CodeArts TestPlan

User Guide

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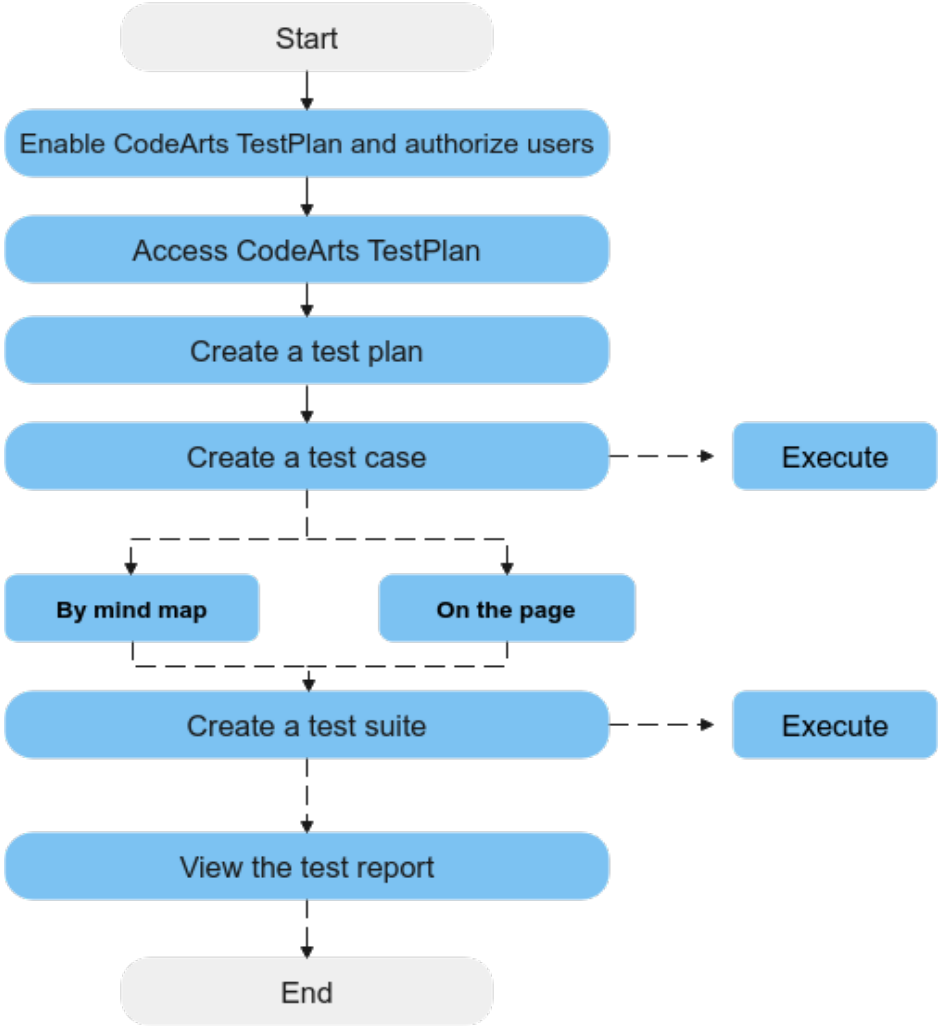
1 Working with CodeArts TestPlan

CodeArts TestPlan is a one-stop test management platform, covering the entire process of test plan, test design, test cases, test execution, and test evaluation. The platform originates from Huawei's years of high-quality software test engineering methodologies and practices, and aims to help enterprises with collaborative, efficient, and trustworthy test activities before product release.

CodeArts TestPlan is an individual service provided within the **CodeArts** solution. For details about its role in the solution, see **CodeArts service portfolio**.

Basic Operation Process

Figure 1-1 Basic operation process



2 Enabling CodeArts TestPlan

Prerequisites

You have registered with Huawei Cloud and completed real-name authentication. If you do not have a HUAWEI account yet, follow these steps to create one:

1. Visit **Huawei Cloud official website**.
2. Click **Sign Up** and create your account as instructed.

   Once your account is created, the system automatically redirects you to your personal information page.
3. Complete individual or enterprise real-name authentication. For details, see **Real-Name Authentication**.

Purchasing CodeArts TestPlan

Refer to **Purchasing CodeArts**.

Adding Members and Assigning Roles

Path for project-level permissions:

Step 1 Click a project name to enter the project. If no project exists, **create one**.

Step 2 In the navigation pane, choose **Settings** > **Permissions**.

----End

The following table describes the user roles and their operation permissions on CodeArts TestPlan.

Table 2-1 User roles and permissions

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. 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. Check specification compliance. Cannot merge test cases to the baseline.		Export and view test cases.	
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.	

Operation/Role	Project Administrator	Project Manager	Test Manager	Product Manager	System Engineer	Committer	Developer	Tester	O&M Manager	Participant/Viewer
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.	
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.	
Mind map backups	View and create mind maps, and delete and restore personal mind map backups. Delete and restore all mind map backups (except product manager, developer, and tester).								View mind map backups.	
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 bin	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.	

Operation/Role	Project Administrator	Project Manager	Test Manager	Product Manager	System Engineer	Committer	Developer	Tester	O&M Manager	Participant/Viewer
Rules	Create, view, modify, and delete rules.								View rules. Participants can create, modify, and delete rules.	
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.

3 Accessing CodeArts TestPlan Homepage

Step 1 Log in to the Huawei Cloud console.

Step 2 Click  in the upper left corner of the page and choose **Developer Services** > **CodeArts TestPlan** from the service list.

Step 3 Click **Go to CodeArts TestPlan**.

Step 4 In the upper left corner of the page, click the project drop-down list, select the target project, and click **Enter Project**.

Alternatively, click **Homepage** on the top navigation bar, hover the cursor over the target project card, and click **Testing**. The **Testing Plan** page is displayed.

----End

4 Configuring a Test Plan

In the development phase, CodeArts TestPlan helps test teams formulate comprehensive and detailed test plans based on project requirements and product features.

Test tasks are split and assigned to testers with deadlines. As the testing goes as planned, team members can track the progress of tasks, such as the number of test cases completed and being executed. Test results, including the quantity, type, and severity of bugs, are recorded for timely analysis so that testers can make adjustments and keep the testing process smooth and efficient. This provides a solid guarantee for product quality.

The typical testing process involves creating a test plan, designing tests, executing them, and generating a test report.

- In the test planning and design stages, define the test scope and objectives, and develop strategies, tools, environments, models, test cases, and automated test scripts.
- A test plan specifies the test time, scope, and objectives, and manages all test activities. It can be specific to a version, sprint, or project.

Prerequisites

You have obtained the permissions to create and modify test plans in the target project. For details, see **Table 2-1**.

Constraints

For Scrum and IPD projects, work items that can be added as requirements to test plans include epics, features, and stories.

For Kanban projects, the default requirement work items can be added to test plans as requirements.

Creating a Test Plan

Step 1 **Access CodeArts TestPlan** through a 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 Configure the following information and click **Next**.

Configuration Item	Description
Name	Name of a test plan. Describe the test scenario or function. Enter 3 to 128 characters. Use only letters, digits, spaces, and special characters (,-_/|*&`^~;:(){}=+,×...'!@#$%.\'[]<>?"—). Do not start with a space.
Version (optional)	The version of the test plan. Enter 3 to 32 characters of digits, letters, hyphens (-), underscores (_), and periods (.).
Processor	Select a member in the project as the processor of the test plan.
Plan Period	Select the start date and end date of the test plan.
Release (optional)	This parameter is available when the project type of the plan is **IPD-Standalone Software** or **IPD-System Device**.
Sprint (optional)	Associate the test plan with a sprint of the project.
Description (optional)	Brief description of a plan. The value contains a maximum of 1,000 bytes.

Step 5 Select the execution mode, add a requirement, and click **Save**.

- The execution mode selected here can be modified in the test plan later.
- The **Testing Case** and **Testing Execution** pages will show the tabs for the selected modes. Click the tabs and then handle test cases and suites for manual or automated API testing. The **Quality Report** page will also show relevant statistics.

Step 6 Check the test plan in the test plan list in card mode.

----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, edit the test plan (including the test plan name, description, execution mode, and basic information) and click **Save**.
- On the **Requirements** tab page, add or remove 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, view the test cases in the plan, and add test cases from the version that the test plan belongs to.
- On the **Operation History** tab page, view the editing history of the test plan.

Designing a Test Plan

Design test cases, develop automated testing scripts, and prepare test data based on specified test 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 Select a test plan to be designed from the list.

- Hover over **Design**. The design progress is displayed, including the numbers of test cases, requirements, and covered requirements.
- Click **Design** to go to the **Testing Case** page.

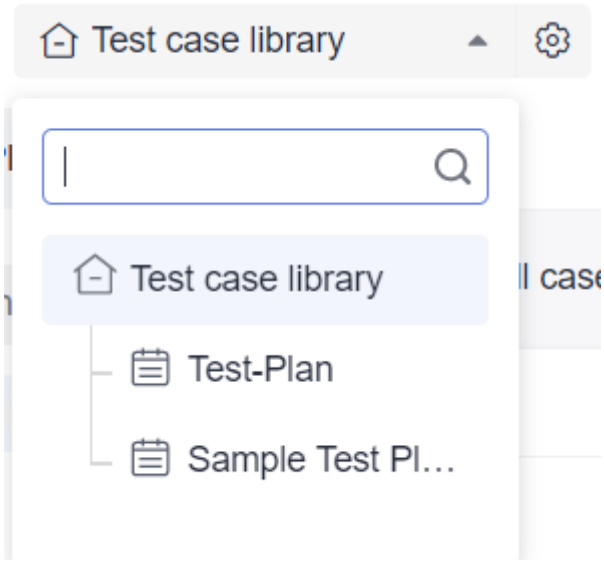
Step 4 Click a required test type tab and then click **Create Case** to create a test case.

After a test case is created, the **Design** circle changes from gray to blue, indicating that the test plan is under design.

For details about how to create a test case, see **related topics**.

Step 5 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 of all test plans in the current version. You can maintain the global test case library as required.



----End

Related Topics

- **Creating a Manual Test Case**: Create manual test cases on the **Manual Test** tab page.

- **Creating an Automated API Test Case**: Create automated API test cases on the **Auto API Test** tab page.

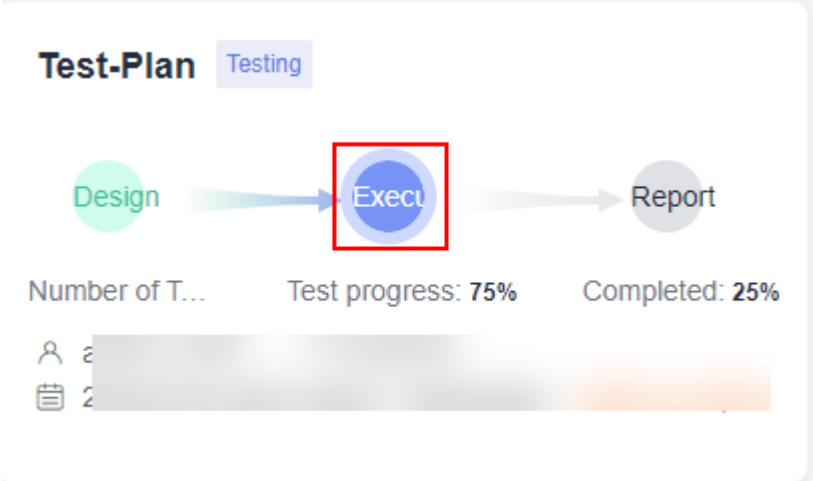
Executing a Test Plan

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. Statistics include the test progress, number of executed test cases, pass rate, and completed bugs/total bugs.
- Click **Execute** to go to the **Testing Execution** page.

Step 2 Create a test suite to execute test cases in batches.

After a test case is executed, the **Execute** circle changes from gray to blue, indicating that the test plan is under test.



For details about test execution operations, see **related topics**.

Step 3 Set the status of all test cases in the test plan to **Completed**. Then the status of the test plan is automatically updated to **Completed**.

----End

Related Topics

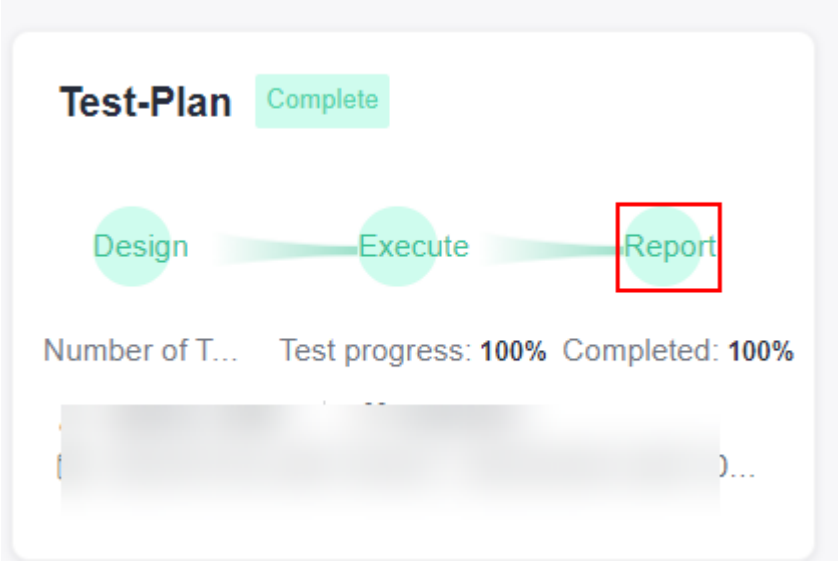
- **Creating a Manual Test Suite**: Execute multiple test cases in a test suite on the **Manual Test** tab page.
- **Executing an Automated API Test Suite**: Execute the automated API test suite on the **Auto API Test** tab page.

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 Move the cursor over the test plan whose report you want to view, 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. You can analyze and record test risks on the page.
- In the **Manual Test** and **Auto API Test** areas, statistics on the execution of test cases and the number of bugs are displayed by execution type.
- To add more reports to the page, click **Add Report** in the lower left corner, 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 and select the target plan.

----End

Related Topics

Viewing the Test Quality Dashboard: Check the test quality dashboard. It shows the statistics on requirements and test cases in the current plan.

5 Configuring a Test Version

In CodeArts TestPlan, test cases are managed and evaluated by product baseline, branch version, and test plan. The service enables teams to collaborate efficiently, allows for the reuse of test assets across different versions, and supports the simultaneous development and delivery of multiple product versions.

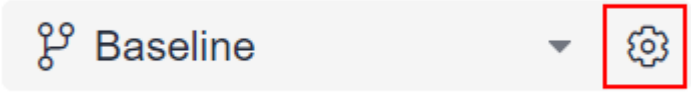
- Version: A version records the test data of a software version, containing details on managing and running test cases and suites, as well as quality reports.
- Relationship between version and test plan: A version contains multiple test plans (and one test case library).
- Baseline: A baseline is a 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. You can merge test cases from a version to the baseline, import test cases from the baseline to a version, and handle conflicts when merging cases between versions. This supports collaborative and simultaneous testing of multiple versions, and enables accumulation and reuse of test assets.

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 Click **Additions**.

Step 5 Enter a 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 change the version name.

Deleting a Version

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

Viewing Test Case Changes

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

Managing Versions

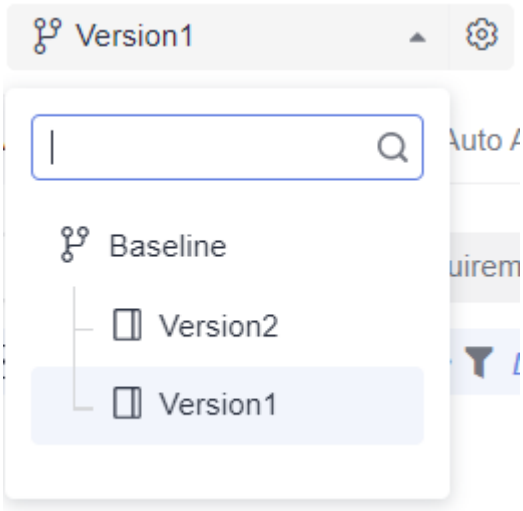
Based on your test strategy, import the test cases from the baseline to a version, or merge the test cases in a version to the baseline.

- **Importing 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, choose **Import** > **Import from Version**.

NOTE

If no test case is available or you need to create a test case, click **Create Case**. For details, see **Creating a Manual Test Case**.

Step 5 Select **Test Cases** for **Resource Type** to import test cases from another version together with the directory of them. If you deselect **Test Cases**, only the directory will be imported.

Step 6 Select a source version from the drop-down list under **Source**.

Step 7 In the displayed dialog box, select the test cases to be imported, select an overwriting rule, and click **OK**.

To select test cases in batches, move the cursor over the check box on the left of **Name**, and select **Select More**. In the displayed dialog box, specify a range of test cases to be imported or select all test cases.

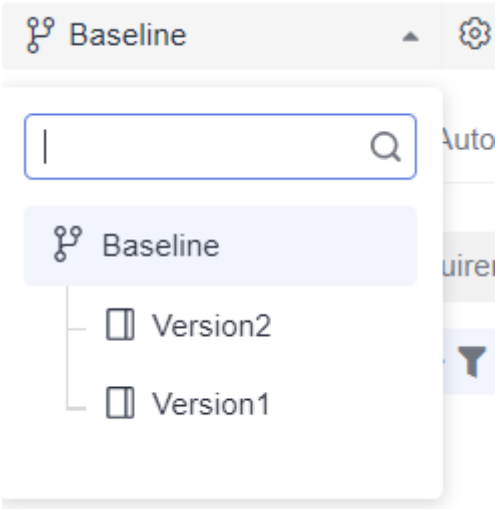
----End

Merging Test Cases in a Version into the Baseline (On 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 version 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 is available or you need to create a test case, click **Create Case**.

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

To select test cases in batches, hover over the check box on the left of **Name**, and select **Select Current Page** or **Select All Pages** to select the test cases in the current page or all pages.

----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 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

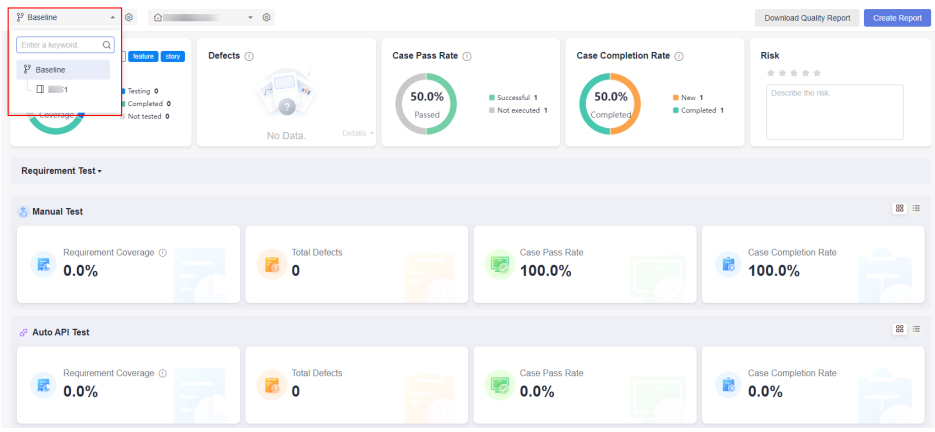
Measuring a Version

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 Check the quality report of the version.

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



----End

6 Configuring a Test Case

6.1 Generating a Test Case

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.

In CodeArts TestPlan, you can create test cases for manual testing, automated API testing, automated performance testing, and custom automated testing.

You can directly create test cases, or design the test on a mind map and then generate test cases on the map.

Concepts related to test case:

- **Test case library**: It stores all types of cases in different versions of a project. For details, see **Test Case Library**.
- **Manual test case**: It includes test steps for a specific test scenario, their expected results, the test case result, and the test case status.
- **Automated API test case**: It is used to automate the testing of predefined APIs to verify system functions and performance. These test cases simulate user operations and input data based on API design standards to check whether the system processes requests correctly and returns accurate responses.

Test Case Library

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

- You can add test cases from 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 On the top navigation bar, choose **Testing** > **Testing Case**. The test case library is displayed by default.

Select a test plan from the drop-down list of the test case library to view the test case details of the plan.

----End

Generating Test Cases Based on Features

You can create a feature folder in the **Features** directory and then create test cases in the folder.

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

Step 2 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 ··· on the right of the **Features** directory to create another subdirectory. Click ··· next to the new subdirectory to delete or rename the subdirectory, or create test cases or subdirectories.

Step 3 Click the subdirectory, select an execution type tab, and click **Create Case**. Then, the created test case is saved in the subdirectory.

----End

Generating Test Cases Based on Requirements

If a project has been associated with a requirement, you can create test cases for the requirement in the **Requirements** directory.

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

Step 2 Click **Requirements** on the left of the page. By default, all associated requirements of the project belong to this **Requirements** directory.

To associate a project with requirements, see **Creating a Work Item**.

Step 3 Click a requirement in the **Requirements** directory, all test cases associated with the requirement are displayed. To create a test case, click an execution type tab and click **Create Case**. The new test case is associated with the requirement by default.

Step 4 On the right of the requirement name, click ··· and choose to view the requirement details or create a test case for the requirement.

----End

6.2 Creating a Test Case by Using Mind Map

6.2.1 Designing a Test Case on Mind Map

CodeArts TestPlan provides a test design feature that offers multi-dimensional heuristic test strategies and design templates. Testers can break down test requirements into scenarios, test points, and test cases. In this way, we hope to

inspire testers to design tests creatively, visualize their ideas, and improve test coverage. This feature enables continuous optimization of test completeness, and helps testers reduce product test omissions during execution.

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

With the help of mind map, you can perform heuristic and visual test design.

NOTE

A 65-day trial is available now. After the trial ends, create a service ticket or contact the account manager to apply for the feature.

Designing a Mind Map Based on a Requirement

Create a mind map for a requirement, break down test scenarios, analyze test points, and output test plans and test cases based on the requirement.

Step 1 Search for your target project and click the name to access the project.

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

Step 3 Click **Requirements** on the left of the page. By default, all associated requirements of the project belong to this **Requirements** directory.

To associate a project with requirements, see **Creating Work Items**.

Step 4 In the search box under **Requirements**, enter a keyword of the target requirement and click . The target requirement is displayed in the requirement directory.

Step 5 Click **Requirements** on the left, select a requirement, and click **Create** or **Templates** in the upper left corner.

Step 6 The mind map design page is displayed. For subsequent operations, go to **Creating a Mind Map and Generating a Test Case**.

----End

Designing a Mind Map Based on a Feature

Create a mind map for a feature, break down test scenarios, analyze test points, and output test plans 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**. In the search box under it, enter a keyword of the target feature and click .

Step 4 Select a feature and click **Create** or **Templates**.

Step 5 The mind map design page is displayed. For subsequent operations, go to **Creating a Mind Map and Generating a Test Case**.

----End

Moving a Mind Map to Change Its Feature

Step 1 In the test design list, move the cursor to the check box of a mind map. ⠿ is displayed on the left of the check box. Drag the mind map to the required feature in the **Features** directory on the left. The feature that the mind map is designed for is changed.

Step 2 Check the mind map in the directory of the new feature.

To move mind maps in batches, select multiple or all mind maps, click **Batch Change Feature**. In the displayed dialog box, select the target directory, and click **Confirm**.

NOTE

Mind maps cannot be moved to other requirements in the **Requirements** directory.

----End

Associating a Test Case Generated on a Mind Map with Requirements

After a test case is designed and archived for a feature on a mind map, associate the case with requirements.

Step 1 Go to the mind map designed based on a feature.

Step 2 Find a test case that has been archived and needs to be associated with a requirement, and click .

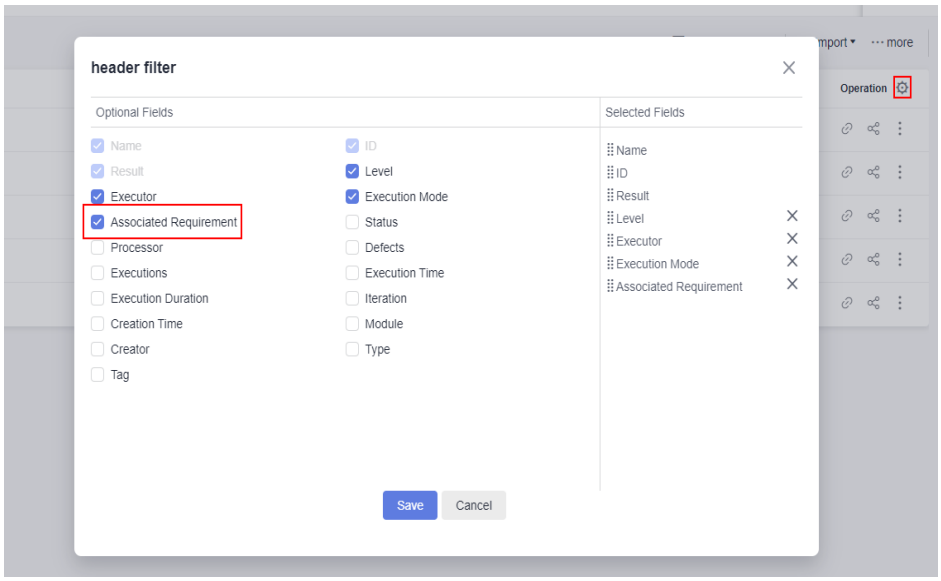
Step 3 Click the **Requirements** tab and click **Associated With Requirement**.

Step 4 In the displayed dialog box, select the target requirement in the current plan and project, and click **OK**.

Step 5 Click **Save** in the upper right corner.

Step 6 In the navigation pane, choose **Testing** > **Testing Case**. On the displayed page, find the test 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, select **Associated Requirement**, and click **Save**.



----End

6.2.2 Creating a Mind Map and Generating a Test Case

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 been assigned a role (except the viewer, participant, and O&M manager) that has permissions to create mind maps in the target project. For details, see **Adding Members and Assigning Roles**.

Constraints

The description of a single node in a mind map can contain a maximum of 5,000 characters.

Creating a Mind Map from Scratch

Step 1 Search for your target project and click the 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 named **Mind Map** by default is displayed in the middle of the page. You can double-click the root node to change its name.

Step 4 In the upper left corner of the page, click , rename the mind map, and click **Confirm**.

Step 5 Click ← in the upper left corner of the page. The test design list is displayed. The created mind map is displayed in the list.

----End

Creating a Mind Map from 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 ▼ next to **Create** and choose **Templates**.

Step 4 Select a required template. 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.

Step 7 To open multiple mind maps on multiple tab pages, click ••• in the **Operation** column and choose **Open in New Tab**.

----End

Renaming a Mind Map

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

Drawing a Mind Map

On the **Testing Design** page, click the name of a mind map to be edited, and draw the mind map.

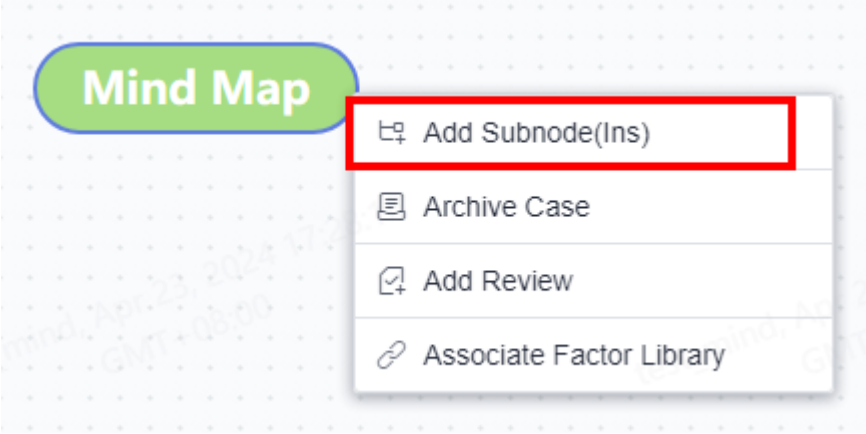
Adding a Node

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 a mind map, select a node, and add a subnode in either of the following ways:

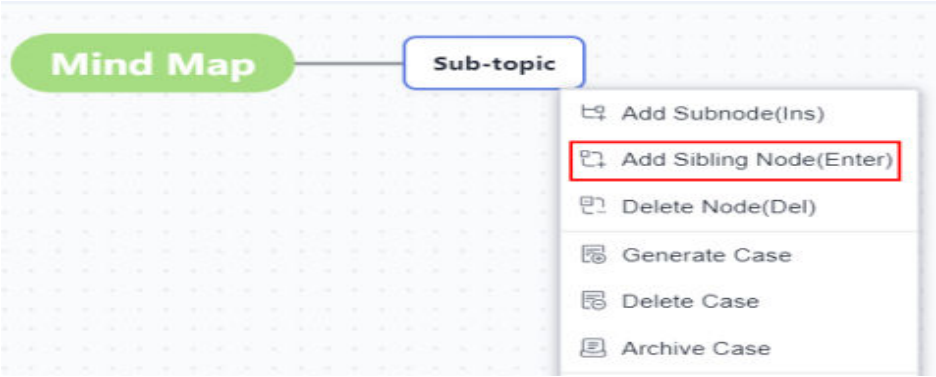
  - Right-click and choose **Add Subnode (Ins)** from the shortcut menu.
  - Press **Insert** or **Tab**.



- Add a sibling node.

  Access a mind map, select any node except the root node, and add a sibling node in either of 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 a mind map, select any node except the root node, and delete the node in one 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**.

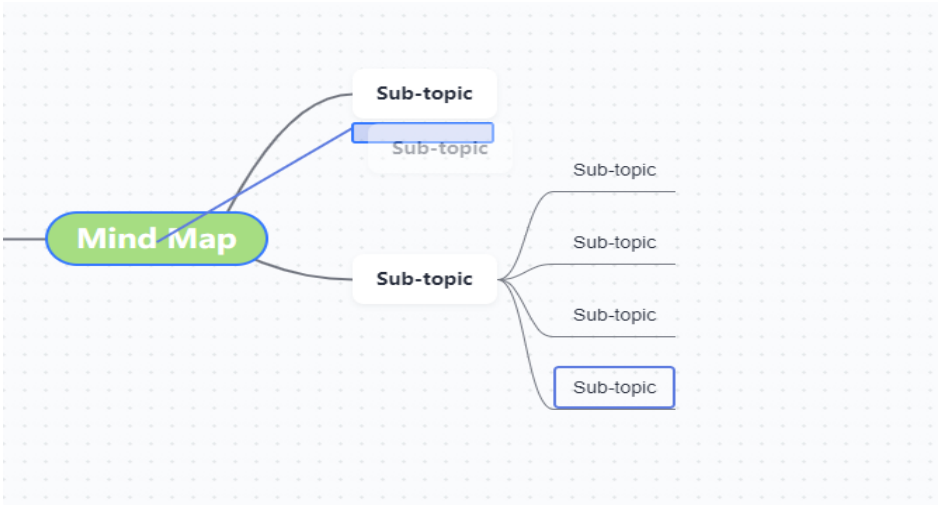
Moving a Node

- Move a node up or down.

  Access a 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 among its sibling nodes.

- Drag a node.

  Access a mind map, select the node to be moved, hold down the left mouse button, drag the node to the required position, and release the mouse.



Expanding Display Levels

Expand to the required mind map node level.

Right-click a node, choose **Display Layer Number** from the shortcut menu, and choose the target level.

Designing a Scenario

Design scenarios based on the requirement for which the mind map is created.

Step 1 Go to a mind map.

Step 2 Add a subnode to the root node. (You can set any non-root node as a scenario.)

Step 3 Enter a scenario description. For example, **Membership registration**.

Step 4 Select the node created in **Step 2** and click SC on the toolbar above the mind map.

If SC is displayed on the selected node, the scenario is added successfully.

----End

Designing a Test Point

Design test points based on the requirement for which the mind map is created.

Step 1 Go to a mind map.

Step 2 Add a subnode to the root node. (You can set any non-root node as a test point.)

Step 3 Enter a subnode name. For example, **Membership registration**.

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

Step 4 Select the node created in **Step 2** and click TP on the toolbar above the mind map.

If TP is displayed on the selected node, the test point is added successfully.

----End

Designing a Test Case

Design a test case to refine a test point.

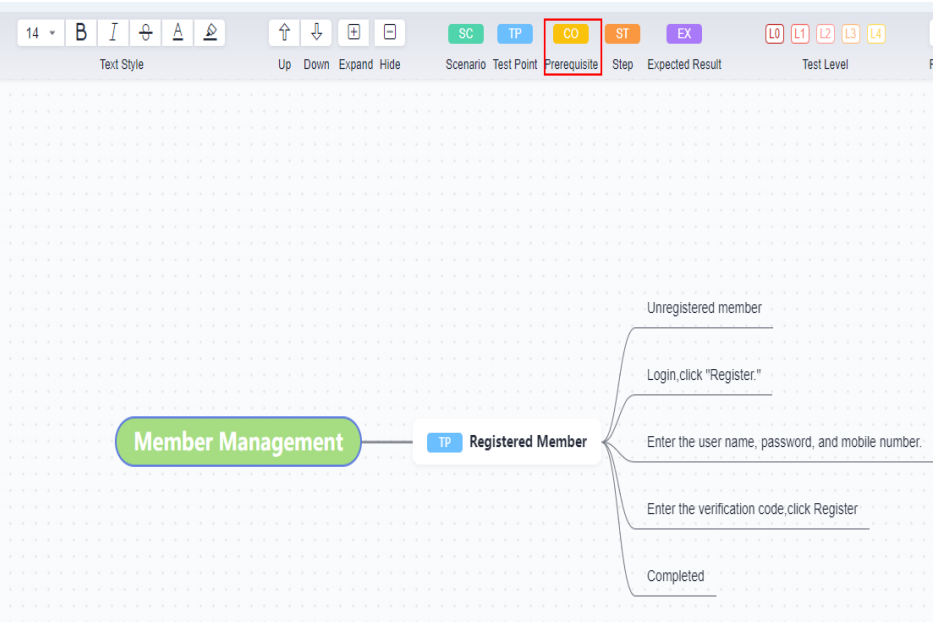
A test case consists of prerequisites, steps, and expected results. Set the three parts as subnodes of the test point node.

Step 1 Go to a mind map.

Step 2 Under the **Membership registration** node, create subnodes and enter the descriptions of prerequisites, steps, and expected results.

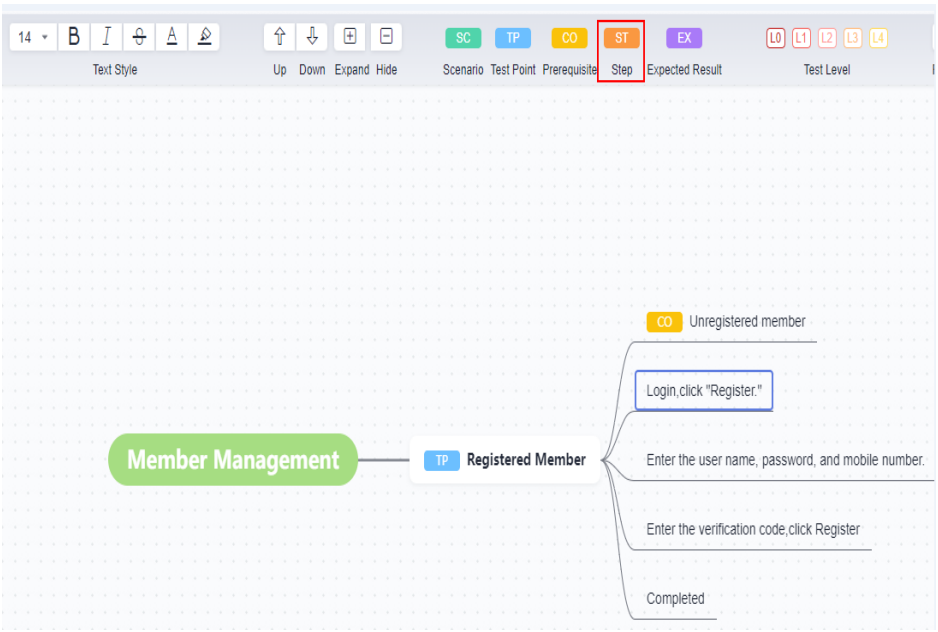
Step 3 Select a node to which you have entered a prerequisite, and click CO on the toolbar above the mind map.

If CO is displayed on the node, it is set as a prerequisite node.



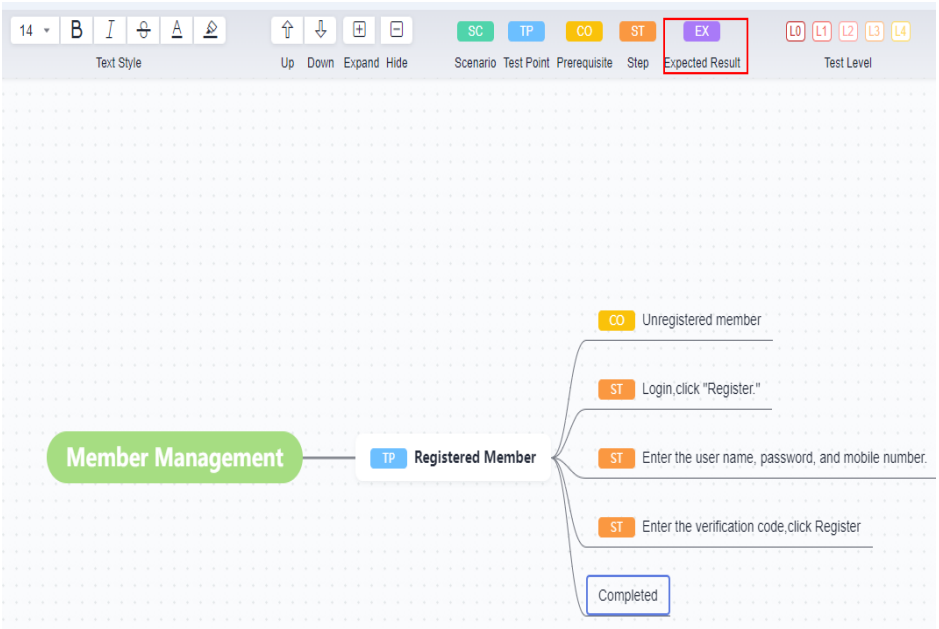
Step 4 Select a node to which you have entered a step, and click ST on the toolbar above the mind map.

If ST is displayed on the node, it is set as a step node.



Step 5 Select a node to which you have entered an expected result, and click EX on the toolbar above the mind map.

If EX is displayed on the node, it is set as an expected result node.



----End

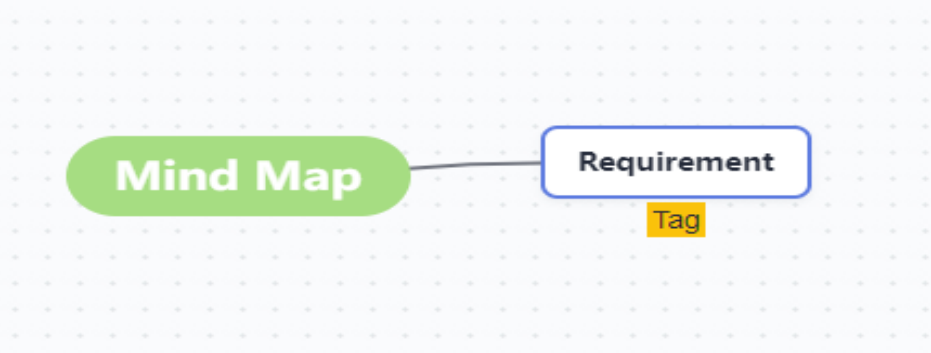
Adding a Tag

Add tags to nodes as auxiliary information. Only one tag can be added to a node. The tag length must be 1 to 128 characters.

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

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

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



----End

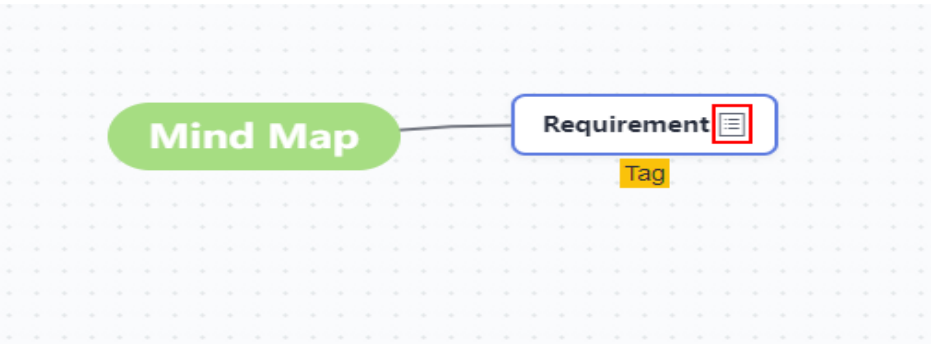
Adding Remarks

Add remarks to nodes as auxiliary information. Only one remark can be added to a node. The remark length must be 1 to 500 characters.

Step 1 Access a 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.

Step 3 If  is displayed on the node, the remarks are successfully added to the node.



----End

Performing Online Review

Review and comment on mind map nodes.

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

Step 2 In the displayed dialog box, select a type and enter comments.

Step 3 Select reviewers. A maximum of five reviewers can be selected.

Step 4 Click **Add Review**.

Step 5 View the review record in the historical review comments.

Step 6 On the right of the review record, click . Then edit the content in the **Type** and **Comments** boxes. (Only the creator and reviewers of the review can edit and delete it.)

To close a confirmed review, toggle off the switch on its right.

----End

Generating Test Cases

After test case design, generate test cases on the mind map.

Generating a Single Test Case

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

Step 2 Check whether is displayed on the node. This icon indicates that a draft test case is generated.

Step 3 Click . The case details drawer page is displayed.

Before generating cases, enable or disable the function of generating each step with an expected result. For details, see **Function Switch**.

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. There will be no expected result (EX) displayed if not set for an ST node.
3. If an ST node has multiple EX nodes, only the first one will be generated as the expected result.

Step 4 To generate a new test case after you modify the previous nodes, repeat the preceding steps.

----End

Generating Cases in Batches

If a scenario has multiple test points, generate draft test cases in batches for it.

Step 1 In the mind map, select a scenario node that contains multiple test points.

Step 2 Right-click the node and choose **Generate Case** from the shortcut menu.

The  icon is displayed on all test point nodes of the scenario node, indicating that draft test cases have been generated for them.

----End

Updating a Case

To update draft test cases after you modify the mind map, perform the following operations.

Step 1 Modify the mind map and right-click the target TP node.

Step 2 Click **Update Case**.

Step 3 In the displayed dialog box, select the draft test cases to be updated.

Step 4 Click **Confirm**.

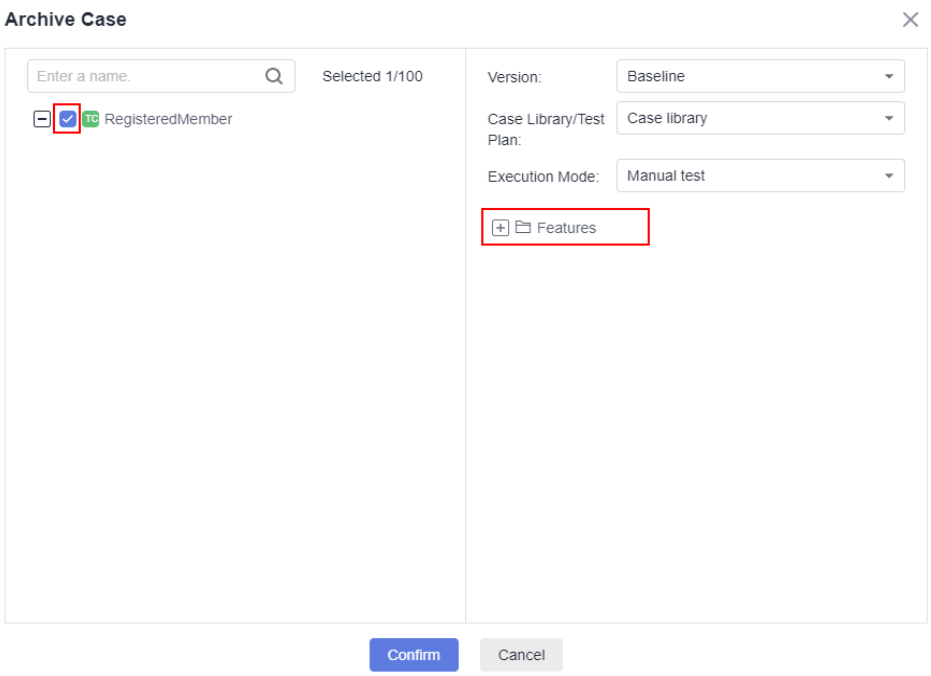
----End

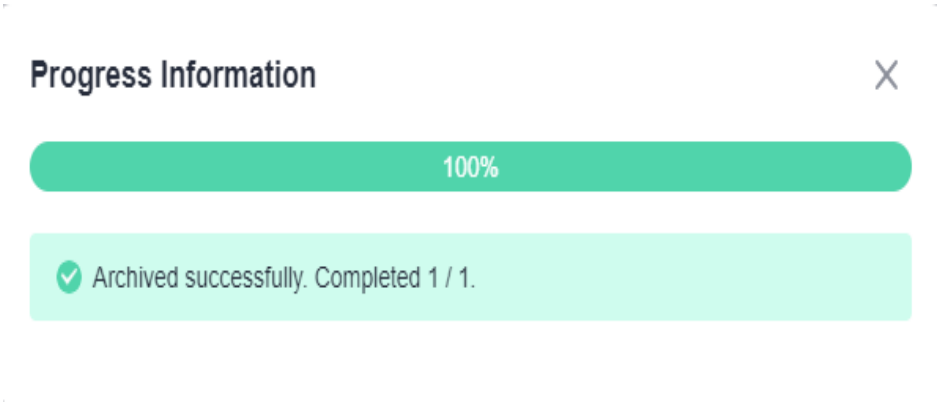
Archiving Cases

Archive draft test cases. Archived test cases will be displayed on the **Testing Case** page.

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

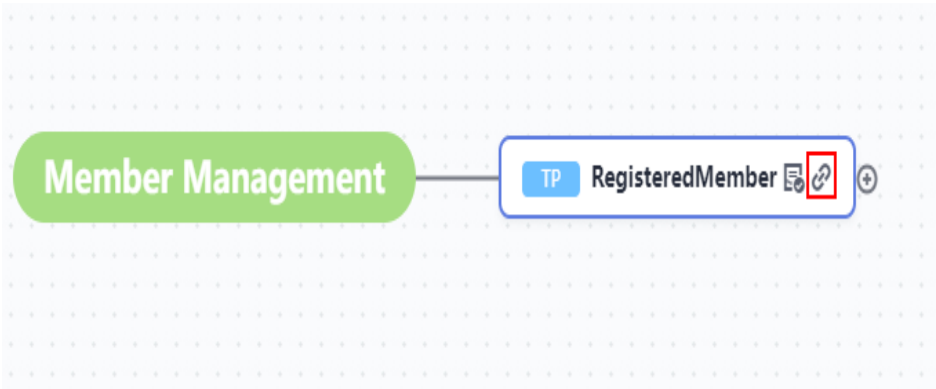
Step 2 On the left, select the test cases to be archived. On the right, set the version, test case library/test plan, execution type, and feature, and click **Confirm**.





Step 3 Check whether is displayed on the node. The archived test cases are displayed on the **Testing Case** page.

Click . The test case details page is displayed.



----End

Deleting Archived Test Cases from a Mind Map

Step 1 Right-click the node with test points for which test cases have been generated.

Step 2 Choose **Delete Case** from the short-cut menu.

Step 3 Select one of the following options:

- **Do not delete them.**: Only the test case formats will be removed from the mind map. The test cases remain in the list in the **Testing Case** page.
- **Label them as "Discarded".**: In the manual test case list, the cases will be tagged with **Discarded** in the basic information.
- **Delete them.**: Those in the case library and test plan will also be deleted. The associations with test suites, requirements, and bugs cannot be restored.

Step 4 Enter **DELETE** in the text box and click **OK**.

----End

6.2.3 Generating a Combinatorial Test Case on Mind Map

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

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.

Prerequisites

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

By Adding Action and Data Factors

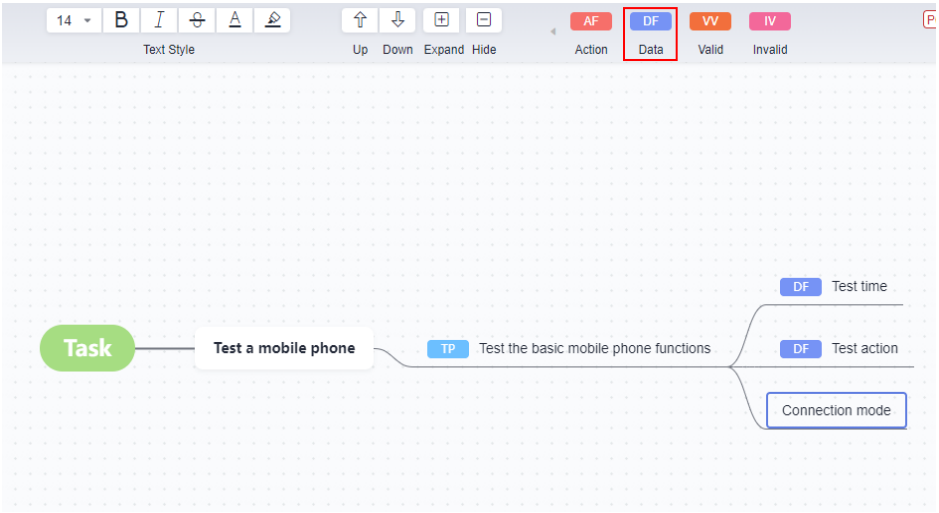
During test design, you can add **Action Factor**, **Data Factor**, **Valid Value**, and **Invalid Value** to mind map nodes.

Step 1 Go to a 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 node to which you want to add action or data factors (max. 100 action factors and 100 data factors per mind map).

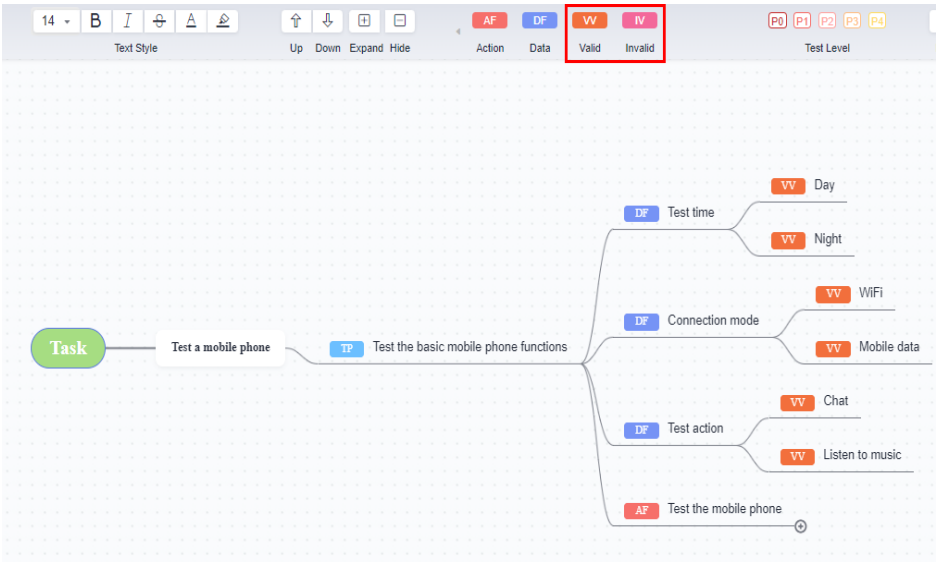
Click  on the toolbar above the mind map. Take the node **Test the basic mobile phone functions** as an example. If the test process is to use a mobile phone to perform *{test action}* in *{connection mode}* at *{test time}*, the data factors can be *{test time}*, *{connection mode}*, and *{test action}*, to cover all scenarios.



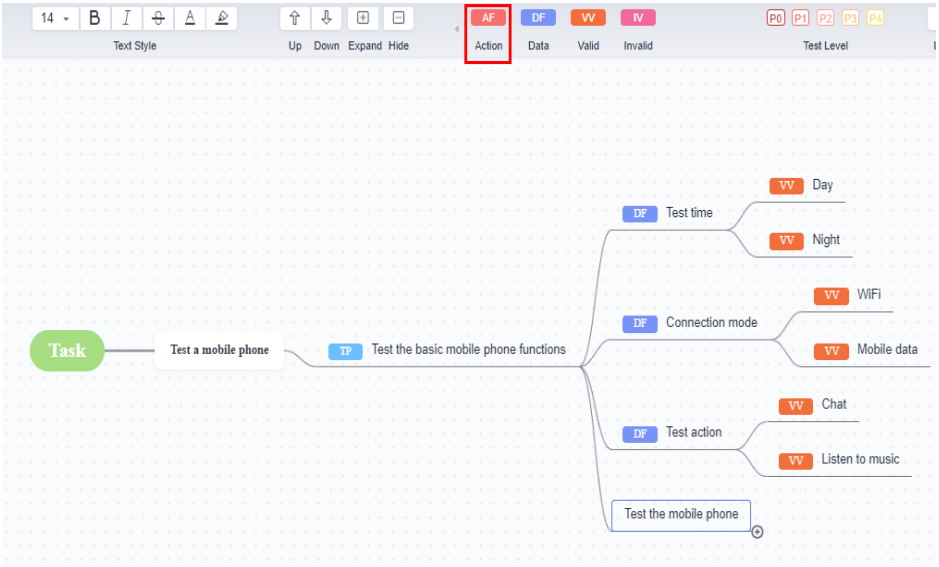
Step 4 Add a valid or invalid value: Add subnodes to the data factor nodes, select the subnodes, and click the valid value icon VV or the invalid value icon IV on the toolbar.

- **Valid Value**: A normal system value of a data factor to be tested.
- **Invalid Value**: An abnormal system value to be tested, or a value not within the range of a data factor. A good test model should include both valid and invalid values to test whether the system program can correctly process errors. Only one invalid value is allowed in a test case. There is no need for multiple invalid values as any single one will trigger system exceptions.

  The following figure shows the valid and 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 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 from top to bottom.

Step 7 On the **Generate Combinatorial Case** page, select the factors you need. By default, all action and data factors are selected.

Step 8 Click **Next**.

Step 9 Hover over a combinatorial algorithm and click **Use and Preview**. For details about the combinatorial algorithms, see the following table.

Data Combination Coverage Type	Description
All Combinations (AC)	All values of each test factor are combined. AC is the most comprehensive coverage mode.
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.
PairWise	Pair-wise testing is N-wise testing when *N* is 2.
TripleWise	Triple-wise testing is N-wise testing when *N* is 3. It generates more combinations than pair-wise testing.
Basic Choice (BC)	Use this algorithm if you want to compare single-factor changes. You need to set a base combination first. From the base combination, new combinations are created by varying one factor value at a time.

Data Combination Coverage Type	Description
Each Choice (EC)	Each test factor value appears at least once in any combination.

To change the algorithm, click **Change Algorithm** and select another algorithm.

NOTICE

If you go back to the mind map, modify or delete a test factor node, and click **Generate Combinatorial Case** again, then you need to click **Refresh** to synchronize the modification.

Step 10 (Optional) Add data factor constraints to limit the values to be used for generating combinatorial cases.

1. Select **Data Constraint** and click **Add**. You can add up to 20 constraints.
2. Select the required operation relationship, set **Variable** to the data factor to which the constraint is to be added, select the operator, and set **Value** to the valid or invalid value of the data factor.

   To clear the value, click  .
3. In the condition expression box, check the configured algorithm and click **Preview Constraint** to view the constraint.
4. Click **Confirm**.
5. If you modify the data constraints, click **Refresh** in the upper right corner of the combination preview.

Example variables and values:

Type: **Primary**, **Logical**, **Single**, **Span**, **Stripe**, **Mirror**, **RAID-5**

Size: **10**, **100**, **500**, **1000**, **5000**, **10000**, **40000**

Format method: **quick**, **slow**

File system1: **FAT**, **FAT32**, **NTFS**

File system2: **FAT**, **FAT32**, **NTFS**

Cluster size: **512**, **1024**, **2048**, **4096**, **8192**, **16384**, **32768**, **65536**

Compression: **ON**, **OFF**

- **Non-conditional constraints**

  To limit parameter values, use non-conditional constraints.

  [Size] > 10000: The value of **Size** in the case set can only be **40000**.

  [File system1] <> [File system2]: The values of **File system1** and **File system2** in the case set must be different.

[Size] > 10000 and **[Compression]="ON"**: The value of **Size** in the case set can only be **40000** and the value of **Compression** can only be **ON**.

- **IF condition constraints**

  To set an IF condition, use this format: **IF** *expression1* **THEN** *expression2*, where the expressions are in the format *[Data factor] Operator [Value]*.

  For example, the expression **IF [File system1]="FAT" THEN [Cluster Size] <= 4096** indicates that if **File system1** is **FAT**, then the value of **Cluster Size** can only be **512**, **1024**, **2048**, or **4096**.

- **AND/OR/NOT**

  For complex expressions, use AND, OR, and NOT, and then enclose them with parentheses (required).

  For example, the expression **IF ([File system1]="NTPS" OR ([File system2]="NTPS" AND [Cluster Size] <= 4096)) THEN [Compression]="OFF"** indicates that if either **File system1** or **File system2** is **NTPS**, and **Cluster Size** is **512**, **1024**, **2048**, or **4096**, then **Compression** is **OFF**.

- **IN/LIKE**

  To limit a factor value within a specific value set, use the IN operator.

  For example, the expression **IF [File system1] IN {"FAT","FAT32"} THEN [Cluster Size] <= 4096** indicates that if **File system1** is **FAT** or **FAT32,** the value of **Cluster Size** can only be **512**, **1024**, **2048**, or **4096**. This constraint is equivalent to **IF ([File system1]="FAT" OR [File system1]="FAT32") THEN [Cluster Size] <= 4096**.

  For wildcard matching, use the LIKE operator together with asterisk (*) or question mark (?). For example, use **FA***, ***FA**, and **?A** to match the values starting with FA, ending with FA, and containing A, respectively.

  For example, the expression **IF ([File system1] LIKE "FA*") THEN [Cluster Size] <= 4096** indicates that if **File system1** is set to **FAT** or **FAT32**, the value of **Cluster Size** can only be **512**, **1024**, **2048**, or **4096**.

  NOTE

  1. Constraints differentiate between integer and string variables. If all values of a variable are numbers, it is regarded as a number. If any one of the values is not a number, the variable is regarded as a string.
  2. When an operator is used to constrain two data factors in the format *[Data factor 1] Operator [Data factor 2]*, both data factors must be of the same type.
  3. Do not use the LIKE operator to constrain two integer variables. Do not use operators >, <, >=, and <= to constrain two string variables.

Step 11 In the **Combination Preview** list, select the data combination to be created.

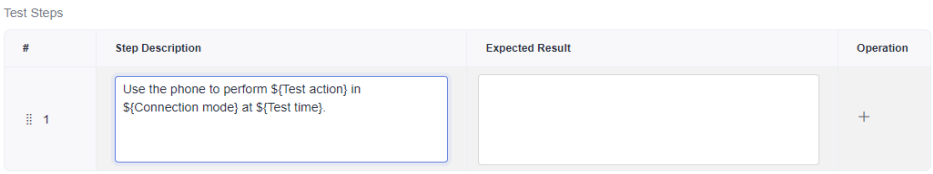
Move the cursor over the first check box, select **Select All Pages** or **Select Current Page**, and click **Next**.

Step 12 On the **Configure Test Case** page, set the following parameters:

- **Test Case**: The default case name is in the format of *TP node name*_**${***Data factor***}**.

- **ID**: The case IDs will be generated based on the auto-increment rule you set.
- **Case Level**: Select **P0**, **P1**, **P2**, **P3**, or **P4**.
- **Test Case Description**: Enter a description. Max. 500 characters.
- **Prerequisite**: Enter the prerequisites. Max. 2,000 characters.

Step 13 Write test steps. Use **$** to reference data factors. Click **Confirm**.



Step 14 Click to view the test case list.

Step 15 The generated test cases are displayed by default. Choose **Combination Strategies** to view the history of combinatorial algorithms.

Step 16 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 17 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 18 In the navigation pane, choose **Testing** > **Testing Case**. Select the required version, test plan, and test type tab, and view the archived test cases.

----End

By Factor Library

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 subdirectory name within 1 to 500 characters.

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

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

Configuration Item	Mandatory	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. 5,000 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 displayed page, modify the factor information and click **Copy**.
- Edit a factor: Click in the **Operation** column. On the displayed page, 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 displayed dialog box, 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 For details about how to generate a case, see **Step 6**.

----End

6.2.4 Managing a Mind Map

Constraints

A maximum of 20 MB mind map files can be imported. A maximum of 100 mind maps in a compressed package can be imported.

Basic Operations on Mind Map

In addition to editing nodes, you can perform the following operations.

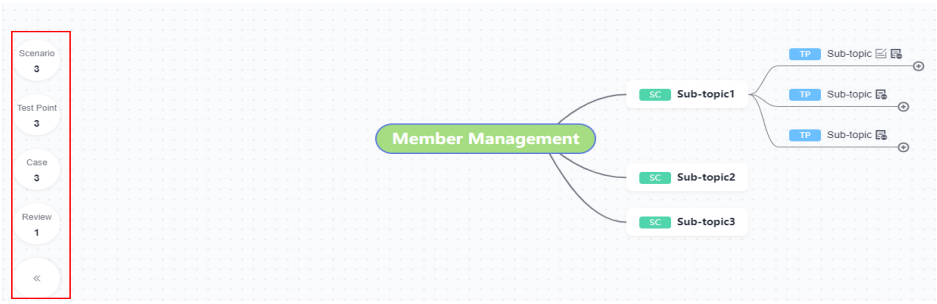
Operation	Description
Rename	Click in the upper left corner of the mind map. In the displayed dialog box, rename the mind map.
Delete a mind map	In the upper right corner of the mind map page, click , select **Delete Mind Map**, and click **Confirm** to delete the current mind map. The deleted mind map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

Operation	Description
Manage the recycle bin (on mind map)	Click  in the upper right corner of the mind map and select **Recycle Bin** from the drop-down list. In the displayed dialog box, view the list of deleted mind maps. For mind maps in the recycle bin, you can perform the following operations: • Click  and **Confirm** to restore the mind map in the corresponding row. **NOTE** • 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. • You are advised to create a blank mind map to restore the mind map in the recycle bin. • Click  to view details about the mind map in the corresponding row. • Click  and **Confirm** to permanently delete the mind map in the corresponding row. Deleted mind maps cannot be restored. Exercise caution before performing this operation.
Recycle bin (on the **Testing Design** page)	In the lower left corner of the **Testing Design** page, click **Recycle Bin**. In the displayed dialog box, see the list of deleted mind maps. For mind maps in the recycle bin, you can perform the following operations: • Click  and **Confirm** to restore the mind map in the corresponding row. **NOTE** • The mind map will be restored to the directory. • Once a record in the recycle bin is restored, the record is removed from the list. • Click  to view details about the mind map in the corresponding row. • Click  and **Confirm** to permanently delete the mind map in the corresponding row. Deleted mind maps cannot be restored. Exercise caution before performing this operation.

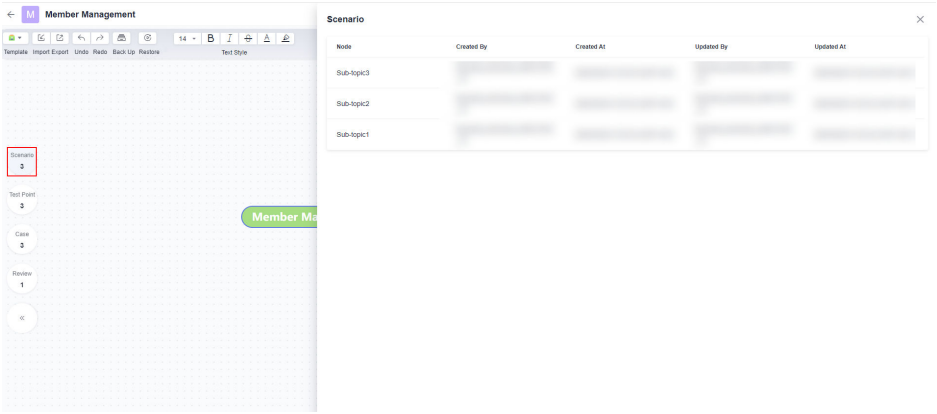
Operation	Description
Import	Click  on the toolbar above the mind map, and then click **Confirm**. In the displayed dialog box, select a local **.xmind** file to import. **NOTE** • A file whose size does not exceed 20 MB can be imported. • A maximum of 100 **.xmind** files in a compressed file can be 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	Click  on the toolbar above the mind map, select the PDF, PNG, or HTSM format, and click **OK** to export the mind map to the local computer.
Backup	Click  on the toolbar above the mind map. In the displayed dialog box, enter the name and description, and click **Confirm** to create a backup for the mind map on the page.
Restore	Click  on the toolbar of the mind map. In the displayed dialog box, select a backup and click  . In the displayed dialog box, click **Confirm** to restore the backup mind map to the current page. **NOTE** • 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 .
Collapse all	Select a node with  and click  on the toolbar above the mind map to collapse all subnodes under the node. The icon next to the node changes to  .

Collecting Node Statistics

On the left of the mind map page, the statistics of each type of node are displayed, including the total number of scenarios, test points, cases, and reviews.



Click any statistical value. A drawer expands from the right, showing the node details.



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

Managing a Mind Map Template

Saving a Mind Map as Template

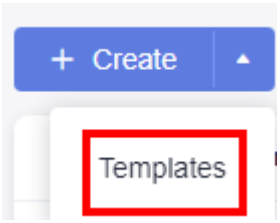
A mind map can be saved as a template.

Step 1 Access a 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 displayed the dialog box, 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.



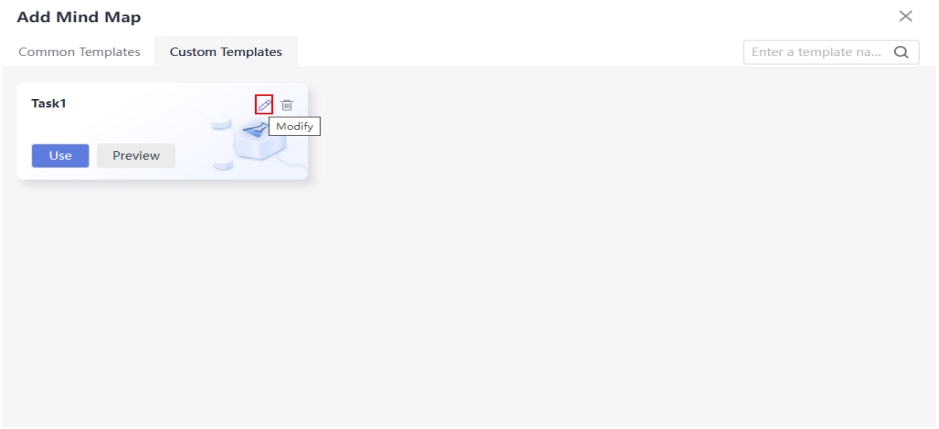
----End

Editing a Template

Members can edit the templates saved by themselves.

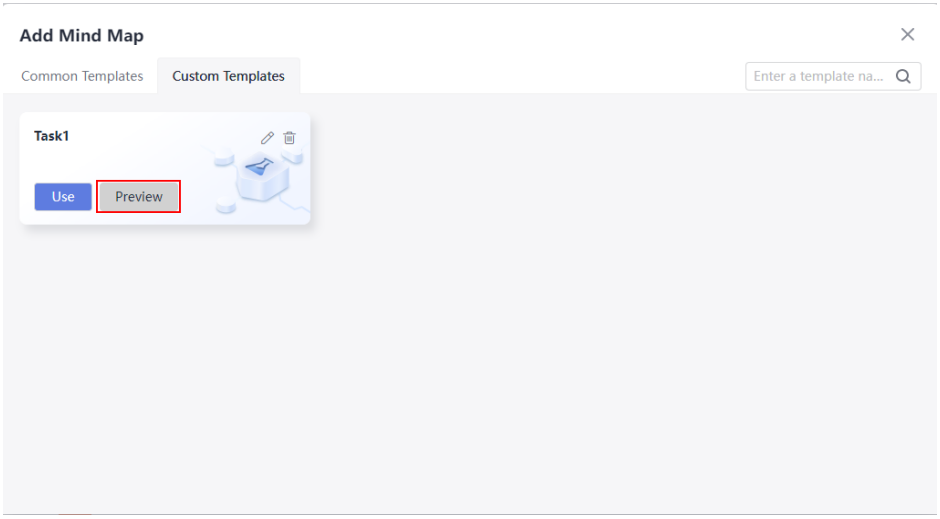
Step 1 Go to the **Testing Design** page and click **Templates** in the upper left corner of the page.

Step 2 Click the **Custom Templates** tab. In the displayed dialog box, select a template and click .



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 displayed dialog box, locate the edited template and click **Preview** to view the modified template details.

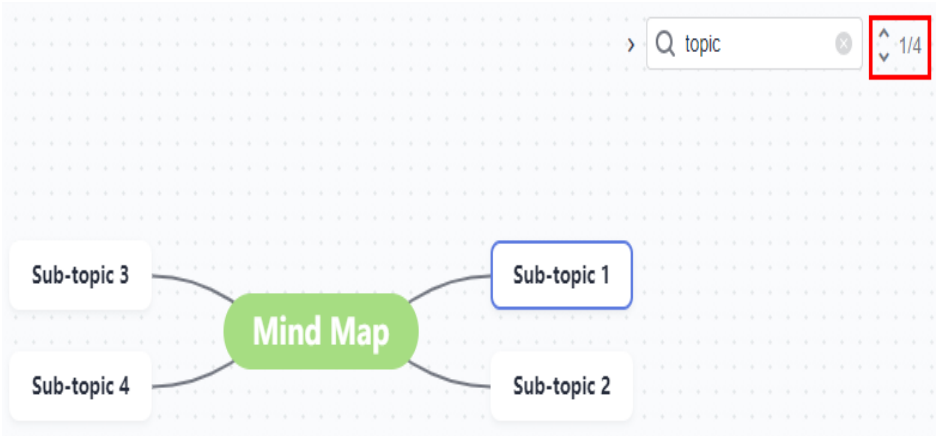


----End

Searching for Nodes

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

On the right of the search box, you can see the number of matched items and the sequence number of the matched item of the current node. You can click the up or down arrow to shift to other matching items.



Renaming a Node

Step 1 Enter a mind map. In the upper right corner of the map, click on the left of the search box.

Step 2 In the search box, enter a node name.

Step 3 In the text box below the search box, enter a new name.

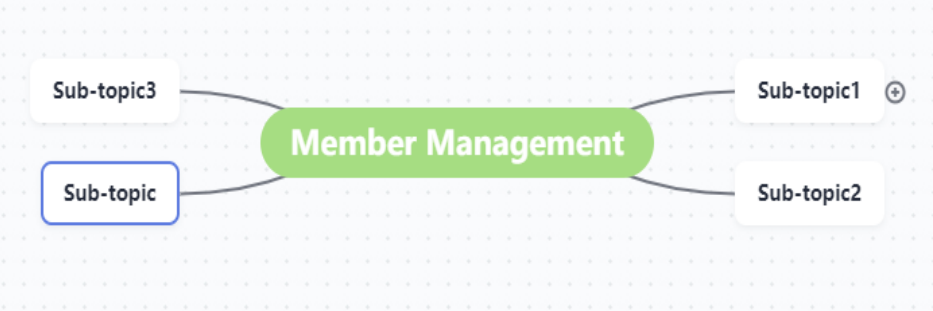
Step 4 Click to replace the name of a node with the new name. The next node to be renamed is marked in a blue box. After all nodes are renamed, a message is displayed indicating that all the nodes have been renamed.

Click to rename nodes in batches. A progress dialog box is displayed on the page.

----End

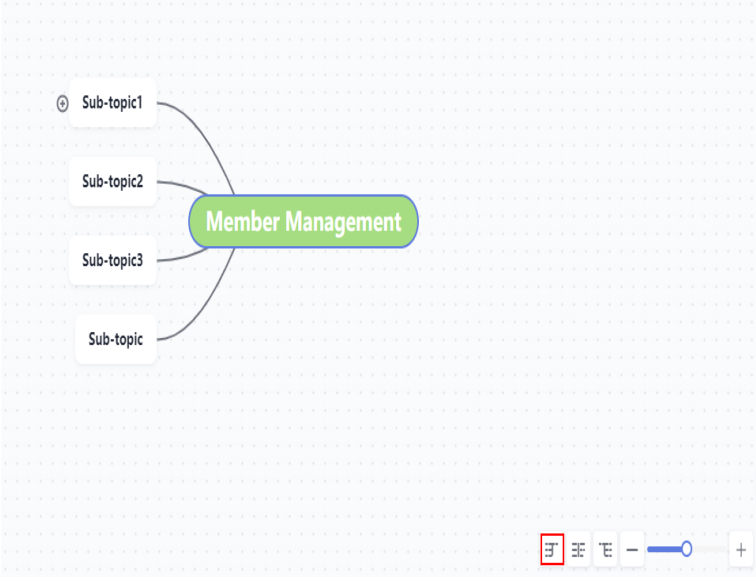
Adjusting Layout

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.

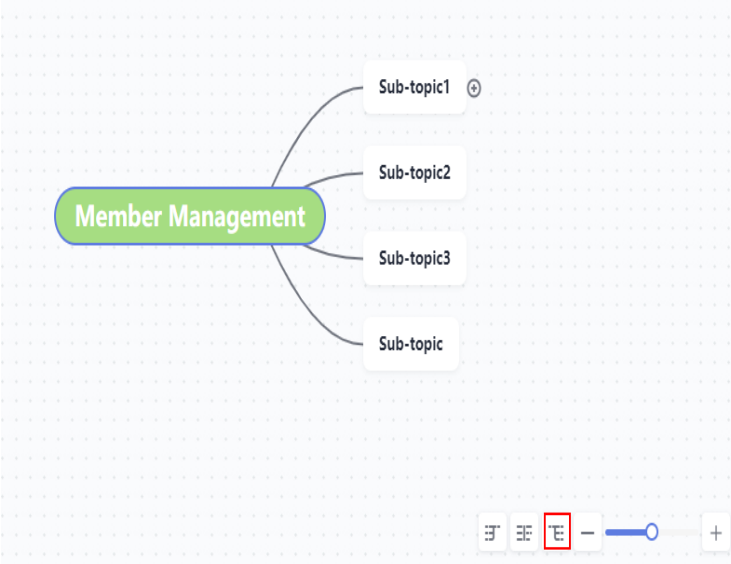


Click the toolbar in the lower right corner of the mind map to adjust the layout of the mind map.

- 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.

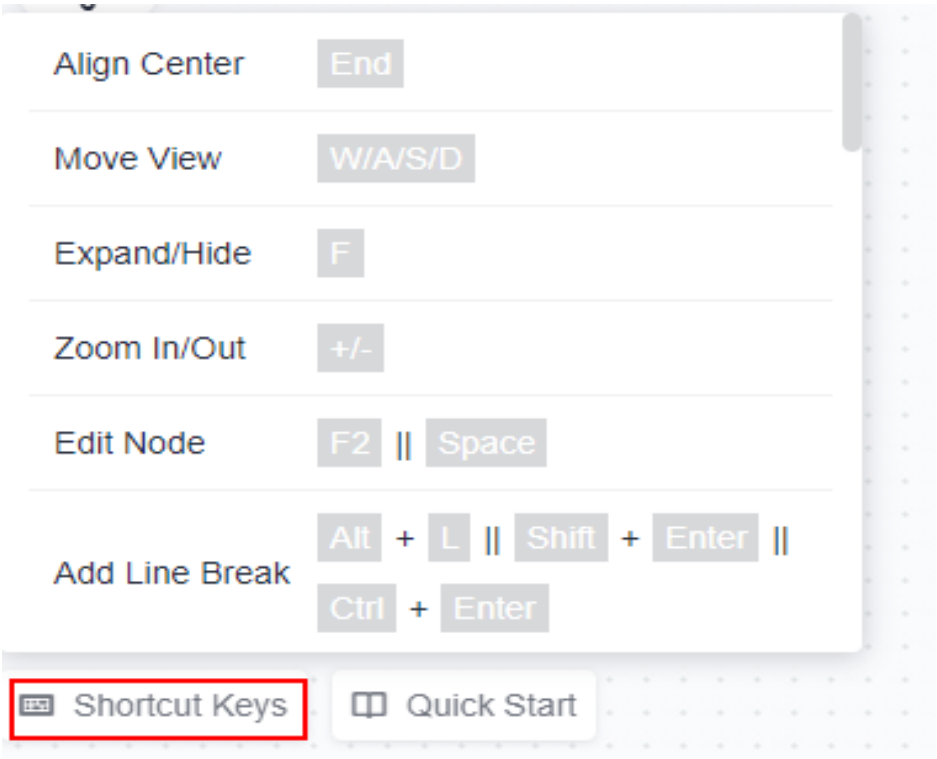
Shortcut Keys

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
Adding 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 Action Factor	Alt+Shift+A
Add Data Factor	Alt+Shift+D
Add Case Level	Ctrl+0 / 1 / 2 / 3 / 4
Find/Replace	Ctrl+F
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.



Copying a Mind Map in a Project or to Other Projects

Copy and paste a mind map within the same project or to other projects.

Step 1 Go to the **Testing Design** page.

Step 2 Locate the row of the mind map to be copied, click ••• in the **Operation** column, and click **Copy**.

To copy multiple mind maps, select them and click **Batch Copy** in the tool bar below the list. Up to 10 mind maps can be copied each time.

Step 3 In the mind map list page of the current project or other project, click Paste in the upper right corner of the list.

----End

Changing Mind Map Creator

Step 1 Go to the **Testing Design** page.

Step 2 Locate the target mind map and click ••• in the **Operation** column.

Step 3 Click **Change Permission**.

Step 4 In the displayed dialog box, click the drop-down list and select the project member to whom you want to transfer the mind map permissions.

Step 5 Click **OK**.

----End

6.3 Creating a Manual Test Case

Manual test cases are designed by testers based on requirements or product features to manage test scenarios and steps, and to verify whether software can function as expected.

Prerequisites

You have been assigned a role (except the O&M manager, viewer, and participant) that has permissions to create test cases. For details, see **User roles and permissions**.

Constraints

For Scrum and IPD projects, work items that can be added to manual test cases as requirements are epics, features, and stories.

For Kanban projects, the default requirement work items can be added to manual test cases as requirements.

Creating a Manual 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 **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 following table describes the main configuration items of manual test cases.

Configuration Item	Description
Name	(Mandatory) Enter 1 to 128 characters. Describe the test scenario or function.
Description	Brief description of a test case. Enter the test scope, test objectives, test policy, test methods, test tools, test data, test metrics, and test environments of the current test case.
Prerequisites	Prerequisites for executing the current test case.
Test Steps	Step description and expected result. +: Add a row. : Copy the row and paste it to the next row. : Delete the row.

Configuration Item	Description
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.
ID	Test case ID. You can enter a custom ID. If left blank, it will be automatically generated. 1. In the navigation pane, choose **Settings** > **Testing**. 2. Click the **Test Case Settings** tab, locate the row of **ID**, and click in the **Operation** column. 3. In the displayed dialog box, enter the prefix, auto-increment start value, and connector. 4. Click **OK**. Test cases will be automatically numbered by this rule. The test case ID can be changed as required at the test case list page. An ID can contain 3 to 128 characters.
Case Level	Test case level based on the importance of the scenario or function. The default level is **L2**. • **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 sprint 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 **Adding Work Item Modules**.
Version	Version number of the current test case.
Sprint	Sprint to test the current test case.
Processor	Person who needs to complete the test task.
Associated Requirement	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.
Folder	Associated feature directory. The test case is in the **Other** directory by default.

Configuration Item	Description
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 in the **Settings** page. For details, see **Test Case Fields**.

----End

Editing Test Case Details

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

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.

Step 1 After the operations described in **Creating a Manual Test Case** are complete, choose **Testing Design** > **Manual Test**, click the name of the test case to be edited, and click the **Details** tab.

Step 2 Edit the test details. Two views are provided for editing test steps:

- Text view. Click **Text** on the segmented button and enter test steps and expected results in the two text boxes.
- Table view. Click **Table** on the segmented button and enter test steps and expected results in the table. To add more rows, click + in the **Operation** column.

Step 3 Click the **Requirements** tab. Click **Associate With Requirement** on the right of the page. In the displayed dialog box, select the requirements to be associated and click **OK**.

Step 4 Click **Save**.

----End

Related Topics

- **Adding Test Cases to a Test Plan** and **Creating a Manual Test Suite**: Add test cases to test plans and suites to assign execution tasks to testers.
- **Managing Test Cases**: Import and export manual test cases and associate requirements or bugs.

6.4 Creating an Automated API Test Case

6.4.1 Using Automated API Test Cases

A rich UI is provided for writing of automated API test cases. You can orchestrate test steps in a visual manner, use various checkpoints, configure extraction as needed, and quickly generate test cases that match the core API logic without coding. You can arrange API test sequence by dragging and dropping test steps to generate your own strategies for automated testing. You can also generate automated API test scripts from scenarios to avoid repetitive tasks, and focus on exploratory testing and other creative and valuable test activities.

An automated API test case consists of basic information and scripts.

- Basic information is for managing and describing the test case, including the name (mandatory), type, module, version, sprint, associated requirements, ID, tag, test case level, processor, folder, description, prerequisites, test steps, and expected results.
- A script defines automated test procedure, including test steps, logic control, and test parameters.

The process of using an automated API 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 the Response Extraction of an API Script**.
- 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 impacting other tests or the following test, clear the test environment data after each test, reset the test environment, and delete the data created in the preparation stage.
  - If no data needs to be deleted, ignore this stage. You can delete data using API calls. The test steps in the destruction stage can reference the parameters extracted in the preparation stage.

6.4.2 Creating an Automated API Test Case Template

Constraints

The name of an API automation test case must contain 1 to 128 characters. Only letters, digits, and special characters (-_/|*&`'^~;:(){}=+,×...—!@#$%.[]<>?–") are supported.

Creating an Automated API 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 **Auto API Test** tab and click **Create Case** in the upper left corner of the page.

Step 4 Enter the test case name, set other information as required, and click **Save**. Alternatively, click **Save and Write Script**. The **Scripting** page is displayed.

The main configuration items of automated API test cases are similar to those of manual test cases. For details, see **Creating a Manual Test Case**.

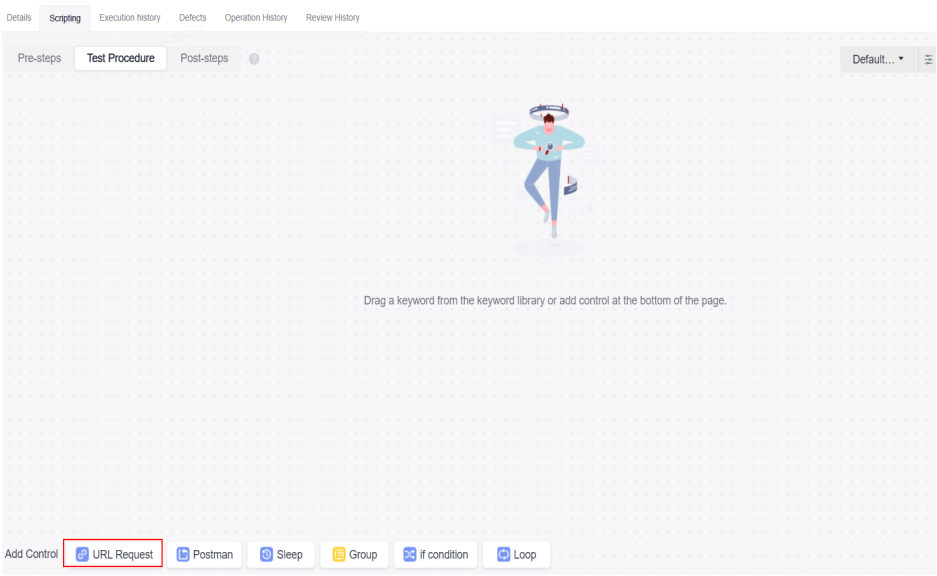
----End

6.4.3 Adding an API Test Script by Using a Custom URL Request

6.4.3.1 Adding and Setting the URL Request of an API Script

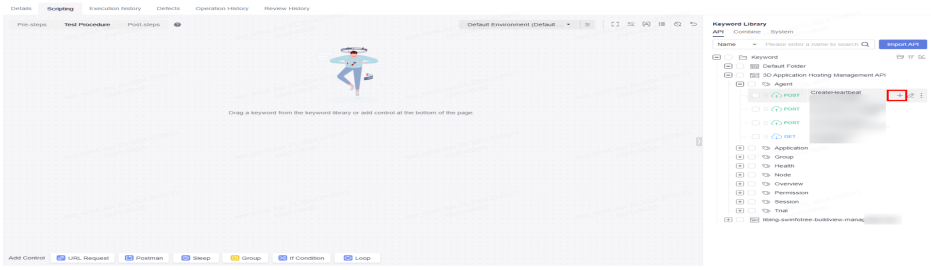
Step 1 After the operations described in **Creating an Automated API Test Case Template** are complete, choose **Testing Case** > **Auto API Test** and click the name of the test case to be edited.

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



You can import a Swagger description file of the API to be tested to generate a script template and then orchestrate test cases. For details, see **Saving Test Procedure as an API Keyword**.

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 **Adding and Setting the URL Request of an API Script**, **Setting Checkpoints for an API Script**, and **Setting the Response Extraction of an API Script**. Enter a domain name or IP address as the environment address in the request. If you import a Swagger or Postman file, the address will be automatically generated to the request.

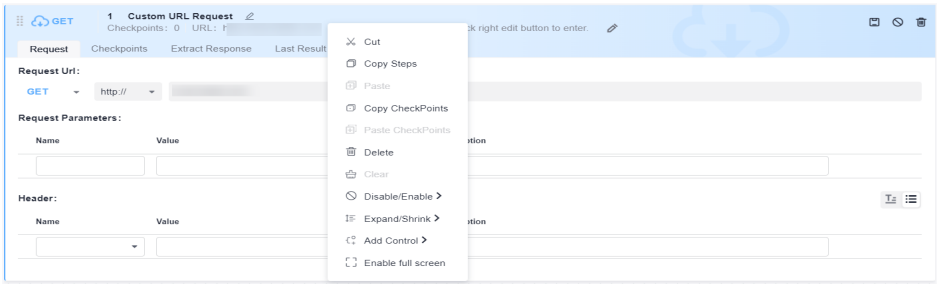
Step 4 (Optional) Repeat **Step 2** to **Step 3** to add pre-steps and post-steps.

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

----End

NOTE

- Automated API 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 automated API 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 press **Ctrl+left-click** 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. So, 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**.

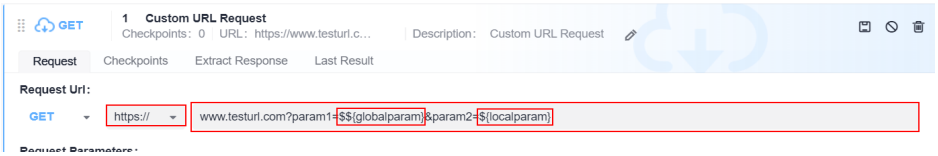
Requesting URL and URL Parameters

On the **Scripting** tab page of the automated API 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.
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.

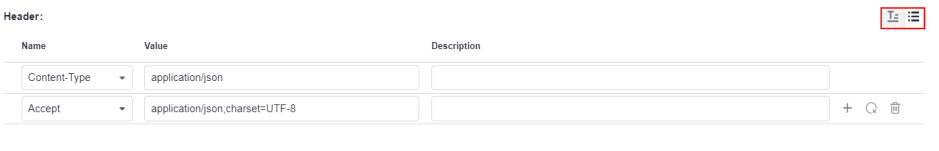
The request URL supports environment parameters, local parameters, and response extraction parameters. For details, see **Setting Test Case Parameters of an API Script**.



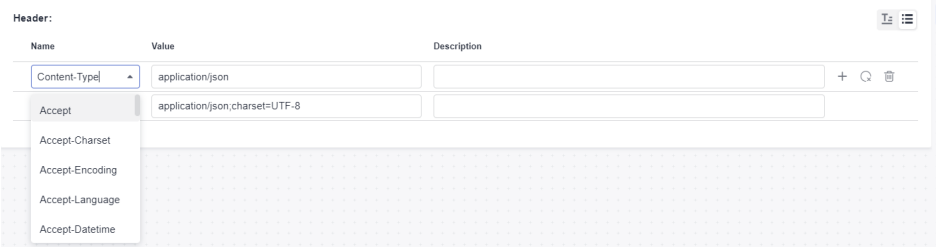
Request Header

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.



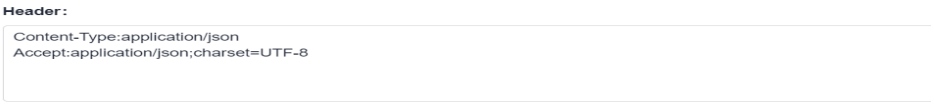
- Text: The request header must be in the format of **key:value**.

  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:

  a. The total number of request headers cannot exceed 30.

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

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.

Request Header	Description
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.
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. So, 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.

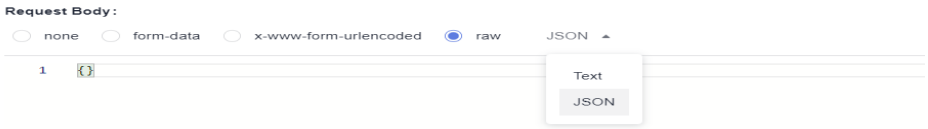
Request Header	Description
If-Range	If an entity is not modified, one or more parts that are missing are sent to the sender. Otherwise, the entire new entity is sent.
If-Unmodified-Since	A response is sent only when the entity has not been modified since a specific time.
Max-Forwards	Number of times 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.
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

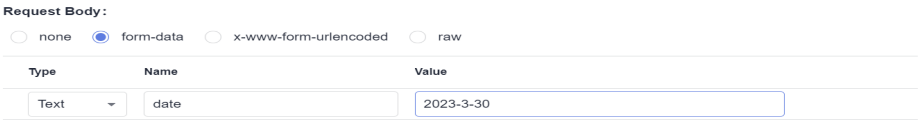
A request body is a message (packet) to be transferred in an API request. The request body can be in text, JSON, or form format.

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.

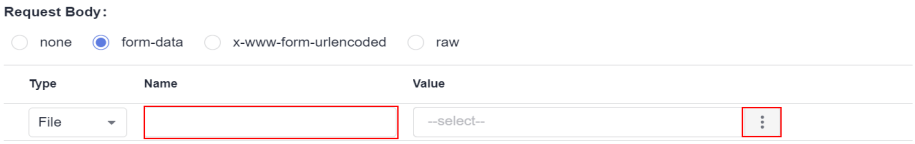
- Text: You can enter a standard JSON string. The method is the same as that for selecting a JSON request body.



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



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



6.4.3.2 Setting Checkpoints for an API Script

Suggestions

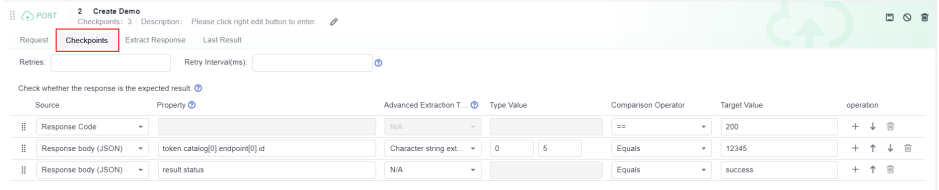
You are advised to set checkpoints. For API requests, provide checkpoints for determining response codes.

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.



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 between retries 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.
Property	Enter $ to invoke global variables, local variables, and built-in functions. • 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: 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	(Optional) Use the advanced extraction type to assist in extracting checkpoint information. If **N/A** is selected, no additional matching mode is used. Currently, there are two modes: • Character string extraction (truncation). For details, see **Character String Extraction Description**. • Regular expressions to filter source strings. For details, see **Regular Expression Description**. For the advanced extraction type, the string extraction function is preferred. If the function cannot meet the requirements, you can use the regular expression.

Parameter	Description
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

Character String Extraction Description

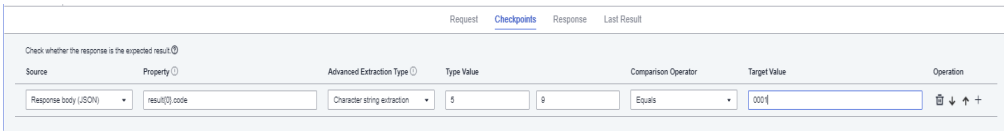
When setting checkpoints or response extraction, if the expressions in the property setting bar cannot meet the requirements, you can set **Advanced Extraction Type** to **Character string extraction**.

There are two **Type Value** text boxes for string truncation:

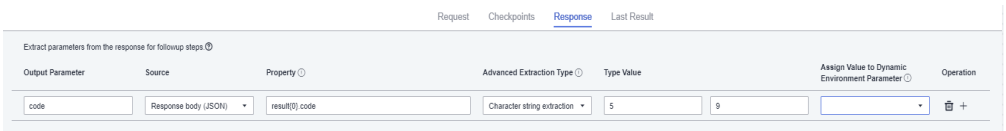
- The first box indicates the start index. The first digit is **0**. The start index is contained in the truncated string.
- The second box indicates the end index. The end index is not contained in the truncated string.

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 by referring to the following figure.



- 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 response extraction by referring to the following figure.



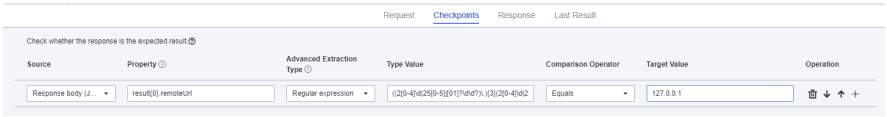
Regular Expression Description

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**.

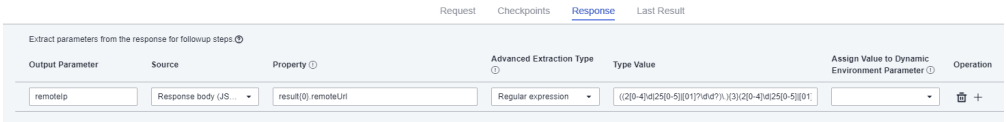
The Java regular expression engine can be used.

The following response body is used as an example.

- To verify the IP value of **remoteUrl** in the first element of the **result** array in the response body, use regular expression for matching and enter the target value in the checkpoint setting area. The following figure shows an example. Set **Type Value** to **((2[0-4]\d|25[0-5]|[01]?\d\d?)\.){3}(2[0-4]\d|25[0-5]|[01]?\d\d?)**.



- To extract the IP value of **remoteUrl** in the first element of the **result** array in the response body, and assign the value to the variable **remoteIp**, use regular expression for matching and set the response extraction by referring to the following figure. Set **Type Value** to **((2[0-4]\d|25[0-5]|[01]?\d\d?)\.){3}(2[0-4]\d|25[0-5]|[01]?\d\d?)**.



Comparison Operator Description

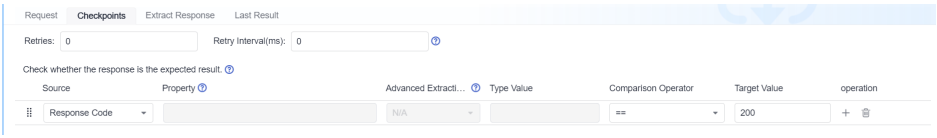
CodeArts TestPlan supports the following comparison types.

Comparison Type	Comparison Operator	Value Mandatory or Not	Example
Digit	• == • != • >= • <= • >\ • <	Yes	• Response code = 200 • Response code != 200 • Response code >= 200 • Response code <= 200 • Response code > 200 • Response code < 200
String	• Equals • Does not equal • Equals (case insensitive) • Contains • Does not contain	Yes	• 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	• Regular expression for parameter 1 in the response body: **^[A-Za-z0-9]{1,32}$**
General	• Is empty • Is not empty	No	• Parameter 1 in the response body is empty. • Parameter 2 in the response body is not empty.
JSON array	• Has null JSON array • Has non-null JSON array	No	• Parameter 1 in the response body has a null JSON array. • Parameter 2 in the response body has a non-null JSON array.

Comparison Type	Comparison Operator	Value Mandatory or Not	Example
	JSON array size	Yes	• Size of the parameter 1 **JSON** array in the response body.
Type	• Is JSON type • Is JSON array type	No	• Parameter 1 in the response body is of the JSON type. • Parameter 2 in the response body is of the JSON array type.
JSON object	JSON value	Yes	• The JSON value of parameter 1 in the response body is **{"name":"zhangsan"}**.

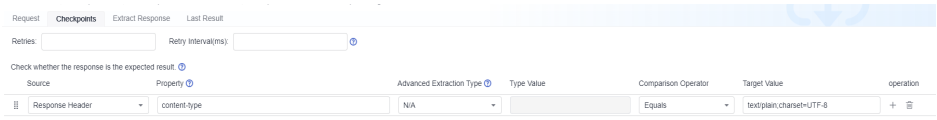
Response Code Check

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



Response Header Check

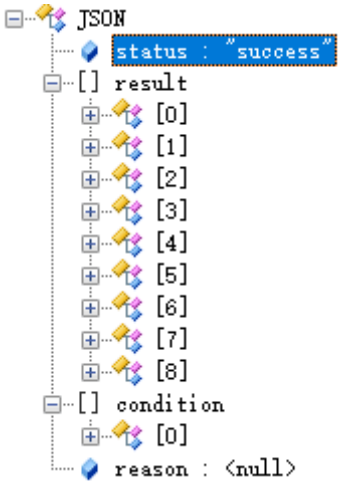
Compare the value of a field in the response header with the target value. For example, check whether the value of **content-type** in the response header is equal to **text/plain;charset=UTF-8**.



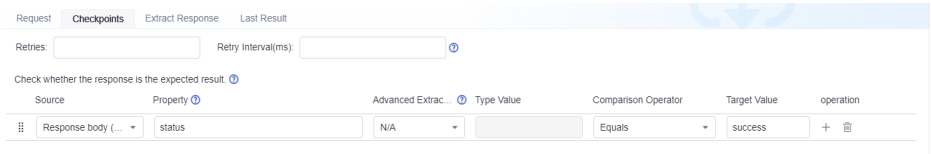
Response Body (JSON) Check

1. Check the value of the object field in the response body (JSON). For example:

   The response body structure is as follows.

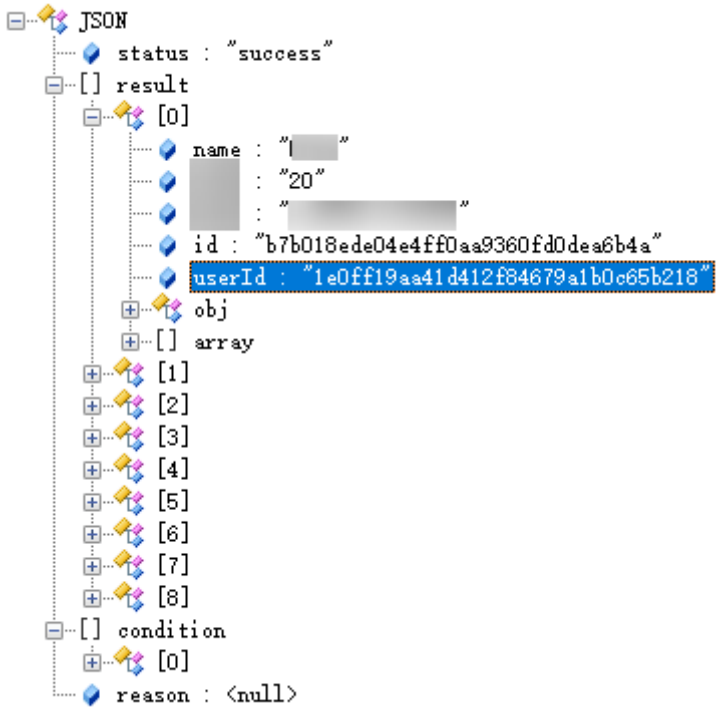


To check the value of the field whose name is **status** in the response body object, configure the checkpoint by referring to the following figure.

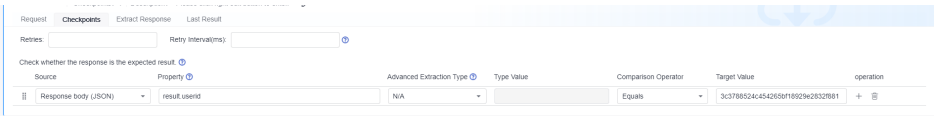


2. Check the field value of an array object in the response body (JSON). (The array condition uses the subscript starting from 0 to determine the object.) For example:

   The response body structure is as follows.

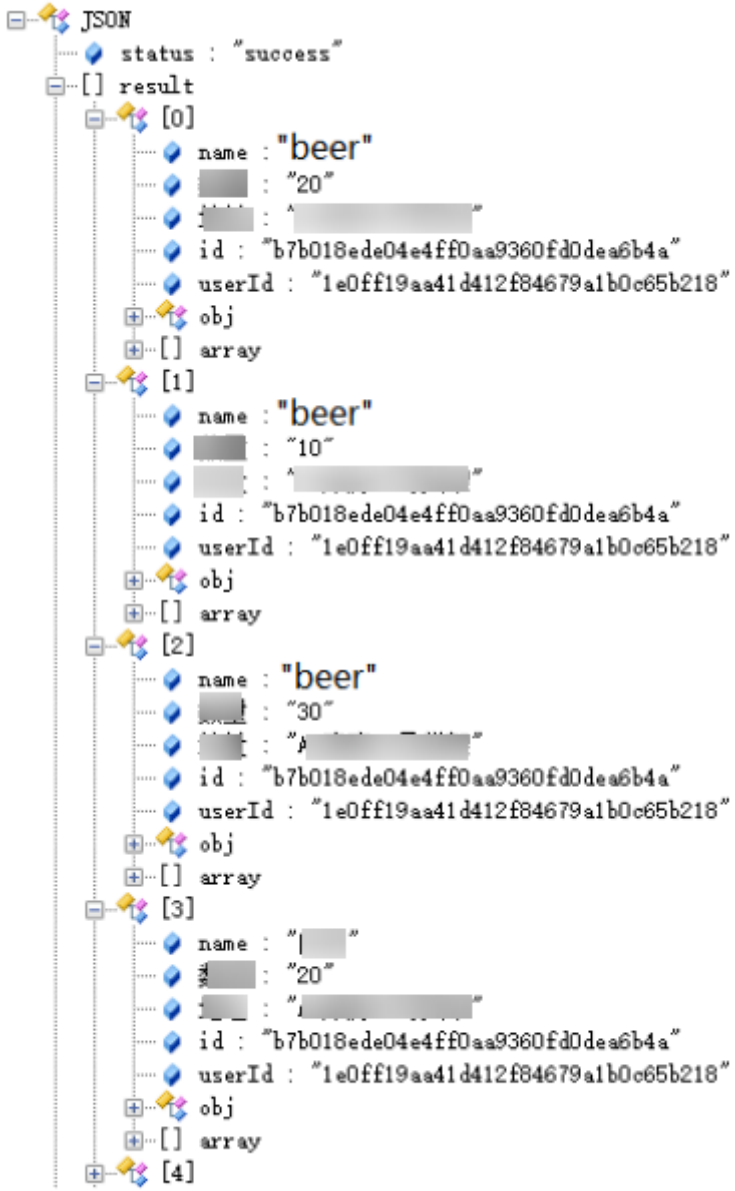


   To check the value of **userId** in the first element object field of the **result** array in the response body, configure the checkpoint by referring to the following figure.

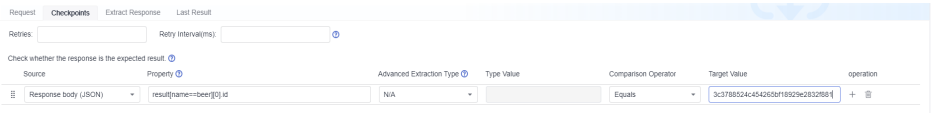


3. Check the field value of an array object in the response body (JSON). (The array condition uses the fuzzy match function to determine the object.) For example:

   The response body structure is as follows.



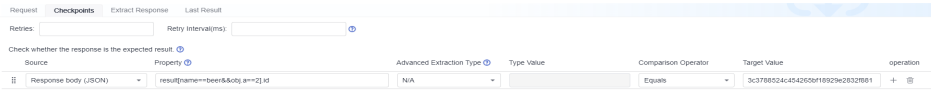
   a. Check all objects whose **name** is **beer** in the **result** array of the response body. Obtain the values of **id** after the first object. Configure the checkpoint by referring to the following figure.



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**.

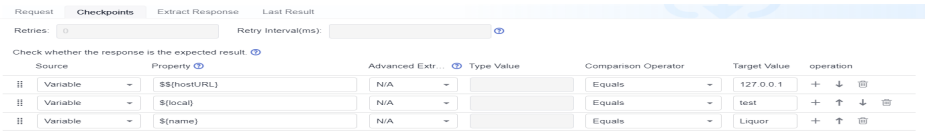
b. Check the ID of the object whose **name** in the **result** array of the response body is **beer**, and of which the **a** property under **obj** is **2**. Configure the checkpoint by referring to the following figure.



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 **text**.
- 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

Connector	Description	Example
<=	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==**.
- If the property value of a checkpoint contains special characters, use single quotation marks or double quotation marks as boundary characters.

  For example, **name=="zhangsan(ab)"**.

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.
$..book[0,1]	The first two books.
$..book[:2]	All books from index 0 (inclusive) until index 2 (exclusive).
$..book[1:2]	All books from index 1 (inclusive) until index 2 (exclusive).
$..book[-2:]	Last two books.
$..book[2:]	Book number two from tail.
$..book[?(@.isbn)]	All books with an ISBN.
$.store.book[?(@.price < 10)]	All books in store cheaper than 10.
$..book[?(@.price <= $['expensive'])]	All books in store that are not "expensive".
$..book[?(@.author =~ /.*REES/i)]	All books matching regex (ignore case).
$..*	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 **$..book.length()** returns the number of books, determine the path and change it to **$.store.book.length()**.

6.4.3.3 Setting the Response Extraction of an API Script

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.

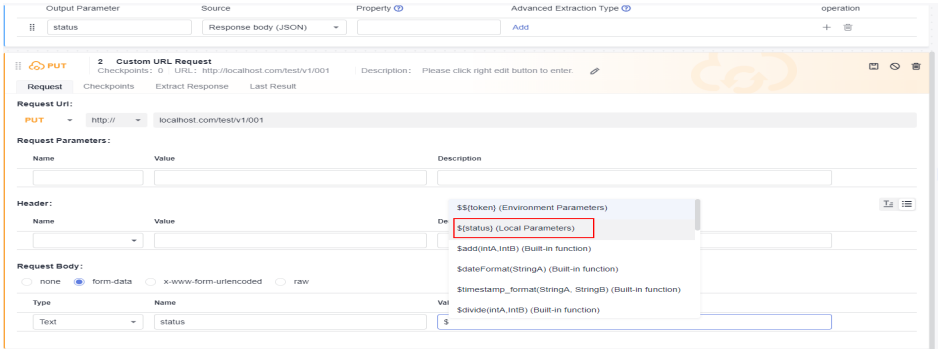
You can mask sensitive information in response parameters by referring to **Step 6**.

- 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.

Parameter	Description
Property	Enter $ to invoke global variables, local variables, and built-in functions. • 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: 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**.
Advanced Extraction Type	(Optional) Use the advanced extraction type to assist in extracting response information. If **N/A** is selected, no additional matching mode is used. Currently, there are two modes: • Character string extraction (truncation). For details, see **Character String Extraction Description**. • Regular expressions to filter source strings. For details, see **Regular Expression Description**. For the advanced extraction type, the string extraction function is preferred. If the function cannot meet the requirements, you can use the regular expression.
Assign Value to Dynamic Environment Parameter	Assigns the value extracted from the response to the dynamic parameter so that the **dynamic parameter** can be referenced in subsequent tests.

6.4.4 Adding an API Script by Importing a Postman File

Background

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

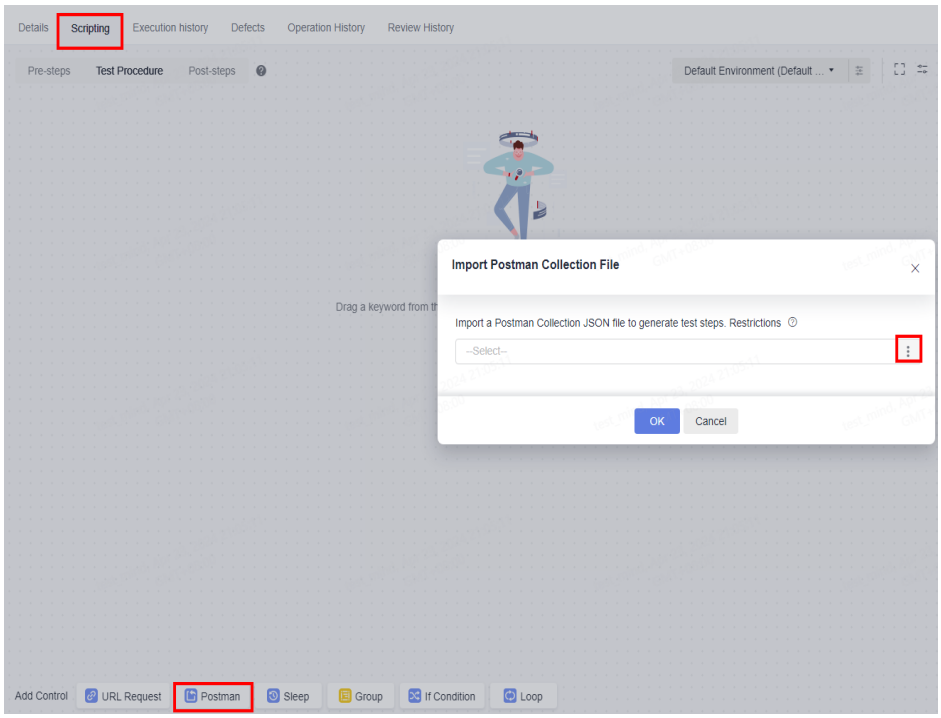
Requirements:

- 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-urlencode, 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 Automated API Test Case Template** are complete, click the test case name, and click the **Scripting** tab.

Step 2 Click **Postman**. In the displayed dialog box, 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

6.4.5 Adding an API Script by cURL

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.

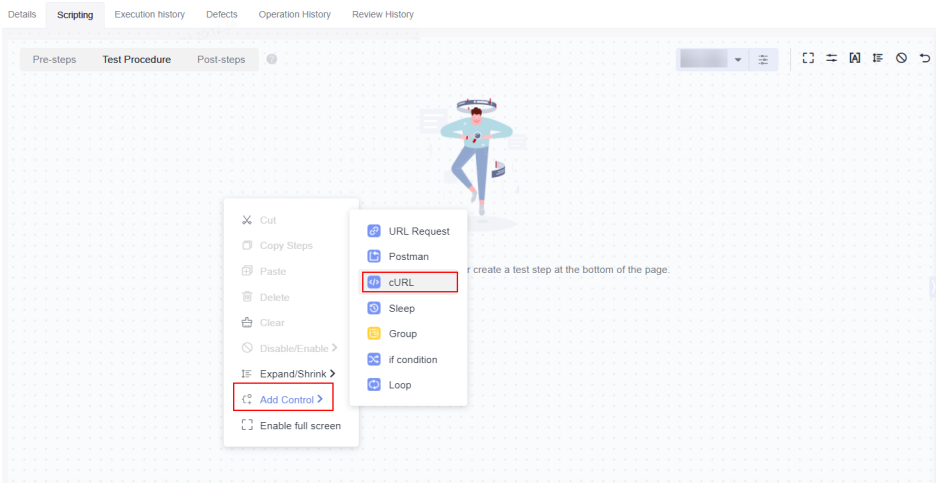
Procedure

Step 1 After the operations described in **Creating an Automated API Test Case Template** are complete, click the test case name, and click the **Scripting** tab.

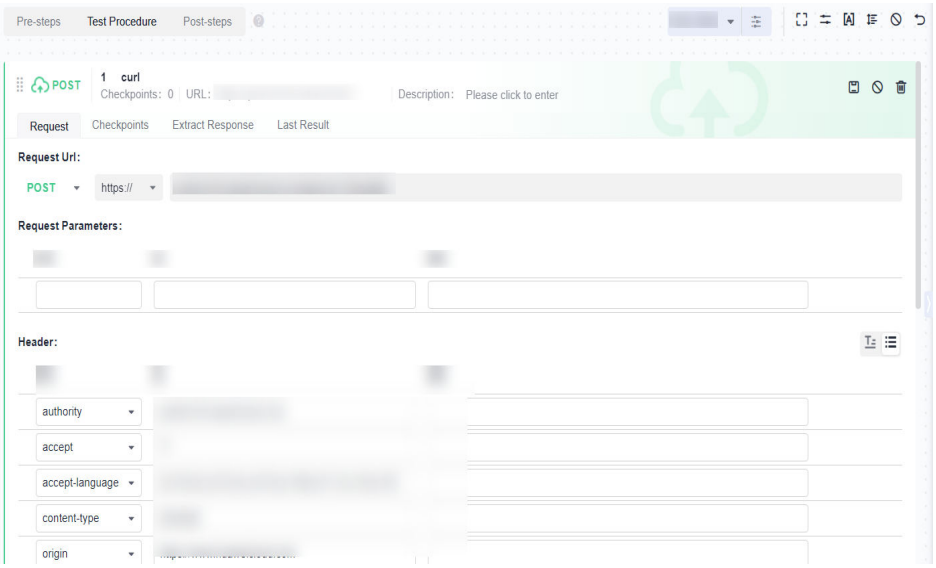
Step 2 Use a new browser tab to open the web page of the API to be tested and press **F12** to open the control panel.

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

6.4.6 Adding an API Script by Keyword Library

6.4.6.1 Introduction to 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 pre-steps 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.

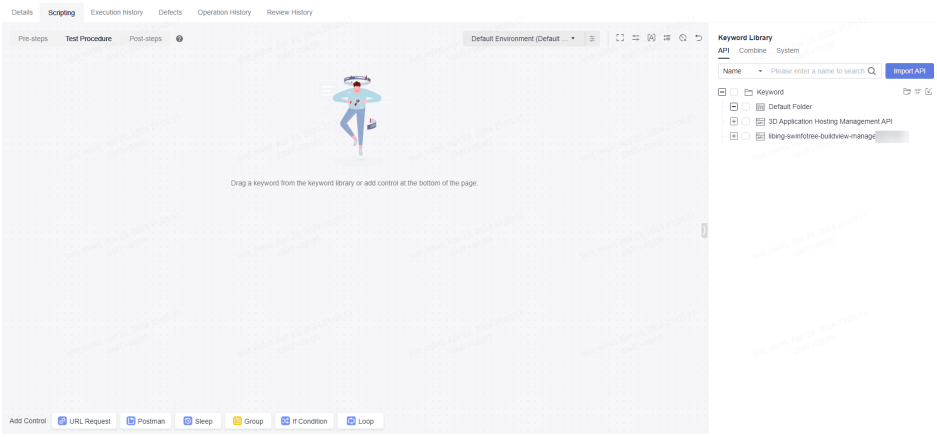
  For details about API keywords, see **Saving Test Procedure as an API Keyword**.
- Combined keywords encapsulate multiple test steps as common test logic. This test logic can be reused when the combined keywords are invoked by other test cases. For details about combined keywords, see **Saving Test Procedure as a Combined Keyword**.
- 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. For details about system keywords, see **System Keywords**.

Accessing Keyword Library

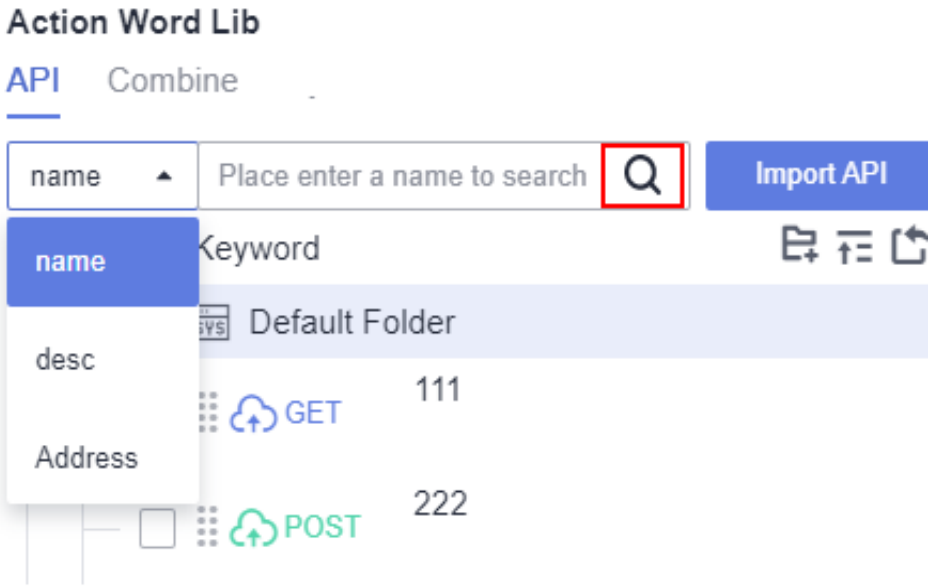
Step 1 After the operations described in **Creating an Automated API Test Case Template** are complete, choose **Testing Case** > **Auto API Test** and click the name of the test case to be edited.

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 **Saving Test Procedure as an API Keyword**.
- Keyword test cases and combined keywords are placed on the **Combine** tab page. You can create combined keywords from test case keywords and then save them. For details, see **Saving Test Procedure as a Combined Keyword**.
- Practical keyword types such as authentication, database operation, middleware, and protocol are placed on the **System** tab page. For details, see **automated API test keywords**.

Step 3 Click the drop-down list on the **API** tab page and search with keywords of name, description, or address.



----End

6.4.6.2 Saving Test Procedure as an API Keyword

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 automated API 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 following tables show the mapping between the script template and the fields in the Swagger API description.

- Swagger 2.0 format

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

Script Template Attribute	Swagger API Definition Attribute
Request parameter **hostURL**	**host**
Other request parameters	parameters

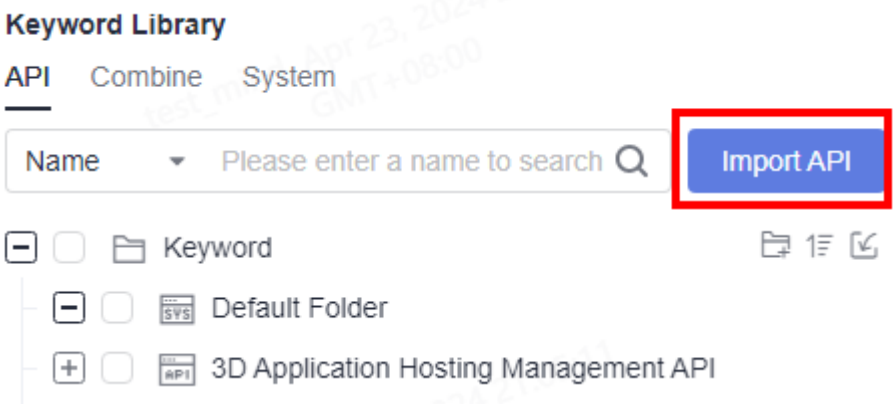
- Swagger 3.0 format

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

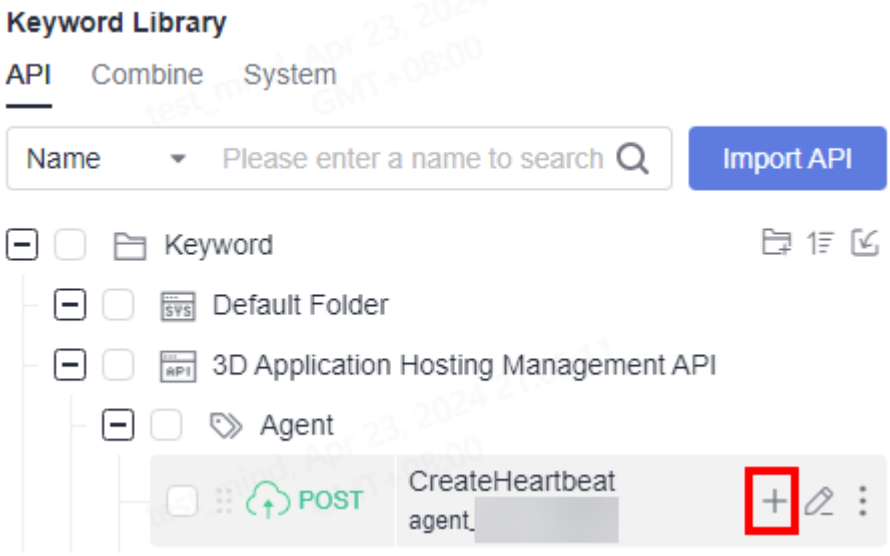
Step 1 After the operations described in **Creating an Automated API Test Case Template** are complete, click the test case name, and click the **Scripting** tab.

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.

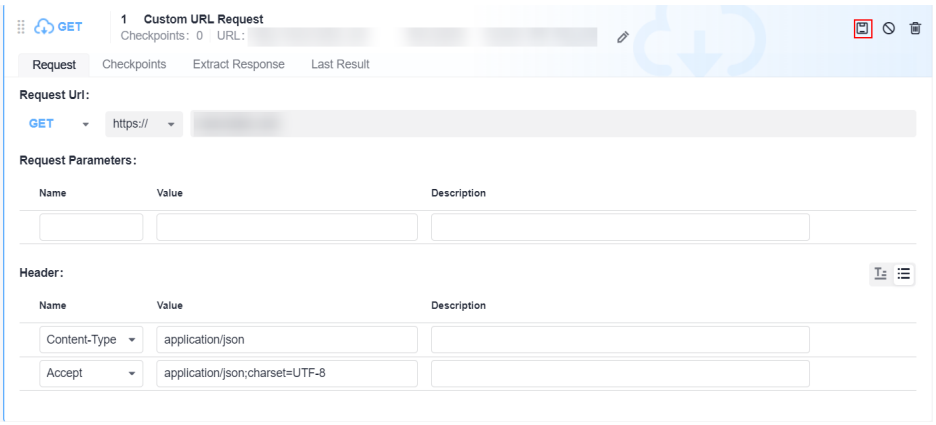


----End

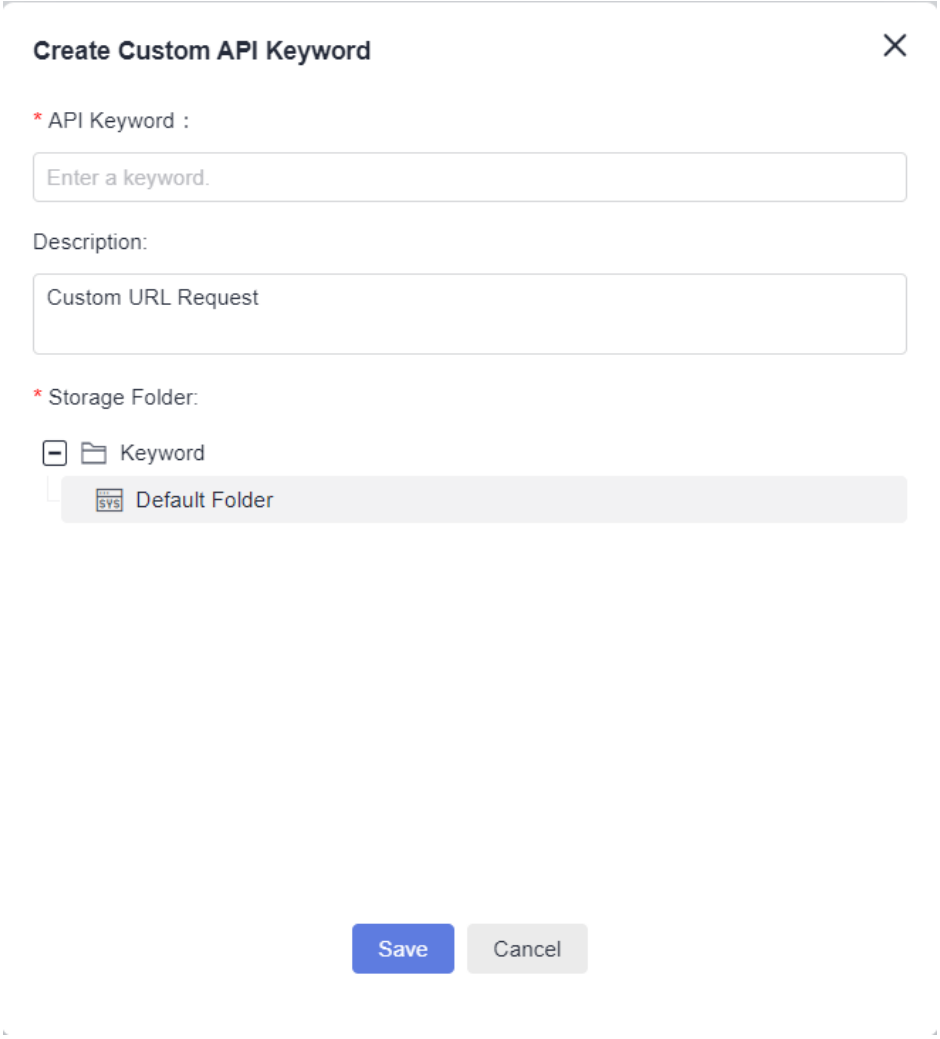
Saving a Customized API Keyword

Step 1 After the operations described in **Creating an Automated API Test Case Template** are complete, click the automated API test case name and click the **Scripting** tab.

Step 2 After the operations described in **Adding an API Test Script by Using a Custom URL Request** 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 displayed page, set **API Keyword** and **Description**, and select the directory for storing the keyword. By default, keywords are stored in **Default Folder** under **API > Keyword**.

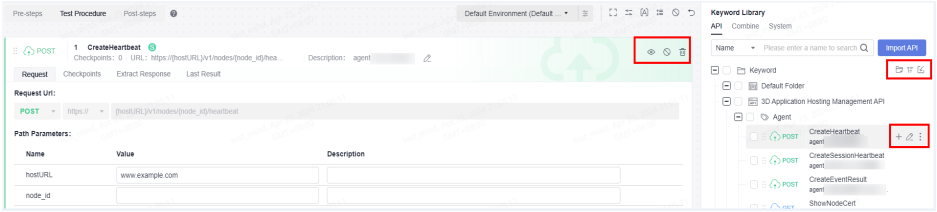


Step 4 Click **Save**.

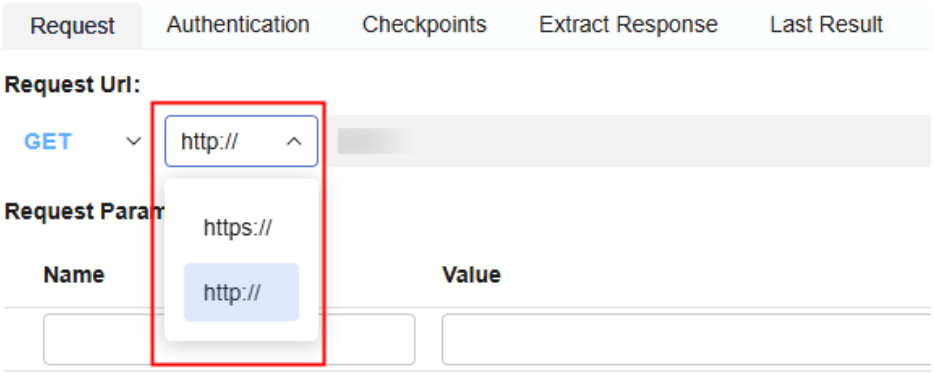
----End

Managing Existing Keywords

For an existing 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 a keyword to edit it.
- 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.
- Modify the protocol type of a saved keyword.



6.4.6.3 Saving Test Procedure as a Combined Keyword

Background

When designing test cases, you may often use the same pre-steps or test logic. If these steps are written in each test case, the workload is heavy and the maintenance is difficult. 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.

Scenario 1

Step 1 Click in the upper right corner of the **Scripting** tab page.

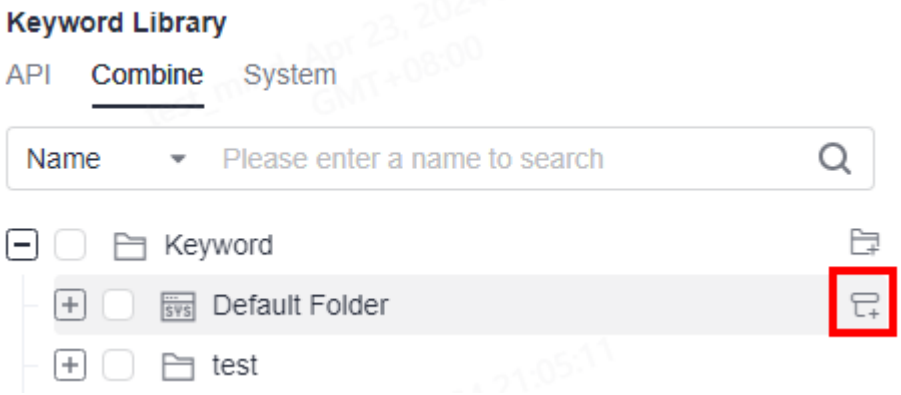
Step 2 Enter the **Name** and **Description**, select the directory, and set request parameters as required. Select the added **URL Request** and click **Save**.

Step 3 In the **Keyword Library** > **Combine** tab page, view the combined keywords that have been saved.

----End

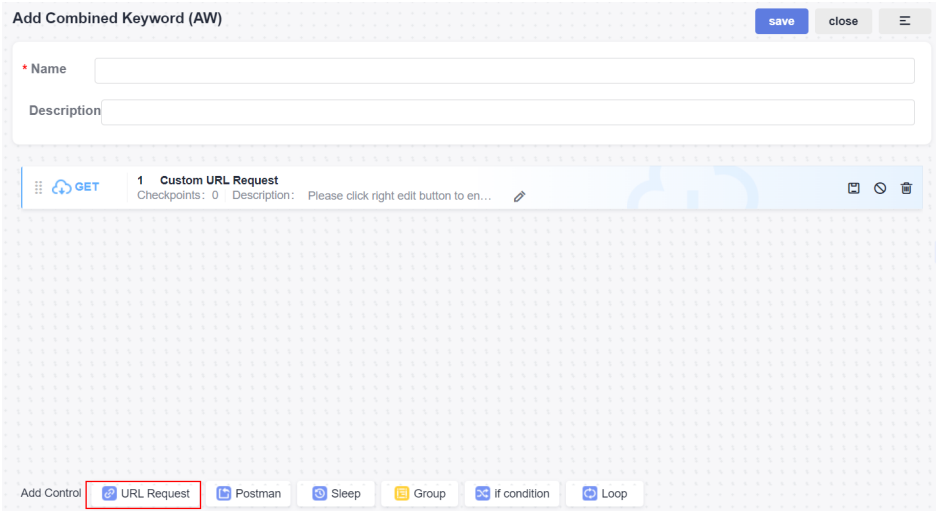
Scenario 2

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.

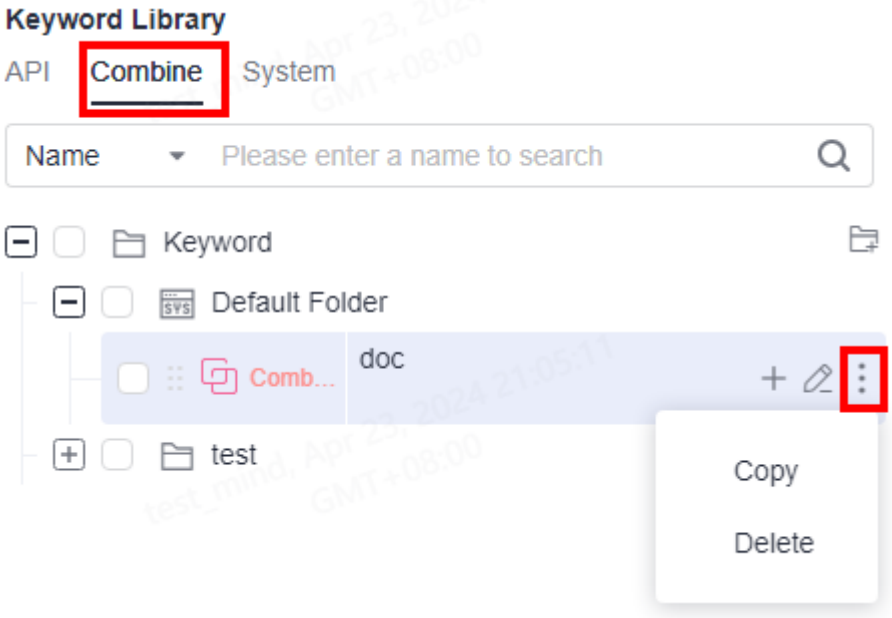


Click the **API** tab, select the folder where the keyword to be added is located, and click on the right of the keyword to be added or hover the cursor over the keyword area and drag the keyword to the test step area.

Step 4 Click **Save**.

----End

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



- 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.

Modifying the Protocol and Address of a Combined Keyword

Modify the protocol and address of a combined keyword or URL request.

Step 1 On the **Keyword Library** > **Combine** tab page, find the target combined keyword.

Step 2 Hover the cursor over the combined keyword name and click .

Step 3 Modify the saved protocol type.

Step 4 Click **Save**.

----End

6.4.6.4 Refreshing a Keyword in Multiple Test Cases

If you have used a keyword to write test cases and then want to modify the keyword in all these test cases, you can refresh the keyword. At present, this refresh feature is limited to combined keywords and the keywords generated by importing YAML files.

Prerequisites

You have used a keyword in test cases or combined keywords.

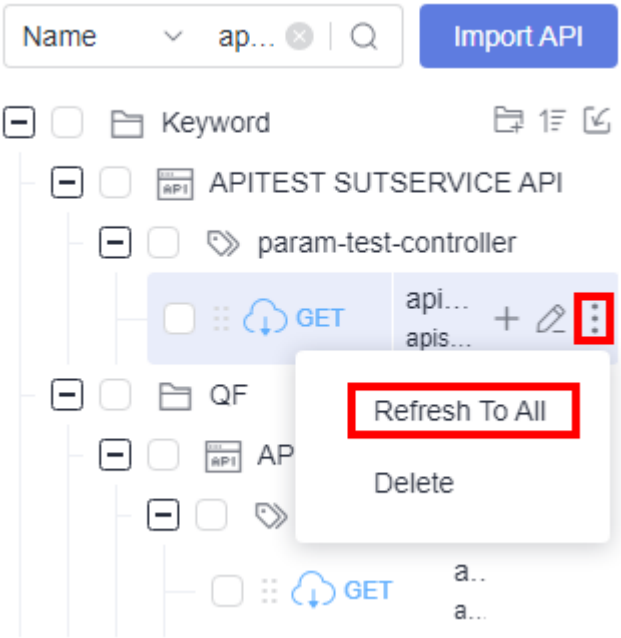
Procedure

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**.

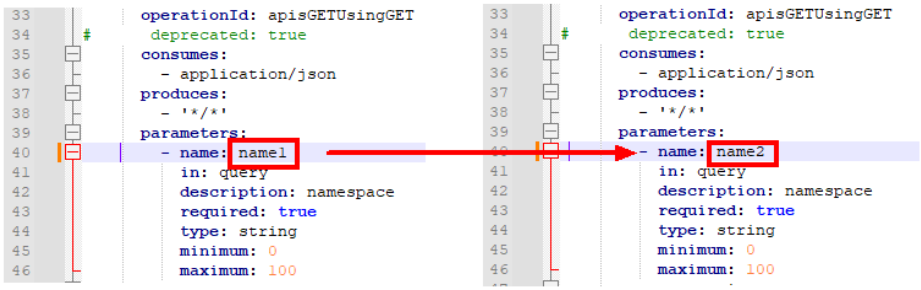
Step 3 On the **Auto API Test** tab page, click a case name and click the **Scripting** tab.

Step 4 On the **Keyword Library** part on the right, click next to the keyword and click **Refresh to All**.

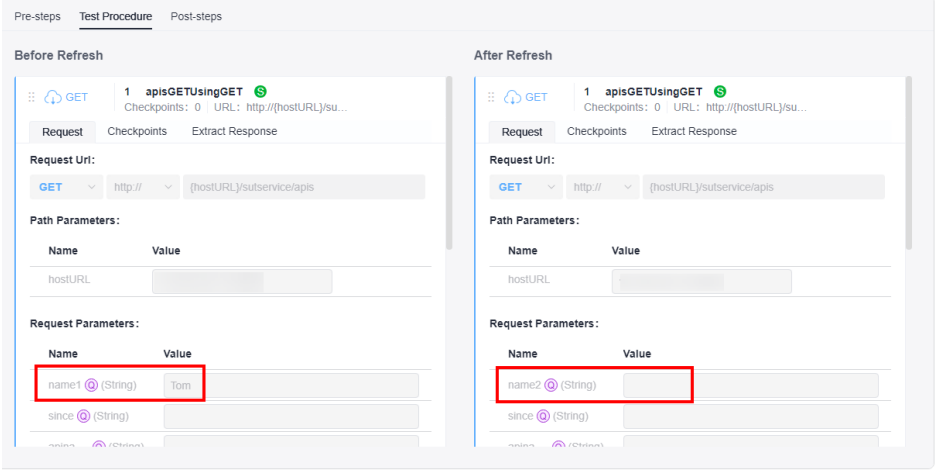


Step 5 On the right of the displayed dialog box, configure the refresh rule. Parameter values can be inherited. Example:

Change the parameter name **name1** in the YAML file to **name2**.

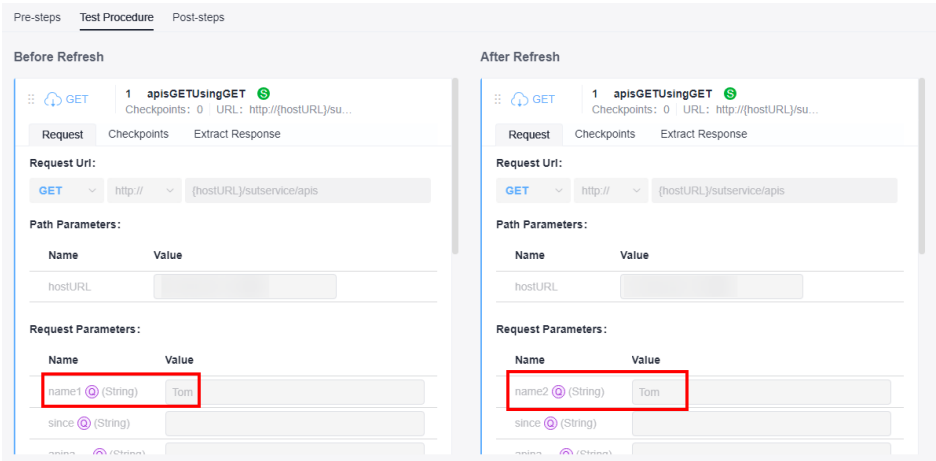


Import the new YAML file. The value of **name1** is not automatically inherited to **name2** yet.



Configure a refresh rule. The figure below shows an example.

Click **OK**. The value is inherited.



NOTE

For the refresh rule:

- Parameter name must be unique.
- The content in the text box of script will not refresh with the keyword.

Step 6 On the left of the dialog box for refreshing keyword, you can configure whether to refresh the keyword in the test cases that were removed to the recycle bin.

- Test cases marked with  are in the recycle bin.
- Test cases marked with  can be used normally.

Step 7 If there are cases or combined keywords that you do not want to refresh, click  next to them to remove them from the list. These removed items can still be searched.

Step 8 Click **OK**.

NOTICE

Refresh operation cannot be rolled back. Exercise caution before performing this operation.

----End

6.4.7 Adding Logic Control to an API Script

Logic control is used to orchestrate test scenarios, including sleep, group, if condition, and loop.

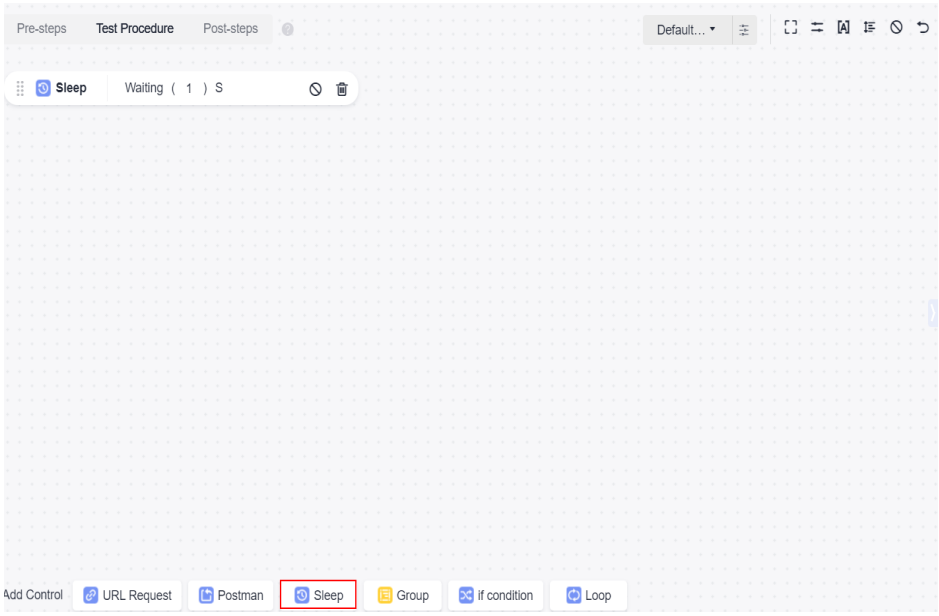
Sleep

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.



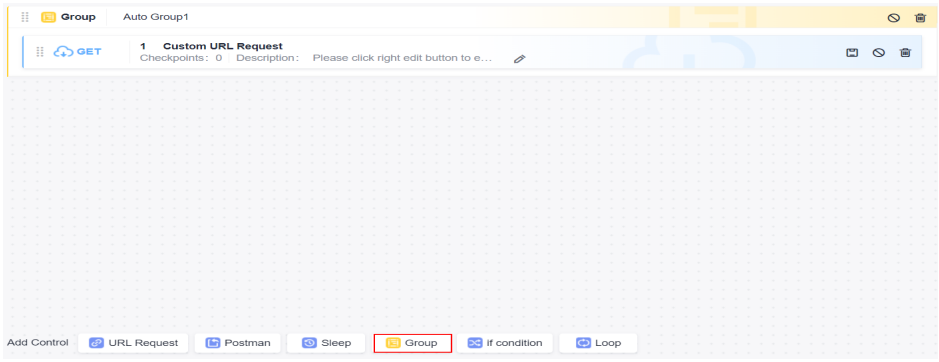
----End

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

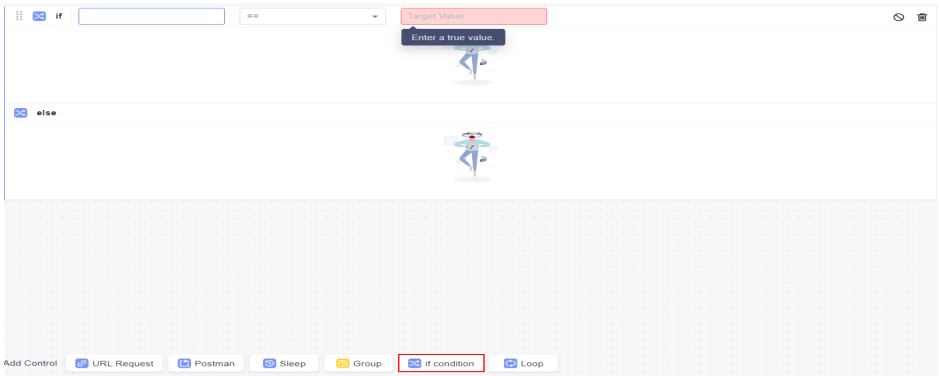
To determine the subsequent test steps based on the results of the previous test steps, use **If Condition**.

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

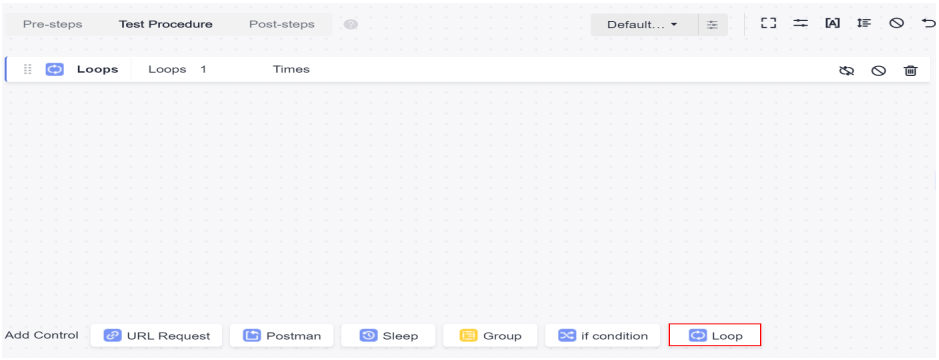
The **if** condition supports referencing local variables and passing parameters. For details about how to use comparison operators, see **Comparison Operator Description**.

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

6.4.8 Setting Test Case Parameters of an API Script

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 automated API test cases are classified into the following types:

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

Masking Sensitive Parameters

Sensitive parameters involve sensitive information and security issues, such as typical sensitive data (passwords and bank accounts), common authentication credentials (keys and private keys), and personal data. These parameters must be protected. You can mask sensitive information in the API request response parameters. For details, see **Step 6**.

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 following tables show the main configuration items of local parameters.

Table 6-1 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 6-2**.
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 6-2**.
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.
Dynamic	No	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. 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.

Table 6-2 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 default value is the current timestamp. Click the timestamp format and select the required format from the drop-down list. For details about the formats, see **Table 6-4**. 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**.
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.

To set local parameters, perform the following steps:

- **Creating a Variable**

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

- **Importing Variables in Batches**

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

Step 2 Click **Import**.

Step 3 In the displayed dialog box, click **Download Template**.

Set parameters based on the format requirements in the template and return to the page. Click  , upload the file, and click **Confirm**.

Step 4 View the import result.

- Import successful: New parameters are displayed in the list. The number of new parameters is the same as the number of rows in the Excel file.
- Import failed: A dialog box is displayed in the upper right corner of the page, indicating that the import fails. Click **Details** to view the error cause, rectify the fault, and import the file again.

----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	• Checkpoint property field. • Property field for parameter passing.	• 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	• Checkpoint property field. • Property field for parameter passing.	• 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	• Property or value of a checkpoint. • Property field of a variable.	• 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 the Response Extraction of an API Script**.

6.4.9 Setting Environment Parameters of an API Script

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 parametrization 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.

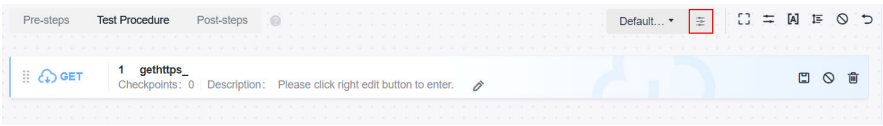
Reference Format

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 automated API test cases can be reused in all environments.

Procedure

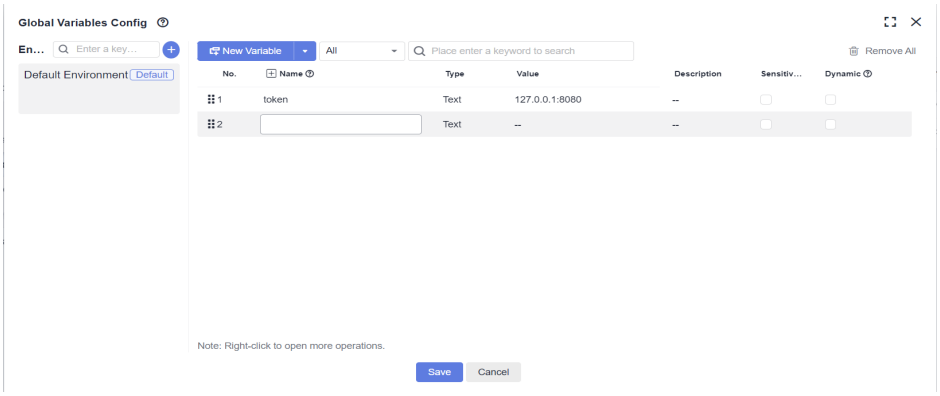
Step 1 Go to the **Scripting** tab page and click .



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

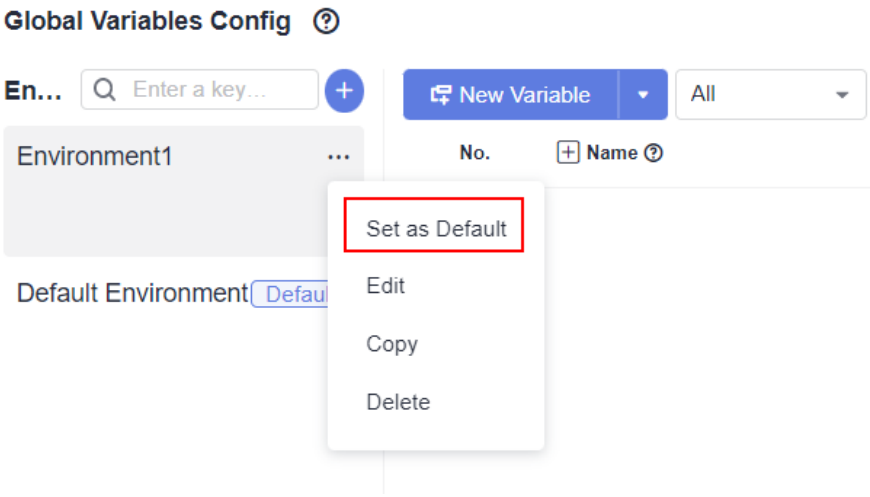
Configuration Item	Description
Name	Parameter name.

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

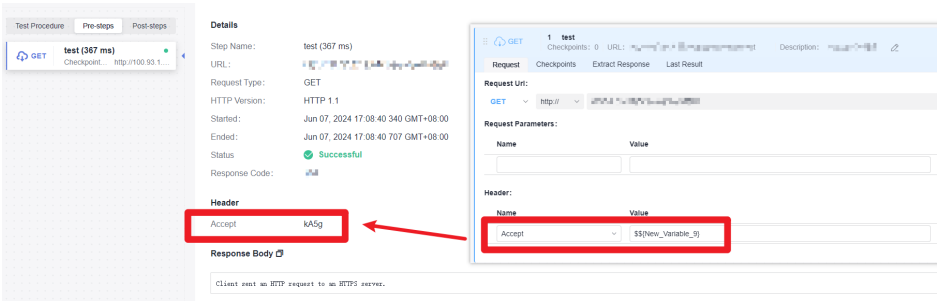
Built-in Functions

1. You can use built-in functions to configure environment parameters. Note that nested built-in functions are output as they are.
2. For details about the supported built-in functions, see **Table 6-3**.

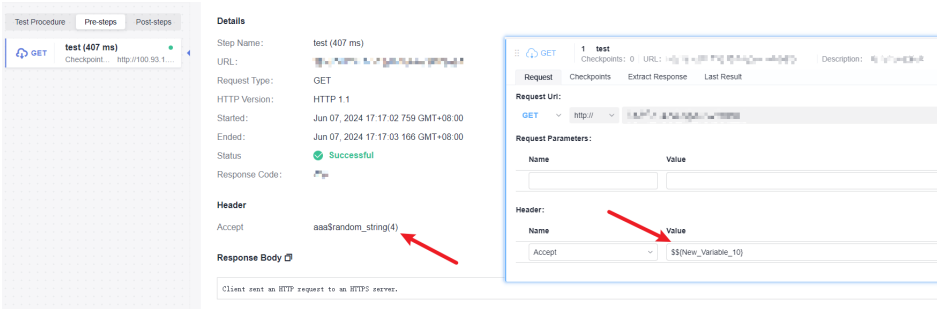
Table 6-3 Supported built-in functions

No.	Function	Description
1	$random_string(intA)	Generate a random string of a specified length
2	$random_int(intA, intB)	Generate a random number in a specified range
3	$timestamp()	Obtain the current timestamp
4	$timestamp_format(String A, String B)	Convert a timestamp into a date
5	$uuid()	Generate a UUID
6	$encode_base64(StringA)	Generate Base64 encoding
7	$md5(StringA)	Generate an MD5 hash value
8	$sha512(StringA)	Generate SHA512 encoding

3. Examples:
   - The value of **$random_string(intA)** is output normally.

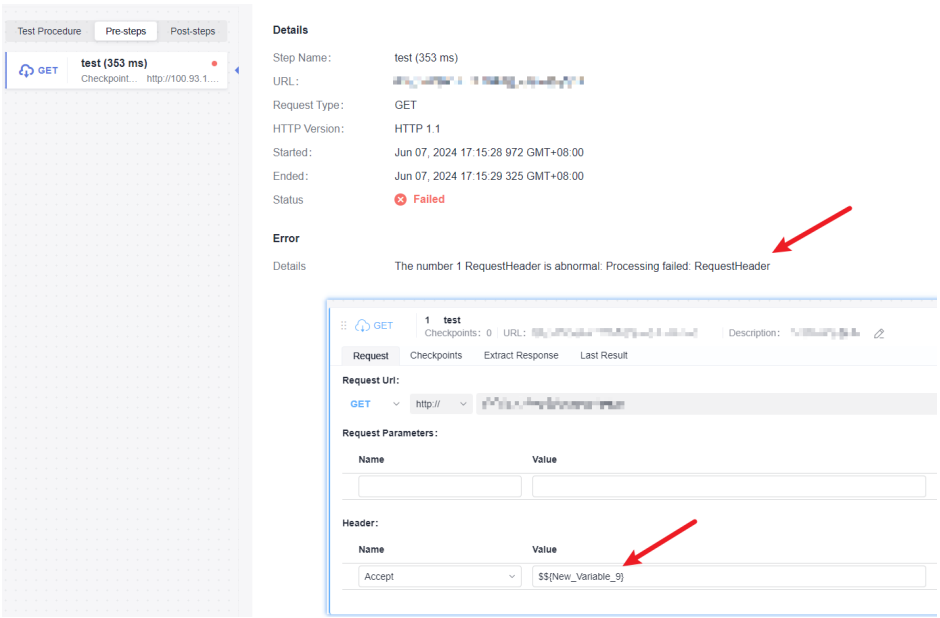


- Built-in functions that concatenate strings are parsed as strings, and their output values are strings as they are. For example, the output values of functions **aa$random_string(10)** and **$random_string(10)aa** are **aa$random_string(10)** and **$random_string(10)aa**.



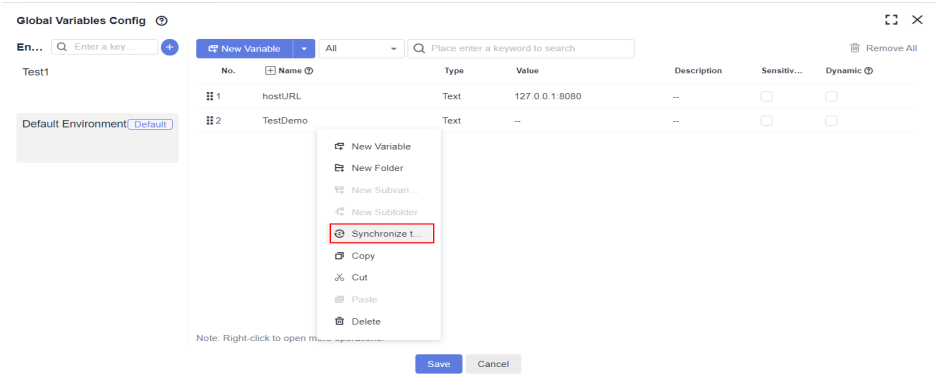
- If two parameters are passed while only one parameter is required, for example, **$random_string (1,1)**, an exception will be thrown.

  If the input and required parameter types do not match, for example, **$random_string(fff)** or **$random_string()**, an exception will be thrown.



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.



Copy Environment Parameters in an Environment or to Other Environments

Step 1 Right-click the parameter to be copied and choose **Copy** from the shortcut menu.

Step 2 Go to the environment page list of the current environment or other environments, right-click the blank area, and choose **Paste** from the shortcut menu.

----End

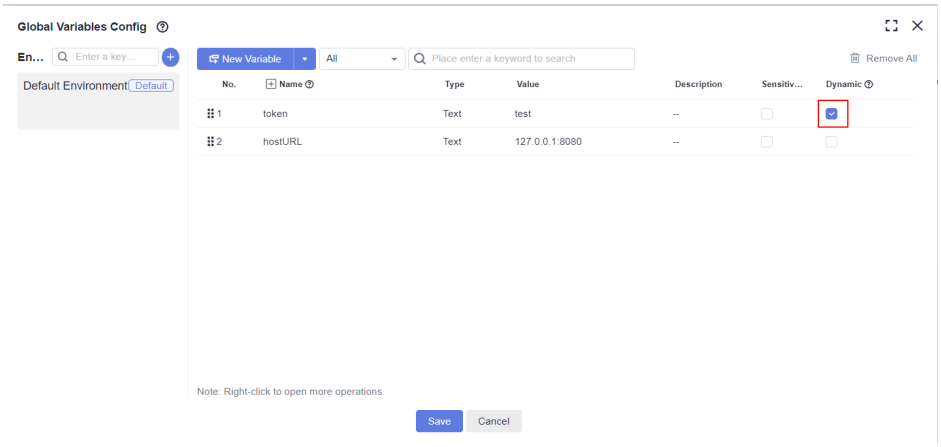
Dynamic Variable Description

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.

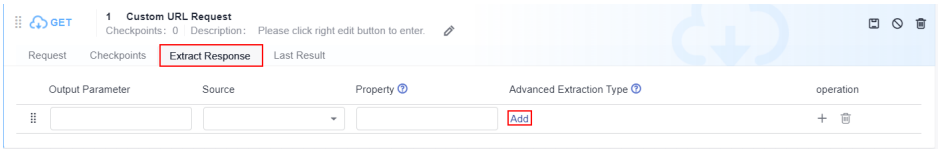
Step 1 Set dynamic variables.

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.

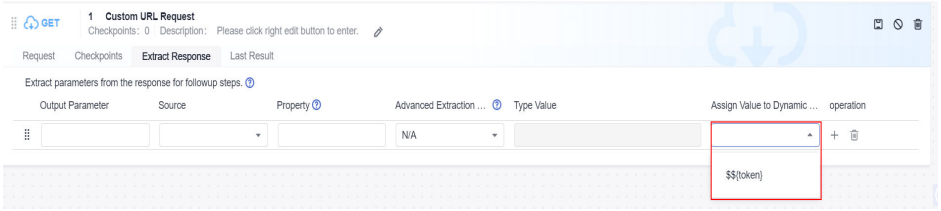


Step 2 Assign values to dynamic variables.

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



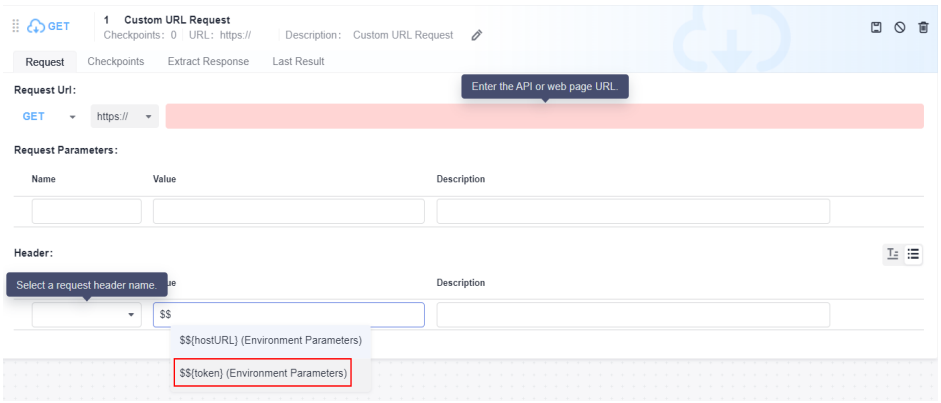
2. Select a value from the **Assign Value to Dynamic Environment Parameter** drop-down list box.



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

6.4.10 Importing an Automated API Test Case Dataset

API testing may involve testing a logic in multiple rounds with different data combinations. Manually configuring test case scripts for each round is labor- and time-consuming.

With CodeArts TestPlan, you can perform data-driven API testing by importing Excel files of test data to efficiently generate and execute automated API test cases for different test scenarios.

NOTE

Currently, this feature is available in the **AP-Singapore** and **LA-Mexico City** regions.

Prerequisites

1. You have configured an accessible request address in the script of the target API test case.
2. You have set the fields in the Excel dataset file as **local parameters**.

Constraints

1. A maximum of 100 rows and 50 parameter fields can be uploaded.
2. Only one Excel file can be uploaded each time.
3. By default, API automation test case datasets are executed using the **DEFAULT** agent pool that is set for the API cases. They cannot be executed by custom executors.
4. If the names and sensitivity of local parameters related to an uploaded dataset change, upload the dataset file again to ensure correct display and execution.

Procedure

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

Step 2 Click the **Auto API Test** tab, click the target test case, and click the **Scripting** tab.

Step 3 Click  .

Step 4 In the displayed dialog box, click the **Default Environment** drop-down box and select the target environment. For details about how to set the environment, see **Setting Environment Parameters of an API Script**.

Step 5 Click **Download Template** and save the Excel template file to the local PC.

Step 6 Fill in the dataset description and local parameters. If multiple rows of data are set, the test case will be executed using each row round by round.

- **Dataset Description**: Optional. 1 to 128 bytes.
- Other headers must have been set as local parameters (case-sensitive) in the case scripting page. For details, see **Table 6-1**.

Step 7 In the displayed dialog box, click  , select the Excel file, and click **Upload**.

NOTE

1. A maximum of 100 rows and 50 parameter fields can be uploaded.
2. Only one Excel file can be uploaded each time.
3. Uploading a new Excel file will clear the data of the previous file, and the dialog box will show the data from the most recent upload.

Step 8 The uploaded data is displayed in the list. To delete the data, click **Clear**.

Step 9 Click **Close**.

Step 10 Click a URL request, and use **$** to reference the configured local parameters. When the test case is executed, the values of the local parameters are read. For details about the execution, see **Execution of an Automated API Test Case with a Dataset**.

----End

6.4.11 Built-in Functions

6.4.11.1 Binary Addition Function

Function Name

$add(*intA*, *intB*)

Function Description

Implements the addition operation between parameter A and parameter B. Parameters A and B support the following types:

- Numbers
- Local parameters
- Binary operations

Application Scenarios

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

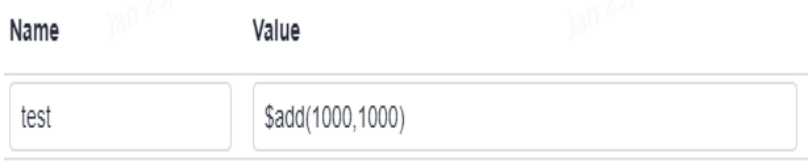
- Request URL
- Request header
- Request body

- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

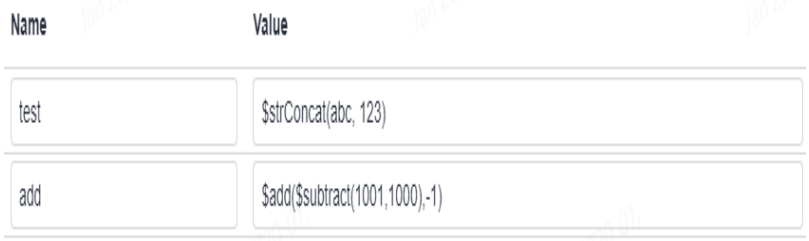
- Request URL

  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**.

- 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**.

- 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**.

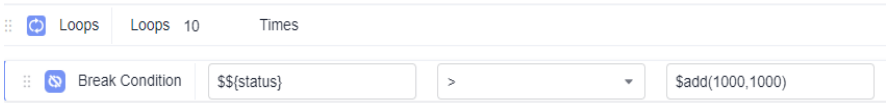
- **if** condition

  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 of an API Script**.

- **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**.



6.4.11.2 Binary Subtraction Function

Function Name

$subtract(*intA*, *intB*)

Function Description

Implements the subtraction operation between parameter A and parameter B. Parameters A and B support the following types:

- Numbers
- Local parameters
- Binary operations

Application Scenarios

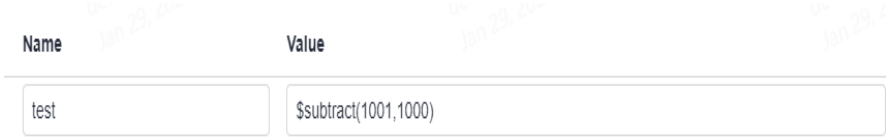
The binary subtraction function can be used in the following scenarios for API automation:

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

Example

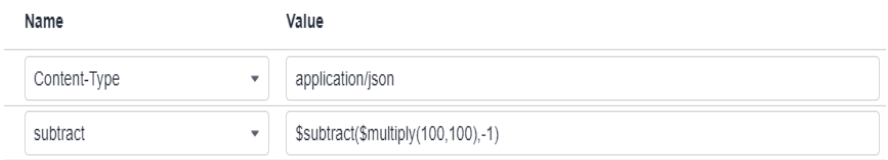
- Request URL

  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)**.

```
{
    "add":"$add($multiply(100,100),$divide(1000,100))",
    "subtract":"$subtract($divide(1000,100),$add(1000,1000))",
    "multiply":"$multiply($add(1000,1000),$subtract(1001,1000))",
    "divide":"$divide($subtract(1001,1000),$multiply(100,100))"
}
```

- Checkpoint property

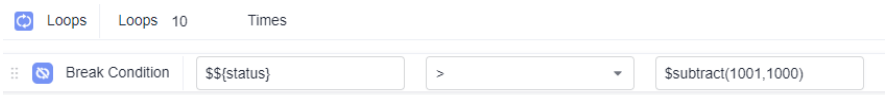
  As shown in the following figure, the target value of the checkpoint property **result** is the binary subtraction function. Parameter A in the function is the local parameter **test**, and parameter B is **1**. For details about how to set local parameters, see **Local Parameters**.

- **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 of an API Script**.

- **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.



6.4.11.3 Binary Multiplication Operation

Function Name

$multiply(*intA*, *intB*)

Function Description

Implements the multiplication operation between parameter A and parameter B. Parameters A and B support the following types:

- Numbers
- 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

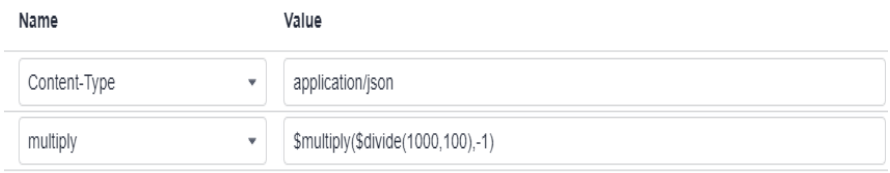
- Request URL

  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 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)**.

  ```
  {
      "add":"$add($multiply(100,100),$divide(1000,100))",
      "subtract":"$subtract($divide(1000,100),$add(1000,1000))",
      "multiply":"$multiply($add(1000,1000),$subtract(1001,1000))",
      "divide":"$divide($subtract(1001,1000),$multiply(100,100))"
  }
  ```

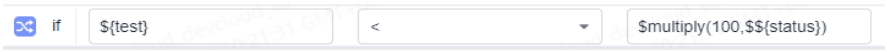
- Checkpoint property

  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**.

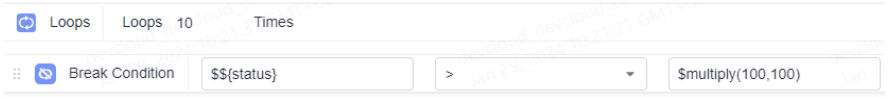
- **if** condition

  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 of an API Script**.



  – **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**.



6.4.11.4 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
- 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**.

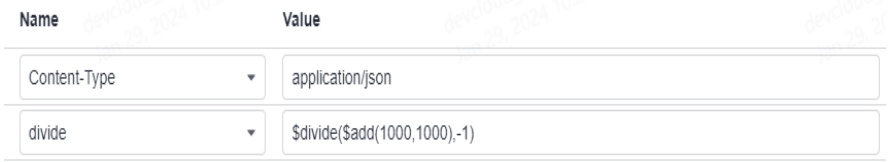
  

- As shown in the following figure, the value of **test** in the request URL is the binary division function with a precision value. Parameter A in the function is **1**, parameter B is **3**, and the precision value is **5**.

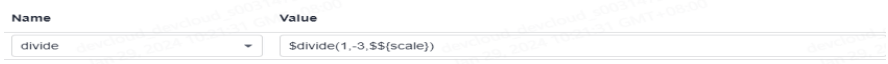
  

- Request header

  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)**.

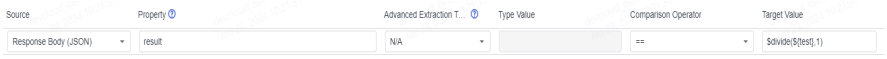

```
{
    "add":"$add($multiply(100,100),$divide(1000,100))",
    "subtract":"$subtract($divide(1000,100),$add(1000,1000))",
    "multiply":"$multiply($add(1000,1000),$subtract(1001,1000))",
    "divide":"$divide($subtract(1001,1000),$multiply(100,100))"
}
```

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}**.

```
{
    "divide":"$divide(1,3,$${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**.

  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**.

- **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**.

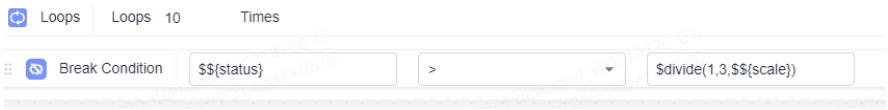
  As shown in the following figure, the target value of the **if** condition is the binary division function with a precision value. Parameter A in the function is **1** and parameter B is **3**. For details about how to set environment parameters, see **Setting Environment Parameters of an API Script**.

- **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**.

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 **$${scale}**.



6.4.11.5 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

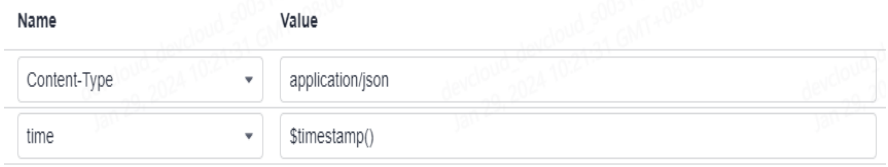
- Request URL

  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.



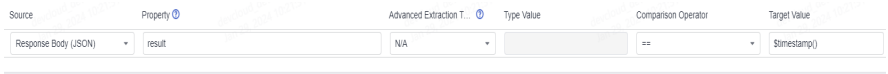
- Request body

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

```
{
    "time":"$timestamp()"
}

```

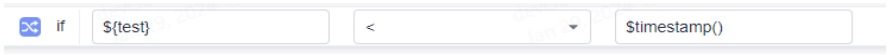
- Checkpoint property

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



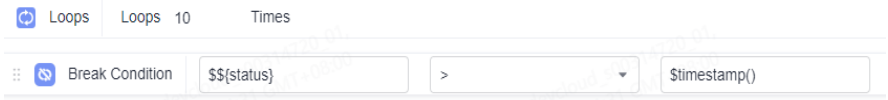
- **if** condition

  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.



6.4.11.6 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
- Local parameters

- Other built-in functions

Application Scenarios

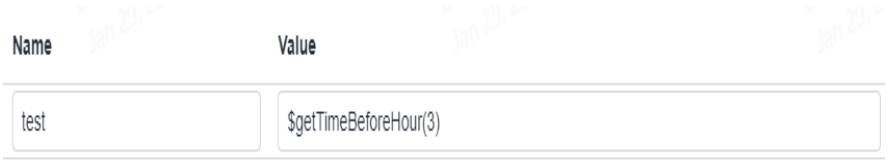
The function for obtaining the specified timestamp can be used in the following scenarios for API automation:

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

Example

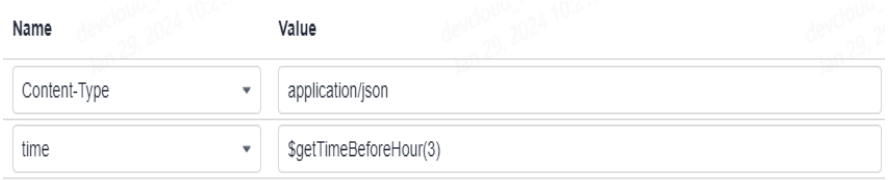
- Request URL

  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**.

- 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**.

- 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)**.

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

  ```

- 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

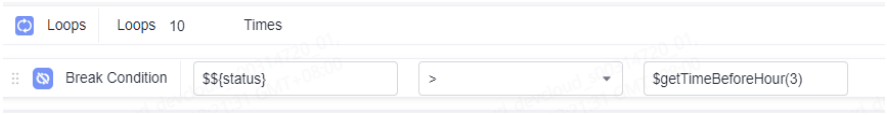
the function is the local parameter **test**. For details about how to set local parameters, see **Local Parameters**.

- **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 of an API Script**.

- **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**.



6.4.11.7 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**
- 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

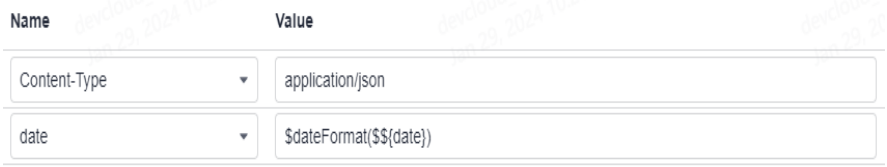
Example

- 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 of an API Script**.

- 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**.



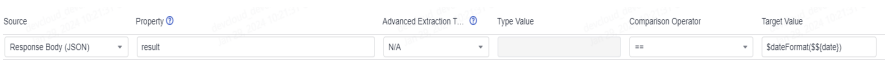
- Request body

  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**.

```
{
    "date":"$dateFormat(2020.09.11 11:00:00)"
}

```

- 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**.

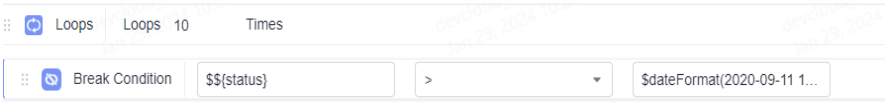


- **if** condition

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**.



6.4.11.8 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.
- **Table 6-4** Letters and corresponding parameter types

Letter	Date/Time Element	Type	Example
G	Era identifier	Text	AD
y	Year	Year	1996, 96
M	Month in a year	Month	July, Jul, 07
w	Week number in a year	Number	27
W	Week number in a month	Number	2

Letter	Date/Time Element	Type	Example
D	Day number in a year	Number	189
d	Day number in a month	Number	10
F	Week number in a month	Number	2
E	Day in a week	Text	Tuesday, Tue
a	am/pm flag	Text	PM
H	Hour number in a day (0–23)	Number	0
k	Hour number in a day (1–24)	Number	24
K	Hour number in am/pm (0–11)	Number	0
h	Hour number in am/pm (1–12)	Number	12
m	Minute number in an hour	Number	30
s	Second number in a minute	Number	55
S	Millisecond	Number	978
z	Time zone abbreviation	Text	PST, EST
Z	Time zone offset	Text	+800, -0530

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**.

A date and time value can contain spaces, hyphens (-), slashes (/), and colons (:), but not escape characters, such as \n. Common 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
- yyyy-MM-dd HH:mm:ss SSS
- yyyy-MM-dd HH:mm:ss
- yyyy-MM-dd HH:mm
- yyyy-MM-dd HH
- yyyy-MM-dd
- yyyy-MM
- yyyy
- yy
- MM-dd HH
- MM-dd
- MM
- dd
- HH:mm:ss SSS
- HH:mm:ss
- HH:mm
- HH
- mm
- mm:ss
- ss
- 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

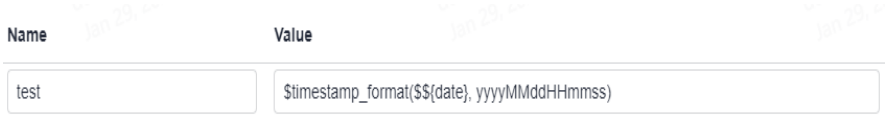
- Request URL

  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 of an API Script**.

- 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**.

  ```
  {
      "date":"$timestamp_format(123456789, 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**.

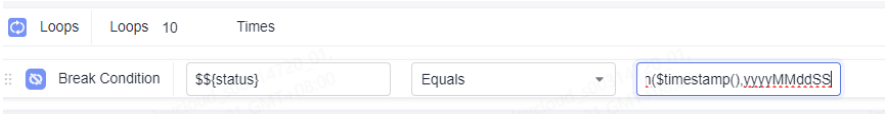
- **if** condition

  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**.

6.4.11.9 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**
- Local parameters
- Other built-in functions

Application Scenarios

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

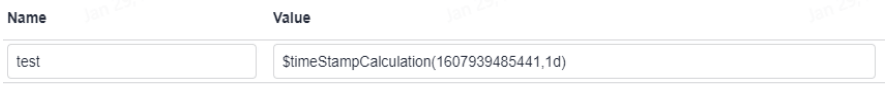
- Request URL
- Request header
- Request body
- Checkpoint property

- **if** condition
- **for** loop interrupt condition

Example

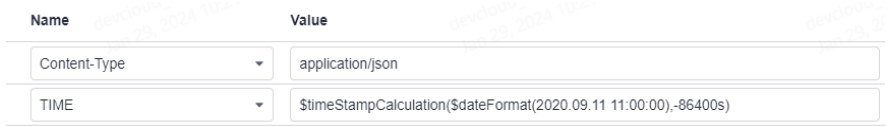
- Request URL

  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**.

- 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 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**.

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

  ```

- 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 of an API Script**.

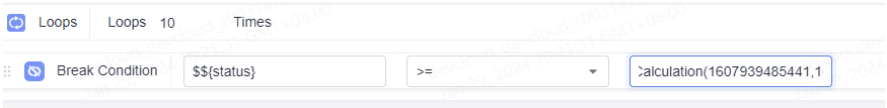
- **if** condition

  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 of an API Script**.

- **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**.



6.4.11.10 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 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**.

- Request body

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

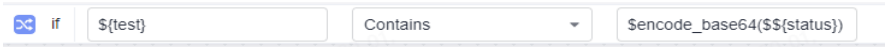
```
{
    "encoding":"$encode_base64($uuid())"
}

```

- 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**.

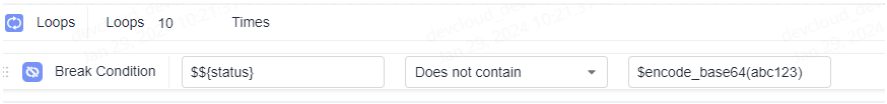
- **if** condition

  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 of an API Script**.



- **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**.



6.4.11.11 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

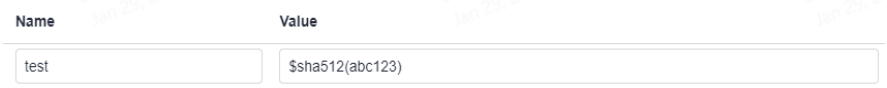
The SHA512 encoding generation function can be used in the following scenarios for API automation:

- 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 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**.

- Request body

  As shown in the following figure, the request body uses the SHA512 encoding generation function. Parameter A in the function is **$uuid()**.

  ```
  {
      "encoding":"$sha512($uuid())"
  }
  ```

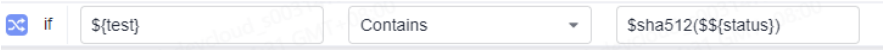
- Checkpoint property

  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**.

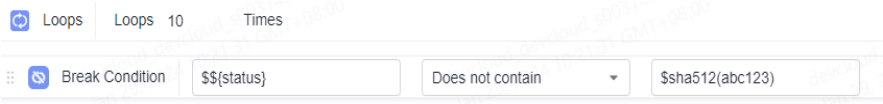
- **if** condition

  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 of an API Script**.



- **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**.



6.4.11.12 Generating SHA256 Encoding

Function Name

$sha256(*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 SHA256 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 SHA256 encoding generation function can be used in the following scenarios for API automation cases:

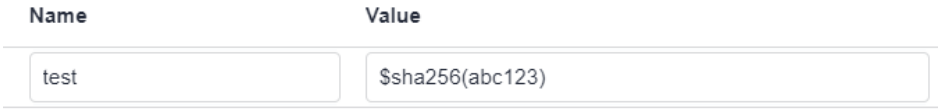
- Request URL
- Request header
- Request body

- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

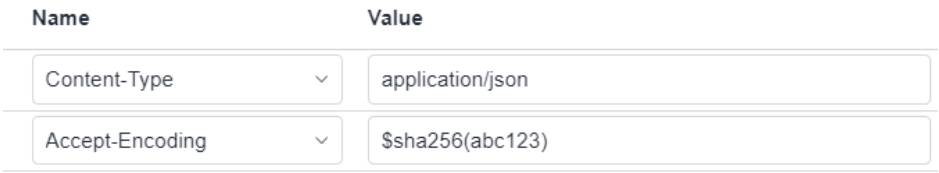
- Request URL

  As shown in the following figure, the value of **test** in the request URL is the SHA256 encoding 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 SHA256 encoding generation function. Parameter A in the function is the string **abc123**.

- Request body

  As shown in the following figure, the request body uses the SHA256 encoding generation function. Parameter A in the function is **$uuid()**.

  ```
  {
      "encoding":"$sha256($uuid())"
  }

  ```

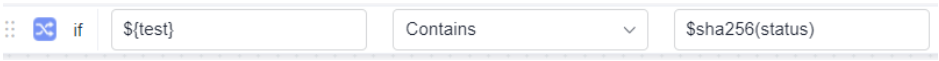
- Checkpoint property

  As shown in the following figure, the target value of the checkpoint property **result** is the SHA256 encoding generation function. Parameter A in the function is the local parameter **test**. For details about how to set local parameters, see **Local Parameters**.

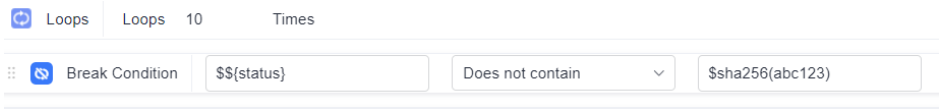
- **if** condition

  As shown in the following figure, the target value of the **if** condition is the SHA256 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 of an API Script**.

- **for** loop interrupt condition

  As shown in the following figure, the target value of the **for** loop interrupt condition is the SHA256 encoding generation function. Parameter A in the function is the string **abc123**.



6.4.11.13 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 body

  As shown in the following figure, the request body uses the MD5 hash value generation function. Parameter A in the function is **$uuid()**.

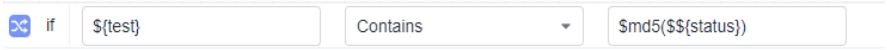
```
{
    "encoding":"$md5($uuid())"
}
```

- 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**.

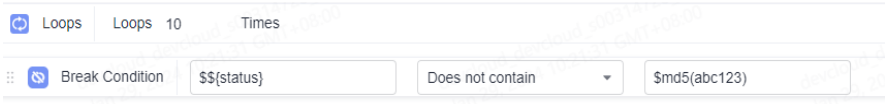
- **if** condition

  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 of an API Script**.



- **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**.



6.4.11.14 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

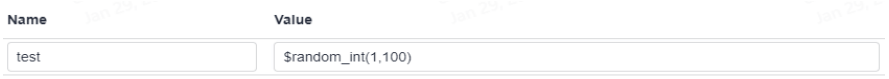
The function for generating random numbers within a specified range can be used in the following scenarios for API automation:

- 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**.

- 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 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)**.

  ```
  {
      "number":"$random_int($add(5,5),$multiply(5,5))"
  }

  ```


- 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**.

- **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 of an API Script**.

- **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**.

6.4.11.15 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:

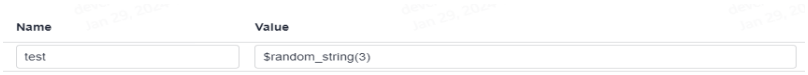
- Request URL
- Request header
- Request body

- Checkpoint property
- **if** condition
- **for** loop interrupt condition

Example

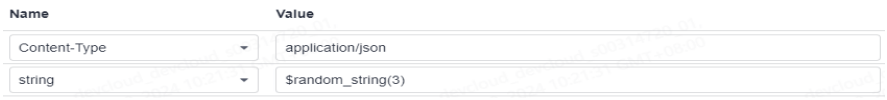
- Request URL

  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 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**.

- 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)**.

  ```
  {
      "string":"$random_string($add(2,2))"
  }
  ```

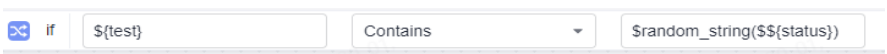
- Checkpoint property

  As shown in the following figure, the target value of the checkpoint property **result** is the function for generating random strings of a specified length. Parameter A in the function is the local parameter **test**. For details about how to set local parameters, see **Local Parameters**.

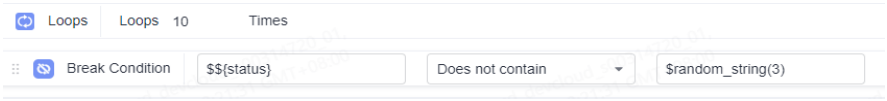
- **if** condition

  As shown in the following figure, the target value of the **if** condition is the function for generating random strings of a specified length. Parameter A in the function is the environment variable **status**. For details about how to set environment parameters, see **Setting Environment Parameters of an API Script**.

- **for** loop interrupt condition

  As shown in the following figure, the target value of the **for** loop interruption condition is the function for generating random strings of a specified length. Parameter A in the function is **3**.



6.4.11.16 Generating a Random Decimal in a Specified Range

Function Name

$randomDecimal(*double A*, *double B*, *int C*)

Function Description

Generates a random decimal with *C* decimal places within the range between parameter A and parameter B. CodeArts TestPlan can generate random decimals with up to 9 decimal places, within the range of [–9999999999.999999999, +9999999999.999999999].

Parameters A and B support the following types:

- Decimals or integers
- Environment parameters
- Local parameters
- Other built-in functions

Parameter C supports the following types:

- Positive integers
- Environment parameters
- Local parameters
- Other built-in functions

If *C* is **0**, the function generates a random integer.

Application Scenarios

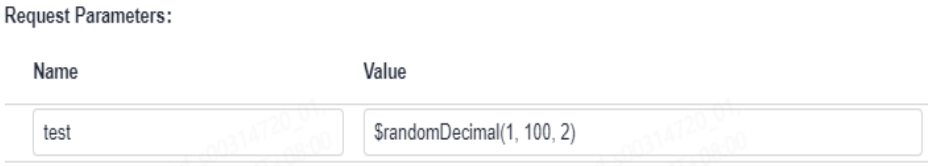
The function for generating random decimals within a specified range can be used in the following scenarios for API automation:

- 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 decimals within a specified range. Parameter A in the function is **1**, parameter B is **100**, and parameter C is **2**.



- Request header

  As shown in the following figure, the value of **number** in the request header is the function for generating random decimals within a specified range. Parameter A in the function is **1**, parameter B is **100**, and parameter C is **2**.

- Request body

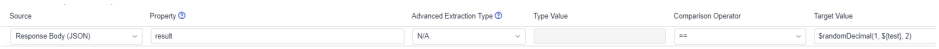
  As shown in the following figure, the request body uses the function for generating random decimals within a specified range. Parameter A in the function is the binary addition operation **$add(1,1)**. Parameter B is the binary multiplication operation **$multiply(10,10)**.

  Parameter C is **2**.

```
{
    "number":"$randomDecimal($add(1,0), $multiply(10,10), int 2)"
}

```

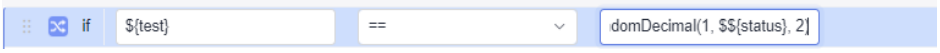
- Checkpoint property

  As shown in the following figure, the target value of the checkpoint property **result** is the function for generating random decimals within a specified range. Parameter A in the function is **1**, parameter B is the local parameter **test**, and parameter C is **2**. For details about how to set local parameters, see **Local Parameters**.



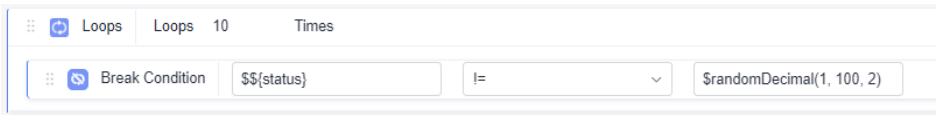
- **if** condition

  As shown in the following figure, the target value of the **if** condition is the function for generating random decimals within a specified range. Parameter A in the function is **1**, parameter B is the environment variable **status**, and parameter C is **2**. For details about how to set environment parameters, see **Setting Environment Parameters of an API Script**.



- **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 decimals within a specified range. Parameter A in the function is **1**, parameter B is **100**, and parameter C is **2**.



6.4.11.17 Generating a UUID

Function Name

$uuid()

Function Description

Generates a random string.

Application Scenarios

The UUID 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 UUID generation function.

- Request header

  As shown in the following figure, the value of **time** in the request header is the UUID generation function.

- Request body

As shown in the following figure, the request body uses the UUID generation function.

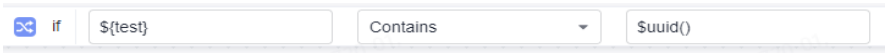
```
{
    "string":"$uuid()"
}
```

- Checkpoint property

  As shown in the following figure, the target value of the checkpoint property **result** is the UUID generation function.

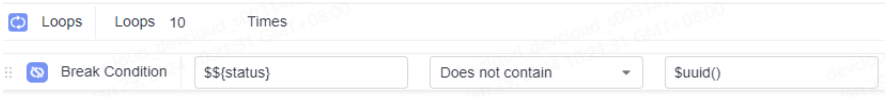
- **if** condition

  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.



6.4.11.18 Obtaining an Array via Reverse Index

Function Name

$getReverseItem(*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

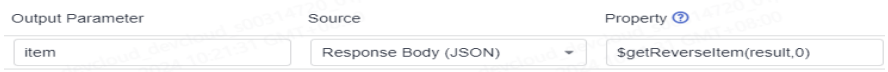
Obtains an array from a response body or header based on the reverse index.

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**.



6.4.11.19 Obtaining the Element Values of an Array via Reverse Index

Function Name

$getReverseItem(*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

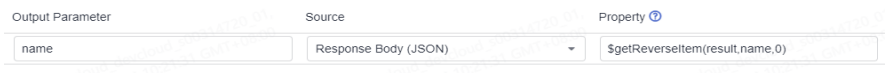
Obtains a specified element value of an array from a response body or header based on the reverse index.

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**.



6.4.11.20 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
- 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**.

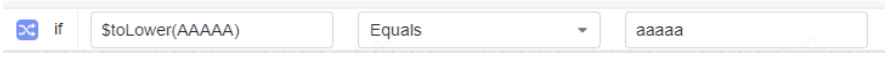
  ```
  {
      "id":1,
      "lower":"$toLower(TEST)"
  }
  ```


- 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**.

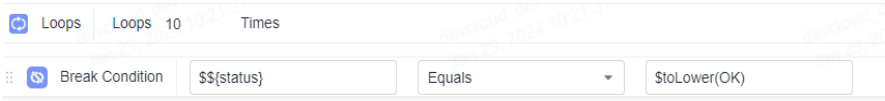
- **if** condition

  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**.



6.4.11.21 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
- 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

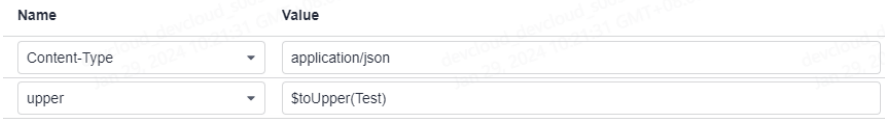
Example

- 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**.

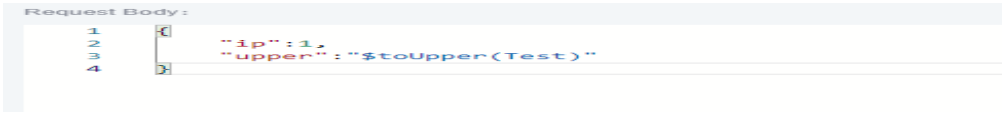
- Request header

  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**.

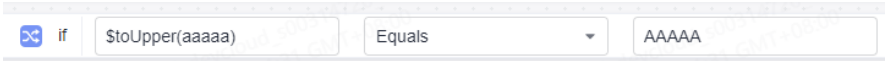


- Checkpoint property

  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**.

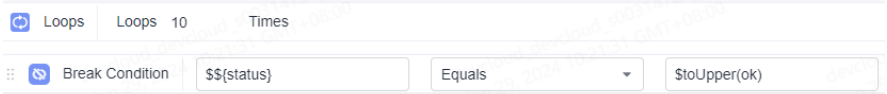
- **if** condition

  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**.



6.4.11.22 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
- Local parameters

Function Description

Concatenates strings 1 and 2 into a new string.

Application Scenarios

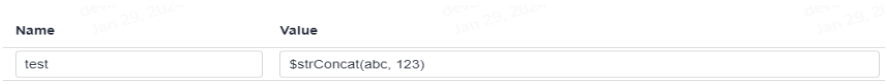
The string concatenation function can be used in the following scenarios for API automation:

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

Example

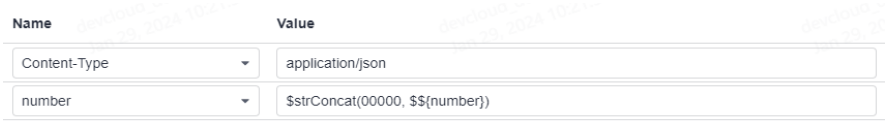
- Request URL

  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}**.

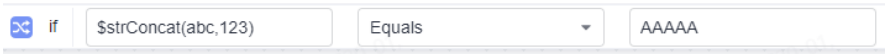
```
{
    "id":1,
    "address":"$strConcat($${info}, $${number})"
}

```

- 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}**.

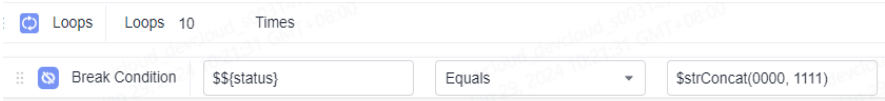
- **if** condition

  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**.



6.4.11.23 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
- 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**.

- 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**.

- 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**.

```
{
    "id":"$toUpper($${a})",
    "name":"$strCut($${user}, 2, 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**.

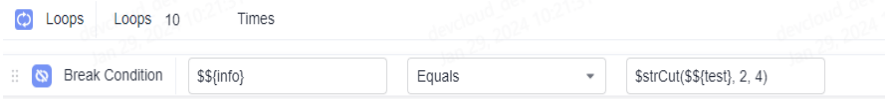
- **if** condition

  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**.

6.4.11.24 Obtaining String Length

Function Name

$strLen(*String A*)

Parameter Description

- *String A*: original string whose length is requested.

Parameter A supports the following types:

- Strings
- Local parameters

Function Description

Obtains the length of a specified string.

Application Scenarios

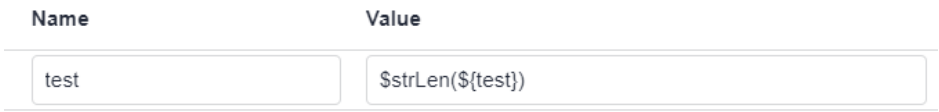
The string length function can be used in the following scenarios for API automation cases:

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

Example

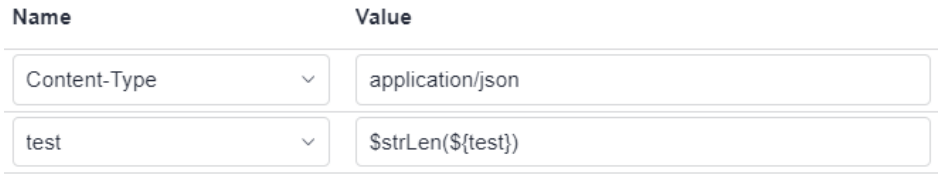
- Request URL

As shown in the following figure, the value of **test** in the request URL is the string length function that uses the local parameter **${test}**.



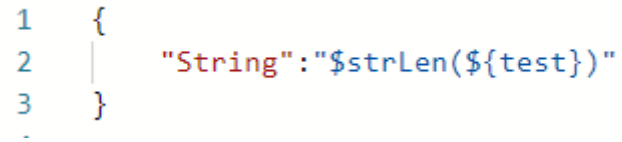
- Request header

As shown in the following figure, the value of **test** in the request header is the string length function whose parameter A is the local parameter **${test}**.



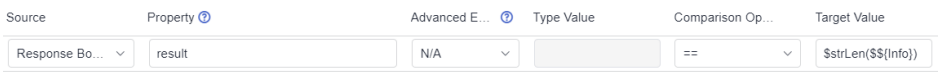
- Request body

  As shown in the following figure, the request body uses the string length function whose parameter A is the local parameter **${test}**.



- Checkpoint property

  As shown in the following figure, the target value of the checkpoint property **result** is the string length function whose parameter A is the environment parameter **$${info}**.

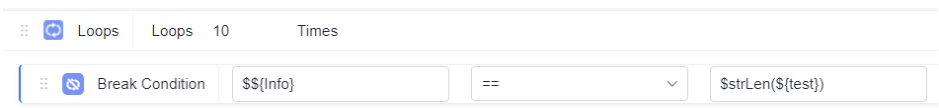


- **if** condition

  As shown in the following figure, the target value of the **if** condition is the string length function uses the local parameter **${test}**.

- **for** loop interrupt condition

  As shown in the following figure, the target value of the **for** loop interrupt condition is the string length function uses the local parameter **${test}**.



6.4.12 System Keywords

6.4.12.1 Overview

Frequent operations of automated API tests are encapsulated into keywords for more efficient API test case writing. For details about the keywords, see **Table 6-5**.

Table 6-5 System keywords

Category	Keyword Set
Authentication	• **GetIAMToken**
Database operation	• **MySQLQuery** • **MySQLUpdate** • **MySQLInsert** • **MySQLDelete** • **OpenGaussQuery** • **OpenGaussUpdate** • **OpenGaussInsert** • **OpenGaussDelete** • **PostgreSQLQuery** • **PostgreSQLUpdate** • **PostgreSQLInsert** • **PostgreSQLDelete** • **MongoDBQuery** • **MongoDBInsert** • **MongoDBUpdate** • **MongoDBDelete**
Middleware	• **RedisGet** • **RedisSet** • **OBSWrite** • **OBSDelete** • **OBSQuery** • **KafkaProducer** • **KafkaConsumer**
Protocol	• **TCP** • **UDP** • **WSConnect** • **WSRequest** • **WSWriteOnly** • **WSReadOnly** • **WSDisConnect** • **DubboClient**

6.4.12.2 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**.
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...",
```



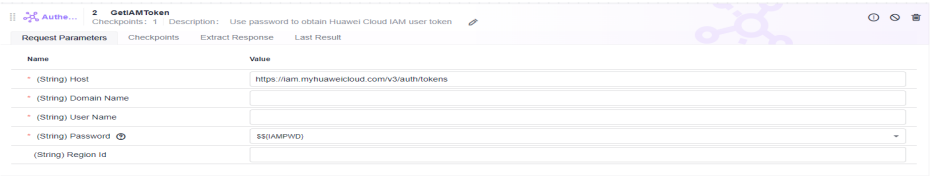
```
            "name": "IAMDomain"
        },
        "id": "7116d09f88fa41908676fdd4b039e...",
        "name": "IAMUser",
        "password_expires_at": ""
    }
  },
  "X-Subject-Token": "MIIatAYJKoZIhvcNAQcCoIIapTCCGqECAQExDTALB..."
}
```

Example

- **Obtaining an IAM user token**

NOTE

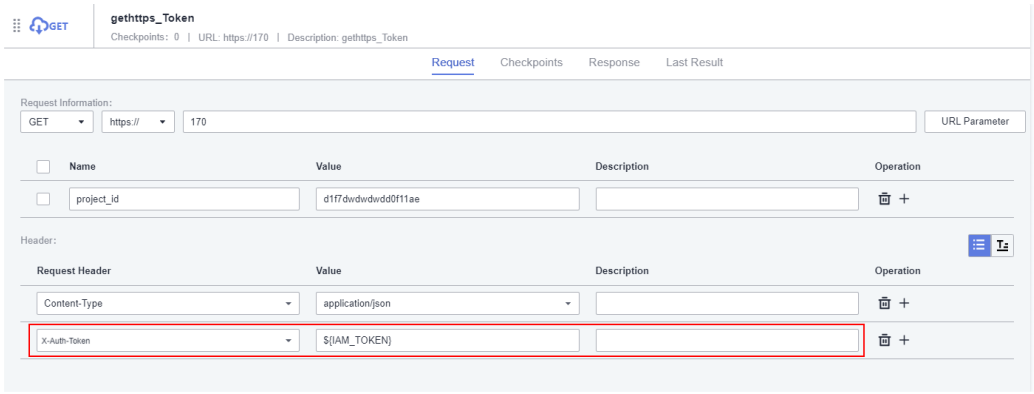
The **Password** field needs to be configured as a sensitive parameter in the variable. Select a value from the drop-down list box.



- **Referencing a token in an API**

NOTE

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



6.4.12.3 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, 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 MySQL CLI to Connect to an 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 *n*

MySQLQuery Response Example

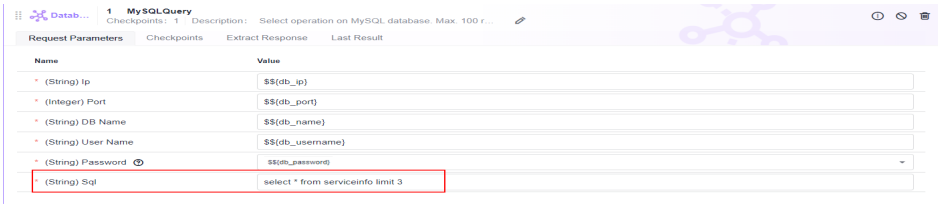
```
[
  {
    "name": "Sam",
    "id": "efdb403066474ab08836b9eeaaa23bca",
    "age": 18
  },
  {
```



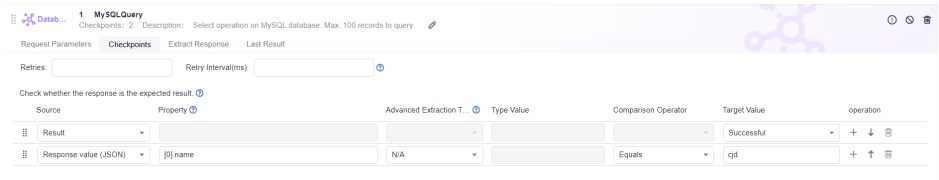
```
    "name": "Sue",
    "id": "g582b0d966611486f918bedb9c711b14",
    "age": 20
  }
]
```

MySQLQuery Usage Example

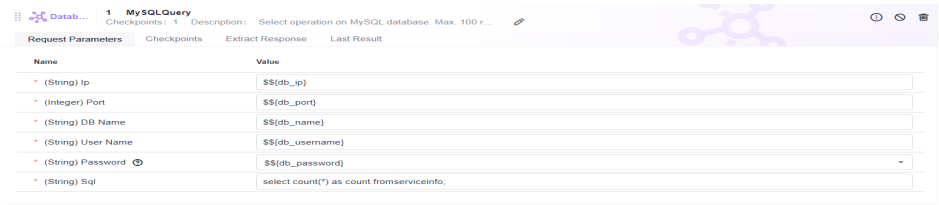
- Query the database table. A user data list is returned based on the system keyword. You can determine the return based on the service.



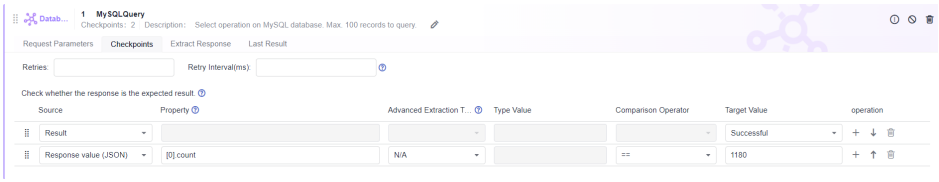
Determine the result in the returned list.



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



Determine the result in the response extraction.



6.4.12.4 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.

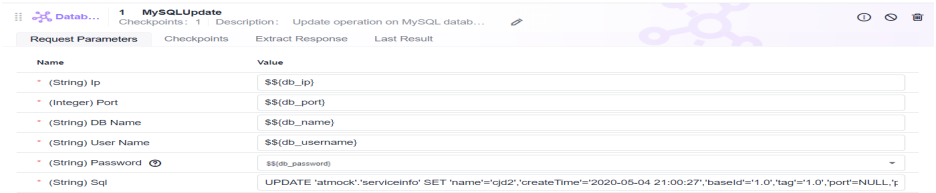
Parameter	Mandatory	Type	Description
Ip	Yes	String	Database IP address. For a Huawei Cloud RDS instance, bind an EIP to the instance and ensure that the security group policy of the instance port is enabled to allow access. For details, see **Using MySQL CLI to Connect to an Instance Through a Public 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

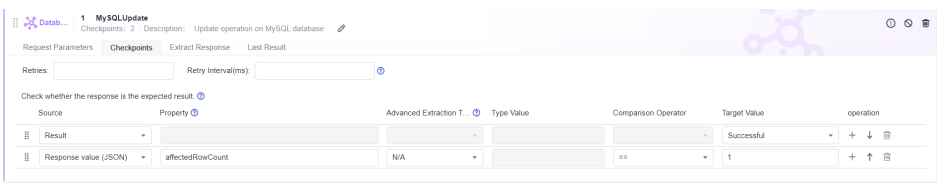
Status: success

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

MySQLUpdate Usage Example



Determine the number of affected rows.



MySQLUpdate Response Example

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

6.4.12.5 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, 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 MySQL CLI to Connect to an 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 **INSERT**, which has no returns

MySQLInsert Response

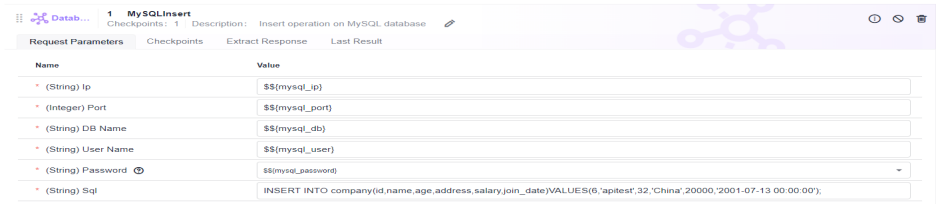
Status: success

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

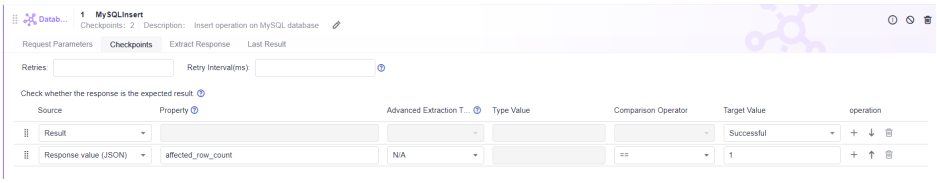
MySQLInsert Response Example

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

MySQLInsert Usage Example



Determine the number of affected rows.



6.4.12.6 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 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 **Using MySQL CLI to Connect to an Instance Through a Public Network**.

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 **DELETE**, which has no returns

MySQLDelete Response

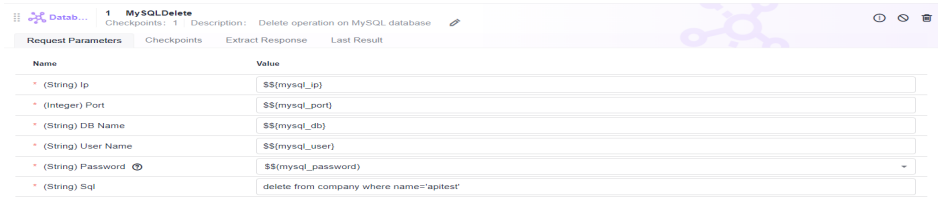
Status: success

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

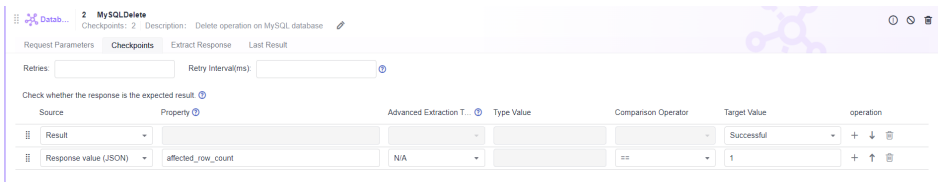
MySQLDelete Response Example

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

MySQLDelete Usage Example



Determine the number of affected rows.



6.4.12.7 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, 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**.
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

OpenGaussQuery Response

Status: success

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

Parameter Description

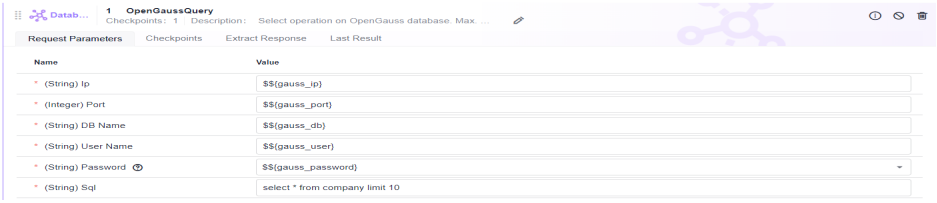
Parameter	Type	Description
field1	String	Database field 1
field2	Integer	Database field 2
...	String	Database field *n*

OpenGaussQuery Response Example

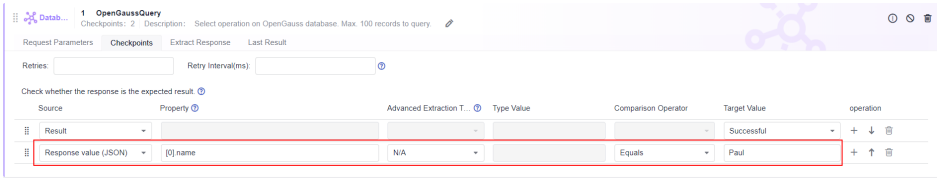
```
[
  {
    "name": "Sam",
    "id": "efdb403066474ab08836b9eeaaa23bca",
    "age": 18
  },
  {
    "name": "Sue",
    "id": "g582b0d966611486f918bedb9c711b14",
    "age": 20
  }
]
```

OpenGaussQuery Usage Example

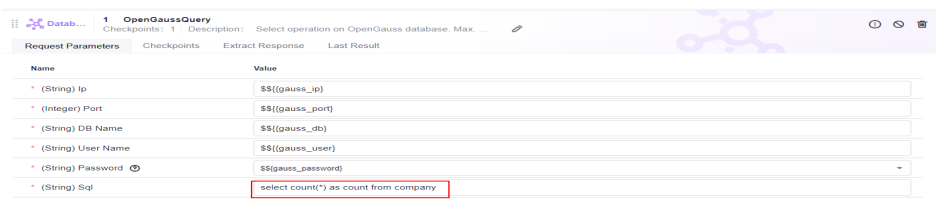
Query the database table. A user data list is returned based on the system keyword. You can determine the return based on the service.



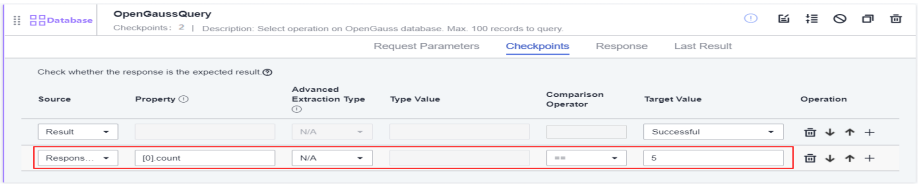
Determine the result in the returned list.



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



Determine the result in the response extraction.



6.4.12.8 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, 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**.
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

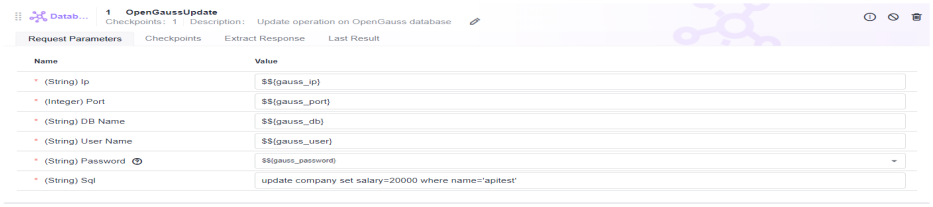
Status: success

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

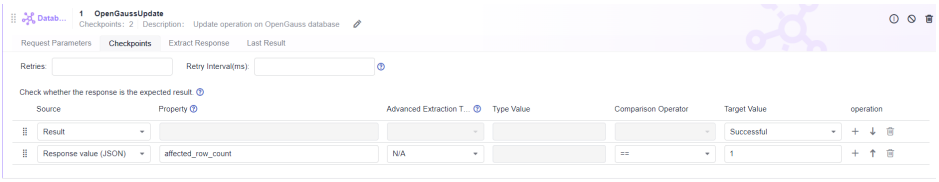
OpenGaussUpdate Response Example

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

OpenGaussUpdate Usage Example



Determine the number of affected rows.



6.4.12.9 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, 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**.
Port	Yes	Integer	Database port

Parameter	Mandatory	Type	Description
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

OpenGaussInsert Response

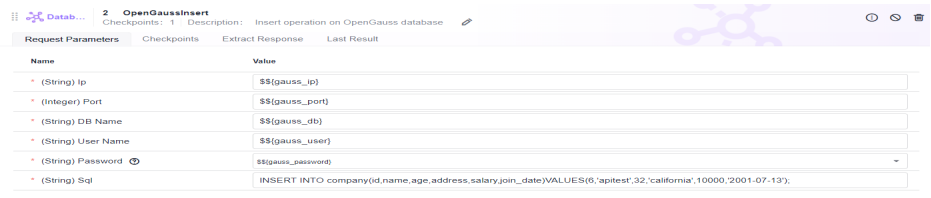
Status: success

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

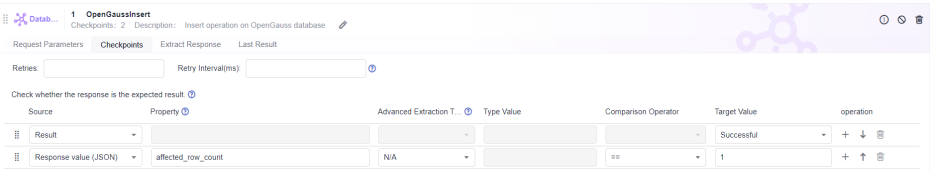
OpenGaussInsert Response Example

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

OpenGaussInsert Usage Example



Determine the number of affected rows.



6.4.12.10 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, 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**.
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

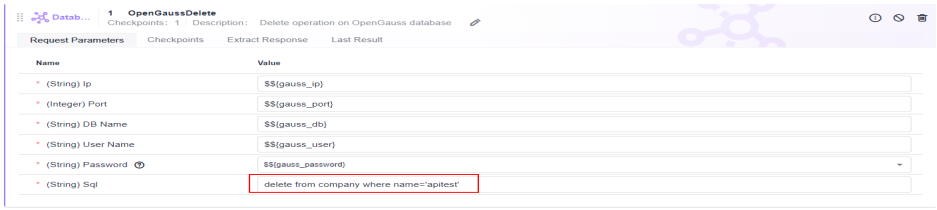
Status: success

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

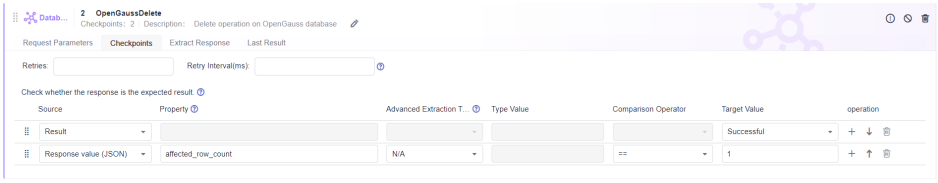
OpenGaussDelete Response Example

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

OpenGaussDelete Usage Example



Determine the number of affected rows.



6.4.12.11 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 the **connection methods**.
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
[*Array elements*]	Array of row objects	Structure returned by the SQL query result list

Parameter Description

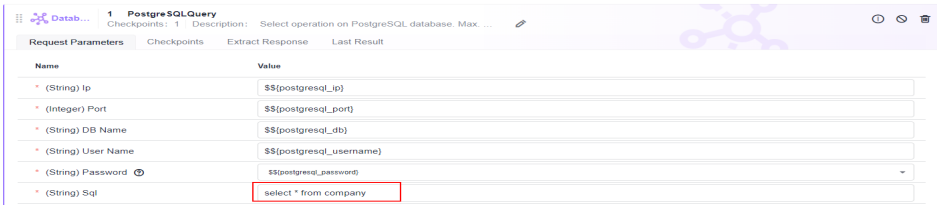
Parameter	Type	Description
field1	String	Database field 1
field2	Integer	Database field 2
...	String	Database field *n*

PostgreSQLQuery Response Example

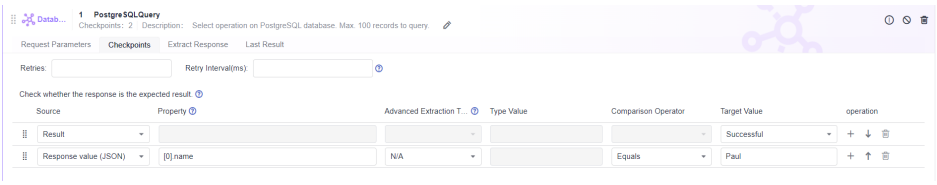
```
[
  {
    "name": "Sam",
    "id": "efdb403066474ab08836b9eeaaa23bca",
    "age": 18
  },
  {
    "name": "Sue",
    "id": "g582b0d966611486f918bedb9c711b14",
    "age": 20
  }
]
```

PostgreSQLQuery Usage Example

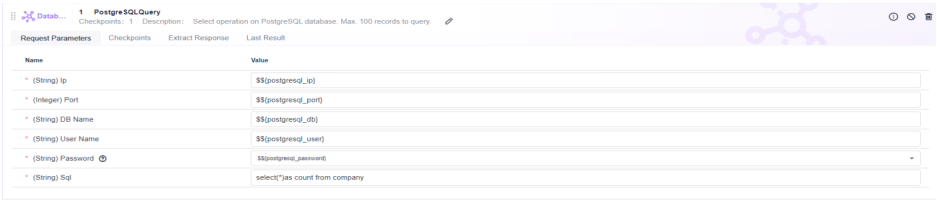
Query the database table. A user data list is returned based on the system keyword. You can determine the return based on the service.



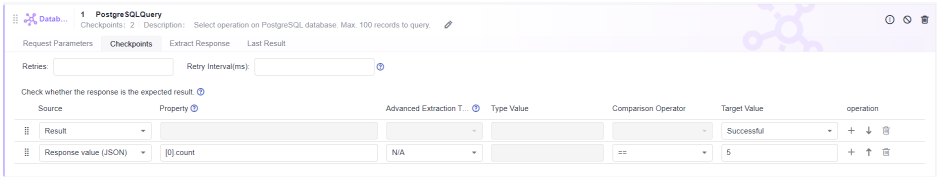
Determine the result in the returned list.



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



Determine the result in the response extraction.



6.4.12.12 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 the **connection methods**.

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

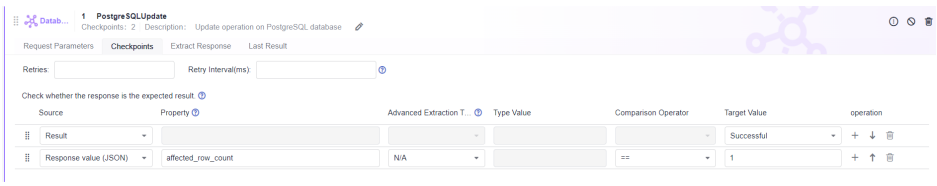
Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by the SQL statement

PostgreSQLUpdate Response Example

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

PostgreSQLUpdate Usage Example

Determine the number of affected rows.



6.4.12.13 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 the **connection methods**.
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

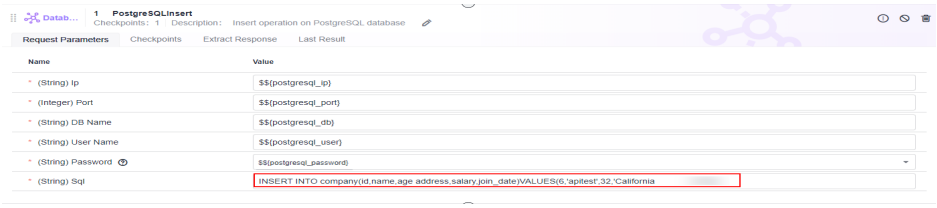
Status: success

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

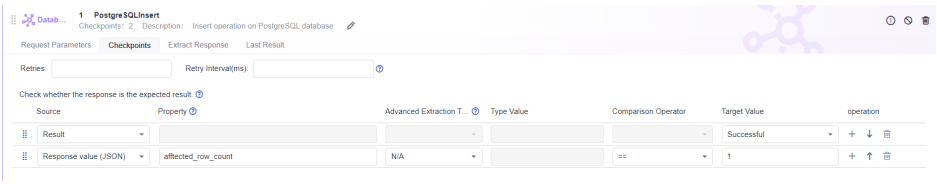
PostgreSQLInsert Response Example

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

PostgreSQLInsert Usage Example



Determine the number of affected rows.



6.4.12.14 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 the **connection methods**.
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

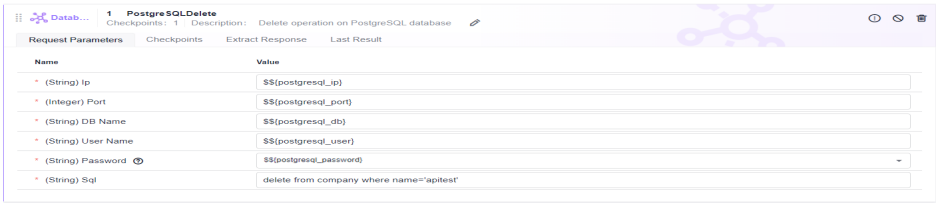
Status: success

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

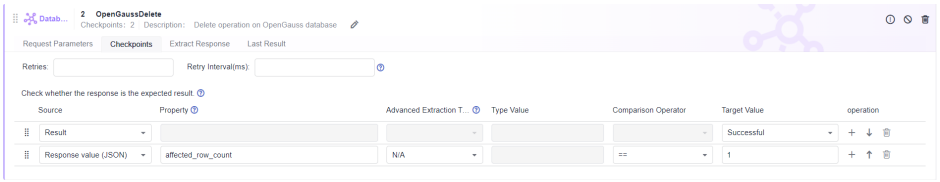
PostgreSQLDelete Response Example

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

PostgreSQLDelete Usage Example



Determine the number of affected rows.



6.4.12.15 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	• 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
[*Array elements*]	Array of row objects	Structure returned by the query result list

Parameter Description

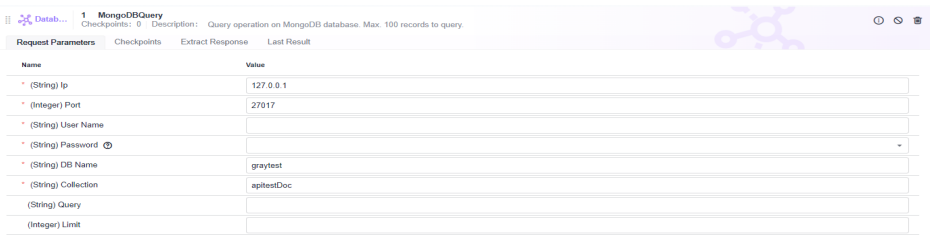
Parameter	Type	Description
field1	String	Database field 1
field2	Integer	Database field 2
...	String	Database field *n*

MongoDBQuery Response Example

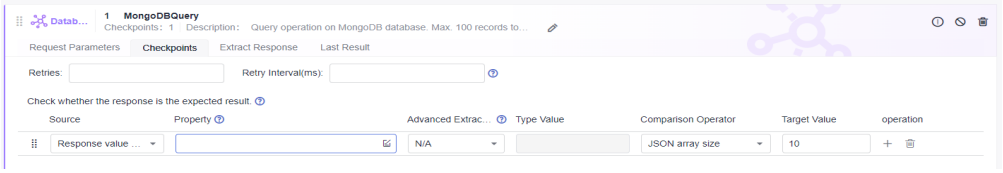
```
[ {
  "_id" : {
    "$oid" : "62465c42907c00003d0076fe"
  },
  "title" : "MongoDB Tutorial",
  "description" : "MongoDB is a NoSQL database.",
  "by" : "test",
  "url" : "",
  "tags" : [ "mongodb", "database", "NoSQL" ],
  "likes" : 100.0
}, {
  "_id" : {
    "$oid" : "62465ce4907c00003d0076ff"
  },
  "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

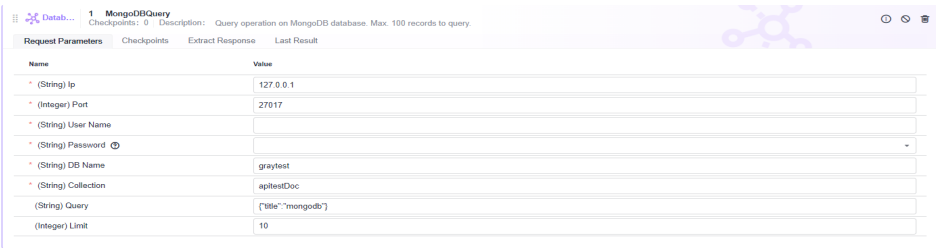
- Query the number of documents in the database collection. The system returns the document data list based on the system keyword. You can determine the returned result based on the service.

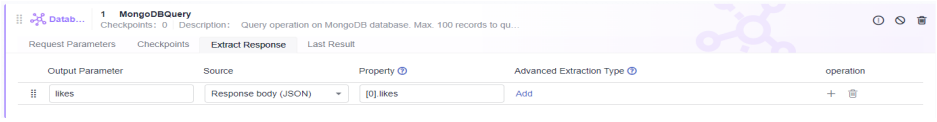
  You can determine the result based on the returned list. For example, the number of documents in the collection is 10.



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



Extract or determine the result from response information.



6.4.12.16 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

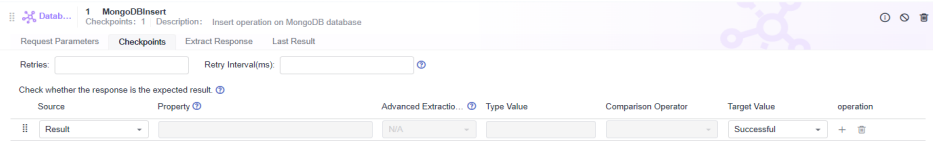
MongoDBInsert Response Example

```
{
  "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.



6.4.12.17 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

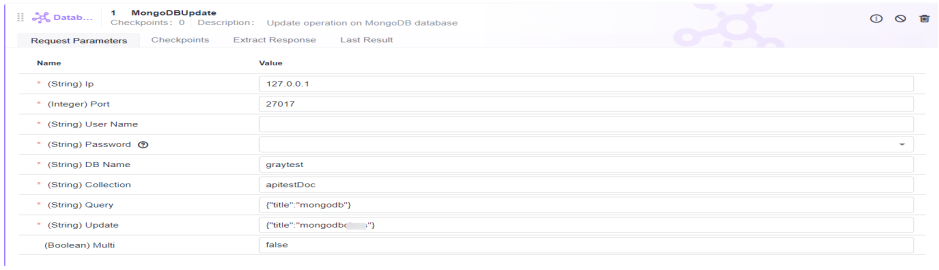
Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by document update

MongoDBUpdate Response Example

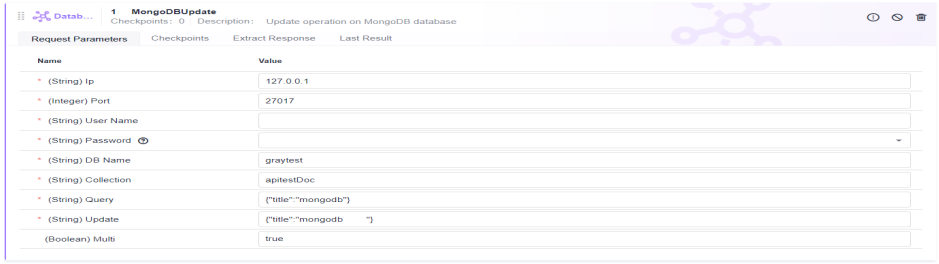
```
{
  "affected_row_count" : 1
}
```

MongoDBUpdate Usage Example

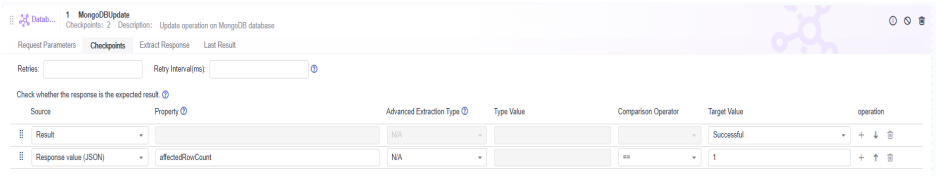
Update documents in the collection based on the entered query data and update data. The system keyword returns the number of updated records.



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.



6.4.12.18 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

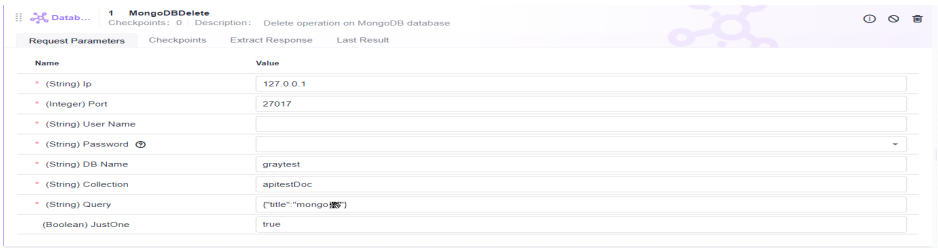
Parameter	Type	Description
affected_row_count	Integer	Number of rows affected by document deletion

MongoDBDelete Response Example

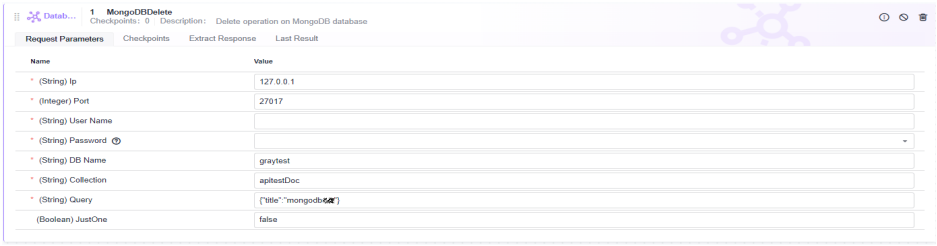
```
{
  "affected_row_count" : 1
}
```

MongoDBDelete Usage Example

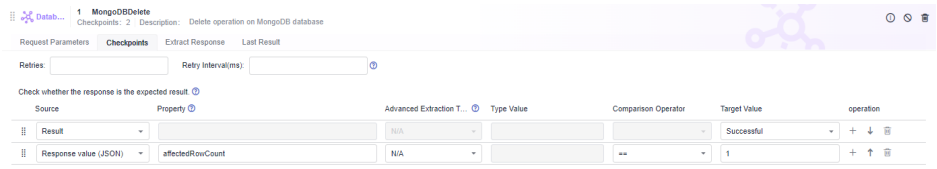
Delete documents based on the entered query parameters. The system keyword returns the number of deleted records.



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



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



6.4.12.19 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

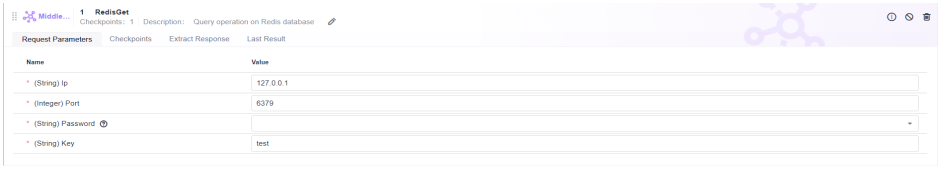
Parameter	Type	Description
key	String	Value of the specified key

RedisGet Response Example

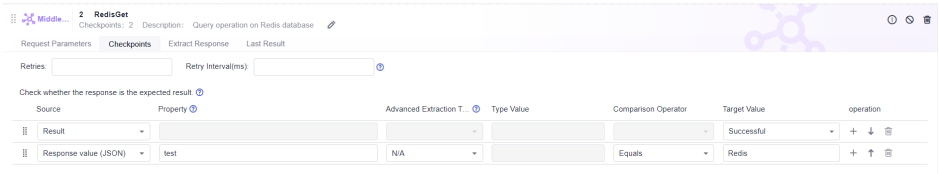
```
{
  "test" : "Redis"
}
```

RedisGet Usage Example

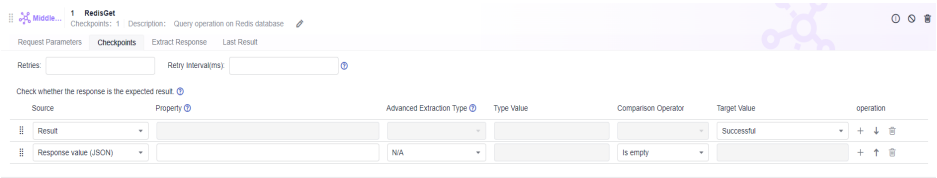
- Obtain the value based on the entered key value.



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.



6.4.12.20 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

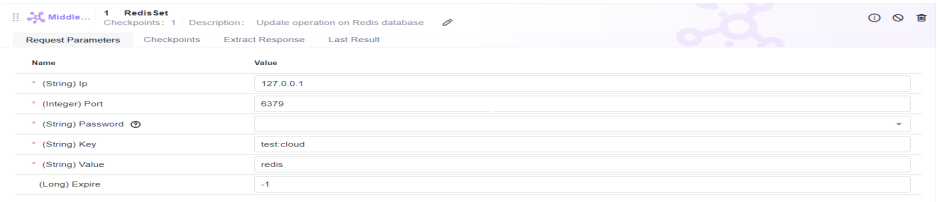
Parameter	Type	Description
result	String	Result returned by the configured value corresponding to the key. If the setting is successful, **OK** is returned. If the setting fails, an error message is returned.

RedisSet Response Example

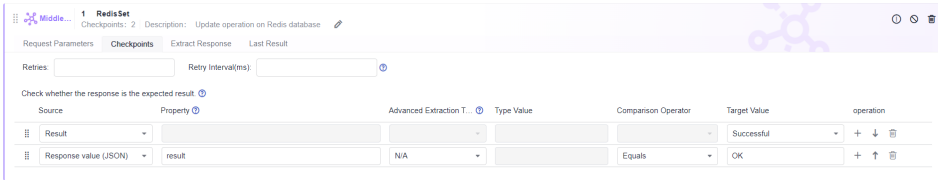
```
{
  "result" : "OK"
}
```

RedisSet Usage Example

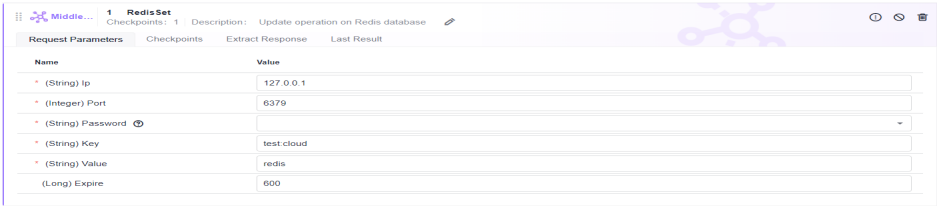
- Set the value based on the entered key value. The default value is used, indicating that the password never expires.



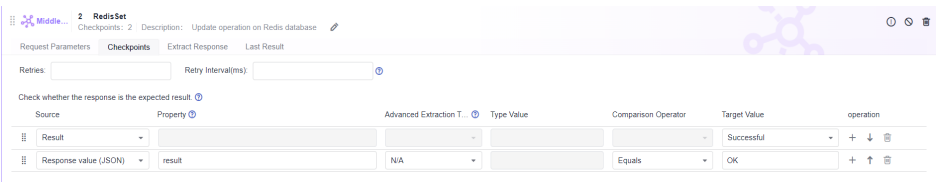
Check whether the setting is successful.



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



Check whether the setting is successful.



6.4.12.21 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	If the setting is successful, **fail** is returned.

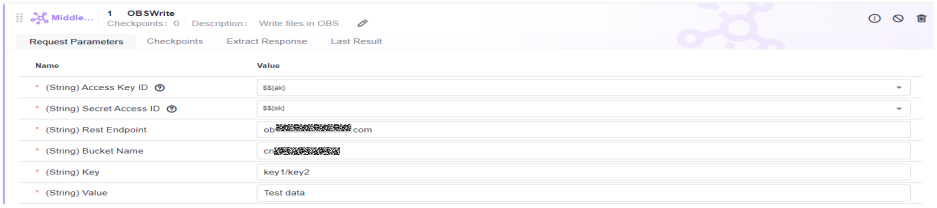
Parameter	Type	Description
errorMessage	String	Failure cause

OBSWrite Response Example

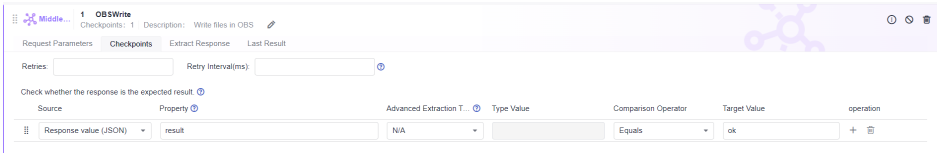
```
{
  "result" : "ok",
  "key" : "/key"
}
```

OBSWrite Usage Example

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



Check whether the setting is successful.



6.4.12.22 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.)

Parameter	Mandatory	Type	Description
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	If the setting is successful, **fail** is returned.
errorMessage	String	Failure cause

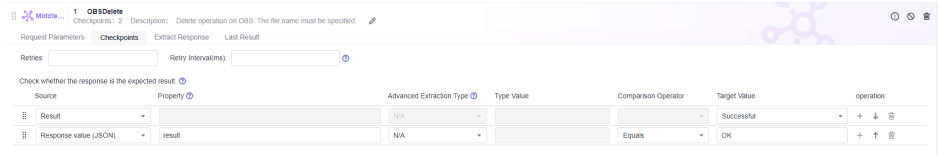
OBSDelete Response Example

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

OBSDelete Usage Example

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

Check whether the setting is successful.



6.4.12.23 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".

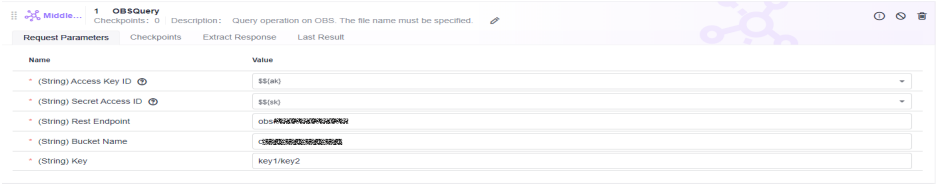
```
"Test data"
```

Status: failed

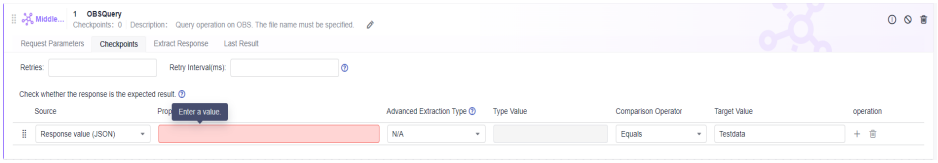
Parameter	Type	Description
result	String	If the setting is successful, **fail** is returned.
errorMessage	String	Failure cause

OBSQuery Usage Example

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



Check whether the data is obtained successfully.



6.4.12.24 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

Kafka Authentication Description

- Authentication mode: If you configure **SASL Username**, **SASL Password**, **Truststore**, and **Truststore Password** in the **KafkaProducer** keyword, and the

Kafka uses the SASL_SSL authentication protocol for encrypted data transmission, then client authentication is required.

- No authentication mode: If you do not configure **SASL Username**, **SASL Password**, **Truststore**, and **Truststore Password** in the **KafkaProducer** keyword, and the Kafka uses the default SASL_PLAINTEXT protocol, then no encryption or authentication mechanism will be used. In this mode, the communication between the client and server is in plaintext, and security cannot be guaranteed.

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.

6.4.12.25 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
SASL Password	No	String	-	Kafka SASL password
Truststore	No	File	-	Kafka client certificate
Truststore Password	No	String	-	Password of the Kafka client certificate

Kafka Authentication Description

- Authentication mode: If you configure **SASL Username**, **SASL Password**, **Truststore**, and **Truststore Password** in the **KafkaProducer** keyword, and the Kafka uses the SASL_SSL authentication protocol for encrypted data transmission, then client authentication is required.
- No authentication mode: If you do not configure **SASL Username**, **SASL Password**, **Truststore**, and **Truststore Password** in the **KafkaProducer** keyword, and the Kafka uses the default SASL_PLAINTEXT protocol, then no encryption or authentication mechanism is used. In this mode, the communication between the client and server is in plaintext, and security cannot be guaranteed.

KafkaConsumer Response

Status: success

Parameter	Type	Description
Body	String	Value returned by the KafkaConsumer API

KafkaConsumer Response Example

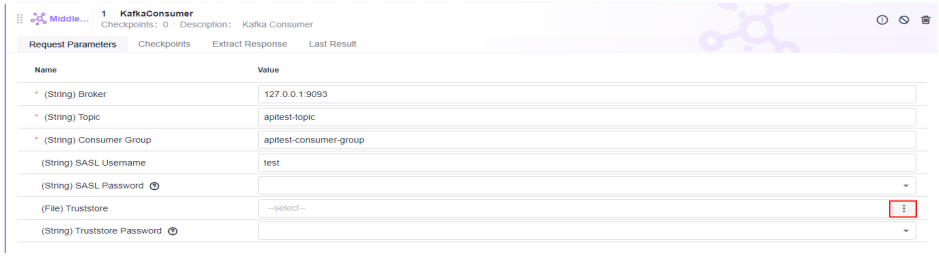
```
{
  "message" : [{
    "offset" : 102130,
    "value" : "kafka message 1"
  }, {
    "offset" : 102131,
    "value" : "kafka message 2"
  }]
}
```

Default Checkpoint

Name	Expected Value
Result	Success

KafkaConsumer Usage Example

Configure parameters to receive a Kafka message.



6.4.12.26 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

Parameter	Mandatory	Type	Default Value	Description
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

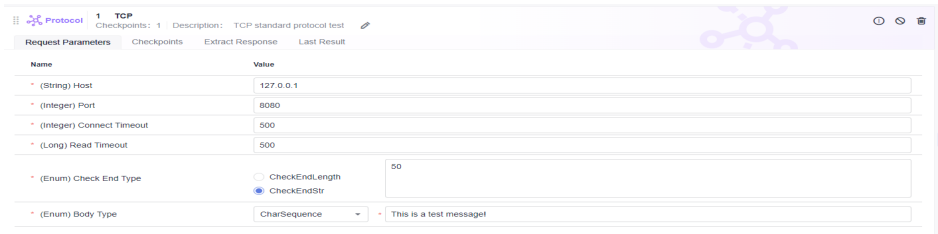
```
{
   "This is a test Message."
 }
```

Default Checkpoint

Name	Expected Value
Result	Success

TCP Usage Example

Configure parameters to access the TCP service.



6.4.12.27 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**
Body Type	Yes	Enum	CharSequence	Message body type: **CharSequence** **HexadecimalCodeStream**

UDP Response

Status: success

Parameter	Type	Description
Body	String	UDP API return

UDP Response Example

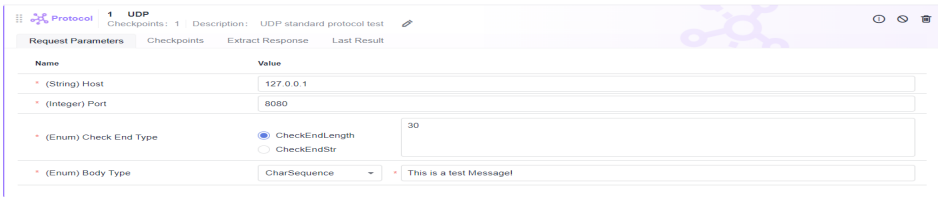
```
{
   "This is a test Message."
 }
```

Default Checkpoint

Name	Expected Value
Result	Success

UDP Usage Example

- Configure parameters to access the UDP service.



6.4.12.28 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

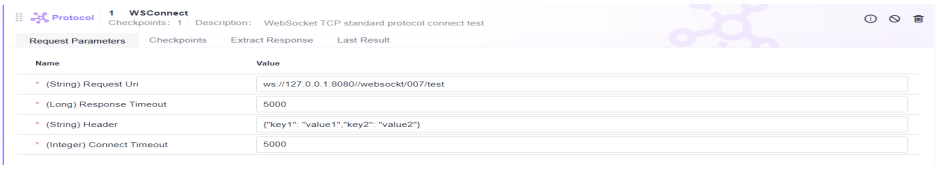
```
{
   "Connect to *** at port *** in time 5000 successfully."
}
```

Default Checkpoint

Name	Expected Value
Result	Success

WSConnect Usage Example

Configure parameters to access the WebSocker service.



6.4.12.29 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

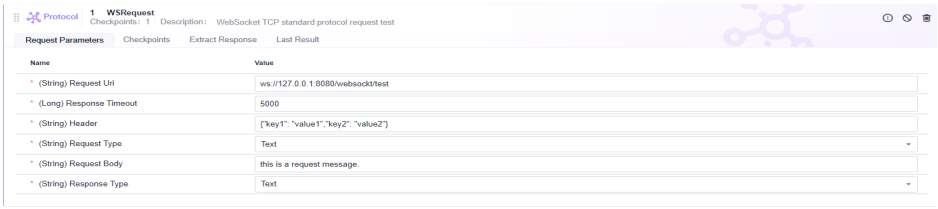
```
{
   "Write data to *** at port *** successfully. response: this is a response message."
}
```


Default Checkpoint

Name	Expected Value
Result	Success

WSRequest Usage Example

Configure parameters to access the WebSocker service.



6.4.12.30 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

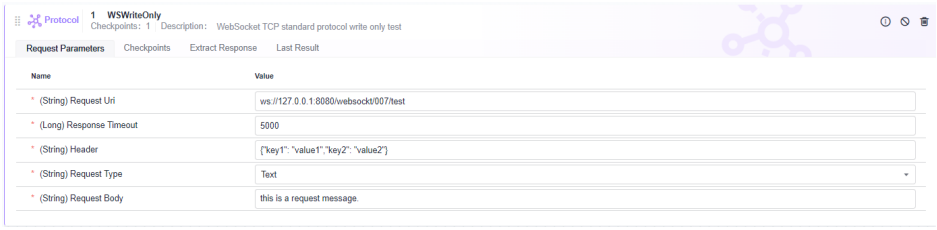
```
{
   "Write data to *** at port *** successfully. response: this is a response message."
}
```


Default Checkpoint

Name	Expected Value
Result	Success

WSWriteOnly Usage Example

Configure parameters to access the WebSocker service.



6.4.12.31 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

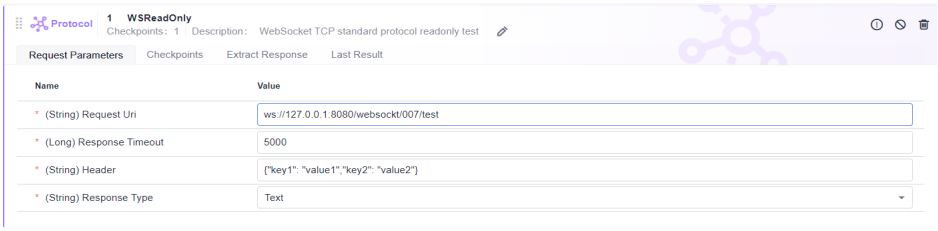
```
{
   "Read data from*** at port *** successfully. response: this is a response message."
}
```


Default Checkpoint

Name	Expected Value
Result	Success

WSReadOnly Usage Example

Configure parameters to access the WebSocker service.



6.4.12.32 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

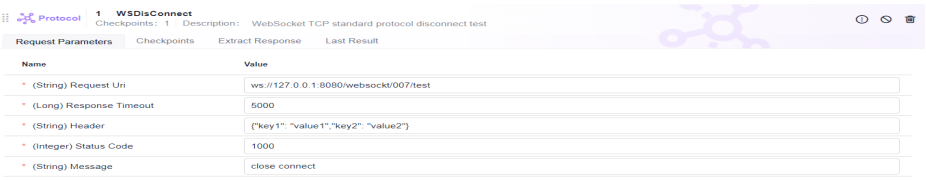
```
{
   "Disconnect to *** at port *** in time 5000 successfully."
}
```

Default Checkpoint

Name	Expected Value
Result	Success

WSDisConnect Usage Example

Configure parameters to access the WebSocker service.



6.4.12.33 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

Parameter	Mandatory	Type	Default Value	Description
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

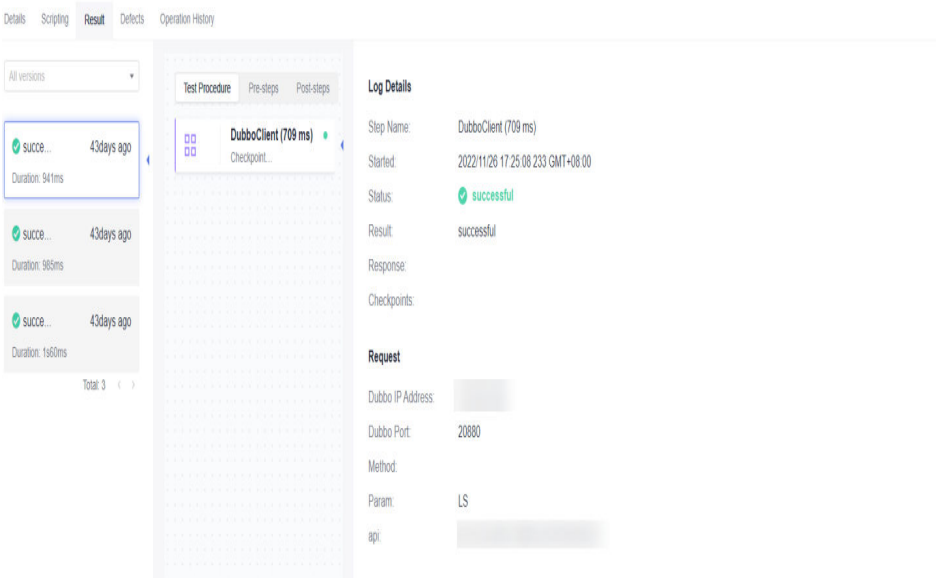
Default Checkpoint

Name	Expected Value
Result	Success

DubboClient Usage Example: Obtaining All Registered APIs of the Server

Parameter example:

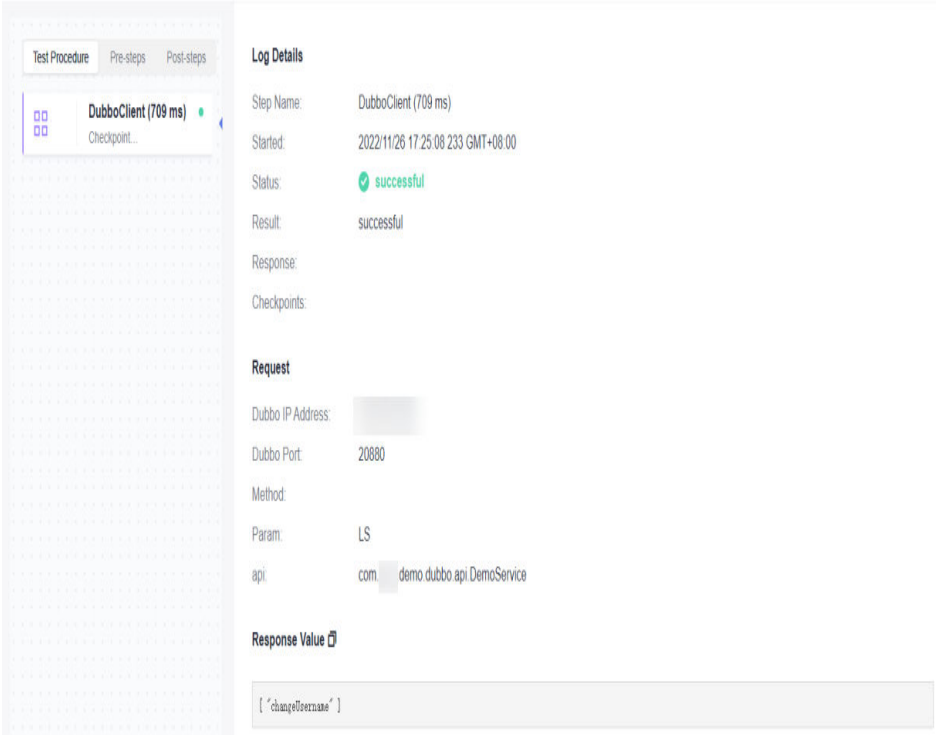
Response example:



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

Parameter example:

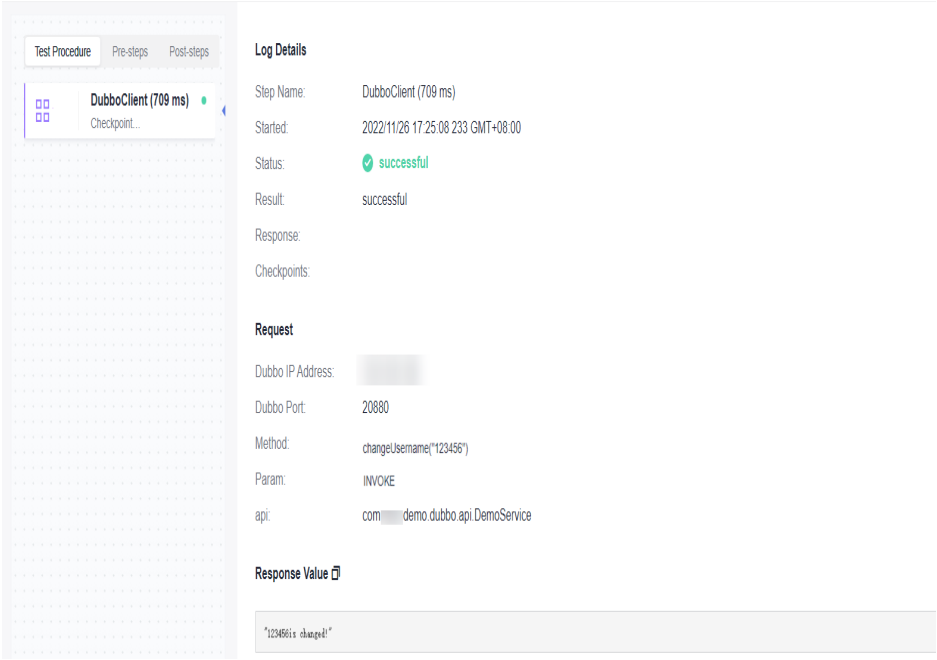
Response example:



DubboClient Usage Example: Calling a Specified Dubbo API

Parameter example:

Response example:



6.5 Executing a Test Case

Execute test cases and record the results.

Constraints

Up to five API automation test cases can be executed in a batch each time.

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 Click the tab that corresponds to the execution type of the test case. For example, click the **Manual Test** tab for a manual test case, or the **Auto API Test** for an automated API test case. Click ▷ in the **Operation** column of the test case. The execution page is displayed.

Batch execution: For manual test cases, select them and click **Batch Set Results**. For automated API test cases, select them and click **Execute**.

NOTICE

Redirection in API testing refers to the process of forwarding a request for a URL or web page to another URL or web page. The server forwards the user's access request for a URL to another URL based on certain rules. The user will then see the page of the latter URL.

This redirection function can be enabled in **Function Switch** on the **Test Settings** page. After this function is enabled, if the request code is **302** during execution of API automation test cases, the system will automatically forward the request to the destination redirect address in the URL.

Step 4 Set the case result based on the actual test result.

Click **Add** to upload local attachments related to the test activity to the execution history. Up to five attachments can be uploaded, max. 10 MB each.

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.

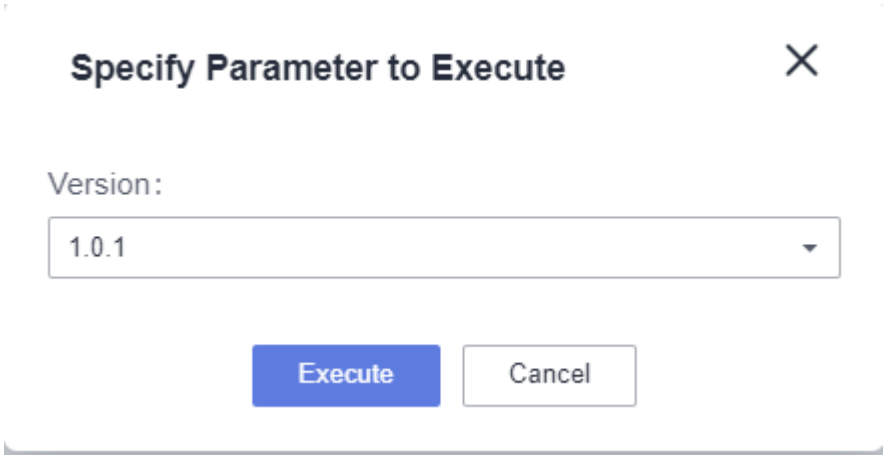
----End

Executing a Manual Test Case with Parameters

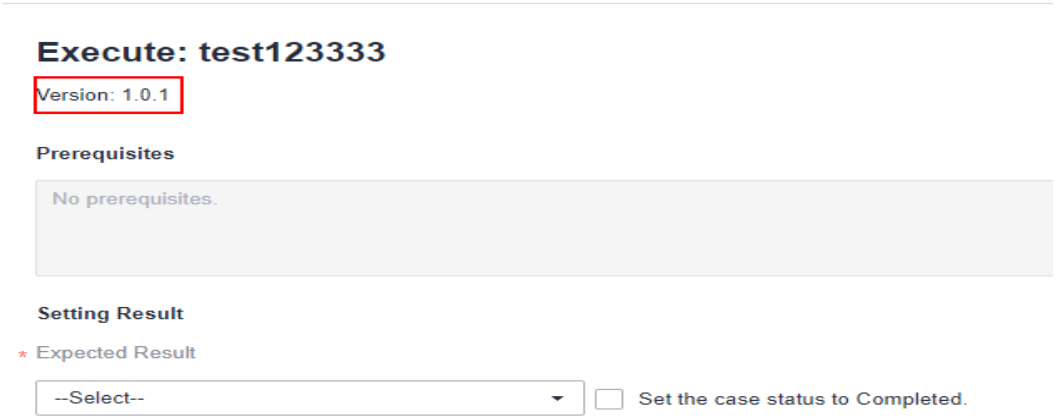
Test cases can be executed with parameters.

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 Check 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

Execution of an Automated API Test Case with a Dataset

Step 1 **Import an automated API test case dataset**.

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

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

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

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

Step 5 View the number of failed rounds and the total number of dataset rounds.

Step 6 Click ⌄ on the card to view the execution status of each round of a dataset.

Click the drop-down list box to filter data by **Successful** or **Failed**.

Step 7 Click a round. The detailed log information about the round is displayed.

----End

6.6 Managing Test Cases

You can import test cases from the local PC to the test case library in CodeArts TestPlan, and export test cases from the test case library. You can also add test cases in batches, manage test cases through the feature directory, associate test cases with requirements, comment on test cases, filter test cases, customize the columns to be displayed in the test case list, and set test case fields.

Constraints

- When importing test cases from a file, make sure that the file size is smaller than 5 MB, and that the number of test cases in the version will not exceed the package limit.
- A maximum of 500 API automation test cases can be imported using an Excel file.
- A test case can be associated with up to 100 requirements.
- API automation test cases can be imported either by Postman and Swagger files. The file types can be:

  Postman: Postman Collection v2.1 standard, Postman Collection JSON file

  Swagger: Swagger 2.0 and 3.0 standards, YAML file

Importing a Manual Test Case from Excel

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

Step 2 Click the **Manual Test** tab, click **Import** on the right of the page, and choose **Import from File** from the drop-down list.

Alternatively, click the **All Cases** tab, click **Import** on the right of the page, and choose **Import from File** from the drop-down list. In the displayed dialog box, set **Execution Type** to manual test and auto function test.

Step 3 Decide whether to allow the uploaded cases to overwrite the existing cases with the same IDs, and select the corresponding option.

YES: If the uploaded cases have the same IDs with the existing cases, the existing ones will be overwritten.

NO: All cases will be uploaded to the case list.

Step 4 In the displayed dialog box, select **Whether to create a directory**.

The directory corresponds to the feature directory on the page. Directory structure: level-1 subdirectory, level-2 subdirectory, level-3 subdirectory, and level-4 subdirectory. The level-1 subdirectory is the first directory under the **Features** directory.

Step 5 In the displayed dialog box, 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

- Currently, CodeArts TestPlan supports the Excel format. If the data does not meet the import criteria, a message asking you to download the error report is displayed. Modify the data and import it again.

----End

Adding Manual Test Cases from Another Project

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

Step 2 Click the **Manual Test** tab, click **Import** on the right of the page, and choose **Import from Project** from the drop-down list.

Step 3 In the displayed dialog box, select the source project.

Step 4 Select a source version.

Step 5 Select or deselect the overwriting rule for the test cases with duplicate IDs.

- If the rule is selected, the uploaded cases will overwrite the existing cases with the same IDs.
- If the rule is deselected, the uploaded cases will not be imported if they have the same IDs as the existing cases.

Step 6 Select the original feature or requirement to which the test cases belong. You can find them by using the search box on the left.

Step 7 Search for or filter the required cases by using the search box above the test case list.

Step 8 Select the cases and click **Target Folder**. In the displayed dialog box, select the feature or requirement to which the cases are imported, and click **OK**.

If you select **Synchronize cases only**, only the cases in the original directory are imported to the target directory.

Step 9 Click **OK**.

The directory of the original feature or requirement will also be imported to the current project.

----End

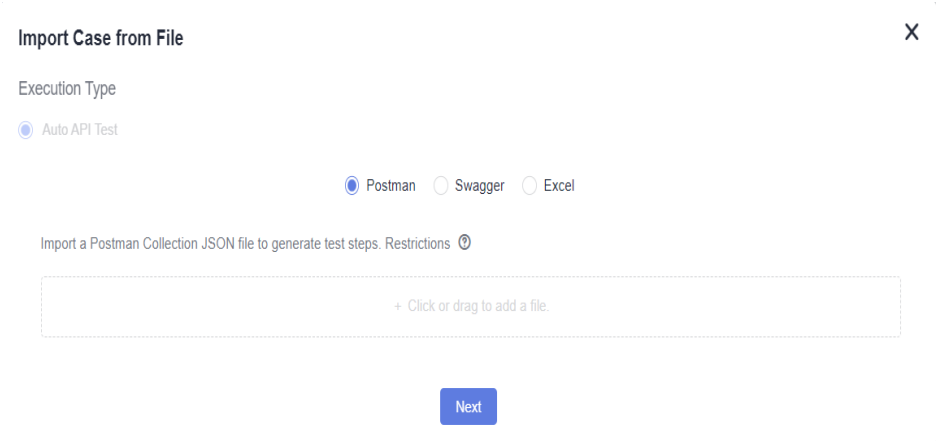
Importing Postman or Swagger Files to Generate API Automation Test Cases

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

Step 2 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 3 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 4 In the displayed list, select the items that you want to create test cases for in the specified order, and click **Save**.

----End

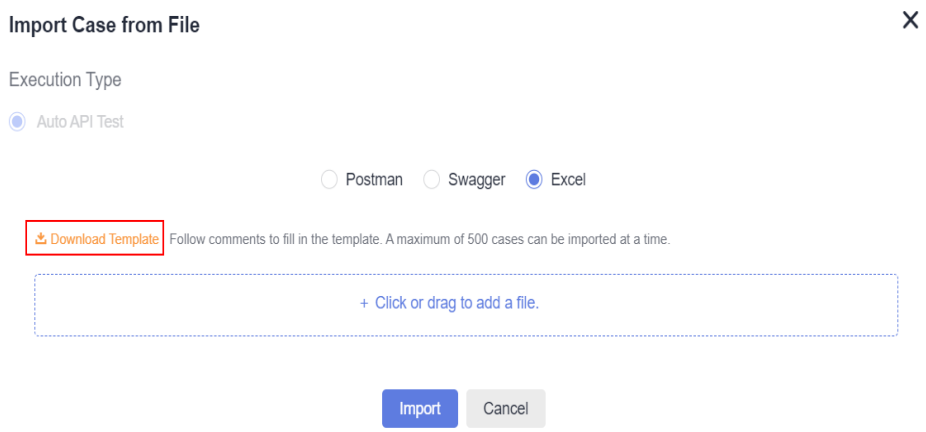
Generating API Automation Test Cases by Importing an Excel File

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

Step 2 Click the **Auto API Test** tab and choose **Import** > **Import from File** on the right of the page.

Alternatively, click the **All Cases** tab, click **Import** on the right of the page, and choose **Import from File** from the drop-down list. In the displayed dialog box, set **Execution Type** to **Auto API Test**.

Step 3 Select **Excel** and click **Download Template**.



Step 4 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 following table shows the template fields.

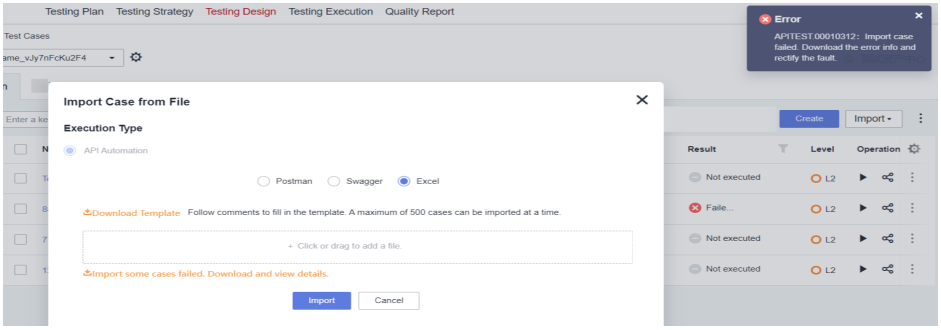
Field	Description
Case Name (mandatory)	The value can contain 1 to 128 characters. Only letters, digits, and special characters (-_/|*&`'^~;:(){}=+,×…—!@#$%.[]<>?–") are supported.
Case Description	Max. 500 characters.
Request Type (mandatory)	Only GET, POST, PUT, and DELETE are supported.

Field	Description
Request Header Parameter	Format: **key=value**. If there are multiple parameters, separate them with **&**, that is, **key=value&key1=value1**.
Request Address (mandatory)	The request protocol can be HTTP or HTTPS. The format is **https://ip:port/pathParam?query=1**.
Environment Group	Environment parameter group.
IP Variable Name	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	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 not set, the JSON format is used by default.
Request Body	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	Supports exact match and fuzzy match. **Exact match** indicates **Equals**, and **Fuzzy match** indicates **Contains**.
Expected Checkpoint Value	Target value of the checkpoint.

Step 5 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 6 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 it again.

----End

Exporting Test Cases

Step 1 Click an execution type tab, click **More** on the right and choose **Export** from the drop-down list.

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

Select **Partial Export**, set **Start position** to the case to be exported to the first row of the table and **End position** to the case to be exported as the last row of the table, and click **OK**.

Step 3 Select **Export Directory Hierarchy** as required.

Step 4 Open the exported Excel file on the local PC and check the exported test case. (You will see the IDs of bugs and requirements associated with the exported test cases. Multiple IDs are separated by commas.)

----End

Adding Test Cases in Batches from the Test Case Library

Add manual and automated API test cases from the test case library to test plans 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 Click the **Manual Test** or **Auto API Test** tab, click **Import** in the right area, and select **Add Existing Cases** 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

Reviewing Test Cases Online

Review the created test cases.

Creating a Review

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 tab of the corresponding test type, click ··· on the right of the case to be reviewed, and click **Create Review**.

Step 4 In the displayed dialog box, configure the following information and click **Confirm**.

Configuration Item	Description
Name	By default, the name of a new review is the same as the test case name.
Test Case Modification Time	By default, the time is set to the current system date.
Review Auto-Close	You can enable or disable the automatic closure function for the review. • **Yes**: The review will be automatically closed after it is created. • **No**: The test case will be manually reviewed and closed by the person to whom the review is assigned to.
Expected Closure Time	If you select **No** for **Review Auto-Close**, you can select the expected closure time.
Review Comment	Enter review information containing a maximum of 1,000 characters.
Assigned To	If you select **No** for **Review Auto-Close**, you can select a person to whom the review is assigned to close.

----End

Batch Review

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

Step 2 In the test case list, select the test cases to be reviewed in batches.

Step 3 Click **Batch Review**.

Step 4 In the displayed dialog box, configure the following information and click **Confirm**.

- **Review Auto-Close**: If this parameter is set to **Yes**, the review status is automatically set to **Closed**. If this parameter is set to **No**, the test case will be manually reviewed and closed by the person to whom the review is assigned.
- **Expected Closure Time**: If you select **No** for **Review Auto-Close**, you can select the expected closure time.
- **Review Comment**: Enter review information containing a maximum of 1000 characters.
- **Assigned to**: If you select **No** for **Review Auto-Close**, you can select a person to whom the review is assigned for closure.

----End

Checking Review Records

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

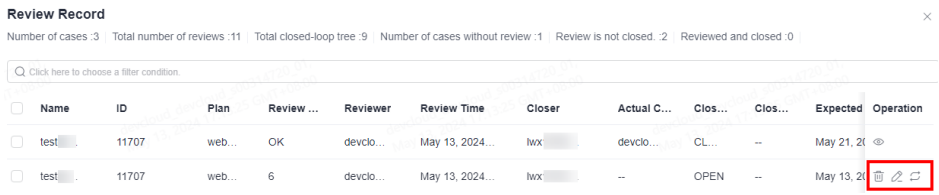
Step 2 In the navigation pane, choose **Testing** > **Testing Case**.

Step 3 Click **Review Record**. The created review record is displayed on the page.

Step 4 Click the search bar on the review record page and select a filter field.

Step 5 Enter a keyword to search for the corresponding review record.

Step 6 Delete, edit, or close reviews that have not been closed.



- To delete an unclosed review, click in the **Operation** column and click **OK**.
- To edit an unclosed review record, click in the **Operation**. In the displayed dialog box, edit the review.
- To close an unclosed review, click in the **Operation** column. In the **Close Review** dialog box, close the review.

----End

Associating Test Cases with Project Requirements

CodeArts TestPlan supports association between test cases and requirements.

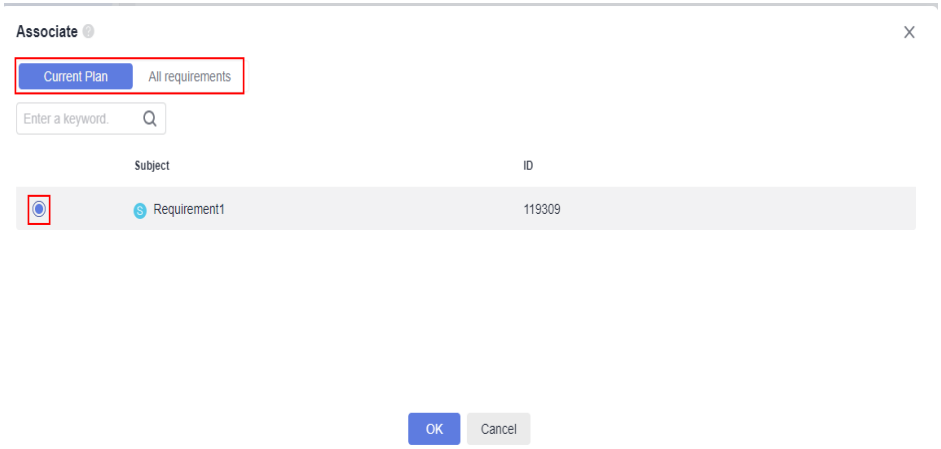
Step 1 In the navigation pane, choose **Testing** > **Testing Case**.

Step 2 Associate test cases with requirements in one of the following ways:

- Click the required test type tab. In the case list, click ··· in the row of the target case and select **Associated With Requirement**.
- Click the **All** tab. In the **Operation** column of the target test case, click to associate the case with a requirement.
- Go to the test case details page, click the **Requirements** tab, and click **Associated With Requirements**.
- To associate multiple test cases with one requirement, select the required test cases in the list and click **Batch Associate Requirements** on the toolbar below the list.

Step 3 In the displayed dialog box, select the requirement to be associated on the **Current Plan** or **All requirements** tab page, and click **OK**.

When you associate the target requirement in **All requirements**, if the requirement has not been added to the current test plan, select **Add it synchronously.** or **Only the requirement is associated.** in the dialog box.



----End

Adding Test Cases from Associated Requirements

Prerequisites

The requirements in the test plan have been associated with test cases in the test case library.

Managing Test Cases by Requirement

Step 1 On the **Testing Case** page, click the **Requirements** tab on the left. By default, the requirements that have been associated are stored in the **Requirements** directory.

Step 2 Click a requirement to view all cases associated with it.

Step 3 On the right of the requirement name, click ··· and choose to view the requirement details or create a test case for the requirement.

----End

Adding Test Cases from Requirements Associated with a Test Plan

Step 1 Click **Test case library** in the upper left corner of the page and select the target test plan from the drop-down list.

Step 2 Click the **Manual Test** or **Auto API Test** tab, click **Import** in the right area, and select **Add Existing Cases** from the drop-down list.

Step 3 In the displayed dialog box, select **Select all test cases related to the requirements in this test plan.**. The test cases associated with requirements in the test plan are automatically selected.

Step 4 Click **OK**.

----End

Requirement Change Notification

If a requirement associated to a test case is changed in CodeArts Req, a red dot will show up next to the requirement name on the **Testing Case** page. This signals that you should update the test cases for that requirement or add new ones.

Test Cases and Bugs

When a test case fails to be executed, the test case is usually associated with a bug. You can create a bug or associate the test case with an existing bug.

The following uses manual test cases as an example.

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

Step 2 Select a test case to be associated with a bug. Create or associate a bug in one of the following ways:

- Click  in the **Operation** column to associate an existing bug in the current project.
- Click in the **Operation** column, and select **Create and Associate Defects** to create a bug as prompted.
- Click a test case to associate it with a bug.

  Click the test case name. On the displayed page, select **Defects** and click **Create and Associate Defects**.
- Associate multiple test cases with bugs: Select the required test cases and click **Associate with Defect**. In the displayed dialog box, select the required bugs and click **OK**.

Step 3 After a defect is created or associated, view the defect information on the **Defects** tab page. You can click  to disassociate the current bug.

----End

Commenting on a Test Case

You can comment on test cases.

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

Step 2 Select a test case to be commented on, click the test case name, and click the **Details** tab.

Step 3 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

Filtering Test Cases

CodeArts TestPlan supports filtering of test cases by using custom filter criteria. The following procedure uses the **Testing Case** > **Manual Test** as an example.

Using the Default Filter Criteria

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

Step 2 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 **Processor** is the current login user.
- **Unassociated with test suites**: Displays test cases that are not associated with any test suite.

----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 In the navigation pane, choose **Testing** > **Testing Case**.

Step 2 Click **Advanced Filter** above the test case list. Common filter criteria are displayed on the page.

Step 3 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 displayed dialog box, enter the filter name and click **OK**. The saved filter is added to the **All cases** drop-down list.

Step 4 (Optional) If advanced filter criteria still do not meet requirements, click **Add Filter**, select a filter field from the drop-down list box as required. The filtering field is displayed on the page. Repeat **Step 3** to complete the filtering. You can add custom filter fields for advanced filtering.

----End

Updating Test Case Fields in Batches

Step 1 In the navigation pane, choose **Testing** > **Testing Case** and click the target case type tab.

Step 2 In the test case list, select the target test cases.

- To select all test cases on the current page, hover the cursor over the topmost check box and click **Select Current Page**.
- To select specified test cases, hover the cursor over the topmost check box and click **Select More**. In the displayed dialog box, select all test cases or set the selection scope, and click **OK**.

Step 3 Click **Batch Update Property**.

Step 4 In the displayed dialog box, select the field to be modified from the left drop-down list box, and select the target option from the right drop-down list box.

- To modify more fields, click +.
- To delete a field, click .

----End

Customizing Test Case List Columns

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

Step 2 On the **Manual Test** tab page, click in the last column of the test case list. In the displayed dialog box, select the fields to be displayed, deselect the fields to be hidden, and drag the selected fields to rearrange their display sequence. You can also add custom headers to the test case list.

----End

Searching for a Test Case

You can search for test cases by name, ID, or description.

Step 1 Create a test case.

Step 2 In the search box above the test case list, enter a keyword of the name, ID, or description.

Step 3 Click .

Step 4 The required test cases are filtered and displayed in the list.

----End

Deleting a Test Case

In the test case list, you can delete test cases one by one or in batches.

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

Step 2 In the upper part of the test case list, select the target version or test plan.

Step 3 Click the tab of the target test execution type.

Step 4 Delete test cases one by one or in batches.

- Delete a single test case: Find the target test case, click ••• in the **Operation** column of the test case, and click **Delete**. The test case is removed to the recycle bin.
- Delete test cases in batches: Select the test cases to be deleted and click **Batch Delete** below the list. The test cases are removed to the recycle bin.

If the test case to be removed is associated with a test suite, a dialog box is displayed. In the dialog box, click ⊖ to disassociate the test case from the suite.

----End

Recycle Bin

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

Step 2 Click **Recycle Bin** in the lower left corner of the page.

Step 3 Perform the following operations on the removed test cases as required:

- Click ↺ in the **Operation** column of a test case to restore it.
- Click 🗑 in the **Operation** column of a test case to delete it permanently.
- Select some or all test cases and click **Recover** or **Delete** in the lower part of the page to restore or delete them in batches.

----End

7 Creating and Executing a Test Suite

7.1 Creating a Test Suite

Use a test suite to assign test cases to a specific processor.

Prerequisites

- Multiple test cases have been created.

Creating a Manual Test Suite

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.

Step 4 On the **Manual Test** tab page, click **Create Suite** in the upper left corner. The creation page is displayed.

Step 5 Configure the parameters by referring to the following table.

Configuration Item	Mandatory	Description
Name	Yes	Name of a suite. Enter 1 to 128 characters.
Plan Period	No	Select the start time and end time of the test suite.
Description	No	Brief description of the suite. Max. 500 characters.
Tag	No	Enter up to 10 tags separated by spaces.

Configuration Item	Mandatory	Description
ID	No	Enter 3 to 128 characters. If this is not set, the service will automatically generate an ID.
Module	No	Select a module in the current project. For details about how to set a module, see **Adding Work Item Modules**.
Version	No	Enter a version containing at least three characters.
Processor	No	Select a person responsible for processing the suite.

Step 6 Click **Add Case** or **Add now**, select the test case to be tested, click **OK**, and click **Save**.

In the **Add Test Case** dialog box, you can search for the target case by case name, ID, description, or custom field. To filter test cases that have not been added to test suites, click the drop-down list box on the left of the search box and choose **No Associated TestSuite**.

----End

Creating an Automated API Test Suite

With CodeArts TestPlan, you can create API test suite, run test cases in serial or parallel mode, and accelerate execution of some test cases. The service helps you use resource pools efficiently, reduce task blocking, intercept product defects, and detect issues quickly.

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.

Step 4 On the **Auto API Test** tab page, click **Create Suite** in the upper left corner. The creation page is displayed.

Step 5 Configure the parameters by referring to the following table.

Configuration Item	Mandatory	Description
Name	Yes	Name of a suite. Enter 1 to 128 characters.
Preparations	No	Prepare the data required during testing. Click **Add Now** to select preparation cases from the list.

Configuration Item	Mandatory	Description
Followups	No	Release or restore the test data. Click **Add Now** to select followup cases from the list.
Agent Pool	Yes	The agent pool allows you to access your own execution resources. When executing a task, you can select an agent in the agent pool to execute the task. This improves the task execution efficiency and does not depend on the public resources of CodeArts. Click **Agent Pool Management** to see existing pools. For details about how to create an agent pool, see **Creating an Agent Pool**.
ID	No	Enter 3 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 **Adding Work Item Modules**.
Processor	No	Person who needs to complete the test task.
Version	No	Select the version that has been set for the current test plan and test cases.
Description	No	Enter a brief description of the API test suite. Max. 500 characters.
Environment Parameters	No	Environment parameters can be referenced by parameters, checkpoints, variables, and URLs of test steps in the entire project. Click  to create an environment parameter.
Max. Duration	Yes	The longest time taken for executing a test case. Cases exceeding this limit will fail. Max. 10 minutes.
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. • **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.

Configuration Item	Mandatory	Description
Start	Yes	There are two options. By default, the task is executed immediately. • **Immediately**: The task is executed immediately. • **At specific time**: The task is executed at a specified time.
Sequence	Yes	There are two modes. The default mode is **Serial**. • **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.

Step 6 Click **Add Case** or **Add Now** and select the test case to be executed.

In the **Add Test Case** dialog box, you can search for the target case by case name, ID, description, or custom field. To filter test cases that have not been added to test suites, click the drop-down list box on the left of the search box and choose **No Associated TestSuite**.

Step 7 Complete the execution settings as required and click **Save**.

Step 8 Perform the following operations on the created API test suite as required:

- Modify: Click the name of the test suite and modify its information.
- Delete: Click ··· in the **Operation** column of the test suite and click **Delete**. To delete test suites in batches, select the test suites and click **Delete** at the tool bar below the list.
- Copy: Click ··· in the **Operation** column of the test suite and click **Copy Test Suite**. By default, the new suite will be named *Name of the copied suite*_**copy**_*Current timestamp*. You can rename the new suite, enter a description, and click **OK** to finish the copy operation.

----End

7.2 Executing a Test Suite

In the test execution stage, testers run test suites to check whether the system functions as expected. They record the test results and identify any issues or defects in the product, which assists R&D engineers in analyzing and resolving problems.

Prerequisites

A test suite has been created.

Executing a Manual Test Suite

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.

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. Switch to other 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.

Data will be saved automatically once you set the test case result or switch to another case. After that, if you modify the step results, description, or remarks, click 💾 to save them.

Step 7 After the execution is complete, view the execution result in the execution history column of the test case list.

Step 8 Associate existing bugs with the test cases in the suite based on the suite execution result.

1. Open the test suite and click the target case.
2. Click **Associate with Existing Defect**.
3. Select the bugs to be associated.
4. Click **OK**.

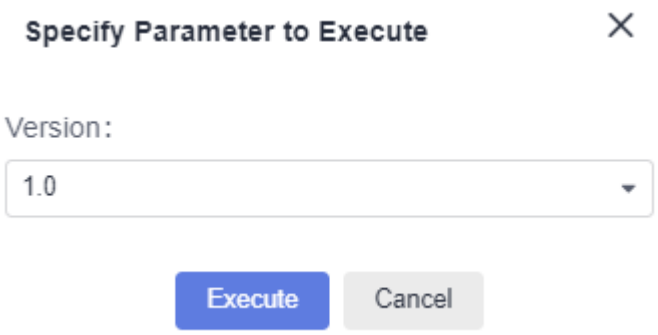
----End

Executing a Manual Test Suite with Parameters

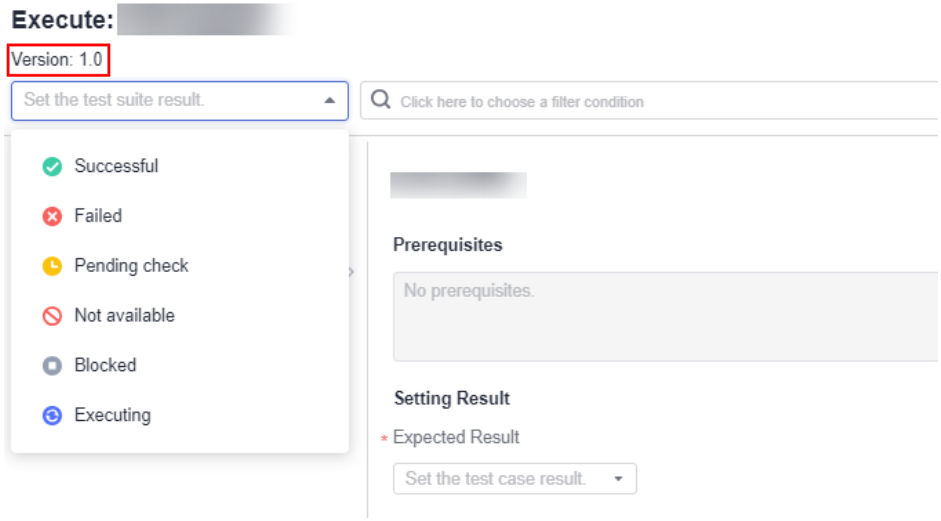
Manual test suites can be executed with parameters.

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 In the drop-down list under the version, set the actual test suite execution result. Enter an actual result, and click **Save**.



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

----End

Executing Manual Test Suites in Batches

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 displayed dialog box, set the test case status and result.

Step 4 Click **OK**.

----End

Executing an Automated API Test Suite

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.

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.

To stop the suite, click ⏻ in the **Operation** column.

Step 5 In the test suite list, click ⟲ in the **Operation** column. On the **Execution History** tab page, view the historical execution details of test cases in the test suite.

----End

8 Viewing and Evaluating Test Quality

8.1 Viewing the Test Quality Dashboard

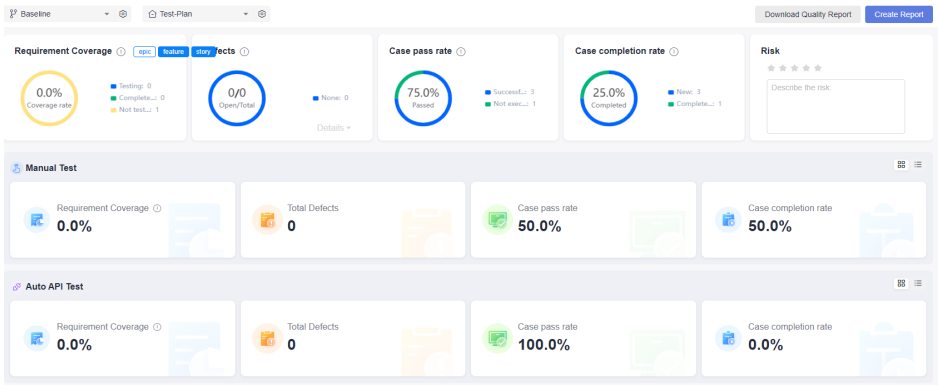
CodeArts TestPlan provides dashboards with more than 10 quality metrics, such as the requirement coverage rate, requirement pass rate, case execution rate, and legacy DI, for evaluation of functions, performance, and reliability. You can clearly learn about the progress and risks of the overall test plan through the dashboard.

Project-Level Dashboard

The project dashboard displays statistics on the test case library and test plan. The items include the requirement coverage rate, number of bugs, test case pass rate, test case completion rate, and details of associated bugs.

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	Percentage of tested requirements in the selected sprint and module. This reflects function test coverage. To view the requirements associated with the current test plan, click the **Requirement Test** tab. • **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** **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**.
Bug	Collects statistics on the number of unresolved defects and the total number of defects in the selected sprint and module. The statistics are grouped by defect severity. **NOTE** The number of unresolved bugs includes the following: • Number of bugs in the **To do** and **Doing** states in a Scrum project. • Number of bugs whose state is not **Completed** under a Kanban project.
Case Pass Rate	Pass rate of test cases in the selected sprint and module. The test case pass rate and bugs 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. **Case pass rate = Number of successful test cases/Total number of test cases**
Manual Test	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 sprint and module.
Auto API Test	Collects statistics on the requirement coverage rate, total number of defects, case pass rate, and case completion rate associated with automated API test cases in the selected sprint and module.
Defects	List of bugs associated with test cases in the selected sprint and module. Click in the upper right corner of the Manual Test or Auto API Test area to view the list. You can filter bugs by bug name and ID. You can also click a bug name to go to the bug details page.
Test Cases	List of test cases in the selected sprint 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, or 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.

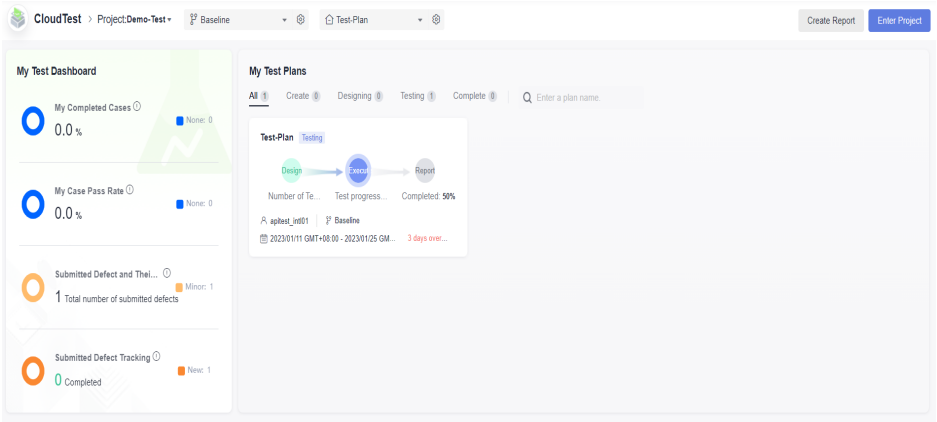
The quality report of a test plan is not filtered by sprint or module. In addition, it shows the test case completion rate and the risk description of the test plan. Other report items are the same as those of **the quality report of the test case library**.

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 bugs, pass rate, and completion rate of manual test cases.
Auto API Test	Requirement coverage rate, total number of bugs, pass rate, and completion rate of automated API test cases.

Personal Dashboard

Log in to the CodeArts homepage. On the top navigation bar, choose **Services** > **TestPlan**. The page displays the personal dashboard. It contains statistics that are processed by the current login user, including:

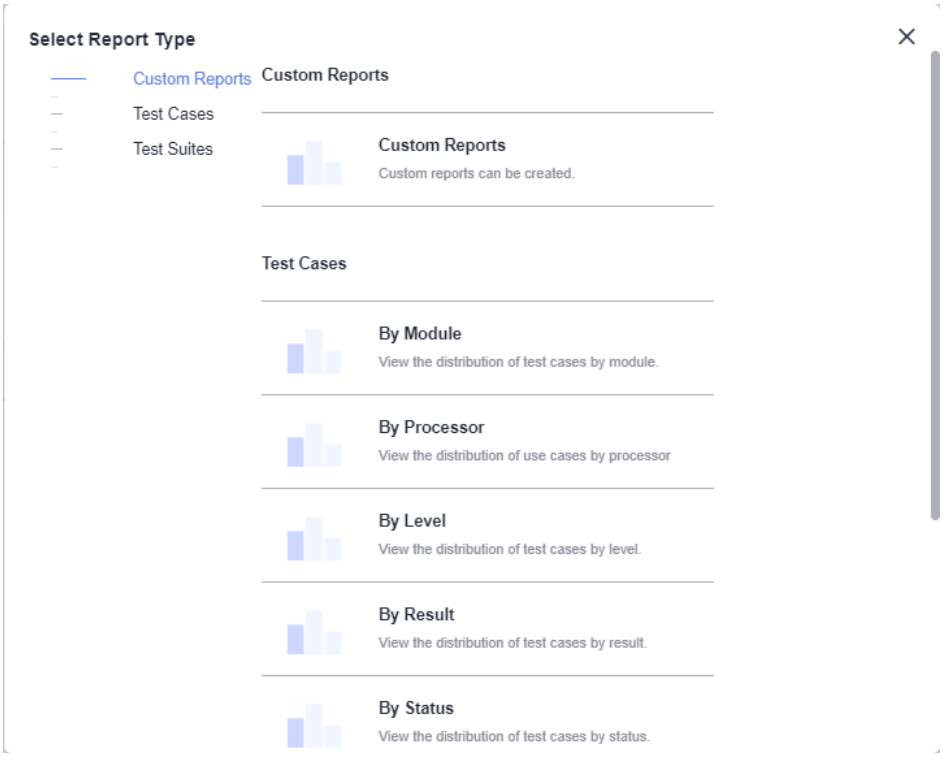
- Personal case completion rate, case pass rate, submitted bug status, submitted bug severity, bug statistics based on the test case library and test plan in the project
- Personal test plans, test tasks, and submitted bugs based on the test case library and test plan in the project



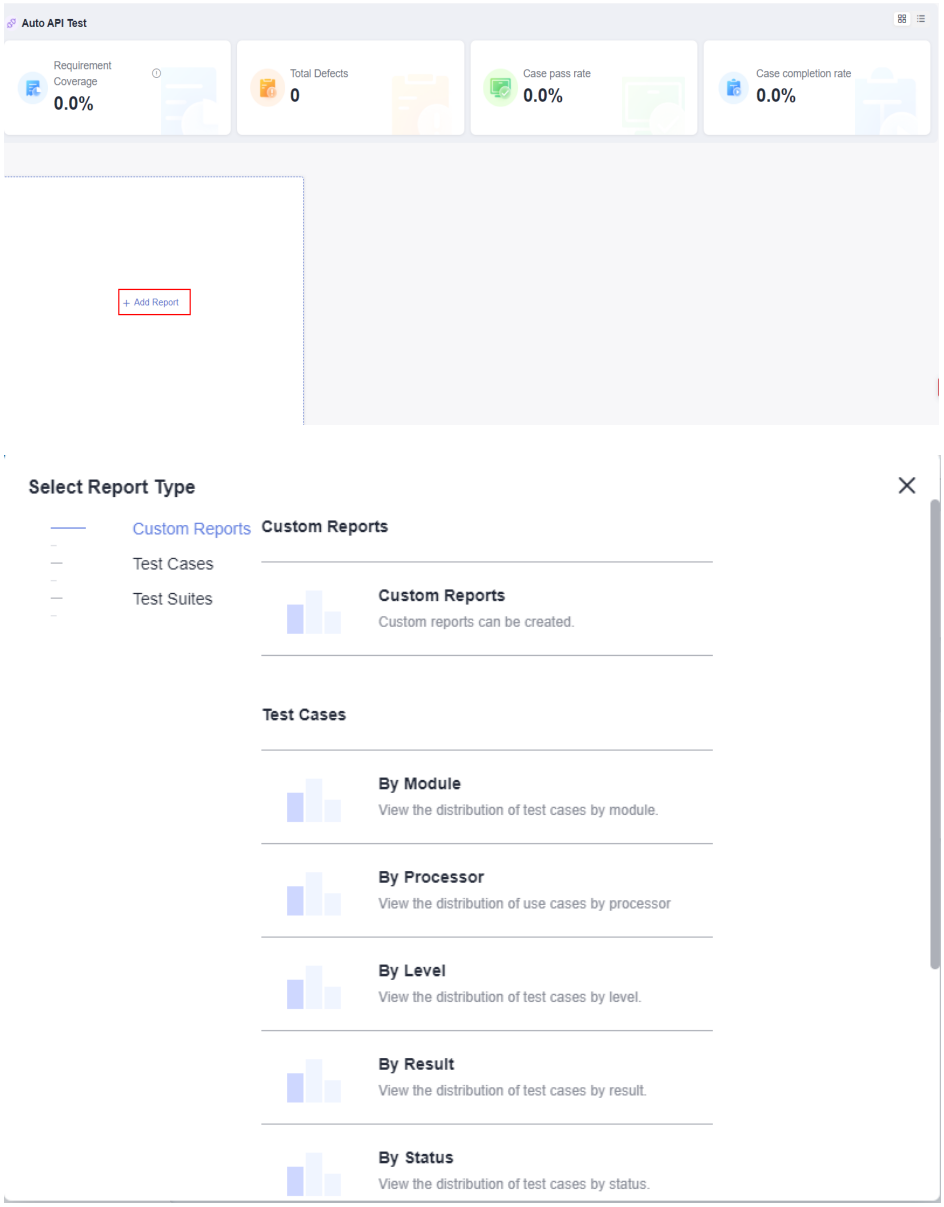
Custom Test Reports

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 lower left corner.
  c. On the displayed **Select Report Type** page, select the type of the report to be created.



- 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.



8.2 Evaluating Test Quality

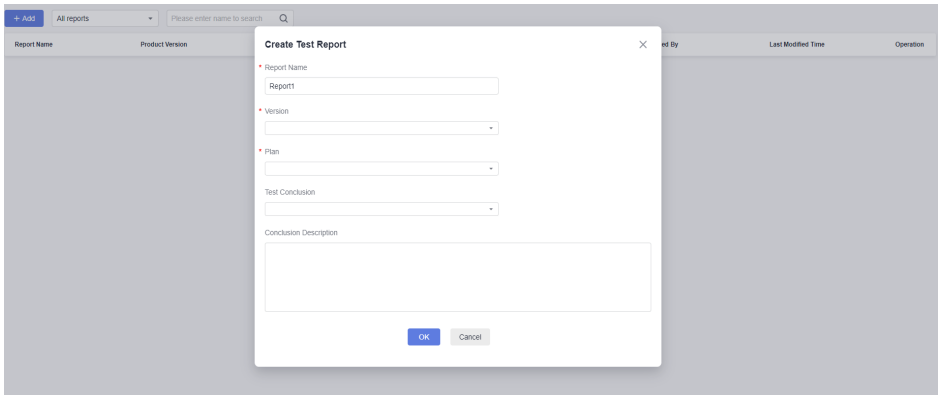
Constraints

Up to 15 attachments, max. 10 MB each, can be uploaded to **Custom Information** of a test report.

Step 1 Log in to the CodeArts homepage and search for and access the target project.

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

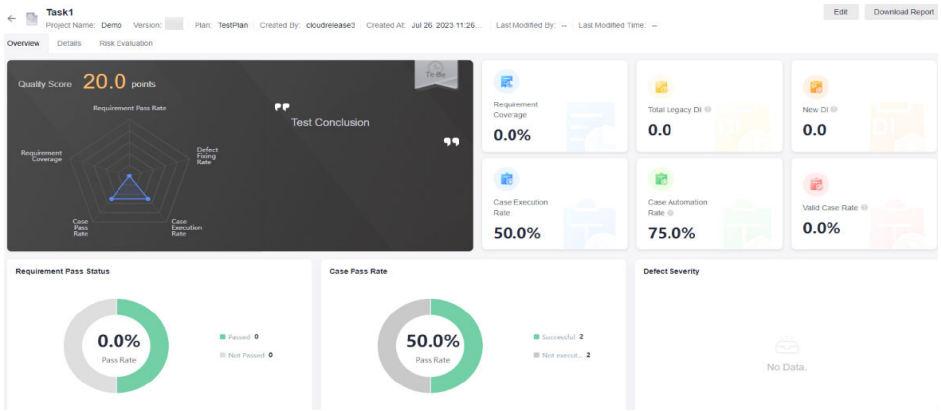
Step 3 Click **Create Report** in the upper left corner of the page. Enter a report name, select a version and test plan (or multiple test plans), enter a test conclusion and description, and click **OK**.



----End

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.



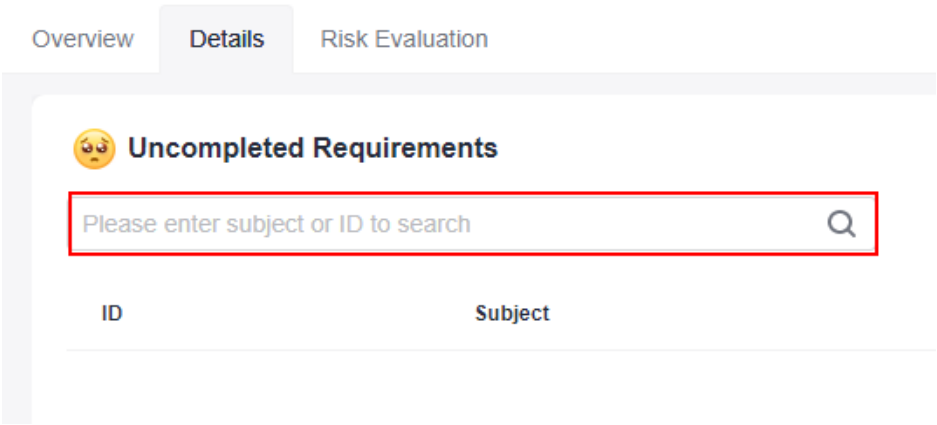
Report Item	Description
Requirement Coverage	The requirement coverage rate reflects the test coverage of function points. The test coverage rate of all requirements associated with the selected plan is calculated. Requirement coverage rate = Number of completed requirements/Total number of requirements
Project 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

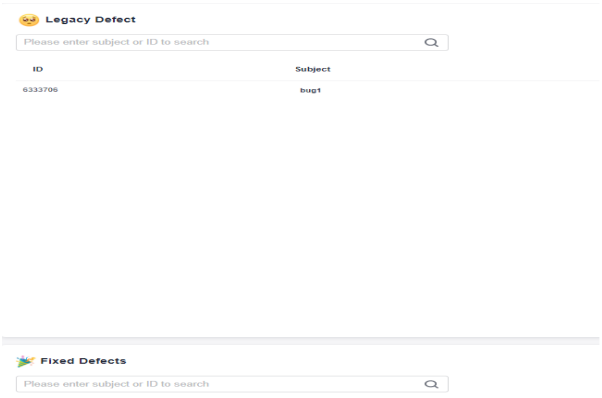
Report Item	Description
Case Automation Rate	Proportion of automated test cases. Case automation rate in the test plan = (Total number of test cases – Number of manual test cases)/Total number of test cases
Valid Case Rate	Proportion of executed test cases where defects are found to all executed test 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.
Automation Rate	Displays the proportion of automated test cases in a pie chart. Case automation rate in the test plan = (Total number of test cases – Number of manual test cases)/Total number of test cases
Case Pass Rate by Type	Displays the pass rate of test cases of different test types.
Bugs by Module	Displays the number of defects 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.



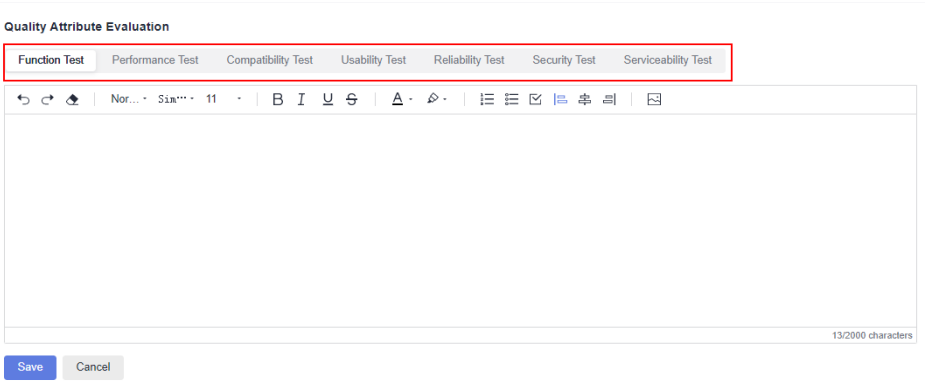


Evaluating Risks

On the **Risk Evaluation** page, enter your evaluation of the test quality and risks, or add custom information modules to the report.

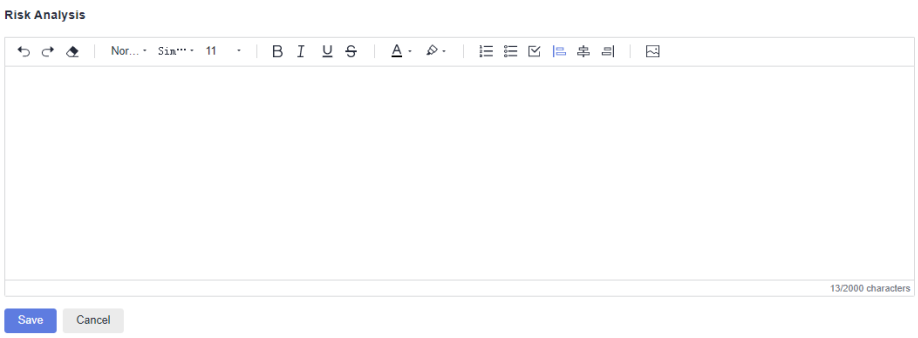
- Quality attribute evaluation

  Select a test type on the top, click the text box area, enter evaluation information, and click **Save**.



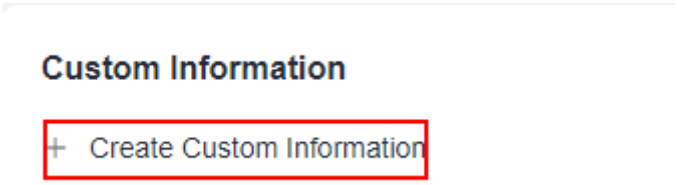
- Risk analysis

  Evaluate risks based on the test progress. Click the text box, enter risk analysis information, and click **Save**.

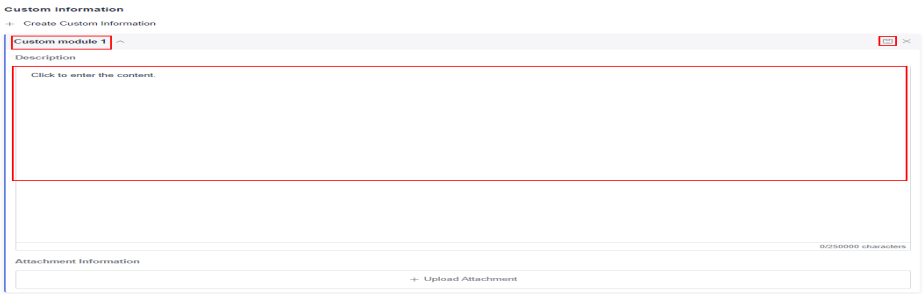


- Custom information

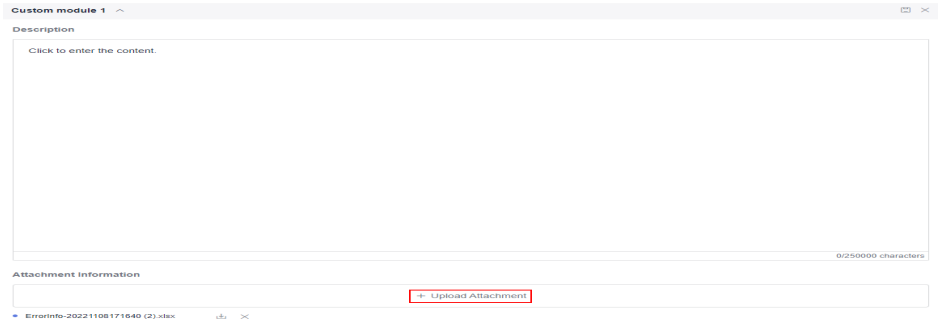
  Click **Create Custom Information** and add an information module.



Click the module name to redefine the module title, enter the related description, and click to save the modification. To delete the module, click .



Click **Upload Attachment** to upload a local file to the customized module.

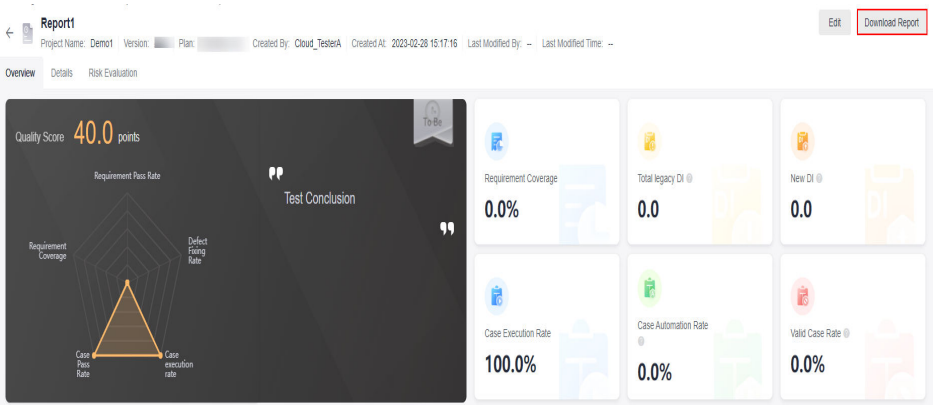


NOTE

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

In the upper right corner of the page, click **Download Report** to download the assessment report in PDF or Word format to the local PC.



9 Settings

9.1 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.

Table 9-1 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	Notification recipient (if set on the CodeArts TestPlan settings page), or project manager and test manager (if the recipient is not set)
Comment Notification	No	User who has been mentioned in the comments on the test case details page
API Test Cases Completed	Yes	User who executed the automated API test case

Event Type	Operator be Notified	Recipient
API Test Suite Completed	Yes	User who executed the automated API test suite

----End

9.2 Function Switch

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 following functions as required.

- **Requirement update dot**: Updated requirements are indicated by a red dot next to their names in the requirement directory on the test case page. Click the red dot to see the change history. For details, see the instructions for **associating test cases with requirements**.
- **When importing a swagger file, use the fields defined by the API as the script template name**: The default script template name is the value of **operationId**. You can turn on the switch to use the value of **summary**.
- **Interface automation testing supports redirection.**: redirection during execution of automated API test cases.
- **Test design generates test cases step by step**: Generate test cases on a mind map, with each step having an expected result. For details, see the instructions for **step-by-step case generation**.
- **Automatic roll-up of manual test suite results**: If all the steps in a test case are **Successful**, the test case result will be automatically set to **Successful**; similarly, if all the test cases within a test case suite are **Successful**, the suite result will be automatically set to **Successful**.

----End

9.3 Project Members

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

9.4 Test Case Fields

If the preset test case fields do not meet your actual requirements, you can add custom 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

Adding a Custom 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**. Max. 25 custom fields can be added.

Step 2 Set **Field Name**, **Description**, and **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 2,000 characters.
- **Single-choice list**: Only one option can be selected in this field. Click **Add Option** and set the required options for the field. Up to 300 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 20 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

9.5 Test Suite Status and Results

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

9.6 Background Images and Logos of Test Reports

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

9.7 Request Timeout Interval, Resource Pool, and DNS Mapping

After DNS mapping is configured, if the URL request path in the automated API 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. Select the target agent pool required for API test case debugging from the **Agent Pool** drop-down list (**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 (.)

Step 6 Enter a JSON array to mask your sensitive parameters. For example, **["password","psd"]**. This example configuration will mask the middle six digits of a password if it has more than six digits, or mask all the digits if it has six or fewer digits.

----End

10 Querying Audit Logs

Cloud Trace Service (CTS) records operations on CodeArts TestPlan for query, audit, and backtrack.

Operations Recorded by CTS

Table 10-1 CodeArts TestPlan operations recorded by CTS

Operation	Resource Type	Trace Name
Merge cases to the baseline	Testcase	mergeTestCase
Import test cases from other branches	Testcase	importTestCase
Download the import template	Testcase	downloadImportTem-plate
Import test cases from a file	Testcase	importTestCaseListTask
Export test cases	Testcase	exportTestCases
Export incorrect test cases	Testcase	exportErrorTestCases
Download the exported case file	Testcase	downloadExportTestCa-sesFile
Synchronize test cases	Testcase	syncTestCases
Add a test case comment	Testcase	addTestCaseComment
Update a test case comment	Testcase	updateTestCaseComment
Delete a test case comment	Testcase	deleteTestCaseComment

Operation	Resource Type	Trace Name
Create test case reviews in batches	Testcase	createTestCaseReview-Batch
Update a test case review	Testcase	updateTestCaseReview
Delete test case reviews in batches	Testcase	deleteTestCaseReview-Batch
Download an attachment	Testcase	downloadAttachment-FromObs
Upload attachment cache	Testcase	uploadCacheFile
Delete attachment cache	Testcase	deleteCacheFile
Upload an image	Testcase	uploadStepImg
Download an image	Testcase	downloadStepImage
Download an attachment	Testcase	downloadAttachment
Upload a local attachment	Testcase	uploadLocalAttachment
Add an attachment	Testcase	addAttachments
Delete an attachment	Testcase	deleteAttachment
Query test report template information	TestReport	getBackgroundInfo
Update the test report template	TestReport	uploadBackground
Download the background image of the test report template	TestReport	downloadBackground
Update the custom display configurations of test cases	Testcase	updateCustomizedConfig
Add a custom filter	Testcase	addCustomizedFilter
Update a custom filter	Testcase	updateCustomizedFilter
Delete a custom filter	Testcase	deleteCustomizedFilter
Create a test report	TestReport	createReport
Update a test report	TestReport	updateReport
Delete a test report	TestReport	deleteReport

Operation	Resource Type	Trace Name
A tenant joins a trial	Domain	addDomainTrial
Stop a debugging task	APITestSchedule	stopCaseTask
Create a test task	APITestSchedule	createTestCasesTask
Create a case	testcase	createTestCaseAndScript
Create a test suite task	APITestSchedule	createTestSuiteTask
Update a case	testcase	updateTestCaseAndScript
Obtain a sensitive variable	variable	getSensitiveVariable
Refresh a script	testcase	refreshJavaCode
Create cases by importing a file	testcase	createTestcasesByFile
Add a custom URL keyword	basic-aw	addUserDefinedUrlKey-Word
Create a keyword directory	basic-aw-cata	createAwCata
Delete keywords in batches	basic-aw	batchDeleteBasicAW
Delete a case	delete-test-case	deleteTestCase
Import cases from Postman	testcase	importTestcaseFromPost-man
Process variables in batches	variable	batchDealVariable
Delete case associations	testcase	deleteTestcaseRelation
Delete the arts keywords in batches	basic-aw	batchDeleteBasicAW-arts
Obtain a sensitive variable	testcaseVariable	getSensitivePropertybyId
Update a keyword	basic-aw	updateAPI-arts
Create a keyword	testcase	createKeyword
Update notification configurations	NoticeConfigs	updateNoticeConfigs
Create a combined keyword	basic-aw	createCombinedAw
Import test cases	testcase	importTestCase

Operation	Resource Type	Trace Name
Obtain sensitive information	testcaseVariable	getSensitiveProByTmssIdAndName
Create a project	project	createProject
Delete a test case and its script	testcase	deleteTestCaseAndScript
Delete a keyword directory	basic-aw-cata	deleteAwCata
Delete case cache	testcaseCache	deleteTestcaseCache
Keyword sorting	basic-aw	orderBasicAW
Create a TMSS case	testcase	createTMSSCaseAndCopyScript
Upload a file	upload-file	uploadFile
Update a keywords directory	basic-aw-cata	updateAwCata
Copy a tenant keyword	basic-aw	copyCombinedAw
Create a case by Swagger	testcase	createTestcasesBySwagger
Add an APIArts keyword	basic-aw	addAPI-arts
Obtain sensitive information	basic-aw	getSensitiveValueByAwIdAndName
Delete a keyword	basic-aw	deleteBasicAW
Create a test suite	testsuit	createTestSuit
Download a template	download-template	downloadTemplate
Send a notification	noticeConfig	sendNotice
Update a keyword name	AwNameView	updateAwNameView
Modify a keyword directory	basic-aw-cata	modifyAwCata
Update the timeout interval	TimeOutSet	updateTimeOutSet
Add a task	Task	addTask
Modify a task	Task	updateTask
Delete a task	Task	deleteTask
Start a task	Task	startTask
Stop a task	Task	stopTask

Operation	Resource Type	Trace Name
Update intelligent alarms	Task	updateTaskWiseAlert
Enable or disable alarms	Task	pauseOrResumeAlert
Favorite a task	Task	favoriteTask
Unfavorite a task	Task	cancelFavoriteTask
Add an alarm group	AlertGroup	addGroup
Update an alarm group	AlertGroup	updateGroup
Update the alarm group data	AlertGroup	updateProperties
Delete an alarm group	AlertGroup	delete
Add an alarm template	AlertTemplate	addTemplate
Update an alarm template	AlertTemplate	updateTemplate
Delete an alarm template	AlertTemplate	delete
Ignore an alarm	Msg	ignore
Create a mind map	project	saveMindmap
Import a mind map	mindmap	importMindmap
Edit a mind map	mindmap	editMindmap
Delete a mind map	mindmap	deleteMindmapById
Upload a file	mindmap	saveFileLibFile
Create a mind map backup	mindmap	mindmapBackupBackUp-Mindmap
Delete a mind map backup	backup	deleteMindmapBackup-ById
Restore a mind map	mindmap	mindmapBackupRecover-Mindmap
Delete a mind map from the recycle bin	recycle	deleteMindmapRecycle-ById
Restore a mind map from the recycle bin	mindmap	mindmapRecycleReco-verMindmap
Save a review	mindmap	saveReview
Delete reviews in batches	review	logicDeleteReviewByNo-deId

Operation	Resource Type	Trace Name
Delete a review	node	logicDeleteReviewById
Update a review	review	updateReview
Save a template	mindmap	saveTemplate
Delete a template	template	deleteTemplateById
Update a template	template	updateTemplate
Delete a feature directory	feature	deleteFeature

Viewing Audit Logs

Query CodeArts TestPlan traces on the CTS console. For details, see **Querying Real-Time Traces**.

