Oracle® Cloud

Using Robots in Oracle Integration 3

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Preface

Using Robots in Oracle Integration 3 describes how to automate your business processes using robots in Oracle Integration.

Topics:

Audience

Using Robots in Oracle Integration 3 is intended for users who want to create and manage robots in Oracle Integration.

Documentation Accessibility

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Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

Related Resources

For more information, see these Oracle resources:

- Oracle Integration documentation on the Oracle Help Center.

Conventions

The following text conventions are used in this document.

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Start Building Robots Today!

Robotic process automation (RPA) is available directly within Oracle Integration. Adopters of this exciting new technology can start building robots today.

- **Already using Oracle Integration?**
  - If robotic process automation is available in your region, you can start building robots today. To see the regions in which RPA is available, see Availability in *Provisioning and Administering Oracle Integration 3*.
  - If robotic process automation isn't available in your region yet, enter a service request (SR) so that RPA can be enabled.
- **Not yet using Oracle Integration?**

  Contact Oracle to set up a demo. You can also get a free trial of Oracle Integration.

Before you start building robots, review your use cases and requirements with your contact at Oracle to ensure their feasibility.

2

Learn About Robots

Robots and integrations help you achieve the same business goals using different technologies. A robot performs UI-based automation, whereas an integration performs API-based automation. You can build both robots and integrations using Oracle Integration.

What Do You Want to Do?

Goal	Links
Watch a quick introduction to robots	Video: Introduction to RPA Video: Build a Simple Robot in Minutes Video: See a Simple Robot in Action
Plan how to fit robots into your business	5 Reasons to Unify Your Automation Create an Automation Strategy
Learn about robots and robotic process automation (RPA)	About Robots More Robot Concepts

Video: Introduction to RPA

Watch a video that introduces the robotic process automation (RPA) capabilities in Oracle Integration.

Video

If your organization doesn't yet use Oracle Integration, contact Oracle to set up a demo. You can also get a free trial of Oracle Integration.

5 Reasons to Unify Your Automation

With Oracle Integration, your organization can automate efficiently and effectively by producing UI-based automation and API-based automation in one complete business automation platform.

If your organization already has a team or department that delivers robotic process automation (RPA), that's great! The RPA capabilities in Oracle Integration can still help your business. Keep reading to learn more.

1. Bridge the Gaps Between Your Automation Strategies

Many organizations divide their automation work and strategies. For example:

- IT teams perform API-based automation by designing integrations.

  They can't automate legacy applications that don't have APIs because their tools don't allow them to develop UI-based automation.
- Business teams perform UI-based automation by building robots.

They can't develop more complex automation because their tools don't allow them to develop API-based automation.

Both teams have the same goals: automating their business processes. However, their separate tools lead to automation gaps, including imperfect and abandoned automation efforts.

With Oracle Integration, you can unify your automation work and your automation strategies. IT and business teams can collaborate on this automation work. Individuals with more technical skill sets can work with APIs and more complex integrations, and people with strong business acumen can work with robots.

When you perform UI-based automation and API-based automation in one place—Oracle Integration—you can find the right solution for the problem that you're facing and eliminate your automation silos.

See Create an Automation Strategy.

2. Ensure Good Corporate Governance

Teams typically delight in the opportunity to streamline tedious and time-consuming work through automation. However, unfettered access to automation tools can lead to challenges that impact your key business systems. For example, a large number of people working in an application at the same time can impact its performance, and the same is true for robots. Similarly, a large number of robots could infringe upon license agreements. Good governance is critical to such situations.

With Oracle Integration, you gain the efficiencies of automation along with the controls to guarantee good corporate governance. A central team can vet all new robots to ensure that they have a positive impact on your business operations. They can also design the integrations that call the robots and deploy the robots and integrations to production.

With this controlled process, everyone wins. Business teams can automate their business processes with only minimal involvement from IT, while a designated team maintains operational excellence by providing oversight.

3. Manage the Lifecycle of Assets in One Place

Oracle Integration offers a central place manage the lifecycle of your assets from development to deployment: a project.

Whether you're developing a new robot or integration, or updating an existing robot or integration, you work in a project. And when you're ready to promote your work from development to production, you don't need to go to multiple applications and find all the pieces and parts that you need and move them over individually. Instead, deploy your related robots and integrations together as a single automation solution.

Gain efficiency and reduce risk by managing the entire lifecycle of your automation assets in one place.

See Get Started with Projects in *Using Integrations in Oracle Integration 3*.

4. Unify Observability

When your organization works in several automation tools, your monitoring work can be inefficient and inconsistent. For example:

- You don't have a central place to monitor all automation. Instead, teams must access separate dashboards and monitoring tools.
- Teams must create and follow different procedures for monitoring and responding to issues.

Oracle Integration addresses these issues by offering unified observability of all automation assets. Gain efficiencies by monitoring everything in one place with robust observability tools, including dashboards, proactive email notifications, and detailed troubleshooting pages.

See Workflow for Monitoring Integrations and Get Started with Observability in *Using Integrations in Oracle Integration 3*.

5. Build Flexible and Future-Proof Solutions

No matter how you're automating your business, you always start with an integration. For example, even when you need to do UI-based automation by building a robot, you must also design an integration that calls the robot.

This construct helps to future-proof your work. For example, consider a scenario in which your business requirements and automation strategy require a robot. You create an integration that calls the robot and then move on to your next automation work. Then, if your requirements change in the future and you need to replace the UI-based automation with API-based automation, you can make the update without impacting your business process. Simply version the integration and replace the robot with API-based actions or a new integration.

Learn More

To understand the value of robots, see About Robots.

If your organization doesn't yet use Oracle Integration, contact Oracle to set up a demo. You can also get a free trial of Oracle Integration.

Create an Automation Strategy

With Oracle Integration, you can automate any application, whether it has APIs or not. Combine your new enterprise-level perspective on automation with an automation strategy to ensure that your automation decisions are future proof.

What is an Automation Strategy?

An automation strategy specifies your overall plan for automating your organization's processes. For example, an automation strategy might answer the following questions:

- How do you determine the business processes to automate?
- What analysis do you complete before and after automating a process?
- How do you improve a business process after automating it?
- How do you manage the lifecycle of your automation?
- How do you manage the environments where robots run?
- When do you use API-based automation, and when do you use UI-based automation?

> **Note:**
>
> This guide refers to the process of creating robots and integrations as **automating**, whether the robots and integrations automate or digitize work. For example, an integration might send a notification email for an approval, and a person must still approve the request. Such an integration *digitizes* some of this work.

Sample Automation Strategy

Your automation strategy can be high level, detailed, or anywhere in between. Consider the following high-level strategy as a starting place.

- Our organization values rapidly digitizing and automating our current business processes over replanning the processes.
- We believe that our automation journey begins, rather than ends, when we automate and digitize our business processes.
- We develop API-based automation when feasible and UI-based automation when necessary.
- We strive to continuously improve the efficiency and effectiveness of our business processes by analyzing the insights that we gain from automating and digitizing them.

Expect Your Automation Strategy to Evolve

Consider a situation in which a business team has historically developed UI-based automation, while an IT team has developed API-based automation.

With Oracle Integration, when the IT team's automation requires UI-based automation, they now can build a robot. Similarly, when a business team's automation benefits from API-based automation, IT teams now can contribute to the solution. Teams can build confidently and work together in Oracle Integration, knowing that they're delivering a fast, flexible, and future-proof solution.

Whether you manage this automation work centrally within your organization or locally within teams is up to you. As you automate more and more solutions using Oracle Integration, you might find that your automation strategies and the way that you manage your automation solutions also continue to evolve.

About Robots

A robot is a software script. A robot specifies the steps to follow for accomplishing a task using an application's user interface. A robot performs work just like a human or an integration, and it helps your business become more autonomous.

Topics:

Robots Automate Without APIs

Need to automate a business process, but APIs don't expose the fields you need to update? A robot can help!

How Robots Fit into a Broader Automation Strategy

A robot is another tool in your toolbox for automating your business processes.

With robots and integrations, you can automate *everything*, from robust enterprise software with extensive APIs to legacy systems without any APIs.

Your automation work fits into one of the following categories:

- **UI-based automation**

  When you're automating an application that doesn't have APIs for your specific business process, build a **robot**, and specify the workflow from within the application user interface.

- **API-based automation**

  When you're automating an application that has APIs for your specific business process, design an **integration**, and call the APIs from the integration.

If you have business processes that you've been unable to automate because the applications don't have APIs, robots are a game changer.

Already Familiar with Integrations?

If you've built integrations before, you're already an expert in robots. Robots and integrations provide two ways to automate your business and have much in common. For example:

- You build integrations and robots in projects.
- The canvases where you build integrations and robots have the same look and feel.
- Integrations and robots both require connections to connect to applications.
- You deploy integrations and robots the same way in a project.
- Similar observability pages are available for integrations and robots.

Additionally, robots and integrations complete the same type of work, including the following:

- Automating your business processes by connecting to applications, getting information from the applications, and passing the information back to Oracle Integration.
- Improving the efficiency and effectiveness of your business and offering valuable insight into your business processes.

When to Build a Robot

When creating a robot, you specify the steps that a human takes when interacting with a user interface. For example, a robot might need to open a browser, enter data into a field, and click a button.

Build a robot when an application doesn't have APIs, when the APIs are inaccessible, or when integration development resources aren't available.

See When to Create Robots Versus Integrations.

Robots Require Integrations

In Oracle Integration, automation begins with an integration. Even if you're automating a business process with a single robot, the only way to run the robot is to call it from an integration.

While this approach requires a little extra work, the work is an investment in the future of your business processes. For example:

- Integrations provide robust observability capabilities to monitor your operations.
- Consider a scenario in which a robot creates an order and a process application calls the robot.

  In this scenario, if the robot no longer meets your organization's needs and needs to be reconfigured as an integration, you also must update the process application to call the integration instead. Updating your process application when your business needs change can lead to interruptions in your business processes.

  Instead, with Oracle Integration, the process application calls an integration, and the integration calls a robot. If you need to switch from UI-based automation to API-based automation, all you need to do is modify the integration so that it completes API-based automation tasks instead of UI-based automation tasks.

Enjoy Simplicity While Gaining Control

Most robots in the automation industry record one path through a user interface. If you want the robot to take a different path, you must build another robot. Before you know it, you've built an army of robots that can complete only very specific tasks and can't do anything when the application that they automate goes down.

Robots in Oracle Integration are different. They combine the simplicity of a recording with the control of a low-code environment. To create a recording, simply work in an application as users normally do. Oracle Integration generates the code for this automation as you work, providing you with valuable knowledge of how the automation code works. As you work, tweak the automation and define parameters for the automation using an intuitive low-code editor.

When you finish creating the recording, you've also finished your automation work. Instead of creating an army of robots, you've created one robot that can handle numerous use cases.

Because you call every robot from an integration, you can incorporate fault handlers and error management to gracefully handle all the situations that the robot might encounter. And, thanks to consistent user interfaces and terminology between integrations and robots, integration developers typically can learn how to build robots very quickly.

Even better? You build robots from within Oracle Integration, without needing to install a special additional application.

Differences: Robots and Integrations

Robots and integrations provide similar capabilities, including automating your business by connecting to applications and sending data back to Oracle Integration. However, robots and integrations get information from applications in different ways.

Area	Integration	Robot
How it gets information from an application	An integration gets information from an application by calling its APIs.	A robot gets information from an application by opening the application and completing a task in the user interface as a person does.
Key requirements	An integration developer with a broad and deep technical skill set designs an integration. The integration must access the application's APIs.	A robot developer who is comfortable with technology builds a robot. The robot must access an application's user interface.
Sample usage for an ERP system	When you want to automate the creation of orders, and APIs are available for the work, you can design an integration that connects to the ERP application's APIs. You connect to the APIs using an adapter in Oracle Integration.	When you want to automate the creation of orders, and an API isn't available for the work, you can build a robot that interacts with the ERP application's user interface.

When to Create Robots Versus Integrations

You have several options for automating your business, including integrations and robots. Integrations use API-based automation, and robots use UI-based automation. Learn when to use each type of automation so that your organization develops the right automation for each use case.

When to Create an Integration

When automating a business process, if an application supports an integration, you should design an integration. Integrations offer the most scalable and robust automation solutions.

When all of the following statements are true, design an integration:

- The applications that you're automating have APIs.
- The APIs can access and update the fields that the business process uses.
- You have access to all of the APIs.
- Your organization has the staffing resources to design an integration.

When to Create a Robot

You typically build a robot when one or more blockers prevent you from designing an integration. For example, you build a robot for any of the following scenarios:

1. **No APIs**

   The applications that you're automating have no APIs; or their APIs can't access and update the fields that the business process uses.

2. **Operational and logistical challenges**

   The applications that you need to automate have APIs, but operational or logistical challenges prevent you from accessing them. For example:

   - The APIs are currently inaccessible.

     For example, consider an application for which the APIs must be enabled. The team that manages the application is willing to enable the APIs, but only when they perform

routine maintenance on the application. The next maintenance period is nine months away.

- Integration developers are currently unavailable.

  Developing integrations and robots is intuitive and straightforward, and often times, integration developers and robot developers can do the same work. However, sometimes no one is available for the integration work.

In both cases, you could postpone the automation work until your organization can support the design of an integration. Or, you can eliminate these bottlenecks and automate your business now by rapidly prototyping a robot.

In the future, when the APIs are accessible and the integration developers have availability, you have the option of replacing the robot with an integration and incorporating more robustness and scalability into the automation. Or, you might find the robot suits your business needs.

Reminder: Even when you build a robot, you still need to design an integration that calls the robot.

> **Tip:**
>
> Your decision about creating an integration or a robot is important and worthy of careful consideration, but you can always change your mind. With Oracle Integration, you can easily replace a robot with an integration without impacting your business process. See Replace a Robot with an Integration.

Available Robot Patterns

Robots interact with user interfaces just as humans do. Robots can complete the manual tasks that humans have historically had to do.

Robot pattern	Description	Sample use cases
Web-based applications	You can build a robot that interacts with any HTML-based web application, such as a website or an application that you access from an internet browser. **Note:** You currently cannot run a robot on a page that contains an inline frame (iframe). If you run the recorder on a page with an iframe, the recorder informs you that iframes aren't supported.	**Balancing invoices** An integration identifies the invoices that are out of balance, but APIs are not available to balance the invoices. You can build a robot to open each out-of-balance invoice, compare specific values, and update the invoice as needed so that it's in balance. The finance team that has historically needed to complete these tasks is therefore relieved of this tedious and manual work. **Getting the supplier name from an invoice** A business application requires information from an invoice. An integration can collect most information, but APIs aren't available to obtain the supplier name. You can build a robot to get the supplier name, and an integration can pass this information to the business application. The finance team no longer needs to complete this manual task. **Updating emergency contact information** An employee provides various information as part of their onboarding. APIs can send most of the data to your HCM software, but APIs aren't available for sending the emergency contact information. You can build a robot to update the emergency contact so that your human resources team doesn't need to complete this manual task.

For more information about use cases, see Use Cases.

What Happens When a Robot Runs

Understanding the events that occur when a robot runs can provide helpful context for your setup work.

You might spend a minute or two reading this information, but keep in mind that most of these tasks typically finish in seconds or less.

Order	Task	Details
1	An integration runs and kicks off the robot	An integration runs according to its logic. When the integration reaches the point in its flow where it invokes the robot, the integration notifies Oracle Integration that the robot needs to run.
2	Oracle Integration chooses where to run the robot	Oracle Integration finds the environment pool that you configured the robot to run on. Next, Oracle Integration looks within the environment pool and selects an environment that is available to run the robot.
3	The environment collects the latest version of the robot	The robot agent that is installed on the selected environment detects that a robot instance needs to run. The robot agent gets the latest version of the robot and all connection details from Oracle Integration. Then, the robot agent runs an instance of the robot.
4	A robot instance runs on the environment	The robot agent runs the robot instance on the environment. The robot agent sends regular status updates back to Oracle Integration.

Order	Task	Details
5	The robot instance finishes running	The robot instance finishes running and reports its status to Oracle Integration. Oracle Integration shares this status information with the integration that invoked the robot and allows the integration to continue to its next step.

How Robots, Integrations, and Process Applications Interact

Robots, integrations, and process applications interact in different ways. For example, an integration can call a robot, but a robot cannot call an integration or another robot.

Type of automation	Can call an integration?	Can call a process application?	Can call a robot?
Integration	✓	✓	✓
Process application	✓	✓	✗
Robot	✗	✗	✗

Building Options for Robots

To build a robot, record the actions that a robot completes, similar to a screen recording. At any time, you can pause the recording and harness the control and power of the low-code capabilities, which let you drag actions to the canvas in Oracle Integration.

Quick Introduction

The recorder is the building tool of choice for most robot developers because it's fast and easy, and all the control of the low-code capabilities remains at your fingertips.

Start and Stop Anywhere, and Update as You Build

You can always use your tool of choice to build. You can start and stop the recorder from anywhere in your robot. Additionally, you can switch from the recorder to the low-code tools at any time.

Both the recorder and the low-code capabilities generate code as you work, and you can update the code as needed right away. Updating as you build offers several benefits. You're engaged in the code generation from the beginning, and you can swap out hard-coded values for parameters as you work.

Learn More

You don't need extensive programming knowledge to use either building tool. Give them both a try! See Quick Start for Building Robots.

Data Retention for Robots

Robot data is retained according to the data retention period of an Oracle Integration service instance.

See Edit the Data Retention Period for an Instance in *Provisioning and Administering Oracle Integration 3*.

More Robot Concepts

Familiarize yourself with the components that are related to robots.

What Do You Want to Learn About?

About Projects

Build your automation solutions, manage their deployment, and observe them in a project.

New to Projects?

A project is the hub of all your automation work. It's also the place to go when you want to design automation solutions, including integrations and robots. Each project can focus on a specific business objective. People who are on different teams and who have different skill sets can collaborate in the project to achieve the objective.

Projects provide convenient deployment and unified observability, allowing everyone to work together to build, deploy, and monitor integrations and robots.

To learn more about projects in general, see Get Started with Projects in *Using Integrations in Oracle Integration 3*.

Familiar with Projects?

If you're already familiar with projects, here are some key points to know about how UI-based automation and robots work in projects:

- You create and manage the following components in a project:
  - Robots
  - Robot connections and robot connection types
  - Environment pools
  - Integrations that call robots
- When testing, you can run robots and the integrations that call robots from within a project.

About Robot Connections and Robot Connection Types

A robot connects to an application using a robot connection. You specify the parameters that you define in a robot connection using a robot connection type.

Familiar with Connections for Integrations?

Are you already familiar with connections for integrations? Connections for robots are similar. An integration connection and a robot connection both connect to an application. However, they have some key differences, which the following table explains.

Area	Integration connections	Robot connections
Basis of the connection	An integration connection is based on an adapter. An adapter is specific to an application or technology and includes information about the connection type and security protocols.	A robot connection is based on a robot connection type. You can use the predefined robot connection type, or create your own. A robot connection type defines how to connect to an application, such as by specifying a URL and user credentials.
Connection method	An integration connection uses Java code to call an API. For example, the integration connection might perform an invoke activity for the application that it's connecting to.	A robot connection contains the information that a robot uses to open an application.
Testing	After creating a connection, you can test it to ensure that you configured it correctly.	You test a robot connection as part of testing a robot.

Keep reading to learn more.

Robot Connection Types Are Similar to Templates

Unlike an integration, a robot doesn't need information about an application's security protocols or its APIs. A robot typically needs only a little information about the application or web page that it's connecting to, such as a URL and credentials. You list the fields that a robot needs to connect to an application in a robot connection type.

A robot connection type doesn't list the values of the fields, and it's not application specific. Therefore, robot connections to different applications can be based on the same robot connection type. For example, if a robot requires a user name, password, and URL to access an application, you can base its robot connection on the predefined robot connection type. See Predefined Robot Connection Types.

If an application requires parameters that aren't included in the predefined robot connection type, you can create a new robot connection type.

Robot Connections Are Based on Robot Connection Types

You specify the parameters that a robot needs in a robot connection type, and you specify values for the parameters in a robot connection. For example, a user name is a parameter; `jane.doe@example.com` is an example of a value of this parameter.

You base every robot connection on a robot connection type.

Separation Provides Benefits

A robot connection is separate from a robot, and this separation offers several benefits. For example:

- Robot connections protect secret information.

  You store secret information, such as credentials, in a robot connection. Robot connections are stored with an extra measure of security, and their information doesn't appear in the activity stream.
- Reusing robot connections makes updates faster.

When your organization rotates passwords, you can update a password in one place, and all robots that use the connection start using the new password. Reusing connections makes for faster, easier, and less risky updates.

- Multiple robots can use the same robot connection, so you can build robots more quickly.
- You can update a robot connection of an active robot without deactivating it.

  Therefore, you can quickly update a robot when credentials change.

Predefined Robot Connection Types

When you create a robot connection, you can base it on a predefined robot connection type that specifies commonly required connection parameters.

The following predefined robot connection type is available.

Name	Parameters	Usage
Oracle RPA web login	• User name • Password • URL	Signing in to a web application that requires only a user name and password.

If your application requires different parameters, you can base a robot connection on a robot connection type that you create. See Create a Robot Connection Type.

How Robot Connections Work for Multiple Instances

You might have multiple service instances of Oracle Integration and of the applications that your robots connect to. Learn how to optimize your workflow for each scenario.

Multiple Oracle Integration Instances

Factor	More information
Building an automation solution in a development environment	You can build and test your robot in one or more lower Oracle Integration environments without impacting your production environment.
Deploying an automation solution to a higher environment	Use the built-in capabilities in a project to seamlessly deploy an automation solution, including robots and integrations, to a higher environment, such as a production environment. When you promote a solution to a higher environment, the values in the integration and robot connections are removed. For security reasons, Oracle Integration doesn't include sensitive data, such as passwords, in deployment packages. You likely need to provide different values for a higher environment, anyway. For example, the robot must work in a production instance, which might have a different URL and different credentials.
Updating an automation solution when a robot's credentials change	The password that a robot uses is sensitive information. Often, one person builds a robot and another person enters these credentials. When a robot's password changes, only the robot connection needs to be updated. You don't need to open or update the robot to make this change. If a robot has already been deployed to a production environment, you can update the password directly in the production environment.

Multiple Instances of the Application That a Robot Automates

Factor to consider	More information
Building and testing an automation solution against a development instance	While you're building and testing a robot and its integration, point to the development instance of the application. Identify any differences between the development and production instances of the application. These differences could impact the robot's behavior in production. For example, sometimes new features are deployed to a development environment first.
Pointing to a higher environment after deployment to production	After you deploy an automation solution to a production environment of Oracle Integration, update the connections so that they point to the production instance of the application.

For details about deployment, see Workflow for Deploying a Robot.

About Environments and Environment Pools

An environment is the computer or virtual machine where instances of your robots run. An environment pool is similar to a cluster and is a collection of computers or virtual machines that can run specific robots. You must associate each environment with exactly one environment pool.

Your Requirements Determine the Environments You Need

Knowing a robot's duration is the key to setting up environments effectively and efficiently.

For example, if a robot takes one minute or less to run, and you need to run one transaction per minute, you typically need only one environment.

However, if you need to run two transactions per minute, you need two environments, or you'll end up with a bottleneck situation and delayed transactions.

Your Responsibilities

Your organization is responsible for the following tasks:

- Setting up and managing the environments that you need to run your robots.

  An environment is typically a Windows virtual machine (VM). You can also use a Mac or Linux machine.

  Depending on your automation requirements, you might build several VMs or hundreds of VMs for robots to run on.
- Associating each environment with exactly one environment pool.

  For example, you might have an environment pool for human resources robots, another for finance robots, and so on.
- Installing and managing the robot agent on each environment.

  See About the Robot Agent.

About the Robot Agent

You install a robot agent on every environment, which is the computer or virtual machine where a robot runs. The robot agent runs the instances of the robots on these environments.

To learn more about environments, see About Environments and Environment Pools.

Familiar with the Connectivity Agent?

If you're familiar with the connectivity agent in Oracle Integration, the robot agent offers similar capabilities with some differences.

Area	Connectivity agent	Robot agent
Usage	You use the connectivity agent when an integration must connect to a resource on a private or on-premises network.	You use the robot agent to run a robot.
Installation and number	You install the connectivity agent on an on-premises machine, typically a virtual machine. Your organization can install one or many connectivity agents.	You install the robot agent on every environment that must run a robot.
Components	Two types of connectivity agents are available: • SaaS agent, which runs in Oracle Integration. Oracle manages this agent. • On-premises agent, which you must install and manage.	Only one robot agent is available.

Your Responsibilities

Your organization is responsible for the following tasks:

- Ensuring that all environments meet the system requirements for the robot agent.

  See System Requirements.
- Installing the robot agent on every environment and, if required, configuring the robot agent as a Windows service.

  See Design Considerations and Complete Prerequisites.
- Keeping the robot agent up to date on every environment.

System Requirements

You must install the robot agent on every environment. Ensure that each environment meets the system requirements for the robot agent.

Area	Requirements
Software	• Java Development Kit (JDK) 17 • One of the following browsers for the environment where the robot agent runs: – Apple Safari – Google Chrome (recommended) or Headless Chrome – Microsoft Internet Explorer – Microsoft Edge – Mozilla Firefox or Headless Firefox **Note:** Oracle Integration has different browser requirements. See Supported Browsers in *Getting Started with Oracle Integration 3*. • One of the following options for storing secret information in the computer's local keystore: – Linux and Unix computers: Keyutils You can install Keyutils by installing Homebrew, Yum, or AptGet. – Windows computers: PowerShell This solution is usually included in the operating system of Windows computers. – Mac computers: Security Utility This software is usually included in the operating system of Mac computers.

Specifications

Get an in-depth understanding of the robot agent by reviewing its communication method, security protocols, and more.

Area	More information
Communication and ports	• The robot agent initiates all communication and must be able to contact Oracle Integration so that it can poll for work. See Review Your Network Configuration. • No ports are opened on the on-premises system for communication.
Security protocol	• The robot agent registers with Oracle Integration over SSL using the provided Oracle Integration credentials. See Complete Prerequisites. • All communication is secured using SSL. • The robot agent processes requests by pulling messages from Oracle Integration across SSL. • The robot agent posts responses by pushing messages to Oracle Integration across SSL.
Data persistence	No data is persisted in the robot agent.

Design Considerations

A robot runs on an environment, which is a computer or virtual machine (VM) on which the robot agent is installed. When determining where to place the environment, consider the requirements for the robot's interaction.

Type of robot interaction	Location for the environment
Interact with a publicly available website	Ensure that the robot's environments are within a network that can interact with a publicly available web application.
Interact with an internal web application that is within a firewall and VPN	Ensure that the robot's environments are within the VPN so that they have access to the internal web application. The environment must be able to access the public internet the first time that you start the robot agent. The robot agent requires this access to download its required dependencies. Therefore, you might need to temporarily disable VPN access on the environment the first time you start the robot agent.

3

Best Practices and Guidelines

Spend some time reviewing the best practices and guidelines so that you can build like an expert from the beginning.

Where Do You Want to Start?

Operations Best Practices

Promote Communication

At many organizations, teams often divide automation responsibilities.

- One person or team builds a robot.
- Another person or team designs the integration that calls the robot.
- A third person or team monitors the automation after it goes live.

In such cases, communicate your goals and timelines early and often. Identify people's availability, create a schedule for the work, and schedule periodic check-ins to ensure that everyone is working toward the same deadlines.

Automate Today, Iterate in the Future

If today's business process is working for your organization, you don't need to redesign the process before you can automate it. Automate it today, and use the insights that you gain to find opportunities for efficiency and effectiveness.

For more details, see Identify the Problem.

Plan Strategically Across Teams

At many organizations, different people and sometimes different teams are responsible for building robots and integrations. Oracle Integration supports this collaborative work by allowing integration and robot developers to complete their work in parallel or sequentially, all while collaborating within a project.

While planning and working, follow the best practices for the development of component-based software. Work intentionally by defining the contracts up front, and make sure everyone agrees to them. For example, a contract might state that a robot expects to get a purchase order and deliver a supplier name.

After everyone has agreed to the contracts, work can begin. A robot developer can build and test a robot, even if an integration developer isn't available to start work on the integration yet. Similarly, an integration developer can start working after a robot developer creates only the shell of a robot, a task that takes just a couple minutes. See Create a Robot.

Understand a Problem Before Solving It

It's important to fully understand the problem you're trying to solve before you start trying to plan a solution.

All too often, software has limitations and restrictions. Because you know your applications so well, you might focus on what your software tools let you do rather than on your business goals. As a result, you could start making compromises from the beginning. Your solution might become what your software can support, rather than what your business requires, and it might solve only part of the problem.

With Oracle Integration, you don't need to make compromises on automation because you can design API-based automation and UI-based automation in the same place.

Oracle meets you where you are and helps make your applications more intelligent. With Oracle Integration, you can create a complete, simple, observable, and intelligent automation strategy.

Strive for Continuous Improvement

Deploying your automation solution to production is, in many ways, the beginning of your automation journey. After deploying a solution, you can analyze and optimize it.

After you deploy an automation solution, analyze your solution, and look for opportunities for tactical improvements that move your organization toward a more perfect business process.

Remember that automation offers three key benefits:

- Efficiency: For example, fulfilling the same number of orders using fewer resources.
- Effectiveness: For example, fulfilling orders with fewer errors and in less time.
- Insight: For example, identifying the issues that require more resources to fulfill orders, the issues that lead to errors, and the issues that lead to order delays.

The insights that you gain from your automation are the keys to optimizing the automation. These insights help you identify the changes that you need to make.

For example, after you automate an approval process, you might see that a team requires 6.5 days on average to offer their approval. This delay leads to inefficiencies, downstream delays, and stress. The insight and an understanding of its business impact help you determine next steps, such as:

- Expanding the pool of approvers.
- Removing the approval requirement.
- Identifying a daily designated approver who must approve all open requests by the end of each day.

Environment Best Practices

Set Up Enough Environments

Make sure that you've created enough environments to handle the workload of your robot.

For example, consider a robot that runs in two minutes and has one environment. If you call the robot every three minutes, the robot typically runs without issues, even with occasional performance issues. However, if you call the robot every minute, you create a backlog.

How do you know how many environments to run? Consider the following factors:

- Amount of time a robot instance typically requires to run.
- Frequency with which the robot is called.
- Likelihood of performance issues in the application that the robot automates.
- Impact to the business if a backlog occurs.

Create System Requirements

Each robot has different requirements. Document the requirements and use them when setting up and testing each environment. Make sure to include all software requirements, configuration requirements, and network connectivity requirements.

Follow All License Agreements

Verify that your applications' license agreements allow for automation.

Replicate the Robot's Environment

Most computers have time-saving features, including applications that remember your credentials and browsers that remember your preferences. However, a robot's environment is likely to be a clean slate.

Additionally, the account that you use to record a robot could inadvertently have more or fewer permissions than the robot will have in production.

To ensure that your robot can run as expected in a production environment, make sure that the experience you have while building a robot accurately replicates the experience that the robot will have while running on its environment.

Monitor Your Environments

Periodically throughout the day, monitor your environments. For example, ensure that all environments remain up and running.

See Check Whether an Environment is Available.

Maintain Good Performance

A robot works in an application like a person does. Before creating your robots, understand their performance implications.

For example, consider a scenario in which ten robots are active in an application at a time. Determine whether the robots could impact the performance of the application, and take the

appropriate action. You could reduce the number of robots, run the robots overnight, or increase the capacity of the machine that hosts the application.

Building and Testing Best Practices

Think Like a Robot, Not a Human

In an ideal world, a robot completes the same tasks every day without interruption or fail. However, in the real world, robots sometimes get stuck.

Robots typically get stuck due to the following reasons.

Scenario	How to plan for the scenario
A robot doesn't understand an element in a user interface (UI)	Remember that a robot interacts with an application differently than a human does. Build your robot intentionally for the robot's requirements. For example, many people interact with software using their vision. When people encounter issues, they often click around and troubleshoot to find a way forward. Robots don't have these abilities. A robot can do only what it's programmed to do, nothing more or less. While building a robot, thinking about its actions programmatically, rather than visually, helps you build more effectively.
The UI or HTML for a page changes	The robots in Oracle Integration are continually evolving to better handle these scenarios. Additionally, you can use global targeting in your actions so that you can more quickly update fields when needed.

Define Inputs Using Robot Connections

When defining an action's input, such as the URL for a browser, use the values that you defined in a robot connection whenever possible.

Specifying a value one time in the robot connection and pointing to that variable lets you isolate this information. When you need to update the value in the future, you need to update only the robot connection, rather than every robot that uses the connection.

Future-Proof Your Robots

Don't hard-code data unless you need to. Instead, future-proof a robot by using placeholder values.

See Alternatives to Hard Coding Data.

Keep the Canvas Tidy

You build your robot in the canvas. Keep the canvas organized so that you can find information quickly. For example, use clear names for actions.

For more guidance, see Quick Start for Building Robots.

Create Naming Conventions

When performing UI-based automation, you must provide names for a variety of components, including robots, the environments that the robots run on, and the actions that the robots perform.

The names of some objects, such as robots, robot connections, and environment pools, can include spaces. Other more programmatic objects, such as variables and input parameters, cannot include spaces in their names.

If your organization doesn't have them yet, create naming conventions. Then, follow the conventions so that everyone understands the components at a glance and can update a robot quickly and confidently.

Test in Real-World Conditions

Test a robot early and often using real-world conditions.

See Run and Test a Robot.

Use Screenshots to Help with Testing

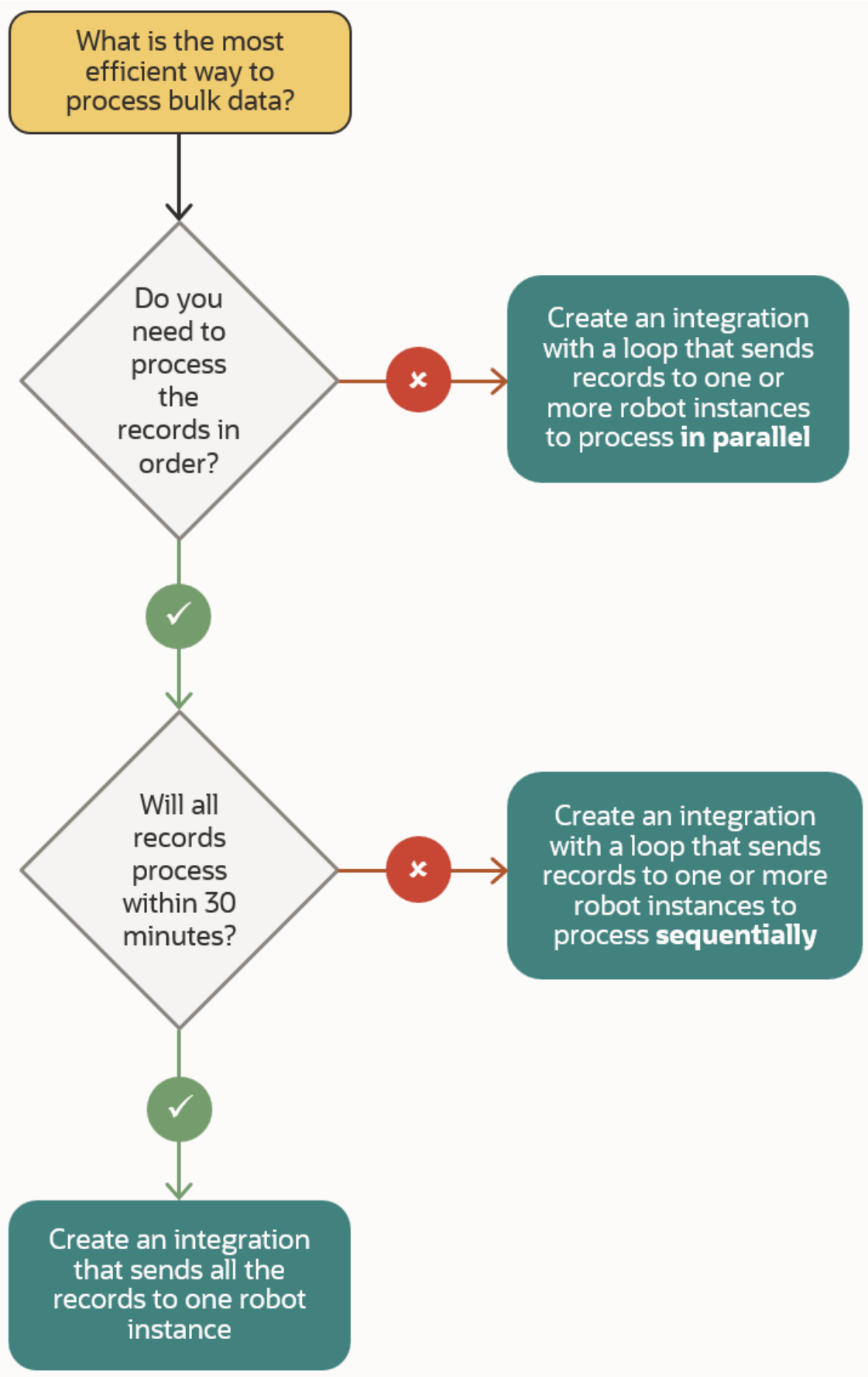
When you add an action to a robot, you have several options for capturing screenshots, including capturing a robot's view before and after completing an action. The screenshots are helpful when troubleshooting a failed robot instance.

For example, if a robot's credentials don't have the appropriate access, a robot might not be able to see the field it needs to update. A screenshot of the missing field can help you quickly troubleshoot any issues that the robot encounters in the user interface.

See Capture Screenshots in Robots.

Processing Bulk Data Best Practices

Your automation work might involve processing bulk data, such as a file of input data or a JSON object containing a number of items. You have several options for processing bulk data.


What is the most efficient way to process bulk data?
Do you need to process the records in order?
Create an integration with a loop that sends records to one or more robot instances to process in parallel
Will all records process within 30 minutes?
Create an integration with a loop that sends records to one or more robot instances to process sequentially
Create an integration that sends all the records to one robot instance

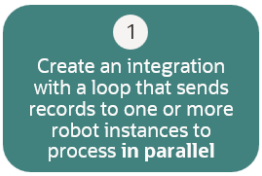
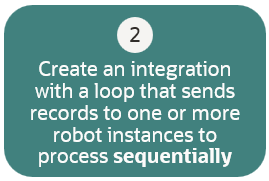
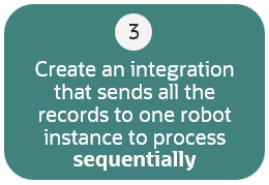
Questions

Understand how the answers to the questions in the flow chart help inform your decision-making process.

Question	Example	Why the question matters
	For example, do you need to update record 1, then record 2, and so on? Or can you update 5 records simultaneously?	Robots can process orders in sequence without any issues. However, when your business requirements allow it, you'll find opportunities for efficiency by processing records in parallel.
	For example, if you need to update 100 records, and each update takes 30 seconds, the total processing time is 50 minutes.	In general, when the total processing time for all records exceeds 30 minutes, Oracle recommends using an integration to manage the distribution of work across multiple robots. On the other hand, when the total processing time for all records is less than 30 minutes, you can allow the robot to manage the distribution of its own work and don't need a more robust solution architecture. The 30-minute time limit is an Oracle-recommended limit. Your organization can choose a different time period. Consider the amount of time you're willing to wait to determine whether a set of records processed successfully, as well as the service limits. See Service Limits in *Provisioning and Administering Oracle Integration 3*.

Processing Options

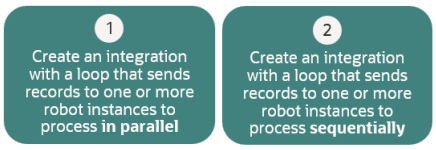
The flow chart provided several processing options. Review them in more detail.

Processing option	Description	Use cases
	Create an integration with a foreach loop that handles parallel iterations. The integration processes the data in parallel. Each branch invokes a robot instance to process one or more records. For example, consider a data set with 100 records. An integration supports 5 parallel branches, and each branch calls 1 robot. Therefore, the integration and robot process 5 records at a time. For guidance on the number of robot instances to invoke and the number of records to pass to each robot, keep reading.	This solution is efficient when the total processing time for your records is high, either because you have a lot of records to process or because each record takes a long time to process, and your business requirements allow you to process the records in any order.
	Create an integration with a foreach loop that handles sequential iterations. The integration iterates over all of the records, one at a time, and invokes a robot instance for each record in turn. For guidance on the number of robot instances to invoke and the number of records to pass to each robot, keep reading.	This solution is ideal for the following scenarios: • Each record takes a long time to process. • You want to include error handling. If a single robot instance fails, you can add error handling to the integration so that the integration can continue sending records to other robot instances.
	Create an integration that passes the entire data set to a single robot instance. In the robot, create a foreach loop that iterates over all of the records, one at a time.	This solution is easy and straightforward and is best for records that can be processed relatively quickly and must be processed in a specific order.

Additional Factors: Number of Robots and Records

Several scenarios require you to determine the number of robots that process records and the number of records that each robot processes.

The following scenarios require you to make these decisions:



Consider the following factors.

Factor	More information
Overhead for calling a robot instance	Each robot accomplishes one or more specific goals, such as updating a record. However, to achieve its goal, a robot must complete other tasks, such as opening an application, signing in, and navigating to the right page. All of the tasks that a robot does to prepare for its specific goal are the robot's overhead. For example, a robot that takes one minute and 15 seconds (1m 15s) to run might spend 1 minute navigating to the right page and then 15 seconds accomplishing its goal. That robot has 1 minute of overhead.
Total processing time for all records	The following components determine the total processing time for all records: • Number of records to process • Overhead for the robot • Number of robots that process records For example, if you pass 3 records to a robot instance, you eliminate the overhead for 2 robots, but you also increase the total running time for the robot instance.
30-minute (or a different organization-created) time limit	The time limit is the amount of time that you're willing to wait before knowing whether a robot has succeeded. This value becomes the maximum processing time for a set of records and helps you calculate the number of records to send to a given robot instance. To maximize the efficiency of your automation, Oracle recommends passing the maximum number of records to the robot instance to limit the overhead time. Additionally, you can use parallel processing to reduce the clock time that passes before all records are processed. However, remember that each branch of the parallel processing incurs the overhead costs. Depending on the overhead duration and other components, distributing records to 5 branches might be less efficient than distributing records to only 3 branches.

Sample Calculations

Sample calculations help you understand how to calculate the optimal number of robots to use and the number of records to send them.

Simple Scenarios

A robot takes one minute and 15 seconds (1m 15s) to run. The robot spends 1 minute navigating to the right page and then 15 seconds accomplishing its goal. Different numbers of records and robot instances impact the total processing time for this work.

Scenario	More information

Five robot instances each process one record, either sequentially or in parallel	Each robot requires 1m 15s to run, resulting in a total processing time of 6m 25s:
	`1m 15s processing time x 5 robots`
	`= 6m 25s processing time`
	The robots can run sequentially or in parallel.

One robot instance processes five records sequentially	The robot requires 1 minute of overhead, and then 15 seconds of processing time for each record, resulting in a total processing time of 2m 25s:
	`1 minute overhead`
	`+`
	`(15 seconds processing time per record x 5 records)`
	`= 2m 15s processing time`

Scenario	More information

One robot instance processes 150 records sequentially	Reducing overhead costs improves the efficiency of your automation, but passing too many records to a single robot instance can result in longer-than-preferred processing times.
	For example, if one robot updates 150 records, you save 149 minutes of overhead time. However, the total processing time is 38m 30s, which might be longer than you want to wait to determine whether all the updates completed successfully.
	`1 minute overhead`
	`+`
	`(15 seconds processing time per record x 150 records)`
	`= 38m 30s processing time`

Sequential Processing

If your business requires you to process records in sequence, determine the optimal number of tasks that each robot instance should process.

Here's how to complete these calculations.

1. **Determine the overhead time**

   For example, consider a robot that spends 1 minute navigating to the right page and then 15 seconds accomplishing its goal. This robot has 1 minute, or 60 seconds, of overhead.

2. **Determine the maximum time to process records**

   The 30-minute time limit contains 1,800 seconds:

   ```
   30 minutes x 60 seconds
   = 1,800 seconds
   ```

   Each record requires 60 seconds of overhead. You must subtract the overhead time from the maximum processing time:

   ```
   1,800 seconds - 60 seconds
   = 1,740 seconds
   ```

   This calculation assumes that in 30 minutes, you complete the overhead one time and then use the rest of the time to process records.

3. **Calculate the number of records that you can process**

   A robot needs 15 seconds to process each record.

   To calculate the maximum number of records that a robot can process, divide the maximum time to process records by the time to process each record:

   ```
   1,740 seconds maximum time / 15 seconds per record
   = 116 records
   ```

Theoretically, the optimal number of records for each robot to process is 116.

> **Note:**
>
> This conclusion is theoretical because it makes several potentially faulty assumptions. For example, the calculation assumes that the processing time never changes, but response times vary significantly in the real world. The optimal value according to a calculator doesn't reflect these varying circumstances. When making decisions, consider building in some wiggle room that accommodates requirements that these calculations don't consider, such as network latency.

Parallel Processing

If your business allows you to process records in parallel, you can distribute the work in a way that minimizes the time of the jobs.

1. **Calculate the total potential overhead time**

   For example, if you have 100 records to process, and each record requires 60 seconds of overhead time, the total potential overhead is 6,000 seconds:

   ```
   100 records x 60 seconds of overhead
   = 6,000 seconds of potential overhead
   ```

   You can reduce this value by processing multiple records using a single robot instance.

2. **Calculate the processing time without any overhead**

   For example, if each record requires 15 seconds to process (without its overhead time), the total processing time is 1,500 seconds:

   ```
   15 seconds of processing time x 100 tasks
   = 1,500 seconds
   ```

   You cannot reduce this time. However, you can reduce the amount of time that passes on the clock by processing records in parallel.

3. **Consider several scenarios to find your preferred number of parallel branches (up to 5) and the number of records that each processes**

   To minimize the processing time, including overhead, you need to reduce your overhead time as much as possible while staying within the 30-minute time limit (or whatever time limit your organization chooses). Processing the records in parallel also minimizes the total time that passes on the clock before the jobs complete.

   Calculate several scenarios to find your preferred combination. For example:

Scenario	Total processing time per branch	Calculation

2 branches, 50 records per branch	810 seconds (13 ½ minutes)	`60 seconds of overhead`
		`+`
		`(50 records x 15 seconds of processing time)`
		`= 810 seconds`

Scenario	Total processing time per branch	Calculation
3 branches, 33 or 34 records per branch	570 seconds (9 ½ minutes)	60 seconds of overhead + (34 records x 15 seconds of processing time) = 570 seconds
4 branches, 25 records per branch	435 seconds (7 ¼ minutes)	60 seconds of overhead + (25 records x 15 seconds of processing time) = 435 seconds
5 branches, 20 records per branch	360 seconds (6 minutes)	60 seconds of overhead + (20 records x 15 seconds of processing time) = 360 seconds
5 branches, 20 records per branch, sent in 2 different batches	Each batch finishes in 210 seconds (3 ½ minutes), for a total processing time of 420 seconds (7 minutes) per branch	[60 seconds of overhead + (10 records x 15 seconds of processing time)] x 2 = 420 seconds

With a higher number of records or higher processing times, you might need to consider sending records to each branch in batches. This approach often reduces the processing time for a given batch of records but increases the total processing time. The following table provides sample calculations for processing 500 records in parallel.

Scenario	Total processing time per branch	Calculation
2 branches, 250 records per branch	3810 seconds (63 ½ minutes) This value exceeds the 30-minute time limit	60 seconds of overhead + (250 records x 15 seconds of processing time) = 3810 seconds
3 branches, 166 or 167 records per branch	2565 seconds (42 ¾ minutes) This value exceeds the 30-minute time limit	60 seconds of overhead + (167 records x 15 seconds of processing time) = 2565 seconds
4 branches, 125 records per branch	1935 seconds (32 ¼ minutes) This value exceeds the 30-minute time limit	60 seconds of overhead + (125 records x 15 seconds of processing time) = 1935 seconds

Scenario	Total processing time per branch	Calculation
4 branches, 125 records per branch, send in 2 different batches	Each batch finishes in 1005 seconds (16 ¾ minutes), for a total processing time of 2010 seconds (33 ½ minutes) per branch	[60 seconds of overhead + (63 records x 15 seconds of processing time)] x 2 = 2010 seconds
5 branches, 100 records per branch	1560 seconds (26 minutes)	60 seconds of overhead + (100 records x 15 seconds of processing time) = 1560 seconds
5 branches, 100 records per branch, sent in 2 different batches	Each batch finishes in 810 seconds (13 ½ minutes), for a total processing time of 1620 seconds (27 minutes) per branch	[60 seconds of overhead + (50 records x 15 seconds of processing time)] x 2 = 1620 seconds

4. **Choose the right scenario for your requirements**

   Consider your calculations. Build in some wiggle room for periods of higher-than-usual volume, network latency, and other unforeseen issues. Then, choose an approach.

   Oracle recommends testing an integration and robot under load before going live to confirm that your approach will succeed in the real world.

Guidelines for Expressions

When you define an action in a robot, you sometimes need to update a value, complete a calculation using the value, or perform an operation on the value. Complete these tasks by using expressions. For each expression, you must use the correct syntax.

About Expressions

An expression performs an operation on a value and returns another value.

When building a robot, you can use expressions in many fields. The value that an expression works with can come from many places, including:

- An application that the robot interacts with.
- Another application.
- A variable, parameter, or property that you define.
- A value that you define.

For more real-world examples of expressions, see Use Cases.

Mathematical Operators

A mathematical operator performs math operations, such as addition and subtraction.

Operator	Python equivalent	Description	Expression	Returns
+	+	Addition	`${2+2}`	`4`
-	-	Subtraction	`${3-1}`	`2`
*	*	Multiplication	`${3*2}`	`6`
/	/	Division	`${8/4}`	`2`
%	%	Modulo, which returns the remainder of a division	`${3%2}`	`1`

Comparison Operators

A comparison operator compares values and returns true or false.

Operator	Python equivalent	Description	Expression	Returns
>	>	Greater than	`${2>3}`	`false`
<	<	Less than	`${1<3}`	`true`
>=	>=	Greater than or equal to	`${2>=1}`	`false`
<=	<=	Less than or equal to	`${4<=5}`	`true`
==	==	Equal to	`${1==1}` `${one==one}`	`true`

Logical Operators

A logical operator combines two comparisons and returns true or false.

Operator	Python equivalent	Description	Expression	Returns
&&	and	Both statements must be true	`${1<=2 && 2<=3}`	`true`
||	or	Either statement must be true	`${2<=1 || 3<=2}`	`false`

Inversion Operators

An inversion operator returns the opposite result from what you'd expect.

Operator	Python equivalent	Description	Expression

`!`	`not`	NOT operation, which inverses the result of a comparison
		Use parentheses to clearly separate the NOT operation (`!`) from the expression.
			`${!(1>=2)}` returns `true`
			`${!(1<=2 && 2<=3)}` returns `false`
			`${!(2<=1 || 3<=2)}` returns `true`

Functions

A function takes in data, processes it, and returns a result.

Function	Python equivalent	Description	Format	Example

`toNumber`	No direct equivalent, though you can use `int()` and `float()` to convert strings to numbers	Returns an integer or float for a numerical string.	`${toNumber(`*value*`)}`
			where:
			value is the number to return
				Return a number from a numeric string value
				`toNumber("100.00")` returns `100.00`
				`toNumber("100,000")` returns `100000`
				`toNumber("100,000.00")` returns `100000.00`
				`toNumber($VARIABLE.amount)` returns a value according to the value of the variable:
				• If `$VARIABLE.amount` is `100`, returns `100`
				• If `$VARIABLE.amount` is `100.00`, returns `100.00`
				If the string value contains any non-numeric characters, an error occurs. For example, `toNumber("100A")` returns an error

Function	Python equivalent	Description	Format	Example

`toString`	`str()`	Returns a string that represents an object.	`${toString(value)}`
			where:
			value is the string to return
				Return a string that represents a number
				`${toString(1)}` returns `1`
				Return a person's first and last name
				You define a data type named *Person*. Person contains two properties: *First_name* and *Last_name*.
				Next, you define a variable, *var1*. Base *var1* on the *Person* data type.
				A robot returns the following values for the variable:
				• `var1.FirstName = "John"`
				• `var1.Lastname = "Doe"`
				Given this scenario, the following expression:
				`${toString(var1)}`
				returns
				`{ "FirstName": "John",. "lastName": "Doe" }`

Function	Python equivalent	Description	Format	Example

`subString`	`$name[start:stop]`	Returns the specified characters within a string.
		Indexes are zero based. In plain English, a zero-based index means that you start counting the values at 0. For example, if you're using a `subString` function for the value `ABC`:
		• `A` is entry `0`
		• `B` is entry `1`
		• `C` is entry `2`
			`${subString(string, startIndex, endIndex)}`
			where:
			• *string* is the string to evaluate
			• *startIndex* is the first character to include in the returned substring
			• *endIndex* is the last character to include in the returned substring
				Return a subset of letters
				`${subString(ABCDEF, 0, 0)}` returns `A`
				`${subString(ABCDEF, 1, 1)}` returns `B`
				`${subString(ABCDEF, 2, 4)}` returns `CDE`
				Return the last four digits of a phone number
				`${subString(5551234567, 6, 9)}` returns `4567`

Formatting Rules for Expression Syntax

When you're creating robot actions or robot resources, you can enter expression syntax into many fields. You must use the correct syntax for each expression.

General Formatting Rules

Some general rules apply to all expressions.

Guideline	More information
Format all expressions using the following syntax: `${}`	Enclose the entirety of every expression within curly brackets. For example: `${toString($VARIABLE.CurrentInvoice[InvoiceAmount]) == $VARIABLE.InvAmt && $VARIABLE.CurrentInvoice[SupplierName] ==$VARIABLE.SuppName}`
Enclose all literal strings in quotation marks: `""`	A literal string is any straight text that you type. For example: `${"https://www.mycompany.com/"}`
You can use literal numbers but not exponents	Supported values: • `1`, `-1`, and `+1` • `1.56`, `-1.56` and `+1.56` Not supported: • `1e2` • `2^2`
Expect that the order of operations follows globally established rules of precedence	For example, the expressions on either side of a logical operator are evaluated before the logical operator is evaluated.

Formatting Rules for Placeholder Values

Each placeholder value, such as a variable, robot connection, or input and output property, has its own formatting rules for expression syntax.

Value	Format
Input properties	**Format for an input property** `${INPUT.`*`input_property_name`*`}` where: • *input_property_name* is the name of the input property. **Format for a data type property on an input property** Use this format when you base an input property on a custom data type with one or more properties, and you need to refer to one of the data type properties. • Option 1: `${INPUT.input_property_name[`*`property_name`*`]}` This format allows you to reference a property name that includes spaces in its value. • Option 2: `${INPUT.`*`input_property_name.property_name`*`}` This format doesn't allow spaces in the *property_name* value, so you can use this option only if the data type's property has no spaces in its name. where: • *input_property_name* is the name of the input property. • *property_name* is the name of the data type property that the input property is based upon. **Note:** Inputs properties can be nested. Follow the same formatting rules for nested properties. For example: • `${INPUT.input_property_name[`*`property_name`*`][`*`property_name`*`][`*`property_name`*`]}` • `${INPUT.`*`input_property_name.property_name.property_name.property_name`*`}`

Value	Format
Output properties	**Format for an output property** `${OUTPUT.output_property_name}` where: • *output_property_name* is the name of the output property. **Format for a data type property on an output property** Use this format when you base an output property on a custom data type with one or more properties, and you need to refer to one of the data type properties. • Option 1: `${OUTPUT.output_property_name[property_name]}` This format allows you to reference a property name that includes spaces in its value. • Option 2: `${OUTPUT.output_property_name.property_name}` This format doesn't allow spaces in the *property_name* value, so you can use this option only if the data type's property has no spaces in its name. where: • *output_property_name* is the name of the property of the output. • *property_name* is the name of the data type property that the output property is based upon. **Note:** Output properties can be nested. Follow the same formatting rules for these nested properties. For example: • `${OUTPUT.output_property_name[property_name][property_name][property_name]}` • `${OUTPUT.output_property_name.property_name.property_name.property_name}`
Page states	`${pageState("page_state_name")}` where: • *page_state_name* is the name of the page state
Robot connections	`${CONNECTION.robot_connection_name.property}` where: • *robot_connection_name* is the name of the robot connection • *property* is the name of the property in the robot connection
Targets	`${TARGET.target_name}` where: • *target_name* is the name of the target.

Value	Format
(x) Variables	**Format for a variable** `${VARIABLE.variable_name}` where: • *variable_name* is the name of the variable. **Format for a data type property on a variable** Use this format when you base a variable on a custom data type with one or more properties, and you need to refer to one of the properties. • Option 1: `${VARIABLE.variable_name[property_name]}` This format allows you to reference a property name that includes spaces in its value. • Option 2: `${VARIABLE.variable_name.property_name}` This format doesn't allow spaces in the *property_name* value, so you can use this option only if the data type's property has no spaces in its name. where: • *variable_name* is the name of the variable. • *property_name* is the name of the property of the data type that the variable is based upon. **Note:** Variables can have nested properties. Follow the same formatting rules for these nested properties. For example: • `${VARIABLE.variable_name[property_name][property_name][property_name]}` • `${VARIABLE.variable_name.property_name.property_name.property_name}`

When to Convert a String to a Number

When you use the **get text** action to obtain a value from an application, Oracle Integration stores the value as a string. If you want to perform a numeric function on the value, such as adding it to another number or comparing it to another number, you must first convert the value to a number.

If you don't convert the value to a number, the numeric function won't work as expected.

Use the `toNumber` function to convert a string to a number. See Functions.

4

Build a Robot

Ready to build a robot? Familiarize yourself with key concepts in the quick start, and then get started. Don't forget to complete the prerequisite tasks first.

What Do You Want to Do?

Goal	More information
Get started	Quick Start for Building Robots
Build a robot and its related components	1. Complete Prerequisites 2. Create Connections to Applications 3. Create a Robot and Integration 4. Add an Action to a Robot 5. Add Logic to a Robot 6. Fix a Robot's Errors 7. Specify Where a Robot Runs
Create the robot resources that offer alternatives to hard-coding data	Create and Update a Robot Resource
Get help with the underlying HTML for a page or UI element	View HTML and XPaths

Complete Prerequisites

Before you start building robots, complete all the prerequisite tasks.

Task	More information
Review your network configuration	1. Review Your Network Configuration
Create accounts for robots and people	2. Create Application Accounts
Create a confidential application	3. Create a Confidential Application (Optional) 4. Ensure that the Confidential Application is Active (Required only for troubleshooting) 5. Assign the ServiceDeployer Role to the Confidential Application (Required only if you created a confidential application)
Install and configure the robot agent	6. Meet the Robot Agent's Requirements 7. Download the Robot Agent 8. Update the Robot Agent's Configuration File 9. Start the Robot Agent 10. Start the Robot Agent Automatically (Optional)

Task	More information
Install the recorder	11. Install the Recorder
Create a project	12. Create a Project

Next workflow: Workflow for Planning a Robot.

Review Your Network Configuration

The robot agent polls Oracle Integration for work. The robot agent must be able to contact Oracle Integration so that it can poll for work, and your network must allow this polling to occur. Additionally, identify the correct network location for environments.

1. Review your organization's network configuration. Ensure that the robot agent poll for work by contacting Oracle Integration.

   For example, ensure that your corporate firewall allows outbound calls to occur. If you need to update your allowlist, see Obtain the Inbound and Outbound IP Addresses of the Oracle Integration Instance in *Provisioning and Administering Oracle Integration 3*.

2. Determine the appropriate network location for the environments that host the robot agent.

   See Design Considerations.

Create Application Accounts

When a robot needs to sign in to an application to complete its work, the robot needs a user account. Additionally, whoever is building the robot requires an account with the same access and privileges.

Accounts That You Might Need

- Accounts for the robot and the robot builder in the application's test environment.

  The robot builder should have the same access as the robot.

- Account for the robot in the application's production environment.

Create Accounts:

1. Identify all of the required accounts, including their access level, in the applications that you're automating.
2. Work with an administrator to create the accounts.

Create a Confidential Application

When you provision your Oracle Integration instance, Oracle creates a default confidential application for all of your robot agents to use. If you want some robot agents to use different credentials, you can create additional confidential applications.

What Is a Confidential Application?

A confidential application is an OAuth client application that allows robot agents to securely connect to Oracle Integration using the OAuth protocol. Organizations typically create additional confidential applications to increase security. For example, consider an organization that builds robots for human resources and financial applications. All of the HR robot agents

can use one confidential application, and the financial robot agents can use another confidential application.

Create a Confidential Application

1. Sign in to the Oracle Cloud Infrastructure Console.
2. Navigate to the Integrated applications page.
   a. Open the navigation menu and select **Identity & Security**. Under **Identity**, select **Domains**.

      The Domains page is displayed.

   b. If it isn't already selected, select the **Compartment** that holds the domain in which you want to create the confidential application.

   c. In the **Name** column, select the domain in which you want to create the confidential application.

      You must work in the domain in which your organization created the Oracle Integration instance.

      The Overview page for the domain is displayed.

   d. In the left menu below Identity domain, select **Integrated applications**.
3. Add a confidential application.
   a. Select **Add application**.

      The Add application wizard appears.

   b. Select **Confidential Application**, and select **Launch workflow**.

   c. Enter a name and description for the confidential application, and select **Next**.

      You don't need to fill in any other fields on this page.

   d. On the Configure OAuth tab, fill in the following fields:
      - Select **Configure this application as a client now**.
      - Below Authorization, select only **Client credentials**.
      - Below Token issuance policy, select **Specific** and **Add resources**.
      - Below Resources, select **Add scope**, select the name of the Oracle Integration instance that the confidential application is associated with, and select **Add**.

   e. Select **Next**, and then **Finish**.

Ensure that the Confidential Application is Active

The confidential application that the robot agent uses must be active, or the robot agent can't start running. You typically need to check whether the confidential application is active only if you experience issues with the robot agent or its environment.

1. Sign in to the Oracle Cloud Infrastructure Console.
2. Navigate to the Integrated applications page.
   a. Open the navigation menu and select **Identity & Security**. Under **Identity**, select **Domains**.

      The Domains page is displayed.

   b. If it isn't already selected, select the **Compartment** that holds the domain in which you want to create the confidential application.

c. In the **Name** column, select the domain that holds the confidential application.

   The Overview page for the domain is displayed.

d. In the left menu below Identity domain, select **Integrated applications**.

3. Verify that the confidential application is active.

   a. Search for the confidential application that the robot agent uses.

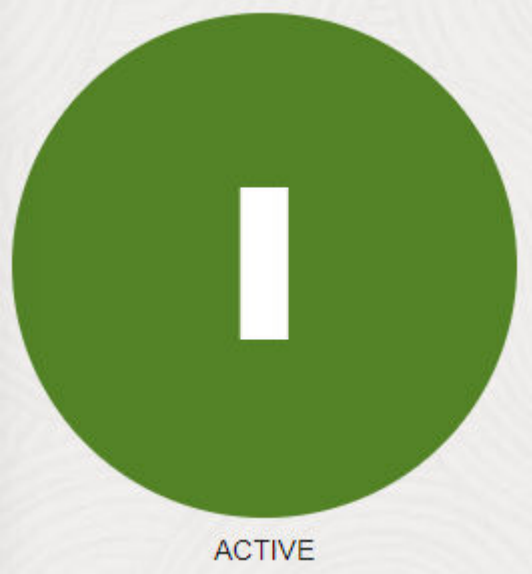
      The name of the confidential application that Oracle created for you ends with **RPA_AGENT_DEFAULT_APP**, and its description is **Integration Cloud Services RPA Agent**.

      > **Note:**
      >
      > If you don't see an Oracle-created confidential application, you can enter a service request (SR), and Oracle can create the application for you.

   b. In the Name column, select the confidential application.

   c. To the left of the name, check the status.

      If Active appears, the confidential application is active.

   d. If the confidential application isn't active, investigate the reason.

      For example, if your organization experienced a security issue, someone might have deactivated the confidential application and created a new confidential application.

Assign the ServiceDeployer Role to the Confidential Application

A confidential application requires the ServiceDeployer role so that the robot agent can access the Oracle Integration APIs. When Oracle creates a default confidential application for you, Oracle assigns this role to the application. Therefore, you must complete this step only if you create an additional confidential application.

1. Open a confidential application.

   a. Sign in to the Oracle Cloud Infrastructure Console.

b. Open the navigation menu and select **Identity & Security**. Under **Identity**, select **Domains**.

   The Domains page is displayed.

c. If it isn't already selected, select the **Compartment** that holds the domain in which you want to create the confidential application.

d. In the **Name** column, select the domain in which you want to create the confidential application.

   The Overview page for the domain is displayed.

e. In the left menu below Identity domain, select **Oracle Cloud Services**.

f. Search for the confidential application that you just created.

   The name of the confidential application that Oracle created for you ends with **RPA_AGENT_DEFAULT_APP**, and its description is **Integration Cloud Services RPA Agent**.

g. In the Name column, select the confidential application to update.

2. Assign the ServiceDeployer role to the confidential application.

   a. In the left menu, below Resources, select **Application roles**.

   b. In the Application roles table, find the **ServiceDeployer** role, and at the end of its row, click the arrow to expand the entry.

   c. Next to Assigned applications, select **Manage**.

   d. Find the confidential application in the list and select it.

   e. Select **Close**.

Meet the Robot Agent's Requirements

The computer where a robot runs, typically a Windows virtual machine (VM), is called an environment. You must ensure that all computers meet the system requirements for the robot agent.

- Ensure that the computers meet the system requirements for the robot agent.

  See System Requirements.

Download the Robot Agent

Download and install the robot agent on every virtual machine (VM) or computer that runs a robot.

Learn More About the Robot Agent

See About the Robot Agent and Specifications.

Where You Typically Download the Robot Agent

You typically download the robot agent on the following computers:

- The work computers of the people who build robots.

  If robot builders install the robot agent on their computers, they can test their robots as they build them.

- The environments that the robots run on for formal testing.

- The environments that the robots run on in production.

Download the Robot Agent

1. On the computer where you need to install the robot agent, sign in to the Oracle Integration instance that the robot agent needs to connect to.
2. Download the ZIP file for the robot agent.

   The ZIP file contains a single folder with all the files that you need. One of the files is a `readme` that contains a link to this page.

   - Download the robot agent outside a project.

     Anyone with access to Oracle Integration can use this option.

     a. In the navigation pane, click **Design**, then **Agents**.

     b. Select **Download**, then **Robot Agent**.

   - Download the robot agent inside a project.

     To use this option, you must have access to a project with an environment pool that has at least one environment associated with it.

     a. In the navigation pane, select **Projects**.

     b. Select the project name.

     c. In the left toolbar, select **Robot**  .

     d. In the **Environment Pools** box, point to an environment pool, select ⋮, and select **Add environment**.

     e. At the bottom of the Add environment panel, select **Download robot agent**.

   The ZIP file is downloaded to the computer, often to the `Downloads` folder. The download typically takes a minute or less, though sometimes it takes a few moments for the download to begin.
3. Extract the ZIP file to the directory of your choice on the computer.

   > **WARNING:**
   >
   > Do not include any spaces in the folder name, or you won't be able to install the robot agent. Additionally, Oracle recommends not including any spaces in the directory path.

   The files need to remain on the computer for as long as the robot agent runs on the computer, so choose a location carefully. For example, don't leave the files in your `Downloads` folder, in case you or someone else inadvertently deletes the files in the future.

Update the Robot Agent's Configuration File

Every robot agent contains a configuration file, which contains properties for the robot agent's name, secrets, and service instance. For every robot agent, you must enter the robot agent's name. Additionally, if the robot agent communicates with a confidential application, you must update several other properties.

1. Get the client secret and scope values from the confidential application.

These steps are required only if the robot agent communicates with a confidential application that your organization created. **If you're using the default confidential application that Oracle created, skip to the next step.**

a. Sign in to the Oracle Cloud Infrastructure Console.

b. Open the navigation menu and select **Identity & Security**. Under **Identity**, select **Domains**.

   The Domains page is displayed.

c. If not already selected, select the **Compartment** that holds the domain with the confidential application.

d. In the **Name** column, select the domain that holds the confidential application.

   The Overview page for the domain is displayed.

e. In the left menu below Identity domain, select **Integrated applications**.

f. In the search box above the table, search for the confidential application.

   The name of the confidential application that Oracle created for you ends with `RPA_AGENT_DEFAULT_APP`, and its description is **Integration Cloud Services RPA Agent**.

g. Scroll down, and find the client secret and scope values.

   These values are sensitive, so be mindful of where you place them after copying them.

Value you need	Where to find it
Client ID	Below the **General Information** heading, find the **Client ID** entry, and copy the value.
Client secret	Below the **General Information** heading, find the **Client secret** entry. Select **Show secret**, and copy the value.
Scope	Below the **Token issuance** policy heading, and then below the **Resources** heading, review the entries in the table. If multiple entries appear, copy the value that ends with `consumer::all`.

2. On the computer where you installed the robot agent, open the folder that contains the agent and its related files.

3. Open the `InstallerProfile.cfg` file in a text editor, such as Notepad.

   The file contains the following properties. The `DISPLAY_NAME=` property is blank, but the other properties have values specified.

```
DISPLAY_NAME=
IDCS_CLIENT_ID=
IDCS_CLIENT_SECRET=
IDCS_SCOPE=
IDCS_URL=
SERVICE_INSTANCE_ENDPOINT=
SERVICE_INSTANCE_ID=
```

4. Update the properties in the file as needed.

Property	Value to enter
`DISPLAY_NAME=`	**If you're using the default confidential application that Oracle created, this is the only property that you need to define.** Enter the name of the robot agent in Oracle Integration. Choose a value carefully, and consider creating naming conventions for your robots. For example, you might want to distinguish individuals' local computers from the virtual machines (VMs) that host robots, and you might want to distinguish the VMs for each robot.

`IDCS_CLIENT_ID=`
`IDCS_CLIENT_SECRET=`
`IDCS_SCOPE=`
	If the robot agent uses a confidential application that your organization created, update the values so that they reference the confidential application:
	• `IDCS_CLIENT_ID=`: Client ID of the confidential application that the robot agent uses.
	• `IDCS_CLIENT_SECRET=`: Client secret of the confidential application that the robot agent uses.
	• `IDCS_SCOPE=`: Scope of the confidential application that the robot agent uses.
	A previous step in this procedure describes how to find these values.

`IDCS_URL=`
`SERVICE_INSTANCE_ENDPOINT=`
`SERVICE_INSTANCE_ID=`
	Do not update the values of any of these properties, even if the robot agent uses a confidential application that your organization created.

5. Save and close the file.
6. Repeat these steps as needed for other robot agents that you installed.

Start the Robot Agent

You must start the robot agent from the computer on which it is installed. If a robot agent isn't running on a computer, the computer can't run any robots.

1. If this is the first time that you're starting the robot agent on the computer, ensure that the computer has access to the public internet.

   The robot agent requires this access to download its required dependencies. This requirement exists only for the first time that you start the robot agent.
2. Open the location to which you extracted the ZIP file for the robot agent.
3. Note the version number in the `orpa-agent` JAR file.

   For example, for the `orpa-agent-0.1.80.jar` file, the version number is `0.1.80`.
4. Build the following command:

   ```
   java -jar agent_install_directory-folder_name\orpa-agent-
   name_of_agent_JAR_file
   ```

   where:

   - *agent_install_location* is the location of the unzipped files. Oracle recommends not including any spaces in the directory path.
   - *folder_name* is the name of the folder that contains the robot agent's files. Do not include any spaces in the folder name, or you won't be able to install the robot agent.

- *name_of_agent_JAR_file* is the name of the robot agent's JAR file, including its version number in the *X.X.XX* format (such as `0.1.80`) and its `.jar` extension.

For example, if the folder is on your `C:\` drive, you named the folder `robot_agent`, and the JAR file is named `orpa-agent-0.1.80.jar`, the command looks like this:

```
java -jar C:\robot_agent\orpa-agent-0.1.80.jar
```

5. If the computer's home directory contains a folder with a space in its name, create a new home directory, and update the command so that it specifies this new directory.

   This step is required even if you install the robot agent somewhere other than the home directory. Regardless of where you install the robot agent, the robot agent must create files in the home directory, and the robot agent is unable to create the files if the home directory contains any spaces.

   a. Create a home directory without any spaces.

      For example, if your home directory is `C:\Users\John Smith`, create the following new directory:

      ```
      C:\Users\JohnSmith
      ```

   b. Update the command so that it specifies the new home directory as the location to install files for the robot agent.

      Use the following command to set the home directory: `-Duser.home=`

      For example: `-Duser.home=C:\Users\JohnSmith`

      Use the following format to include this command in the previous sample command:

      ```
      java -Duser.home=C:\Users\JohnSmith -jar C:\robot_agent\orpa-
      agent-0.1.80.jar
      ```

6. Open a command-line tool.

   You have the following options.

Operating system	Places where you can start the robot agent
Windows	• **Command Prompt** Open a Command Prompt, and navigate to the location of the unzipped files. • **Command Prompt as an administrator** If your Windows machine doesn't allow you to run scripts from the command line, you can start the robot agent from a Command Prompt that you run as an administrator. Run a Command Prompt as an administrator, and navigate to the location of the unzipped files.
MacOS	Open the **Terminal** app, and navigate to the location of the unzipped files.

7. Start the robot agent by running the command that you built in the command-line tool.
8. If you don't see the previous message, or if any errors appear after you try to start the agent, run the command again, up to a few times if required.

   Network issues sometimes prevent the robot agent from starting.

How to Determine if the Robot Agent Started Successfully

Information messages appear in the command-line tool. When the following message appears, the robot agent has started successfully:

```
INFO - Requesting messages from ControlRoom
```

If the following message appears in the command-line tool, the robot agent was already running prior to your attempting to start it:

```
ORPA Agent process is already running.
```

A robot agent might be running already if you configured it to start automatically. See Start the Robot Agent Automatically.

What Happens After the Robot Agent Starts the First Time

After the robot agent starts successfully for the first time, Oracle Integration removes the values of the following properties from the robot agent's configuration file for security properties:

- `IDCS_CLIENT_ID=`
- `IDCS_CLIENT_SECRET=`

Oracle Integration writes the properties to the computer's local keystore and adds a commented-out message to the file about the change. During subsequent starts of the robot agent, the values are read from the local keystore.

What to Do if the Robot Agent Doesn't Start Successfully

Troubleshoot the issue. See A Robot Agent Doesn't Start.

The Robot Agent Runs as Long as the Computer Is On

If you shut down the computer that runs the robot agent, the robot agent stops running. After you restart the computer, start the agent again. Alternatively, configure the robot agent to start automatically. See Start the Robot Agent Automatically.

Start the Robot Agent Automatically

If you want the robot agent to automatically start and stop with the operating system, configure the robot agent as a service. This task is optional.

Linux Machines

On a Linux machine, you can start the robot agent as a daemon process with sudo privilege.

Use the following command:

```
sudo su
 nohup java -jar orpa-agent-0.1.80.jar &
```

If you installed the robot agent on an Oracle Cloud Infrastructure Compute Linux instance, you can use the following command to log in to the host:

```
 ssh opc@ip_address –i private_key.
```

For more information, see Connecting to a Linux Instance in the OCI Documentation.

Windows Machines

> **Caution:**
>
> If you don't configure the robot agent as a Windows service, you must manually start the robot agent every time the computer or VM restarts.

You use an open-source application called NSSM to configure the robot agent as a Windows service.

1. Download NSSM to the computer.
   a. Download NSSM from the NSSM website.

      Download the file to the computer that hosts the robot agent, or to a location that you can access from that computer.

   b. Unzip the NSSM file.
   c. Place the NSSM files in a location of your choice on the computer.
2. Locate the `nssm.exe` file in the NSSM files, and copy the path to its location.
3. Update the robot agent's configuration file, and start the robot agent.

   The first time you start a robot agent, Oracle Integration removes the values of several properties for security purposes. The values must be in the file when you start the robot agent as a service.

   a. If the robot agent is running, stop it.
   b. Open the ZIP file that you downloaded when you downloaded the robot agent.

      If you deleted the ZIP file, you can download it again at any time. See Download the Robot Agent.

   c. In the ZIP file, open the `InstallerProfile.cfg` file in a text editor, such as Notepad.
   d. Copy the values of the following properties:
      - `IDCS_CLIENT_ID=`
      - `IDCS_CLIENT_SECRET=`
   e. Navigate to the location where you installed the robot agent, and open the `InstallerProfile.cfg` file.
   f. Paste in the properties you copied, and remove their empty values.
   g. Start the robot agent.

      See Start the Robot Agent.
4. Add the path for the NSSM service to your Windows environment variables.
   a. Open the Settings dialog in Windows.

      For example, open the Windows menu, and type `settings`.

   b. Next to **Related links**, select **Advanced system settings**.

      The System Properties dialog opens.

c. Select **Environment Variables**.

   The Environment Variables dialog opens.

d. In the **User variables** list, select the `Path` variable, and select **Edit**.

   The Edit environment variable dialog opens.

e. Click **New**.

   A new row becomes editable in the Edit environment variable dialog.

f. Paste the path that you copied in a previous step into the row.

   The path shouldn't include `nssm.exe` file name.

g. Click **OK**, and then click **OK** again.

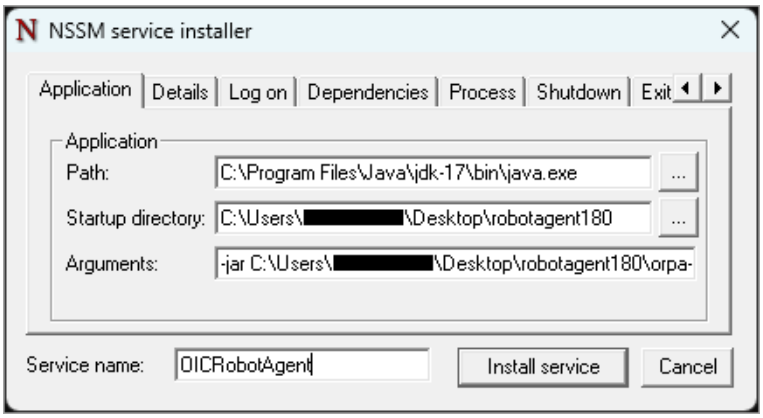
5. Install the robot agent as a Windows service.

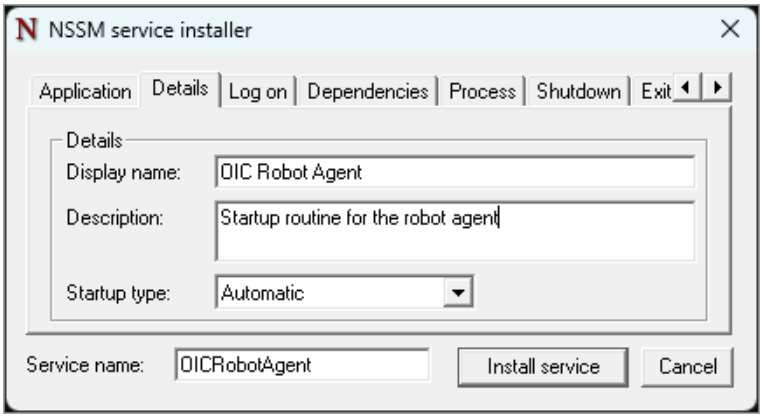
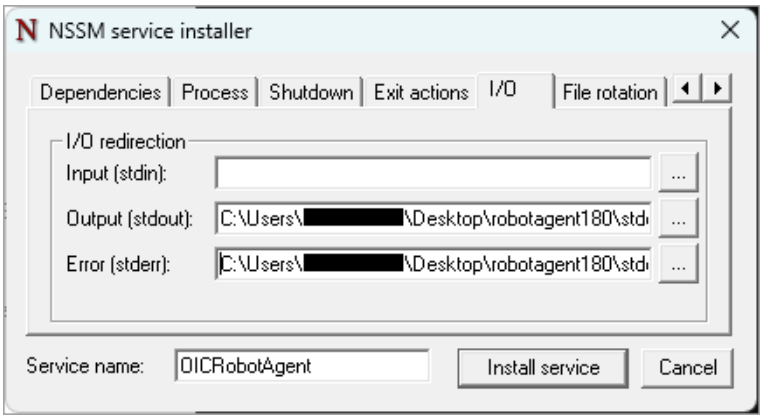
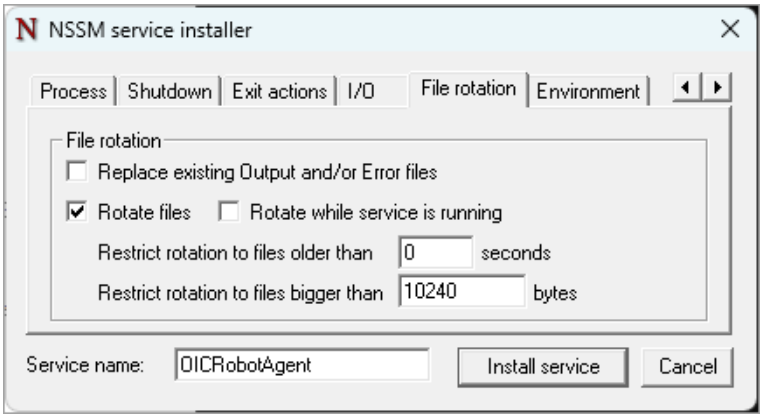
   a. Open a command prompt as an administrator.

   b. Enter the following command: `nssm install`

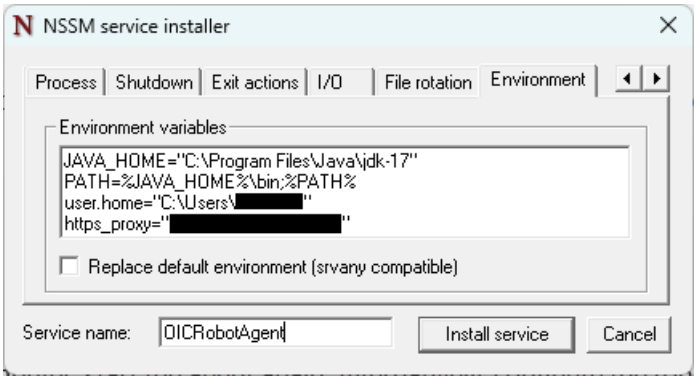
      The NSSM service installer dialog box appears.

   c. Fill in the fields.

Tab	Fields to enter
Application	• **Path:** Enter the directory of the java.exe file, including the `java.exe` file name. • **Startup directory:** Enter the directory of the robot agent. • **Arguments:** Enter the command that starts the robot agent, without **java** at the beginning. If you're not sure, see Start the Robot Agent. • **Service name:** Enter the name of the service as you want it to appear in the list of Windows services. Do not include spaces in the name. 

Tab	Fields to enter
Details	• **Display name:** Enter the display name for the service. • **Description:** Enter a description for the service. • **Startup type:** Select **Automatic**. 
I/O	• **Output (stdout):** Select the location for the output files for the service, including the name of the output file. • **Error (stderr):** Select the location for the error files for the service, including the name of the error file. 
File rotation	• Select only **Rotate files**. • For **Restrict rotation to files bigger than __ bytes**, enter `10240` or an appropriate value for your organization. 

Tab	Fields to enter

Environment	**Environment variables:** Enter the following values:
	• Location of the Java home, such as:
	`JAVA_HOME="C:\Program Files\Java\jdk-17"`
	`PATH=%JAVA_HOME%\bin;%PATH%`
	• (Required only if the robot agent is running behind a firewall and is unable to connect to the public internet) Location of the user home, such as:
	`user.home="C:\Program Files\<user_name>"`
	• Definition of the `https_proxy` parameter.
	 

d. Click **Install service**.

   In the command prompt, a message informs you that the service was installed successfully.

6. Start the service.
   a. Open the Services dialog in Windows.

      For example, open the Windows menu, and type `services`.

   b. Find the service you just created. Its name is the Display name that you specified.
   c. Start the service.
7. To verify that the service started as expected, check the output and error files for any errors.
8. Repeat the previous steps as needed for other Windows computers or virtual machines for which the robot agent must start automatically.

Install the Recorder

The recorder is a Google Chrome browser extension that you use to build robots. Everyone who builds robots must install the recorder.

1. Open Oracle Integration in the Google Chrome browser.
2. Open any robot.

> **Tip:**
>
> If you haven't created a robot yet, you can create one now. See Create a Robot.

   a. In the navigation pane, select **Projects**.

b. Select the project name.

c. In the left toolbar, select **Robot**.

d. In the **Robots** box, select the robot to open.

The canvas appears.

3. Navigate to the download area for the recorder extension.

a. In the toolbar, select **Targets**.

The Targets panel appears.

b. Select **Create +**.

The Target panel appears.

c. Click within the **Locator** field, and select **Target a page element**.

The Browser extension not detected message appears.

4. Download the recorder extension: Below the Browser extension not detected message, select **Download browser extension**.

A ZIP file downloads locally, typically in your Downloads folder.

5. Install the recorder.

a. Navigate to the location where the ZIP file downloaded, such as your **Downloads** folder.

b. Extract the ZIP file to a location of your choice.

c. In Google Chrome, open the **Extensions** menu, and select **Manage Extensions**.

d. In the upper-right corner, select **Developer mode**, if it's not already selected.

Don't skip this step, or you won't be able to install the extension.

e. On the Google Chrome Extensions page, select **Load unpacked**, located below the page title.

f. Navigate to the folder where you unzipped the file, select the `target` folder, and select **Select Folder**.

6. Close and reopen the Google Chrome browser.

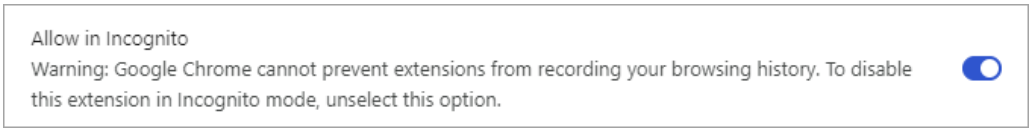
7. If you work in an Incognito window, allow the extension in Incognito windows.

You can perform these steps in an Incognito browser or a regular Chrome browser.

a. In Google Chrome, open the **Extensions** menu, and select **Manage Extensions**.

b. In the box for the Oracle Robot Designer Extension, select **Details**.

c. Enable the **Allow in Incognito** setting.



Create a Project

Build a robot within a project. If you don't have an existing project to work in, create a new project.

To learn about projects, including how to keep them organized, see Get Started with Projects in *Using Integrations in Oracle Integration 3*.

- Create a project.

  See Create or Import a Project in *Using Integrations in Oracle Integration 3*.

Quick Start for Building Robots

Get started building quickly, confidently, and correctly with videos, tips, and more.

Goal	More information
Read about your workflow	Workflow for Planning a Robot Workflow for Building a Robot
Watch a video	Video: Introduction to RPA Video: Build a Simple Robot in Minutes Video: See a Simple Robot in Action
Complete a tutorial	Learn with a Tutorial
Read tips and tricks	11 Tips for New Robot Builders Tailor Your Building Experience

Workflow for Planning a Robot

Don't skip the critical step of planning and designing your automation. Planning helps ensure that your automation achieves your business goals, and it can reduce or eliminate the need for reworking.

Previous workflow: Complete Prerequisites.

Identify the Problem

Your first step in planning a robot is familiarizing yourself with the business process that it will address, including the problems that the business process solves.

Task	More information
Identify a business process that is impacting your business	How you define a business impact is up to you. For example, the impact could be one or more of the following: • Inefficiencies. • Reduced effectiveness. • Limited or no oversight and observability. • Lack of continuous improvement.
Identify the stakeholders	Identify the stakeholders for the business process, including: • The people who complete any steps in the current process and anyone in the organization who has an interest in the process. • Anyone who is a stakeholder for the automation work.

Task	More information
Review the current business process and the problem that it addresses	Gather information about the business process that is impacting your organization. If possible, meet with the stakeholders to collect information about the current state of the business process and the problem that the process addresses. Focus on the current situation rather than on opportunities for improvement or on implementation details. The deep knowledge that you gain will help you plan the right solution.
Assess the need to redesign the business process	Determine whether the process is working for your organization: • **Process that isn't working** Some business processes are inherently flawed. For example, if your current process generates invalid orders, automation doesn't make sense. Generating invalid orders more efficiently is not a win. Instead, redesign the process before automating it. • **Process that is working** Some business processes are perfect, but most have room for improvement. How do you know whether to rethink the process or automate it as-is? After all, automating a bad process is generally a bad idea. Here's what Oracle recommends: If the business process that you're currently using is working, your can benefit from automating it *today*. The automation doesn't change or improve the business process, but you gain immediate value from the automation. For example: – The business process is now automated, with potential for immediate gains in efficiency and effectiveness. – You gain insight into how the business process is working, so you can start identifying the areas to improve. **Note:** Automating an inefficient process might seem unproductive. But, consider the cost of rethinking a business process. You could spend years assessing and evaluating the process and reaching consensus with all stakeholders. That's years of working without automation. Instead, Oracle recommends automating today, and making tactical improvements in the future using the insight that you gain.

Understand the Applications

Familiarize yourself with the applications that you're automating and their APIs, if applicable.

Task	More information
Understand the applications	Familiarize yourself with the applications that you're automating. For example, while interviewing users, you might ask for demos of the business process that you'll automate.
Determine whether the applications have APIs	Determine whether an application has APIs so you can understand your options for automation: • If an application doesn't have APIs, you can still automate it using robots. • If an application has APIs, you can automate it using integrations, too.
If the applications have APIs, familiarize yourself with them	Familiarize yourself with the application's APIs by reviewing their documentation. This knowledge helps you determine the right automation for a given task. For example, if APIs are available for the task that you want to automate, you can consider designing an integration for the automation.

Define the Requirements

After collecting information about the use cases for your automation, define and prioritize your requirements.

Task	More information
Identify your requirements	Using the use cases that you collected, write the requirements for your automation solution. Be as specific as you prefer, and work in the format that your team usually uses. For example, you might write a product requirement document, or you might create one or more tickets in your issue tracking software.
If needed, prioritize the requirements	Determine the timeline for work, the scope of the work, and the availability of resources. Next, determine whether you can deliver all requirements in the initial delivery of the automation. If you need to split the work into multiple sprints, phases, or releases, work with your stakeholders to prioritize the requirements.
Plan your implementation and work	Determine how you will implement your requirements. For example: • Identify the number of integrations and robots to design and build. See When to Create Robots Versus Integrations. • Specify the actions that the integrations and robots will take. • Determine how many environments you must set up, and create system requirements for them. • Create a schedule for the work.

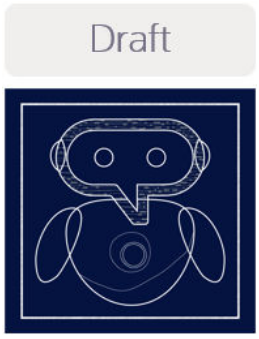
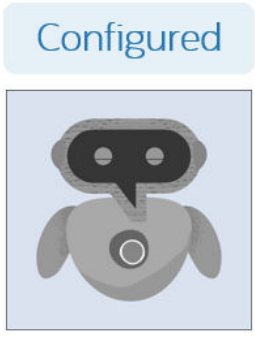
Next workflow: Workflow for Building a Robot.

Workflow for Building a Robot

To build a robot, provide information about the application(s) that the robot works in and define the activities that the robot completes. You also need to design the integration that calls the robot.

Previous workflow: Workflow for Planning a Robot.

Step	Task	More information
1	Complete Prerequisites	For example, create accounts, and install and configure the robot agent.
2	Create a Robot Connection Type (Optional)	A robot connection type specifies the parameters that you use to connect to an application. For example, a web application might require a user name, password, and URL. If the predefined robot connection types don't meet your needs, create a new one.
3	Create a Robot Connection	Base the robot connection on a robot connection type.

Step	Task	More information
4	Create a Robot	After creating a robot, define the steps that the robot completes by adding robot actions and logic to the robot. See the following: • Add an Action to a Robot • Add Logic to a Robot Before or while creating the robot, add the robot resources that the robot uses, such as a trigger or variable. See Create and Update a Robot Resource. While you're building a robot, its status is **Draft**. 
5	Design an Integration That Calls a Robot	A robot developer must create a robot and define a few details, and then an integration developer can start designing an integration. After the robot exists, robot and integration developers can work concurrently or at different times.
6	Fix a Robot's Errors	Address any errors with the robot, such as an incomplete robot action.
7	Specify Where a Robot Runs	Create an environment pool, add computers to it, and associate your robot with the environment pool. If the robot is free of errors, its status changes to **Configured**. 

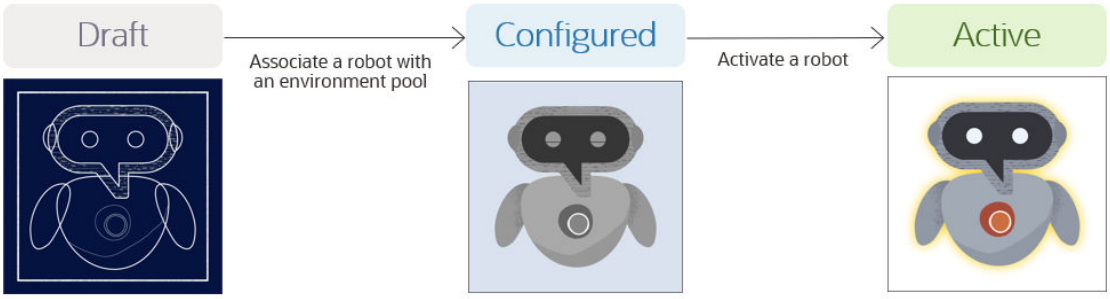
Next workflow: Workflow for Testing a Robot.

Design Time Robot Statuses

A robot's design time status progresses from Draft to Configured to Active. View the status in a project on the Design page.

Workflow

The following diagram illustrates the workflow that you follow to update a robot's status.



Description of the Statuses

Status	Description
Draft	A newly created robot has a status of Draft.
Configured	A robot's status changes to Configured after you complete the following tasks: • Resolve any errors. See Fix a Robot's Errors. • Associate the robot with an environment pool. See Specify Where a Robot Runs.
Activation in progress	After you activate a robot, it's status briefly changes to **Activation in progress** before becoming **Active**. You typically need to refresh the page to see the **Active** status.
Active	A robot that is active can be run, either on its own or by an integration. **Tip:** If you need to update an active robot, just deactivate it. Its status changes from **Active** to **Configured**.

Robots *Instances* Have Runtime Statuses

When you run a robot, a robot instance is created, and the robot instance has a status that indicates whether the robot was successful. For details, see Runtime Statuses of Robot Instances.

Video: Build a Simple Robot in Minutes

Watch a video that explores the end-to-end process of building a robot.

Video

Video: See a Simple Robot in Action

Watch a video that shows how to design the integration that calls a robot, activate and run the integration, watch the robot run, and ensure that everything ran as expected.

Video

Learn with a Tutorial

Ready to build your first robot? Walk through the process by following a step-by-step tutorial.

Tutorial	Description
Get Started with Robotic Process Automation (RPA)	Learn how to build a robot and the integration that calls it.

11 Tips for New Robot Builders

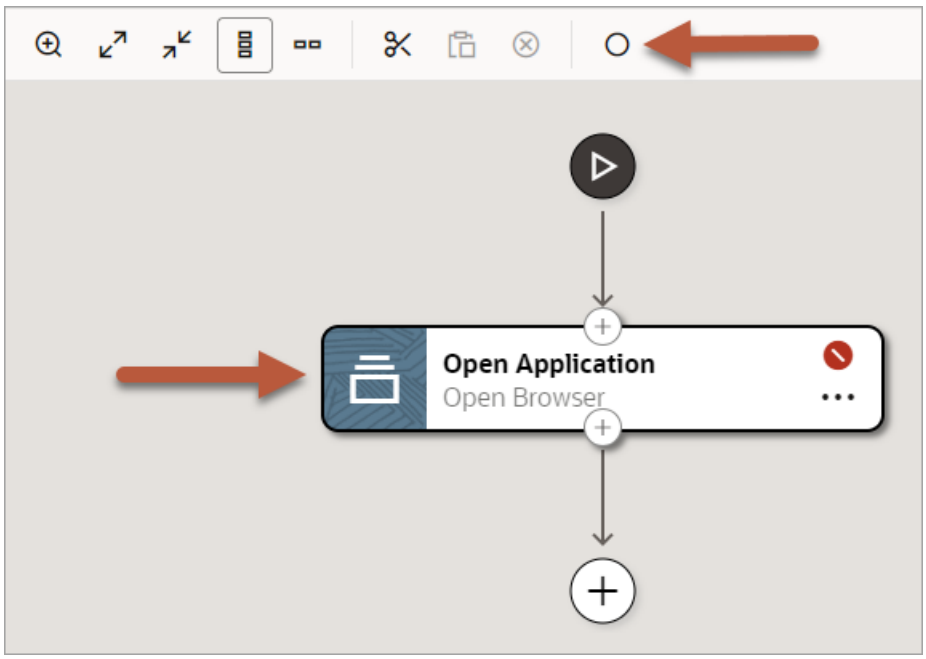
While building a robot, you'll record the actions that a robot completes using the recorder, all while harnessing the power of control and power of the low-code capabilities. Keep reading to learn useful tips and tricks for these building tools.

1. Open the Application to Record in Before Starting the Recorder

You can record actions only in the browsers that are open before you start the recorder. But, not to worry: If you open an application after starting the recorder, just stop and restart the recorder.

2. Select an Action Before Starting the Recorder

To enable the **Record after the selected action** ○ button on the canvas, you must first select an action on the canvas.



3. Understand Where the Recorder Adds Actions

When you select an action on the canvas and then select **Record**, the recorder adds the new actions *after* the currently selected action, with the following exceptions:

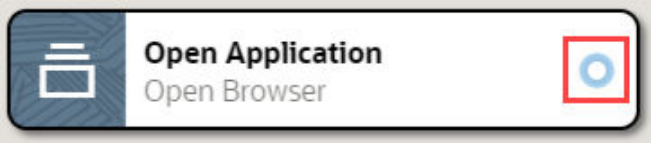
- Foreach loop

When you record from a foreach loop, the recorder asks whether you want to add the action after or within the foreach loop.

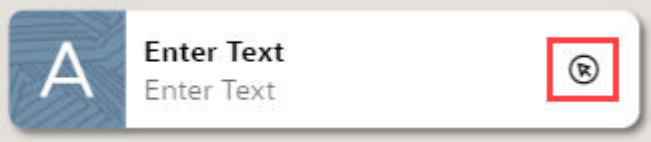
- Switch condition

  When you record from a switch condition, the recorder always adds the actions within the condition, since you cannot record after a condition branch.

Bonus tip: If you missed adding an action, you can still add it, even if the recorder is still running. Note that the **Recording cursor location** icon appears on the currently selected action.



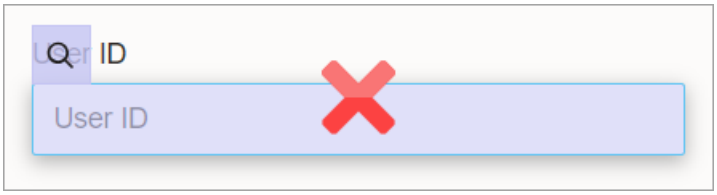
To select a different action, simply point to another action, and select **Place recording cursor**.



The next action that you record is inserted after the selected action.

4. Wait for the Green Shading

When recording or when targeting a field, hover your cursor over a UI element and note the shading that appears. While the shading is purple and the icon above the field is a magnifying glass, the recorder is still collecting information about the element. **Don't select the element yet.**



After the shading turns green and the icon changes to a target, select the UI element.

5. If the Whole Page Turns Green, Press Esc

If you hover over an element that covers the entire page, the entire page becomes shaded green. Cancel the targeting by pressing **Esc**.

6. Target the Correct UI Element

When you point to a UI element while recording, you can often target multiple options, such as the icon on a button, the button itself, and an element that encloses the button. Most of the

time, you can target any of these options, and the robot works as expected. However, if the robot must enter text into a field, select the field, not its label.

7. Select the Correct Robot Action

While you select a field while recording, a drop-down list shows all of the available actions for the UI control.

The recorder selects the action that you are most likely to use, but you can select a different option from the drop-down list.

8. Familiarize Yourself with an Application's HTML

To build a robot using the low-code capabilities, you should have some familiarity with reviewing the HTML of a web page.

For example, you should understand the structure of the website or application that you're interacting with and feel comfortable viewing the source for the application's HTML

This familiarity is helpful because the appearance of a UI element is sometimes different from its underlying HTML code. For example, if a robot must interact with a checkbox, you might add the checkbox action to the robot. However, if the checkbox isn't coded as a checkbox in its HTML, the checkbox action can't interact with the element.

And remember: If you don't want to wade through a page's HTML, use the recorder to build your robot. The robot reviews the HTML for each element that you select and provides the available actions for the element.

For help working with HTML and XPaths, see View HTML and XPaths.

9. Customize Oracle Integration to Fit Your Working Style

Think about your preferred working style:

- Define the big picture first, and then build the smaller components.
- Define the smaller components first, and use them to construct the big picture.
- Build every component when you need it.

Oracle Integration supports all of these working styles. For example:

- Optimize your working experience to match your preferences by updating your build settings.

See Tailor Your Building Experience.

- Understand your options for building robot resources.

  Every robot requires a trigger. Additionally, most robots require variables, validation, and custom data types. The timing of when you create these resources is up to you: Either before or as you build the robot.

  See Create and Update a Robot Resource.

10. To Find Stuff Fast, Use Search

When you have a robot with many actions, finding the action you need to update can take a little time. A Search panel helps you find what you need quickly.

In the toolbar to the right of the canvas, click **Search** .

The Search panel contains a tree that lists all the actions in the robot, including their names and unique identifiers, prefaced with `lc` (`lc1`, `lc2`, and so on).

11. Choose a Layout That Suits You

- If your monitor looks like it belongs in a movie theater, you might prefer to see your robot in a horizontal layout.

  On the toolbar above the canvas, select **Horizontal layout** .

  Select Vertical layout to switch back to the original view.
- If you're working on a small screen or want to minimize distractions, make the most of your screen's real estate by enlarging the canvas.

  On the toolbar above the canvas, select **Maximize** .

  Select **Minimize** to go back to the original view.

If you get stuck while recording, troubleshooting help is available. See Troubleshoot the Recorder.

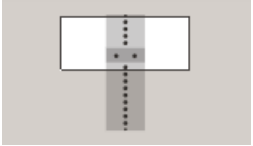
Tailor Your Building Experience

On the canvas, several settings allow you to tailor your building experience to your preferences. Oracle Integration saves the setting selections in the local storage in your browser.

1. Open the robot for which you want to update settings.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the title bar of the canvas, next to the Save button, select **Action** , and then select **Settings**.

   The Settings panel appears.
3. Update the settings as needed to suit your build preferences.

Tab	Setting	Description
Modeling tab	Auto create targets	Choose whether to generate a reusable target when you identify a UI control that a robot acts upon. • When selected and you identify a UI control for a robot action, Oracle Integration creates a reusable target for the UI control, though you can override this setting and hard code the value. If you select the same UI control *within the same robot*, you can reuse the existing target, create a new target, or hard code the value. • When deselected, Oracle Integration hard codes the value for the UI control, though you can override this setting and create a reusable target for the robot.
Modeling tab	Auto create pre validation page states	When selected, Oracle Integration creates validation that runs before each robot action. The validation is based on the field(s) that you select for the action. When a robot instance runs, the validation ensures that the action starts only after the selected fields are visible in the application. Oracle recommends leaving this setting selected.
Editor tab	Auto edit newly created actions in the canvas	When selected, Oracle Integration opens a panel for specifying details after you add an action or logic to a robot. When not selected, you must double-click an action or logic to view the panel. Whether to leave this setting selected depends upon your workflow. For example: • If you want to enter all the settings for each action as you build a robot, leave this setting selected. • If you'd rather add all the actions to the robot and then enter their details later, you'll save some clicks by deselecting this setting.
Editor tab	Auto close palette drawer after drag and drop	When selected, Oracle Integration closes the panel after you add an action to the canvas using the **Robot actions** button on the right toolbar, or after you add logic using the **Flow control** button. Whether to leave this setting selected depends upon your workflow. For example: • If you want to enter all the settings for each action as you build a robot, deselect this setting. • If you'd rather add all the actions to the robot and then enter their details later, you'll save some clicks by selecting this setting. **Note:** You typically either select or deselect this setting and the previous setting. That way, a panel doesn't open over another panel.
Editor tab	Show overview	When selected, the overview box for the canvas appears on the canvas. The overview box helps you understand which part of the robot you're looking at.  Select its position from the drop-down.
Editor tab	Show Smart Recording splash screen	When selected, the splash screen appears when you start the recorder for the first time in your sign-in session.

4. Select **OK**.

Create Connections to Applications

To complete its task, a robot must connect to an application. Provide the information that the robot needs, such as its credentials and the application's URL, by creating a robot connection. Base each robot connection on a robot connection type, which is similar to a template.

1. Create a Robot Connection Type

   Skip this step if you can use a predefined connection type.

2. Create a Robot Connection

Create a Robot Connection Type

Oracle Integration comes with a predefined robot connection type that handles most connection requirements. However, if an application requires additional parameters that aren't included in the predefined types, you can include these parameters in a robot connection type that you create.

To learn more, see About Robot Connections and Robot Connection Types.

Prerequisites:

- Create a Project.
- Determine whether the predefined robot connection type meets your requirements.

  If so, you don't need to create a new connection type. See Predefined Robot Connection Types.

To create a robot connection type:

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot**  .
3. In the **Robot connection types** box, click **Add**.

   The Create robot connection type panel appears.
4. Fill in the following fields:
   - **Name:** Enter a name for the robot connection type. When you create a robot connection, you base it on a robot connection type, so enter a helpful and straightforward name. Consider including details about its parameters.
   - **Identifier:** Oracle Integration generates this value using the Name value.
   - **Description:** Provide additional information about the robot connection type.
   - **Keywords:** Enter text that people might use to search for the robot connection type. Press **Enter** after you finish entering each keyword.
5. Add the parameters for the robot connection type.

   A parameter is data that a robot needs to connect to an application. For example, to connect to a web application, a robot might need the application's URL, credentials, and key. If you're not sure of the fields the application requires, ask the application's administrator.

a. In the panel, next to **Properties**, click **Add +**.

b. Fill in the fields:

- **Name:** Enter a name for the parameter, such as **URL**, **User name**, or **Password**. The value that you provide appears later when you create a robot connection, so enter a helpful and straightforward name.
- **Type:** Select the data type of the parameter.
- **Secret:** If the value for the property is a secret value, select this checkbox. For example, passwords are secrets. When you select this option, the value is masked: asterisks appear instead of the actual characters.

c. Add additional parameters if needed.

6. Click **Create**.

The robot connection type appears in the Robot connection types box with a status of **Configured**. You can now use the robot connection type to create a robot connection.

Need to update the robot connection type? See Update a Robot Connection Type.

Create a Robot Connection

A robot connection specifies the information that a robot needs to connect to an application. For example, a typical connection specifies the robot's user name and password, plus the URL for the application.

To learn more, see About Robot Connections and Robot Connection Types.

> **Tip:**
>
> Oracle recommends reusing robot connections whenever you can. You save time building, and updates to the values are faster in the future.

Option 1: Work Outside a Robot

You can create a robot connection before you even create a robot.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot** .
3. In the **Robot Connections** box, click **Add**.

   The Create robot connection panel appears.
4. In the list, select the robot connection type to base the connection on.

   If the robot connection type that you need hasn't been created yet, you can create it. See Create a Robot Connection Type.

   The fields that you must define for the robot connection appear, including the parameters that the robot connection type defined.
5. Fill in the following fields:

- **Name:** Enter a name for the robot connection. Consider including the name of the application for which you're creating the connection.
- **Identifier:** Oracle Integration generates this value using the Name value.
- **Description:** Provide additional information about the connection.
- **Keywords:** Enter text that people might use to search for the connection. Press **Enter** after you finish entering each keyword.

6. Enter values for the parameters for the robot connection, such as user name and password.

> **Tip:**
>
> While you build a robot, your robot connection typically uses the URL and credentials for a test, UAT, or similar environment. Later, when you are ready to deploy the robot to a production environment, you can update the robot connection so that it contains the production URL and credentials. See Update a Robot Connection.

7. Click **Create**.

The robot connection appears in the Robot connections box.

If your robot needs to connect to another application, create another connection. Otherwise, start build your robot. See Create a Robot.

Option 2: Work in a Robot

You can create a robot connection right when you need it, while you're adding an action to a robot. Any action that lets you define a field using a robot connection parameter also lets you create a robot connection.

1. In a robot, add an action that requires a robot connection.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. Create a robot.

      See Create a Robot.
   e. Add an action that requires a robot connection.

      For instance, add an open browser action (see Add an Open Browser Action) or a login action (see Add a Login Action).
2. In the Open Browser panel, select within the URL field, and select **Robot connections** .

   The Robot connections panel appears.
3. Next to Available robot connections, select **Create** .
4. Fill in the fields.
   - **Type:** Select the robot connection type to base the connection on.

If the robot connection type that you need hasn't been created yet, you can create it. See Create a Robot Connection Type.

- **Name:** Enter a name for the robot connection. Consider including the name of the application for which you're creating the connection.
- **URL:** Enter the URL for the web application.
- **Username:** Enter the user name that the robot uses to sign in to the application.
- **Password:** Enter the password for signing in.

5. In the Robot connections panel, select **OK**.

   The robot connection is saved. The Robot connections panel refreshes and lists all available robot connections.

6. Continue defining the open browser action.

   See Add an Open Browser Action.

Create a Robot and Integration

You must design an integration to call a robot. Design the integration at any time after creating the robot.

Workflow

1. Create a Robot
2. Design an Integration That Calls a Robot

Create a Robot

When you create a robot, you define its trigger and the actions that the robot performs.

To learn more about robots, see About Robots.

Prerequisite: Create a Robot Connection.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot**  .
3. Create a robot.
   a. In the **Robots** box, click **Add** (if no robots have been built) or **+** (if one or more robots have been built).

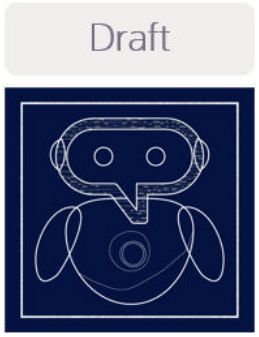
      The Create robot panel appears.

   b. Enter descriptive metadata for the robot by filling in the following fields:
      - **Name:** Enter a name for the robot. Consider including the action that the robot performs.
      - **Identifier:** Oracle Integration generates this value using the Name value.
      - **Version:** Update the version number, if needed. Most people use the default value.
      - **Description:** Provide additional information about the robot.

- **Keywords:** Enter text that people might use to search for the robot. Press **Enter** after you finish entering each keyword.

c. Click **Create**.

The canvas appears. The robot includes an open browser action that you must define. The new robot has a status of Draft.



4. Define the robot's trigger.

A trigger is a JSON object that defines the interface for the robot. You define an input, which comes into the robot. An input is the activity or event that starts the robot.

You also define an output, which comes out of the robot after it runs. An output is the event or incident that the robot produces.

a. Select **Click to edit trigger** .

The Trigger panel appears.

b. Define the input: On the **Input** tab, click **Add +**, and fill in the fields.

- **Name:** Enter the name of the input. For example, if the robot runs after a purchase order is created, you might name the input **PO_Number**.

  When the integration developer calls the robot from an integration, the robot developer maps the input and output to the appropriate fields.

- **Type:** Select the data type of the field. If the right data type doesn't exist, you can create it. See Create a Data Type.

- **Collection:** Select this value if the input is an array of value. For example, select this option if you're passing an array of PO numbers into the robot.

c. Define another input, if needed.

d. Define the output: Select the **Output** tab, click **Add +**, and fill in the same fields that you completed for the input.

e. Define another output, if needed.

f. Click **OK**.

> **Tip:**
>
> If an integration developer needed you to create a robot so that they could start designing the integration that calls the robot, you've now done enough so that they can start this work.

5. Define the open browser action, which is included in every robot.

This action tells the robot to open a web browser and sign in to an application.

For step-by-step instructions, see Add an Open Browser Action.

6. Specify the other steps that the robot completes by adding additional actions and logic to the robot.

   See:

   - Quick Start for Building Robots
   - Add an Action to a Robot
   - Add Logic to a Robot

Design an Integration That Calls a Robot

A robot runs only when an integration calls it. Therefore, you must design an integration to call each robot that you build. An integration developer can design the integration at any time during the development process of the robot.

Prerequisites for Designing an Integration

Before an integration developer can start designing an integration, the robot builder must create a robot and define its trigger, including its input and output properties. These properties represent the contract that the robot makes with the integration. A robot builder can typically complete these tasks in just a few minutes.

See Create a Robot.

Flexible Workflow to Suit Your Schedules

Oracle Integration allows teams to divide their work according to their availability. Additionally, integration and robot developers don't need to worry about block the other person's work:

- An integration developer can start designing the integration that calls the robot after a robot builder creates the robot and defines its trigger. The robot builder doesn't need to specify any actions or logic yet.
- Similarly, a robot developer can build and begin testing a robot, even if the integration doesn't exist yet.

Design an Integration That Calls a Robot

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Integration** .
3. Create an integration.
   a. In the **Integrations** box, click **Add** (if no integrations have been designed) or **+** (if one or more integrations have been designed).

      The Add integration panel appears.
   b. Select **Create**.
   c. Select the type of integration to design.

      For details about each integration pattern, see Understand Integration Patterns in *Using Integrations in Oracle Integration 3*.
   d. Enter a name for the integration and provide additional descriptive information, if needed.

e. Select **Create**.

For detailed step-by-step instructions, see Create an Integration in *Using Integrations in Oracle Integration 3*.

4. Call the robot from the integration.

a. Add a robot action to the integration. You have the following options:

- Click + at the location where you want to add the action, then select **Robot flow**.
- On the right side of the canvas, click **Actions** and drag the **Robot flow** action to the appropriate location.

b. Point to the **Robot process automation** action, select ..., and then select **Edit**.

The Configure Basic Info panel appears.

c. Fill in the following fields:

- **What do you want to call your endpoint?:** Enter descriptive text for the robot, such as the robot's name or information about its business process.
- **What does this endpoint do?:** Provide a brief description of the robot.

d. Select **Continue**.

e. From the **Flow Name** drop-down, select the robot that the integration calls, including the appropriate version.

The drop-down lists all of the robots that are in the same project as the integration.

f. Select **Continue**.

g. Review the summary, and select **Finish**.

A Map object appears before the Robot process automation action.

5. Pass information from the integration to the robot.

a. Point to the **Map** action that is before the **Robot process automation** action, select ..., and select **Edit**.

The mapper opens.

b. In the Sources list on the left, expand the tree until you find the data element that you need to pass to the robot.

c. In the Target list on the right, expand the tree until you find the input that needs to receive the data.

d. Drag the source element to the target element.

For more help working in the mapper, see About Mapping Data Between Applications and Map Data in *Using the Oracle Mapper with Oracle Integration 3*.

e. If you need to pass more information to the robot, map additional elements.

f. After you finish mapping elements, test your mappings.

See Test Your Mappings in *Using the Oracle Mapper with Oracle Integration 3*.

g. Select **Go back <** to return to the canvas.

Add an Action to a Robot

Specify the steps that a robot takes by adding actions to the robot. Each action corresponds to an activity a human would do, such as clicking within a field, entering a value, and submitting the change.

What Does the Robot Need to Do?

Type of interaction	Available actions
Open, close, or switch a browser, or sign in	Close browser: Close an internet browser. Login: Sign in to an application. Open browser: Open an internet browser and, optionally, sign in to an application. Switch browser: Start working in a different tab or window for an internet browser.
Select an element in a user interface	Checkbox: Select or deselect a checkbox, or determine whether a checkbox is selected. Click element: Select a button, link, some items in lists, and some checkboxes. List: Select one or more items in a list or drop-down list.
Interact with text in a user interface, such as obtaining, entering, or clearing text	Clear text: Clear text from a field. Enter text: Enter text into a field. Get text: Get text from the user interface. Radio button: Interact with a radio button. Web table: Get text from one or more columns in a table.
Work with files	Download file: Download a file from an application.
Add testing and validation actions	Log: Record an entry in the activity stream. Screenshot: Capture a screenshot and save it as a file. Wait until element is visible: Pause until an element in the user interface is visible.
Manage variables	Data stitch: Manage the variables in a robot.

Get Help with the Settings for Each Robot Action

See Deeper Dive: Settings for Robot Actions.

Add a Checkbox Action

The checkbox action interacts with a checkbox, such as by selecting it, deselecting it, or determining whether it's selected.

Use Case

This action has specific requirements for the page's underlying HTML code. You can use the checkbox action only for a UI element with a tag name of `INPUT` and a type attribute of `checkbox`.

Add a Checkbox Action

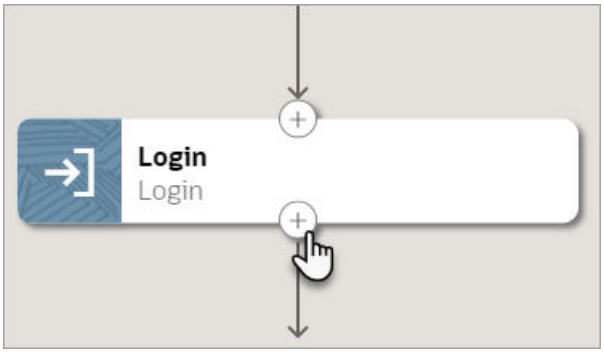
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Checkbox**.

   A Checkbox action appears on the canvas, and the Checkbox panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. From **Operations**, specify how the robot interacts with the checkbox.

   - **Select Checkbox:** The robot selects a checkbox.
   - **Unselect Checkbox:** The robot clears a checkbox selection.
   - **Is Checkbox Selected:** The robot determines whether a checkbox is selected. This option is useful if the next action depends on whether a checkbox is selected.

5. On the **Input** tab, specify input details for the action.

   a. In another browser window or tab, open the application where the robot works.

   b. In the robot, click within the **Locator** field, and select **Target a page element** .

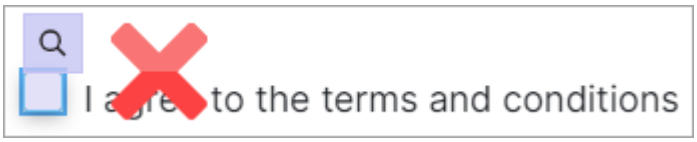
   The Target a page element panel appears.

   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

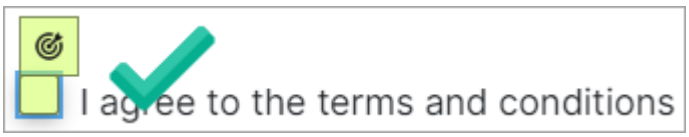
   The application opens.

   d. In the application where the robot works, point to the checkbox that the robot needs to interact with, but don't select it yet.

For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

6. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

7. If you selected the **Is Checkbox Selected** operation, specify where to save the answer.

   - Assign the value to a variable.

     a. Select the **Output** tab.

     b. Click within the **Save to** field, and select **Variables** (x).

        The Variables panel appears.

     c. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable.

     d. Select the variable to assign the value to, and drag it to the **Save to** field.

   - Assign the value to a property of the output.

     a. Select the **Output** tab.

     b. Click within the **Save to** field, select **More options**, and then select **Output**.

        The Output panel appears.

     c. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output.

     d. Select the output to assign the value to, and drag it to the **Save to** field.

8. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

9. Click **OK**.

10. Above the canvas, select **Save**.

Add a Clear Text Action

The clear text action removes text from a field in a user interface.

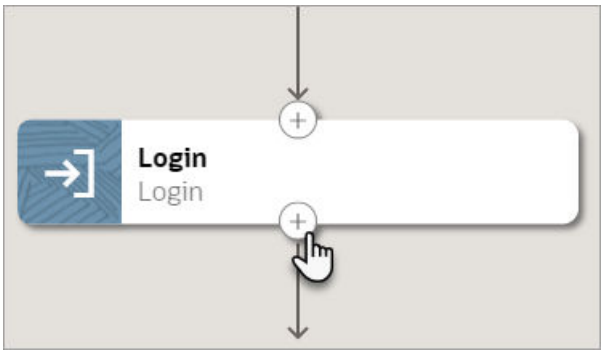
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Clear Text**.

   A Clear Text action appears on the canvas, and the Clear Text panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, specify input details for the action.

   a. In another browser window or tab, open the application where the robot works.

   b. In the robot, click within the **Locator** field, and select **Target a page element**.

   The Target a page element panel appears.

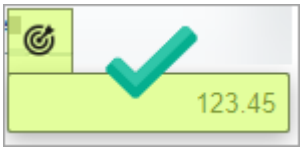
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

   The application opens.

   d. In the application where the robot works, point to the field where the clears text, but don't select it yet.

   For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.

e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

5. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

6. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

7. Click **OK**.

8. Above the canvas, select **Save**.

Add a Click Element

The click element action selects an element in a user interface, such as a button or link.

Several other actions allow a robot to click and can offer more control for specific interactions. See the checkbox and list actions.

Add a Click Element Using the Recorder

Before you add the action, consider creating the robot resources that the robot action requires, such as a variable or a trigger's input and output. Otherwise, just pause the recorder and create the resources when you need them.

1. Open the robot to edit.

   See Open a Robot.

2. Start the recorder.

   a. On the canvas, select the action to record after.

   b. On the toolbar, select **Record after the selected action** ○.

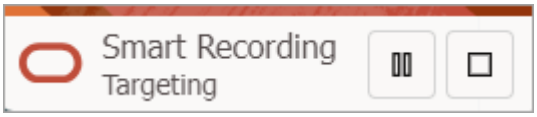
c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works. You might need to scroll to find it.

   If the application doesn't appear, close the panel, open the application in another tab, and start the recorder again.

   A splash screen appears, and the RPA Smart Recording panel appears.

d. Select **Begin Recording**.

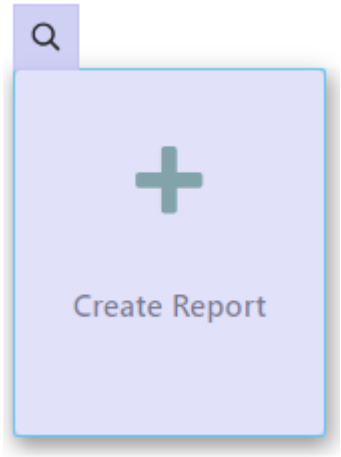
   The Smart Recording window appears in the lower-left corner of your browser. Additionally, your mouse cursor can now target elements in the user interface.



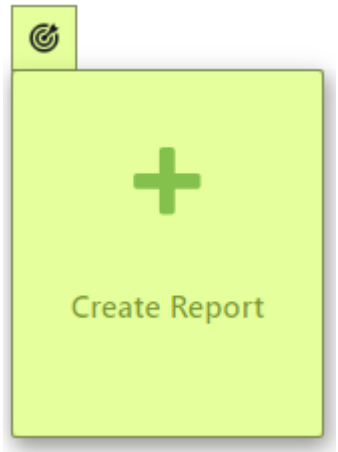
3. Identify the element in the user interface that the robot needs to interact with.

   a. Point to the field that the robot needs to interact with, but don't select it yet.

      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



   b. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



      For more tips, see Quick Start for Building Robots.

      A panel appears with details about the element you selected.

c. Review and update the fields as needed.

- **Name:** Enter the name of the target. This text appears on the robot action in the canvas and in the list of targets in the robot.

  Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

- **Target name:** Review the XML Path Language, or XPath, for the element that you selected. Underscores (_) appear in place of invalid characters. You can update the value, if you want.
- **Element:** Review the HTML element that you selected. If you selected the wrong element type, select **Discard** in the panel, and select a different element.
- **Action:** Select **Click Element**.
- **Execute action on save:** Select this option if you want to complete the action that you just recorded. For example, if you just clicked a button and you want the click to occur in the application after you save these changes, select this option.

d. Select **Save**.

4. Choose the appropriate next step:

- Add another action using the recorder.

  See Add an Action to a Robot.

- Pause the recorder so you can figure out your next steps. Select **Pause** in the Smart Recording window in the lower-left corner of the browser.
- Stop the recorder and return to the canvas. Select **Stop** in the Smart Recording window in the lower-left corner of the browser.

  If you close the application that you're recording in, you can still stop the recorder. Select **Stop** in the toolbar of the canvas.

- Customize the action you just added, such as by creating validation or identifying the screenshots to capture. Stop the recording, double-click the action on the canvas, and update the action as needed.

  All actions are read-only until you stop the recorder.

5. Above the canvas, select **Save**.

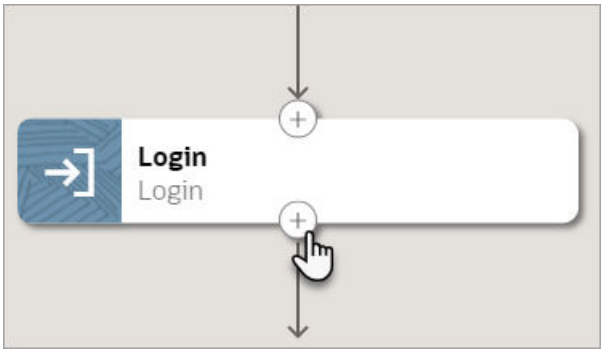
Add a Click Element Using the Low-Code Tools

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.



A menu of available actions appears.

b. Select **Click Element**.

A Click Element action appears on the canvas, and the Click Element panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, specify input details for the action.

a. In another browser window or tab, open the application where the robot works.

b. In the robot, click within the **Locator** field, and select **Target a page element** .

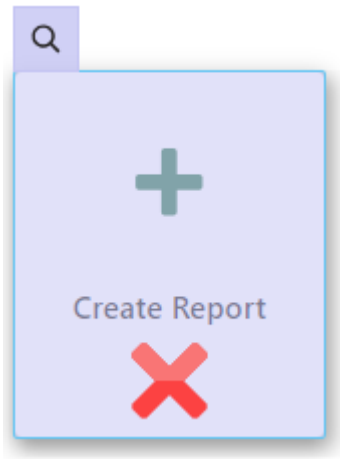
The Target a page element panel appears.

c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

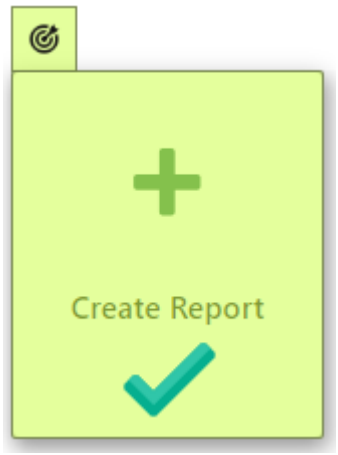
The application opens.

d. In the application where the robot works, point to the field that the robot must click, but don't select it yet.

For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

5. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

6. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

7. Click **OK**.
8. Above the canvas, select **Save**.

Add a Close Browser Action

The close browser action closes the web browser that the robot is working in.

Use Case

You typically use the close browser action with the switch browser action. For example, get data from one browser, and then switch to a different browser window to paste the values into the application or get more data.

Add a Close Browser Action

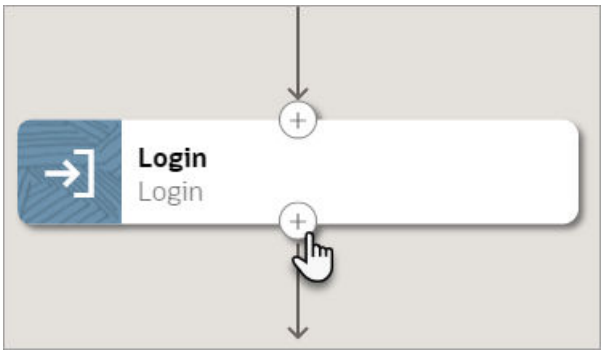
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Close Browser**.

   A Close Browser action appears on the canvas, and the Close Browser panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. Click **OK**.

5. Above the canvas, select **Save**.

Add a Data Stitch Action

A data stitch lets you perform an action on the data that a robot collects. With a data stitch, you can move data across variables and output properties.

Use Cases

Unlike other robot actions, a data stitch doesn't allow a robot to interact with an application's user interface. Instead, it allows you to manipulate data.

For example, you can build an array of data or a list structure by assigning and appending values for variables and output properties. You often use a data stitch when a robot produces an output that is a collection.

A data stitch has two operations: assign and append.

Use case	Description
Assign a value	The assign operation for a data stitch action assigns a new value to a variable. For example, consider a robot that needs to provide the total value of an invoice. The robot uses the get text action to obtain two values: an invoice value and a tax value. The robot assigns the values to two variables. Next, the robot must add these values to calculate the total value of the invoice. To add these values, create an expression and assign the total to an output variable; complete these tasks in a data stitch action.

Use case	Description
Append a value	The append operation for a data stitch action preserves the existing value for a variable and appends a new value as a suffix. Use the append operation to build a collection as a response or output from a robot. For example, consider a robot that updates a set of invoices. Use a foreach loop to update each invoice, one at a time. To provide the robot with the invoice numbers to update, define the input's trigger, which is a collection that holds arrays of values for each property. After the foreach loop processes each invoice, the data stitch action inserts the invoice number into another variable.

For more details and other use cases, see the following:

- Use Case: Save Data After Iterating on Invoices
- Use Case: Save Values After Iterating on a Table

Add a Data Stitch Action

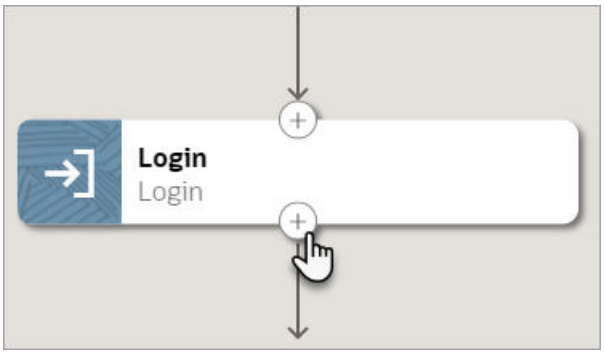
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Data Stitch**.

   A data stitch action appears on the canvas, and the Data Stitch panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. Specify how you need to manipulate data.

a. Select **Add assignment**.

   The cursor appears in the Variable field, and the Variables panel appears.

b. Drag a variable to the **Variable** field.

   The data stitch action assigns or appends a value to a variable. This variable receives the value.

c. From the **Operation** drop-down, select one of the following options:

   - **Assign:** The robot must assign a new value to the variable that you selected.
   - **Append:** The robot must preserve the existing value in the variable and append a new value as a suffix.

d. In the **Value** field, enter the value to assign or append to the variable that you selected for the **Variable** field.

   For example, you might drag a variable to the field, hard code a value, or compute a value using an expression.

5. Add additional assignments to the data stitch as needed.
6. Click **OK**.
7. Above the canvas, select **Save**.

Add a Download File Action

The download file action downloads a file so that an integration can act upon the file. The downloaded file is also saved to the home directory of the computer where the robot ran.

Where the File Is Saved

The downloaded file is saved to the following location on the computer or virtual machine where the robot ran:

USER_HOME`/.orpa/instances/`*instance_id*`/output/download`

Where:

- *USER_HOME* is the home directory, such as `C:\Users\JohnSmith`
- *instance_id* is the identifier of the robot instance

Add a Download File Action

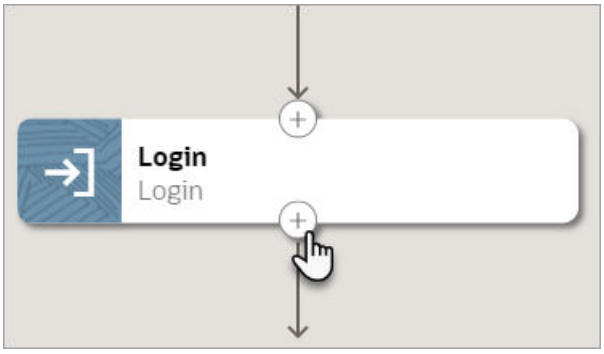
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.



A menu of available actions appears.

b. Select **Download File**.

A Download File action appears on the canvas, and the Download File panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, specify input details for the action.

a. In another browser window or tab, open the application where the robot works.

b. In the robot, click within the **Locator** field, and select **Target a page element** .

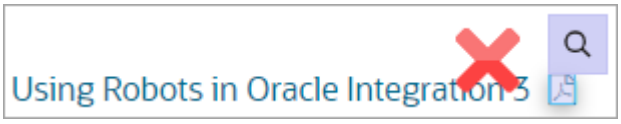
The Target a page element panel appears.

c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

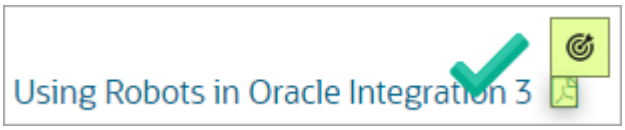
The application opens.

d. In the application, point to a file link, but don't select it.

For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

f. For **Maximum download wait time**, enter the maximum time in seconds to wait for the file to download.

   If a download attempt isn't successful, the robot retries approximately every 60 seconds, so consider entering a value that is a multiple of 60.

   The robot moves on to the next action immediately after the download is successful.

5. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

6. On the **Output** tab, specify the robot resource that you want to assign the file to. You have the following options:

   - Assign the file to a variable.

     a. Click within the **Save to** field, and select **Variables** (x).

        The Variables panel appears.

     b. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable.

     c. Select a variable that is of the `File` type and that isn't a collection, and drag it to the **Save to** field.

   - Assign the file to an output.

     a. Click within the **Save to** field, select **More options**, and then select **Output**.

        The Output panel appears.

     b. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output.

     c. Select an output that is of the `File` type and that isn't a collection, and drag it to the **Save to** field.

7. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

8. Click **OK**.

9. Above the canvas, select **Save**.

Add an Enter Text Action

The enter text action inserts a value into a field in a user interface.

Use Cases

You typically use the enter text action in a text field that is coded as an `<input>` field in the page's HTML.

The robot can enter any of the following values into the field:

- A variable
- An input parameter
- A hard-coded value

Additionally, the robot can press **Enter** after entering a value.

Add an Enter Text Action Using the Recorder

Before you add the action, consider creating the robot resources that the robot action requires, such as a variable or a trigger's input and output. Otherwise, just pause the recorder and create the resources when you need them.

1. Open the robot to edit.

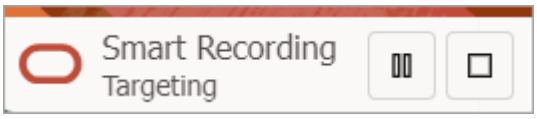
   See Open a Robot.

2. Start the recorder.
   a. On the canvas, select the action to record after.
   b. On the toolbar, select **Record after the selected action** .
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works. You might need to scroll to find it.

      If the application doesn't appear, close the panel, open the application in another tab, and start the recorder again.

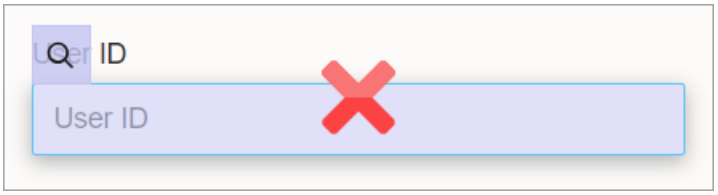
      A splash screen appears, and the RPA Smart Recording panel appears.
   d. Select **Begin Recording**.

      The Smart Recording window appears in the lower-left corner of your browser. Additionally, your mouse cursor can now target elements in the user interface.



3. Identify the element in the user interface that the robot interacts with.
   a. Point to the field that the robot needs to interact with, but don't select it yet.

      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



   b. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

For more tips, see Quick Start for Building Robots.

A panel appears with details about the element you selected.

c. Review and update the fields as needed.

- **Name:** Enter the name of the target. This text appears on the robot action in the canvas and in the list of targets in the robot.

  Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

- **Target name:** Review the XML Path Language, or XPath, for the element that you selected. Underscores (_) appear in place of invalid characters. You can update the value, if you want.

- **Element:** Review the HTML element that you selected. If you selected the wrong element type, select **Discard** in the panel, and select a different element.

- **Action:** Select **Enter Text**.

- **Value:** Enter the value that the robot must insert into the field.

  The following instructions are for selecting a variable. To review all of your options for the value, see Define the Fields of an Action.

  i. Select within the **Value** field, and select **Variables** (x).

     The Variables panel appears.

  ii. If the variable to use doesn't exist yet, create it. See Create a Variable.

  iii. From the **Available variables** list, select a variable, and drag it to the **Value** field.

- **Test value:** Provide a value to enter into the field now so that you can continue with the recording.

d. Select **Save**.

4. Choose the appropriate next step:

- Add another action using the recorder. See Add an Action to a Robot.

- Pause the recorder so you can figure out your next steps. Select **Pause** ⏸ in the Smart Recording window in the lower-left corner of the browser.

- Stop the recorder and return to the canvas. Select **Stop** ⏹ in the Smart Recording window in the lower-left corner of the browser.

  If you close the application that you're recording in, you can still stop the recorder. Select **Stop** ⏹ in the toolbar of the canvas.

- Customize the action you just added, such as by creating validation or identifying the screenshots to capture. Stop the recording, double-click the action on the canvas, and update the action as needed. All actions are read-only until you stop the recorder.

5. Above the canvas, select **Save**.

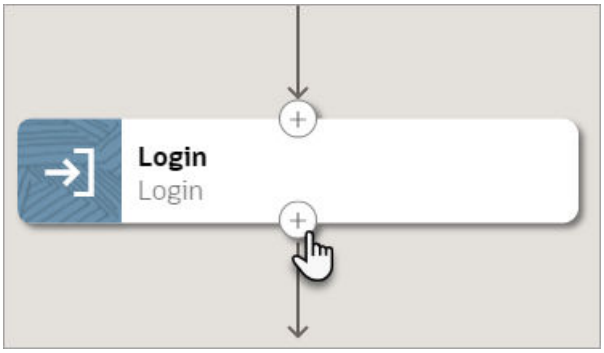
Add an Enter Text Action Using the Low-Code Tools

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Enter Text**.

   A Enter Text action appears on the canvas, and the Enter Text panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, specify input details for the action.

   a. In another browser window or tab, open the application where the robot works.

   b. In the robot, click within the **Locator** field, and select **Target a page element** .

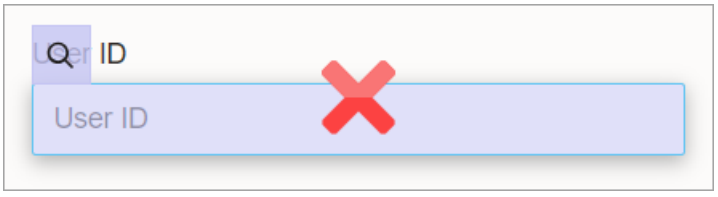
   The Target a page element panel appears.

   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

   The application opens.

   d. In the application where the robot works, point to the field where the robot must enter text, but don't click it yet.

   For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.

   e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

f. In the **Text** field, enter the value that the robot inserts into the field.

   The following instructions are for selecting a variable. To review all of your options for the value, see Define the Fields of an Action.

   i. Select within the **Text** field, and select **Variables** (x).

      The Variables panel appears.

   ii. If the variable to use doesn't exist yet, create it. See Create a Variable.

   iii. From the Available variables list, select a variable, and drag it to the **Text** field.

g. If the robot must press **Enter** after inserting the value into the field, select **Press ENTER key to finish action**.

5. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

6. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

7. Click **OK**.

8. Above the canvas, select **Save**.

Add a Get Text Action

The get text action collects a value from a user interface and then assigns the value to a variable or an output parameter.

Use Cases

Consider a scenario in which a robot verifies that the invoice totals in a report are identical to the actual invoice totals.

After the robot uses the get text action to obtain the total of each invoice, you can take the following actions:

- **Report the actual total of each invoice:** To complete this task, assign the value for an invoice total to an output parameter.

- **Complete additional processing on the invoice totals:** To complete this task, assign the value for an invoice total to a variable.

For another real-world use case, see Use Case: Save Values After Iterating on a Table.

Add a Get Text Action Using the Recorder

Before you add the action, consider creating the robot resources that the robot action requires, such as a variable or a trigger's input and output. Otherwise, just pause the recorder and create the resources when you need them.

1. Open the robot to edit.

   See Open a Robot.

2. Start the recorder.

   a. On the canvas, select the action to record after.

   b. On the toolbar, select **Record after the selected action** ○.

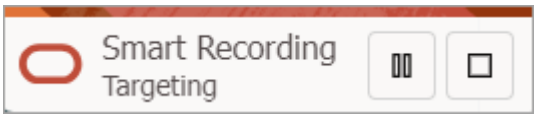
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works. You might need to scroll to find it.

      If the application doesn't appear, close the panel, open the application in another tab, and start the recorder again.

      A splash screen appears, and the RPA Smart Recording panel appears.

   d. Select **Begin Recording**.

      The Smart Recording window appears in the lower-left corner of your browser. Additionally, your mouse cursor can now target elements in the user interface.

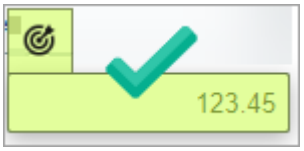
3. Identify the element in the user interface that the robot needs to interact with.

   a. Point to the field that the robot needs to interact with, but don't select it yet.

      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.

   b. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

      For more tips, see Quick Start for Building Robots.

      A panel appears with details about the element you selected.

   c. Review and update the fields as needed.

- **Name:** Enter the name of the target. This text appears on the robot action in the canvas and in the list of targets in the robot.

  Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

- **Target name:** Review the XML Path Language, or XPath, for the element that you selected. Underscores (_) appear in place of invalid characters. You can update the value, if you want.
- **Element:** Review the HTML element that you selected. If you selected the wrong element type, select **Discard** in the panel, and select a different element.
- **Action:** Select **Get Text**.

d. For **Save to**, specify where to save the text that you get from the field. You have the following options:

- Assign the value to a variable.

  i. Click within the **Save to** field, and select **Variables** (x).

     The Variables panel appears.

  ii. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable.

  iii. Select the variable to assign the value to, and drag it to the **Save to** field.

- Assign the value to a property of the output.

  i. Click within the **Save to** field, select **More options**, and then select **Flow Input/Output**.

     The Input & Output panel appears.

  ii. Select the **Output** tab.

  iii. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output.

  iv. Select the output to assign the value to, and drag it to the **Save to** field.

e. Select **Save**.

4. Choose the appropriate next step:

- Add another action using the recorder.

  See Add an Action to a Robot.

- Pause the recorder so you can figure out your next steps. Select **Pause** in the Smart Recording window in the lower-left corner of the browser.
- Stop the recorder and return to the canvas. Select **Stop** in the Smart Recording window in the lower-left corner of the browser.

  If you close the application that you're recording in, you can still stop the recorder. Select **Stop** in the toolbar of the canvas.

- Customize the action you just added, such as by creating validation or identifying the screenshots to capture. Stop the recording, double-click the action on the canvas, and update the action as needed.

  All actions are read-only until you stop the recorder.

5. Above the canvas, select **Save**.

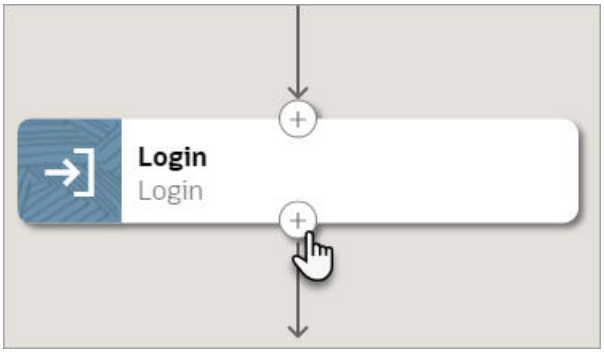
Add a Get Text Action Using the Low-Code Tools

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Get Text**.

   A Get Text action appears on the canvas, and the Get Text panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, specify input details for the action.

   a. In another browser window or tab, open the application where the robot works.

   b. In the robot, click within the **Locator** field, and select **Target a page element** .

   The Target a page element panel appears.

   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

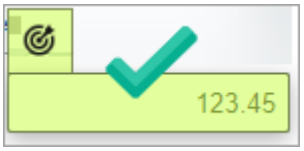
   The application opens.

   d. In the application where the works, point to the field where the robot gets text, but don't select it yet.

   For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.

   e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

5. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

6. On the **Output** tab, specify where to save the text that you get from the field. You have the following options:

   - Assign the value to a variable.

     a. Click within the **Save to** field, and select **Variables** (x).

        The Variables panel appears.

     b. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable.

     c. Select the variable to assign the value to, and drag it to the **Save to** field.

   - Assign the value to a property of the output.

     a. Click within the **Save to** field, select **More options**, and then select **Output**.

        The Output panel appears.

     b. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output.

     c. Select the output to assign the value to, and drag it to the **Save to** field.

7. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

8. Click **OK**.

9. Above the canvas, select **Save**.

Add a List Action

The list action interacts with a list, such as by selecting or deselecting one or more items, or by getting the value of one or more items.

Use Cases

This action has specific requirements for the page's underlying HTML code.

You can use this action only when a UI element has a web element of `select`. For drop-down and multi-select lists, the HTML code might wrap the `select` element in an `option` element.

Add a List Action Using the Recorder

1. Open the robot to edit.

   See Open a Robot.

2. Start the recorder.

   a. On the canvas, select the action to record after.

   b. On the toolbar, select **Record after the selected action** ○.

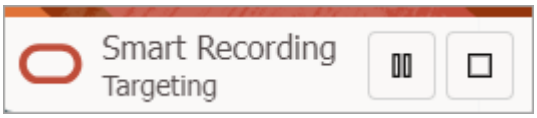
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works. You might need to scroll to find it.

      If the application doesn't appear, close the panel, open the application in another tab, and start the recorder again.

      A splash screen appears, and the RPA Smart Recording panel appears.

   d. Select **Begin Recording**.

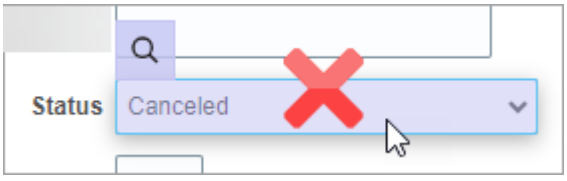
      The Smart Recording window appears in the lower-left corner of your browser. Additionally, your mouse cursor can now target elements in the user interface.

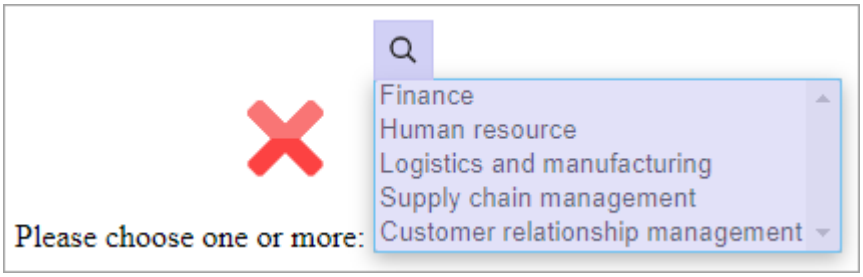


3. Identify the list that the robot interacts with.

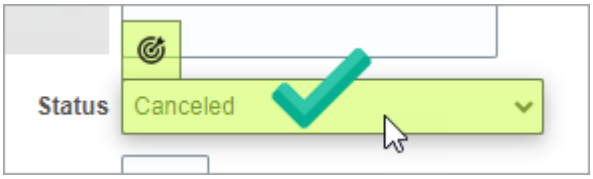
   a. Point to the list, but don't select it yet.

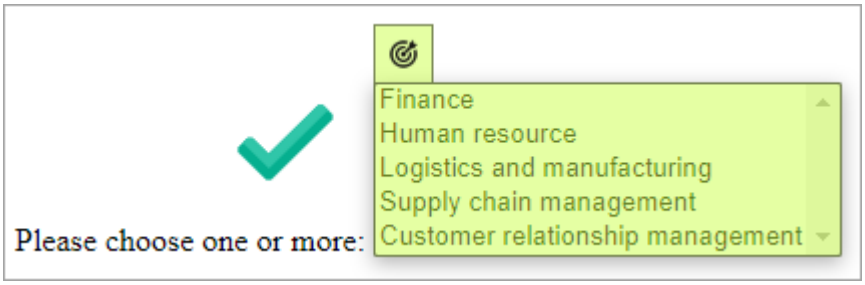
      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.





   b. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.





For more tips, see Quick Start for Building Robots.

A panel appears with details about the element you selected.

c. Review and update the fields as needed.

- **Name:** Enter the name of the target. This text appears on the robot action in the canvas and in the list of targets in the robot.

  Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

- **Target name:** Review the XML Path Language, or XPath, for the element that you selected. Underscores (_) appear in place of invalid characters. You can update the value, if you want.

- **Action:** Select how the robot interacts with the list. See Operations for the List Action.

d. For **Save to**, if you selected an operation that gets a label or value, specify where to save it. You have the following options:

- Assign the value to a variable.

  i. Click within the **Save to** field, and select **Variables** (x).

     The Variables panel appears.

  ii. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable.

  iii. Select the variable to assign the value to, and drag it to the **Save to** field.

- Assign the value to a property of the output.

  i. Click within the **Save to** field, select **More options**, and then select **Flow Input/Output**.

     The Input & Output panel appears.

  ii. Select the **Output** tab.

  iii. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output.

  iv. Select the output to assign the value to, and drag it to the **Save to** field.

e. Select **Save**.

4. Choose the appropriate next step:
   - Add another action using the recorder. See Add an Action to a Robot.
   - Pause the recorder so you can figure out your next steps. Select **Pause** in the Smart Recording window in the lower-left corner of the browser.
   - Stop the recorder and return to the canvas. Select **Stop** in the Smart Recording window in the lower-left corner of the browser.

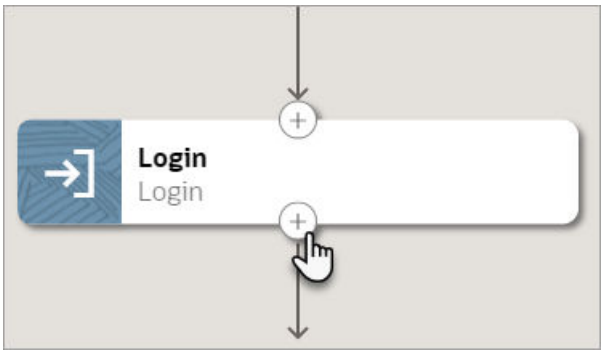
     If you close the application that you're recording in, you can still stop the recorder. Select **Stop** in the toolbar of the canvas.
   - Customize the action you just added, such as by creating validation or identifying the screenshots to capture. Stop the recording, double-click the action on the canvas, and update the action as needed. All actions are read-only until you stop the recorder.
5. Above the canvas, select **Save**.

Add a List Action Using the Low-Code Tools

1. Open the robot to edit.

   See Open a Robot.
2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **List**.

   A List action appears on the canvas, and the List panel appears.
3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.
4. From the **Selection List Type** drop-down, select the type of list that the robot interacts with.

Option	Description
Single Selection List	The list allows you to select only one option. If the robot will select only one option, but the list allows multiple items to be selected, select **Multiple Selection List** instead.

Option	Description
Multiple Selection List	The list allows you to select one or more options.

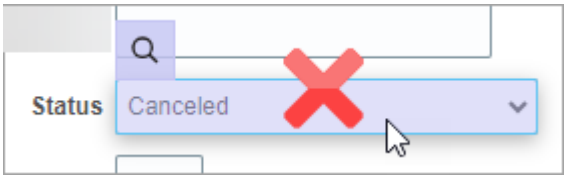
5. From **Operations**, select how the robot interacts with the list. See Operations for the List Action.
6. On the **Input** tab, specify input details for the action.
   a. In another browser window or tab, open the application where the robot works.
   b. In the robot, click within the **Locator** field, and select **Target a page element**.

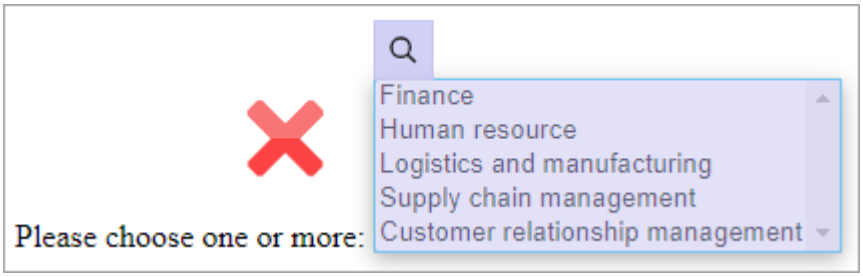
      The Target a page element panel appears.
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

      The application opens.
   d. In the application that the robot needs to work in, point to the list that the robot needs to interact with, but don't select the list yet.

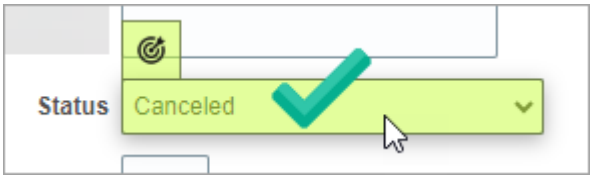
      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.

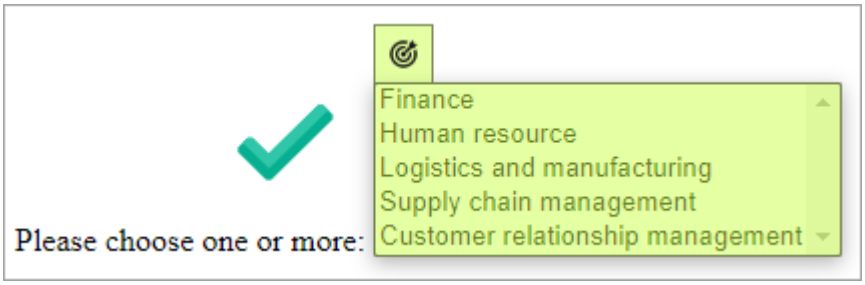
      Regardless of the operation that you chose, always point to the list itself.





   e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.





For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

7. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

   If you choose an operation that gets a label or value, Oracle recommends taking a screenshot of the list.

8. On the **Output** tab, specify where to save the value(s) that you got from the action.

   The Output tab appears for only some operations, including **Get Selected List Label(s)** and **Get Selected List Value(s)**.

   - Assign the value to a variable.

     a. Click within the **Save to** field, and select **Variables** (x).

        The Variables panel appears.

     b. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable.

     c. Select the variable to assign the value to, and drag it to the **Save to** field.

        If the action interacts with a multiselect list, you must select a collection variable, even if the operation gets a single value. If the action interacts with a single-select list, you must select a non-collection variable. Otherwise, an error occurs for the action when you save the robot.

   - Assign the value to a property of the output.

     a. Click within the **Save to** field, select **More options**, and then select **Output**.

        The Output panel appears.

     b. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output.

     c. Select the output to assign the value to, and drag it to the **Save to** field.

        If the action interacts with a multiselect list, you must select a collection variable, even if the operation gets a single value. If the action interacts with a single-select list, you must select a non-collection variable. Otherwise, an error occurs for the action when you save the robot.

9. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

10. Click **OK**.

11. Above the canvas, select **Save**.

Operations for the List Action

Option	Description	Selection list type
Get Selected List Label	Get the label attribute of the selected item. If no items are selected in the list, the robot returns an empty value.	Single Selection List
Get Selected List Labels	Get the label attribute of every selected item. If no items are selected in the list, the robot returns an empty value.	Multiple Selection List
Get Selected List Value	Get the value attribute of the selected item. If no items are selected in the list, the robot returns an empty value.	Single Selection List
Get Selected List Values	Get the value attribute of every selected item. If no items are selected in the list, the robot returns an empty value.	Multiple Selection List
Select From List By Index	Select one or more items in the list. The robot uses the HTML index attribute that you provide to determine the items to select. The indexes of list options start from 0: The first entry in the list is numbered 0, the second entry is numbered 1, and so on.	Single Selection List Multiple Selection List
Select From List By Label	Select one or more items in the list. The robot uses the HTML label attribute that you provide to determine the items to select.	Single Selection List Multiple Selection List
Select From List By Value	Select one or more items in the list. The robot uses the HTML value attribute that you provide to determine the items to select.	Single Selection List Multiple Selection List
Unselect From List By Index	Deselect one or more items in a list. The robot uses the HTML index attribute that you provide to determine the items to select. The indexes of list options start from 0: The first entry in the list is numbered 0, the second entry is numbered 1, and so on.	Multiple Selection List
Unselect From List By Label	Deselect one or more items in a list. The robot uses the HTML label attribute that you provide to determine the items to select.	Multiple Selection List
Unselect From List By Value	Deselect one or more items in a list. The robot uses the HTML value attribute that you provide to determine the items to select.	Multiple Selection List

Add a Log Action

The log action adds a message to the activity stream for a robot instance. Unlike other robot actions, the log action doesn't interact with the user interface.

Use Cases

You can record any message to the activity stream, but you typically record a value that the robot obtains. For example, you might record the value from a get text action. The value could be the output of the robot or a value that the robot obtains and later updates using logic.

Add a Log Action

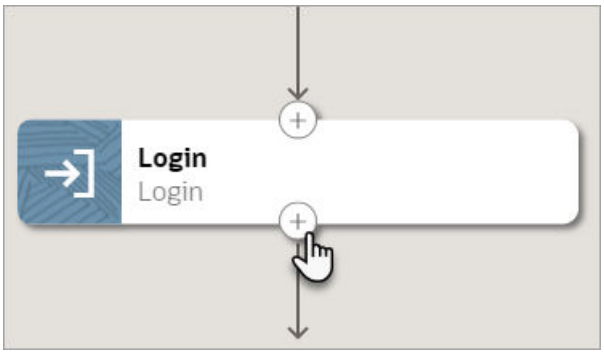
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Log**.

   A Log action appears on the canvas, and the Log panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. In the **Message** field, enter the message to record in the activity stream.

   The message can include some or all of the following information:

   - Typed text
   - Variables
   - User interface element
   - Input and output properties from the trigger

- Fields from a robot connection

For details on how to include these values in a message, see Define the Fields of an Action.

5. Click **OK**.
6. Above the canvas, select **Save**.

Add a Login Action

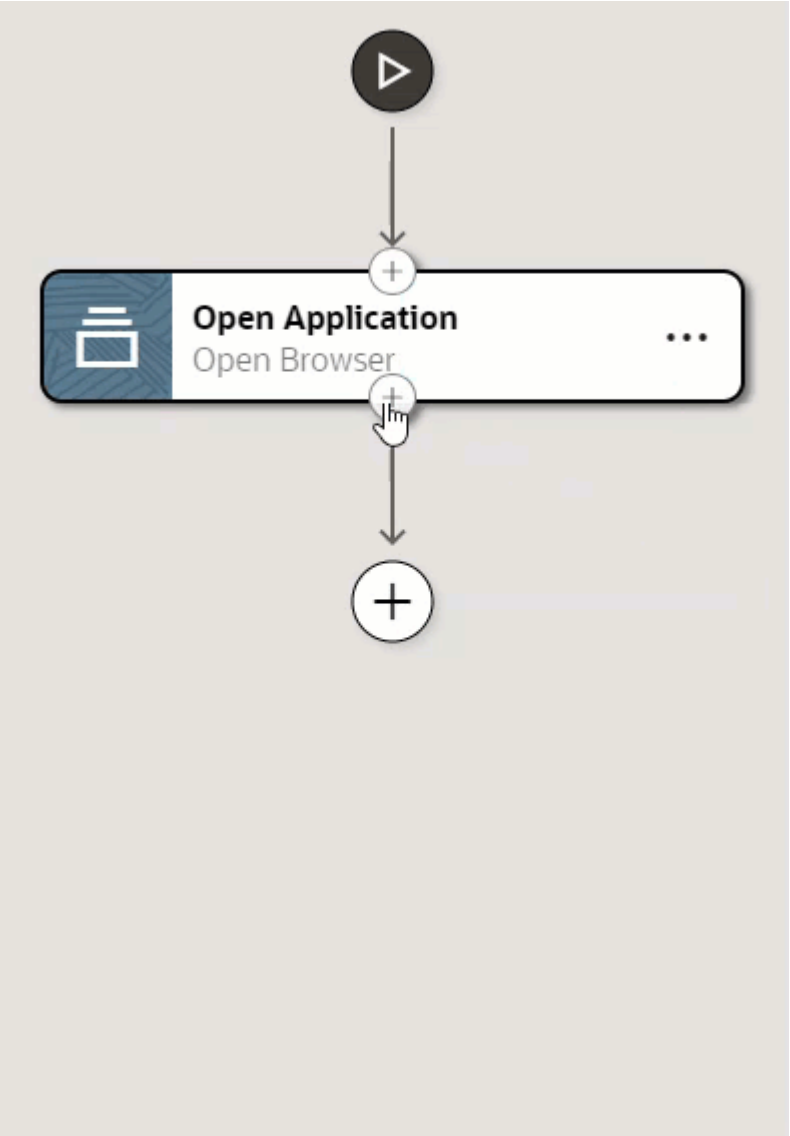
The login action enters a robot's user name and password and signs the robot in to an application.

> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.
2. Add the action to the robot.
   a. On the canvas, point to an action, and click **+**.

      A menu of available actions appears.



b. Select **Login**.

   A Login action appears on the canvas, and the Login panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, enter the robot's credentials.

   a. Select within the **Username** field.

      This field is for the robot's user name for the application. You can hard-code a value, but Oracle recommends specifying a property from the robot connection instead. When you need to update this value in the future, such as to point to a production instance of an application, all you need to do is update the value in the robot connection.

      To specify a property from the robot connection, continue following these steps. Or, to review all your options for specifying a value, see Define the Fields of an Action.

   b. In the field, select **More options** ⋯, and then select **Robot connections**.

The Robot connections panel appears.

c. In the list, expand the entry for a robot connection.

d. Drag a parameter for the robot connection to the field.

e. Repeat these steps for the **Password** field, which holds the robot's password for the application.

5. On the **Input** tab, specify input details for the action.

a. In another browser, open the sign-in page for the application where the robot works.

b. In the robot, select within the **Username locator** field, and select **Target a page element** .

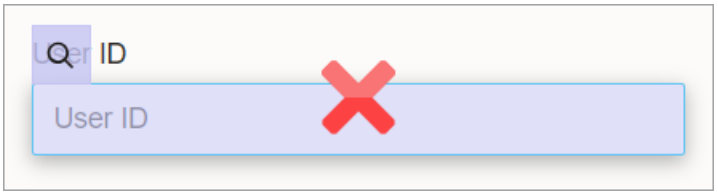
The Target a page element panel appears.

c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

The application opens.

d. In the application that the robot needs to work in, point to the field where the robot needs to enter its user name, but don't select the field yet.

For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Username locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

f. Repeat the previous steps for the following fields:

- **Password locator:** Select the field that the robot enters the password into.
- **Submit locator:** Select the button or link that the robot clicks to sign in to the application, such as a **Sign In** or **Submit** button.

6. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

7. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

8. Click **OK**.

9. Above the canvas, select **Save**.

Add an Open Browser Action

The open browser action opens a browser window and enters the URL for an application or website. The open browser action is included in every robot, though you still need to specify the details for the action, including the URL to open.

> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

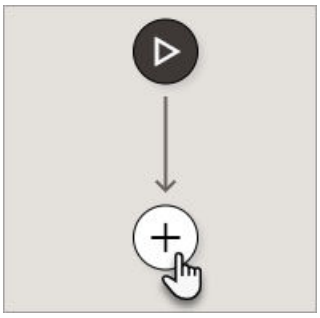
1. Open the robot to edit.

   See Open a Robot.

2. If the robot doesn't contain an open browser action, add it.

   Every new robot includes an open browser action, but if you removed it, you can add it back.

   a. Select **Click to insert an action +**.

   A menu of available actions appears.

   b. Select **Open Browser**.

   A open browser action appears on the canvas, and the Open Browser panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, enter information about the browser.

   a. Select within the **URL** field.

   This field is for the URL that the robot opens. You can hard-code a value, but Oracle recommends specifying a property from the robot connection instead. When you need

to update this value in the future, such as to point to a production instance of an application, all you need to do is update the value in the robot connection.

To specify a property from the robot connection, continue following these steps. Or, to review all your options for specifying a value, see Define the Fields of an Action.

b. In the field, select **More options** ⋯, and then select **Robot connections**.

The Robot connections panel appears.

c. In the list, expand the entry for a robot connection.

d. Drag a parameter for the robot connection to the field.

e. From the **Browser** field, select a browser from the list of options. This list includes all supported browsers, not just the browsers that are installed on a given environment. Make sure you select a browser that is installed on the environment where the robot will run.

f. If the browser that the robot runs in should run without launching a visible browser on the computer or virtual machine, select **Headless**.

The robot runs the same regardless of your selection. For example, the browser page renders as expected, and the robot captures screenshots as expected. The only difference is that the browser is never visible on the computer. The headless option is useful if the robot works on a computer that a person works on. With a headless browser, the robot doesn't interrupt the person, and the person can't interrupt the robot.

5. On the **Input** tab, if you want to capture a screenshot after the robot opens the browser, select **Full page screenshot after this action**.

6. If you need to switch back to this browser later in the robot: On the **Output** tab, select the variable that stores the index for the browser session.

The index is an assigned number. The index for the first open browser action in the robot is 1, the index for the second browser action in the robot is 2, and so on.

If the entire robot stays in a single internet browser, or if the robot opens one or more other internet browsers and doesn't need to return to this browser, you don't need to enter any values on the Output tab.

> **Tip:**
>
> To learn more about how to switch between browsers, see Use Case: Switch Browsers.

a. Select within the **Save to** field, and select **Variables** (x).

The Variables panel appears.

b. If the variable to use doesn't exist yet, create it. See Create a Variable.

c. From the Available variables list, select a variable, and drag it to the **Save to** field.

7. On the **Post Validate** tab, specify whether to complete any validation after the action.

See Add Validation to a Robot Action.

8. Click **OK**.

9. Above the canvas, select **Save**.

Next, define additional actions if needed. For example, the robot might need to sign in to the application you just opened. See Add a Login Action.

For all available actions, see Add an Action to a Robot.

Add a Radio Button Action

The radio button action interacts with a radio button, such as by selecting it, determining whether *any* radio buttons in a group are selected, or determining whether a *specific* radio button is selected.

Use Case

This action has specific requirements for the page's underlying HTML code. You can use this action only when a UI element has a tag name of `INPUT` and a type attribute of `radio`.

Add a Radio Button Action Using the Recorder

1. Open the robot to edit.

   See Open a Robot.

2. Start the recorder.

   a. On the canvas, select the action to record after.

   b. On the toolbar, select **Record after the selected action** .

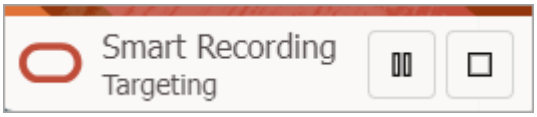
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works. You might need to scroll to find it.

      If the application doesn't appear, close the panel, open the application in another tab, and start the recorder again.

      A splash screen appears, and the RPA Smart Recording panel appears.

   d. Select **Begin Recording**.

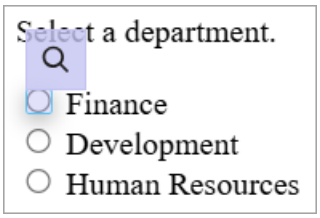
      The Smart Recording window appears in the lower-left corner of your browser. Additionally, your mouse cursor can now target elements in the user interface.

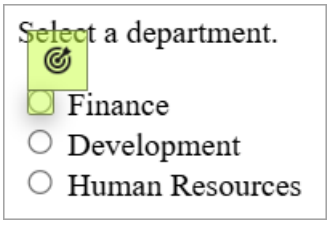
3. Identify the radio button that the robot interacts with.

   a. Point to the radio button, but don't select it yet.

      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.

   b. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



For more tips, see Quick Start for Building Robots.

A panel appears with details about the element you selected.

c. Review and update the fields as needed.

- **Name:** Enter the name of the target. This text appears on the robot action in the canvas and in the list of targets in the robot.

  Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

- **Target name:** Review the XML Path Language, or XPath, for the element that you selected. Underscores (_) appear in place of invalid characters. You can update the value, if you want.

- **Action:** Select how the robot interacts with the radio button. See Operations for the Radio Button Action.

The action that you select determines the other fields that appear.

d. Provide values for the action that you selected.

Action	Fields to update
Is Radio Button Selected	• **Save to:** Specify where to save the answer about whether any radio buttons are selected. You have the following options: – Assign the value to a variable. i. Select the **Output** tab. ii. Click within the **Save to** field, and select **Variables** (x). The Variables panel appears. iii. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable. iv. Select the variable to assign the value to, and drag it to the **Save to** field. – Assign the value to a property of the output. i. Select the **Output** tab. ii. Click within the **Save to** field, select **More options**, and then select **Output**. The Output panel appears. iii. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output. iv. Select the output to assign the value to, and drag it to the **Save to** field.

Action	Fields to update
Is Radio Button Set To	• **Value:** Specify a radio button. The robot determines whether that specific option is selected. First, choose the radio button's label from the **Set Value** field, and then select **Set Runtime value**. • **Test value:** Optionally, specify a radio button. The recorder determines now whether that specific option is selected right now. First, choose the radio button's label from the **Set Value** field, and then select **Set Runtime value**. • **Save to:** Specify where to save the answer about whether a specific radio button is selected. You have the following options: – Assign the value to a variable. i. Select the **Output** tab. ii. Click within the **Save to** field, and select **Variables** (x). The Variables panel appears. iii. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable. iv. Select the variable to assign the value to, and drag it to the **Save to** field. – Assign the value to a property of the output. i. Select the **Output** tab. ii. Click within the **Save to** field, select **More options**, and then select **Output**. The Output panel appears. iii. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output. iv. Select the output to assign the value to, and drag it to the **Save to** field.
Select Radio Button	• **Value:** Specify the radio button that must be selected. First, choose the radio button's label from the **Set Value** field, and then select **Set Runtime value**. • **Test value:** Specify the radio button that must be selected now, while you record. First, choose the radio button's label from the **Set Value** field, and then select **Set Runtime value**. If needed, you can choose different values for these fields.

e. Select **Save**.

4. Choose the appropriate next step:
   - Add another action using the recorder. See Add an Action to a Robot.
   - Pause the recorder so you can figure out your next steps. Select **Pause** in the Smart Recording window in the lower-left corner of the browser.
   - Stop the recorder and return to the canvas. Select **Stop** in the Smart Recording window in the lower-left corner of the browser.

     If you close the application that you're recording in, you can still stop the recorder. Select **Stop** in the toolbar of the canvas.
   - Customize the action you just added, such as by creating validation or identifying the screenshots to capture. Stop the recording, double-click the action on the canvas, and update the action as needed. All actions are read-only until you stop the recorder.

5. Above the canvas, select **Save**.

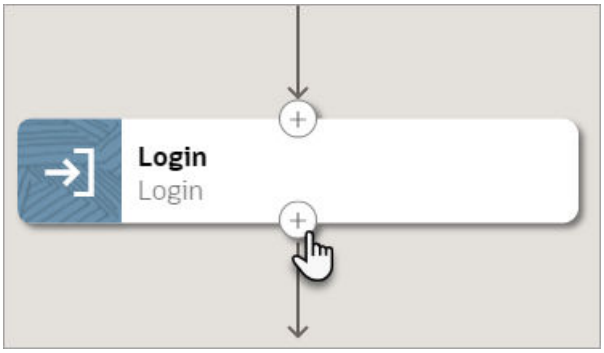
Add a Radio Button Action Using the Low-Code Tools

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Radio Button**.

   A Radio Button action appears on the canvas, and the Radio Button panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. From **Operations**, select how the robot interacts with the radio button.

   See Operations for the Radio Button Action.

5. On the **Input** tab, specify details for the **Value** field, if it appears.

   If the operation that you selected requires you to target an individual radio button, the Value field appears on the Input tab.

   a. In another browser window or tab, open the application where the robot works.

   b. Right-click the radio button that the robot needs to interact with, and select **Inspect**.

   c. In the HTML code for the page, locate the `id` or the `value` of the radio button.

   d. Type the value for the `id` or `value` into the **Value** field in the robot.

   You don't need to format the value in a specific way. For example, if the `id` is `choice1`, type `choice1`.

6. On the **Input** tab, specify details for the **Group Name** field.

   Every operation requires you to select the radio button group.

   a. In another browser window or tab, open the application where the robot works.

   If you opened the application already, you don't need to open it again.

   b. Right-click one the radio button group that the robot needs to interact with, and select **Inspect**.

c. In the HTML code for the page, locate the `name` for the radio buttons in the radio button group.

d. Type the value for the `name` into the **Group Name** field in the robot.

7. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

8. If the **Output** tab appears, specify where to save the radio button information from this action. You have the following options:

   - Assign the value to a variable. The value is a boolean value, indicating whether a radio button is selected.

     a. Click within the **Save to** field, and select **Variables** (x).

        The Variables panel appears.

     b. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable. The variable must have a type of boolean.

     c. Select the variable to assign the value to, and drag it to the **Save to** field.

   - Assign the value to a property of the output. The value is a boolean value, indicating whether a radio button is selected.

     a. Click within the **Save to** field, select **More options**, and then select **Output**.

        The Output panel appears.

     b. Determine whether the output that you need appears in the list. If not, create it. See Create a Trigger's Input or Output. The property must have a type of boolean.

     c. Select the output to assign the value to, and drag it to the **Save to** field.

9. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

10. Click **OK**.

11. Above the canvas, select **Save**.

Operations for the Radio Button Action

Option	Description
Is Radio Button Selected	Determine whether *any* radio buttons in a group are selected.
Is Radio Button Set To	Determine whether a *specific* radio button is selected.
Select Radio Button	Select a radio button.

Add a Screenshot Action

The screenshot action captures a screenshot of a user interface and sends the file to the integration that ran the robot.

Use Cases

The screenshot action is different from the screenshots that you can capture before and after an action occurs as part of troubleshooting. See Capture Screenshots in Robots.

You typically use the screenshot action when the screenshots that are available within an action don't meet your requirements. For example:

- If an action opens a new tab or browser, use the screenshot action to capture an image of the new tab.
- If you need to send a screenshot to another application, use the screenshot action to capture the image.

Add a Screenshot Action

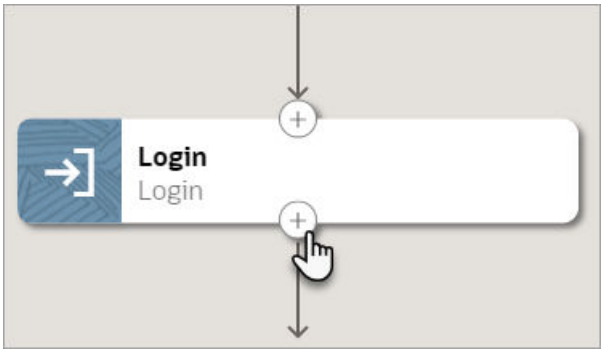
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Screenshot**.

   A Screenshot action appears on the canvas, and the Screenshot panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. Specify how much of the user interface to capture in the screenshot:

   - **Full page:** Capture the application's entire page in the screenshot.
   - **Element locator:** Capture only a specific element in the user interface in the screenshot.

     If you choose this option, the **Locator** field appears. In this field, specify the element to capture.

     a. In another browser window or tab, open the application where the robot works.

     b. In the robot, click within the **Locator** field, and select **Target a page element** .

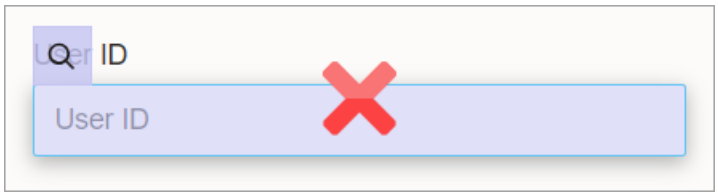
     The Target a page element panel appears.

c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

   The application opens.

d. In the application that the robot needs to work in, point to the field from which the robot needs to get text, but don't select the element yet.

   For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

   For more tips, see Quick Start for Building Robots.

   The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

5. Click **OK**.
6. Above the canvas, select **Save**.

Add a Switch Browser Action

The switch browser action stops a robot's work in a given window or tab and switches the robot to a different browser window or tab. The window or tab that the robot switches to must be open already.

Use Case

You can also use the switch browser action to move past pop-up windows and pages.

To read about a real-world use case, see Use Case: Switch Browsers.

Add a Switch Browser Action

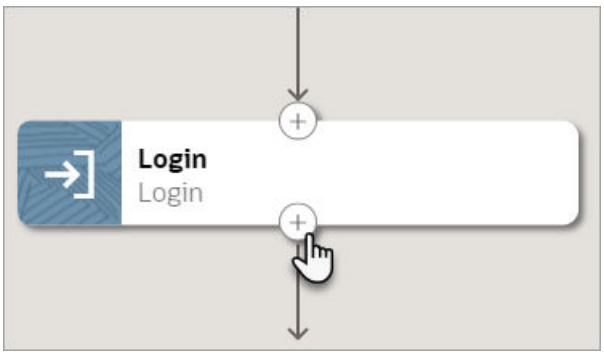
> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Switch Browser**.

   A Switch Browser action appears on the canvas, and the Switch Browser panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, in the **Browser window** field, specify the index value of the browser window to switch to.

   You define the index value using the output for an open browser action. You can select the variable that stores the index value or hard-code a value. The index for the first open browser action in the robot is 1, the index for the second browser action in the robot is 2, and so on.

   > **Tip:**
   >
   > To learn more about how to switch between browsers, see Use Case: Switch Browsers.

   a. Select within the **Browser window** field, and select **Variables** (x).

   The Variables panel appears.

   b. If the variable to use doesn't exist yet, create it. See Create a Variable.

c. From the **Available variables** list, select a variable, and drag it to the **Browser window** field.

5. On the **Input** tab, if you want to capture a screenshot after the robot switches browsers, select **Full page screenshot after this action**.
6. On the **Post Validate** tabs, specify whether to complete any validation after the action.

   See Add Validation to a Robot Action.
7. Click **OK**.
8. Above the canvas, select **Save**.

Add a Wait Until Element Is Visible Action

The "wait until element is visible" action pauses a robot until a specific element in a user interface is visible.

Use Cases

Every robot action includes optional validation. This validation is more robust than the "wait until element is visible" action and can handle nearly all wait-related activities.

Therefore, most of the time, you do not need to add the "wait until element is visible" action to any robot. For details about the validation on robot actions, see Add Validation to a Robot Action.

If you opt to add this action to a robot, specify the maximum time to wait, such as 30 seconds. As soon as the element becomes visible, even if the entire time period hasn't elapsed, the robot continues running. If the element doesn't appear within the time, the robot fails.

Add a Wait Until Element Is Visible Action Using the Recorder

Before you add the action, consider creating the robot resources that the robot action requires, such as a variable or a trigger's input and output. Otherwise, just pause the recorder and create the resources when you need them.

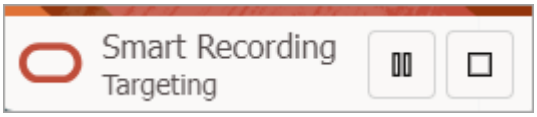
1. Open the robot to edit.

   See Open a Robot.
2. Start the recorder.
   a. On the canvas, select the action to record after.
   b. On the toolbar, select **Record after the selected action** ○.
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works. You might need to scroll to find it.

      If the application doesn't appear, close the panel, open the application in another tab, and start the recorder again.

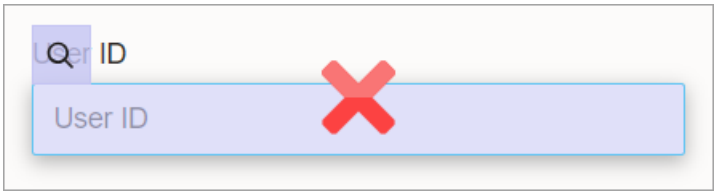
      A splash screen appears, and the RPA Smart Recording panel appears.
   d. Select **Begin Recording**.

      The Smart Recording window appears in the lower-left corner of your browser. Additionally, your mouse cursor can now target elements in the user interface.



3. Identify the element in the user interface that the robot needs to interact with.
   a. Point to the field that the robot needs to interact with, but don't select it yet.

      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



   b. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

      For more tips, see Quick Start for Building Robots.

      A panel appears with details about the element you selected.

   c. Review and update the fields as needed.

      - **Name:** Enter the name of the target. This text appears on the robot action in the canvas and in the list of targets in the robot.

        Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

      - **Target name:** Review the XML Path Language, or XPath, for the element that you selected. Underscores (_) appear in place of invalid characters. You can update the value, if you want.

      - **Element:** Review the HTML element that you selected. If you selected the wrong element type, select **Discard** in the panel, and select a different element.

      - **Action:** Select **Wait Until Element Is Visible**.

   d. Select **Save**.

4. Choose the appropriate next step:

   - Add another action using the recorder.

     See Add an Action to a Robot.

   - Pause the recorder so you can figure out your next steps. Select **Pause** in the Smart Recording window in the lower-left corner of the browser.

   - Stop the recorder and return to the canvas. Select **Stop** in the Smart Recording window in the lower-left corner of the browser.

If you close the application that you're recording in, you can still stop the recorder.

Select **Stop** ☐ in the toolbar of the canvas.

- Customize the action you just added, such as by creating validation or identifying the screenshots to capture. Stop the recording, double-click the action on the canvas, and update the action as needed.

  All actions are read-only until you stop the recorder.

5. Above the canvas, select **Save**.

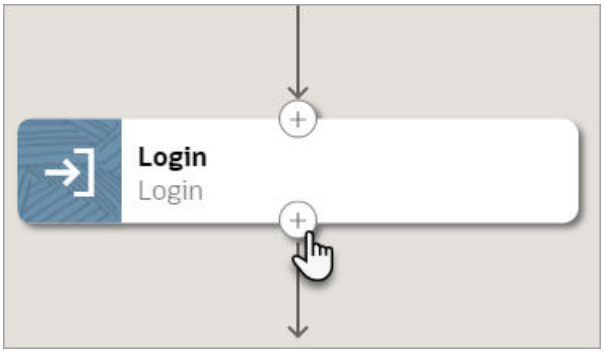
Add a Wait Until Element Is Visible Action Using the Low-Code Tools

1. Open the robot to edit.

   See Open a Robot.

2. Add the action to the robot.

   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

   b. Select **Wait Until Element Is Visible**.

   A Wait Until Element Is Visible action appears on the canvas, and the Wait Until Element Is Visible panel appears.

3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.

4. On the **Input** tab, specify input details for the action.

   a. In another browser window or tab, open the application where the robot works.

   b. In the robot, click within the **Locator** field, and select **Target a page element** .

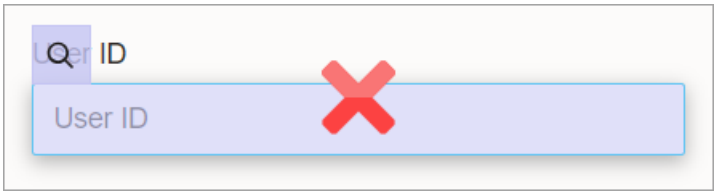
   The Target a page element panel appears.

   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

   The application opens.

   d. In the application that the robot needs to work in, point to the field that the robot needs to confirm is visible, but don't select the element yet.

   For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

f. In the **Timeout** field, enter the maximum amount of time wait in seconds.

5. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

6. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

7. Click **OK**.

8. Above the canvas, select **Save**.

Add a Web Table Action

The web table action lets you to identify the columns in a table that you are interested in. Add more actions to interact with the table cells.

Use Cases

Consider a table that contains invoice numbers in one column and a hyperlink in another column. Use a web table action to identify the two columns. Then, use a get text action to get each invoice number, and use a click element action to select each link. Include both of these actions within a foreach loop, which lets you iterate on multiple rows of data.

For a real-world scenario, see Use Case: Save Values After Iterating on a Table.

Requirements and Output

- You can use this action only for a UI element that is coded as a `table`.

- Create the web table definition first, and then add a web table action to a robot.

  The web table definition identifies the table that the robot interacts with. If the table changes, update the web table definition as needed.

  Then, when you add a web table action to a robot, you choose the web table definition to use.
- This action returns an output: A collection of HTML table rows for the columns that you select. Each row consists of key-value pairs:
  - The key is a column name.
  - The value is the XPath of a row cell.
- Only the get text and click element actions can interact with the XPath values that this action returns.

Step 1. Create a Web Table Definition

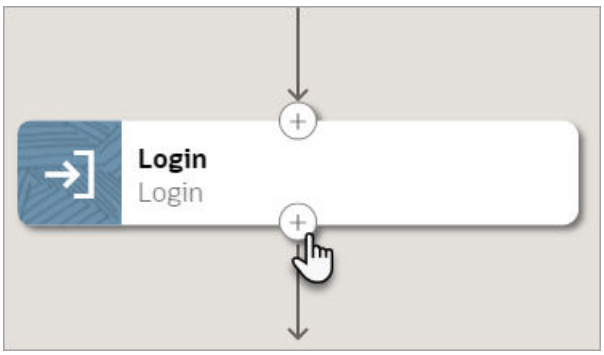
See Create a Web Table Definition.

Step 2. Add a Web Table Action

> **Note:**
>
> You must use the low-code capabilities to add this action to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.
2. Add the action to the robot.
   a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.
   b. Select **Web Table**.

   A Web Table action appears on the canvas, and the Web Table panel appears.
3. In the panel, enter a **Name** and **Description** for the action.

   The Name appears on the action in the canvas and should help you and others understand the goal of the action.
4. On the **Input** tab, select the web table definition that the action interacts with.

a. Click within the **Web Table** field, and select **Web Table** .

   The Web table definitions panel appears.

b. Drag a web table definition to the **Web Table** field.

5. On the **Input** tab, specify whether to capture any screenshots as part of the action.

   See Capture Screenshots in Robots.

6. On the **Output** tab, review the variable name that the table information is saved to.

   The web table action creates a custom data type and variable. The properties of the data type are the columns that you identified in the web table action. The variable is a collection of the data type that the web table action created.

7. On the **Pre Validate** and **Post Validate** tabs, specify whether to complete any validation before and after the action.

   See Add Validation to a Robot Action.

8. Click **OK**.

9. Above the canvas, select **Save**.

Your next steps depend upon your goals:

- To iterate over the records in the table, add a foreach loop.

  For more guidance, see Use Case: Save Values After Iterating on a Table.

- To record the values from the table to the activity stream, add a log action.

- To view the data type or variable that the web table action created, select **Data types** or **Variables** on the toolbar in the canvas.

Deeper Dive: Settings for Robot Actions

The settings on a robot action allow you to tailor the robot's behavior to meet your goals. Learn more about your options for customizing the behavior of robot actions.

What Do You Want to Learn About?

Goal	Link
Use one of the following placeholder values, rather than hard-coded values, when defining a robot action: • Robot connection • Target • Input or output property of a trigger • Variable	Define the Fields of an Action
Choose the screenshots to capture in a robot action	Capture Screenshots in Robots
Add validation to a robot action	Add Validation to a Robot Action

Define the Fields of an Action

If you're new to designing robots, spend some time familiarizing yourself with your options for defining the fields for an action.

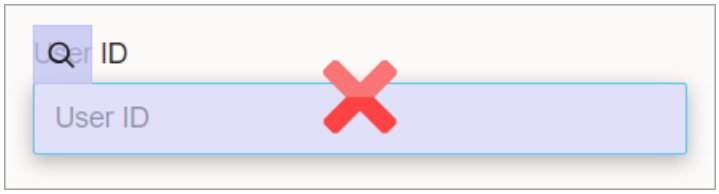
On This Page

How to Define Field Values

The following table helps you understand all the available options and how to apply them.

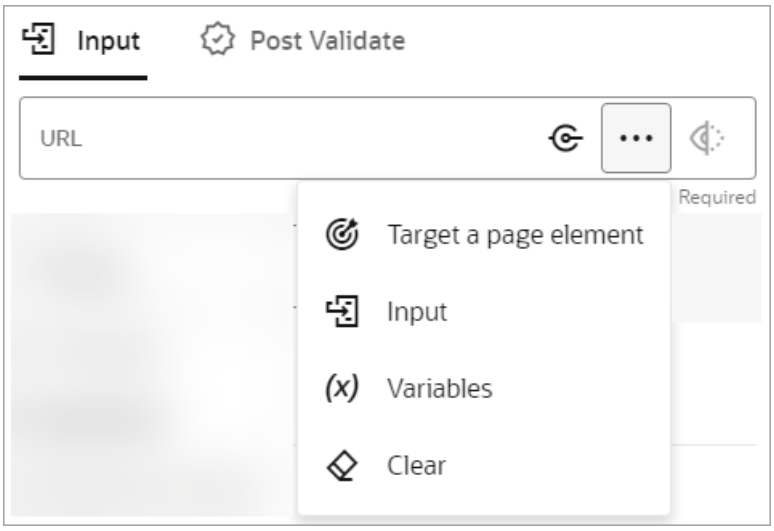
Some fields include only some of these options.

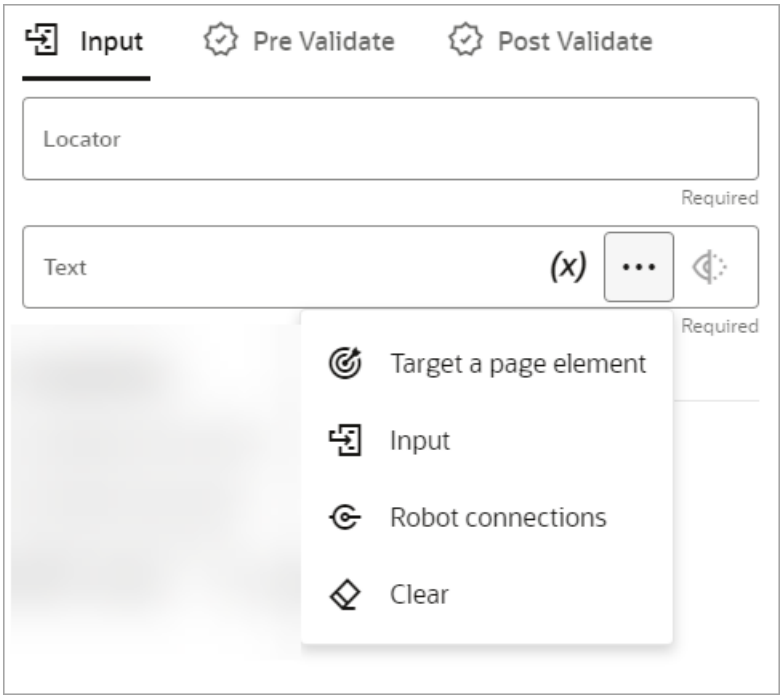
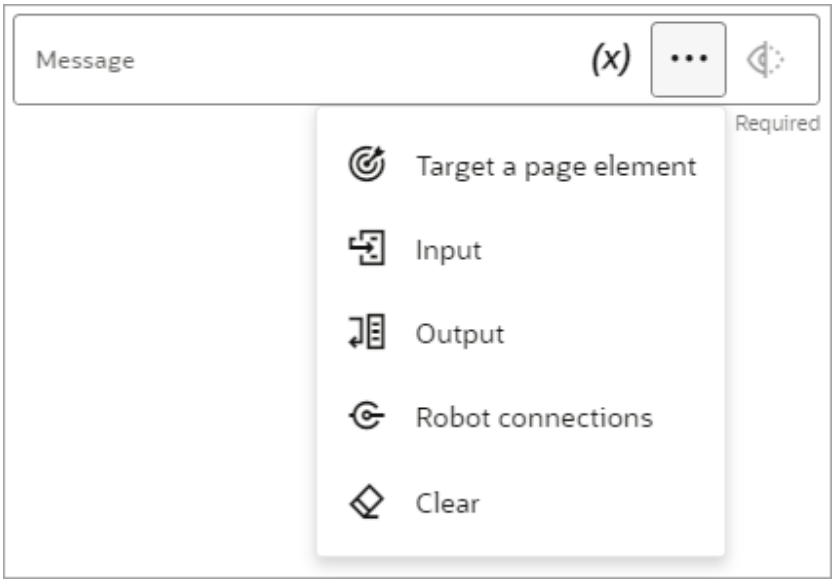
Goal	More information
Use a value from a robot connection **Robot connections**	1. In a robot action, select within the field to define, and select **Robot connections**. This option is sometimes in the **More options** menu. The Robot connections panel appears. 2. In the list, expand the entry for a robot connection. If you haven't created any robot connections, you can create one now. See Create a Robot Connection. 3. Drag a parameter for the robot connection to the field.

Goal	More information
Choose an element in a user interface **Target a page element**	**To select a field using the recorder:** 1. In a robot action, select within the field to define, and select **Target a page element**. This option is sometimes in the **More options** ••• menu. The Target a page element panel appears. 2. In the **Select browser tab to target** drop-down, select an application. 3. In the application, point to the UI element that the robot needs to interact with, but don't select the field yet. For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.  4. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.  **Tip:** Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.
Use an input property from the robot trigger **Input**	1. In a robot action, select within the field to define, and select **More options** •••, and then select **Input**. The Input panel appears. 2. From the **Properties** list, select a property, and drag it to the field. If you haven't created the input yet, you can create it now. See Create a Trigger's Input or Output.
Use an output property from the robot trigger **Output**	1. In a robot action, select within the field to define, and select **More options** •••, and then select **Output**. The Output panel appears. 2. From the **Properties** list, select a property, and drag it to the field. If you haven't created the output yet, you can create it now. See Create a Trigger's Input or Output.

Goal	More information
Use a project-level variable (x) **Variables**	1. In a robot action, select within the field to define, and select **Variables** (x). This option is sometimes in the **More options** ••• menu. The Variables panel appears. 2. If the variable to use doesn't exist yet, create it. See Create a Variable. 3. From the **Available variables** list, select a variable, and drag it to the field.
Hard code a value by typing text	In general, Oracle recommends using placeholder values rather than hard-coded values. Placeholder values are easy to reuse and update. However, you can hard-code a value if needed when defining a robot action. 1. In a robot action, select within the field to define. 2. Enter the value for the field.
Include an expression in a field	If you need to take action on a value, such as by using it to obtain a different value through a calculation, you can include an expression in a field. See Guidelines for Expressions.

Examples

Action	Example
Open browser	The URL field has offers several options for defining a value. 

Action	Example
Enter text	The Text field offers several options for defining a value. 
Log	The Message field offers several options for the data to include in the activity stream. 

Additional Options When Defining an Action

Each action has additional options that are specific to the action. For details, see Add an Action to a Robot.

Capture Screenshots in Robots

When you add an action to a robot, you have several options for capturing screenshots, including capturing a robot's view before and after completing an action.

Why Capture Screenshots?

Screenshots are typically most helpful when you are debugging and troubleshooting a new robot that is failing.

For example, if a robot's credentials don't have the appropriate access, a robot might not be able to see the field it needs to update. A screenshot of the missing field can help you quickly troubleshoot any issues that the robot encounters.

Keep in mind that a robot that captures screenshots sometimes run a little slower and captures more data than a robot that doesn't capture screenshots.

Screenshot Options

Most robot actions include the following options for capturing screenshots:

- **Before this action:** Take a screenshot of the application before the action occurs.
- **After this action:** Take a screenshot of the application after the action occurs.
- **Specify screenshot type:** Select the scope of the screenshot. To capture the entire application screen, select **Full page**. To capture only the UI element that the action affects, select **Action target**.

A Screenshot Action Is Also Available

You capture screenshots for robot action to use in troubleshooting. If you need to use a screenshot as part of a robot's or integration's other activities, use the screenshot action. See Add a Screenshot Action

Add Validation to a Robot Action

When the locator input for a robot action is a target, Oracle Integration can automatically create prevalidation for the UI element(s) that you selected. If needed, you can add more prevalidation and postvalidation. Validation can be for the visibility or enabled state of a UI control, or for a specific wait time.

Whether Oracle Integration automatically creates validation depends on whether you've selected the **Auto create pre validation page states** setting. See Tailor Your Building Experience.

The default prevalidation ensures that the UI control from the input action is *visible* before proceeding with the action. For example, if the input for a click element action is a Submit

button, the validation allows the action to start only after the Submit button is visible. If the action must also wait until the Submit button is *enabled*, add prevalidation for that requirement.

All the validation conditions must be met for an action to proceed.

1. Open a robot.

   See Open a Robot.

2. On the canvas, find the robot action that requires validation, and double-click it.

   The panel for the action appears.

3. Choose the type of validation to add:

   - To add validation before the robot performs an action, select the **Pre Validate** tab.
   - To add validation after the robot performs an action, select the **Post Validate** tab.

4. If you already created a page state, select it from the **Page state** drop-down.

   If you don't need to add any more validation, you're now finished.

5. If you haven't create a page state already, create it now.

   A page state is a container for one or more validation checks. After creating a page state, you add validation checks to the page state.

   a. Click **Create +**.

   b. In the **Name** field, enter a name for the page state, such as **Verify that I'm on the order page**.

   c. Add a validation condition: Next to Conditions, click **Create +**.

   d. Fill in the following fields.

Field	Description
Name	Enter a name for the validation condition, such as **Submit button enabled**.
Message	Enter the message that appears when the validation condition isn't met before the timeout period elapses. For example, **The Submit button did not become enabled within the specified 30-second timeout period.** If the condition times out, the robot fails, and this message appears in the activity stream.
Strategy	Select one of the following options: • **Element**: Add validation that is related to the visibility or enabled state of a UI element. • **Fixed Time**: Add a predetermined wait period. **Caution:** The Fixed Time validation introduces explicit slowness. Consider your requirements carefully before adding this validation, and use it sparingly.
State	(Visible only if you select **Element** for the **Strategy**) Select one of the following options: • **Visible**: The validation condition checks whether a UI element appears before the action proceeds. • **Enabled**: The validation condition checks whether a UI element is clickable before the action proceeds.

Field	Description
Timeout (seconds)	Enter the timeout period for the validation. • If you selected **Element** for the **Strategy**: Enter the maximum amount of time to wait for the condition to become true. The action runs as soon as the condition becomes true; this value is simply the maximum amount of time to wait before the robot instance fails. • If you selected **Fixed Time** for the **Strategy**: Enter the specific wait time that the robot waits every time it runs.

e. If you selected **Element** for the **Strategy**): Next to Selectors, click **Create +**, and identify the UI control for the validation.

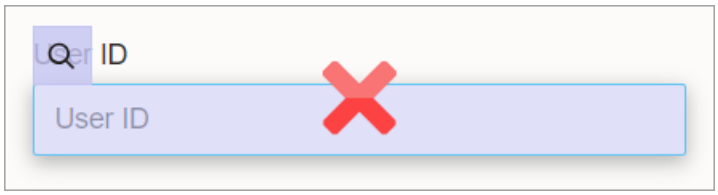
For example, if the validation ensures that a button is visible, target the button.

i. In another browser window or tab, open the application where the robot works.

ii. In Oracle Integration, click within the **Value** field, and select **Target a page element** .

iii. In the application that the browser needs to work in, point to the UI control that you're adding validation to, but don't select the UI control yet.

For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



iv. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

For more tips, see Quick Start for Building Robots.

The recorder enters a value in the Value field in Oracle Integration.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

f. Next to **Create page state**, click **OK**.

6. If needed, repeat the previous steps to add more validation.

If you need to update a page state or its conditions, see Update a Page State.

Add Logic to a Robot

Logic helps your robot complete complex tasks.

What Does the Robot Need to Do?

Flow control	Description
Loop through a collection of items	Add a Foreach Loop
Take different actions based on conditions	Add a Switch Condition
Stop running	Add a Stop

Add a Foreach Loop

When a robot performs the same actions for multiple items, add the actions to a foreach loop. A foreach loop instructs a robot to iterate through a collection of items, one at a time. Provide the items to iterate upon using a variable collection.

Use Cases

Consider an organization that needs to manually update several invoices every day. Within a robot, they create a foreach loop, which contains the actions for updating the invoices. The input for the robot is a variable collection, which contains the invoices that require updates.

For more details and for other use cases that use a foreach loop, see the following:

- Use Case: Update a Set of Invoices
- Use Case: Save Data After Iterating on Invoices
- Use Case: Save Values After Iterating on a Table

Prerequisites

A foreach loop requires a collection variable, which is an array of values. For example, a variable can contain the invoice numbers that require updates. Define the variable at any time, including while you're adding the foreach loop.

Add a Foreach Loop

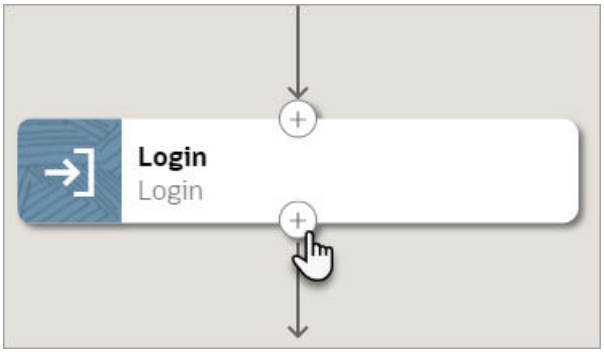
> **Note:**
>
> You must use the low-code capabilities to add this logic to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the logic to the robot.

   a. On the canvas, point to an action, and click **+**.



A menu of available actions appears.

b. Select the **Flow control** tab.

c. In the list, select **foreach**.

A foreach action appears on the canvas, and the foreach panel appears.

3. In the panel, enter a **Name** and **Description** for the action.
4. In the **Collection** field, specify the data set that the foreach loop iterates on.

You have the following options:

- Use the data set from a collection variable.
  a. Click within the **Collection** field, and select **Variables** (x).

     The Variables panel appears.

  b. Determine whether the variable that you need appears in the list. If not, create it. See Create a Variable. When creating a variable, ensure the following:
     – The variable must be a collection.
     – The properties within the variable must *not* be collections.

  c. Select the variable to assign the value to, and drag it to the **Collection** field.
- Use the data from an output property that is a collection.
  a. Click within the **Collection** field, select **More options ...**, and then select **Input**.

     The Input panel appears.

  b. Determine whether the input property that you need appears in the list. If not, create it. See Create a Trigger's Input or Output.

     The property must be a collection.

  c. Select the input property to assign the value to, and drag it to the **Collection** field.

5. In **Iteration parameter**, enter the name to give to every record in the collection.

The Iteration parameter becomes a variable that you can reference in any action within the foreach loop.

For example, if you chose an `Invoice` variable for **Collection**, you might enter `Current_Invoice` as the Iteration parameter.

6. Determine whether to select **Continue iteration on error**:
   - When **Continue iteration on error** is selected and an error occurs while a robot instance works on a record, the robot instance records the error, stops performing any additional actions on the record, and moves on to work on the next record. For example, if the foreach loop contains a logger action, the robot instance doesn't complete the logging work for any records with errors.

     This approach follows a fail-safe methodology.
   - When **Continue iteration on error** is not selected and an error occurs while a robot instance works on a record, the robot instance records the error and stops all work on all records.

     This approach follows a fail-fast methodology.
7. Click **OK**.
8. Above the canvas, select **Save**.

Next, add actions that the robot needs to complete within the foreach loop. For example, you might start by adding the Log action so that you can record the information that is passed into the foreach loop. See Add a Log Action or Add an Action to a Robot.

Add a Switch Condition

When the presence or absence of circumstances determines a robot's next step, add a switch condition to a robot. A switch condition evaluates one or more conditions and then takes the appropriate action.

Use Case

A robot must complete the following tasks:

- Compare the supplier name that is passed into the robot with the supplier name that appears on an invoice.
- Compare the invoice total that is passed into the robot with the total that appears on an invoice.
- Take the appropriate action:
  - If the supplier names and invoice totals match, update the invoice.
  - If the supplier names and invoice totals don't match, do nothing.

Use a switch condition to achieve these goals. A condition in the switch condition uses an expression to determine whether all values match. Include the action to take in the condition. An otherwise condition contains the alternative action—in this case, doing nothing.

For more details about this use case, see Use Case: Update a Set of Invoices.

Add a Switch Condition

> **Note:**
>
> You must use the low-code capabilities to add this logic to a robot. Keep reading for step-by-step instructions.

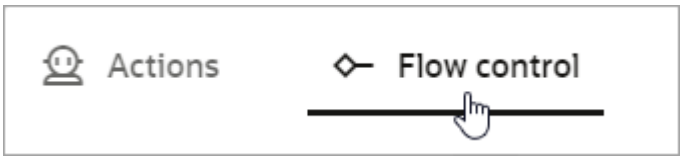
1. Open the robot to edit.

See Open a Robot.

2. Add the logic to the robot.
   a. On the canvas, point to an action, and click **+**.

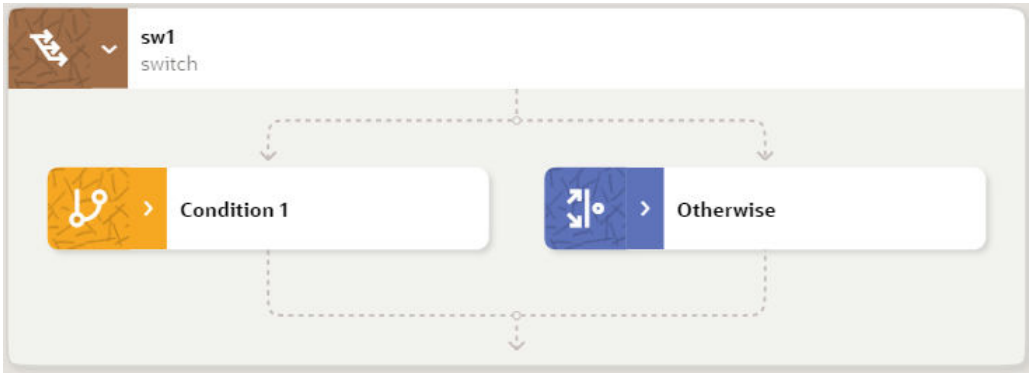
      A menu of available actions appears.

   b. Select the **Flow control** tab.



   c. In the list, select **switch**.

      A switch condition appears on the canvas, and the Switch condition panel appears.



3. Name the switch condition.
   a. In the panel, enter a **Name** and **Description** for the action.
   b. Select **OK**.
4. Define the first condition in the switch condition.

   For example, the condition might include an expression to determine whether an invoice meets specific criteria.

   a. Within the switch condition on the canvas, point to **Condition1**, select **Show node menu ...**, and then select **Edit** .

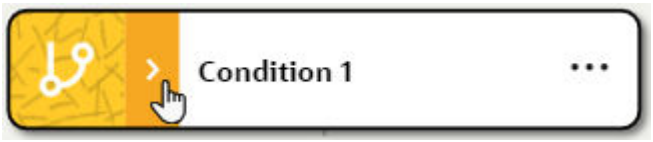
      The switch condition panel appears.

   b. Fill in the following fields:
      - **Name:** Enter a name for the condition. The name appears in the box for the condition on the canvas.
      - **Description:** Enter a description for the condition.
      - **Condition:** Enter the expression that the condition must evaluate. If the expression returns `true`, the switch performs the actions that you define in the condition box.

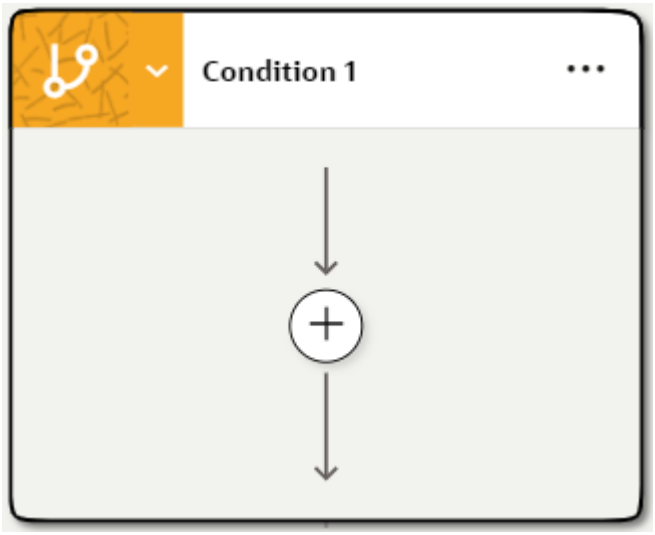
        The expression can include variables, inputs, page states, robot connections, and expression language. For help formatting an expression, see Guidelines for Expressions.

   c. Click **OK**.
5. Add one or more actions to the first condition.

a. Point to the condition, and select the **>** button to expand it.



The condition expands, and a plus sign appears in it.



b. Define actions or logic that the robot takes if the condition returns `true`.

See Add an Action to a Robot and Add Logic to a Robot.

6. If needed, add more conditions to the switch.

For example, if the robot should take Path A if one condition is `true`, Path B if another condition is `true`, and Path C if both conditions are `false`, add another condition to define Path B.

a. Point to the switch condition on the canvas, and select **Insert switch condition** .

b. Use the previous steps to define the condition and its actions and logic.

7. Define the otherwise condition, and add one or more actions to the condition.

If all the other conditions return `false`, the robot completes the actions in the otherwise box.

a. Within the switch box on the canvas, point to **Otherwise**, select **Show node menu** , and then select **Edit**

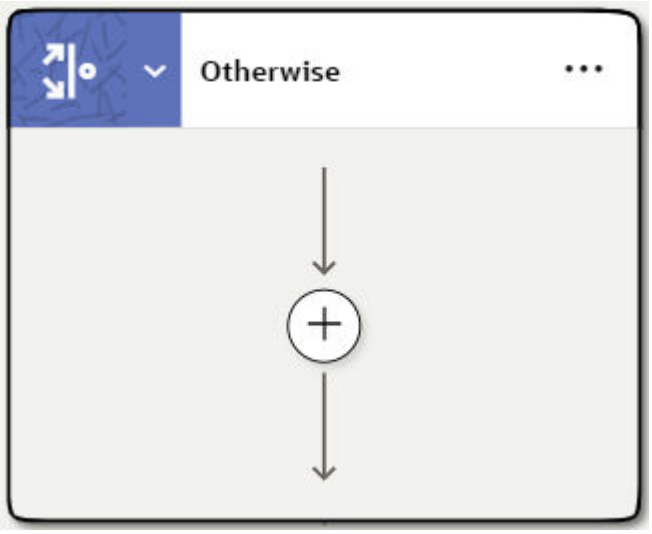
The default panel appears.

b. Fill in the following fields:

- **Name:** Enter a name for the otherwise condition. The name appears in the box for the condition on the canvas.
- **Description:** Enter a description for the otherwise condition.

c. Point to the otherwise condition, and select the **>** button to expand it.

The condition expands, and a plus sign appears in it.



d. Add actions or logic to the Otherwise box.

   See Add an Action to a Robot and Add Logic to a Robot.

8. Click **OK**.
9. Above the canvas, select **Save**.

Add a Stop

Most of the time, you don't need to tell a robot to stop running because it stops when it runs out of actions. However, when you need to add an explicit stop to a robot, add the stop logic, which ends a robot's work.

Use Case

You typically add a stop within the Otherwise condition of a switch condition. For example, consider a robot that evaluates a condition. If the condition is true, the robot completes the actions in the condition and then completes the remaining actions in the robot. If the condition is false, the robot stops running. Use the stop logic to tell the robot to stop running.

Add a Stop

> **Note:**
>
> You must use the low-code capabilities to add this logic to a robot. Keep reading for step-by-step instructions.

1. Open the robot to edit.

   See Open a Robot.

2. Add the logic to the robot.

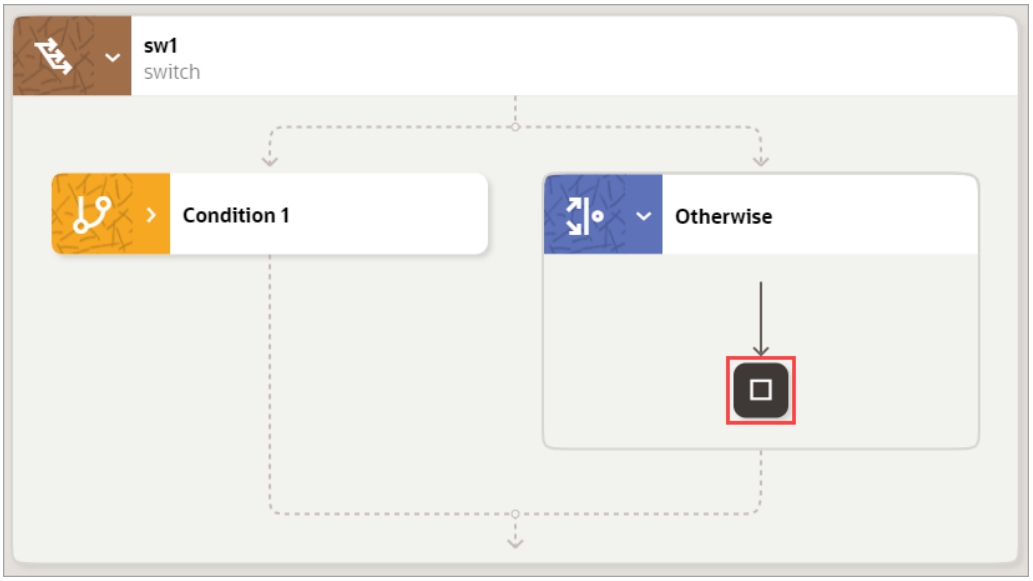
a. On the canvas, point to an action, and click **+**.

   A menu of available actions appears.

b. Select the **Flow control** tab.

c. In the list, select **stop**.

   A stop action appears on the canvas.



3. Click **OK**.
4. Above the canvas, select **Save**.

Fix a Robot's Errors

First, validate a robot to identify its errors. Then, determine the cause of each error and fix it.

Validate a Robot

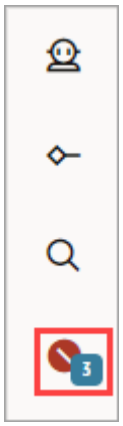
Every time you save a robot, Oracle Integration validates the robot and identifies its errors, if any exist. You can also validate a robot without saving.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. In the **Robots** box, select the robot to open.

      The canvas appears.

2. On the toolbar, select **Validate model** .

If the validation finds any errors, an error count appears on the right toolbar.



Fix an Error in a Robot

Errors occur in a robot for different reasons, such as an incomplete robot action or a renamed resource. You must fix all errors in a robot before you can activate a robot.

Validation Is Iterative

Fixing errors is often an iterative process. Try to fix errors as you build. Keep in mind that the validation process looks for errors in the following way:

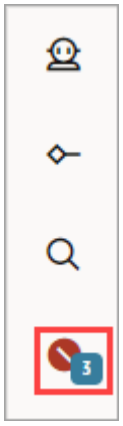
1. The validation identifies all **syntax errors** in the robot.
2. After you correct all syntax errors and save the robot again, the validation identifies all **semantic errors** in the robot.

   Therefore, you might address all the errors, save your robot again, and find new errors.

Fix an Error in a Robot

1. Validate a robot.

   See Validate a Robot.
2. On the right toolbar, select **Errors**.

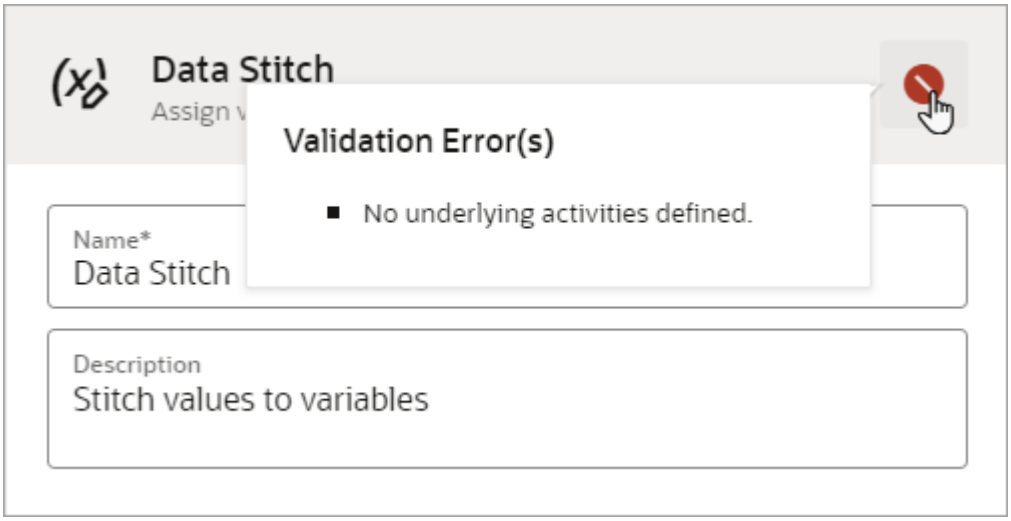


   The Errors panel appears.
3. Point to an error, and select **Edit** .

Oracle Integration scrolls to the action on the canvas and opens its panel. The panel and the action contain an **Action has a validation error** icon.

4. To remind yourself of the error, select the **Action has a validation error** icon.

   The Validation Error(s) popup appears.



5. Address the errors as needed.
6. Rerun validation and address any errors until the robot contains no more errors.

Next step: Specify Where a Robot Runs.

Specify Where a Robot Runs

To test a robot on its environment, you must create an environment pool, add computers to the environment pool, and associate the robot with the environment pool.

Workflow

1. Understand the Rules for Environments and Environment Pools
2. Create an Environment Pool
3. Add Computers to an Environment Pool
4. Associate a Robot with an Environment Pool

Perform as Needed

- Update an Environment Pool
- Remove an Environment Pool from a Robot

Understand the Rules for Environments and Environment Pools

Environments are the computers or virtual machines (VMs) where robots run. Environment pools are collections of these computers. Understand the rules for setting up environments and associating robots with them.

Rule	More information
To create an environment, install the robot agent	A computer or VM becomes an environment when you install the robot agent on the computer or VM. Complete the following tasks: 1. Meet the Robot Agent's Requirements Every environment in an environment pool should contain everything that a robot needs, such as the correct internet browser. 2. Download the Robot Agent 3. Update the Robot Agent's Configuration File 4. Start the Robot Agent After a computer becomes an environment, you can add the environment to an environment pool.
Robots in the same project can share an environment pool	You can associate multiple robots with one environment pool as long as all the robots are in the same project. You can't associate robots from multiple projects with the same environment pool.
An environment can be part of only one environment pool	To reduce resource conflicts, you can add an environment to only one environment pool.
Change the environments appropriately for each environment	A robot has the same environment pool during building and testing, as well as in production. When you promote the robot to testing or production, add and remove environments as needed.

Create an Environment Pool

An environment pool is a computer or set of computers that specific robots can run on.

Prerequisites

- Install the robot agent on every environment that must be part of the robot's environment pool.

  Complete the following tasks:

  1. Meet the Robot Agent's Requirements
  2. Download the Robot Agent
  3. Update the Robot Agent's Configuration File
  4. Start the Robot Agent
- Create the robot that must run on the environment pool.

  See Create a Robot.
- Familiarize yourself with environments.

See Understand the Rules for Environments and Environment Pools.

Create an Environment Pool

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot**.
3. In the **Environment Pools** box, select **Add** (if you have no environment pools) or **+** (if you have one or more environment pools).

   The Create environment pool panel appears.
4. Fill in the fields, and select **Create**.

Next step: Add Computers to an Environment Pool.

Add Computers to an Environment Pool

Group related computers or virtual machines into environment pools in a way that makes sense for your organization.

Previous step: Create an Environment Pool.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot**.
3. In the **Environment Pools** box, point to an environment pool, select **...**, and select **Add environment**.

   The Add environment panel appears.
4. From the list of options, select one or more environments to add to the environment pool.

   An environment appears in the list only if the robot agent has successfully run on it. See Start the Robot Agent.
5. Select **Add**.

   The Environment pools box lists the number of environments that are associated with the pool in a button. To view the environments, click the button.

Next step: Associate a Robot with an Environment Pool.

Associate a Robot with an Environment Pool

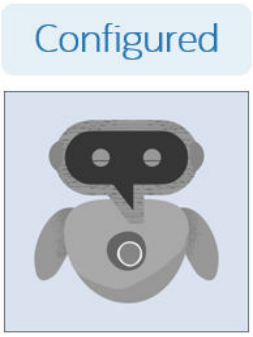
To run a robot on a real-world environment, you must associate the robot with an environment pool.

Previous step: Add Computers to an Environment Pool.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot** .
3. In the **Robots** box, point to a robot, select **...**, and select **Add environment pool**.

   The Add environment pool panel appears.
4. Select the environment pool where the robot will run.
5. Select **Add**.

You now have an environment pool where a robot can run, and the robot is associated with the environment. If the robot doesn't contain any errors, its state changes from Draft to Configured.



If the state doesn't change, you can fix the robot's errors now. See Fix a Robot's Errors.

If the robot's state is Configured, you can activate the robot. See Activate a Robot.

Update an Environment Pool

You can remove environments from an environment pool or rename an environment pool at any time. You typically remove environments after you've deployed a robot to a testing or production instance.

For example, an environment pool might contain your local computer while you're building the robot. Then, after you deploy a robot to a testing or production instance, you remove your local computer from the environment pool and add a different environment.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot** .
3. To remove an environment from an environment pool:
   a. In the **Environment Pools** box, point to an environment pool, select **...**, and select **Remove environment**.

The Remove environment panel appears.

b. Select the environment(s) to remove, and select **Remove**.

4. To rename an environment pool:

a. In the **Environment Pools** box, point to an environment pool, select **...**, and select **Update**.

The Update environment pool panel appears.

b. Update the fields as needed, and select **Update**.

Remove an Environment Pool from a Robot

If a robot has a status of **Draft** or **Configured**, you can remove its environment pool. If a robot has a status of **Active**, and you need to remove its environment pool, you must deactivate the robot first.

1. Open a project.

a. In the navigation pane, select **Projects**.

b. Select the project name.

2. In the left toolbar, select **Robot** .

3. In the **Robots** box, point to a robot, select **...**, and select **Remove environment pool**.

The environment pool is no longer associated with the robot.

Create and Update a Robot Resource

You can create variables, a trigger's input and output, page states, targets, and data types either before build your robot or as you build your robot—it's up to you. If you want to build your robot from start to finish without pausing, create the resources before you build your robot.

You can update these resources at any time from the canvas.

Robot connections are different from other resources. You must create them before you build, and you create and manage them outside a robot. See Create Connections to Applications.

Learn About Robot Resources

Alternatives to Hard Coding Data

What Do You Want to Create or Update?

- Work with Web Table Definitions
- Work with Variables
- Work with a Trigger's Input and Output
- Work with Page States
- Work with Targets
- Work with Data Types
- Work with Robot Connections and Robot Connection Types

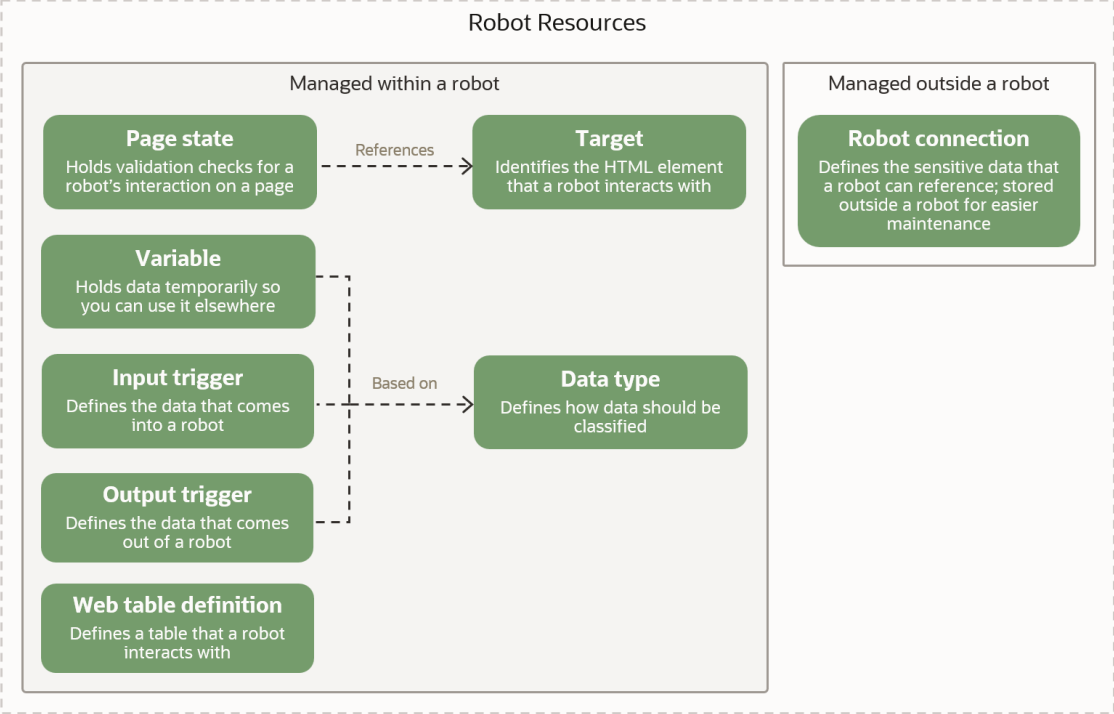
Alternatives to Hard Coding Data

Hard coding values in your robot can make updates tedious and time consuming. To reduce your maintenance costs, Oracle Integration offers numerous alternatives to hard coding data.

You can use many of these robot resources in a robot action. See Define the Fields of an Action.

On This Page

Illustration



Overview

Option	Why they're helpful	Example
	A web table definition defines the columns in a table that a robot must interact with. Learn more: Web Table Definitions	Consider a robot that gets invoice numbers from a table that lists all invoices that meet specific criteria. You identify the table using a web table definition. When you add a web table action to a robot and select a web table definition, Oracle Integration creates a variable for saving the table information.
(x) Variables	A variable holds data temporarily for a robot so that you can use the data somewhere else. Learn more: Variables	Consider the get text action, which obtains text from a field. You can hold the value in a variable. Additionally, if the text value is an output for the robot, you can use the variable as an output property.
Input	An input defines the data that comes into a robot, typically when the robot starts running. Learn more: Triggers	Consider a robot that needs to update a purchase order. An integration obtains the purchase order number and passes it to the robot as an input property. You dynamically define the input properties in a map action in an integration. You can also define these values when you test a robot outside an integration.
Output	An output defines the data that comes out of a robot. You can dynamically pass the output data elsewhere, such as to another robot, integration, or action in an integration. Learn more: Triggers	Consider a robot that obtains the total value of a purchase order. The robot can pass the total value into an output, which an integration can use to take further action.
Page states	A page state is a container for one or more validation checks. A validation check occurs before or after an action in a robot. Learn more: Page States	Consider an application that experiences latency issues during periods of high usage. Without validation checks, a robot that runs in the application could fail if the robot attempts to complete a task before the required fields and buttons are visible. Validation checks ensure that all fields and buttons are visible and enabled on a page before a robot attempts to complete its task. These checks increase the likelihood of a robot completing its tasks successfully.
Targets	A target identifies the HTML element that a robot interacts with. Every target has two components: a user-friendly name, and the hard-coded XML path language, or XPath. Learn more: Targets	Targets help with maintenance. Consider a robot that interacts with the same HTML element multiple times. Oracle Integration creates a target for the element and can reuse the target for each interaction. Therefore, if the HTML for a page changes, all you need to do is update the target one time, and all of the robot's interactions with the element are updated.

Option	Why they're helpful	Example
Data types	A data type defines how data should be classified. A data type is the basis of every variable, output property, and input property. You can use one of the default data types provided by Oracle or a custom data type that you create. Learn more: Data Types	Consider a robot that must update a set of invoices. You can create a data type that defines the components of invoice data, such as invoice number, invoice amount, supplier name, and due amount. Next, you can create a input of the data type, and use the trigger to pass this information into the robot.
Robot connections	A robot connection lets you store sensitive data, such as sign-in credentials, outside a robot for easier maintenance. Learn more: Robot Connections	In order for a robot to sign in to an application, you must provide a user name and password. However, an administrator needs easy access to this information so they can update the password according to your organization's security policies. Thanks to a robot connection, this sensitive information lives outside a robot, so you can update it easily outside the lifecycle of the robot.

Web Table Definitions

Area	More information
How to define the values	A web table definition identifies columns in a table. You cannot hard code these columns.
Where to define the values	Create a web table definition at any time on the canvas.
How to use the values	Use a web table definition when you add a web table action to a robot.

Variables

Area	More information
How to define the values	A variable stores one value or a set of values that come from another place. You typically use a variable to hold the output value of a robot action. You cannot hard code values for a variable.
Where to define the values	Create a variable when you add an action to a robot, or at any time on the canvas.
How to use the values	If you use a variable to hold the output value of a robot action, you can use the variable however you need to. For example, the variable might be the input for another robot action, a part of an expression, or the output for a robot.

Triggers

Area	More information
How to define the values	Inputs and outputs contain one or more properties. Define the properties, including specifying their data types and whether they hold a single value or an array of values, when you create the trigger. You don't define a value for an input or output because a trigger is a container for its properties. Additionally, you can't hard code values for the properties. Instead, you dynamically pass in values for each input and output property.
Where to define the values	Create an input or output in a robot, either when you define the trigger of a robot, or at any time on the canvas.
How to use the values	Use an input or output property when you define a robot action.

Page States

Area	More information
How to define the values	Page states contain one or more validation checks for a robot action. A validation check uses a target to reference a specific UI control, such as waiting until a button is visible on a page.
Where to define the values	Create an input or output in a robot, either when you define the trigger of a robot, or at any time on the canvas.
How to use the values	Select a page state for a robot action when you define a robot action.

Targets

Area	More information
How to define the values	Oracle Integration creates targets for you when you select an element for the robot to interact with while building a robot, either using the recorder or the low-code tools.
Where to define the values	Create a target when you add an action to a robot, or at any time on the canvas.
How to use the values	Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

Data Types

Area	More information
How to define the values	A data type can contain one or more properties. Oracle Integration provides several predefined data types, including string, boolean, and number. You can define additional data types as needed, including defining their properties.
Where to define the values	Create a data type at any time on the canvas.
How to use the values	Select a variable as the basis when you create a variable or create a trigger's input or output.

Robot Connections

Area	More information
How to define the values	A robot connection contains one or more parameters. Define hard-coded values for the parameters when you create the robot connection. You cannot pass in values to a parameter. Additionally, a robot connection and its parameters live outside a robot, so you can update the parameter values without updating a robot.
Where to define the values	Create a robot connection in a project.
How to use the values	Use the value of a parameter when you define a robot action.

Work with Web Table Definitions

Create and update web table definitions on the canvas.

To learn more about web table definitions and other robot resources, see Alternatives to Hard Coding Data.

Create a Web Table Definition

A web table definition defines a table that a robot interacts with.

For example, consider a robot that gets invoice numbers from a table that lists all invoices that meet specific criteria. You identify the table using a web table definition.

1. Verify that the table in the application is coded as a `table` element in the page's HTML.

   For help understanding the HTML of a page, see View the HTML Code for a Page.

   If the table was coded using `div` elements and the page's CSS transforms the content into a table, you can't identify it using a web table definition. Instead, use the get text action and save the individual values as a variable collection. See Add a Get Text Action.

2. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.

3. In the toolbar, select **Web table definitions**.

   The Web table definitions panel appears.

4. Select **Create**.
5. In the panel, enter a **Name** and **Description**.

   The name appears when you add a web table action to a robot. The name should help you and others identify:

   - The application where the table appears.
   - The page where the table appears.

- If necessary, the table's location on the page.

6. Identify the first column of data that the robot must interact with.

   You don't need to identify *every* column in the table. Instead, just identify the columns that the robot interacts with.

   a. In another browser window or tab, open the application where the robot works.

   b. In the web table definition, click within the **Header** field, and select **Target a page element** .

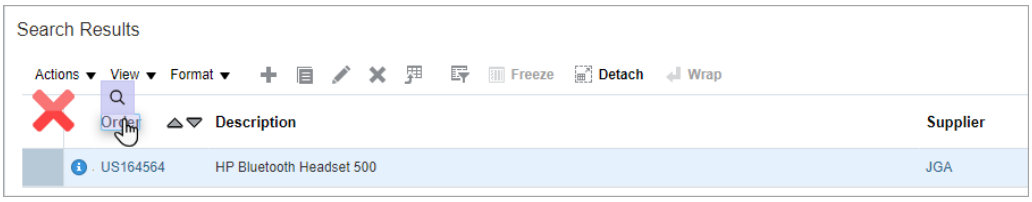
      The Target a page element panel appears.

   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

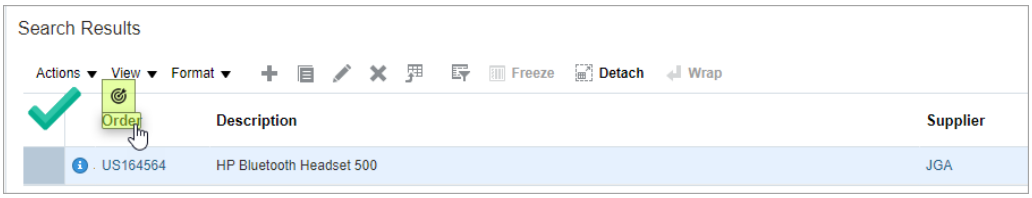
      The application opens.

   d. In the application where the robot works, point to the header of the first column that the robot interacts with, but don't select it yet.

      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



   e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.



      For more tips, see Quick Start for Building Robots.

      The recorder enters a value in the **Header** field in the robot.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

   f. Click within the **Row 1** field, and repeat the previous steps to target the first row in the column to target.

   g. Click within the **Row 2** field, and repeat the previous steps to target the second row in the column to target.

7. If the robot must interact with one or more additional columns in the table, identify the additional columns.

a. Next to Columns, select **Add** .

b. Repeat the previous steps to identify the header and first two rows of the column that the robot interacts with.

c. Add more columns as needed until you've identified all the columns that the robot interacts with.

8. Click **OK**.

Next, you an add a web table action to a robot. See Add a Web Table Action.

Update a Web Table Definition

You can update a web table definition at any time from the canvas, without opening the actions that use the web table definition.

1. Open the robot whose web table definition needs to change.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the toolbar, select **Web table definitions** .

   The Web table definitions panel appears.
3. Select the web table definition to edit, and select **Edit** .
4. Update the web table definition as necessary, and select **OK**.
5. Above the canvas, select **Save**.

Work with Variables

Create and update variables on the canvas or in a robot action.

To learn more about variables and other robot resources, see Alternatives to Hard Coding Data.

Create a Variable

A variable holds data temporarily for a robot so that you can use the data somewhere else. You can add a variable on the canvas or in a robot action.

If you plan to add actions using the recorder, consider creating the variables that you need on the canvas, before you start building the robot. That way, you won't have to pause the recorder to create the variables.

1. Determine where to start:
   - If you're currently adding an action to a robot, work within the robot action.
     a. Add an action to a robot.

        See Add an Action to a Robot.

b. While the panel for the robot action is open, select within any field for which you can provide a value, and select **Variables** (x).

   This option is sometimes in the **More options** ••• menu.

   The Variables panel appears.

- Otherwise, start on the canvas.

  a. In the navigation pane, select **Projects**.

  b. Select the project name.

  c. In the left toolbar, select **Robot**.

  d. In the **Robots** box, select the robot to open.

     The canvas appears.

  e. In the toolbar, select **Variables** (x).

     The Variables panel appears.

2. Select one of the following options:
   - If no variables have been created, select **Create**.
   - If at least one variable exists, select **Create** +.

   A new variable is added to the list of variables, and the Variable panel appears.
3. Fill in the following fields:
   - **Name:** Enter a name for the variable.
   - **Type:** Select the type on which to base the variable. If the type that you require doesn't appear, you can create it. See Create a Data Type.
   - **Description:** Enter a description for the data type.
   - **Collection:** Select this checkbox if the variable needs to store an array of values. If the checkbox is deselected, the variable can store only a single value. If a robot obtains a value and stores it in a variable, and the robot iterates over several records, you must select **Collection** so that the variable can store a value from each record.
4. Click **OK** until you return to the canvas.
5. Above the canvas, select **Save**.

Update a Variable

You can update a variable at any time from the canvas, without opening an action that uses the variable.

Before updating a variable, check where it's used: See Where a Variable Is Used.

1. Open the robot whose variable needs to change.

   a. In the navigation pane, select **Projects**.

   b. Select the project name.

   c. In the left toolbar, select **Robot**.

   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. On the toolbar, select **Variables** (x).

The Variables panel appears.

3. Select a variable in the list, and select **Edit** .
4. Update the fields as necessary, and select **OK**.
5. Above the canvas, select **Save**.

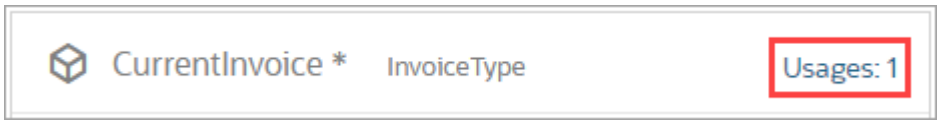
See Where a Variable Is Used

At any time, you can view the actions and logic that reference a variable.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. On the toolbar, select **Variables** .

   The Variables panel appears.
3. In the list, locate a variable.
4. Select the **Usages** link for the variable.



   The Variable usages panel appears.
5. Review the actions and logic that reference the variable.
6. Click **OK**.

Work with a Trigger's Input and Output

Create and update a robot trigger, including the trigger's input and output, on the canvas.

To learn more about triggers and other robot resources, see Alternatives to Hard Coding Data.

Create a Trigger's Input or Output

An input defines the data that comes into a robot, typically when the robot starts running. An output defines the data that comes out of a robot. You can dynamically pass the output data elsewhere, such as to another robot, integration, or action in an integration.

You define the trigger for a robot, including its input and output, on the robot canvas. You can also define the output when you add the get text action to a robot using the low-code tools. See Add a Get Text Action.

If you plan to add actions using the recorder, consider creating any triggers that you need in advance, so that you don't have to pause the recorder to create the triggers.

1. Open a robot.

a. In the navigation pane, select **Projects**.
b. Select the project name.
c. In the left toolbar, select **Robot**.
d. In the **Robots** box, select the robot to open.

   The canvas appears.

2. In the toolbar, select **Trigger**  .

   The Trigger panel appears.
3. Select one of the following tabs:
   - **Input:** Define a trigger's input.
   - **Output:** Define a trigger's output.
4. Define the trigger.
   a. Select **Add**  .
   b. Fill in the fields.
      - **Name:** Enter the name of the trigger's property. For example, an input for a person might have properties of `Name`, `Age`, and so on.
      - **Type:** Select the type on which to base the trigger. If the type that you require doesn't appear, you can create it. See Create a Data Type.
      - **Collection:** Select this checkbox if the trigger needs to store an array of values. If the checkbox is deselected, the trigger can store only a single value.
   c. Add additional properties as needed.
5. Click **OK**.
6. Above the canvas, select **Save**.

Update a Trigger's Input or Output

You can update a trigger at any time from the canvas, without opening the actions that use the trigger.

1. Open the robot whose input or output needs to change.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the toolbar, select **Trigger**  .

   The Trigger panel appears.
3. Select one of the following tabs:
   - **Input:** Update a trigger's input.
   - **Output:** Update a trigger's output.

4. Expand the property to edit.
5. Update the fields as necessary, and select **OK**.
6. Above the canvas, select **Save**.

Work with Page States

You create and update a page state on the canvas and within a robot.

If you prefer build components before you start building a robot, create page states on the canvas and then select them as needed for each robot action.

To learn more about page states and other robot resources, see Alternatives to Hard Coding Data.

Create a Page State

A page state is a container for one or more validation checks. A validation check occurs before or after an action in a robot. You create a page state, including its validation checks, on the canvas.

You can also create and update a page state when you add an action to a robot. See Add Validation to a Robot Action.

When you create a page state on the canvas, Oracle Integration doesn't apply its validation checks to a robot action. Later, when you select the page state for a robot action, you specify whether the validation must occur before or after the action occurs.

All the validation conditions must be met for an action to proceed.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the toolbar, select **Page states**.

   The Page states panel appears.
3. Select **Create** (if no page states have been created) or **Create** + (if at least one page state exists).

   The Page state panel appears.
4. In the **Name** field, enter a name for the page state, such as **Verify that I'm on the order page**.
5. Add one or more conditions to the page state.
   a. Next to Conditions, select **Create** +.
   b. Fill in the following fields.

Field	Description
Name	Enter a name for the validation condition, such as **Submit button enabled**.
Message	Enter the message that appears when the validation condition isn't met before the timeout period elapses. For example, **The Submit button did not become enabled within the specified 30-second timeout period.** If the condition times out, the robot fails, and this message appears in the activity stream.
Strategy	Select **Element**: Add validation that is related to the visibility or enabled state of a UI element.
State	Select one of the following options: • **Visible**: The validation condition checks whether a UI element appears before the action proceeds. • **Enabled**: The validation condition checks whether a UI element is clickable before the action proceeds.
Timeout (seconds)	Enter the maximum amount of time to wait for the condition to become true. The action runs as soon as the condition becomes true. When a robot instance runs, and the time elapses before the condition becomes true, the robot instance fails.

c. Next to Selectors, click **Create +**, and identify the UI control for the validation.

For example, if the validation ensures that a button is visible, target the button.

i. In another browser window or tab, open the application where the robot works.

ii. In the Page state panel, click within the **Value** field, and select **Target a page element** .

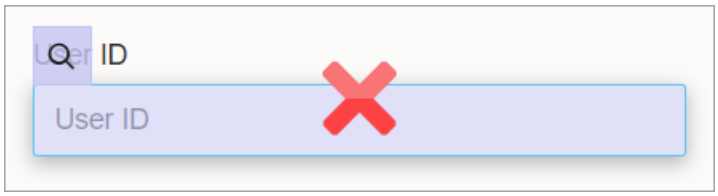
The Target a page element panel appears.

iii. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

The application opens.

iv. In the application where the robot works, point to the UI control that you're adding validation to, but don't select it yet.

For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.



v. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

For more tips, see Quick Start for Building Robots.

The recorder enters a value in the Value field in the Page state panel.

> **Tip:**
>
> Your settings determine whether Oracle Integration reuses targets for previously selected UI controls. You can override these settings, if needed. Reusing a target offers benefits. For example, you can update a target one time, and all actions that use the target get the update.

d. Select **OK** in the Page state panel.

e. If needed, repeat the previous steps to add more page states or validation conditions.

f. After you finish adding page states and validation, select **OK** in the Page states panel.

6. Above the canvas, select **Save**.

Update a Page State

You can update a page state at any time from the canvas, without opening the robot actions that use its validation checks.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the toolbar, select **Page states**.

   The Page states panel appears.
3. Select a page state from the list, and select **Edit**.

   The Page state panel appears.
4. Select a condition from the list, and select **Edit**.
5. Update the fields as necessary, and select **Back**.
6. Click **OK**.
7. Above the canvas, select **Save**.

Work with Targets

Create and update targets on the canvas.

To learn more about targets and other robot resources, see Alternatives to Hard Coding Data.

Create a Target

A target identifies the HTML element that a robot interacts with. Every target has two components: a user-friendly name, and the hard-coded XML path language, or XPath.

You typically create targets while you're adding an action to a robot. Creating targets this way is straightforward. See Add an Action to a Robot. You don't save any time by creating targets before you add actions to a robot, but you can create them ahead of time if you want. Keep reading for instructions.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the toolbar, select **Targets**.

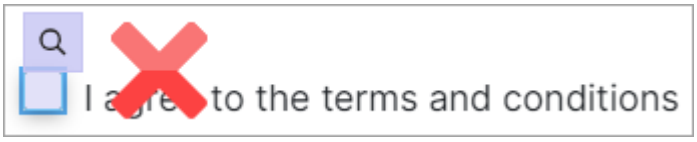
   The Targets panel appears.
3. Select **Create** (if no targets have been created) or **Create** + (if at least one target exists).

   The Target panel appears.
4. Enter a name for the target.
5. Target the HTML element that the robot works with.
   a. In another browser window or tab, open the application where the robot works.
   b. Click within the **Locator** field, and select **Target a page element**.

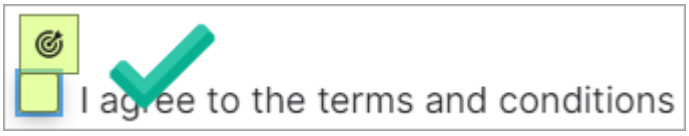
      The Target a page element panel appears.
   c. In the panel, from the **Select browser tab to target** drop-down, select the application where the robot works, and select **Go**. You might need to scroll down to find the application.

      The application opens.
   d. In the application where the robot works, point to the UI element to target, but don't select it yet.

      For example, if the field is shaded purple and the magnifying lens icon appears, don't click yet. The recorder is still collecting information.

   e. After the shading turns green, the icon changes to a target, and the mouse icon changes to a hand, select the UI element.

For more tips, see Quick Start for Building Robots.

The recorder enters a value in the **Locator** field.

6. Click **OK**.
7. Above the canvas, select **Save**.

Update a Target

Sometimes, the fields and buttons that a robot interacts with change. You can update a target without even opening an action that references it. A central list of all targets is right at your fingertips for stress-free maintenance.

Before updating a target, check where it's used. See See Where a Target Is Used.

1. Open the robot whose target needs to change.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the horizontal toolbar on the right, select **Targets**

   The Targets panel appears. The Usages value indicates the number of times the value is used in the robot.
3. Update the target.
   a. Above the list of targets, select **Edit**.

      The Target panel appears.
   b. Optional: Update the fields as needed.
4. Click **OK**.
5. Above the canvas, select **Save**.

See Where a Target Is Used

At any time, you can view the actions and logic that reference a target.

1. Open the robot whose target needs to change.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the horizontal toolbar on the right, select **Targets**

   The Targets panel appears. The Usages value indicates the number of times the value is used in the robot.
3. In the list, locate a target.

4. Select the **Usages** link on the target.

   The Target usages panel appears.

5. Review the actions and logic that reference the target.

Work with Data Types

Create and update data types on the canvas.

To learn more about data types and other robot resources, see Alternatives to Hard Coding Data.

Create a Data Type

A data type defines how data should be classified. Oracle Integration provides several simple data types, including string, boolean, and number. You can create additional data types if needed.

You base variables and a trigger's input and output on data types. For example, consider a variable that must hold several related pieces of data, such as an invoice number, invoice amount, supplier name, and amount due. You can create a data type that contains one property for each piece of data, and then create a variable of the data type. For more information on this use case, see Use Case: Update a Set of Invoices.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.

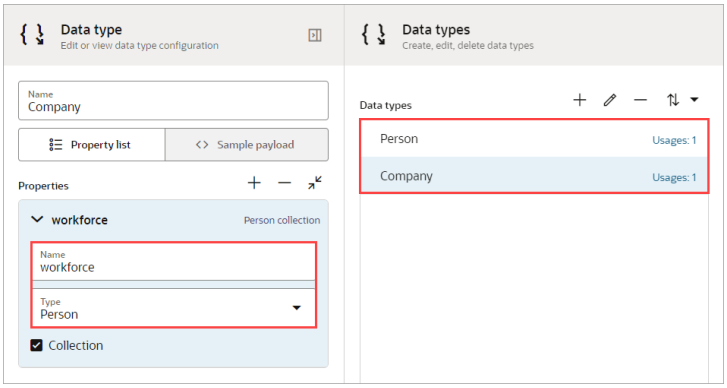
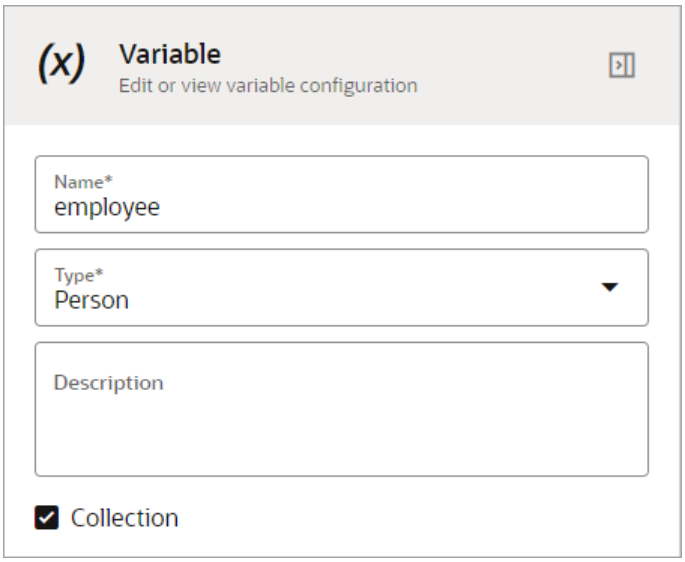
2. In the toolbar, select **Data types** {}.

   The Data types panel appears.

3. Select **Create** (if no data types have been created) or **Create** + (if at least one data type exists).

   The Data type panel appears.

4. Enter the name of the data type, such as `InvoiceType`.
5. Define the data type using one of the following options:
   - Define the properties manually, one at a time.
     a. Make sure that the **Property list** tab is selected.
     b. Next to Properties, select **Add +**.
     c. Fill in the following fields:

Field	Description
Name	Enter the name of the property, such as `InvoiceNumber`.
Type	Select the data type of the property. You can base a property on the simple data types that Oracle Integration provides or on a data type that you create.
Collection	Select this checkbox if the property stores an array of values. If the checkbox is deselected, the data type can store only a single value. For example, consider a data type of `Company`, which represents a company, and a data type of `Person`, which represents an employee. One of the properties of the `Company` data type is `workforce`, which is a collection of `Person` types.  You can create a `employee` variable that is of the data type `Person`. If you want this data type to be an array of persons, mark it as a collection. 

- Upload a JSON file that defines the properties.
  a. Select the **Sample payload** tab.
  b. Select within the **Drag and Drop** area, navigate to the location of the JSON file, and double-click the file.

     or

     Paste the JSON text into the **Enter a JSON sample payload** area.

For example, the following JSON text defines two properties, `Green Corp.` and `employees`. The `employees` property is of type string and is a collection.

```
{
    "name": "Green Corp.",
    "employees": [
        "Horst", "Sandhya"
    ]
}
```

6. In the Data type panel, where you defined the properties, make sure that the tab where you defined the properties—either **Property list** or **Sample payload**—is selected.
7. Click **OK**.
8. Above the canvas, select **Save**.

Update a Data Type

You can update a data type at any time from the canvas. However, your update can affect a variable, input, or output that is of the data type.

Update	How the update affects a robot
Deleting a property or Changing the name of a property	If an expression or field references the property, an error occurs the next time you validate the robot. You must correct the error before you can activate the robot. Validation happens automatically when you save, and you can also validate a robot without saving. See Validate a Robot.
Adding a property	Adding a property doesn't impact any existing robot resources or expressions.

Before updating a data type, check where it's used. See See Where a Data Type Is Used.

1. Open the robot whose data type needs to change.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the toolbar, select **Data types**.

   The Data types panel appears.
3. Update the data type.
   a. Above the list of data types, select **Edit**.

      The Data type panel appears.
   b. Optional: Update the fields as needed.
4. Click **OK**.
5. Above the canvas, select **Save**.

See Where a Data Type Is Used

At any time, you can view the actions and logic that reference a data type.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot**.
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. In the toolbar, select **Data types**.

   The Data types panel appears.
3. In the list, locate a data type.
4. Select **Usages** link to its right.

   The Data type usages panel appears.
5. Review the actions and logic that reference the data type.
6. Click **OK**.

Work with Robot Connections and Robot Connection Types

Update robot connections and robot connection types within a project. You don't need to open a robot to update these resources.

To learn more about robot connections and other robot resources, see Alternatives to Hard Coding Data.

Update a Robot Connection

A robot connection lets you store sensitive data, such as sign-in credentials, outside a robot for easier maintenance. You can update a robot connection at any time without having to open or update a robot. The next time a robot instance runs, it uses the updated values.

If you need to create a robot connection, see Create Connections to Applications.

Required Step After Deploying to a Higher Environment

After you deploy a robot to a higher environment, all robot connections in the project return to a Draft status, and their connection details are removed. You must update the robot connections appropriately for the higher environment. For details about deploying to a higher environment, see Workflow for Deploying a Robot.

Update a Robot Connection

1. Open a project.

a. In the navigation pane, select **Projects**.

b. Select the project name.

2. In the left toolbar, select **Robot**.
3. In the **Robot Connections** box, find the robot connection to update.
4. To the right of the robot connection, select **...**, and then select **Edit**.

   The Edit robot connection panel appears.
5. Update the fields as necessary, and select **Update**.

   For example, if you've deployed a robot to a production environment, update the robot connection so that it contains the production URL and credentials.

Update a Robot Connection Type

You can update a robot connection type at any time. However, if a connection is already based on the robot connection type, the change might make the robot connection no longer valid.

1. Open a project.

   a. In the navigation pane, select **Projects**.

   b. Select the project name.
2. In the left toolbar, select **Robot**.
3. In the **Robot connection types** box, find the robot connection type to update.
4. To the right of the robot connection, select **...**, and then select **Edit**.

   The Edit robot connection type panel appears.
5. Update the fields as necessary, and select **Update**.

   If the robot connection type is used by a robot connection, a warning appears. You can cancel or proceed. If your change makes a robot connection invalid, such as by adding a new field, the status of the robot connection changes to Draft.

View HTML and XPaths

While building or troubleshooting a robot, you sometimes need to understand the underlying HTML for a page or UI element.

What Do You Need to Do?

Goal	Link
Inspect the HTML for a page	View the HTML Code for a Page
Find the XPath value for a UI element	View an Element's XPath
Identify all of the XPaths and other elements that you can target	View All Elements to Target

View the HTML Code for a Page

The only way to determine how a UI element is coded is by reviewing its HTML. These instructions are for the Google Chrome browser.

Inspect a Page

1. Right-click any element on a web page, and select **Inspect**.

   The developer tools appear.

2. Ensure that the **Elements** tab is selected.

   This tab shows you the Document Object Model (DOM) of the web page. The DOM represents the web page as nodes and objects. The DOM also allows the recorder and other tools to interact with the page. Review the DOM to determine how a UI element is coded.

Identify the Part of the Page that a Node or Object Specifies

1. Complete the previous steps.
2. Point to any element on the **Elements** tab.

   The UI element that the node or object specifies is highlighted in blue. Some nodes and objects apply to the entire page, so they highlight the entire page.

   You can also view an element's XPath. See View an Element's XPath.

View an Element's XPath

The recorder identifies the XML Path Language, or XPath, of the element that a robot takes action on. You can view an element's XPath at any time from within a robot action and from your internet browser.

Reasons to View an Element's XPath

You typically need to view an element's XPath for the following situations:

- The recorder is unable to target the exact element that you require.

  Get the XPath value yourself, and manually paste the value into the recorder.

- A robot has suddenly started failing, and you need to determine whether the HTML for the page has changed.

Options for Viewing an Element's XPath

- View an XPath from a Browser
- View an XPath from the Robot Canvas
- View an XPath within a Robot Action
- Paste an XPath into a Locator Field

View an XPath from a Browser

1. In a Google Chrome browser, right-click any element on a web page, and select **Inspect**.

   The developer tools appear.

2. Ensure that the **Elements** tab is selected.

This tab shows you the Document Object Model (DOM) of the web page. The DOM represents the web page as nodes and objects. The DOM also allows the recorder and other tools to interact with the page. Review the DOM to determine how a UI element is coded.

3. On the Elements tab of the developer tools, right-click any node or object, point to **Copy**, and select **Copy XPath**.

   To see the XPath, paste the value into any text editor.

View an XPath from the Robot Canvas

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. Along the toolbar, select **Targets** .
3. Select any target.
4. Select **Edit** .

   The Target panel appears.
5. View the XPath value in the **Locator** field.

View an XPath within a Robot Action

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. Double-click any action.

   The panel for the robot action appears.
3. Select within the **Locator** field, and select **Show target selector** .

   The **Target selector** field appears below the **Locator** field. This field shows the XPath value for the target, prefaced by `xpath:`.

Paste an XPath into a Locator Field

1. Complete any of the previous steps to view an XPath value, and copy the value.
2. Paste the value into a **Locator** field in a robot action.
3. Preface the value with `xpath:`

   For example, for the following XPath: `//*[@id="buttonName"]`

   Enter the following value: `xpath://*[@id="buttonName"]`

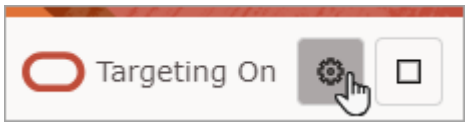
View All Elements to Target

If a robot failed during testing, review all the UI elements that are available for targeting to ensure that you selected the right option.

1. Open a robot.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
   c. In the left toolbar, select **Robot** .
   d. In the **Robots** box, select the robot to open.

      The canvas appears.
2. Add an action to a robot using the low-code tools.

   See Add an Action to a Robot.
3. While you use the recorder to define a locator field for the action, select **Settings** in the Smart Recording window in the lower-left corner of your browser.

   The Settings panel appears.
4. In the Settings panel, select **Select from various generated selectors**, and close the Settings panel.
5. Point to a UI element that the robot needs to work in, and after the icon changes to a target and the shading turns green, select the UI element.

   The Target Element panel appears. This panel lists all the possible XPaths and other elements that you can target for the selected component.
6. Identify the selector to target, and click **Select**.

   The recorder enters a value in the **Locator** field in the robot.

The **Select from various generated selectors** setting remains selected for the duration of your sign-in session.

5

Run and Test a Robot

You have several options for running and testing a robot. Each method offers benefits.

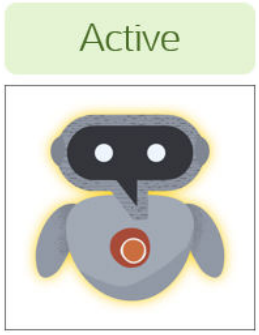
Options for Testing

Building stage and benefit	Prerequisites	Testing options
Test after you build a robot Replicate real-world conditions by testing a robot on its environment	Fix a Robot's Errors Specify Where a Robot Runs Activate a Robot	Test a Robot on Its Environment
Test after you build a robot and the integration that calls it Ensure end-to-end success by testing a robot with its integration on their environment	Design an Integration That Calls a Robot	Test a Robot and Its Integration

Workflow for Testing a Robot

Test a robot to ensure that it completes its task as expected.

Previous workflow: Workflow for Building a Robot.

Step	Task	More information
1	Activate a Robot	After you finish building, get your robot ready to run by activating it. You must activate a robot before you can run it on its environment. After you activate a robot, its status changes briefly to **Activation in progress**, and then **Active**. 
2	Test a Robot on Its Environment	Now you can run the robot on its environments.
3	Monitor a Robot	Monitor the robot that you just ran.
4	Test a Robot and Its Integration	Replicate a real-world scenario by activating the integration and then running the robot from an integration.
5	Monitor a Robot and Its Integration	Monitor the integration and robot that you just ran.

Next workflow: Workflow for Deploying a Robot.

Open a Robot

Your first step in reviewing or updating a robot is opening it.

1. In the navigation pane, select **Projects**.
2. Select the project name.
3. In the left toolbar, select **Robot**  .
4. In the **Robots** box, select the robot to open.

   The canvas appears.

Next, update the robot as needed. For example:

- Add an Action to a Robot
- Add Logic to a Robot
- Fix a Robot's Errors

Activate a Robot

After you finish building a robot, activate it. Afterward, you can test and run the robot.

Requirements for Activation

If version 1.0.0 of a robot is active, you can't make version 1.0.1 or version 1.1.0 active. However, you can make version 2.0.0 active. Or, you can deactivate version 1.0.0 and then activate 1.0.1 or 1.1.0.

The same rule persists as you increase version numbers. If version 2.0.0 is active, you can't make version 2.0.1 or version 2.1.0 active. However, you can make version 3.0.0 active. Or, you can deactivate version 2.0.0 and then activate 2.0.1 or 2.1.0.

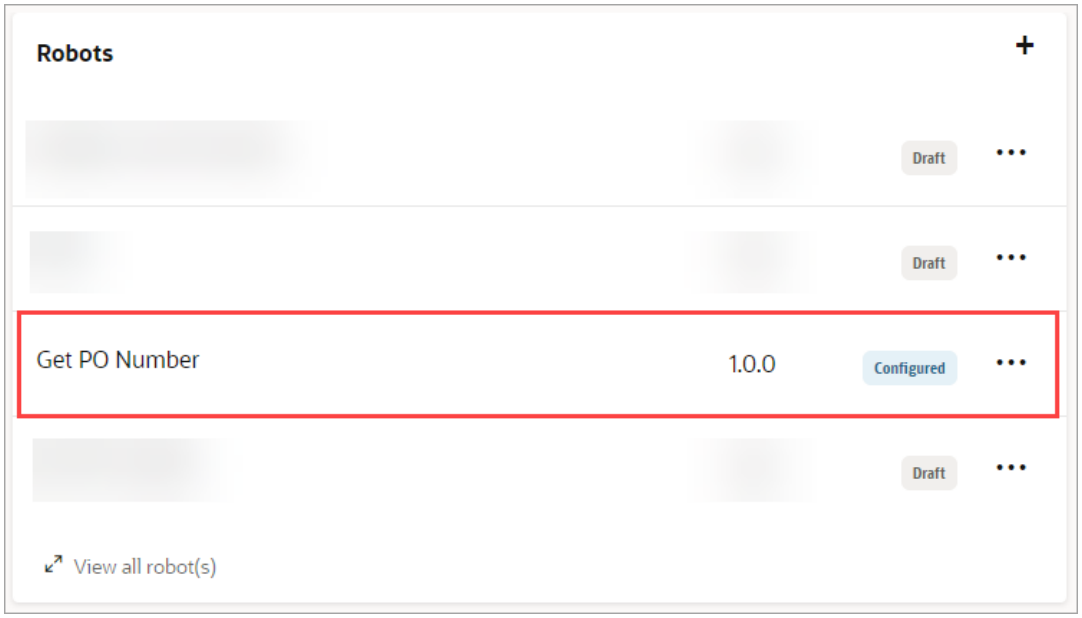
Prerequisites

Before you activate a robot, you must complete the following steps:

- Associate the robot with an environment pool. See Specify Where a Robot Runs.
- Fix all errors. See Fix a Robot's Errors.

Activate a Robot

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot**  .
3. In the **Robots** box, ensure that the robot's state is **Configured**.



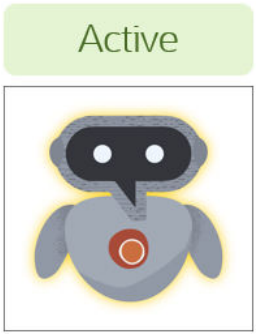
If the robot isn't in a Configured state, you haven't met all the prerequisites for activation. See Specify Where a Robot Runs and Fix a Robot's Errors.

4. In the **Robots** box, point to the Configured robot, select **...**, and select **Activate**.

   A Confirmation pop-up appears, and the state changes to **Activation in progress**.

5. Navigate to another area of the application, and then return to the project to check the robot's state.

   Within a minute or two, the robot's state changes to **Active**.



Next, you can test the robot on its environment. See Test a Robot on Its Environment.

Test a Robot on Its Environment

After you finish building a robot, test the robot on its real-world environment by running the robot from within the project.

Prerequisites

You don't need to design the integration that calls the robot.

- Specify where the robot runs and activate the robot. See Specify Where a Robot Runs and Activate a Robot.
- Update your network's allowlist to allow outbound calls to Oracle Integration.

  If you don't complete this task, the robot agent might not be able to contact Oracle Integration so that it can poll for work, and your robot might not run if you're on a company VPN or wired network. See Review Your Network Configuration.

Test a Robot on Its Environment

If the robot is associated with an environment pool that contains multiple environments, you can't choose the environment that the robot runs on. If you want to control this aspect of testing, associate the robot with an environment pool that has only one environment.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot** .
3. Run the robot.
   a. In the **Robots** box, point to an Active robot, select **...**, and select **Run**.

      The Configure and run page appears.
   b. In the **Input** field, enter or paste the JSON code for the trigger's input.

      For help, see Sample Code for Testing a Robot.
   c. Select **Run**.

      Below Instance ID, the identifier of the robot instance appears.

Next steps

Next, monitor the robot to verify that it ran as expected. See Monitor a Robot.

After verifying that the robot runs successfully in its environment, test the robot with its integration. See Test a Robot and Its Integration.

Sample Code for Testing a Robot

When a robot runs in the real world, an integration passes an input to a robot. However, when you run a robot independent of its integration, you must pass this value manually. To test your robot effectively, enter JSON code that matches the values that you defined in the input.

Formatting Rules

- Enclose all code in curly brackets: { }

- Include a comma after each line.
- Enclose the property names and the values of strings in quotation marks: `" "`
- Enclose the values of collection variables in brackets: `[ ]`
- If a value is a string and is part of a collection variable, include the quotation marks within the brackets. For example:

  `"Property_Name": ["Value"],`

Sample Code: Input with Multiple Properties

The input for a robot contains a number of properties, including `Department`, `Name`, `Activity_Type`, and so on, as shown in the following example. You can pass values for these properties to the robot.

```
{
  "Department": "Finance",
  "Name": "Travel expenses",
  "Activity_Type": ["Adjustments"],
  "Active": "Yes",
  "Account_Source": ["Travel account"],
  "Tax_Rate_Code_Source": ["Activity"],
  "Activity_Account": "ABCD-123456-789000",
  "searchTask": "manage expenses"
}
```

Sample Code: Passing Multiple Records for an Input That Is Based on a Data Type with Four Properties

The input for a robot is named `Invoices` and is of the `InvoiceType` type. The `InvoiceType` data type contains the following properties:

- `InvoiceNumber`
- `SupplierName`
- `InvoiceAmount`
- `DueAmount`

The input must include the name of the input, the name of its properties, and the values for its properties. If the robot iterates over multiple records, you can pass multiple records to it in the input, as shown in the following example.

```
{
  "Invoices": [{
    "InvoiceNumber": "US123456",
    "SupplierName": "Big Computers",
    "InvoiceAmount": 98437,
    "DueAmount": 500.00
  }, {
    "InvoiceNumber": "US234566",
    "SupplierName": "Small, Inc.",
    "InvoiceAmount": 128,
    "DueAmount": 128
  }]
```

```
}
```

Test a Robot and Its Integration

After ensuring that a robot runs as expected, test the robot along with the integration that calls it. This end-to-end testing also helps you confirm that the integration passes the correct values to the robot.

Workflow

1. Prerequisite: Activate the robot

   If an integration tries to call a robot that isn't active, the integration fails.
2. Activate an Integration
3. Run an Integration and Robot

Activate an Integration

After you finish designing the integration that calls your robot, you must activate it and set its tracing level.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Integration**  .
3. In the **Integrations** box, find the integration to activate.

   The integration must be in a Configured state.
4. Click **Actions ...**, and select **Activate**.

   The Activate integration panel opens.
5. Follow the steps to activate the integration.

   See Activate and Deactivate Integrations in *Using Integrations in Oracle Integration 3*.

Run an Integration and Robot

After you activate a robot and the integration that calls it, you can run them both by running the integration.

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Integration** .
3. In the **Integrations** box, find the integration to run.

   The integration must be in an Active state.
4. Click **Actions ...**, and select **Run**.

   The Configure and run page opens.

5. Select **Run**.

   The Activity Stream panel opens to show the progress of the run.

Next steps

Monitor the integration and robot. See Monitor a Robot and Its Integration.

6

Deploy and Monitor a Robot

Learn how to deploy a robot to a higher environment, monitor a robot, and update a deployed robot.

What Do You Need to Do?

- Deploy a Robot
- Monitor an Automation Solution
- Update a Deployed Robot

Deploy a Robot

Learn how to deploy a robot to a test or production instance.

Topics:

- Workflow for Deploying a Robot
- Deploy a Robot to a Higher Environment

Workflow for Deploying a Robot

After you finish building a robot and testing it locally, you can deploy the robot and its integration to a higher environment, such as a test or production environment.

Previous workflow: Workflow for Testing a Robot.

Step	Task	More information
1	Deploy your automation solution to a higher environment	You can deploy to a test, production, or other environment. The steps you follow are the same for promoting to any environment. See Deploy a Robot to a Higher Environment.
2	Update the robot connection so that it contains information for the higher environment	When you import a project deployment into a project in a new environment, the robot connections are included in the import, but their details are removed. See Update a Robot Connection.

Step	Task	More information
3	Install the robot agent on the machine(s) that the robot must run on in the higher environment	Complete the following tasks for each machine that a robot must run on: 1. Meet the Robot Agent's Requirements 2. Download the Robot Agent 3. Update the Robot Agent's Configuration File 4. Start the Robot Agent 5. Start the Robot Agent Automatically (Optional)
4	Update the robot's environment pool	You probably added your own computer or a development machine to the environment pool for testing and validating the robot. However, the robot might need to run somewhere else after you deploy it to a higher environment. The import process removed all environments from the environment pool. You must add the production machine(s) that you just configured to the environment pool. See Add Computers to an Environment Pool.
5	Activate the robot	After you deploy a robot to a test or production instance, the robot's status changes to Draft. Perform the following steps so that the robot can run: 1. Remove an Environment Pool from a Robot 2. Associate a Robot with an Environment Pool Associate the environment pool with the robot again so that the robot's state changes to **Configured**. 3. Activate a Robot
6	Monitor your automation solution	Monitor a Robot and Its Integration

Deploy a Robot to a Higher Environment

After you finish local testing, create a deployment package that contains a robot and its integration. Import the deployment package into a higher environment, such as test or production.

Use Cases

You have several opportunities to deploy to a test or production environment:

- Many organizations deploy to a testing environment to simulate real-world usage.
- Additionally, everyone should deploy to a production environment when you're ready to go live.

Prerequisites

Before deploying to a higher environment, ensure that the robot is error free and runs successfully. See Workflow for Building a Robot and Workflow for Testing a Robot.

Workflow for Deploying to a Higher Environment

1. Create a deployment package that contains the robot and its integration.

   See Create and Manage a Project Deployment in *Using Integrations in Oracle Integration 3*.
2. Export the project deployment.

   See Export a Project in *Using Integrations in Oracle Integration 3*.
3. Import the project deployment into the higher environment.

   See Create or Import a Project in *Using Integrations in Oracle Integration 3*.

How Import Changes Your Components

The import process makes the following changes:

- The robot's status changes to **Draft**.
- The connection details in all robot connections are removed.
- All environments are removed from the environment pools.

Monitor an Automation Solution

Learn how to monitor a robot and integration together in a project, and ensure that all robot agents are up and running.

Topics:

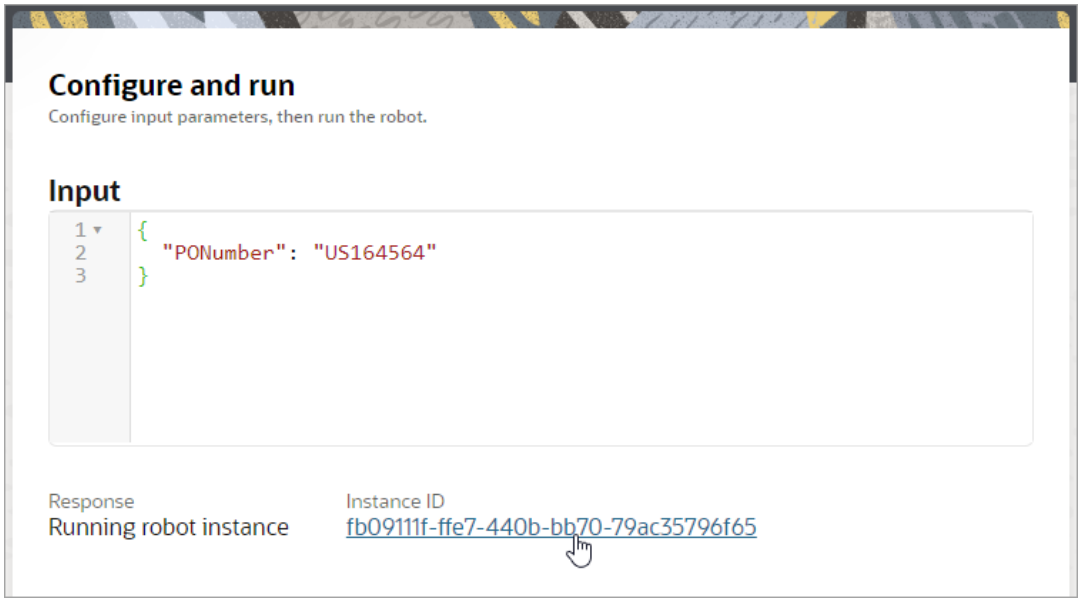
Monitor a Robot

Learn how to verify that a robot has run as expected.

1. Run a robot.

   For details, see Test a Robot on Its Environment. The steps below start where the steps for testing a robot end.

   If you ran a robot by running an integration, different monitoring steps are available. See Monitor a Robot and Its Integration.
2. Select the robot's Instance ID.



The Integration page opens with the Observe tab selected.

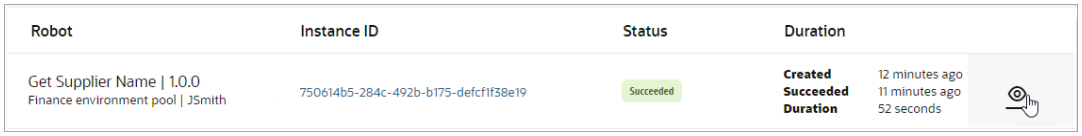
3. In the left toolbar, select **Robot** .

   The Robot instances tab appears.

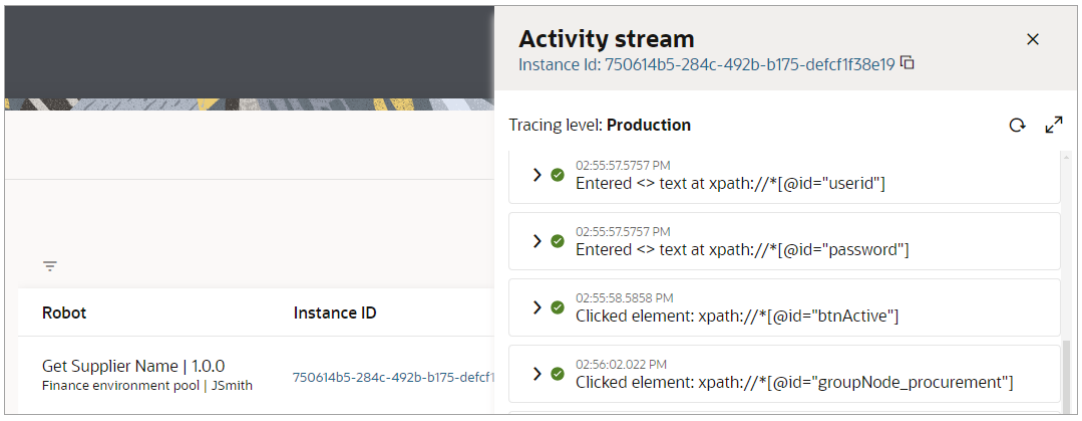
4. Check the status of the robot.

   For descriptions of each status, see Runtime Statuses of Robot Instances.

5. Point to the robot, and select **View details** .



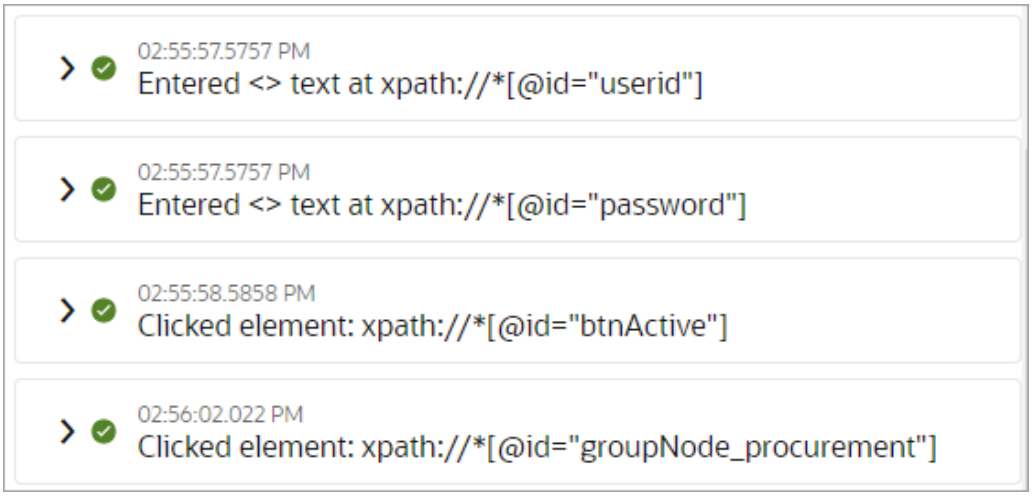
The Activity stream panel opens.



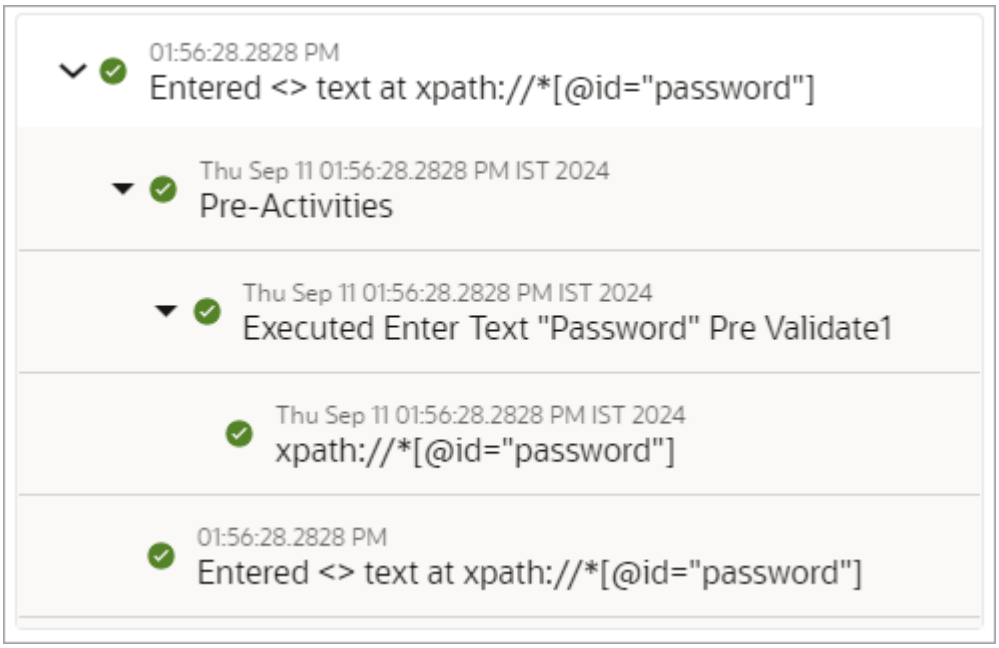
6. Review the activity stream for the robot.

> **Note:**
>
> Details are available in the activity stream only after the robot has one of the following statuses: **Succeeded** or **Failed**.

- **Check whether each step ran correctly:** Green checkmarks indicate that the action completed successfully. A red X indicates that the robot wasn't able to complete the action.



- **Review the steps that the robot completed for each action:** Expand each entry in the activity stream to review the tasks that the robot performed.

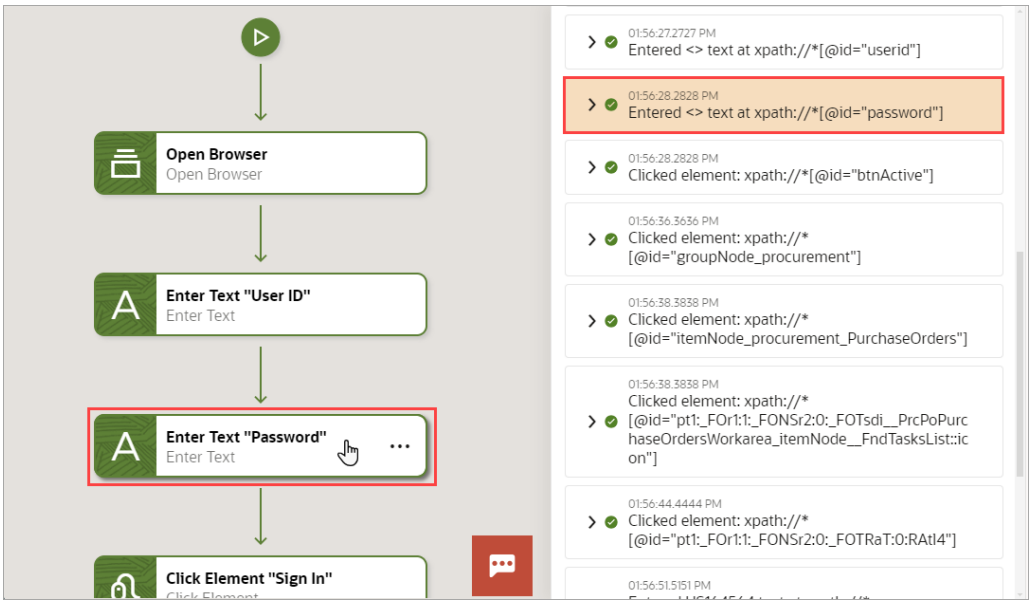


- **Review any information that was logged:** For example, if you added a log action to record a value in the activity stream, find and review the logged data.

7. Review the activity stream for the robot alongside a canvas view of the robot.
   a. At the top of the activity stream, select the robot's instance ID.

      The canvas view of the robot opens, with the activity stream on the right.
   b. To view the activity stream entry for an action, double-click the action on the canvas.

      The related record in the activity stream is highlighted in orange.



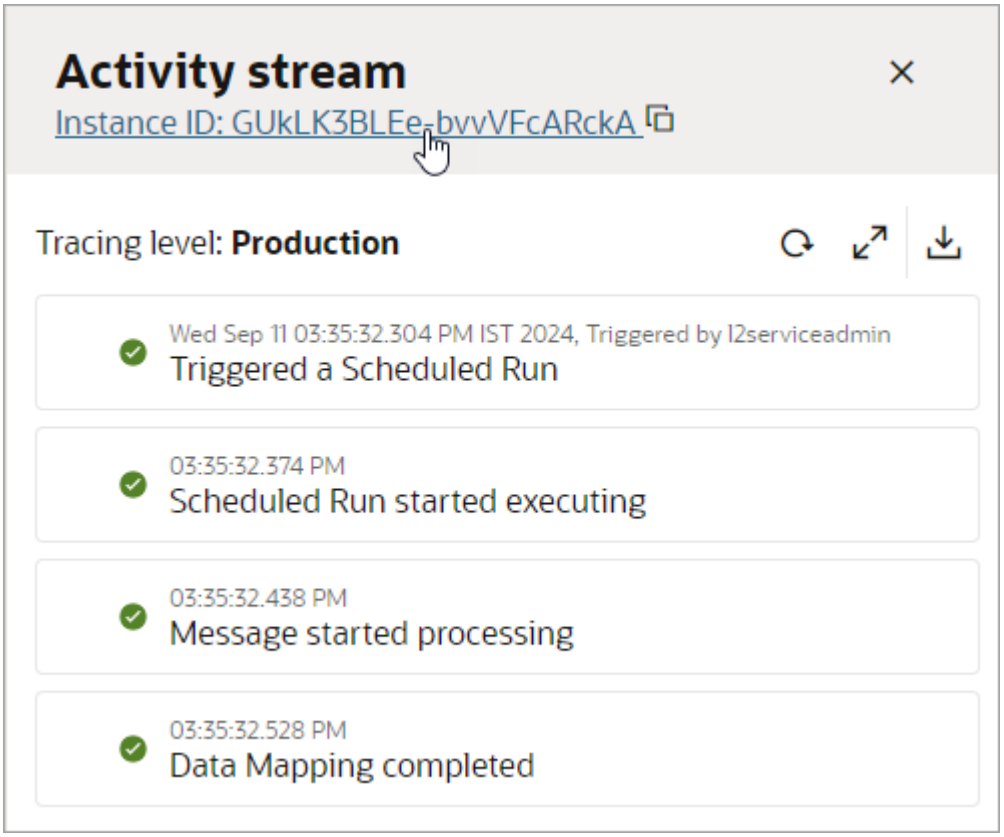
Monitor a Robot and Its Integration

Learn how to verify that an integration and robot have run as expected.

1. Run an integration that calls a robot.

   For details, see Test a Robot and Its Integration. The steps below start where the steps for testing a robot and its integration end.

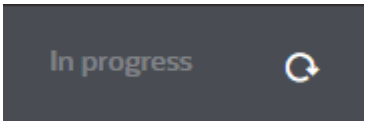
   If you ran a robot without running its integration, different monitoring steps are available. See Monitor a Robot.
2. Monitor the integration.
   a. Select the integration's instance ID.



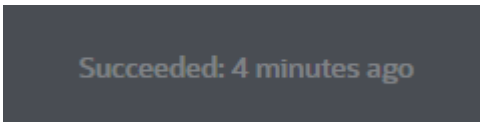
The canvas view of the integration opens, with the activity stream on the right.

b. In the upper-right corner, check the status of the integration and robot.

If the integration or robot is still running, **In progress** appears, along with a Refresh button .



c. Select **Refresh** until **Succeeded** appears in the upper-right corner.

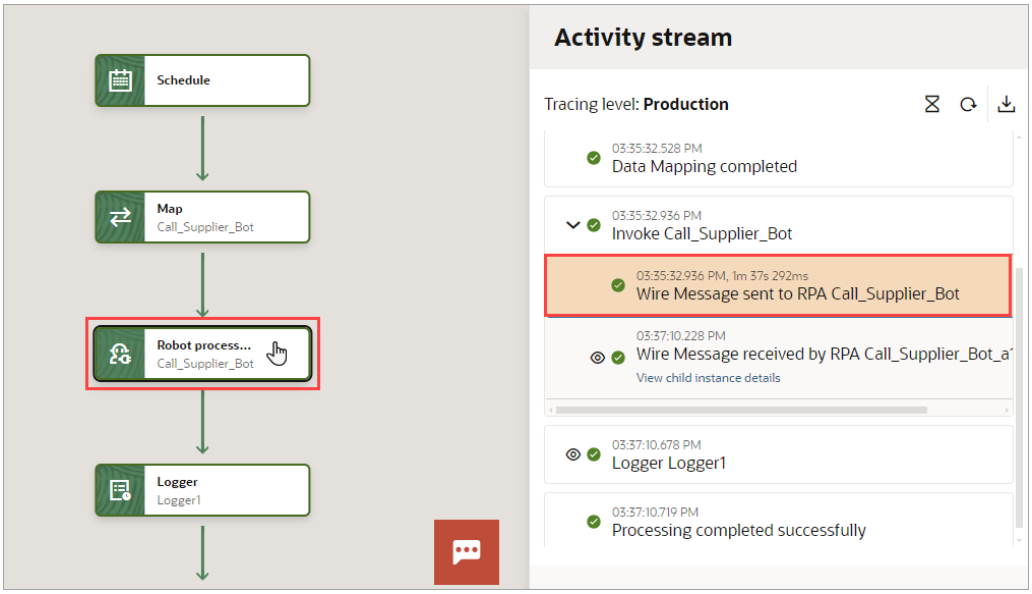


For more information about monitoring an integration, see Monitor Integrations in a Project.

3. Monitor the robot.

a. Double-click the **Robot process automation** action on the canvas.

The related record in the activity stream is highlighted in orange.



b. Below the **Wire Message received** entry, select **View child instance details**.

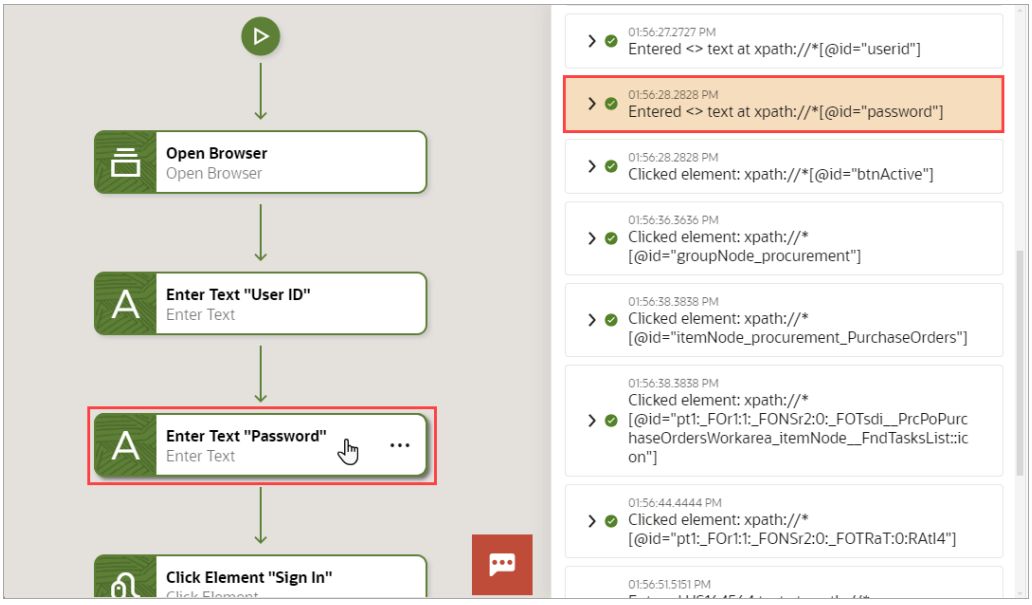
The activity stream for the robot instance opens.

c. At the top of the activity stream, select the robot's instance ID.

The canvas view of the robot opens, with the activity stream on the right.

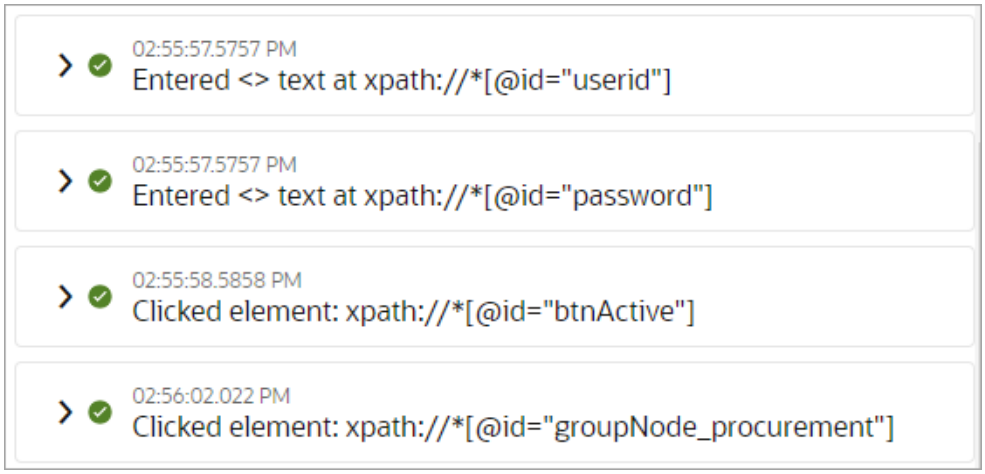
d. To view the activity stream entry for an action, double-click the action on the canvas.

The related record in the activity stream is highlighted in orange.

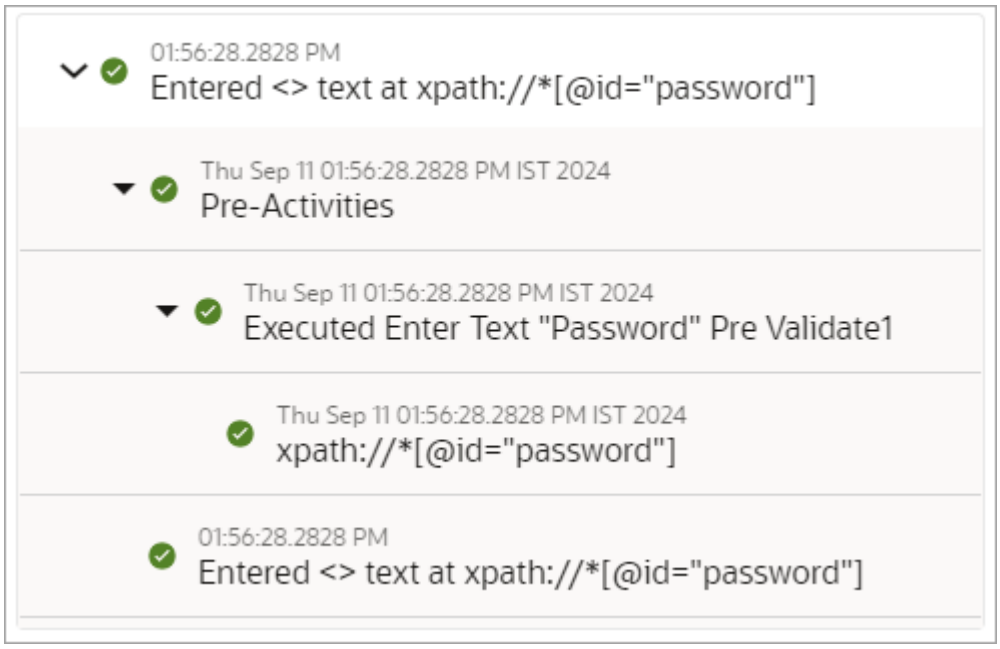


e. Review the activity stream for the robot.

- **Check whether each step ran correctly:** Green checkmarks indicate that the action completed successfully. A red X indicates that the robot wasn't able to complete the action.



- **Review the steps that the robot completed for each action:** Expand each entry in the activity stream to review the tasks that the robot performed.

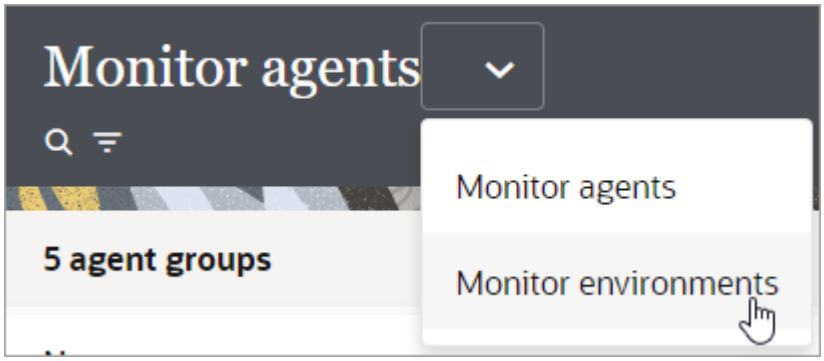


- **Review any information that was logged:** For example, if you added a log action to record a value in the activity stream, find and review the logged data.

Check Whether an Environment is Available

You can check the availability of all environments on a single page.

1. In the navigation pane, click **Observability**, then **Agents**.
2. At the top of the page, expand the **Monitor agents** drop-down, and select **Monitor environments**.



The Monitor environments page lists every environment on which the robot agent has been installed for the instance, plus the following information:

- Computer that the robot agent was installed on
- Status of the environment
- Environment pool that the environment is in
- Project that the environment is associated with

3. To view more information about an environment, point to the environment, and select **Expand** ⌄.
4. Check the **Status** column to identify any environments that are unavailable.

Name	Host	Status	Environment pool	Project
JSmith	JSMITH	Unavailable	Local_JSmith	FINANCE

5. Troubleshoot any environments with a status of **Unavailable**.

   See An Environment Is Unavailable.

Runtime Statuses of Robot Instances

A robot instance's runtime status, visible on the Observe page in a project, indicates whether the robot instance ran successfully.

Robot instance status	Description
Agent Failed	The robot instance didn't run because two or more versions of the robot agent are installed and running on an environment.
Deleted	The robot instance was deleted. Instances are deleted according to the data retention rules of the Oracle Integration instance.
Failed	The robot instance was unable to complete its task. For example: • An error occurred for the robot instance. • An environment wasn't available or couldn't accept the request to run the robot before the robot instance's duration exceeded the timeout limit. For details about the timeout limit, see Service Limits in *Provisioning and Administering Oracle Integration 3*. For troubleshooting help, see A Robot Fails.
In Progress	The robot instance is currently running.
New	Oracle Integration does not currently use this status for robot instances.

Robot instance status	Description
Pending	Oracle Integration is currently creating the robot instance or trying to assign the robot instance to an environment.
Succeeded	The robot instance completed all of its tasks successfully and has finished running.
Timeout	The robot instance timed out. For example: • The environment that the robot was supposed to run on was deleted. • The robot instance was still running when its duration exceeded the timeout limit. For details about the timeout limit, see Service Limits in *Provisioning and Administering Oracle Integration 3*.

Update a Deployed Robot

Learn how to update a robot that you've deployed to a higher environment, such as a production or test instance.

Topics:

- Workflow for Updating a Deployed Robot
- Version a Robot
- Replace a Robot with an Integration

Workflow for Updating a Deployed Robot

If you need to update a robot that you've deployed to a higher environment, you don't need to rerecord the robot or wade through code. The same intuitive tools that you used to build the robot are available to update the robot.

Step	Task	More information
1	Open the lower environment where you built the robot and its integration, and create a new version of the robot	Version a Robot
2	Update the robot as needed	For example: • Add an Action to a Robot • Add Logic to a Robot
3	Address any errors with the robot	Fix a Robot's Errors
4	Activate the robot, and test it in the build environment to ensure that the robot works as expected	Workflow for Testing a Robot
5	Deploy the robot to a higher environment	Workflow for Deploying a Robot

Version a Robot

Creating a new version of a robot gives you the ability to fall back to an earlier version of the robot. Additionally, you can have multiple versions of a robot active in an environment.

Use Cases

The following scenarios illustrate the power of versioning:

- Fall back to an earlier version of a robot

  If you need to update a robot that's already been deployed to a higher environment, create a new version of the robot first. That way, if any issues occur with the new robot's version after deployment, you can always fall back to an earlier version of the robot.

- Have two or more versions of a robot active at one time

  Consider the following scenario: Robot Version 1 runs successfully on an application. The application recently released an update featuring significant changes to the user interface. The changes are available in a testing environment for a couple months and then will be available in production. You create Robot Version 2, update it for the changes to the user interface, and deploy the robot to production so that you can ensure the robot runs as expected. In this situation, Robot Version 1 and Robot Version 2 are active at the same time in production.

Version a Robot

1. Open a project.
   a. In the navigation pane, select **Projects**.
   b. Select the project name.
2. In the left toolbar, select **Robot** .
3. In the **Robots** box, point to a robot, select **...**, and select **Create new version**.

   The Create new version panel appears.
4. Update the version field appropriately for the change.

   If you must activate this robot on an instance for which another version is already active, you must increment the major version number. For example, increment from 1.0.0 to 2.0.0. Otherwise, you can increment the version number as you choose.

For guidance on how to update the robot, see Workflow for Updating a Deployed Robot.

Replace a Robot with an Integration

When circumstances or requirements change, you can replace a robot with an integration without impacting your business process. Oracle Integration supports this workflow and allows you to build the way you need to, today and in the future.

Use Case

Consider a situation in which integration developers weren't available when you needed to automate a business process. You chose to move forward with the automation work by rapidly prototyping a robot and planned to replacing the robot with an integration within a year.

Replace a Robot with an Integration

- Open an integration, and replace the action that calls the robot appropriately.

  For example:

  - Replace the robot action with other actions.
  - Design a new integration, and call it from the integration.

  See Workflow for Developing an Integration in *Using Integrations in Oracle Integration 3*.

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Troubleshoot

Get help troubleshooting the robot agent, the recorder, and robots.

What Do You Need Help With?

- Troubleshoot the Robot Agent and Environments
- Troubleshoot the Recorder
- Troubleshoot Robots
- Download the Log File for a Robot or Robot Agent

Troubleshoot the Robot Agent and Environments

Get help when you can't start the robot agent, or when an environment is unavailable.

What Are You Trying to Do?

Goal	Troubleshooting help
Start or restart the robot agent	A Robot Agent Doesn't Start
Check the availability of environments	An Environment Is Unavailable

A Robot Agent Doesn't Start

If you're unable to start a robot agent, whether for the first time or after stopping it, use the troubleshooting steps to get back on track.

Issue

You cannot stop the robot agent, either immediately after you installed it or after someone stopped it.

Why It Happens

This issue typically occurs when the robot agent can't connect to Oracle Integration, or when the configuration of the robot agent requires some adjustments. Keep reading for step-by-step instructions on how to troubleshoot.

How to Troubleshoot Errors

The following errors could appear in the command line or the robot agent logs.

Error	What happened	Troubleshooting steps
`Agent jar version is either blank or not correct`	The file name of the robot agent's JAR file no longer contains the robot agent's version number, such as `0.1.80`.	Restore the file name of the JAR file to the original name, including the robot agent's version number. If you aren't sure of the correct format, you can download the agent again and copy the JAR file into your robot agent's directory. See Download the Robot Agent.

`An error occurred while storing or trying to retrieve secrets from the local store.`
or
`An Exception occurred while retrieving secrets. Terminating agent`
	Oracle Integration was unable to write values to or retrieve values from the computer's local keystore. This error typically appears when a user doesn't have sufficient privileges. For example, one administrator might have downloaded the robot agent, and a second administrator is trying to start the robot agent. The second administrator might not be able to access the credential manager on the computer.	Run the command prompt as an administrator, and then try starting the robot agent again. See Start the Robot Agent.

`Could not determine the path to the JAR file. Provide full path of the agent jar.`	One of the following issues occurred: • The folder name or directory where the robot is installed contains a space. • The command that you used to start the robot agent didn't include the full directory of the robot agent's JAR file.	Check whether the folder name or directory contains a space. If so, remove the spaces from the directory, update the command to start the robot agent appropriately, and try again. If no spaces are in the folder name or directory, review the command that you used to start the robot agent. update the command so that it contains the full directory to the JAR file. See Start the Robot Agent.

`Either latest available version or current running agent version is null.`
or
`Either minimum supported version is not met or current running agent version is null.`
or
`Minimum supported agent version is` *`version_number`*`, current running version` *`version_number`*
	The robot agent's version is no longer compatible with Oracle Integration.	Update to a newer version of the robot agent. See Download the Robot Agent.

Error	What happened	Troubleshooting steps

`Error occurred while downloading dependencies like micromamba, robot runtime, rcc, etc.`
or
`Robot runtime is not available. Please check robot runtime installation before proceeding.`
	The environment on which you installed the robot agent doesn't have access to the public internet and is unable to download the required dependencies.	The environment must be able to access the public internet when you start the robot agent for the first time. Ensure that the computer has access to the public internet, such as by temporarily disabling the VPN, and try starting the robot agent again.
		Depending on the robot's interactions, it might need access to the public internet in general. See Design Considerations.

`Failed creating python virtual environment for flowRT`	This error can occur when you're trying to start the robot agent or trying to start the robot agent as a Windows service. • If you're trying to start the robot agent, the machine might not have network connectivity, or the robot agent might not be able to create subdirectories in the user home. • If you're starting the robot agent as a Windows service, you might not have defined a required environment variable.	**Starting the robot agent** The environment must be able to access the public internet when you start the robot agent for the first time. Ensure that the computer has access to the public internet, such as by temporarily disabling the VPN, and try starting the robot agent again. Depending on the robot's interactions, it might need access to the public internet in general. See Design Considerations. Additionally, run the command prompt as an administrator, and then try starting the robot agent again. See Start the Robot Agent. **Starting the robot agent as a Windows service** See Start the Robot Agent Automatically.
`Failed saving the modified InstallerProfile configuration file`	Oracle Integration was unable to update the robot agent's configuration file. Oracle Integration must remove sensitive values from the configuration file and add a comment to the file about the change.	Run the command prompt as an administrator, and then try starting the robot agent again. See Start the Robot Agent.
`Failed to create environment in the control room or update Agent.properties file.`	An issue occurred during the installation of the robot agent. For example: • The installation parameters for the robot agent weren't correct. • The robot agent couldn't register with Oracle Integration. • The `Agent.properties` file couldn't be updated.	Confirm that your network allows the computer to access Oracle Integration. See Review Your Network Configuration. Next, confirm that your network allows the computer to access the public internet. This access is required the first time that you start the robot agent. See Start the Robot Agent. Finally, ensure that the person who starts the robot agent has the require file system permissions to save files on the computer.

Error	What happened	Troubleshooting steps
`Format of minimum supported version or current running agent version is not correct.`	The file name of the robot agent's JAR file no longer contains the robot agent's version number, such as `0.1.80`.	Restore the file name of the JAR file to the original name, including the robot agent's version number. If you aren't sure of the correct format, you can download the agent again and copy the JAR file into your robot agent's directory. See Download the Robot Agent.
`InstallerProfile.cfg or Agent.properties file is either missing fields or has invalid data`	The `InstallerProfile.cfg` file or `Agent.properties` file has been modified and is no longer valid.	1. Download the robot agent, and copy the `Agent.properties` and `InstallerProfile.cfg` files to the directory where you've installed the robot agent. See Download the Robot Agent. 2. Update the Robot Agent's Configuration File 3. Start the Robot Agent

`No value passed to -jar argument for agent jar. Wrong arguments passed`
or
`Unable to retrieve the -jar argument value. Wrong arguments passed`
	The command that you used to start the robot agent was missing one or more parameters. For example, the command might not contain a required parameter, or the command contains an environment variable that hasn't been set in the command prompt.	Update the command so that it contains the correct parameters. See Start the Robot Agent.

`RPA Agent is supported on JDK version 1.17 and above, please install or upgrade JDK/JVM to run RPA Agent.`	Java Development Kit (JDK) 17 isn't installed on the computer or virtual machine.	Install Java Development Kit (JDK) 17 on the computer or virtual machine. See Meet the Robot Agent's Requirements.

Error	What happened	Troubleshooting steps
`User agent set to: Oracle-JavaSDK/2.56.0 (Mac OS X/ 14.3.1; Java/ 17.0.8; Java HotSpot(TM) 64-Bit Server VM/ 17.0.8+9-LTS-211) Exception in thread "main" com.oracle.bmc.model.BmcException: Error returned by GetAgentVersion operation in Agent service. (401, NotAuthenticated, false) The required information to complete authentication was not provided or was incorrect. (opc-request-id: *debugging_identifier/ debugging_identifier/ debugging_identifier*) Timestamp: *timestamp* Client version: *robot_agent_version* Request Endpoint: *endpoint* Troubleshooting Tips: See https://docs.oracle.com/en-us/iaas/Content/API/References/apierrors.htm#api`	An issue has occurred with the `Agent.properties` file.	Navigate to the folder that contains the unzipped files for the robot agent, and delete the `Agent.properties` file. Next, try starting the agent again.

Error	What happened	Troubleshooting steps
errors_401__401_notauthenticated for more information about resolving this error Also see for details on this operation's requirements. To get more info on the failing request, you can enable debug level logs as mentioned in `Using SLF4J for Logging section` in https://docs.oracle.com/en-us/iaas/Content/API/SDKDocs/javasdkconfig.htm. If you are unable to resolve this Agent issue, please contact Oracle support and provide them this full error message. at com.oracle.bmc.http.internal.ResponseHelper.throwIfNotSuccessful(ResponseHelper.java:160)		

What to Do if an Error Doesn't Occur

After completing each step, try running the agent again.

Step	Consideration	More information
1	Does the robot agent's computer meet the system requirements for the robot agent?	For example, the correct version of the JDK might not be installed, or the JAVA_HOME might not be set. See System Requirements.
2	Does the robot agent's computer have internet access?	Navigate to a website that your network allows you to access, and confirm that the page loads. If the computer doesn't have internet access, work with a network administrator to correct this issue.
3	Does your network allow the robot agent's computer to access Oracle Integration?	Sign in to Oracle Integration from the computer that the robot agent is installed on. If you are unable to sign in, your network might restrict access to the internet based on IP address. Work with an administrator to ensure that the egress rules allow access to the inbound IP address for Oracle Integration. Otherwise, the robot agent cannot access Oracle Integration. See Obtain the Inbound and Outbound IP Addresses of the Oracle Integration Instance in *Provisioning and Administering Oracle Integration 3*.
4	Does a confidential application exist for the robot agent, and is it active?	A confidential application is an OAuth client application that allows robot agents to securely connect to Oracle Integration using the OAuth protocol. See Ensure that the Confidential Application is Active.
5	Is the robot agent's configuration file defined correctly?	For step-by-step instructions on updating the file, see Update the Robot Agent's Configuration File.
6	Is there a space in the folder name or directory where the robot agent is installed?	Do not include any spaces in the folder name, or you cannot start the robot agent. Additionally, Oracle recommends not including any spaces in the directory path.
7	Is there a space in the home directory of the computer?	Even if you don't install the robot agent to the home directory, the robot agent must create files in the home directory. The robot agent is unable to create the files if the home directory contains any spaces. For information about how to create a new home directory and specify the new home directory in the startup command for the robot agent, see Start the Robot Agent.
8	Enter a service request	If you complete all of these steps and the robot agent still won't run, get help from Support by entering a service request (SR). Include the log files for the robot agent with the request. See Download the Log File for a Robot or Robot Agent.

An Environment Is Unavailable

When an environment's status is **Unavailable** on the Monitor environments page, open the command line from which you started the robot agent for the environment. Next, find the error that occurred, and follow the troubleshooting workflow to get the environment back up and running.

Check Whether an Environment Is Available

See Check Whether an Environment is Available.

Errors and How to Address Them

You might encounter one or more of the following errors in the command line or the robot agent logs when an environment is unavailable. Use the troubleshooting steps to get back on track.

Error	What happened	Troubleshooting steps

`An error occurred while storing or trying to retrieve secrets from the local store.`
or
`An Exception occurred while retrieving secrets. Terminating agent`
	Oracle Integration was unable to write values to or retrieve values from the computer's local keystore. This error typically appears when a user doesn't have sufficient privileges. For example, one administrator might have downloaded the robot agent, and a second administrator is trying to start the robot agent. The second administrator might not be able to access the credential manager on the computer.	Run the command prompt as an administrator, and then try starting the robot agent again. See Start the Robot Agent.

`Either minimum supported version is not met or current running agent version is null.`	The robot agent's version is no longer compatible with Oracle Integration.	Update to a newer version of the robot agent. See Download the Robot Agent.

Troubleshoot the Recorder

Get help when the screen recorder that you use to build a robot doesn't work the way that you expect.

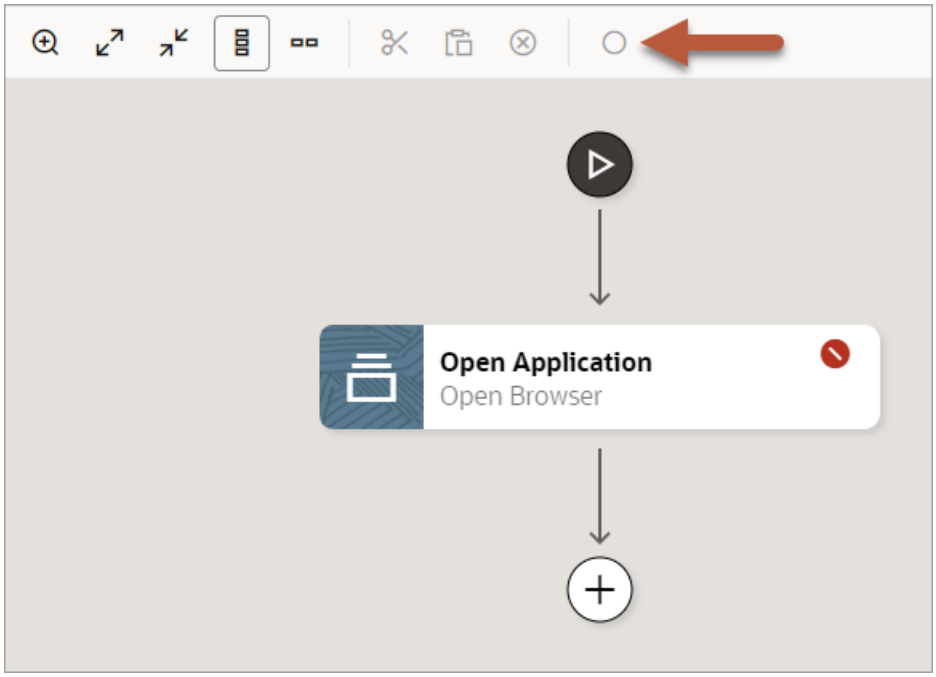
Goal	Troubleshooting help
Start the recorder	The Recorder Doesn't Start
Build a robot using the recorder	The Recorder Stops Working An Application Isn't in the Browsers List The Canvas Is Read-Only

The Recorder Doesn't Start

If you can't start the recorder from the canvas, make sure that you've selected an action on the canvas.

Issue

The **Record after the selected action** button ○ is grayed out on the canvas, so you can't start recording.

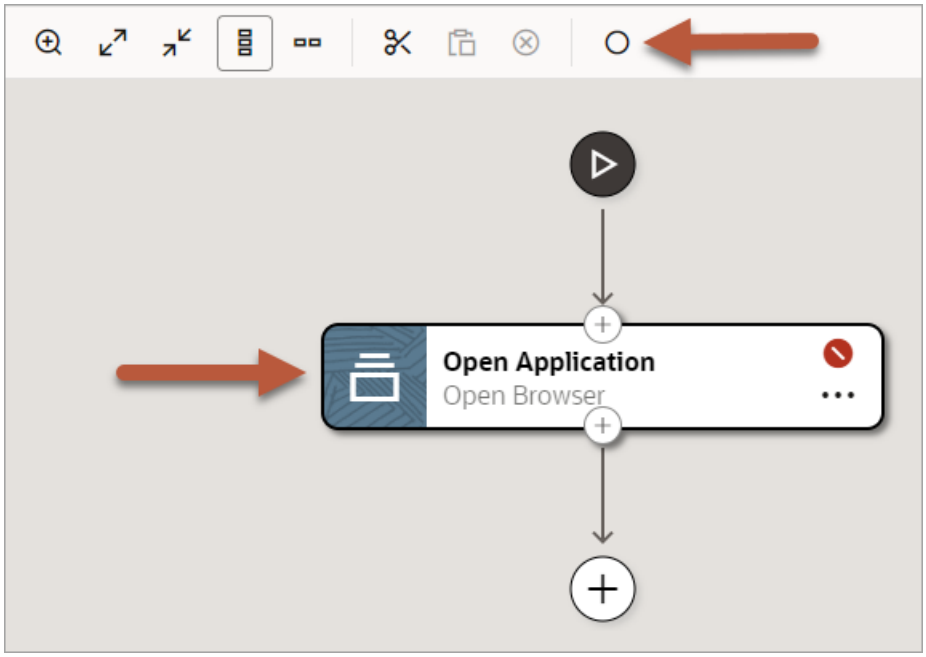


Why It Happens

The button becomes enabled only when you select an action in the canvas.

What to Do

Select an action in the canvas.



The Recorder Stops Working

When you're building a robot using the recorder, and the recorder suddenly stops working, a significant change to the page's HTML is often the reason why.

Issue

You're in the middle of recording, but you suddenly can't target any UI elements. The targeting colors no longer appear when you point to various UI elements.

Why It Happens

This issue occurs when a page replaces its HTML with new HTML without loading a new page. The recorder is unable to continue recording because the page hasn't changed—but its HTML has.

What to Do

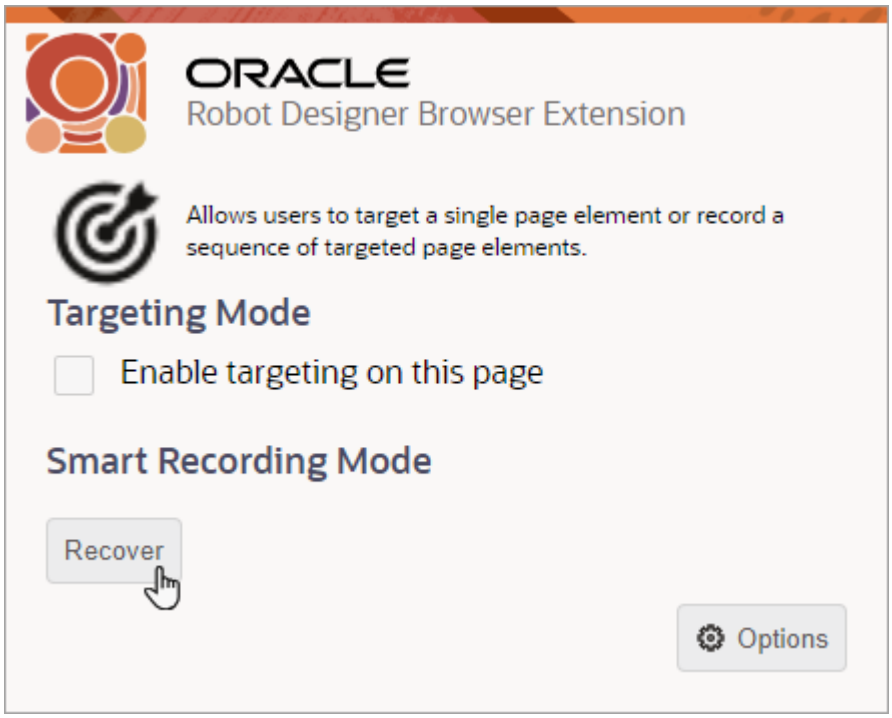
You have several options for moving forward:

- Return to Oracle Integration, stop the recording by selecting **Stop** ☐ on the toolbar, and restart the recording from the same position in the robot where you left off.

  Next, continue with your recording.
- In the toolbar of the browser that you're recording in, select the icon for the Robot Designer Browser Extension .

  This icon appears with your other extensions. For example, in Chrome, you might need to select Extensions to see it.

  Next, select **Recover**.



Next, continue with your recording.

An Application Isn't in the Browsers List

When an application doesn't appear in the list of browsers to target, the application might not have been open when you started the recorder.

Issue

When you're using the targeting tool to identify a locator field for a robot action, your application's browser is sometimes missing from the list.

Why It Happens

This issue typically occurs when you open the application after you start the recorder.

What to Do

Stop the recorder, open the application in a new tab, and start the recorder again.

> **Tip:**
>
> If you opened the application before starting the recorder, make sure that you're scrolling down all the way in the list of browsers. If you have a number of browsers open, you might need to scroll all the way to the bottom of the list.

The Canvas Is Read-Only

If everything is read-only, you're probably still recording.

Issue

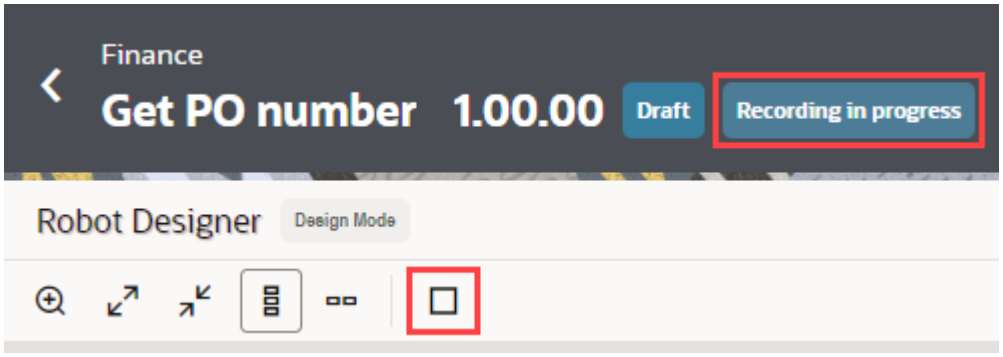
Most actions on the canvas are read-only or unavailable.

Why It Happens

Most actions are read-only or unavailable while the recorder is running.

What to Do

If you can't complete any tasks, check whether the **Recording in progress** badge and the **Stop recording** buttons appear. If so, you're still recording.



Stop the recording, and then you can work on the canvas.

Troubleshoot Robots

Get help troubleshooting robots.

What Are You Trying to Do?

Goal	Troubleshooting help
Activate a robot	A Robot Doesn't Activate
Run a robot	A Robot Fails

A Robot Doesn't Activate

If you can't activate a robot, the robot might still contain an error, or you might not have associated an environment with the robot.

Issue

You are unable to activate a robot.

Why It Happens

This issue typically occurs when:

- The robot contains one or more errors.
- The robot isn't associated with an environment.

What To Do

- Determine whether any errors are present.

  See Fix an Error in a Robot.
- Determine whether the robot is associated with an environment.

  See Create an Environment Pool.

A Robot Fails

When a robot fails, use the troubleshooting steps to get back on track.

Issue

A robot failed.

Why It Happens, and What To Do

Step	Why it happens	More information	What to do
1	The robot doesn't have the required access	You typically build a robot using different credentials than a robot uses to sign in to an application. Your credentials might have more or different permissions than the robot. For example, when you built the robot, your credentials might have shown you pages and buttons that the robot can't see due to its more limited access.	Verify that the robot's credentials have the required access to complete its tasks.
2	The environment pool that the robot is associated with doesn't have any environments, or none of its environments are active	A robot must run on an environment.	If the environment pool has no environments, add one or more environments to it. See Specify Where a Robot Runs.
3	The robot timed out	A robot can time out in the following ways: • The total running time for the robot exceeds the service limit. This timeout typically occurs due to a programming error. For example, the robot might create an infinite loop. To address this issue, determine the action where the robot got stuck, and make the necessary corrections. • A prevalidation page state on an action within the robot times out. A prevalidation page state specifies a timeout period. If the timeout period passes before the page state's requirements are met, the action doesn't occur, and the robot times out. See Add Validation to a Robot Action. • A "wait until element is visible" action within the robot times out. A wait action specifies a timeout period. If the timeout period passes before the action's requirements are met, the robot times out. See Add a Wait Until Element Is Visible Action.	You might or might not need to address timeouts. For example, if a robot has been running successfully for months and has failed because the application that it works in has gone down or because the network experienced temporary latency, the robot runs successfully again after the issues are resolved. However, if a robot consistently times out during testing, latency issues are often to blame. Complete the robot's task yourself in the application, and then consider how to address the issue. For example, increasing the timeout period for a single action might prevent robot instances from timing out.

Step	Why it happens	More information	What to do
4	The page's underlying HTML has changed since you built the robot	If a robot has run successfully for a period of time and now consistently fails on the same step, the application's underlying HTML might have changed.	Review the XPath of the element in the action that has failed, and compare it to the XPath in the robot. See View an Element's XPath.
5	The HTML code for an element doesn't match its action	If you used the low-code tools to build your robot, you might have chosen an action that can't interact with the underlying HTML code. For example, sometimes a UI field looks like a drop-down list but is actually coded as a text field. For example, the following actions are used for similar activities: • Add a Checkbox Action • Add a Click Element • Add an Enter Text Action • Add a List Action	Use the recorder to recapture the action that is failing. When you use the recorder to create robot actions, the recorder reviews the page's HTML and determines the appropriate robot action to use.
6	The action targets the wrong UI element	While identifying the field that a robot needs to act on, you might have inadvertently targeted the wrong element.	The advanced settings for the recorder allow you to view all the elements to target before saving a specific XPath. See View All Elements to Target. Alternatively, if the recorder is unable to target the exact element that you require, you can obtain the XPath of the element, and paste the value into the recorder. See View an Element's XPath.

Download the Log File for a Robot or Robot Agent

If you need help troubleshooting issues with a robot or robot agent, enter a service request (SR) and include the log file. Downloading the file takes just a couple moments.

1. Navigate to the appropriate location:
   - For a robot instance:

     `UserHome/.orpa/instances/InstanceId/output/`
   - For the robot agent:

     `Robot_agent_installation_path/Robot_agent_folder/orpa-agent-service-logs/info-Date.log`
2. Enter an SR, and attach the log file to the request.

A

Use Cases

Explore how to implement real-world scenarios.

What Do You Want to Learn About?

- Use Case: Update a Set of Invoices
- Use Case: Save Data After Iterating on Invoices
- Use Case: Save Values After Iterating on a Table
- Use Case: Switch Browsers

Use Case: Update a Set of Invoices

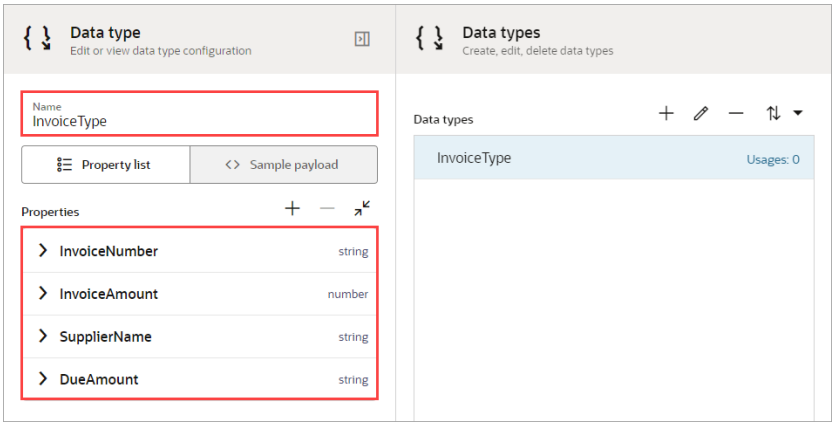
In this use case, an organization must manually update a set of invoices. Explore how data types, triggers, a foreach loop, a switch condition, and expression syntax support this workflow.

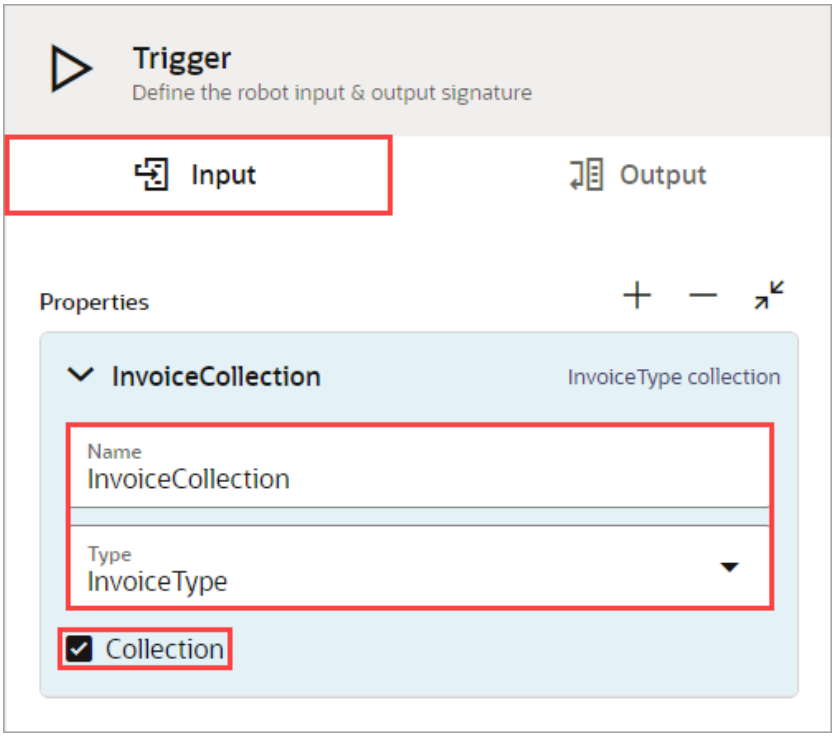
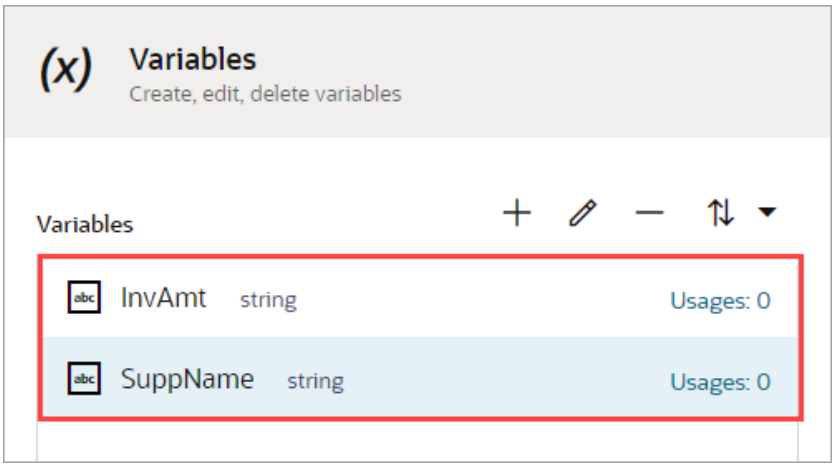
Scenario

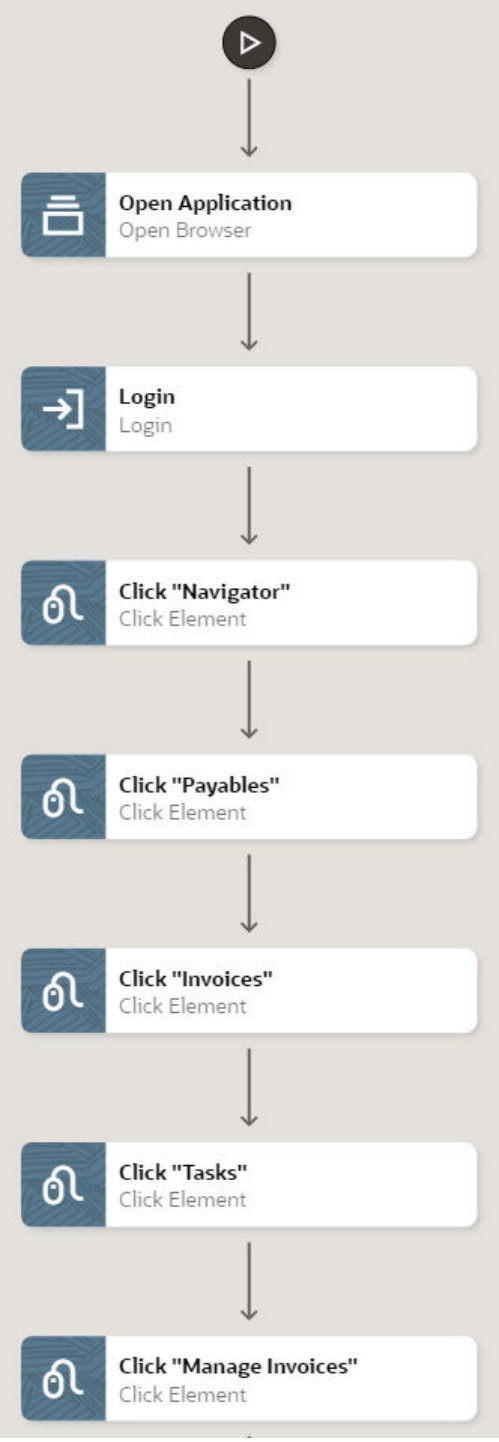
A robot completes the following tasks for a set of invoices:

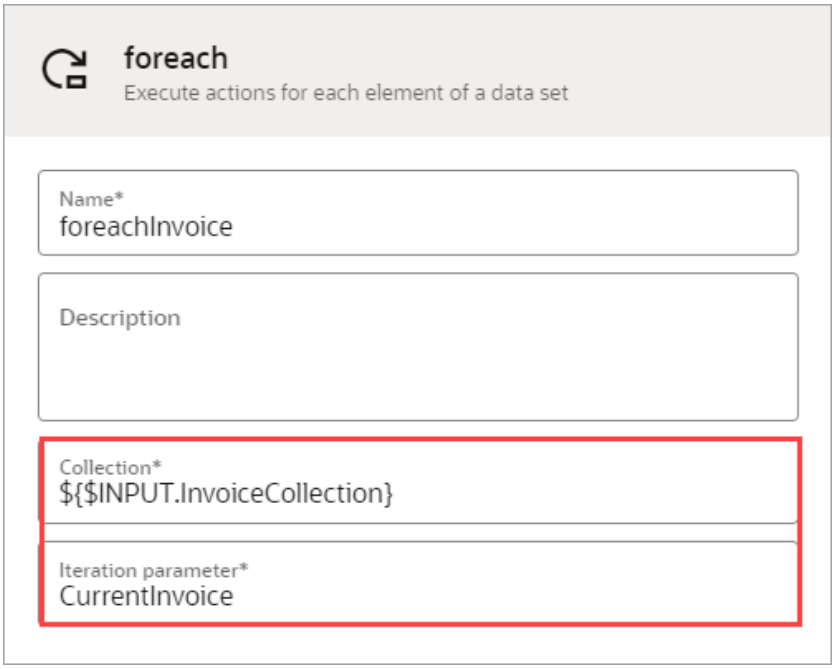
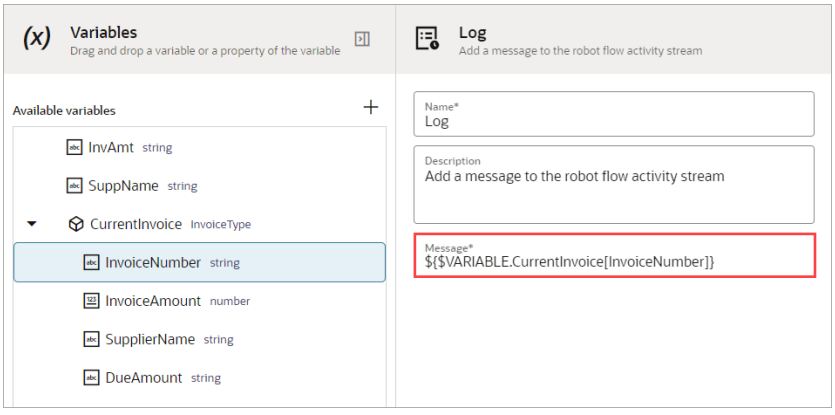
- Identifies an invoice to update in Oracle Cloud ERP.
- Finds the invoice.
- Verifies the supplier name and invoice totals, and then updates the invoice.

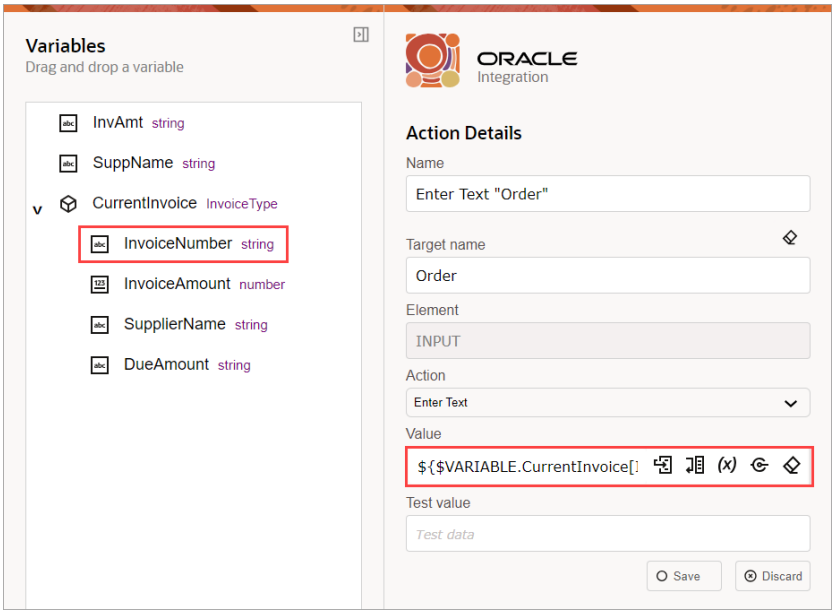
Workflow

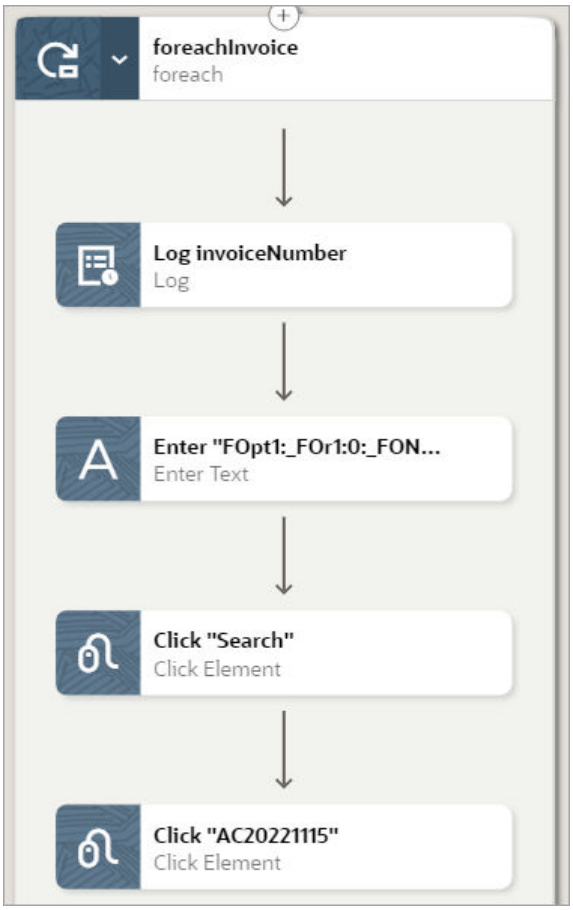
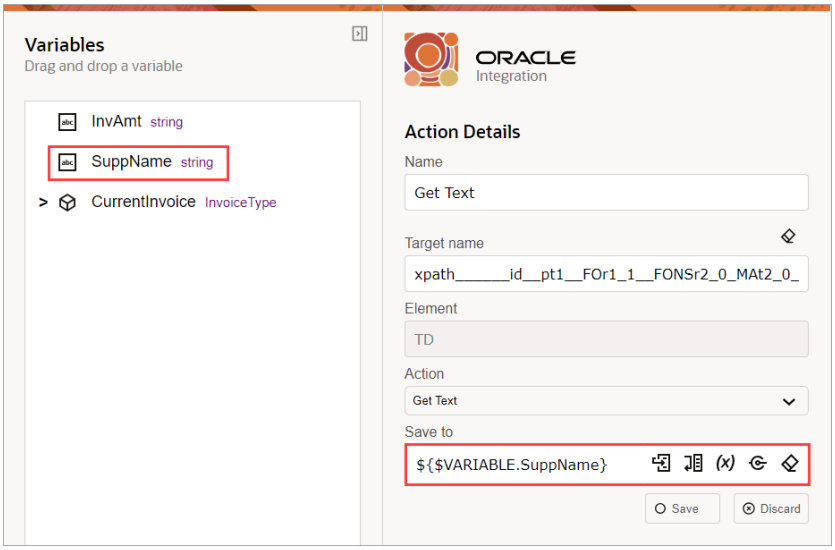
Requirement	How to meet the requirement
Define the components of invoice data	Create a data type, `InvoiceType`, with the following properties: • `InvoiceNumber` • `InvoiceAmount` • `SupplierName` • `DueAmount`  See Create a Data Type.

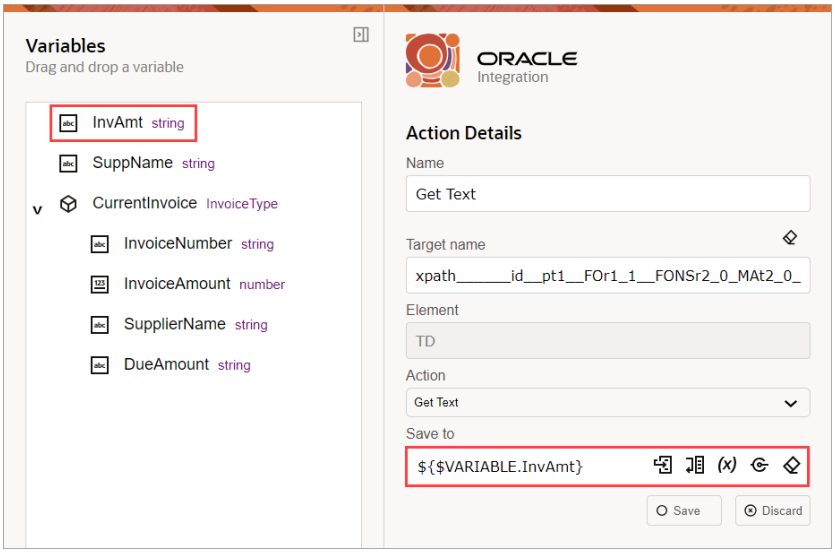
Requirement	How to meet the requirement
Define the trigger	Create an input, `InvoiceCollection`, that is of the `InvoiceType` data type. Make the trigger a collection so that it can pass in an array of data—in this case, a number of invoices.  See Create a Trigger's Input or Output.
Define places to store invoice amount and supplier name data	Create the following variables: • `InvAmt` • `SuppName`  See Create a Variable.

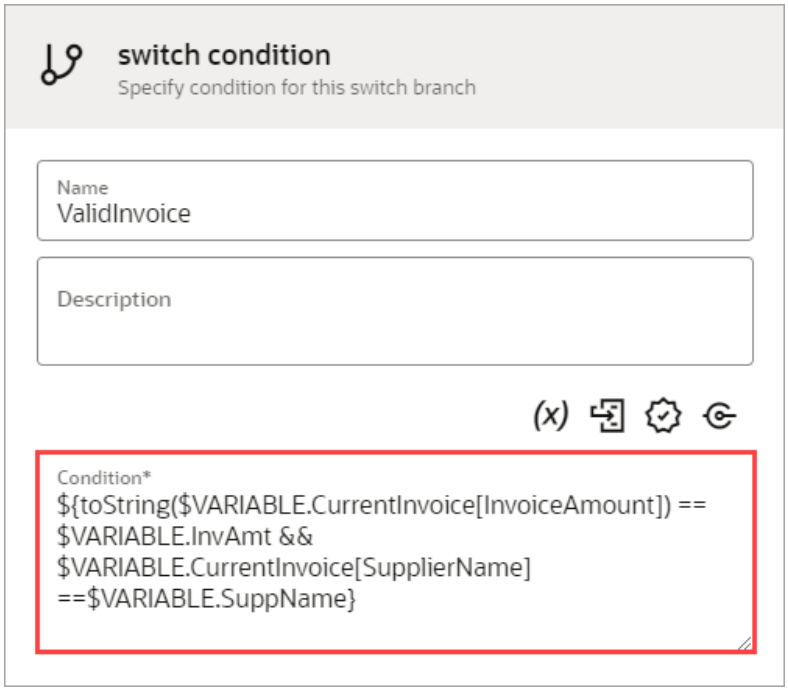
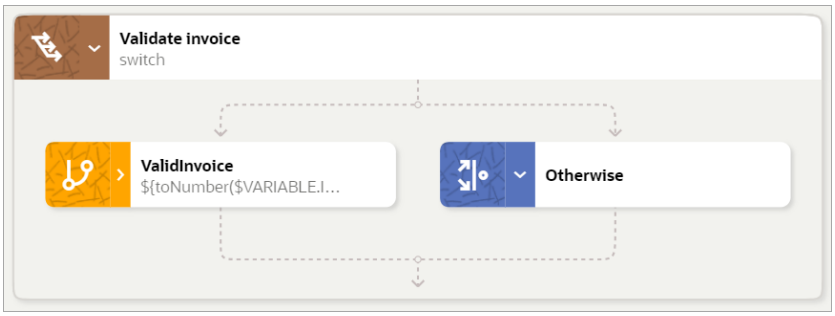
Requirement	How to meet the requirement
Define the navigation to the page in the application where you search for invoices	Using either the recorder or the low-code tools, define the actions that allow the robot to navigate to the area of the application for finding invoices. After you finish defining the actions, the robot looks something like this:  See Add an Action to a Robot.

Requirement	How to meet the requirement
Create a container for the actions that the robot must perform on every invoice	Add a foreach loop to the robot. The foreach loop defines how the robot iterates over the invoices. In the foreach loop, use the **Collection** field to identify the data set that the foreach loop iterates on. Insert the input, `InvoiceCollection`, into this field. The **Iteration parameter**, `CurrentInvoice`, is the name to use for every record in the collection. This entry becomes a variable that you can reference only in actions within the foreach loop.  See Add a Foreach Loop.
Record the invoice number in the activity stream	Within the foreach loop, create a log action, which records the invoice number of every invoice that the robot updates. This information appears in the activity stream. Knowing the invoice number is helpful if you need to troubleshoot a robot instance.  See Add a Log Action.

Requirement	How to meet the requirement
Enter the invoice number into the Search field in the application	Within the foreach loop, use the recorder or low-code tools to enter the value from the `InvoiceNumber` property of the `CurrentInvoice` variable into the Search field in Oracle Cloud ERP.  See Add an Enter Text Action.

Requirement	How to meet the requirement
Open the invoice	Within the foreach loop, define additional required interactions to open an invoice.  See Add an Action to a Robot.
Get the supplier name from an invoice, and save it to a variable	Within the foreach loop, use the recorder or low-code tools to get the supplier name from an invoice and save the value to the `SuppName` variable.  See Add a Get Text Action.

Requirement	How to meet the requirement
Get the invoice total from an invoice, and save it to a variable	Within the foreach loop, use the recorder or low-code tools to collect the invoice total from an invoice. Save the value to the `InvAmt` variable.  See Add a Get Text Action.

Requirement	How to meet the requirement
Take the appropriate action, depending on whether the company name on the invoice matches the company name in Oracle Cloud ERP	Within the foreach loop, create a switch condition that performs the following tasks: • Condition 1 determines whether the company names match, and if they do, updates the invoice amount.  The first condition contains the following expression in the Condition field: `${toString($VARIABLE.CurrentInvoice[InvoiceAmount]) == $VARIABLE.InvAmt && $VARIABLE.CurrentInvoice[SupplierName] == $VARIABLE.SuppName}` In plain English, this condition says the following: – Return a string value for the invoice amount that was passed into the robot, and compare the value to the invoice amount that the robot obtained from the invoice. – Compare the supplier name that was passed into the robot to the supplier name that the robot obtained from the invoice. – If the invoice amounts match AND the supplier names match, update the invoice amount appropriately. • Condition 2 specifies that if the company names don't match, do nothing.  See Add a Switch Condition.

Use Case: Save Data After Iterating on Invoices

In this use case, an organization must manually cancel a set of invoices and obtain the invoice number and status for each invoice. Explore how a foreach loop and the data stitch action support this workflow.

Scenario

You must periodically cancel a number of invoices. An integration identifies the invoice numbers to cancel by generating a report.

The robot completes the following tasks:

- Cancels a set of invoices one by one.
- Obtains the invoice number and status for each canceled invoice.

This use case focuses on how you use the data stitch action to obtain the invoice number and status from each invoice. For information about how to update a set of invoices, see Use Case: Update a Set of Invoices.

Why Create a Robot?

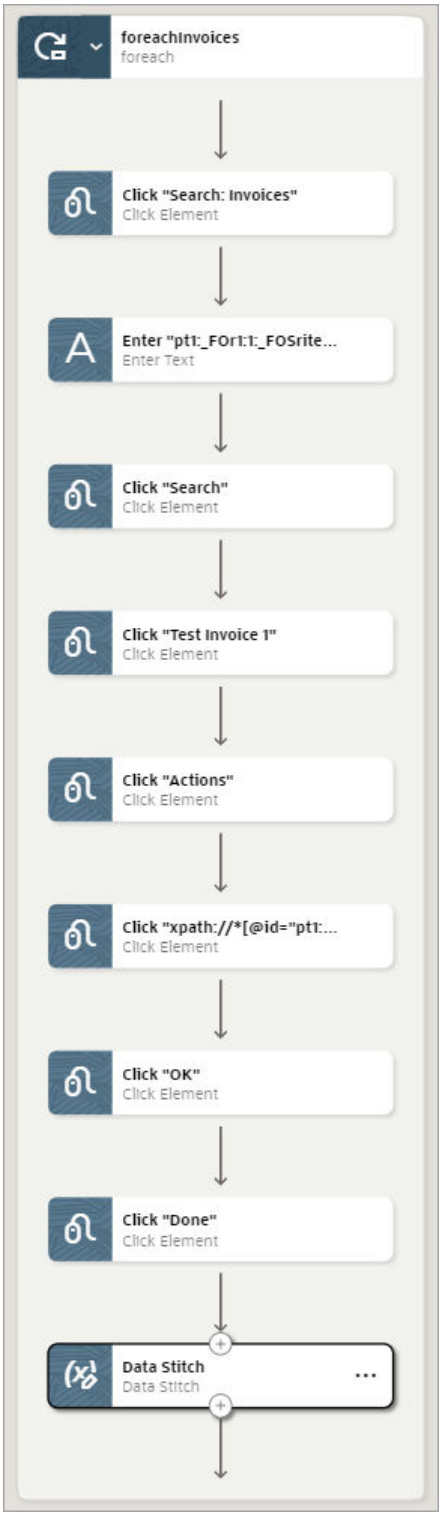
An integration provides improved scalability over a robot for work like this. However, an integration can't perform this task. Here's why: The REST APIs for the application don't allow you to select invoices of a specific type, and you must cancel invoices with a specific invoice type. Therefore, a robot is the ideal solution for automating this manual, repetitive task.

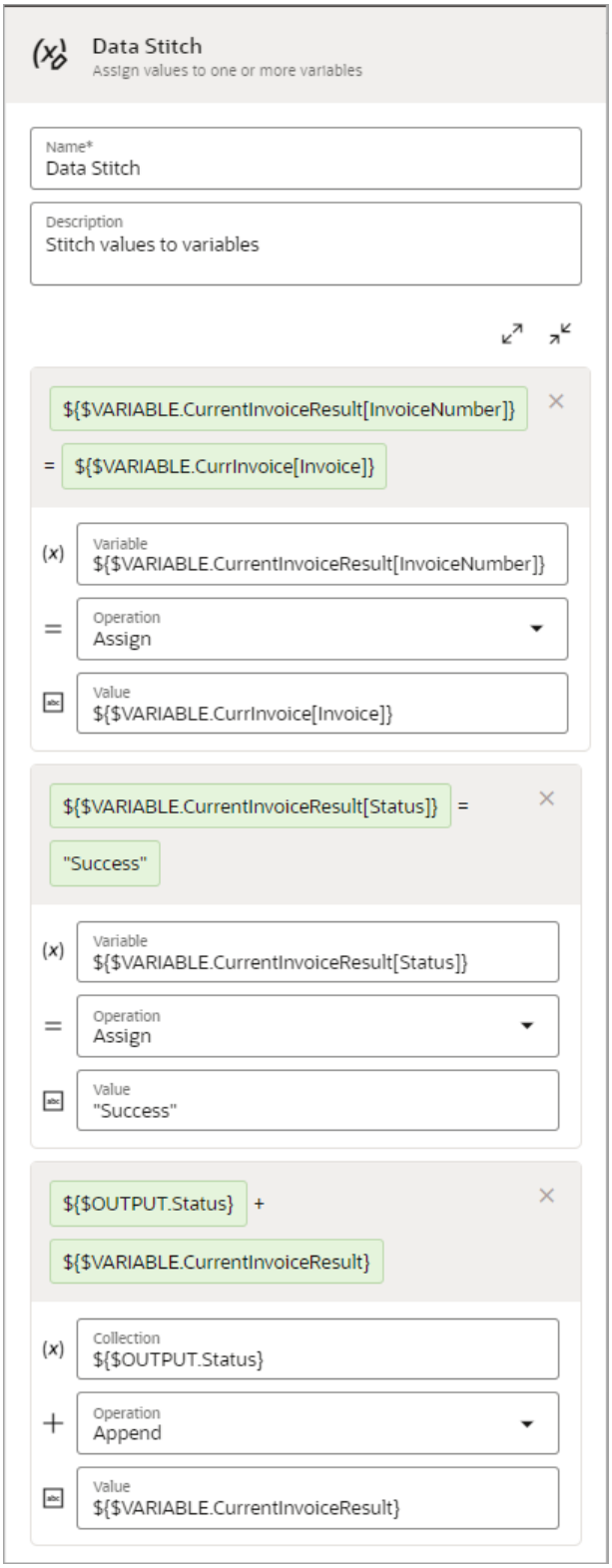
Workflow

Requirement	How to meet the requirement
Create the data types for the trigger	**Define the data type for the input** • Name: `InvoiceNumber` • Property: `Invoice` – Type: `string` – Not a collection **Define the data type for the output** • Name: `Result` • Properties: – `InvoiceNumber` * Type: `string` * Not a collection – `Status` * Type: `string` * Not a collection See Create a Data Type.

Requirement	How to meet the requirement
Define the trigger	**Define the trigger's input** • Name: `InvoiceNumber` • Type: `InvoiceNumber` • Collection: Yes The input allows the robot to receive a list of invoices from an integration. For example, the robot might receive the invoice numbers for 20 invoices. **Define the trigger's output** • Name: `Status` • Type: `Result` • Collection: Yes The output collects information for multiple invoices, so it must be a collection. The output allows the robot to collect the following information and pass it back to an integration: • The invoice number of each canceled invoice. • The status of each canceled invoice. See Create a Trigger's Input or Output.
Define the variables	**Define a variable to hold the number of each updated invoice** • Name: `CurrInvoice` • Type: `InvoiceNumber` • Collection: No **Define a variable to hold the status of each updated invoice** • Name: `CurrentInvoiceResult` • Type: `Result` • Collection: No See Create a Variable.

Requirement	How to meet the requirement
Within the robot, add a foreach loop and a data stitch action within it	When a robot must perform the same work on multiple items, define the robots actions in a foreach loop. This use case is focused on the tasks that you perform in the data stitch and doesn't provide details about all of the actions in the foreach loop. For a use case that focuses on how to update a set of invoices, see Use Case: Update a Set of Invoices. The foreach loop might look something like this:

Requirement	How to meet the requirement
	 See Add a Foreach Loop and Add a Data Stitch Action.

Requirement	How to meet the requirement
Define the details of the data stitch	The data stitch contains the following operations: 

- **First operation: Assign a value**
  ${$VARIABLE.CurrentInvoiceResult[InvoiceNumber]}

Requirement	How to meet the requirement
	= *${$VARIABLE.CurrInvoice[Invoice]}* The foreach loop cancels each invoice, one at a time. This assignment loads the invoice number for each canceled invoice to the `InvoiceNumber` object in the `CurrentInvoiceResult` variable. Because each iteration of the foreach loop loads a new invoice number, the `InvoiceNumber` object in the `CurrentInvoiceResult` variable holds each invoice number only temporarily. The third operation in the data stitch records the value permanently. • **Second operation: Assign a value** *${$VARIABLE.CurrentInvoiceResult[Status]}* = *"Success"* This assignment assigns the `Success` value for each canceled invoice to the `Status` object in the `CurrentInvoiceResult` variable. Because each iteration of the foreach loop loads a new status, the `Status` object in the `CurrentInvoiceResult` variable holds each status only temporarily. Another operation in the data stitch records the value permanently. • **Third operation: Append a value** *${$OUTPUT.Status}* + *${$VARIABLE.CurrentInvoiceResult}* This assignment appends the two objects in the `CurrentInvoiceResult` property, `InvoiceNumber` and `Status`, to the `Status` output. Because this operation is an append, the operation records all values for all invoices to the output. See Add a Data Stitch Action.

Use Case: Save Values After Iterating on a Table

In this use case, an organization must save values from a table. Explore how the define web table action, data stitch action, and a foreach loop support this workflow.

Scenario

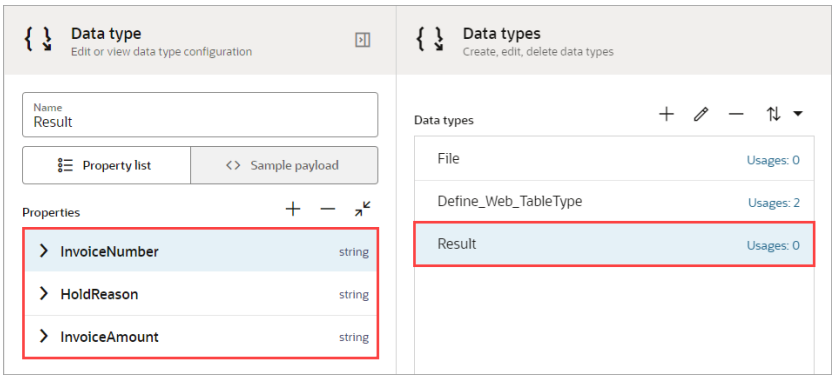
A robot completes the following tasks:

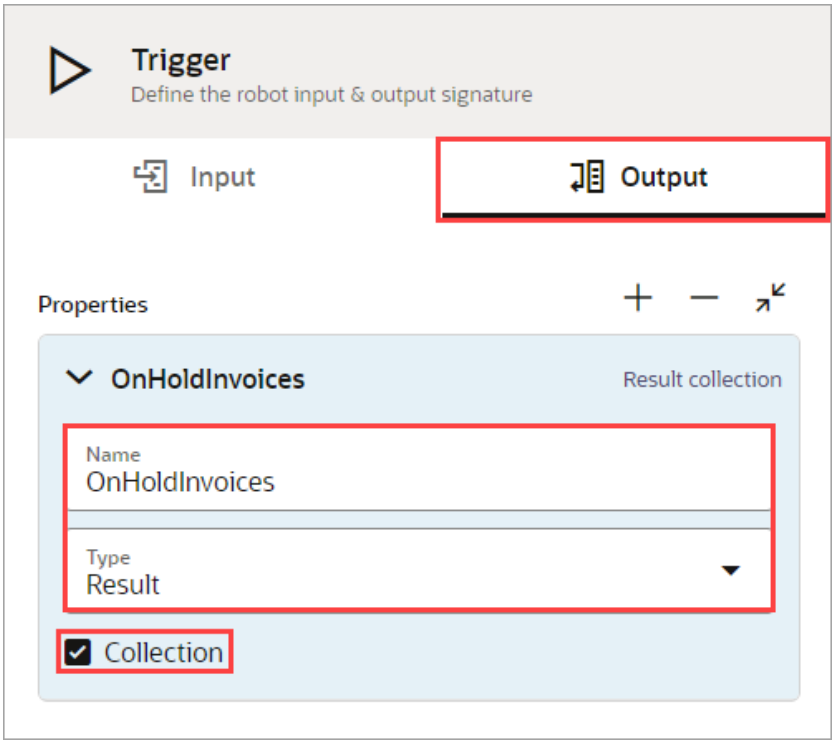
- Opens a dashboard, and views all invoices that have been placed on hold.
- Collects the following information for all on-hold invoices:
  - Invoice number
  - Hold reason
  - Invoice amount

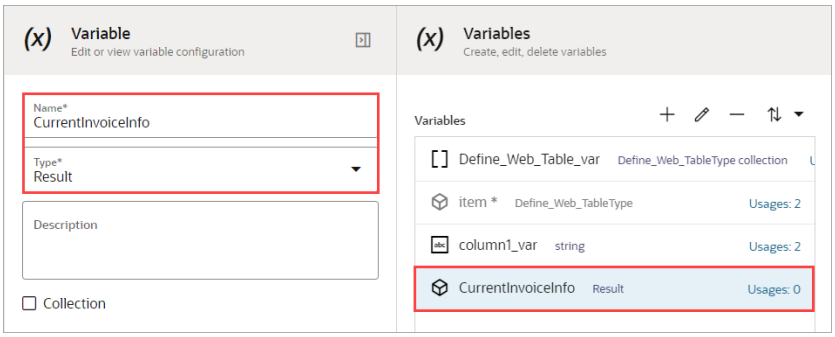
Why Create a Robot?

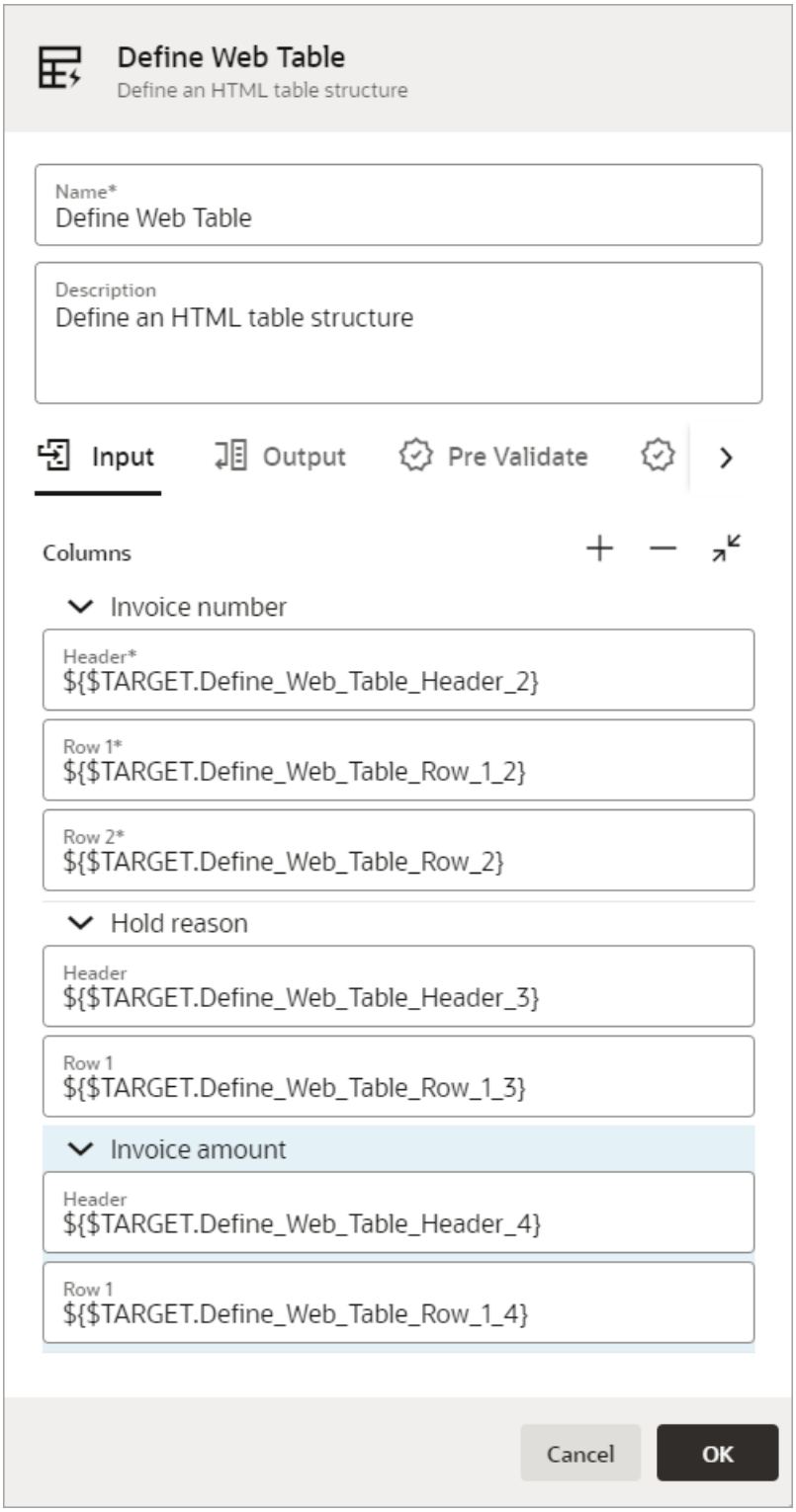
An API is unable to capture the data from the table, or the team that is planning this automation work is unaware of the availability of an API that can do this work.

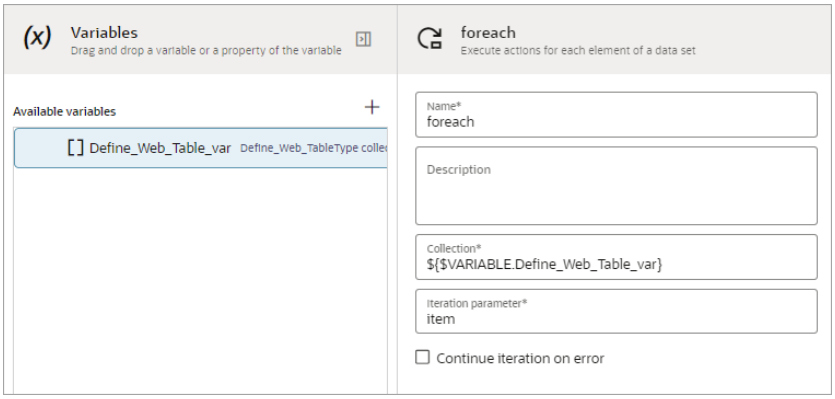
Workflow

Requirement	How to meet the requirement
Create a data type for the trigger's output	• Name: `Result` • Properties: – `InvoiceNumber` * Type: `string` * Not a collection – `HoldReason` * Type: `string` * Not a collection – `InvoiceAmount` * Type: `string` * Not a collection  See Create a Data Type.

Requirement	How to meet the requirement
Define the trigger's output	• Name: `OnHoldInvoices` • Type: `Result` • Collection: Yes  The output allows the robot to collect the invoice number, hold reason, and invoice amount for each on-hold invoice and pass this information back to the integration. See Create a Trigger's Input or Output.

Requirement	How to meet the requirement
Define the variables	**Define a variable to hold each invoice number, hold reason, and invoice amount** • Name: `CurrentInvoiceInfo` • Type: `Result` • Collection: No Because this variable is of the `Result` data type, it has three properties: • `InvoiceNumber` • `HoldReason` • `InvoiceAmount` These properties hold the required data from the on-hold invoices. This variable collects the values obtained by the get text action. This variable also sends the values to the output using a data stitch action.  See Create a Variable.

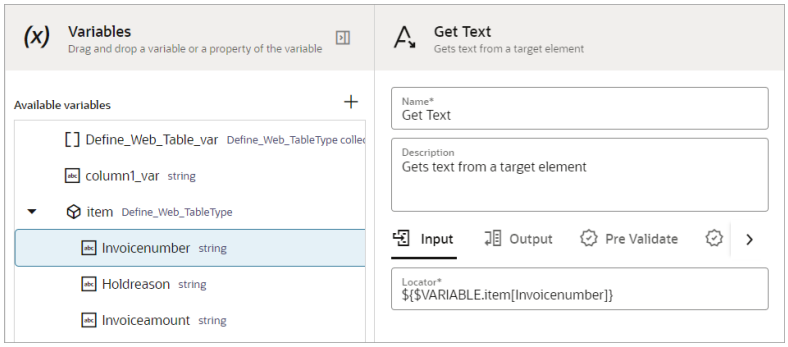
Requirement	How to meet the requirement
Identify the columns that contain the data that you need	Add a define web table action, and target the columns that contain the data that you need. After you finish identifying the columns, the action looks similar to this:  See Add a Web Table Action.

Requirement	How to meet the requirement
Add a foreach loop so that you can iterate over the XPath locators in the table	Add a foreach loop to the robot. With the define web table action, you identify the XPath locators that you're interested in. The foreach loop allows you to iterate over these locators. • For the **Collection** field, select the variable that the define web table action created for you. • For the **Iteration parameter** field, enter a name for every value in the table, such as `item`.  See Add a Foreach Loop.

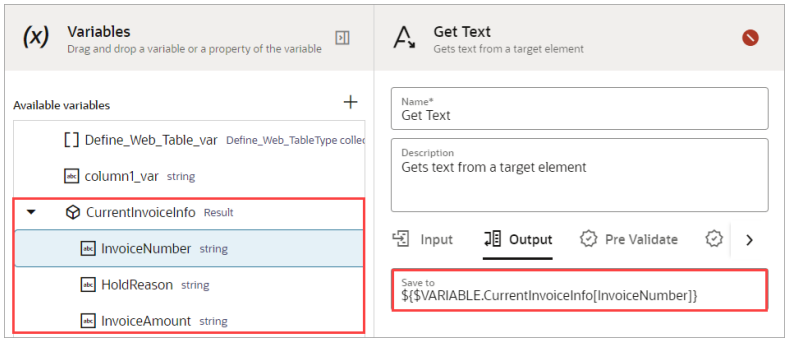
Requirement	How to meet the requirement
Get text from the table	**Overview** Within the foreach loop, add the following actions: 1. Get text: Get the text from one cell in the *first column* you identified. 2. Log: Record the text to the activity stream. 3. Get text: Get the text from one cell in the *second column* you identified. 4. Log: Record the text to the activity stream. 5. Get text: Get the text from one cell in the *third column* you identified. 6. Log: Record the text to the activity stream. The first iteration of the foreach loop gets text from the *first row* in the table. The second iteration gets text from the *second row* in the table, and so on.

Requirement	How to meet the requirement
	 **How to define the get text actions** • On the Input tab for each get text action, for the **Locator** field, select the property for a column.

Requirement	How to meet the requirement



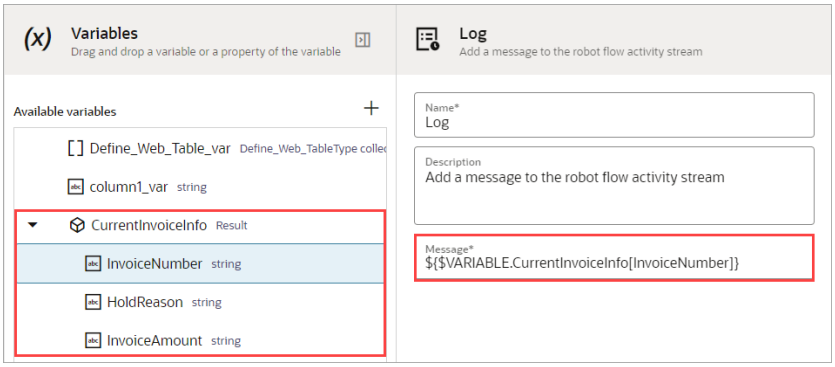
- On the Output tab, for the **Save to** field, drag the appropriate property for the `CurrentInvoiceInfo` variable. For example:
  - Use `InvoiceNumber` for the first get text action.
  - Use `HoldReason` for the second get text action.
  - Use `InvoiceAmount` for the third get text action.



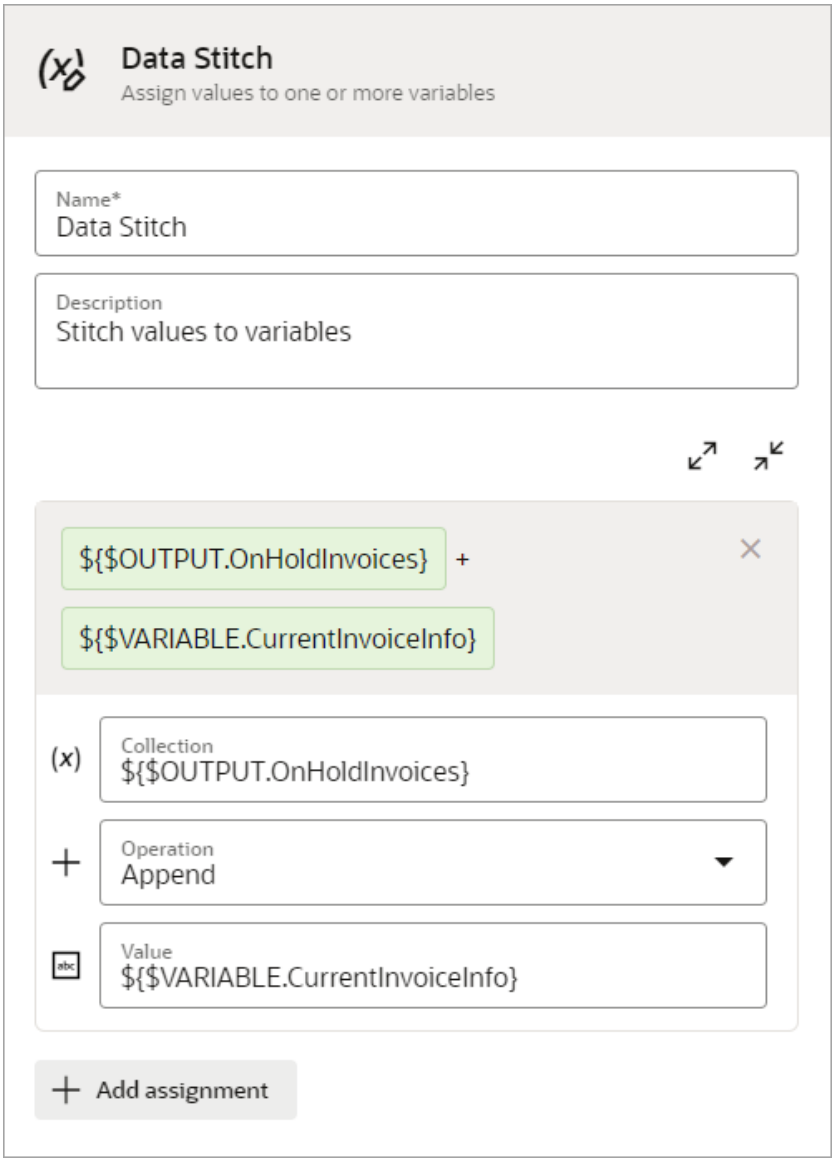
How to define the log actions

For each log action, in the **Message** field, drag the appropriate property for the `CurrentInvoiceInfo` variable. For example:

- Use `InvoiceNumber` for the first log action.
- Use `HoldReason` for the second log action.
- Use `InvoiceAmount` for the third log action.



See Add a Get Text Action and Add a Log Action.

Requirement	How to meet the requirement
Add a data stitch to the foreach loop, and define its details	The data stitch doesn't contain an assign operation because the get text action already inserted values into the properties of the placeholder variable (`CurrentInvoiceInfo`). Therefore, the data stitch contains only the following an append operation. This operation appends the `CurrentInvoiceInfo` variable to the `OnHoldInvoices` output. Because this operation is an append, the operation records all values for all on-hold invoices to the output. `${$OUTPUT.OnHoldInvoices} + ${$VARIABLE.CurrentInvoiceInfo}`  See Add a Data Stitch Action.

Use Case: Switch Browsers

In this use case, a robot must resume working in an already-open internet browser after starting to work in a second internet browser. Explore how the open browser and switch browser actions support this workflow.

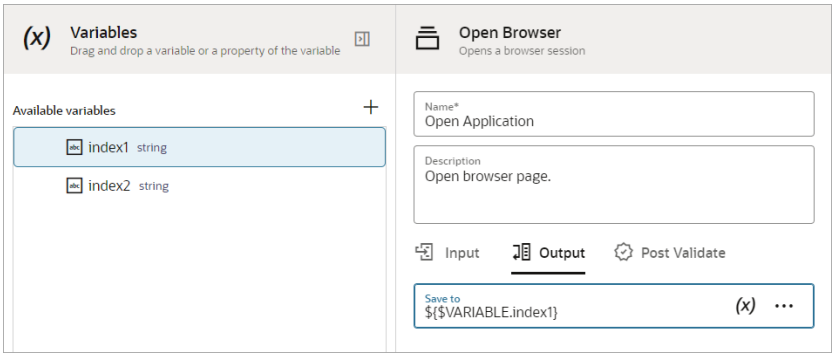
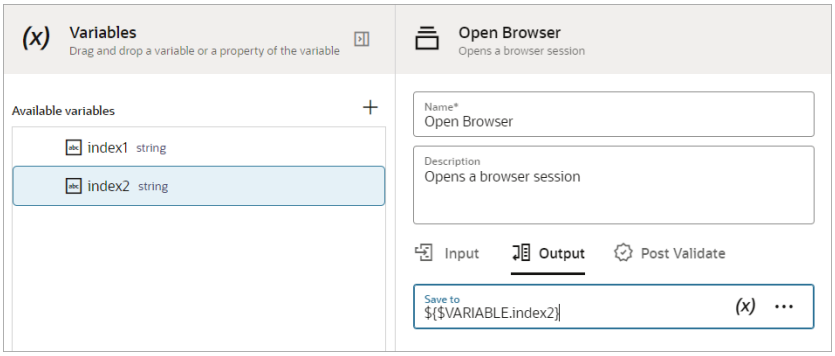
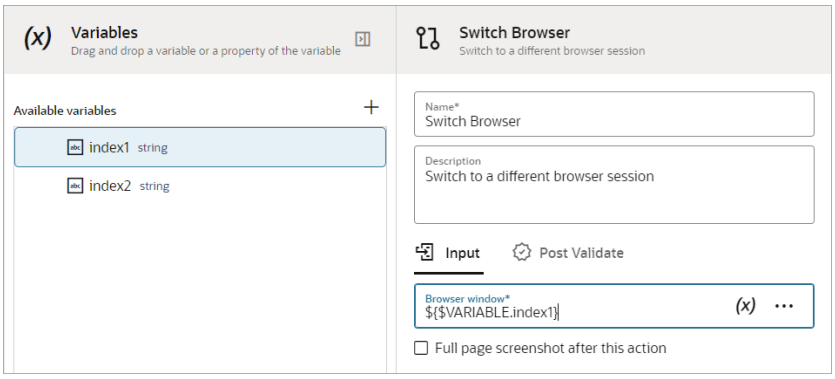
Scenario

A robot completes the following tasks:

1. Opens an internet browser.
2. Completes a task.
3. Opens another internet browser.
4. Completes a task.
5. Resume working in the first internet browser

Workflow

Requirement	How to meet the requirement
Add two open browser actions to the robot, as well as any additional actions	Build the robot as required, as shown in the following example.  See Add an Action to a Robot.

Requirement	How to meet the requirement
Use a variable to define the output for each open browser action	For example, create two variables, `index1` and `index2`, to store the index value for each open browser action. The index is an assigned number. The index for the first open browser action in the robot is 1, the index for the second browser action in the robot is 2, and so on.   See Create a Variable.
When the robot needs to switch back to the first internet browser, add a switch browser action to the robot	Define the **Browser window** field using the `index1` variable. Alternatively, you can hard-code a value of `1`, as long as you're switching back to the first browser window that you opened.  See Add a Switch Browser Action.