all applications at the beginning of the call, even if you do not know that the application will be needed during the call.
- Avoid one monolithic attended automation that takes too long. Separate it into multiple automations that are invoked from various steps within the Pega application. Here is an example:
  - Automation 1: Open the application and navigate to the customer information at the start of the call.
  - Automation 2: Retrieve the current customer information available for user to see as the Runtime user determines why the customer has called.
  - Automation 3: Update the legacy applications with data received from the customer.
- If user input is required during the attended automation, it should be entered through a user interface in the Pega application and not through data entry forms created using Robot Studio or the applications being automated. By returning control to the Pega application, the timing for the data entry will not fall under the 60-second maximum.

Introduction to building solutions

Pega Robot Studio lets you create solutions that integrate and automate desktop applications without writing code. When creating solutions, you go through many of the same logical steps and practices required by software programming.

Designing solutions based on user actions

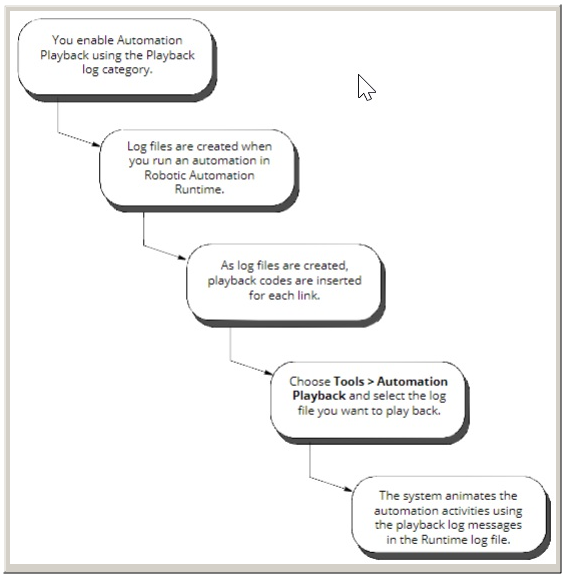
Capture the sequence of actions you want to automate in a series of screen shots and make a note of all your keyboard and mouse interactions. The more detail you capture, the easier the design and testing process will be. Base your solution design on the user interactions with the applications and processes you plan to automate. Remember, each automation in your solution must begin with an event. Therefore, user and system actions play an important role in solution design.

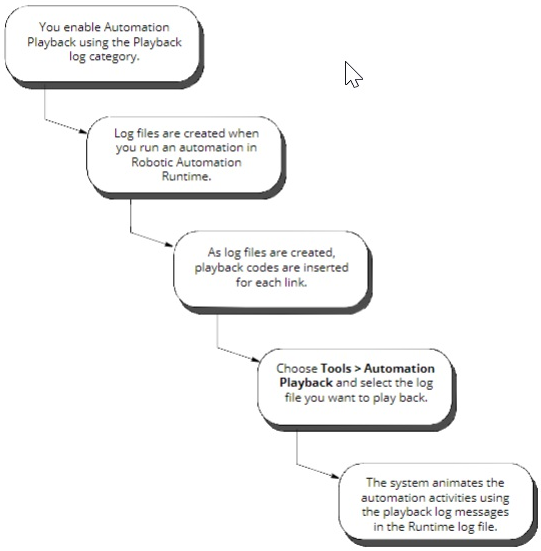
For more information, see Building Solutions.

Introduction to Automation Playback

The Automation Playback feature lets you animate the automation activities in Runtime log files so you can better see what is happening as your automations are executed. Automation Playback also works with files generated with the Log4Net Publisher.

This illustration shows how Automation Playback works.





For more information, see Using Automation Playback.

Introduction to using PDF files in automations

Build 19.1.14.0 greatly enhances your PDF processing capabilities. The new visual designer makes working with PDF files much easier because you can visually identify the items within the file that you want to automate. Once identified, these items appear in your Object Explorer so that you can use them directly in your automation. With this functionality, you can perform the following actions:

- Read and write to form objects (items that users can edit in a standard PDF editor) in your automation, similar to what you would do with an interrogated adapter control.
- Use Optical Character Recognition (OCR) to detect whether an image-based document has any check marks, signatures, or both at known locations.
- Automatically detect tables within PDF files based on intersecting lines and extract the information in those tables into a data table for use in your automation.
- Use the reconciliation mode to quickly automate a workflow. In this mode, Robot Runtime users can see the data elements that are extracted from a file and update those elements if required.

For more information about using PDF files in Pega Robotic Automation 19.1, see Incorporating PDF files in automations 19.1.

For more information about using PDF files in Pega Robotic Automation 8.0 and 8.0 SP1, see Incorporating PDF files in automations 8.0 and 8.0 SP1.

Introduction to Screen OCR capabilities

Pega Robotic Automation includes the ABBYY® Fine Reader Engine (FRE) to provide the following optical character recognition (OCR) capabilities:

- To convert images of application screens into text, so Robot Studio can find key words and you can automate those applications based on the key words. This is known as screen-scraping. For more information, see Creating automations using the Screen OCR feature.
- To convert image-based PDF files into text. After you use Robot Studio to convert the image-based PDF files into text using the Document OCR component, you can use the Robot Studio PDF component to extract data. You can use the resulting data in your automations. For more information, see Incorporating PDF files into your automation using Pega Robot Studio.

Note: Robot Studio does not provide direct access to the Fine Reader Engine from the automation surface. Instead, communication between Robot Studio and the ABBYY Fine Reader Engine is handled internally.

Screen scraping

The Screen OCR feature uses an image of the application to find the location of the controls that are used in the automation. The image is processed by the Fine Reader Engine, which is an OCR library that is included in Pega Robotic Automation. This library tells the system where key words are located on the screen, so you can use Robot Studio methods to click, double-click, get, and set text relative to those key words. In most cases, Robot Studio's interrogation capabilities provide a better way to automate applications, but screen-scraping is included to provide you the maximum flexibility when automating applications.

Working with PDF files

When text-based documents, like Microsoft Word documents, are converted into PDF files, the text is retained and can be directly extracted from the PDF file using Robot Studio's PDF component. This process does not require the use of OCR. You can find the PDF component in the Robot Studio Toolbox.

If the PDF file is actually a form that is filled out using Acrobat Reader or a similar tool, Robot Studio can extract the data from the form fields using the PDF component and produce excellent results. This process does not normally require OCR, but can include some OCR functionality, like checking for a signature. The PDF component uses the Fine Reader Engine to check signatures.

Some PDF files only contain an image of the text. This usually happens when the PDF was created from a fax or a scanned document. To extract the text from these image-based PDF files for use in an automation, use the Document OCR component. This component is also found in Robot Studio's Toolbox. The Document OCR component uses the Fine Reader Engine to process the image to create a text-based PDF file. You then extract the data from the new PDF file using the PDF component.

If the PDF file was printed and data was handwritten onto the form and then scanned or faxed, the results can vary widely. Handwritten text is not supported, but the Fine Reader Engine system can detect that a signature is present and interpret handwritten check marks.

No matter which method is required, incorporating a verification process may be an essential part of your automation strategy. The Reconcile method, available in the PDF component, makes it easy to incorporate the reconciliation process into your automation workflow.

Introduction to UI Connectors

Use the UI connectors feature to develop translators for .NET and Java applications and extend support for additional controls. With this feature, you build the integration points that provide the ability to automate the controls for an application.

- Mimic the power and control that Robot Studio provides out-of-the-box.
- Map the properties and methods of a control to the standard items used by automation developers.
- Use when you interrogate an application and the application controls are not identified.

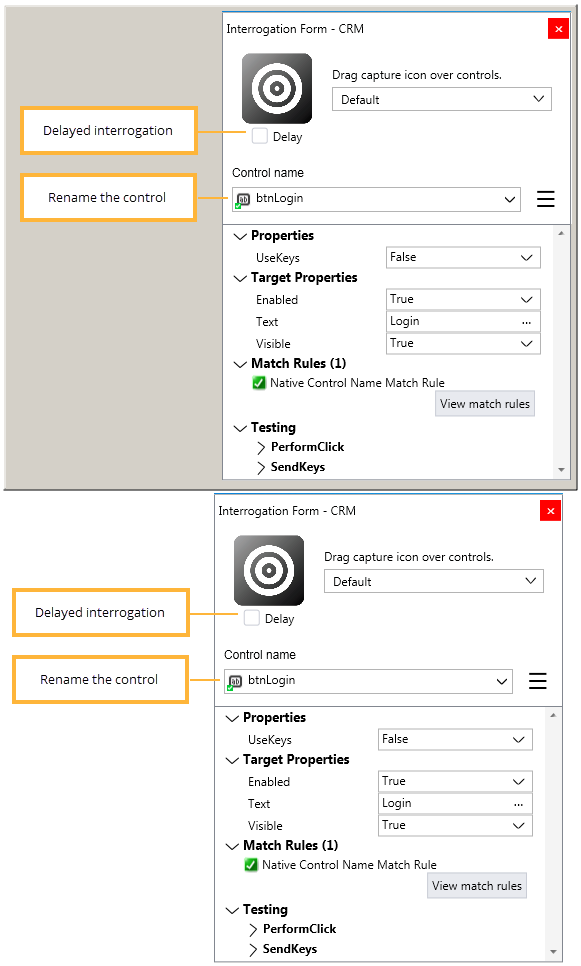
For more information, see Creating UI Connectors.

Introduction to the Interrogation Form

Beginning in build 19.1.34, the Interrogation Form provides the most common functions directly on the form. Robot Studio minimizes when you begin an interrogation, so that you can focus on the Interrogation Form and the application. You can rename controls, highlight controls, delete controls, modify properties, and test modifying target properties and methods directly from the Interrogation Form. Only when you need to perform the most advanced features, such as editing match rules or working with the Windows, Web, or Virtual controls tab, is returning to Robot Studio necessary.

The Interrogation Form also adds a new delayed interrogation feature. You can start a timer and then navigate the application. When the timer expires, the currently selected control is interrogated. This makes it easier to interrogate controls that hide automatically when they lose focus.

The following figure calls out two convenient features of the Interrogation Form.

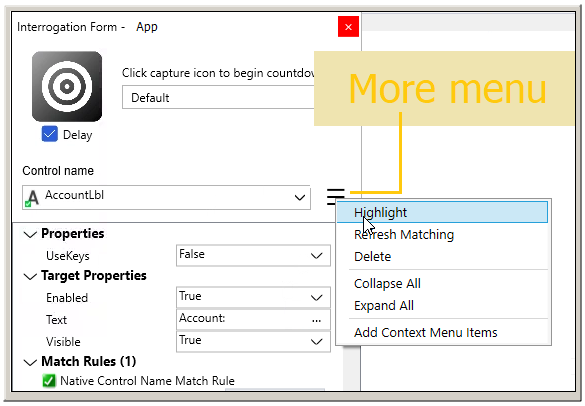


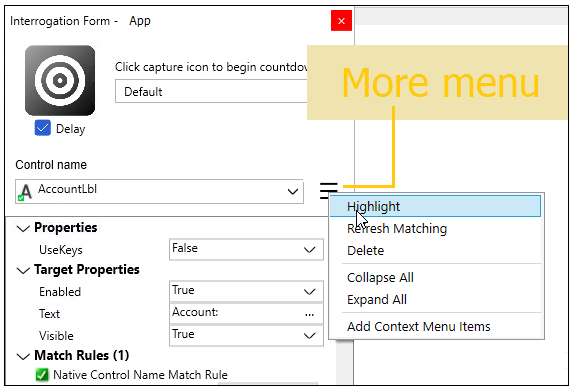
You can still complete all of these tasks in Robot Studio; however, the Interrogation Form can save time and mouse clicks as you complete these tasks.

For more information, see Enhanced Interrogation Form.

Working with interrogated controls: the More menu

When working with controls on the Interrogation Form, additional functionality (such as highlighting a control or refreshing match rules) is available under the More menu, next to the Control Name field.





More menu

Highlighting a control

Perform the following steps to highlight a control so you can identify it. To use the Highlight feature, the control must be currently matched.

1. From the Control name drop-down list, select a currently matched control.
2. Click the More menu and then click Highlight.

A box briefly flashes around the selected control.

Refreshing matching

If you change match rules or other properties, or a control is not currently matching, you can refresh the matching to make Robot Studio rematch the control.

1. From the Control name drop-down list, select a control.
2. Click the More menu and then click Refresh Matching.

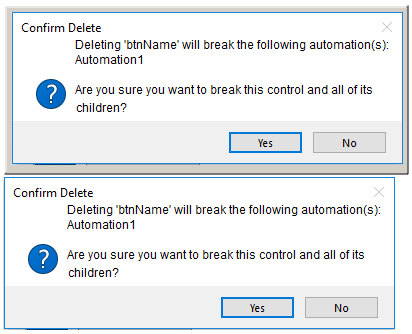
The matching status of the control is updated (if it changes).

Deleting a control

To delete a control, select it as the current control. If the control is used in an automation, you receive a warning that automations can get broken, giving you an opportunity to cancel the deletion.

1. From the Control name drop-down list, select a control.
2. Click the More menu and then click Delete.

- If the control or any of its children are not used in any automation, you are prompted with a simple confirmation message. Click Yes to delete the control.
- If an automation does use the control or any of its children, you receive the following message. Clicking Yes can break the listed automations.



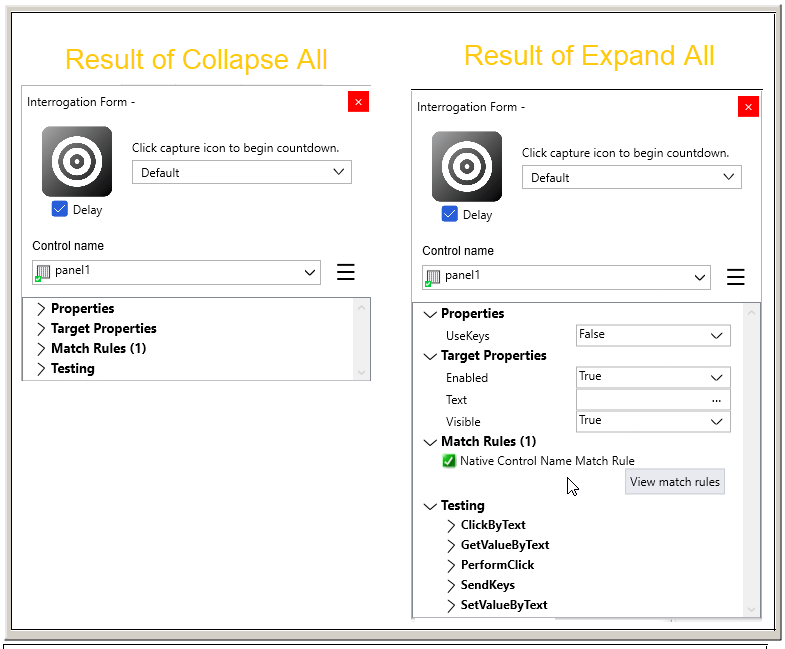
Confirm delete

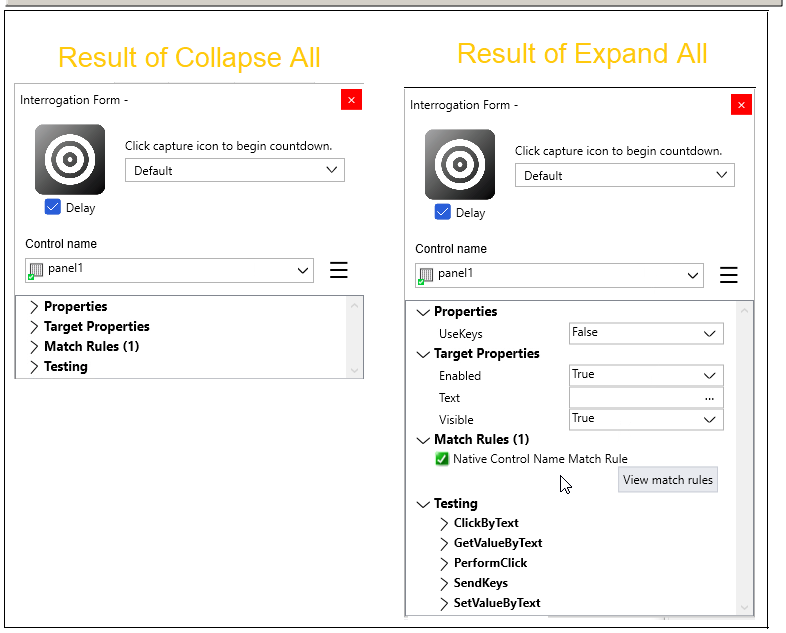
Collapse All/Expand All

Use the Collapse All or Expand All options to open or close the four main groups on the Interrogation Form:

- Properties
- Target Properties
- Match Rules
- Testing

1. On the Interrogation Form, click the More icon.
2. In the More menu, click either Expand All or Collapse All.





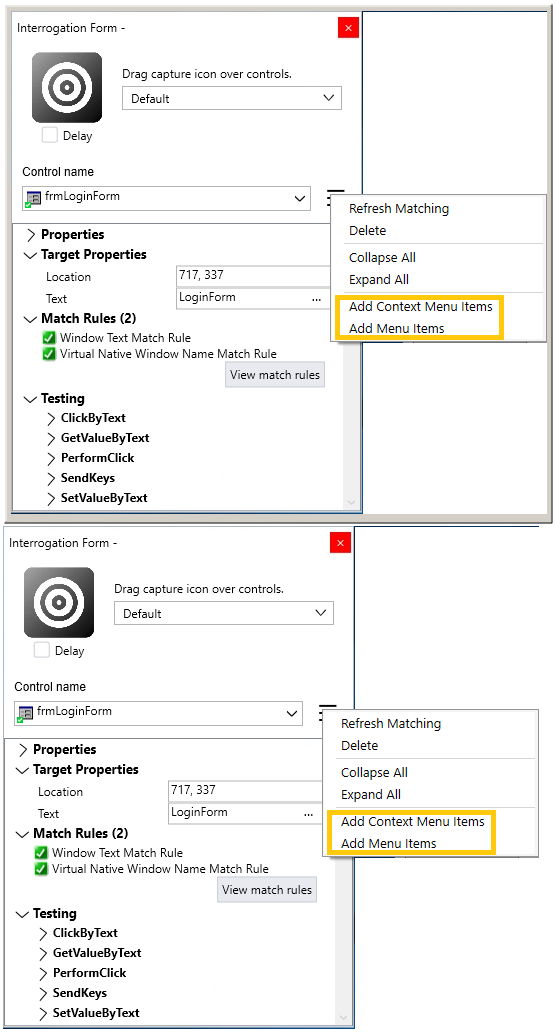
Expand All/Collapse All

Adding Context Menu/Menu items

Container controls often have menus or context menus associated with them. When a control has a menu, the Add Menu Items or the Add Context Menu Items option is available.

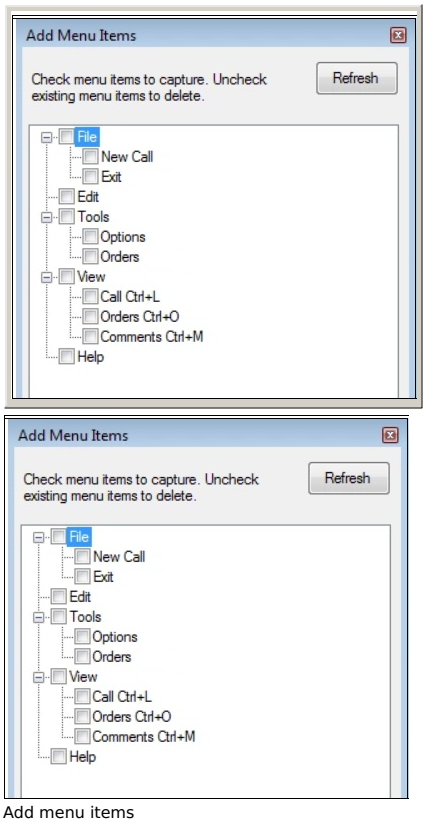
To add menu items to the list of interrogated objects, perform the following steps:

1. From the Control name drop-down list, select a container control.
2. From the More menu, select either Add Menu Items or Add Context Menu Items.



Add items menu

3. In the Add Menu Items or Add Context Menu Items window, select the options that you want to add to the list of interrogated controls. Uncheck options to remove them from the list of controls.



Add menu items

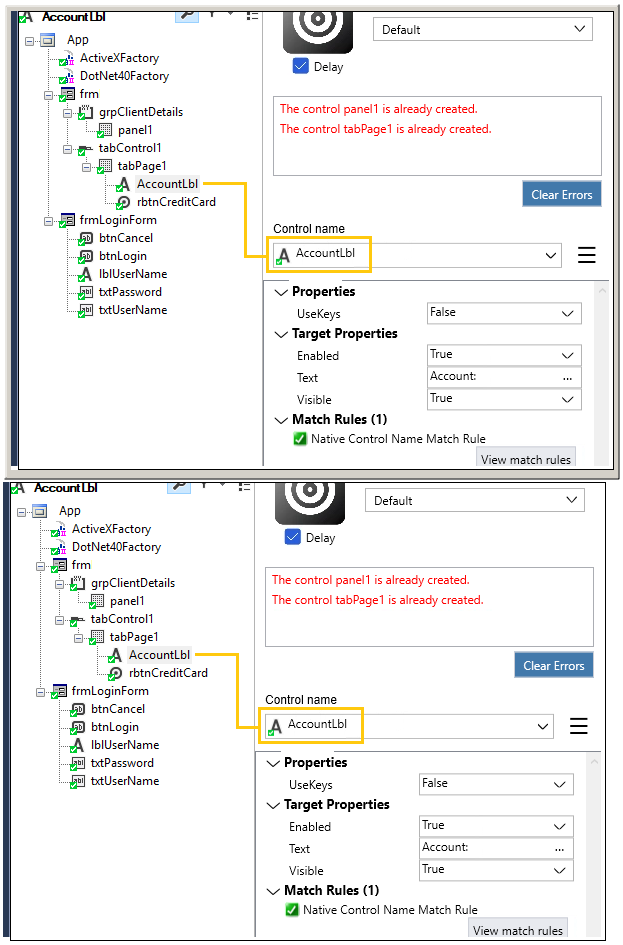
4. Based on your selections, Robot Studio updates the menu options in the list of controls for the automation (in the Interrogation Form and Object Explorer).

Interrogating and renaming controls

After you interrogate a control, the new control becomes the current control and is selected in the Control name box on the Interrogation Form. The cursor moves to the Control name box field, so that you can rename the control before interrogating the next control. You can also modify any of the standard properties that are associated with the control.

To test how an automation works with the control, you can modify the target properties. When modified, these properties directly affect the behavior of the application, so use caution. A common test is to set the Text property to see how other controls react. You can also use the Testing section to execute a select list of methods on the control. All of these tests enhance your understanding of how the application behaves when automated.

Note: Controls that can be selected on the Interrogation Form can also be found on the Object Explorer in Robot Studio.



Change control name

Interrogating and renaming controls after interrogation

1. To interrogate a control, drag the bullseye in the Interrogation Form to the target control in the application. The control is created and becomes the current control in the Interrogation Form. The cursor moves to the Control name field.
2. In the Control name field, enter a new, more descriptive name as required.
3. To save your changes, press Enter or move the cursor out of the Control name field to save the change.

Interrogating disappearing controls

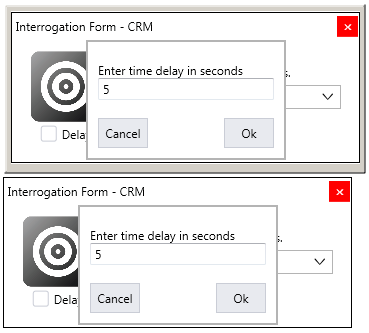
Some controls disappear when they lose focus, making it difficult to interrogate the control. This often happens with menus in applications. Select the Delay option below the bullseye to set a countdown timer that starts when you click the bullseye. This gives time to navigate the application to the desired control - you will see controls highlighted beneath the mouse as in normal interrogation mode. When the timer elapses, the system interrogates the selected control.



Delay checkbox

Enabling the delayed interrogation feature

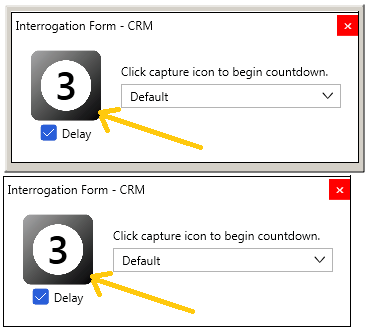
1. Select the Delay check box.
2. In the popup window, change the time-delay setting to the number of seconds the countdown timer should use, and then clickOK.



Performing delayed interrogation

1. Click the Delay bullseye. The timer starts counting down.
2. Navigate the application to the control that you want to interrogate and make sure it is highlighted.

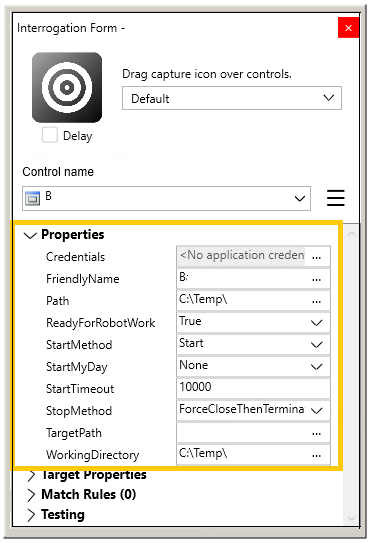
When the timer expires, Robot Studio interrogates the highlighted control.

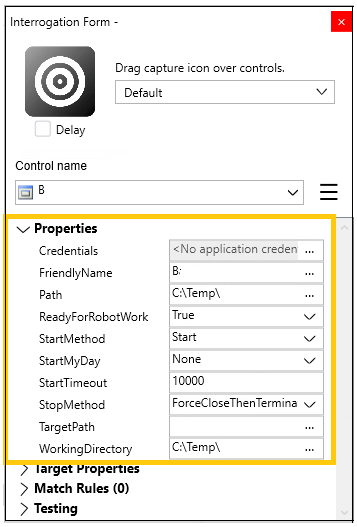


Delayed interrogation timer

Changing control properties with the Interrogation Form

After interrogating and renaming a control, you can modify the standard or target properties within the Interrogation Form.





Standard properties

Modifying standard properties

From the Interrogation Form, you can modify property values that are also available on the standard property grid for the current control. When you expandProperties, only standard properties appear here. To see the full list of properties, switch to Robot Studio.

Modifying target properties

Target properties are the properties of the interrogated control within the application. Some commonly used target properties are: Text, InnerHtml, OuterHtml, Enabled, and Visible. Altering the values of these properties changes the value of the control within the application, so you can perform automation testing while you are interrogating. Note that editing target properties to invalid values could have a negative impact on the application. When used with the methods in the Testing section, you can simulate most steps that you would perform in automation.

For more information, see Testing a control.

Reviewing Match Rules

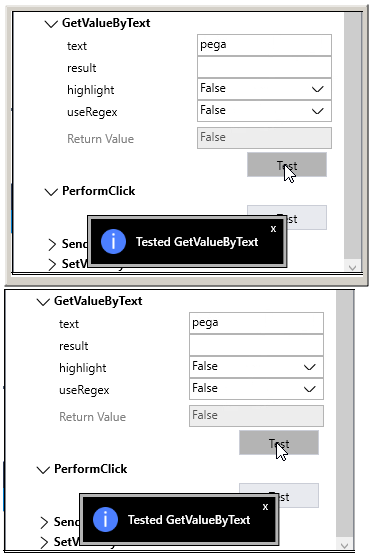
The Match Rules section shows you the match rules that the system assigns to the current control and whether they are currently matched. You cannot directly edit the match rules in the Interrogation Form. Clicking on View match rules maximizes Robot Studio and allows you to edit the match rules. When you finish editing the rules, minimize Robot Studio and you are returned to the Interrogation Form.

For more about editing match rules, see Modifying Match Rule Properties.

Testing an interrogated control

You can use a selected list of methods on the Interrogation Form to test the current control. The list of available testing methods depends on the type of control selected.

By testing methods and modifying target properties, you can simulate automation during interrogation. You can switch between controls by changing the current control on the Interrogation Form. Use this feature to test logging into an application, performing application navigation, and other use cases.



Testing methods

1. In the Interrogation Form, highlight the control you want to test.
2. Expand the method you would like to test and fill in the required parameters.
3. Click Test.

A message displays that the test was executed.

Introduction to data components

Using data components lets you include data from external data sources into a Pega Robot Studio solution.

The important element when using data components is the placement of data. If you plan to bind data to a visual component such as a list box or data grid, add table views to the form that contains the visual components. Add queries to the Global Container item.

For more information, see Using data components.

Introduction to match rules

Every time an application runs, a new user interface is rendered by the underlying program. To users, the interface appears the same because certain characteristics, such as the type and position of user interface elements like labels, buttons, and drop-down lists, remain the same. However, from a technical perspective, the user interface elements are different for every instance of the application.

To automate an application, a Robot Studio developer must identify a user interface element across multiple application instances, just as a user would. Additionally, the developer must distinguish between unchanging or persistent data that should be used to identify an element, and changing or transient data that should be ignored.

Robot Studio provides an advanced matching system that uniquely identifies user interface elements across multiple instances of an application using a set of rules that capture the necessary persistent data. You can customize matching behavior by adding, removing, or modifying these match rules.

For more information, see Using match rules.

Introduction to translators

Pega Robotic Automation lets you integrate applications at the desktop through your user interfaces. To integrate with an application, Pega Robot Studio injects code within the target application that directly interacts with the application's objects. Robot Studio does not require the target application to be recompiled or modified in any way.

Robot Studio supports a number of platforms and controls including Windows common controls, Internet Explorer HTML controls, Visual Basic, Java, and .NET. In some cases, however, you have to create a special object, known as a translator, to expose a user interface element to Robot Studio.

For more information, see Understanding translators.

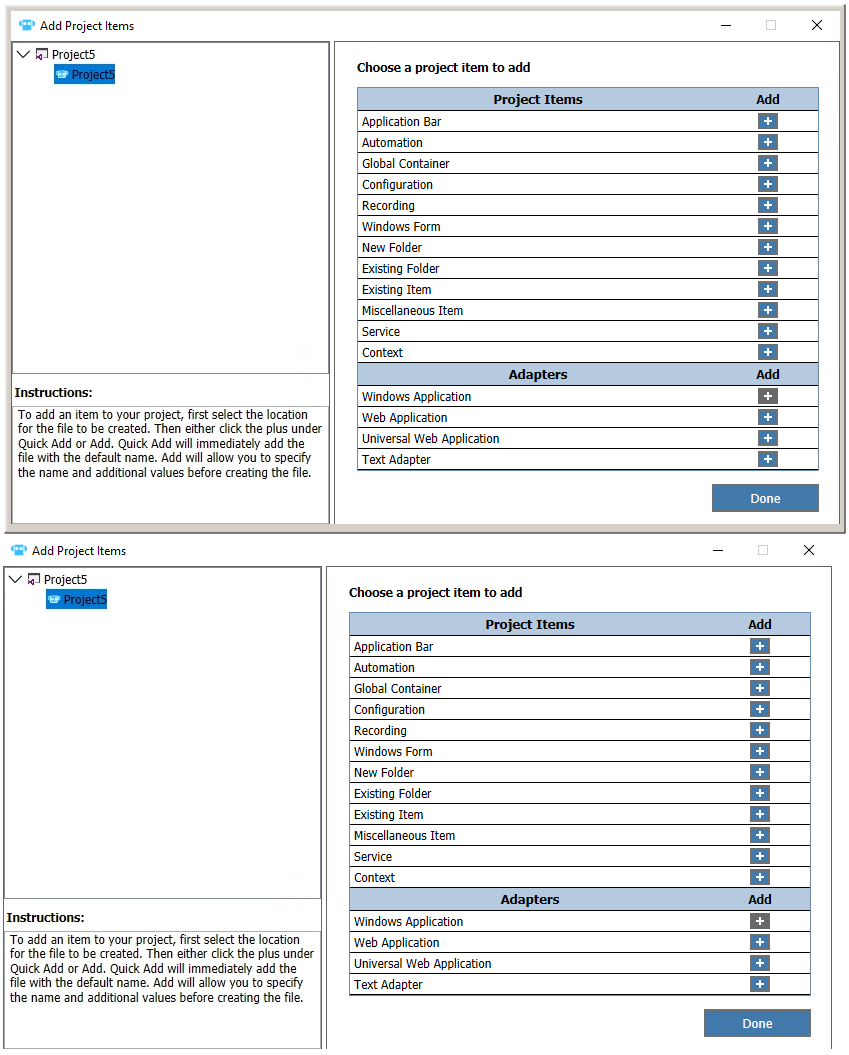
Introduction to the New Project Wizard

The New Project Wizard lets you quickly create and configure new projects that are part of your Pega solution. You can add adapters, automations, and other project items, and even configure properties on the project items and add components to automations. Adding multiple project items is easy when done through the wizard—you can continue adding items through the same interface until you are done.

The wizard allows you to set important properties on your project items when you create them, if you choose to. For example, on a web adapter you can set theStart Page, the Start method, the Start My Day option, and the Friendly Name when adding the adapter.

There are shortcuts for adding commonly used components to Global containers and for creating Configurations.

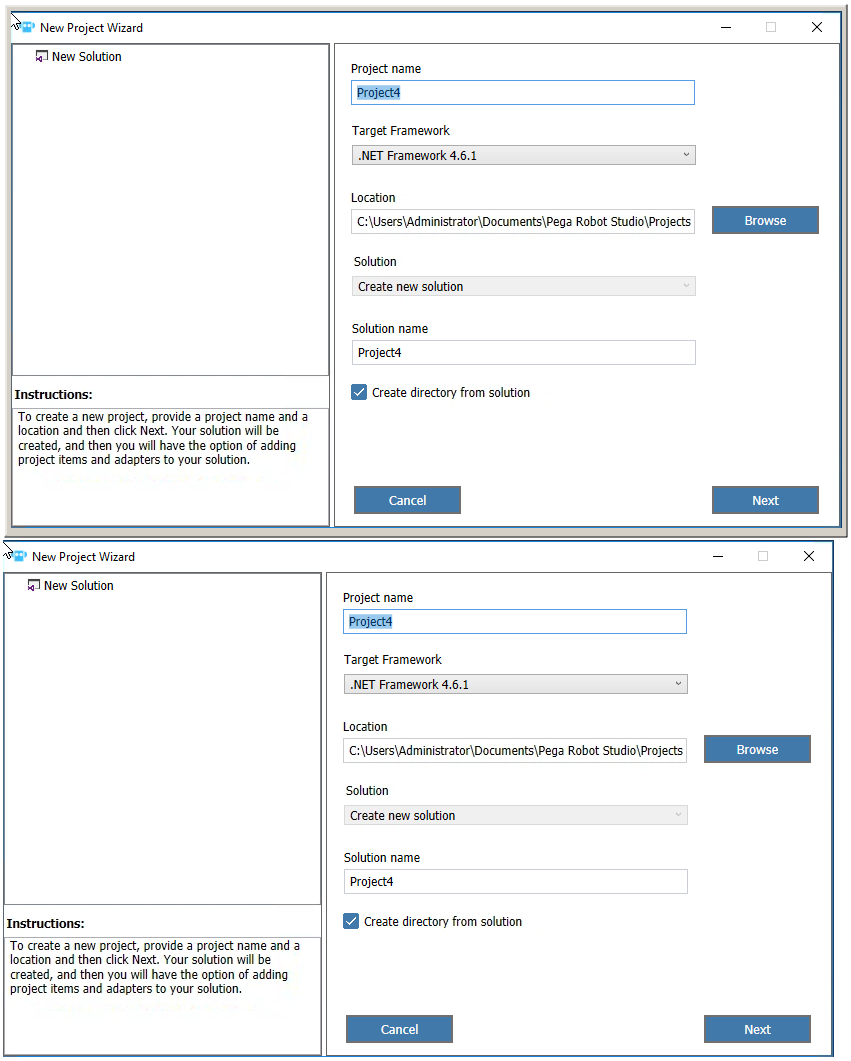
And finally, the wizard adds the ability to add automations using automation templates that you can create.



For more information, see Using the New Project Wizard.

Creating a project with the New Project Wizard

Use the New Project Wizard to create a project and define multiple project items.



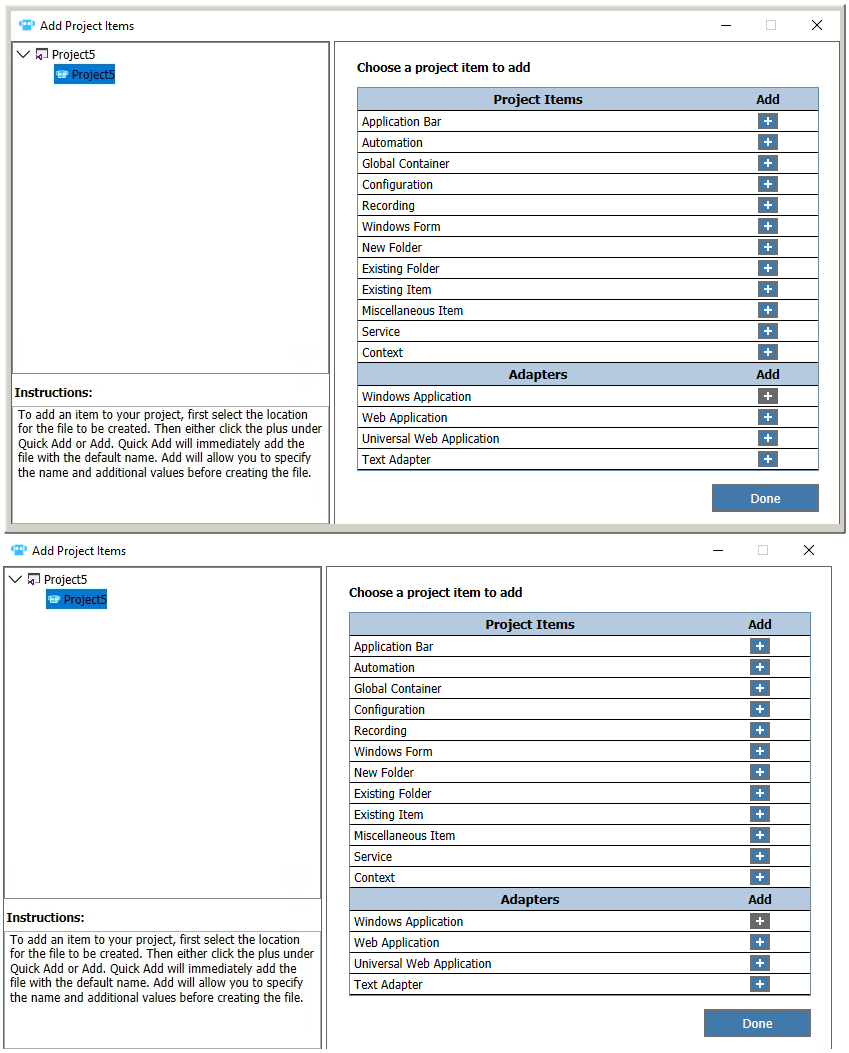
New Project Wizard

1. On the File menu, click New > Pega Robot New Project Wizard.
2. In the New Project Wizard dialog box, in the Project Name field, enter a descriptive label for the project.
3. In the Target Framework list, select the .NET Framework version that you want to use for your project. The list contains the .NET Framework versions that are installed on your computer; the latest version is the default selection, and is rarely changed.
4. In the Location field, specify the directory where you want to store your project files. This field defaults to the folder where Robot Studio documents are stored—a Projects folder in MyDocuments under the Robot Studio or Visual Studio 2015 folder.
5. Choose to create a new solution, or add this project to an existing solution. When no solution is open, the only option is Create new solution. When a solution is open, the default is Add to solution.
6. For new solutions, in the Solution name field, enter a descriptive label for the new solution. (This option and the next one are only available when creating a solution.)
7. For new solutions, to name the folder based on the name of the solution, select the Create directory from solution check box.
8. Create the project and start adding items by clicking Next.

For more information, see Using the New Project Wizard.

Adding a project item with the New Project Wizard

Adding project items to your solution is performed on the second page of the wizard. The Project Items page can also be displayed by selecting Add Project Items from the project context menu. You can add multiple items from this page.



New Project Wizard

1. Click the Add (+) button beside the item you want to add.
2. From the list on the left, select the parent folder for the item.
3. Fill in additional fields, as needed. When you click Add, you return to the wizard to continue adding project items.

Types of Project Items

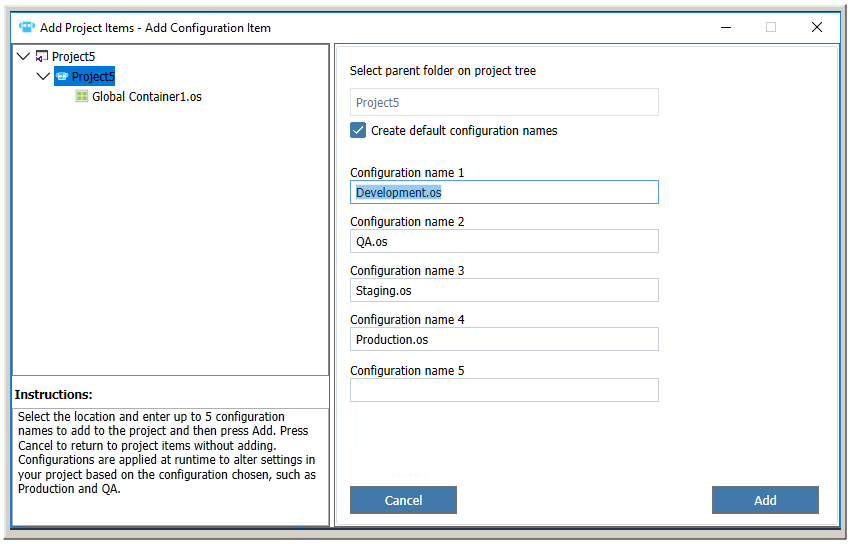
Project item	Description	Options
Application bar	Use an Application Bar as a special Windows form that you can dock on one side of the window. It can claim a portion of the desktop or overlay existing applications.	Parent folder Application Bar name
Automation	Use Automations to create logic for executing Studio integration, automations, and events projects.	Parent folder Automation name Available Templates For more options, see Adding an automation.
Global container	Use a Global Container to add items to a project that are accessible throughout the project. Add global variables and utility components here.	Parent folder Global Container name Defaults: Diagnostic Log, Message Dialog, String Utils For more options, see Adding a global container.
Configuration	Use Configuration files to modify a set of property values in a solution at run time. A common use for Configurations is to change URLs or application paths of adapters, depending on whether the solution runs in a production environment or a QA environment.	Parent folder Create default configuration names For more options, see Adding a configuration.
Windows form	Use a Windows Form project to construct a form for interacting with a user. This form is based on the .NET Framework System.Windows.Forms library.	Parent folder Form name Form title Show on startup Form border style Start position

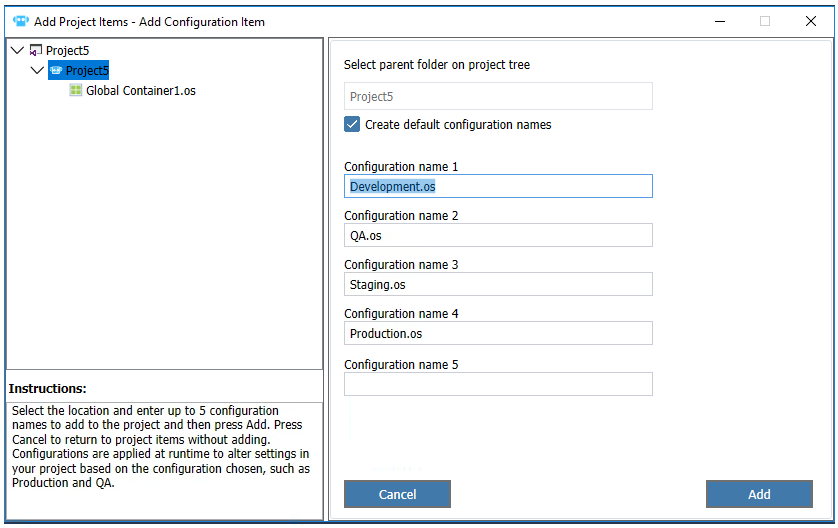
New folder	Use the New Folder project item to organize project items in Solution Explorer. Robot Studio saves project items to corresponding Windows folders on disk. Use folders to create a Solution Explorer hierarchy based on tasks.	Parent folder Folder name
Existing folder	Use the Existing Folder project item to browse to and copy an existing folder into your project.	Parent folder Existing folder to copy Name
Existing item	Use an Existing Item to browse to a project item and copy it into your project.	Parent folder Folder name See Adding an existing item for more options.
Miscellaneous item	Use this option to add bitmap, icon, text, or XML files to your project.	Parent folder File name File type
Service	Use the Service project item to create a Windows Communication Foundation (WCF) service that uses automations as web service endpoints.	Parent folder Service name
Context	Use the Context project item to create a container for other project items and specify where those project items run. When you run part of a solution on a Citrix server, you create a Citrix context for the parts of your project that run on the Citrix server.	Parent folder Context type
Windows app	Use the Windows App project name to create an integration with a Windows application. Use interrogation to define the application elements to use in your automations.	Parent folder Name Path Working directory Start method Ready for robot work Start my day Friendly name
Web app	Use a Web App project item to create an integration with a web application that runs in Internet Explorer. Use interrogation to define the application elements to use in your automations.	Parent folder Name Start page Start method Ready for robot work Start my day Friendly name
Universal web app	Use a Universal Web App project item to create an integration with a web application that runs in Chrome or Firefox. Use interrogation to define the application elements to use in your automations.	Parent folder Name Start page Start method Ready for robot work Start my day Friendly name
Text adapter	Use the Text Adapter project item to create an integration with an application that runs in a HLLAPI compliant emulator. Use interrogation to define the application elements to use in your automations. For more information, see Text application integration.	Parent folder Name Adapter type DLL name Screen definition Start my day Friendly name Session ID

For more detail, including a description of each type of project item and the available options, see Using the New Project Wizard.

Adding a configuration with the New Project Wizard

You can add Configuration names or Create default configuration names for Development, QA, Staging, and Production.





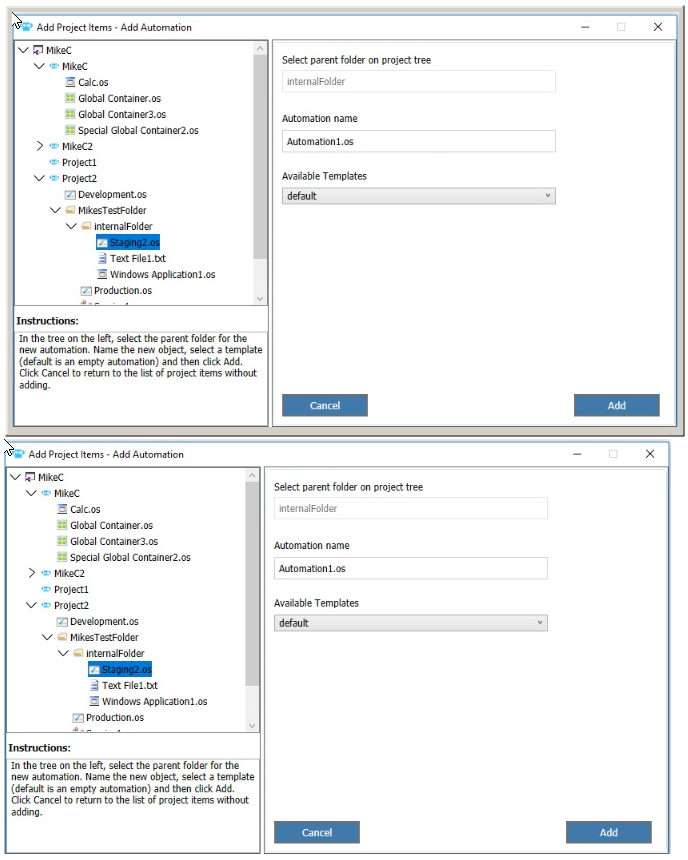
Adding a configuration

1. In the Add Project Items page, in the Configuration row, click the Add button.
2. From the folder list on the left side, select the parent folder for this configuration.
3. Add up to five configurations by entering configuration names in the boxes. Optionally, you can click Create default configuration names to populate the first four entries with Development, QA, Staging, and Production.
4. You can edit these names to suit your needs. Configurations are only created if a Configuration name is present.
5. Add configurations for each entry by clicking Add.

For more information, see Using the New Project Wizard.

Adding a new automation in the New Project Wizard

You can add an automation to your project in the New Project Wizard, using an existing project for a template, if desired.



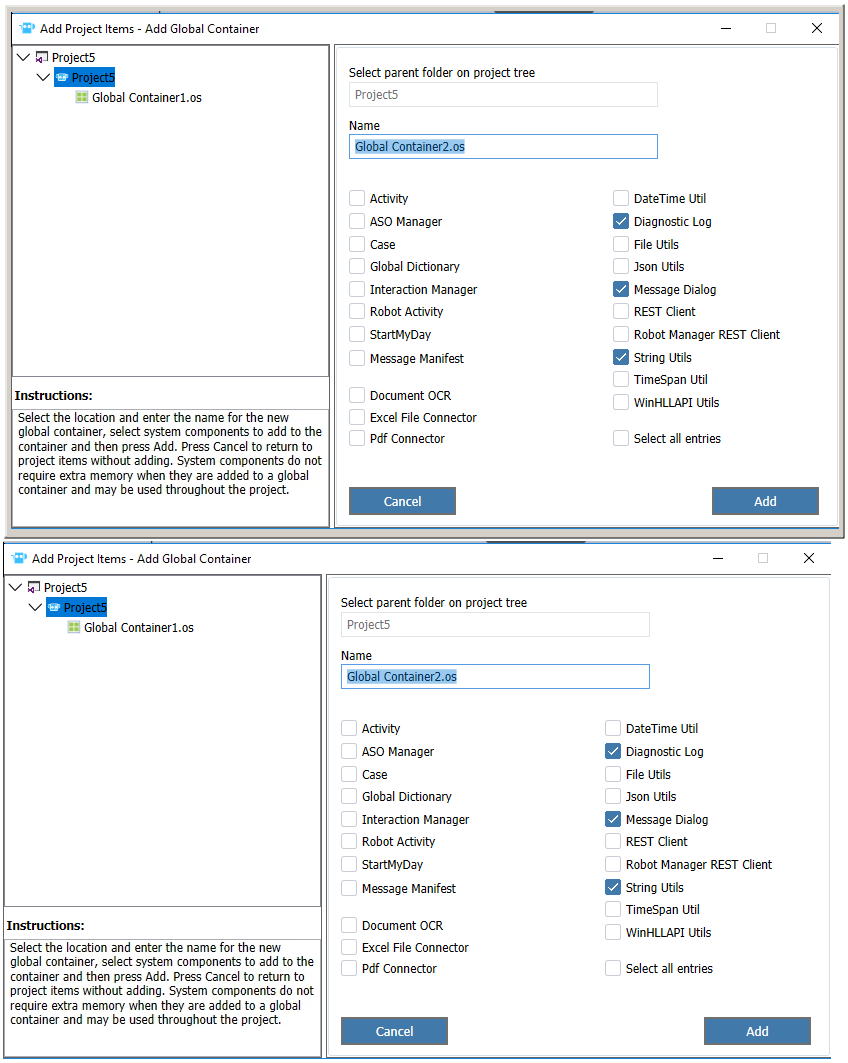
Adding an automation

1. In the Add Project Items page, in the Automation row, click the Add button.
2. In the folder list on the left side, select the parent folder for this automation.
3. In the Automation name field, enter a unique and descriptive name for your automation.
4. In the Available Templates drop-down list, select a template to use for this automation. Or, to create an empty automation, leave Available Templates set to default.

Templates are created from existing automations, and stored in the Templates folder at %appdata%\Pegasystems. For more information, see Using the New Project Wizard.

Adding a global container with the New Project Wizard

Use a Global Container to add items to a project that are accessible throughout the project, including global variables and utility components.



Adding a global container

1. In the Add Project Items page, in the Global Container row, click the Add button.
2. In the folder list on the left side, select the parent folder for this Global Container.
3. In the list of utilities, select the check boxes for system utilities to add to the Global Container.

By default, these options are selected:

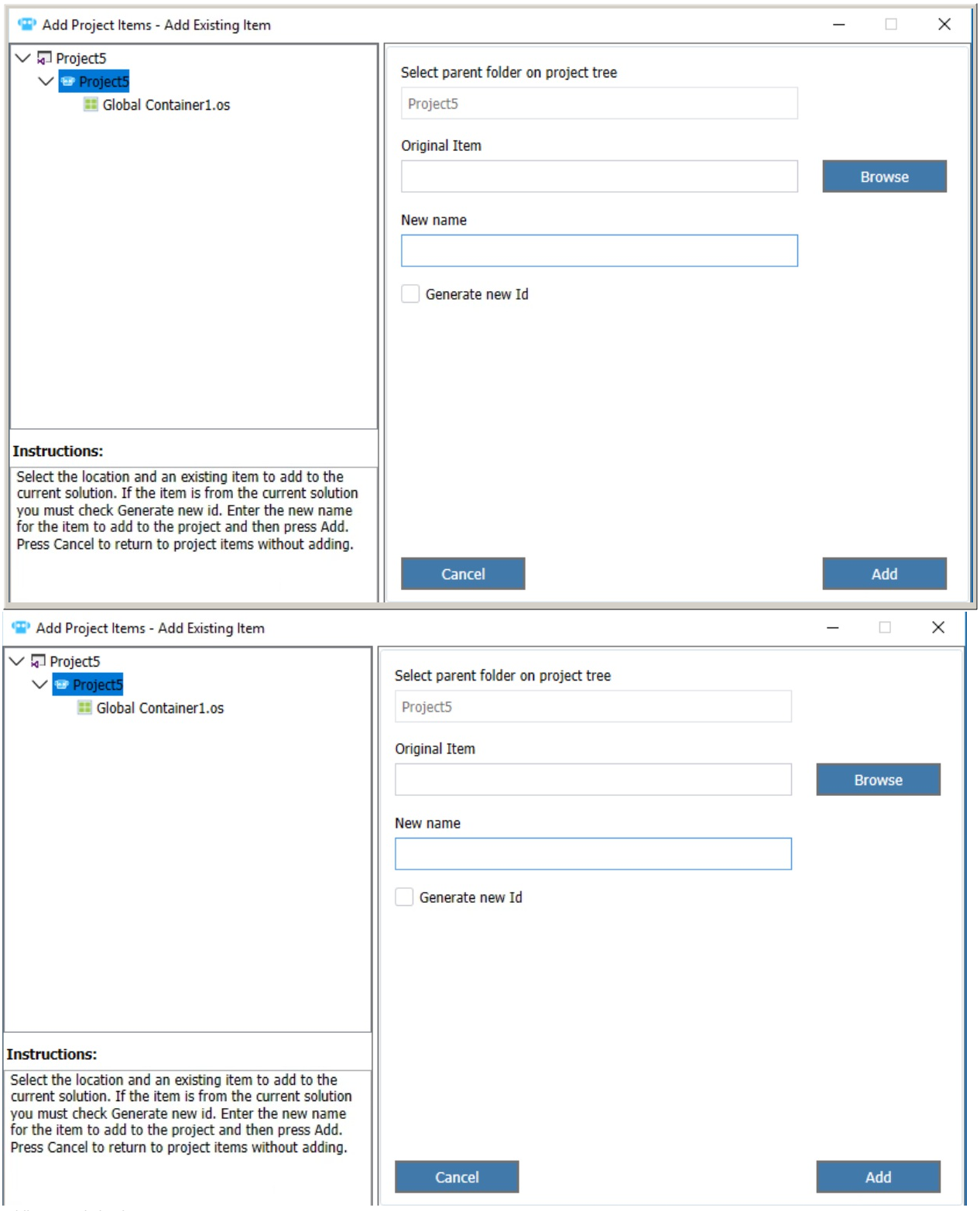
- Diagnostic Log
- Message Dialog
- String Utils

4. Create the Global Container with selected options by clicking Add.

For more information, see Using the New Project Wizard.

Adding an existing item with the New Project Wizard

Using the Existing Item project item, you can browse to an existing control and copy it into your project.



Adding an existing item

1. In the Add Project Items page, in the Existing Item row, click the Add button.
2. In your project folder, browse for the existing item that you want to copy and select the item.
3. In the New name field, you can edit the item's name, if the name is already used in the project.
4. Optional: To generate a new unique ID for the item, select the Generate new ID check box. Each project item has an ID assigned when it is first created. This ID must be unique within the solution. The wizard prevents you from adding an item if its ID is not unique.

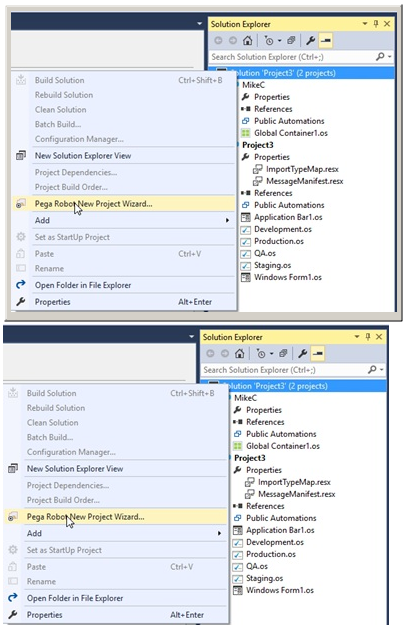
For more information, see Using the New Project Wizard.

Updating a project in the New Project Wizard

Adding a new project to an existing solution

After you have created your solution using the New Project Wizard, you can access the New Project Wizard again to add other projects to your solution.

1. In the Solution Explorer, highlight a solution.
2. Right-click the solution, and then select Pega Robot New Project Wizard.



Existing solution

Adding project items to an existing project

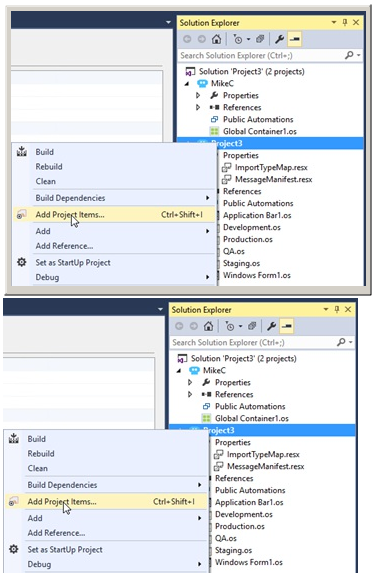
In the Solution Explorer, right-click a project or a folder.

1. Select Add Project Items to open the wizard for that project.

-OR-

1. With a project or folder selected, press Ctrl-Shift-i.

The Add Project Items window displays



Existing Project

For more information, see Using the New Project Wizard.

Moving, renaming, or deleting project items with the New Project Wizard

Within the New Project Wizard, you can move project items to a different folder, rename project items, and delete project items.

Moving project items

You can move a project item to a folder within the same project.

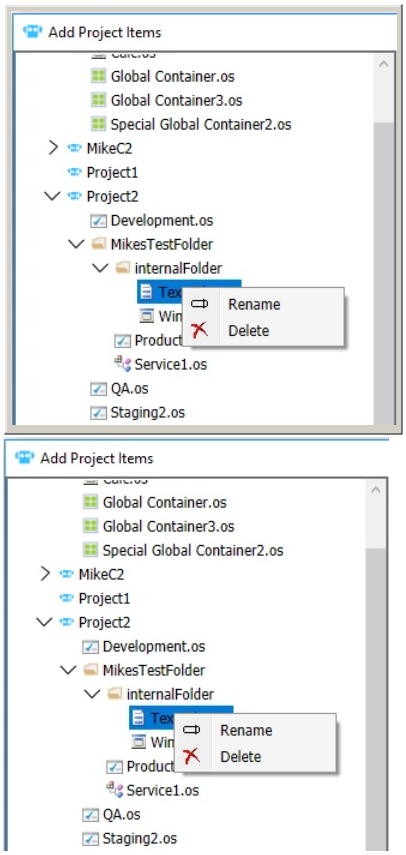
1. On the Solution tree, select and hold the project item that you want to move.
2. Drag the project item to the target folder.

You can move a folder within another folder. You cannot move an item to a different project.

Renaming project items

You can rename a project or a project item in the Solution tree on the left of the New Project Wizard.

1. Right-click the project or project item that you want to rename.



Rename menu

2. Select the Rename option from the menu.
3. In the text field, enter the new name and then press Enter.

Deleting project items

In the Solution tree, you can delete a project item. You cannot delete a project or solution this way.

1. In the Solution tree, right-click the project item you want to delete.
2. Select the Delete option from the menu.
3. In the confirmation dialog box, click OK.

For more information, see Using the New Project Wizard.

Creating a template for automations

You can create templates from automations that are self-contained to make the subsequent creation of similar automations simpler. A self-contained automation has no references to objects that are external to that automation.

1. In the Solution Explorer, right-click an automation, and then select Create Template.
2. At the prompt, enter a name for the template.

Automation templates are stored in the Templates folder at %appdata%\Pegasystems, and you can copy them to other machines from that location.

You can select a template when you add an automation in the New Project Wizard.

For more information, see Using the New Project Wizard.

Introduction to threading

There are several types of threading you use in Pega Robot Studio:

- User interface threads
- Robot Studio automations and user interface threads
- Adapter threads
- Automation threads

Threads are a very powerful tool for developers but they also must be used with great care. Threads are a resource within the operating system and only a limited number are available at a time. Using too many threads simultaneously can cause a computer's CPU to thrash.

For more information, see Threading best practices.

Using X-ray Vision in Pega Robotic Automation

X-ray Vision is a new way of identifying controls in Robot Studio, starting in version 19.1.73. When interrogating an application, if new controls become available in the application (due to navigation of the application, or from a screen change that makes new controls appear), the new controls are added to the X-ray database file for the application. The system assigns the new control a numeric PegaId that is stored in the X-ray database file for the application, along with a collection of attributes that define the control. When you interrogate a control to use it in an automation, the PegaId is set as the match rule that maps the adapter's object to the control within the X-ray database file. This PegaId match rule never needs modification. When the X-ray Vision engine sees the control a second time, it compares all of its attributes to those stored in the database, to determine the best attribute to use. The database file is constantly updated while the application is in interrogation mode.

When you create the automation package during the deployment process, the system includes the database files. Robot Runtime uses these files to provide the attribute values that are used for control identification. If an attribute changes for a control in Runtime, the engine continues to track the control by finding the next best attribute to use. The system keeps this attribute change in memory until you close Robot Runtime.

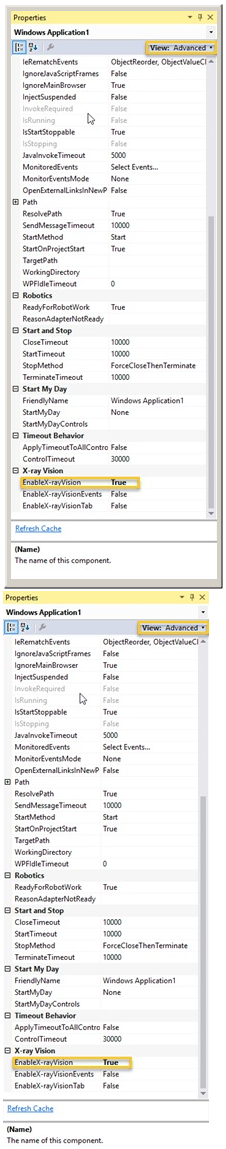
Currently, X-ray Vision supports .NET, WPF, Universal Web Adapter, and Windows Form applications.

Enabling X-ray Vision

Use the new Windows adapter properties to enable X-ray Vision. Access these properties through the property grid in the X-ray Vision section.

1. In Pega Robot Studio, switch your property grid view to Advanced.
2. In the X-ray Vision section, set the EnableX-rayVision property to True. By default, X-ray Vision is disabled for a newly added Windows adapter, so you must enable it.

There are two additional adapter properties in the X-Ray Vision section, called EnableX-rayVisionEvents and EnableX-rayVisionTab. Pega Support uses these properties to troubleshoot any issues that occur with the X-ray vision feature, and they should not be used otherwise.



X-Ray Properties

When an application is interrogated with X-ray Vision, Robot Studio creates four files in the X-ray folder, located in the project folder. If an application starts other applications, Robot Studio creates a set of four files for each application.

Each file is named with a shared GUID. The files represent the application whose data they store, and have the following extensions:

- .xrayConfig – Contains configuration information for the application.
- .xrayDb – Contains the X-ray control information that has been collected for the application. This includes the assigned PegaId, the technique used to solve, and the attribute values.
- .xrayTad – Contains attributes and their weights that have been modified for the application from the default framework TAD file.
- .xray – The .xray file is the master file that contains the name of the application executable in its filename, along with the GUID. This file makes it clear which files belong to what application, tying the .xrayConfig, .xrayDb, and xrayTad files together for the application. For example:

GUID.APPNAME.xray [master]
    GUID.xrayConfig
    GUID.xrayDb
    GUID.xrayTad

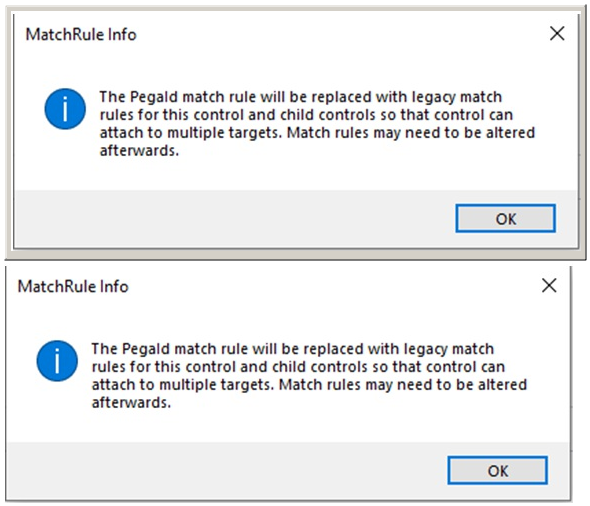
When you deploy an automation, all of these files are included, along with the default framework TAD files. Robot Runtime uses these files as it executes the automation.

Universal Web Adapter considerations

Note: The following UseKeys considerations only apply when you are using X-Ray Vision and the Universal Web Adapter. These considerations do not apply when you are using X-ray Vision to interrogate .NET or Windows Presentation Foundation applications.

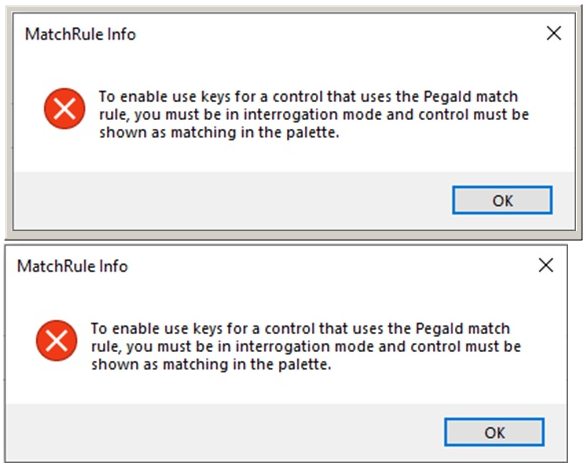
When you use X-ray Vision and the Universal Web Adapter, consider the following limitations:

- Do not enable UseKeys, unless you are in interrogation mode. Controls have to be matching when you are in interrogation mode.
- When you enable a property for the control, Robot Studio displays a confirmation message. To have Robot Studio convert the match rules for the control, and any children of those legacy match rules, click OK. If you change UseKeys to false after you click OK, Robot Studio will continue to use the legacy match rules. To go back to using the PegaId match rule, delete the control and interrogate it again. The following illustration is an example of the confirmation message.



Match Rule confirmation message

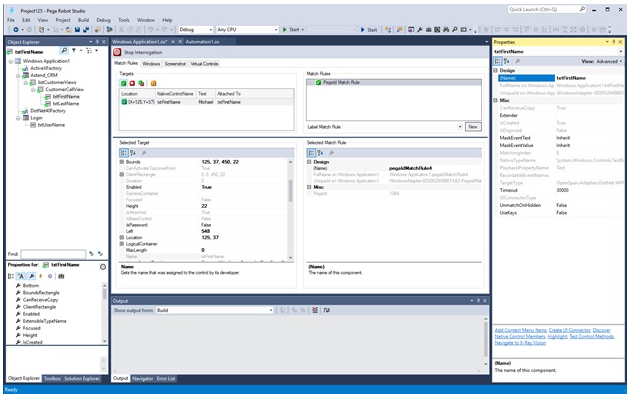
- If you try to enable UseKeys when the control is not matching or before you start interrogation, Robot Studio displays the following error message:



Match Rule error message

PegaId match rule

When you enable X-ray Vision on the adapter, the controls that are interrogated in the application use the PegaId match rule. This match rule ties the control to the application's .xraydb file. Only the PegaId match rule is needed when X-ray Vision is enabled for the adapter. Do not include additional match rules when using X-ray Vision and the PegaId match rule.


Pega ID

Keep in mind the following limitations:

- X-ray Vision is not supported for applications that contain embedded frameworks. For example, if you start a Windows Presentation Foundation (WPF) application that has embedded controls, X-ray Vision assigns PegaIds for the WPF controls. Legacy match rules are used for embedded controls of a different framework than the application.
- X-ray Vision is not supported for the Infragistics ultratab control.
- The PegaId match rule is not available for top-level forms, context menus, or menu items. Use legacy match rules for these controls.

New and Modified Assemblies for X-ray Vision

New Assemblies	Modified Assemblies
Pega.Xray.dll Pega.Xray.DotNet.dll Pega.Xray.Hooks.dll Pega.Xray.Design.dll Pega.Profiler.DotNet.x32.dll Pega.Profiler.DotNet.x64.dll	Pega.Remoting.dll OpenSpan.dll OpenSpan.Design.dll OpenSpan.Events.dll OpenSpan.IDE.dll OpenSpan.MPF.dll

New Assemblies	Modified Assemblies
Pega.Xray.ProfilerRegistration32.exe Pega.Xray.ProfilerRegistration64.exe Pega.Register.XrayDlls.exe Pega.Xray.GacRegistration.exe Pega.Xray.DictionaryEditor.exe Pega.Xray.DotNet.DictionaryGenerator.exe Pega.Brokers.Platform.DotNet.v20.dll Pega.Brokers.Platform.DotNet.v40.dll Pega.Brokers.Framework.DotNetWinForms.v20.dll Pega.Brokers.Framework.DotNetWinforms.v40.dll Pega.Brokers.Framework.DotNetWpf.v20.dll Pega.Brokers.Framework.DotNetWpf.v40.dll Pega.Translators.DotNet.v20.x32.dll Pega.Translators.DotNet.v20.x64.dll Pega.Translators.DotNet.v40.x32.dll Pega.Translators.DotNet.v40.x64.dll Pega.Translators.DotNet.Virtual.dll Pega.Translators.DotNet.v20.Shim.dll Pega.Translators.DotNet.v40.Shim.dll Pega.Translators.DotNet.v20.WindowsForms.dll Pega.Translators.DotNet.v40.WindowsForms.dll Pega.Translators.DotNet.v20.WPF.dll Pega.Translators.DotNet.v40.WPF.dll Pega.Translators.DotNet.Syncfusion.dll Pega.Translators.DotNet.v20.DevComponents.dll Pega.Translators.DotNet.v40.DevComponents.dll Pega.Translators.DotNet.v20.DevExpress.dll Pega.Translators.DotNet.v40.DevExpress.dll Pega.Translators.DotNet.v20.Infragistics.dll Pega.Translators.DotNet.v40.Infragistics.dll Pega.Translators.DotNet.v20.WPF.Infragistics.dll Pega.Translators.DotNet.v40.WPF.Infragistics.dll Pega.Translators.DotNet.v40.WPF.FocusPoint.dll	OpenSpan.Studio.dll OpenSpan.Virtual.Interfaces.dll OpenSpan.Adapters.dll OpenSpan.Adapters.Web.WebBase OpenSpan.Adapters.Web.WebBase.Design.dll OpenSpan.Adapters.Text.Design.dll OpenSpan.Adapters.ActiveX.dll OpenSpan.Adapters.DataGrid.Design.dll OpenSpan.Adapters.Design.dll OpenSpan.Adapters.Virtual.dll OpenSpan.Adapters.Virtual.Design.dll OpenSpan.Adapters.Windows.dll OpenSpan.Adapters.Windows.Design.dll OpenSpan.Adapters.Web.dll OpenSpan.Adapters.Web.Design.dll OpenSpan.Adapters.Siebel.dll OpenSpan.Adapters.Delphi.dll OpenSpan.Adapters.DotNet.dll OpenSpan.Adapters.DotNet.Design.dll OpenSpan.Adapters.Endsleigh.dll OpenSpan.Adapters.MFC.dll OpenSpan.Adapters.PowerBuilder.dll OpenSpan.Adapters.VisualBasic6.dll OpenSpan.Adapters.WinInet.dll OpenSpan.Translators.Clarify.x32.dll OpenSpan.Translators.CSG.x32.dll OpenSpan.Translators.At000Win.x32.dll OpenSpan.Translators.DotNet.v20.DevComponents.dll OpenSpan.Translators.DotNet.v40.DevComponents.dll OpenSpan.Translators.DotNet.v20.DevExpress.dll OpenSpan.Translators.DotNet.v40.DevExpress.dll OpenSpan.Translators.DotNet.v20.Infragistics.dll OpenSpan.Translators.DotNet.v40.Infragistics.dll OpenSpan.Translators.DotNet.v20.WPF.Infragistics.dll OpenSpan.Translators.DotNet.v40.WPF.Infragistics.dll OpenSpan.Translators.DotNet.Virtual.dll OpenSpan.Translators.DotNet.Syncfusion.dll OpenSpan.Translators.DotNet.v20.WindowsForms.dll OpenSpan.Translators.DotNet.v40.WindowsForms.dll OpenSpan.Translators.DotNet.v20.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.dll OpenSpan.Translators.DotNet.v40.WPF.FocusPoint.dll OpenSpan.Translators.Facets.CerlCtl.x32.dll OpenSpan.Translators.Facets.CerlDlg.x32.dll OpenSpan.Translators.FarpointGrid.x32.dll OpenSpan.Translators.FarpointList.x32.dll OpenSpan.Translators.Farpoint.Spread25.x32.dll OpenSpan.Translators.Farpoint.Spread30.x32.dll OpenSpan.Translators.Farpoint.Spread70.x32.dll OpenSpan.Translators.Farpoint.Spread80.x32.dll OpenSpan.Translators.Gupta.Tabli62.x32.dll OpenSpan.Translators.IBM.ArsGui32.x32.dll OpenSpan.Translators.IBM.ArsGui32.x64.dll OpenSpan.Translators.MhTab.x32.dll OpenSpan.Translators.MSFlexGrid.x32.dll OpenSpan.Translators.MSHFlexGrid.x32.dll OpenSpan.Translators.NiSource.KipCzCnr.x32.dll OpenSpan.Translators.NiSource.KipCzNb.x32.dll OpenSpan.Translators.ProfUIS.x32.dll OpenSpan.Translators.OpenEdge.Prow.x32.dll OpenSpan.Translators.OpenEdge.Prow.x64.dll OpenSpan.Translators.Sheridan.DataWidgets.x32.dll OpenSpan.Translators.SSTab.x32.dll OpenSpan.Translators.Uniface.Umsw.x32.dll

Mainframe application automation

When you add a mainframe application to your robotic automation solution, there are several points to consider.

First, understand that the robot interacts with the mainframe system using HLLAPI-compliant emulators. There are numerous HLLAPI-compliant emulators on the market, such as Rumba, Attachmate, and BlueZone. For more information, see Text application integration.

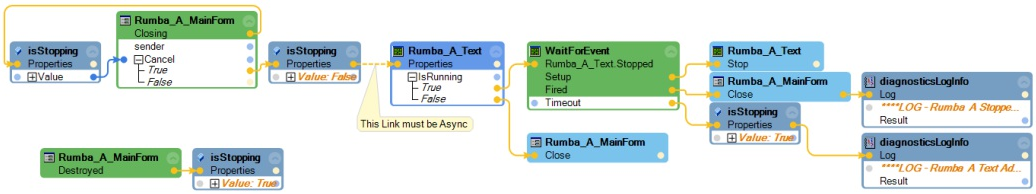
You also need to understand how to control how the emulator starts and stops itself. To handle the emulator in the solution, use two adapters. Use a Windows adapter to start or stop the emulator and to know when the emulator is available to be used. Once you start the emulator and it is available, launch the Text adapter. The Text adapter connects to the emulator using the HLLAPI shortname.

The Text adapter is the interface that you use to interact with the mainframe functions like setting, reading, or navigating the mainframe application.

For more information, see How to configure and interrogate a text adapter.

Controlling the adapters

One of the issues many developers have is controlling the stopping of the two adapters. First, you must stop the Text adapter, allowing it to disconnect from the emulator before stopping the windows adapter and shutting down the actual emulator. If done incorrectly, the Text adapter can get into a bad state and not restart or connect to the emulator correctly. Controlling the stopping is easy if done through the automation; however, the difficulty comes when a user clicks the X on the emulator window. To handle this case, you must catch the emulator's stopping, stop the Text adapter, and then allow the emulator to close. The following illustration is an example of this type of automation:



A couple of key points:

- Ensure the IsStopping variable to be global, so that is lives through the life time of the project.
- Set the event link from the isStopping variable to the text adapter isRunning and check Asynchronous. This allows the IsStopping variable to be changed to False before the adapter property is checked.

Robotic Automation security, credentials, and encryption

To safeguard sensitive data and provide a secure environment for the Robotic Automation solutions that you create, Pega Robotic Automation includes encryption, assisted sign-on, credential management, and other security-related features.

Encryption and the Assisted Sign-On component

The Assisted Sign-On component in Pega Robot Studio is based on the Windows Data Protection API (DPAPI). DPAPI encrypts data by using a private key derived from a user's Windows identity. Once encrypted, data can only be decrypted by the same Windows user. For more information, refer to the following webpage:

http://msdn.microsoft.com/en-us/library/ms995355.aspx

The following sections detail some frequently asked questions about the Assisted Sign-On component. For more information, see Assisted Sign-On component.

Where are credentials stored?

Credentials are stored locally on the machine in an encrypted file located by default under the user's application data roaming directory. The Assisted Sign-On component does not use a central server. The following paths are examples of this location:

- 8.0 SP1 – C:\Documents and Settings\John Doe\AppData\Roaming\OpenSpan\ASO.db
- 19.1 – C:\Users\John Doe\AppData\Roaming\Pegasystems\ASO.db

You can change the file location by modifying the FileLocation option in the AssistedSignOn section of the RuntimeConfig.xml file. You can change the location to other known .NET special folders, Environment variables, or a fully-qualified path.

How are credentials stored?

The Assisted Sign-On component persists the following strings:

- Application name
- User name
- Domain

Note: You can optionally store the password if you set the StorePassword option in the AssistedSignOn section in the RuntimeConfig.xml file to True. The default is False.

DPAPI initially generates a strong key called a MasterKey, which is protected by the user's password. DPAPI uses a standard cryptographic process called Password-Based Key Derivation, described in the Password Based Encryption Standard (PKCS) #5, to generate a key from the password. This password-derived key is then used with Triple-DES to encrypt the MasterKey, which is finally stored in the user's profile directory.

The MasterKey, however, is not used explicitly to protect the data. Instead, a symmetric session key is generated based on the MasterKey, some random data, and an additional hard-coded entropy string that Pega provides. This session key is used to protect the data. The session key is never stored. Instead, DPAPI stores the random data it used to generate the key in the opaque data blob. When the data blob is passed back in to DPAPI, the random data is used to re-create the key and unprotect the data.

For security reasons, MasterKeys expire, which means that after a period of time -- the hard-coded value being three months -- a new MasterKey is generated and protected in the same manner. This expiration prevents an attacker from compromising a single MasterKey and accessing all of a user's protected data.

Can anyone view or decrypt stored credentials?

No. Only the user whose Windows identity was used to encrypt the data can decrypt it. Moreover, the additional entropy string supplied by Pega helps prevent other applications from decrypting the credential data.

Are the credentials encrypted in memory?

Yes. Credentials are encrypted in memory by using a randomly generated entropy that is a valid only for the current Runtime session. Additionally, all credential values are stored with .NET SecureStrings to ensure that they cannot be inspected in memory. For more information, see Encryption settings for Pega Robotic Automation.

Where is the software installed?

The Assisted Sign-On component is installed with Pega Robot Studio and Pega Robot Runtime. Pega Robot Studio is installed on developer desktops. Pega Robot Runtime is installed on Runtime user desktops.

How are passwords managed?

The Assisted Sign-On Component is used by Pega Robot Studio developers when they create automations which are then deployed to the end user desktop and executed by Runtime. Pega Robot Studio's automations run independently on each end user desktop and are not connected to a central management server following deployment. Developers can choose to enforce password management functions within their automations, but there is no server that centrally manages password rules.

How often does the user have to input their credentials?

The Assisted Sign-On component can persist credentials indefinitely. Developers, however, can choose to enforce password management functions within their automations, including periodically prompting for the re-entry or clearing of stored passwords. For instance, a developer can create an automation that initially prompts users for credentials the first time they log on. For subsequent logons, the automation automatically logs in the user until it detects that a login failed. Once a login has failed, the automation prompts the user to re-enter his or her credentials.

Does the software log who accessed credentials or who accessed the tool?

You can enable local logging of the Runtime environment, which will provide general log details. Credential information might be marked as sensitive and, if so, will not appear in the logs.

Is this software commonly deployed by other clients?

Yes. Pega has deployed this capability to several other clients. Implementation of the Assisted Sign-On component varies from account to account depending on their project requirements, internal security policies, and the infrastructure already in place.

Encryption settings for Pega Robotic Automation

Windows Data Protection API (DPAPI) is a cryptographic application programming interface that is available as a built-in component in Microsoft Windows. The Pega Robotic Automation credential store uses DPAPI to securely store assisted sign-on credentials on the desktop.

DPAPI encrypts data by using a key derived from the logged-in Windows user's credentials. The use of this key ensures that the assisted sign-on credentials cannot be decrypted by anyone other than the user who initially entered them. DPAPI uses industry-standard encryption algorithms.

The Pega Robotic Automation team has tested DPAPI on the following configurations to determine the algorithms and settings used by the following versions of 64-bit Windows.

- Windows 7 Enterprise Service Pack 1
- Windows 8.1 Enterprise
- Windows 10 Enterprise
- Windows Server 2008 R2 Datacenter Service Pack 1
- Windows Server 2012 R2 Datacenter
- Windows Server 2016

Windows version	7	8.1	10	Server 2008	Server 2012	Server 2016
Encryption	AES-256	AES-256	AES 256	AES-256	AES-256	AES-256
Hashing	SHA-512	SHA-512	SHA-512	SHA-512	SHA-512	SHA-512
Iteration	17400	8000	8000	17400	8000	8000

Customer security teams can use this information when evaluating the security of the credential store component.

Setting up the Certificate Revocation List

After you verify that the certificate has been updated, next check to see if your Certificate Revocation List (CRL) needs to be updated. The updated Pega Robotic Automation authority certificate uses the new Certificate Revocation List for revocation checking.

- If you did not add a list of safe recipients to the CRL, no other steps are needed, and you have completed the steps that are required to replace an authority encryption certificate.
- If you have included a list of safe recipients to your CRL, repeat the process for replacing an authority encryption certificate for the following sites. Do this each time you update the authority certificate.
  - http://crl.godaddy.com/gdig2s2-5.crl
  - http://certificates.godaddy.com/repository/gdig2.crt
  - http://crl.godaddy.com/gdroot-g2.crl
  - http://crl.godaddy.com/gdig2s2-8.crl
  - http://crl.godaddy.com/gdroot.crl

When you finish updating the CRL, you have completed the steps that are required to replace an authority encryption certificate.

BeyondTrust support in Pega Robotic Automation

Build automations that work seamlessly in a secure environment by combining Pega Robotic Automation 19.1 with BeyondTrust Password Safe, a component of BeyondInsight. Pega Robotic Automation supports Password Safe 6.9, beginning in Release 19.1.32.

Credentials are needed to authenticate with Robot Manager, Microsoft Windows, and applications throughout the Pega Robotic Automation process. When running an attended automation, a user is present and can provide these credentials. When running an unattended automation, there is no user present, and a credential provider is required.

You can integrate BeyondTrust with the Pega RPA Service and Pega Robot Runtime. The integration is an End-Point integration with no Middle Tier or Central Server. Credential retrieval is triggered by the Pega RPA Service and Pega Robot Runtime:

1. When the service starts, the Pega RPA Service retrieves the RegistrationOperator value and uses it as the credentials to log in to the Pega Robot Manager.
2. When the Pega Robot Manager tells the Pega RPA Service to start the robot, the Pega RPA Service retrieves the WindowsUser credentials and performs a Windows login.
3. After the robot is logged in, the Pega RPA Service looks for the RuntimeUser credentials.
   - If there are RuntimeUser credentials, Pega Robot Runtime is started by using these credentials.
   - If there are no RuntimeUser credentials, Pega Robot Runtime is started by using the logged-in user's credentials.
4. When Pega Robot Runtime starts, the RegistrationOperator credentials are retrieved and Pega Robot Runtime logs in to the Pega Robot Manager.
5. Pega Robot Runtime retrieves application credentials by using the ASO Manager or the Credential Store.

Note: For robotic processing automations, the RegistrationOperator and WindowsUser credentials are required, and the RuntimeUser credentials are optional.

For more information, see Integrating BeyondTrust and Pega Robotic Automation. This document and the BeyondTrust Setup checklist help you plan your integration of Pega Robotic Automation with BeyondTrust's Password Safe.

CyberArk support in Pega Robotic Automation

Build automations that work seamlessly in a secure environment by combining Pega Robotic Automation 19.1 with CyberArk Application Access Manager (AAM) 9.1 and later.

Note: CyberArk Application Access Manager (AAM) was previously known as Application Access Manager (AIM).

AIM is integrated with the Pega RPA Service and Pega Robot Runtime. The integration is an End Point integration with no Middle Tier or Central Server. Credential retrieval is triggered by the Pega RPA Service and Pega Robot Runtime:

1. When the service starts, the Pega RPA Service retrieves RegistrationOperator credentials. These credentials are used to log in to the Pega Robot Manager.
2. When the Pega Robot Manager tells the Pega RPA Service to start the robot, the Pega RPA Service retrieves the WindowsUser credentials and performs a Windows log in.
3. After the robot is logged in, the Pega RPA Service looks for the RuntimeUser credentials.
   - If there are RuntimeUser credentials, Pega Robot Runtime is started by using these credentials.
   - If there are no RuntimeUser credentials, Pega Robot Runtime is started by using the logged in user's credentials.
4. When Pega Robot Runtime starts, the RegistrationOperator credentials are retrieved and Pega Robot Runtime logs in to the Pega Robot Manager.

Note: For unattended automations, the Registration Operator and WindowsUser credentials are required, and the RuntimeUser credentials are optional.

A Robotic Automation solution can use the ASO (Assisted Sign-On) Manager component or the Credential Store component to retrieve applications credentials. You can configure the ASO Manager and Credential Store to retrieve these credentials from CyberArk.

For more information, see Integrating CyberArk and Pega Robotic Automation. See also the following links:

- Common configuration settings
- CredentialManagerConfig.xml file
- Assisted Sign-On component
- Pega Robotic Automation Credential Store
- AAM Integration - Pega Robotic Automation 19.1
- AIM Integration - Pega Robotic Automation 19.1

Client credential provider support in Pega Robotic Automation

Build automations that work seamlessly in a secure environment by combining Pega Robotic Automation 19.1 with your external credential provider.

Credentials are needed to authenticate with Robot Manager, Microsoft Windows, and applications throughout the Pega Robotic Automation process. When running an attended automation, a user is present and can provide these credentials. When running an unattended automation, there is no user present, and a credential provider is required.

You can integrate an external credential provider with the Pega RPA Service and Pega Robot Runtime, using the Pega Robot API. The integration is provided through a DLL you write using a C# template that Pega provides. The template provides a framework for handling a request--you supply the additional logic to securely retrieve the credentials from your credential provider. This DLL plugs into Pega RPA Service and Robot Runtime and is configured locally. When credential retrieval is triggered by Pega RPA Service and Robot Runtime, the following actions occur:

1. A credential request is forwarded to the Credential Service inside of Pega RPA Service or Robot Runtime.
2. The Credential Service processes the request. All replaceable parameter entries in the CredentialManagerConfig.xml are replaced with the current value of the parameter. For example: {MachineName} is replaced with the computer name.
3. Entries in the CredentialManagerConfig.xml are evaluated and the first Credential element matching the request is returned to the Credential Service.
4. The Credential Service formats a request for the Client Credential Provider (your DLL) using the information returned from the CredentialManagerConfig.xml file and makes a request to the Client Credential Provider.
5. The Client Credential Provider fulfills the credential request by retrieving credentials from the external credential provider and returns the result to the Credential Service.
6. The Credential Service returns the credentials to the requestor.

For more information, see Integrating a client credential provider.

Robotic Automation WebInterface Property Manager utility

Use the WebInterface Property Manager utility to write property values to an external properties file that Pega® Robotic Automation Runtime can read. Use this properties file to pass unique values to Robotic Automation Runtime, such as user names and passwords. The properties file also allows you to change values without redeploying the solution.

For example, if you have multiple robots that log in to the same Citrix server, but have different credentials, you can use this utility to pass such values. You can also use this utility to switch between the development and production versions of a solution.

Creating a properties file

1. Open Windows File Explorer and go to the Robotic Automation install folder.
2. In the Windows File Explorer address bar, enter cmd. Windows opens a command prompt with the install folder as the directory.
3. In the command prompt, enter the following command: OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe.
4. Complete the fields on the utility window and then click Save As. The values in the General section pertain to connecting a Citrix server by using Citrix Web Interface or Netscaler. Here is an example of what you would enter in the Published App Name field: Prod\Pega\OpenSpanRuntime.
5. If you want to display a window that allows you to view and debug the connection process, click the Show Navigation UI field in Citrix Web Interface environments. To hide the window, clear the option.
6. Assign a name to the properties file and click Save.

Editing a properties file

1. Open Windows File Explorer and go to the folder that contains the properties file.
2. In the Windows File Explorer address bar, enter cmd.
3. In the command prompt, enter the following command: OpenSpan.Connectors.Citrix.WebInterfacePropertyManager.exe
4. Click Open File.
5. Go to the folder that contains the properties file and select the file.
6. Edit the fields on the utility window and then click Save As.
7. Assign a name to the properties file and click Save.

Note: The system encrypts the values in the User Name and Password fields by using Windows DPAPI. For more information, see Encryption settings for Pega Robotic Automation.

Removing personal information from log files

If you are instructed to send log files to Robotic Automation Support and those files contain personal information, use the Log File Cleaner utility to remove personal data elements, such as Social Security and credit card numbers, from those log files.

You can use this utility to clean log files that are created by PegaRobot Runtime, Robot Studio, Supertrace, the Robotic Automation Dump utility (OSDump), and WinDbg Process dumps. The Log File Cleaner utility examines each line in the log file and either masks or removes the data elements that you specify, such as Social Security or credit card numbers. You can select to mask or remove only the data elements from a line or you can select to mask or remove the entire line.

To install and run the utility, complete the following steps:

1. Click the following link and download the Log File Cleaner utility.

   Log File Cleaner

2. Unzip the file into a folder location of your choice.
3. In the folder where you unzipped the Log File Cleaner utility, open a command prompt.
4. Start the Log File Cleaner utility by entering `OpenSpanLogFileCleaner.exe` at the command prompt.
5. Select the log file that you want to clean.
6. Select whether you want to mask (replace) individual data elements or remove all of the data on any line that contains a personal data element.
7. Select the data element types that you want to remove.
   - If you elect to mask data elements, specify the replacement characters to use in the associated text fields. For example, if you enter -- SSN -- as the replacement characters for a Social Security number, a Social Security number such as 901-45-6789 is changed to -- SSN --. If you leave the field blank, the Social Security number is removed entirely.
   - For credit card numbers, the utility detects all numeric strings that have lengths from 11 to 16 digits. The string can include any number of dashes. If the utility finds this pattern, it removes or masks these numbers with the replacement characters you specify.
   - For US taxpayers IDs (SSNs, EINs, ITINs), the utility looks for nine-digit strings in the following formats: XXX-XX-XXXX, XXXXX-XXXX, XXXXXXXXX, XXX-XXXXXX, or XX-XXXXXXX.
   - You can also use Regex to define strings to search for when the utility locates data elements.
8. Optional: Select to mask HTML source code. This change affects the HTML tags and data within the tags.
9. Optional: To delete the original log file after the utility creates the cleaned file, select the Delete the original log file after cleaning option.
10. Specify the folder location and name for the cleaned file. The utility appends the extension.cln to the end of the file name.
11. Click Clean Log File after you have made your selections.

If the Log File Cleaner utility fails to remove the specified data elements from your log file, contact Pega Support.

Types of Secure Sockets Layer (SSL) certificates

There are three types of Secure Sockets Layer (SSL) certificates that you can install to enable single sign-on for the solutions that you create with Pega Robotic Automation. You install the certificates on a computer that is running Pega Robot Runtime. This computer must also use either Active Directory Federated Services (AD FS) or the Pega Robotic Automation Security Token Service (STS) to authenticate the Pega Robot Runtime and Studio products with the Pega Robot Manager.

Note: For more information, see the Pega Robotic Automation Security Token Service User Guide.

Depending on your situation, install one of these certificates on a Pega Robot Runtime (client) machine.

- Self-signed SSL

A self-signed SSL certificate is an SSL certificate in which the root authority and identifying entity are the same. In this case, the self-signed certificate should be stored only under the Trusted Root Certification Authorities store.

- Internal CA SSL

There are situations in which your organization may require you to use your own internal Certificate Authority. In this case, the SSL certificate's path reflects two or more certificates in the certificate chain. The top-level certificate serves as the SSL root certificate with an internal CA-issued certificate underneath. Only place the root certificate in the Trusted Root Certification Authorities store.

For example, if you already have an internal CA, you might want to use it for SSL certificates in non-testing environments. With an internal CA, you only have to deploy its root

certificate to the client desktops once and then all of the local servers with SSL certificates issued by that CA are validated. In contrast, when using self-signed certificates, each server's certificate must be deployed to the client desktops and updated each time they are renewed. Using an internal CA can reduce the effort and complexity of establishing and revoking trust on client desktops.

- External CA SSL (third-party issue)

You can also choose to use an external CA or third-party issued certificate as the server's SSL certificate. Typically, you have already established trust with the external CA when you choose this option. You must verify that this trust has been established by checking for the SSL's root authority certificate under the Trusted Root Certification Authorities store of the client through the machine or current user profile. If for some reason, it is not found in either profile, test to see if communication to the AD FS or STS server is preset by group policy. If you cannot establish communication during testing, install the third-party SSL's root certificate to the Trusted Root Certification Authorities store on the client machine.

Best practices

The general rule is to always establish the trust to the AD FS or STS server by installing the SSL's root certificate to the Trusted Root Certification Authorities store. Adding the SSL intermediate and entity certificates does not assist in establishing trust. The trust is established solely through the root certificate. When establishing the connection to the STS or AD FS server, the client machine is presented with the full SSL certificate that is being published from the server side. The client only checks to see if the root that is presented by the server is found in the Trusted Root Certification Authorities store. It does not matter whether the root is installed using the machine or current user profile.

Troubleshooting

Build path errors can occur if intermediate certificates are missing from the publication of the SSL from the server. To handle such errors, republish the SSL certificate from the server, including the intermediate certificates, or add intermediate access information to the root certificate. This access information would include the URL site locations from to download the intermediate certificates from the client machine.

Best practices for setting up and maintaining robot operator passwords

Learn how the various types of unattended robot operators manage passwords when communicating by using basic authentication with Pega Platform™.

Note: Each robot can use multiple operator accounts in Pega Platform.

Robot operator types

Several types of robot operators operate in Pega Platform. Each of the following operator types uses a password to establish secure communication with your application when using basic authentication.

Registration operator

Robots use the registration operator only at the beginning of a robotic session. Multiple robots can share a registration operator, which enables robots to reuse a single user name and password if needed. This is the only operator whose credentials you can change.

Robotic Process Automation (RPA) Service operator

The RPA Service runs on the robot virtual machine (VM) and manages the local unattended Robot Runtime sessions that are running as a Windows session on the robot system. Initially, the service connects to Pega Platform by using the registration operator. Then, as part of the registration sequence, the RPA Service generates a unique password for the RPA Service operator and communicates this new password to Robot Manager through API calls that use the registration operator credentials. As part of the registration sequence, Robot Manager generates the RPA Service operator in Pega Platform if that operator does not already exist and applies the new password. Do not change the password for this operator.

The RPA Service operator performs all subsequent communication with Pega Platform.

Note: The RPA service generates a unique password at startup, which means that each time the VM restarts, it uses a new password.

Robot Runtime operator

Robot Runtime is the robot that uses the Get Next Work function and is visible in the Robot Manager interface. Similarly to the RPA Service, Robot Runtime establishes the initial connection by using the registration operator and then switches to a separate robot operator, with a new password for each session. This means that the Robot Runtime operator uses a new password with each new Windows session and when Robot Runtime restarts. Do not change the password for this operator.

Guidelines for changing passwords for robot operators in Pega Platform

Comply with these guidelines to ensure that your robot operators can access and communicate with your application in a secure manner.

- Never change a Robot Runtime operator password. The system automatically updates the password at the beginning of every session, rendering any manual change unnecessary. Additionally, changing a robot password during a session causes a loss of connectivity.
- Never change an RPA Service operator password. As with the Robot Runtime operator, the system automatically updates the password at the beginning of every session. Additionally, changing a robot password during a session causes a loss of connectivity.
- You can change only the registration operator password. You can change the password while a robot is running. After you change the registration operator password, you must immediately make the new password available to all robots. If your robots are using a central location for sourcing passwords (for example, CyberArk, BeyondTrust, or a custom vault) then immediately make the password change in your vault. If you are using the default password storage (the Data Protection API on the robot VM), then immediately update all robots with the new password.

Certificate expiration dates

Pega Robotic Automation uses certificates to ensure secure communication between Pega Robot Runtime and the Pega applications that you have automated. Pega updates the certificate periodically, and includes the latest certificate in each Robot Runtime build.

Note: If you install Robot Runtime using the Setup wizard or from the command line, a script runs to import the certificate and register the certificate on the selected port. When using the Pega Synchronization Engine to update your environment to a new Runtime version, this script does not run. If you are using the Pega Synchronization Engine, see Using a script to replace a secure communication certificate for instructions on updating your certificate manually.

Certificate expiration dates for 19.1

Certificate expiration dates

For these builds of Robot Runtime and Robot Studio	The certificate expires on
19.1.120 – current	October 20, 2023
19.1.107 – 19.1.119	March 28, 2023
19.1.96 – 19.1.106	October 01, 2022 (expired)

For these builds of Robot Runtime and Robot Studio	The certificate expires on
19.1.50 – 19.1.95	April 16, 2022 (expired)
19.1.30 – 19.1.49	March 12, 2021 (expired)
19.1.1 – 19.1.29 *	April 30, 2020 (expired)
* This certificate also had an expiration date of March 12, 2021. In 19.1.30, the certificate chain was changed to include intermediate certificates.	

Note: If you need to update a certificate without updating Robot Runtime, you can customize the sample scripts that Pega has prepared for that purpose. For more information, see Using a script to replace a localruntime.pega.com certificate.

Checking your certificate expiration date

Authorization certificates are an important part of system security. For example, a certificate is used to secure the communication between a Pega application running in a browser and Pega Robot Runtime. These certificates expire and you might need to check the expiration date of a certificate. Perform the following steps to check the expiration date of a certificate:

1. To run the Microsoft Management Console (MMC) snap-in, click Start > Run and then enter mmc.exe.
2. Click File > Add/Remove Snap In.
3. In the Add Standalone Snap-in dialog box, select Certificates.
4. Click Add.
5. In the Certificates snap-in dialog box, select Computer account and click Next.
6. In the Select Computer dialog box, click Finish.
7. In the Add/Remove Snap-in dialog box, click OK.
8. To view the certificate stores for the computer, in the Console Root dialog box, expand Certificates (Local Computer).
9. Expand Personal Folder.
10. Select Certificate.
11. In the middle pane, check the certificate expiration date that is issued to your certificate. For example, for a certificate that secures the communication between a Pega application running in a browser and Pega Robot Runtime, check the date for the localruntime.pega.com certificate.

Using a script to replace a secure communication certificate

Pega Robotic Automation uses certificates to ensure secure communication between Pega Robot Runtime and the Pega applications that you have automated. Pega updates the certificate periodically, and includes the latest certificate in each Robot Runtime build. When you install or update Robot Runtime to the latest version, you receive the most current certificate **(**localruntime.pega.com). For more information, see Certificate expiration dates.

Note: You can also use your own certificate instead of the localruntime.pega.com certificate and you can use this script to install your certificate. If you use a custom certificate, ensure that the domain that you use matches the domain specified within that certificate.

When you install Robot Studio or Robot Runtime using the Setup wizard or from the command line, a script runs to import the certificate and register the certificate on the port that you selected. When you use the Pega Synchronization Engine to update your environment, this script does not run. If you are using the Pega Synchronization Engine, you can follow these instructions to manually run the script, which will update the certificate and register the port.

Note: Alternatively, you can use Microsoft's Group Policy feature to make these updates. If you use Group Policy, make sure that you bind the certificate to the appropriate port, which you can do using the scripts below as an example.

To update the certificate without updating Robot Runtime, perform the following tasks in this order to replace the certificate:

1. In a test environment, install the latest version of Robot Runtime.
2. In a test environment, export the certificate.
3. In a production environment, locate the port.
4. In a production environment, run a batch or PowerShell script to install the certificate on your production computers.

Note: You can download and customize sample batch and PowerShell scripts from the link on this page. In some customer environments, the execution of batch or PowerShell scripts is disabled. You can update a certificate using either of the sample scripts, and you can choose the type of script that you prefer. The batch file executes on the command line using PowerShell.

Installing Robot Runtime to get the localruntime.pega.com certificate

1. Download the latest version of Robot Runtime from Digital Delivery.
2. In a test environment, follow the installation instructions to install Robot Runtime.
3. In the Robotic Desktop Automation (RDA) Integration pane, select the Enable RDA Integration option. This option installs the certificate in the test environment.

Exporting the localruntime.pega.com certificate

During this task, you will need to note the following information, which you will use when you customize the script file:

- The hash value of the Thumbprint property.
- The password you choose to protect the Personal Information Exchange (PFX) file.
- The path to the certificate.

Follow these steps to use the Microsoft Management Console (MMC) to export the localruntime.pega.com certificate from the test environment.

1. Click the Search icon on the task bar and enter **mmc.exe**. Right-click on mmc.exe and select Run as Administrator.
2. Click File > Add/Remove Snap-in.
3. In the Add or Remove Snap-ins window, under **Available snap-ins**, select **Certificates** and click **Add**.
4. Select the **Computer account** option and click **Next.**
5. Choose **Local computer** and click **Finish**.
6. In the Add or Remove Snap-ins window, click OK.
7. Expand the **Certificates (Local Computer) > Personal** folders under the Console root, and then select the **Certificates** folder.
8. Double-click the localruntime.pega.com certificate and then click the Details tab.
9. Scroll down to the **Thumbprint** property and note the hash value stored there. You will enter it in the script. Then click **Copy to File.**
10. On the Certificate Export Wizard, click Next.
11. Select the Yes, export the private key option and click **Next.**
12. Select the Personal Information Exchange -PKCS #12 (.PFX) option, select the check boxes for the following options, and then click Next:

- **Include all certificates in the certification path if possible**

- **Export all extended properties**
- Enable certificate privacy

13. Select the Password check box, then enter and confirm the password that you want to use to protect the PFX file. Note the password, and then click **Next.**
14. Enter a file name and location to export the certificate, and then click Next.
15. Verify the file name and path and ensure that the Export Keys and Include all certificates in the certification path options are set to **Yes**, and the File Format is **Personal Information Exchange (*.pfx).** Note the path and then click Finish.

Locating the port

In this task, you use a Robot Runtime computer in a production environment to locate and verify the port that Robot Runtime uses to communicate with the Pega application. Bind the localruntime.pega.com or your certificate's REST service to this port to ensure secure communications between Robot Runtime and the Pega application. The default port is 9443.

1. In a text editor, open a RuntimeConfig.xml file used in a production environment. This file is located at %appdata%\pegasystem (for 19.1 and higher) or %appdata%\OpenSpan (for 8.0 SP1 and lower).
2. In the Robotics > LocalApiService section, locate the port key. The value stored in this key is the port binding. Make a note of this value. The following is an example:

```
<LocalApiService enabled="true" SSL="true" port="9443" allowedOrigins="*pega.com" JWTSecurity="false" PegaServerURL="https://MyPegaServer.com/prweb"/>
```

Creating the script

You can create a batch or PowerShell script to make installing the certificate easier. Download and open the sample scripts from the following ZIP file:

Sample scripts for installing local Robot Runtime certificates

Customize these scripts to install the certificate. After you customize the script, run the saved script on each Robot Runtime computer that needs an updated certificate.

Customizing the batch file

1. Open the sample batch file in a text editor.
2. Replace Line 5 - ipport PortNumber with the port number that you verified in the previous task.
3. Replace Line 8 - p value with the password you used when exporting the certificate.
4. Replace Line 8 - importpfx value with the path to the certificate.
5. Replace Line 11 - $certHash value with the certificate hash value.
6. Replace Line 11 - $port value with the port binding number.
7. Save the batch file.

The following is an excerpt from the script in the sample batch file:

```
1  ::Removes existing localruntime.pega.com certificate
2  powershell -command "Get-ChildItem Cert:\LocalMachine\My | Where-Object { $_.Subject -match 'localruntime.pega.com' } | Remove-Item"
3
4  ::Deletes the existing certificate binding
5  netsh http delete sslcert ipport=0.0.0.0:9443
6
7  ::Installs the new localruntime.pega.com private certificate exported from Step 3
8  certutil -f -p "Test1234!" -importpfx "C:\NewRuntimeCert\LocalRuntimeLatestCert.pfx""
9
10 ::Binds the newly installed localruntime.pega.com certificate to the port
11 powershell -command "$guid = [guid]::NewGuid();$certHash = \"6d17bbf275d73a011de1520de373ca9f80fe89a7\";$ip = \"0.0.0.0\";$port = \"9443\";\"
```

Excerpt from sample batch file script for installing local Robot Runtime certificates

Note: If you use a custom certificate, enter the domain for the custom certificate on line 2.

Customizing the PowerShell file

1. Open the sample batch file in a text editor.
2. Replace Line 5 - ipport PortNumber with the port number that you verified in the previous task.
3. Replace Line 8 - p value with the password you used when exporting the certificate.
4. Replace Line 8 - importpfx value with the path to the certificate.
5. Replace Line 12 - $certHash value with the certificate hash value.
6. Replace Line 14 - $port value with the port binding number.
7. Save the PowerShell file.

The following is an excerpt from the script in the sample PowerShell file:

```
1  #Removes existing localruntime.pega.com certificate
2  Get-ChildItem Cert:\LocalMachine\My | Where-Object { $_.Subject -match 'localruntime.pega
3
4  #Deletes the existing certificate binding
5  netsh http delete sslcert ipport=0.0.0.0:9443
6
7  #Installs the new localruntime.pega.com private certificate exported from Step 3
8  certutil -f -p "Test1234!" -importpfx "C:\NewRuntimeCert\LocalRuntimeLatestCert.pfx"
9
10 #Binds the newly installed localruntime.pega.com certificate to the port
11 $guid = [guid]::NewGuid()
12 $certHash = "6d17bbf275d73a011de1520de373ca9f80fe89a7"
13 $ip = "0.0.0.0"
14 $port = "9443"
15 "http add sslcert ipport=$($ip):$port certhash=$certHash appid={$guid}" | netsh
```

```
#Removes existing localruntime.pega.com certificate
Get-ChildItem Cert:\LocalMachine\My | Where-Object { $_.Subject -match 'localruntime.pega

#Deletes the existing certificate binding
netsh http delete sslcert ipport=0.0.0.0:9443

#Installs the new localruntime.pega.com private certificate exported from Step 3
certutil -f -p "Test1234!" -importpfx "C:\NewRuntimeCert\LocalRuntimeLatestCert.pfx"

#Binds the newly installed localruntime.pega.com certificate to the port
$guid = [guid]::NewGuid()
$certHash = "6d17bbf275d73a011de1520de373ca9f80fe89a7"
$ip = "0.0.0.0"
$port = "9443"
"http add sslcert ipport=$($ip):$port certhash=$certHash appid={$guid}" | netsh
```

Excerpt from sample PowerShell script for installing local Robot Runtime certificates

Replacing the Pega RDA certificate with a self-provisioned certificate

The certificates that Pega includes with Pega Robotic Automation expire one year after Pega generates the certificate. Because of this, best practice is to use a self-provisioned certificate that is provisioned through an internal certificate authority, or a third-party certificate authority, or to use a certificate that is self signed so you can choose the the expiration of the certificate. The following steps explain how to replace an expired Pega certificate with your self-provisioned certificate.

Note: If you are unable to provide a certificate and you want to continue using the Pega-provided certificate, contact Pega Support.

Locating the port

Use a Robot Runtime computer in a production environment to locate and verify the port that Robot Runtime uses to communicate with the Pega application. Bind your certificate's REST service to this port to ensure secure communications between Robot Runtime and the Pega application. The default port is 9443.

1. In a text editor, open a RuntimeConfig.xml file used in a production environment. This file is located at %appdata%\OpenSpan (for 8.0 SP1 and earlier versions).
2. In the Robotics > LocalApiService section, locate the port key. The value stored in this key is the port binding. Make a note of this value. The following is an example of a port key:

```
<LocalApiService enabled="true" SSL="true" port="9443" allowedOrigins="*pega.com" JWTSecurity="false" PegaServerURL="https://MyPegaServer.com/prweb"/>
```

Creating the script

You can create a batch or PowerShell script to make installing the certificate easier. Download and open the sample scripts from the following ZIP file:

Sample scripts for installing local Robot Runtime certificates

Customize these scripts to install the certificate. After you customize the script, run the saved script on each Robot Runtime computer that needs an updated certificate.

Customizing the batch file

1. Open the sample batch file in a text editor.
2. Replace Line 5 - ipport PortNumber with the port number that you verify in the Locating the port section above.
3. Replace Line 8 - p value with the password for the self-provisioned certificate.
4. Replace Line 8 - importpfx value with the path to the certificate.
5. Replace Line 11 - $certHash value with the certificate hash value.
6. Replace Line 11 - $port value with the port binding number.
7. Save the batch file.

The following is an excerpt from the script in the sample batch file:

```
::Removes existing localruntime.pega.com certificate
powershell -command "Get-ChildItem Cert:\LocalMachine\My | Where-Object { $_.Subject -match 'localruntime.pega.com' } | Remove-Item"

::Deletes the existing certificate binding
netsh http delete sslcert ipport=0.0.0.0:9443

::Installs the new localruntime.pega.com private certificate exported from Step 3
certutil -f -p "Test1234!" -importpfx "C:\NewRuntimeCert\LocalRuntimeLatestCert.pfx""

::Binds the newly installed localruntime.pega.com certificate to the port
powershell -command "$guid = [guid]::NewGuid();$certHash = \"6d17bbf275d73a011de1520de373ca9f80fe89a7\";$ip = \"0.0.0.0\";$port = \"9443\";\"
```

Excerpt from sample batch file script for installing local Robot Runtime certificates

Note: You can provision the certificate with the localruntime.pega.com domain name, or you can choose another domain name. Ensure that the domain resolves to 127.0.0.1 for the Robot Runtime and Robot Studio computers on which you want to develop and run attended automations.

Customizing the PowerShell file

1. Open the sample PowerShell file in a text editor.
2. Replace Line 5 - ipport PortNumber with the port number that you verify in the Locating the port section.
3. Replace Line 8 - p value with the password for the self-provisioned certificate.
4. Replace Line 8 - importpfx value with the path to the certificate.
5. Replace Line 12 - $certHash value with the certificate hash value.
6. Replace Line 14 - $port value with the port binding number.
7. Save the PowerShell file.

The following is an excerpt from the script in the sample PowerShell file:

```powershell
#Removes existing localruntime.pega.com certificate
Get-ChildItem Cert:\LocalMachine\My | Where-Object { $_.Subject -match 'localruntime.pega

#Deletes the existing certificate binding
netsh http delete sslcert ipport=0.0.0.0:9443

#Installs the new localruntime.pega.com private certificate exported from Step 3
certutil -f -p "Test1234!" -importpfx "C:\NewRuntimeCert\LocalRuntimeLatestCert.pfx"

#Binds the newly installed localruntime.pega.com certificate to the port
$guid = [guid]::NewGuid()
$certHash = "6d17bbf275d73a011de1520de373ca9f80fe89a7"
$ip = "0.0.0.0"
$port = "9443"
"http add sslcert ipport=$($ip):$port certhash=$certHash appid={$guid}" | netsh
```


```powershell
#Removes existing localruntime.pega.com certificate
Get-ChildItem Cert:\LocalMachine\My | Where-Object { $_.Subject -match 'localruntime.pega

#Deletes the existing certificate binding
netsh http delete sslcert ipport=0.0.0.0:9443

#Installs the new localruntime.pega.com private certificate exported from Step 3
certutil -f -p "Test1234!" -importpfx "C:\NewRuntimeCert\LocalRuntimeLatestCert.pfx"

#Binds the newly installed localruntime.pega.com certificate to the port
$guid = [guid]::NewGuid()
$certHash = "6d17bbf275d73a011de1520de373ca9f80fe89a7"
$ip = "0.0.0.0"
$port = "9443"
"http add sslcert ipport=$($ip):$port certhash=$certHash appid={$guid}" | netsh
```


Excerpt from sample PowerShell script for installing local Robot Runtime certificates

Multi-factor authentication in your automations

Work with multi-factor authentication (MFA) in your unattended automations to ensure secure communications and keep your data safe. MFA requires users to produce at least two pieces of identifying information to gain access.

Typically, entering a combination of a user ID and password is the first form of authentication, and you can automate this authentication step with an automation. This means that your automation can use single sign-on for a seamless logon experience and then connect with third-party credential providers, such as BeyondTrust or CyberArk.

Note: Your automation can handle exceptionally long (hundreds of characters) and complex passwords that would would be hard for most human users to remember.

To further ensure security, additional forms of authentication often require human intervention. For example, a second form of authentication could involve any of the following authentication checks:

- Performing a retina scan with a smart phone
- Submitting a code sent in a text message to a smart phone or to an email address

If the authentication form requires human input to provide the additional information, create an attended automation. The attended automation can then pass control back to the robot.

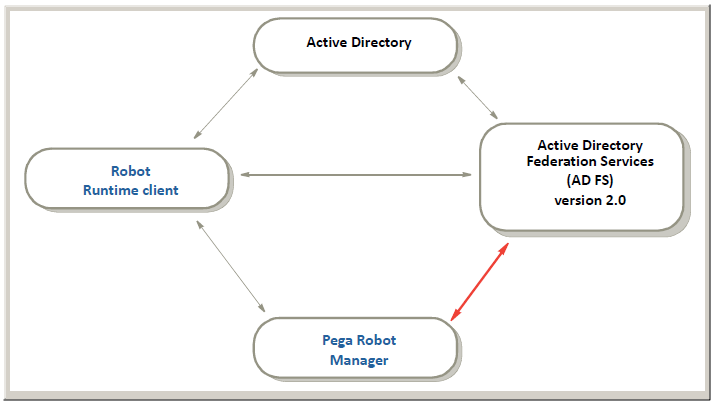
To determine how to work with MFA in your automation, first review the options that your MFA vendor makes available. For example, determine whether you can provide MFA using a REST API, or if you can access an application from the desktop for secrets or tokens.

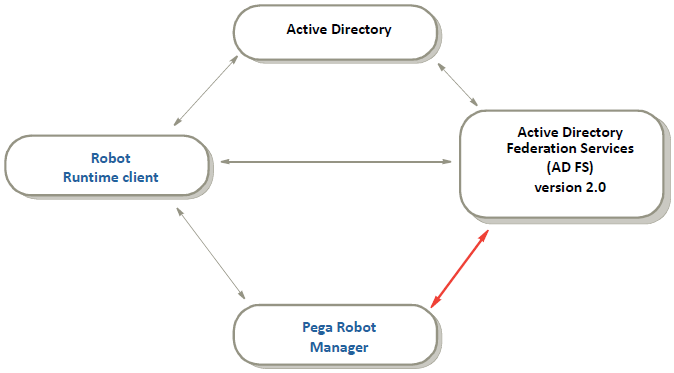
- If an API is available, use the REST API component that is included with Pega Robot Studio.
- If a separate application is available, add an adapter and automate that application to retrieve the secret or token.
- If you can use additional security questions, you can provide the authentication by creating an automation that looks up the answers from your password vault.

Note: Multi-factor authentication is a governmental requirement in some locales. Check your local regulations for more information.

Setting up a relying party in AD FS

To provide single sign-on authentication in Pega Robot Manager implementations that use Pega Robot Runtime, you can set up a relying party in Active Directory Federation Services (AD FS). The following diagram provides an overview of how the applications work together. The red arrow represents the authentication process that you can set up:





For more information, see Setting up a relying party in AD FS.

Debugging and testing automations

Once you have created a Robot Studio project, you can debug the project in Robot Studio to test the functionality and integration. Debugging a project in Robot Studio launches Robot Runtime which runs the project. To stop the project, click Stop on the Debug toolbar. Stopping the project unloads the project, closing all project integrated applications, and shuts down Robot Runtime.

For more information, see Running and Debugging Studio Projects.

Introduction to the Robot Inspector

Build 19.1.14.0 introduced the Robot Inspector for Pega Robot Runtime. The Robot Inspector lets you start and stop adapters and start automations with supplied parameters. It provides live visibility into adapter matching, and lets you view and modify global variables, lookup tables, and more. The Robot Inspector is available for every solution without having to add a component to the solution, and can be enabled through the Runtime icon menu.

For more information see Using the Robot Inspector.

Enabling verbose-level Runtime logging

Capturing verbose-level Runtime logging files can help to diagnose and resolve errors, when requested by the Pega Robotic Automation support team. For example, if you are designing an automation with Robot Studio, and it is not working as expected, verbose logging can help you or Pega Support determine what the issue is.

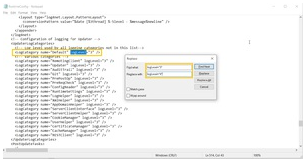
To set the system to capture verbose information in the logging files, first determine the location of the RuntimeConfig.xml file. The default location of the RuntimeConfig.xml file can differ, depending on the version of the product.

- For Robot Runtime version v19.1: %appdata%\Pegasystems
- For Robot Runtime version 8.0 SP1 and earlier: %appdata%\Openspan

Modifying the RuntimeConfig.xml file

To enable verbose logging, perform the following steps:

1. Before starting Robot Runtime, open the RuntimeConfig.xml file in a text editor.
2. Find type="OpenSpan.Diagnostics.Publishers.FilePublisher" near the top of the document. On the same line, set the publisher mode to `on`.
3. Towards the bottom of the file, find the <LogCategories> section. For each category, change the logLevel attribute from its current value to `4`.



Tip: In Notepad, all logLevels can be set to 4 at once, using the Ctrl+H and Replace window.

4. Save and close the file.
5. Re-create the issue that you experienced. Take note of when you began the steps to re-create the issue and when you finished.
6. After you re-create the issue, turn off the logging by setting the publisher mode to `off` for type="OpenSpan.Diagnostics.Publishers.FilePublisher".
7. Collect the log file, timestamps, and any additional notes about the issue and provide them to your Support Engineer for analysis.

Results

You can find the log files in the same folder as the RuntimeConfig.xml file. The file is assigned the name RuntimeLog.txt.

RPA automated testing

While you can automate the testing of the robotic automations that you create, including building an RPA testing solution to test RPA use cases (if you can automate almost anything with RPA, why couldn't you automate the testing of an automation using an automation?), most users deem the idea impractical.

There are three main issues that affect automated RPA testing that make a testing automation administratively and economically prohibitive:

Providing system access

Automations work on behalf of a user who has a certain security access profile for each application or through a system ID that is configured just like a user would be configured. Some systems don't even have adequate sub-environments where testing access is available. Creating and maintaining a *super-user* profile for automated testing that includes a mix of UAT and production access often represents a security risk and is difficult to keep updated, as new automations requiring new systems are constantly developed.

Creating and maintaining test data

100% automated testing requires a large number of test scenarios, including exception cases that are usually not available in sub-environments. Some automation steps require actions in the systems that use up test scenarios irrevocably. Thus, automated testing can fail simply because the automation can't reach certain screens or successfully perform transactions, if adequate test data is unavailable. A constant refresh of the test data to replace the types of scenarios that are irrevocable is often impractical.

Maintaining the automated testing framework

In addition to the previous issues, most RPA solutions require modifications to be tested automatically. Some changes are significant, such as excluding transactions, screens, or scenarios that cannot be effectively tested, and the outcome are copies of RPA solutions adapted for testing. Going forward, an additional maintenance burden exists to keep the extra testing solutions updated with any changes that are made during maintenance of production solutions.

So, what are the best practices?

There are offsetting factors that are unique to RPA technology that minimize the risk of disruption even without the effort toset up and maintain automated testing:

- Quick turnaround time for RPA solution maintenance
    - 99% of system changes that can impact existing automations can be coded and tested with as little as one week lead time before the system release because application control re-match does not require a re-write of the RPA code. This allows for proactive mitigation of any high risk system changes within tight timelines.
- Temporary manual fallback is available for most automations in case of unexpected down times due to system changes. By their nature, RPA solutions represent work that human users can do, if an RPA solution is down.
- Centralized deployment of updated RPA solutions to target user/bot machines enables the prompt release of automation changes within 24 hours for the rare cases of system changes that have not been evaluated in advance.
- Virtualized computing environments are typically cheap and can carry spare capacity to allow RPA solutions to catch up on the volumes after an unexpected brief outage, with minimal impact to business SLAs.

There are a small number of precedents when customers persevered with the setup of the automated RPA testing, yet they all have ultimately abandoned or scaled down the extent of the automated testing. Those that continue with automated testing have reduced the scope to high level application pings because of the test data constraints noted previously.

Based on these considerations, the following best practices are recommended instead of automated testing:

1. Set up change management dependencies for individual RPA solutions to receive notifications of target application releases.
2. Review pending system changes, assess risk, and work with the business area to perform regression testing of individual automations based on level of risk and availability of sub-environments and test data.
3. Monitor the impact on automations during the rollout of system changes and quickly troubleshoot, if necessary.

Introduction - Publish to Server

Once you have created and debugged a Pega Robot Studio project, you can promote the project from the design environment, Pega Robot Studio, to the runtime environment, Pega Robot Runtime. Pega Robot Runtime is a desktop application that was created to run the compiled projects you build in Pega Robot Studio. Pega Robotic Automation provides several ways to deploy solutions.

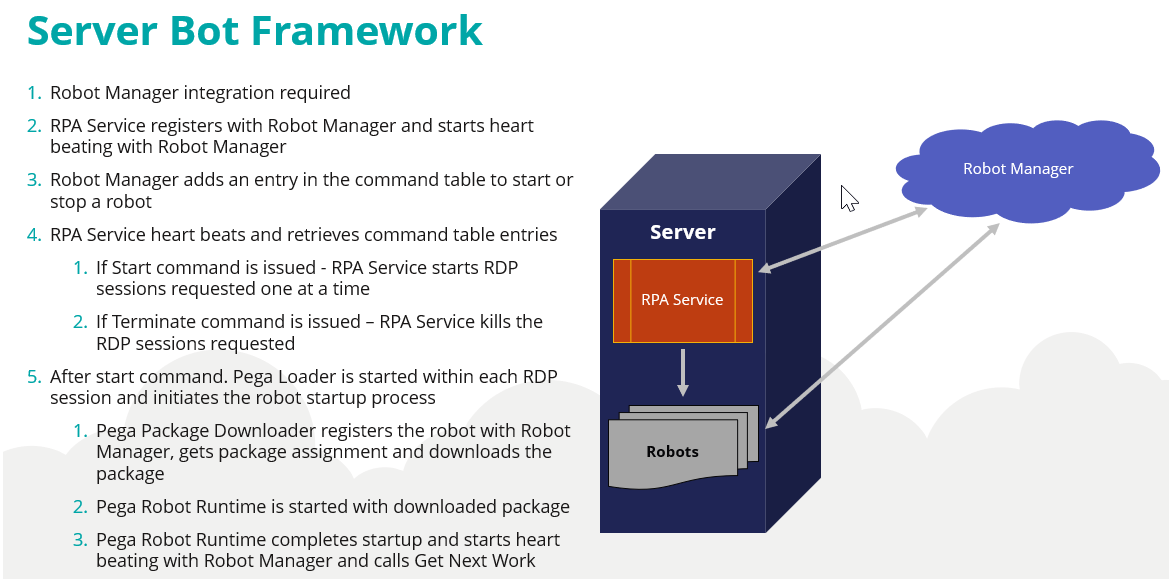
- Network Share — Deployment files are saved to a network share that can be accessed by the Runtime desktops/users.
- Web server — Deployment files are saved to a web server that can be accessed by the Pega Robot Runtime desktops/users.
- Local system — Deployment files are copied to each Runtime user's workstation.
- Pega Robot Manager — Deployment files are automatically uploaded from Pega Robot Studio to Pega Robot Manager for further assignment to end users. Pega Robot Manager lets you configure, manage, and deploy Pega Robot Studio projects from a centralized web portal.

For more information, see Project distribution options.

Introduction to Server Bot Framework

Beginning with build 19.1.32, the Server Bot Framework enables full utilization of the resources of a Windows Server when running Robotic Process Automations. A Server Bot is a robotic process automation (RPA) running in its own Remote Desktop Protocol (RDP) session on a machine with Windows Server 2012 R2, Windows Server 2016, or Windows Server 2019 version 1809. An RPA becomes a Server Bot when you deploy it on the Server Bot Framework. This feature allows you to:

- Run multiple Server Bots in the same workgroup at the same time
- Run Server Bots in multiple workgroups at the same time
- Start, stop, and assign work to Server Bots from Robot Manager



For more information, see Server Bot Framework.

Pega.CacheUpdater utility

Use the Pega.CacheUpdater utility to add product bundle files to a Robot Runtime computer when Pega Synchronization Server is not configured, not present, or when you want to

update a Server Bot server. For example, you can use this utility in the following situations:

- When you do not have a Pega Synchronization Server. Use this utility to add new product versions to each robot. You add the bundles using a login script to make them ready for use when a solution requires that version
- When you run mixed-mode Citrix solutions. You need to pre-stage the required version of Robot Runtime on the Citrix server because the Pega Synchronization Server cannot update the version at run time. Use the Pega.CacheUpdater utility to add product versions to the Citrix server for running your mixed-mode solutions.
- When workers typically connect directly to the Pega Synchronization Server on the network but, due to the pandemic, they are instead working from home and connect to a VPN before they connect to the Pega Synchronization Server. Use the Pega.CacheUpdater utility to add product versions directly to these user's computers by using a login script.

You can run this utility in a login script, in a PowerShell script, through a batch file, or manually from the command line. This utility is installed when you install the Pega Synchronization Engine, in the default installation location:

C:\Program Files (x86)\Pegasystems\Pega Synchronization Engine\ClientTools\Pega.CacheUpdater.exe

Note: Pega Synchronization Engine 3.1.13.0 and later versions include this utility. You can use the utility to install bundles from any version of the product. For more information about bundles, see the Pega Synchronization Server and Package Server User Guide

Parameters

The following table lists the parameters that you can include in the command to start the utility.

Pega.CacheUpdater parameters

Action	Main parameter	Optional parameters
Add a bundle file to the cache for the appropriate product	--file [path to the bundle file]	--verbose (Sends any messages to the console.) --manifest (Overwrites the local product.manifest file with the product.manifest file that is in the bundle. Use only under the direction of Pega Support.)
Clear the cache of a product.	--clear [RUNTIME, RPASERVICE, NATIVEFOUNDATION, or UPDATER]	--verbose (Sends any messages to the console.)
Display a list of products that are installed on the computer	--products	none
Display help information	--help	none

Note: This utility requires system administrator privileges to modify the contents of the cache folders. By default, the cache folders are located in the C:\Program Files (x86)\Pegasystems folder. When you run this utility in a command shell, run the shell as an administrator.

Examples

The following examples demonstrate how you can use this utility.

- This command adds the bundle file to the cache for the appropriate product:

```
Pega.CacheUpdater --file [path to the bundle]
```

- This command clears the cache for the product that you specify:

```
Pega.CacheUpdater --clear ProductName
```

- This command lists the products that are installed on the computer:

```
Pega.CacheUpdater --products
```

Robotic Automation sample solutions and examples

The following articles provide sample solutions and examples common tasks that you can perform when creating solutions in Pega Robotic Automation:

Sample solutions

- Sample solution: .NET DataGrid
- Sample solution: Cancel event
- Sample solution: City State ZIP Regex - Splitting an array
- Sample solution: File access
- Sample solution: HTML grid to Excel
- Sample solution: HTML table click
- Sample Robotic Automation solution: Shutting down emulator processes
- Sample solution: xmlDocumentComponent
- Sample solution: xmlDocumentComponent with schema

Examples

- Example: An integration that uses VB.NET
- Example: Fixing the DataGridView "Red X" Error
- Example: Handling Cancellable events in .NET
- Example: Integrating a ListView within an application
- Example: Rewriting the HTML of a web control
- Example: Selecting all entries in a list box on a web page
- Example: Shutting down emulator processes
- Example: Using the ICA file template for load balancing via the ZDC
- Example: Using the UI Connector

Sample Robotic Automation solution: .NET DataGrid

This sample solution shows how to use custom column names in a .NET DataGrid in place of the metadata associated with the data source by using Pega Robotic Automation.

Usually, the column headings that are displayed in a data grid show the text that is associated with the data source. To change these names, you must assign a style for the table and then map the custom column headings to the columns of the data source.

Project items

- Automation: getTableData
- Windows Form1
  - The data source for the data grid is a script in the automation. NewStyle is added for DataGrid – see the steps in Special considerations.

Automation details

The automation getTableData contains two script methods. One method creates a data source with columns Col1, Col2, and Col3 and sample data. The second method lets the user enter additional data to the table. These methods take the place of queries to a database or connections to a data source, which would be used in practice.

Scripts

```
Name: MakeTable

Parameters: none

Result type: DataTable

DataSet ds = new DataSet();

DataTable table = ds.Tables.Add("MyTable");

table.Columns.Add("Col1");

table.Columns.Add("Col2");

table.Columns.Add("Col3");

DataRow row = table.NewRow();

row["Col1"] = "abc";

row["Col2"] = "def";

table.Rows.Add(row);

DataRow row2 = table.NewRow();

row2["Col1"] = "ghi";

row2["Col2"] = "jkl";

table.Rows.Add(row2);

return table;


Name: AddTableRow

Parameters: DataTable table, string col1, string col2, string col3

Result type: void

DataSet ds = new DataSet();

DataTable table = ds.Tables.Add("MyTable");

table.Columns.Add("Col1");

table.Columns.Add("Col2");

table.Columns.Add("Col3");

DataRow row = table.NewRow();

row["Col1"] = "abc";

row["Col2"] = "def";

table.Rows.Add(row);

DataRow row2 = table.NewRow();

row2["Col1"] = "ghi";

row2["Col2"] = "jkl";

table.Rows.Add(row2);

return table;
```

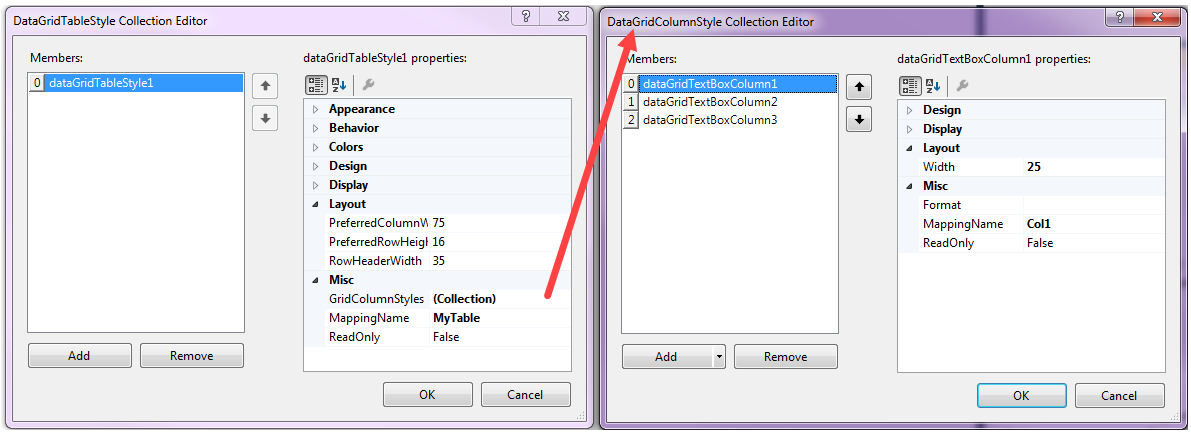
Special considerations

The sample solution uses a script to populate the data grid. The data columns are Col1, Col2, and Col3. The grid has been modified to have the following columns: MS, Col-2, and Last Col.

To use the solution, click the Do Query button. Once data displays in the grid, you can add more rows to the grid by entering values in the Col1 value, Col2 value, and Col3 value text boxes then clicking the Add Row button.

The following steps describe how to get the .NET data grid to handle customized column definitions when using a database query:

1. Create a form with a DataGrid and TableView, then bind the DataGrid to the TableView by using the TableView as the grid's DataSource property value.
2. Create the query by using any query provider and bind this to the TableView by setting the query to the tableview's TableProvider property value. This updates the grid display in the form, displaying the various columns from the query with default properties (width, caption, and so on).
3. Return to the DataGrid. To display the property editor, under the Data category, click the TableStyles property.
4. Add a table style.
5. In the new table style, in the MappingName column, enter `Table1`.
6. To display the property editor, click the GridColumnStyles property.



7. In the GridColumnStyles property editor, add members for the various data columns.
8. For each column, specify the MappingName to tie the column to a particular column in the grid – select the grid column from a list. You can also use this editor to specify the width, alignment, and header text on each column.

The key to making this work is the entry of the Table1 mapping name on the table style. This is used to equate a table with a visual style. Internally, Studio always sets this text from the TableView object to be Table1.

You can download completed solutions for each version in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	DBGridTest 8.0
8.0 SP1	8.0.2037	DBGridTest 8.0 SP1
19.1	19.1.2.0	DBGridTest 19.1

Sample Robotic Automation solution: Cancel event

This solution shows how to cancel an event based on conditional logic by using Pega Robot Studio.

Project items

- Web application: WebBing - Start page = www.bing.com, Internet Explorer version 8 was used.
- Automation: StartSearch

Automation details

StartSearch

This automation is triggered when you click the Search button on the Bing page. If the text in the Search text box (q1) matches the text box entry (Fritz), then the Clicking event is cancelled. Otherwise, the Clicking event is completed and the search begins.

Cancelling the Clicking event

You can cancel events such as the Clicking event by using automation logic. To expose the Cancel parameter, add the Clicking event to the automation and then click the up arrows at the top right of the Design block, as displayed in the following image:



The Cancel parameter accepts Boolean input. In the sample solution, the condition is set based on the Search text matching “Fritz”. If the string matches, a Boolean variable set to True and is sent to the Cancel parameter. This cancels the Clicking event.

You can download completed solutions for each version in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	Cancel Event Example 8.0
8.0 SP1	8.0.2037	Cancel Event Example 8.0 SP1
19.1	19.1.2.0	Cancel Event Example 19.1

Sample Robotic Automation solution: City State ZIP regex - Splitting an array

This sample solution shows how to use a StringUtils component from the Advanced tab of the Toolbar to get the City, State, and ZIP from a single line of text by using Pega Robot Studio.

A StringUtils component is used to return an array of the City, State, and ZIP information, and then the automation breaks the array apart by using a StringArrayProxy object.

Project items

- Windows form: User Interface
- Automation: RegEx Example Stripping out an Address

Automation details

The logic is triggered when you click the Break Apart into Three button on the Windows form.

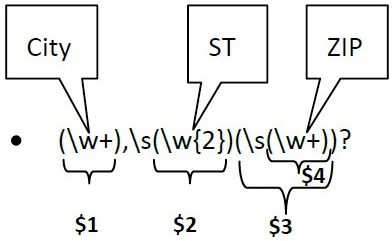
The entry from the txtWholeAddress text box is sent to the StringUtils RegexReplace method where the regular expression (regex) syntax removes the commas and spaces in the input text string and separates the text with exclamation points (!). For example: Indiana, TX 56473 returns as Indiana!TX!56473. For more information on the syntax, see Special considerations.

The result of the RegexReplace method is then passed to a StringUtils Split method where the string is split into an array. The items are split based on the position of the exclamation points in the text string.

A proxy is created for the StringArray result. The Get method for the StringArrayProxy object is used to return the value of each array member beginning with member at index zero (0) – the first item.

Special considerations

The following image displays the regex syntax that is used with the RegexReplace method. Note that the input for the method contains text that is separated by a comma and spaces: City, ST ZIP. The ZIP code is optional. To represent this in Regex syntax, the commas and spaces in the text string are used to group the text.



Where "\w" represents words and "\s" represents spaces.

The replacement string removes any spaces or commas and inserts exclamation points before words 2 and 4. Therefore, the replacement syntax is$1!$2!$4

You can download completed solutions for each version in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	Address Regex - Splitting 8.0
8.0 SP1	8.0.2037	Address Regex - Splitting 8.0 SP1
19.1	19.1.2.0	Address Regex - Splitting 19.1

Sample Robotic Automation solution: File access

This project shows how to use the AppendAllText, WriteAllText, and Exists static methods to interface with a flat text file through a Pega Robot Studio solution.

The solution prompts the user for a file name. If an existing text file is entered, text is appended to the text in the file. If a new file name is entered, the file is created and text is added to the file.

Automation details

Main Automation

This automation checks to see if the file name entered in the text box on the Windows form exists. If the file exists, a message indicates that the file was found and then the Append automation is launched. The contents of the text box from the Windows form (the file name including path) is passed to the Append automation.

If the file is not found, a message displays indicating that the file was not found and the Write automation is launched. The contents of the text box from the Windows form (the file name and path) is passed to the Write automation.

Append

This automation calls the AppendAllText method by using the file name that is provided by the user on the Windows form. The method opens the file and appends the following text: “I’m appending”. The file is then closed and saved.

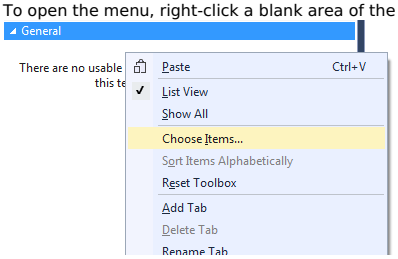
Write

This automation calls the WriteAllText method by using the file name that is provided by the user on the Windows form. The method creates the file and enters the text: “Openspan Rocks!” The file is then closed and saved.

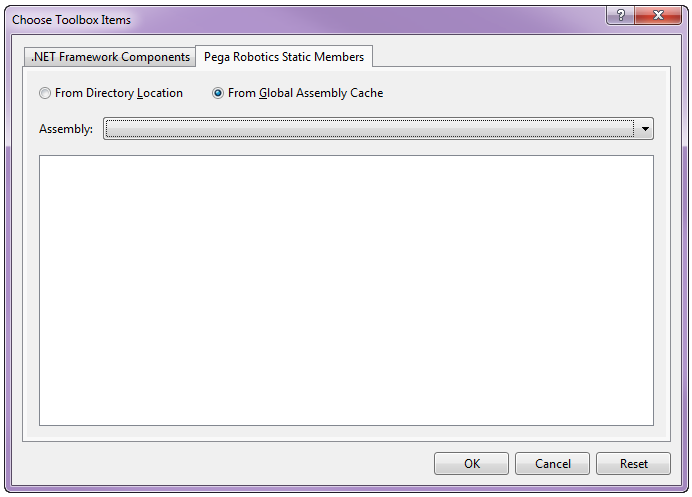
Special considerations

To create this solution, you need methods from the mscorlib.dll file. To add these methods to the Robot Studio toolbox, complete the following steps:

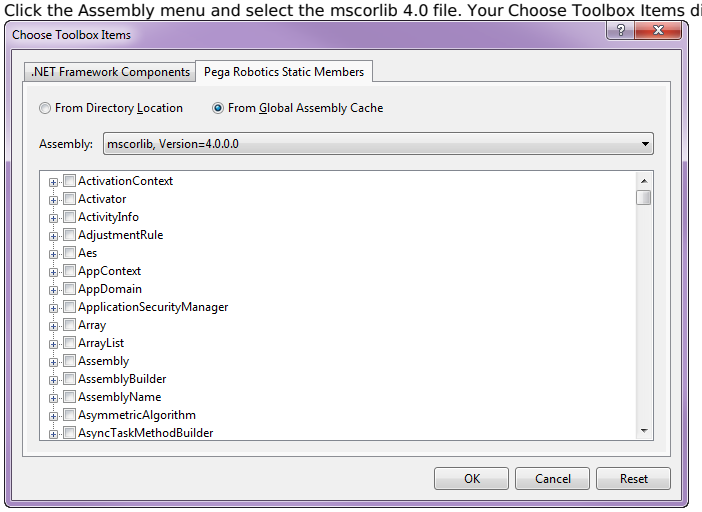
1. To open the menu, right-click a blank area of the toolbox and select Choose Items.



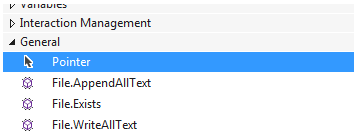
2. On the Choose Toolbox Items dialog, select the Pega Robotics Static Members tab, then click From Global Assembly Cache.



3. Click the Assembly menu and select the mscorlib 4.0 file. Your Choose Toolbox Items dialog should resemble the following example:



4. Scroll down the list to the File member and select the following methods:
   - AppendAllText (String path, String contents): Void
   - Exists
   - WriteAllText (String path, String contents): Void
5. To add the methods, click OK. The new methods are added to the toolbox, as displayed in the following image:



In the screen shown above, the methods were added to the General tab. The location of the methods depends on the tab that you specified when you selected the Add/Remove Items option. You can move toolbox items by dragging them from one tab to another.

You can download completed solutions for each version in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	File Access 8.0
8.0.SP1	8.0.1037	File Access 8.0 SP1
19.1	19.1.2.0	File Access 19.1

Sample Robotic Automation solution: HTML grid to Excel

This sample solution shows how to loop through the contents of an HTML grid and copy the data to an Excel spreadsheet by using Pega Robot Studio.

Project items

- Web application: AKPoker
  - StartPage: http://training.openspan.com/rankings.html
  - Internet Explorer version 8 was used

See the interrogation notes under Special considerations.

- The page is minimized after the data is read from the table.
- Windows form: Windows form
  - Microsoft Office Excel 2013 was used
  - Workbook: C:\Program Files\OpenSpan\OpenSpan Studio\How To AKPoker Table\AKPoker Table.xlsx
  - Change the path to the location that you specified for this file

Ensure that when you install Robot Studio, you enable support for Office components. Otherwise, the Office components do not display in the toolbox.

- Automation: Add Row
- Automation: Copy Table
- Automation: Globals
- Automation: Set Headings

Automation details

Add Row

This automation writes to the Excel spreadsheet: C:\Program Files\OpenSpan\OpenSpan Studio\How To AKPoker Table\AKPoker Table.xls the path that is specified in the Windows form. It uses the Excel connector.

The Add Row automation is called from the Copy Table automation after a particular player row is identified by using the ForLoop process. This process yields indices that are passed to the Add Row automation by way of an entry point and are used to pull data from specific cells within the HTML grid. For example, when the dataCell_Name.Text property is placed on the automation, the parameter is selected to identify the contents. The Index parameters display, and indices for the league, division, and player are supplied to identify the cell.

Before the data can be written to an Excel cell, the cell must be identified by row and column. The Counter supplies the row number. For the player name, the A column of the spreadsheet is used. The StringUtils Concat method is used to create the result *Arownum*, where *rownum* is the value of the counter. This result is provided to the Excel component's SetCellValue method, which requires the cell to be identified by row and column, such as A20 for column A, row 20. This process is repeated for the other HTML data cells to be copied to the Excel spreadsheet.

After all data for a particular player has been copied, the counter is incremented so the next player record begins on a new row.

The final part of the automation is to calculate a running tally of the players' earnings. This is accomplished by using the Excel SUM function. By setting a cell to the formula and then retrieving the contents of the cell, the sum of the earnings column can be retrieved. A StringUtils component, Format method, is used to format the SUM function as required. To determine the entire range of rows to include in the formula, the VarPlayersTotal variable is used from the Globals automation.

Copy Table

This automation reads each row of data from the HTML grid and then launches the Copy Table automation to copy the data to the Excel spreadsheet.

To read a row of player data, the automation must read each player row in a given division and league. When it finishes reading the divisions in a league, it repeats the process with the next league. This process requires three ForLoop components. The first ForLoop processes the leagues, the second ForLoop processes the divisions, and the third ForLoop processes the players.

The limit for each ForLoop is set by the Count property for the table section. Note that the Count property is for the table element *above* it in the table schema hierarchy. For example, to get the number of divisions, highlight the League table section.

By the end of this automation, indices are set for the league, division, and player. These indices are used to pull a particular cell value into the Add Row automation. These indices are passed to the Add Row automation via the Execute method.

Set Headings

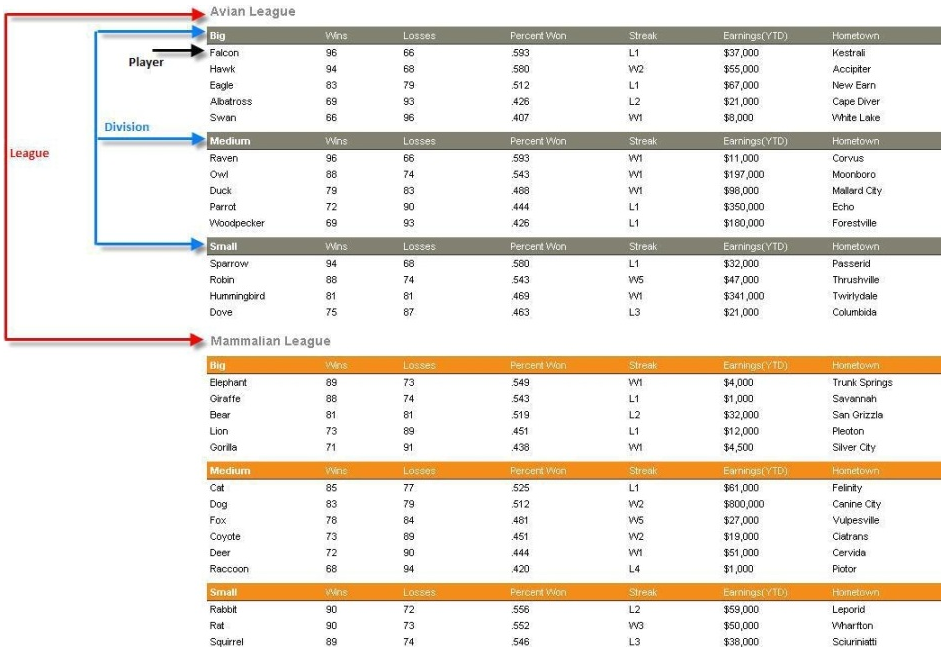
This automation contains the Counter component that is used in the Add Row automation. The Counter is set at two (2), which is the first blank row in the Excel spreadsheet. After the initial value, the Add Row automation increments the value to set the new row value for writing data.

This automation also contains the VarPlayersTotal variable, which is the total count of players in the table (Player.AbsoluteCount) plus one and sets the row numbers that contain player data in the Excel spreadsheet. This variable is used in calculating the sum of the player earnings.

This automation sets the headings to be used in the Excel spreadsheet. The matching cells for the Name, Wins, Losses, and Earnings are copied from the HTML grid to the spreadsheet by using the SetCellValue method for the Excel component.

Special considerations

When interrogating the Rankings.html page, keep in mind that this page contains multiple repeating sections, as displayed in the following image:



Avian League

Big	Wins	Losses	Percent Won	Streak	Earnings(YTD)	Hometown
Falcon	96	66	.593	L1	$37,000	Kestrali
Hawk	94	68	.580	W2	$55,000	Accipiter
Eagle	83	79	.512	L1	$67,000	New Earn
Albatross	69	93	.426	L2	$21,000	Cape Diver
Swan	66	96	.407	W1	$8,000	White Lake
Medium	**Wins**	**Losses**	**Percent Won**	**Streak**	**Earnings(YTD)**	**Hometown**
Raven	96	66	.593	W1	$11,000	Corvus
Owl	88	74	.543	W1	$197,000	Moonboro
Duck	79	83	.488	W1	$98,000	Mallard City
Parrot	72	90	.444	L1	$350,000	Echo
Woodpecker	69	93	.426	L1	$180,000	Forestville
Small	**Wins**	**Losses**	**Percent Won**	**Streak**	**Earnings(YTD)**	**Hometown**
Sparrow	94	68	.580	L1	$32,000	Passerid
Robin	88	74	.543	W5	$47,000	Thrushville
Hummingbird	81	81	.469	W1	$341,000	Twirlydale
Dove	75	87	.463	L3	$21,000	Columbida

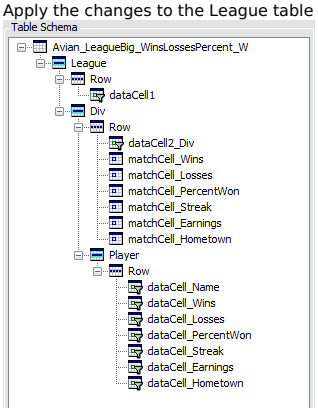
Mammalian League

Big	Wins	Losses	Percent Won	Streak	Earnings(YTD)	Hometown
Elephant	89	73	.549	W1	$4,000	Trunk Springs
Giraffe	88	74	.543	L1	$1,000	Savannah
Bear	81	81	.519	L2	$32,000	San Grizzla
Lion	73	89	.451	L1	$12,000	Pleoton
Gorilla	71	91	.438	W1	$4,500	Silver City
Medium	**Wins**	**Losses**	**Percent Won**	**Streak**	**Earnings(YTD)**	**Hometown**
Cat	85	77	.525	L1	$61,000	Felinity
Dog	83	79	.512	W2	$800,000	Canine City
Fox	78	84	.481	W5	$27,000	Vulpesville
Coyote	73	89	.451	W2	$19,000	Clatrans
Deer	72	90	.444	W1	$51,000	Cervida
Raccoon	68	94	.420	L4	$1,000	Piotor
Small	**Wins**	**Losses**	**Percent Won**	**Streak**	**Earnings(YTD)**	**Hometown**
Rabbit	90	72	.556	L2	$59,000	Leporid
Rat	90	73	.552	W3	$50,000	Wharfton
Squirrel	89	74	.546	L3	$38,000	Sciuriniatti

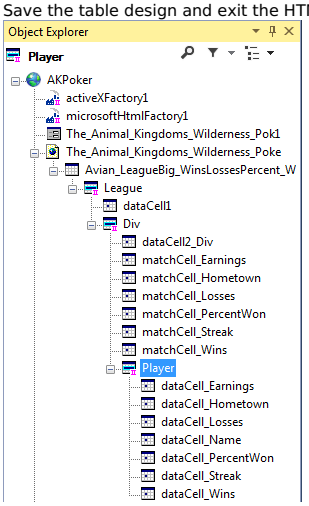
Start by interrogating the entire table by using the HTML Table Designer option. After the table opens in the HTML Table Designer, to create the table sections, complete the following steps:

1. Highlight rows: Avian League up to, but not including, Mamalian League and select it as a table section. Assign this name to it: League.
2. Mark the Avian League row as a data cell.
3. Mark the Big cell as a data cell. Mark the rest of the cells on that row as matching cells.
4. Highlight the first set of rows from Big up to but not including Medium as a table section. Assign this name to it: Div.
5. Highlight the first row of player data and mark the cells as data cells. Also, set this row as a table section. Assign this name to it: Player.
6. Name the matching cells and data cells. For this sample solution, the cell contents are appended to the cell name, for example, MatchCell_Wins.
7. Apply the changes to the Player table section.
8. Apply the changes to the Div table section.

9. Apply the changes to the League table section. Your table schema should resemble the following image:



10. Save the table design and exit the HTML Table Designer. Your Object Explorer should resemble the following image:



You can download completed solutions for each version in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	HTMLGrid to Excel 8.0
8.0.SP1	8.0.2037	HTMLGrid to Excel 8.0 SP1
19.1	19.1.2.0	HTMLGrid to Excel 19.1

Sample Robotic Automation solution: HTML table click

This sample solution shows how to interrogate an HTML table that contains buttons in the data cells and then use the Click event of a table button to retrieve data from a corresponding cell using Pega Robot Studio. The solution also shows how to use the Query parameter of the data cell's Text property to locate a particular cell value in the table.

Project items

- Web application: Dashboard
  - StartPage: http://training.openspan.com/dashboard.html
  - For details about interrogating the HTML table that is contained in the web application, see the Steps section
- Windows form: Windows form1
- Automation: Get Cell Value

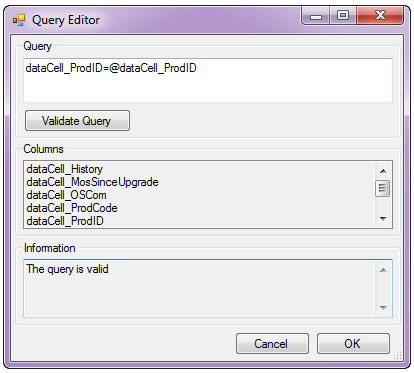
Automation details

Get Cell Value

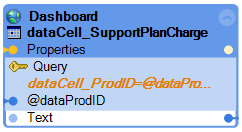
This automation provides the logic to display a selected product ID based on the row under the Upgrade History column in which you click the View button. The automation also retrieves the value from the Support Plan Charge column when provided with a specific product ID.

This automation is triggered when you click a View button in the Upgrade History column of the OpenSpan Dashboard HTML table. The automation then returns the value of the Product ID cell from the row in which the View button was selected.

Next, if you click the Get Support Plan Amount button on the Windows form, the value from the Support Plan Amount column is returned for the corresponding product ID. The automation uses the Query parameter of the DataCell control's Text property to find the Support Plan Amount that corresponds to the specified product ID. The query syntax is "dataCell_ProdID=@dataCell_ProdID" as displayed in the following image:

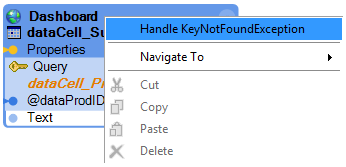


The resulting connection block is displayed in the following image:

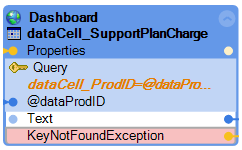


Note that the at sign (@) prefix creates a parameter for the Query. The product ID from the Windows form text box is used for the Query parameter. The resulting text for the dataCell_SuppoprtPlanChange is output to a label on the Windows form.

After you have set the query, you can add an event that triggers if the item searched for by the query is not found. Highlight and right-click thedataCell_SupportPlanChange connection block, then select Handle KeyNotFoundException.



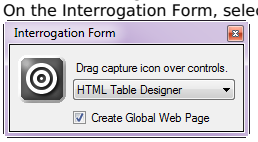
When you select this option, a new event output is added to the connection block as displayed in the following image:



You can then connect this event to another control to handle the situation where the query input is not found. In the sample solution, the event is connected to a MessageDialog that displays this text: Item not found.

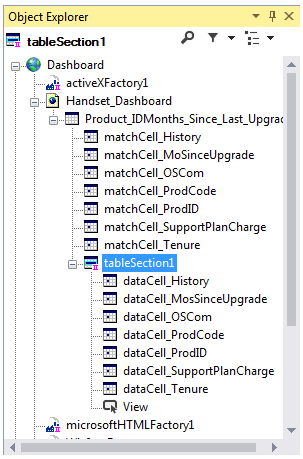
Steps

1. Set the StartPath property for the web adapter to: **http://training.openspan.com/dashboard.html**
2. Start the Interrogator. On the Interrogation Form, select the Create Global Web Page option.
3. On the Interrogation Form, select HTML Table Designer as the interrogation option.



4. Drag the bullseye over the table to under the Upgrade Summary heading.
5. Select the first of the two Table HTML tags.
6. The table opens in the HTML Table Designer. Highlight and right-click the first row of cells, then select Define Match Cell(s).
7. Select and right-click the second row of cells, then select Define Table Section.
8. Select and right-click the row of cells in the TableSection1, then select Define Data Cell(s).
9. Click Apply Changes. The rest of the cells in the table are matched as repeating data cells in TableSection1.
10. Click File > Save.
11. Select the first MatchCell that is listed in the Table Schema *matchCell1*. In the Properties grid, rename the control so it reflects the contents, which in this case is Product ID. In the provided sample solution, the cell was renamed: matchcell_ProdID.
12. Repeat this process for the rest of the match cell controls.
13. Select the first DataCell that is listed in the table section of the table schema and rename it to reflect its contents. In the provided sample solution, the cell was renamed: dataCell_ProdID.
14. Repeat this process for the rest of the data cells in the table section.
15. Apply the changes and save the schema, then exit the HTML Table Designer.
16. Return to the Interrogation Form and change the setting to Default.
17. Interrogate the first View button that is listed in the Upgrade History column.

This completes the interrogation process. Your Object Explorer should resemble the following image. Make sure that the View button is added under the tableSection1:



You can download completed solutions for each version in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	HTML Table Click Example 8.0
8.0. SP1	8.0.2037	HTML Table Click Example 8.0 SP1
19.1	19.1.2.0	HTML Table Click Example 19.1

Sample Robotic Automation solution: xmlDocumentComponent

This sample solution shows you how to use the xmlDocumentComponent component by using Pega Robot Studio.

Project items

- Windows form: Windows form1
- Automation: LoadDocument

Automation details

LoadDocument

This automation contains the logic that performs when you click various buttons on the Windows form.

When you click the Load button, it opens the XML file that is specified in the txtFileName text box and and displays the contents in the txtXML text box.

When you click the Select button, it displays the child nodes, InnerText, and other details depending on the XPath that is specified in the txtSelectedXML text box.

For more information and instructions on how to build the automation, see Using the xmlDocumentComponent.

You can download completed solutions for each version in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	XMLDocument 1 - 8.0
8.0.SP1	8.0.1037	XMLDocument 1 - 8.0 SP1
19.1	19.1.2.0	XMLDocument 1 - 19.1

Sample Robotic Automation solution: xmlDocumentComponent with schema

This sample solution shows how to use the xmlDocumentComponent component with an external schema in Pega Robot Studio.

Project items

- Windows form: Windows form1
- Automation: LoadDocument
- Automation: UpdatePublishers
- Automation: ValidateSchema

Automation details

LoadDocument

This automation contains the logic to be performed when various buttons on the form are clicked:

- When you click the Load button, the automation opens the XML file specified in the txtFileName text box and and displays the contents in the txtXML text box.
- When you click the Select button, the automation displays the child nodes, InnexText, and other details depending on the XPath specified in the txtSelectedXML text box.

UpdatePublishers

This automation contains the following group boxes: Append Publishers, Prepend Publishers, and Insert Publishers.

- In the Append Publishers group box, when you click the Append Child button from the Publisher Operations tab, the automation appends the Publisher Info at the end of the XML file.
- In the Prepend Publishers group box, when you click the Prepend Child button from the Publisher Operations tab, the automation prepends the Publisher Info at the start of the XML file.
- In the Insert Publishers group box, when you click the Insert button from the Publisher Operations tab, the automation inserts the Publisher Info at the index location mentioned in the txtPublisherIndex text box.

ValidateSchema

When you click the Validate button, the XML document is validated with reference to the XSD document that is used. The validation errors are displayed if any are found. For

more information and instructions on how to build the automation, see Using the xmlDocumentComponent with schema.

You can download completed solutions for each version by using the links in the following table:

Studio version	Built by using this build	Sample solution download
8.0	8.0.1037	xmlDocumentComponent with schema 8.0
8.0.SP1	8.0.2037	xmlDocumentComponent with schema 8.0 SP1
19.1	19.1.2.0	xmlDocumentComponent with schema 19.1

Robotic Automation example: An integration that uses VB.NET

This article describes how to integrate a Windows application (calculator) and a web application (the Google search page) by using VB.NET code. It also demonstrates how to start Pega Robot Studio application adapters and use them by using .NET code.

This article assumes that you have the following expertise:

- Are familiar with Visual Studio and VB.NET
- Know how to create adapters and interrogate controls

Integrating applications requires the use of adapters, which are essentially classes that describe and work with the application that is being integrated. The adapters in this case are placed in a single Robot Studio project. The VB.NET code is placed in a separate Microsoft Visual Studio project that is part of the same solution.

You must add references to your VB.NET project before it recognizes the adapters. You can do this in a couple of ways, the easiest of which is to complete the following steps:

1. In your VB.NET project, click Project > Add Reference.
2. Add the following references:
   - OpenSpan
   - OpenSpan.Adapters
   - OpenSpan.Adapters.Web
   - OpenSpan.Adapters.Windows
3. Click the Project References tab and add an adapter.
4. Rebuild the solution.
   This is important because when you start using the adapter and controls in the .NET project, you need a project reference that includes those objects. When you add a project reference from the OpenSpanIntegration project to the VB_Calc_Sample project, the .NET code recognizes any controls that are interrogated.

If you add or remove controls or adapters, always rebuild the project so that the references are also added or removed for any other projects that use them.

The following code is an example:

```
Private Sub Form1_Load(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles MyBase.Load
Calc = New OpenSpanIntegration.Calculator
WebSearch = New OpenSpanIntegration.WebSearch

'Handler for pressing the M+ key on calc
AddHandler Calc.btnMPlus.Click, AddressOf CalcMPlusPressed

'Handler for when the web page changes
AddHandler WebSearch.Search_Results.Created, AddressOf SearchResultsCreated

'By using the form (Me) as a synchronization object, you do not have to worry about
'cross-thread exceptions when an event happens on a different thread from this one.
WebSearch.Start(Me)

'Since you do not use events from Calc to modify the Windows form UI, you will not have cross-thread issues.
Calc.Start()
End Sub

Private Sub Form1_FormClosing(ByVal sender As System.Object, ByVal e As
System.Windows.Forms.FormClosingEventArgs) Handles MyBase.FormClosing
If Calc.IsRunning Then
Calc.Stop()
End If
If WebSearch.IsRunning Then
WebSearch.Stop()
End If
End Sub

Private Sub CalcStopped(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Calc.Stopped
'If calculator is closed, close this application
Application.Exit()
End Sub

'When the Calculator M+ key is pressed, do a web search if the web query page can be found
Private Sub CalcMPlusPressed(ByVal sender As System.Object, ByVal e As System.EventArgs)
If WebSearch.query.IsCreated Then
WebSearch.query.Text = Calc.txtTextBox.Text
WebSearch.go.PerformClick()
End If
End Sub

'Displays all the links found on the search page after it loads
Private Sub SearchResultsCreated(ByVal sender As System.Object, ByVal e As System.EventArgs)
WebLinkList.Items.Clear()
For i As Int16 = 0 To WebSearch.Google.Links.Count – 1
WebLinkList.Items.Add(WebSearch.Google.Links.Item(i).Url())
Next
End Sub
End Class
```

Robotic Automation example: Correcting the DataGridView Red X error

The DataGridView is a .NET control that is used to display and permit the editing of tabular data. The grid can be filled in by using code or by attaching a data source.

DataGridView controls, like most controls, are not thread-safe. That is, you need to perform operations on them within the same thread in which they were created. Sometimes, however, Pega Robot Studio developers accidentally modify the DataGridView control from another thread. This typically happens when an operation is coming from an event in another application.

To correct this problem and make sure that it does not accidentally happen again, postpone the updating of the DataGridView control during an OnPaint event if it is triggered from another thread. You do this by handling an exception and then flagging the control to be redrawn when the Message Pump runs.

Create a .NET class that inherits from the DataGridView control and overrides the OnPaint event. You must have a C# compiler to build this. Once built, add it to the Robot Studio toolbox and replace your DataGridView controls with it.

The following is an example:

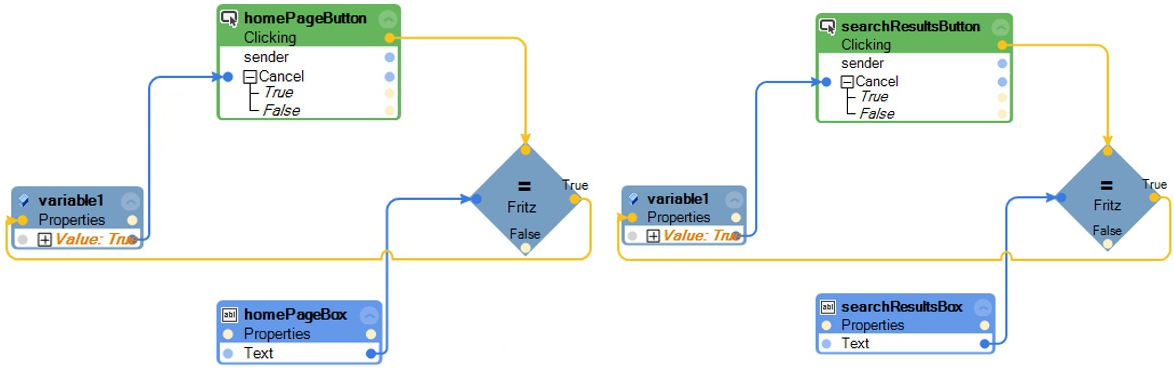
```
using System;
using System.Windows.Forms;

namespace DataGridViewPlus
{
   public class DataGridViewPlus : DataGridView
   {
      ///
      /// This prevents the "red X" error which happens when you cause updates to a datagrid
      /// from multiple threads. It catches the OnPaint() exception and invalidates
      /// the grid so it gets redrawn the next time the application hits its message loop.
      ///
      /// The following solution to this problem was found at
      /// http://social.msdn.microsoft.com/forums/en-US/winforms/thread/fdd94896-80e9-4e91-9ed5-0348bf2633a9
      ///
      protected override void OnPaint( PaintEventArgs e )
      {
         try
         {
            base.OnPaint( e );
         }
         catch
         {
            Invalidate();
         }
      }
   }
}
```

Robotic Automation example: Handling cancelable events in .NET

Some events, such as button clicking, are passed to the automation code before the application gets the event. These events are named with the -ing suffix, such as Clicking and RightClicking. You handle all of these events and then, optionally, pass them to the application. If you choose not to pass an event to the application, the event is cancelled.

Cancelable events receive the CancelEventArgs argument, which has the Cancel property. To prevent an event from being passed to the application, set the Cancel property to True and then handle the event as needed in your automation.

In the attached solution, the homePageBox text field object is associated with the Search field on the Bing search page. The searchResultsBox text field object is associated with the Search field on the Bing search results page. If the text in the Bing Search field matches the text in the equals block, the system cancels the search.

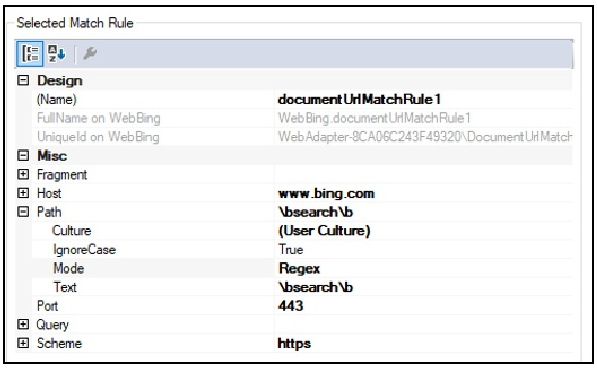


To test this solution, complete the following steps:

1. Download and run the attached solution in Robot Studio.
2. Go to the Bing search page and then enter text into the Search field.
3. Click Search.

Note: This exercise works both for the Bing search home page and for the search results page. There are many ways to do this, but this example uses a separate control for each page, as shown in the preceding example.

The Document Title match rule for the home page matches any webpage with “Bing” in the title. To uniquely identify the Bing search page, use the Document URL match rule. The following example shows the properties for this match rule:



The Path field contains a regex expression, \bsearch\b. The match rule criteria shown in this example identifies URLs that contain “search” as the correct URL for the search page.

Pega Robot Studio version	Built using version	Download
8.0	8.0.1084	Cancel Event Example 8.0
8.0 SP1	8.0.2037	Cancel Event Example 8.0 SP1
19.1	19.1.2.0	Cancel Event Example 19.1

Robotic Automation example: Integrating a ListView within an application

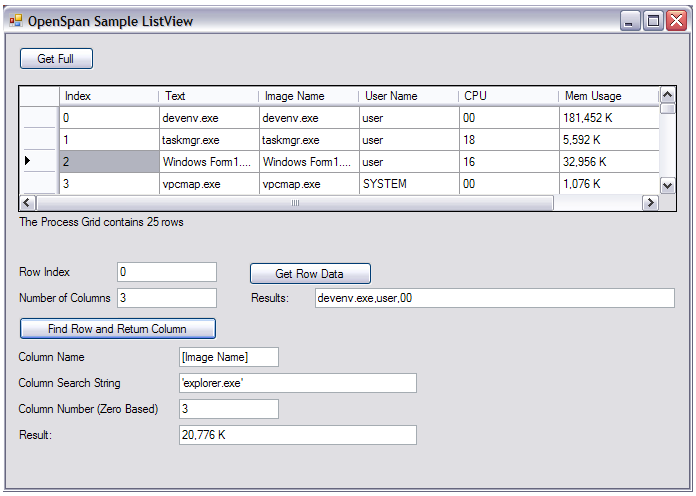
Note: The techniques described in this article can also apply to other controls.

A common situation faced by Pega Robot Studio developers is how to get information from a ListView control in some application. This example uses the Task Manager application that comes with Windows as an example and shows how to read information from that application then manipulate it in your own custom application.

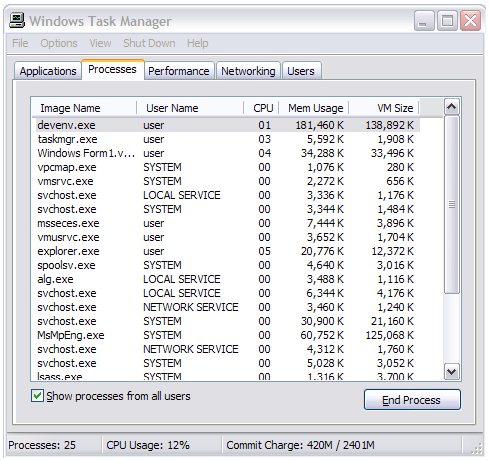
The main points of using Robot Studio with .NET that are demonstrated in this article include the following topics:

- Starting and stopping an application by using an adapter
- Reading from a ListView control by treating it as a data source

The following example includes a Windows form that copies information from the Task Manager:



The Task Manager is a standard Windows application.



Starting the Task Manager application

There is an important change in how the application is started compared to the earlier project.

```
if ( !m_TaskManager.IsRunning )
{
   m_TaskManager.Start();
}
```

The Start method can take a parameter that provides a synchronization object so that events coming in on other threads are automatically assembled in the UI thread. However, because you are not handling events from the Task Manager application, you do not need to perform this action. If you were, use the this object of the Windows form to synchronize events with the UI thread. Doing this lets the Robot Studio adapters automatically assemble their events to your user interface so you do not have to.

You only need to do this for adapters that you handle events from and the event handlers that modify user interface items. Because neither of those conditions are true, use the Start method.

Working with the ListView control

There is nothing to show outside of how to start the Task Manager application. This is because after it is started, Robot Studio works with the ListView as though it was an object in your C# project. Some of the methods are different from a standard ListView, and some are more powerful than what you get from .NET.

For instance, in the following routine, you see code that uses the m_TaskManager adapter to assign a DataTable to the dataGridView that you are using on the Windows form. That single line of code causes the information to be copied from one application to the other. The rest of the code then writes a message that indicates how many rows and columns there are:

```
///
/// This automation sends the contents of the ListView from
/// the Processes tab of the Task Manager
/// to a DataGrid on a Windows Form.
/// The automation also determines a count of the total number
/// of rows returned for the ListView and generates
/// a message if no rows are returned.
/// The number of rows is displayed on the Win Form.
///
private void SendListViewtoDataGrid()
{
```

```
    // Populates the Data Grid View with data from Task Manager.
    dataGridView1.DataSource = m_TaskManager.listView.DataTable;

    // Update windows form based on number of rows returned.
    int numRows = m_TaskManager.listView.DataTable.Rows.Count;
    if ( numRows > 0 )
    {
        label8.Text = "The Process Grid contains " + numRows + " rows";
    }
    else
    {
        label8.Text = "Task Manager returned No Processes";
    }
}
```

Likewise, the other parts of the code search for items in the ListView to read a line of text from the other application, such as the following line:

```
txtRowDataResults.Text = m_TaskManager.listView.GetItemFullText(rowIndex,numColumns);
```

When you run the application, you should also select a different tab in the Task Manager and then refresh the data grid on the C# application. The Robot Studio adapter reads the data from the ListView and not directly from the screen.

After you have created the adapter to the application, using the controls in the adapter is similar to how you use objects in any other .NET application.

Robot Studio version	Built by using version	Download link
8.0	8.0.1037	ListView Example 8.0
8.0 SP1	8.0.2037	ListView Example 8.0 SP1

Robotic Automation example: Rewriting the HTML of a web control

This article provides an example of how to rewrite the HTML of a web control by using Pega Robot Studio to change the behavior of the web control. You typically rewrite the HTML of a web control to redirect hyperlinks to other destinations. You can also use this capability to highlight specific controls or to make visible controls that have been hidden by the page.

To rewrite the HTML of a web control, complete the following steps:

1. Create a new solution and add a web application.
2. Set the StartPage to: http://training.openspan.com/login
3. Start interrogation and interrogate the user name text box, the password text box, the Login button, and the information label found at the bottom of the sign in page.
4. Add an Element Index match rule to the information label to ensure that it matches uniquely.
5. Create a new automation.
6. Add the Created event for the information label.
7. Add the OuterHtml property for the label.
8. Connect the Created event to the OuterHtml property.
9. Set the OuterHtml property to: Web Adapter Certification Course**.**
10. Run the solution.

When the system creates the control, its OuterHtml is rewritten. This causes a message box to display when clicked.

Robotic Automation example: Selecting all entries in a list box that is on a webpage

The methods and properties for changing the selected entry on multiselect HTML list boxes only allow you to select one entry. There is no simple way to perform a Select All action.

To work around this limitation, use the ExecuteScript method off of the webpage. To do this, your list box must meet these requirements:

- It must be an HTML Select element
- It must have an ID

If you run the following script in an ExecuteScript method call, the system selects all of the list box items:

```
var listbox = document.getElementById("elementid");
var options = listbox.options;

for (var index = 0; index < options.length; index++)
{
    options[index].selected = true;
}
```

In the example script, replace *elementid* with the ID of your list box.

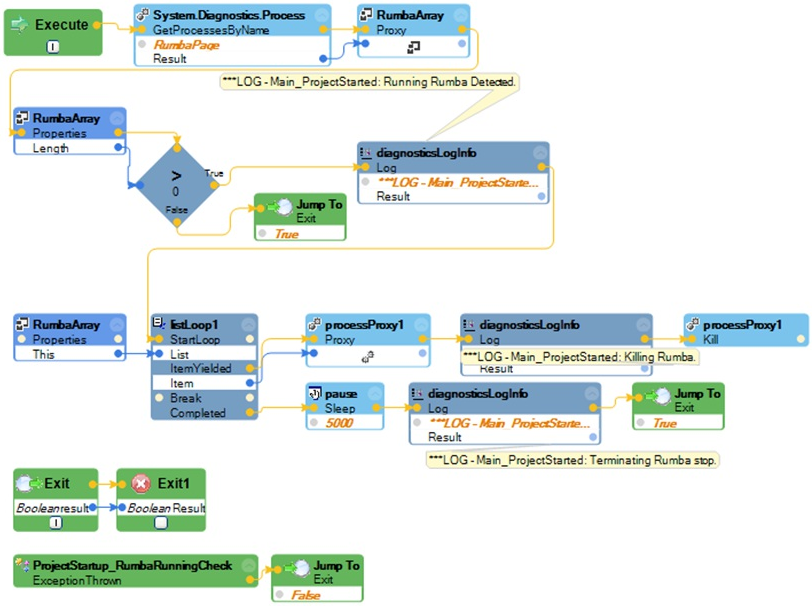
For more information on the ExecuteScript method, see Webpage properties, methods, and events.

Robotic Automation example: Shutting down emulator processes

For best results, all Pega Robotic Automation solutions that include a text adapter should also include logic that makes sure that no emulators are running before you start the robotic automation.

Some emulators do not shut down entirely and instead leave processes running. If processes are still running and your automation starts, the automation could connect to the wrong process and not work as designed.

To avoid this issue, add logic to the beginning of your automation to search for and shut down any running emulators. The following example solution provides an example of a solution that shuts down any Rumba emulators, and then starts Pega Robot Runtime.



Example solution for shutting down Rumba processes

Robotic Automation example: Using the ICA file template for load balancing using the ZDC

The attached ICA file, launch.zip, shows the requirements for automatically authenticating a published application, such as Pega Robot Runtime, when you are load balancing using the Zone Data Collector (ZDC) for the Citrix farm. You must identify this template file in the Citrix Context and the template file must be available to all client systems that run the solution.

The attached template file is an example. You must modify this file to match specific Citrix farm environments.

The following is a listing of the contents of the attached example ICA file:

```
[WFClient]
Version=2
HttpBrowserAddress=1.1.1.1:95
HttpBrowserAddress1=1.1.1.2:95
HttpBrowserAddress2=1.1.1.3:95
HttpBrowserAddress3=1.1.1.4:95
HttpBrowserAddress4=1.1.1.5:95
HttpBrowserAddress5=1.1.1.6:95
HttpBrowserAddress6=1.1.1.7:95

[ApplicationServers]
OpenSpan Runtime=

[OpenSpan Runtime]
TWIMode=On
TransportDriver=TCP/IP
LongCommandLine=/"project=
InitialProgram=#OpenSpan Runtime
Address=OpenSpan Runtime
UseLocalUserAndPassword=0
```

The HTTPBrowserAddress is the IP address of the Zone Data Collector (ZDC) for the Citrix farm. The port assigned is the XML service port on which the Citrix farm is operating.

Download: launch.zip

Robotic Automation example: Using the UI Connector

Pega Robot Studio provides a platform for automating the controls of almost any technology. Pega's library of translators makes the majority of controls immediately accessible for you to include in your automation. Translators are custom objects that talk directly to the native control and expose that control's functionality to Pega. If, however, no translator is available for a control, your ability to work with the control is limited.

Beginning with Pega Robot Studio version 8.0.1053, you can access native controls without using translators. This build includes a new feature, the UI Connector, which uses a programming technique called Reflection. Many popular software technologies, such as .NET, provide a form of Reflection that lets you inspect and invoke objects at run time. By leveraging this technology, Robot Studio can communicate with native controls without the need for a custom translator.

Note: Support for .NET and Windows Presentation Foundation (WPF) applications was added to the UI Connector in build 8.0.1053. Support for Java was added to the UI Connector in version 8.0 SP1.

In build 8.0.1053 and later, you can find fully-functional UI Connectors in the UI Connectors folder. These connectors include explanatory comments in the class files, which you can use as a guide for your use case.

Here is an example of where you will find this folder, assuming that you installed the build in the default location:

- 8.0 and 8.0 SP1: C:\Program Files (x86)\OpenSpan\OpenSpan Plug-in for Microsoft Visual Studio 2015\UI Connectors
- 19.1 and later: C:\Program Files (x86)\Pegasystems\Pega Robot Studio\UI Connectors

The folder contains examples for the following types of controls:

- DevExpress
- Infragistics
- QzSourceGrid

Use these examples as templates for creating your own controls by using the UI Connector.

For more information, see Creating UI Connectors.

Pega Robot Manager

Robotic Automation frequently asked questions

The articles in this section present answers to questions that are commonly asked about Pega Robotic Automation.

If your question is not answered in these articles, go to the Pega Support Center.

Adding Robotic Automation components to the Windows Defender excluded list

Windows Defender is an antivirus, malware, and spyware protection application included in Microsoft Windows 8 and later, replacing Microsoft Security Essentials. The use of Windows Defender is optional.

If you use Windows Defender and Pega Robotic Automation, to ensure optimal performance, add the following Pega Robotic Automation components to the Windows Defender excluded processes list. Otherwise, the unnecessary scanning of routine robotic processes and logging by Windows Defender can slow the performance of your system.

Use Windows Defender to add the Pega Robotic Automation components to the excluded list. For more information, see the Microsoft documentation for Windows Defender.

For 64-bit Pega Robotic Automation components, the following examples show the paths and file names that are used when you install the system in the default locations under the C:\Program Files\ folder:

- Robot Studio

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Studio for Microsoft Studio 2015\OpenSpan.Studio.Shell.exe
  For 19.1 and later: Pegasystems\Pega Robot Studio\OpenSpan.Studio.Shell.exe

- Robot Runtime

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Runtime Enterprise\OpenSpan.Runtime.exe
  For 19.1 and later: Pegasystems\Pega Robot Runtime\OpenSpan.Runtime.exe

- Agile Desktop

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Studio for Microsoft Studio 2015\OpenSpan.AgileDesktop.exe
  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Runtime Enterprise\OpenSpan.AgileDesktop.exe
  For 19.1 and later: Pegasystems\Pega Robot Studio\OpenSpan.AgileDesktop.exe
  For 19.1 and later: Pegasystems\Pega Robot Runtime\OpenSpan.AgileDesktop.exe

- Test Runner

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Studio for Microsoft Studio 2015\OpenSpan.TestRunner.exe
  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Runtime Enterprise\OpenSpan.TestRunner.exe
  For 19.1 and later: Pegasystems\Pega Robot Studio\OpenSpan.TestRunner.exe
  For 19.1 and later: Pegasystems\Pega Robot Runtime\OpenSpan.TestRunner.exe

For 32-bit Pega Robotic Automation components, the following examples show the paths and file names that are used when you install the system in the default locations under the C:\Program Files (x86)\ folder:

- Robot Studio

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Studio for Microsoft Studio 2015\OpenSpan.Studio.Shell.exe
  For 19.1 and later: Pegasystems\Pega Robot Studio\OpenSpan.Studio.Shell.exe

- Robot Runtime

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Runtime Enterprise\OpenSpan.Runtime.exe
  For 19.1 and later: Pegasystems\Pega Robot Runtime\OpenSpan.Runtime.exe

- Agile Desktop

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Studio for Microsoft Visual Studio 2015\OpenSpan.AgileDesktop.exe
  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Runtime Enterprise\OpenSpan.AgileDesktop.exe
  For 19.1 and later: Pegasystems\Pega Robot Studio\OpenSpan.AgileDesktop.exe
  For 19.1 and later: Pegasystems\Pega Robot Runtime\OpenSpan.AgileDesktop.exe

- Test Runner

  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Studio for Microsoft Studio 2015\OpenSpan.TestRunner.exe
  For 8.0 SP1 and earlier: OpenSpan\OpenSpan Runtime Enterprise\OpenSpan.TestRunner.exe
  For 19.1 and later: Pegasystems\Pega Robot Studio\OpenSpan.TestRunner.exe
  For 19.1 and later: Pegasystems\Pega Robot Runtime\OpenSpan.TestRunner.exe

You can also exclude specific files, such as log files. The following examples show the location of Studio and Runtime log files.

- Robot Studio

  %Appdata%\OpenSpan\Studio_Log4Net.txt

  %AppData%Pegasystems\StudioLog.txt
  %AppData%Pegasystems\Studio_Log4Net.txt

- Robot Runtime

  %Appdata%\OpenSpan\Runtime_Log4Net.txt

  %AppData%Pegasystems\RuntimeLog.txt
  %AppData%Pegasystems\Runtime_Log4Net.txt

Are there any types of certificates that are not supported by the Security Token Service?

Yes. The Pega Robotic Automation Security Token Service does not support CNG (Cryptography Next Generation) certificates.

There are two ways to determine if a certificate is a CNG certificate:

- Do a p/invoke of CertGetCertificateContextProperty, and inspect dwProvType on the returned CertGetCertificateContextProperty.
- Use the certutil command from the command line to query the certificates.

If the ProviderType (rgProvParam) and KeySpec (dwKeySpec) are zero (0), it is a CNG private key. Here is the format of the command that you would use to list the certificate properties:

```
certutil -v -store [StoreName]
```

For example, use the following command:

```
certutil -v -store my
```

Note: Use the certutil –store –? command to get Help on the –store command.

Can you customize the menu options that display when you click the Runtime icon?

To customize the menu options that appear when you right click the Pega Robot Runtime icon in the system tray, open the RuntimeConfig.xml file and modify the options in the RuntimeMenuTray section. For example, Workforce Intelligence associates can use this option to open the Enter Expected Hours window.

The following list is a summary of the items that you can place on the menu:

- LoadLocalProject – Loads a local project.
- LoadWebProject – Loads a web project.
- Unload – Unloads projects.
- RecentProjects – Loads recently accessed projects.
- LoadMostRecent – Loads the most recently accessed project.
- About – Displays the Robotic Automation About box.
- ReportProblem – Lets you report a problem.
- DiagnosticConfiguration – Displays the Diagnostic Configuration dialog.
- TestConnection – Lets you test connections with Pega Robot Manager.
- ShowOutputWindow – Displays the Output window.
- ExpectedHours – Displays the Enter Expected Hours window.
- Exit – Exits Robot Runtime.
- LoadedProjects – Inserts a placeholder where a list of the currently running projects displays.
- Separator – Adds a separator line. You can add separator lines to group items to improve readability.

For more information on these options, see Runtime configuration settings.

Checking the build number for Robotic Automation applications

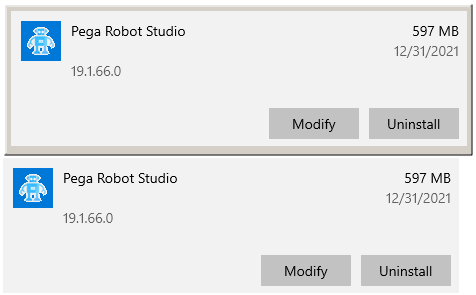
A *build* occurs when every file within the install folder gets updated as a new version of Pega Robot Studio or Pega Robot Runtime. For Robot Studio and Robot Runtime, the Robotic Automation development team provides a new build if it corrects a problem or adds a feature. Build numbers are assigned to the following Robotic Automation 19.1 applications:

- Pega Robot Studio
- Pega Robot Runtime
- Pega Native Foundation
- Pega RPA Service
- Pega Synchronization Engine
- Pega Synchronization Server
- Pega Package Server

Note: For more information on the contents of the various builds, see Pega Robotic Automation release and build notes.

To determine which build you have installed, follow these steps. The names of the options may vary, depending on the version of Windows you have. These instructions are based on Windows 10.

1. Right-click the Start button and select Apps and Features.
2. Scroll through the list of applications to select the Pega Robotic Automation application that you want to check. The following is an example for Pega Native Foundation:
3. Locate the latest build number beneath the application name. In this Pega Robot Studio example, the build number is 19.1.66.



Pega Robot Studio build number

Determining the Microsoft .NET version

To install Pega Robot Runtime, for use with Robot Studio or with Pega Workforce Intelligence, you must have the Microsoft .NET Framework installed on your computer. The version of .NET that you need can vary, so check the requirements outlined in the installation instructions for more information.

To determine which version you have installed, perform the following steps:

1. Open the Windows Registry Editor.
2. Find the following text in the registry:

   HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\NET Framework Setup\

3. Click Find Next.
4. In left pane of the window, double-click the NET Framework Setup registry link.
5. In the right pane, click the version line to determine the full version number of .NET Framework that you have on your computer.

Enabling trace logging

As directed by the Pega Robotic Automation support team, capturing trace logging files can be helpful in diagnosing and resolving errors. The procedure for capturing trace logging files differs depending on the version of Pega Robotic Automation you are using:

- If you are using Pega Robotic Automation 19.1.5 or later, see Enabling trace logging in Pega Robotic Automation 19.1.
- If you are using Pega Robotic Automation 19.1.4, see Enabling trace logging in Pega Robotic Automation 8.0 SP1.

Enabling trace logging in Pega Robotic Automation 19.1

If you are using Pega Robotic Automation 19.1.5 or later, use the following instructions to enable the logging of trace files. This logging uses the built-in Microsoft Windows Logman command. Administrator access is not required if you are using version 19.1.5 or later.

To enable trace logging, perform the following steps:

1. Before starting Pega Robot Runtime, right-click the Start menu and search for Command Prompt. Click the Command Prompt application.
2. At the command prompt, go to the Pega Robot Studio installation folder. By default, the folder is C:\Program Files (x86)\Pegasystems\Pega Robot Studio.
3. Enter one of the following commands:

Coretest.x32.exe options

Location to create a trace file	Command to enter
Current folder	Coretest.x32.exe tracestart
Folder that you specify	Coretest.x32.exe tracestart c:\full\path

The Coretest utility creates the trace file in the folder that you indicate.

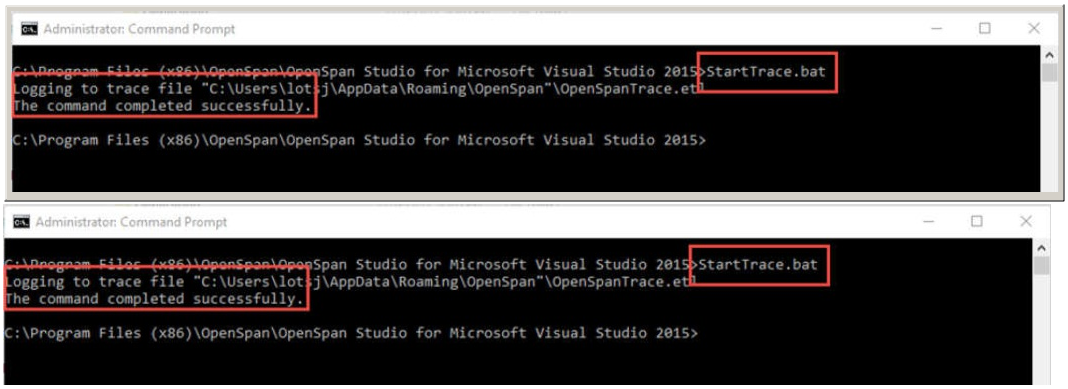
4. Start Pega Robot Runtime and re-create the issue that you experienced. Note when you began the steps to re-create the issue and when you finished.
5. After you re-create the issue, stop the logging by opening a command prompt and entering the following command: `Coretest.x32.exe tracestop`.
6. Collect the log file, timestamps, and any additional notes about the issue and provide them to your Support Engineer for analysis.

The trace file is assigned the name PegaTrace.etl and is located in the folder that you chose in step 3.

Enabling trace logging in Pega Robotic Automation 8.0 SP1

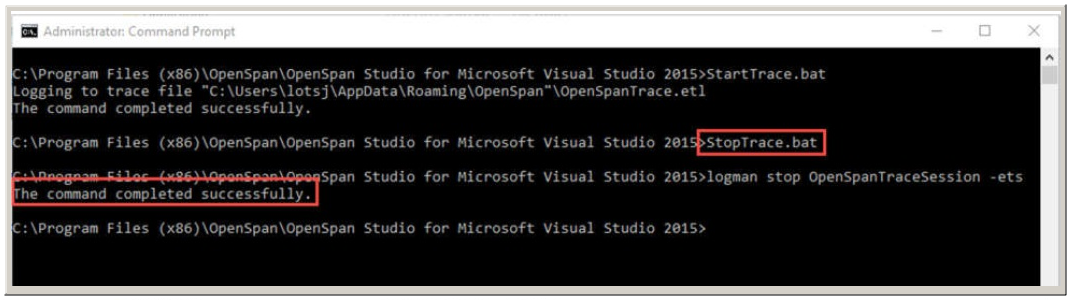
If you are using Pega Robotic Automation 19.1.4 or earlier, including versions 8.0 SP1, use the following instructions to enable trace logging. Note that Administrator access is required to run trace logging. This logging uses the built-in Microsoft Windows Logman command.

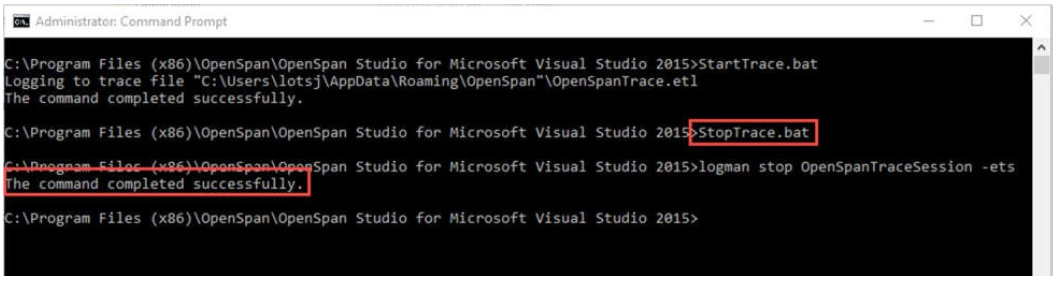
1. Before starting Pega Robot Runtime, right-click the Start menu and search for Command Prompt. Right-click the Command Prompt application and select Run as administrator.
2. At the command prompt, go to the Pega Robot Studio installation folder. By default, the folder is C:\Program Files (x86)\ OpenSpan\OpenSpan Studio for Microsoft Visual Studio 2015.
3. Enter the command: `Run StartTrace.bat`. A confirmation prompts notes that the command completed successfully.



Command prompt example

4. Re-create the issue that you experienced. Note when you began the steps to re-create the issue and when you finished.
5. After you re-create the issue, turn off the logging by entering the command: `>Run StopTrace.bat`. The system confirms that the command was completed.





Command prompt example

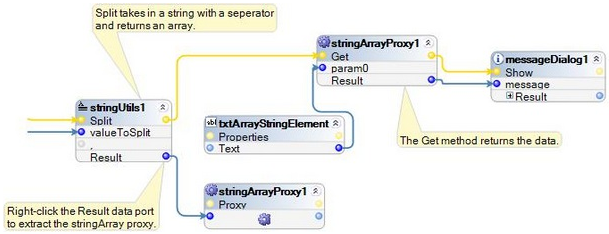
6. Collect the log file, timestamps, and any additional notes about the issue and provide them to your Support Engineer for analysis.

You can find the log files in the roaming Appdata folder. You can quickly go to the folder by typing `%appdata%\OpenSpan` into the File Explorer path. The file is assigned the name OpenSpanTrace.etl.

How can I get the elements from an array?

Use an Array data port to extract an arrayProxy and gain access to the array elements:

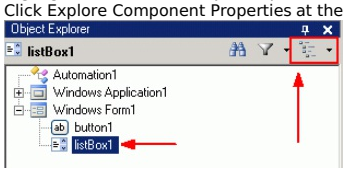
1. In a Pega Robotic Automation automation, right-click the Result data port on the array, that is, the blue output data port on the StringUtils Split (2 parameters) component. Then, select Extract Proxy from the menu.
2. In Object Explorer, select the array, such as stringProxy, in the automation hierarchy and drag the Get method onto the automation. The Get method has one (1) input parameter, ElementID, which is zero-based. The Get method result is the ElementID value.



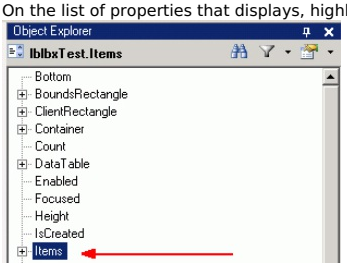
How do I add items to list boxes or combo boxes?

To add or remove items from a list box or combo box control, you must access methods for the Items property. Perform the following steps:

1. Highlight the control in Object Explorer.
2. Click Explore Component Properties at the top of Object Explorer.

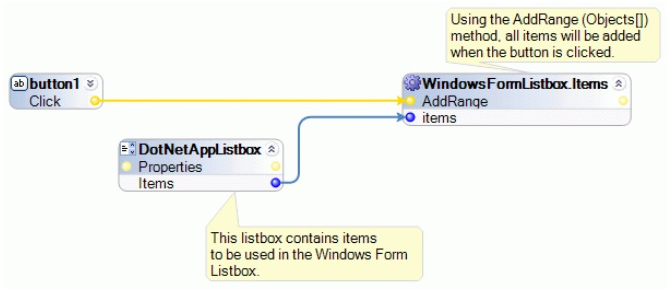


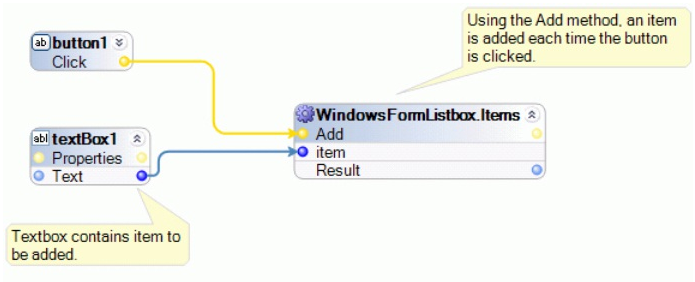
3. On the list of properties that displays, highlight the Items property.

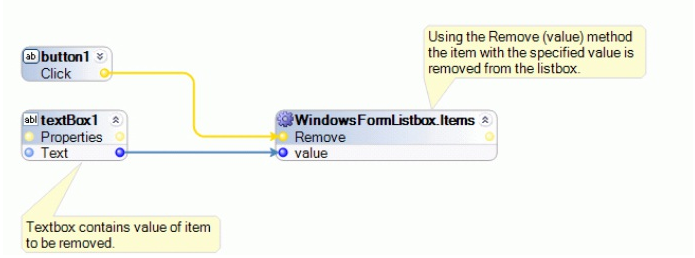


4. To see a list of available properties and methods, click Configure Type.
5. In the Configuration dialog, click the methods that you want to use and click OK. The methods that you selected display in the Object Explorer. Commonly used methods are displayed in the following list:
   - Items.Add – Adds an item at the specified index.
   - Items.AddRange – There are two AddRange methods, AddRange(ObjectCollection value) and AddRange((Object[] items). To add an array of items, use the AddRange(Objec[] items) method.
   - Items.Clear – Removes all items from the list box or combo box.
   - Items.Remove – Removes the item with the specified value.
   - Items.RemoveAt – Removes the item at the specified index.

The following automation shows how you can add and remove items from a list box:







How do I configure Robotic Automation for Pega Platform applications?

To run robotic automations from your Pega Platform application, there are several installation and configuration options that you need to specify. You can choose from the following installation options:

- **Run-time only installation** – The Run-time only installation installs Pega Robot Runtime.
- **Studio installation** – The Studio installation installs Pega Robot Studio and Pega Robot Runtime.

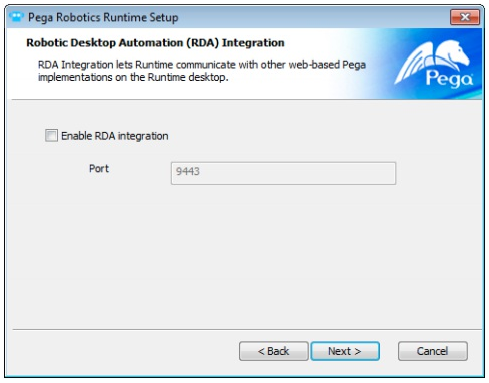
Pega Robot Runtime installation

The Pega Robot Runtime installation wizard automatically configures many of the typical settings needed to run automations from your Pega Platform application. During the installation process, you are prompted to enable robotic desktop automation (RDA). To invoke automations from your Pega Platform application, you must select the Enable RDA integration check box.

Enabling RDA in the installation wizard will:

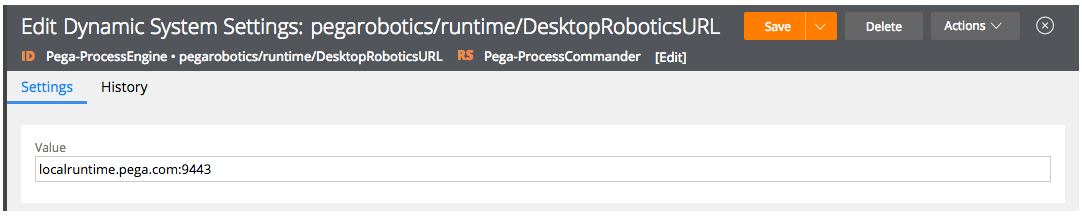
- Activate and configure a locally-hosted REST service that is responsible for responding to automation requests from your Pega Platform application.
- Automatically install the **localruntime.pega.com** SSL security certificate to your Local Computer, Personal Certificates store, and bind the certificate to the port specified during installation. The default port is **9443**.
- Add a new certificate each year and include it in the latest Pega Robot Runtime release to ensure that the installed certificate never expires on a customer computer. Pega updates the certificate periodically to ensure that the installed certificate does not expire on a customer machine. The latest certificate is included in each build. For example, the certificate in the initial 19.1 build expires on March 12, 2021. The certificate in build 8.0 SP1 2030 expires on April 30, 2020.

Note: Changing the port after you have completed the installation wizard requires rebinding the SSL certificate to the new port. For more information, see Changing the Pega Robotic Automation Runtime port after installation.



The Enable RDA integration option in the installation wizard

Your Pega Platform application is already configured to invoke automations through localruntimepega.com:9443. If you change port 9443 to another port, you can make the corresponding adjustment in your Pega Platform application by modifying the **pegarobotics/runtime/DesktopRoboticsURL** Dynamic System Setting:



Note: If you change this system setting, you are required to re-save all flow actions that include automation invocations.

In addition to configuring the port number, you must enter the domain name of your Pega Platform server in the Pega Robot Runtime list of allowed origins. Only requests from the approved domains in the list are serviced. Requests from other domains are rejected. Also, all remote requests are rejected. You can make an entry for your particular Pega domain by doing either of the following actions:

- Using a command line parameter during a silent installation.
- Directly editing the allowedOrigins setting inside the <Robotics> block of the **RuntimeConfig.xml** file.

You also configure Robotic Processing Automation (RPA) in the **RuntimeConfig.xml** file. Specify the URL of the Pega Platform server that robotic virtual machines (VMs) use to communicate with a user's Pega Platform application, for example, PegaServer baseUrl="http://<*MYPEGASERVER*>:<*PORT*>/prweb/api/v1/" />.

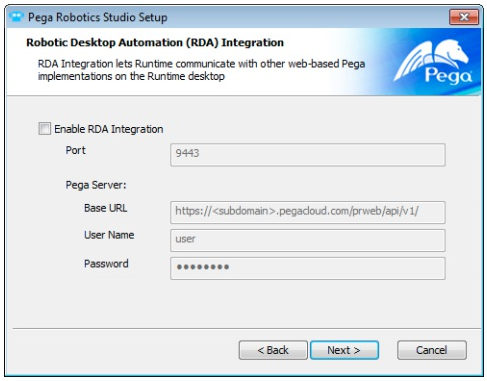
For more information about the **RuntimeConfig.xml** file, see Runtime configuration settings.

Sample configuration

```
<Robotics>
   <!-- PegaServer tag is specific to RPA. -->
   <!--   baseurl: Base address for Runtime to use for calls to request work items.-->
   <PegaServer  baseUrl=""  />
   <!-- LocalApiService tag is specific to RDA. -->
   <!-- enabled: If true, Runtime will self-host a REST service to accept requests from Pega 7 applications. -->
   <!-- SSL: If true, the service uses SSL and must be accessed through https. -->
   <!-- port: The port the service will listen on. -->
   <!-- allowedOrigins: A comma-delimited list of domains from which the service will accept requests. -->
   <!-- A specific domain can be given, such as acme.pega.com, or wild carded, such as *.pega.com. -->
   <!-- Requests from any domain not in this list will be rejected. -->
   <LocalApiService enabled="true" SSL="true" port="9443" allowedOrigins="*.pega.com" />
</Robotics>
```

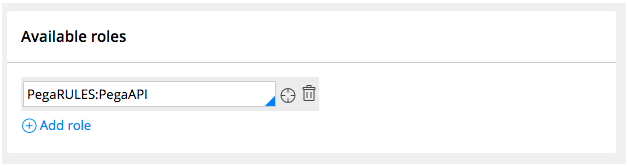
Pega Robot Studio installation

Pega Robot Studio communicates with your Pega Platform development environment to retrieve the properties defined in your application. After these properties are imported, an automation developer can use those properties in the design-time authoring. The exact set of properties pulled into Pega Robot Studio is controlled by the set of relevant records defined for each Pega class or case type. You can manage relevant records from the Relevant Records landing page in Designer Studio. In addition to the port information, the Pega Robot Studio installation wizard prompts you to enter the connection URL to your Pega Platform development environment and a valid user name and password through which to connect to that environment.



Installation wizard for Pega Robot Studio

Properties from your development environment are retrieved through the Pega API. Ensure that the Pega operator that you specify belongs to an access group with the PegaRULES:PegaAPI access role.



Configuration of the PegaRULES:PegaAPI access role

You can update your installation configuration by modifying the <Robotics> block in the **StudioConfig.xml** file:

```
<Robotics>

<!-- baseUrl: Address of Pega API endpoint -->

        <PegaServer baseUrl="https://<YOUR_PEGA_SERVER>/prweb/api/v1/"  />

        <!-- The following credentials let Studio authenticate with the Pega server. -->

        <!-- This user has read-only access to Pega classes and field names. -->

        <!-- No other permissions are required by or granted to this user. -->

        <!-- userName: The name used to authenticate with the Pega server. -->

        <!-- password: The password used to authenticate with the Pega server. -->

        <RDA_Credentials userName="" password="" />

</Robotics>
```

Changing the Pega Robot Runtime port after installation

If a port change is required after installation, you must change the port number in the following places:

- The port setting in the Robotics section of the **RuntimeConfig.XML** file.
- The **DesktopRoboticsURL** Dynamic System Setting in your Pega application.
- The certificate used to SSL-enable the Pega Robotic Automation Runtime REST service that is bound to the port at installation. You can update the certificate by using the following commands in PowerShell:

To unbind the certificate from the previous port, run the following commands:

```
netsh http delete urlacl url=https://+:<oldPort>

netsh http delete sslcert ipport=0.0.0.0:<oldPort>
```

To bind the certificate to the new port, run the following commands:

```
netsh add http sslcert ipport=0.0.0.0:<newPort> certhash=77fb73781fa1d6989eae02f6c1eb8f7e06b4331e appid={A4D00AA5-E03B-4692-A5B4-33CA8D1F2E2C}

netsh http add urlacl url=https://+:<newPort>/ user=Everyone
```

Command line installation

You can install Pega Robot Studio and Pega Robot Runtime through the command line. You can also use the /q or q/+ switch to perform a command line or silent installation.

You can use the following command line parameters with both Pega Robot Studio and Pega Robot Runtime with or without the silent installation switches:

Checkbox = RDA_INT

Port = RDA_PORT

URL = PEGA_BASE_URL

AllowedOrigins = ALLOWED_ORIGINS

User name = RDA_USERNAME

Password = RDA_PASSWD

For more information about installing from the command line, see the installation guides,

How do I install the Pega Robotic Automation Chrome extension with version 8.0 SP1 or later?

Use the Chrome extension to Pega Robotic Automation to interrogate and automate the Google Chrome browser. Typically, you use the Setup wizard for Robot Studio or Robot

Runtime to install or update the Chrome extension. If you are updating several users, you could also use the command line installation command with the INST_CHROME=1 parameter. For more information, see the installation instructions.

If you did not install the extension when you installed Robot Studio or Robot Runtime and need to install it now, use the following program to install the extension:

OpenSpan.WebExtensionInstaller.exe

For more information, see Google Chrome support in Pega Robotic Automation.

Installing the Chrome extension

Perform the following steps to install the Chrome extension in Robotic Automation 8.0.SP1 2007 and later:

1. From the Start menu, select Search.
2. Enter CMD, and then right-click Command Prompt.
3. Choose Run as Administrator.
4. In the Administrator Command window, go to the Pega Robot Studio, Pega Robot Studio Plug-In, or Pega Robot Runtime install directory.
5. Enter the following command: OpenSpan.WebExtensionInstaller.exe Chrome -i

Validating that the extension is enabled

To enable the extension, open a Chrome browser instance. A message about the extension displays in Chrome's top, right corner to which you must respond. To ensure that Robot Studio displays in the list of extensions, you can also open Chrome, click the More icon, and select More tools > Extensions.

Updating the Chrome extension

Repeat the installation steps each time you receive a new version of the Pega Robotic Automation Chrome extension. Updates to this extension are announced in theRelease or Build notes.

How do I install the Pega Robotic Automation Firefox extension?

Use the Firefox extension to Pega Robotic Automation to interrogate and automate the Mozilla Firefox browser. Typically, you use the Setup wizard for Robot Studio or Robot Runtime to install or update the Firefox extension. If you are updating several users, you could also use the command line installation command with the INST_Firefox=1 parameter. For more information, see the installation instructions for your version of Robot Studio or Robot Runtime.

If you did not install the extension when you installed Robot Studio or Robot Runtime and need to install it now, use the following program to install the extension:

OpenSpan.WebExtensionInstaller.exe

For more information, see Mozilla Firefox support in Pega Robotic Automation.

Installing the Firefox extension

Perform the following steps to install the Firefox extension in Robotic Automation 8.0.SP1 2006 or later:

1. From the Start menu, select Search.
2. Enter CMD, and then right-click Command Prompt.
3. Choose Run as Administrator.
4. In the Administrator Command window, go to the Pega Robot Studio, Pega Robot Studio Plug-In, or Pega Robot Runtime install directory. .
5. Enter the following command: OpenSpan.WebExtensionInstaller.exe Firefox -i

Validating that the extension is enabled

To enable the extension, open a Firefox browser instance. A message displays in Firefox's top, right corner to which you must respond. To ensure that Robot Studio displays in the list of extensions, you can also open Firefox, click the Open menu icon, and select Add-ons > Extensions.

Updating the Firefox extension

Repeat the installation steps each time you receive a new version of the Pega Robotic Automation Firefox extension. Updates to this extension are announced in theRelease or Build notes.

How do I install the Pega Robotic Automation version 8.0 Chrome extension?

Use the Chrome extension to Pega Robotic Automation 8.0 to interrogate and automate the Google Chrome browser. Typically, you use the Setup wizard for Robotic Automation Studio or Robotic Automation Runtime to install or update the Chrome extension. If you are updating several users, you could also use the command line installation command with the INST_CHROME=1 parameter. For more information, see the installation instructions.

If you did not install the extension when you installed Robotic Automation Studio or Robotic Automation Runtime and need to install it now, use the following programs to install the extension:

- OpenSpan.ChromeExtensionInstaller.exe
- OpenSpan.ChromeMessagingHostIntaller.exe

For more information, see Google Chrome support in Pega Robotic Automation.

Installing the Chrome extension

Perform the following steps to install the Chrome extension in Pega Robotic Automation 8.0.

1. Log in as an administrator.
2. Open the Chrome browser, click the More icon, and select More tools > Extensions.
3. On the Chrome extension page, enable Developer mode.
4. In Windows Explorer, go to the folder where Pega Robotic Automation is installed.
5. Open the BrowserExtensions > Chrome folder.
6. Drag the .crx file onto the Chrome browser.
7. Run the OpenSpan.ChromeExtensionInstaller.exe program.
8. Run the OpenSpan.ChromeMessagingHostIntaller.exe program by using Robotic Automation Studio's Chrome Extension ID as a parameter. The Extension ID assigned by Google is: lajjpilliikppcbaghjehndpfdiiphbe

Here is an example of the command that you enter:

OpenSpan.ChromeMessagingHostInstaller.exe -id:lajjpilliikppcbaghjehndpfdiiphbe

Validating that the extension is enabled

To enable the extension, open a Chrome browser instance. A message displays in Chrome's top, right corner to which you must respond. To ensure that Robotic Automation Studio displays in the list of extensions, you can also open Chrome, click the More icon, and select More tools > Extensions.

Updating the Chrome extension

Repeat the installation steps each time you receive a new version of the Pega Robotic Automation Chrome extension. Updates to this extension are announced in the Build notes.

How do Robot Runtime and Robot Manager work together?

Pega Robot Manager™ manages the work performed by the various installations of Robot Runtime that you have in your Robotic Process Automation (RPA) implementation. For example, this allows you to batch process a large volume of work assignments by using unattended robots with your Pega Platform™ application. Each robot belongs to a work group that has an assigned automation package. Automation packages are collections of automations that have been written for your RPA robots.

When a robot logs in to Pega Platform, it registers itself into a defined work group, retrieves the automation package that is assigned to that work group, loads it, and becomes ready to receive work assignments. When a robot is ready to work, it continuously fetches assignments from shared assignment types within a specified work group, and runs the automations required to complete the assignment.

For more information, see Diagrams of how Robot Runtime and Robot Manager work together.

Determining if Robot Runtime is running on a Citrix server

If a connection to a Citrix server times out due to session inactivity, the Robot Runtime client does not receive any notification. To address this issue, use the IsContextConnected static method.

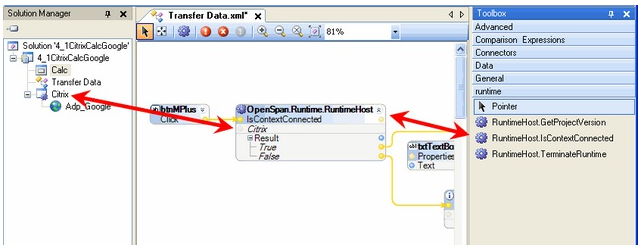
The IsContextConnected method takes the context name as an argument and returns a Boolean value that indicate whether the context is connected. The context name is case insensitive. There is a 10-second timeout interval before the methods returns a False value, to indicate that there is no longer a connection.

Adding the IsContextConnected method to the Robot Studio toolbox

1. In Robot Studio, open the Runtime tab in the Toolbox window.
2. Right-click in the Runtime tab and select Choose Items.
3. In the Add Toolbox Items dialog, click the Pega Robot Static Members tab.
4. Click Browse and then select the OpenSpan.Runtime.Core.dll file in the Pega Robot Studio program folder.
5. Expand the RuntimeHost tree view node and select the IsContextConnected check box.
6. Click OK to save your changes.

The following is an example:

When using this static method within an automation, you must add the Citrix Context name in the connection block property.



Does spyware detection software affect Studio's ability to interrogate and integrate applications?

Spyware detection software can prevent Studio from interrogating your target applications.

For example, interference caused by anti-spyware software can occur when you try to interrogate a target application by clicking Start Interrogation in the adapter designer. The label on that button briefly changes to Stop Interrogation, but immediately reverts to the original label and the Interrogation Form dialog box fails to open.

To avoid these problems, disable the anti-spyware programs before interrogating your applications.

How do I detect when a Windows form is being closed?

When a user closes a Windows form that Robot Studio created, the system actually hides the form instead of closing it.

To detect when a user has closed a Robot Studio-created Windows form, use the VisibleChanged event. Check the Visible property after this event has occurred, and if it is False, then the form has been closed.

How do I determine the active window in a Java MDI application?

In Java MDI applications, the Active key is not available to let you operate on the active window. To work around this limitation of Java, follow these steps:

1. Create an automation to track the active window.
2. Place the Created and Activated events of the window into your automation.
3. Drag the Key property of the window into your automation as well.
4. Add a string variable and grab its Value property and place into your automation.
5. Connect both the Created and Event and the Activated event to the Value property of the automation and pass the Key property from the window into the blue data path. You can use this variable to determine what the last activated window is.

How do I interrogate web applications in Windows 10 and Windows Server 2016?

When you run Pega Robot Studio on Windows 10 or Windows Server 2016, you must first add the webpages that you want to interrogate to theLocal intranet or Trusted sites category and set the security level for the zone to Low, Medium Low, Medium, or Medium-High.

Even with the security level for the Internet zone set to Low, Medium Low, Medium, or Medium-High, Robot Studio might not recognize some controls as being destroyed. These controls are noted as errors in the log.

Pega Robot Studio cannot inject if you set the security level for the zone to High. Instead, it throws an exception when you start interrogating.

Interrogating 16-bit Windows-based applications using Robot Studio

16-bit Windows-based applications are not supported by Pega Robotic Automation.

How do you launch Agile Desktop via Runtime Launcher?

You can use the LaunchTarget key in the RuntimeConfig.xml file to tell Updater to launch Agile Desktop.

This flowchart diagram provides more information on launching projects using Agile Desktop and Runtime. This diagram shows what happens when Agile Desktop and Runtime are started.

Pega Browser Extension FAQ

The Pega Browser Extension (PBE) component, released in build 19.1.115, replaces the individual Chrome and Edge extensions released in earlier 19.1 builds. PBE updates the Google Chrome and Microsoft Edge browser extensions to comply with the Chromium Project Manifest V3 specification.

Google Chrome and Microsoft Edge support for Manifest V2 is currently scheduled to end in 2024. For the latest information and timelines, monitor the Chrome Developer's website.

Review the following information to learn about the reason for the changes and how to respond.

- Pega Browser Extension overview
- Timelines and important dates
- Installing the Pega Browser Extension
- Pega Robotic Automation project compatibility
- Supported product versions and technologies

Note: If you have questions that are not answered in this article, contact Pega Support.

Pega Browser Extension overview

What is the Pega Browser Extension (PBE)?

Pega Browser Extension is a standalone component of Pega Robotic Automation, just like Pega RPA Service and Pega Native Foundation. With this component, you can automate applications that run in Chrome and Edge by using the Universal Web Adapter. PBE includes the extension and the native messaging host. The native messaging host transmits communications between Robot Runtime or Robot Studio, and the browser.

What is the difference between PBE and the earlier 19.1 Chrome and Edge extensions?

The extensions that come with PBE are updated to the latest version of the extension manifest (Manifest V3).

What is a manifest file?

Google Chrome and Microsoft Edge are based on the open-source Chromium browser platform. Chromium browser extensions require a JSON-formatted manifest file, named manifest.json. This file describes the behavior of the extension and provides essential information about the extension, including its name, version, an array of permissions the extension might use, and other technical details.

What is Manifest V3?

Manifest V3 is the latest manifest extension for Chromium extensions and was created by the Chromium Project. Manifest V3 replaces Manifest V2. Manifest V3 is now included in Chrome and Edge. For more information, visit the following website:

https://developer.chrome.com/docs/extensions/mv3/intro/

How is the Pega RPA team responding to the change in the manifest version?

As the Pega RPA team migrates to Manifest V3, we are taking the opportunity to improve the installation and update the experience for everyone.

With Manifest V2, the Pega Robotic Automation installation process included the Pega Robotic Automation for Browsers extension. With Manifest V3, the new Pega Browser Extension (PBE) component, isolates the extensions (now called the Pega Robotics Automator) and other related elements into a separate, installable component that is similar to Pega RPA Service and Pega Native Foundation. Pega Robotic Automation version 19.1.115 and later include PBE.

How do I know if I have a Manifest V2 or Manifest V3 Pega browser extension?

The Manifest V2 extension is named Pega Robotic Automation for Browsers, and its version number starts with 1.0. The Manifest V3 extension is named Pega Robotics Automator, and its version number starts with 3.1.

What is the benefit to me to use PBE?

Because PBE is a separate, installable component, you can update it without having to update Robot Studio and Robot Runtime.

What is a self-hosted extension?

Self-hosting is the practice of hosting an extension outside of the Chrome Web Store. Self-hosting provides several advantages, including making it easier and quicker for you to distribute extensions to your users.

Self-hosting also allows Pega to continue to automate and maintain compatibility with automations that use the ExecuteScript or InvokeScript methods. Self-hosting allows the Pega RPA team to release builds faster.

Timelines and important dates

When will Google and Microsoft stop supporting Manifest V2?

Support is currently scheduled to end in 2024. Follow this link to see Google's Manifest V2 end of support schedule:

https://developer.chrome.com/docs/extensions/mV3/mV2-sunset/

Follow this link to see Microsoft's Manifest V2 end of support schedule:

https://docs.microsoft.com/en-us/microsoft-edge/extensions-chromium/developer-guide/manifest-V3

When will Pega stop supporting Manifest V2?

Like Google and Microsoft, Pega plans to end support for the Manifest V2 in 2024. After that, you must use Pega Browser Extension (PBE). We are closely monitoring the Chromium Project and will make any necessary scheduling adjustments. Keep in mind that you can install PBE at any time and not only move to Manifest V3, but also enjoy an easier extension update process.

When should I start using PBE?

For systems that only use Pega Robotic Automation 19.1, you can migrate to PBE at any time, but do so before the Google and Microsoft-imposed deadlines.

The Pega RPA team recommends that you migrate 19.1 implementations to PBE when you install 22.1 because both items (PBE and Pega Robot Runtime 22.1) must be installed before the Pega Synchronization Engine can maintain these items.

Keep in mind that if you are using Pega Robotic Automation 19.1 and 22.1 on the same computer, you must use PBE. PBE is compatible with both 19.1 and 22.1, and is required for 22.1. For more information on PBE and version 22.1, see PBE frequently asked questions.

Can I use both extensions (Pega Robotics Automator and Pega Robotic Automation for Browsers) on the same computer?

No. If you run Pega Robotic Automation 19.1 and 22.1 on the same computer, you must uninstall the Pega Robotic Automation for Browsers extension and install PBE to automate applications that run on a Chrome or Edge browser.

Installing the Pega Browser Extension

How do I install PBE?

The Pega Browser Extension is included when you download version 19.1.115 and later of Robot Studio and Robot Runtime from the My Pega website. You can extract the PBE installation files from this download and apply PBE to earlier 19.1 installations as needed. After you install PBE, use the Pega Synchronization Engine to maintain the version of PBE that is running on your system.

How do I prepare for PBE?

To allow users to install a self-hosted extension, add the extension ID to the ExtensionInstallAllowlist policy in the Group Policy Editor for your Active Directory Domain Service. Alternatively, you can set the ExtensionInstallForcelist policy to force-install an extension on your users' computers. For more information on setting Group Policy, see the following articles:

- Automating applications that run on Google Chrome
- Automating applications that run on Microsoft Edge

Note: Remove any group policy settings for the Pega Robotic Automation for Browsers extension. You cannot run the Pega Robotics Automator and Pega Robotic Automation for Browsers on the same computer.

For more information on setting Group Policy, see the following articles:

- Using Microsoft Group Policy to control Chrome policies
- Using Microsoft Group Policy to control Edge policies

How do I upgrade to PBE?

Pega Robot Studio and Pega Robot Runtime version 19.1.115 and later include PBE. You can install PBE by itself or as part of a Robot Studio or Robot Runtime installation. To install as part of a Robot Studio or Robot Runtime installation, select the option to install the Pega Browser Extension when you run the Setup wizard. For more information, see the installation instructions.

Can I use the Pega Synchronization Engine to install PBE?

No. You must install and configure all new components. After you install PBE, you can configure the Pega Synchronization Engine to ensure proper maintenance and updates.

Pega Robotic Automation project compatibility

Do I need to upgrade my projects after I install PBE?

No, one of the benefits of using PBE is that it is a separate component from Robot Studio and Robot Runtime. This enables you to use PBE without rebuilding your solutions, unless you are using the Electron translator. If your project uses the Electron translator, then you must upgrade the project.

How do I know if my projects are incompatible with PBE?

If your 19.1 project contains an adapter that uses the Electron translator, update the project to a build that includes PBE to make the project compatible with PBE. If you are unsure whether your projects are compatible with PBE, contact Pega Support.

Supported product versions and technologies

How do I handle browser updates?

Best practice is to turn off automatic updates of your browsers. Only deploy new browser versions after you have had time to smoke test your automations.

Which technologies are not backward compatible?

Currently, the only technology that is not backward compatible is Electron.

Can I use any version of 19.1 with PBE?

It depends; if your projects use the Electron translator, which is not backward compatible, then use a build that includes PBE. If your projects do not use the Electron translator, then all versions of 19.1 are compatible with PBE.

Can I use any version of 8.0 SP1 with PBE?

No, Pega Robotic Automation 8.0 SP1 does not support PBE.

What browser versions does PBE support?

The Pega Browser Extension works with Chrome versions 88 and later, and all versions of Edge.

Using Microsoft Group Policy to control access to Chrome policies

Most enterprises use group policy to control which extensions can be run by the Chrome browser. While you can add entries locally, it is best practice to specify these settings for your entire enterprise. This article discusses how to specify the following settings:

- Adding the extension to the force install list
- Adding the extension to the allow list
- Adding the messaging host to the native messaging allow list

Installing the extension

Explicitly allow the Chrome extension in the Group Policy Editor to use the Chrome extension when you create or run automations in the Google Chrome browser. There are two ways that you can allow the extension:

- Force installing the extension -- Best practice is to force install the extension because that also enables the extension.
- Add the extension to the Allow list -- If you add the extension to the Allow list, then your end users must enable the extension when they open Chrome.

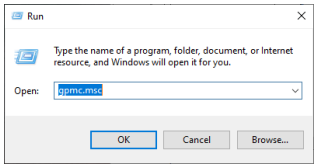
Download and install the Administrative Templates for Chrome for group policy before you allow the extension. Download the templates from the following website:

https://dl.google.com/dl/edgedl/chrome/policy/policy_templates.zip

Force installing the Chrome extension

Force install the Google Chrome extension when you create or run automations in the Google Chrome browser to install and enable the extension.

1. In the Search box the Taskbar, enter Run.
2. In the Run dialog box, enter gpmc.msc.



Run dialog box

3. In the Group Policy Management console, select Administrative Templates > Google > Google Chrome > Extensions and enable Configure the list of force-installed apps and extensions.
4. In the Configure the list of force-installed apps and extensions dialog box, add an entry to the update.xml file a value that includes the extension ID and the path to the update.xml file for the browser extension. The following is an example:

```
iodegoagldeabbkcidchfdifcghijihb;file:///C:/Program Files (x86)/Pegasystems/Pega Browser Extension/BrowserExtensions/Chrome/update.xml
```

5. Installing the Pega Browser Extension creates the update.xml file in the following directory:

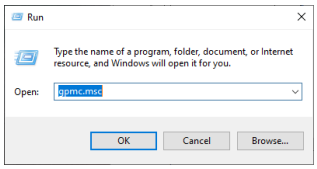
   ```
   Pegasystems/Pega Browser Extension/BrowserExtensions/Chrome
   ```

   Note: You can complete this step before or after you set up the group policy setting.

Adding the Chrome extension to the Allow List

Add the Google Chrome extension to the group policy allow list when you create or run automations in the Google Chrome browser to install the extension.

1. From the Taskbar, enter Run.
2. In the Run dialog box, enter gpmc.msc.



Run dialog box

3. In the Group Policy Management console, select Administrative Templates > Google > Google Chrome > Extensions and enable Configure extension installation allow list.
4. In the Configure extension installation allow list dialog box, add a value with the extension ID. The following is an example:

```
Software\Policies\Google\Chrome\ExtensionInstallAllowlist\1 = iodegoagldeabbkcidchfdifcghijihb
```

What to do next: Enable the extension on each computer that you use to create or run automations.

Ensuring that the Chrome extension can connect to the Messaging Host

If you use a Microsoft Group Policy Object (GPO) to control Chrome policies, and you enable the Configure native messaging block list setting in the Native Messaging section to block all extensions, perform the following steps to provide Robot Studio and Robot Runtime with the access they need to function correctly.

1. Start the Microsoft Group Policy Management Console.
2. Select Computer Configuration > Administrative Templates > Google > Google Chrome > Native Messaging.
3. In the Configure native messaging allowlist setting, add the messaging-host executable so that messaging host is not blocked. The following is an example:

```
Software\Policies\Google\Chrome\NativeMessagingAllowlist\1 = pega.web.chrome.messaginghost
```

4. Save your changes and close the Group Policy Management Console.

Using Microsoft Group Policy to control access to Edge policies

Most enterprises use group policy to control which extensions can be run by the Edge browser. While you can add entries locally, it is best practice to specify these settings for your entire enterprise. This article discusses how to specify the following settings:

- Adding the extension to the force install list
- Adding the extension to the allow list
- Adding the messaging host to the native messaging allow list

Installing the extension

Explicitly allow the Edge extension in the Group Policy Editor to use the Edge extension when you create or run automations in the Microsoft Edge browser. There are two ways that you can allow the extension:

- Force install the extension -- Best practice is to force install the extension because that also enables the extension.
- Add the extension to the Allow list -- If you add the extension to the Allow list, then end users must enable the extension when they open Edge.

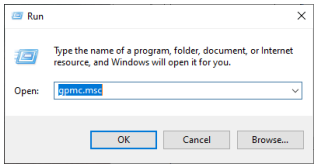
Download and install the Administrative Templates for Edge for group policy before you allow the extension. Download the templates from the following website:

https://www.microsoft.com/en-us/edge/business/download

Force installing the Edge extension

Force install the Microsoft Edge extension when you create or run automations in the Microsoft Edge browser to install and enable the extension.

1. In the Search box the Taskbar, enter Run.
2. In the Run dialog box, enter gpmc.msc.



Run dialog box

3. In the Group Policy Management console, select Administrative Templates > Microsoft Edge > Extensions and enable Control which extensions are installed silently.
4. In the Control which extensions are installed silently dialog box, add an entry to the update.xml file a value that includes the extension ID and the path to the update.xml file for the browser extension. The following is an example:

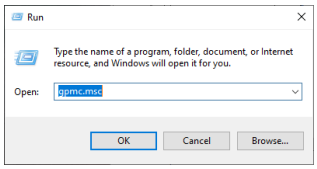
```
Software\Policies\Microsoft\Edge\ExtensionInstallForcelist\1 = iodegoagldeabbkcidchfdifcghijihb;file:///C:/Program Files (x86)/Pegasystems/Pega Browser Extension/BrowserExtensions/Edge/update.xml
```

5. Installing the Pega Browser Extension creates the update.xml file in the Pegasystems/Pega Browser Extension/BrowserExtensions/Edge directory. You can complete this step before or after you set up the group policy setting.

Adding the Edge extension to the Allow List

Add the Microsoft Edge extension to the group policy allow list when you create or run automations in the Microsoft Edge browser to install the extension.

1. From the Taskbar, enter Run.
2. In the Run dialog box, enter gpmc.msc.



Run dialog box

3. In the Group Policy Management console, select Administrative Templates > Microsoft Edge > Extensions and enable Allow specific extensions to be installed.
4. In the Allow specific extensions to be installed field, add a value with the extension ID. The following is an example:

```
Software\Policies\Microsoft\Edge\ExtensionInstallAllowlist\1 = iodegoagldeabbkcidchfdifcghijihb
```

Ensuring that the Edge extension can connect to the Messaging Host

If you use a Microsoft Group Policy Object (GPO) to control Edge policies, and you enable the Configure native messaging block list setting in the Native Messaging section to block all extensions, perform the following steps to provide Robot Studio and Robot Runtime with the access they need to function correctly.

1. Start the Microsoft Group Policy Management Console.
2. Select Computer Configuration > Administrative Templates > Microsoft Edge > Native Messaging
3. In the Control which native messaging hosts users can use setting, add the messaging-host executable so that messaging host is not blocked. The following is an example:

```
Software\Policies\Microsoft\Edge\NativeMessagingAllowlist\1 = pega.web.chrome.messaginghost
```

4. Save your changes and close the Group Policy Management Console.

What to do next: Enable the extension on each computer that you use to create or run automations.

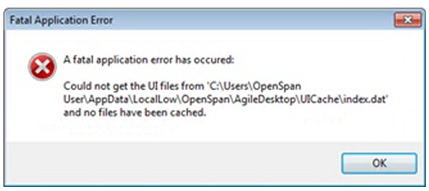
Robotic Process Automations and screen locking

The operating system should never lock the screen on a computer that is running a Robotic Process Automation (RPA). For every computer or virtual machine that runs Robotic Process Automations, you must adjust the Windows registry to make sure the desktop or virtual machine never locks the screen. This includes turning off the use of screen savers.

Many applications are not designed to be used when the system is locked and could operate differently than the automation expects. Since RPA robots operate just like a user would, these robots require the same operating conditions a user would enjoy. If the automation does not involve user interaction, or if those applications can operate when the system is locked, then the automation should work fine.

What causes an Agile Desktop Fatal Application Error?

If you get a message similar to the following, it indicates the computer cannot find the files it needs to run Agile Desktop:



These files are stored in the AgileDesktop folder. This folder is installed with Robot Studio and is automatically configured for Robot Studio. For an Agile Desktop install, however, you need to...

- Place the AgileDesktop folder in an accessible location
- Configure each Agile Desktop installation to look for the AgileDesktop folder

The best way to make sure all Agile Desktop users have access to the same AgileDesktop folder is to host it on an internally available web server. This is the approach we recommend.

For more information, see the "Deploying Agile Desktop to End Users" topic in the Agile Desktop Implementation Guide.

Requesting a Robotic Automation translator

Translators allow Pega Robotic Automation to interact with specific technologies and controls, for example; an Infragistics UltraGrid or UltraToolbar control. While Pega Robotic Automation includes translators to support many common technologies, you might encounter an unsupported technology for which an additional translator is required. The process for handling requests for a new translator is outlined below.

At the beginning of a Robotic Automation development project, interrogate the applications that you want to automate to see if new translators are required. Submitting translator requests at the beginning of a development project helps you avoid delays later in the project life cycle.

1. Create a support request at Pega Support that describes the technology or control that you need. When you request that the Pega Robotic Automation team create a translator, ensure that you supply the following information:
   - Details about the computer environment in which the target application runs.
   - Information about the target application and controls that you want to interrogate.
2. The Robotic Automation Support team performs the following tasks.
   - Determines if there are existing options for working with the technology so that project development can proceed unhindered.
   - Contacts you to gather details about the requirements, such as the use cases and the properties, methods, and events that you require. When defining requirements, focus only on what is needed to accomplish the current task in your project.
   - Collects application logging information and creates a translator request for the Robotic Automation Development team.
3. The Robotic Automation Development team reviews the information, determines the feasibility of the translator, and might request additional information. Based on this information, the Robotic Automation Development team estimates the level of effort in man-days and the cost, if any, of developing the translator. During development, the Robotic Automation Development team might provide you with prototypes of the translator to confirm that the functionality meets your needs. Once you approve the prototype, the Robotic Automation Development team finalizes the code so that it is ready for distribution in a future release.

The amount of time that is required to create a translator varies depending on the technology involved, developer availability, and current backlog. Typically, the initial research and level of effort (LOE) estimate can take up to four man-weeks. Creating a translator often requires eight man-weeks once it is added to the development cycle and work begins.

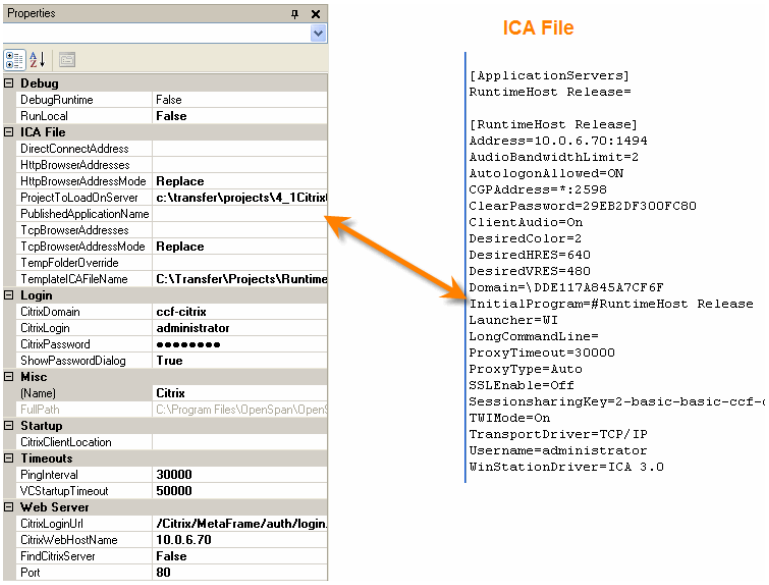
Note: Once work begins, Robotic Automation developers often require additional information and feedback. Your timely response is critical for keeping the development effort on schedule.

Understanding how the Citrix Context works with the Citrix ICA file

In Robot Studio, the Citrix context allows a template ICA file to specify the published application to use when starting a Robot Studio project.

InitialProgram ICA setting

If the PublishedApplicationName property is blank in the context, then the InitialProgram value that is specified in the template ICA file is used. If the template file does not contain an InitialProgram value, then an error message appears.



If the PublishedApplicationName property contains a value, it always replaces the InitialProgram value, which is how it worked before this update.

Address ICA setting

If the PublishedApplicationName property is blank, and the InitialProgram is specified in the template ICA file, then the Address property can be populated in several ways:

- If the ConnectionServerAddress property contains a value, the Address property uses that value.
- If the ConnectionServerAddress property is blank, and the Address property contains a value in the template file, the Address property value is used.
- If the ConnectionServerAddress property is blank and the Address property is also blank, then the InitialProgram property is used as the Address value, minus the leading # character.

If the PublishedApplicationName property contains a value, then the Address property can be populated these ways:

- If the ConnectionServerAddress property contains a value, the Address property uses that value.
- If the ConnectionServerAddress property is blank, the Address property uses the value for the PublishedApplicationName property.

Understanding the Wild Card match rule

Use the Wild Card match rule to match variable content. The following table provides some examples:

Wild Card match rule examples

To match	Examples
Patterns that include variable content, indicated by an asterisk (*)	• **G*** matches *Google*, *Gary*, *John Grossman*, and *G*. It does not match words or phrases that include a G in the middle or end of a word, for example *JG Smith* or *AMG*. • ***le** matches *Google*, *Able*, *Google Maps*, and *le*. It does not match words or phrases that include an le in the middle or beginning of a word, for example *bless* or *least*. • ***oo*** matches any word or phrase that includes a word that contains an *oo* anywhere within the word, for example *Google*, *spoon*, and *floo*.
Patterns that can contain multiple words with asterisk (*) characters	• **G* M*** matches *Google Maps*, *George Miseal*, *G Miseal*, and *G M*.
Patterns that match any input string that contains the pattern are not surrounded by single quotes	• **G* M*** matches *I use Google Maps*, *George Miseal is a good man*, *I hope George Miseal is alright*, and *My favorite letters are G M and U*.
Patterns that only match if the entire input string matches the pattern are surrounded by single quotes	• **'G* M*'** matches *Google Maps* and *George Miseal*, but does not match *I use Google Maps*.

Understanding translators and how Robot Studio uses them

Most vendors who automate user interfaces use screen scraping or basic accessibility APIs. These APIs let you perform simple tasks like clicking text and sending data but have limitations, such as an inability to perform the following tasks.

- Automate applications in the background or in parallel.
- Perform complex interactions, particularly with grids, such as grabbing all of the data, scrolling and finding the right data, and handling embedded grid controls.
- Automate with an end user present and working in the same application (attended automation).
- Receive and respond to events from applications, such as for validation purposes or in a workflow automation.

Pega Robot Studio does not have these limitations because Robot Studio injects code into applications. This code then communicates with the user interface objects the application programmer used to build the application. The code Robot Studio injects is called a *translator*. For instance, when you automate a Java application, the translator talks to the Java objects. When you automate a .NET application, the translator talks to the .NET objects. Pega Robotic Automation includes translators for the most common platforms and controls used in enterprises.

There are applications built on other platforms for which Robot Studio does not have translators. Typically, this occurs when an application leverages a third party control library, such as Infragistics or DevExpress, or when an application leverages custom controls, such as with Remedy or SAP. When this happens the Robot Studio engineering team creates translators for these new controls and adds them to our product. Once created, these translators are made available to all customers.

For more information, see Technical Article: Understanding Translators.

When I update a solution, why do I receive the error Converted:0. Not Converted:1?

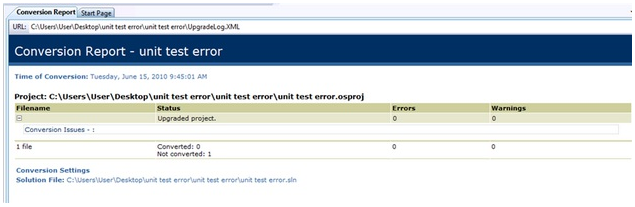
Programs affected: Robot Studio plug-in for Microsoft Visual Studio

When updating an older Robot Studio solution, you might receive a Conversion report that says no files were converted. For example, the report will say:

Converted: 0.

Not Converted: 1.

Here is an example:



Most likely, the solution updated just fine. These messages are a byproduct of Visual Studio and are not relevant to the Pega Robot Studio solution. If, however, a solution*does not* update correctly, Studio generates an error message and the project is in an unloaded state.

Starting adapters and multithreading

This article discusses how to start an adapter and multithreading. Although these seem like separate issues, how you start your application affects how it works with events.

A Pega Robot Studio adapter is a class that is generated by the Studio tools. It encapsulates the data in an application and permits your code to monitor and modify how the application works.

Starting an adapter from .NET

There are a few ways to start an adapter from a .NET project. The simplest way is to use the adapter's Start() method.

```
// Starts the external application
Crm.Start();
}
```

The Start() method can also take a parameter that provides a synchronization object. This object must implement the *ISynchronizeInvoke* interface. In practical terms, you pass it a Windows form UI object, such as a form or a control. Doing this lets the adapters automatically marshal their events to your UI, so you do not have to. This is because in Windows, you cannot modify a UI element safely except from the thread that the UI element was created on.

You only need to do this for adapters that you handle events from *and* that the event handlers modify UI items. If either of those conditions are not true, then you do not need to pass an object to the Start() method.

```
// Starts the external application
```

```
Crm.Start( this ); // this is a System.Windows.Forms.Form object
}
```

Multithreading with adapters and .NET

If you start your application adapter with the Start() method and no synchronization, you need to handle marshalling events explicitly. This has the advantage of giving your code more control over how it is done, with the disadvantage of having to remember to do this or else exceptions might be thrown while your application is running.

Microsoft Windows, as a part of how Win32 works, requires that all changes made to a user interface control be done by the thread that created the control. It is, however, something that you need to be aware of, because it happens when handling events from external application adapters.

Studio adapters fire their events on different threads than your .NET application's UI thread. This keeps your application's UI responsive, however, it also means that you need to marshal events to the UI thread to work with controls such as text boxes and labels. If you do not do this, you get cross-threading exceptions.

Note: This is not needed if your event handler does not touch a UI control or if you do not handle events from the application.

Advantages and disadvantages to each method

Start(this)

The advantages to using this method are that it is easy and safe and you do not need to worry about when you need to marshal code. Usually, you have a System.Windows.Forms.Form object that you can pass to the Start() method as a this object, which then correctly marshals all events for you.

The disadvantage to this method is that when your code is in an event handler, it is on the thread of the UI object and the UI object does not handle any repaint or other events until your code is done. This is only an issue if your code takes a long time to complete. This is no different from the usual event handlers in .NET code. In the cases where it does take a long time, you can place calls to the Update() method in your code to force a repaint or call the message loop, the Application.DoEvents() method, or you can spin off a different thread to handle the processing. Normally though, this is not an issue.

One thing to note is that all control events are marshaled for you. However, at this time, adapter events (Starting, Stopping, Stopped) are not marshaled and you still need to use the Invoke() method if you use these events and modify a UI while handling the event.

Start()

You have more control with this method of starting an adapter, but you must use the Invoke() method to marshal UI references to the correct thread.

The advantage of this method is that you have more control. The disadvantage of this method is that you need to be more careful when coding and debugging. Also, the same problem of long running events can still happen if you marshal the code to the UI thread and then take a long time in that thread.

How to marshal events in your code

Note: This only applies if you use the Start() method without giving it an object reference to synchronize with.

The following is a sample pattern for handling an UI control safely from different threads. There are many patterns you can use; this one is self-contained. You can find out more by searching the Microsoft Developer Network (MSDN).

The important thing is to use the Invoke() method when updating anything on a UI control. Some examples are changing Text, clearing a list box, or working with a DataGridView. If you use the Invoke() method, you need to use a delegate.

The following example shows a delegate for passing a single string argument.

```
public delegate void updateUI( string key );

///


/// Handles updating the application bar's values. It's done here so we can ensure its
/// thread safe for calls from the OpenSpan adapter.
///
/// account number for the window we are working with
public void handleToolbarUpdate( string keyText )
{
if ( InvokeRequired )
{
// Call self but on the correct thread
Invoke( new updateUI( handleToolbarUpdate ), keyText );
return;
}

… the rest of your code …
```

If, however, you do not need to pass arguments, then you can use the MethodInvoker delegate, which is part of .NET. For example:

```
if ( InvokeRequired )
{
Invoke( new MethodInvoker( updateLabels ) );
return;
}
```

Symantec Endpoint Protection conflicts with Robotic Automation interrogation

Symantec Endpoint Protection version 14 conflicts with Pega Robotic Automation, thereby preventing Pega Robotic Automation from interrogating Internet Explorer, Calc, and other applications.

Symantec resolved the issue with the release of Client Intrusion Detection System (CIDS) version 16.2. This Symantec patch enables Pega Robotic Automation to work with a system that also runs Symantec version 14 and higher.

For more information and to download updates, see the Symantec website.

Updating UI Connector files in Robotic Automation

If you are updating UI Connector files from version 8.0 to either version 8.0 SP1 or version 19.1, perform the following steps. If you are updating from version 8.0 SP1 to 19.1, omit the steps in this article.

Note: During the update, in the .cs file, the name of the OpenSpan.IPC.ExpressTranslators.IExpressVirtualControl module is changed to Pega.Remoting.ExpressTranslators.IExpressVirtualControl. No other changes are made to the solution.

Updating to 8.0 SP1

If you are updating UI Connector files from version 8.0 to 8.0 SP1, perform the following steps:

1. Open Windows File Explorer and go to the install folder.
    - If you installed PegaRobotic Automation Studio, go to the OpenSpan Studio for Microsoft Visual Studio 2015 folder.

    - If you installed the Robotic Automation Studio Plug-in, go to the OpenSpan Plug-in for Microsoft Visual Studio 2015 folder.
2. In the Windows File Explorer address bar, enter `cmd`. Windows opens a command prompt with the install folder as the directory.
3. Enter the following command:

```
UiConnectorUpgrade.exe <location of the project that you want to update>
```

The utility checks all of the files in the location that you specify and updates the files that require updating.

Updating to 19.1

If you are updating UI Connector files from version 8.0 to 19.1, perform the following steps:

1. Open Windows File Explorer and go to the install folder.
    - If you installed PegaRobot Studio, go to the Pegasystems\Pega Robot Studio folder.
    - If you installed the Robot Studio Plug-in, go to the Pegasystems\Pega Robot Studio Plug-in folder.
2. In the Windows File Explorer address bar, enter `cmd`. Windows opens a command prompt with the install folder as the directory.
3. Enter the following command:

```
UiConnectorUpgrade.exe <location of the project that you want to update>
```

The utility checks all of the files in the location that you specify and updates the files that require updating.

Why does my robot start slowly when using the AllProjectsStarted event?

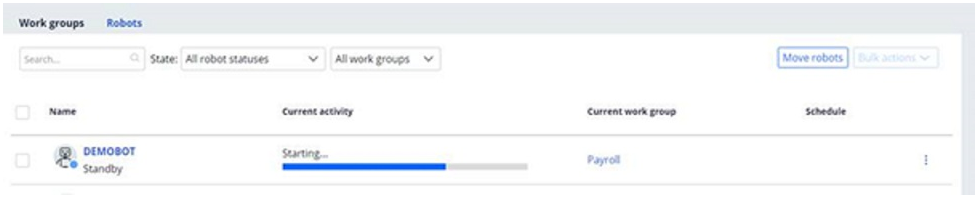
The robot registration process starts when Robot Runtime starts and ends after all projects within the automation package are up and running. This includes starting any applications that are set to start when the project starts. Additionally, automations that use synchronous threads that are triggered from events like the ProjectStarted, AllProjectsStarted, and adapter.Started, must complete before the robot finishes registering and starts heartbeating. If the robot does not finish registering within the expected PackageLoad time, then Robot Manager considers this a timeout and might turn off the robot. Use these events carefully to ensure that the registration process completes within the expected time period.

Using automations that are triggered from events on startup

When you use an AllProjectsStarted, ProjectStarted or an adapter.Started event to start automations, the robot status, as displayed in Robot Manager, can make it appear that the robot is stuck “starting” until the automations complete.
When an unattended robot starts automations using a synchronous link that emanates from these events, there is a step in the registration process that is not completed until the automations triggered by the events are completed.
The best practice is to use synchronous links to start automations from the these events. This method allows the system to ensure that applications are started, logged in, or navigated properly before work assignments begin.

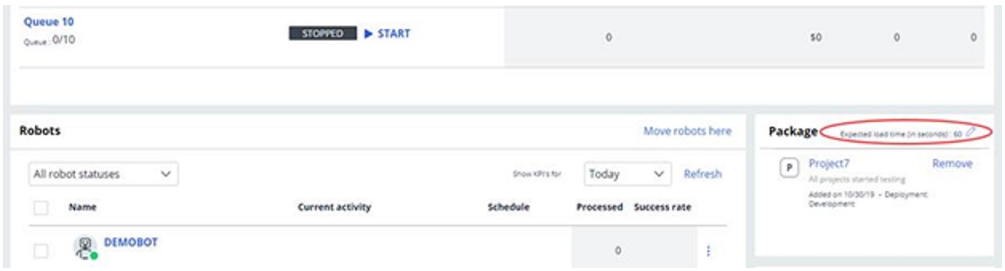
Using synchronous links

If you use synchronous links to start automations from an AllProjectsStarted, ProjectStarted or an adapter.Started event, and if those automations take a long time to complete, then the robot status in Robot Manager can appear as shown below. This is your indication that the system is finishing the automations.



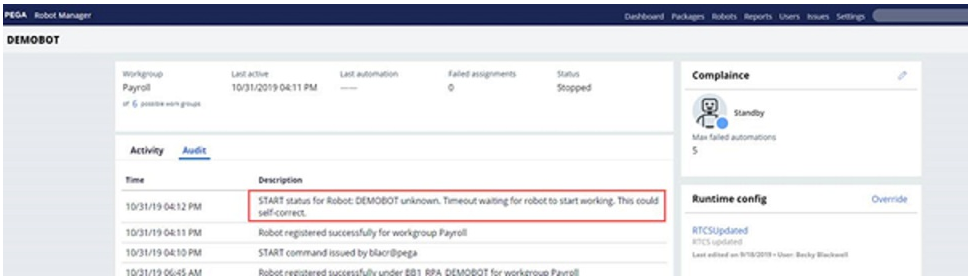
Robot Manager status of launching applications

If the runtime startup sequence, which includes the AllProjectsStarted, ProjectStarted or an adapter.Started automations, exceeds the default package load time interval of 60 seconds, you can lengthen the time interval on the Work group screen (package widget), as shown in this example:



Work group screen

If the default package load time is exceeded, then you see this message on the audit log for the robot. After the AllProjectsStarted, ProjectStarted or an adapter.Started automations finish processing, the robot successfully registers.



Robot start status timeout

Using asynchronous links

While it is possible to use asynchronous links to start automations from an AllProjectsStarted, ProjectStarted or an adapter.Started event, this is not the recommended method. If you follow this method, then after that asynchronous link is passed within the automation execution flow, the AllProjectsStarted, ProjectStarted or an adapter.Started event is considered complete, the Activate command is sent to Robot Manager, and the heartbeating begins.

Using asynchronous links to start automations from an AllProjectsStarted, ProjectStarted or an adapter.Started event allows the robot to finish the registration process sooner. However, there is no validation that all applications are started, logged in, or navigated properly before the Activate command is sent and heartbeating begins.

Verifying the version of Agile Desktop and the package that is running

To prepare for a support call or to see version information about Pega Robotic Automation Agile Desktop and the package you are running, follow these steps:

1. Open Agile Desktop.
2. Right-click and choose the About option. The version and package information appears on the About dialog.

Note: Your Agile Desktop implementation might look different, depending on how it has been customized for your organization.

What are the prerequisites for Pega Robotic Automation 19.1?

When you use the Setup wizard to install Pega Robot Studio (stand-alone or plug-in), Pega Robot Runtime/Agile Desktop, or both, the wizard first looks for certain Microsoft software prerequisites, such as the .NET Framework. Some prerequisites, such as the C++ redistributables, are included in the installation. If the required software components are missing, the wizard downloads them from Microsoft's site and installs them before it installs your Pega Robot Studio or Pega Robot Runtime software.

Components to check

To install the prerequisites before running the Setup wizard, or if you are doing an offline installation, use the following information as a guide for finding the necessary components. For more information about installing Pega Robot Studio offline, see the installation instructions.

Note: The following links are provided for your convenience. If any of these links no longer work, visit the Microsoft website to download these applications. Click feedback on the right side of this page to report broken links.

Pega Robot Studio

Before you install Pega Robot Studio, stand-alone or plug-in, ensure that you have the following applications installed on your computer:

- Microsoft Visual Studio 2015 RTM Update 3 or later
- Microsoft .NET Framework 4.6.1 or later
- (Only required for Agile Studio) Microsoft Visual C++ Redistributable for Visual Studio 2012 version 11.0.61030.0 or later (x86 and x64 -- included in the installation in 19.1.38 and later)
- Microsoft Visual C++ Redistributable for Visual Studio 2017 version 14.10.25017.0 or later (vc_redist.x86.exe and vc_redist.x64.exe -- included in the installation in 19.1.38 and later)

If you do not have the correct version of these applications installed, the Setup wizard downloads the following applications from the specified locations:

- Microsoft Visual Studio 2015: https://visualstudio.microsoft.com/vs/older-downloads/
- Microsoft .NET Framework 4.6.1: https://www.microsoft.com/en-us/download/confirmation.aspx?id=49981

Pega Robot Runtime/Agile Desktop

Before you install Pega Robot Runtime/Agile Desktop, ensure that you have the following applications installed on your computer.

- Microsoft .NET Framework 4.6.1 or later
- (Only required for Agile Studio) Microsoft Visual C++ Redistributable for Visual Studio 2012 version 11.0.61030.0 or later (x86 and x64 -- included in the installation in 19.1.38 and later)
- Microsoft Visual C++ Redistributable for Visual Studio 2017 version 14.10.25017.0 or later (vc_redist.x86.exe and vc_redist.x64.exe -- included in the installation in 19.1.38 and later)

If you do not have the correct version of these applications installed, the Setup wizard downloads the following applications from the specified locations:

- Microsoft .NET Framework 4.6.1: https://www.microsoft.com/en-us/download/confirmation.aspx?id=49981

What are the setup wizard prerequisites for Pega Robotic Automation version 8.0 and 8.0 SP1?

When you use the Setup wizard to install Pega Robotic Automation Studio (stand-alone or plug-in), Pega Robotic Automation Runtime/Agile Desktop, or both, the wizard first looks for certain Microsoft software prerequisites, such as the Microsoft .NET Framework. If the required software components are missing, the wizard downloads them from Microsoft's site and installs them before it installs your Pega Robotic Automation Studio or Pega Robotic Automation Runtime software.

To install the prerequisites before running the Setup wizard, or if you are doing an offline install, use the following information as a guide for finding the necessary components. For more information on installing Pega Robotic Automation Studio offline, see the installation instructions.

Note: The following links are provided for your convenience. If any of these links no longer work, visit the Microsoft website to download the these applications and click Feedback so that we can update the link.

Pega Robotic Automation Studio

For Pega Robotic Automation Studio, stand-alone or plug-in, you must have the following applications installed on your computer before you install Pega Robotic Automation Studio:

- Microsoft Visual Studio 2015 RTM
- Microsoft .NET Framework 4.6
- Microsoft Visual C++ Redistributable for Visual Studio 2017 (vc_redist.x86.exe and vc_redist.x64.exe)

Version 8.0.1053 and later builds require Microsoft Visual Studio 2015 Update 3 for the stand-alone and plug-in versions of Pega Robotic Automation Studio.

If you do not have the correct version of these applications installed, the Setup wizard downloads the following applications from the specified locations:

- Microsoft Visual Studio 2015: https://visualstudio.microsoft.com/vs/older-downloads/
- Microsoft .NET Framework 4.0: http://download.microsoft.com/download/1/B/E/1BE39E79-7E39-46A3-96FF-047F95396215/dotNetFx40_Full_setup.exe
- Microsoft .NET Framework 4.6: https://www.microsoft.com/en-us/download/details.aspx?id=48130

Pega Robotic Automation Runtime/Agile Desktop

For Pega Robotic Automation Runtime/Agile Desktop, you must have the following applications installed on your computer before you install Pega Robotic Automation Runtime/Agile Desktop. For Pega Robotic Automation Runtime, you must have Microsoft .NET Framework version 3.5 SP1 or 4.0. For Pega Robotic Automation Agile Desktop, you must have Microsoft .NET Framework version 4.0. For Pega Robotic Automation Runtime/Agile Desktop 8.0 SP1 and later, you must have Microsoft .NET Framework 4.5.

If you do not have the correct version of these applications installed, the Setup wizard downloads the following applications from the specified locations:

- Microsoft .NET 3.5 SP1: http://download.microsoft.com/download/0/6/1/061F001C-8752-4600-A198-53214C69B51F/dotnetfx35setup.exe
- Microsoft .NET 4.0: http://download.microsoft.com/download/1/B/E/1BE39E79-7E39-46A3-96FF-047F95396215/dotNetFx40_Full_setup.exe
- Microsoft .NET 4.5

https://www.microsoft.com/en-us/download/details.aspx?id=30653
- Microsoft Visual C++ Redistributable for Visual Studio 2017 (vc_redist.x86.exe and vc_redist.x64.exe)
https://visualstudio.microsoft.com/downloads/

Why can I not interrogate the Chrome browser?

This problem can occur if the Google Chrome browser and Pega Robot Studio are started with different integrity levels. For best results, start both Pega Robot Studio and Chrome as an Administrator.

What startup parameters can I use with Pega Robot Runtime?

Pega Robot Runtime runs the attended and unattended automations that you create by using Pega Robot Studio.

To start Pega Robot Runtime, perform the following steps:

1. Open a command prompt window.
2. At the command prompt, enter the command to start Pega Robot Runtime.

The following example shows the syntax for version 19.1 and later:

```
C:\{path to Synchronization Engine install folder}\Pega.Loader.exe -d "path and project name"
```

The following example shows the syntax for version 8.0 SP1 and earlier:

```
C:\{path}\OpenSpan.Runtime.exe
```

By including parameters with the command to start Pega Robot Runtime, you can perform the following tasks:

- Loading Robotic Automation projects from the command line
- Overriding work groups in unattended (RPA) implementations
- Logging Pega Robot Runtime user activities

Loading Robotic Automation projects from the command line

To start Pega Robot Runtime from the command line and specify the name of the project (or package) that you want your users to run, include the `-d` or `Project=` parameter. This way, your Pega Robot Runtime users do not have to select the project from the Runtime menu that is available from the task bar.

To load a project, perform the following steps:

1. Open a command prompt window.
2. At the command prompt, enter the command to start Pega Robot Runtime and include the `-d` or `Project=` parameter. Include quotation marks (") around the path and project name.

For version 19.1 and later, to load a project, enter the following on the command line:

```
C:\{path to the Synchronization Engine install folder}\Pega.Loader.exe -d "path and project name"
```

For version 8.0 SP1 and earlier, to load a project named example.openspan, enter the following on the command line:

```
C:\{path}\OpenSpan.Runtime.exe Project="C:\OpenSpanDeploymentFiles\example.openspan"
```

Logging Pega Robot Runtime user activities

To create a log file of user activities, include the `Loguser=` parameter in the command that you use to start Pega Robot Runtime. This information can help Pega Support to quickly identify and correct the problem.

To specify a file in which to log user activities, perform the following steps:

1. Open a command prompt window.
2. At the command prompt, enter the command to start Pega Robot Runtime and include the `Loguser=` parameter. Include quotation marks (") around the file path and name.

For example, to create a log file named pra01.txt in the C:\LogFiles folder, in version 19.1 or later, enter the following on the command line:

```
C:\{path to synch engine install}\Pega.Loader.exe --args Loguser="C:\LogFiles\pra01.txt"
```

To create a log file named pra01.txt in the C:\LogFiles folder, in version 8.0 SP1 or earlier, enter the following on the command line:

```
C:\{path}\OpenSpan.Runtime.exe Loguser="C:\LogFiles\pra01.txt"
```

Overriding work groups in unattended (RPA) implementations

To override the default work group when Pega Robot Runtime starts in an unattended (RPA) implementation, include the `Workgroup=` parameter in the command that you use to start Pega Robot Runtime.

These instructions are only valid if you are using Pega Robot Manager version 5 or earlier. You must also have Robotic Automation Runtime version 8.0.1058 or later to use the `Workgroup=` parameter on the command line.

In an unattended (RPA) implementation, you typically use the workgroup setting in the CommonConfig.xml file to specify the work group to which this robot belongs. This in turn tells Pega Robot Manager which package (or project) this robot should run. Include the `Workgroup=` parameter in the command that starts Pega Robot Runtime to override the value in the CommonConfig.xml file and specify a different work group for this Robotic Process Automation (RPA) robot.

To override the work group, perform the following steps:

1. Open a command prompt window.
2. At the command prompt, enter the command to start Pega Robot Runtime and include the `Workgroup=` parameter.

The following example shows the syntax for version 19.1 and later:

```
C:\{path to synch engine install}\Pega.Loader.exe --args Workgroup="work group name"
```

The following example shows the syntax for version 8.0 SP1:

```
(program executable path) Workgroup="work group name"
```

Include the quotation marks ("). For example, to specify a work group named Customer service, enter the following on the command line:

```
C:\{path to synch engine install}\Pega.Loader.exe --args Workgroup="Customer service"
```

For more information about the CommonConfig.xml file, see Common Configuration Settings.

Pega.Loader parameters

The Pega Loader program is part of the Pega Synchronization Engine. The program coordinates the launch of Pega Robotic Automation™ components such as Pega Robot Runtime, Pega Updater, Pega Native Foundation, and Pega RPA Service.

When you use Pega Robot Manager, you normally do not need to specify anything on the command line. The only parameter you would typically use with Pega Robot Manager is –noSplash, to hide the splash screen.

If you are not using Pega Robot Manager, you can include the -d parameter to start Pega Robot Runtime and use the Pega Synchronization Engine. In this scenario, you use the -d parameter to specify the deployment package that you want to load. The following example shows the syntax that you use to startPega.Loader.exe:

```
C:\{path to the Synchronization Engine install folder}\Pega.Loader.exe -d "path and project name"
```

The following parameters are available for use with the Pega.Loader program:

- -b (--basic) – Include this parameter to load the default settings to start Pega Robot Runtime.
- -v (--version) – Enter the specific version that you want to load or enter `latest` to load the latest version. Your entry overrides the version of Robot Studio that the deployment package was created with, which is the default if you omit this parameter.
- --noSplash – Include this parameter to suppress the splash screen.
- -e (--exe) – Specifies the Pega application that you want to launch. The program determines the path to the application, based on your entry for the Product parameter.
- -p (--product) – This parameter is for future use in Pega Workforce Intelligence implementations.
- -d (--package) – Only include this parameter if you want to start Robot Runtime and use the Pega Synchronization Engine without using Pega Robot Manager. You use this parameter to specify the deployment package that you want to load.
- --args – The Pega.Loader program passes all text on the command line after the --args parameter to the launched executable. This must be the last parameter on the command line.

For more information, see Pega Synchronization Server and Package Server User Guide.

Why can't Robot Studio build projects that are on a network drive?

Pega Robot Studio cannot build projects that are on a network drive due to a change in Microsoft's .NET Common Language Runtime (CLR) between versions 2 and 4. Previously, .NET CLR allowed the loading of binaries by default. In later versions of .NET CLR, this is denied.

The following steps might resolve this issue. These steps let the Robot Studio deployment executable (OSD.exe) access any remote binaries on a network drive:

1. Open Notepad.
2. Paste in the following text:

```
<configuration>
  <runtime>
    <loadFromRemoteSources enabled="true" />
  </runtime>
</configuration>
```

3. Save the file as OSD.exe.config in the same folder as the OSD.exe program, such as in C:\Program Files (x86)\OpenSpan\OpenSpan Plug-in for Microsoft Visual Studio 2015 for 8.0 SP1, or C:\Program Files\Pegasystems\Pega Robot Studio Plugin for 19.1.
   - For the 8.0 SP1 standalone version of Robot Studio, save the file to the following folder: C:\Program Files\OpenSpan\OpenSpan Studio for Microsoft Visual Studio 2015\Application.
   - For version 19.1 and later, save the file to the following folder: C:\Program Files\Pegasystems\Pega Robot Studio\Application.
   - If you are using a 64-bit operating system, use the following folder: C:\Program Files (x86)\.
4. Rebuild the project.

Note: The system does not support this configuration and your results may vary.

Why do I get an error when calling the SetCellValue method and using a MicrosoftExcel Connector?

In Pega Robot Studio, when you use the SetCellValue method and the MicrosoftExcel Connector to work with a Microsoft Excel spreadsheet, you get the following error message:

```
Operation is not allowed while Microsoft Excel is in the 'Edit Mode'.
```

Make sure that the cell you are calling is valid. For example; Excel spreadsheets start at row 1 instead of row zero, so the first valid cell is A1, instead of A0.

Robotic Automation glossary

adapter control | bundle | CommonConfig.xml file | deployment level | execution context | inheritance | Interaction Manager | interactions | Interaction.xml file | native control | package | Pega Robot Manager | project | RuntimeConfig.xml | Runtime-only users | solution | StudioConfig.xml | target | translator | UI Connector

Note: For terms related to Pega Infinity, see the Pega Platform Glossary. For detailed information about Pega Robot Studio configuration files, see Pega Robotic Automation Help.

adapter control

Adapter controls are components displayed in Pega Robot Studio Object Explorer and used by automation developers. The properties, methods, and events of these controls provide a way to interact with native controls.

bundle

When you use the option to build a solution in Pega Robot Studio, the system creates a bundle that includes all the files needed by Pega Robot Runtime to execute that solution plus files that Pega Robot Manager and Pega Synchronization Server use to ensure that the files are safe.

CommonConfig.xml file

The `CommonConfig.xml` configuration file contains information necessary to connect to and work with systems that are external to Pega Robot Studio and Pega Robot Runtime (such as Pega Robot Manager). This file is copied to your computer when Pega Robot Studio and Pega Robot Runtime are first installed.

deployment level

The deployment level denotes the various stages a Pega Robot Studio solution goes through as it moves from development to production. The first and last stages, Development and Production, are built into the system for you. You can define any intermediary stages you need, such as stages for testing and staging.

execution context

An execution context represents a single run of a Pega Robot Studio automation. Each execution context is started with an event, such as a button click. Any links started as a result of a button click are part of the same context. If an automation calls another automation, the links executed in the second automation are part of the same context. Any child threads that are created are also part of the same context.

inheritance

To Pega Robot Manager, inheritance is applicable when making package assignments. For example, inheritance means that when you are placed in a department, you will inherit the package assignments and configuration settings made for that department. Conversely, if you leave that department, you would disinherit those assignments.

Interaction Manager

The Interaction Manager component connects customer interactions through the configuration of its properties, events, and methods. The Interaction Manager maintains a direct link to the contents of the interaction.xml file and stores the context values defined for each interaction.

interactions

In Pega Robotic Automation Agile Desktop an interaction is a session with a customer. For example, the session could be a phone call or a chat. An interaction is sometimes called a transaction.

Interaction.xml file

The interaction.xml file defines the contexts, activities, and plug-ins that comprise the implementation that you are designing.

native control

A native control is a control in the application that you are automating.

package

A package is a deployable solution ready to be used by Pega Robot Runtime. A deployment package comprises two files, with these extensions: .openspan and .manifest. The .openspan file contains the specific adapter, translators, and custom components that make up the solution. The .manifest file contains a list of the contents of the .openspan file, along with project version information.

Pega Robot Manager

Pega Robot Manager helps you configure, manage, and deploy these automations, bundled into projects, from a centralized, cloud-based portal. Pega Robot Manager sits on top of the Pega Platform / Server.

project

Pega Studio bundles functionality in projects. Project iRobot tems let you integrate applications, monitor events, and automate tasks. Adapters, automations, and global containers are stored as .os files in the solution and project folders.

RuntimeConfig.xml

The RuntimeConfig.xml file contains the configuration settings primarily used by Pega Robot Runtime. Pega Robot Runtime is installed as a stand-alone application and also with a Pega Robot Studio installation.

Runtime-only users

Runtime-only users only use Pega Robot Runtime and do not use other Pega Robotic Automation products like Pega Robot Studio.

solution

Within Pega Robot Studio, solutions and projects are containers for all of the items required to build and run the project. Solutions can include multiple projects. Once you deploy a solution to the Pega Robot Manager, it is known as a package.

StudioConfig.xml

The StudioConfig.xml file contains the configuration settings for Pega Robot Studio.

target

A target is an object created in the adapter control that represents a native control in the application that you are automating. There are many types of targets and each target represents a specific type of control. So a GridTarget knows how to get cell values, set cell values, and so on. A ListBoxTarget provides a count of items and returns the items as a list.

translator

Translators are Pega Robotic Automation objects that are injected into the adapter application and operate directly against the native control. Translators are designed to operate against a specific type of control. For instance the .NET DataGrid translator works against System.Windows.Forms.DataGrid or any objects that inherit from DataGrid.

UI Connector

UI Connectors are C# classes that are created and compiled into your Pega Robot Studio project. UI Connectors contain the logic for mapping the target implementation to the native control. The adapter control communicates with the UI Connector and the UI Connector uses the target to make reflective calls to the native control.