

CodeArts TestPlan

User Guide

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1 Service Entries

You can access CodeArts TestPlan through the [project homepage](#) or [navigation entry](#).

Project Homepage

Access CodeArts TestPlan through the project homepage. The **Testing Plan** page is displayed by default. You can switch to **Testing Design, Testing Case, Testing Execution, Quality Report**, and **Quality Assessment** to manage test activities for the current project.

Step 1 Log in to CodeArts.

Step 2 Hover the cursor over the project card, click **Testing** at the bottom of the card. The **Testing Plan** page is displayed by default.


----End

Navigation Entry

Access CodeArts TestPlan through the navigation entry. The **Testing Plan** homepage is displayed by default. The statistics of the current login user are displayed, including test plans, test cases, test suites, and defects. You can also select a project on the page to manage test activities.

Step 1 Log in to CodeArts.

Step 2 Access CodeArts TestPlan using either of the following methods:

- On the top navigation bar, choose **Services > TestPlan**.
- Click  in the upper left corner of the page. In the left pane, click **TestPlan**.

----End

2 Testing Plan

2.1 Introduction

The standard test process includes the test plan, test design, test execution, and test report.

- In the test plan and test design stages, you should specify the test scope and objectives, formulate test policy, prepare test tools and test environments, establish test models, design test cases, and develop automated testing scripts.
- A test plan specifies the test time, scope, and objectives, and manages all test activities. It can be specific to a version, iteration, or project.

This chapter describes how to manage test plans from the following aspects:

- [Creating and Editing a Test Plan](#)
- [Designing and Executing a Test Plan](#)
- [Managing and Measuring a Test Plan](#)

2.2 Creating and Editing a Test Plan

Creating a Test Plan

 NOTE

Only the **Epic**, **Feature**, and **Story** work items of a Scrum project and the default **Requirement** work items of a Kanban project can be added to a test plan as requirements.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Plan**.
- Step 3** Click **Create Plan** in the upper part of the page. The **Create Test Plan** page is displayed.
- Step 4** Set **Name**, **Version** (optional), **Processor**, **Plan Period**, **Associated Iteration** (optional), and **Description** (optional), and click **Next**.

Step 5 Select the execution mode, add a requirement, and click **Save** to complete the test plan creation.

- The execution mode selected here can be modified in the test plan later.
- After an execution mode is selected, menus corresponding to the mode are generated on the test case and test execution pages to manage the cases and suites of **Manual Test** and **Auto API Test**. Preset statistics reports of the corresponding mode are displayed in the quality report.

----End

Editing a Test Plan

In the test plan list, click the name of the test plan to be edited. The editing window is displayed on the right of the page.

- On the **Details** tab page, you can modify the test plan (including the test plan name, description, execution mode, and basic information). After editing the test plan, click **Save**.
- On the **Requirements** tab page, you can add or delete requirements within the current test plan scope. The operations are the same as those in **Creating a Test Plan**.
- On the **Test Cases** tab page, you can view the test cases in the plan, and add test cases from the version to which the test plan belongs.
- On the **Operation History** tab page, you can view the editing history of the test plan.

2.3 Designing and Executing a Test Plan

Designing a Test Plan

Designing a test plan is to design test cases, develop automated testing scripts, and prepare test data based on the test requirements specified in the test plan.

Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Plan**.

Step 3 Select a test plan to be designed from the list.

- Move the cursor over **Design** to view the design progress of the test plan, including the number of test cases, total number of requirements, and number of covered requirements.

When the number of test cases is greater than 0, the circle around **Design** changes from gray to blue, indicating that the test plan is being designed, as shown in the following figure.

- Click **Design**. The **Testing Case** page is displayed.



Step 4 On the **Manual Test** tab page, click **Import** in the right area and select **Adding an Existing Case** from the drop-down list.

NOTE

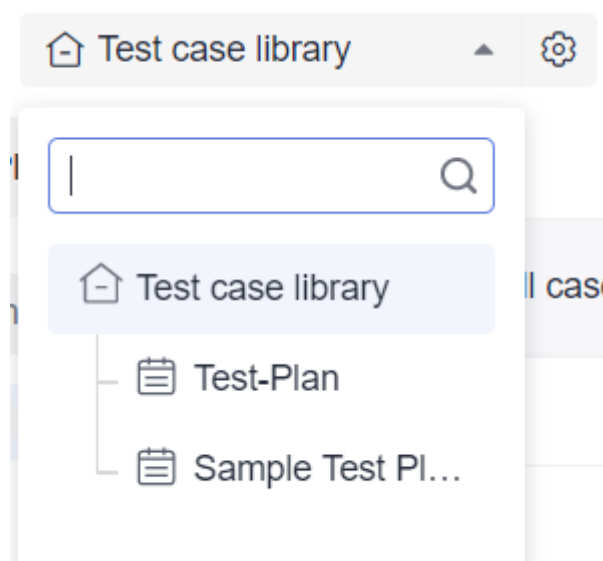
If no test case has been created or you need to create a test case, click **Create Case**. For details, see [Creating a Manual Test Case](#). The new test case is also added to the test case library.

Step 5 In the displayed dialog box, select a test case and click **OK**.

Step 6 Click the **Auto API Test** tab to add or create API automation test cases to the test plan. For details about the method, see [Step 4](#). For details about how to create a case, see [Creating an API Automation Test Case](#).

Step 7 Click the test plan name in the upper left corner of the page to switch to another test plan or view the global test case library.

The global test case library displays all test cases (including test cases that belong to or do not belong to the test plan) in the current version. You can maintain the global test case library as required.



----End

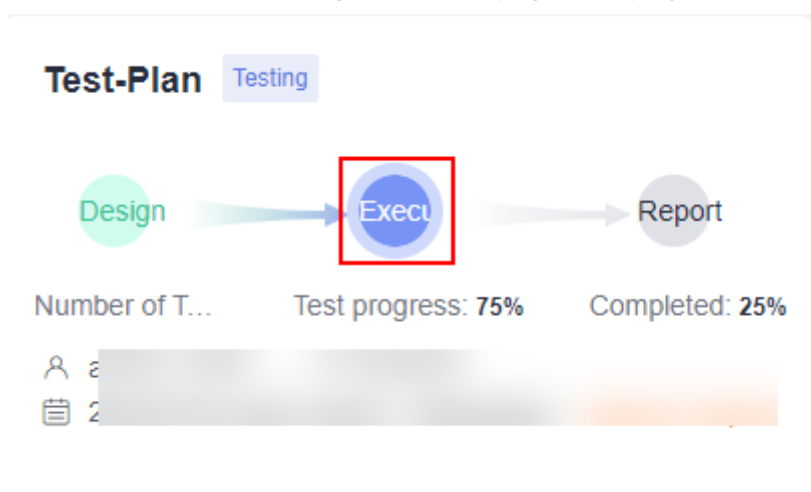
Executing a Test Plan


Step 1 Return to the **Testing Plan** page and select the test plan to be executed from the list.

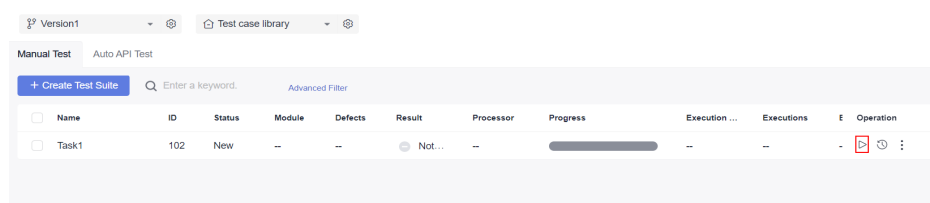
- Move the cursor over **Execute** to view the execution progress of the test plan, including the test progress, number of executed test cases, pass rate, and completed defects/total defects.

When the number of executed test cases is greater than 0, the circle around **Execute** changes from gray to blue, indicating that the test plan is under test.

- Click **Execute**. The **Testing Execution** page is displayed.



Step 2 On the **Manual Test** tab page, click  in the **Operation** column to execute a manual test suite of multiple test cases. If no test suite is available, create one by following instructions provided in [Creating a Manual Test Suite](#).



Step 3 Click the **Auto API Test** tab and execute an API automation suite. For details, see [Executing an API Automation Test Suite](#).

Step 4 After you manually set the status of all test cases in the test plan to **Completed**, the status of the test plan is automatically updated to **Completed**.

NOTE

On the **Testing Plan** page, click **Execute**. The **Testing Execution** page is displayed. You can create a test suite to execute the cases in the test plan.

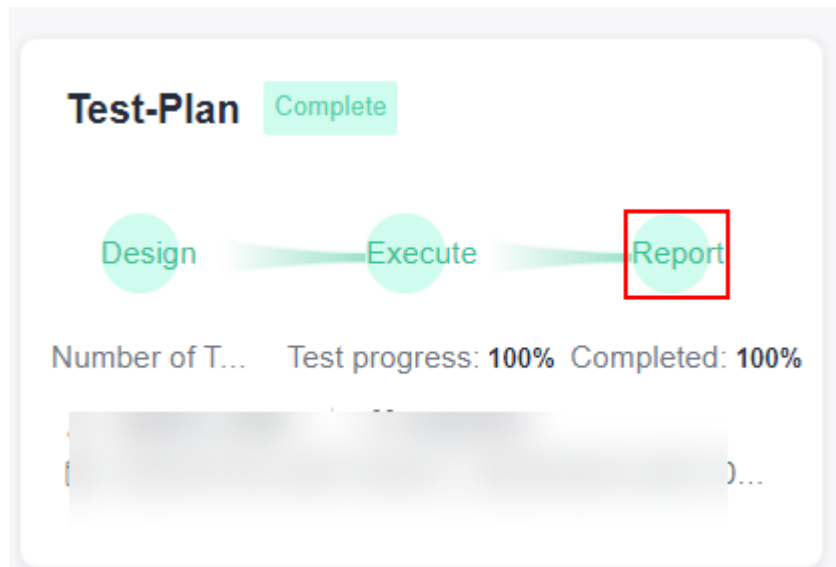
----End

2.4 Managing and Measuring a Test Plan

Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Plan**.

Step 3 Select the test plan whose report you want to view from the list and click **Report**.



Step 4 View the quality report of the test plan.

- The page displays the current requirement coverage, defects, case pass rate, and case completion rate of the test plan, and analyzes and records test risks.
- In the **Manual Test** and **Auto API Test** areas, statistics on the execution of test cases and the number of defects are displayed by execution mode.
- To add more reports to the page, click **Add Report**, or click **Create Report** in the upper right corner.
- To switch to another test plan or view the quality report of the global test case library, click the test plan name in the upper left corner of the page.

----End

3 Testing Design

3.1 Introduction

The earlier a defect is detected, the lower the fix cost is. Data shows that the average cost of fixing each defect after product release is more than 6 times that in the verification phase. Defects left after product release not only increase the R&D and repair costs of enterprises, but also affect the reputation and customer satisfaction of products. Therefore, how to improve the completeness of tests and intercept product defects in advance is a top problem faced by enterprise product quality.

To address this R&D pain point, Huawei Cloud CodeArts TestPlan provides multi-dimensional test strategies and design templates, applies heuristic test policies and design models, and provides 4-layer test breakdown and design capabilities: requirement, scenario, test point, and test case, inspiring testers to have divergent thinking, and graphically express the test model in mind to support efficient communication with all stakeholders. This feature continuously optimizes test completeness, improves test design efficiency by 30%, and helps testers reduce product test omissions during execution.

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The purpose of test design is to clarify the scope, objectives, and methods of test activities, guide the implementation of test activities, and standardize test behaviors.

With the help of mind mapping, heuristic test design can be performed and the design process can be visualized.

Based on different design inputs, there are two processes: requirement > scenario > test point > test case, and feature > scenario > test point > test case. The final test scheme and test cases are generated.

NOTE

Currently, this function is available in the AP-Singapore, TR-Istanbul, LA-Santiago, LA-Sao Paulo, and LA-Mexico City regions.

This chapter describes how to design test cases from the following aspects:

- [Mind Maps](#)
- [Test Design Strategies Based on Requirements](#)
- [Test Design Strategies Based on Features](#)

3.2 Mind Maps

3.2.1 Creating a Mind Map

Mind maps, also called brain maps, are used to plan test schemes, design test scenarios, define test points, orchestrate test steps, and generate test cases. You can use the mind map function on the test design page.

Prerequisites

You have the permission to create mind maps (that is, you have other roles except the viewer, participant, and O&M manager in the project). For details, see [User Management](#).


Direct Creation

Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Design**.

Step 3 Click **Create** in the upper left corner of the page.

The new mind map page is displayed. The root node is displayed in the middle of the page, and the name of the root node is automatically set to **Mind Map**. You can double-click the root node to change its name.

Step 4 Click  in the upper left corner of the page. The test design list is displayed. The name of the root node of the mind map is displayed in the list.

----End

Using a Template


Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Design**.

Step 3 Click **Templates** in the upper left corner of the page.

Step 4 Select a template as required. Click **Preview** to view the mind map details. Click **Use** to access the mind map.

Step 5 View the displayed mind map page and details about the selected template.

Step 6 Click  in the upper left corner of the page. The test design list is displayed.

The name of the root node of the mind map is displayed in the list.

----End

To open multiple mind maps on multiple tab pages, click ******* in the **Operation** column and choose **New tab opens**.

Renaming

- Step 1** In the mind map list, click ******* in the **Operation** column and choose **Rename**.
- Step 2** The name of the mind map is displayed in the dialog box. Enter a new name. The length cannot exceed 500 characters.
- Step 3** Click **OK**. The mind map is renamed.

----End

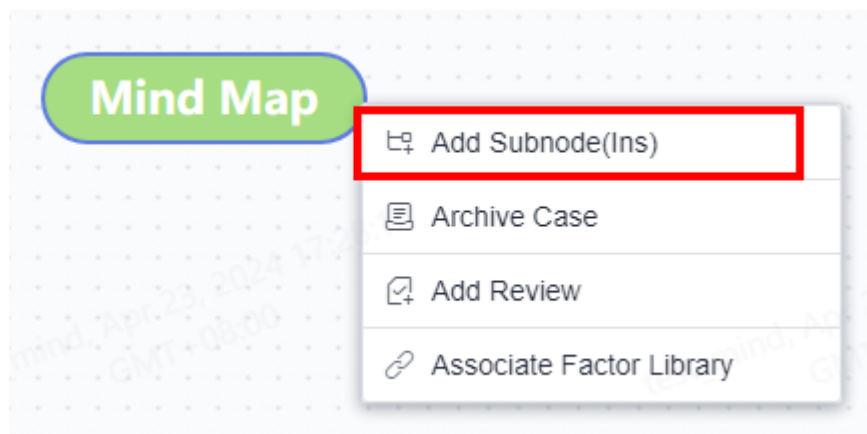
3.2.2 Drawing a Mind Map

After the operation is complete in [Creating a Mind Map](#), click the name of the mind map to be edited on the **Testing Design** page to draw the mind map.

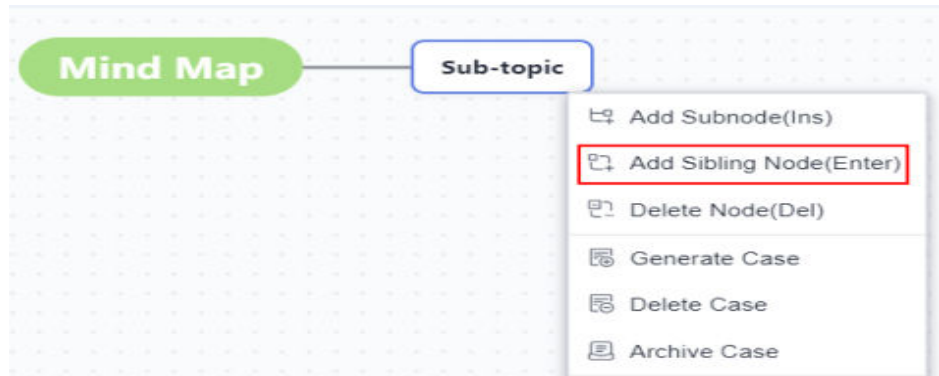
Adding a Node

You can add new sibling nodes and subnodes. Select any node in the mind map and select the type of the new node as required. Only subnodes can be added to the root node. Sibling nodes and subnodes can be added to other nodes.

- Add a Subnode
 - Access the created mind map, select a node, and add a subnode in either of the following ways:
 - Right-click and choose **Add Subnode (Ins)** from the shortcut menu.
 - Press **Insert** or **Tab**.




- Add a Sibling Node
 - Access the created mind map, select any node except the root node, and add a sibling node in the following ways:
 - Right-click and choose **Add Sibling Node (Enter)** from the shortcut menu.
 - Press **Enter**.

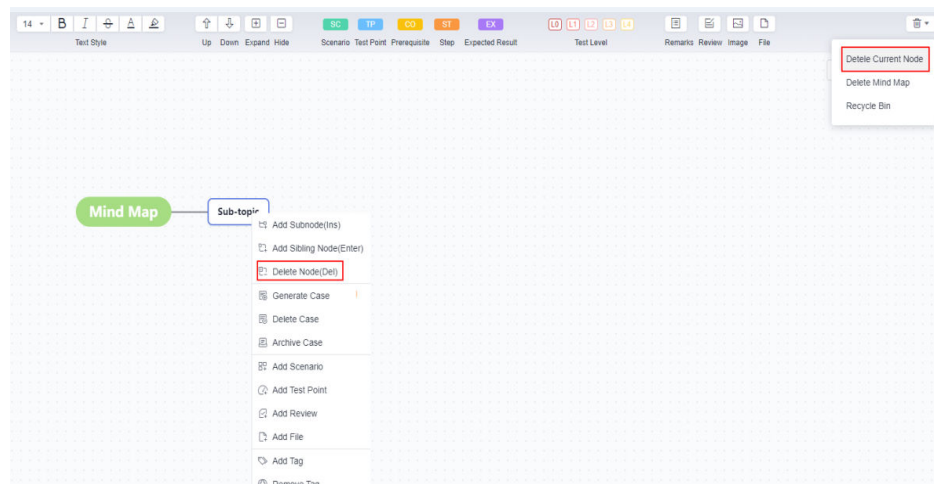


Deleting a Node

You can delete any node except the root node in the mind map. If the deleted node contains subnodes, the subnodes are also deleted.



Access the created mind map, select any node except the root node, and delete the node in either of the following ways:

- Right-click and choose **Delete Node (Del)** from the shortcut menu.
- Click  in the upper right corner of the page and select **Delete Current Node**.
- Press **Delete**.



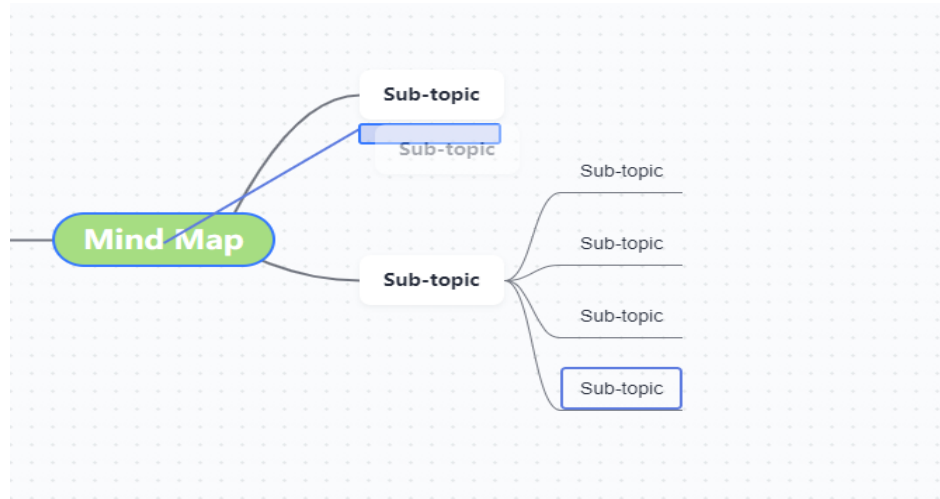
Moving a Node

- Move Up/Down

Access the created mind map, select the node to be moved, and click  or  on the toolbar above the mind map to move the node up or down between nodes of the same level.

- Dragging a Node



Access the created mind map, select the node to be moved, click the node, drag the node to the required position, and release the left mouse button.




















3.2.3 Managing a Mind Map

Performing Basic Operations


After entering the mind map, you can perform the following operations in addition to editing nodes.

Operation	Description
Rename	Click  in the upper left corner of the mind map. In the dialog box that is displayed, rename the mind map.
Delete a mind map	In the upper right corner of the mind map page, click  , select Delete Mind Map , and click Confirm to delete the current mind map. The deleted mind map is moved to the recycle bin.

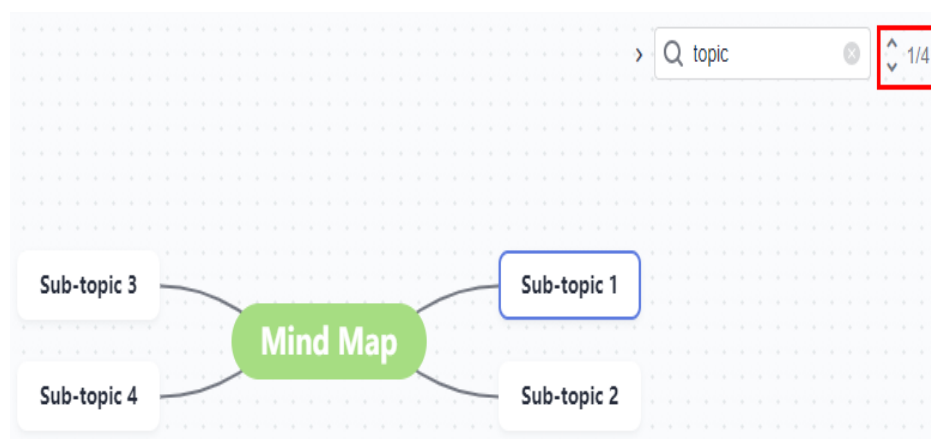
Operation	Description
Recycle bin	<p>Click  in the upper right corner of the mind map and select Recycle Bin from the drop-down list. In the dialog box that is displayed, view the list of deleted mind maps.</p> <p>For mind maps in the recycle bin, you can perform the following operations:</p> <ul style="list-style-type: none">• Click  and Confirm to restore the mind map in the corresponding row. <p>NOTE</p> <ul style="list-style-type: none">• Restoring the mind map will replace the content on the current page. Exercise caution when performing this operation.• Once a record in the recycle bin is restored, the record is removed from the list.• Restoring the recycle bin will overwrite the current mind map. You are advised to create a blank mind map to restore the recycle bin. <ul style="list-style-type: none">• Click  to view details about the mind map in the corresponding row.• Click  and OK to permanently delete the mind map in the corresponding row. Deleted mind maps cannot be restored. Exercise caution when performing this operation.
Import	<p>Click  on the toolbar above the mind map, and then click Confirm. In the dialog box that is displayed, select an existing local .xmind file to import the file to the current page.</p> <p>NOTE</p> <ul style="list-style-type: none">• A file whose size does not exceed 20 MB can be imported.• A maximum of 100 .xmind files in a compressed file can be imported.• The imported content will replace the mind map on the current page. Exercise caution when performing this operation.• After the mind map is imported successfully, the root node is not changed.
Export	<p>Click  on the toolbar above the mind map, select the PDF or PNG format, and click OK to export the mind map to the local computer.</p>
Backup	<p>Click  on the toolbar above the mind map. In the dialog box that is displayed, enter the name and description, and click Confirm to create a backup for the mind map on the page.</p>

Operation	Description
Restore	<p>Click  on the toolbar of the mind map. In the dialog box that is displayed, select a backup and click . In the dialog box that is displayed, click Confirm to restore the backup mind map to the current page.</p> <p>NOTE</p> <ul style="list-style-type: none">Restoring the mind map will replace the content on the current page. Exercise caution when performing this operation.Before the mind map is restored, the content of the current mind map is automatically backed up.
Undo	Click  on the toolbar above the mind map to cancel the last operation on the page.
Redo	Click  on the toolbar above the mind map to restore the latest undone operation.
Expand all	Select a node with  and click  on the toolbar above the mind map to expand all subnodes under the node. The icon next to the node changes to  .
Hide All	Select a node with  and click  on the toolbar above the mind map to hide all subnodes under the node. The icon next to the node changes to  .

Searching for Nodes

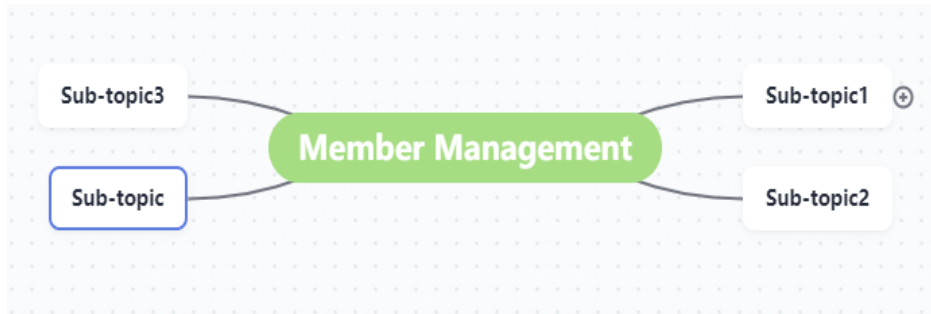
Enter a keyword in the search box in the upper right corner of the mind map and click  to find the node containing the keyword in the mind map. The found node is marked in a blue box.

If multiple search results are matched, you can view the number of matched items on the right of the search box and the sequence number of the matched item of the current node. You can click the up or down arrow to adjust the matching items.




Adjusting Layout


By default, the mind map is in the center view. That is, the root node is in the center, and subnodes are distributed on both sides of the root node.

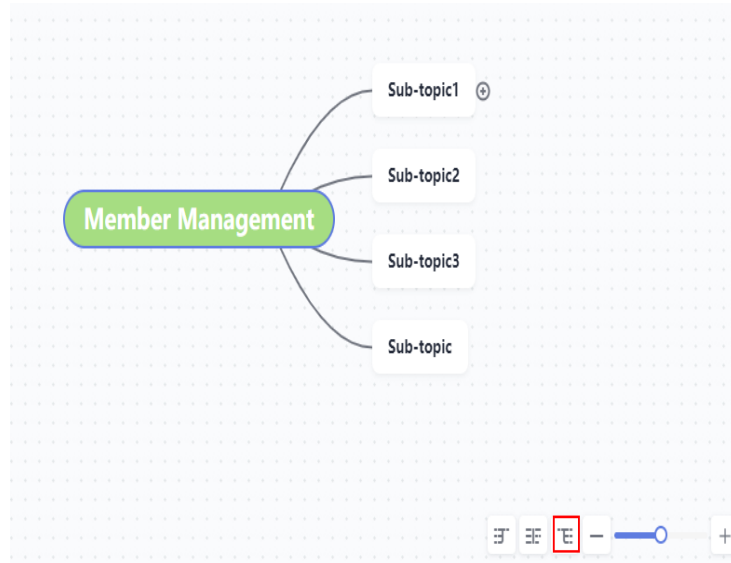





Click the toolbar in the lower right corner of the mind map to adjust the layout of the mind map.

- Click  to adjust the subnodes to the left of the root node.



- Click  to adjust the subnodes to the right of the root node.



- Click  to adjust the view to the default center view.
- Click  or  to zoom out or zoom in the mind map.

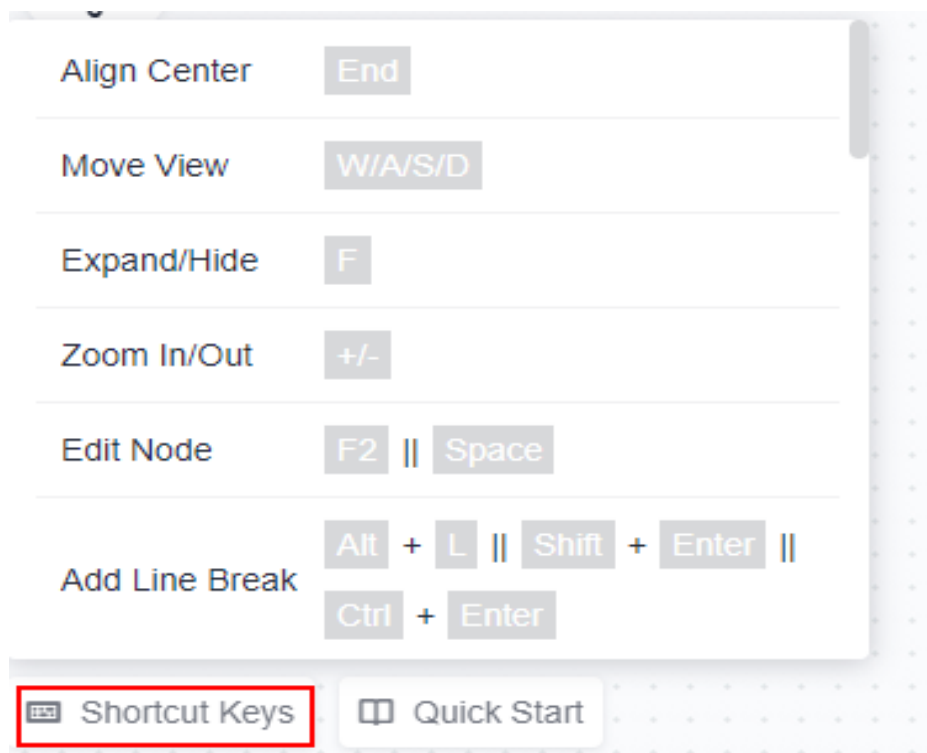
Shortcut Keys

You can use the following shortcut keys to edit the mind map during test design.

Operation	Shortcut Key
Align Center	End
Move View	W/A/S/D
Expand/Hide	F
Zoom In/Out	+/-
Edit Node	F2 or Space
Add Line Break	Alt+L/Shift+Enter/Ctrl+Enter
Copy	Ctrl+C
Paste	Ctrl+V
Cut	Ctrl+X
Undo	Ctrl+Z
Redo	Ctrl+Y
Add Sibling	Enter
Add Child	Ins or Tab
Remove Node	Del
Select Root Node	Ctrl+Home or Home
Select Parent Node	Backspace

Operation	Shortcut Key
Move Selected Node	↑/←/↓/→
Move Node	Ctrl+↑/←/↓/→
Add Scenario	Alt+C
Add Test Node	Alt+P
Add Prerequisite	Alt+O
Add Step	Alt+T
Add Expected Result	Alt+X
Add Case Level	Ctrl+0 / 1 / 2 / 3 / 4
Add Image	Ctrl+I
Add File	Ctrl+D
Set Tag	F3
View Shortcut Keys	Ctrl+Shift+L


Click **Shortcut Keys** in the lower left corner of the mind map to view the shortcut key list.

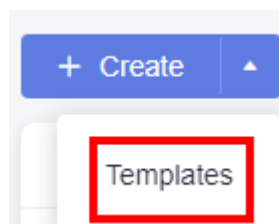


3.2.4 Managing a Template

Save As

A created mind map can be saved as a template.


- Step 1** Access the created mind map and edit the mind map as required.
- Step 2** Click **Template** on the toolbar of the mind map and choose **Save As**.
- Step 3** In the dialog box that is displayed, enter a name and click **Confirm**.
- Step 4** Click  in the upper left corner to return to the test design list. Click **Templates** in the upper left corner of the page, and click the **Custom Templates** tab. The saved template is displayed in the dialog box.

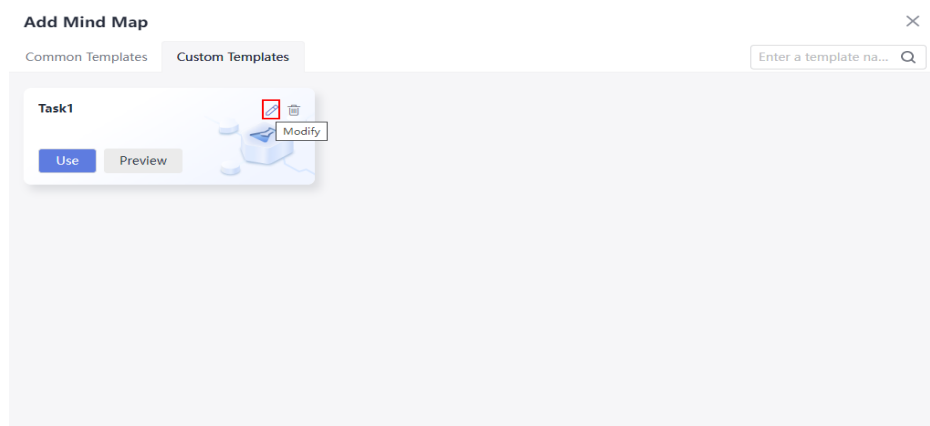



----End

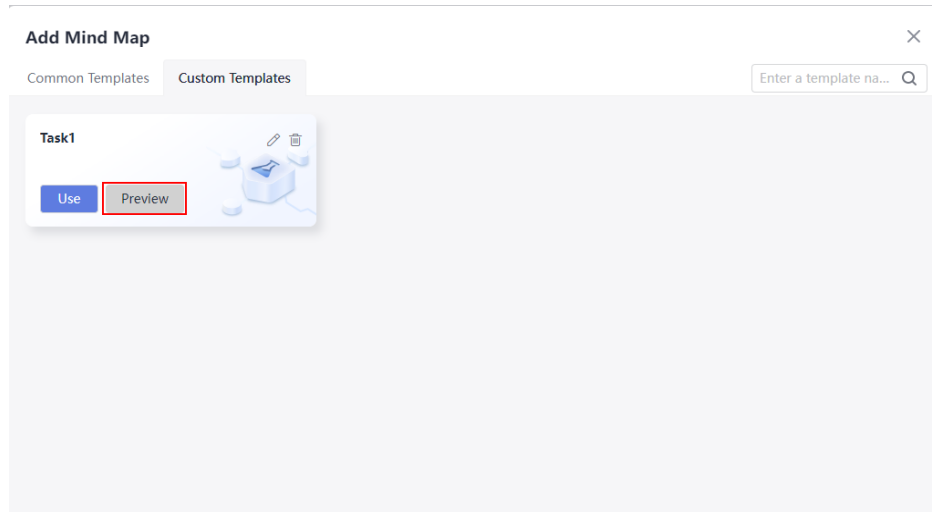
Editing a Template

Members can edit the templates saved by themselves.

- Step 1** Go to the **Testing Design** page and click **Templates** in the upper left corner of the page.
- Step 2** Click the **Custom Templates** tab. In the displayed dialog box, select a template and click  corresponding to the template.



- Step 3** Edit the template as required. After the editing is complete, click  in the upper left corner of the page.
- Step 4** Click **Templates** in the upper left corner of the page. Click the **Custom Templates** tab. In the dialog box that is displayed, locate the edited template and click **Preview** to view the modified template details.



----End

3.3 Test Design Strategies Based on Requirements

3.3.1 Creating a Mind Map Based on Requirements


CodeArts TestPlan allows you to create a mind map for a requirement, break down test scenarios, analyze test points, and output test schemes and test cases based on the requirement.


- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Design**.
- Step 3** Click **Requirements** on the left, select a requirement, and click **Create or Templates** in the upper left corner.

----End

3.3.2 Designing a Scenario

After the operation in [Creating a Mind Map Based on Requirements](#) is complete, you can design a scenario based on this requirement.

- Step 1** Go to the created mind map.
- Step 2** Add a subnode to the root node. For details, see [Adding a Node](#).
- Step 3** Select the node created in [Step 2](#) and click  on the toolbar above the mind map.

If  is displayed next to the selected node, the scenario is added successfully.




----End


3.3.3 Designing a Test Point

After the operation in [Creating a Mind Map Based on Requirements](#) is complete, you can design a test point based on this requirement.

Step 1 Go to the created mind map.

Step 2 Add a subnode to the root node. For details, see [Adding a Node](#).

Step 3 Select the node created in [Step 2](#) and click  on the toolbar above the mind map.

If  appears in front of the selected node, the test point is added successfully.



----End

NOTICE

The test point name can contain only 1 to 128 characters and allows letters, digits, and special characters (-_|/*&`^~:;(){}=+,x...—!@#\$\$%.[]<>?-").


3.3.4 Designing a Test Case

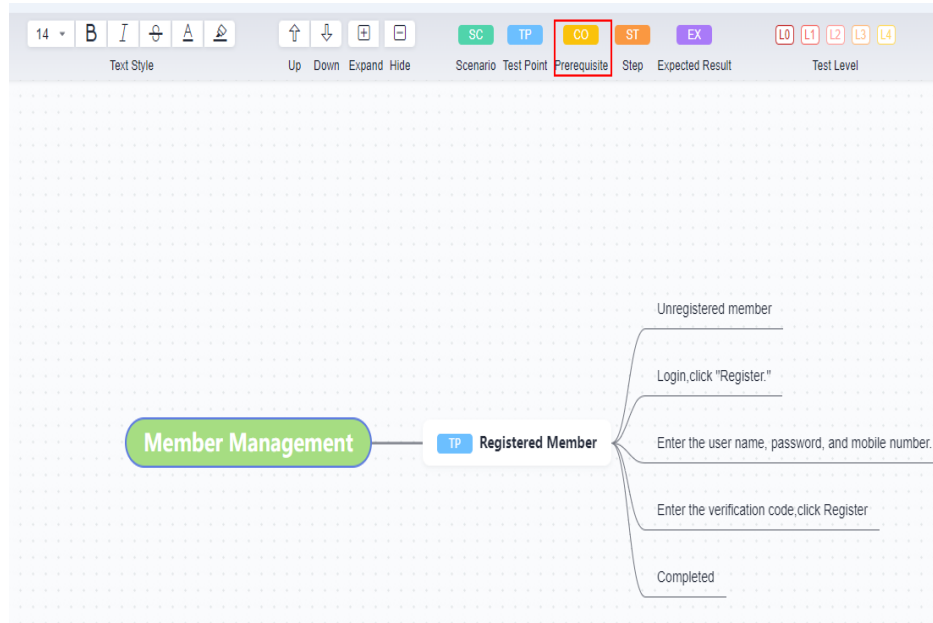
After the operation in [Designing a Test Point](#) is complete, the test cases can be further refined.

A test case consists of three parts: prerequisites, step, and expected result. Set the three parts during test case design.

Step 1 Go to the created mind map.

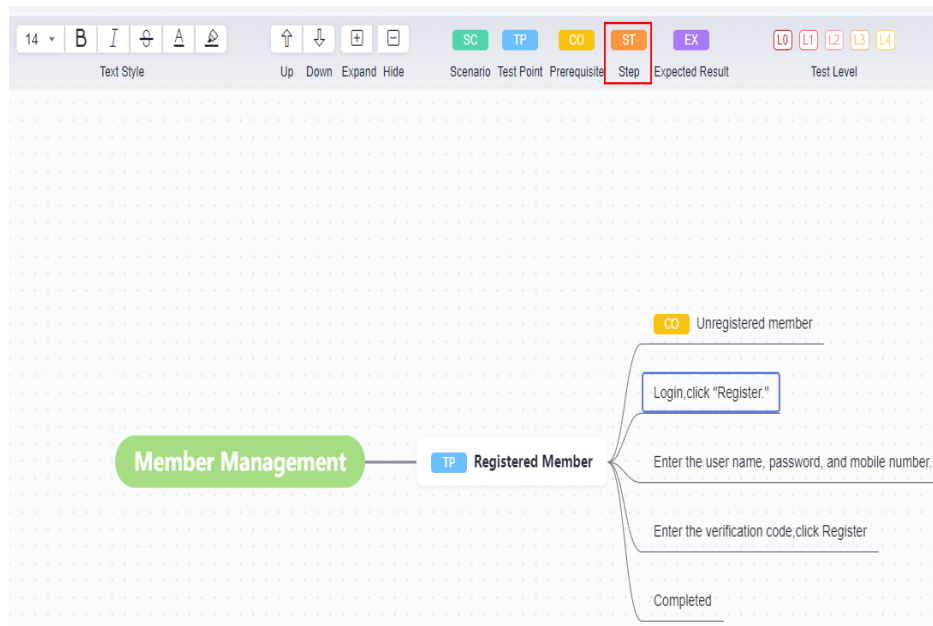
Step 2 Under the registered member node, create subnodes as required (prerequisites, step, and expected result). For details, see [Adding a Node](#).

Step 3 Select the node as the prerequisite and click  on the toolbar above the mind map.



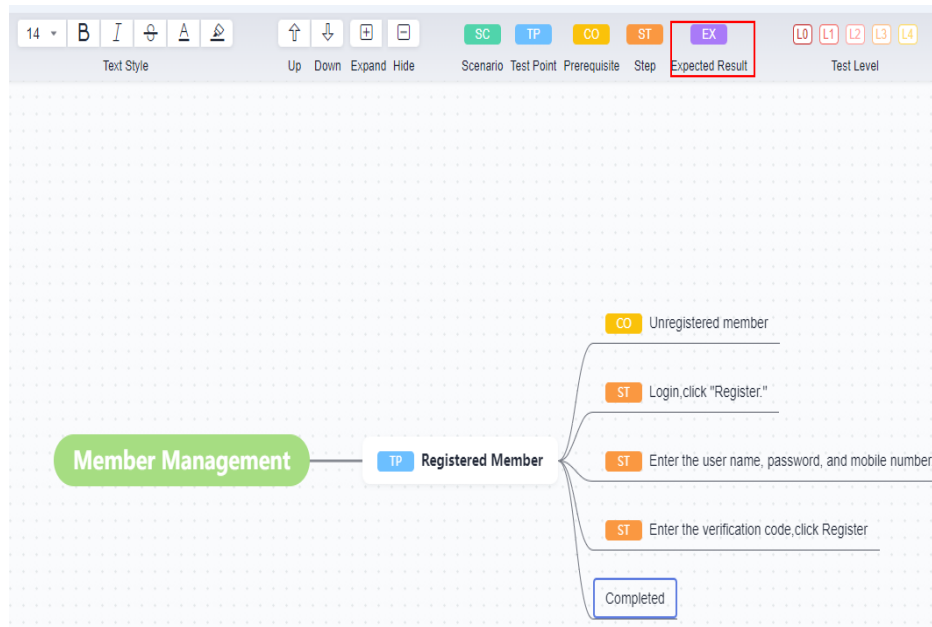
If **CO** is displayed in the node, the setting is successful.

Step 4 Select the node that is used as the step and click **ST** on the toolbar above the mind map.



If **ST** is displayed in the node, the setting is successful.

Step 5 Select the node as the expected result and click **EX** on the toolbar above the mind map.



If **EX** is displayed in the node, the setting is successful.


----End

3.3.5 Generating a Test Case

After the operation in **Designing a Test Case** is complete, you can use the mind map to generate a real test case.

Generating a Test Case

Step 1 In the mind map, right-click the test point (TP) node for which a case is to be generated and choose **Generate Case**.

Step 2 If  is displayed on the node, the operation is successful. In this case, a draft case is generated.

Click . The case details are displayed on the right of the page.

 NOTE

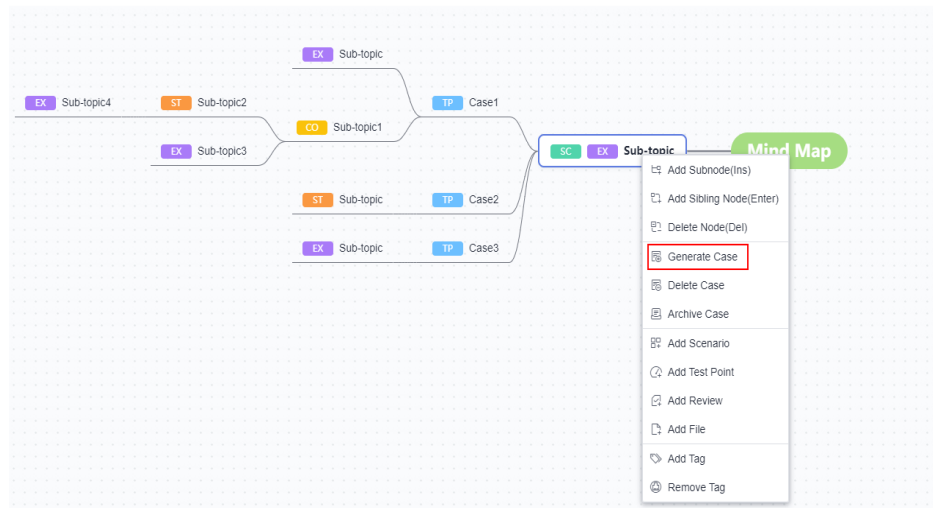
1. When a test case is generated from a TP node, only the first-layer step (ST) subnodes are read, from top to bottom.
2. If no expected result (EX) is set for an ST node, the expected result of the ST node in the case details is empty.
3. If multiple expected results are set for one ST node, only the first result is read.


----End

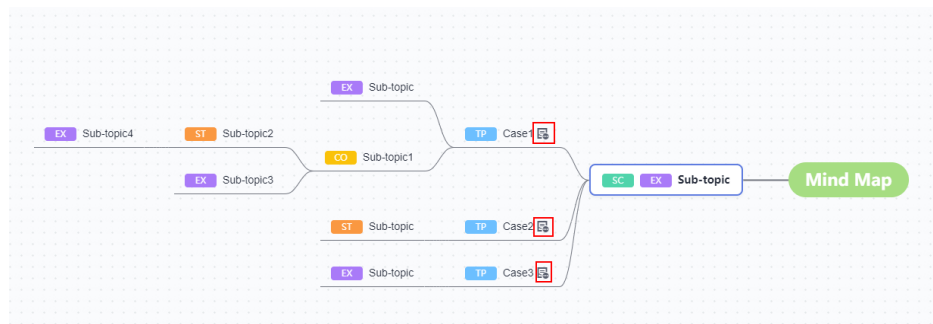
Generating Cases in Batches

If multiple test points are set in a scenario, draft cases can be generated in batches based on the scenario.

In the mind map, select a scenario that contains multiple test points, right-click the node for which a case is to be generated and choose **Generate Case**.



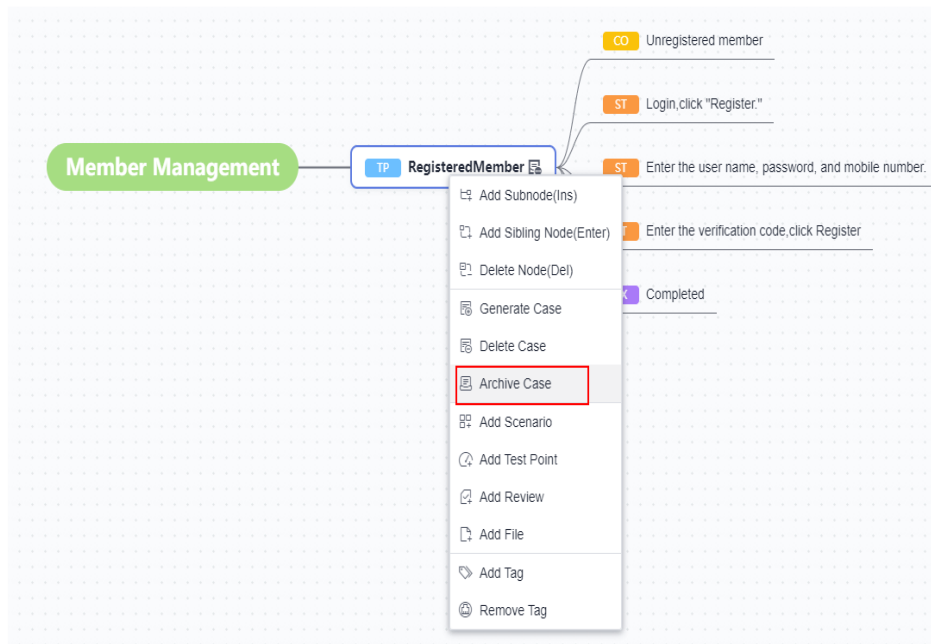
If  is displayed on all test point nodes in this scenario, the operation is successful, and draft test cases are generated.



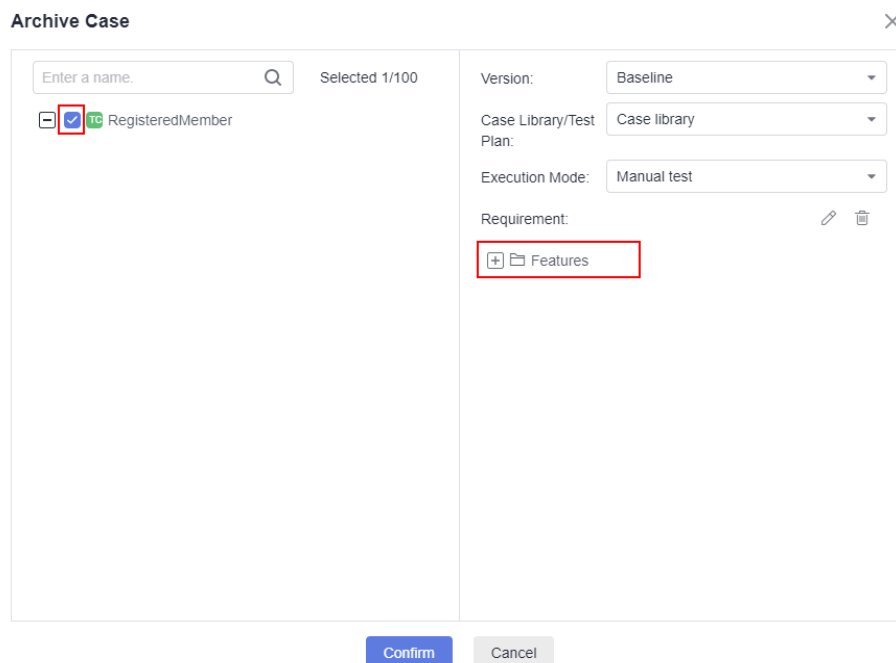
Archiving Cases


After the generated test cases are archived, real test cases are generated. You can find the test case records on the test case page.


Step 1 In the mind map, right-click a node for which a case has been generated and choose **Archive Case** from the shortcut menu. The **Archive Case** window is displayed.

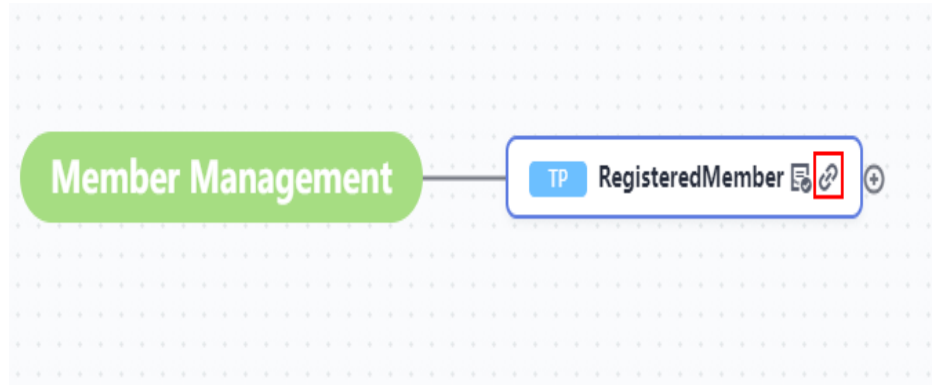


Step 2 Select the cases to be archived on the left. On the right of the page, set **Version**, **Case Library/Test Plan** where the cases are to be stored, and **Execution Mode**, select the feature directory, and click **Confirm**.



Step 3 If  is displayed in the node, the operation is successful. You can find the test case on the **Testing Case** page.

Click . The test case details page is displayed.



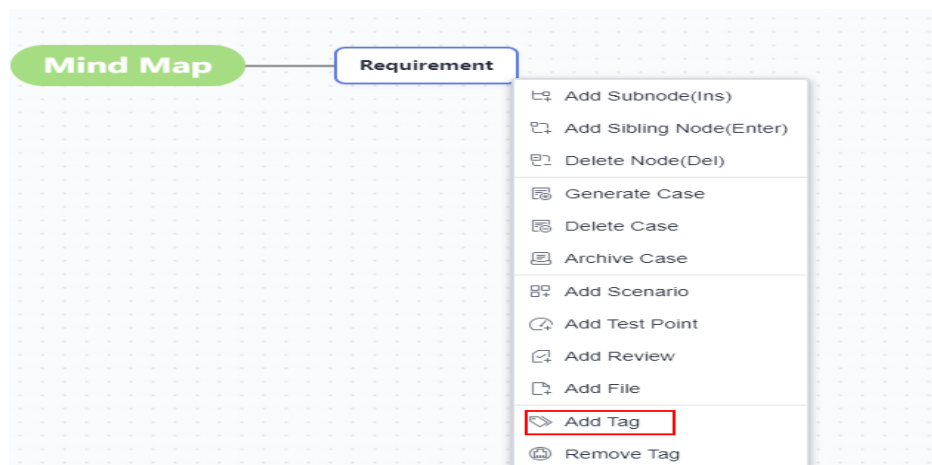
----End

3.3.6 Adding a Tag and Remarks

During test design, you can add tags and remarks for nodes as auxiliary tools.

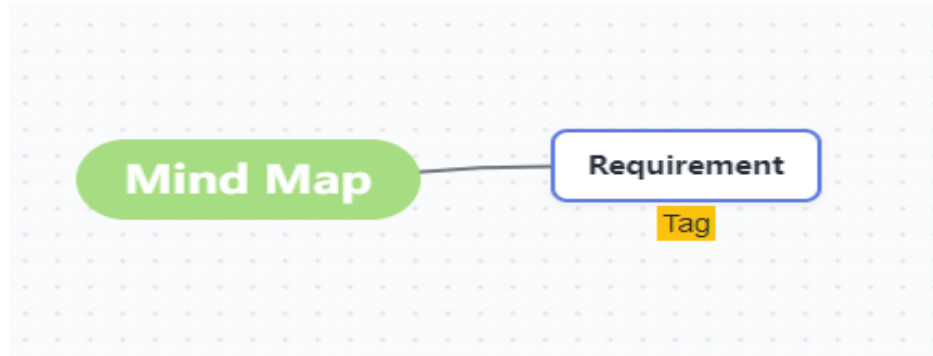
Adding a Tag

Step 1 Access the mind map, right-click a node, and choose **Add Tag**.




Step 2 Enter the tag content in the text box under the node as required and click any position on the screen to save the tag content.

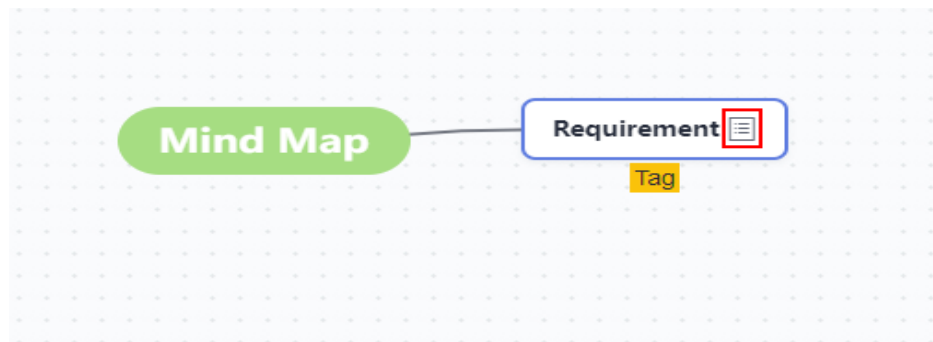
Step 3 After the settings are saved, a tag with a yellow background is displayed under the node.



----End

Adding Remarks

- Step 1** Access the mind map, select a node, and click **Remarks** in the upper part of the page.
- Step 2** Enter remarks in the window that is displayed on the right of the page and click anywhere on the screen to save the remarks.
- Step 3** After the settings are saved,  is displayed in the node.

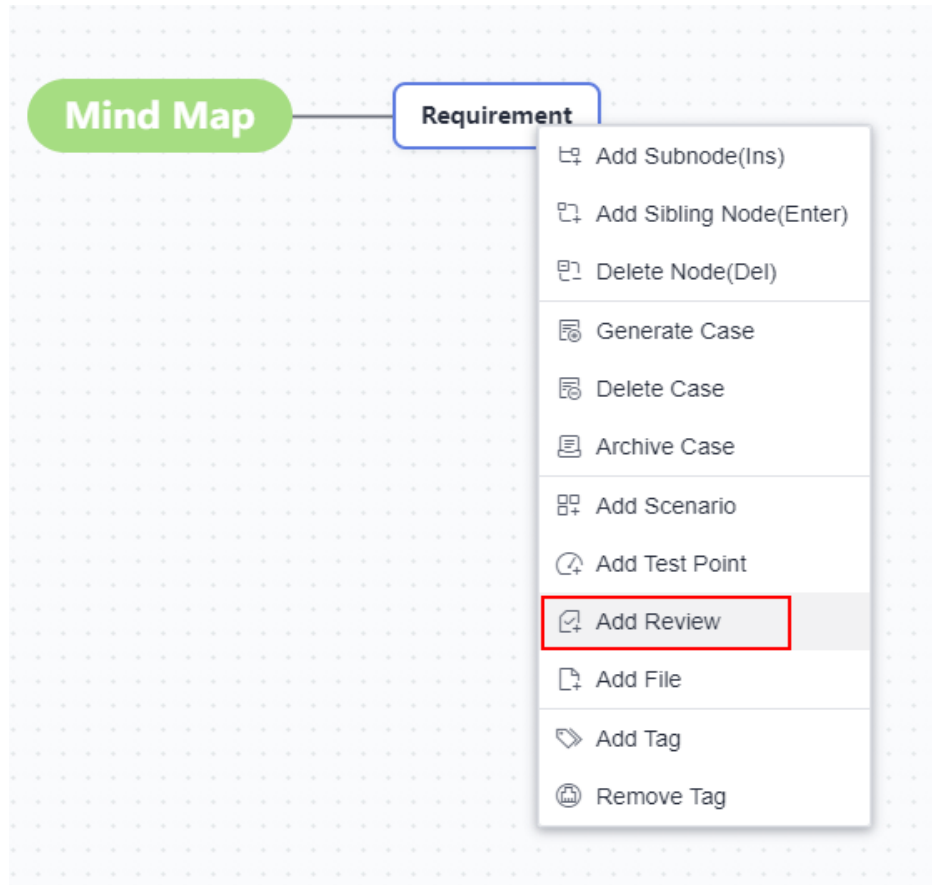


----End

3.3.7 Performing Online Review

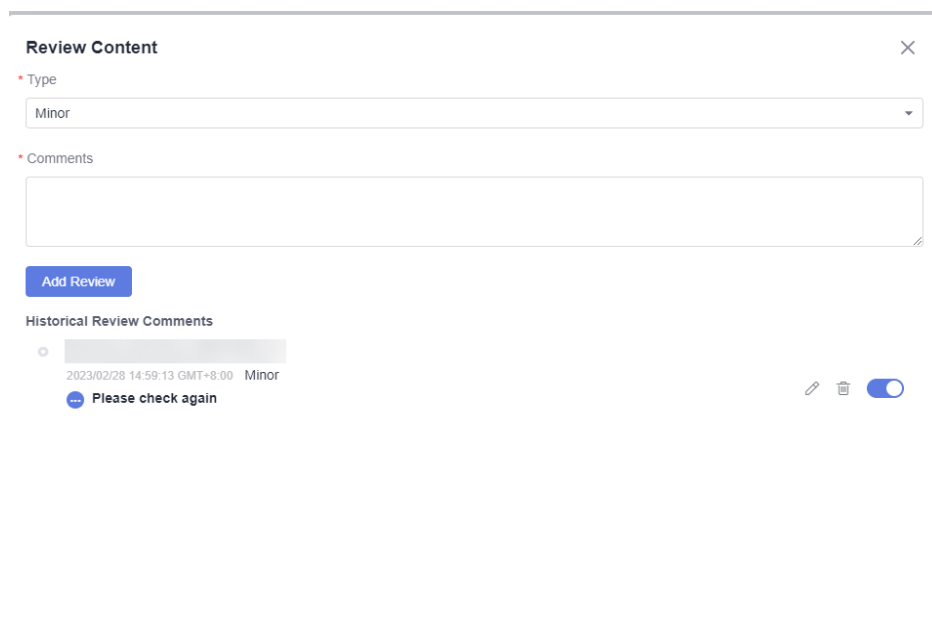
After the case design process is complete, you can review the case online and add review comments.


- Step 1** Access the mind map to be reviewed, right-click a case node, and choose **Add Review**.



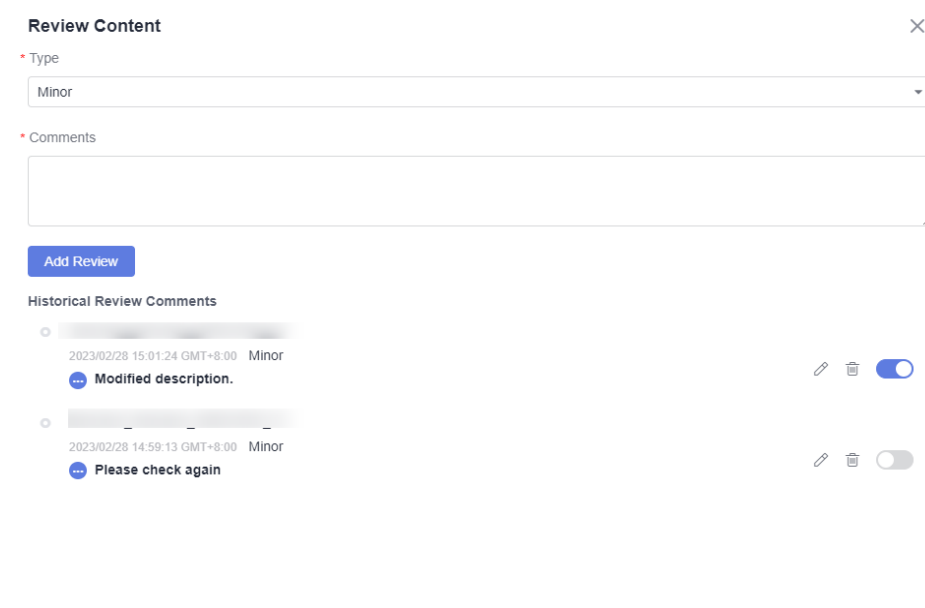
Step 2 In the dialog box that is displayed, select a type, enter comments, and click **Add Review**. The review record is added.

Step 3 View the review record in **Historical Review Comments**.



Step 4 Click  to modify the review comment and its type.

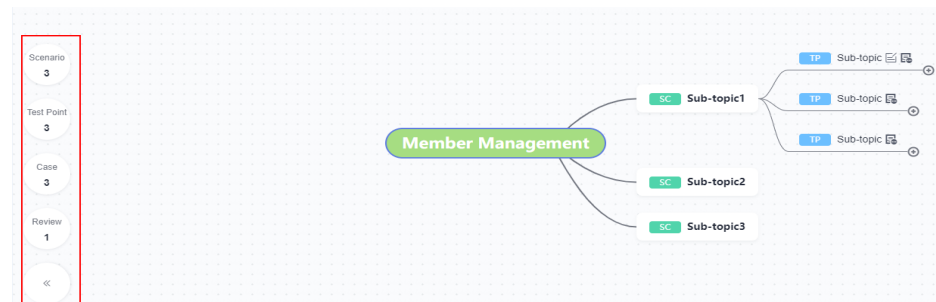
You can click the switch button on the right of a review comment to change the review comment status.



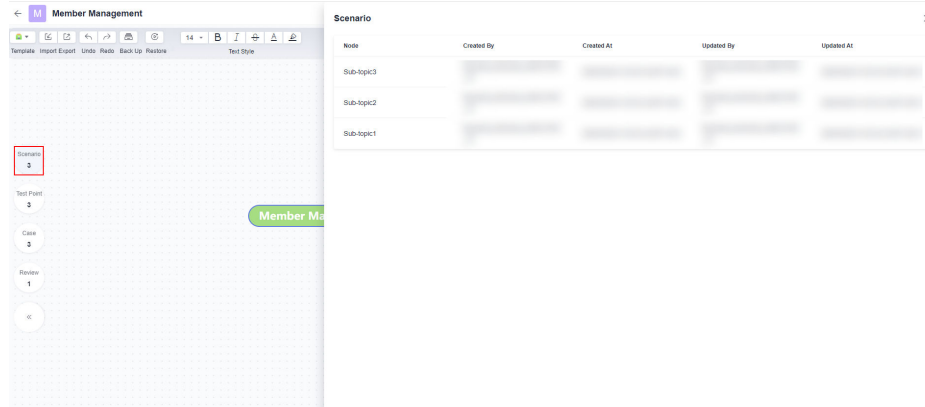
----End

3.3.8 Collecting Node Statistics

Access a mind map. The statistics of each type of node in the mind map are displayed on the left of the page, including the total number of scenarios, test points, cases, and reviews.



Click any statistical value. The node list corresponding to the value is displayed on the right of the page.



Click any node name in the list to locate the corresponding node in the mind map and view the node details.

3.4 Test Design Strategies Based on Features

3.4.1 Creating a Mind Map Based on Features


CodeArts TestPlan allows you to create a mind map for a feature, break down test scenarios, analyze test points, and output test schemes and test cases based on the feature.

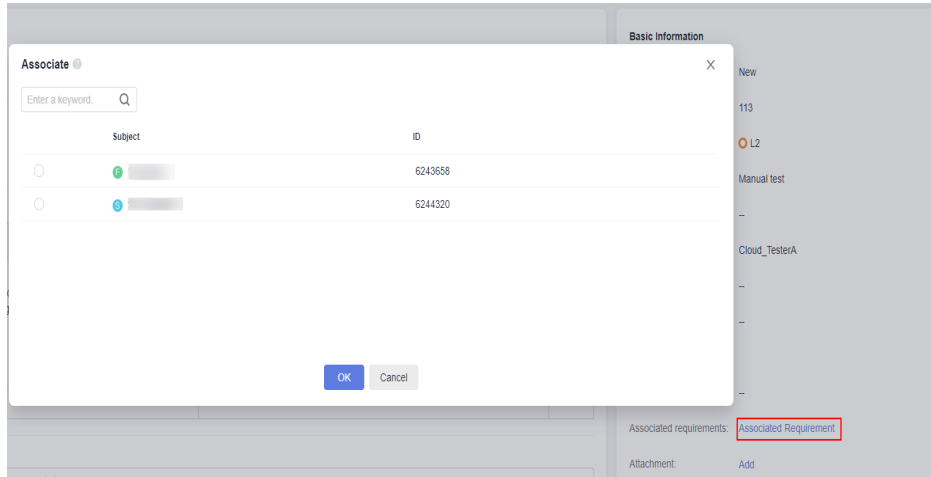
- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Design**.
- Step 3** Click **Features** on the left, select a feature directory on the left and choose **Create** or **Templates** in the upper left corner.

----End

3.4.2 Associated with a Requirement

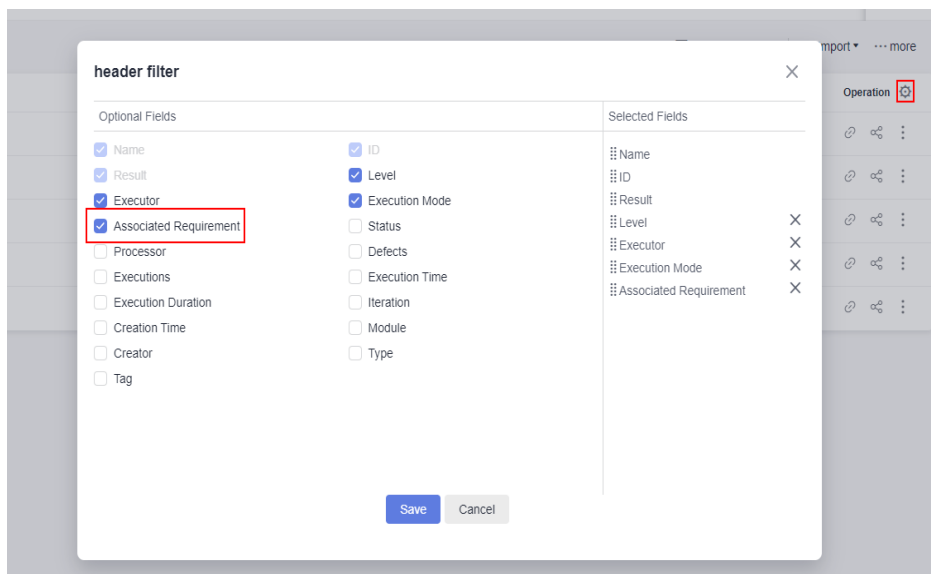
Test cases designed and archived through the feature catalog are not associated with requirements. You can perform the following steps to associate with a requirement:

- Step 1** Go to the mind map generated based on the feature directory.
- Step 2** Find the case that has been archived and needs to be associated with a requirement, and click .
- Step 3** On the right of the page, click **Associate Requirement**. In the dialog box that is displayed, select the requirement, click **OK**, and click **Save** in the upper right corner.



Step 4 In the navigation tree, choose **Testing > Testing Case**. On the page that is displayed, find the case. The value in the **Associated Requirement** column is Associated.

If the **Associated Requirement** column does not exist in the list, click the gear icon in the upper right corner to customize column settings, select **Associated Requirement**, and click **Confirm**.



----End

3.5 Data Combinations

3.5.1 Introduction

You can combine test factors to generate test cases. Data factor combinations enable full coverage of test factors for manual generation of test cases, and diversify test design functions.

3.5.2 Creating Test Cases with Data Combinations

Test factors refer to the factors that affect a test, such as the environment, test mode, and test difficulty. The number of test factors of a test is the number of factors that affect the test. By combining these factors, each test case can cover multiple conditions, which helps avoid missing tests.

Selecting Action and Data Factors to Be Combined


During test design, you can add **Action Factor**, **Data Factor**, **Valid Value**, and **Invalid Value** to mind map nodes.


- **Prerequisites**

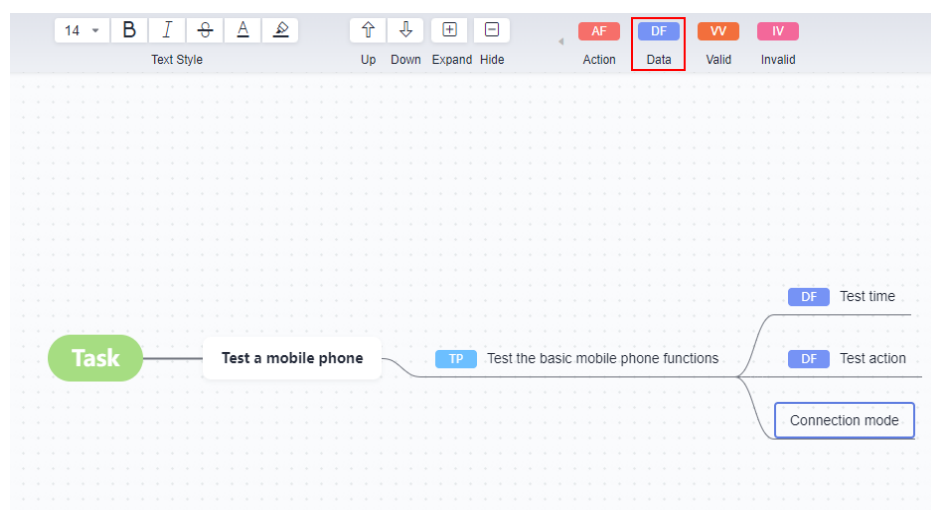
You have created a **Test Point** node, for example, **Test the basic functions of a mobile phone**. Note that combination can be done only on test points.





Step 1 Go to the created mind map.

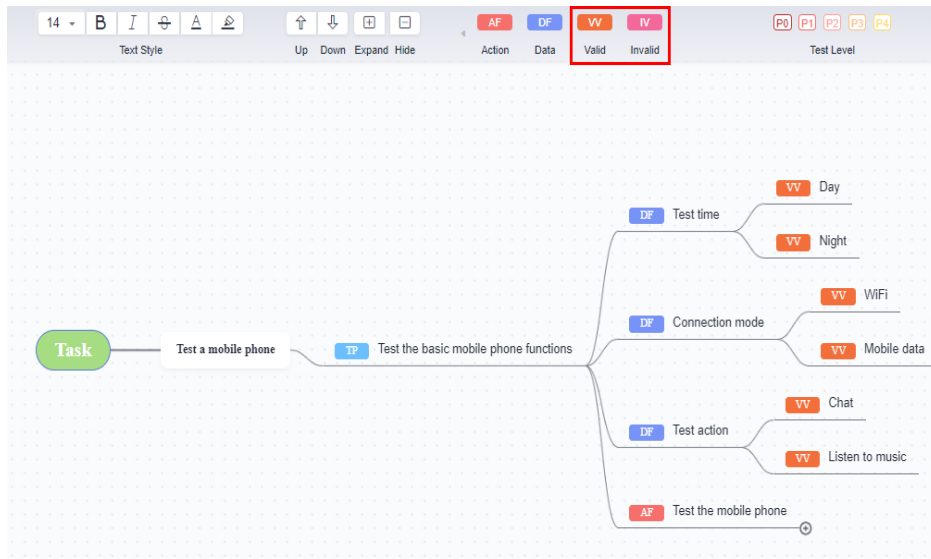
Step 2 On the top toolbar bar, click  on the right of **Expected Result**. The **Action Factor**, **Data Factor**, **Valid Value**, and **Invalid Value** tag icons are displayed.

Step 3 Select the nodes and click the data factor tag icon . Take the node **Test the basic mobile phone functions** as an example. If the test process is to use a mobile phone to perform *{test action}* in *{connection mode}* at *{test time}*, the data factors can be *{test time}*, *{connection mode}*, and *{test action}* to cover all scenarios for manual testing.

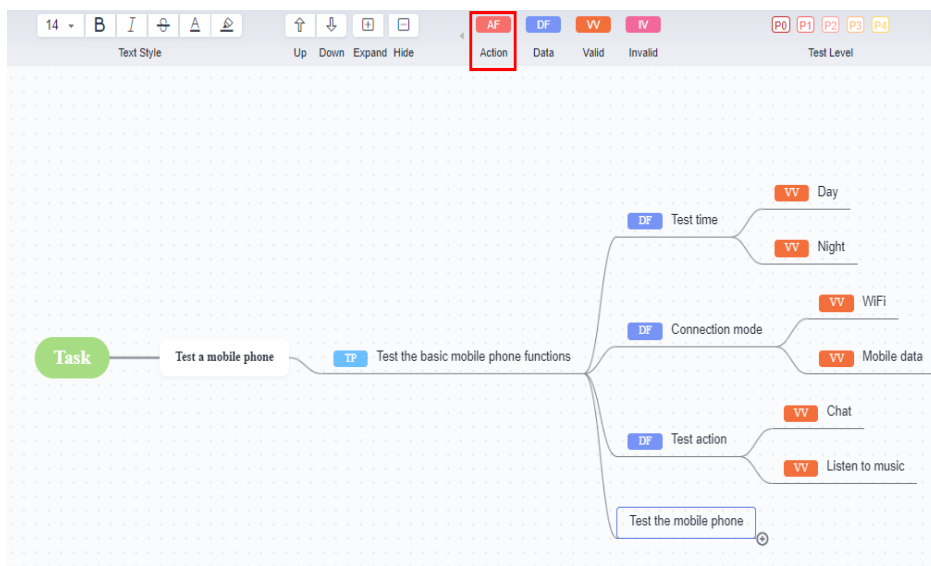


Step 4 Add a valid or invalid value: **Add subnodes** to the data factor nodes, select the subnodes, and click the valid value tag icon  or the invalid value icon  on the toolbar.

The following figure shows the valid or invalid value subnodes of the data factor nodes **Test time**, **Connection mode**, and **Test action**.



Step 5 Add an action factor: Select a subnode and click the action factor tag icon **AF** on the toolbar. For example, set **Test the mobile phone** to be an action factor.



Step 6 Right-click a test point node and choose **Generate Combinatorial Case** from the shortcut menu.

NOTE

The system finds the parent node of the DF nodes and displays their valid and invalid values.

Step 7 The **Generate Combinatorial Case** page is displayed, on which action factors are displayed by default.

Step 8 Click the **Data Factor** tab, click the **Combinatorial Algorithm** drop-down list box, and select a combinatorial algorithm. The following table describes the combinatorial algorithms.

Data Combination Coverage Type	Description
All Combinations (AC)	All values of each test factor are combined. AC is the most comprehensive coverage mode.
Each Choice (EC)	Each test factor value appears at least once in any combination.
Basic Choice (BC)	Change the value of an input to a BC combination to create a new combination.
N-wise	This combination covers N inputs. When N equals the number of parameters, this mode generates AC. Tests prove that when N=2 (pair-wise), the generated test data provides the highest efficiency, making this one of the most widely used algorithms.

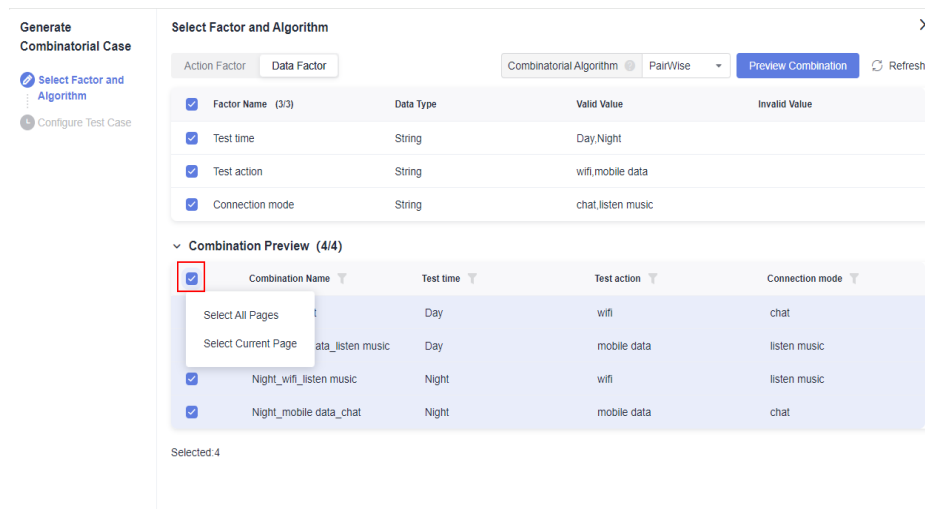
NOTICE

After modifying or deleting a data factor node, click **Refresh** to synchronize modification.

Step 9 Click **Preview Combination**.

Step 10 In the **Combination Preview** list, select the data combination to be created.

Move the cursor over the first check box, select **Select All Pages** or **Select Current Page**.



Step 11 Click **Next**.

Step 12 On the **Configure Test Case** page, set the test case name, number, description, and level. The default test case name format is *TP node name_\${data factor}*. Test case numbers will be generated in ascending order based on the set rule.

Step 13 Write test steps. Use \$ to reference data factors.


Test Steps




#	Step Description	Expected Result	Operation
1	Use the phone to perform \${Test action} in \${Connection mode} at \${Test time}.		+

Step 14 Click **OK**.

Step 15 Click  to view the test case list.

Step 16 The generated test cases are displayed by default. Choose **Combination Strategies** to view the history of combinatorial algorithms.

Step 17 Click  in the **Operation** column of the test case to be archived, and click **Archive Cases**. Other operations:

- Archive multiple test cases: Select multiple test cases and click **Archive Cases**.
- Edit a test case: Click  in the **Operation** column, and view and edit the test case.
- Delete a test case: Click  in the **Operation** column and click **Delete**.
- Delete test cases in batches: Select multiple test cases and click **Delete**.
- Search for a test case: Enter a keyword in the search box, and click .
- Filter test cases: Click the drop-down list box under **Test Cases**, and select **All**, **Unarchived**, or **Archived**.

Step 18 On the **Archive Case** page, select the target test cases on the left. On the right area, select the version, test plan, execution mode, and feature directory, and click **Confirm**.

Step 19 In the navigation pane, choose **Testing > Testing Case**. Select the required version, test plan, and test type tab page, and view the archived test cases.

----End


3.5.3 Factor Library

In the test factor center, action and data factors can be preset for editing mind maps.

Creating a Factor

Step 1 In the navigation pane, choose **Testing > Testing Design**.

Step 2 Click **Test Factor Center** in the upper right corner of the page.

Step 3 Create a directory if there is only the root directory: Click  next to the root directory and click **Create Directory**.






Step 4 Enter a directory name.

Step 5 Click the directory name and click **Create Factor**.

Step 6 Configure the following information and click **Confirm**.

Configurati on Item	Mandat ory	Description
Factor Name	Yes	Max. 500 characters.
Factor Type	Yes	Data Factor or Action Factor .
Factor Description	No	Brief description of a factor. Max. 500 characters.
Prerequisite	Yes	Prerequisites for action factors.
Test Steps	Yes	Step descriptions and expected results for action factors. Max. 2,000 characters. Click + in the Operation column to add more test steps.
Data Type	No	The default value is String .
Valid Value/ Invalid Value	No	Valid or invalid values for data factors. Click Add to add more valid or invalid values.
Remarks	No	Max. 500 characters.

Step 7 The new factor is displayed in the directory. You can:

- Copy a factor: Click  in the **Operation** column. On the page that is displayed, modify the factor information and click **Copy**.
- Edit a factor: Click  in the **Operation** column. On the page that is displayed, modify the factor information.
- Delete a factor: Click  in the **Operation** column and click **Delete**.
- Delete factors in batches: Select factors and click **Delete** on the tool bar below.
- Export factors: Select factors, click **Export** on the tool bar below, and save the file to the local PC.
- Filter factors: Click the drop-down list box on the right of **Create Factor** and select **All Factor**, **My Factor**, **Action Factor**, or **Data Factor**.
- Search for a factor: Type a keyword in the search box and click the search icon.
- Edit the factor list headers: Click  in the **Operation** column of the factor list. In the dialog box that is displayed, select headers and adjust the display sequence on the right.
- Import: Click **Import** in the upper right corner. In the displayed dialog box, click **Download Template** to download the template to the local PC. Edit the template file, click  in the dialog box, select the file, and click **OK**.

----End

Associating a Mind Map with the Factor Library

- Step 1** In the navigation pane, choose **Testing > Testing Design**.
- Step 2** Create or select a mind map.
- Step 3** Right-click a node and choose **Associate Factor Library** from the shortcut menu.

NOTICE

Association can be done only on test point nodes.

- Step 4** On the **Associate Factor Library** page, select factors and click **Confirm**. The factors are displayed in the mind map.
 - Step 5** Generate a test case by following the instructions for [creating a combinatorial test case](#).
- End

4 Testing Management

4.1 Introduction

A version records information, such as test cases, test case execution, test suites, test suite execution, and quality reports, about a specific software version.

- Version: A version records information, such as test cases, test case execution, test suites, test suite execution, and quality reports, about a specific software version.
- Relationship between versions and test plans: A version contains one case library and multiple test plans.
- Baseline: A baseline is a special version that has been formally reviewed and is the basis for subsequent test activities. Cases in a baseline are generally stable and are test assets accumulated for a long time.
- Hierarchical management of test cases: Test cases can be managed by layer, that is, by product baseline library, version branch, and test plan. Test cases can be merged from a version to the baseline and imported from the baseline to a version, and case merging conflicts between versions can be managed. This meets the requirements of concurrent tests of multiple versions and collaborative tests of multiple persons, enabling test asset accumulation and reuse.

This section describes how to manage versions from the following aspects:

[Creating, Editing, and Deleting a Version](#)

[Managing a Version](#)


[Measuring a Version](#)

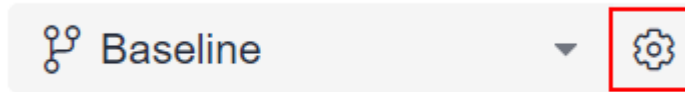
4.2 Creating, Editing, and Deleting a Version

Creating a Version

- Step 1** Log in to the service homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 Click  on the right of **Baseline**. The **Version Management** page is displayed.




Step 4 On the **Version Management** page, click **+ Additions**.


Step 5 Enter the version name and click **Save**.

----End


Editing a Version

On the **Version Management** page, move the cursor over the test version to be edited, click , and edit the version name.

Deleting a Version

On the **Version Management** page, click  in the **Operation** column of the target version to delete the version.

Viewing Test Case Changes

On the **Version Management** page, click  in the **Operation** column of the target version, and view the change history.

4.3 Managing a Version

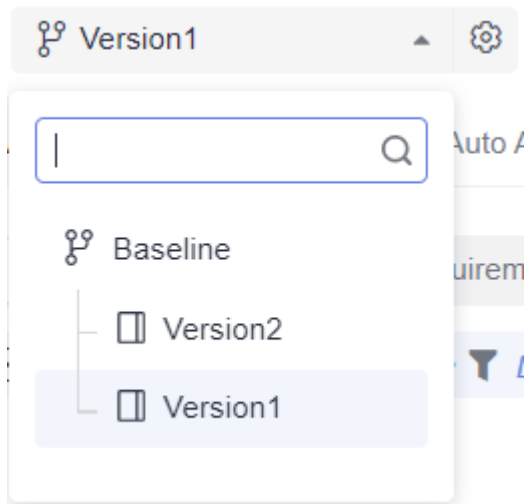
Version management is a process of importing test cases to a baseline to a version or merging test cases from a version to a baseline based on test policies.

Importing Manual Test Cases from Other Versions

Step 1 Log in to the service homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 Select a version from the version drop-down list in the upper left corner of the page.



Step 4 Click the **Manual Test** tab. In the right area of the tab page, click **Import** and select **Import from Version** from the drop-down list.

 **NOTE**

If no test case has been created or you need to create a test case, click **Create Case**. For details, see [Creating a Manual Test Case](#).

Step 5 In the displayed dialog box, select the case to be imported, select the overwriting rule, and click **OK**.

Move the cursor over the check box on the left of **Case Name** and select **Select Current Page** or **Select All Pages** to import the cases on the current page or all cases of the corresponding version to the current version.

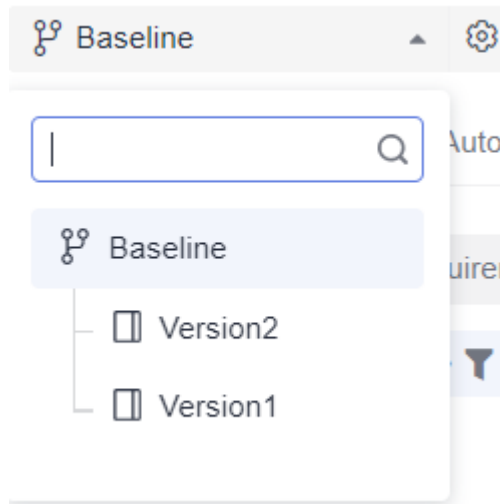
----End

Merging Test Cases in a Version into the Baseline (Testing Case Page)

Step 1 Log in to the service homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 Select a version from the drop-down list in the upper left corner of the page.



Step 4 Select a test type tab. In the right area of the tab page, click **Merge into Baseline**.

NOTE

If no test case has been created or you need to create a test case, click **Create Case**.

Step 5 In the displayed dialog box, select the test case to be merged, select the overwriting rule, and click **OK**.

Move the cursor over the check box on the left of **Case Name** and select **Select Current Page** or **Select All Pages** to merge the cases on the current page or all manual test cases of the current version into the baseline.

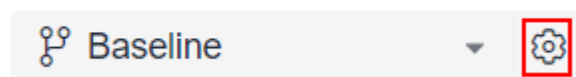
----End


Merging All Test Cases in a Version into the Baseline (Through Version Management)

Step 1 Log in to the service homepage, search for your target project, and click the project name to access the project.

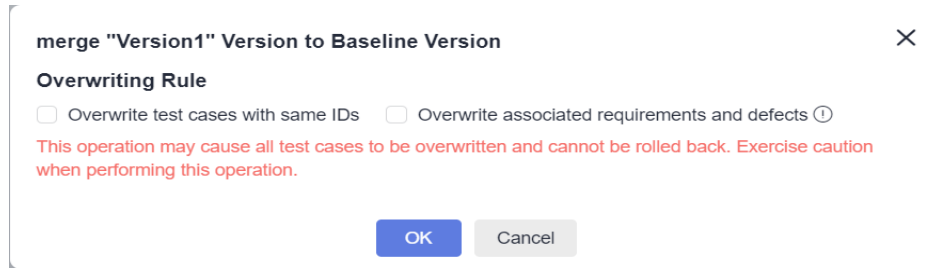
Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 Click  on the right of **Baseline**. The **Version Management** page is displayed.



Step 4 On the **Version Management** page, select the version whose cases you want to merge into the baseline, and click  in the **Operation** column.

Step 5 In the displayed dialog box, select a rule and click **OK** to merge test cases.



----End

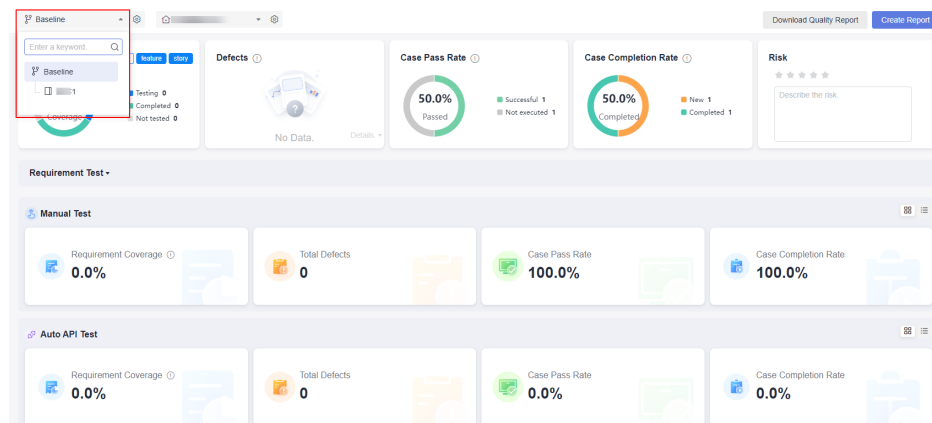
4.4 Measuring a Version

Step 1 Log in to the service homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Quality Report**. The **Quality Report** page is displayed.

Step 3 View the test dashboard of the version.

To view the quality reports of other versions or test plans, select the target version or test plan from the version or test plan drop-down list in the upper left corner of the page.



----End

5 Testing Case

5.1 Introduction

A test case describes a test task for a specific software product, including the test solution, method, technique, and policy. The content includes the test objective, test environment, input data, test procedure, expected result, and test script.

This chapter describes how to design test cases from the following aspects:

- [Test Case Library](#)
- [Manual Test Cases](#)
- [API Automation Test Cases](#)
- [Built-in Functions](#)
- [Adding Test Cases in Batches](#)
- [Managing Test Cases in the Features Directory](#)
- [Test Cases and Requirements](#)
- [Test Cases and Defects](#)
- [Commenting on Test Cases](#)
- [Filtering Test Cases](#)
- [Customizing Columns to Be Displayed in the Test Case List](#)

5.2 Test Case Library

In test case library, you can view, manage, and use all test cases of the versions of a project.

- You can add test cases in the test case library to test plans.
- You can view, manage, and use only the test cases in the current test plan.
- The test cases created in test plans are collected to the test case library.

To view the test case library, perform the following steps:

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**. The **Test case library** is displayed by default.

You can select a test plan from the drop-down list of the test case library to view the test case details in the test plan.

----End

5.3 Manual Test Cases

5.3.1 Creating a Manual Test Case

Prerequisites

You have the permission to create test cases (that is, you have other system roles except the O&M manager, viewer, and participant in the project).

Procedure

Manual test cases are used to manage test scenarios and steps. You can view manual test cases on the **Testing Case > Manual Test** page.

Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 **Baseline** and **Test case library** are displayed by default. On the **Manual Test** tab page, click **Create Case** on the left.

Step 4 Enter the name, description, prerequisites, and test steps as required, and click **Save**.

The main configuration items of the manual test cases are as follows.

Configur ation Item	Description
Name	Name of a test case (mandatory). You can describe its test scenario or function.
Descriptio n	Brief description of a test case. You can enter the test scope, test objectives, test policy, test methods, test tools, test data, test metrics, and test environments of the current test case.
Prerequisi tes	Prerequisites for executing the current test case.
Test Steps	Step description and expected result.
Tag	Tag for the current test case as required. Each test case can be associated with a maximum of 10 tags, which should be separated by spaces.

Configuration Item	Description
ID	Test case ID, which can be customized. If this item is left blank, a test case ID is automatically generated.
Case Level	<p>Test case level based on the importance of the scenario or function. The default level is L2.</p> <ul style="list-style-type: none">• L0: verification of underlying functions. Each module should have 10 to 20 test cases. L0 test cases account for 5% of all test cases.• L1: verification of basic functions for inherited features or before iteration acceptance. L1 test cases account for 20% of all test cases.• L2: verification of important features for manual tests in non-regression versions. L2 test cases account for 60% of all test cases.• L3: verification of minor and non-important functions, and exception tests on basic and important functions. L3 test cases account for 15% to 20% of all test cases.• L4: verification of special input, scenarios, and threshold conditions. L4 test cases account for less than 5% of all cases.
Module	Module of the current test case. The module list comes from the project settings. For details, see Setting Modules .
Version	Version number of the current test case.
Iteration	Iteration to test the current test case.
Processor	Person who needs to complete the test task.
Associated Requirement	<p>It is recommended that test cases be bidirectionally associated with test requirements. If the current test case is used to test a specific requirement and the requirement has been recorded in the CodeArts Req service, click Associate to associate the test case with the requirement work item.</p> <p>NOTE Test cases can be associated only with Epic, Feature, and Story work items of a Scrum project and default Requirement work items of a Kanban project.</p>
Folder	Associated feature directory. The test case is in the Other directory by default.
Attachment	Attachment related to the current test case. You can associate an existing file from the Files page or upload an attachment from the local PC.
Custom Field	Customized fields set by the user in Settings . For details, see Test Case Settings .

----End

5.3.2 Editing Test Case Details

Background

Take a Scrum project as an example. Related requirements have been recorded in the project management module for the current iteration.

Before testing, the tester creates a manual test case for the corresponding function in the test case library based on front-end requirements, and associates them.

Procedure

Step 1 After the operations described in [Creating a Manual Test Case](#) are complete, choose **Testing Case > Manual Test**, and click the name of the test case to be edited. The **Details** tab page is displayed.

Step 2 Edit the test details as required.

- In the table under **Test Steps**, click the blank area in the **Test Steps Description** and **Expected Result** columns and enter information as required. Click **+** in the **Operation** column to add a step and enter the step description and expected result as required.
- Click **Associated Requirements** on the right of the page. In the dialog box that is displayed, select the requirement to be associated and click **OK**.

----End

5.3.3 Migrating a Manual Test Case

Background

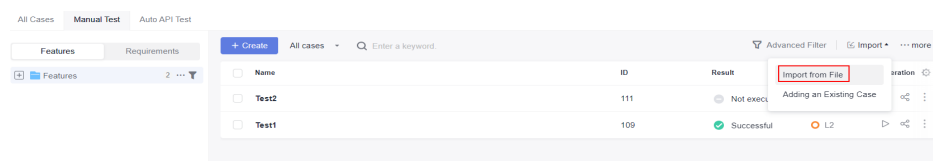
CodeArts TestPlan allows you to import test cases from the local PC to the test case library and export test cases from the test case library.

Importing a Test Case

Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 Click the **Manual Test** tab, click **Import** on the right of the page, and choose **Import from File** from the drop-down list.



Step 4 In the dialog box that is displayed, click **Download Template**.

Enter the test case information based on the format requirements in the template, return to the **Testing Case** page, upload the created test case file, and click **OK**.

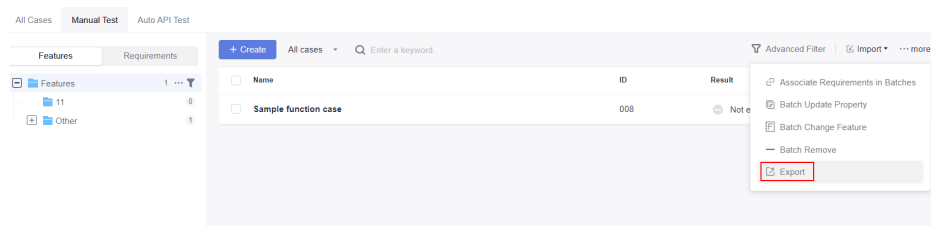
NOTE

- A maximum of 5000 test cases can be imported at a time.
- The size of a single file cannot exceed 5 MB.
- Currently, CodeArts TestPlan supports the Excel format. If the data does not meet the import criteria, a message is displayed, asking you to download the error report. Modify the data and import it again.

----End

Exporting a Test Case

Step 1 On the **Manual Test** tab page, click **More** on the right of the page and choose **Export** from the drop-down list.



Step 2 In the dialog box that is displayed, select the case export scope. You can select **Export All**.

Select **Partial Export** (set **Start Position** to the case in the first row of the table and **End Position** to the case in the last row of the table by default), and click **OK**.



Step 3 Open the exported Excel file on the local PC and view the exported test case.


----End

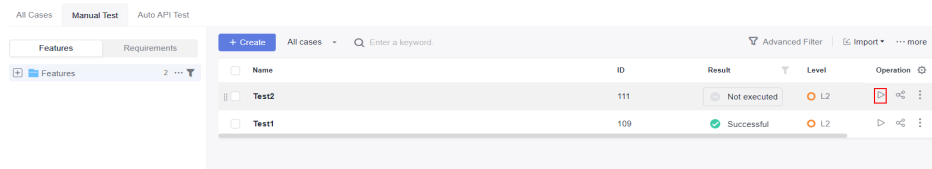
5.3.4 Executing a Manual Test Case

Prerequisites

A manual test case has been created.

Common Execution

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** On the **Manual Test** tab page, locate the test case to be executed and click  in the **Operation** column. The execution page is displayed.



If multiple test cases need to be executed at the same time, select them and click **Batch Set Results**.

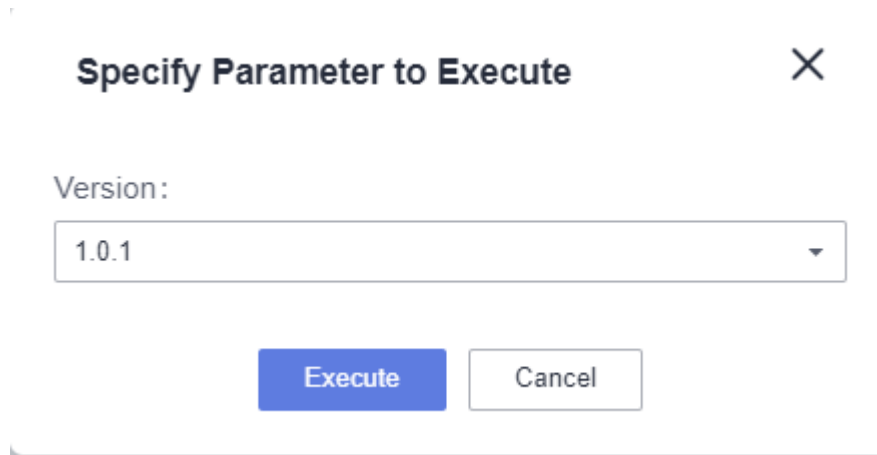
- Step 4** Set the case result based on the actual test result.
- Step 5** After the setting is complete, click **Save** to return to the test case list. You can view the execution result in the **Result** column.
- Step 6** Click the test case name, click the execution history tab, and view the execution history of the test case.

----End

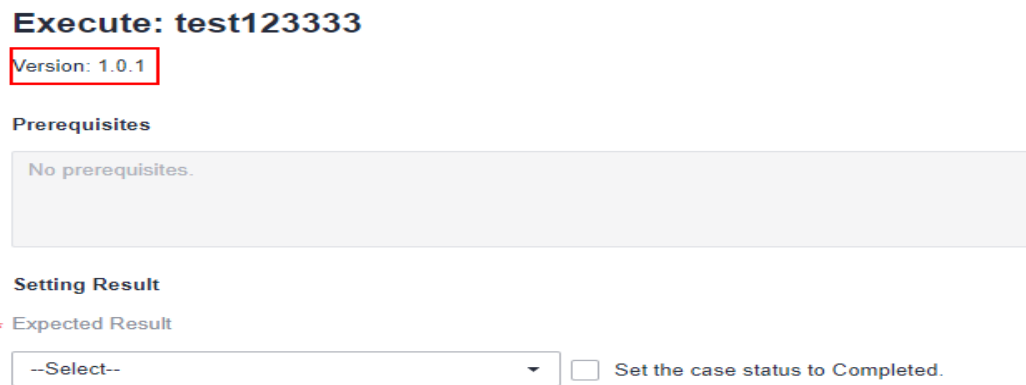
Execution with Specified Parameters

Manual test cases can be executed with parameters.

- Step 1** In the test case list, click ******* in the **Operation** column and select **Specify Parameter to Execute**.
- Step 2** In the displayed dialog box, enter the version number and click **Execute**. The execution page is displayed.



Step 3 You can view the test version number. Set the test case execution result, enter the actual result, and click **Save**.



Step 4 Click the corresponding case and click the execution history tab to query the execution result.

----End

5.4 API Automation Test Cases

5.4.1 Creating an API Automation Test Case

Background

API automation test cases involve the **Details** and **Scripting** tab pages.

- **Details:** manages and describes test cases, including the name (mandatory), type, module, version, iteration, associated requirements, ID, tag, test case level, processor, folder, description, prerequisites, test steps, and expected result.
- **Scripting:** defines the automated testing procedure, including the test steps, logic control, and test parameters.

Procedure

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** Click the **Auto API Test** tab and click **Create Case** in the upper left corner of the page.
- Step 4** Enter the test case name, configure other information as required, and click **Save**. Alternatively, click **Save and Write Script**. The **Scripting** page is displayed.

The main configuration items of API automation test cases are similar to those of manual test cases. For details, see [Creating a Manual Test Case](#).

NOTE

The test case name can contain only 3 to 128 characters and allows uppercase letters, lowercase letters, digits, and special characters (-_/*&`^~;:(){}=+,x...—!@#%\$.[]<>?-"').

----End

5.4.2 Writing an API Automation Script

Background

An API automation test case consists of three stages: preparation, testing, and destruction.

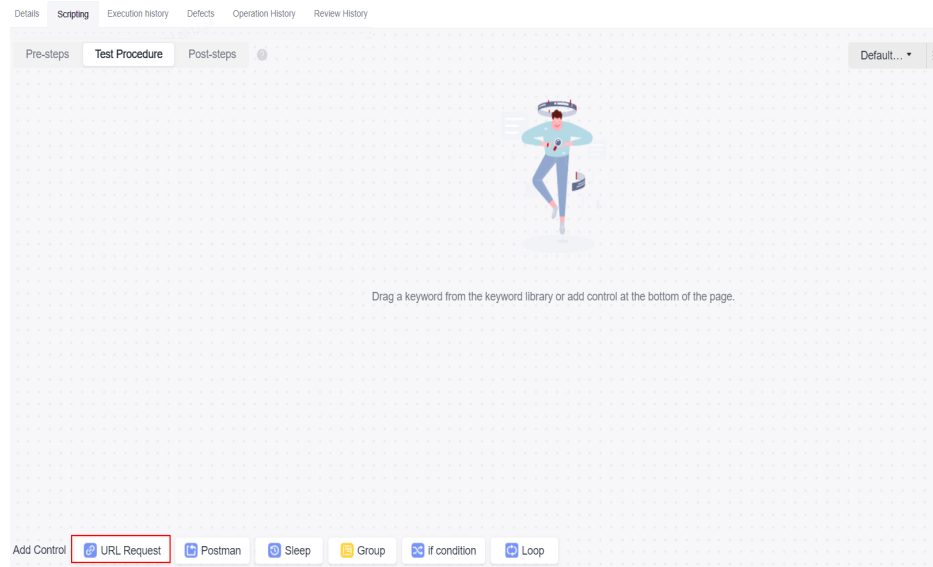
The preparation stage corresponds to the **Pre-steps** tab page to prepare for the test prerequisites. The testing stage corresponds to the **Test Procedure** tab page to implement the API function test. The destruction stage corresponds to the **Post-steps** tab page to release or restore the test data in the preparation and testing stages.

- (Optional) Preparation stage
 - In this stage, prepare the prerequisite data required in the testing stage. If there is no prerequisite, skip this stage.
 - In this stage, the prerequisites are initialized using API calls. If the data of the prerequisites needs to be referenced in the testing stage, you can use parameter passing to parameterize the data. For details, see [Setting Response Extraction](#).
- Testing stage
 - Define the API core test steps. The test steps in the testing stage can reference the parameters extracted in the preparation stage.
- (Optional) Destruction stage
 - To avoid affecting other tests or the next test, you are advised to clear the test environment data, restore the initial status of the test environment, and destroy the data created in the preparation stage after each test.
 - If no data needs to be destroyed, ignore this stage. You can destroy data using API calls. The test steps in the destruction stage can reference the parameters extracted in the preparation stage.

Procedure

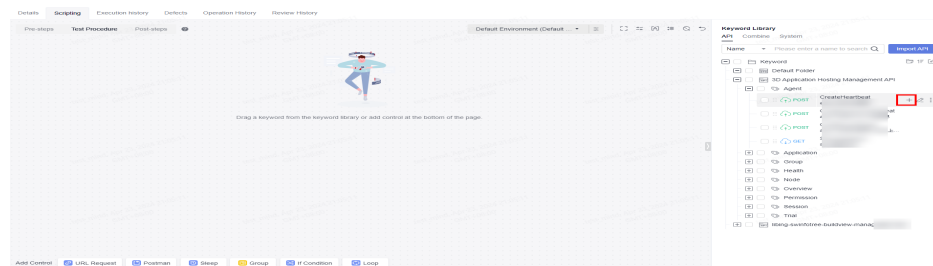
Step 1 After the operations described in [Creating an API Automation Test Case](#) are complete, choose **Testing Case > Auto API Test** and click the name of the test case to be edited.

Step 2 Choose **Scripting > URL Request** to generate a test step.



If the Swagger description file of the tested API is available, you can import it to generate a script template, based on which you can orchestrate test cases. For details, see [API Keywords](#).

Select a script template and drag and drop the script template card or click **+** on the card to add the script to the **Test Procedure** tab page.



Step 3 Edit the URL request as required by referring to [Setting an API Request](#), [Setting a Test Checkpoint](#), and [Setting Response Extraction](#). Enter a domain name or IP address as the environment address in the request. If you import a Swagger or Postman, the address will be automatically generated to the request.

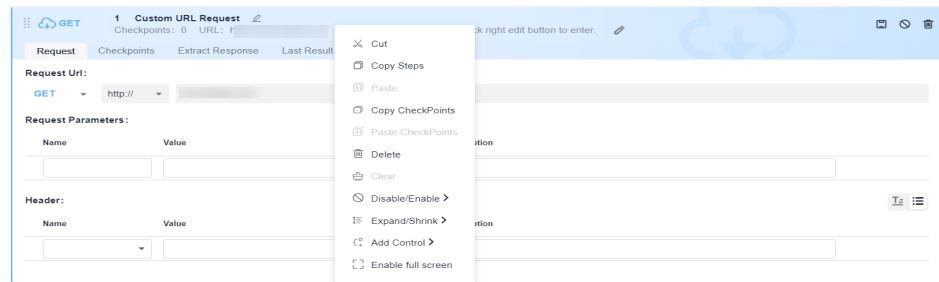
Step 4 (Optional) Repeat [Step 2](#) to [Step 3](#) to add pre-steps and post-steps.

Step 5 After the editing is complete, click **Save** in the upper right corner of the page to save the script.

----End

NOTE

- API automation test cases support the use of built-in functions in the request URL path, request header, request body, checkpoint parameters, and URL response. For details about built-in functions, see [Built-in Functions](#).
- When editing API automation test cases, you can right-click the title area of a test step to cut, copy, paste, and delete a test step. If there are multiple test steps, you can use the "Ctrl+left click" combination to select multiple test steps and right-click them in batches. After a test step is cut or copied, the test step can be pasted on the current tab page, across tab pages, or across test cases.



- Note that the right-click response in the title area is the operation on the test step. Therefore, when you edit the text box in the title area of the test step, the shortcut menu of the browser is overwritten by the shortcut menu of the system, and the shortcut menu of the browser does not take effect. To copy and paste text in the text box of the test step title area, press **Ctrl+C** and **Ctrl+V**.

5.4.3 Keyword Library

Background


Keyword-driven testing is a test automation technique that creates automated test cases by providing a set of "build blocks" called keywords. Keyword-driven testing can be used at different test levels, such as component testing and system testing. Its advantages lie in usability, understandability, maintainability, reuse of test information, support for test automation, saving potential costs, and promoting progress.

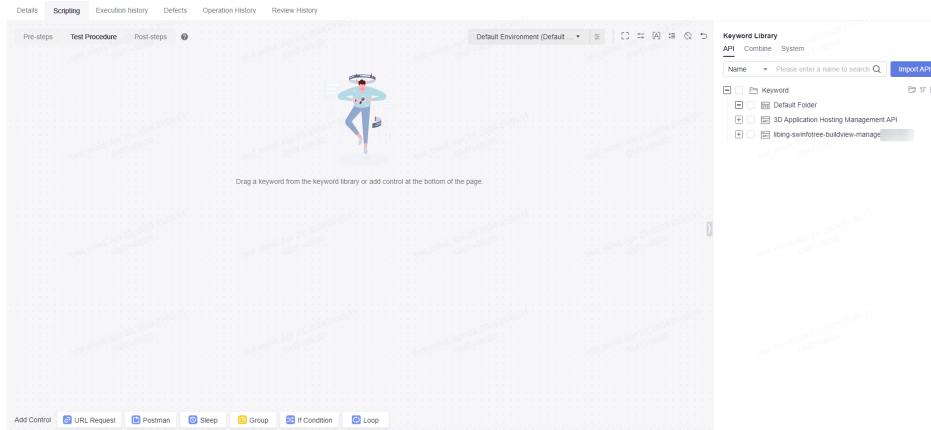
When designing test cases, you may often use the same preparations or test logic. If these steps are written in each test case, the workload is heavy and the maintenance is difficult. Test keywords can help reuse these test steps.

Keyword Library manages API keywords, system keywords, and combined keywords in a unified manner to build one-stop keyword management capabilities and ensure consistent user experience during test case scripting.

- API keywords define the request of a single API, and can be generated by importing a Swagger file or saving a user-defined URL request.
- Combined keywords encapsulate multiple test steps as common test logic. This test logic can be reused when the combined keywords are invoked by other test cases.
- System keywords cover authentication, protocols, middleware, and database, for various scenarios such as identity authentication, complex protocols, data processing, data preconfiguration, data verification, and API integration.

Procedure

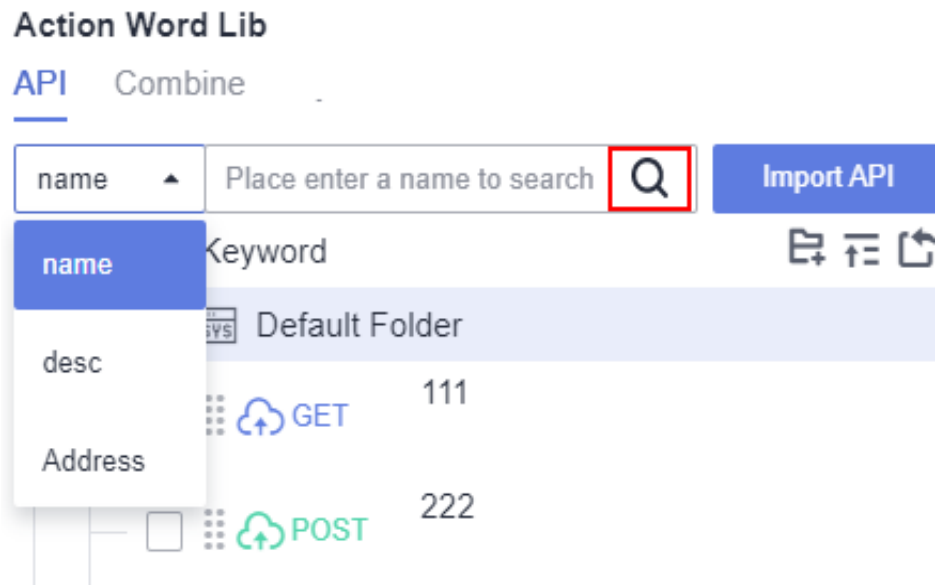
- Step 1** After the operations described in [Creating an API Automation Test Case](#) are complete, choose **Testing Case > Auto API Test** and click the name of the test case to be edited.
- Step 2** Click the **Scripting** tab. **Keyword Library** is displayed on the right of the page. (If it is not displayed, click )



- The Swagger import keywords are placed on the **API** tab page. For details, see [API Keywords](#).
- Keyword test cases and combined keywords are placed on the **Combine** tab page. You can create combined keywords. For details, see [Combined Keywords](#).
- Practical keyword types such as authentication, database operation, middleware, and protocol are placed on the **System** tab page. For details, see [API automation keywords](#).

----End

Click the drop-down list on the **API** tab page and search for keywords by **Name**, **Desc**, or **Address**.



5.4.4 API Keywords

Background

API keywords define the request of a single API, and can be generated by importing a Swagger file or saving a user-defined URL request.

Swagger is a tool for defining, developing, and debugging APIs such as RESTful. Swagger can be used to define API attributes in a standardized manner, facilitating interconnection and interworking. API automation allows you to import API description files in Swagger 2.0 and 3.0 format, parse API definition descriptions, and generate a script template. You only need to enter API parameters based on the template to create API automation test cases.

You can import a Swagger API description file to generate a script template. A script template corresponds to an API definition in the Swagger file. Test cases can be orchestrated in a visualized manner based on the script template.

The mapping between the script template and the fields in the Swagger API description is as follows.

- Swagger 2.0 format is as follows.

Script Template Attribute	Swagger API Definition Attribute
Name	By default, operationId is used. You can set it to summary .
Path	schema + :// + basePath + path.
Request parameter hostURL	host

Script Template Attribute	Swagger API Definition Attribute
Other request parameters	parameters

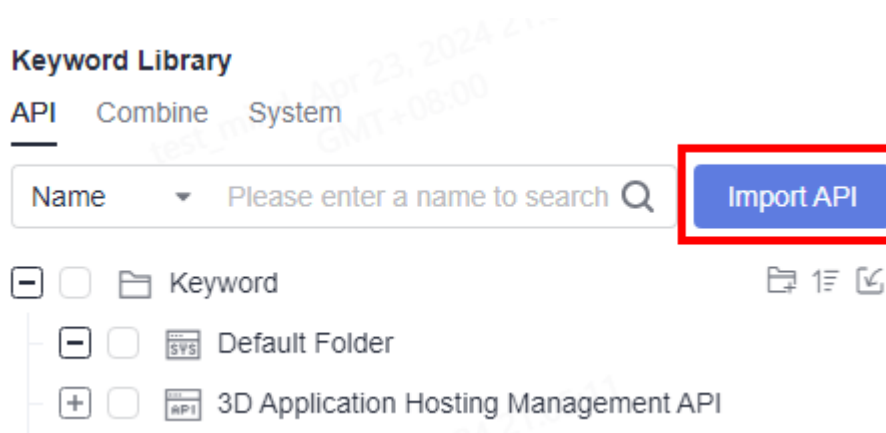
- Swagger 3.0 format is as follows.

Script Template Attribute	Swagger API Definition Attribute
Name	By default, operationId is used. You can set it to summary .
Path	url + path
Request parameter hostURL	servers: - URL: https://{hostURL}/variable variables: hostURL: default: test.demo.com
Other request parameters	parameters, requestBody, and responses


Importing a Swagger File to Generate a Test Script

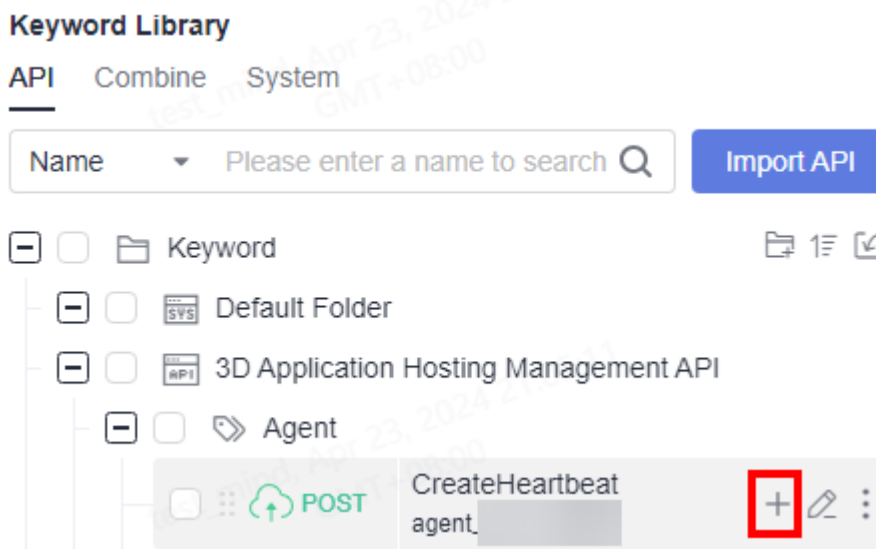
Step 1 After the operations described in [Creating an API Automation Test Case](#) are complete, click the test case name, and click the **Scripting** tab.

Step 2 On the **Keyword Library** page on the right, click **Import API**.




Step 3 Click **Click to add file or drag upload**, select the configured Swagger API file, and click **ok**.

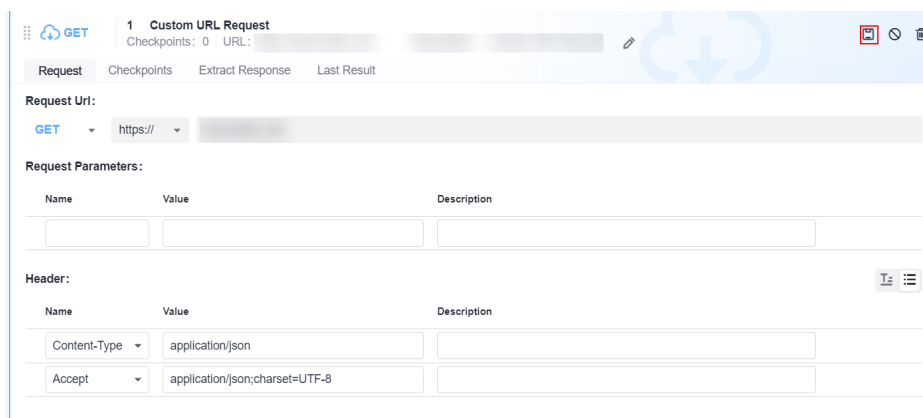
- Step 4** After the file is imported successfully, the system automatically parses and generates a script template. The script template contains the basic description of the API. You can click  or drag and drop an API on the **Keyword Library** page to add it to the test step. You only need to enter the API parameters based on the template to perform the test.



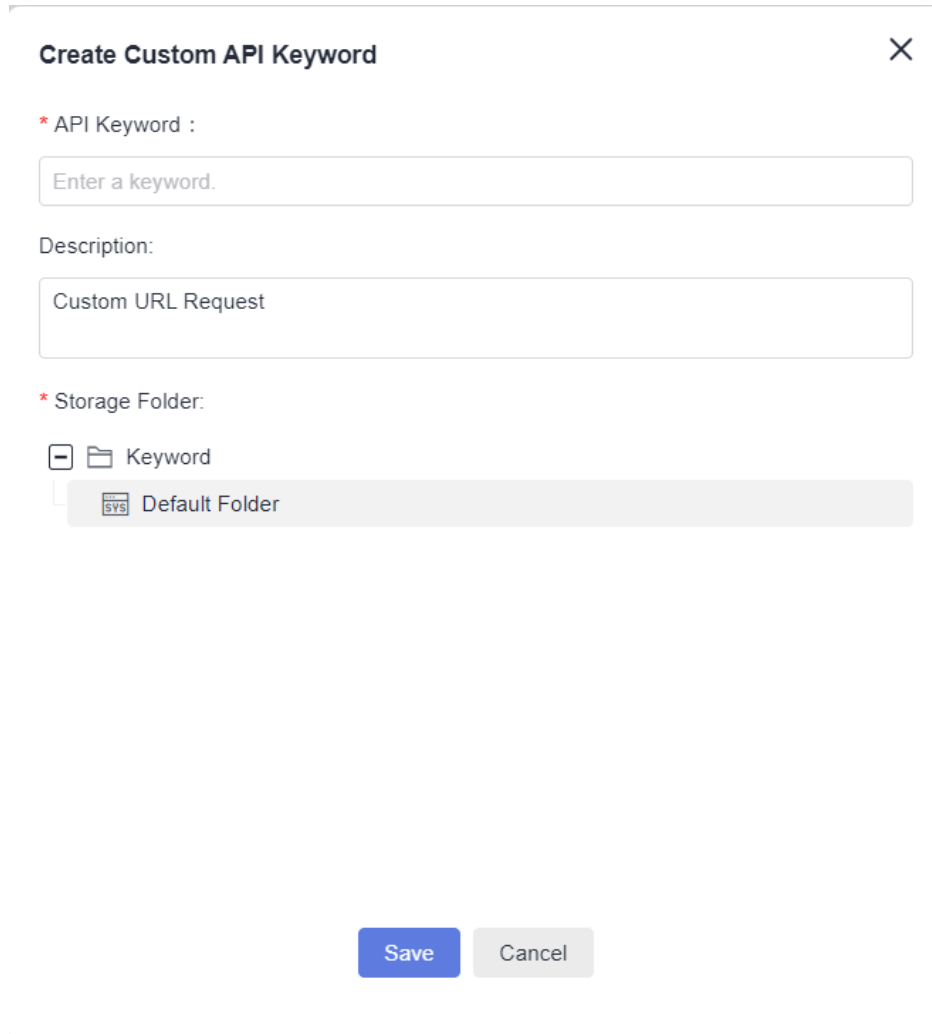
----End

Saving a Customized API Keyword

- Step 1** After the operations described in [Creating an API Automation Test Case](#) are complete, click the API automation test case name and click the **Scripting** tab.
- Step 2** After the operations described in [Writing an API Automation Script](#) are complete, select the test step to be set as a keyword (only for custom URL request steps), and click  at the upper right corner of the test step page to save the API keyword.



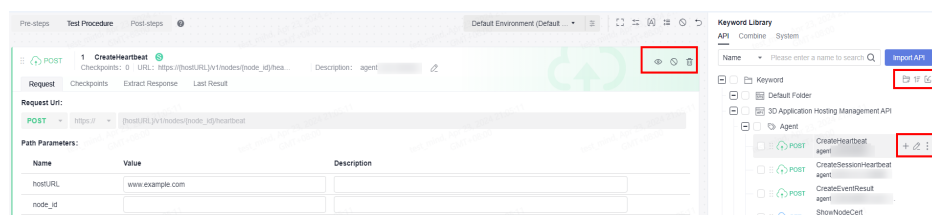
- Step 3** On the page that is displayed, set **API Keyword** and **Description**, and select the directory for storing the keyword. By default, keywords are stored in **Default Folder** under **API > Keyword**.








Step 4 Click **Save**.

----End

For an added keyword, you can hover the cursor over the keyword area and perform the following operations:



- Click a keyword name to view the details about the keyword.
- Click  on the right of the **Keyword** to create a folder. Save the keyword set in [Step 3](#) to a custom folder.
- Hover the cursor over the left area of a keyword name to adjust the keyword sequence.
- Click  or hover the cursor over the keyword and drag it to the blank page of the test step to add a test step as a keyword.


- Click any area of the test keyword to edit the keyword pair application case details.
- Click  to view the information about the key word.
- Click  to disable a keyword, and click it again to enable the keyword.
- Click  to delete the keyword from the test procedure.

5.4.5 Combined Keywords

Background


When designing test cases, you may often use the same preparations or test logic. If these steps are written in each test case, the workload is heavy and the maintenance is difficult. Combined keywords are used to encapsulate common test logic for multiple steps and can be invoked by test cases to implement logic reuse.

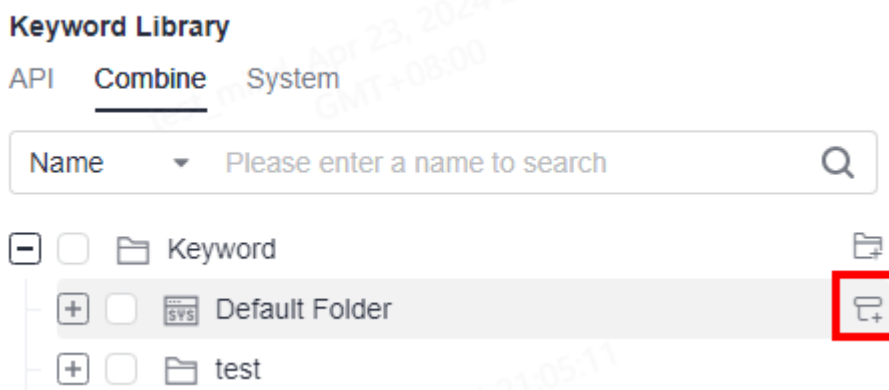
Scenario 1

- Step 1** Click  in the upper right corner of the **Scripting** tab page.
- Step 2** Enter the **Name** and **Description**, select the directory, and set request parameters as required. Select the added **URL Request** and click **Save**.
- Step 3** In the **Keyword Library** > **Combine** tab page, view the combined keywords that have been saved.

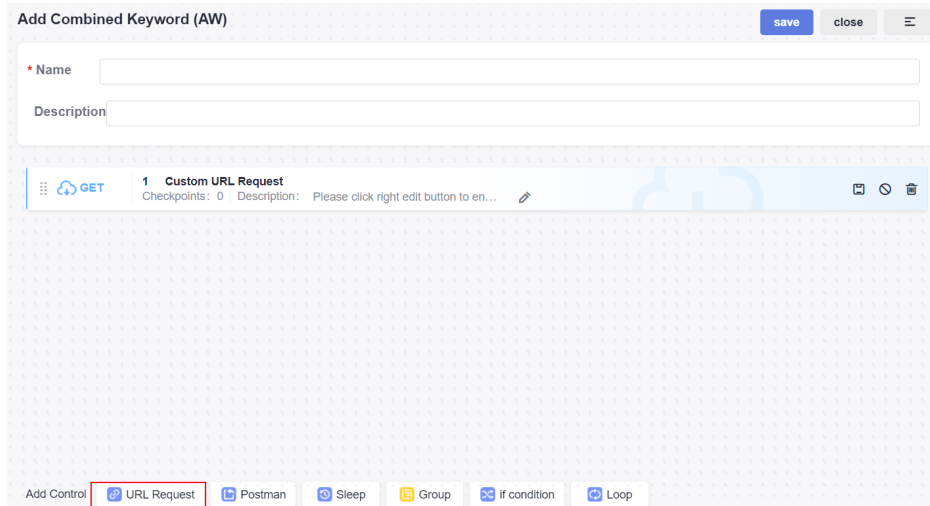
----End


Scenario 2

- Step 1** On the **Keyword Library** > **Combine** page, click  next to the folder to be saved.



- Step 2** Set **Name** and **Description**.
- Step 3** You can add user-defined URL requests to the combined keywords.



Click the **API** tab, select the folder where the keyword to be added is located, and click  on the right of the keyword to be added or hover the cursor over the keyword area and drag the keyword to the test step area.

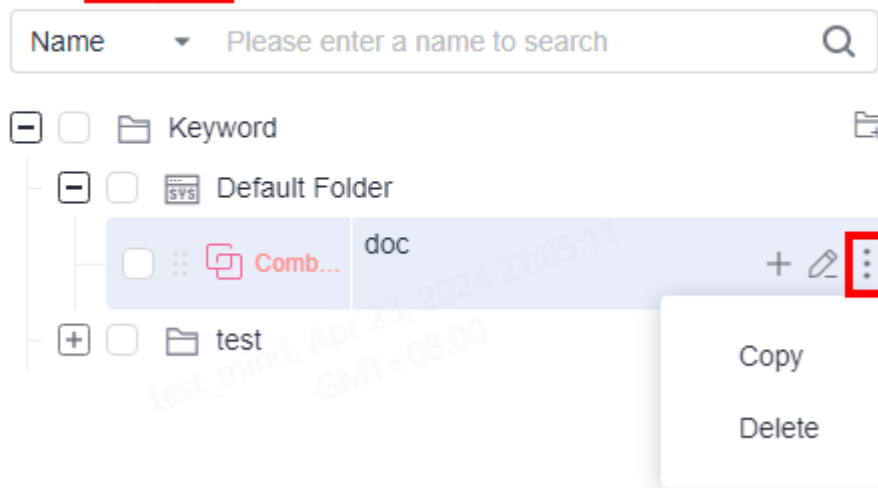
Step 4 Click **Save**.



----End


For an added combined keyword, you can hover the cursor over the keyword area and perform the following operations:

Keyword Library

API **Combine** System



- Click  on the right of the **Keyword** to create a folder. You can create combined keywords in a custom folder by referring to [Step 1](#).
- Click  or hover the cursor over **Combine** to drag the combined keyword to the blank page of the test step to add it to the script.
- Hover the cursor over **Combine** to adjust the sequence of combined keywords.

- Click  to edit the keyword information.
- Click **Mark As**. You can set the status of **Normal**, **New**, or **Update** for the combined keyword.
- Click **Copy** to copy a combined keyword test case in the folder.
- Click **Delete** to delete a combined keyword.

5.4.6 System Keywords

5.4.6.1 Introduction

Frequent operations of API automation tests are encapsulated into keywords for more efficient API test case writing. For details about the keywords, see [Table 5-1](#).

Table 5-1 System keywords

Category	Keyword Set
Authentication	<ul style="list-style-type: none">• Authentication: GetIAMToken
Database operation	<ul style="list-style-type: none">• Database: MySQLQuery• Database: MySQLUpdate• Database: MySQLInsert• Database: MySQLDelete• Database: OpenGaussQuery• Database: OpenGaussUpdate• Database: OpenGaussInsert• Database: OpenGaussDelete• Database: PostgreSQLQuery• Database: PostgreSQLUpdate• Database: PostgreSQLInsert• Database: PostgreSQLDelete• Database: MongoDBQuery• Database: MongoDBInsert• Database: MongoDBUpdate• Database: MongoDBDelete
Middleware	<ul style="list-style-type: none">• Middleware: RedisGet• Middleware: RedisSet• Middleware: OBSWrite• Middleware: OBSDelete• Middleware: OBSQuery• Middleware: KafkaProducer• Middleware: KafkaConsumer

Category	Keyword Set
Protocol	<ul style="list-style-type: none">• Protocol: TCP• Protocol: UDP• Protocol: WSConnect• Protocol: WSRequest• Protocol: WSWriteOnly• Protocol: WSReadOnly• Protocol: WSDisConnect• Protocol: DubboClient

5.4.6.2 Authentication: GetIAMToken

Overview

This system keyword is used for obtaining an IAM user token through username or password authentication. A token is an access credential issued to an IAM user. It carries their identity and permissions. When calling APIs of IAM and other cloud services, you can use this system keyword to obtain an IAM user token.

Parameter Description

Parameter	Mandatory	Type	Default Value	Description
IAM Token URL	Yes	String	https://iam.myhuaweicloud.com/v3/auth/tokens	IAM endpoint. This API can be called using both global and regional endpoints.
Domain Name	Yes	String	<Empty>	IAM account or tenant name. When a Huawei account is used for login, the tenant (account) name is the same as the username. For details about how to obtain an account name, see Obtaining Account, IAM User, Group, Project, Region, and Agency Information .

Parameter	Mandatory	Type	Default Value	Description
User Name	Yes	String	<Empty>	IAM username. For details about how to obtain a username, see Obtaining Account, IAM User, Group, Project, Region, and Agency Information .
Password	Yes	String	<Empty>	IAM user login password. (The login password is personal information and must be defined as sensitive in the environment parameters.)
Region ID	No	String	<Empty>	Region ID, for example, cn-north-1 . For details about how to obtain a region ID, see Obtaining Account, IAM User, Group, Project, Region, and Agency Information .

Default Checkpoint

Name	Expected Value
Result	Success

Default Response Extraction

Name	Extraction Variable	Description
IAM_TOKEN	X-Subject-Token	User token character

Response

- **Status: success**

Parameter	Type	Description
Body	Response body of the IAM API	Response body of the IAM API

- **Example response**

```
{  
  "token": {
```

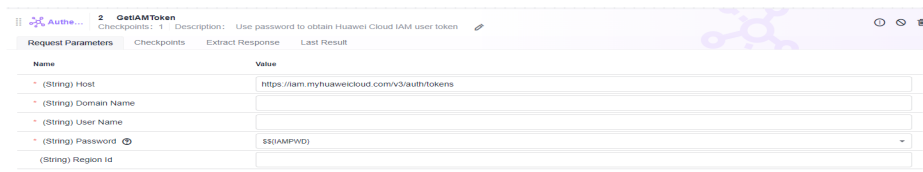
```
"catalog": [],
"expires_at": "2020-01-04T09:05:22.701000Z",
"issued_at": "2020-01-03T09:05:22.701000Z",
"methods": [
  "password"
],
"project": {
  "domain": {
    "id": "d78cbac186b744899480f25bd022f...",
    "name": "IAMDomain"
  },
  "id": "aa2d97d7e62c4b7da3ffdfc11551f...",
  "name": "cn-north-1"
},
"roles": [
  {
    "id": "0",
    "name": "te_admin"
  },
  {
    "id": "0",
    "name": "op_gated_OBS_file_protocol"
  },
  {
    "id": "0",
    "name": "op_gated_Video_Campus"
  }
],
"user": {
  "domain": {
    "id": "d78cbac186b744899480f25bd022f...",
    "name": "IAMDomain"
  },
  "id": "7116d09f88fa41908676fdd4b039e...",
  "name": "IAMUser",
  "password_expires_at": ""
}
},
"X-Subject-Token": "MIlatAYJKoZIhvcNAQcCollapTCCGqECAQExDTALB..."
}
```


Example

- **Obtaining an IAM user token**

 **NOTE**

The **Password** field needs to be configured as a sensitive parameter in the variable. Select a value from the drop-down list box.

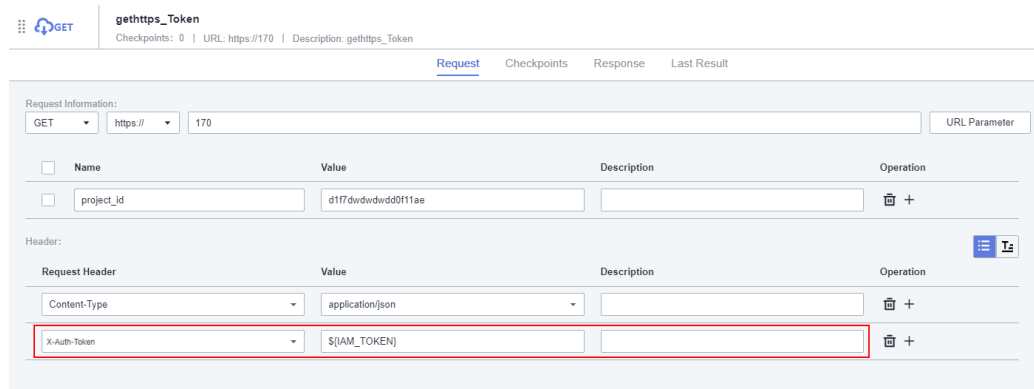


Name	Value
(String) Host	https://iam.myhuaweicloud.com/v3/auth/tokens
(String) Domain Name	
(String) User Name	
(String) Password 	\$\${AMPWD}
(String) Region Id	

- **Referencing a token in an API**

 **NOTE**

IAM_TOKEN is the reserved default response extraction and can be directly referenced in the request.



5.4.6.3 Database: MySQLQuery

This system keyword is used for **select** operations on MySQL database. A maximum of 100 result records can be queried in the system.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, you need to bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Connecting to an RDS for MySQL DB Instance Through a Public Network .
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL query statement

MySQLQuery Response

Status: success

Parameter	Type	Description
[Array elements]	Array of row objects	Structure returned by the SQL query result list

Parameter Description

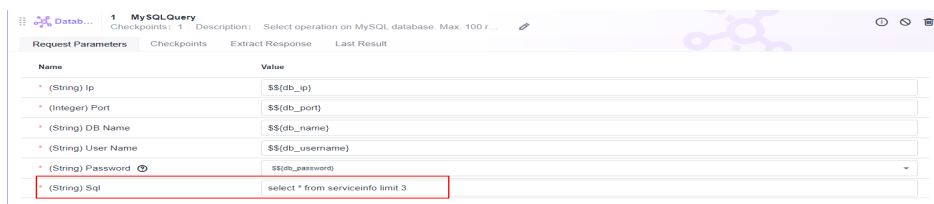
Parameter	Type	Description
field1	String	Database field 1
field2	Integer	Database field 2
...	String	Database field <i>n</i>

MySQLQuery Response Example

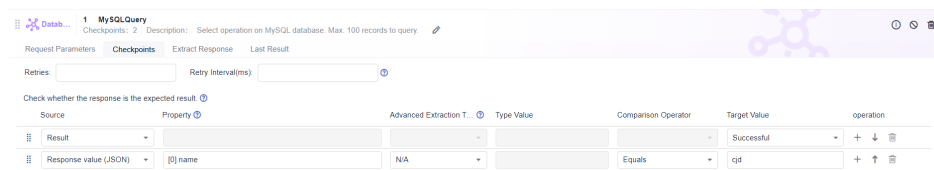
```
[
  {
    "name": "XXX",
    "id": "efdb403066474ab08836b9eeaaa23bca",
    "age": 18
  },
  {
    "name": "YYY",
    "id": "g582b0d966611486f918bedb9c711b14",
    "age": 20
  }
]
```

MySQLQuery Usage Example

- Query the database table. A user data list is returned based on the system keyword. You can determine the return based on the service.



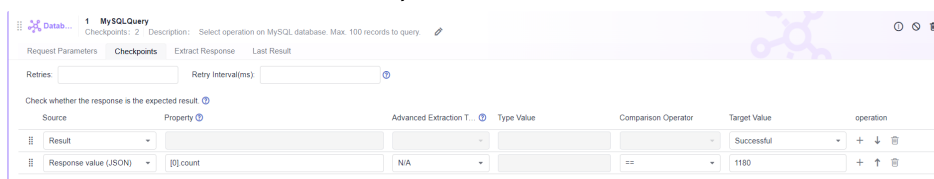
Determine the result in the returned list.



- Query and collect user data. A user data list is returned.



Determine the result in the response extraction.



5.4.6.4 Database: MySQLUpdate

This system keyword is used for modification operations on MySQL database. It is applicable to statements, such as **INSERT**, **UPDATE**, and **DELETE**, which have no returns.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, you need to bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Connecting to an RDS for MySQL DB Instance Through a Public Network .
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as UPDATE , which has no returns

MySQLUpdate Response

Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

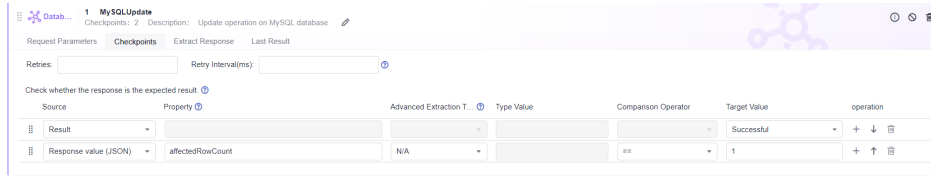
MySQLUpdate Usage Example



The screenshot shows a configuration window for a MySQLUpdate operation. The 'Request Parameters' tab is active, displaying a table with the following parameters:

Name	Value
(String) Ip	\$\$db_ip
(Integer) Port	\$\$db_port
(String) DB Name	\$\$db_name
(String) User Name	\$\$db_username
(String) Password	\$\$db_password
(String) Sql	UPDATE 'atmock','serviceinfo' SET 'name'='cjd2','createTime'='2020-05-04 21:00:27','baseId'='1.0','tag'='1.0','port'=NULL,...

Determine the number of affected rows.



MySQLUpdate Response Example

```
{  
  "affected_row_count": 3  
}
```

5.4.6.5 Database: MySQLInsert

This system keyword is used for data insertion on MySQL database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, you need to bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Connecting to an RDS for MySQL DB Instance Through a Public Network.
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)

Parameter	Mandatory	Type	Description
Sql	Yes	String	SQL statement, such as INSERT , which has no returns

MySQLInsert Response

Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

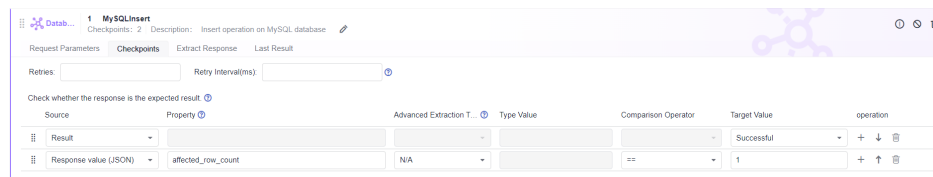
MySQLInsert Response Example

```
{
  "affected_row_count": 1
}
```

MySQLInsert Usage Example



Determine the number of affected rows.



5.4.6.6 Database: MySQLDelete

This system keyword is used for deletion operations on MySQL database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS DB instance, you need to bind an EIP to the instance and ensure that the security group rules allow access over the instance port. For details, see Connecting to an RDS for MySQL DB Instance Through a Public Network .
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as DELETE , which has no returns

MySQLDelete Response

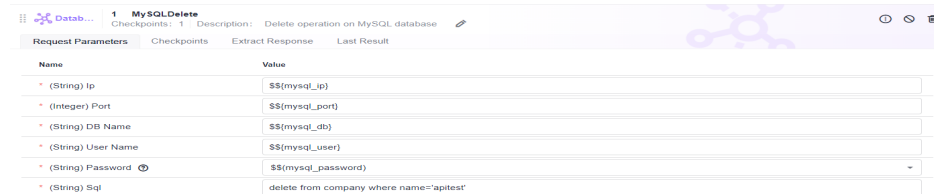
Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

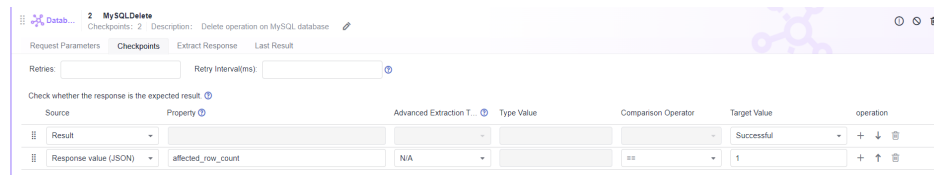
MySQLDelete Response Example

```
{
  "affected_row_count": 1
}
```

MySQLDelete Usage Example



Determine the number of affected rows.



5.4.6.7 Database: OpenGaussQuery

This system keyword is used for **select** operations on OpenGauss database. A maximum of 100 result records can be queried in the system.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address For a cloud-based GaussDB instance, you need to bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Using gsq to Connect to an Instance from a Linux Server.
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username

Parameter	Mandatory	Type	Description
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL query statement

OpenGaussQuery Response

Status: success

Parameter	Type	Description
[<i>Array elements</i>]	Array of row objects	Structure returned by the SQL query result list

Parameter Description

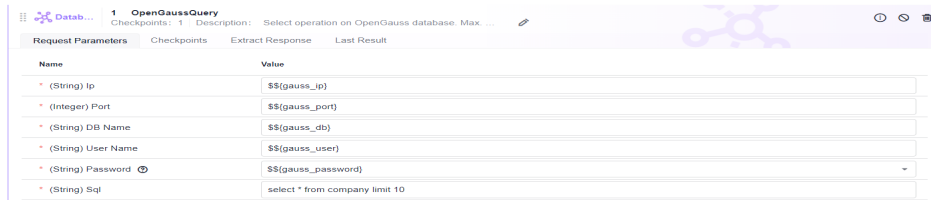
Parameter	Type	Description
field1	String	Database field 1
field2	Integer	Database field 2
...	String	Database field <i>n</i>

OpenGaussQuery Response Example

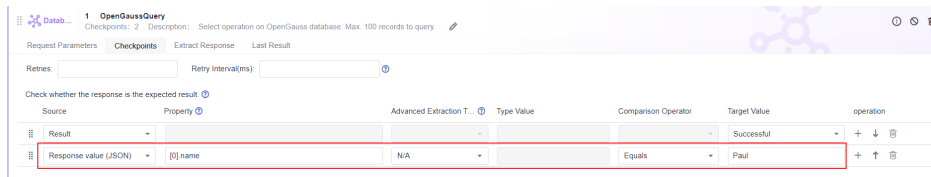
```
[
  {
    "name": "XXX",
    "id": "efdb403066474ab08836b9eeaaa23bca",
    "age": 18
  },
  {
    "name": "YYY",
    "id": "g582b0d966611486f918bedb9c711b14",
    "age": 20
  }
]
```

OpenGaussQuery Usage Example

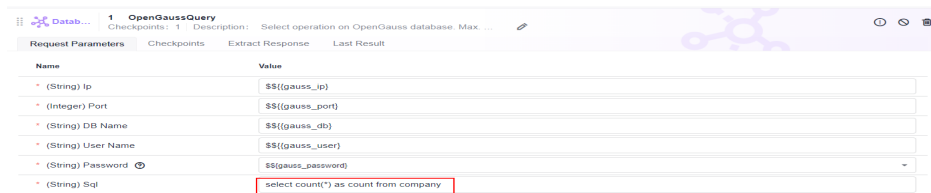
Query the database table. A user data list is returned based on the system keyword. You can determine the return based on the service.



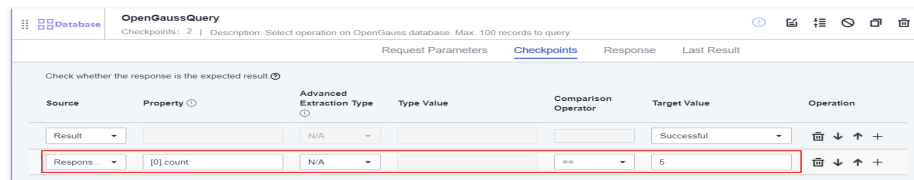
Determine the result in the returned list.



Query and collect user data. A user data list is returned.



Determine the result in the response extraction.



5.4.6.8 Database: OpenGaussUpdate

This system keyword is used for modification operations on OpenGauss database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a cloud-based GaussDB instance, you need to bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Using gsql to Connect to an Instance from a Linux Server .
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as UPDATE , which has no returns

OpenGaussUpdate Response

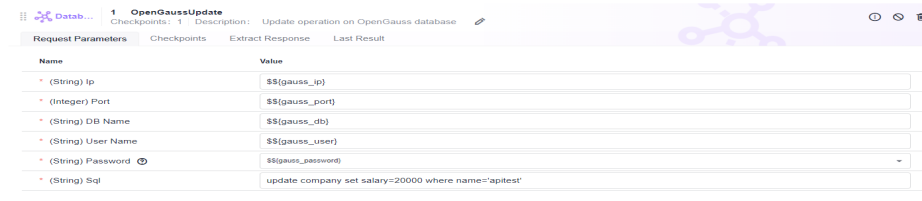
Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

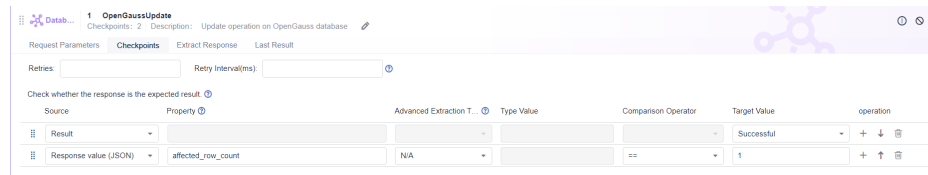
OpenGaussUpdate Response Example

```
{
  "affected_row_count": 1
}
```

OpenGaussUpdate Usage Example



Determine the number of affected rows.



5.4.6.9 Database: OpenGaussInsert

This system keyword is used for data insertion on OpenGauss database.

Parameter	Mandatory	Type	Description
ip	Yes	String	Database IP address. For a cloud-based GaussDB instance, you need to bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Using gsq to Connect to an Instance from a Linux Server.
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username

Parameter	Mandatory	Type	Description
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as INSERT , which has no returns

OpenGaussInsert Response

Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

OpenGaussInsert Response Example

```
{
  "affected_row_count": 1
}
```

OpenGaussInsert Usage Example

The screenshot shows the configuration for an OpenGaussInsert test case. The 'Request Parameters' tab is active, displaying a table with the following parameters:

Name	Value
(String) Ip	\$\$gauss_ip
(Integer) Port	\$\$gauss_port
(String) DB Name	\$\$gauss_db
(String) User Name	\$\$gauss_user
(String) Password	\$\$gauss_password
(String) Sql	INSERT INTO company(id,name,age,address,salary,join_date)VALUES(6,'apitest',32,'california',10000,'2001-07-13');

Determine the number of affected rows.

The screenshot shows the configuration for an OpenGaussInsert test case, specifically the 'Checkpoints' tab. The 'Response value (JSON)' property is selected, and the 'affected_row_count' is being checked against the value '1' using the '==' comparison operator.

Source	Property	Advanced Extraction T.	Type Value	Comparison Operator	Target Value	operation
Result	affected_row_count	N/A		==	1	

5.4.6.10 Database: OpenGaussDelete

This system keyword is used for deletion operations on OpenGauss database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a cloud-based GaussDB instance, you need to bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Using gsql to Connect to an Instance from a Linux Server .
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as DELETE , which has no returns

OpenGaussDelete Response

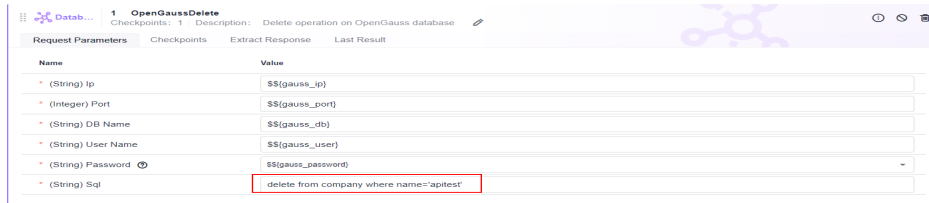
Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

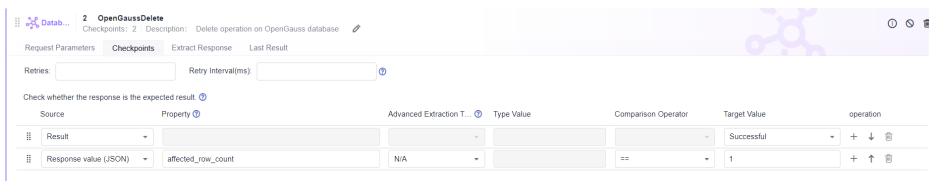
OpenGaussDelete Response Example

```
{
  "affected_row_count": 1
}
```

OpenGaussDelete Usage Example



Determine the number of affected rows.



5.4.6.11 Database: PostgreSQLQuery

This system keyword is used for **select** operations on PostgreSQL database. A maximum of 100 result records can be queried in the system.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Connecting to an RDS for PostgreSQL Instance.
Port	Yes	String	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username

Parameter	Mandatory	Type	Description
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL query statement

PostgreSQLQuery Response

Status: success

Parameter	Type	Description
[<i>Array elements</i>]	Array of row objects	Structure returned by the SQL query result list

Parameter Description

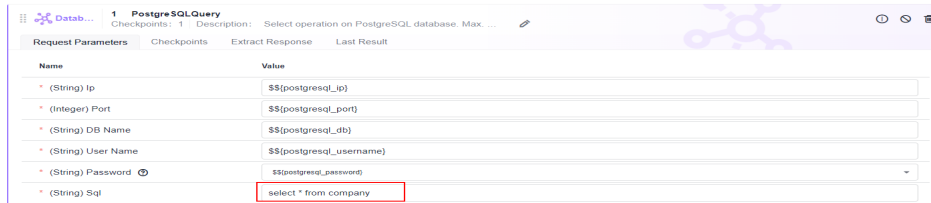
Parameter	Type	Description
field1	String	Database field 1
field2	Integer	Database field 2
...	String	Database field <i>n</i>

PostgreSQLQuery Response Example

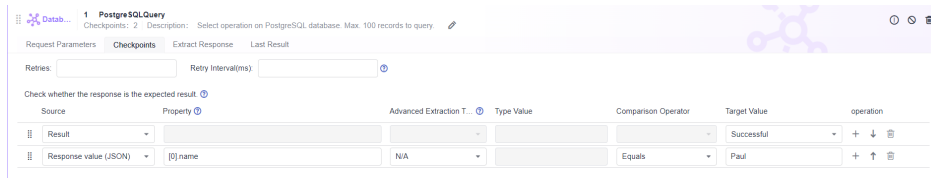
```
[
  {
    "name": "XXX",
    "id": "efdb403066474ab08836b9eeaaa23bca",
    "age": 18
  },
  {
    "name": "YYY",
    "id": "g582b0d966611486f918bedb9c711b14",
    "age": 20
  }
]
```

PostgreSQLQuery Usage Example

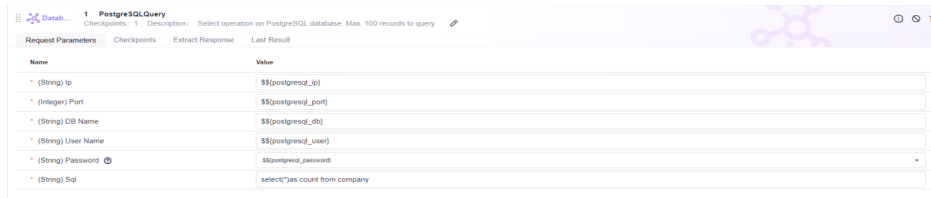
Query the database table. A user data list is returned based on the system keyword. You can determine the return based on the service.



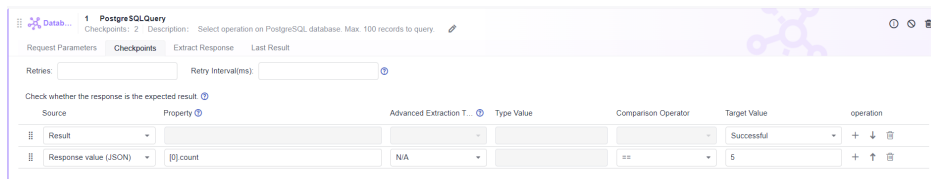
Determine the result in the returned list.



Query and collect user data. A user data list is returned.



Determine the result in the response extraction.



5.4.6.12 Database: PostgreSQLUpdate

This system keyword is used for modification operations on PostgreSQL database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Connecting to an RDS for PostgreSQL Instance.

Parameter	Mandatory	Type	Description
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as UPDATE , which has no returns

PostgreSQLUpdate Response

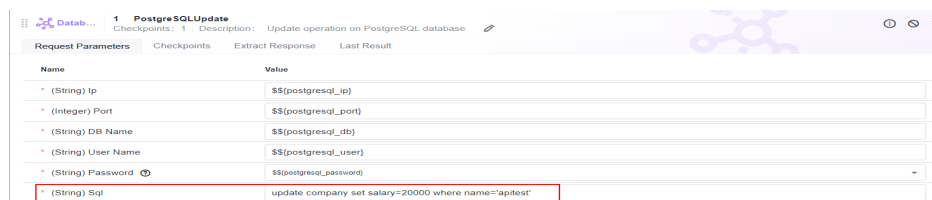
Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

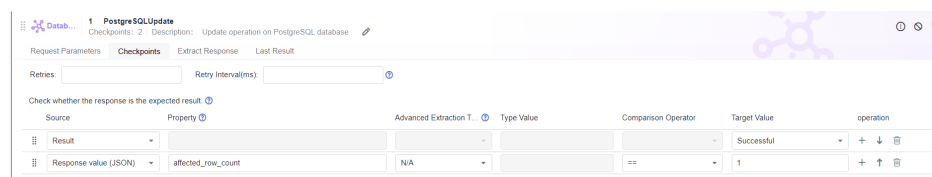
PostgreSQLUpdate Response Example

```
{
  "affected_row_count": 1
}
```

PostgreSQLUpdate Usage Example



Determine the number of affected rows.



5.4.6.13 Database: PostgreSQLInsert

This system keyword is used for data insertion on PostgreSQL database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Connecting to an RDS for PostgreSQL Instance .
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as INSERT , which has no returns

PostgreSQLInsert Response

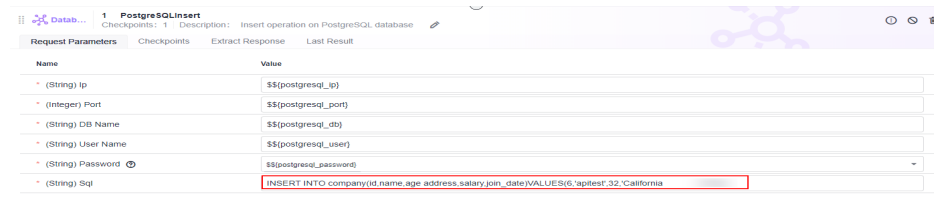
Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

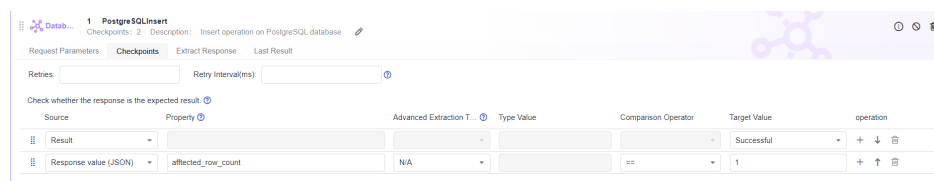
PostgreSQLInsert Response Example

```
{
  "affected_row_count": 1
}
```

PostgreSQLInsert Usage Example



Determine the number of affected rows.



5.4.6.14 Database: PostgreSQLDelete

This system keyword is used for deletion operations on PostgreSQL database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see Connecting to an RDS for PostgreSQL Instance.
Port	Yes	Integer	Database port
DB Name	Yes	String	Database instance name
User Name	Yes	String	Username

Parameter	Mandatory	Type	Description
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Sql	Yes	String	SQL statement, such as DELETE , which has no returns

PostgreSQLDelete Response

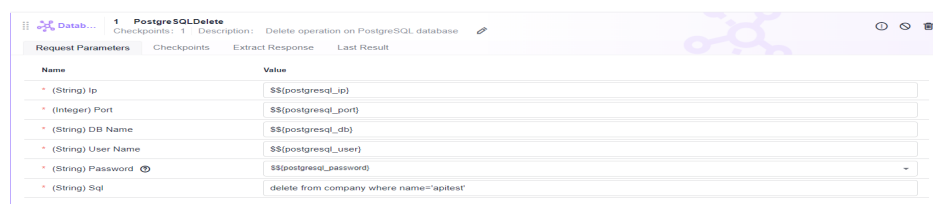
Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

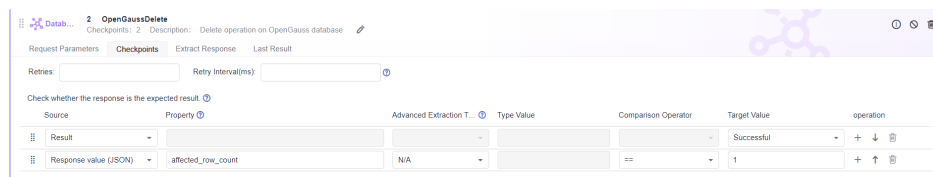
PostgreSQLDelete Response Example

```
{
  "affected_row_count": 1
}
```

PostgreSQLDelete Usage Example



Determine the number of affected rows.



5.4.6.15 Database: MongoDBQuery

This system keyword is used for query operations on the MongoDB database. A maximum of 100 records can be queried in the system.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address
Port	Yes	Integer	Database port
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
DB Name	Yes	String	Database instance name
Collection	Yes	String	Collection name
Query	No	String	Query conditions (data in BSON format). By default, this parameter is left blank to query all data in the collection. A maximum of 100 records can be queried in the system.
Limit	No	Integer	<ul style="list-style-type: none">Maximum number of records in the query result. By default, this parameter is left blank to query all data in the collection. A maximum of 100 records can be queried in the system.If the value is a number out the range of 0 to 100, a maximum of 100 records can be queried in the system.

MongoDBQuery Response

Status: success

Parameter	Type	Description
[<i>Array elements</i>]	Array of row objects	Structure returned by the query result list

Parameter Description

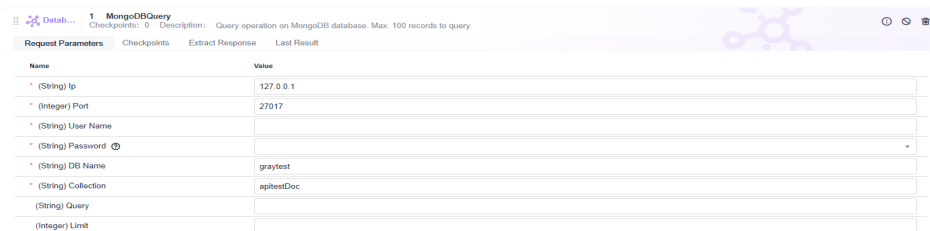
Parameter	Type	Description
field1	String	Database field 1
field2	Integer	Database field 2
...	String	Database field <i>n</i>

MongoDBQuery Response Example

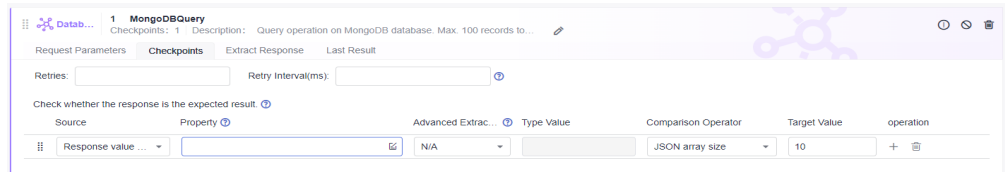
```
[ {
  "_id" : {
    "$oid" : "62465c42907c00003d0076fe"
  },
  "title" : "MongoDB Tutorial",
  "description" : "MongoDB is a NoSQL database.",
  "by" : "test",
  "url" : "",
  "tags" : [ "mongodb", "database", "NoSQL" ],
  "likes" : 100.0
}, {
  "_id" : {
    "$oid" : "62465ce4907c00003d0076ff"
  },
  "title" : "PHP Tutorial",
  "description" : "PHP is a powerful server-side scripting language for creating dynamic interactive sites.",
  "by" : "test",
  "url" : "",
  "tags" : [ "php" ],
  "likes" : 200.0
}, {
  "_id" : {
    "$oid" : "62465ce8907c00003d007700"
  },
  "title" : "Java Tutorial",
  "description" : "Java is a high-level programming language launched by Sun Microsystems in May 1995.",
  "by" : "test",
  "url" : "",
  "tags" : [ "java" ],
  "likes" : 150.0
} ]
```

MongoDBQuery Usage Example

- Query the number of documents in the database collection. The system returns the document data list based on the system keyword. You can determine the returned result based on the service.



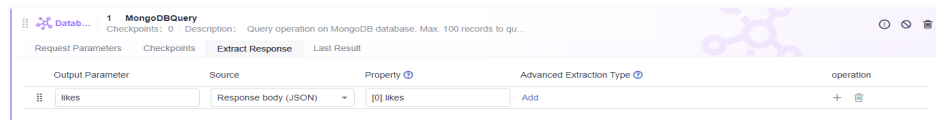
You can determine the result based on the returned list. For example, the number of documents in the collection is 10.



- Query user data and extract data. The queried data list is returned.



Extract or determine the result from response information.



5.4.6.16 Database: MongoDBInsert

This system keyword is used to insert documents into collections in the MongoDB database.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address
Port	Yes	Integer	Database port
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
DB Name	Yes	String	Database instance name
Collection	Yes	String	Collection name
Bson	Yes	String	Inserted data (in BSON format)

MongoDBInsert Response

Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by document insertion

MongoDBInsert Response Example

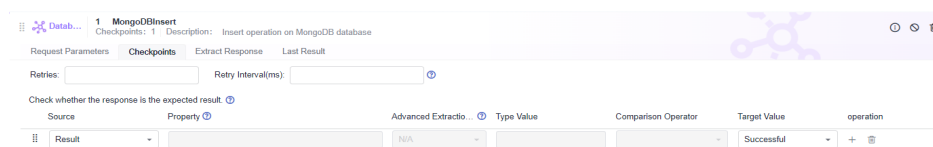
```
{
  "affected_row_count": 1
}
```

MongoDBInsert Usage Example

Insert data into a collection based on the input test parameter. The system keyword returns the number of inserted records.



Check whether the result is successful through the test checkpoint.



5.4.6.17 Database: MongoDBUpdate

This system keyword is used to update documents in a collection based on input parameters.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address
Port	Yes	Integer	Database port
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
DB Name	Yes	String	Database instance name
Collection	Yes	String	Collection name

Parameter	Mandatory	Type	Description
Query	Yes	String	Updated query conditions (in BSON format)
Update	Yes	String	Document data to be updated (in BSON format)
Multi	No	Boolean	Whether to update all records. false (default): Update only the first record that meets the conditions. true : Update all records that meet the conditions.

MongoDBUpdate Response

Status: success

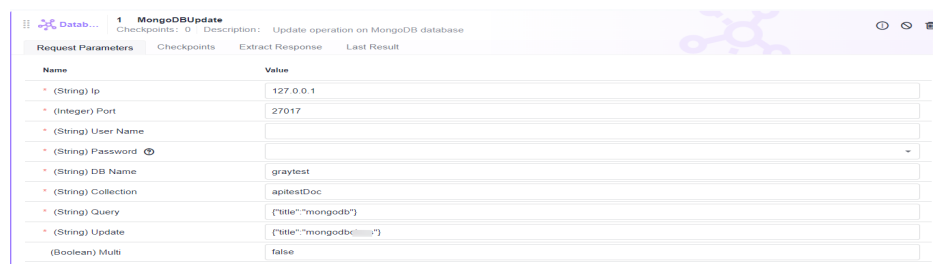
Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by document update

MongoDBUpdate Response Example

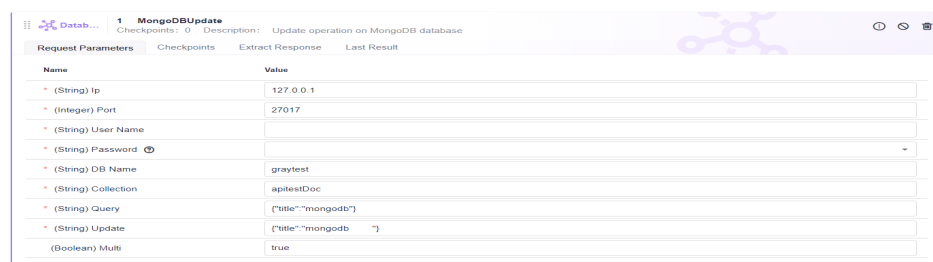
```
{  
  "affected_row_count": 1  
}
```

MongoDBUpdate Usage Example

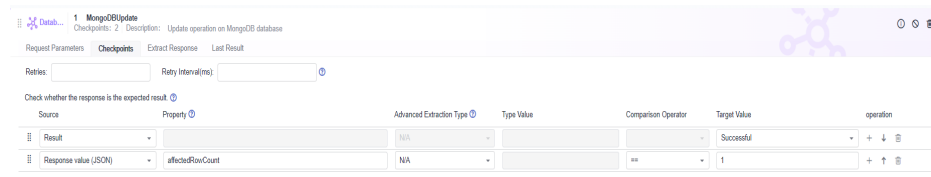
Update documents in the collection based on the entered query data and update data. The system keyword returns the number of updated records.



Update all matched documents when the **multi** parameter is set to **true**.



Check whether the result is successful and whether the number of updated records is expected.



5.4.6.18 Database: MongoDBDelete

This system keyword is used to delete documents from a collection based on input parameters.

Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address
Port	Yes	Integer	Database port
User Name	Yes	String	Username
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
DB Name	Yes	String	Database instance name
Collection	Yes	String	Collection name
Query	Yes	String	Condition (in BSON format) for deletion. By default, this parameter is left blank to query all data in the collection and delete the data.
JustOne	No	Boolean	Whether to delete a single data record. false : Delete all documents that meet the conditions. true (default) or not configured: Delete only one document that meets the conditions.

MongoDBDelete Response

Status: success

Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by document deletion

MongoDBDelete Response Example

```
{
  "affected_row_count" : 1
}
```

MongoDBDelete Usage Example

Delete documents based on the entered query parameters. The system keyword returns the number of deleted records.

Name	Value
(String) Ip	127.0.0.1
(Integer) Port	27017
(String) User Name	
(String) Password	
(String) DB Name	graytest
(String) Collection	apitestDoc
(String) Query	{"title":"mongodb"}
(Boolean) JustOne	true

If the **JustOne** parameter is set to **false**, all matched documents are deleted.

Name	Value
(String) Ip	127.0.0.1
(Integer) Port	27017
(String) User Name	
(String) Password	
(String) DB Name	graytest
(String) Collection	apitestDoc
(String) Query	{"title":"mongodb"}
(Boolean) JustOne	false

Check whether the result is successful and whether the number of updated records is expected.

Source	Property	Advanced Extraction T.	Type Value	Comparison Operator	Target Value	operation
Result	affectedRowCount	N/A		==	1	

5.4.6.19 Middleware: RedisGet

This system keyword is used for Redis character string operations to obtain the value of a specified key.

Parameter	Mandatory	Type	Description
Ip	Yes	String	IP address of the Redis database
Port	Yes	Integer	Redis database port

Parameter	Mandatory	Type	Description
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Key	Yes	String	Specified key name

RedisGet Response

Status: success

Parameter	Type	Description
key	String	Value of the specified key

RedisGet Response Example

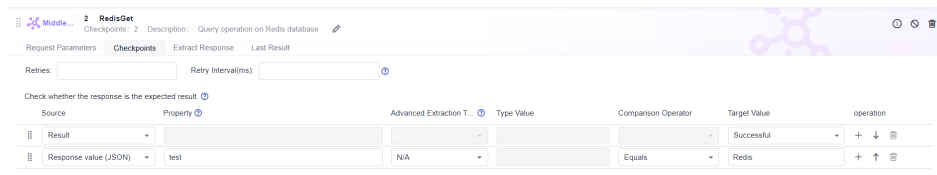
```
{
  "test" : "Redis"
}
```

RedisGet Usage Example

- Obtain the value based on the entered key value.

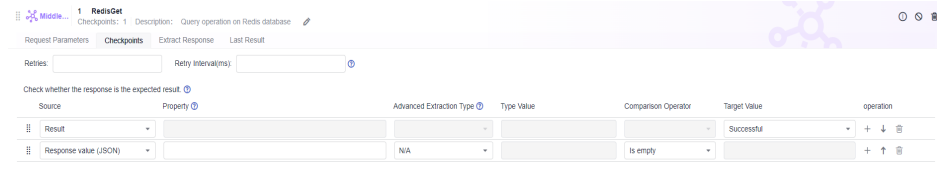


Check whether the result is successful and expected.



If the key does not exist, the returned value is empty. You can determine it at the checkpoint.





5.4.6.20 Middleware: RedisSet

This system keyword is used for Redis character string operations. You can configure the expiration time and value based on a specified key.

Parameter	Mandatory	Type	Description
Ip	Yes	String	IP address of the Redis database
Port	Yes	Integer	Redis database port
Password	Yes	String	Password (The login password is personal information and must be defined as sensitive in the environment parameters.)
Key	Yes	String	Specified key name
Value	Yes	String	Specified value
Expire	No	Long	Expiration time, in seconds. If the default value -1 is used, the password never expires. If a negative integer of the Long type is used, the password never expires.

RedisSet Response

Status: success

Parameter	Type	Description
result	String	Result returned by the configured value corresponding to the key. If the setting is successful, OK is returned. If the setting fails, an error message is returned.

RedisSet Response Example

```
{
  "result": "OK"
}
```

RedisSet Usage Example

- Set the value based on the entered key value. The default value is used, indicating that the password never expires.

The screenshot shows the 'Request Parameters' tab for a 'RedisSet' test case. The parameters are as follows:

Name	Value
(String) Ip	127.0.0.1
(Integer) Port	6379
(String) Password	
(String) Key	test:cloud
(String) Value	redis
(Long) Expire	-1

Check whether the setting is successful.

The screenshot shows the 'Checkpoints' tab for the 'RedisSet' test case. It displays a checkpoint configuration:

Source	Property	Advanced Extraction T...	Type Value	Comparison Operator	Target Value	operation
Result					Successful	+ ↓ ▢
Response value (JSON)	result	N/A		Equals	OK	+ ↑ ▢

- Set the corresponding value based on the entered key value. Set the expiration time to 600 seconds.

The screenshot shows the 'Request Parameters' tab for a 'RedisSet' test case. The parameters are as follows:

Name	Value
(String) Ip	127.0.0.1
(Integer) Port	6379
(String) Password	
(String) Key	test:cloud
(String) Value	redis
(Long) Expire	600

Check whether the setting is successful.

The screenshot shows the 'Checkpoints' tab for the 'RedisSet' test case. It displays a checkpoint configuration:

Source	Property	Advanced Extraction T...	Type Value	Comparison Operator	Target Value	operation
Result					Successful	+ ↓ ▢
Response value (JSON)	result	N/A		Equals	OK	+ ↑ ▢

5.4.6.21 Middleware: OBSWrite

This system keyword is used for OBS string operations, that is, to set the value based on a specified key.

Parameter	Mandatory	Type	Description
Access Key ID	Yes	String	OBS AK (This personal information must be defined as sensitive in the environment parameters.)
Secret Access ID	Yes	String	OBS SK (This personal information must be defined as sensitive in the environment parameters.)
Rest Endpoint	Yes	String	OBS endpoint
Bucket Name	Yes	String	OBS bucket name
Key	Yes	String	OBS file path
Value	Yes	String	OBS file content

OBSWrite Response

Status: success

Parameter	Type	Description
result	String	If the setting is successful, OK is returned.
key	String	OBS file path

Status: failed

Parameter	Type	Description
result	String	Failed
errorMessage	String	Failure cause

OBSWrite Response Example

```
{
  "result" : "ok",
  "key" : "/key"
}
```

OBSWrite Usage Example

Write the test data to the **key1/key2** path.

The screenshot shows the 'Request Parameters' tab of the OBSWrite configuration. It lists several parameters with their values:

Name	Value
(String) Access Key ID	\$\$\$AK
(String) Secret Access ID	\$\$\$SK
(String) Rest Endpoint	obs-\$\$\$region.com
(String) Bucket Name	cn-\$\$\$region
(String) Key	key1/key2
(String) Value	Test data

Check whether the setting is successful.

The screenshot shows the 'Checkpoints' tab of the OBSWrite configuration. It displays a checkpoint configuration for checking the response:

- Retries: Retry Interval(ms):
- Check whether the response is the expected result:
- Source: Response value (JSON)
- Property: result
- Advanced Extraction T.: N/A
- Type Value:
- Comparison Operator: Equals
- Target Value: ok
- operation:

5.4.6.22 Middleware: OBSDelete

This system keyword is used for deleting OBS files based on a specified key.

Parameter	Mandatory	Type	Description
Access Key ID	Yes	String	OBS AK (This personal information must be defined as sensitive in the environment parameters.)
Secret Access ID	Yes	String	OBS SK (This personal information must be defined as sensitive in the environment parameters.)
Rest Endpoint	Yes	String	OBS endpoint
Bucket Name	Yes	String	OBS bucket name
Key	Yes	String	OBS file path

OBSDelete Response

Status: success

Parameter	Type	Description
result	String	If the setting is successful, OK is returned.
key	String	OBS file path

Status: failed

Parameter	Type	Description
result	String	Failed
errorMessage	String	Failure cause

OBSDelete Response Example

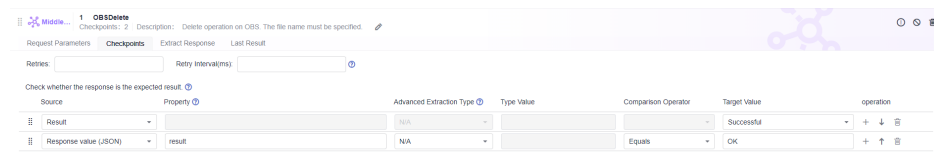
```
{
  "result": "ok",
  "key": "/key"
}
```

OBSDelete Usage Example

Delete data based on the **key1/key2** path.



Check whether the setting is successful.



5.4.6.23 Middleware: OBSQuery

This system keyword is used for querying OBS content, that is, to obtain the file content based on a specified key.

Parameter	Mandatory	Type	Description
Access Key ID	Yes	String	OBS AK (This personal information must be defined as sensitive in the environment parameters.)
Secret Access ID	Yes	String	OBS SK (This personal information must be defined as sensitive in the environment parameters.)
Rest Endpoint	Yes	String	OBS endpoint
Bucket Name	Yes	String	OBS bucket name
Key	Yes	String	OBS file path

OBSQuery Response

Status: success

The file content is directly returned, for example, "Test data".

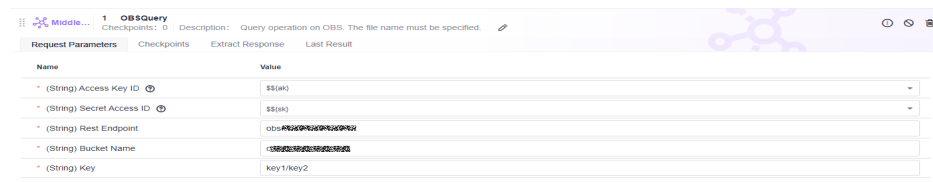
```
"Test data"
```

Status: failed

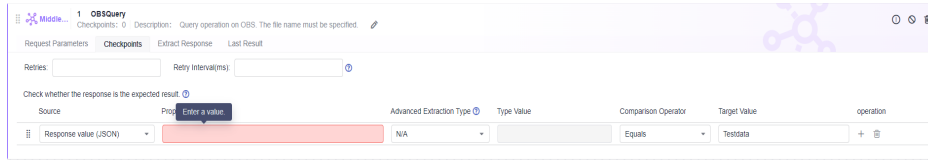
Parameter	Type	Description
result	String	Failed
errorMessage	String	Failure cause

OBSQuery Usage Example

Query data based on the **key1/key2** path.



Check whether the data is obtained successfully.



5.4.6.24 Middleware: KafkaProducer

Introduction to KafkaProducer

This system keyword can be used to test Kafka producers.

Parameter	Mandatory	Type	Default Value	Description
Broker	Yes	String	127.0.0.1:9093	IP address of a Kafka instance
Topic	Yes	String	-	Topic of a Kafka message
Message	Yes	String	-	Body of each Kafka message
SASL Username	No	String	-	Kafka SASL username
SASL Password	No	String	-	Kafka SASL password
Truststore	No	File	-	Kafka client certificate
Truststore Password	No	String	-	Password of the Kafka client certificate

KafkaProducer Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the KafkaProducer API

KafkaProducer Response Example

```
{
  "result" : "send message to kafka success.",
  "status" : "ok"
}
```

Default Checkpoint

Name	Expected Value
Result	Success

KafkaProducer Usage Example

Configure parameters to send a Kafka message.



5.4.6.25 Middleware: KafkaConsumer

Introduction to KafkaConsumer

This system keyword can be used to test Kafka consumers.

Parameter	Mandatory	Type	Default Value	Description
Broker	Yes	String	127.0.0.1:9093	IP address of a Kafka instance
Topic	Yes	String	-	Topic of a Kafka message
Consumer Group	Yes	String	-	Kafka message consumer group
SASL Username	No	String	-	Kafka SASL username

Parameter	Mandatory	Type	Default Value	Description
SASL Password	No	String	-	Kafka SASL password
Truststore	No	File	-	Kafka client certificate
Truststore Password	No	String	-	Password of the Kafka client certificate

KafkaConsumer Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the KafkaConsumer API

KafkaConsumer Response Example

```
{
  "message": [{
    "offset": 102130,
    "value": "kafka message 1"
  }, {
    "offset": 102131,
    "value": "kafka message 2"
  }]
}
```

Default Checkpoint

Name	Expected Value
Result	Success

KafkaConsumer Usage Example

Configure parameters to receive a Kafka message.

Name	Value
(String) Broker	127.0.0.1:9093
(String) Topic	apitest-topic
(String) Consumer Group	apitest-consumer-group
(String) SASL Username	test
(String) SASL Password	
(File) Truststore	--select--
(String) Truststore Password	

5.4.6.26 Protocol: TCP

TCP

This system keyword is used to test the TCP basic protocol. Ensure that the user IP address is accessible from the public network and the security group policy of the corresponding port is enabled to permit access.

Parameter	Mandatory	Type	Default Value	Description
Host	Yes	String	-	TCP service address
Port	Yes	Integer	-	TCP service port
Connect Timeout	Yes	Integer	-	TCP service connection timeout Unit: millisecond
Read Timeout	Yes	Long	-	Message reading timeout Unit: millisecond
Check End Type	Yes	Enum	CheckEndStr	Message end flag: CheckEndLength CheckEndStr
Body Type	Yes	Enum	CharSequence	Message body type: CharSequence HexadecimalCodeStream

TCP Response

Status: success

Parameter	Type	Description
Body	String	TCP API return

TCP Response Example

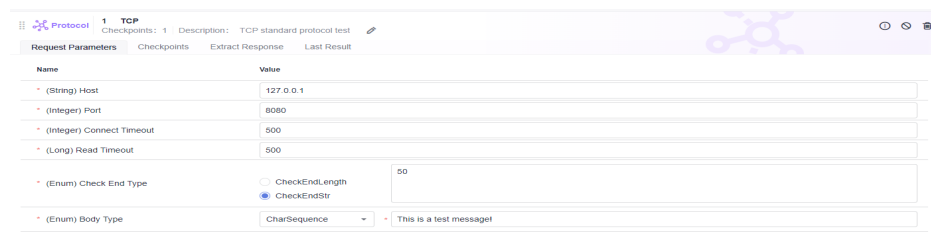
```
{
  "This is a test Message!"
}
```

Default Checkpoint

Name	Expected Value
Result	Success

TCP Usage Example

Configure parameters to access the TCP service.



5.4.6.27 Protocol: UDP

UDP

This system keyword is used to test the UDP basic protocol. Ensure that the user IP address is accessible from the public network and the security group policy of the corresponding port is enabled to permit access.

Parameter	Mandatory	Type	Default Value	Description
Host	Yes	String	-	UDP service address
Port	Yes	Integer	-	UDP service port
Check End Type	Yes	Enum	CheckEndStr	Message end flag: CheckEndLength CheckEndStr

Parameter	Mandatory	Type	Default Value	Description
Body Type	Yes	Enum	CharSequence	Message body type: CharSequence Hexadecimal CodeStream

UDP Response

Status: success

Parameter	Type	Description
Body	String	UDP API return

UDP Response Example

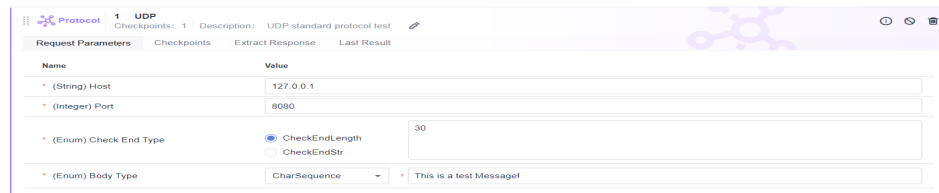
```
{  
  "This is a test Message!"  
}
```

Default Checkpoint

Name	Expected Value
Result	Success

UDP Usage Example

- Configure parameters to access the UDP service.



5.4.6.28 Protocol: WSConnect

This system keyword is used for connecting a WebSocket client to a server.

Parameter	Mandatory	Type	Description
Request Uri	Yes	String	WebSocket service address
Response Timeout	Yes	Long	Response timeout period
Header	Yes	String	Request header
Connect Timeout	Yes	Integer	Connection timeout period

WSConnect Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the WSConnect API

WSConnect Response Example

```
{  
  "Connect to *** at port *** in time 5000 successfully!"  
}
```

Default Checkpoint

Name	Expected Value
Result	Success

WSConnect Usage Example

Configure parameters to access the WebSocker service.



5.4.6.29 Protocol: WSRequest

This system keyword is applicable to the scenario where a WebSocket client requests a server operation.

Parameter	Mandatory	Type	Description
Request Uri	Yes	String	WebSocket service address
Response Timeout	Yes	Long	Response timeout period
Header	Yes	String	Request header
Request Type	Yes	String	Request data type
Request Body	Yes	String	Request data
Response Type	Yes	String	Response data type

WSRequest Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the WSRequest API

WSRequest Response Example

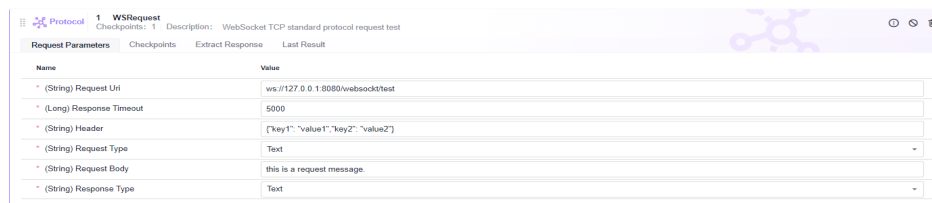
```
{
  "Write data to *** at port *** successfully! response: this is a response message."
}
```

Default Checkpoint

Name	Expected Value
Result	Success

WSRequest Usage Example

Configure parameters to access the WebSocker service.



5.4.6.30 Protocol: WSWriteOnly

This system keyword is used to access a WebSocket server for write-only operations.

Parameter	Mandatory	Type	Description
Request Uri	Yes	String	WebSocket service address
Response Timeout	Yes	Long	Response timeout period
Header	Yes	String	Request header
Request Type	Yes	String	Request data type
Request Body	Yes	String	Request data

WSWriteOnly Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the WSWriteOnly API

WSWriteOnly Response Example

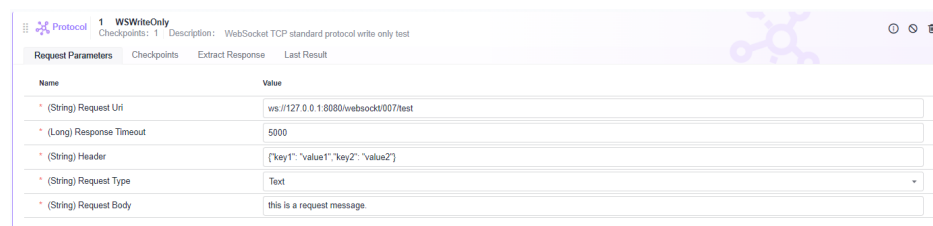
```
{  
  "Write data to *** at port *** successfully! response: this is a response message."  
}
```

Default Checkpoint

Name	Expected Value
Result	Success

WSWriteOnly Usage Example

Configure parameters to access the WebSocker service.



5.4.6.31 Protocol: WSReadOnly

This system keyword is used to access a WebSocket server for read-only operations.

Parameter	Mandatory	Type	Description
Request Uri	Yes	String	WebSocket service address
Response Timeout	Yes	Long	Response timeout period
Header	Yes	String	Request header
Response Type	Yes	String	Response data type

WSReadOnly Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the WSReadOnly API

WSReadOnly Response Example

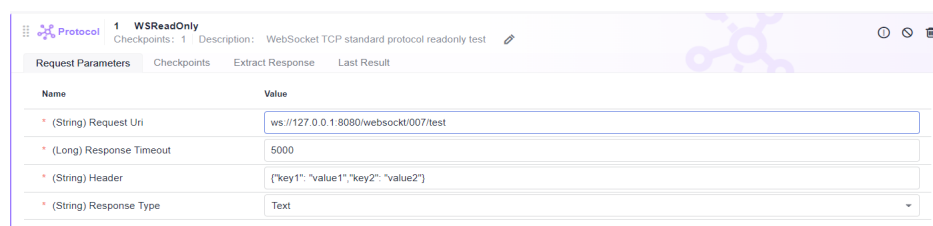
```
{  
  "Read data from*** at port *** successfully! response: this is a response message."  
}
```

Default Checkpoint

Name	Expected Value
Result	Success

WSReadOnly Usage Example

Configure parameters to access the WebSocker service.



5.4.6.32 Protocol: WSDisConnect

This system keyword is used to access a WebSocket server for disconnection.

Parameter	Mandatory	Type	Description
Request Uri	Yes	String	WebSocket service address
Response Timeout	Yes	Long	Response timeout period
Header	Yes	String	Request header
Status Code	Yes	String	Response data type
Message	Yes	String	Disconnection message

WSDisConnect Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the WSDisConnect API

WSDisConnect Response Example

```
{
  "Disconnect to *** at port *** in time 5000 successfully!"
}
```

Default Checkpoint

Name	Expected Value
Result	Success

WSDisConnect Usage Example

Configure parameters to access the WebSocker service.



5.4.6.33 Protocol: DubboClient

Introduction to Dubbo

Apache Dubbo is a microservice development framework that provides RPC communication and microservice governance. Microservices developed using Dubbo can remotely discover and communicate with each other. In addition, Dubbo provides rich service governance capabilities to meet service governance requirements such as service discovery, load balancing, and traffic scheduling.

Introduction to DubboClient

This system keyword is used to test the Dubbo protocol. Ensure that the Dubbo service is accessible from the public network and the security group policy of the corresponding port is enabled to permit access.

Parameter	Mandatory	Type	Default Value	Description
Dubbo Server IP Address	Yes	String	-	IP address of the Dubbo service
Dubbo Server Port	Yes	Integer	-	Dubbo service port
Dubbo operation instruction	Yes	String	LS	Dubbo operation command. The options are LS and INVOKE .
Dubbo Registration API	Yes	String	-	Name of the API registered with Dubbo. It is a fully qualified class name.
Dubbo Registration API	Yes	String	-	Method signature corresponding to the API registered with Dubbo

DubboClient Response

- Status: success

Parameter	Type	Description
Body	String	Value returned by the Dubbo service

Default Checkpoint

Name	Expected Value
Result	Success

DubboClient Usage Example: Obtaining All Registered APIs of the Server

Parameter example:

The screenshot shows the 'Request Parameters' tab for a test case named 'DubboClient'. The parameters are as follows:

Name	Value
(String) Dubbo Server IP Address	
(Integer) Dubbo Server Port	20880
(String) Dubbo Operation Instruction	LS
(String) Dubbo Registration API	
(String) Dubbo Registration Method	

Response example:

The screenshot displays the 'Result' tab of a test execution. The test procedure 'DubboClient (709 ms)' is shown as successful. The log details on the right provide the following information:

- Step Name: DubboClient (709 ms)
- Started: 2022/11/26 17:25:08 233 GMT+08:00
- Status: successful
- Result: successful
- Response:
- Checkpoints:
- Request:
 - Dubbo IP Address: [Redacted]
 - Dubbo Port: 20880
 - Method:
 - Param: LS
 - api: [Redacted]

DubboClient Usage Example: Obtaining the Specified Service Registration API of the Server

Parameter example:

Protocol 1 DubboClient
Checkpoints: 1 Description: Access the Dubbo server.

Name	Value
(String) Dubbo Server IP Address	
(Integer) Dubbo Server Port	20880
(String) Dubbo Operation Instruction	LS
(String) Dubbo Registration API	
(String) Dubbo Registration Method	

Response example:

Test Procedure Pre-steps Post-steps

DubboClient (709 ms)
Checkpoint...

Log Details

Step Name: DubboClient (709 ms)
 Started: 2022/11/26 17:25:08 GMT+08:00
 Status: ✓ successful
 Result: successful
 Response:
 Checkpoints:

Request

Dubbo IP Address: [Redacted]
 Dubbo Port: 20880
 Method:
 Param: LS
 api: com demo dubbo api DemoService

Response Value

```
[ "changeUsername" ]
```

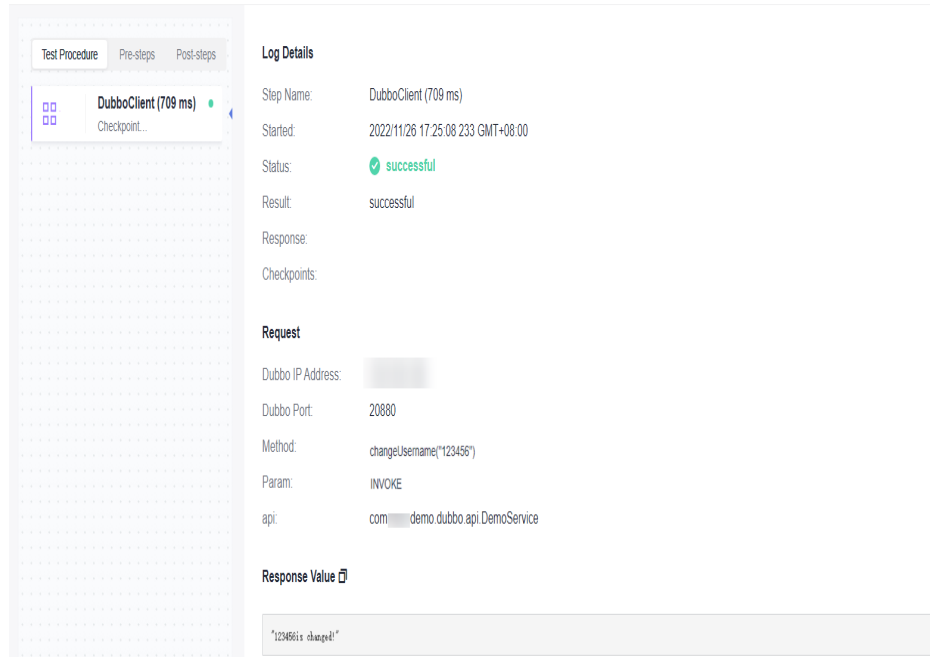
DubboClient Usage Example: Calling a Specified Dubbo API

Parameter example:

Protocol 1 DubboClient
Checkpoints: 1 Description: Access the Dubbo server.

Name	Value
(String) Dubbo Server IP Address	
(Integer) Dubbo Server Port	20880
(String) Dubbo Operation Instruction	INVOKE
(String) Dubbo Registration API	
(String) Dubbo Registration Method	

Response example:



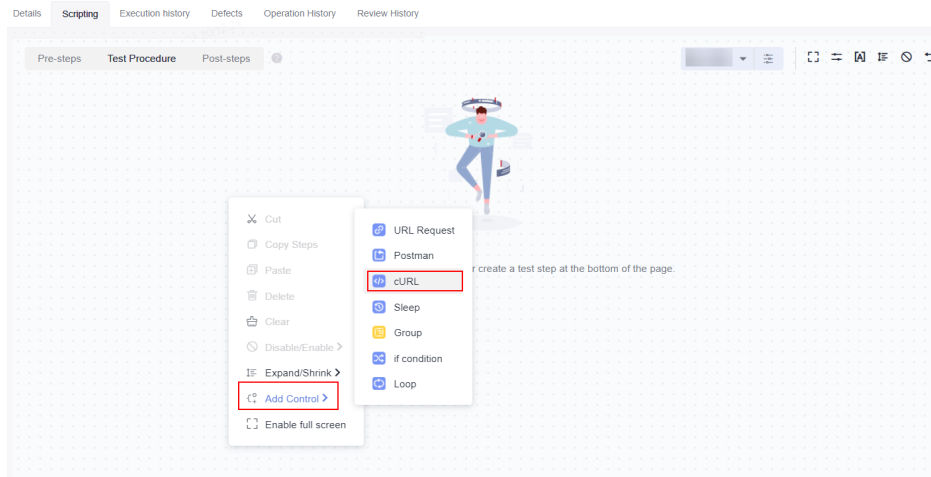
5.4.7 Importing cURL to Generate Test Scripts

Background

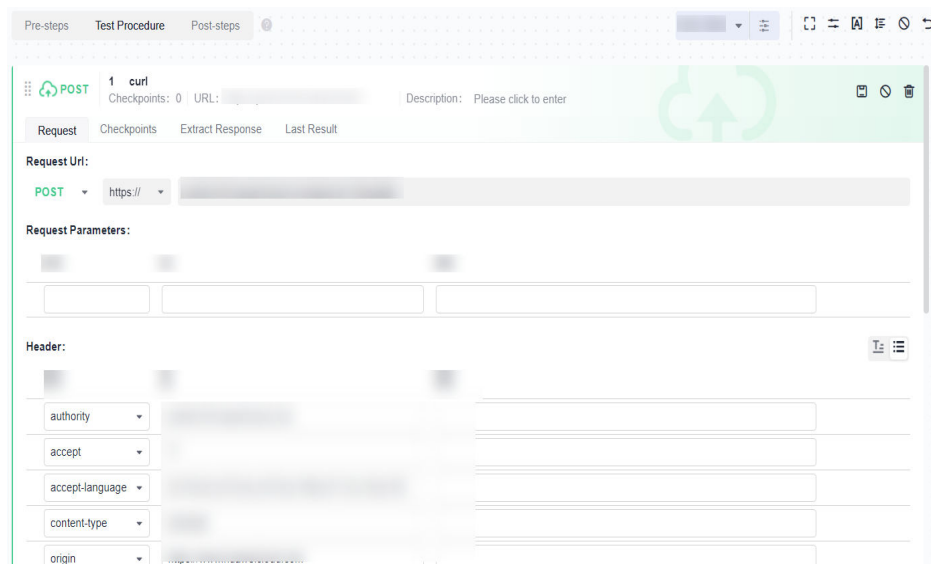
cURL is a command-line tool for transferring data specified with URL syntax. API automation allows you to copy the cURL of an API request from the Chrome control panel and paste the cURL to automatically generate an API test script.

Procedure

- Step 1** After the operations described in [Creating an API Automation Test Case](#) are complete, click the test case name, and click the **Scripting** tab.
- Step 2** Use a new browser tab to open the web page of the API to be tested and press **F12** to open the control panel.
- Step 3** Click the **Network** tab, right-click the API request in the list, and choose **Copy > Copy as cURL (bash)** from the shortcut menu.
- Step 4** Return to the **Scripting** tab, right-click the blank area on the page, and choose **Add Control > cURL** from the shortcut menu.



The test script is automatically generated on the page.



----End

5.4.8 Setting an API Request

Requesting URL and URL Parameters

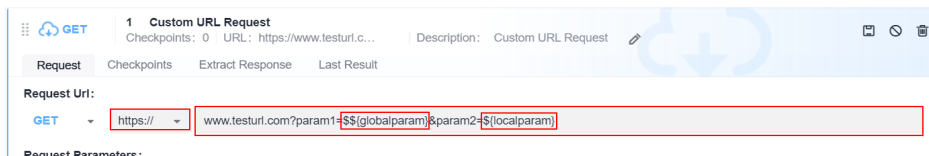
On the **Scripting** tab page of the API automation test cases, enter the URL to be requested. HTTP and HTTPS requests are supported.

API automation supports the following URL request modes. By default, the request mode of a new URL is **GET**.

Request Mode	Description
GET	Retrieves data from APIs.
POST	Uploads files and adds data.


Request Mode	Description
PUT	Replaces the existing data.
DELETE	Deletes the existing data.
HEAD	Obtains the HTTP header of a response.
OPTIONS	Pre-checks requests.
PATCH	Updates the fields of some existing data.

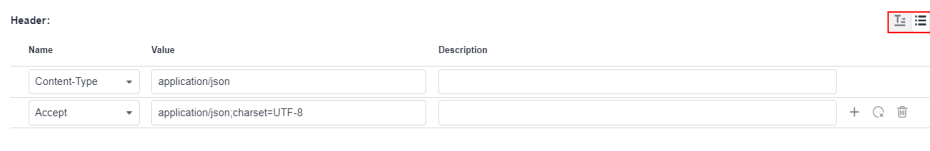
The request URL supports environment parameters, local parameters, and response extraction parameters. For details, see [Setting Test Case Parameters](#).



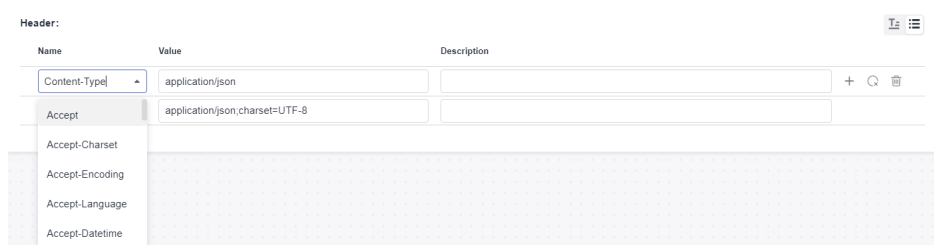
Request Header

Common HTTP request headers are preset for API automation. In the request header module, enter the request header information.

The request header can be in a form or text. By default, the form mode is used on the page. You can click  to switch between the form and text modes.



- **Form:** Select or enter a request header name in the **Name** column, and select or enter a value in the **Value** column.



- **Text:** The request header must be in the format of **key:value**. Unlike the form mode, the text mode supports only the configuration of **Request Header** and **Value**, but not **Description**.

Pay attention to the following restrictions when setting request headers:

- The total number of request headers cannot exceed 30.

- b. The length of the request header cannot exceed 10000.

Header:

```
Content-Type:application/json  
Accept:application/json;charset=UTF-8
```

Multiple common HTTP request headers are preset in CodeArts TestPlan. For details, see the following table.

Request Header	Description
Accept	Acceptable response content type (Content-Types), for example, text/plain.
Accept-Charset	Acceptable character set, for example, UTF-8.
Accept-Encoding	List of acceptable encoding modes, for example, compress gzip identity.
Accept-Language	Natural language list of acceptable response content, for example, en-US.
Accept-Datetime	Acceptable versions displayed by time.
Access-Control-Request-Method	Pre-checks requests so that the server knows which HTTP methods will be used when the actual requests are sent.
Access-Control-Request-Headers	Pre-checks requests so that the server knows which HTTP headers will be used when the actual requests are sent.
Authorization	Information used for HTTP authentication.
Cache-Control	Instructions that must be followed by all cache mechanisms for a request or response chain.
Connection	Preferred connection type used by the browser.
Cookie	HTTP cookie sent by servers through the Set-Cookie.
Content-Length	Length of the request body represented by 8-byte arrays.
Content-MD5	Binary MD5 hash value of the content of the request body, which is encoded using Base64.
Content-Type	Multimedia types of the request body (used in POST and PUT requests), for example, application/json.
Date	Date and time when a message is sent.
Expect	Specific actions required by a client for a server.

Request Header	Description
Forwarded	Client-oriented information from the path proxy server that the proxy participates in the request when it is changed or lost. It is used for debugging, collecting statistics on, and generating location-dependent content, and is designed to display privacy-sensitive information, such as the IP address of the client. Therefore, pay attention to user privacy when deploying this header.
From	Email address of the user who initiates the request.
Host	Domain name of the server (used for the virtual host) and the port number of the transmission control protocol listened to by the server. If the requested port is the standard port of the corresponding service, the port number can be omitted. This field is mandatory since HTTP/1.1. If the domain name in the URL is an IP address, this field is automatically added. Otherwise, enter the IP address and port number of the tested application in this field.
If-Match	The corresponding operation is performed only when the entity provided by the client matches the entity on the server. It is used in a method such as PUT to update a resource which has not been modified since the last update.
If-Modified-Since	Return 304 Not Modified is allowed when the corresponding content is not modified.
If-None-Match	Return 304 Not Modified is allowed when the corresponding content is not modified. Refer to the HTTP entity tag. In a typical use, when a URL is requested, the web server returns the resource and its corresponding Etag value, which is placed in the Etag field of the HTTP. The client can then decide whether to cache the resource and its Etag . If the client requests the same URL in the future, a request containing the saved Etag and the If-None-Match field is sent.
If-Range	If an entity is not modified, one or more parts that are missing are sent to the sender. Otherwise, the entire new entity is sent.
If-Unmodified-Since	A response is sent only when the entity has not been modified since a specific time.
Max-Forwards	Number of times a message can be forwarded by the proxy and gateway.
Origin	Initiates a request for cross-origin resource sharing. The server is mandatory to add an Access-Control-Allow-Origin field to the response.
Pragma	Related to specific implementations and may produce multiple effects at any time in the request or response chain.

Request Header	Description
Proxy-Authorization	Information used to authenticate a proxy.
Range	Requests only a part of an entity with the byte offset starting from 0.
Referer	Previous page accessed by a browser. A link on this page brings the browser to the currently requested page.
TE	Transmission coding mode expected by a browser. You can use a value of Transfer-Encoding in the response protocol header. In addition, the value trailers (related to the block transmission mode) indicates that the browser expects to receive additional fields if the size of the last block is 0.
User-Agent	String of the browser identity.
Upgrade	Asks the server to be upgraded to another protocol.
Via	Request-sending agents informed to the server.
Warning	General warning indicating that errors may exist in the body of an entity.

Request Body

A request body is a message (packet) to be transferred in an API request. The request body can be in text, JSON, or form format.

If the request method is **POST**, **PUT**, **DELETE**, **OPTIONS**, **PATCH**, or **HEAD**, the request body is displayed on the page. If the request method is **GET**, the request body is not displayed.

- **Text:** You can enter a standard JSON string. The method is the same as that for selecting a JSON request body.

Request Body:

none form-data x-www-form-urlencoded raw JSON

1

Text
JSON

- **Form:** The text and file types are supported.
 - **Text:** Set the parameter name and value.

Request Body:

none form-data x-www-form-urlencoded raw

Type	Name	Value
Text	date	2023-3-30

- File: Set the parameter name and assign a value to the parameter by uploading a file in any format.

Request Body:

none
 form-data
 x-www-form-urlencoded
 raw

Type	Name	Value
File	<input type="text"/>	--select-- <input type="button" value="⋮"/>

5.4.9 Setting a Test Checkpoint

Suggestions

You are advised to set checkpoints. For API requests, you need to provide checkpoints for determining response codes.

If the checkpoints are left empty, the result is success regardless of the response code of the API.

Checkpoint Description

A test checkpoint is also called assertion. It determines whether the system meets the expectation based on the API response.

On the **Checkpoints** tab page of the test step in the test case details of API automation, you can define test checkpoints.

Source	Property	Advanced Extraction T.	Type	Value	Comparison Operator	Target Value	operation
Response Code		N/A			==	200	+ ↓
Response body (JSON)	token catalog[0] endpoint[0] id	Character string ext...	0	5	Equals	12345	+ ↑ ↓
Response body (JSON)	result status	N/A			Equals	success	+ ↑

Checkpoint parameters include **Property**, **Comparison Operator**, and **Target Value**.

Parameter	Description
Retries	Number of times that the test step is re-executed if the checkpoint fails. The value is an integer ranging from 0 to 5.
Retry Interval	Interval for retrying a checkpoint if the checkpoint fails. The unit is ms. The value is an integer ranging from 0 to 10,000.
Source	Source of the detected field, such as the response body (JSON), response header, response code, and variable.

Parameter	Description
Property	<p>Enter \$ to invoke global variables, local variables, and built-in functions.</p> <ul style="list-style-type: none">• If the source is a response code, this parameter can be left empty. For details, see Response Code Check.• If the source is a response header, the property is the name of the field in the response header. For details, see Response Header Check.• If the source is the response body (JSON), the property can be set in either of the following ways:<ol style="list-style-type: none">1. Common extraction expression (not starting with \$), for example, item.name. Obtain the value of a field. Nested values are supported. For details, see Response Body (JSON) Check. When an array is extracted from the response body, the index can be a number or a key:value expression. For details, see Example: Obtaining a String from the Response Body Based on the Specified key:value.2. JSONPath expression (starting with \$. or \$[]), for example, \$.store.book[0].title. For details, see Obtaining Data from the Response Body Based on JSONPath.• If the source is a variable, the property is a global variable, a local variable, or a variable after response extraction. For details, see Variables Check.
Advanced Extraction Type	<p>(Optional) Use the advanced extraction type to assist in extracting checkpoint information. If N/A is selected, no additional matching mode is used.</p> <p>Currently, there are two modes:</p> <ul style="list-style-type: none">• Character String Extraction: truncates strings.• Regular Expression: filters source strings using regular expressions. <p>For the advanced extraction type, the string extraction function is preferred. If the function cannot meet the requirements, you can use the regular expression.</p>
Type Value	Parameter required in the advanced extraction type.
Comparison Operator	Comparison operator, such as numbers, strings, JSON objects, and types, are supported. For details, see Comparison Operator Description .
Target Value	Expected value of a checkpoint. Built-in parameters can be used for target values. For details, see Built-in Parameters .

For example, the following table describes the parameter settings to check whether the range from the 0th digit (first digit) to the 4th digit of the **item.name** field in the response body (JSON format) is **petty**.

Parameter	Value
Source	Response body (JSON)
Property	item.name
Advanced Extraction Type	Character string extraction
Type Value	0-5
Comparison Operator	Equals (string)
Target Value	petty

Comparison Operator Description

CodeArts TestPlan supports the following comparison types.

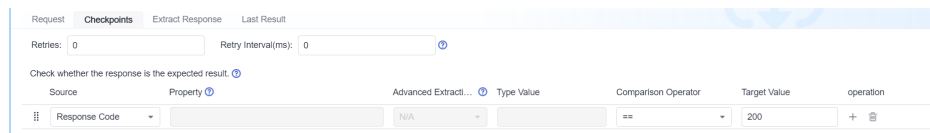
Comparison Type	Comparison Operator	Value Mandatory or Not	Example
Digit	<ul style="list-style-type: none">• ==• !=• >=• <=• >• <	Yes	<ul style="list-style-type: none">• Response code = 200• Response code != 200• Response code >= 200• Response code <= 200• Response code > 200• Response code < 200

Comparison Type	Comparison Operator	Value Mandatory or Not	Example
String	<ul style="list-style-type: none"> • Equals • Does not equal • Equals (case insensitive) • Contains • Does not contain 	Yes	<ul style="list-style-type: none"> • Parameter 1 in the response body equals test. • Parameter 2 in the response body does not equal test. • Parameter 3 in the response body equals TEST. • Parameter 4 in the response body contains tri. • Parameter 5 in the response body does not contain tri.
Regular expression	Regular expression	Yes	<ul style="list-style-type: none"> • Regular expression for parameter 1 in the response body: ^[A-Za-z0-9]{1,32}\$
General	<ul style="list-style-type: none"> • Is empty • Is not empty 	No	<ul style="list-style-type: none"> • Parameter 1 in the response body is empty. • Parameter 2 in the response body is not empty.
JSON array	<ul style="list-style-type: none"> • Has null JSON array • Has non-null JSON array 	No	<ul style="list-style-type: none"> • Parameter 1 in the response body has a null JSON array. • Parameter 2 in the response body has a non-null JSON array.
	JSON array size	Yes	<ul style="list-style-type: none"> • Size of the parameter 1 JSON array in the response body.
Type	<ul style="list-style-type: none"> • Is JSON type • Is JSON array type 	No	<ul style="list-style-type: none"> • Parameter 1 in the response body is of the JSON type. • Parameter 2 in the response body is of the JSON array type.

Comparison Type	Comparison Operator	Value Mandatory or Not	Example
JSON object	JSON value	Yes	<ul style="list-style-type: none"> The JSON value of parameter 1 in the response body is <code>{"name":"zhangsan"}</code>.

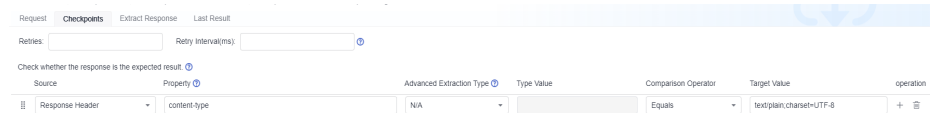
Response Code Check

Compare the response code with the target value. For example, check whether the response code is **200**.



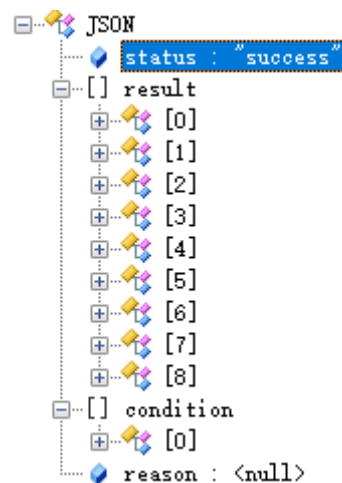
Response Header Check

Compare the value of a field in the response header with the target value. For example, check whether the value of **content-type** in the response header is equal to **text/plain;charset=UTF-8**.



Response Body (JSON) Check

1. Check the value of the object field in the response body (JSON). For example: The response body structure is as follows.

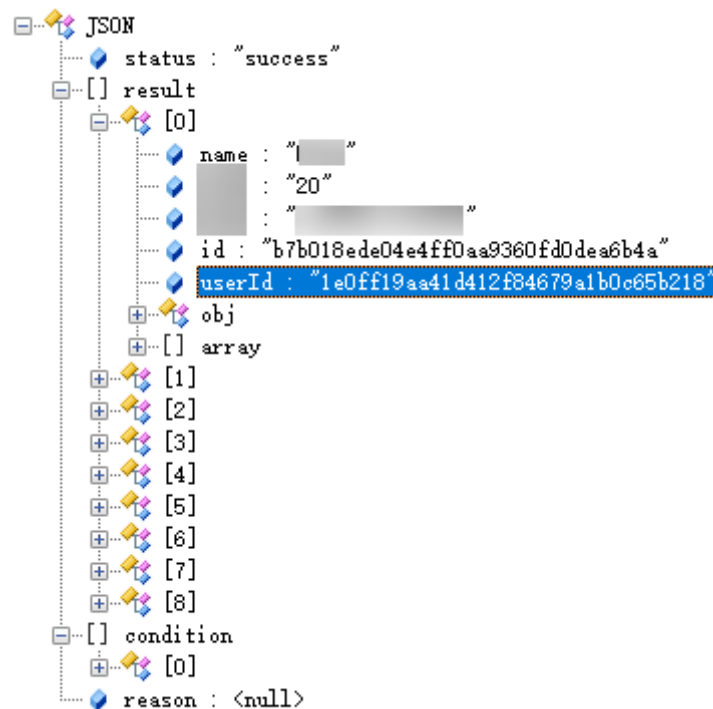


Check the value of the field whose name is **status** in the response body object. The checkpoint configuration is as follows.

Source	Property	Advanced Extrac...	Type Value	Comparison Operator	Target Value	operation
Response body (...)	status	N/A		Equals	success	+

2. Check the field value of an array object in the response body (JSON). (The array condition uses the subscript starting from 0 to determine the object.)
For example:

The response body structure is as follows.



Check the value of **userId** in the first element object field of the **result** array in the response body. The checkpoint configuration is as follows.

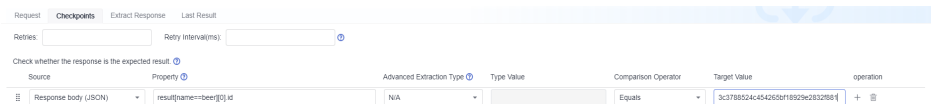
Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	operation
Response body (JSON)	result.userId	N/A		Equals	3c378852444542658f1829c2852881	+

3. Check the field value of an array object in the response body (JSON). (The array condition uses the fuzzy match function to determine the object.)
For example:

The response body structure is as follows.



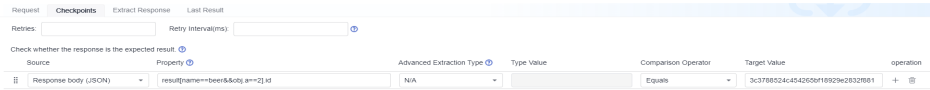
- a. Check all objects whose **name** is **beer** in the **result** array of the response body. Obtain the values of **id** after the first object. The checkpoint configuration is as follows.



NOTE

If there is only one object in the obtained array, **[0]** can be omitted. The expression in the example can be written as **result[name==beer].id**.

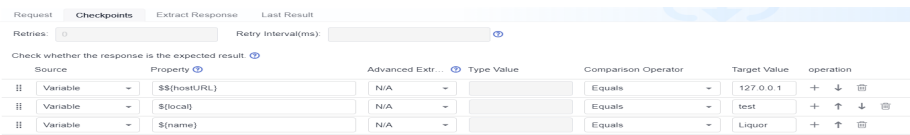
- b. Check the ID of the object whose **name** in the **result** array of the response body is **beer**, and of which the **a** property under **obj** is **2**. The checkpoint configuration is as follows.



Variables Check

Check global variables, local variables, and variable values after response extraction, and compare them with target values. For example:

- Check whether the value of the global variable **hostIp** is **127.0.0.1**.
- Check whether the value of the local variable **local** is **test**.
- Check whether the value of the variable **name** after response extraction is **Liquor**.



Example: Obtaining a String from the Response Body Based on the Specified key:value

You can enter an array whose subscript is in the **key:value** format for the **Property** field of the check body to obtain the JSON string that meets the condition from the response body based on the specified **key:value**.

The following connectors are supported between **key:value**.

Connector	Description	Example
==	Equals (string or digit)	name==John age==20
!=	Does not equal (string or digit)	name!=John age!=20
>	Greater than (digit)	age>20
>=	Greater than or equal to (digit)	age>=20
<	Less than (digit)	age<20
<=	Less than or equal to (digit)	age<=20

The array subscript supports multiple groups of **key:value** conditions connected by **&&**, indicating that the extracted JSON string must meet all **key:value** conditions. For example, **student[age>20&gender=female]** indicates that the extraction conditions are that the age must be greater than 20 and the gender must be female.

The search criteria of an array support nested arrays. In this case, the sub-condition can be met only when all objects in the nested condition meet the conditions.

NOTE

- If the value is an empty object, use **\$null**, that is, **key==\$null**.
- If the value is a null string ("null"), use **null**, that is, **key==null**.
- If the value is an empty string (""), use **key==**.

The following response body (JSON) is used as an example:

```
{
  "status": "success",
  "result": [
    {
      "name": "Beer",
      "quantity": "20"
      "address": "Shelf 10 in repo A3",
      "obj": {
        "a": 1,
        "b": "test",
        "c": "test"
      },
      "array": [
        {
          "id": 1,
          "name": "aaa"
        },
        {
          "id": 2,
          "name": "bbb"
        }
      ]
    },
    {
      "name": "Beer",
      "quantity": "10",
      "address": "Shelf 10 in repo A3",
      "obj": {
        "a": 1,
        "b": "test",
        "c": "test"
      },
      "array": [
        {
          "id": 1,
          "name": "aaa"
        },
        {
          "id": 2,
          "name": "bbb"
        }
      ]
    },
    {
      "name": "Liquor",
      "quantity": "20"
      "address": "Shelf 10 in repo A3",
      "obj": {
        "a": 1,
        "b": "test",
        "c": "test"
      },
      "array": [
        {
          "id": 1,
```

```
        "name": "aaa"
      },
      {
        "id": 2,
        "name": "bbb"
      }
    ]
  },
  {
    "name": "Liquor",
    "quantity": "30",
    "address": "Shelf 10 in repo A3",
    "obj": {
      "a": 1,
      "b": "test",
      "c": "test"
    },
    "array": [
      {
        "id": 3,
        "name": "aaa"
      },
      {
        "id": 4,
        "name": "bbb"
      }
    ]
  },
  {
    "name": null,
    "quantity": "10",
    "address": "Shelf 10 in repo A3",
    "obj": {
      "a": 2,
      "b": "test",
      "c": "test"
    },
    "array": [
      {
        "id": 5,
        "name": "aaa"
      },
      {
        "id": 6,
        "name": "bbb"
      }
    ]
  },
  {
    "name": "",
    "quantity": "10",
    "address": "Shelf 10 in repo A3",
    "obj": {
      "a": 2,
      "b": "test",
      "c": "test"
    },
    "array": [
      {
        "id": 5,
        "name": "aaa"
      },
      {
        "id": 6,
        "name": "bbb"
      }
    ]
  }
],
```

```

"condition": [
  {
    "name": "Beer",
    "quantity": "120",
    "address": "Shelf 15 in warehouse A1",
  }
],
"reason": null
}

```

The following table lists the expressions for obtaining data from the response body.

Extraction Condition	Expression
Obtain the data whose name is Liquor from the result array.	result[name==Liquor]
Obtain the data whose name is not Beer and quantity is greater than 20 from the result array.	result[name!=Beer&&quantity>20]
Obtain the data whose name is a null object and id is less than or equal to 2 from the result array.	result[name==\$null&&array[id<=2]]
Obtain the data whose name is a null string and property a under obj is 2 from the result array.	result[name==null&&obj.a==2]
Obtain the data whose name is an empty string ("") from the result array.	result[name==]

If you need to check whether the data (JSON) whose **name** is **Liquor** and **quantity** is greater than 20 is [{"name": "Liquor", "quantity": "30", "address": "Shelf 10 in warehouse A3", "obj": {"a": 1, "b": "test", "c": "test"}, "array": [{"id": 3, "name": "aaa"}, {"id": 4, "name": "bbb"}]}, refer to the following table for the configuration of each field.

Parameter	Value
Source	Response body (JSON)
Property	result[name!=Beer&&quantity>20]
Comparison Operator	Equals (string)
Target Value	[{"name": "Liquor", "quantity": "30", "address": "Shelf 10 in warehouse A3", "obj": {"a": 1, "b": "test", "c": "test"}, "array": [{"id": 3, "name": "aaa"}, {"id": 4, "name": "bbb"}]}

Example: Obtaining Data from the Response Body Based on JSONPath

For details about JSONPath, visit the [official website](#).

The following response body (JSON) is used as an example:

```
{
  "store": {
    "book": [
      {
        "category": "reference",
        "author": "Nigel Rees",
        "title": "Sayings of the Century",
        "price": 8.95
      },
      {
        "category": "fiction",
        "author": "Evelyn Waugh",
        "title": "Sword of Honour",
        "price": 12.99
      },
      {
        "category": "fiction",
        "author": "Herman Melville",
        "title": "Moby Dick",
        "isbn": "0-553-21311-3",
        "price": 8.99
      },
      {
        "category": "fiction",
        "author": "J. R. R. Tolkien",
        "title": "The Lord of the Rings",
        "isbn": "0-395-19395-8",
        "price": 22.99
      }
    ],
    "bicycle": {
      "color": "red",
      "price": 19.95
    }
  },
  "expensive": 10
}
```

The JSONPath expression can contain dots (.) or brackets ([]). For example:

- \$.store.book[0].title
- \$('[store]')['book'][0]['title']

The following table describes the JSONPath expressions and their meanings.

JSONPath Expression	Description
\$.store.book[*].author	The authors of all books.
\$.author	All authors.
\$.store.*	All things, both books and bicycles.
\$.store..price	The price of everything.
\$.book[2]	The third book.
\$.book[-2]	The second to last book.

JSONPath Expression	Description
<code>\$.book[0,1]</code>	The first two books.
<code>\$.book[:2]</code>	All books from index 0 (inclusive) until index 2 (exclusive).
<code>\$.book[1:2]</code>	All books from index 1 (inclusive) until index 2 (exclusive).
<code>\$.book[-2:]</code>	Last two books.
<code>\$.book[2:]</code>	Book number two from tail.
<code>\$.book[?(@.isbn)]</code>	All books with an ISBN number.
<code>\$.store.book[?(@.price < 10)]</code>	All books in store cheaper than 10.
<code>\$.book[?(@.price <= \$('[expensive'])]</code>	All books in store that are not "expensive".
<code>\$.book[?(@.author =~ /. * REES/i)]</code>	All books matching regex (ignore case).
<code>\$.*</code>	Give me everything.

NOTE

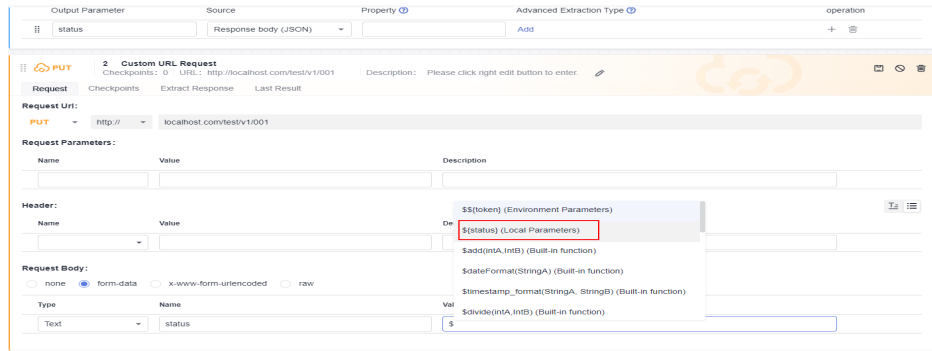
If the **length** or **size** function is used, do not use deep scanning (that is, the `..` symbol) when calling the function for multiple times. For example, if `$.book.length()` returns the number of books, you need to determine the path and change it to `$.store.book.length()`.

5.4.10 Setting Response Extraction

Response extraction is to extract a part of the API response result and name it as a parameter for invoking in subsequent test steps. Response extraction needs to be defined in the previous test steps and used in subsequent test steps.

- In the **Pre-steps** tab page, create the parameters to be passed on the **Extract Response** tab page. Built-in parameters are used for response extraction. For details, see [Built-in Parameters](#). Response extraction also supports regular expression matching and extracts the return value that matches the given regular expression.
- In subsequent test steps, use `#{parameter name}` to reference the response extraction created in the previous test steps. This parameter can be referenced in the URL, request header, and request body in subsequent steps. If this parameter is referenced in the request body in JSON format, enclose the parameter with quotation marks. For example:

```
{
  id: "Test case ID"
  name: " #{name}"
}
```



- The response extraction function can obtain strings based on the specified **key:value**. For details, see [Example: Obtaining a String from the Response Body Based on the Specified key:value](#).

Parameter	Description
Output Parameter	`\${Output Parameter}` , which will be referenced later. The name consists of letters, digits, and underscores (_).
Source	Source of the detected field, such as the response body (JSON), response header, and response code.
Property	<p>Enter \$ to invoke global variables, local variables, and built-in functions.</p> <ul style="list-style-type: none"> • If the source is a response code, this parameter can be left empty. For details, see Response Code Check. • If the source is a response header, the property is the name of the field in the response header. For details, see Response Header Check. • If the source is the response body (JSON), the property can be set in either of the following ways: <ol style="list-style-type: none"> 1. Common extraction expression (not starting with \$), for example, item.name. Obtain the value of a field. Nested values are supported. For details, see Response Body (JSON) Check. When an array is extracted from the response body, the index can be a number or a key:value expression. For details, see Example: Obtaining a String from the Response Body Based on the Specified key:value. 2. JSONPath expression (starting with \$. or \$[]), for example, \$.store.book[0].title. For details, see Example: Obtaining Data from the Response Body Based on JSONPath.

Parameter	Description
Advanced Extraction Type	<p>(Optional) Use the advanced extraction type to assist in extracting response information. If N/A is selected, no additional matching mode is used.</p> <p>Currently, there are two modes:</p> <ul style="list-style-type: none">• Character String Extraction: truncates strings.• Regular Expression: filters source strings using regular expressions. <p>For the advanced extraction type, the string extraction function is preferred. If the function cannot meet the requirements, you can use the regular expression.</p>
Assign Value to Dynamic Environment Parameter	<p>Assigns the value extracted from the response to the dynamic parameter so that the dynamic parameter can be referenced in subsequent tests.</p>

5.4.11 Importing a Postman File

Background


Test steps can be generated by importing Postman files for API automation test cases.

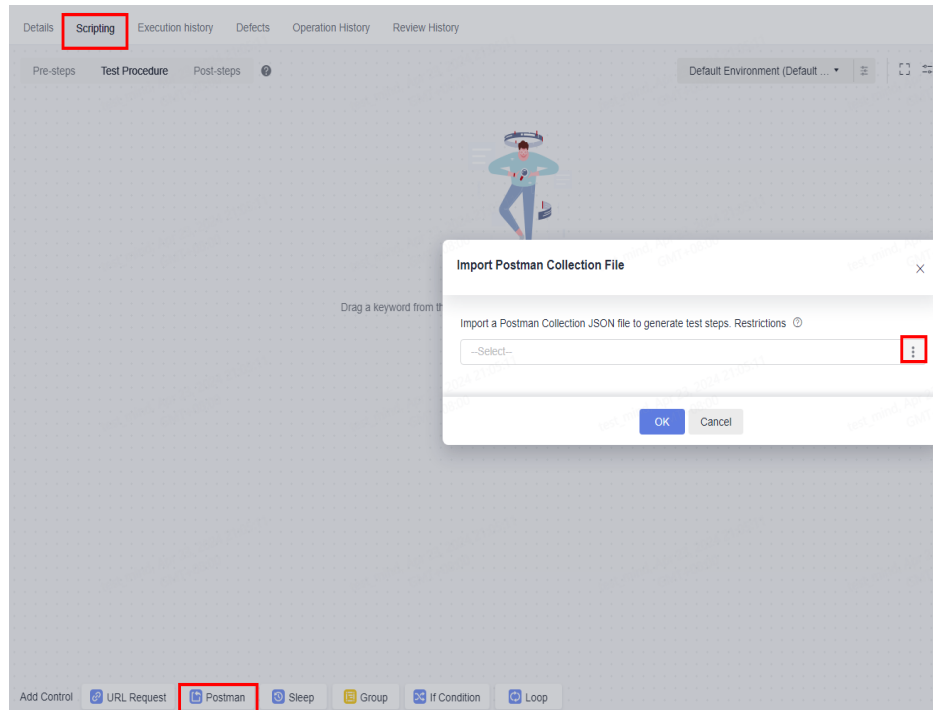
Requirements:

- The Postman Collection v2.1 standard is supported.
- Use only the Postman request method, URL, header, and body to generate test steps.
- Use only the form-data, x-www-form-urlencoded, or raw modes to import the Postman request body.
- Upload the Postman request form-data attachment separately in test steps.

Procedure

Step 1 After the operations described in [Creating an API Automation Test Case](#) are complete, click the test case name, and click the **Scripting** tab.

Step 2 Click **Postman**. In the dialog box that is displayed, click , select the file to be imported, and click **ok**.



Step 3 The URL request is displayed on the page. Click **Save** in the upper right corner. The system displays a message indicating that the update is successful.

If the saving fails, a dialog box is displayed in the upper right corner, indicating the failure cause.

----End

5.4.12 Inserting Logic Control

Background

Logic control is used to orchestrate test scenarios, including:

- **Sleep**
- **Group**
- **If Condition**
- **Loop**

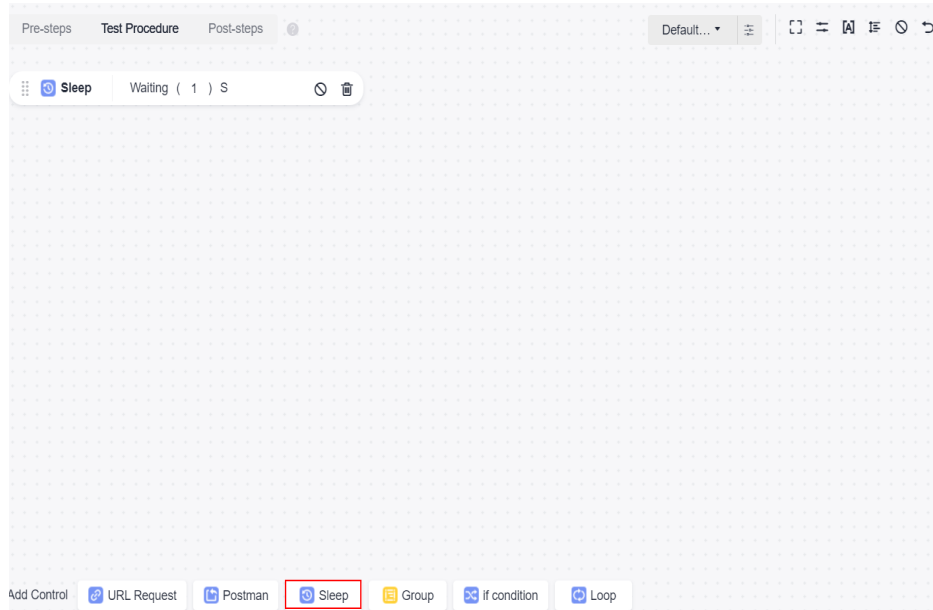
Sleep

Sleep allows you to wait for a period of time after performing a test step.

To set **Sleep**, perform the following steps:

Step 1 Go to the **Scripting** tab page and click **Sleep**.

Step 2 Enter an integer from 1 to 60.



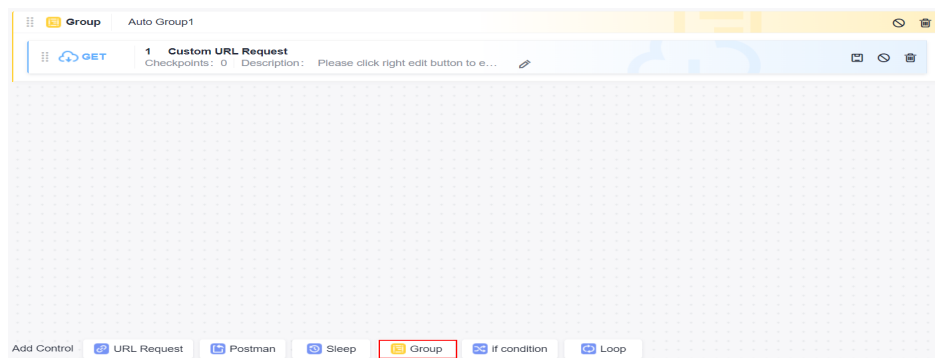
----End

Group

Step 1 Go to the **Scripting** tab page and click **Group**.

Step 2 Enter the group name and drag related test steps to the group.

- The **URL Request**, **If Condition**, **Sleep**, and **Loop** test steps can be grouped.
- You can drag and orchestrate the sequence of groups in test cases.
- You can drag and orchestrate the sequence of test steps in a group.
- You can disable or delete all groups.



----End

If Condition

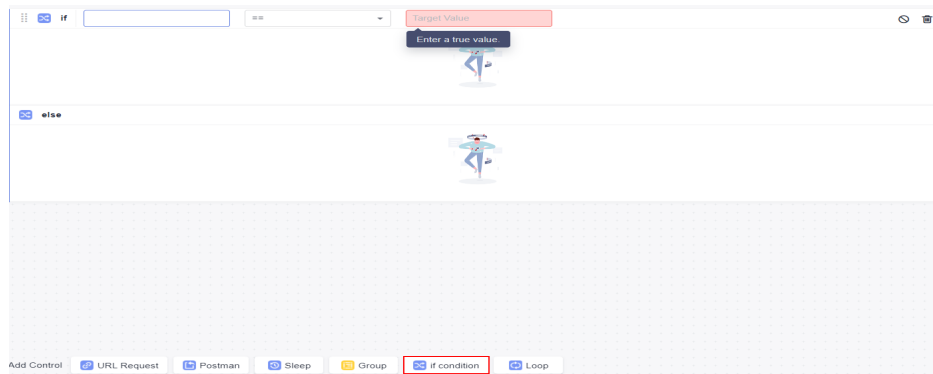
If you need to determine the subsequent test steps based on the results of the previous test steps, you can use **If Condition**.

To set an **if** condition, perform the following steps:

Step 1 Go to the **Scripting** tab page and click **If Condition**.

Step 2 Enter the parameter, and add subsequent test steps to the branch.

URL Request, If Condition, Sleep, and Loop can be added to the branch of the **If Condition**.



----End

NOTE

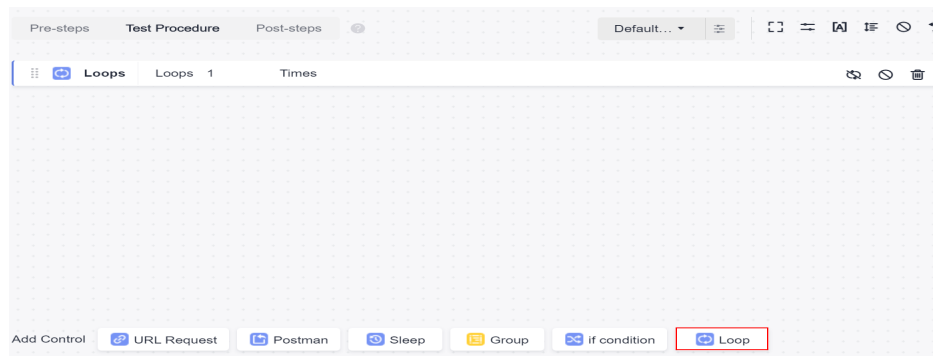
The **if** condition supports referencing local variables and passing parameters. For details about how to use comparison operators, see [Comparison Operator Description](#).

Loop

Step 1 Go to the **Scripting** tab page and click **Loop**.

Step 2 Set the loop count.

You can add URL requests, if conditions, groups, wait time, and test keywords to a loop.



----End

5.4.13 Setting Test Case Parameters

Background

Proper test design requires that the test logic and test data be separated to maximize the reuse of the test logic and enhance the maintainability and input-to-output ratio of test cases. For example, the URL domain names of different test

environments are test data independent of the test logic and related to the test environment. Test case parameters can be used to manage test data.

Parameters of API automation test cases are classified into the following types:

- **Local Parameters**
- **Built-in Parameters**
- **Response Extraction Parameters**


Local Parameters

Local parameters can be used in the current test case. For example, parameters, checkpoints, and variables of test steps can reference local parameters.

Use `#{Parameter name}` to reference a local parameter, for example, `#{hostIp}`.

The main configuration items of local parameters are as follows.

Table 5-2 Main local parameter configuration items

Configuration Item	Mandatory	Description
Name	Yes	The value can contain 1 to 300 characters. Only letters, digits, periods (.), underscores (_), and hyphens (-) are supported.
Type	Yes	Supported types: text, random character string, random integer, timestamp, formatted timestamp, UUID, Base64 encoding, MD5 hash value, password or authentication information, and SHA-512 encoding. For details, see Table 5-3 .
Description	No	Brief description of the parameter (current parameter by default). The value can contain up to 3,000 characters. Click the text box to enter the description. Click  , enter a JSON string, click JSON Parse to add line breaks and indentation, and click Fill Back .
Value	No	Local parameter values. Assign values to the supported parameter types by referring to Table 5-3 .
Sensitive	No	CodeArts TestPlan encrypts sensitive parameter values during storage and overwrites them with asterisks (*) in test result logs. Sensitive data includes but is not limited to personal and authentication information, such as names, addresses, and usernames.

Configuration Item	Mandatory	Description
Dynamic	No	<p>Values of dynamic parameters can be assigned during test case execution. The initial value of a dynamic parameter can be empty. After a value is assigned, the latest value is displayed.</p> <p>Assigning values to dynamic parameters: In the Extract Response tab page of a test step, set the value of the Assign Value to Dynamic Environment Parameter column. The extracted value will be assigned to the dynamic parameter during test execution.</p>

Table 5-3 Parameter types

Name	Description
Text	The value can contain up to 10,000 characters. A local parameter of text type can be set to Sensitive and Dynamic , which are not selected by default.
Random character string	The system randomly generates a character string of a length from 1 to 9999 digits. The parameter of this type cannot be set to Sensitive or Dynamic .
Random integer	The system randomly generates an integer from -999999999 to 999999999. The parameter of this type cannot be set to Sensitive or Dynamic . For example, if this parameter is set to [-9999,9999], a random integer in this range will be generated.
Timestamp	The system generates the current integer timestamp. No value needs to be set. The parameter of this type cannot be set to Sensitive or Dynamic .
Formatted timestamp	The format is yyyy-MM-dd HH:mm:ss or yyyy-MM-dd. The parameter of this type cannot be set to Sensitive or Dynamic . Example 1: For yyyy-MM-dd HH:mm:ss:33250825252000, the expected value is 3023-09-05 20:20:52. Example 2: For yyyy-MM-dd:33250825252000, the expected value is 3023-09-05.
UUID	No value needs to be set. The parameter of this type cannot be set to Sensitive or Dynamic .
Base64 encoding	The parameter of this type uses Base64 encoding method. The value can contain up to 256 characters. The parameter of this type cannot be set to Sensitive or Dynamic .

Name	Description
MD5 hash value	The system generates an MD5 hash value with the parameters of this type. The value can contain up to 256 characters. The parameter of this type cannot be set to Sensitive or Dynamic .
Password or authentication information	The value can contain up to 256 characters. The parameter of this type is set to Sensitive by default and cannot be changed.
SHA-512 encoding	The value can contain up to 256 characters. The parameter of this type is set to Sensitive by default and cannot be changed.
Array	The value is in JSON format and contains up to 10,000 characters. This parameter cannot be set as sensitive or dynamic parameter.

To set local parameters, perform the following steps:

Step 1 Go to the **Scripting** tab page and click .

Step 2 Click **New Variable**. Enter the parameter name, type, and value.

After all the parameters are set, click **Save**.

----End

Built-in Parameters

Built-in parameters are used to parameterize the corresponding part of an HTTP or HTTPS response. You can select built-in parameters from the **Source** options in the **Checkpoints** and **Response** pages.

The following table lists the built-in parameters of CodeArts TestPlan.

Built-in Parameter	Description	Multi-level Values Supported or Not	Function	Example
Response Body (JSON)	Response body returned by an API.	Yes	<ul style="list-style-type: none"> Checkpoint property field. Property field for parameter passing. 	<ul style="list-style-type: none"> Checkpoint: Check whether the value of id in the response body is 100. Settings: Set Source to Response body (JSON), Property to id (only if the id field exists in the JSON string), Comparison Operator to Equals (case insensitive), and Target Value to 100.
Response Header	Response header returned by an API.	Yes	<ul style="list-style-type: none"> Checkpoint property field. Property field for parameter passing. 	<ul style="list-style-type: none"> Checkpoint: Check whether the value of token in the response header is abcd. Settings: Set Source to Response Header, Property to token (only if token exists in the response header), Comparison Operator to Equals (case insensitive), and Target Value to abcd.
Response Code	Response code returned by an API.	No	<ul style="list-style-type: none"> Property or value of a checkpoint. Property field of a variable. 	<ul style="list-style-type: none"> Checklist: Check whether the response code is 200. Settings: Set Source to Response Code, Comparison Operator to Equals, and Target Value to 200.

NOTE

Built-in parameters support multi-level values, for example:

- If the response body is `{"result":{"appId":12}}`, the format of **appId** is as follows: **Source=Response body; Property=result.appId**. If the value of **result** is in array format, **Property=result[i].appId**, where *i* is a non-negative integer.

Response Extraction Parameters

Response extraction parameters are extracted from the response body of an API. For details about the definition and usage, see [Setting Response Extraction](#).

5.4.14 Setting Environment Parameters

During automated testing, there are multiple test environments whose parameter values are different, for example, the domain name and account. These parameters are often used in test scripts. If they are bound to test scripts, the scripts will become highly redundant and hard to be reused.

To solve the preceding problems, you can use environment parameters to manage them in a unified manner. In test scripts, environment parameters are referenced in parameterization mode. During execution, you only need to select an execution environment to use the corresponding environment parameter values to complete testing.

Application Scope

The parameters, checkpoints, variables, and URLs of the test steps in each test case of the current project can reference environment parameters.

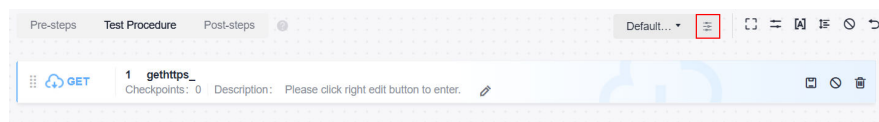
Reference Format

The reference format of an environment parameter is **\$\${Parameter name}**. For example, if the parameter name is **hostname**, you can use **\$\${hostname}** to reference the parameter.

You can configure and manage environment parameters by group as required. For example, the value of **hostname** in the quasi-production environment is **stage.example.com**, and the value in the production environment is **prod.example.com**. The test script uses **\$\${hostname}** to reference this parameter. During the test, select different environments to execute the test so that a set of API automation test cases can be reused in all environments.

Procedure

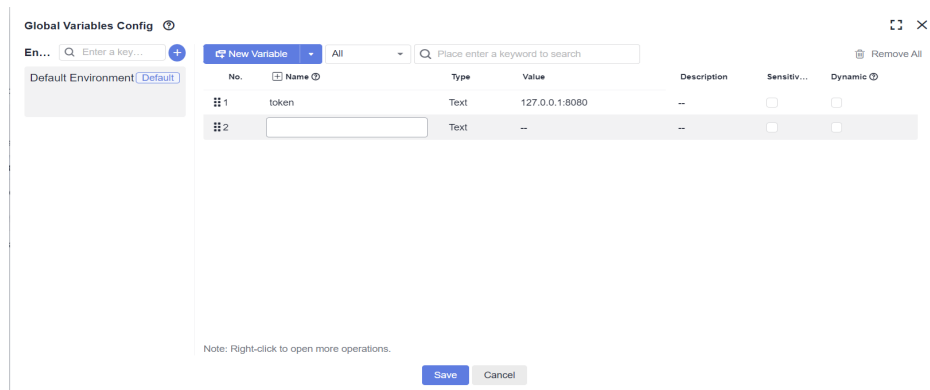
Step 1 Go to the **Scripting** tab page and click .



Step 2 Click **New Variable**, enter parameter information, and click **OK**.

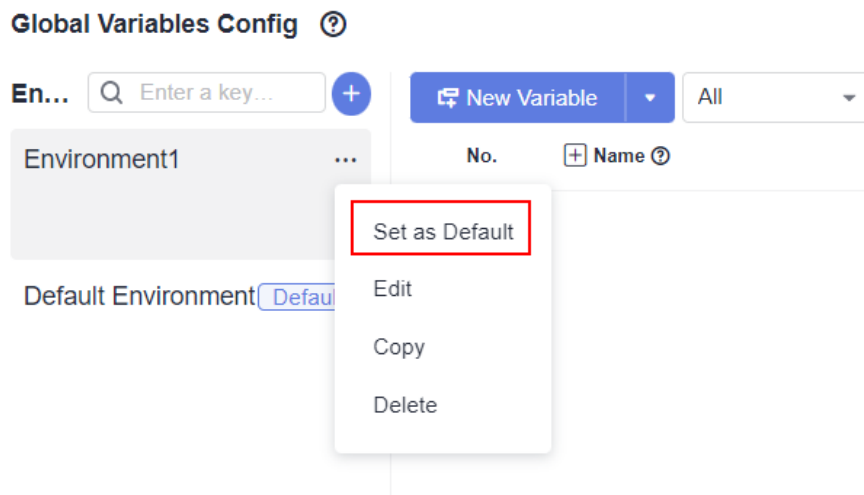
Configuration Item	Description
Name	Parameter name.
Type	Parameter type. Multiple types are supported, such as text, random string, random integer, and timestamp.

Configuration Item	Description
Value	Parameter value.
Description	Parameter description.
Sensitive	This service encrypts sensitive parameter values during storage and overwrites them with asterisks (*) in test result logs. Sensitive data includes but is not limited to personal and authentication information, such as names, addresses, and usernames.
Dynamic	Dynamic parameter setting. The value of a dynamic parameter can be assigned during test case execution. The initial value of a dynamic parameter can be empty. After a value is assigned, the latest value is displayed. After you set the value of the Assign Value to Dynamic Environment Parameter column in the Extract Response tab page of the test step, the extracted value is assigned to the dynamic parameter during test execution. For details, see Dynamic Variable Description .



Step 3 Change the default environment.

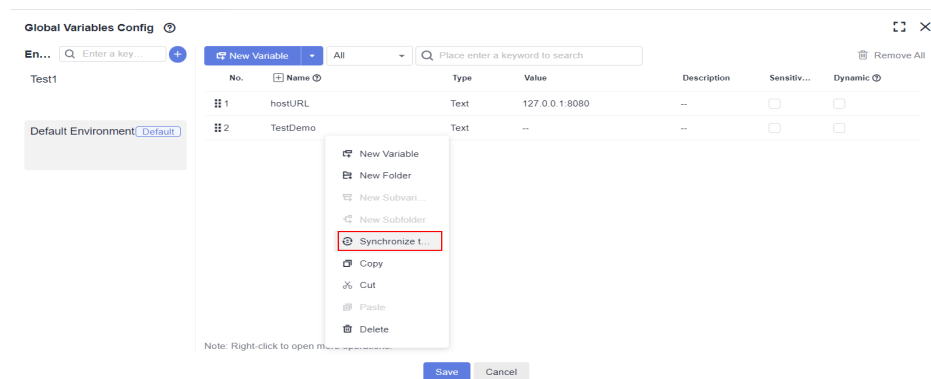
To set another environment as the default environment, click **⋮** in the upper right corner of the environment card and select **Set as Default**.



----End

Synchronization

Right-click the parameter to be synchronized and choose **Synchronize to other environments** from the shortcut menu to synchronize the current parameter to all environments.



Dynamic Variable Description

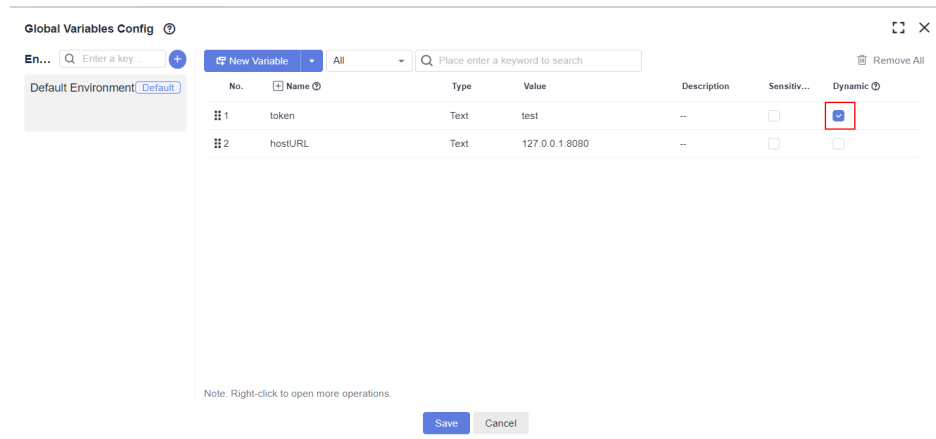
Multiple test cases in a test suite may have context relationships. The test case that is executed later depends on the result returned by the API in the test case that is executed earlier. For example, all APIs require authentication information, which has a validity period. If it is obtained in each test case, the test procedure of the test case will be redundant and difficult to maintain.

This problem can be avoided by using dynamic global variables. In the first executed test case, the authentication information is obtained and then assigned to the dynamic global variables. In the subsequent executed test cases, the dynamic global variables can be directly used, avoiding obtaining authentication information repeatedly.

Step 1 Set dynamic variables.

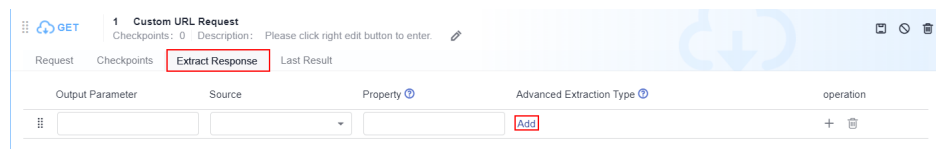
1. On the test case list of the **Auto API Test** tab page, click **More** on the right of the page and choose **Environment Parameters**.

2. Select the check box in the **Dynamic** column and click **Save** to set a global variable to a dynamic variable.

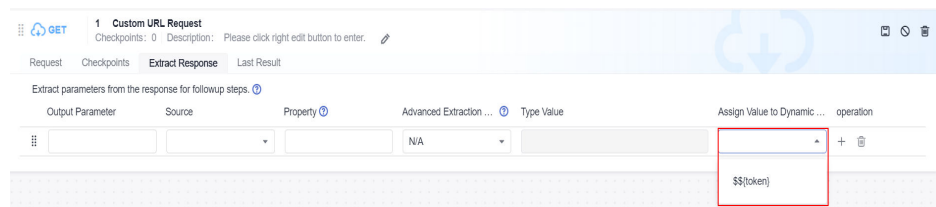


Step 2 Assign values to dynamic variables.

1. In an API automation test case, click the **Extract Response** tab of the test step, and click the **Add** button in the **Advanced Extraction Type** column.



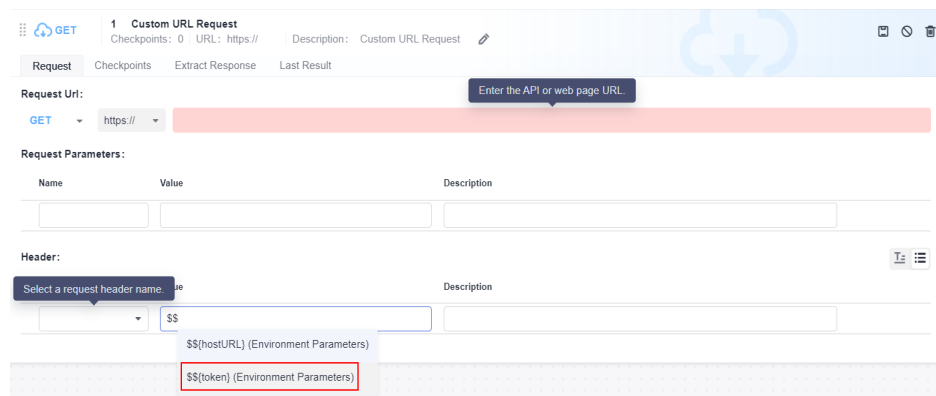
2. Select a value from the **Assign Value to Dynamic Environment Parameter** drop-down list box.



Step 3 Use a dynamic variable.

- Use the dynamic variable in a test case.

Reference the dynamic global variable in a test case as required. For details, see [Reference Format](#).



- Use a dynamic global variable in a test suite.

Add the test cases in **Step 2** and **Step 3** to a test suite in sequence, and select **Serial**. In this way, the latest value assigned to the dynamic global variable can be used during the execution of related test cases.

 **NOTE**

You are not advised to use dynamic global variables during parallel execution because the value assigning and sequence of the dynamic variables are uncertain.

----End

5.4.15 Importing an API Automation Case

Background

CodeArts TestPlan allows you to generate test cases by importing files in any of the following formats:

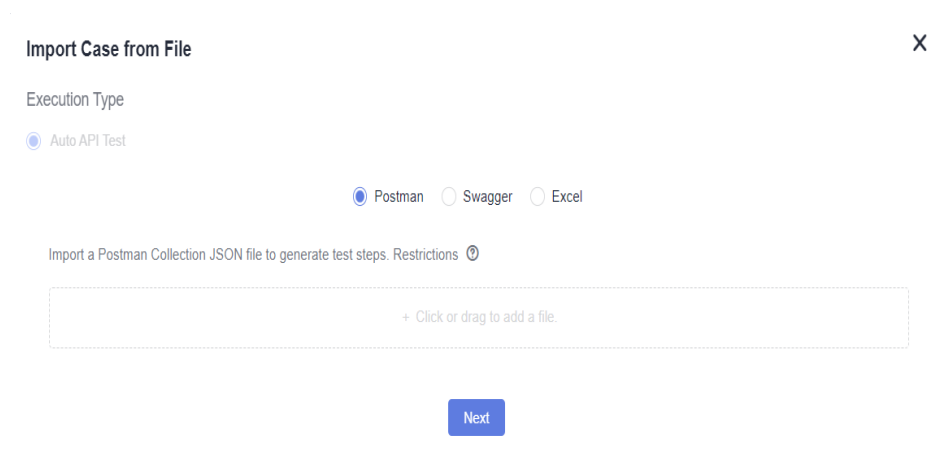
- Postman: Postman Collection v2.1 standard, Postman Collection JSON file
- Swagger: Swagger 2.0 and 3.0 standards, YAML file
- Excel: Excel file based on the given template

Importing a Postman or Swagger File

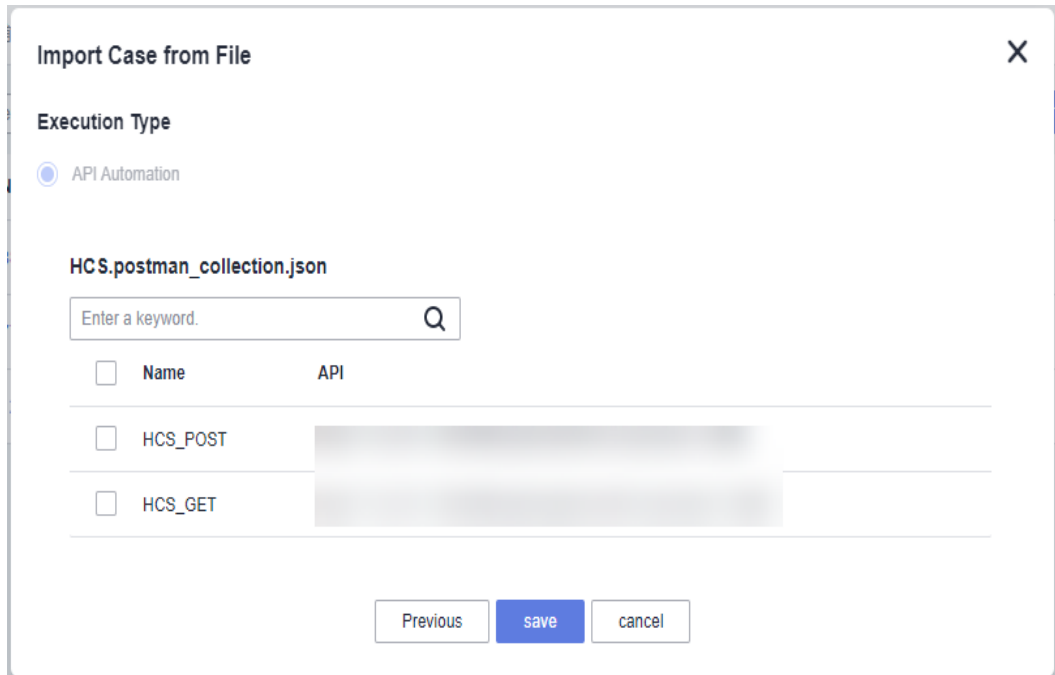
Only one test case can be imported at a time. In addition, only test steps can be generated for the imported test case. Preparations and followups are not supported.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** Click the **Auto API Test** tab and choose **Import > Import from File** on the right of the page. The **Import Case from File** window is displayed.
- Step 4** Select **Postman** or **Swagger**.

Drag a file from the local PC to the window, or click **Click or drag to add a file** and select a file from the local PC. Click **Next**.



Step 5 In the displayed list, select the items for which you want to generate test cases based on the step sequence and click **save**.



----End

Importing an Excel File

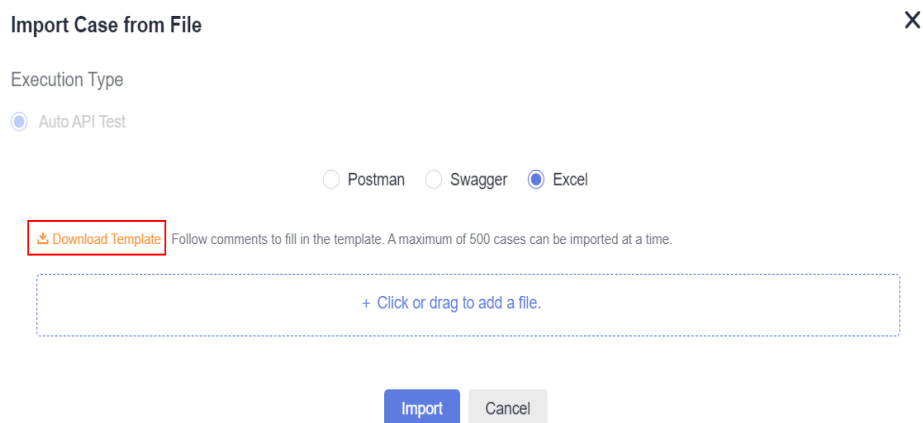
A maximum of 500 test cases can be imported at a time using an Excel file.

Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 Click the **Auto API Test** tab and choose **Import > Import from File** on the right of the page.

Step 4 Select **Excel** and click **Download Template**.



- Step 5** Open the Excel template on the local PC and edit the test case information based on the comments in the template headers. The columns marked with asterisks (*) are required.

The fields in the template are as follows.

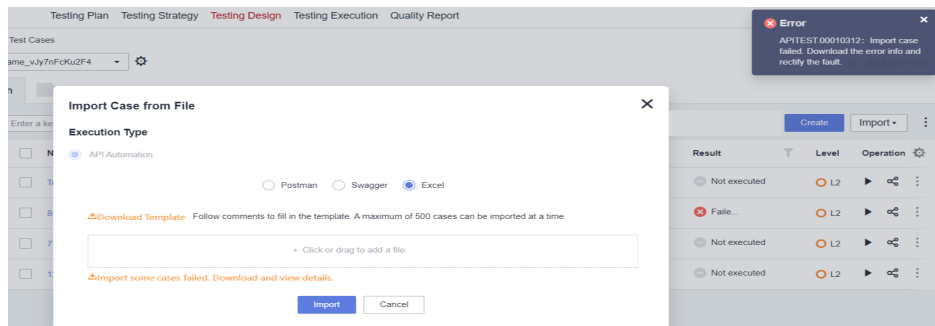
Field	Mandatory	Description
Case Name	Yes	The value can contain only 1 to 128 characters and allows letters, digits, and special characters (-_/*&`'^~:;(){}+=,×...—!@#\$\$%.[]<>?~").
Case Description	No	The value contains no more than 500 characters.
Request Type	Yes	Only GET, POST, PUT, and DELETE are supported.
Request Header Parameter	No	The format is key=value . If there are multiple parameters, separate them with &, that is, key=value&key1=value1 .
Request Address	Yes	The request protocol can be HTTP or HTTPS. The format is https://ip:port/pathParam?query=1 .
Environment Group	No	Environment parameter group.
IP Variable Name	No	Generates the variable name in the corresponding Environment Group , extracts the content of the Request Address , and generates the corresponding global variable.
Request Body Type	No	The value can be raw , json , or formdata , which corresponds to the text, JSON request body, or form parameter format on the page, respectively. If this parameter is empty, the JSON format is used by default.
Request Body	No	If the request body type is formdata , the request body format is key=value . If there are multiple parameters, separate them with &, that is, key=value&key2=value2 . When cases are imported using an Excel file, formdata does not support the request body in file format.
Checkpoint Matching Mode	No	Supports Exact match and Fuzzy match . Exact match indicates Equals , and Fuzzy match indicates Contains .

Field	Mandatory	Description
Expected Checkpoint Value	No	Target Value of the corresponding checkpoint.

Step 6 Save the edited Excel file and drag it from the local PC to the **Import Case from File** window, or click **Click or drag to add a file** and select a file from the local PC. Click **Next**.

Step 7 View the import result.

- Import successful: New test cases are displayed in the list. The number of new test cases is the same as the number of rows in the Excel file.
- Import failed: A failure message is displayed in the upper right corner.



Download the error list from the **Import Case from File** window. Modify the Excel file based on the error causes, and import again.

----End

5.4.16 Executing an API Automation Test Case


Prerequisites

An API automation test case has been created.

Common Execution

Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 On the **Auto API Test** tab page, locate the test case to be executed and click  in the **Operation** column to start automatic execution.

Step 4 After the execution is complete, you can view the execution result in the **Result** column of the test case list.


Click the test case name, click the execution history tab, and view the execution history of the test case.

Step 5 After confirming the test case execution result, set the test case status to **Completed** on the **Details** tab page.

----End

Execution with Specified Parameters

API automation test cases can be executed with parameters.

Step 1 In the test case list, click  in the **Operation** column and select **Specify Parameter to Execute**.

Step 2 In the dialog box that is displayed, select a version number (version number of the test plan to which the test case belongs) and click **Execute**.

Specify Parameter to Execute



Version :

Execute

Cancel

----End

5.5 Advanced Configurations of API Automation Test Cases

5.5.1 Built-in Functions

5.5.1.1 Binary Addition Operation

Function Name

\$add(intA, intB)

Function Description

Implements the addition operation between parameter A and parameter B, which support the following types:

- Numbers

- Environment parameters
- Local parameters
- Binary operations

Application Scenarios

The binary addition function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of the **test** parameter in the request URL is the binary addition function. Parameters A and B in the function are **1000**.

Name	Value	Description	Operation
test	\$add(1000,1000)		🗑️ +

- Request header

As shown in the following figure, the value of parameter **add** in the request header is the binary addition function. Parameter A in the function is the binary subtraction function **\$subtract (1001,1000)**, and parameter B is **-1**.

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
add	\$add(\$subtract(1001,1000),-1)		🗑️ +

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the binary addition function. Parameter A in the function is the local parameter **test**, and parameter B is **1**. For details about how to set local parameters, see [Local Parameters](#).

Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
body (JSON)	result	N/A		=	\$add(\${test},1)	🗑️ ↓ ↑ +

- **if** condition

As shown in the following figure, the target value of the **if** condition is the binary addition function. Parameter A in the function is **1**, and parameter B is the environment variable **status**. For details about how to set environment parameters, see [Setting Environment Parameters](#).



- **for** loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the binary addition function. Parameters A and B in the function are **1000**.



5.5.1.2 Binary Subtraction Operation

Function Name

\$subtract(intA, intB)

Function Description

Implements the subtraction operation between parameter A and parameter B, which support the following types:

- Numbers
- Environment parameters
- Local parameters
- Binary operations

Application Scenarios

The binary subtraction function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

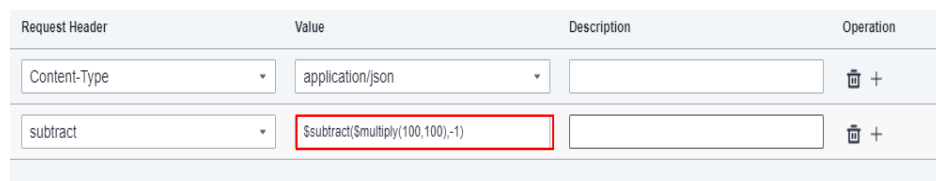
- Request URL

As shown in the following figure, the value of the **test** parameter in the request URL is the binary subtraction function. Parameters A and B in the function are **1001** and **1000** respectively.



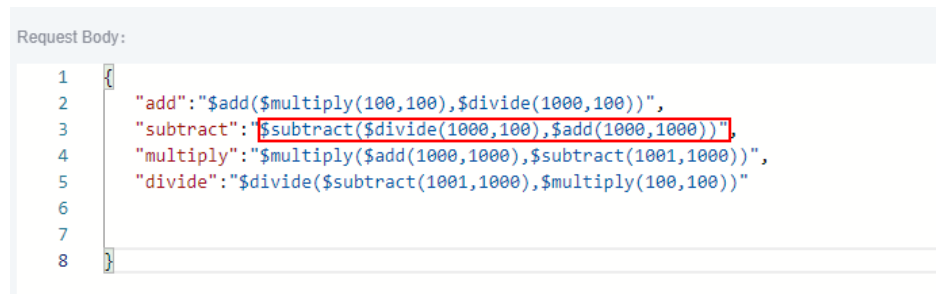
- Request header

As shown in the following figure, the value of parameter **subtract** in the request header is the binary subtraction function. Parameter A in the function is the binary multiplication function **\$multiply(100,100)**, and parameter B is **-1**.



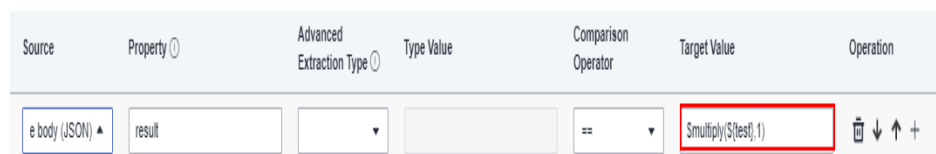
- Request body

As shown in the following figure, the binary subtraction function is used in the request body. Parameter A in the function is the binary division function **\$divide(1000,100)**, and parameter B is the binary addition function **\$add(1000,1000)**.



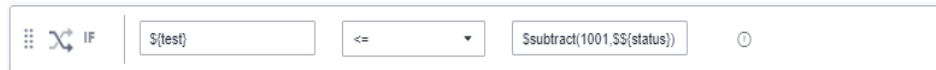
- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the binary subtraction function. Parameter A in the function is the local parameter **test**, and parameter B is **1**. For details about how to set local parameters, see [Local Parameters](#).

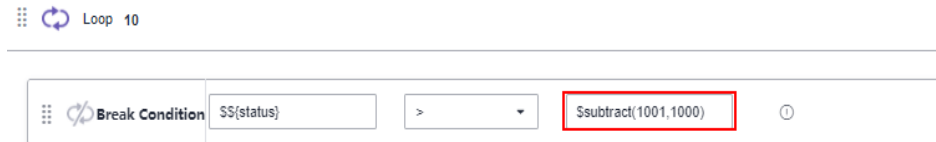


- if condition

As shown in the following figure, the target value of the **if** condition is the binary subtraction function. Parameter A in the function is **1001**, and parameter B is the environment variable **status**. For details about how to set environment parameters, see [Setting Environment Parameters](#).



- **for** loop interrupt condition
As shown in the following figure, the target value of the **for** loop interrupt condition is the binary subtraction function. Parameters A and B in the function are **1001** and **1000** respectively.



5.5.1.3 Binary Multiplication Operation

Function Name

\$multiply(intA, intB)

Function Description

Implements the multiplication operation between parameter A and parameter B, which support the following types:

- Numbers
- Environment parameters
- Local parameters
- Binary operations

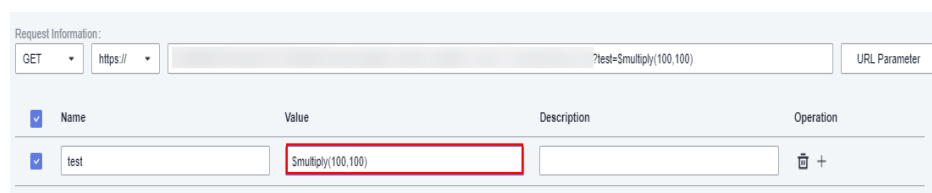
Application Scenarios

The binary multiplication function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL
As shown in the following figure, the value of the **test** parameter in the request URL is the binary multiplication function. Parameters A and B in the function are **100**.



- Request header

As shown in the following figure, the value of parameter **add** in the request header is the binary multiplication function. Parameter A in the function is the binary division function **\$divide(1000,100)**, and parameter B is **-1**.

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
multiply	\$multiply(\$divide(1000,100),-1)		🗑️ +

- Request body

As shown in the following figure, the binary multiplication function is used in the request body. Parameter A in the function is the binary addition function **\$add(1000,1000)**, and parameter B is the binary subtraction function **\$subtract(1001,1000)**.

```
Request Body:
1 {
2   "add": "$add($multiply(100,100),$divide(1000,100))",
3   "subtract": "$subtract($divide(1000,100),$add(1000,1000))",
4   "multiply": "$multiply($add(1000,1000),$subtract(1001,1000))",
5   "divide": "$divide($subtract(1001,1000),$multiply(100,100))"
6 }
7
8 }
```

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the binary multiplication function. Parameter A in the function is the local parameter **test**, and parameter B is **1**. For details about how to set local parameters, see [Local Parameters](#).

Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
e body (JSON)	result			==	\$multiply(\$test,1)	🗑️ ⬇️ ⬆️ ⬇️ +

- if condition

As shown in the following figure, the target value of the **if** condition is the binary multiplication function. Parameter A in the function is **100**, and parameter B is the environment variable **status**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

IF	Condition	Operator	Target Value
\$test	<=	\$multiply(100,\$status)	

- for loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the binary multiplication function. Parameters A and B in the function are **100**.

Break Condition	Condition	Operator	Target Value
SS(status)	>	\$multiply(100,100)	

5.5.1.4 Binary Division Operation

Function Name

\$divide(intA, intB, intC)

Function Description

Implements the division operation between parameter A and parameter B. C is the precision value. Parameters A, B, and C support the following types:

- Numbers
- Environment parameters
- Local parameters
- Binary operations
 - Division operation without precision: For exact division, the value is the number of reserved digits. For inexact division, the value is rounded off with six decimal places by default.
 - Division operation with precision: The precision value is an integer ranging from 1 to 6. For exact division, the reserved decimal places must be in the precision range. For inexact division, the value is rounded off with the specified number of decimal places.

Application Scenarios

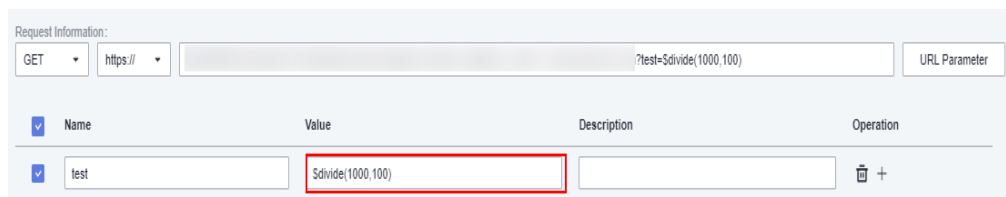
The binary division function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

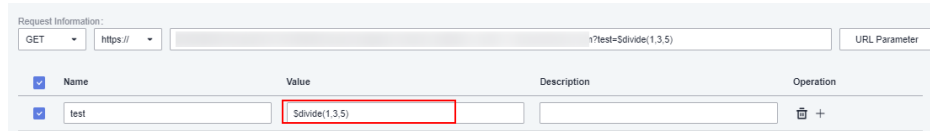
Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the binary division function. Parameter A in the function is **1000** and parameter B is **100**.

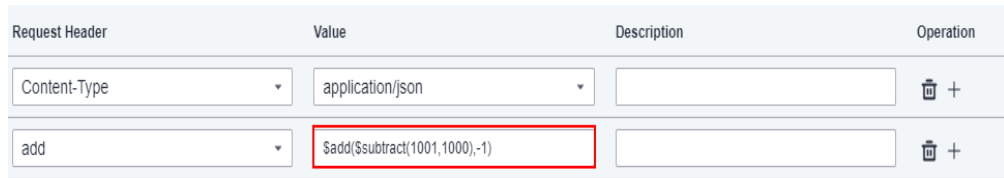


- As shown in the following figure, the value of **test** in the request URL is the binary division function with a precision value. Parameter A in the function is **1**, parameter B is **3**, and the precision value is **5**.

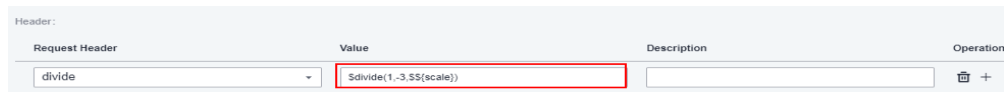


- Request header

As shown in the following figure, the value of **divide** in the request header is the binary division function. Parameter A in the function is the binary addition operation **\$add(1000,1000)**, and parameter B is **-1**.

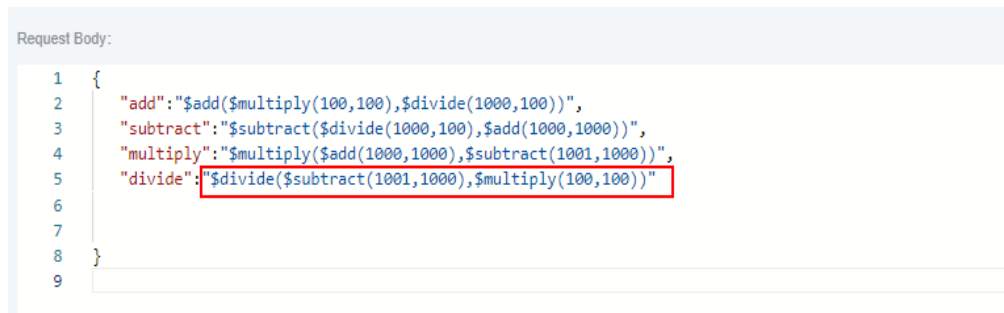


As shown in the following figure, the value of **divide** in the request header is the binary division function with a precision value. Parameter A in the function is **1**, parameter B is **-3**, and parameter C is the global environment parameter **\$\$scale**.

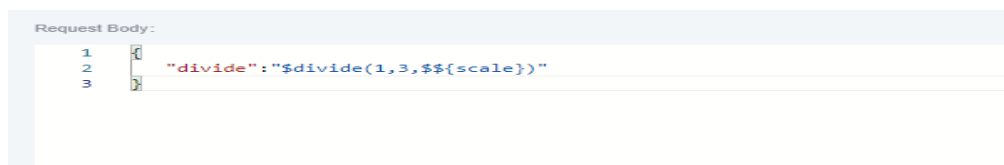


- Request body

As shown in the following figure, the binary division function is used in the request body. Parameter A in the function is the binary subtraction operation **\$subtract(1001,1000)**, and parameter B is the binary multiplication operation **\$multiply(100,100)**.



As shown in the following figure, the binary division function with a precision value is used in the request body. Parameter A in the function is **1**, parameter B is **3**, and parameter C is the global environment parameter **\$\$scale**.



- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the binary division function. Parameter A in the function is the local parameter **test**, and parameter B is **1**. For details about how to set local parameters, see [Local Parameters](#).

Check whether the response is the expected result. ⓘ

Source	Property ⓘ	Advanced Extraction Type ⓘ	Type Value	Comparison Operator	Target Value	Operation
e body (JSON) ▲	result			==	Sdivide(S{test},1)	🗑️ ↓ ↑ +

As shown in the following figure, the target value of the checkpoint property **result** is the binary division function with a precision value. Parameter A in the function is the local parameter **test**, parameter B is **2**, and parameter C is **5**. For details about how to set local parameters, see [Local Parameters](#).

Source	Property ⓘ	Advanced Extraction Type ⓘ	Type Value	Comparison Operator	Target Value	Operation
e body (JSON) ▲	result			==	Sdivide(S{test},2.5)	🗑️ ↓ ↑ +

- **if condition**

As shown in the following figure, the target value of the **if** condition is the binary division function. Parameter A in the function is **1**, and parameter B is the environment variable **status**. Parameter C is the local parameter **localScale**. For details about how to set local parameters, see [Local Parameters](#).

Source	Property ⓘ	Advanced Extraction Type ⓘ	Type Value	Comparison Operator	Target Value	Operation
IF	S{test}			>=	Sdivide(1,3,S{localScale})	🗑️ ↓ ↑ + ⓘ

As shown in the following figure, the target value of the **if** condition is the binary division function with a precision value. Parameter A in the function is **1** and parameter B is **3**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

Source	Property ⓘ	Advanced Extraction Type ⓘ	Type Value	Comparison Operator	Target Value	Operation
IF	S{test}			>=	Sdivide(1,3,S{localScale})	🗑️ ↓ ↑ + ⓘ

- **for loop interrupt condition**

As shown in the following figure, the target value of the **for** loop interrupt condition is the binary division function. Parameter A in the function is **1000**, and parameter B is **100**.

Source	Property ⓘ	Advanced Extraction Type ⓘ	Type Value	Comparison Operator	Target Value	Operation
Loop 10 Break Condition	SS{status}			>	Sdivide(100,100)	🗑️ ↓ ↑ + ⓘ

As shown in the following figure, the target value of the **for** loop interrupt condition is the binary division function with a precision value. Parameter A in the function is **1**, parameter B is **3**, and parameter C is the global environment parameter **SS{scale}**.

Source	Property ⓘ	Advanced Extraction Type ⓘ	Type Value	Comparison Operator	Target Value	Operation
Loop 10 Break Condition	SS{status}			==	Sdivide(1,3,SS{scale})	🗑️ ↓ ↑ + ⓘ

5.5.1.5 Obtaining the Current Timestamp

Function Name

\$timestamp()

Function Description

Obtains the total number of milliseconds from 1970-01-01 00:00:00 to the current time.

Application Scenarios

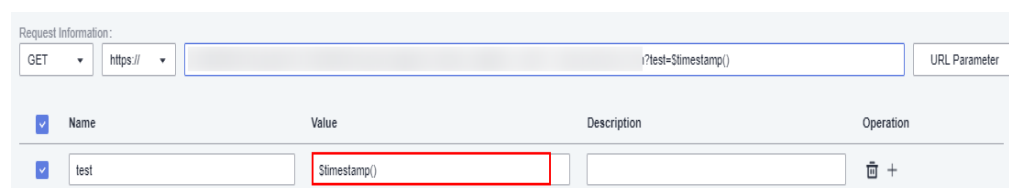
The function for obtaining the current timestamp can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

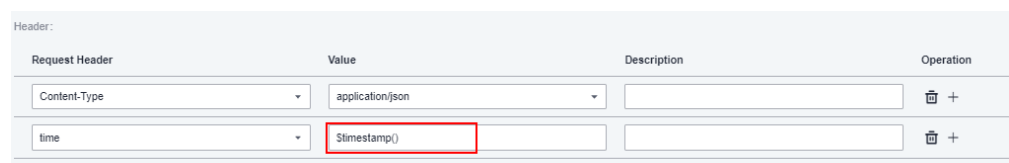
- Request URL

As shown in the following figure, the value of **test** in the request URL is the function for generating the current timestamp.



- Request header

As shown in the following figure, the value of **time** in the request header is the function for generating the current timestamp.



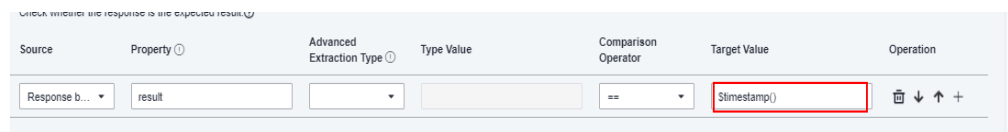
- Request body

As shown in the following figure, the request body uses the function for generating the current timestamp.

```
Request Body:
1  {
2    "time": "$timestamp()"
3  }
4
```

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the function for generating the current timestamp.



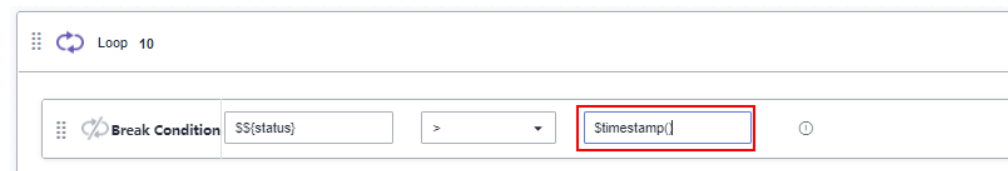
- if condition

As shown in the following figure, the target value of the **if** condition is the function for generating the current timestamp.



- for loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the function for generating the current timestamp.



5.5.1.6 Obtaining a Specified Timestamp

Function Name

\$getTimeBeforeHour(doubleA)

Function Description

Obtains the timestamp of the time that is *A* hours ago. The timestamp is the total number of milliseconds from 1970-01-01 00:00:00 to the specified time.

Parameter *A* in the function supports the following types:

- Numbers
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

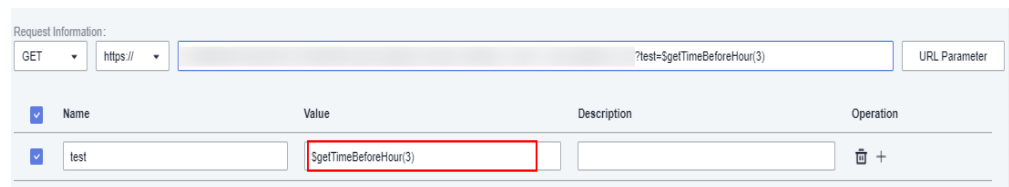
The function for obtaining the specified timestamp can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

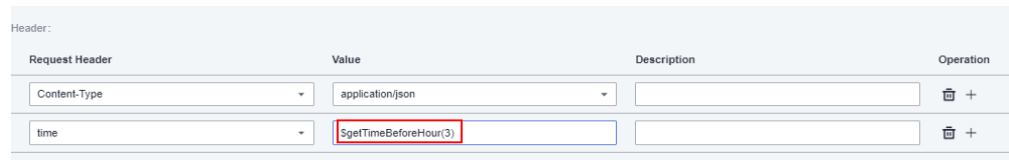
As shown in the following figure, the value of **test** in the request URL is the function for obtaining the specified timestamp. Parameter A in the function is **3**.



The screenshot shows the 'Request Information' configuration interface. At the top, there are dropdowns for 'GET' and 'https://', followed by a text input field containing '?test=\$getTimeBeforeHour(3)' and a 'URL Parameter' button. Below this is a table with columns: Name, Value, Description, and Operation. The table contains one row with 'test' in the Name column, '\$getTimeBeforeHour(3)' in the Value column, an empty Description, and a trash icon with a plus sign in the Operation column.

- Request header

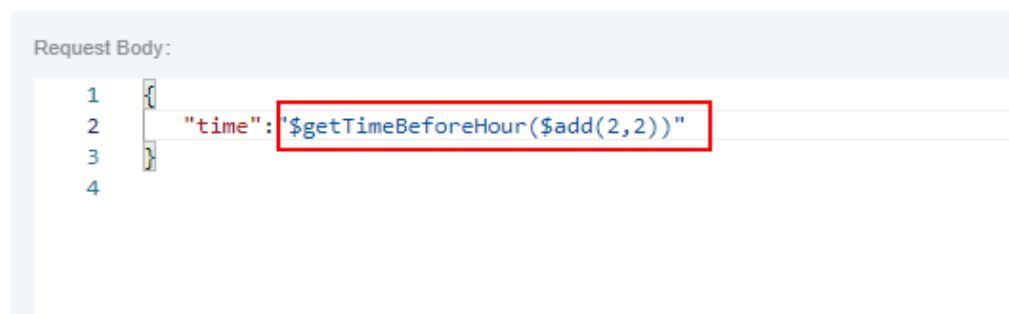
As shown in the following figure, the value of **time** in the request header is the function for obtaining the specified timestamp. Parameter A in the function is **3**.



The screenshot shows the 'Header' configuration interface. It features a table with columns: Request Header, Value, Description, and Operation. The table has two rows. The first row has 'Content-Type' in the Request Header column, 'application/json' in the Value column, an empty Description, and a trash icon with a plus sign in the Operation column. The second row has 'time' in the Request Header column, '\$getTimeBeforeHour(3)' in the Value column, an empty Description, and a trash icon with a plus sign in the Operation column.

- Request body

As shown in the following figure, the request body uses the function for obtaining the specified timestamp. Parameter A in the function is the binary addition operation **\$add(2,2)**.



The screenshot shows the 'Request Body' configuration interface. It displays a JSON body editor with a line number indicator on the left (1, 2, 3, 4). The JSON content is:

```
{
  "time": "$getTimeBeforeHour($add(2,2))"
}
```

 The value '\$getTimeBeforeHour(\$add(2,2))' is highlighted with a red box.

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the function for obtaining the specified timestamp. Parameter A in

the function is the local parameter **test**. For details about how to set local parameters, see [Local Parameters](#).



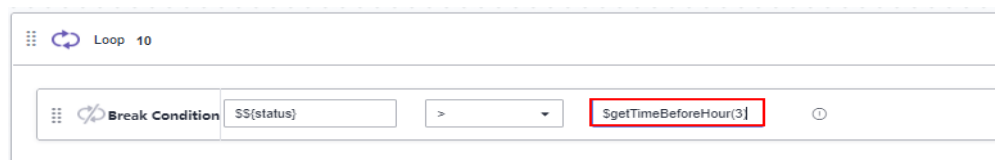
- **if** condition

As shown in the following figure, the target value of the **if** condition is the function for obtaining the specified timestamp. Parameter A in the function is the environment variable **time**. For details about how to set environment parameters, see [Setting Environment Parameters](#).



- **for** loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the function for obtaining the specified timestamp. Parameter A in the function is **3**.



5.5.1.7 Converting a Date into a Timestamp

Function Name

\$dateFormat(String A)

Parameter Description

String A: date and time value. The following formats are supported:

- yyyy-MM-dd HH:mm:ss or MM-dd-yyyy HH:mm:ss
- yyyy MM dd HH:mm:ss or MM dd yyyy HH:mm:ss
- yyyy.MM.dd HH:mm:ss or MM.dd.yyyy HH:mm:ss
- yyyy/MM/dd HH:mm:ss or MM/dd/yyyy HH:mm:ss

Function Description

Converts a string into a timestamp. The timestamp is the total number of milliseconds from 1970-01-01 00:00:00 to the specified time.

Parameter A in the function supports the following types:

- Date and time in the format listed in [Parameter Description](#)
- Environment parameters
- Local parameters

- Other built-in functions

Application Scenarios

The date-to-timestamp function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the date-to-timestamp conversion function. Parameter A in the function is the environment parameter **date**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

Name	Value	Description	Operation
test	<code>\$dateFormat(\$date)</code>		🗑️ +

- Request header

As shown in the following figure, the value of **date** in the request header is the date-to-timestamp conversion function. Parameter A in the function is the environment parameter **date**.

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
time	<code>\$dateFormat(\$date)</code>		🗑️ +

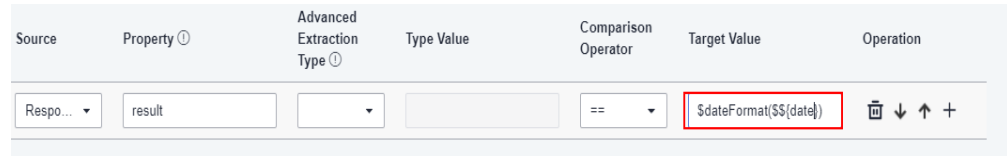
- Request body

As shown in the following figure, the request body uses the date-to-timestamp conversion function. Parameter A in the function is **2020.09.11 11:00:00**.

```
1 {
2   "date": "$dateFormat(2020.09.11 11:00:00)"
3 }
4
```

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the date-to-timestamp function. Parameter A in the function is the environment parameter **test**. For details about how to set local parameters, see [Local Parameters](#).



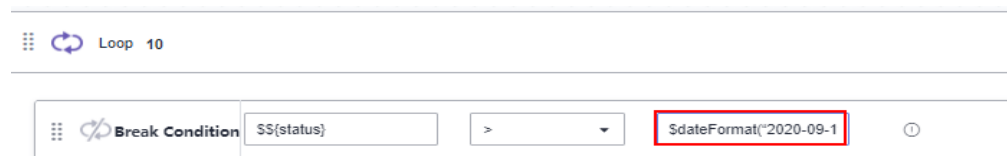
- if condition

As shown in the following figure, the target value of the **if** condition is the date-to-timestamp function. Parameter A in the function is **2020-09-11 11:00:00**.



- for loop interrupt condition

As shown in the following figure, the target value of the **for** loop interruption condition is the date-to-timestamp function. Parameter A in the function is **2020-09-11 11:00:00**.



5.5.1.8 Converting a Timestamp into a Date

Function Name

\$timestamp_format(String A, String B)

Parameter Description

- **String A:** timestamp to be converted. The value is a numeric string containing a maximum of 20 digits. You can also use the built-in function **\$timestamp()** to obtain the current timestamp.
- **String B:** date and time value, consisting of the year, month, day, hour, minute, second, and millisecond. Where,
 - Year: represented by letter "y" and consists of 4 characters.
 - Month: represented by letter "M" and consists of 1 to 2 characters.
 - Day: represented by letter "d" and consists of 1 to 2 characters.
 - Hour: represented by letter "H" and consists of 0 to 2 characters.
 - Minute: represented by letter "m" and consists of 0 to 2 characters.
 - Second: represented by letter "s" and consists of 0 to 2 characters.
 - Millisecond: represented by letter "S" and consists of 3 characters.

 **NOTE**

1. Each letter has its own meaning and is case sensitive.
2. If one of "H", "m", "s" is **0**, the other two must also be **0**.

In a date and time value, spaces, hyphens (-), slashes (/), and colons (:) are optional. For example, the formats include but are not limited to the following:

- yyyy-MM-dd HH:mm:ss
- yyyyMMddHHmmss
- yyyyMMddHHmmssSSS
- yyyy-M-d H:m:s
- MM-dd-yyyy HH:mm:ss
- MM/dd/yyyy HH/mm/ss
- MM/d/yyyy H/mm/ss
- MM/d/yyyy H/mm/ss SSS
- yyyyMMdd SSS

Function Description

Converts a timestamp into a date in the corresponding format. The timestamp is the total number of milliseconds from 1970-01-01 00:00:00 to the specified time.

Parameter A in the function supports the following types:

- Date and time in the format listed in [Parameter Description](#)
- Environment parameters
- Local parameters
- Other built-in functions

Parameter B in the function supports the following types:

- Date and time in the format listed in [Parameter Description](#)
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

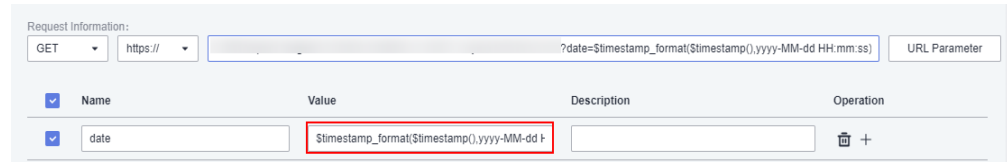
The timestamp-to-date function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **date** in the request URL is the timestamp-to-date conversion function. Parameter A in the function is the built-in function **\$timestamp()** for obtaining the current timestamp. For details, see [Obtaining the Current Timestamp](#). Parameter B is **yyyy-MM-dd HH:mm:ss**.



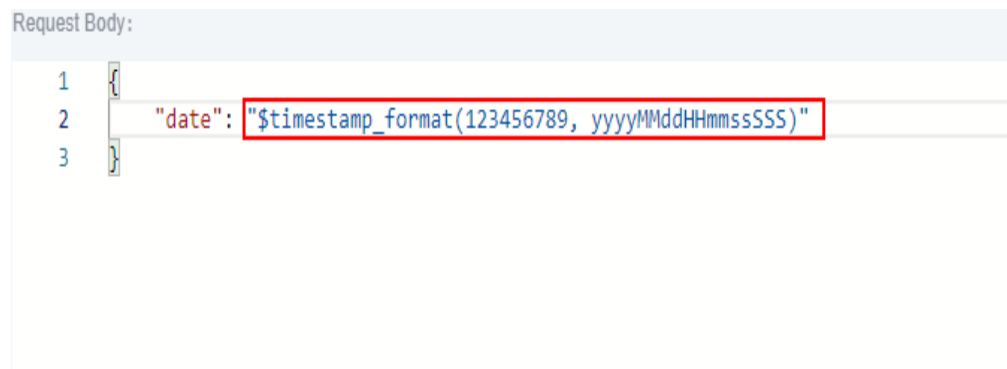
- Request header

As shown in the following figure, the value of **date** in the request header is the timestamp-to-date conversion function. Parameter A in the function is the environment parameter **date**, and parameter B is **yyyyMMddHHmmss**. For details about how to set environment parameters, see [Setting Environment Parameters](#).



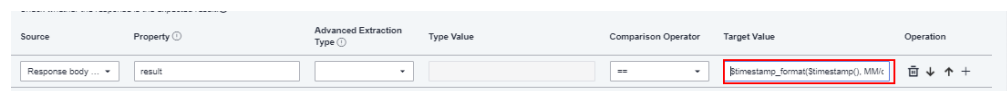
- Request body

As shown in the following figure, the request body uses the timestamp-to-date conversion function. Parameter A in the function is **123456789**, and parameter B is **yyyyMMddHHmmssSSS**.



- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the timestamp-to-date function. Parameter A in the function is the built-in function **\$timestamp()** for obtaining the current timestamp, and parameter B is **MM/dd/yyyy HH/mm/ss**.



- if condition

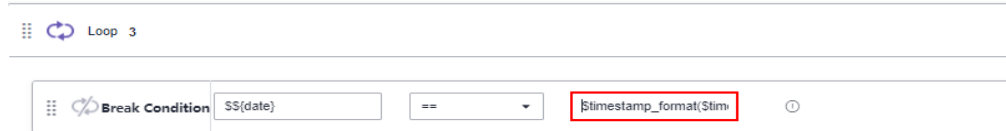
As shown in the following figure, the target value of the **if** condition is the timestamp-to-date function. Parameter A in the function is the built-in

function **\$timestamp()** for obtaining the current timestamp, and parameter B is **MM/d/yyyy H/mm/ss SSS**.



- **for** loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the timestamp-to-date function. Parameter A in the function is the built-in function **\$timestamp()** for obtaining the current timestamp, and parameter B is **yyyyMMdd SSS**.



5.5.1.9 Timestamp Addition and Subtraction Operations

Function Name

\$timeStampCalculation(longA, StringB)

Parameter Description

- **longA**: timestamp in milliseconds.
- **StringB**: time difference. The value is an integer plus a letter ("d": day; "h": hour; "s": second). For example, **1d** indicates that one day is added to the specified timestamp, and **-1d** indicates that one day is subtracted.

Function Description

Implements the addition and subtraction operations between parameter A of the long type and parameter B of the string type. Parameters A and B support the following types:

- Value in the format listed in [Parameter Description](#)
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

Timestamp addition and subtraction operations can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition

- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the timestamp addition and subtraction function. Parameter A in the function is **1607939485441**, and parameter B is **1d**.

Name	Value	Description	Operation
test	TimeStampCalculation(1607939485441,1d)		

- Request header

As shown in the following figure, the value of **time** in the request header is the timestamp addition and subtraction function. Parameter A in the function is the date-to-timestamp conversion function **\$dateFormat(2020.09.11 11:00:00)**, and parameter B is **-86400s**.

Request Header	Value	Description	Operation
Content-Type	application/json		
time	TimeStampCalculation(timestamp(2020.09.11 11:00:00),-86400s)		

- Request body

As shown in the following figure, the request body uses the timestamp addition and subtraction function. Parameter A in the function is **\$dateFormat(2020.09.11 11:00:00)**, and parameter B is **1d**.

```
1 {
2   "time": "$timeStampCalculation($dateFormat(2020.09.11 11:00:00),1d)"
3 }
4
5
```

- Checkpoint property

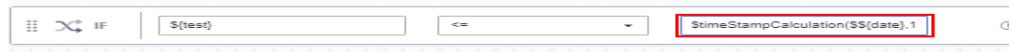
As shown in the following figure, the target value of the checkpoint property **result** is the timestamp addition and subtraction function. Parameter A in the function is the environment parameter **time**, and parameter B is **-24h**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
Response body ...	result			==	TimeStampCalculation(\$time,-24h)	

- **if** condition

As shown in the following figure, the target value of the **if** condition is the timestamp addition and subtraction function. Parameter A in the function is

the environment variable **status**, and parameter B is **1d**. For details about how to set environment parameters, see [Setting Environment Parameters](#).



- **for** loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the timestamp addition and subtraction function. Parameter A in the function is **1607939485441**, and parameter B is **1d**.



5.5.1.10 Generating Base64 Encoding

Function Name

`$encode_base64(StringA)`

Parameter Description

StringA: string to be encoded. The value contains a maximum of 256 bytes and supports the following special characters: !*(); ; @ & = + \$, / ? # [] - . ~ % < > _ { } ` ^ .

Function Description

Performs Base64 encoding on strings. Parameter A supports the following types:

- Value in the format listed in [Parameter Description](#)
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

The Base64 encoding generation function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the Base64 encoding generation function. Parameter A in the function is the string **abc123**.

Request Information:

Name	Value	Description	Operation
test	Sencode_base64(abc123)		🗑️ +

- Request header

As shown in the following figure, the value of **Accept-Encoding** in the request header is the Base64 encoding generation function. Parameter A in the function is the string **abc123**.

Header:

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
Accept-Encoding	Sencode_base64(abc123)		🗑️ +

- Request body

As shown in the following figure, the request body uses the Base64 encoding generation function. Parameter A in the function is **\$uuid()**.

Request Body:

```
1 {
2   "encoding": "$encode_base64($uuid())"
3 }
4
5
```

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the Base64 encoding generation function. Parameter A in the function is the local parameter **test**. For details about how to set local parameters, see [Local Parameters](#).

Check whether the response is the expected result ⓘ

Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
Respons...	result			Contains	Sencode_base64(\$test)	🗑️ ↓ ↑ +

- if condition

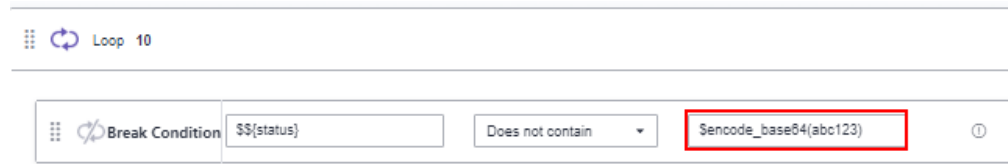
As shown in the following figure, the target value of the **if** condition is the Base64 encoding generation function. Parameter A in the function is the environment variable **\$status**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

IF

\$(test)	Contains	Sencode_base64(\$status)
----------	----------	--------------------------

- for loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the Base64 encoding generation function. Parameter A in the function is the string **abc123**.



5.5.1.11 Generating SHA512 Encoding

Function Name

\$sha512(StringA)

Parameter Description

StringA: string to be encoded. The value contains a maximum of 256 bytes and supports the following special characters: !*() ;@&=+\$/?#[]-.~%<>_[]`^.

Function Description

Performs SHA512 encoding on strings. Parameter A supports the following types:

- Value in the format listed in [Parameter Description](#)
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

The SHA512 encoding generation function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the SHA512 encoding generation function. Parameter A in the function is the string **abc123**.

Request Information:

GET https:// /?test=\$sha512(abc123) URL Parameter

Name	Value	Description	Operation
test	\$sha512(abc123)		+

- Request header

As shown in the following figure, the value of **Accept-Encoding** in the request header is the SHA512 encoding generation function. Parameter A in the function is the string **abc123**.

Header:

Request Header	Value	Description	Operation
Content-Type	application/json		+
Accept-Encoding	\$sha512(abc123)		+

- Request body

As shown in the following figure, the request body uses the SHA512 encoding generation function. Parameter A in the function is **\$uuid()**.

Request Body:

```

1  {
2    "encoding": "$sha512($uuid())"
3  }
4
5

```

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the SHA512 encoding generation function. Parameter A in the function is the local parameter **test**. For details about how to set local parameters, see [Local Parameters](#).

Check whether the response is the expected result

Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
Respons...	result			Contains	\$sha512(\$test)	+

- if condition

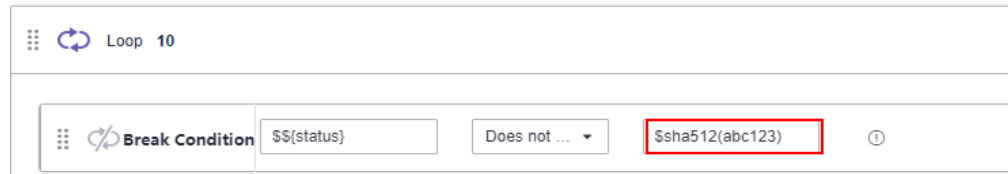
As shown in the following figure, the target value of the **if** condition is the SHA512 encoding generation function. Parameter A in the function is the environment variable **status**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

IF

\$(test) Contains \$sha512(\$status)

- for loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the SHA512 encoding generation function. Parameter A in the function is the string **abc123**.



5.5.1.12 Generating an MD5 Hash Value

Function Name

\$md5(StringA)

Parameter Description

StringA: string to be encoded. The value contains a maximum of 256 bytes and supports the following special characters: !*(); ; @ & = + \$, / ? # [] - . ~ % < > _ { } ` ^ .

Function Description

Converts a string into an MD5 hash value. Parameter A supports the following types:

- Value in the format listed in [Parameter Description](#)
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

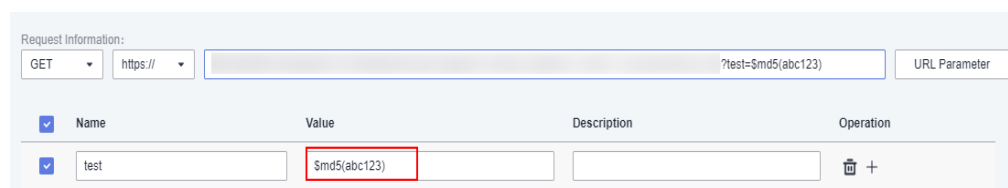
The MD5 hash function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the MD5 hash value generation function. Parameter A in the function is the string **abc123**.



- Request header

As shown in the following figure, the value of **Accept-Encoding** in the request header is the MD5 hash value generation function. Parameter A in the function is the string **abc123**.

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
Accept-Encoding	\$md5(abc123)		🗑️ +

- Request body

As shown in the following figure, the request body uses the MD5 hash value generation function. Parameter A in the function is **\$uuid()**.

```

Request Body:
1  {
2  |   "encoding": "$md5($uuid())"
3  | }
4
5
    
```

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the MD5 hash value generation function. Parameter A in the function is the local parameter **test**. For details about how to set local parameters, see [Local Parameters](#).

Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
Respons...	result			Contains	\$md5(\$test)	🗑️ ↓ ↑ +

- if condition

As shown in the following figure, the target value of the **if** condition is the MD5 hash value generation function. Parameter A in the function is the environment variable **status**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

⋮ IF	\$(test)	Contains	\$md5(\$\$(status))	📄
------	----------	----------	---------------------	---

- for loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the MD5 hash value generation function. Parameter A in the function is the string **abc123**.

⋮ Loop 10				
⋮ Break Condition	\$\$status	Does not ...	\$md5(abc123)	📄

5.5.1.13 Generating a Random Number in a Specified Range

Function Name

\$random_int(intA, intB)

Function Description

Generates a random number within the range between parameter A and parameter B. CodeArts TestPlan can generate random numbers containing a maximum of 10 digits, that is, the value range is [-9999999999, +9999999999].

Parameters A and B support the following types:

- Numbers
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

The function for generating random numbers within a specified range can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the function for generating random numbers within a specified range. Parameter A in the function is **1**, and parameter B is **100**.

<input checked="" type="checkbox"/>	Name	Value	Description	Operation
<input checked="" type="checkbox"/>	test	\$random_int(1,100)		🗑️ +

- Request header

As shown in the following figure, the value of **number** in the request header is the function for generating random numbers within a specified range. Parameter A in the function is **1**, and parameter B is **100**.

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
number	\$random_int(1,100)		🗑️ +

- Request body

As shown in the following figure, the request body uses the function for generating random numbers within a specified range. Parameter A in the function is the binary addition operation **\$add(5,5)**. Parameter B is the binary multiplication operation **\$multiply(5,5)**.

```
Request Body:
1  {
2  |   "number": "$random_int($add(5,5),$multiply(5,5))"
3  | }
4  |
5  |
```

- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the function for generating random numbers within a specified range. Parameter A in the function is **1**, and parameter B is the local parameter **test**. For details about how to set local parameters, see [Local Parameters](#).

Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
Respons...	result			==	\$random_int(1,\$(test))	🗑️ ↓ ↑ +

- if condition

As shown in the following figure, the target value of the **if** condition is the function for generating random numbers within a specified range. Parameter A in the function is **1**, and parameter B is the environment variable **status**. For details about how to set environment parameters, see [Setting Environment Parameters](#).

IF	Source	Comparison Operator	Target Value
IF	\$(test)	==	\$random_int(1,\$\$(status))

- for loop interrupt condition

As shown in the following figure, the target value of the **for** loop interrupt condition is the function for generating random numbers within a specified range. Parameter A in the function is **1**, and parameter B is **100**.

Loop	Break Condition	Comparison Operator	Target Value
Loop 10	\$\$\$(status)	!=	\$random_int(1,100)

5.5.1.14 Generating a Random String of a Specified Length

Function Name

\$random_string(intA)

Function Description

Generates a random string of a specified length. Parameter A supports the following types:

- Numbers
- Environment parameters
- Local parameters
- Other built-in functions

Application Scenarios

The function for generating random strings of a specified length can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the function for generating random strings of a specified length. Parameter A in the function is **3**.

Request Information:

Name	Value	Description	Operation
test	Srandom_string(3)		🗑️ +

- Request header

As shown in the following figure, the value of the **string** parameter in the request header is the function for generating random strings of a specified length. Parameter A in the function is **3**.

Header:

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
string	Srandom_string(3)		🗑️ +

- Request body

As shown in the following figure, the request body uses the function for generating random strings of a specified length. Parameter A in the function is the binary addition operation **\$add(2,2)**.

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

As shown in the following figure, the value of **test** in the request URL is the UUID generation function.

The screenshot shows the 'Request Information' configuration. The method is 'GET' and the URL is 'https://'. A parameter named 'test' is defined with the value '\$uuid()'. The 'test' parameter name and its value are highlighted with a red box.

Name	Value	Description	Operation
test	\$uuid()		🗑️ +

- Request header

As shown in the following figure, the value of **time** in the request header is the UUID generation function.

The screenshot shows the 'Header' configuration. Two headers are listed: 'Content-Type' with value 'application/json' and 'time' with value '\$uuid()'. The 'time' header name and its value are highlighted with a red box.

Request Header	Value	Description	Operation
Content-Type	application/json		🗑️ +
time	\$uuid()		🗑️ +

- Request body

As shown in the following figure, the request body uses the UUID generation function.

The screenshot shows the 'Request Body' configuration. The body is a JSON object with a 'string' field containing the value '\$uuid()'. The 'string' field name and its value are highlighted with a red box.

```

1 {
2   "string": "$uuid()"
3 }
    
```

- Checkpoint property

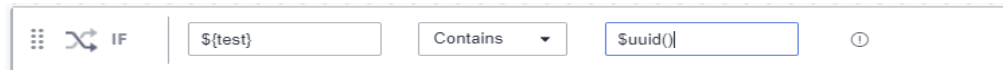
As shown in the following figure, the target value of the checkpoint property **result** is the UUID generation function.

The screenshot shows the 'Checkpoint property' configuration. The source is 'Respo...', the property is 'result', and the target value is '\$uuid()'. The target value is highlighted with a red box.

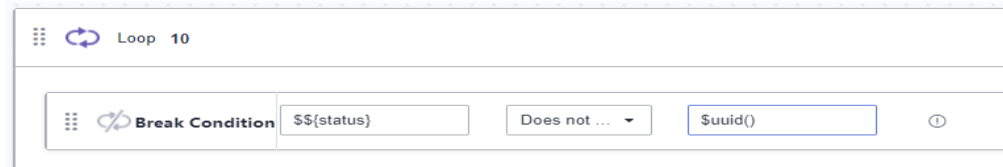
Source	Property	Advanced Extraction Type	Type Value	Comparison Operator	Target Value	Operation
Respo...	result			Contains	\$uuid()	🗑️ ↓ ↑ +

- **if** condition

As shown in the following figure, the target value of the **if** condition is the UUID generation function.



- **for** loop interrupt condition
As shown in the following figure, the target value of the **for** loop interrupt condition is the UUID generation function.



5.5.1.16 Obtaining an Array via Reverse Index

Function Name

\$getReverseltem(StringA, intB)

Parameter Description

- **StringA**: array or list element path of the response body or response header.
- **intB**: subscript of the array in reverse order. **0** indicates the last array, and **2** indicates the last but one array.

Function Description

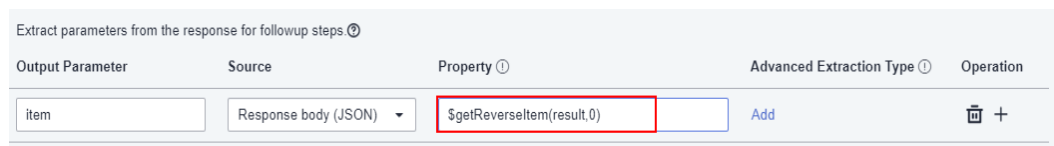
Obtains an array from a response body or header based on the reverse index.

Application Scenarios

The built-in function for obtaining arrays during response extraction based on the reverse index can be used for API automation.

Example

As shown in the following figure, the property value of the response body parameter **item** is the function for obtaining arrays via reverse Index. Parameter A in the function is the response body property **result**, and parameter B is **0**.



5.5.1.17 Obtaining the Element Values of an Array via Reverse Index

Function Name

\$getReverseltem(StringA, StringB, intC)

Parameter Description

- **StringA**: array or list element path of the response body or response header.
- **StringB**: property name of the array object.
- **intC**: subscript of the array in reverse order. **0** indicates the last array, and **2** indicates the last but one array.

Function Description

Obtains a specified element value of an array from a response body or header based on the reverse index.

Application Scenarios

The built-in function for obtaining the element values of an array during response extraction based on the reverse index can be used for API automation.

Example

As shown in the following figure, the property value of the response parameter **name** is the element value of the array obtained via reverse index. Parameter A in the function is the response body property **result**, parameter B is the parameter name **name** in the last N+1 array in the result, and parameter C is **0**.

Extract parameters from the response for followup steps ⓘ				
Output Parameter	Source	Property ⓘ	Advanced Extraction Type ⓘ	Operation
item	Response body (JSON) ▾	<code>\$getReverseltem(result,0)</code>	Add	🗑️ +

5.5.1.18 Converting Uppercase Letters into Lowercase Letters

Function Name

`$toLower(String A)`

Parameter Description

- **String A**: string to be converted into lowercase letters.

Parameter A supports the following types:

- Strings
- Environment parameters
- Local parameters

Function Description

Converts all characters in the specified input string into lowercase characters.

Application Scenarios

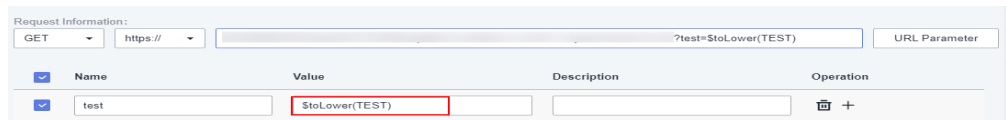
The function for converting uppercase letters into lowercase letters can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

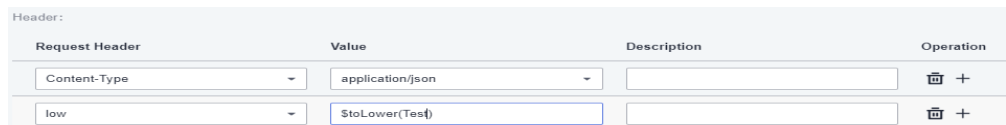
- Request URL

As shown in the following figure, the value of **test** in the request URL is the function for converting uppercase letters into lowercase letters. Parameter A in the function is **TEST**.



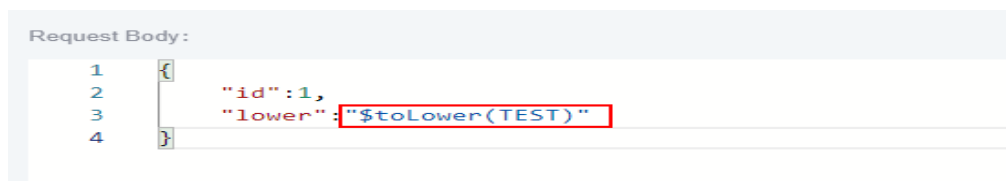
- Request header

As shown in the following figure, the value of **lower** in the request header is the function for converting uppercase letters into lowercase letters. Parameter A in the function is **Test**.



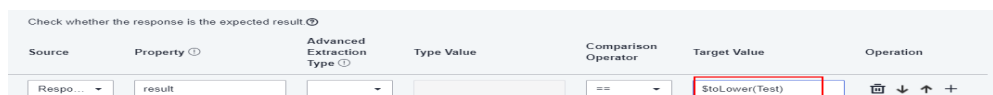
- Request body

As shown in the following figure, the function for converting uppercase letters into lowercase letters is used. Parameter A in the function is **Test**.



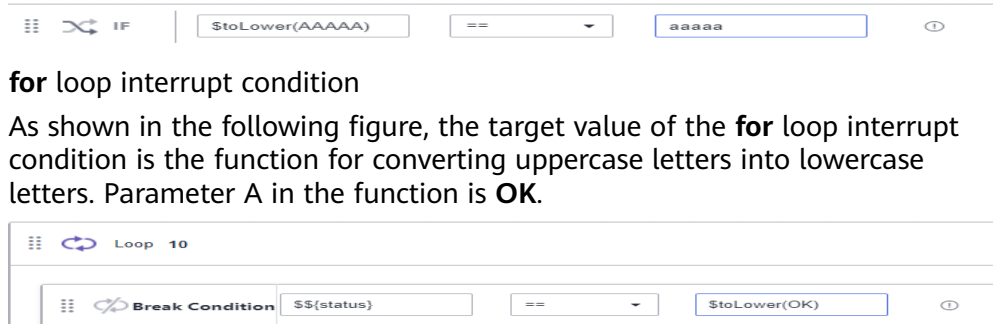
- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the function for converting uppercase letters into lowercase letters. Parameter A in the function is **Test**.



- **if** condition

As shown in the following figure, the target value of the **if** condition is the function for converting uppercase letters into lowercase letters. Parameter A in the function is **AAAAA**.



- **for** loop interrupt condition
As shown in the following figure, the target value of the **for** loop interrupt condition is the function for converting uppercase letters into lowercase letters. Parameter A in the function is **OK**.

5.5.1.19 Converting Lowercase Letters into Uppercase Letters

Function Name

\$toUpper(String A)

Parameter Description

- **String A:** string to be converted into uppercase letters.

Parameter A supports the following types:

- Strings
- Environment parameters
- Local parameters

Function Description

Converts all characters in the specified input string into uppercase characters.

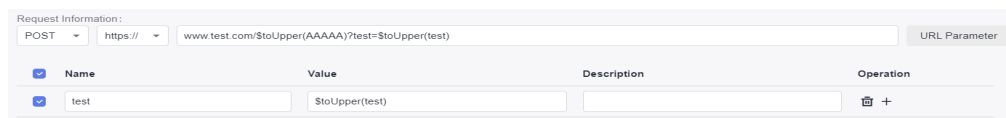
Application Scenarios

The function for converting lowercase letters into uppercase letters can be used in the following scenarios for API automation:

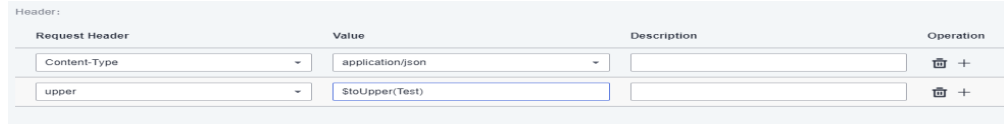
- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

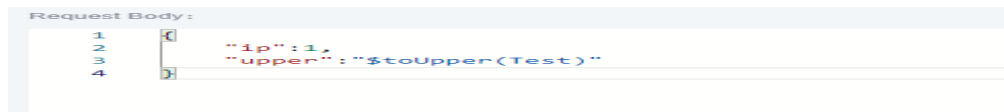
- Request URL
As shown in the following figure, the value of **test** in the request URL is the function for converting lowercase letters into uppercase letters. Parameter A in the function is **test**.



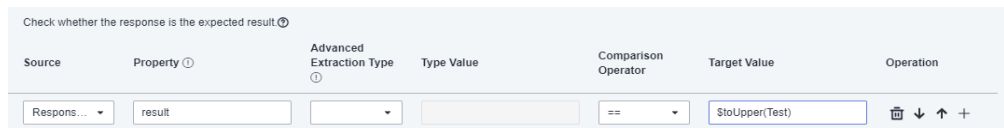
- **Request header**
As shown in the following figure, the value of **upper** in the request header is the function for converting lowercase letters into uppercase letters. Parameter A in the function is **Test**.



- **Request body**
As shown in the following figure, the function for converting lowercase letters into uppercase letters is used. Parameter A in the function is **Test**.



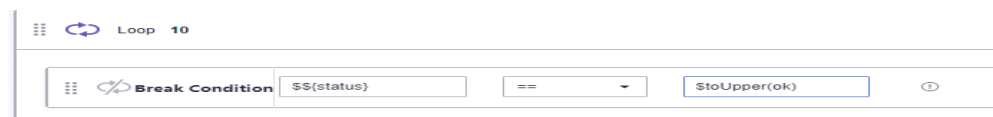
- **Checkpoint property**
As shown in the following figure, the target value of the checkpoint property **result** is the function for converting lowercase letters into uppercase letters. Parameter A in the function is **Test**.



- **if condition**
As shown in the following figure, the target value of the **if** condition is the function for converting lowercase letters into uppercase letters. Parameter A in the function is **aaaaa**.



- **for loop interrupt condition**
As shown in the following figure, the target value of the **for** loop interrupt condition is the function for converting lowercase letters into uppercase letters. Parameter A in the function is **ok**.



5.5.1.20 Concatenating Strings

Function Name

\$strConCat(String A, String B)

Parameter Description

- **String A:** string 1.
- **String B:** string 2.

Parameters A and B support the following types:

- Strings
- Environment parameters
- Local parameters

Function Description

Concatenates strings 1 and 2 into a new string.

Application Scenarios

The string concatenation function can be used in the following scenarios for API automation:

- Request URL
- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

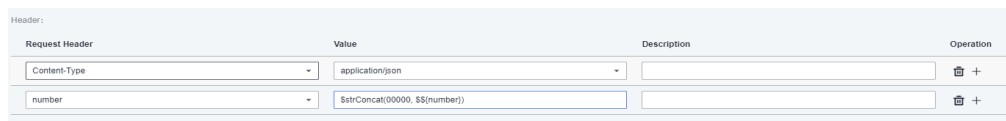
- Request URL

As shown in the following figure, the value of the **test** parameter in the request URL is the string concatenation function. Parameters A and B in the function are **abc** and **123** respectively.



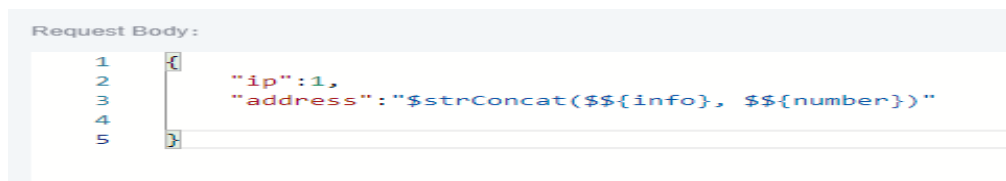
- Request header

As shown in the following figure, the value of **number** in the request header is the string concatenation function. Parameter A in the function is **00000**, and parameter B is the environment parameter **`\${number}`**.



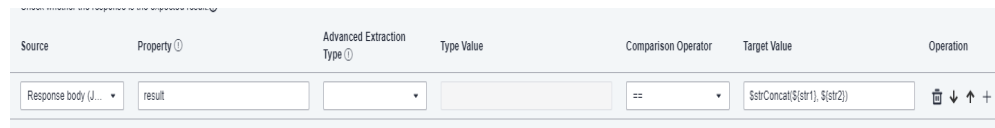
- Request body

As shown in the following figure, the string concatenation function is used in the request body. Parameter A in the function is the environment parameter **`\${info}`**, and parameter B is the environment parameter **`\${number}`**.



- Checkpoint property

As shown in the following figure, the target value of the checkpoint property **result** is the string concatenation function. Parameter A in the function is the local parameter **`\${str1}`**, and parameter B is the local parameter **`\${str2}`**.



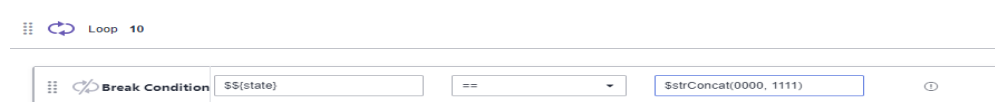
- **if condition**

As shown in the following figure, the target value of the **if condition** is the string concatenation function. Parameter A in the function is **abc**, and parameter B is **123**.



- **for loop interrupt condition**

As shown in the following figure, the target value of the **for loop interrupt condition** is the string concatenation function. Parameter A in the function is **0000**, and parameter B is **1111**.



5.5.1.21 Cutting Strings

Function Name

`$strCut(String A,int B, int C)`

Parameter Description

- **String A:** original string to be cut.
- **int B:** start subscript of the string to be cut, starting from **0**.
- **int C:** end subscript of the string to be cut.

Parameters A, B, and C support the following types:

- Strings
- Environment parameters
- Local parameters

Function Description

Obtains the value string of a specified element and cuts it to a new string.

Application Scenarios

The string cutting function can be used in the following scenarios for API automation:

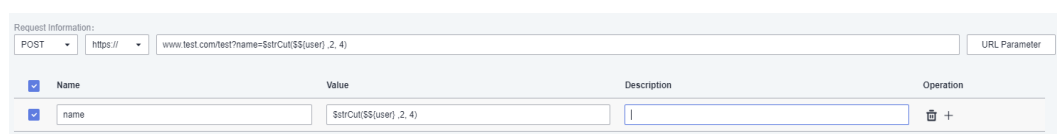
- Request URL

- Request header
- Request body
- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

- Request URL

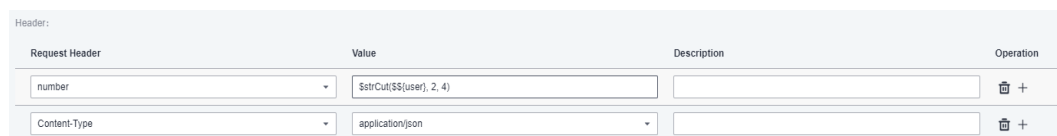
As shown in the following figure, the value of **test** in the request URL is the string cutting function. Parameter A in the function is the environment parameter **\$\$user**, parameter B is **2**, and parameter C is **4**.



The screenshot shows the 'Request Information' configuration interface. At the top, it displays 'POST' as the method and 'https://www.test.com/test?name=\${strCut}(\$\${user}, 2, 4)' as the URL. Below this is a table with columns for Name, Value, Description, and Operation. A single row is visible with 'name' in the Name column, the string cutting function in the Value column, and an empty Description and Operation column.

- Request header

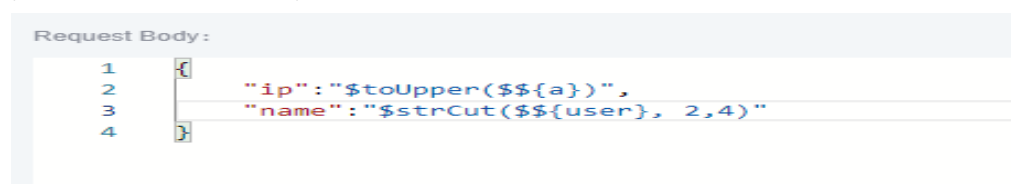
As shown in the following figure, the value of **name** in the request header is the string cutting function. Parameter A in the function is the environment parameter **\$\$user**, parameter B is **2**, and parameter C is **4**.



The screenshot shows the 'Header' configuration interface. It features a table with columns for Request Header, Value, Description, and Operation. Two rows are visible: the first row has 'number' as the header name and the string cutting function as the value; the second row has 'Content-Type' as the header name and 'application/json' as the value.

- Request body

As shown in the following figure, the request body uses the string cutting function. Parameter A in the function is the environment parameter **\$\$user**, parameter B is **2**, and parameter C is **4**.



The screenshot shows the 'Request Body' configuration interface. It displays a JSON body with four lines of code: 1. '{', 2. ' "ip": "\${toUpper(\$\${a})}",', 3. ' "name": "\${strCut}(\$\${user}, 2, 4)"', and 4. '}'.

- Checkpoint property

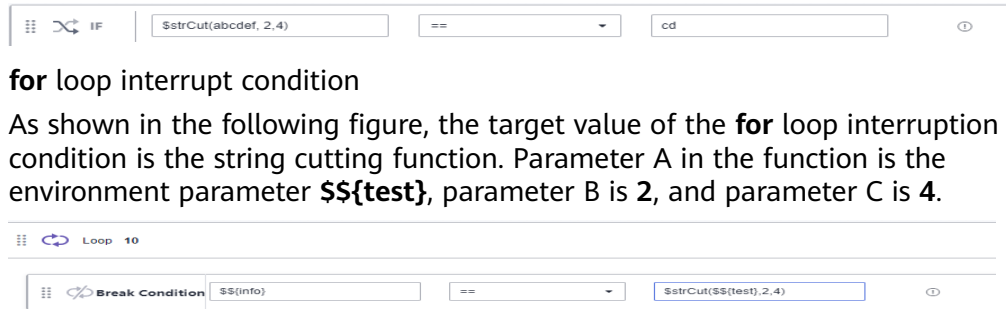
As shown in the following figure, the target value of the checkpoint property **result** is the string cutting function. Parameter A in the function is the environment parameter **\$\$info**, parameter B is **2**, and parameter C is **5**.



The screenshot shows the 'Checkpoint property' configuration interface. It features a table with columns for Source, Property, Advanced Extraction Type, Type Value, Comparison Operator, Target Value, and Operation. A single row is visible with 'Response body (J...)' as the source, 'result' as the property, an empty advanced extraction type, an empty type value, '==' as the comparison operator, and the string cutting function as the target value.

- **if** condition

As shown in the following figure, the target value of the **if** condition is the string cutting function. Parameter A in the function is **abcdef**, parameter B is **2**, and parameter C is **4**.



- **for** loop interrupt condition

As shown in the following figure, the target value of the **for** loop interruption condition is the string cutting function. Parameter A in the function is the environment parameter **\$\$test**, parameter B is **2**, and parameter C is **4**.

5.5.2 Advanced Extraction Types

5.5.2.1 Character String Extraction

Description

When setting checkpoints or response extraction, if the expressions in the property setting bar cannot meet the requirements, you can set **Advanced Extraction Type** to **Character string extraction**.

There are two **Type Value** text boxes for string truncation:

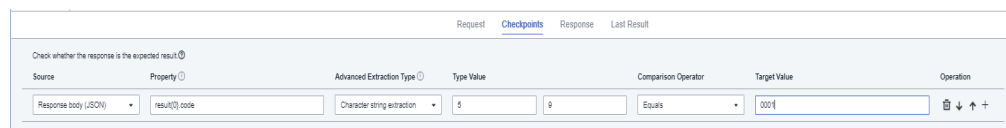
- The first box indicates the start index. The first digit is **0**. The start index is contained in the truncated string.
- The second box indicates the end index. The end index is not contained in the truncated string.

Example

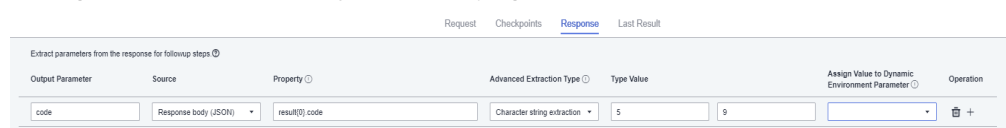
The following response body is used as an example.



- To extract the fifth to ninth digits of **code** in the first element of the **result** array from the response body and compare them with the target value, configure the **Checkpoints** tab page as follows.



- To extract the fifth to ninth digits of **code** in the first element of the **result** array in the response body and assign the value to the variable **code**, configure the **Extract Response** tab page as follows.



5.5.2.2 Regular Expression

Description

When setting checkpoints or response extraction, if the expressions in the property setting bar or the character string extraction function cannot meet the requirements, you can set **Advanced Extraction Type** to **Regular expression**.

The Java regular expression engine can be used.

5.6 Adding Test Cases in Batches

Background

CodeArts TestPlan allows you to add test cases to test plans in batches from the test case library, including manual test cases and API automation test cases.

Adding Manual Test Cases in Batches

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** Click **Test case library** in the upper left corner of the page and select the target test plan from the drop-down list.
- Step 4** On the **Manual Test** tab page, click **Import** in the right area and select **Adding an Existing Case** from the drop-down list.
- Step 5** In the displayed dialog box, select a test case and click **OK**.
 - Test cases that already exist in the test plan cannot be added again.
 - All test cases related to requirements in the test plan can be added.



----End

Adding API Automation Test Cases in Batches

On the **Testing Case** page, click the **Auto API Test** tab to add API automation test cases in batches. The method is the same as that in [Adding Manual Test Cases in Batches](#).

5.7 Managing Test Cases in the Features Directory

Procedure

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** Click **Features** on the left of the page.
 - By default, all test cases belong to this **Features** directory, which has a default subdirectory **Other**. Click  next to the **Features** directory to create another subdirectory. Click  next to the new subdirectory to delete or rename the subdirectory. You can also create test cases or subdirectories in the new subdirectory.

----End


5.8 Test Cases and Requirements

Associating Test Cases with Requirements

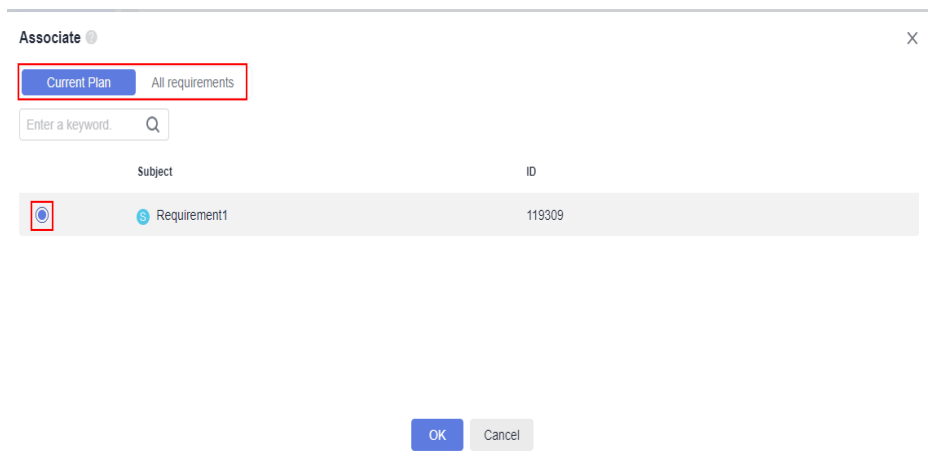
 NOTE

Test cases can be associated only with **Epic**, **Feature**, and **Story** work items of a Scrum project and default **Requirement** work items of a Kanban project.

CodeArts TestPlan supports association between test cases and requirements. The procedure is as follows:

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** Select a test case to be associated with a requirement, click **...** on the right, and select **Associated Requirement**. Alternatively, on the **All Cases** tab page, click the  icon in the **Operation** column of the case to be associated with a requirement.

To associate multiple test cases with one requirement, select the required test cases in the list and click **Associate Requirements in Batches** at the bottom of the page.
- Step 4** In the displayed dialog box, select the requirement to be associated. You can select a requirement on the **Current Plan** or **All requirements** tab page. Click **OK**.



----End

Adding Test Cases Related to Requirements


- **Prerequisites**

The requirements in the test plan have been associated with test cases in the test case library.

The procedure for adding test cases related to requirements is the same as that in [Adding Test Cases in Batches](#). In the dialog box that is displayed, select the **Select all test cases related to the requirements in this test plan** check box.

Managing Test Cases Based on Requirements

On the **Testing Case** page, click the **Requirements** directory in the left pane.

- By default, all associated requirements belong to the **Requirements** directory.
- Click a requirement in the **Requirements** directory to view all cases associated with the requirement.
- Click  on the right of the requirement name to view the requirement details or create a test case associated with the requirement.

Setting Requirement Change Notification

When a requirement is associated with a test case and the requirement is modified in CodeArts Req, a red dot is displayed after the requirement name on the **Testing Case** page. You need to supplement or modify the test case associated with the requirement.

5.9 Test Cases and Defects

When a test case fails to be executed, the test case is usually associated with a defect. You can create a defect or associate the test case with an existing defect.

The following uses manual test cases as an example.

NOTE



Test cases can be associated only with **Bug** work items in a Scrum project and default **Bug** work items of a Kanban project.

Procedure


Step 1 Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **Testing > Testing Case**.

Step 3 Select a test case to be associated with a defect. You can create or associate a defect using either of the following methods:

- Perform the following operations on the **Testing Case** page:
 - Click  in the **Operation** column to associate an existing defect in the current project.
 - Click  in the **Operation** column, and select **Create and Associate Defects** to create a defect as prompted.
- Click a test case to associate it with a defect.

Click the test case name. On the page that is displayed, select **Defects** and click **Create and Associate Defects**.

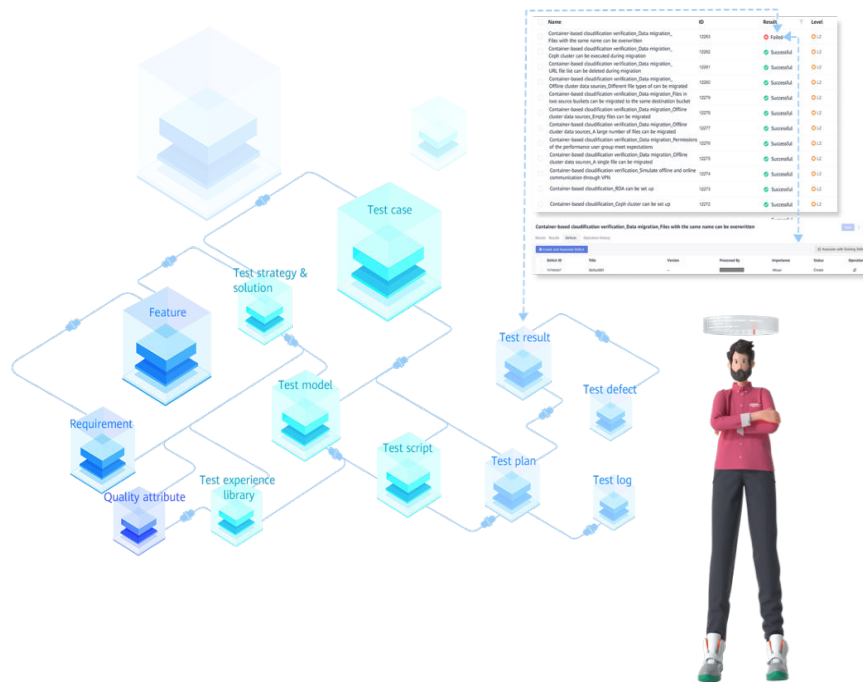
Step 4 After a defect is created or associated, view the defect information on the **Defects** tab page. You can click  to disassociate the current defect.

----End

5.10 Bidirectional Traceability

ISO15288 defines a common framework for system lifecycle processes. It requires bidirectional traceability for requirements, test design solutions, cases, and defects during verification and confirmation. Huawei already explicitly requires end-to-end traceability of test processes.

Huawei Cloud CodeArts TestPlan establishes bidirectional associations among requirements, test solutions, test cases, and defects for reliable test processes and results.



5.11 Commenting on Test Cases

CodeArts TestPlan allows you to comment on test cases.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** Select a test case to be commented on, click the test case name, and click the **Details** tab.
- Step 4** Enter your comments in the **Comments** text box at the bottom of the page and click **Save**.

The comments that are successfully saved are displayed below the **Comments** text box.

----End

5.12 Filtering Test Cases

CodeArts TestPlan supports custom filtering of test cases. The following procedure uses the **Testing Case > Manual Test** as an example.

Using the Default Filter Criteria

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** On the **Manual Test** tab page, select an option from the **All cases** or **All** drop-down list.
- **All cases**: displays all cases in the current test plan or case library.
 - **My cases**: displays all cases whose **Executor** is the current login user.
 - **Unassociated with test suites**: displays test cases that are not associated with any test suite in the **test execution**.

----End

You can click the two drop-down list boxes and filter all cases, your test cases, or test cases that are not associated with test suites.

Setting Advanced Filter Criteria

If the default filter criteria do not meet your requirements, you can customize filter criteria.


- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** Click **Advanced Filter** above the case list. Common filter criteria are displayed on the page.
- Step 4** Set filter criteria as required and click **Filter**. Test cases that meet the filter criteria are displayed on the page.
- You can also click **Save and Filter**. In the dialog box that is displayed, enter the filter name and click **OK**. The saved filter is added to the **All cases** drop-down list.
- Step 5** (Optional) If advanced filter criteria still do not meet requirements, click **Add Filter**, select a filter item from the drop-down list box as required, and click **Save and Filter**.

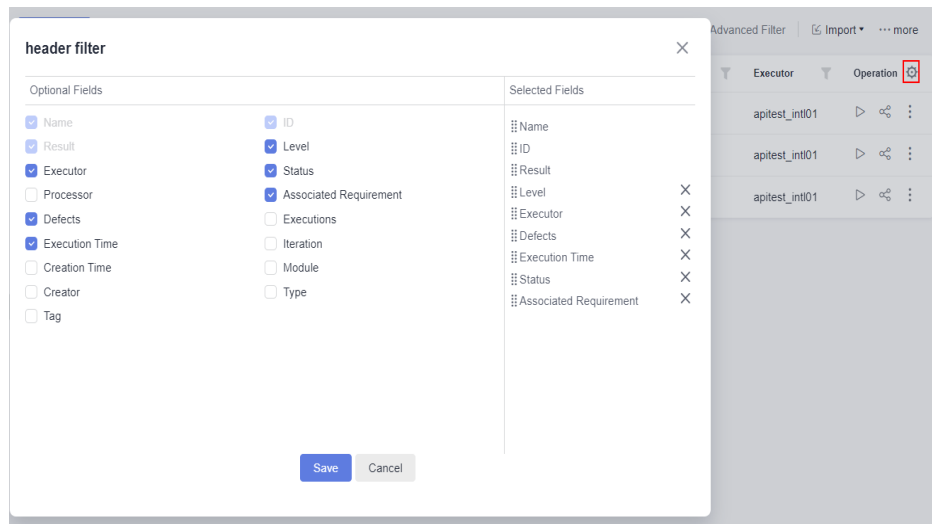
The filtering items are displayed on the page. Repeat step **Step 4** to complete the filtering.

----End

5.13 Customizing Columns to Be Displayed in the Test Case List

CodeArts TestPlan supports customizing columns to be displayed in the test case list. The following procedure uses manual test cases as an example.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Case**.
- Step 3** On the **Manual Test** tab page, click  in the last column of the test case list. In the dialog box that is displayed, you can configure the columns to be displayed or hidden, and drag the selected fields to rearrange the column display sequence.



----End

6 Testing Execution

6.1 Introduction

In the test execution stage, the test suite is executed to check whether the tested system meets the expected result, record the test result, and detect product problems and defects, helping R&D engineers analyze and locate problems.

A test suite is used to assign test cases to specified test executors.

The following sections introduce the details:

- [Manual Test Suites](#)
- [API Automation Test Suites](#)


6.2 Manual Test Suites

6.2.1 Creating a Manual Test Suite

Prerequisites

Manual test cases have been created.

Procedure


- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Execution**. By default, **Test case library** and **Baseline** are displayed.
- Step 3** Click  next to **Test case library** and select a test plan as required.
- Step 4** On the **Manual Test** tab page, click **Create Suite** in the upper left corner. The creation page is displayed.
- Step 5** Enter basic information such as the name, click **Add Case** or **Add now**, select the test case to be tested, click **OK**, and click **Save**.

Create Manual Test Suite

Name:

Description :

Test Cases :

Case Name	ID	Processor	Result	Status ▾
 No cases in the test suite. Add now				

+ Add Case

----End

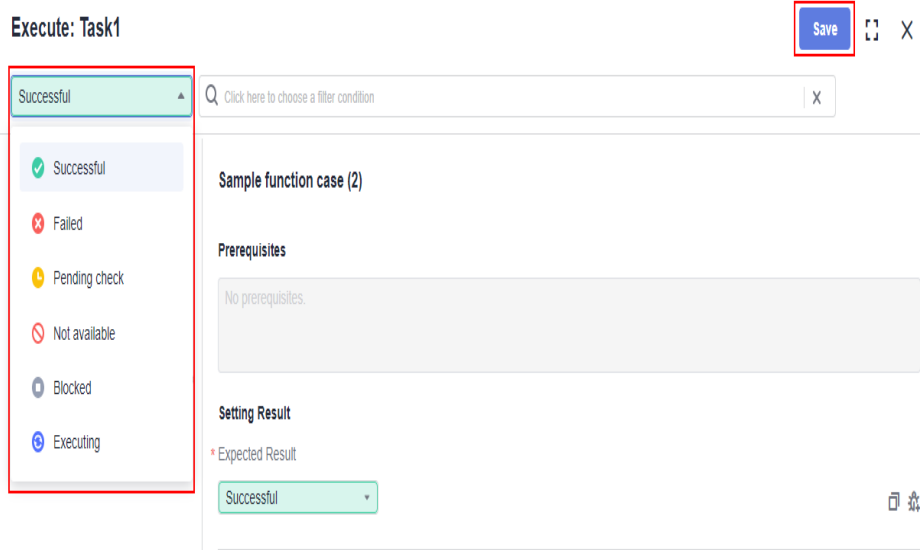
6.2.2 Executing a Manual Test Suite

Prerequisites


A manual test suite has been created.

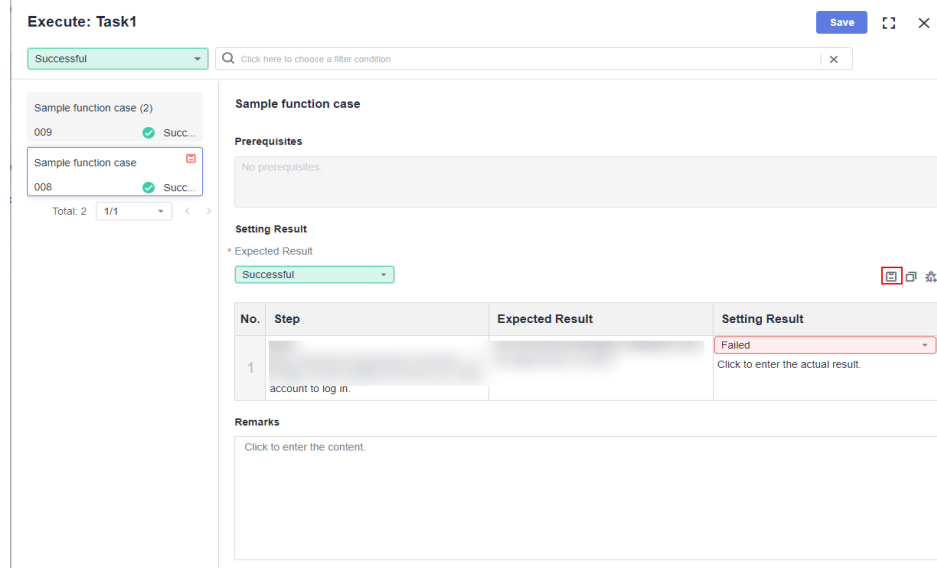
Procedure

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Execution**. **Test case library** is displayed by default.
- Step 3** Click ▾ next to **Test case library** and select a test plan as required.
- Step 4** On the **Manual Test** tab page, locate the test suite to be executed and click ▶ in the **Operation** column.
- Step 5** On the page for executing the manual test suite, set the step result, description, and case result. (You can switch cases in the suite and repeat this step until all cases in the manual test suite are executed.)
- Step 6** Set the manual test suite result and click **Save** in the upper right corner.



NOTE

Set the case result or switch the case to automatically save the result. If you modify the step result, description, or case execution remarks after saving the case result, click  to save the modification.



Step 7 After the execution is complete, you can view the execution result in the execution history column of the test case list.

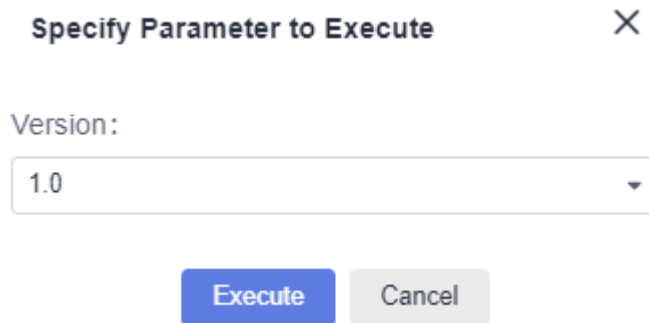
----End

Execution with Specified Parameters

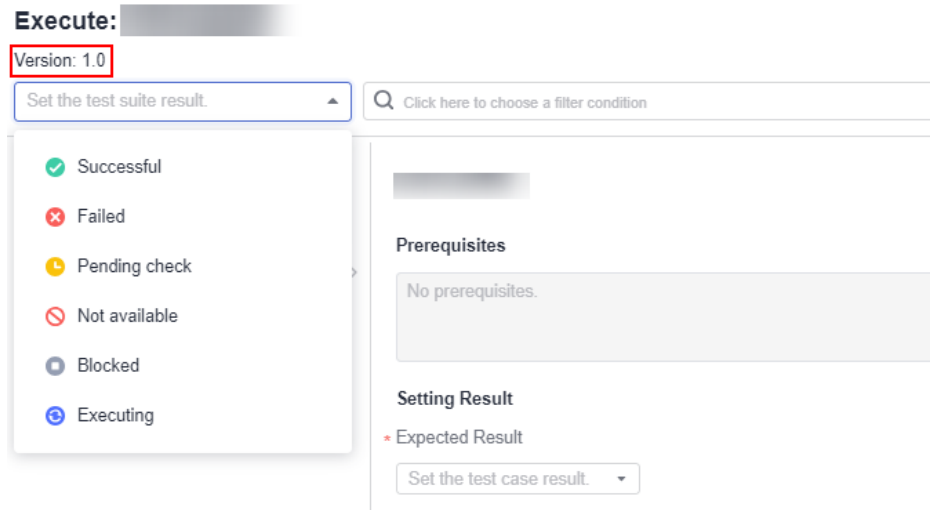
Manual test suites can be executed with parameters.

Step 1 In the test suite list, click ******* in the **Operation** column and select **Specify Parameter to Execute**.

Step 2 In the displayed dialog box, enter the version number and click **Execute**. The execution page is displayed.



Step 3 You can view the test version number. Set the test suite execution result, enter the actual result, and click **Save**.



Step 4 Click the corresponding suite and click the execution history tab to query the execution result.

----End

Batch Execution

Step 1 In the test suite list, click **...** in the **Operation** column and select **Batch Execution**.

Step 2 Select the test cases to be executed and click **Batch Set Results**.

Step 3 In the dialog box that is displayed, set the test case status and result.

Step 4 Click **OK**.

----End


6.3 API Automation Test Suites

6.3.1 Creating an API Automation Test Suite

Prerequisites

API automation test cases have been created.

Procedure

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Execution**.
- Step 3** Click  next to **Test case library** and select a test plan as required.
- Step 4** On the **Auto API Test** tab page, click **Create Suite** in the upper left corner. The creation page is displayed.
- Step 5** Enter basic information such as the name, click **Add Case** or **Add Now**, and select the test case to be executed.


Create API Test Automation Test Suite

Basic Info

* Test Suite Name

* Tests

Preparations **Tests** Followups + Add Case Deleted

<input type="checkbox"/>	Case	ID	Processor	Operation
 No cases in the test suite. Add Now				

* Resource Pool

Save Save and Execute Cancel

Step 6 Complete the execution settings as required and click **Save**.

Configurati on Item	Manda tory	Description
Resource Pool	Yes	The resource pool allows you to access your own execution resources. When executing a task, you can select an agent in the resource pool to execute the task. This improves the task execution efficiency and does not depend on public resources of CodeArts.
ID	No	You can enter a number of 1 to 128 characters.
Tag	No	Set tags for the current task as required. The tags are separated by spaces. Each task can be associated with a maximum of 10 tags.
Module	No	Module of the current test suite. The module list comes from the project settings. For details, see Setting Modules .
Processor	No	Person who needs to complete the test task.
Environmen t Parameters	No	Environment parameters can be referenced by parameters, checkpoints, variables, and URLs of test steps in the entire project.
Max. Duration	Yes	The longest time taken for executing a test case. Cases exceeding this limit will fail. The task continues until the last case is complete.
Overwrite Test Suite Parameters	No	You can set advanced parameters for a test suite, and overwrite global parameters in a test suite. A maximum of three global parameters can be overwritten.
Execute	Yes	There are two types. By default, the task is executed only once. <ul style="list-style-type: none">● Once: The test suite is executed only once.● Regularly: After you set an execution frequency, the test suite is executed periodically. Set this parameter to daily.
Start	Yes	There are two execution modes. By default, the task is executed immediately. <ul style="list-style-type: none">● Immediately: The task is executed immediately after it is executed.● At specific time: The task is executed after a specified time.

Configurati on Item	Manda tory	Description
Sequence	Yes	There are two modes. The default mode is Serial . <ul style="list-style-type: none">• Serial: Test cases in the API test suite are executed in serial mode.• Parallel: Test cases in the API test suite are executed in parallel mode.




----End

6.3.2 Executing an API Automation Test Suite

Prerequisites

An API automation test suite has been created.

Procedure

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Testing > Testing Execution**. **Test case library** is displayed by default.
- Step 3** Click  next to **Test case library** and select a test plan as required.
- Step 4** Locate the test suite to be executed and click  in the **Operation** column to start automatic execution. After the execution is complete, you can view the execution result in the execution history column.
- Step 5** In the test suite list, click  in the **Operation** column. On the execution history tab page that is displayed, you can view the historical execution details of test cases executed by the test suite.

----End

6.4 Continuous Integration of Automation Tests

Prerequisites

Before API automation integration, ensure that an API automation test suite has been created (see [Creating an API Automation Test Suite](#)).

Procedure

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.

Step 2 In the navigation pane, choose **CICD > Pipeline**.

Step 3 Click **Create Pipeline**. For details, see [Creating or Copying a Pipeline](#).

Alternatively, select an existing pipeline, click **Edit** in the **Operation** column. In the window that is displayed, click **+ Stage > + Job**. The page for adding a job is displayed on the right. Click the **Test** tab, move the cursor over **TestPlan**, and click **Add**. Enter the name and select an API automation test suite.

Click **OK**.

Step 4 After a pipeline task is created, click **Save and Run**. On the **Execution Configuration** page that is displayed on the right, click **Run**.

Step 5 After the pipeline job is executed, click the task name to view the task log and result.

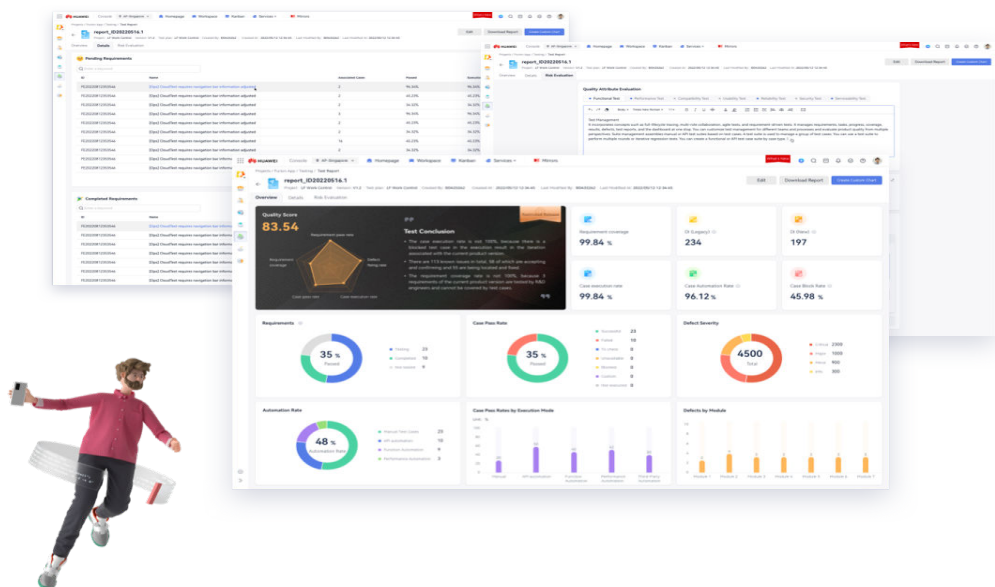
----**End**

7 Quality Report and Assessment

7.1 Introduction

Management guru Peter Drucker once said "what gets measured gets managed". This principle applies to quality of all commercial products. You can use mature models and guidelines to evaluate product quality in a scientific, objective, visualized, and measurable manner, achieving continuous product improvement and high quality goals.

Huawei Cloud CodeArts TestPlan provides more than 10 quality metrics, such as the requirement coverage rate, requirement pass rate, case execution rate, and legacy DI, to evaluate functions, performance, and reliability. A test period can be shortened from days to hours.





7.2 Quality Reports - Project Dashboards

The project dashboard displays the requirement coverage rate, defects, test case pass rate, and test case completion rate corresponding to the test case library and test plan, as well as detailed information such as defects associated with the test cases.

Quality Report of the Test Case Library

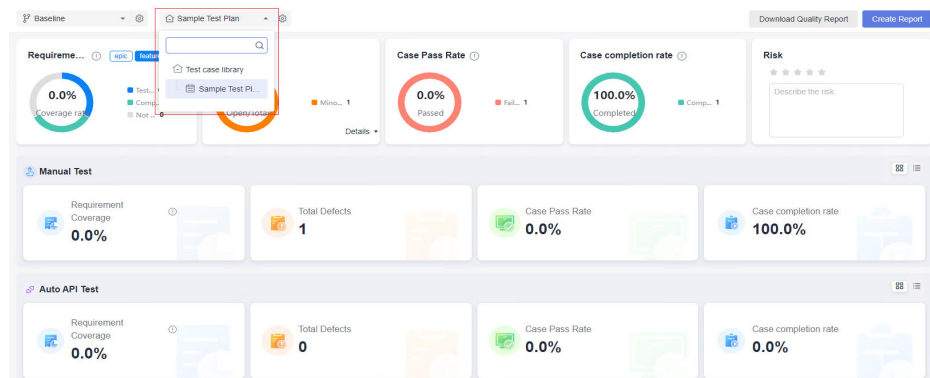
Log in to the CodeArts homepage and search for and access the target project. In the navigation pane, choose **Testing > Quality Report**. The **Quality Report** page is displayed by default.

Report Item	Description
Requirement Coverage	<p>Percentage of tested requirements in the selected iteration and module. This reflects function test coverage.</p> <ul style="list-style-type: none">● Not tested: No test case is associated with the requirement, or each associated test case is not complete.● Testing: Some test cases associated with the requirement are uncompleted.● Completed: All test cases associated with the requirement are completed.● Requirement coverage = Completed/Total <p>NOTE In Scrum projects, only statistics on the Feature and Story requirements are collected by default. To collect statistics on the Epic requirements, select epic.</p>
Defects	<p>Collects statistics on the number of unresolved defects and the total number of defects in the selected iteration and module. The statistics are grouped by defect severity.</p> <p>NOTE The number of unresolved defects includes the following:</p> <ul style="list-style-type: none">● Number of defects in the To do and Doing states in a Scrum project.
Case Pass Rate	<p>Pass rate of test cases in the selected iteration and module. The test case pass rate and defects reflect the overall product quality. The statistics are grouped based on the execution result. The test cases that are not executed are included in the Not executed group.</p> <p>Case pass rate = Number of successful test cases/Total number of test cases</p>
Manual Test	<p>Collects statistics on the requirement coverage rate, total number of defects, case pass rate, and case completion rate associated with manual test cases in the selected iteration and module.</p>
Auto API Test	<p>Collects statistics on the requirement coverage rate, total number of defects, case pass rate, and case completion rate associated with API automation test cases in the selected iteration and module.</p>

Report Item	Description
Defect List	List of defects associated with test cases in the selected iteration and module. Click  in the upper right corner of the Manual Test or Auto API Test area to view the list. You can filter defects by defect name and ID. You can also click a defect name to go to the defect details page.
Test Case List	List of test cases in the selected iteration and module. Click  in the upper right corner of the Manual Test or Auto API Test area to view the list. You can filter test cases by test case name and ID. You can also click a test case name to go to the case details page.

Quality Report of a Test Plan

On the **Quality Report** page, click the **Test case Library** drop-down list in the upper left corner and select a test plan. The quality report page of the selected test plan is displayed.



Compared with the quality report of the test case library, the quality report of the test plan is not filtered by iteration or module. The statistical report of the test case completion rate and the risk description of the test plan are added. Other report items are the same as those of [Quality Report of the Test Case Library](#).

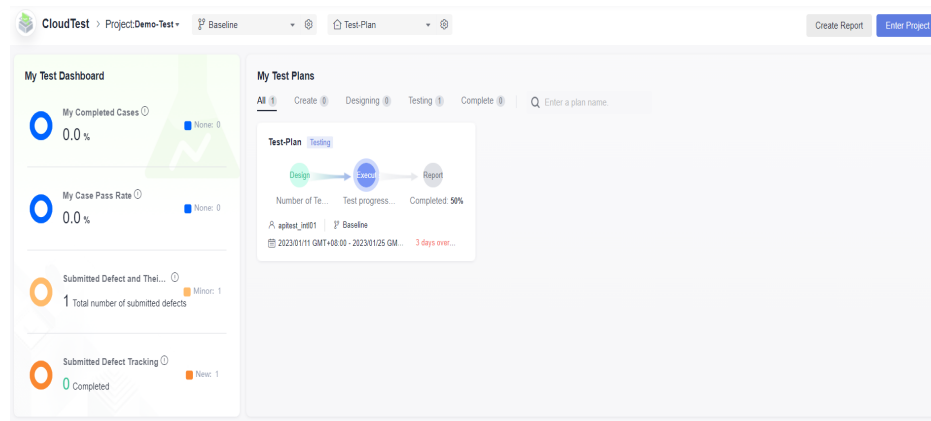
Report Item	Description
Case Completion Rate	Number of completed test cases in the selected plan. This reflects the test progress. The statistics are grouped by case status. Completion rate = Number of completed cases/Total number of cases
Risk	Risk of the test plan. You can evaluate the risk level of the test plan and add risk description.
Manual Test	Requirement coverage rate, total number of defects, and pass rate of manual test cases.

Report Item	Description
Auto API Test	Total number of defects, pass rate, and completion rate of API automation test cases.

7.3 TestPlan Homepage - Personal Dashboards

Log in to the CodeArts homepage. On the top navigation bar, choose **Services > TestPlan**. The CodeArts TestPlan page displays the personal dashboard. It contains statistics that are processed by the current login user, including:

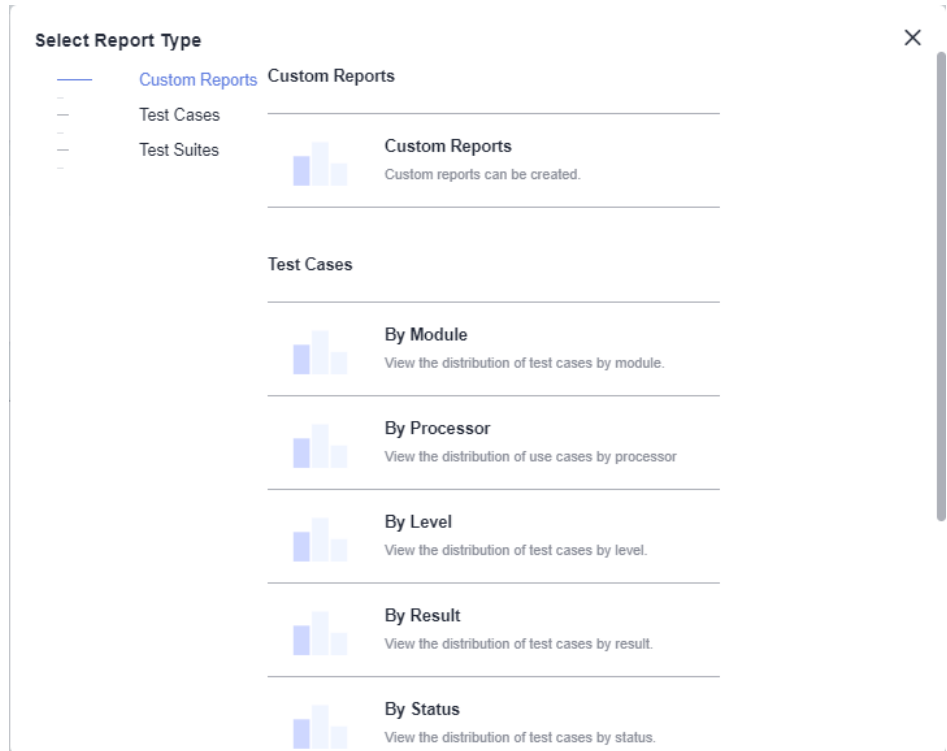
- Personal case completion rate, case pass rate, submitted defect status, submitted defect severity, defect statistics based on the test case library and test plan in the project
- Personal test plans, test tasks, and submitted defects based on the test case library and test plan in the project



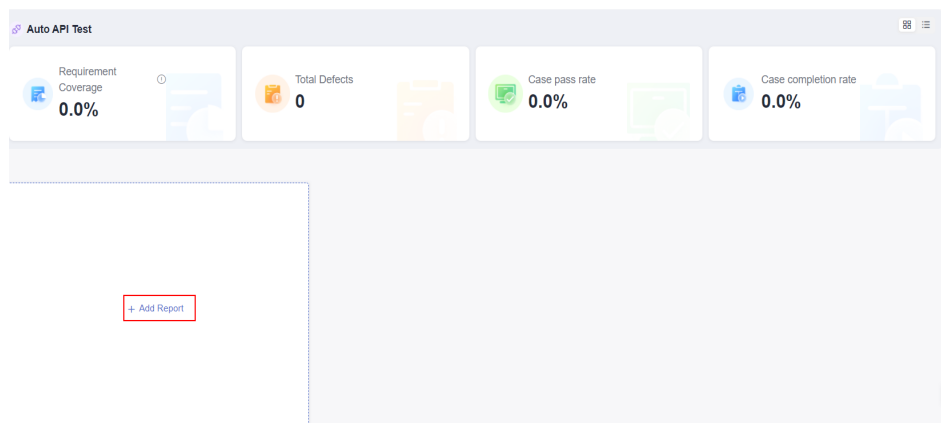
7.4 Custom Test Reports

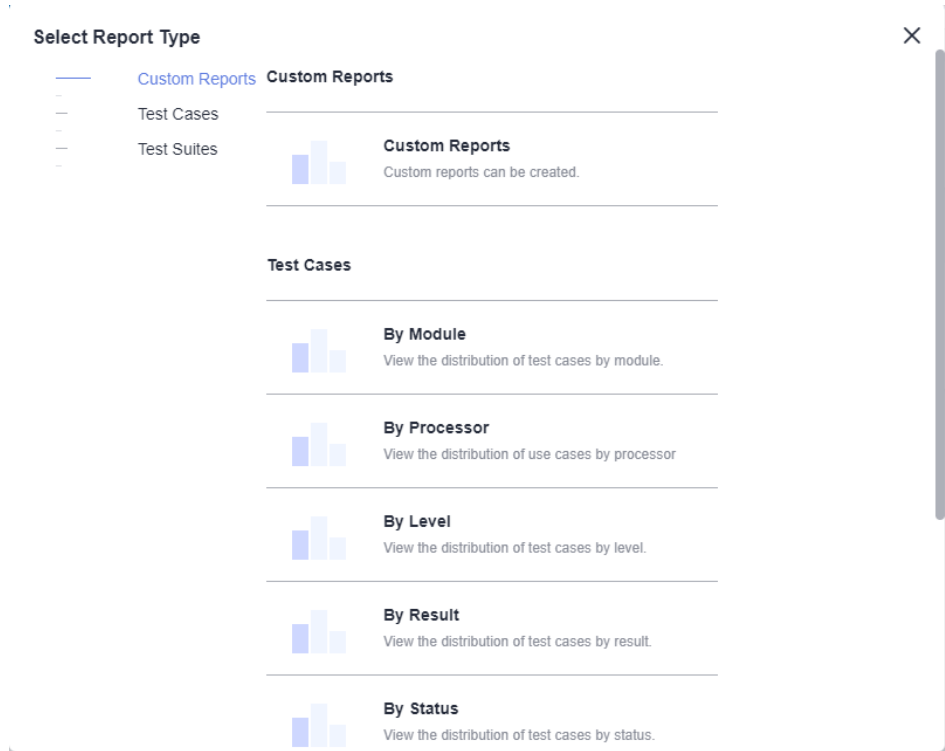
CodeArts TestPlan allows you to create a custom test report in either of the following ways:

- On the homepage
 - a. Log in to the CodeArts homepage. On the top navigation bar, choose **Services > TestPlan**. The homepage is displayed.
 - b. Click **Create Report** in the upper right corner, or click **Add Report** in the custom test report of the current project in the lower left corner.
 - c. On the **Select Report Type** page that is displayed, select the type of the report to be created as required.



- On the quality report page
 - a. Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
 - b. In the navigation pane, choose **Testing > Quality Report**.
 - c. Select the test case library or a test plan, click **Add Report** in the lower left corner of the page, and select the type of the report to be created as required.

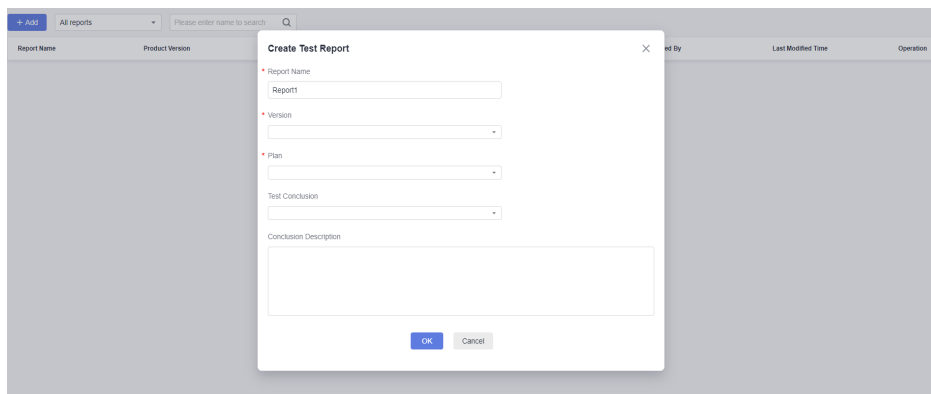




7.5 Evaluating Test Quality

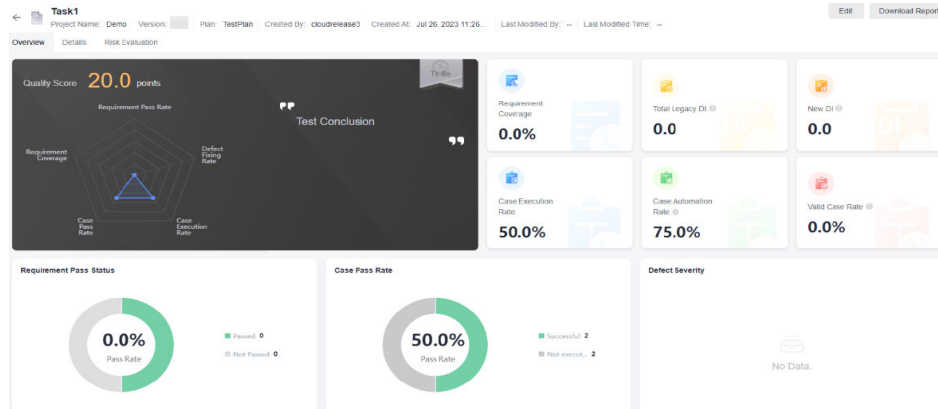
Log in to the CodeArts homepage and search for and access the target project. In the navigation pane, choose **Testing > Quality Assessment**.

Click **Add** in the upper left corner of the page. Enter a report name and a test conclusion, select a version and a plan, and click **OK**.



Overview

Click the report name. The **Overview** page of the test report is displayed by default. The **Overview** page displays the test data of the selected test plan.



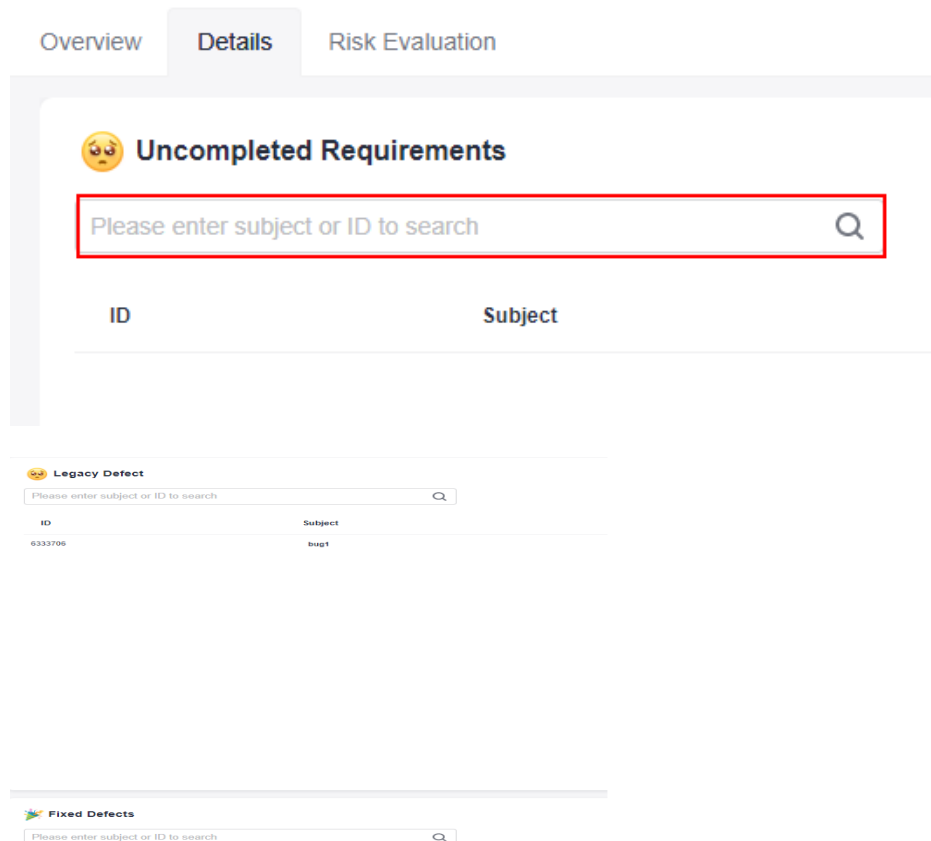
Report Item	Description
Requirement Coverage	The requirement coverage rate reflects the test coverage of function points. The test coverage rate of all requirements associated with the selected plan is calculated. Requirement coverage rate = Number of completed requirements/Total number of requirements
Total Legacy DI	DI value calculated based on all known defects in this version. NOTE All defects are calculated based on their severity levels. The DI value of each defect is as follows: Trivial: 0.1 Minor: 1 Major: 3 Critical: 10
New DI	DI value calculated based on the outstanding defects associated with the test plan.
Case Execution Rate	Statistics on the execution of test cases. Case execution rate = Number of test cases that are executed as planned and have execution results/Total number of test cases as planned
Case Automation Rate	Proportion of non-manual test cases to all test cases. Case automation rate = (Total number of test cases in the test plan – Number of manual test cases in the test plan)/Total number of test cases in the test plan
Valid Case Rate	Proportion of executed test cases where defects are found to all executed test cases. Valid case rate = Number of executed test cases where defects are found/Number of executed test cases
Requirement Pass Status	A requirement is passed if the status of all test cases associated with the requirement is Successful . Requirement pass rate = Number of passed requirements/Total number of requirements
Case Pass Rate	The pass rate reflects product quality. The pass rate covers all test cases in selected plans. Another chart displays data by result. Pass rate = Number of successful cases/Total number of cases
Defect Severity	Displays the number of defects associated with the selected plan.

Report Item	Description
Automation Rate	Calculates the proportion of non-manual test cases to all test cases in the test plan.
Case Pass Rate by Type	Displays the pass rate of test cases of different test types.
Defects by Module	The number of defects is displayed by module.

Details

On the **Details** page, you can view the outstanding and completion status of requirements and defects in the test plan.

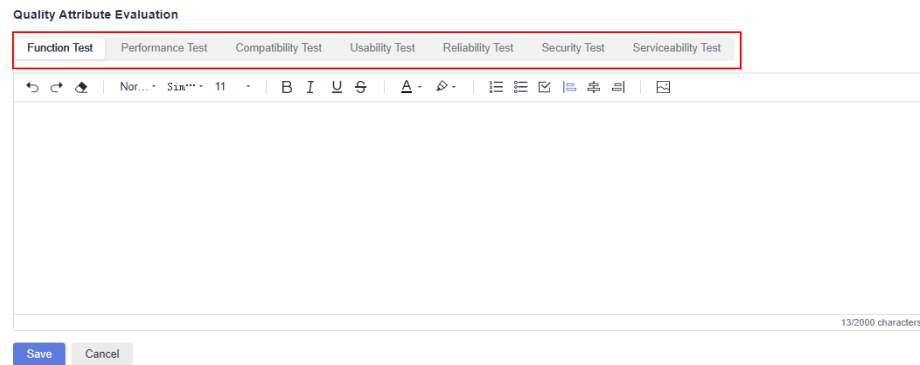
Enter a title or number in the search box to search for the corresponding requirement or defect.



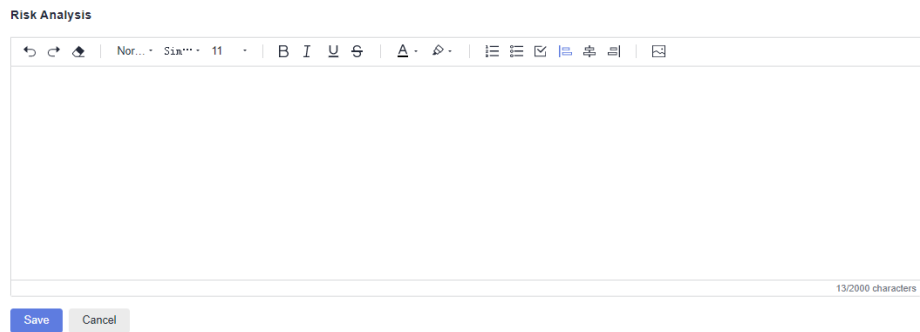
Evaluating Risks

On the **Risk Evaluation** page, you can configure **Quality Attribute Evaluation** and **Risk Analysis**, or customize modules to enter related report information.

- **Quality Attribute Evaluation**
Select a test type on the top, click the text box area, enter evaluation information, and click **Save**.

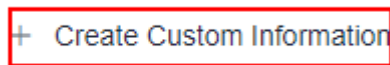




- **Evaluating Risks**
You can evaluate risks based on the test progress. Click the text box, enter risk analysis information, and click **Save**.

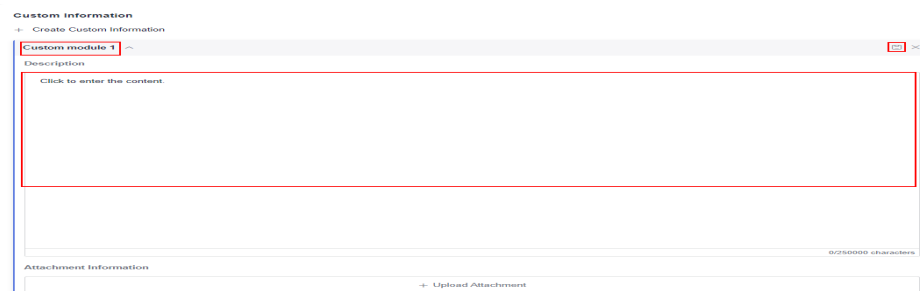


- **Custom information**
Click **Create Custom Information** and add an information module.

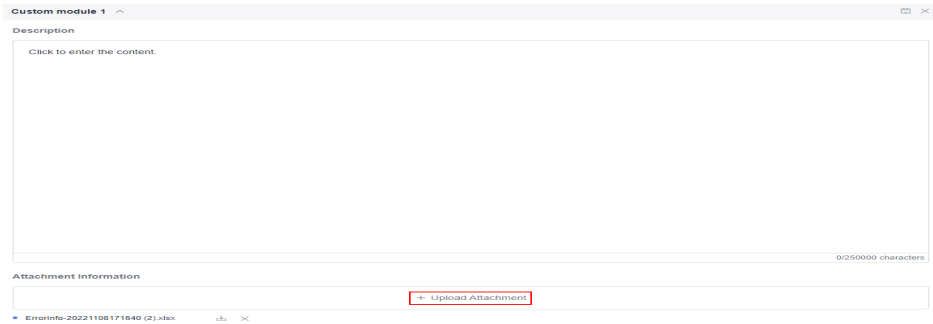
Custom Information



You can click the module name to redefine the module title, enter the related description, and click  to save the modification. You can click  to delete the new module.



Click **Upload Attachment** to upload a local file to the customized module.

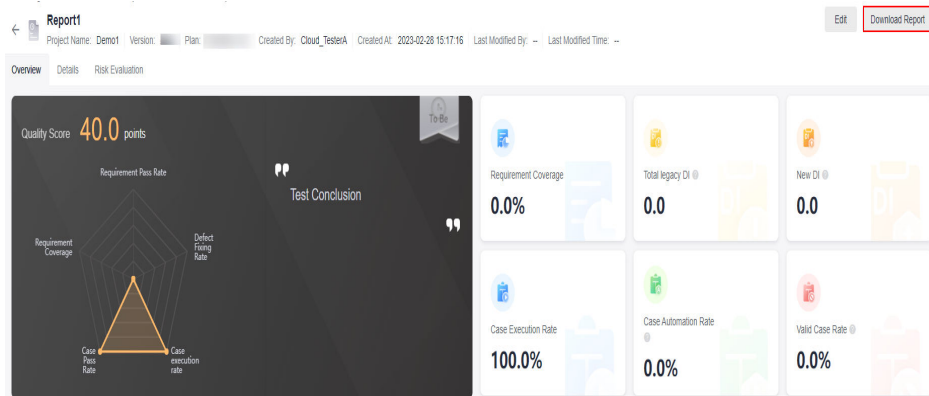


NOTE

- 1. The size of a single file to be uploaded cannot exceed 10 MB.
- 2. A maximum of 15 attachments can be uploaded.

Downloading a Report

Click **Download Report** in the upper right corner of the page to download the created test evaluation report in PDF format to the local PC.



8 Settings

8.1 Notifications

On CodeArts TestPlan, you can configure whether to send notifications for each operation.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Settings > Testing**.
- Step 3** On the **Notification** tab page, configure whether to send service notifications and emails for system events.

Notification sending policy

Event Type	Operator be Notified	Recipient
Assign Case Handler	No	Test case handler
Update Case	No	Project manager, test manager, test case creator, and test case handler
Delete Case	No	Project manager, test manager, project creator (if there is no project manager or test manager), and test case handler
Delete Directory	No	Project manager, test manager, and project creator (if there is no project manager or test manager)
Create Test Suite	No	Test suite handler
Update Test Suite	No	Test suite creator and handler

Event Type	Operator be Notified	Recipient
Delete Test Suite	No	Project manager, test manager, project creator (if there is no project manager or test manager), and test suite handler
Create Report	No	Project manager, test manager, and project creator (if there is no project manager or test manager)
Update Report	No	Project manager, test manager, project creator (if there is no project manager or test manager), and custom report creator
Delete Report	No	Project manager, test manager, project creator (if there is no project manager or test manager), and custom report creator
Edit Risk Info	No	Project manager, test manager, project creator (if there is no project manager or test manager), test plan creator, and test plan handler
Create Plan	No	Project manager, test manager, project creator (if there is no project manager or test manager), and test plan handler
Change Plan	No	Project manager, test manager, project creator (if there is no project manager or test manager), test plan creator, and test plan handler
Delete Plan	No	Project manager, test manager, project creator (if there is no project manager or test manager), test plan creator, and test plan handler
Execute Manual Test Case	No	Test case creator and handler
Send Quality Report upon Plan Completion	Yes	Custom notification recipient on the CodeArts TestPlan settings page (otherwise, project manager and test manager)
Comment Notification	No	User who has been tagged for his or her comments on the test case details
API Test Cases Completed	Yes	API automation test case executor

Event Type	Operator be Notified	Recipient
API Test Suite Completed	Yes	API automation test suite executor

----End

8.2 Function Settings

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Settings > Testing**.
- Step 3** Click the **Function Switch** tab, and enable or disable the requirement update notification.
- Step 4** Enable or disable the function of using the field defined by the API as the script template name when importing a swagger file.
- Step 5** Enable or disable the function of generating test cases step by step during test design.

----End

8.3 User Management

Project members who have logged in to and accessed the CodeArts TestPlan pages are displayed in the CodeArts TestPlan user list. The project creator can manage the user list as required.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Settings > Testing**.
- Step 3** Click the **User Management** tab. On the displayed tab page, view users who have used CodeArts TestPlan. The project creator can delete users as required.

----End



8.4 Test Case Settings

If the preset test case fields do not meet your actual requirements, you can customize fields.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Settings > Testing**.

Step 3 Click the **Test Case Settings** tab. Test case fields are displayed on the tab page.

Step 4 Configure the fields:

- Click  in the **Operation** column to modify the names of some fields, add or delete options, and enable or disable **Show** or **Required**.
- Enable or disable **Display** or **Required** on the setting page.
- Click the drop-down list box of the default value of a field and select a value as the default value of the field after a test case is created.
- Click  in the **Operation** column to delete a field.

----End



Customizing a Field

You can set custom fields. Custom fields are displayed in the details of test cases.

Step 1 In the **Test Case Settings** tab page, click **Add Field**.

Step 2 Set **Field Name** and **Description**. Set **Field Type**, enable or disable **Show** and **Required**, and click **OK**.

- **Single-line text:** Only one line can be entered in this field. The maximum length is 100 characters.
- **Multi-line text:** Multiple lines of fields can be entered in this field. The maximum length is 500 characters.
- **Single-choice list:** Only one option can be selected in this field. Click **Add Options** and set the required options for the field. A maximum of 10 options can be added.
- **Multi-choice list:** Multiple options can be selected in this field. Click **Add Options** and set the required options for the field. A maximum of 10 options can be added.
- **Date Time:** Field for setting date and time.
- **Date:** Field for setting date.
- **Number:** Field for entering an integer ranging from -9999999999 to 9999999999.
- **Decimal:** Field for entering a decimal up to two decimal places.
- **Single-choice user:** Field for selecting a user from the drop-down list box.
- **Multi-choice user:** Field for selecting multiple users from the drop-down list box.

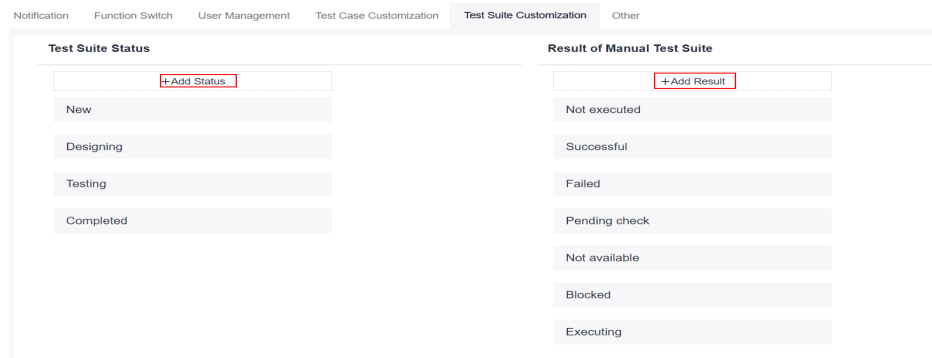
Step 3 The created field is displayed in the list. To edit the field, click . To delete the field, click .

----End

8.5 Test Suite Settings

If the preset test suite status and result do not meet your actual requirements, you can add other status and results as required.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Settings > Testing**.
- Step 3** On the **Test Suite Settings** tab page, click **Add Status** or **Add Result**, and configure the new suite status and result as required.



----End

8.6 Test Report Settings

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Settings > Testing**.
- Step 3** Replace the images of cover page background, body page background, and logo of the test report with the images from your local host.
 - Cover page background image: The recommended format is JPG or PNG; the recommended size is 794 x 1123 pixels.
 - Body page background image: The recommended format is JPG or PNG; the recommended size is 794 x 1123 pixels.
 - Logo: The recommended format is JPG or PNG; the recommended width is ≤ 90 pixels and the recommended height is ≤ 40 pixels.
- Step 4** After the images are uploaded, click **Save**.
- Step 5** **Download a report** and view the reconfigured style.

----End

8.7 Other Settings

After DNS mapping is configured, if the URL request path in the API automation test case is a domain name, the IP address corresponding to the request is automatically mapped.

You can set the request timeout interval, agent pool, and DNS mapping in **Settings**.

- Step 1** Log in to the CodeArts homepage, search for your target project, and click the project name to access the project.
- Step 2** In the navigation pane, choose **Settings > Testing**.
- Step 3** Click the **Other** tab and select the agent pool required for API test case execution (**DEFAULT** is the default public agent pool).
- Step 4** Set **Request Timeout Interval**. The default value is **10,000** ms.
- Step 5** Set **DNS Mapping**.
- **Domain Name**: a unique website identifier
 - **IPS**: the location of a device or host, containing four segments of numbers ranging from 0 to 255, separated by periods (.)
- End

9 Roles and Operation Permissions

Path for project-level permissions:

- Step 1** Log in to the CodeArts homepage.
- Step 2** Click the target project name to access the project.
- Step 3** In the navigation pane, choose **Settings > General > Service Permissions**.

----End

The following table describes the user roles and their operation permissions on CodeArts TestPlan.

Operation /Role	Project Administrator	Project Manager	Test Manager	Product Manager	System Engineer	Committer	Developer	Tester	O&M Manager	Participant Viewer
Test Cases	Create, modify, delete, execute, stop, and view test cases, import test cases from files or versions, export test cases, and check specification compliance. Merge test cases to the baseline (except product manager).						Create, modify, delete, execute, stop, and view test cases, import test cases from files or versions, export test cases, and check specification compliance. Cannot merge test cases to the baseline.		Export and view test cases.	

Operation /Role	Project Administrator	Project Manager	Test Manager	Product Manager	System Engineer	Committer	Developer	Tester	O&M Manager	Participant Viewer
Test Suites	Create, modify, delete, view, execute, and stop test suites.								View test suites.	
Test Versions	View test versions. Create, modify, and delete test versions (except product manager).						View test versions.			
Test Plans	Create, modify, delete, and view test plans.								View test plans.	
Quality Reports	Create, modify, delete, and view quality reports.								View quality reports.	
Quality Assessment	Create, modify, delete, view, and download quality assessments.								View and download quality assessments.	
Test Case Recycle Bin	Delete, restore, and view items in the recycle bin.								View items in the recycle bin.	
Settings	View test settings. Create, modify, and delete settings (except product manager, developer, and tester).								View test settings.	
API Test - Keywords	Create, view, delete, and edit keywords.								View keywords.	
Global Variables	Create, view, delete, and edit global variables.								View global variables.	

Operation /Role	Project Administrator	Project Manager	Test Manager	Product Manager	System Engineer	Committer	Developer	Tester	O&M Manager	Participant Viewer
Test Design - Mind Maps	View and create mind maps, and delete and modify personal mind maps. Delete and modify all mind maps (except product manager, developer, and tester).								View mind maps.	
Test Design - Mind Map Backups	View and create mind maps, and delete and restore personal mind map backup. Delete and restore all mind map backup (except product manager, developer, and tester).								View mind map backups.	
Test Design - Mind Map Templates	View and create mind map templates, and delete and modify personal mind map templates. Delete and modify all mind map templates (except product manager, developer, and tester).								View mind map templates.	
Test Design - Recycle Bins	View deleted mind maps, and delete and restore personal mind maps in the recycle bin.								View deleted mind maps, and delete personal mind maps in the recycle bin.	
APIs	Create, view, modify, delete, copy, and import APIs.								View APIs. Participants can create, modify, delete, copy, and import APIs.	
Rules	Create, view, modify, and delete rules.								View rules. Participants can create, modify, and delete rules.	

Operation/Role	Project Administrator	Project Manager	Test Manager	Product Manager	System Engineer	Committee	Developer	Tester	O&M Manager	Participant Viewer
Instances	Deploy, start, stop, update, and view instances. Delete instances (except testers).								View instances. Participants can deploy, start, stop, update, and view instances.	

 **NOTE**

To modify the permissions of the current role, contact the project administrator.
Custom roles have no preset permissions. Contact the project administrator to add operation permissions for custom roles.