CodeArts PerfTest

FAQs

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1 Resource Group Management

1.1 Suggestions on Test Resource Configuration

Test Resource Groups and Their Constraints

- Test resource groups are classified into shared resource groups and private resource groups. Shared resource groups are provided by the system by default, and private resource groups need to be created.
- Execution nodes of the shared resource group have been bound with an elastic IP address (EIP). When the tested application has network access restrictions, use a private resource group.
- A shared resource group supports a maximum of 1000 concurrent users and 100 Mbit/s bandwidth. If higher concurrency or bandwidth is required, use a private resource group.
- JMeter test tasks can use only private resource groups. A JMeter test task allows a maximum of 2 million concurrent requests.

Suggestions on Using Nodes

- Do not run any applications or perform other functions on nodes used for test resource groups. Otherwise, applications may run abnormally.
- Create at least two empty nodes. One is for debugging an execution node. The other is the execution node/executor (a target machine that a pressure test will be performed on and can provide performance data during testing). Create nodes of the required specifications based on the number of concurrent users for a pressure test. For details about the recommended node specifications, see **Table 1-1** and **Table 1-2**.
- If you want to perform pressure tests on external services, bind an EIP to the execution node. If you want to debug external services, bind EIPs to both the debugging node and execution node.

Table 1-1 Recommended PerfTest pressure test node specifications

Number of Concurrent Users	Specifications	Quantity
0–5000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 4 vCPUs | 8 GB	1
5001–10,000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	1
10,001–20,000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	2
20,001–30,000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	3
30,001–40,000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	4
40,001–50,000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	5
More than 50,001	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	n **NOTE** Each execution node (8 vCPUs | 16 GB) supports 10,000 concurrent users.

Table 1-2 Recommended JMeter pressure test node specifications

Number of Concurrent Users	Specifications	Quantity
0-1000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 4 vCPUs | 8 GB	1
1001-2000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	1
2001-4000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	2
4001-6000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	3
6001-8000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	4
8001-10000	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	5
More than 10,001	Debugging node: 4 vCPUs | 8 GB	1
	Execution node: 8 vCPUs | 16 GB	n **NOTE** Each execution node (8 vCPUs | 16 GB) supports 2000 concurrent users.

NOTE

- Specifications of the preceding nodes are for reference only. During a pressure test, resource specifications are affected by think time, protocol type, the size and number of requests and responses, response time, and result verification. Adjust the specifications based on your requirements.
- Bind an EIP to an execution node to perform a pressure test on an external service. The test bandwidth depends on the EIP bandwidth you purchased.
- If an application is deployed on a node in a cluster, the node cannot be used to create a private resource group.

1.2 How Do I Release Test Resources?

1. On the **Resource Groups** page of the CodeArtsPerfTest console, delete a resource group.

   When you delete a resource group, nodes will not be used in pressure tests again instead of being deleted. To delete nodes, perform **2**.
2. Delete the cluster to which nodes belong from Cloud Container Engine (CCE). For details, see **Deleting a Cluster**.

1.3 What Can I Do If I Cannot See the Purchased Nodes When Creating a Resource Group?

Check whether the region of the purchased nodes is the same as that where CodeArtsPerfTest is located.

Resource groups cannot identify nodes in other regions. When you purchase nodes, ensure that the region of nodes is the same as that of CodeArtsPerfTest.

2 Pressure Test Project Management

2.1 What Are the Differences Between Think Time and Duration in CodeArtsPerfTest?

There are two time-related concepts in CodeArtsPerfTest:

- Think time (ms): waiting period between two consecutive operations performed by a user.
- Duration (min): time spent executing a test task.

The think time does not affect the total duration of concurrency. It only affects the number of concurrent requests. The following example explains this in detail.

The think time is set to 1000 ms, the duration is set to 10 min, and the number of concurrent users is set to 10. The formula for calculating the number of concurrent requests is: Duration x Number of concurrent users/Think time. The result is 6000 (600s x 10/1s). The total duration of the concurrency for this task is 10 min, and 6000 query requests are sent to the server.

NOTE

In some cases, the test result shows that the number of concurrent requests is smaller than 6000. The reason is that if a message is not immediately responded to, the system waits 0.1s for response.

2.2 What Is the Number of Concurrent Users?

The pressure test is used to simulate the actual service operation of a user. The number of concurrent users is configured to simulate operations of a certain number of users.

For example, when a game website holds a competition at a certain time, devices are expected to support a large number of concurrent users. In this case, the number of concurrent users can be set to simulate the number of users performing operations at the same time.

The number of concurrent users, concurrent time, and think time are used to calculate the number of concurrent requests and the maximum number of concurrent requests supported by the server. This maximum number is compared with the desired data to determine whether customers' requirements can be met.

2.3 How Do I Fill in Packets?

Packets refer to all click operations on the website. A click operation is edited to a code stream complying with protocol specifications and carrying a user's request before the code stream is sent to a third party, leading to a correct or failed response. A correct response indicates that the operation is successful, and a failed response provides tips for rectifying the problem.

CodeArtsPerfTest supports packets in the following request types: GET, POST, PATCH, PUT, and DELETE. The following describes how to fill in packets.

1. Before a pressure test, confirm the request type of an operation.

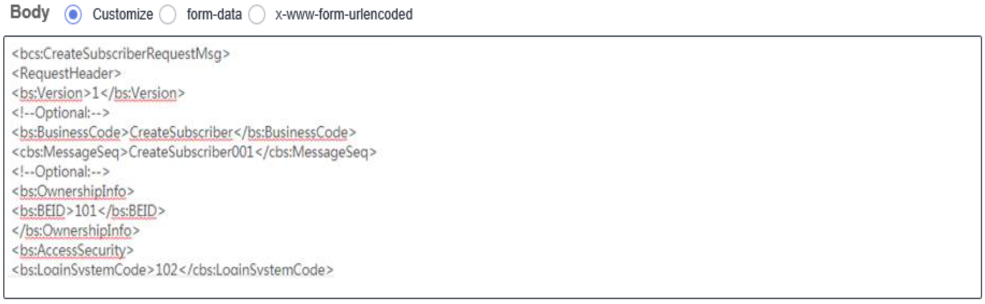
   Taking queries as an example, query messages are GET requests. You can set the request mode to GET during configuration.

2. What do I do if my request messages require parameter input?

   If a request involves various fields, press **F12** or use a packet-capturing tool (such as Wireshark) to check how a packet is requested, what the body format is, and how the request is transmitted to third-party application programming interfaces (APIs). Then, fill in the packet to be tested according to the actual service.

   Generally, such a request uses the POST method. After this method is selected, the following information is displayed.

   Figure 2-1 Packet content



Body ● Customize ○ form-data ○ x-www-form-urlencoded

```
<bcs:CreateSubscriberRequestMsg>
<RequestHeader>
<bs:Version>1</bs:Version>
<!--Optional:-->
<bs:BusinessCode>CreateSubscriber</bs:BusinessCode>
<cbs:MessageSeq>CreateSubscriber001</cbs:MessageSeq>
<!--Optional:-->
<bs:OwnershipInfo>
<bs:BEID>101</bs:BEID>
</bs:OwnershipInfo>
<bs:AccessSecurity>
<bs:LoginSystemCode>102</cbs:LoginSystemCode>
```

For the standard HTTP or HTTPS format, fill in the packet header based on the captured content. The packet body specifies the request content, which depends on the service to be tested. The body can be a game login request or a registration request. All packets can be edited for pressure tests as long as the request complies with the HTTP or HTTPS protocol.

NOTE

The preceding example is also applicable to PATCH, PUT, and DELETE methods. First, confirm the protocol type, request method, and request link of the application to be tested, and then confirm the content in a request.

2.4 Why Does Transaction Debugging Frequently Fail?

Ensure that the following conditions are met before debugging:

- The resource group is running.
- The network between the debugging node of the resource group and the tested application is normal.
  a. Log in to the Elastic Cloud Server (ECS) management console.
  b. Find the debugging and execution nodes. Then, log in to the nodes.
  c. Run the **curl *url*** command (*url* is the URL of the tested application) to check whether the network is normal.

If the preceding conditions are met, debug the transaction. Click **View Log** to check whether the returned content is correct.

If the returned content contains error information, check that the entered parameters and configured contents of the packet are correct.

2.5 Which Headers Are Mandatory in an HTTP-based Packet Request?

CodeArtsPerfTest does not have mandatory headers and is only responsible for transparently transmitting defined headers. Whether a header needs to be carried depends on whether the server will verify or use this header. Therefore, add headers and bodies accordingly.

2.6 Why Is the CPU Usage of the Execution Node Used for the Pressure Test Constantly High?

The high CPU usage is caused by continuous polling which serves to reduce latency. It is likely that the server has a short response time for the sent packet, leading to continuous polling. Note that CPTS requires short processing latency. Nodes used for providing pressure tests to resource groups are exclusive. Therefore, the high CPU usage does not affect your application or affect the test.

2.7 What Are the Differences Between Global Variables and Variables Extracted from Responses?

Global variables can be used for a test project. Currently, enumeration, integer, text, and file variables are supported. Variables extracted from responses are local variables, which can be used only in the current transaction or in the current test case. The variables can be used in subsequent requests, but cannot be used across transactions or test cases.

2.8 What Is the Impact of the Bandwidth Applied for CodeArtsPerfTest on the Test?

The required bandwidth depends on the request and response models of a pressure test. For example, if the TPS is 5000 and each request packet is 1 KB, the total uplink bandwidth is 5000 KB. We can use the same method to estimate the downlink bandwidth. The bandwidth limit only restricts the uplink bandwidth. Therefore, requests with bodies, such as POST and PUT, will consume more bandwidth resources.

If the bandwidth is insufficient during the pressure test, network packet loss occurs. The test report shows a higher latency and occurrence of timeout.

For details about how to change the bandwidth, see **Changing an EIP Bandwidth**.

2.9 How Do I Perform Concurrent Tests?

Concurrent tests can be performed by creating a test project. After building a transaction model based on requirements in this project, add test tasks to start the test. Concurrent tests can be performed not only on a single task but also on multiple test tasks at the same time.

2.10 What Are the Differences Between a JMeter Test Project and a PerfTest Project?

You can directly import JMeter scripts to a JMeter test project and use the native JMeter engine to initiate a performance test.

A PerfTest project supports the import of PerfTest scripts and JMeter scripts. The imported JMeter scripts are automatically converted into PerfTest scripts for performance tests. You can also manually edit test tasks based on the actual performance test scenario.

2.11 How Do I Check If the Global Variable Values Are Read Sequentially in a Test Task?

Perform the following steps:

1. Create a global variable. It is recommended that the number of its values be no more than 10 (for example, 6, 5, 4, 3, 2, and 1) for quick testing.
2. Create a case, reference the global variable configured in **1** in the body of the case packet, set **Execution Policy** to **Count**, set the number of concurrent users to 1, and set the number of transmissions to 10. Then start the test task.
3. In the **Test Metrics** area of the performance report, click ✎ , and click **Download Request Log** to check whether the global variable value in the request body is in the configured sequence.

When reading proceeds to the last value, it will start from the first value again.

3 Pressure Test Report Management

3.1 Is the TPS in the Analysis Report of CodeArtsPerfTest Calculated in the Same Way as That in Other Test Tools?

In CodeArtsPerfTest, the TPS is calculated based on the average number of request packets that are responded to per second in each statistical period (10s). For example, if 1000 requests are responded within 10 seconds, the TPS is 100. Some test tools collect only the number of requests sent per second, which cannot accurately reflect a system's capability. The TPS in CodeArtsPerfTest collects the number of requests processed and returned by the system.

3.2 Why Is No Data Displayed in the Real-Time Report After a Pressure Test Task Is Started?

A communication problem may exist between the debugging node and execution node used for the pressure test. The execution node reports data through port 62000 to the debugging node. Therefore, if you use customized security group rules, ensure that port 62000 of the debugging node is enabled in the security group.

You can set security group rules in **Elastic Cloud Server (ECS)**.

3.3 What Are the Differences Between RPS and TPS in the CodeArtsPerfTest Report?

RPS is short for requests per second. RPS = Total requests of a case/Running duration of the case. TPS is short for transactions per second. TPS = Number of transactions of a case/Running duration of the case. During a CodeArtsPerfTest pressure test, all test steps in a case are executed cyclically. Each cycle is regarded as a transaction.

3.4 What Does "AWs Without Pressure Test Data Will Be Determined As Failed" Mean in Task Logs?

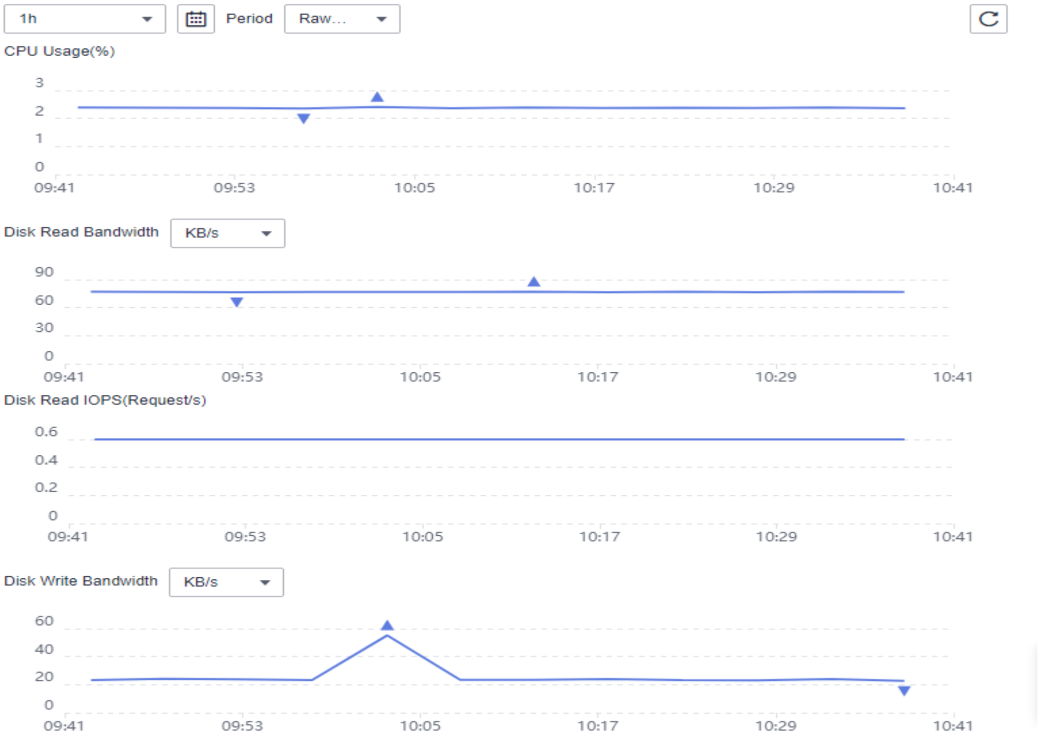
In the CodeArtsPerfTest test report, all cases and AWs must have data. If an AW does not have data, its case result is Failed.

3.5 Why Does the Request Log Contain "Timeout" in the CodeArtsPerfTest Report?

The read/write request timed out. Check whether the server is running properly.

3.6 Why Does the Log Contain "Look up XXX Timeout" in the CodeArtsPerfTest Report?

A network exception occurs. Check the network load of the executor and server. For example, you can check the network bandwidth usage of other Huawei cloud services, such as EIP.



3.7 Why Does the Log Contain "Not Look Like a TLS Handshake" in the CodeArtsPerfTest Report?

The server uses the HTTP protocol. Check whether the HTTPS protocol is mistakenly used for the test case.

4 General FAQs

4.1 What Are the Permissions Required for Using CodeArtsPerfTest?

An account has the administrator permissions by default. The descriptions below are about granting required permissions to IAM users under an account.

Granting Required Permissions to IAM Users

Log in to the IAM console as the account administrator and assign the following permissions to IAM users. For details, see **Creating a User Group and Assigning Permissions**.

No.	Scenario	Assigning Permissions
1	Tenant-level operations on CodeArts PerfTest resources	CodeArts PerfTest Administrator.
2	User-level operations on CodeArts PerfTest resources	CodeArts PerfTest Developer. If you want to use private resource groups, you also need to assign the permission of CodeArts PerfTest Resource Developer.
3	CCE cluster creation	In addition to the permission assigned in scenario 1 or 2, you also need to assign the permissions of CCE Administrator, ECS CommonOperations, and VPC FullAccess. For details, see **Permissions**.

No.	Scenario	Assigning Permissions
4	Private resource group creation	● If no CCE cluster has been created, assign permissions based on scenario 3 and create a CCE cluster. ● If you create a private resource group for the first time, you need to use the tenant account or administrator account to authorize CodeArtsPerfTest to create or modify the CCE cluster and VPC endpoint (VPCEP) of the tenant. ● If CodeArts PerfTest Administrator has been assigned, no other user permissions are required. If CodeArts PerfTest Developer has been assigned, you also need to assign CodeArts PerfTest Resource Administrator.
5	Package purchase	In addition to the permission assigned in scenario 1 or 2, you also need to assign the permission of BSS Finance.
6	Intelligent analysis	● Application monitoring: In scenario 1, the required permissions have been integrated. In scenario 2, APM FullAccess needs to be assigned. ● Host monitoring: This permission has been integrated in scenario 1 or 2. You do not need to add it again.

4.2 Does CodeArtsPerfTest Support Windows Server 2016 Standard (64-bit)?

CodeArtsPerfTest is now only available for Linux. Windows is not supported.

Pressure tests can be performed in applications as long as the network is normal.

4.3 Can I Record Scripts for the WeChat Mobile App?

No. It is not supported in CodeArtsPerfTest.

4.4 What Can I Do If Chinese or Special Characters Are Not Properly Displayed When the API Response Body Containing Them Is Exported Using the Traffic Recording Plug-in?

Delete the local Chrome plug-in for traffic recording. Download and install the plug-in of the latest version as prompted.

Procedure: Log in to the CodeArtsPerfTest console, choose **Script Recording** in the navigation pane, and perform operations as instructed.

5 Using JMeter Projects

5.1 What Are the Differences Between the JMeter Engine of CodeArtsPerfTest and the Open-source JMeter?

The JMeter engine of CodeArtsPerfTest is based on the open-source Apache JMeter. The default version is 5.4. You can also upload versions 5.2 and 5.3.

Compared with the local open-source JMeter, the JMeter engine of CodeArtsPerfTest has the following advantages:

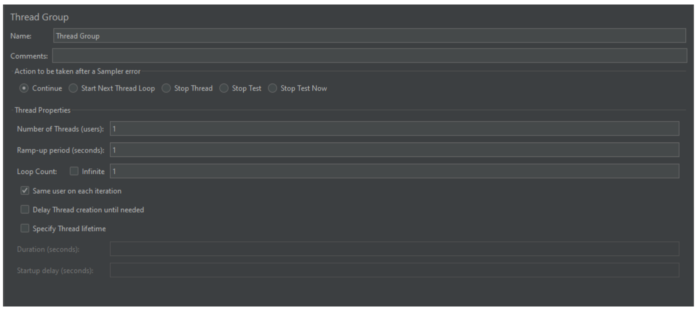
1. Automated distributed scheduling
2. Aggregated and visualized test results
3. Distributed multi-phase capability

5.2 What Scripts Does the JMeter Engine of CodeArtsPerfTest Support?

- JMX scripts created by JMeter 5.2 to 5.4 that do not use any third-party plug-ins.
- Scripts where third-party plug-ins are used but can be uploaded as a JAR package and where the Thread Group elements are not modified. These scripts may not work on CodeArtsPerfTest. Debugging is required.

5.3 Which Operations in Scripts Are Not Supported by the JMeter Engine of CodeArtsPerfTest?

- Log output (Only requesting logs is supported.)
- Variables on the thread group configuration page



Thread Group

Name: Thread Group

Comments:

Action to be taken after a Sampler error

● Continue ○ Start Next Thread Loop ○ Stop Thread ○ Stop Test ○ Stop Test Now

Thread Properties

Number of Threads (users): 1

Ramp-up period (seconds): 1

Loop Count: □ Infinite 1

☑ Same user on each iteration

□ Delay Thread creation until needed

□ Specify Thread lifetime

Duration (seconds):

Startup delay (seconds):

5.4 What Can I Do If an Error Occurs When I Upload JMeter Scripts, CSV Files, Third-Party JAR Packages, or Installation Packages?

Ensure that the CodeArtsPerfTest tool is used in the public network instead of the internal network.

5.5 What Are the Suggestions for Using CodeArtsPerfTest Scripts?

- Result viewers are not recommended in scripts.

  Different result viewers have different impacts on the pressure test performance. If you want to use result viewers, evaluate the risks.
- If the total number of concurrent scripts is greater than 1000, or the number of actuators is configured in **Advanced Config** > **Number of Actuators** of the task, evaluate whether the attributes in the scripts can be used in distributed scenarios (multiple hosts run the scripts at the same time).
- Constant throughput timers are not recommended.

  If the constant throughput timer of JMeter is enabled, the results of pressure test will be inaccurate. You are advised to use the precise throughput timer of JMeter. If the constant throughput timer must be used, evaluate its impact on the actuator performance.
- When you use throughput controllers, the debugging result of the JMeter project may be below expectations.

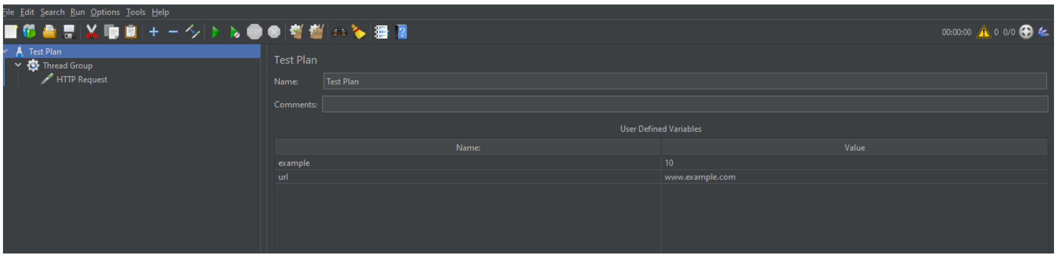
  The reason is that the CodeArtsPerfTest debugging script is executed only once. In this case, you are advised to use concurrent tasks on a small scale in a short time to replace the debugging.

5.6 How Are CodeArtsPerfTest Error Logs Displayed?

- By default, 10‰ of each status code is sampled.
- Click **Advanced Config** and set **Logs Not Collected** to adjust the rate of failure logs to be collected. The maximum rate is 1000‰.

5.7 How Do I Use the Global Variable Function?

Step 1 Open the JMeter script, choose **Test Plan**, and define variables in **User Defined Variables** on the right of the page.



Test Plan
Thread Group
HTTP Request

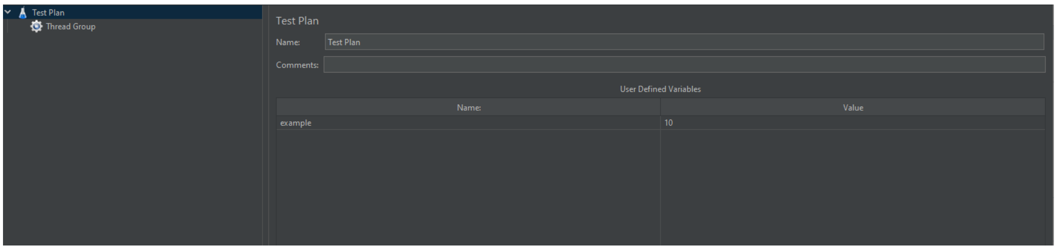
Test Plan

Name: Test Plan

Comments:

User Defined Variables

Name:	Value
example	10
url	www.example.com



Test Plan
Thread Group

Test Plan

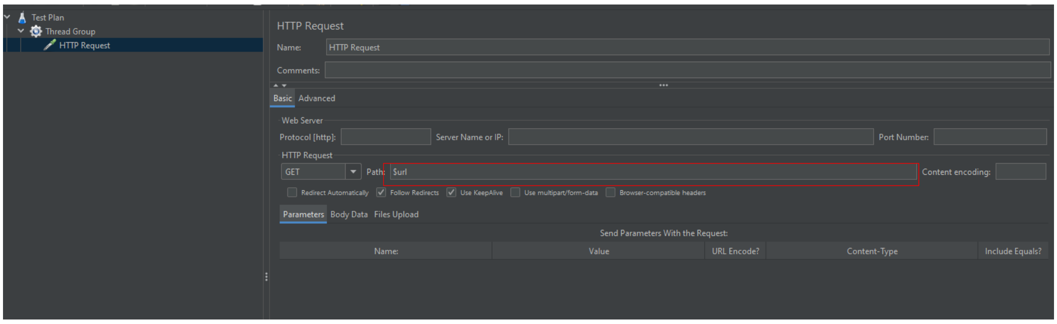
Name: Test Plan

Comments:

User Defined Variables

Name:	Value
example	10

Step 2 Reference variables in the script.



Test Plan
Thread Group
HTTP Request

HTTP Request

Name: HTTP Request

Comments:

Web Server

Protocol [http]:
Server Name or IP:
Port Number:

HTTP Request

GET Path: $url Content encoding:

☐ Redirect Automatically ☑ Follow Redirects ☑ Use KeepAlive ☐ Use multipart/form-data ☐ Browser-compatible headers

Send Parameters With the Request:

Name:	Value	URL Encode?	Content-Type	Include Equals?

Step 3 Log in to the CodeArtsPerfTest console. In the navigation pane on the left, choose **JMeter Test Projects**.

Step 4 Click the project whose global variable is to be imported. The **Test Plan List** tab page is displayed.

Step 5 Click the task to which a global variable is to be added. The **Thread Group** page is displayed.

Step 6 Click **Global Variable** in the upper right corner of the page. In the dialog box that is displayed, click **Add Variable**.

Variables are classified into static variables and evenly-split variables.

- Static variable: Content is delivered as a character string. When scripts are executed in distributed mode, the variable values obtained by each node are the same. For example, if the static variable "successRate = 0.8" is delivered, 2000 tasks are concurrently executed by two actuators, and the value of **successRate** in the script of each actuator is **0.8**.

- Evenly-split variable: Content is delivered as an integer. When scripts are executed in distributed mode, the variable values obtained by each node are evenly distributed. Integer division is used during even distribution, and the remainder is allocated to one of the nodes. For example:
  - If **tps**=**100** and there are four actuators, the value of the variable in the script of each actuator is 25.
  - If **tps**=**20** and there are three actuators, the value of the variable in the script of each actuator is 8, 6, 6.
  - If **tps**=**1** and there are four actuators, the value of the variable in the script of each actuator is 1, 0, 0, 0.

  Pay attention to the following when using the evenly-split variable:

  a. If the allocated value is sensitive to even split, manually set the number of actuators to ensure that the value of the variable is an integer multiple of the number of actuators.

  b. If the allocated value is not sensitive to even split, increase the allocated value as much as possible to reduce the impact of the integer division on the remainder and evenly split the value.

  c. If the allocated value cannot be 0, manually set the number of actuators to ensure that the value of the variable is greater than the number of actuators.

NOTE

If a variable configured in the global variable exists in **Test Plan** > **User Defined Variables** of a script, the variable value defined in the script will be overwritten.

Otherwise, the corresponding variable will be created in **Test Plan** > **User Defined Variables** of the script.

----End

5.8 What Should I Pay Attention to When Uploading a Third-Party JAR Package?

- Ensure that the third-party JAR package is in the JMeter root directory **/lib/ext** when the local JMeter is working.
- Ensure that the script using the third-party JAR package can run properly on the local host.
- The name of the imported file can contain up to 64 bytes (including the suffix). The file size can be up to 10 MB.

5.9 What Should I Pay Attention to When Uploading a CSV File?

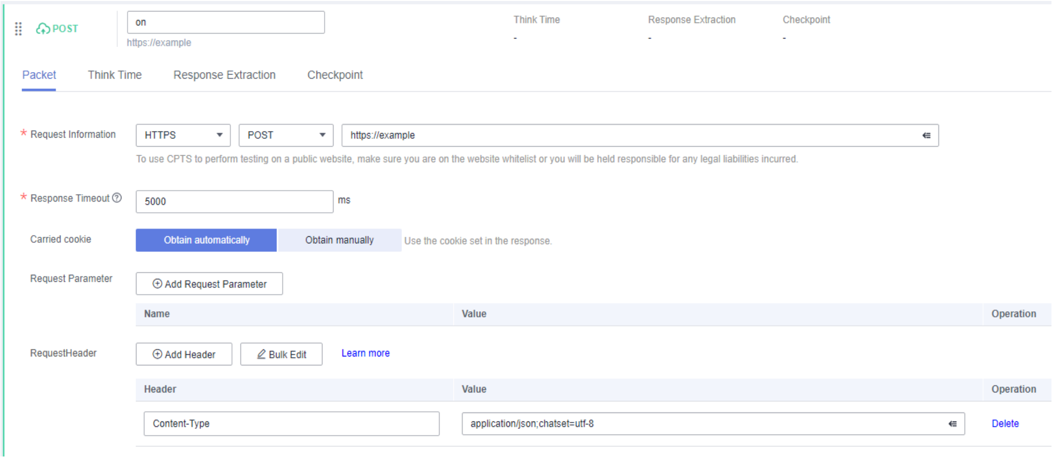
- Ensure that parameters in the CSV file can be valued and used in the local JMeter.
- Upload a file in CSV (UTF-8 without BOM) format. Do not upload files in other formats because code reading problems may occur.

5.10 What Should I Pay Attention to When Uploading a Custom Installation Package?

- Be sure to use a ZIP package from the Apache official website or a package with the same directory structure as the Apache ZIP package.
- The JMeter version must be 5.2 to 5.4.
- Third-party plug-ins contained in the ZIP package will affect the JMeter engine of CodeArtsPerfTest after being uploaded.

5.11 Why Does CodeArtsPerfTest Return Garbled Characters When Content-Type in the Request Header Is Set to UTF-8 in JMeter?

Specify UTF-8 encoding for **content-type** in the request header and delete request header fields irrelevant to services, such as "Accept-Encoding: gzip".



POST on
https://example

Think Time	Response Extraction	Checkpoint
-	-	-

* Request Information: HTTPS | POST | https://example

To use CPTS to perform testing on a public website, make sure you are on the website whitelist or you will be held responsible for any legal liabilities incurred.

* Response Timeout: 5000 ms

Carried cookie: [✓ Obtain automatically] Obtain manually — Use the cookie set in the response.

Request Parameter

Name	Value	Operation

RequestHeader

Header	Value	Operation
Content-Type	application/json;chatset=utf-8	Delete

5.12 Why Does the Event Log Contain "JMeter Timeout" in the JMeter Report?

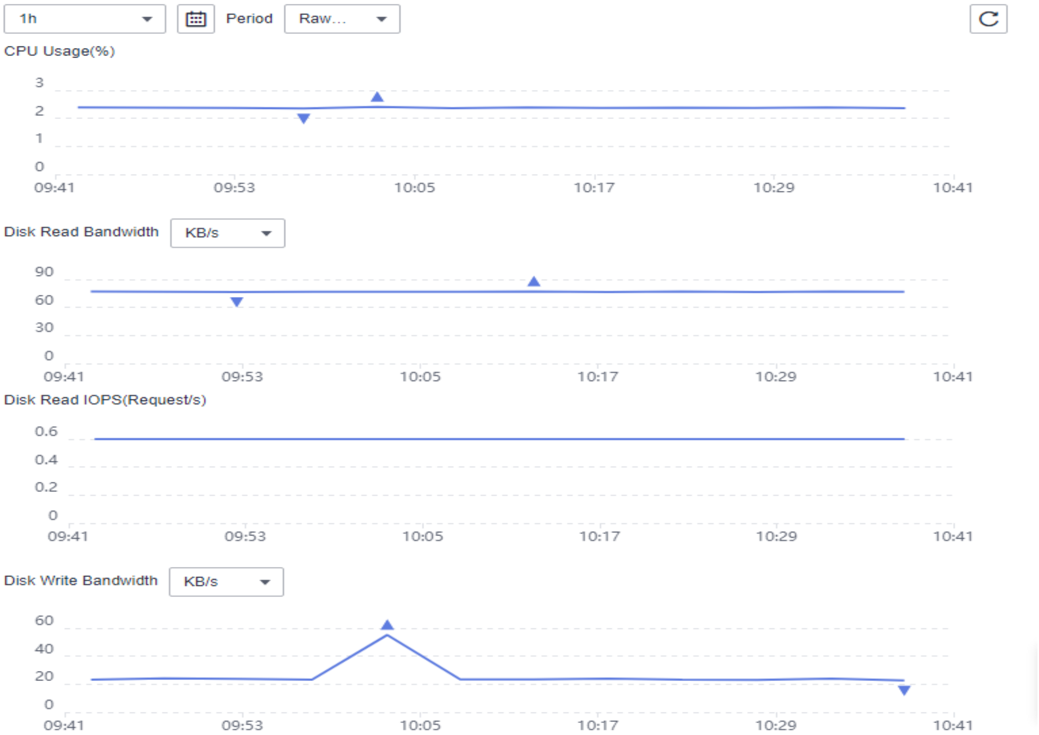
If the JMeter test task does not generate any sampling data in 10 minutes, the task will be forcibly terminated.

5.13 Why Does JMeter Case Debugging Fail in Less Than 5 Seconds and No Data Is Displayed on the Page?

Check that all variable files and third-party JAR packages required by the JMeter test plan are uploaded.

5.14 Why Does the Request Log Contain "connection reset" in the JMeter Report?

A connection interruption occurs. Check the network load of the executor and server. For example, you can check the network bandwidth usage of other Huawei cloud services, such as EIP.


1h
Period
Raw...
CPU Usage(%)
3
2
1
0
09:41
09:53
10:05
10:17
10:29
10:41
Disk Read Bandwidth
KB/s
90
60
30
0
09:41
09:53
10:05
10:17
10:29
10:41
Disk Read IOPS(Request/s)
0.6
0.4
0.2
0
09:41
09:53
10:05
10:17
10:29
10:41
Disk Write Bandwidth
KB/s
60
40
20
0
09:41
09:53
10:05
10:17
10:29
10:41