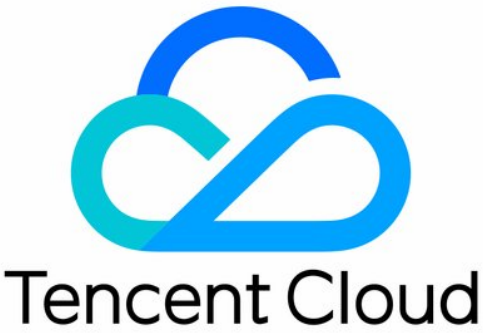
Serverless Cloud Function

Best Practice

Product Documentation



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Best Practice
Overview

Last updated：2020-09-01 10:02:20

Based on the features of SCF, we recommend you:

- Write function code in a stateless style to ensure that your code will not undergo any state maintenance. Both local storage and memory results may be lost; therefore, services such as COS and Redis/Memcached should be used to cache intermediate information and store the final computation results.
- Instantiate any objects that may be reused (such as database connections) other than execution methods.
- Configure +rx (read and execution) permission to your file in the uploaded ZIP package to ensure successful code execution.
- Maximize the use of `log/print` statements in your code to provide sufficient information for debugging.
- You can use external code management services (such as Git) for the purpose of version and audit management of core code, so as to ensure the code completeness (the version management feature will be available in the future).

Note：

In the subsequent specific practices, most of the functions are deployed in the form of function template. You can download the function templates and code for analysis and research.

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Solutions with Tencent Cloud Services

Last updated：2021-01-29 15:57:23

Tencent Cloud SCF can be connected to various Tencent Cloud services to build a wide variety of solutions as shown below:

Connected Service	Solution
API Gateway	RESTful API
Serverless Framework	Deploying static website
	Connecting to Serverless DB
COS	File decompression
	CDN cache purging
CDN	Dumping historical domain name access logs to COS
ES	Automatically deleting expired data with Curator
SMS	Sending SMS verification code
VOD	Receiving event notification
	Using key hotlink protection
CLS	Log ETL
MPS	Video task callback

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Business Development
Function Concurrency Management Practice

Last updated：2023-05-04 18:17:50

Overview

SCF now provides concurrency quota management capabilities at three levels. With this feature, you can get greater permissions to control function concurrency to adjust the concurrency quickly based on your business needs instead of applying for concurrency quota.

Note

The function concurrency management feature has been launched. You can configure the Reserved quota for a function. The provisioned concurrency feature is in beta test. To try it out, submit a ticket for application.

The default function concurrency limit is set to 300 by default. For infrequent businesses with low function usage, the 300 concurrent instances were generally sufficient. However, in cases where high concurrency was required, such as business surges and large-scale campaigns, you needed to submit a ticket to apply for an increase in the concurrency quota. This scheme has the following three challenges:

Every time your business surged, you needed to contact Tencent Cloud to apply for an increase in the function quota, which was time-consuming.

Your business growth might be restricted during the application processing time.

The application might be rejected due to insufficient business scale during the evaluation, leading to reapplication and making the process inefficient.

This document describes the concurrency management feature in detail and provides configuration suggestions for a variety of use cases.

Description

Concurrency capabilities

SCF provides the following concurrency management options:

You can customize the concurrency quota for individual functions.

The concurrency quota is configured at the account level, instead of the function level.

Each account is allocated with a concurrency quota, which is shared by all functions under the account. You do not need to separately apply for a quota for high-concurrency functions.

Each account is allocated with a concurrency quota of 128,000 MB, which allows 1,000 function instances with the 128 MB specification to run concurrently. You don’t need to apply for a quota increase to sustain your business

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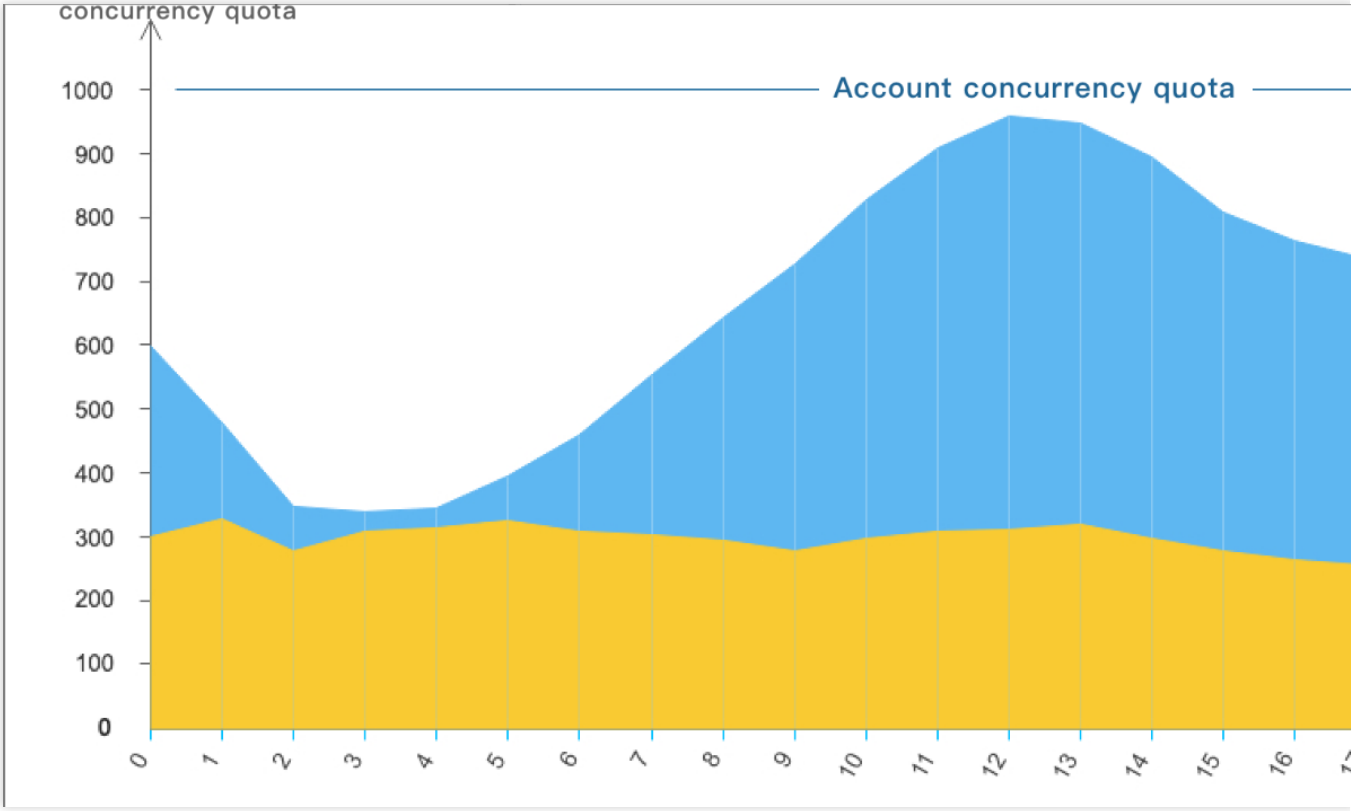
growth. See below for the trend of concurrency usage:



Relationship between memory and concurrency quota

Concurrency quota is calculated by the memory. A function with a higher memory configuration occupies a larger share of the quota during concurrent execution, while a function with a smaller memory configuration memory occupies a smaller share of the quota during concurrent execution.

Since the resource usage billing item of the SCF service is highly related to the configured memory of functions, if you need to control the quota through the memory configuration, we recommend you select an appropriate function memory value for your business, which can effectively control the overall costs. The memory changes are as shown below:

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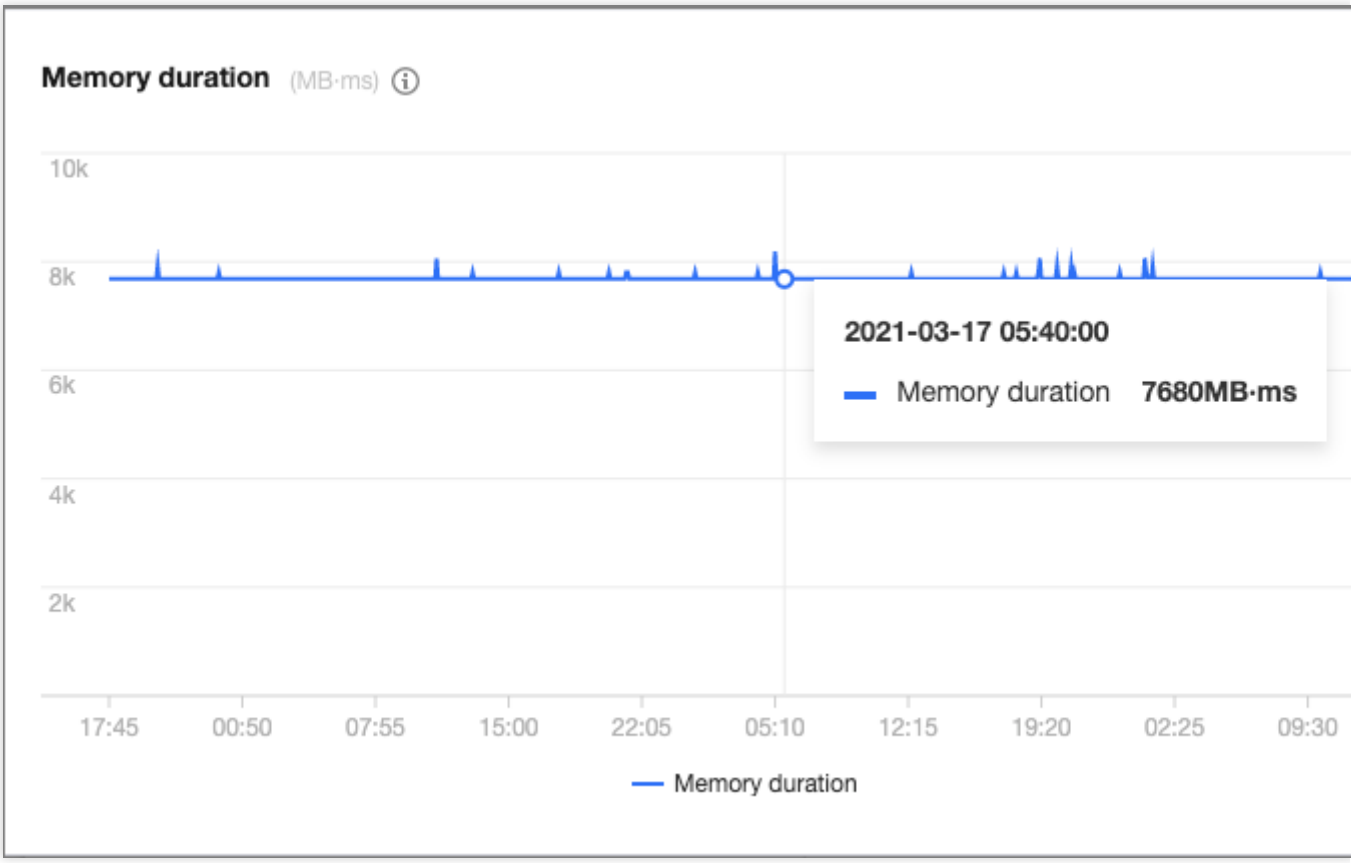

Practice

Concurrency use cases

If multiple businesses under your account use SCF for support at the same time, you should schedule the concurrency quotas of functions as needed and make reasonable settings according to different business characteristics. The following analyzes the types, characteristics, and requirements of different businesses:

Suitable Business Types	Business characteristics	Business Requirements
Frontend business	There are peak hours and off-peak hours.	A fast page load speed is required and a certain fault tolerance is allowed.
Data processing business	The operation is stable with little fluctuation.	Delays, fluctuations, and failures are unacceptable.
OPS tasks	Tasks are scheduled and occasional.	There is no need to pay much attention as long as the tasks run normally.
Video processing	The concurrency is not high, but the computation is complicated and time-	On-demand scheduling is acceptable as long as tasks can automatically restore upon failure.

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business	consuming.	

According to different business characteristics, fault tolerance limits, business fluctuations, and delay requirements, different configurations can be made for different use cases as recommended below:

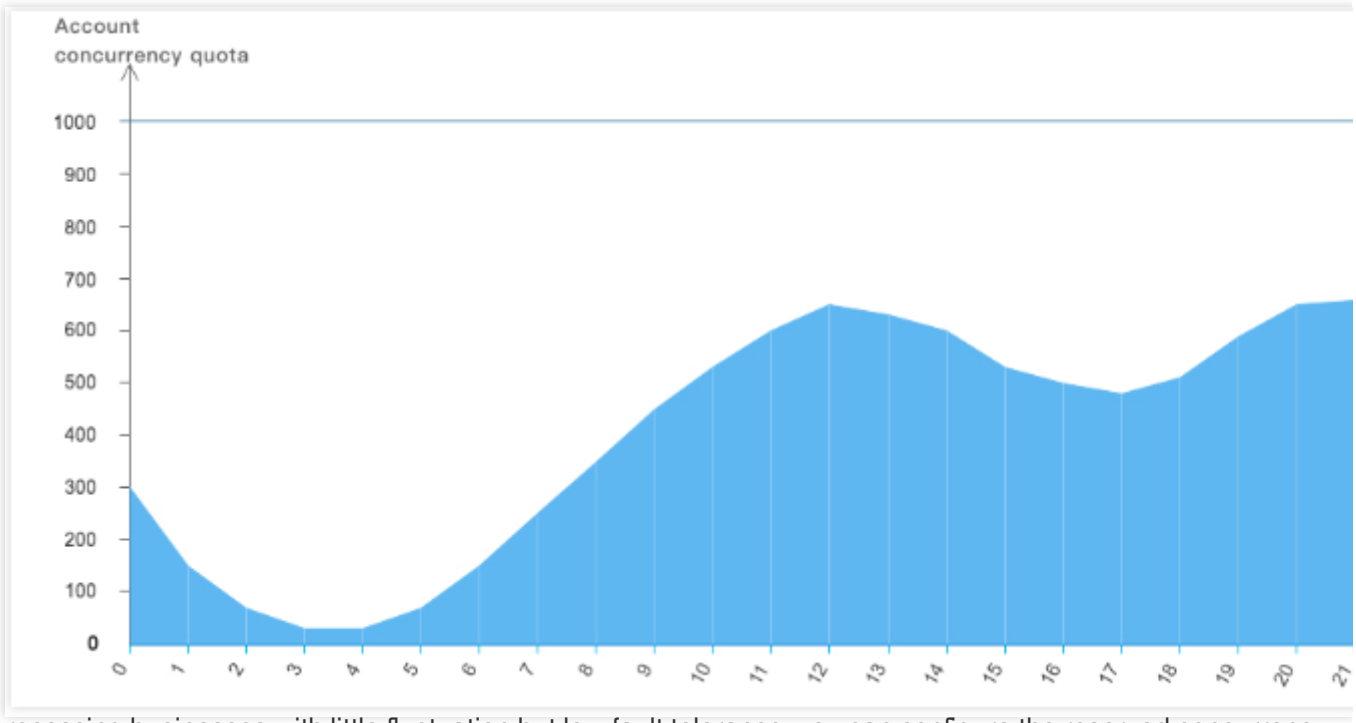
Frontend business

Data processing business

Ops task

Video processing business

Frontend businesses require a fast page load speed and have peak hours and off-peak hours. You can configure the provisioned concurrency quota (e.g. 60% of the maximum usage), and leave out the reserved concurrency quota, so that the total quota can be fully utilized during peak hours. See below for the trend of concurrency usage:



Data processing businesses with little fluctuation but low fault tolerance, you can configure the reserved concurrency quota for the function, so that the quota is not shared by other businesses. See below for the trend of concurrency usage:

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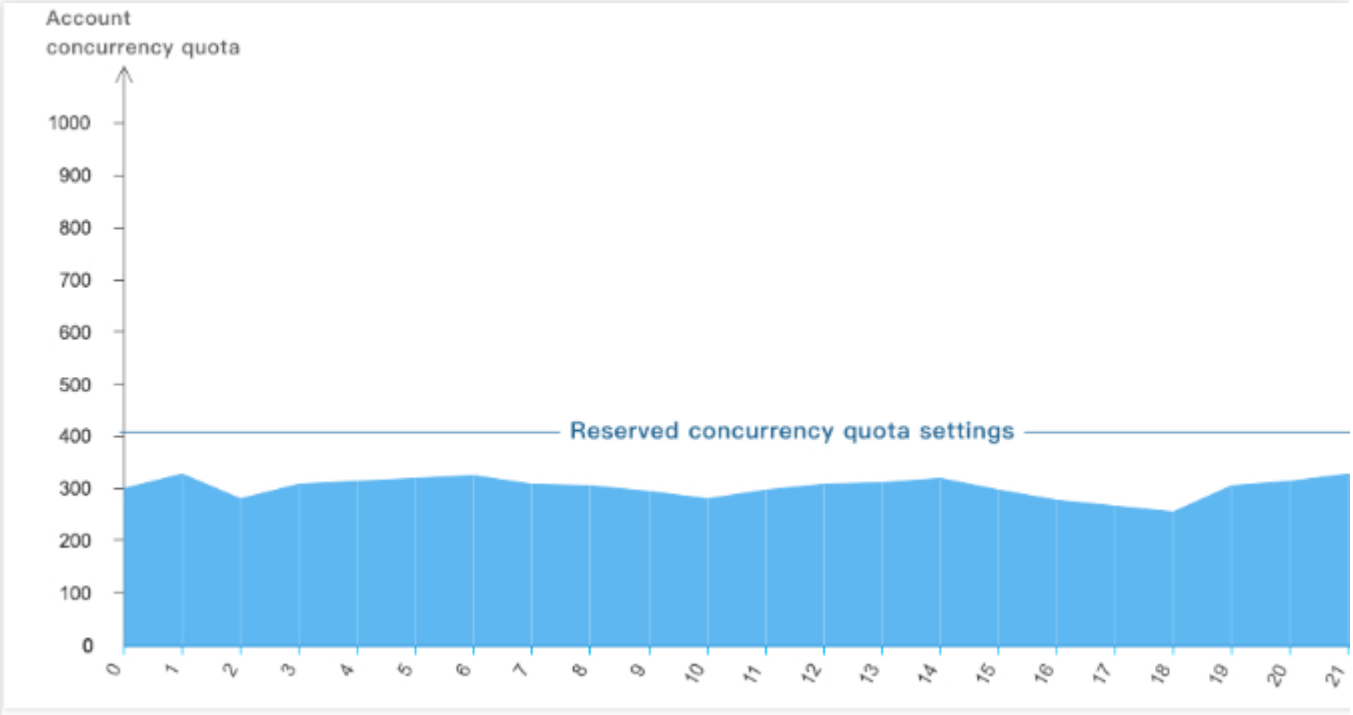
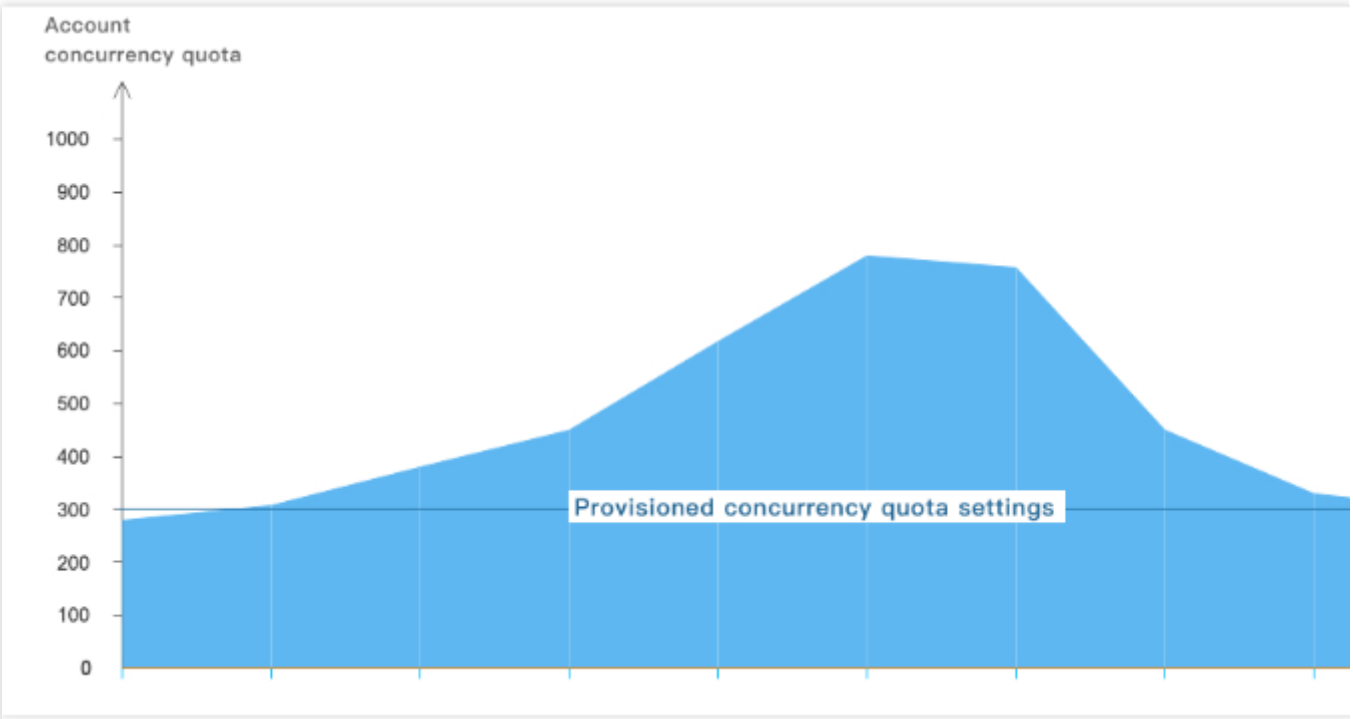


For OPS tasks that are not demanding and run regularly, you don't need to make any configurations; instead, you can simply use the account-level quota logic.

For video processing businesses that have a large amount of computation where tasks are queued up for on-demand processing, a certain reserved concurrency quota can be configured for functions, so that the businesses can run at the full concurrency quota and make the most of computing resources. See below for the trend of concurrency usage:



Reserved quota use case

The account-level quota is shared by multiple functions under the account. If multiple functions run simultaneously, functions whose concurrency is increased due to traffic/business surges may conflict with stable functions after they use up all the available quota.

For the above scenario, there are two solutions as follows:

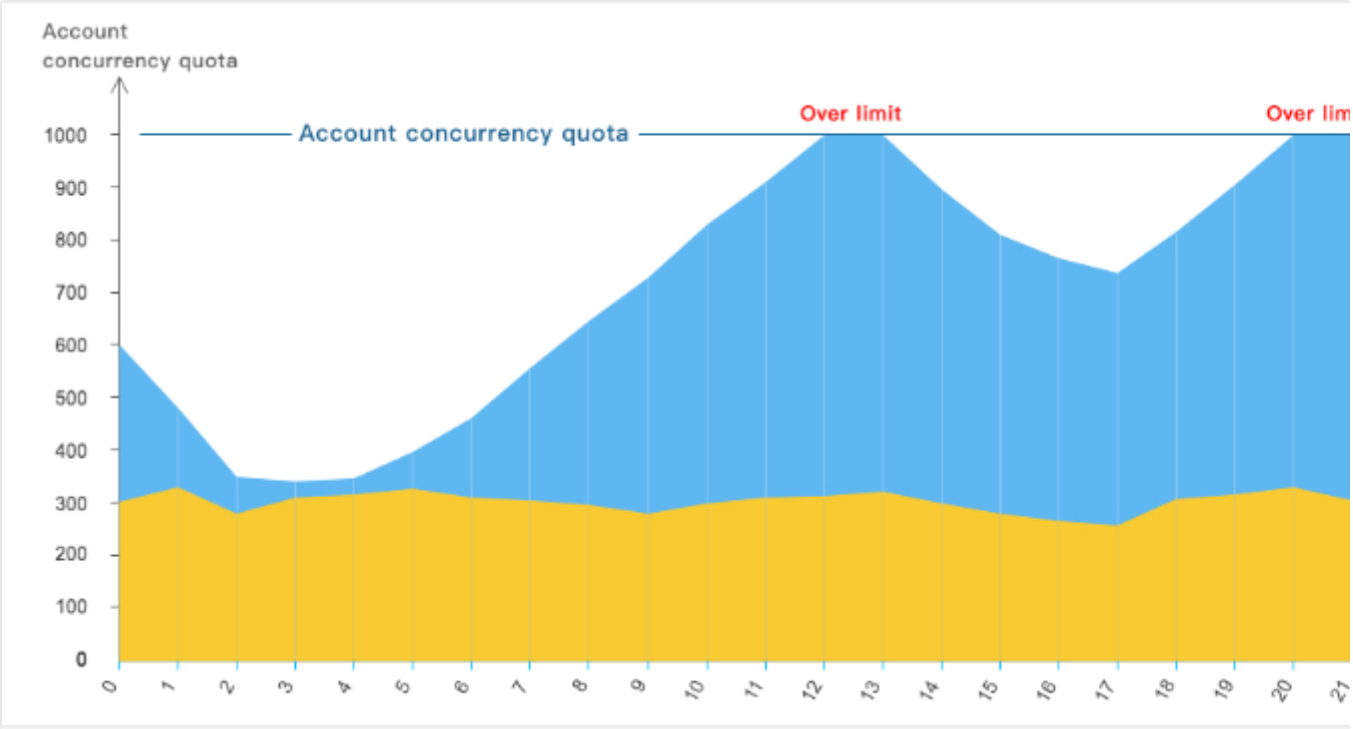
In this case, you can configure the reserved quota. The execution stability of specific functions can be guaranteed by assigning a certain part of the quota to them.

You can also purchase a subscription package with a higher specification to get a higher concurrency quota and better sustain concurrency bursts caused by your business growth.

Configuring reserved quota

The following takes solution 1 (reserved quota configuration) as an example to describe how to use the reserved quota in detail.

Scenario: Function A and Function B are under the same account. Function A is used for flash sale H5 pages, and Function B is used for streamline data processing on the backend. Function B launches 300 concurrent instances first for normal business running, and Function A takes the rest 700 concurrency for promotion events. In this case, if a request surge comes to Function B, no more instances can be started due to the quota limit. You can configure the reserved concurrency to keep the balance between these two funcitons.



Sample configuration: To ensure the reliability of data processing, which is handled by Function B, you can set the reserved concurrency quota to 350 for Function B. Then, this quota will be assigned exclusively to Function B from the account level, and Function A can use 650 concurrent instances at most. Note that the concurrency of Function B cannot exceeds 350 even if there are still available resources within the account-level quota. The function quota changes are as shown below:

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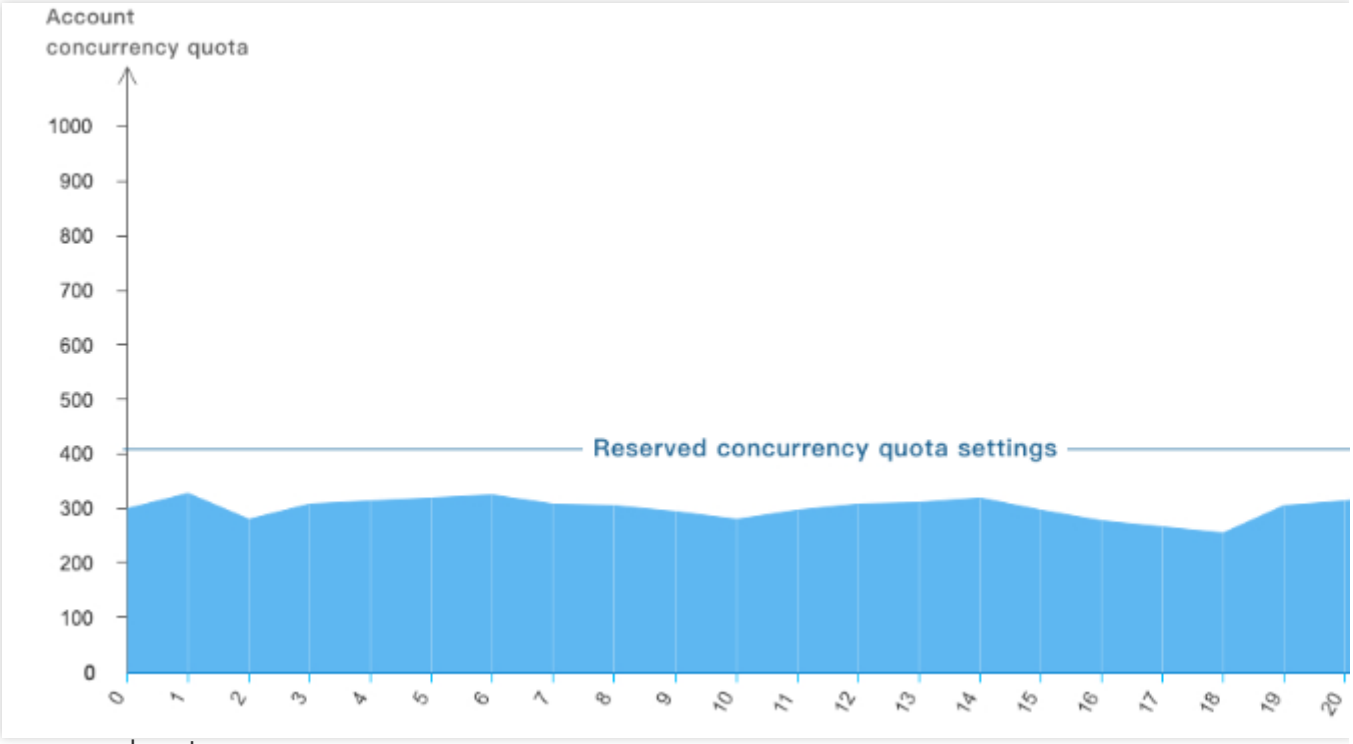

With the reserved quota,

The normal execution of a function is guaranteed, preventing losses caused by the function's inability to run due to other functions using the shared quota.

The max concurrency of a function is limited.

Suggestions:

For functions in the development and testing phase, because of the small number of requests, low business pressure, and low concurrency, there is no need to configure the reserved quota, and it is fine to use the shared quota at the account level.

For functions that run stably, the concurrency is usually predictable with minimal fluctuations. Therefore, you can configure a reserved quota with a small margin to ensure that the quota will not be affected by sharing.

For functions used for operational activities where the concurrency may surge, you can increase the account-level quota to make full use of and support the business growth.

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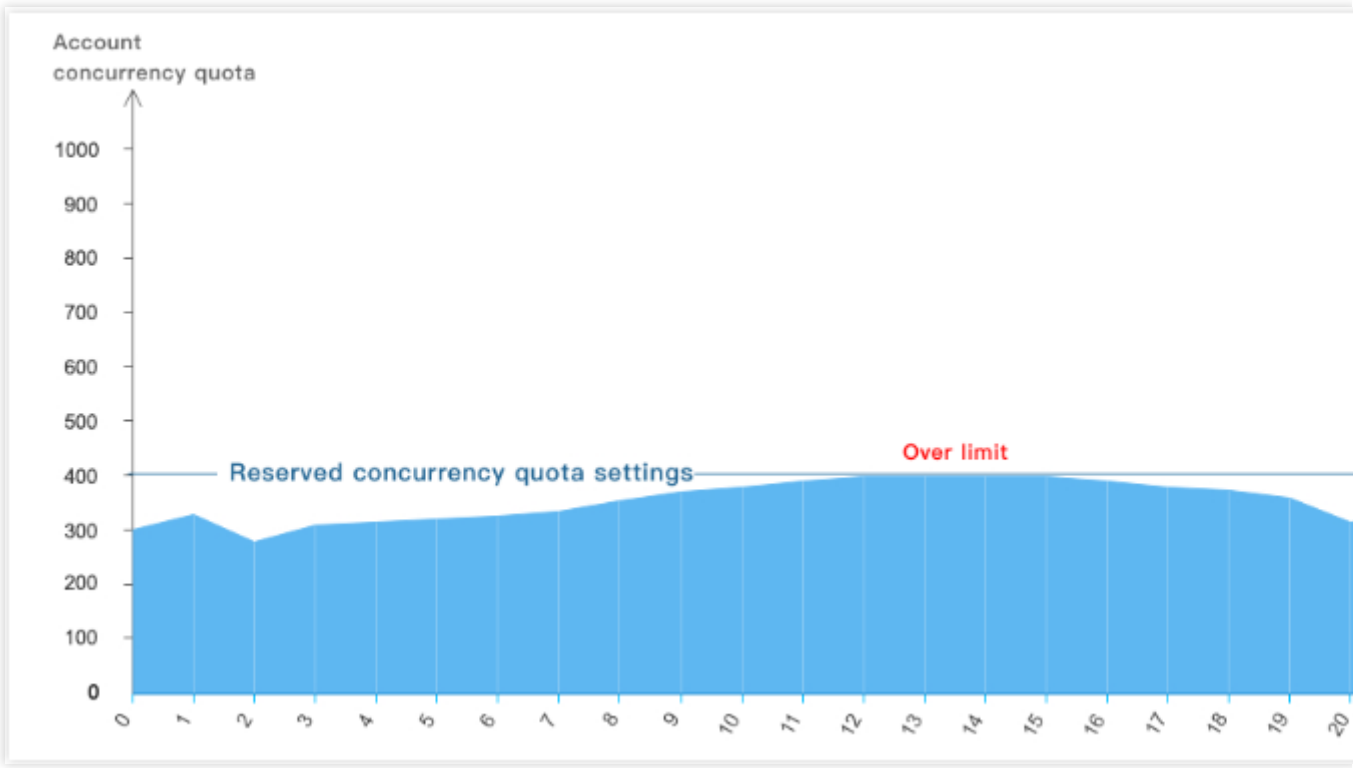

Notes

Currently, provisioned concurrency quota is set at the function version level, which is deducted from the concurrency quota at the account level or the provisioned concurrency quota at the function level.

By configuring provisioned concurrency quota, you can start the required number of concurrent instances, complete the instance initialization, and wait for events to occur in advance. Requests for the function will not have a cold start time, and they can be run directly in the instances that have already been prepared and initialized.

For delay-sensitive businesses (such as frontend SSR page response) or businesses with a long initialization time (such as the model loading process of AI inference), configuring provisioned concurrency can ensure better business operation.

Meanwhile, as the provisioned concurrency quota is not the upper limit of instance concurrency, when the business volume exceeds the maximum scale that the provisioned instances can sustain, the function will still launch more instances according to its provisioned concurrency quota or account-level quota to support the business operation. The function quota changes are as shown below:

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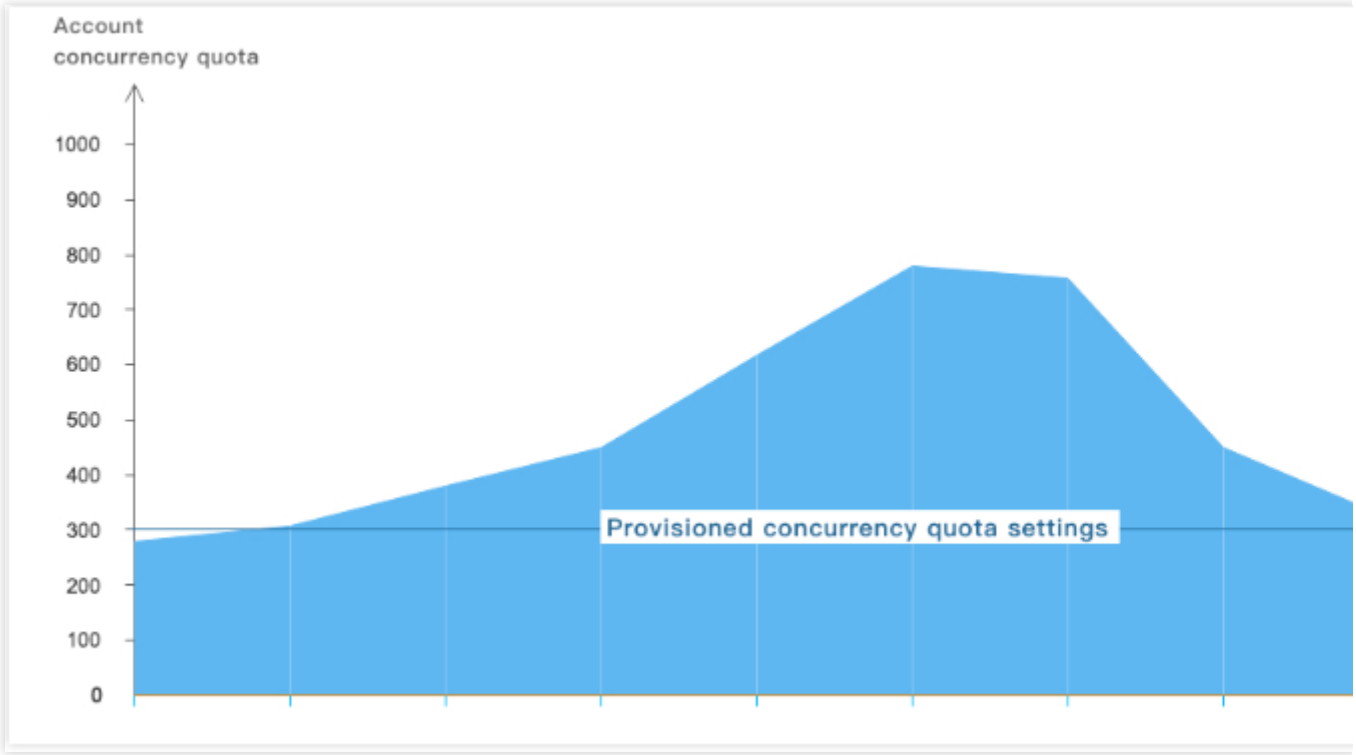

Other usages of reserved concurrency quota

The restriction or shutdown of a business can also be implemented by configuring the reserved quota. In case of emergencies, such as vulnerability attacks and out-of-control loop invocations, in order to avoid major losses, you can set the reserved quota to a very small value to avoid running out of control or even to 0 to stop function execution. For more information, see Concurrency Management System. The configuration is as shown below:

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Concurrent High-Performance Architecture

Last updated：2022-01-24 15:27:02

Concurrency refers to the number of requests that can be processed by a function concurrently at a moment. If it can be sustained by other services of your business, you can increase the function concurrency from several to tens of thousands with simple configuration.

Use Cases

High QPS and short execution duration

A function can be used for simple data or file processing; for example, it can be triggered by COS to report information or process files. In such scenarios, the execution duration of a single request is short.

Computation-Intensive long execution

A function can be used in audio/video transcoding, data processing, and AI-based interference. Due to various operations such as model loading, the function initialization/execution and Java runtime environment initialization take more time.

Async message processing

A function can be used for async message processing in diverse scenarios, such as Tencent Cloud's proprietary WYSIWYG recording and TDMQ function trigger. It can connect the data at both ends of the message queue to the greatest extent and help implement the async event decoupling and peak shifting capabilities under the serverless system.

Strengths

By using reserved quota and provisioned concurrency together, you can flexibly allocate resources among multiple functions and warm up functions as needed.

Shared quota

If nothing is configured, all functions share the account quota by default. If a function generates a surge of business invocations, it can make full use of the unused quota to ensure that the surge will not cause overrun errors.

Guaranteed concurrency

If the business features of a specific function are sensitive or critical, and you need to do your best to ensure a high request success rate, then you can use the reserved quota feature to this end. Reserved quota can give the function

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exclusive quota to guarantee the concurrency reliability and avoid overruns caused by concurrency preemption by multiple functions.

Provisioned concurrency

If a function is sensitive to cold start, the code initialization process takes a long time, or many libraries need to be loaded, then you can set the provisioned concurrency for a specific function version to start function instances in advance and ensure smooth execution.

How Concurrency Expansion Works

For more information on concurrent instance reuse and repossession and concurrency expansion, please see Concurrency Overview.

Samples

For example, the concurrency quota of an account in the Guangzhou region is 1,000 concurrent instances by default for a 128 MB function, and if many requests arrive, 500 concurrent instances can be started from 0 in the first minute. If there are still other requests to be processed, 500 more concurrent instances can be started to reach 1,000 instances in total in the second minute.

The following figure simulates the specific concurrent processing scenario of a function during business traffic peaks. As business requests constantly increase and there are no concurrent instances available to process new requests, the function will start new concurrent instances. When the expansion speed limit of elastic concurrency is reached, function expansion will gradually slow down, and new requests will be restricted and retried. Then, the function will continue expansion and eventually reach the account-level concurrency limit in the current region. Finally, after the business needs are satisfied, the number of requests will gradually decrease, and the unused concurrent instances of

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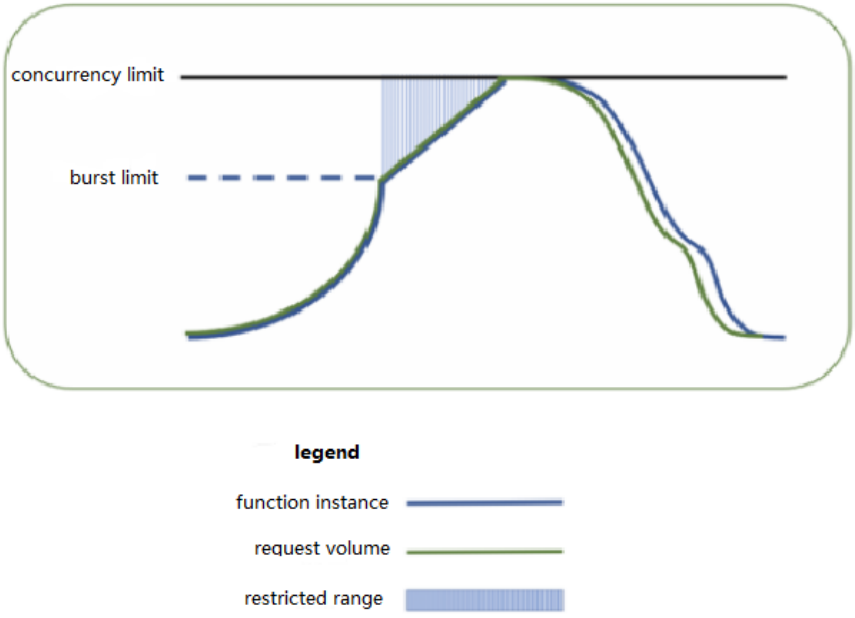
the function will gradually stop.



Provisioned concurrency can start concurrent instances in advance according to the configuration. SCF will not repossess these instances; instead, it will ensure as much as possible that a sufficient number of concurrent instances are available to process requests. You can use this feature to set the quota of provisioned concurrent instances for a specified function version, so as to prepare computing resources in advance and expedite cold start and initialization of the runtime environment and business code. The following figure simulates the actual provisioned concurrency

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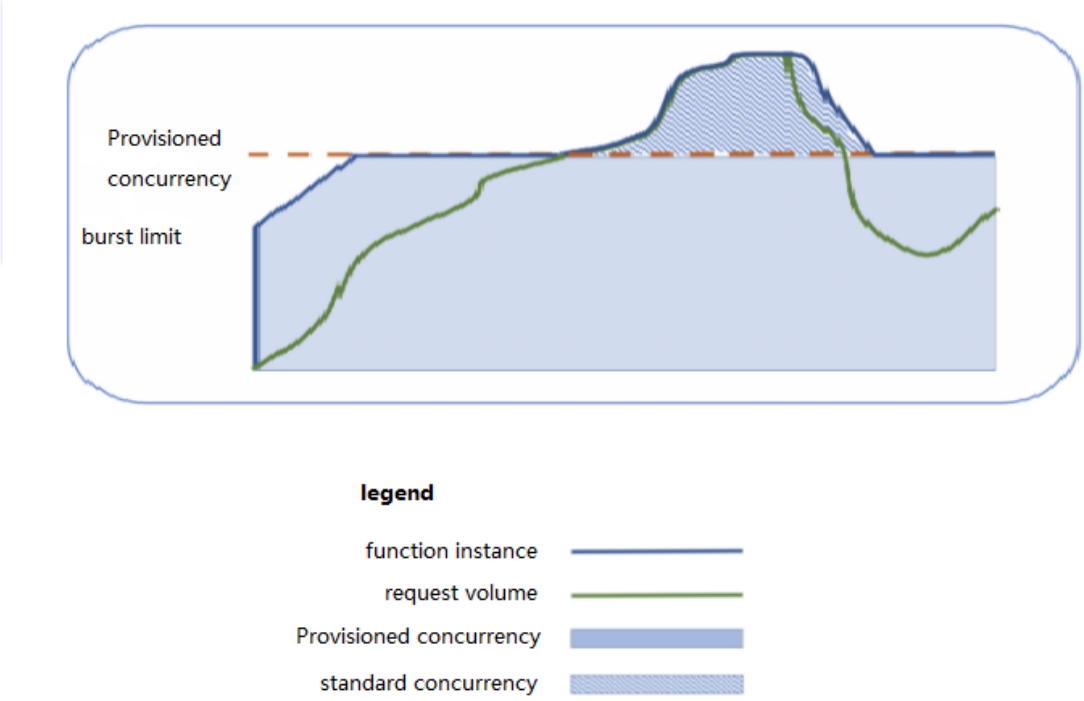
conditions of a function when handling business traffic peaks.



Use Case-Based Stress Tests

Use case 1. High QPS and short execution duration

In this scenario, the QPS is high, the execution duration of a single request is short, and the business experiences a concurrency peak in one or two seconds after cold start. Next, you can carry out tests and observe whether gradually switching traffic or configuring provisioned concurrency can ease the cold start concurrency peak.

Business conditions

Business Information	Metric
Function initialization duration	The function doesn't require initialization
Business execution duration	5 ms
QPS	Around 100,000 (peak)

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Stress test task

We plan three stress test tasks for complete cold start, gradual traffic switch, and provisioned concurrency configuration respectively.
Each stress test task needs to start from cold start with no hot instances and impact of other functions present.

Stress test goal

The business with a high QPS experiences a concurrency peak in one or two seconds after cold start, and gradually switching traffic or configuring provisioned concurrency can ease the cold start concurrency peak.

Stress test configuration

Function configuration	a. Memory: 128 MB, with async execution, status tracking, and log delivery disabled b. Concurrency quota: 4,000 * 128 MB c. Duration: 5 ms d. Burst: 2,000
Testing tool	Directly call the `RegionInvoke` API with the `go-wrk` tool.

Show All

Complete

展开&收起

Start 2,000 concurrent requests on the client, call the API 2,000 * 5,000 times, and collect the statistics of concurrent executions and cold start concurrency.

Performance

The number of concurrent executions of the function is as shown below, and the entire concurrency expansion and reduction process is completed within 3 minutes.

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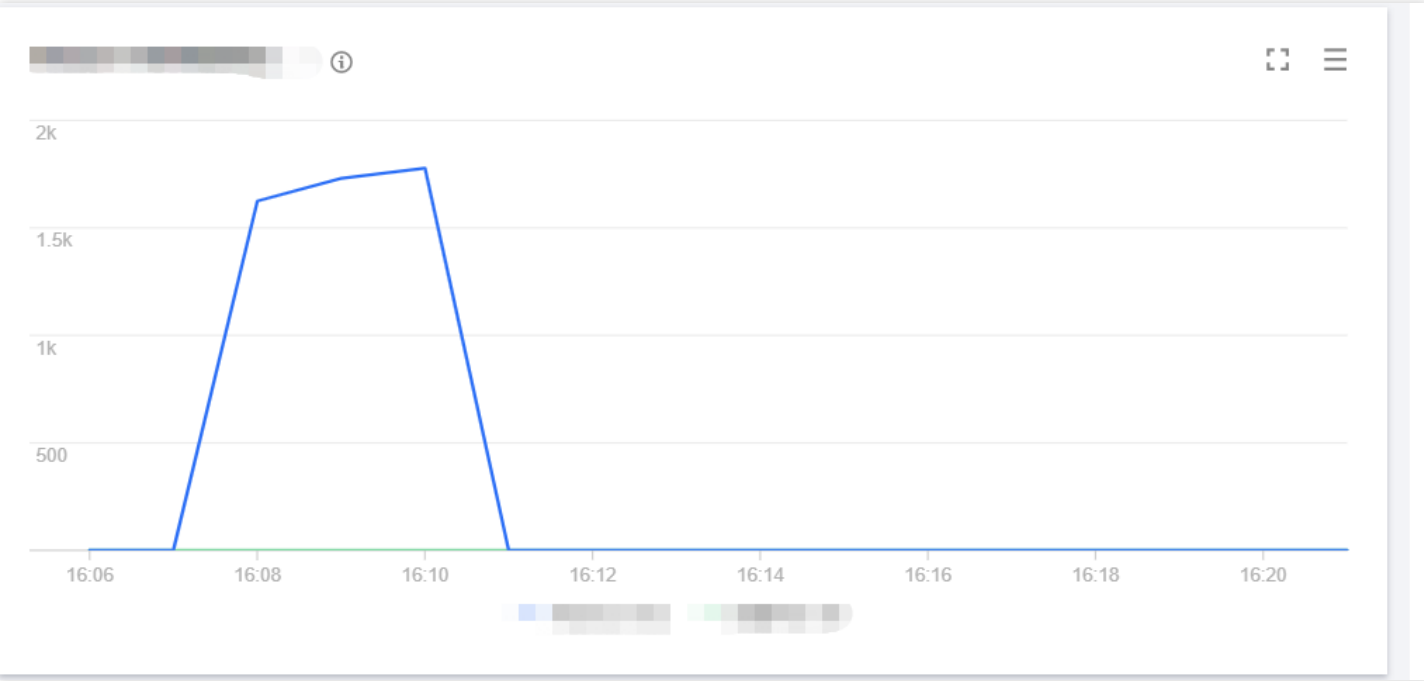

The cold start data of the function is as shown below. Concurrent instances can be started instantly and reach the set cold start limit for the burst of 2,000 within 1 minute.

In this scenario, the average QPS reaches around 60,000, concurrent instances are started instantly within 1 minute, the cold start limit for the burst is normal, and the entire concurrency expansion and reduction process is completed

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within 3 minutes.

```
[root@VM_2_188_centos /data/home/pigpigzhu/test_pt]# ./invoke.sh -I 1253970226 -u 3473058547 -U 100019716422 -F /data/p_lizhili/config.json -c 200 -N 5000 -S Scf.ap-chengdu-pt-1.Regio
nInvoke.OldHttpObj -P Test -R lam-92m8en2h
function lam-92m8en2h already in ap-chengdu-pt-2 cluster.
use polaris
log file path:/data/log/pt/perf_test_m
Summary:
startTime: 2021-09-01 16:07:58 endTime: 2021-09-01 16:10:42
timestamp start: 1630483678, end: 1630483842

Function: pressure-test-qps-1[lam-92m8en2h] pigpigzhu

Client:
Nodes: 10
Request total: 10000000
Avg QPS: 60975.61
CostTime total: 309932549.00ms
Avg cost time: 30.99ms
CostTime P95: 85.00     P75: 29.00      P50: 20.00      P25: 16.00
Avg duration time: 6.24ms
Concurrency: 200
Requests: 5000
Sleep: 0s
[root@VM_2_188_centos /data/home/pigpigzhu/test_pt]#
```

Gradual

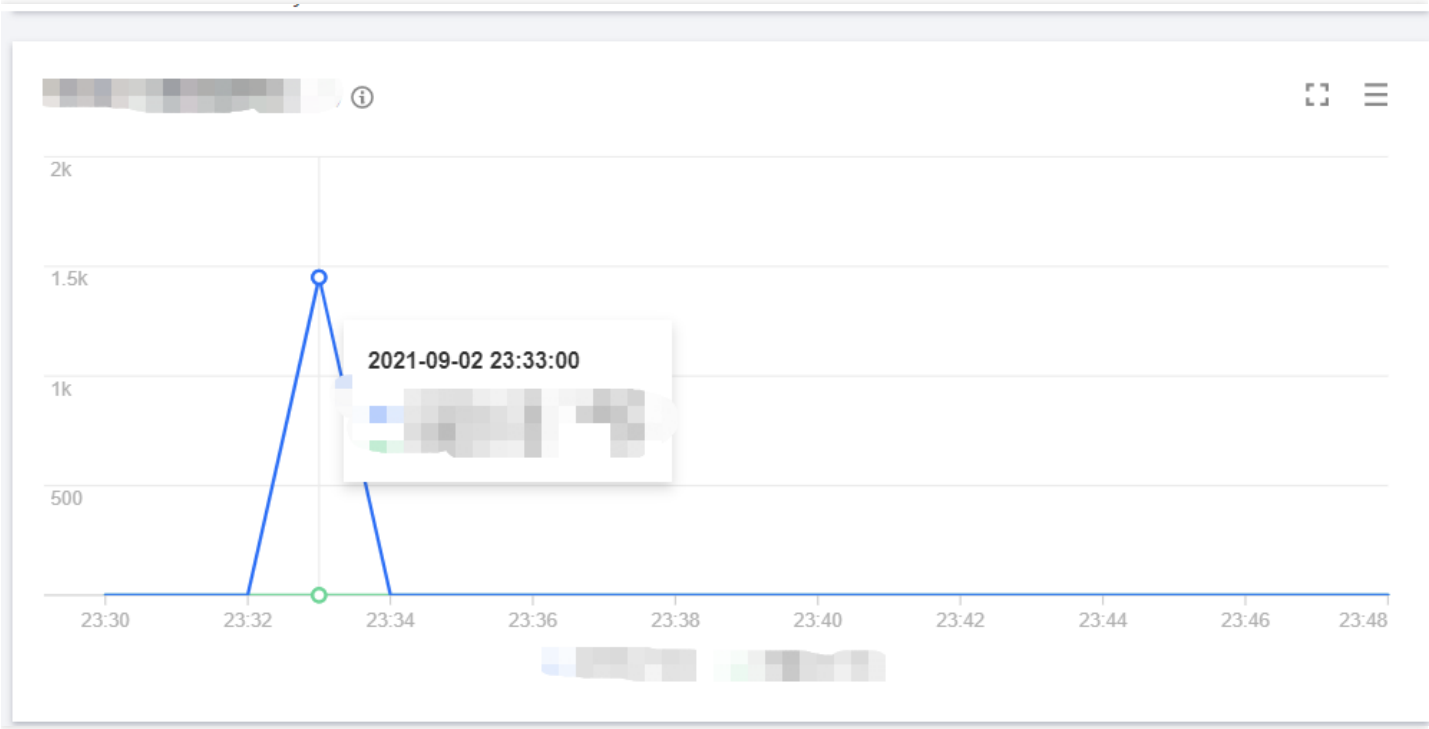
展开&收起

Start 2,000 concurrent requests on the client and call the API 2,000 * 5,000 times.

Increase the request concurrency of the new version from 0 to 1,000 and then to 2,000, reduce the concurrency of the old version from 2,000 to 1,000 and then to 0, and collect the statistics of the concurrency count and cold start concurrency of the new and old versions.

Performance

The line chart of concurrency on the old version is as shown below:



The line chart of concurrency on the new version is as shown below:

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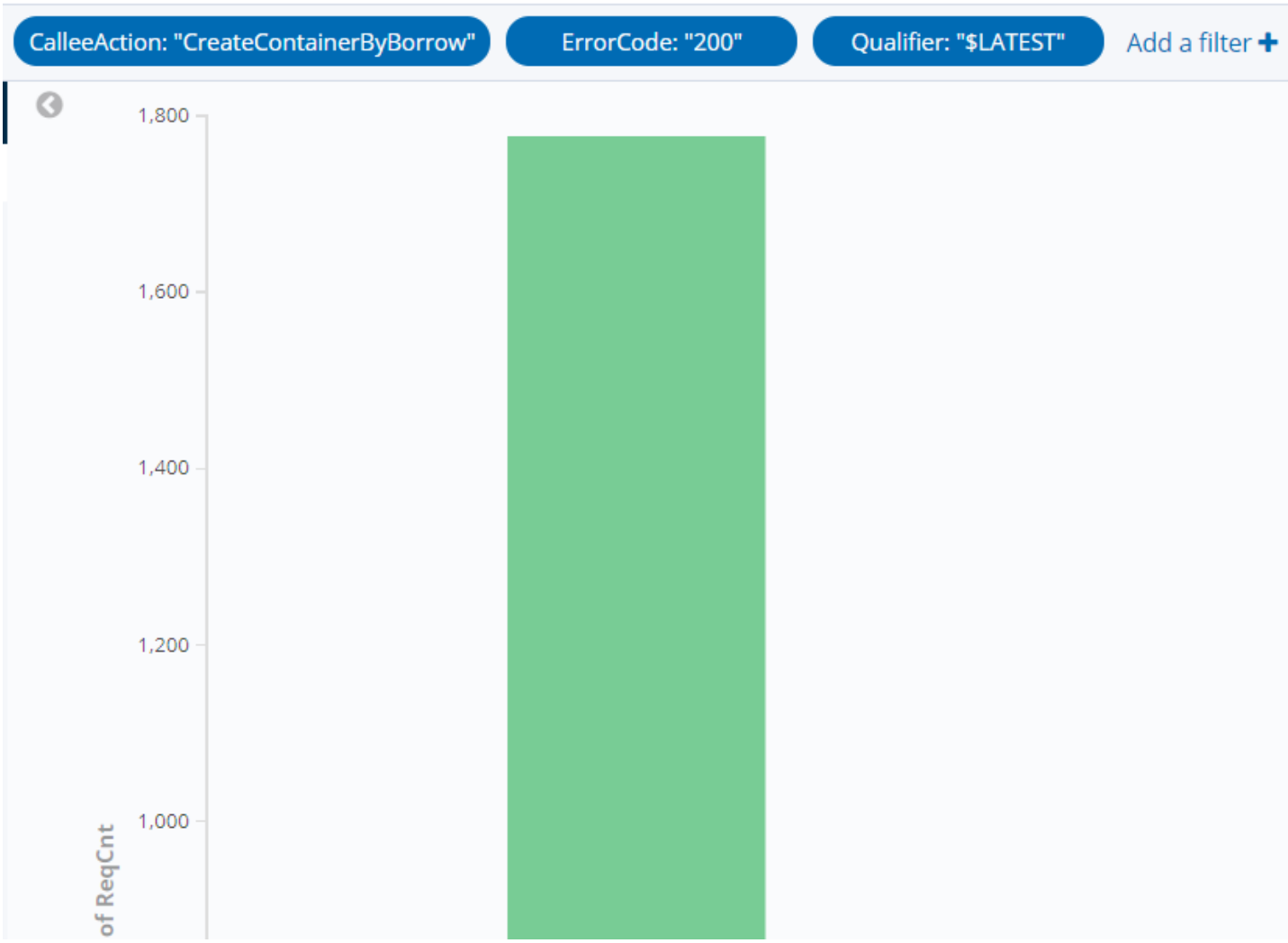
The line chart of cold start on the old version is as shown below:



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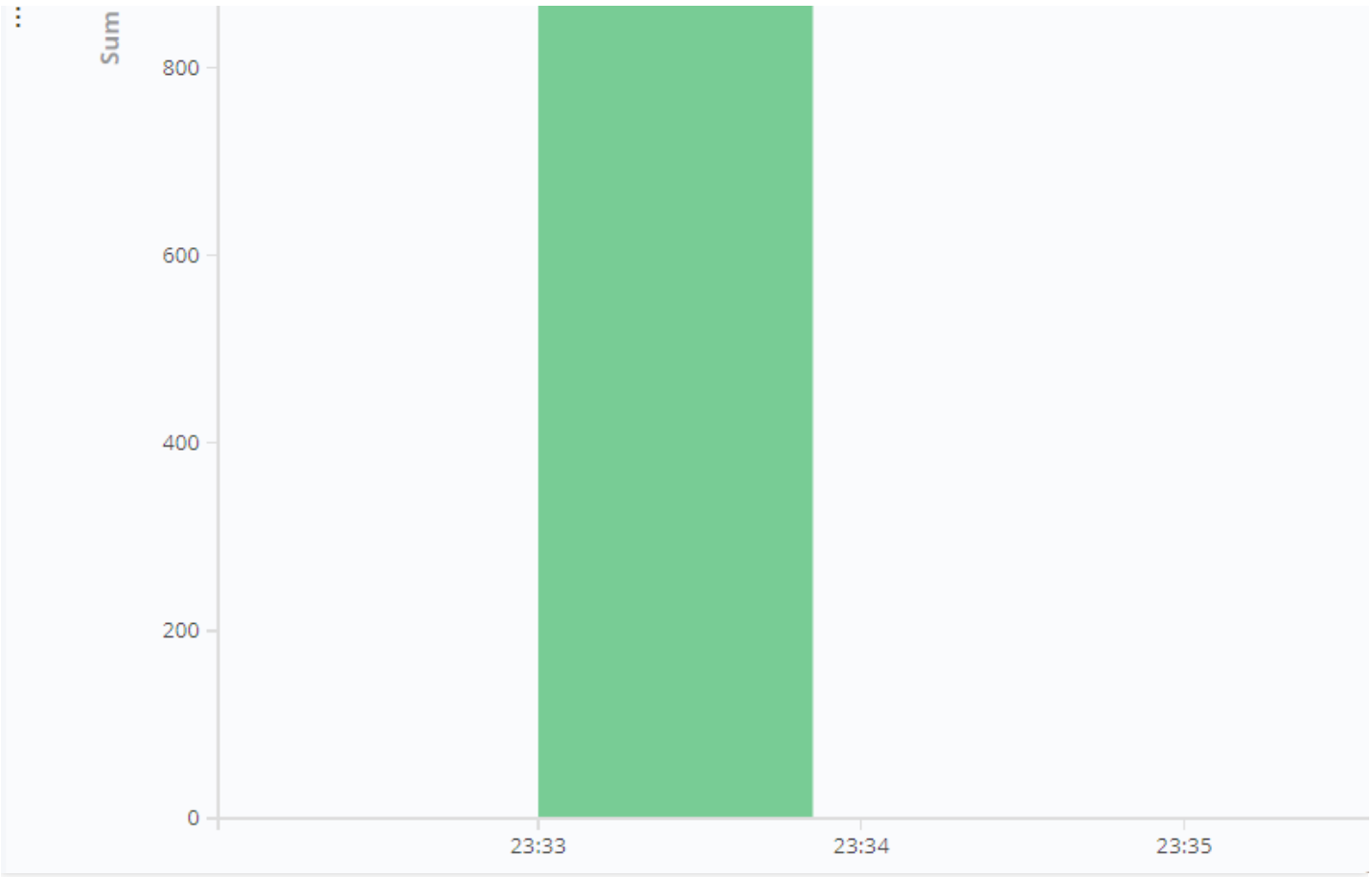

The line chart of cold start on the old version is as shown below:

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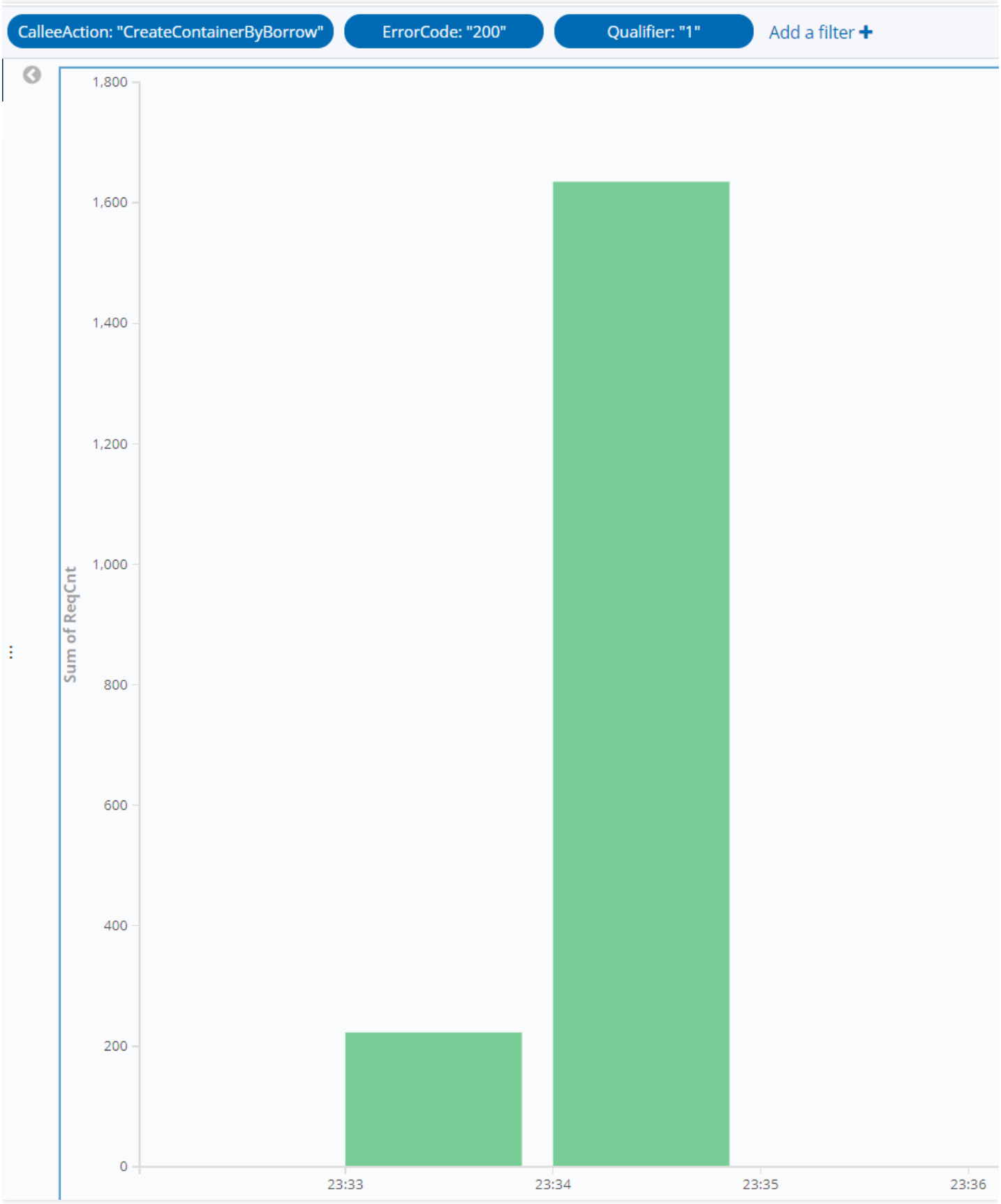

As can be seen from the above data, the sudden concurrency peak can be lowered by gradually publishing versions to switch traffic.

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Provisioned

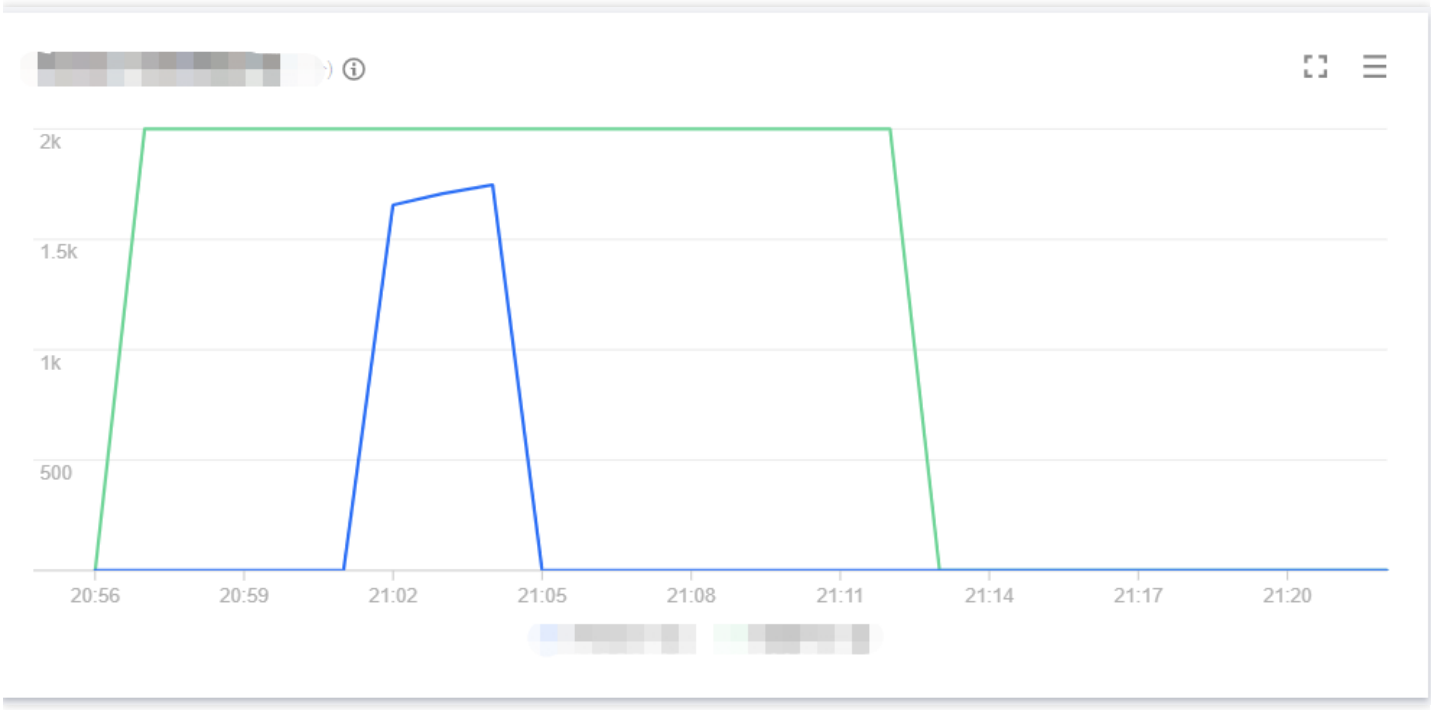
展开&收起

Provision 2,000 concurrent instances for the function.

After the provisioned instances are launched successfully, start 2,000 requests and call the API 5,000 times and collect the statistics of the concurrency count and cold start concurrency.

Performance

The line chart of concurrency is as shown below:



Cold start concurrency is as shown below:

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As can be seen, the number of cold starts in the entire range is 0.
The number of function requests is as shown below:

As can be seen from the above data, the number of concurrent cold starts can be reduced to zero by configuring provisioned instances. We recommend you configure provisioned concurrency to guarantee the performance and avoid lengthy initialization.

Conclusion

In summary, in scenarios with high QPS and short execution duration, gradually switching traffic can ease the cold start concurrency peak, and configuring provisioned concurrency can address the problem of lengthy initialization (including cold function start).

Use case 2. Computation-intensive long execution

Business conditions

Business Information	Metric
Function initialization duration	10s
Business execution duration	2m
QPS	About 20

Stress test goal

The average QPS of the lengthy computing tasks is not high, but due to the lengthy computation process, a high number of instances are running, leading to a high function concurrency. This stress test scenario is designed to test the task scheduling and processing speeds of the function when processing a high number of lengthy execution tasks.

Stress test configuration

Function	a. Memory: 128 MB, with async execution and status tracking enabled but log delivery

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configuration	disabled b. Concurrency quota: 2,000 * 128 MB c. Duration: 2m d. Burst: 2,000
Testing tool	Use the ab tool to simulate messages in COS and invoke the function through a COS trigger.

Stress test task

Each stress test task needs to start from cold start with no hot instances and impact of other functions present.

Show All

Deliver

展开&收起

Start 2,000 concurrent instances, each of which delivers 1 message (2,000 requests in total). Collect the statistics of the start time when the first request arrives, end time when the last request returns, and distribution of the total processing time of the requests.

Performance

The line chart of concurrency is as shown below:

The line chart of cold start is as shown below:

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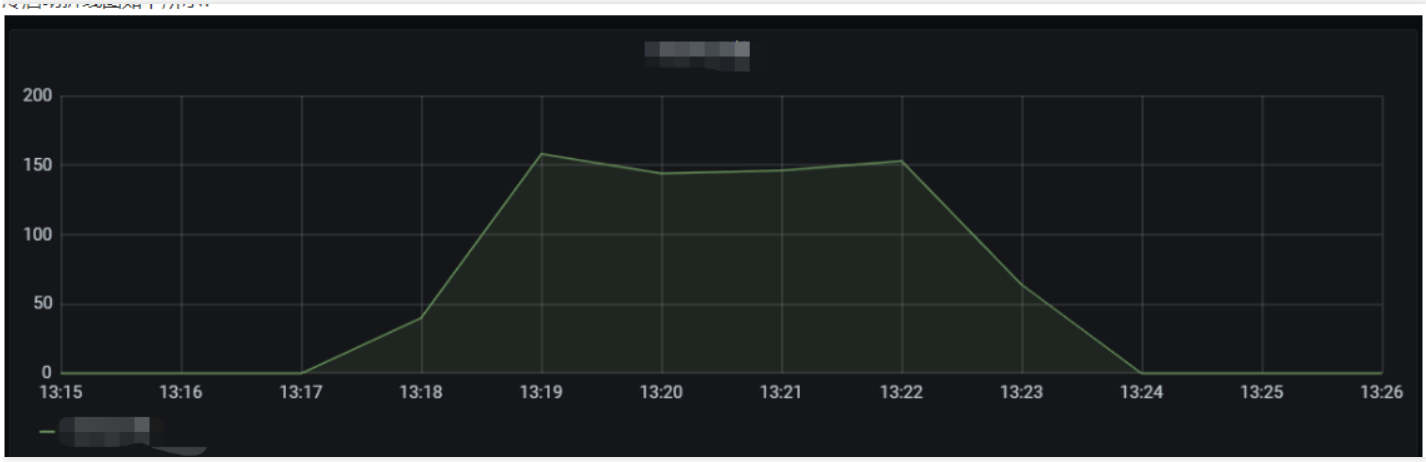

The number of function requests is as shown below:

Why are not all cold starts completed in the same minute?

a. In an async scenario, the number of requests does not reach RegionInvoke at the same time; instead, RegionInvoke is invoked through the worker of the async trigger.

b. The function duration is 2 minutes and the initialization process takes 10 seconds, amounting to below 3 minutes; therefore, as the number of function requests continuously increases but the previously started containers have not been released, it is necessary to keep starting containers to complete the requests. As a result, the rate of increase in the number of function requests per minute is basically consistent with the number of cold starts.

c. The number of cold starts begins to drop when the function concurrency reaches the peak, which is generally normal.

Deliver

展开&收起

Start 2,000 concurrent instances, each of which delivers 2 messages (4,000 requests in total). Collect the statistics of the start time when the first request arrives, end time when the last request returns, and distribution of the total

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processing time of the requests.

Performance

The line chart of concurrency is as shown below:

The line chart of cold start is as shown below:

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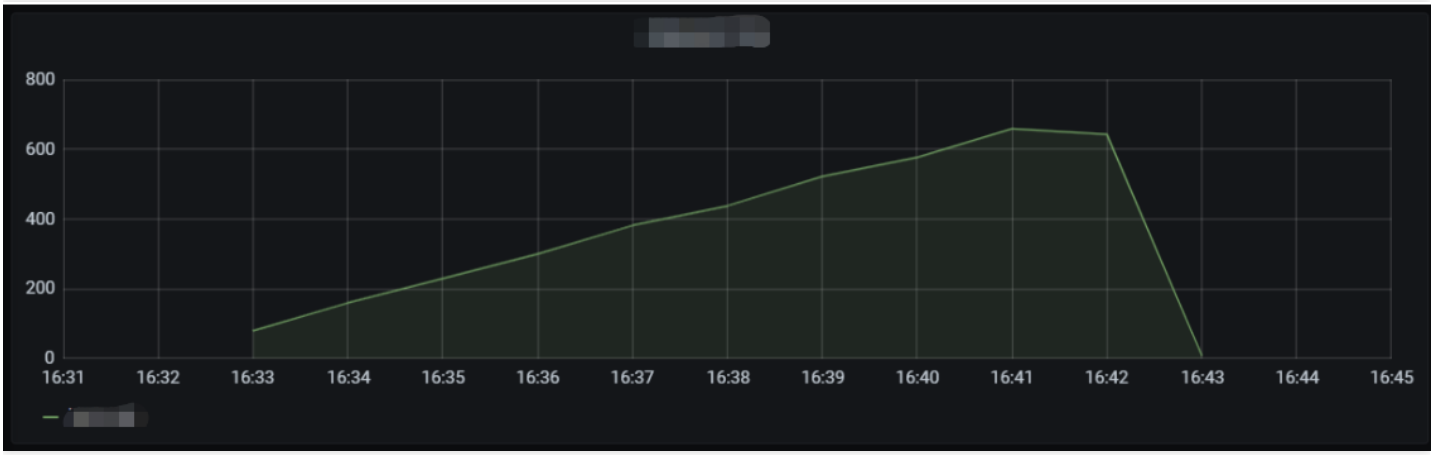
The number of function requests is as shown below:



Result analysis

The case with 4,000 messages can better demonstrate the conclusion drawn in the case of 2,000 messages. Because the previous function is not released in the first two seconds, the number of cold starts is the same as the number of function requests, and subsequently, the increase in the number of cold starts and the increase in the number of function requests are generally consistent.

Conclusion

Business involving a lengthy initialization and execution duration can run stably, and the system can scale instantly based on the number of requests.

Use case 3. Async message processing

Business background

SCF functions are widely used for async message processing. Here, the execution duration of 100 ms is used as the average value.

Business Information	Metric
Function initialization duration	0
Business execution duration	100 ms

Stress test goal

The consumption of async messages is related to production. Suppose a high number of messages have been retained. View the consumption of the function, including the retries during consumption due to concurrency overrun. You can flexibly adjust the reserved concurrency of the function to control its consumption speed, i.e., the stress on the downstream backend.

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Stress test configuration

Function configuration	a. Memory: 128 MB, with async execution and status tracking enabled but log delivery disabled b. Concurrency quota: X * 128 MB c. Duration: 100 ms d. Burst: 2,000
Testing tool	Use the ab tool to simulate messages in COS and invoke the function through a COS trigger.

Stress test task

Each stress test task needs to start from cold start with no hot instances present.

Show All

1,000

展开&收起

Reserve 1,000 concurrent instances for the function, deliver 1,000,000 messages for consumption, record the total consumption time and the distribution of message processing, and monitor the concurrency.

Performance

The line chart of concurrency is as shown below:

The line chart of cold start is as shown below:

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The number of function requests is as shown below:

All messages are processed in 3 minutes.

2,000

展开&收起

Reserve 2,000 concurrent instances for the function, deliver 1,000,000 messages for consumption, record the total consumption time and the distribution of message processing, and monitor the concurrency.

Performance

The line chart of concurrency is as shown below:

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The line chart of cold start is as shown below:

The number of function requests is as shown below:

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All messages are processed in 2 minutes.

4,000

展开&收起

Reserve 4,000 concurrent instances for the function, deliver 1,000,000 messages for consumption, record the total consumption time and the distribution of message processing, and monitor the concurrency.

Performance

The line chart of concurrency is as shown below:

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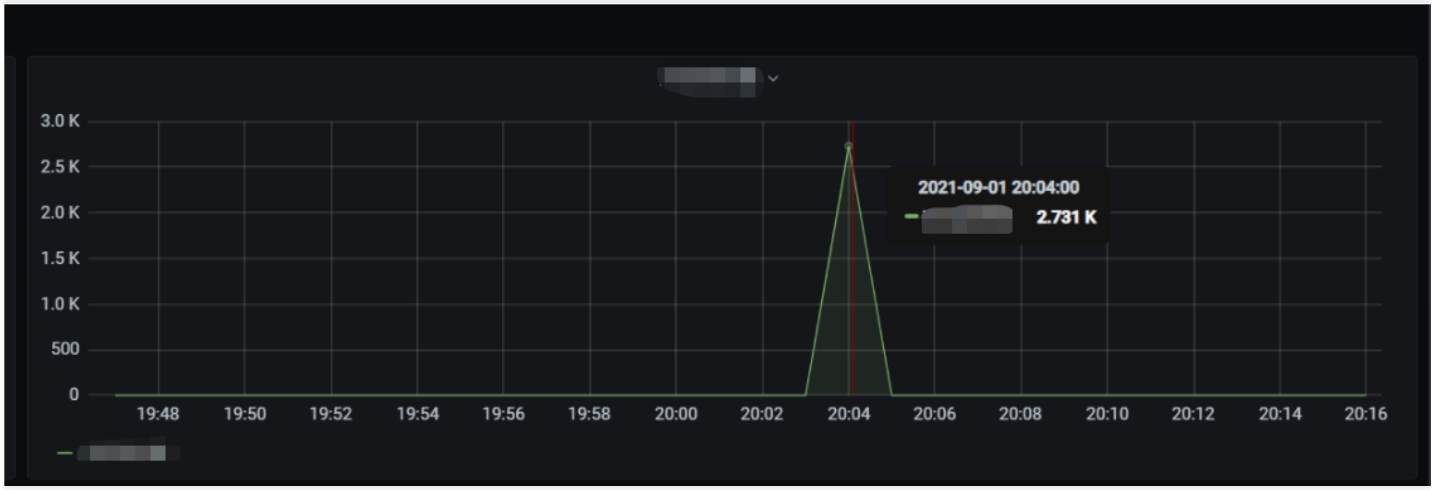
The line chart of cold start is as shown below:



The dashboard displays the cold function start data, which overruns the burst.

The number of function requests is as shown below:

All messages are processed in 1 minute.

Result analysis

1. When the concurrency quota is increased from 1,000 to 2,000, it can be seen that the processing speed of the function, including function concurrency, increases significantly; therefore, when there are many async messages, increasing the concurrency quota can increase the message processing speed.
2. When the concurrency quota is increased from 2,000 to 4,000, the message processing speed and function concurrency also increase, but the overall processing time is also below 2m, which indicates that when there are 1,000,000 async messages, the 4,000 quota value certainly can increase the message processing speed and function concurrency, but the 2,000 quota value can basically meet the needs in the scenario.
3. The burst of 2,000 will be overrun when the concurrency quota is 4,000 and there are a high number of messages.

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Conclusion

In scenarios involving high numbers of async messages, increasing the function concurrency quota can significantly increase the message processing speed, which is in line with the expectations.
You can flexibly control function concurrency so as to control the consumption speed of async messages.

Notes

- Provisioned concurrency is available free of charge during the beta test. This feature is expected to be officially launched in November 2021, and small fees will be charged when provisioned concurrent instances are idle, and fees will be charged based on the actual execution duration of requests when they process requests. For more information, please see Billing Overview.

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Using Custom Font in SCF

Last updated：2022-04-29 15:55:43

Use Cases

By using Puppeteer in SCF, you can take screenshots of, save, screencap, and generate PDFs from specific webpages as needed. This feature extends the on-demand launch feature of SCF and only starts instance execution when needed, without using virtual machines or containers to continuously run the service. Therefore, you can easily encapsulate the feature as a general capability.

The runtime environment of SCF currently has only one built-in font. This document describes how to use custom fonts in SCF to meet your personalized needs. This document takes using the WenQuanZhengHei font in Node.js 16.13 as an example to describe how to use custom fonts in SCF.

Prerequisites

Prepare the desired custom font file, such as WenQuanZhengHei-1.ttf

Overall Process

- *1*Put the font file in the specified directory of the function code.
- *2*Set the font file configuration file `fonts.config` to make it able to load the font file in the directory specified in step 1.
- *3*Set the SCF environment variable `XDG_CONFIG_HOME` to specify the load path of the font configuration file.

Directions

1. Create the folder `fonts` in the root directory of the function code and put the prepared font file in this directory.

2. Create the folder `fontconfig` in the root directory of the function code and create the font configuration file `fonts.conf` in it with the following content:
   Note: `/var/user/fonts` in line 27 is the path of the `fonts` folder created in step 1 in the SCF environment.

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```
<?xml version="1.0"?>
<!DOCTYPE fontconfig SYSTEM "fonts.dtd">
<!-- /etc/fonts/fonts.conf file to configure system font access -->
<fontconfig>
<!--
DO NOT EDIT THIS FILE.
IT WILL BE REPLACED WHEN FONTCONFIG IS UPDATED.
LOCAL CHANGES BELONG IN 'local.conf'.
The intent of this standard configuration file is to be adequate for
most environments. If you have a reasonably normal environment and
have found problems with this configuration, they are probably
things that others will also want fixed. Please submit any
problems to the fontconfig bugzilla system located at fontconfig.org
Note that the normal 'make install' procedure for fontconfig is to
replace any existing fonts.conf file with the new version. Place
any local customizations in local.conf which this file references.
Keith Packard
```

```
-->
<!-- Font directory list -->
<dir>/usr/share/fonts</dir>
<dir>/var/user/fonts</dir>
<dir>/usr/share/X11/fonts/Type1</dir> <dir>/usr/share/X11/fonts/TTF</dir>
<dir>/usr/local/share/fonts</dir>
<dir prefix="xdg">fonts</dir>
<!-- the following element will be removed in the future -->
<dir>~/.fonts</dir>
<!--
Accept deprecated 'mono' alias, replacing it with 'monospace'
-->
<match target="pattern">
<test qual="any" name="family">
<string>mono</string>
</test>
<edit name="family" mode="assign" binding="same">
<string>monospace</string>
</edit>
```

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```
</match>
<!--
Accept alternate 'sans serif' spelling, replacing it with 'sans-serif'
-->
<match target="pattern">
<test qual="any" name="family">
<string>sans serif</string>
</test>
<edit name="family" mode="assign" binding="same">
<string>sans-serif</string>
</edit>
</match>
<!--
Accept deprecated 'sans' alias, replacing it with 'sans-serif'
-->
<match target="pattern">
<test qual="any" name="family">
<string>sans</string>
</test>
<edit name="family" mode="assign" binding="same">
<string>sans-serif</string>
</edit>
</match>
<!--
Load local system customization file
-->
<include ignore_missing="yes">/etc/fonts/conf.d</include>
<!-- Font cache directory list -->
<cachedir>/var/cache/fontconfig</cachedir>
<cachedir prefix="xdg">fontconfig</cachedir>
<!-- the following element will be removed in the future -->
<cachedir>/.fontconfig</cachedir>
<config>
<!--
These are the default Unicode chars that are expected to be blank
in fonts. All other blank chars are assumed to be broken and
```

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```
won't appear in the resulting charsets
-->
<blank>
<int>0x0020</int> <!-- SPACE -->
<int>0x00A0</int> <!-- NO-BREAK SPACE -->
<int>0x00AD</int> <!-- SOFT HYPHEN -->
<int>0x034F</int> <!-- COMBINING GRAPHEME JOINER -->
<int>0x0600</int> <!-- ARABIC NUMBER SIGN -->
<int>0x0601</int> <!-- ARABIC SIGN SANAH -->
<int>0x0602</int> <!-- ARABIC FOOTNOTE MARKER -->
<int>0x0603</int> <!-- ARABIC SIGN SAFHA -->
<int>0x06DD</int> <!-- ARABIC END OF AYAH -->
<int>0x070F</int> <!-- SYRIAC ABBREVIATION MARK -->
<int>0x115F</int> <!-- HANGUL CHOSEONG FILLER -->
<int>0x1160</int> <!-- HANGUL JUNGSEONG FILLER -->
<int>0x1680</int> <!-- OGHAM SPACE MARK -->
<int>0x17B4</int> <!-- KHMER VOWEL INHERENT AQ -->
<int>0x17B5</int> <!-- KHMER VOWEL INHERENT AA -->
<int>0x180E</int> <!-- MONGOLIAN VOWEL SEPARATOR -->
<int>0x2000</int> <!-- EN QUAD -->
<int>0x2001</int> <!-- EM QUAD -->
<int>0x2002</int> <!-- EN SPACE -->
<int>0x2003</int> <!-- EM SPACE -->
<int>0x2004</int> <!-- THREE-PER-EM SPACE -->
<int>0x2005</int> <!-- FOUR-PER-EM SPACE -->
<int>0x2006</int> <!-- SIX-PER-EM SPACE -->
<int>0x2007</int> <!-- FIGURE SPACE -->
<int>0x2008</int> <!-- PUNCTUATION SPACE -->
<int>0x2009</int> <!-- THIN SPACE -->
<int>0x200A</int> <!-- HAIR SPACE -->
<int>0x200B</int> <!-- ZERO WIDTH SPACE -->
<int>0x200C</int> <!-- ZERO WIDTH NON-JOINER -->
<int>0x200D</int> <!-- ZERO WIDTH JOINER -->
<int>0x200E</int> <!-- LEFT-TO-RIGHT MARK -->
<int>0x200F</int> <!-- RIGHT-TO-LEFT MARK -->
<int>0x2028</int> <!-- LINE SEPARATOR -->
```

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```
<int>0x2029</int> <!-- PARAGRAPH SEPARATOR -->
<int>0x202A</int> <!-- LEFT-TO-RIGHT EMBEDDING -->
<int>0x202B</int> <!-- RIGHT-TO-LEFT EMBEDDING -->
<int>0x202C</int> <!-- POP DIRECTIONAL FORMATTING -->
<int>0x202D</int> <!-- LEFT-TO-RIGHT OVERRIDE -->
<int>0x202E</int> <!-- RIGHT-TO-LEFT OVERRIDE -->
<int>0x202F</int> <!-- NARROW NO-BREAK SPACE -->
<int>0x205F</int> <!-- MEDIUM MATHEMATICAL SPACE -->
<int>0x2060</int> <!-- WORD JOINER -->
<int>0x2061</int> <!-- FUNCTION APPLICATION -->
<int>0x2062</int> <!-- INVISIBLE TIMES -->
<int>0x2063</int> <!-- INVISIBLE SEPARATOR -->
<int>0x206A</int> <!-- INHIBIT SYMMETRIC SWAPPING -->
<int>0x206B</int> <!-- ACTIVATE SYMMETRIC SWAPPING -->
<int>0x206C</int> <!-- INHIBIT ARABIC FORM SHAPING -->
<int>0x206D</int> <!-- ACTIVATE ARABIC FORM SHAPING -->
<int>0x206E</int> <!-- NATIONAL DIGIT SHAPES -->
<int>0x206F</int> <!-- NOMINAL DIGIT SHAPES -->
<int>0x2800</int> <!-- BRAILLE PATTERN BLANK -->
<int>0x3000</int> <!-- IDEOGRAPHIC SPACE -->
<int>0x3164</int> <!-- HANGUL FILLER -->
<int>0xFEFF</int> <!-- ZERO WIDTH NO-BREAK SPACE -->
<int>0xFFA0</int> <!-- HALFWIDTH HANGUL FILLER -->
<int>0xFFF9</int> <!-- INTERLINEAR ANNOTATION ANCHOR -->
<int>0xFFFA</int> <!-- INTERLINEAR ANNOTATION SEPARATOR -->
<int>0xFFFB</int> <!-- INTERLINEAR ANNOTATION TERMINATOR -->
</blank>
<!--
Rescan configuration every 30 seconds when FcFontSetList is called
-->
<rescan>
<int>30</int>
</rescan>
</config>
</fontconfig>
```

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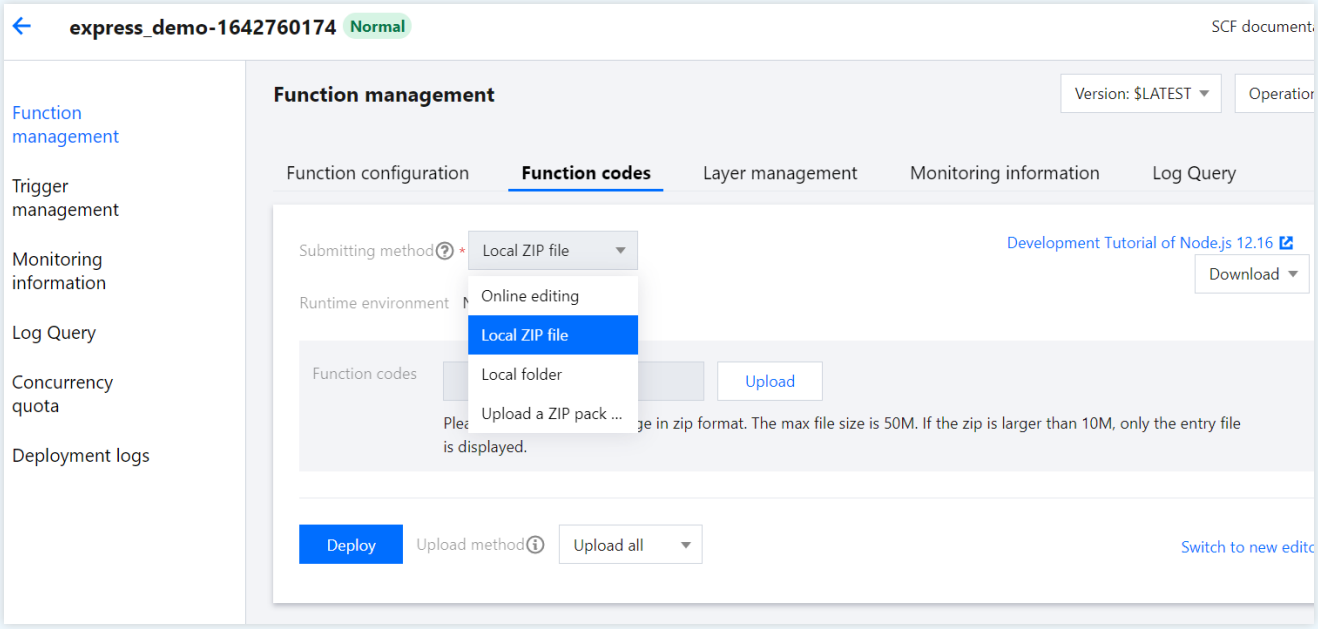
After steps 1 and 2 are completed, the function code directory structure is as follows:

```
├── Function code files (such as index.js and app.js)
├── fonts
|   └── WenQuanZhengHei-1.ttf
├── fontconfig
|   └── fonts.conf
```

3. Package the function code in zip format, select **Local ZIP file**, create a function or update the function code, and click **Deploy** to update the function code in the cloud after successful upload.

Note：
When the function code is packaged, all the files in the code root directory are included, i.e., all the files in the above file structure. The outer folder doesn't need to be packaged.



4. Edit the function's environment variable. After adding the environment variable, click **Save** to complete the configuration update.

key	value
`XDG_CONFIG_HOME`	`/var/user`

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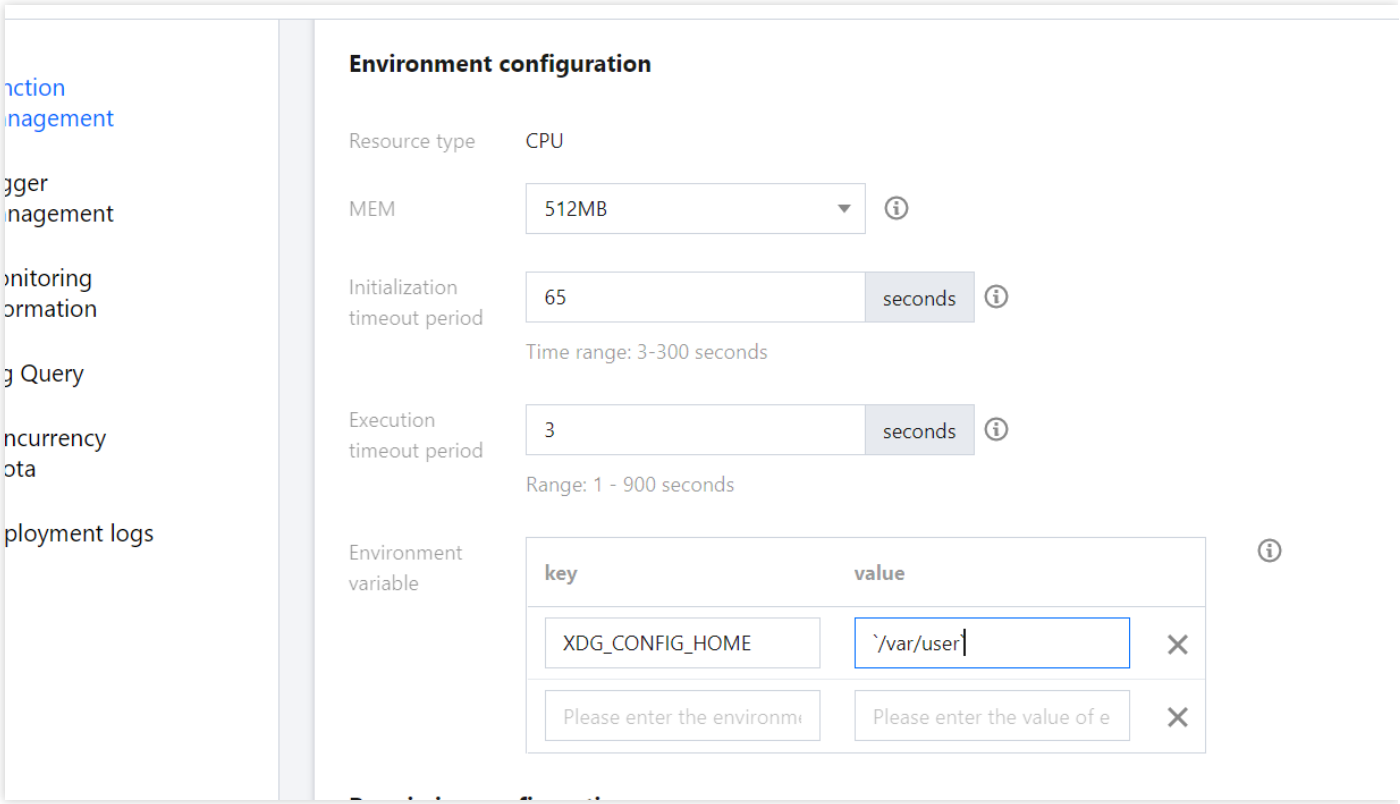

5. Verify whether the font is added successfully. In the Node.js environment, use the `font-list` library to print out the fonts supported in the environment. After completing the above configuration, you can see that the WenQuanZhengHei font has been successfully loaded in the environment.

```
var fontList = require('font-list')
console.log(await fontList.getFonts()) // Print the fonts supported in the envi
ronment
```

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You can also implement custom fonts for image deployment-based functions in the following way. For example, to package Chrome, Puppeteer, and the desired font files in an image and deploy a function with this image, the steps are as follows:

1. Write the dockerfile

This document provides a simple Alpine-based image to create an image build file that includes Chrome and Puppeteer. The file can be named `mypuppeteer.dockerfile` as shown below:

```
FROM alpine
# Installs latest Chromium (92) package.
RUN apk add --no-cache \
chromium \
nss \
freetype \
harfbuzz \
ca-certificates \
ttf-freefont \
nodejs \
yarn

# Tell Puppeteer to skip installing Chrome. We'll be using the installed package.
ENV PUPPETEER_SKIP_CHROMIUM_DOWNLOAD=true \
PUPPETEER_EXECUTABLE_PATH=/usr/bin/chromium-browser
# Puppeteer v10.0.0 works with Chromium 92.
RUN yarn add puppeteer@10.0.0
# Add the CJK font to support Chinese character
```

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```
COPY NotoSansCJK.ttc /usr/share/fonts/TTF
```

Note：

- The font file used in the code needs to be downloaded and placed in the same directory as the docker file.
- This document only provides a sample. You can select font files as needed and adjust the filenames and corresponding fields in the docker file.

2. Build an image

You can build the image by running the following command, which will create an image named `mypuppeteer:v1` :

```
docker build -t mypuppeteer:v1 -f mypuppeteer.dockerfile .
```

3. Perform local testing

After the local image is built, you can use the following `test.js` script to quickly test and verify it by taking and saving a screenshot of a webpage.

```
const puppeteer = require('puppeteer');
(async () => {
const browser = await puppeteer.launch({
executablePath: '/usr/bin/chromium-browser',
args: ['--no-sandbox','--disable-setuid-sandbox','--ignore-certificate-errors'],
defaultViewport: {
width: 1920,
height: 1080,
deviceScaleFactor: 3,
},
});
const page = await browser.newPage();
await page.goto('https://www.baidu.com');
await page.screenshot({path: '/home/test.png'});
await browser.close();
})();
```

Run the following command to run the image, mount the test script directory into a container and run it, and the screenshot file will also be generated in this directory.

```
docker run -it --rm -v $(pwd):/home mypuppeteer:v1 node /home/test.js
```

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You can verify whether the font file works by checking whether the screenshot file is output.

4. Perform subsequent operations

After the image that can run Chrome and Puppeteer is built, you can further build a function runtime environment based on it, push it to the image repository of Tencent Cloud, and then use SCF's custom image deployment capabilities to create your own services.
For the description of custom image deployment in SCF and how to use it, see Feature Description.

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Implementing Todo Application with Spring Boot and SCF

Last updated：2023-06-05 14:48:31

Overview

Spring Boot is a framework provided by the Pivotal team to simplify the initial build and development of new Spring applications. It uses specific configuration methods, so you don't need to define template-based configuration items. This document describes how to use Spring Boot through SCF to build a todo application. SCF provides event-triggered functions and HTTP-triggered functions (recommended in Spring Boot scenarios).

Prerequisites

You have prepared the development environment and tools as instructed in Notes on Java.

Directions

Using an HTTP-triggered function

SCF provides template functions. You can use an HTTP-triggered function as follows to quickly create a todo application and add, delete, modify, and query todos.

Note

This template is for demonstration only. Todo data is actually stored in the instance cache instead of being persistently stored.

Creating a function

1. Log in to the SCF console.
2. Click **Create** on the **Function Service** page.
3. On the **Create** page, select **Template** and search for `springboot` and `webfunc`. In the search results, select **SpringBootToDoApplication** and click **Next**, as shown in the following figure:

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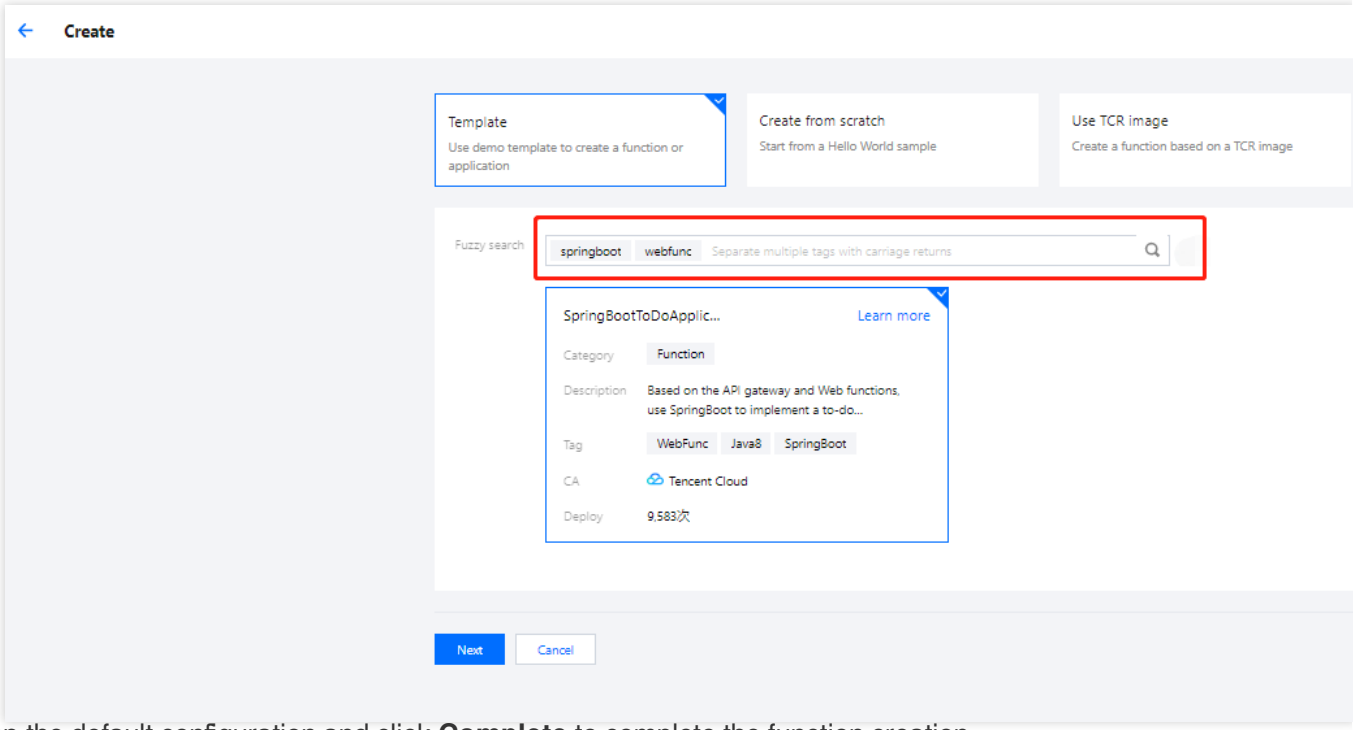


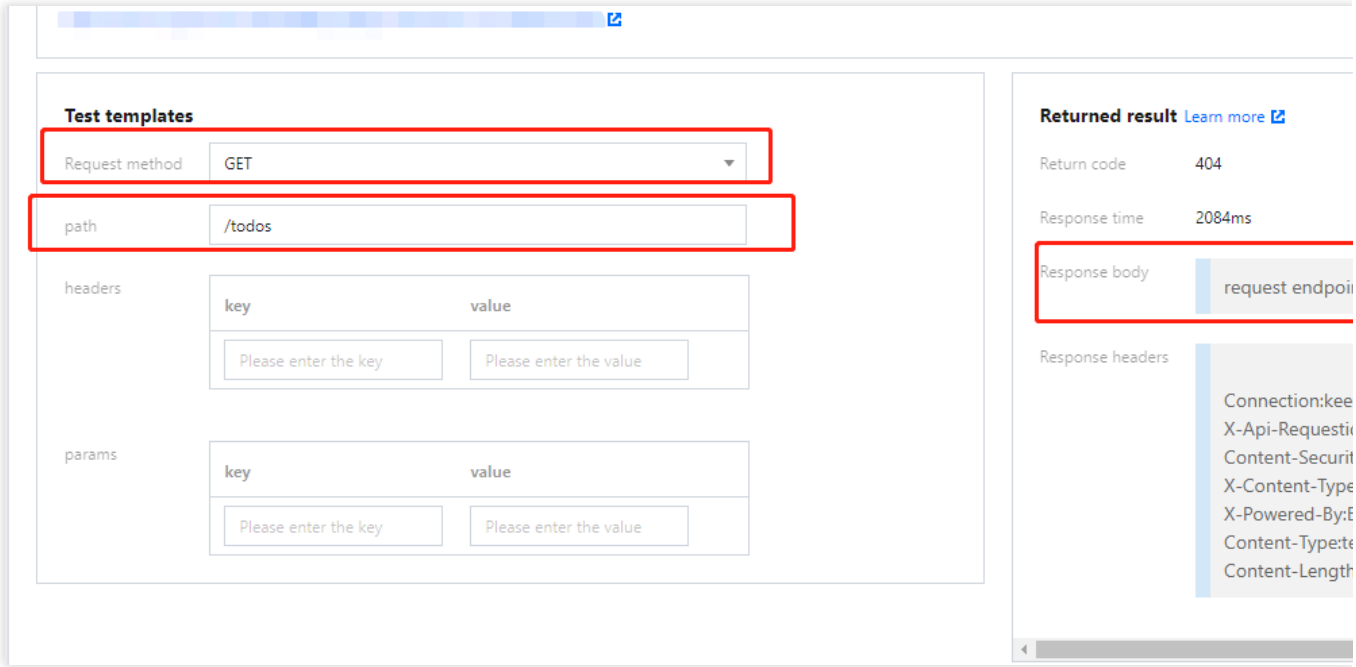
4. Keep the default configuration and click **Complete** to complete the function creation.

Testing a function

On the **Function Code** tab, follow the steps below to initiate a simulated request based on the test template. In this way, you can try out the CRUD features of the todo application.

Query the todo list:

Select GET as the request method, enter `/todos` for `path`, click **Test**, and you will see the current todos in the response body as shown below:



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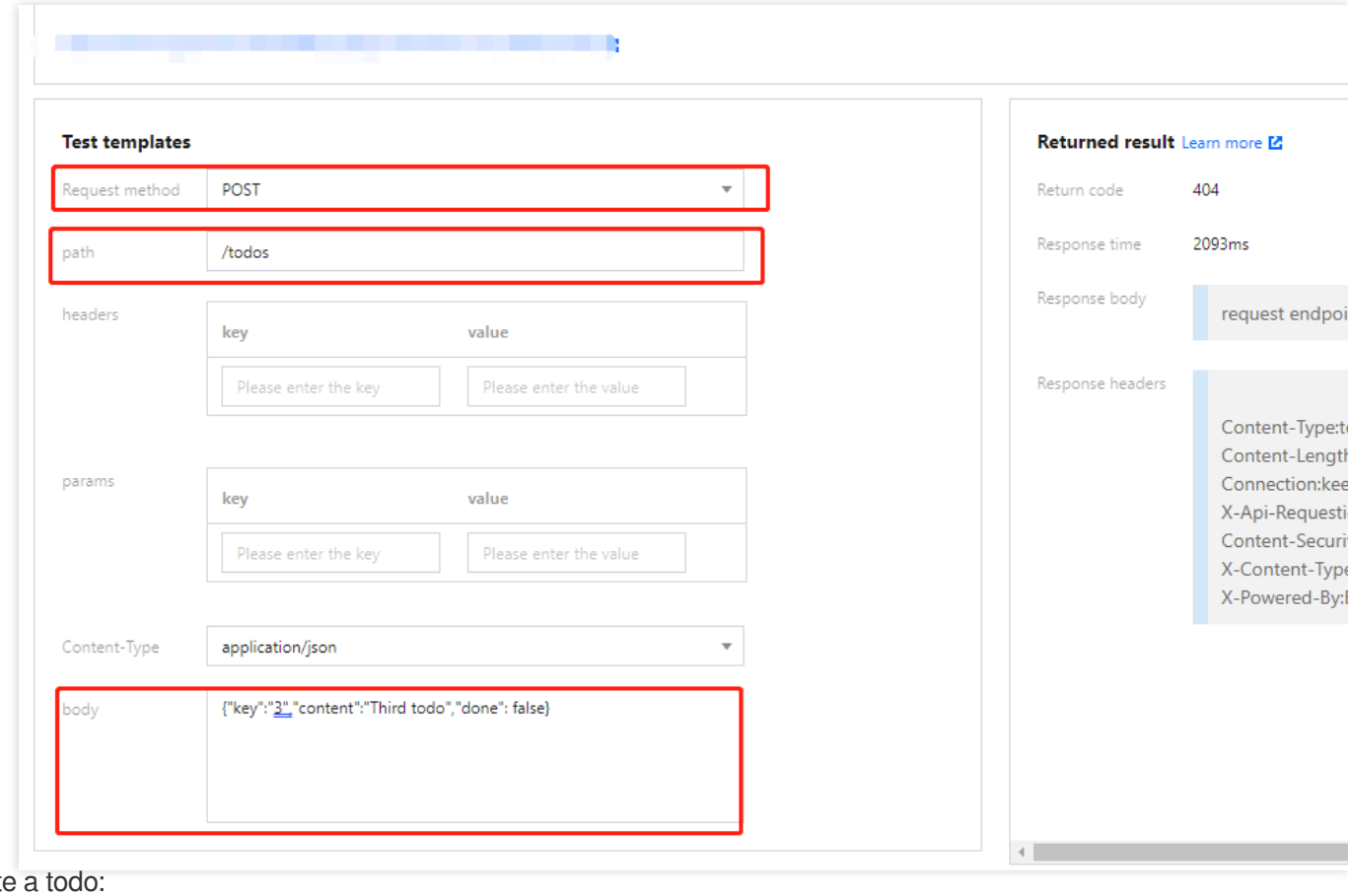
Add a todo:

Select POST as the request method, enter `/todos` for `path` and `{"key":"3","content":"Third todo","done": false}` for `body`, and click **Test** to add a todo as shown below:



Delete a todo:

Select DELETE as the request method, enter `/todos/2` for `path` (to delete the todo whose `key` is 2 for example), and click **Test** as shown below:

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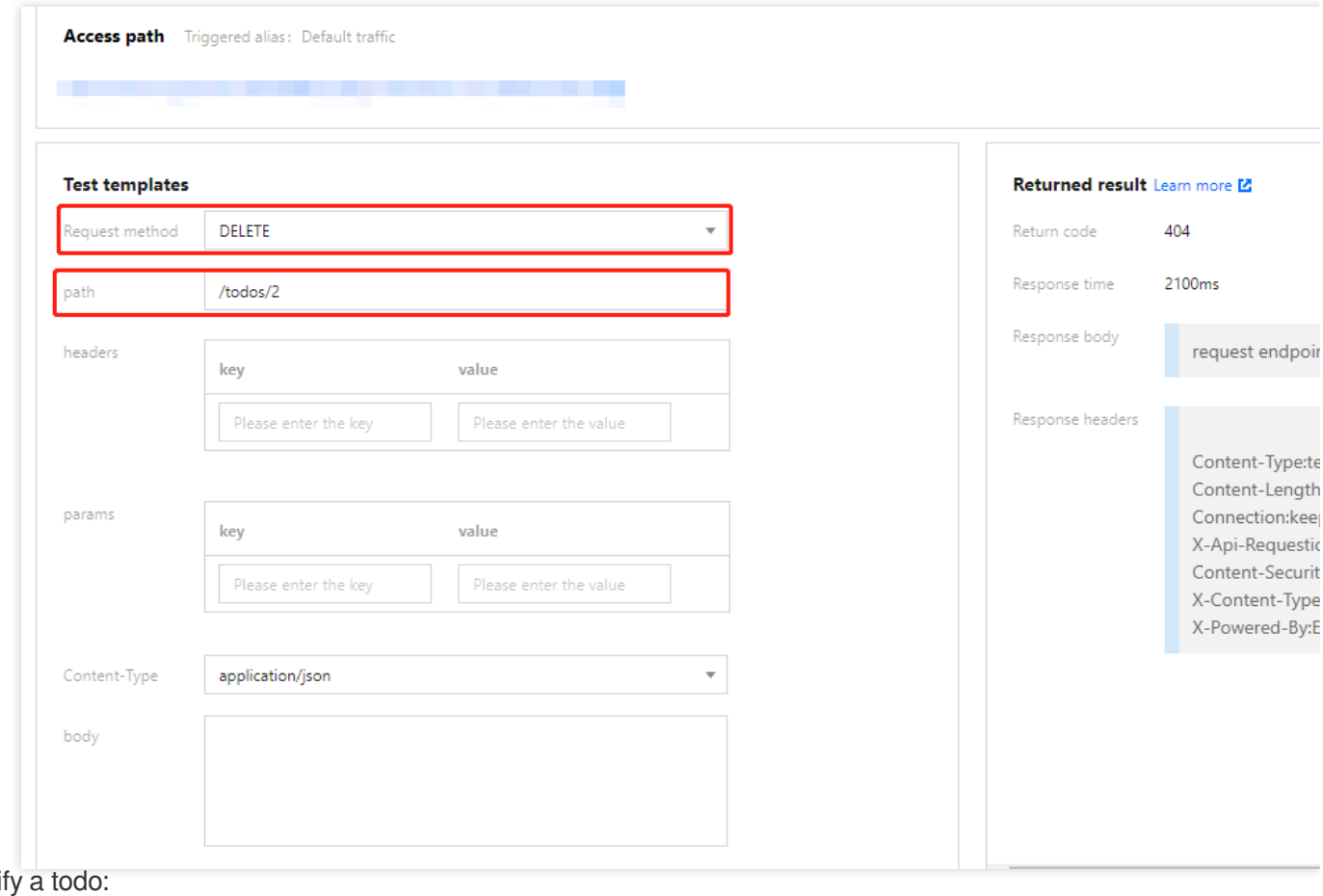

Modify a todo:

Select PUT as the request method, enter `/todos/3` for `path` (to mark the todo whose `key` is 3 as completed for example), enter `{"key":"3","content":"Third todo","done": true}` for `body`, and click **Test** as shown below:

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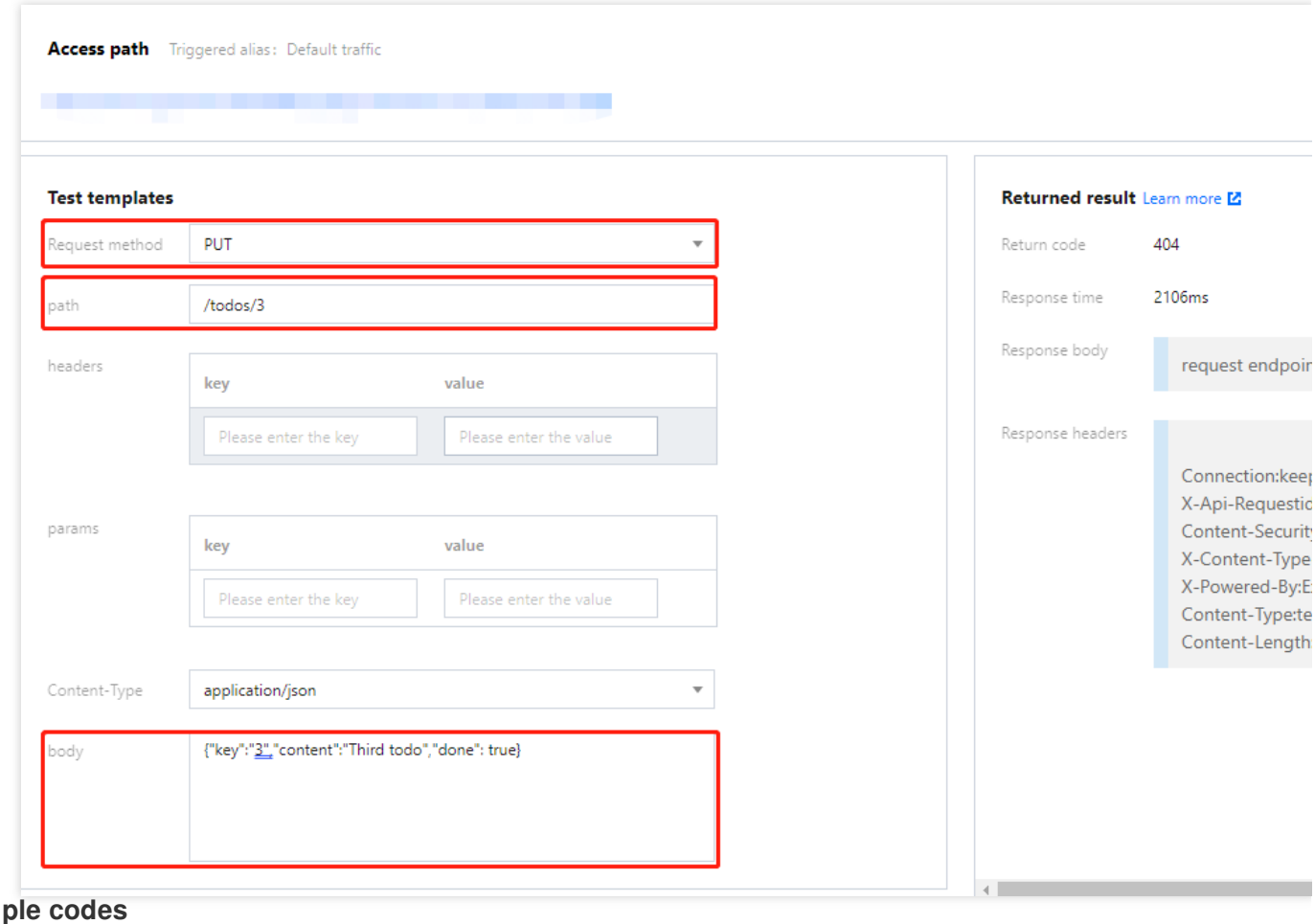
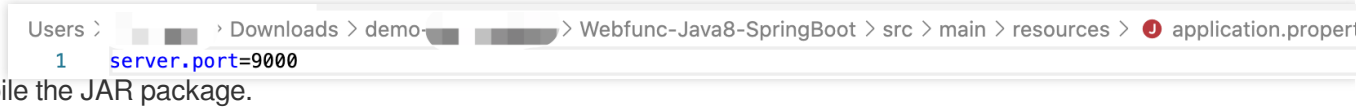


Sample codes

In the Creating a function step, you can also modify the function template based on your business needs. On the **Create** page, click **Learn more** in the upper-right corner of the selected template card. On the pop-up page, click **Download Template Function** to get the source code of the template function.

You can migrate a native Spring Boot project to an HTTP-triggered function as follows:

Make sure that the Spring listening port is 9000 (the specified listening port of the SCF HTTP-triggered function).



Compile the JAR package.

Download the code and run the following compilation command in the `Webfunc-Java8-SpringBoot` directory:

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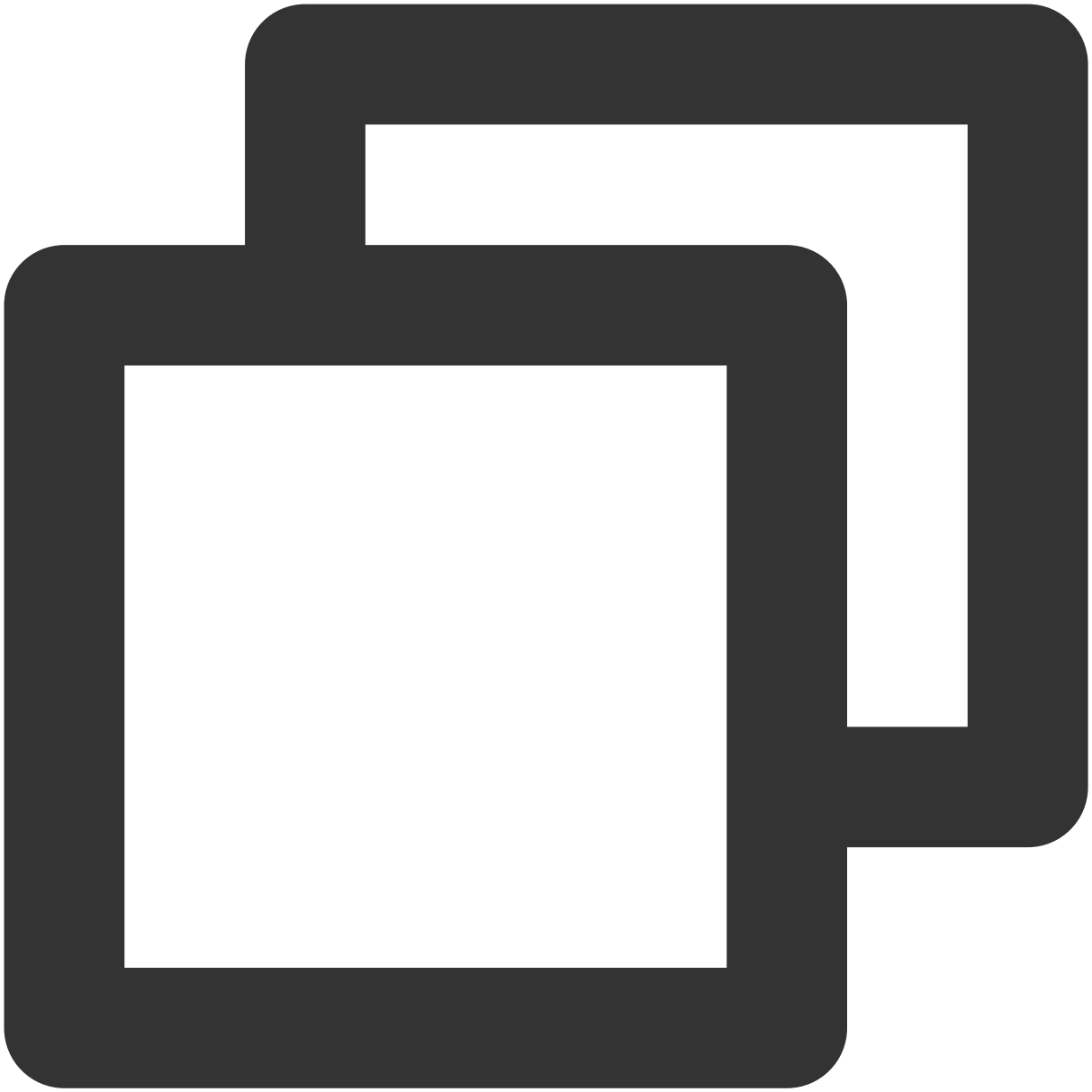

```
gradle build
```

After the compilation, you can get the JAR package in the `build/libs` directory. Select the JAR package whose suffix is `-all` .

Prepare the executable file `scf_bootstrap` to start the web server. Below is the sample file content:

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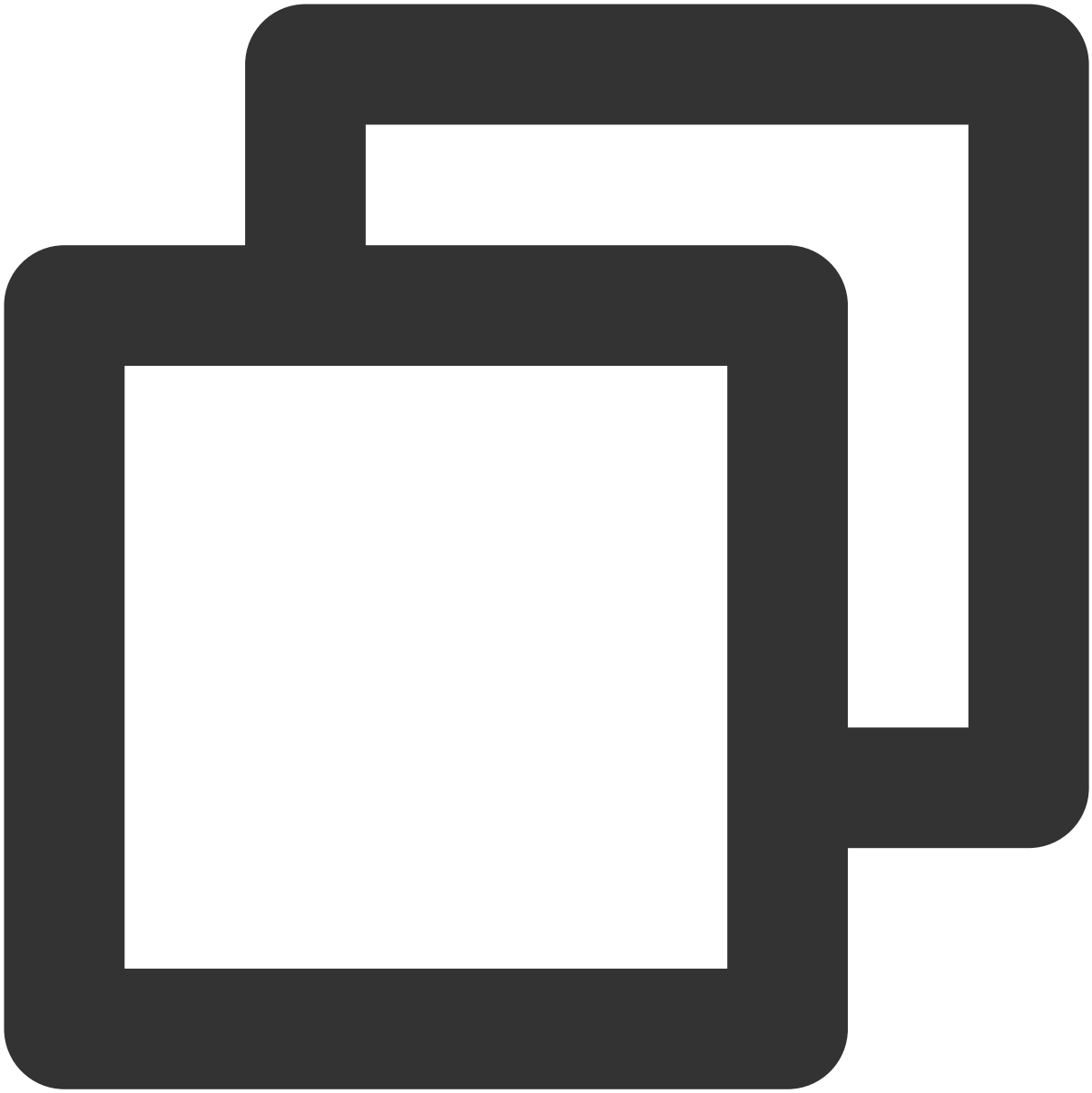

```
#!/bin/bash
/var/lang/java8/bin/java -Dserver.port=9000 -jar scf-springboot-java8-0.0.2-SNAPSHO
```

Note

Run `chmod 755 scf_bootstrap` in the directory of the `scf_bootstrap` file to ensure that the file has the execution permission.

Package the `scf_bootstrap` file and the generated JAR package into a ZIP package and deploy the ZIP package to SCF as follows:

1.1 Log in to the SCF console.

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1.2 Click **Create** on the **Function Service** page.

1.3 On the **Create** page, select **Create from scratch** and configure the following parameters:

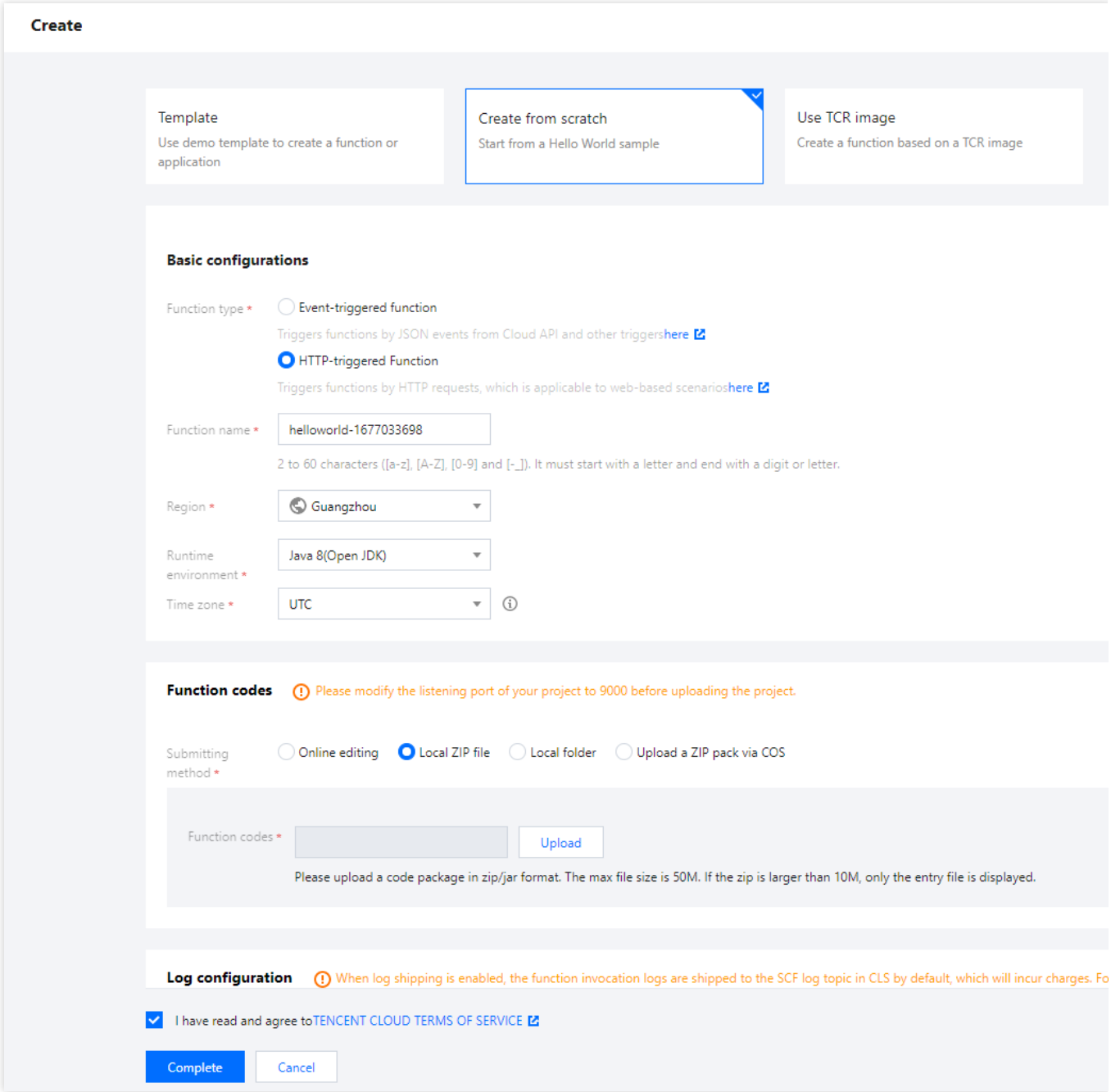
Function type: Select **HTTP-triggered Function**.

Runtime environment: Select **Java 8**.

Submitting method: Select **Local ZIP file**.

Function codes: Click **Upload** and select the ZIP package.

1.4 Keep the default values for other parameters and click **Complete** to complete the function creation, as shown below:



Using an event-triggered function

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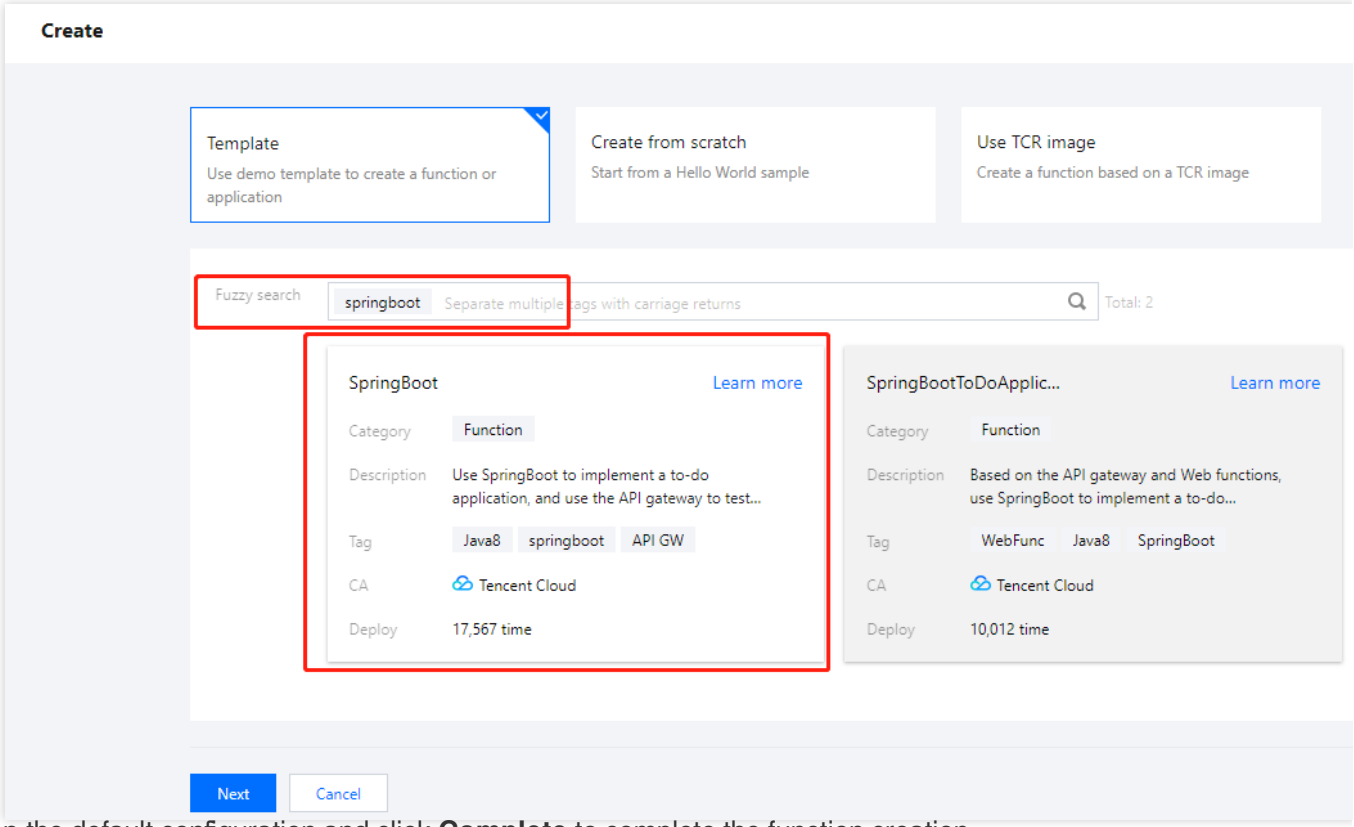
SCF provides template functions. You can use an event-triggered function as follows to quickly create a todo application and add, delete, modify, and query todos.

Note

This template is for demonstration only. Todo data is actually stored in the instance cache instead of being persistently stored.

Creating a function

1. Log in to the SCF console.
2. Click **Create** on the **Function Service** page.
3. On the **Create** page, select **Template** and search for `springboot`. In the search results, select **SpringBoot** and click **Next**.



4. Keep the default configuration and click **Complete** to complete the function creation.

Creating a trigger

Note

If you have created an API Gateway trigger during function creation, simply check whether its configuration is the same as that described below.

1. After creating a function, on the **Trigger management** tab, click **Create trigger**.

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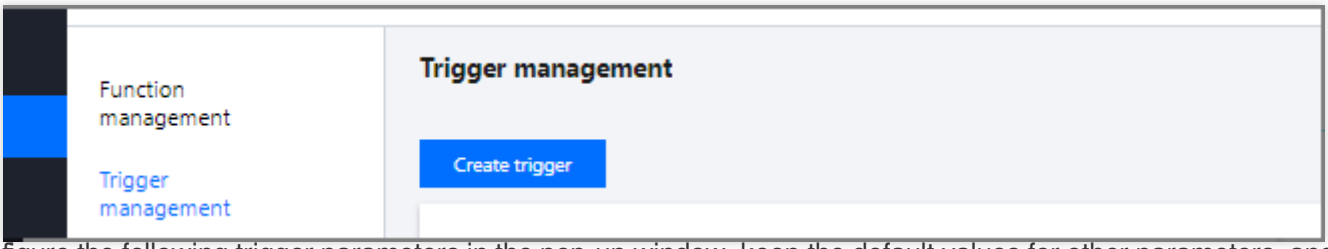
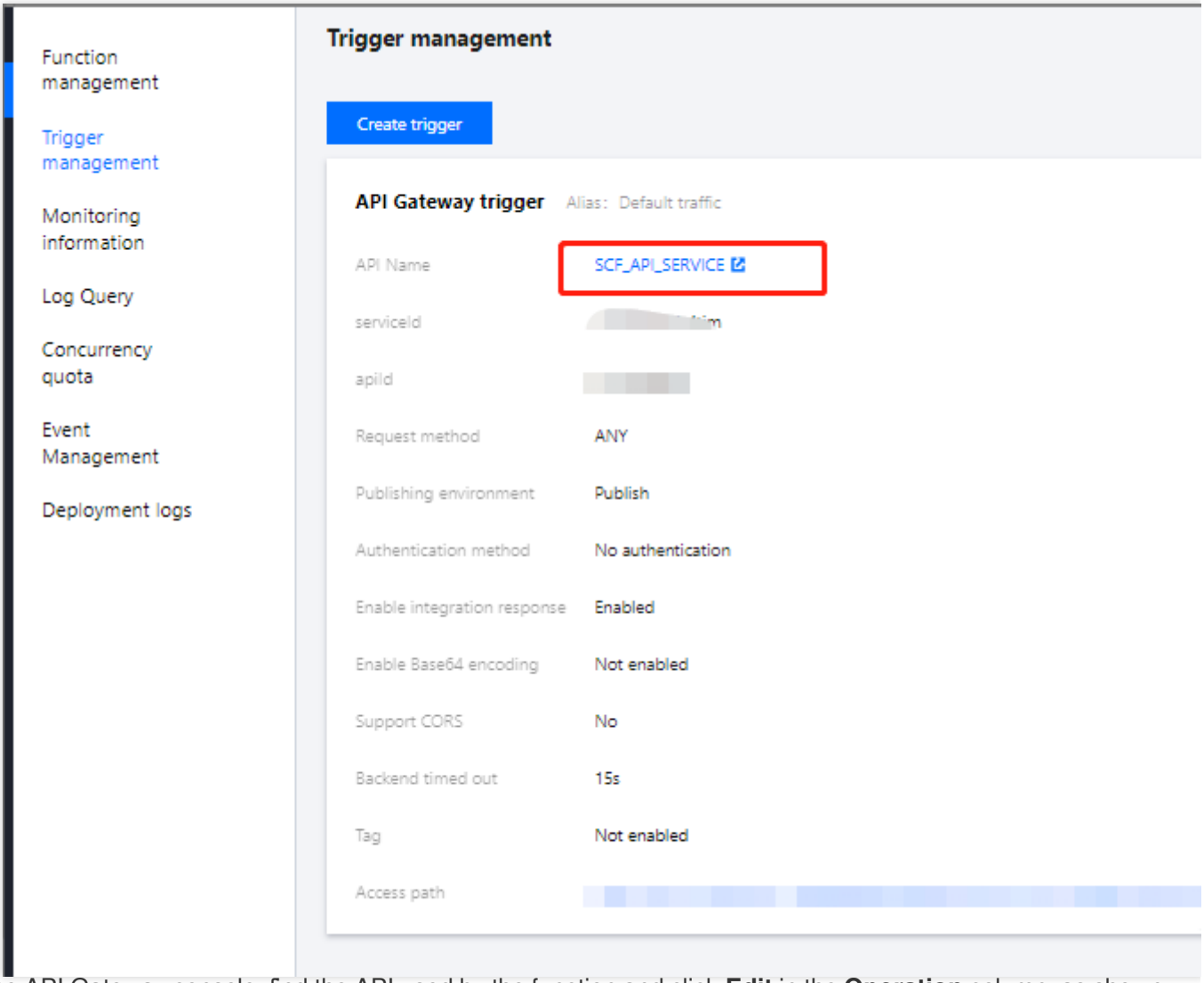


2. Configure the following trigger parameters in the pop-up window, keep the default values for other parameters, and click **Submit**.

Trigger method: Select **API Gateway trigger**.

Integration response: Set to **Enable**.

3. After the creation, you need to adjust the API Gateway trigger parameters. Click **API Name** to enter the API Gateway console for subsequent operations, as shown below:



4. In the API Gateway console, find the API used by the function and click **Edit** in the **Operation** column, as shown below:

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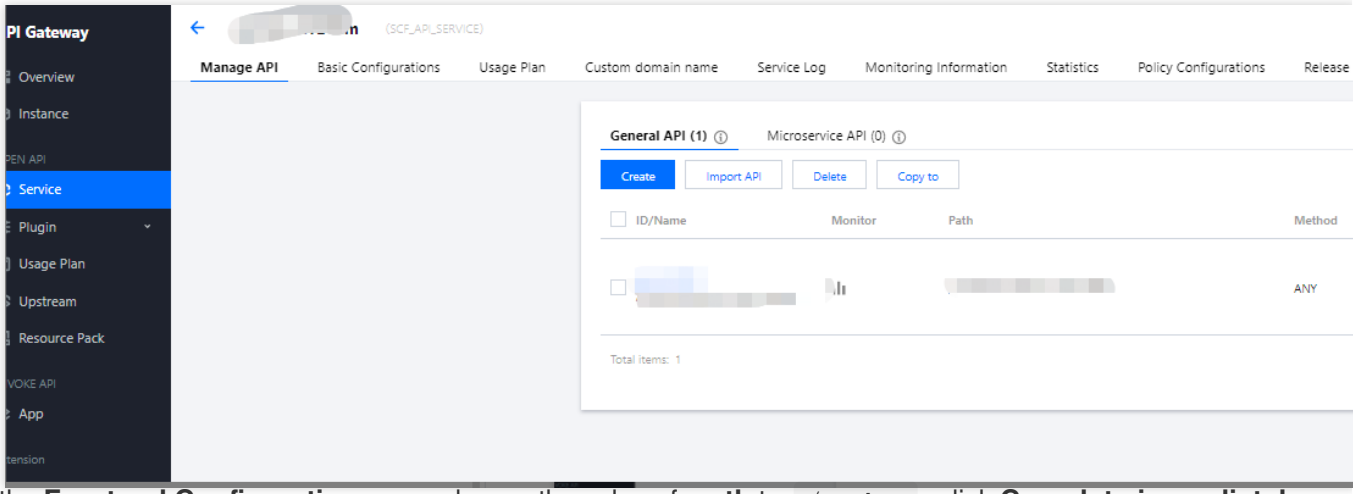

5. On the **Frontend Configuration** page, change the value of **path** to `/todos`, click **Complete immediately**, and release the service as prompted, as shown below:

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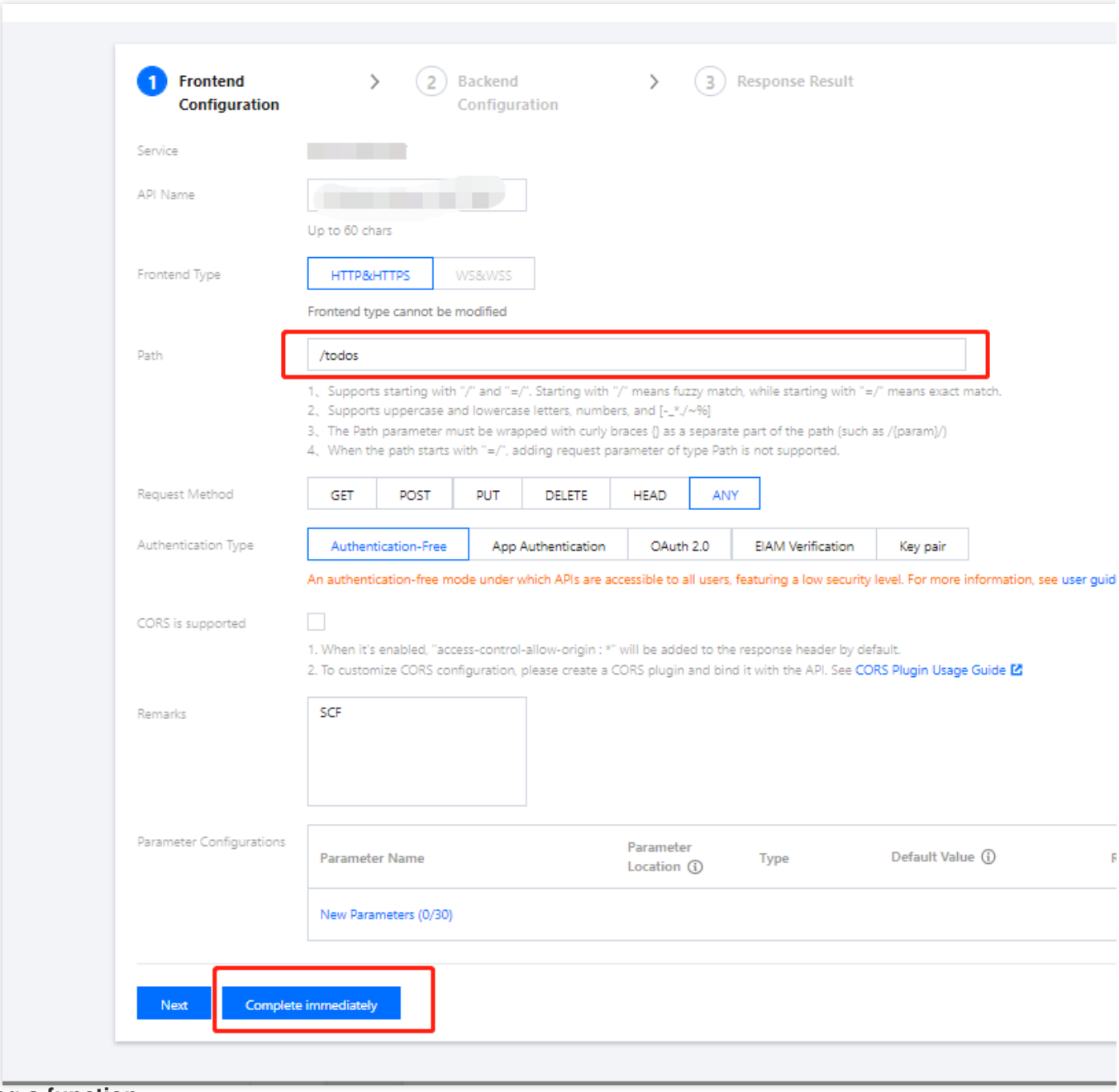

Testing a function

On the **Function Code** tab, follow the steps below to initiate a simulated request based on the Api Gateway event template. In this way, you can try out the CRUD features of the todo application.

Query the todo list:

Select GET as the request method, enter `/todos` for `path`, click **Test**, and you will see the current todos in the response body as shown below:

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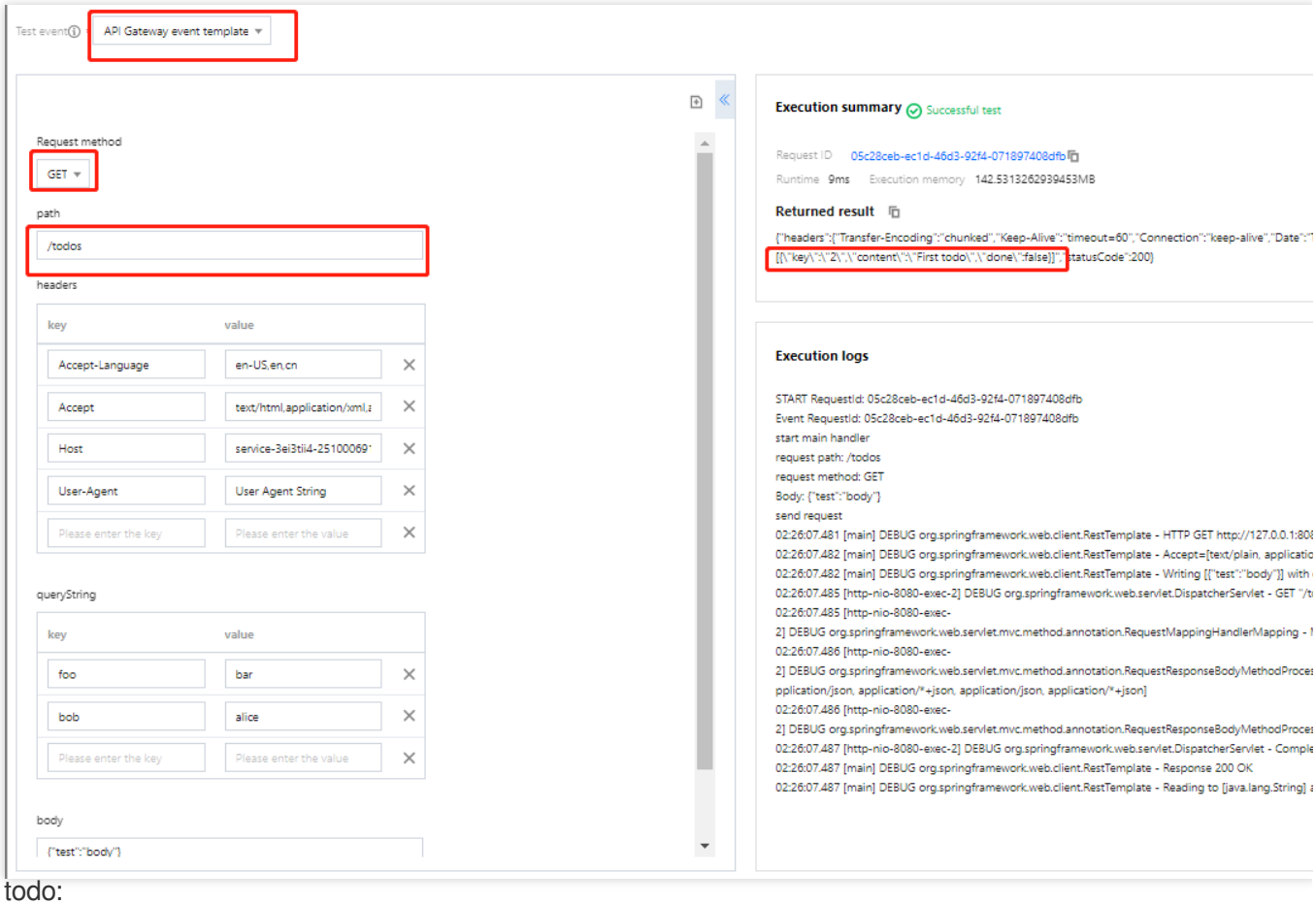

Add a todo:

Select POST as the request method, enter `/todos` for `path`, `Content-Type: application/json` for `headers` and `{"key":"3","content":"Third todo","done": false}` for `body`, and click **Test** to add a todo as shown below:

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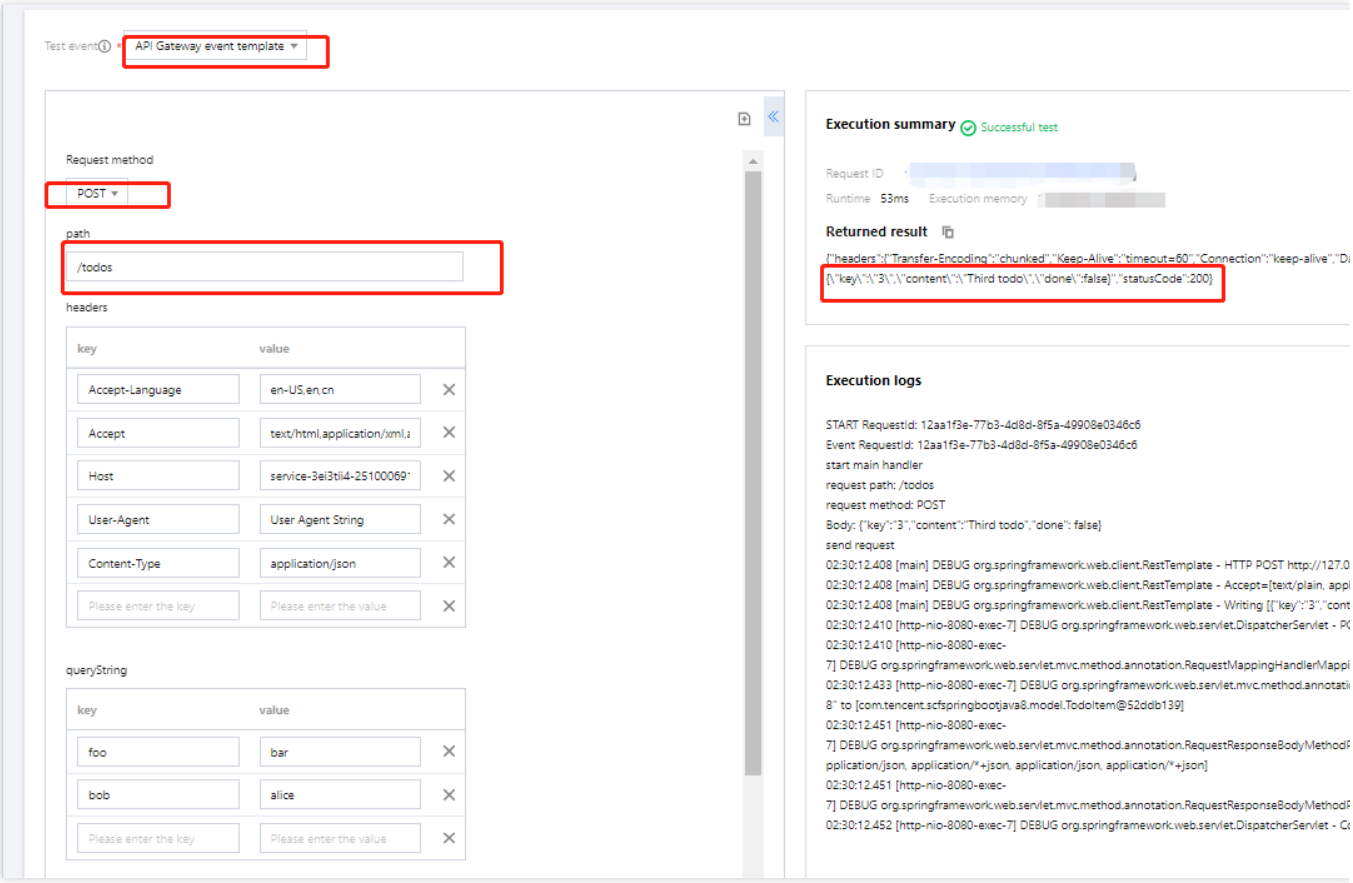
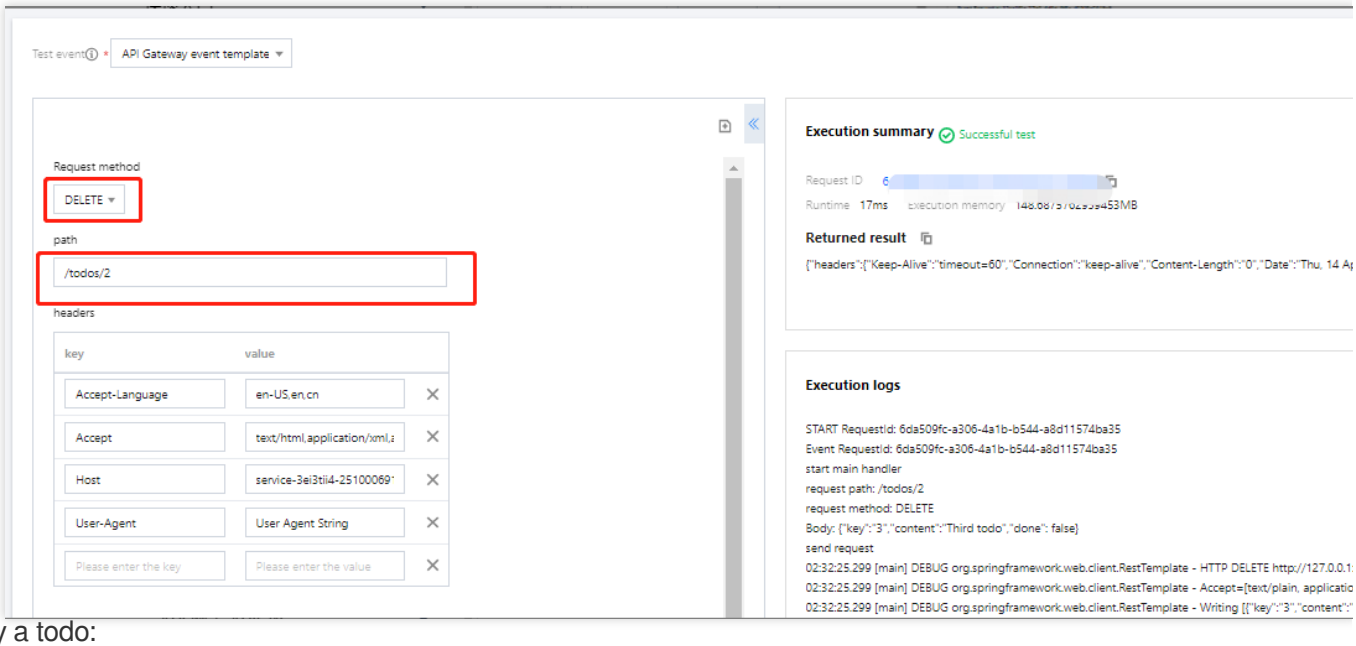


Delete a todo:

Select DELETE as the request method, enter `/todos/2` for `path` (to delete the todo whose `key` is 2 for example), and click **Test** as shown below:



Modify a todo:

Select PUT as the request method, enter `/todos/2` for `path` (to mark the todo whose `key` is 2 as

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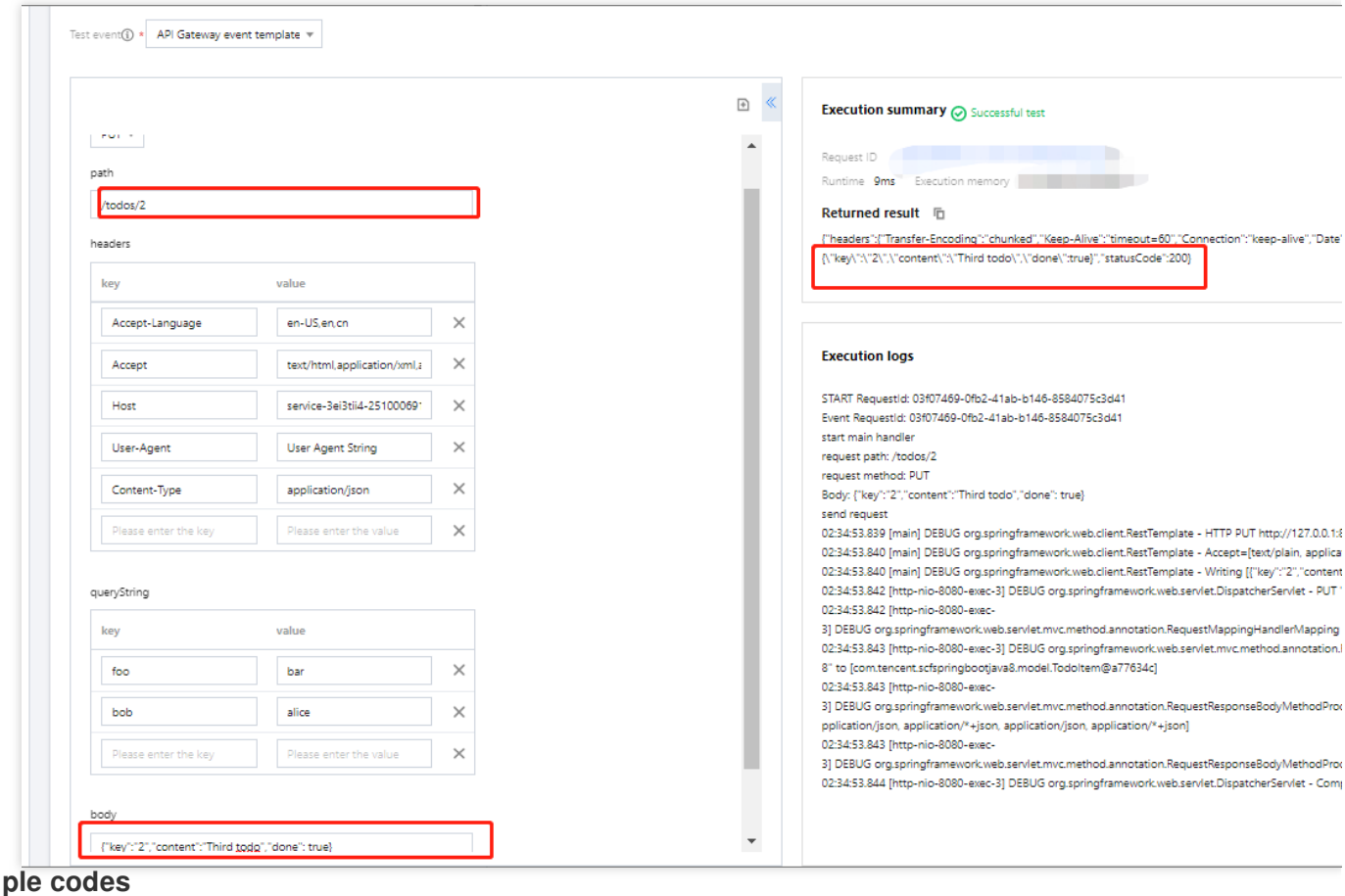
completed for example), enter `{"key":"2","content":"Third todo","done": true}` for `body`, and click **Test** as shown below:



Sample codes

In the Creating a function step, you can also modify the function template based on your business needs. On the **Create** page, click **Learn more** in the upper-right corner of the selected template card. On the pop-up page, click **Download Template Function** to get the source code of the template function.

You can configure as follows:

Add the `ScfHandler` class, which is used to receive event triggers and forward messages to the Spring service. After receiving a response from the Spring service, the function will return the response to the invoker. The project structure after the `ScfHandler` class is added is shown below:

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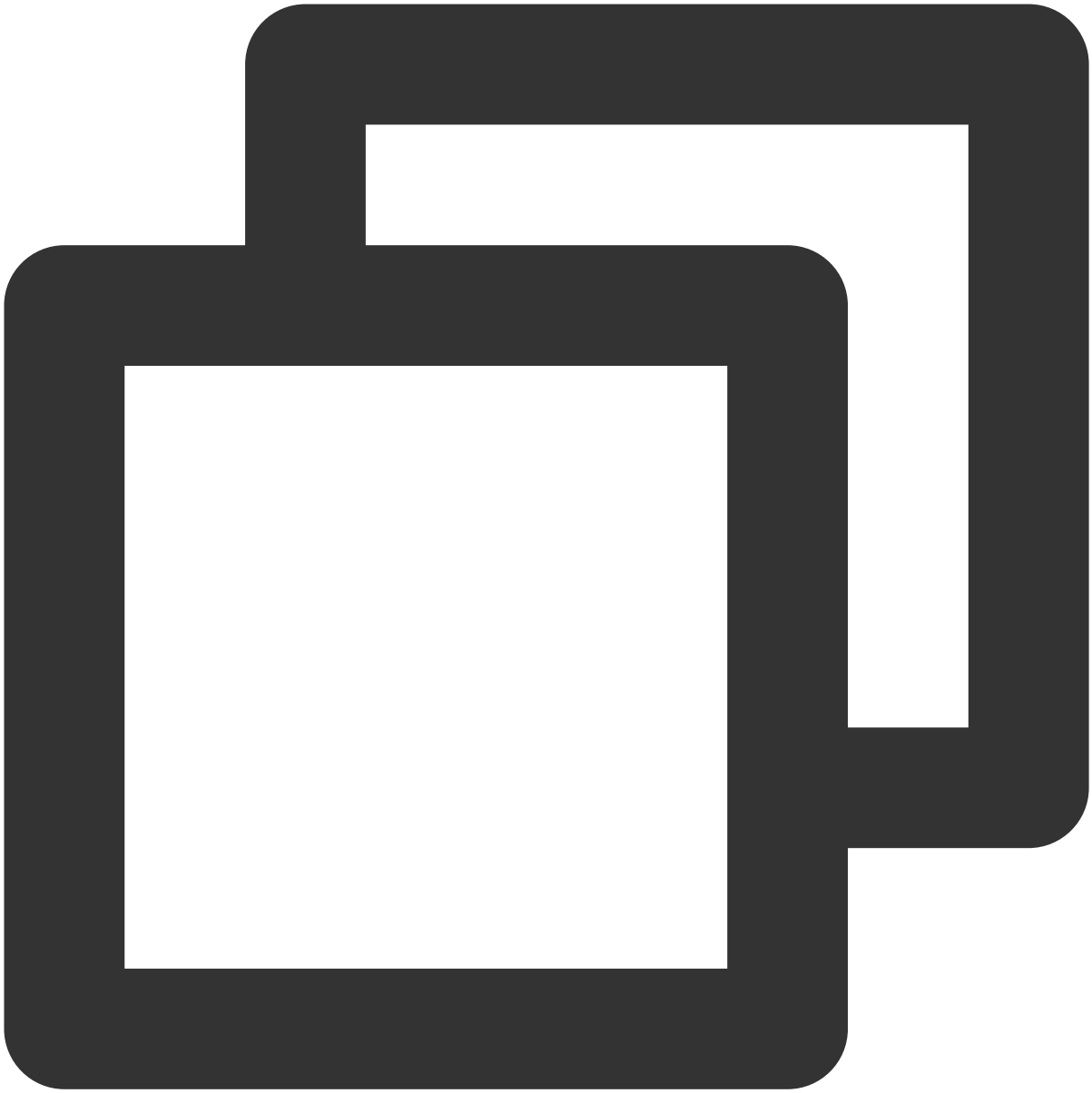

```
.
├── src
|   └── main
|         |         ├── java
|         |         |         └── com.tencent.scfspringbootjava8
|         |         |         |         ├── controller
|         |         |         |         ├── model
|         |         |         |         └── repository
|         |         |         |         |         ├── ScfHandler.java
|         |         |         |         |         └── ScfSpringbootJava8Application.java
|         |         └── resources
```

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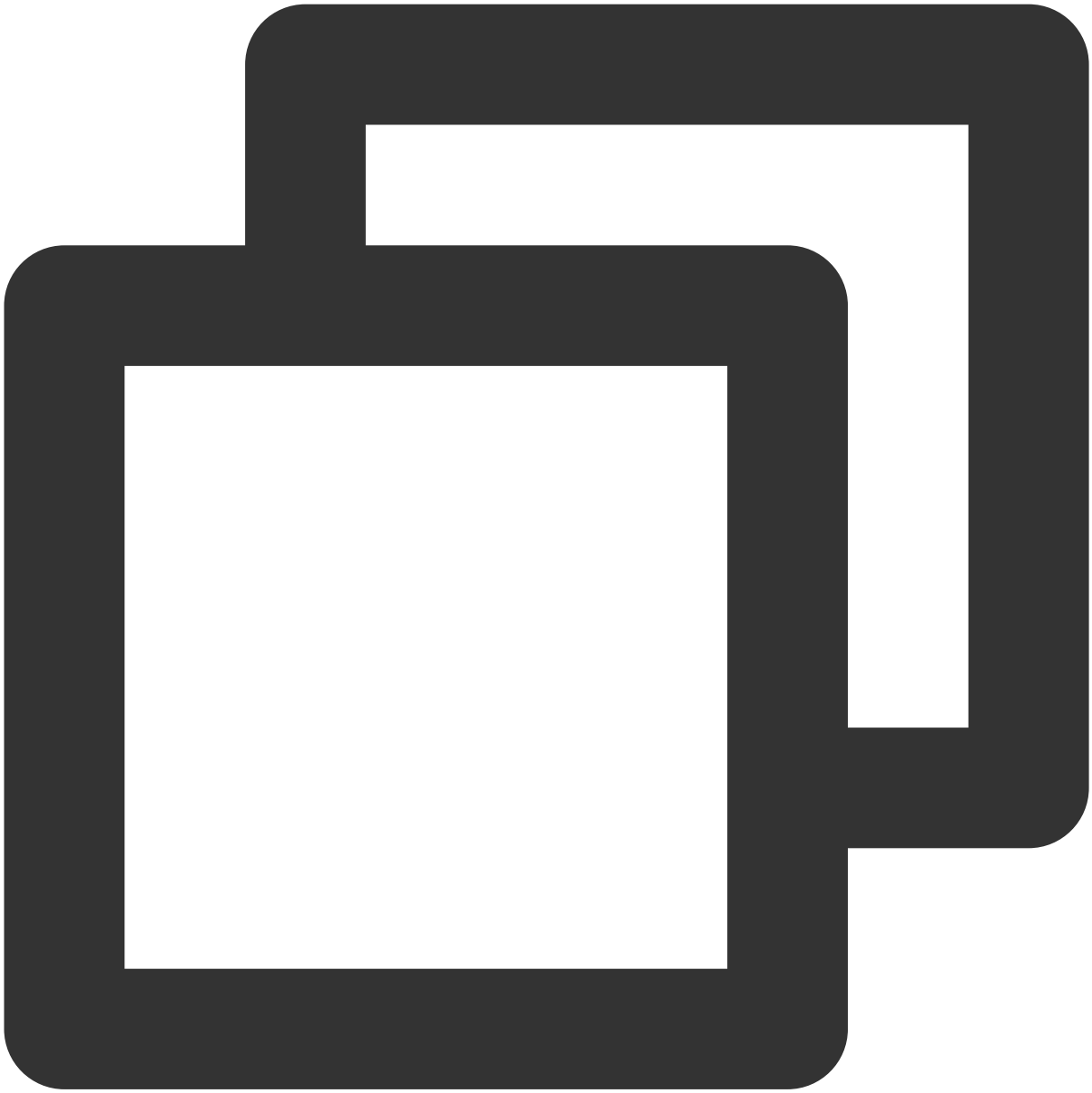
Compile the JAR package

Download the code and run the following compilation command in the root directory:



```
gradle build
```

After the compilation, you can get the JAR package in the `build/libs` directory. Select the JAR package whose suffix is `-all` .

Deploy the generated JAR package to SCF as follows:

1.1 Log in to the SCF console.

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1.2 Click **Create** on the **Function Service** page.

1.3 On the **Create** page, select **Create from scratch** and configure the following parameters:

Function type: Select **Event-triggered function**.

Runtime environment: Select **Java 8**.

Submitting method: Select **Local ZIP file**.

Execution: Enter `com.tencent.scfspringbootjava8.ScfHandler:: mainHandler` .

Function codes: Click **Upload** and select the ZIP package.

1.4 Keep the default values for other parameters and click **Complete** to complete the function creation, as shown below:

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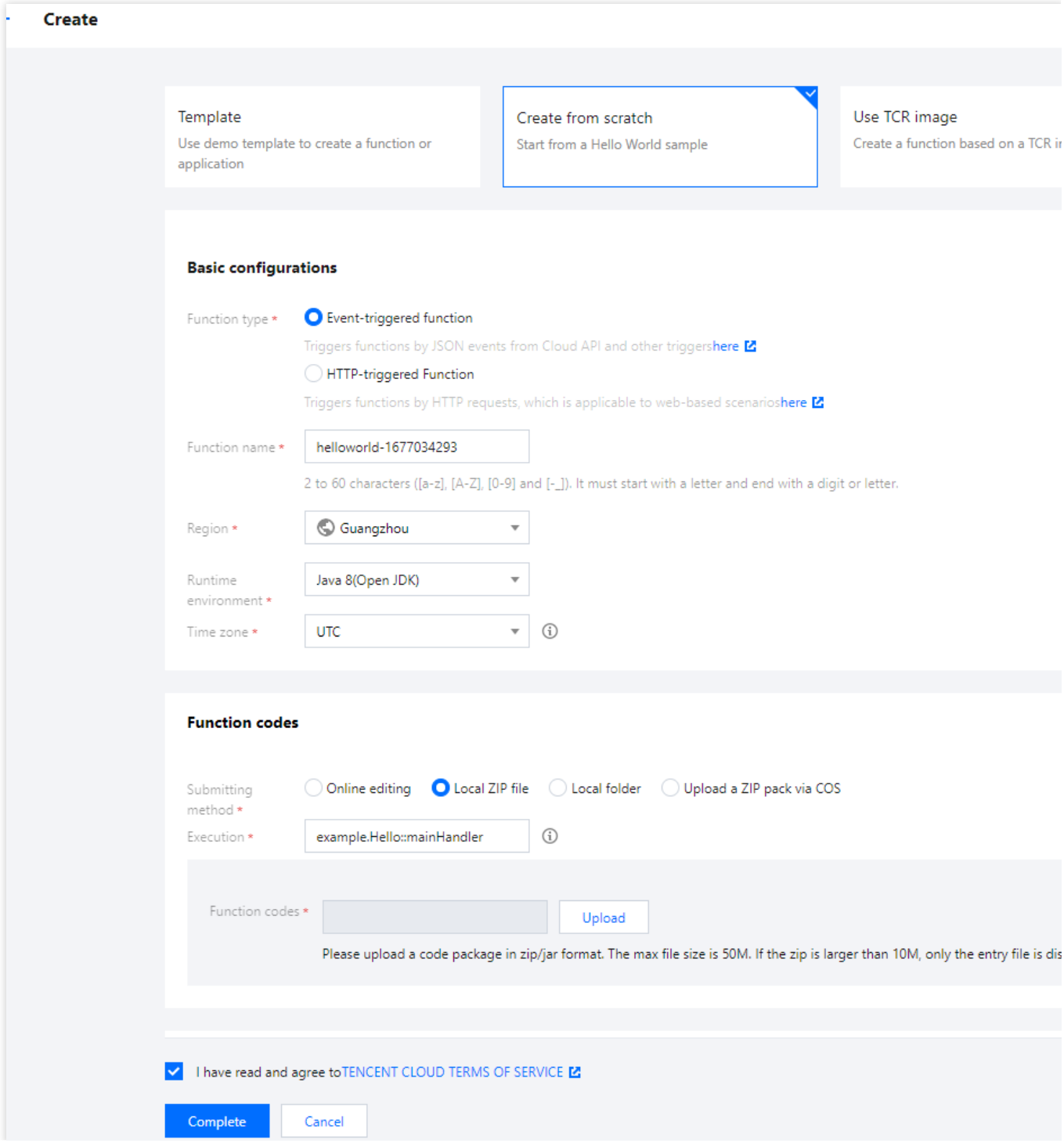

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ServerlessFramework Practices
Framework Migration

Last updated：2020-06-24 17:02:04

You can use Serverless Framework to quickly deploy multiple frameworks in SCF. Supported frameworks are as shown below. Please select them as needed for deployment.

Programming Language	Supported Framework
Node.js	• Express • Egg.js • Next.js • Koa • Nuxt.js
PHP	• PHP Laravel • ThinkPHP
Python	• Flask • Bottle • Django • Pyramid • Tornado

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API Gateway
Using API Gateway to Provide API Service Example

Last updated：2020-09-01 10:01:49

In this tutorial, suppose that:

- You want to use SCF to implement a web backend service, such as querying the articles in a blog and providing the article contents.
- You want to use APIs to provide services for webpages and applications.

Implementation Overview

The implementation process of the service is as follows:

- Create a function, configure API rules in API Gateway, and point the backend service to the function.
- A user sends a request that contains an article ID to the API.
- SCF queries the content corresponding to the ID according to the request parameters and responds to the request in JSON format.
- The user performs subsequent processing after receiving the response in JSON format.

Note: after going through this tutorial, your account will have the following resources:

- An SCF function triggered by API Gateway.
- An API service in API Gateway and related API rules.

This tutorial is divided into three parts:

- Complete the coding, creation, and testing of a function.
- Complete the design, creation, and configuration of an API service and API rules.
- Test and verify the correctness of the API through a browser or HTTP request tool.

API Design

The design of APIs for modern applications usually follows the RESTful specification. Therefore, in this example, we design the API for getting blog articles as follows:

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- /article GET

  Return the article list

- /article/{articleId} GET

  Return the article content based on the article ID

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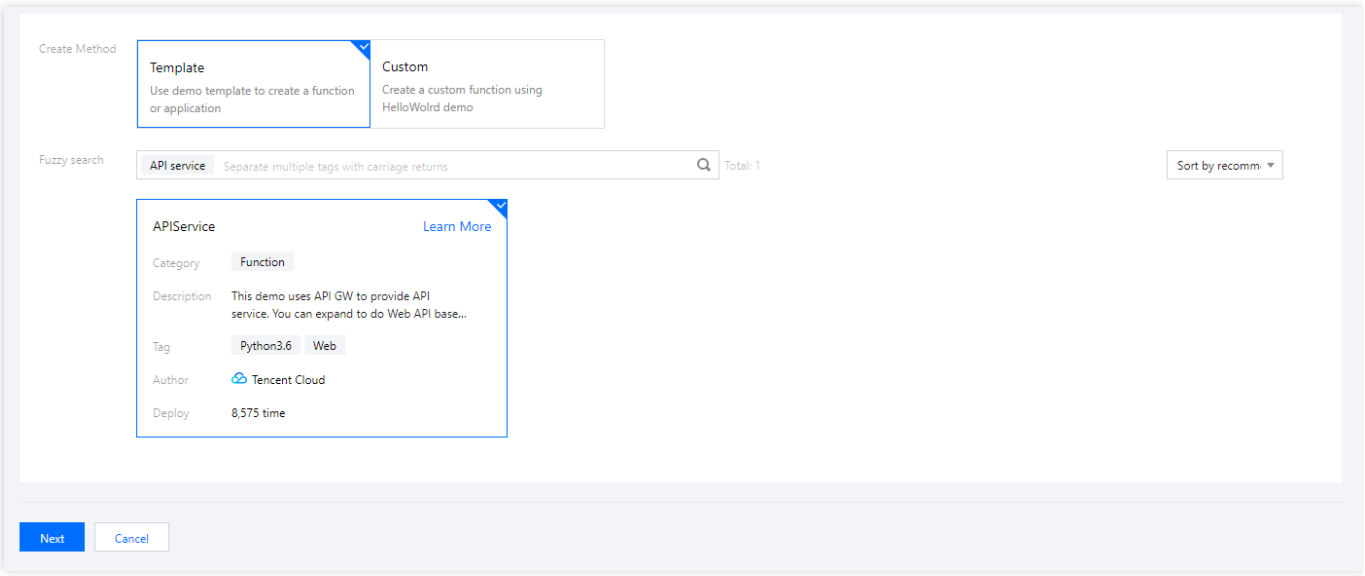
Step 1. Create blogArticle Function

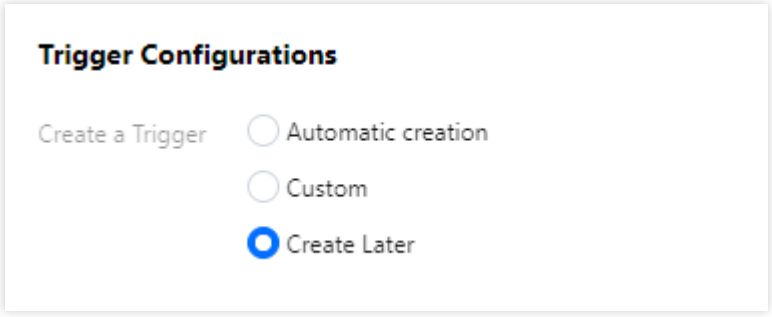
Last updated：2021-03-19 15:15:22

This document describes how to create a function and test it with APIs in the console to implement API response for blog articles.

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creating page.
   Set the following parameter information and click **Next** as shown below:
   - **Creation method**: select **Template**.
   - **Fuzzy search**: enter "APIService" and search.
     Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.



3. The function name is automatically generated by default and can be modified as needed. In **Trigger Configuration**, select **Create Later** as shown below:



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4. Click **Complete** to complete function creation.

> ⚠ **Note：**
>
> Data structures of articles are saved and simulated by the `testArticleInfo` variable here and are usually read from the database or file in real use cases.

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Step 2. Create and Test API Service

Last updated：2022-12-28 16:09:45

Overview

This document describes how to create a service in API Gateway and related API rules, connect them to the SCF function created in step 1, and test them with APIs in the console.

> Note：
> The API service and function must be in the same region. In this tutorial, the Beijing region is used to create the API service.

Creating API Service and Rule

1. Log in to the API Gateway console and select **Service** on the left sidebar.
2. At the top of the **Service** page, select the **Beijing** region and click **Create** to enter the API service creation page.
3. In the **Create Service** pop-up window, set the following parameter information and click **Submit**.

- **Service Name**: enter `blogAPI` .
- **Access Mode**: select **Public Network**.

4. Select the created `blogAPI` service in the service list to enter the **Manage API** page.
5. Click **Create** to enter the **Create API** page. In the **Frontend Configuration** step, refer to the following main parameters to create the API:

- **API Name**: custom API name.
- **Path**: `/article` .
- **Request Method**: GET.
- **Authentication Type**: select **No authentication**.
  Keep the remaining options as default and click **Next**.

6. In the **Backend Configuration** step, refer to the following main parameters to create the API:

- **Backend Type**: select **Cloud Function**.

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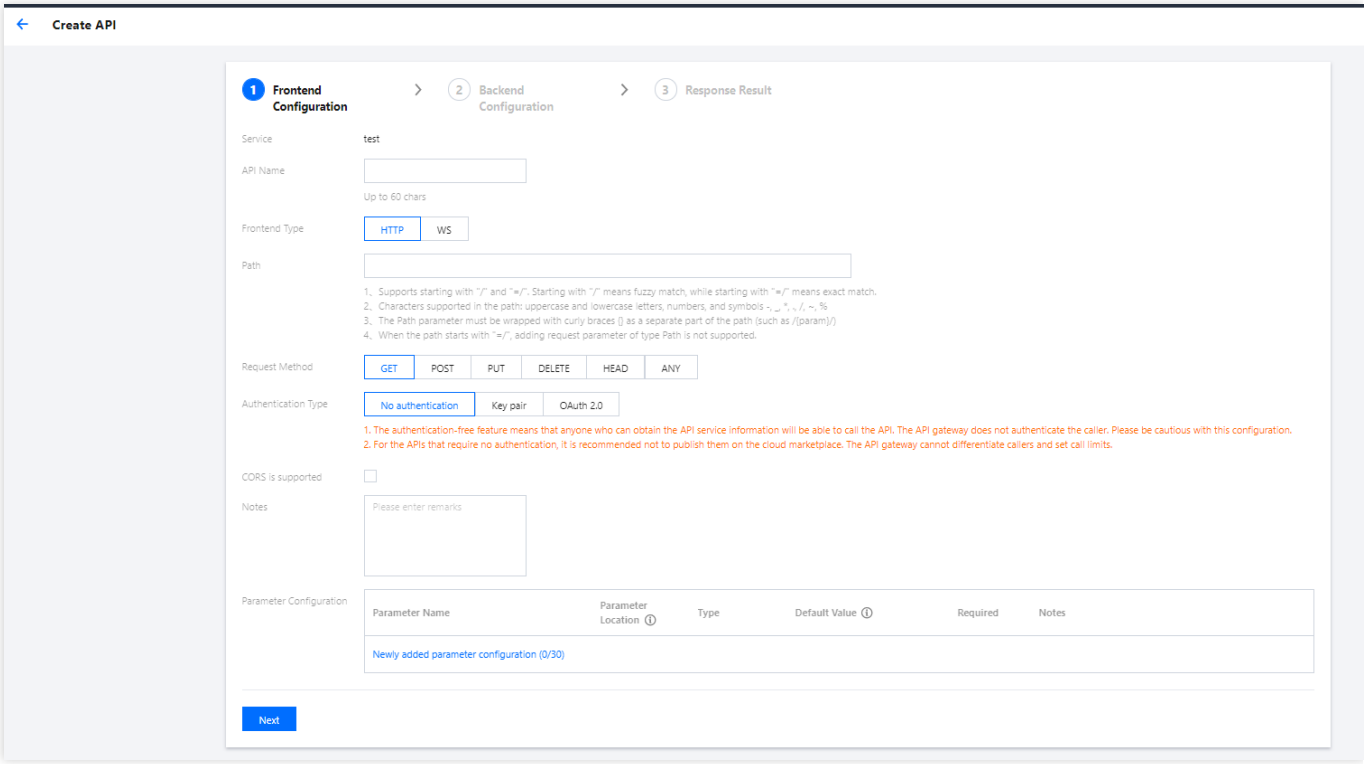
- **Cloud Function**: select the `blogArticle` function created in step 1.
  Keep the remaining options as default and click **Next**.

7. Click **Complete** in **Response Result** to complete the API creation. Select **Test** as the **Publishing Environment** in the pop-up window and click **Publish service**.
8. Click **Create** on the **Manage API** tab again to create an API as shown below:

- **Path**: `/article/{articleId}` .
- **Request Method**: GET.
- **Authentication Type**: select **No authentication**.
- **Parameter Configuration**: select **Add parameter configuration** and refer to the following parameters for configuration:
  - **Parameter Name**: articleId
  - **Parameter Location**: Path
  - **Type**: int



9. In the **Backend Configuration** step, refer to the following main parameters to create the API:

- **Backend Type**: select **Cloud Function**.
- **Cloud Function**: select the `blogArticle` function created in step 1.
  Keep the remaining options as default and click **Next**.

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0. Click **Complete** in **Response Result** to complete the API creation. Select **Test** as the **Publishing Environment** in the pop-up window and click **Publish service**.

Debugging API Rules

1. To debug the API `/article` created in step 5 above, click **Debug**, send a request on the debugging page, and check whether the response body in the returned result is shown as follows:

```
[{"id": 1, "category": "blog", "title": "hello world", "time": "2017-12-05 13:45"}, {"id": 2, "category": "blog", "title": "record info", "time": "2017-12-06 08:22"}, {"id": 3, "category": "python", "title": "python study", "time": "2017-12-06 18:32"}]
```

2. To debug the API `/article/{articleId}` created in step 8 above, click **API Debug**, modify the request parameter value to 1, send a request on the debugging page, and check whether the response body in the returned result is shown as follows:

```
{"id": 1, "category": "blog", "title": "hello world", "content": "first blog! hello world!", "time": "2017-12-05 13:45"}
```

Note：
You can also change the value of the request parameter `articleId` to another number and check the response content.

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Step 3. Publish API Service and Verify Online

Last updated：2022-12-15 11:38:42

If you have completed Step 2. Create and Test API Service, and the test results are as expected, you can then publish this service and initiate a request from a browser to verify whether the API works properly.

API Service Release

1. Log in to the API Gateway console and select **Service** on the left sidebar.
2. On the **Service** page, select **Publish** on the right side of the `blogAPI` service created in step 2.
3. In the **Publish service** pop-up window, select **Release** as the publishing environment, enter **Publish API** in the remarks, and click **Submit**.

Online API Verification

The API service is published through the publishing action, so that the API can be accessed externally. Then, you can initiate a request in a browser to check whether the API can respond correctly.

1. In the `blogAPI` service, click the API name to enter the API **information page** and copy the default access path of the **Release** environment, such as `service-kzeed206-1251762227.ap-guangzhou.apigateway.myqcloud.com/release` .

   > Note：
   > As the domain name varies by service, the domain name assigned to your service may be different from the one in this document. Please do not directly copy the address here for access.

2. Add the path of the created API rule after this path to form the following paths:

```
service-kzeed206-1251762227.ap-guangzhou.apigateway.myqcloud.com/release/article
service-kzeed206-1251762227.ap-guangzhou.apigateway.myqcloud.com/release/article/1
service-kzeed206-1251762227.ap-guangzhou.apigateway.myqcloud.com/release/article/2
```

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3. Copy the paths in step 2 to a browser for access and make sure that the output is the same as that during API test.

4. You can further modify the article number in the request and view the output to check whether the code can correctly handle an incorrect article number.

So far, you have completed the process for implementing a service through SCF and providing it through API. Subsequently, you can modify the code and add features and API rules to form a richer-featured application module.

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Serverless Multi-File Upload Processing

Last updated：2023-06-14 17:30:48

Overview

To process an HTTP request for `multipart/form-data` multi-file upload through Tencent Cloud Serverless, the Base64 encoding capability of API Gateway is needed to encode the `multipart` byte stream in the original HTTP request into a string, so that the HTTP event can be serialized and passed to SCF for processing.

After SCF gets and Base64-decodes the `body` in the `event` passed in by API Gateway, the generated byte stream is the same as that in a regular HTTP request and can be processed normally. In Node.js, it can be processed with libraries such as `busboy` .

Directions

Step 1. Create a function

1. Log in to the Serverless console.
2. On the **Function Service** page, click **Create** to create a `Node.js` function.
   The specific parameters for creation are as follows:

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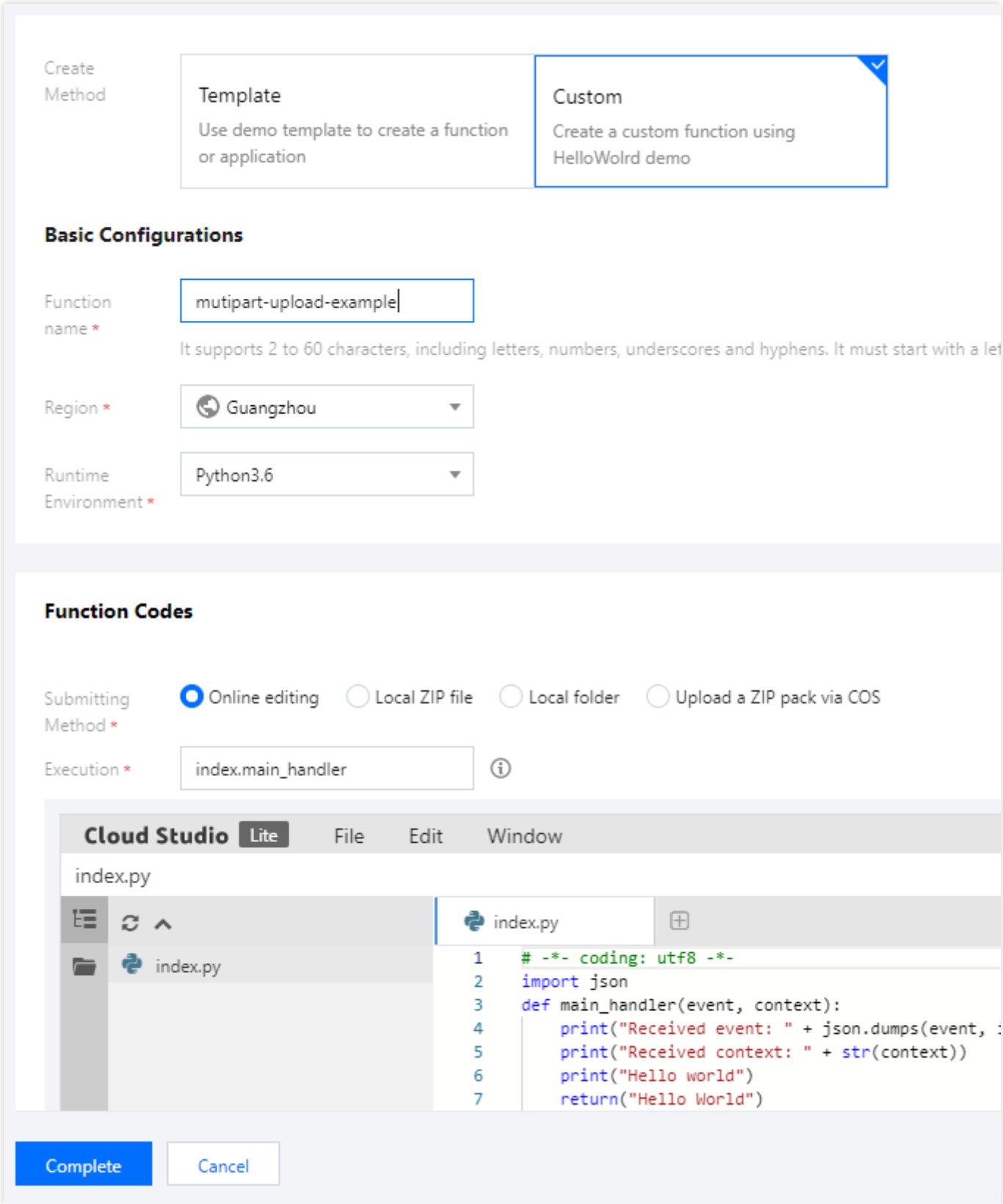

3. Click **Complete**.

Step 2. Write and deploy code

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1. After creating the function, you can refer to the following sample code to write the specific logic for processing `multipart/form-data` .

```
// handler.js
"use strict";
const stream = require("stream");
const Busboy = require("busboy");

/** User upload (POST) is processed */
const handlePost = (event) => {
return new Promise((resolve, reject) => {
const busboy = new Busboy({ headers: event.headers });
let html = "";
/** The file is received */
busboy.on("file", (fieldname, file, filename, encoding, mimetype) => {
let buf = Buffer.alloc(0);
console.log({ fieldname });
/** File data blocks are received and spliced into a complete buffer */
file.on("data", function (data) {
buf = Buffer.concat([buf, data]);
});
/** File data block receipt is completed, and the DOM string is generated */
file.on("end", function () {
const imgBase64 = buf.toString("base64");
html += `<img src="data:${mimetype}; base64, ${imgBase64}" />`;
});
});
/** multipart/form-data receipt is completed, and the generated HTML is constru
cted and returned */
busboy.on("finish", function () {
console.log({ msg: "Parse form complete!", html });
resolve({
statusCode: 200,
headers: {
"content-type": "text/html",
},
body: html,
});
});

/**
* busboy needs to process the data in the form of stream pipe.
* After the body is decoded to the buffer,
* it is converted into a stream and finally piped to busboy
*/
const bodyBuf = Buffer.from(event.body, "base64");
```

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```
var bufferStream = new stream.PassThrough();
bufferStream.end(bodyBuf);
bufferStream.pipe(busboy);
});
};

/** The static file is returned */
const handleGet = (event) => {
const html = `<html><head></head><body>
<form method="POST" enctype="multipart/form-data">
<input type="file" name="image-1" accept="image/*"><br />
<input type="file" name="image-2" accept="image/*"><br />
<input type="submit">
</form>
</body></html>`;
console.log({ msg: "Get form complete!", html });
return {
statusCode: 200,
headers: {
"content-type": "text/html",
},
body: html,
};
};

/** Function entry */
exports.main_handler = async (event, context) => {
const method = event.httpMethod;
/** If the request is a POST request, the user's multipart/form-data is process
ed and a page displaying the upload result is generated */
if (method === "POST") {
return handlePost(event);
}
/** If the request is a GET request, the page where the file is uploaded is ret
urned */
if (method === "GET") {
return handleGet(event);
}
};
```

2. After writing the code, you can also install the runtime dependencies for the function. For example, you can use `busboy` to decode the `multipart/form-data` data.

Note：

Dependencies must be installed in the `src` folder.

```
[root@ws-lgivut-0 src]# npm i busboy
npm WARN saveError ENOENT: no such file or directory, open '/usr/local/var/
npm notice created a lockfile as package-lock.json. You should commit this
npm WARN enoent ENOENT: no such file or directory, open '/usr/local/var/fur
npm WARN src No description
npm WARN src No repository field.
npm WARN src No README data
npm WARN src No license field.

+ busboy@0.3.1
added 3 packages from 1 contributor and audited 3 packages in 0.386s
found 0 vulnerabilities
```

3. Click **Deploy** to complete the function deployment.

Step 3. Bind an API Gateway trigger

In the trigger management of the function, you need to bind an API Gateway trigger to the function before it can process users' specific HTTP requests. The specific binding method and configuration are as follows:

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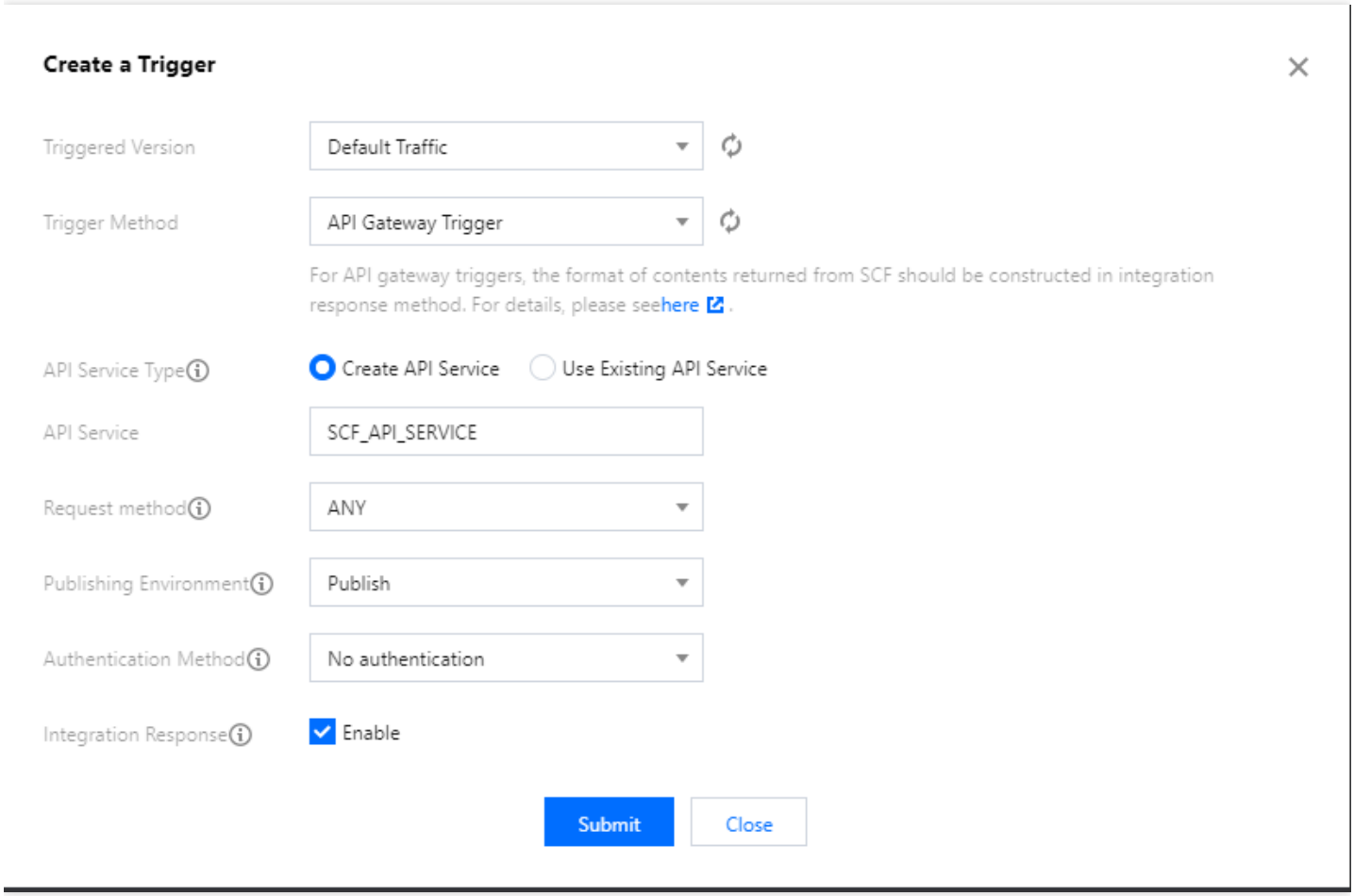
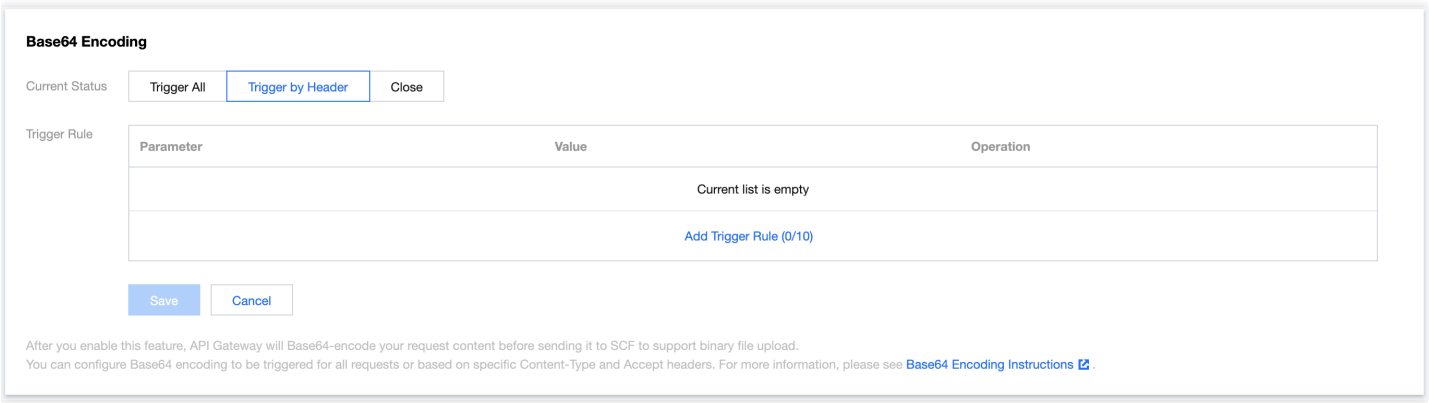


At this time, if you access the link bound by API Gateway, you will find that although the static page can work, the page does not display the correct result after an image is uploaded. This is because the Base64 encoding feature is disabled in API Gateway by default. As a result, the `multipart/form-data` data is incorrectly encoded as a string and passed to the handler function, and busboy cannot decode it.

Therefore, you need to enter API Gateway, find the bound API service, and enable Base64 encoding in the basic configuration.



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After the service is opened and published, it can work normally.

Demo

You can access the official demo built by Tencent Cloud Serverless to view the effect of file upload.

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Implementing Custom Invitation with SCF + API Gateway

Last updated：2022-07-21 11:35:50

Overview

This document describes how to use SCF in combination with API Gateway to customize an invitation, so that you can generate an invitation simply by entering the guest name.

Directions

Creating bucket

A bucket is used to store custom invitations. The specific steps are as follows:

1. Log in to the COS console and select **Bucket List** on the left sidebar.
2. Click **Create Bucket** on the **Bucket List** page.

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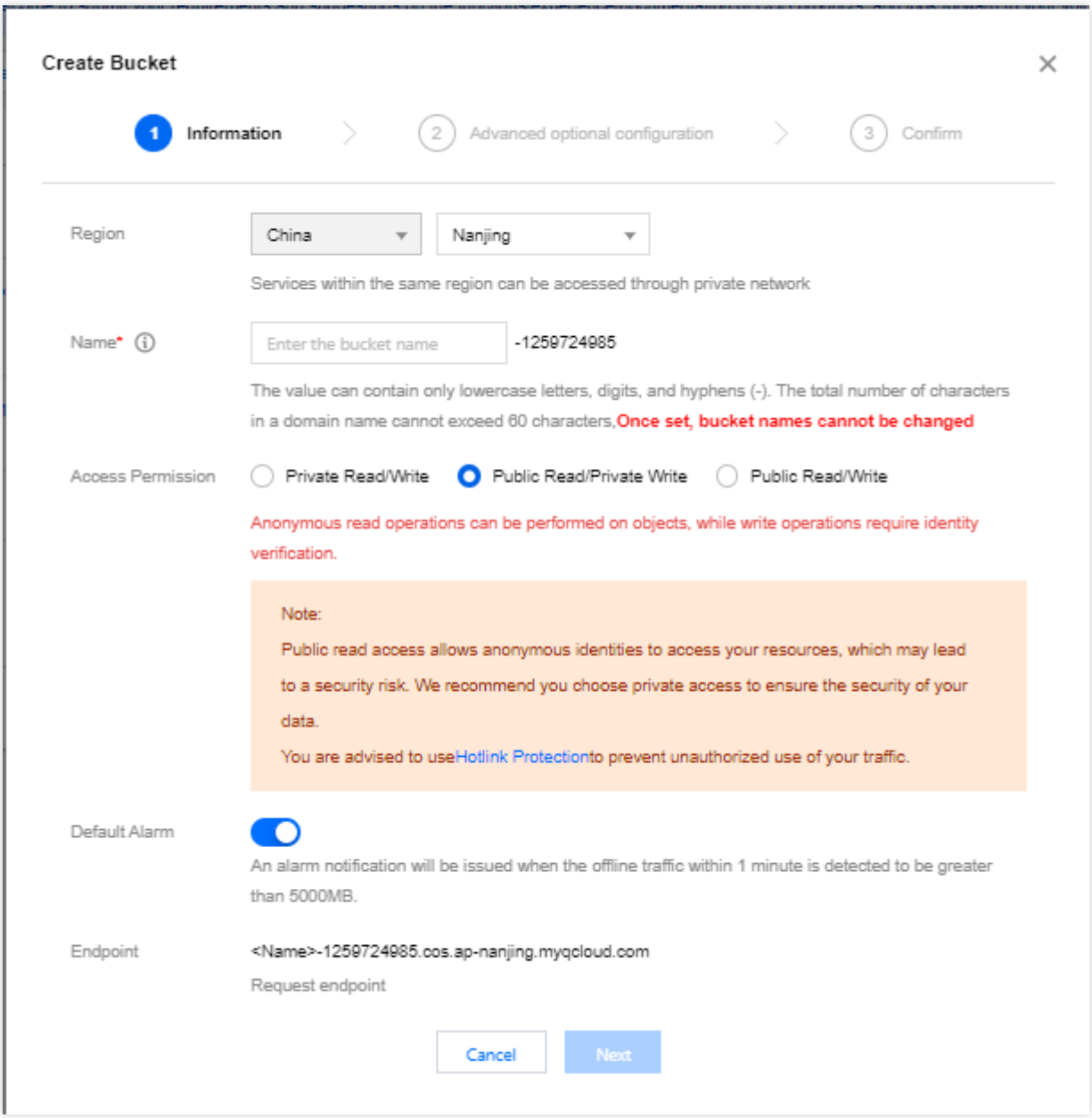
3. In the **Create Bucket** pop-up window, create a bucket as shown below:



The key parameters are as follows. Retain the default settings for other parameters.

- **Region**: Select **Guangzhou**.
- **Name**: Enter a custom name. This document uses `test` as an example.
- **Access Permission**: Select **Public Read/Private Write**.

4. Click **Create**.
5. Select **Security Management** on the left of the bucket and click **Add a Rule** in **CORS (Cross-Origin Resource Sharing) Setting**.

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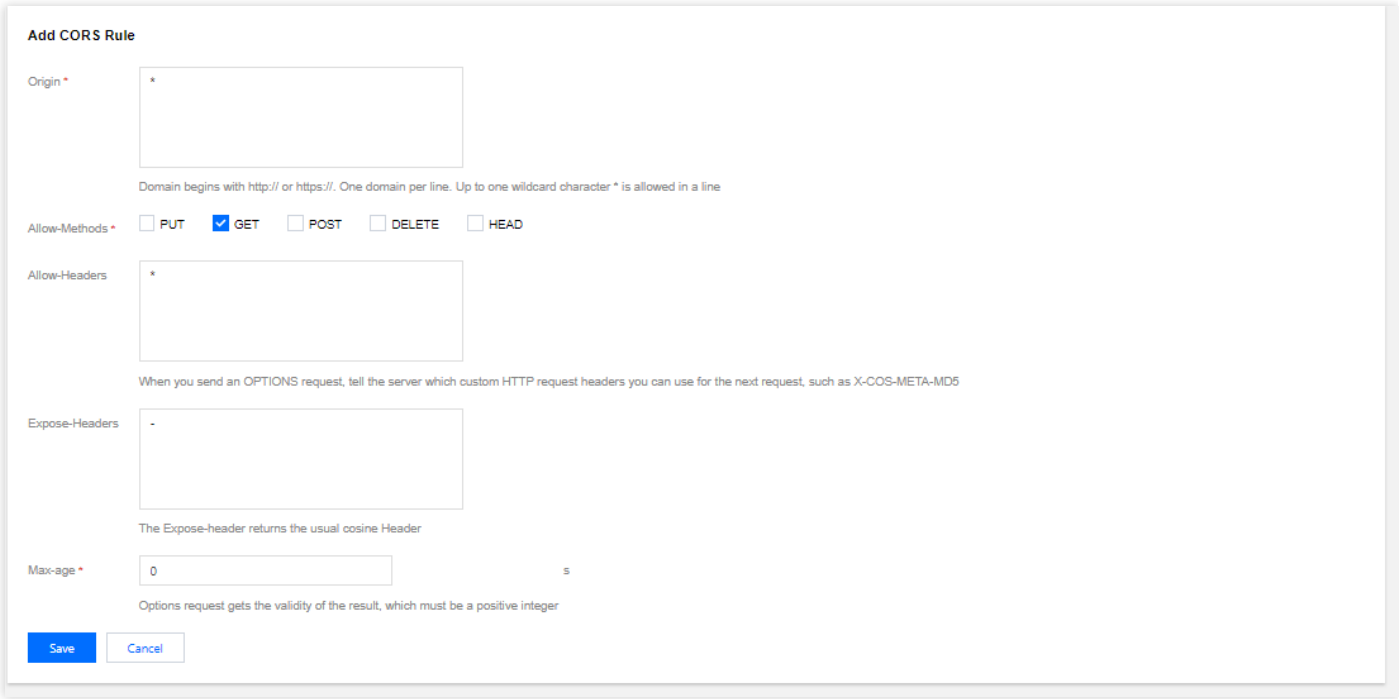
6. In the **Add CORS Rule** pop-up window, add a rule as shown below:



The key parameters are as follows. Retain the default settings for other parameters.

- **Origin**: Enter *****.
- **Allow-Methods**: Select **GET**.
- **Expose-Headers**: Enter **-**.

7. Click **Save**.

Creating function and API Gateway trigger

1. Log in to the SCF console and select **Functions** on the left sidebar.
2. At the top of the **Functions** page, select **Guangzhou** region and click **Create** to enter the function creating page.
3. Follow the procedure below to search for the custom invitation template as shown below. This document uses Python 2.7 as an example:

- **Creation method**: Select **Template**.
- **Fuzzy search**: Enter **CustomInvitation** and search.

  Click **Learn more** in the template to view relevant information in the **Template details** pop-up window, which can

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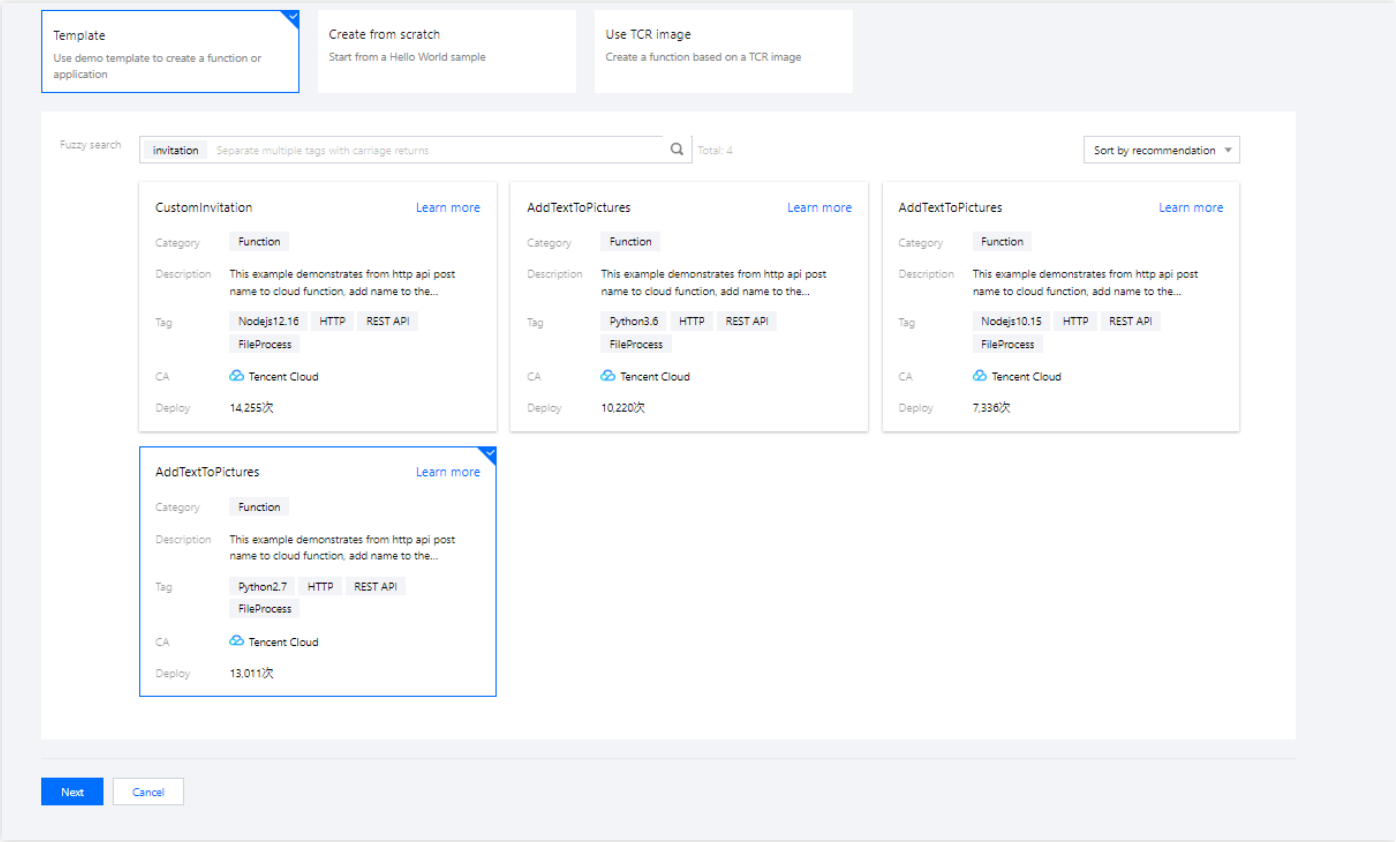
be downloaded.



4. Click **Next**. The function name is automatically generated by default and can be modified as needed. Follow the prompts to enter the corresponding values of the environment variables required by the template in the **Basic Configurations** section and keep other parameters as default as shown below:

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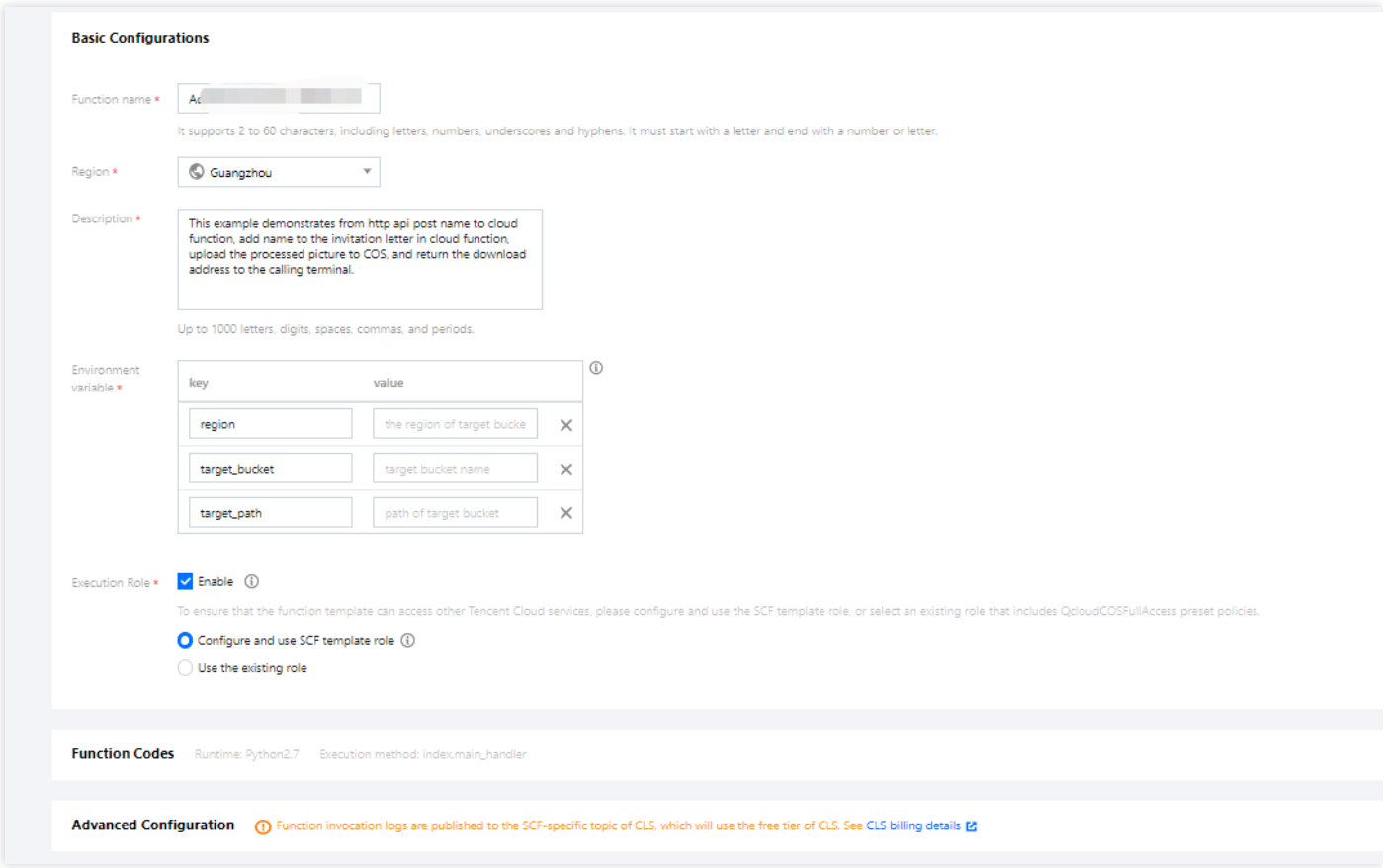
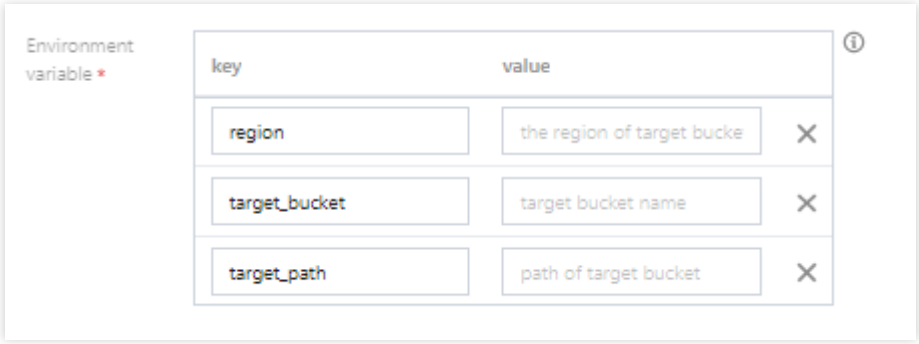


Configure environment variables as shown below:



key	value
region	Bucket region, which starts with `ap-` and ends with the region name. This document takes `ap-guangzhou` as an example.
target_bucket	Name of the created bucket.
target_path	Path of the destination bucket. To view the directory path of the bucket for storing invitations, go to **Bucket List** and **enter the corresponding bucket**. For example, if the directory is `example`, the destination path here is `/example`. If there is no directory created in the bucket, enter `/` here.

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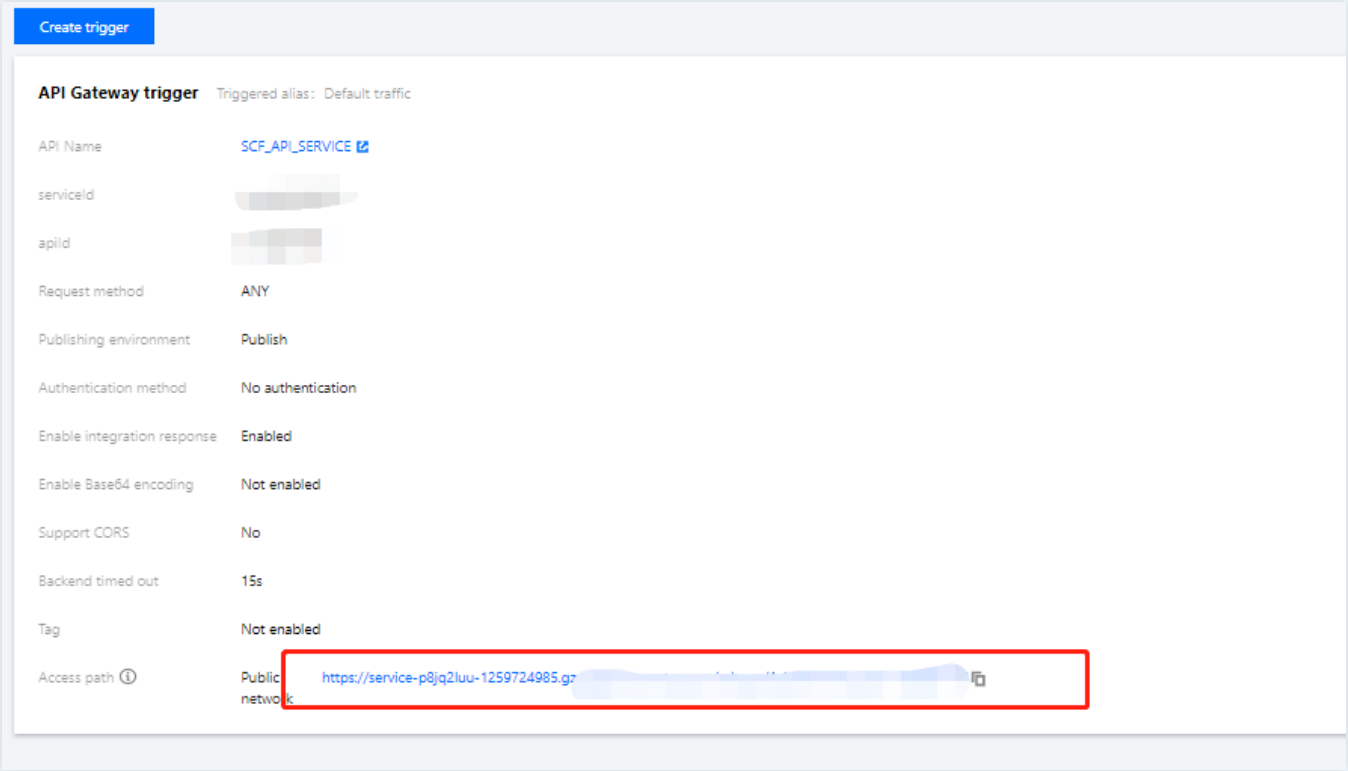
> Note
> This example requires SCF to have the operation permissions of COS. **Execution Role** has been enabled by default, and an execution role has been automatically created and associated with the required COS permission policy `QcloudCOSFullAccess`. If you need to make adjustments, select **Use the existing role** or disable **Execution Role**.

5. Click **Complete**.

Generating invitation

You can generate an invitation in two ways:

> Note
> You can get the access path of the API Gateway trigger on the **Function Details > Trigger management** page as shown below:



Method 1

Run the following command on the command line.

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```
curl API Gateway trigger URL -d 'Name of the invited guest'
```

The download address of the invitation can be obtained on the device, such as:

```
curl https://service-xxxx.gz.apigw.tencentcs.com/release/test-123456 -d 'name'
https://testxxxx.com//invitation-yun-ServerlessDays.jpg%
```

Method 2

1. Download the HTML page and change the URL to the URL of the API Gateway trigger as shown below:

2. Open the HTML page, enter the name of the invited guest to generate a poster, and access the URL to download it.

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TRTC Practices
SCF + TRTC for One-Stop Panoramic Recording

Last updated：2022-01-23 16:20:59

Use Cases

Quick playback file generation

Live stream playback can increase the value and reduce the production costs of high-quality resources to boost the profits. The panoramic recording feature can record the class content from user's perspective in real time, quickly transcode the content based on the massive serverless computing power pool after a class ends, and generate the recording file for playback instantly.

Highlight collection

Parents seldom have time to watch entire class videos of their children. The highlight collection feature renders the moments of children's excellent performance during the class to parents to improve their perception and recognition of the class. You can clip highlights from class recording files on the HTML5 platform, use panoramic recording to generate MP4 files, create a collection of highlight moments of children in class, and quickly distribute them through CDN.

File composition

General file composition requires transcoding, which consumes a lot of computing power. With SCF + TRTC, you can compose videos, audios, images, etc. on the same frontend page, adjust the layout, perform panoramic recording, decode multiple streams, and encode all of them into one stream to quickly generate video files, giving full play to computing power resources.

How It Works

Tencent Cloud's proprietary panoramic recording feature allows you to record videos in a WYSIWYG way. You only need to provide an accessible public network URL, and the feature can use Chrome for page rendering and recording, perform FFmpeg transcoding, and directly upload videos to COS to generate recording files in real time. Together with other Tencent Cloud products such as CSS, VOD, and TRTC, this offers a one-stop solution for education, gaming, and interactive entertainment scenarios.

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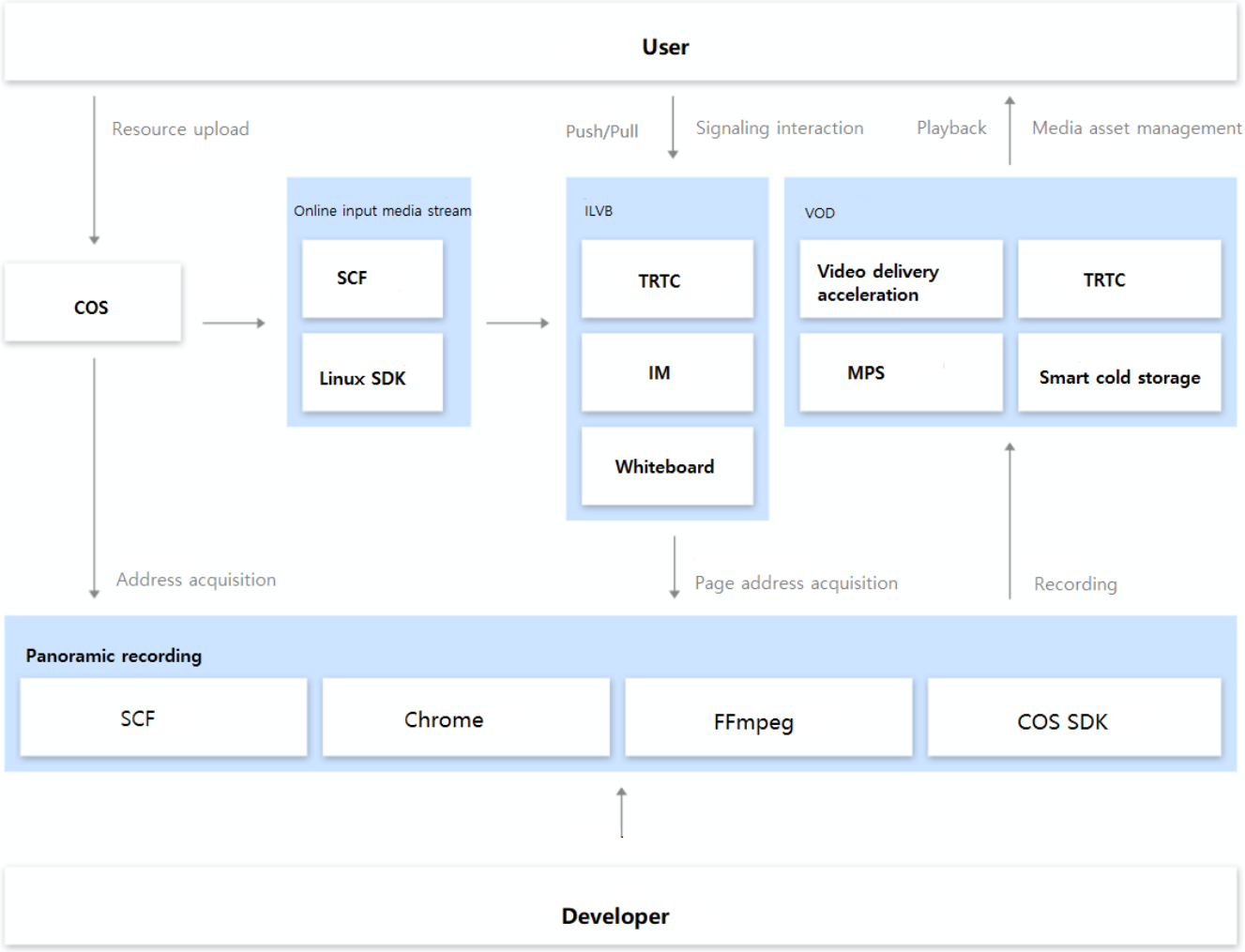

Application Strengths

- **Lower costs**
  Panoramic recording uses Chrome for multi-stream decoding and one-stream encoding, which reduces computing power consumption and lowers the cost by over 60% compared with traditional recording solutions.
- **High fidelity**
  Panoramic recording can capture all external information such as special effects in class on the client, fully retaining the in-person class experience.
- **Free switch**
  During panoramic recording, you can flexibly adjust the browser layout and switch between teacher and student views.
- **Ultra high concurrency**
  SCF computing instances can be quickly started to stably sustain high concurrency and handle business traffic

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spikes with ease.

- **Instant output**
  Panoramic recording allows you to directly get the recording file for playback once the live stream ends, with no need to perform complex composition, which is time-saving and efficient.

Application Resources

After panoramic recording is deployed, the following resources will be created:

- **SCF function**: it gets the external link data and uses panoramic recording to record videos in real time.
- **CLS log**: it stores video processing logs and may incur fees. For more information, see CLS Billing Rules.
- **API Gateway**: you can use an API Gateway trigger to trigger events.

Prerequisites

1. Configure and deploy account permissions as detailed in Account and Permission Configuration.
2. Configure execution role permissions.
3. Panoramic recording needs to be used together with other services, so you must add the following policies: QcloudRedisFullAccess, QcloudVPCFullAccess, QcloudCFSFullAcces, QcloudSCFFullAccess, QcloudCOSFullAccess, and QcloudAccessForScfRole. For more information, see Policy.

Directions

Creating dependency resources

The following components are required as dependencies during function creation and must be created in advance: VPC, CFS file system or COS bucket, and TencentDB for Redis instance. For detailed directions on how to create them, see Building up an IPv4 VPC, Creating File Systems and Mount Targets, Getting Started with the Console, and Creating TencentDB for Redis Instances respectively.

Creating panoramic recording application

1. Log in to the Serverless console and select **Serverless Application** on the left sidebar.
2. On the **Serverless Application** page, click **Create Application**.
3. On the **Create Application** page, configure as prompted.
   - **Creation method**: select **Template**.
   - **Fuzzy search**: enter "panoramic", search, and select **Panoramic recording** .
     Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which

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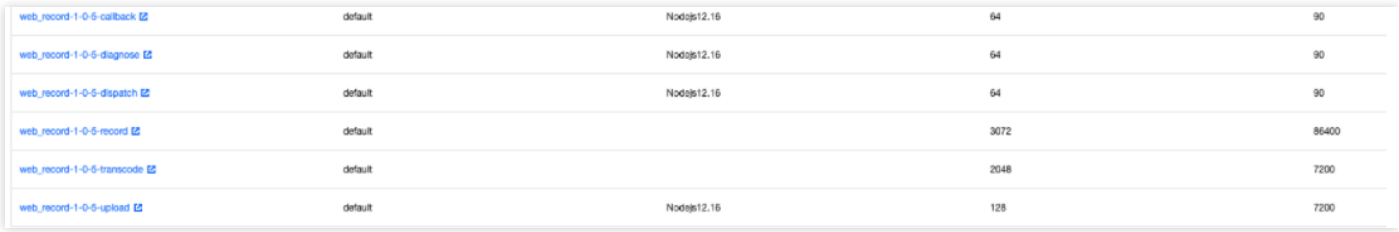
can be downloaded.

4. Click **Next** and configure the related information .
   - **Application Name**: enter a name such as "record-app".
   - **Region**: select a region such as "Shanghai".
   - **Intermediate Result Storage**: select the storage position of temporary files during recording. You can select COS or CFS as needed.
   - **Target Storage**: select the final storage position of recording results. You can select VOD or COS as needed.
   - **File System**: select as needed.
   - **Redis**: select as needed.
5. Click **Complete**.

   If you want to modify function configuration based on your business scenario, do so in **Serverless Application** > **Resource List** > **Function Details** as shown below:



web_record-1-0-5-callback	default	Nodejs12.16	64	90
web_record-1-0-5-diagnose	default	Nodejs12.16	64	90
web_record-1-0-5-dispatch	default	Nodejs12.16	64	90
web_record-1-0-5-record	default		3072	86400
web_record-1-0-5-transcode	default		2048	7200
web_record-1-0-5-upload	default	Nodejs12.16	128	7200

Note

- If the recording application needs to rely on the prolonged function execution capability, configure as instructed in Async Execution.
- To avoid request timeout, we recommend you set the backend timeout period of the API Gateway trigger to a large value or use the default value. For more information, see Provisioned Concurrency.

API use instructions

Prerequisites

- Prepare a webpage that can be visited through a URL and is compatible with Chrome as the recording content source.
- You should handle the possible login status or authentication on the page to be recorded by yourself.
- If multimedia needs to be played back on the page to be recorded, you should handle multimedia operations such as playback, redirect, and stop by yourself.
- The page to be recorded must display the complete content within the specified width and height with no scrollbars, as web panoramic recording can record only the visible area of the browser window but cannot record the content outside this area.

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API request path

- Request URL
- Request method
- API authentication method

1. Log in to the Serverless console and select **Serverless Application** on the left sidebar.
2. On the serverless application list page, click the target application name.
3. On the application details page, get the trigger access entry as shown below:

Recording start API

This API is used to start panoramic recording. Parameters such as recording URL, resolution, and result callback address need to be specified in API parameters.

- Request body parameter description
- Sample request
- Response parameter description
- Sample response parameters

Parameter	Type	Required	Description
Action	string	Yes	Requested operation type. To start recording, set it to `Start`.
Data	object	Yes	Request protocol parameter.

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Parameter	Type	Required	Description
RecordURL	string	Yes	Access URL of the webpage to be recorded. It must be accessible in Chrome.
ManualStart	bool	Yes	Whether the recording task to be created can start after the page actively calls the `window.startRecord` method to trigger recording. The default value is `false`, indicating that the recording task will start automatically. If the value is set to `true`, after the recording function loads the page, it will not automatically start recording but will trigger recording after the page actively calls the `window.startRecord` method.
Width	number	No	Recording image width, which is 1280 by default. Value range: 0–2560.
Height	number	No	Recording image height, which is 720 by default. Value range: 0–2560.
CallbackURL	string	No	Callback address for recording result notification
MaxDurationLimit	int	No	Maximum recording duration in seconds. Value range: 0–36000s. Default value: 21600s (6 hours). You need to configure a permanent key if this value exceeds 6 hours.
StorageType	string	No	Storage position of the intermediate state `webm` file during recording. Valid values: `cos` and `cfs`. Default value: `cfs`. (If the `COS_BUCKET_RAW` parameter is configured in the environment variables, data will be written into the bucket; otherwise, data will be written to the `raw` path in the target bucket.)
Output	object	No	Request protocol parameter.
Cos	object	No	Request protocol parameter.
Domain	string	No	Recording file playback domain name. If it is not set, it will be the origin server domain name by default.
Bucket	string	No	Recording file storage bucket. If it is not set, it will be the storage bucket set during function creation by default.
Region	string	No	Recording file storage region. If it is not set, it will be the region of the storage bucket by default.

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Parameter	Type	Required	Description
TargetDir	string	No	Recording file storage path. If it is not set, it will be `Taskid` by default.
TargetName	string	No	Recording filename. If it is not set, it will be the stop timestamp by default.
Vod	object	No	VOD configuration parameter.
MediaInfo	object	No	VOD media asset information.
MediaName	string	No	Media asset name.
ExpireTime	Timestamp ISO8601	No	Expiration time of media asset file in ISO 8601 format. For more information, see ISO date format.
StorageRegion	string	No	Upload region. This is only applicable to users who have special requirements for the upload region.
ClassId	Integer	No	Category ID, which is used to categorize the media asset for management. A category can be created and its ID can be obtained by using the CreateClass API.
SourceContext	string	No	Source context of up to 250 characters, which is used to pass through the user request information and will be returned by the VOD upload completion callback.
ProcedureInfo	object	No	Task flow information
Procedure	string	No	Subsequent task operation on a media asset file, i.e., after a media asset file is uploaded, task flow operations will be initiated automatically. This parameter value is a task flow template name. VOD supports creating templates and naming them.
SessionContext	string	No	Session context of up to 1,000 characters, which is used to pass through the user request information. If the `procedure` parameter is specified, the task flow status change callback API will return the value of this field.
SubAppId	string	No	ID of a subapplication in VOD. If you need to access a resource in a subapplication, enter the subapplication ID in this field; otherwise, leave it empty.
Video	object	No	Request protocol parameter.

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Parameter	Type	Required	Description
Muxer	string	No	Recording file format. Valid values: `hls` and `mp4`. If it is not set, it will be `mp4` by default.
EncryptKey	string	No	HLS encryption public key. If it is not set, no encryption will be performed by default.
AuthUrl	string	No	Decryption private key address, which is required if the public key is set.

Recording pause API

This API is used to pause a running recording task.

- Request body parameter description
- Sample request
- Response parameter description
- Sample response

Parameter	Type	Required	Description
Action	string	Yes	Requested operation type. To pause recording, set it to `Pause`.
Data	object	Yes	Request protocol parameter.
Data.TaskID	string	Yes	ID of the recording task to be paused, which can be obtained in the response parameters of the recording start API.

Recording resumption API

This API is used to resume a paused recording task. The video content after resumption will be directly added to the content before pause without generating new video segments.

- Request body parameter description
- Sample request
- Response parameter description
- Sample response parameters

Parameter	Type	Required	Description
Action	string	Yes	Requested operation type. To resume recording, set it to `Resume`.
Data	object	Yes	Request protocol parameter.

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Parameter	Type	Required	Description
Data.TaskID	string	Yes	ID of the recording task to be resumed, which can be obtained in the response parameters of the recording start API.

Recording page refresh API

This API is used to initiate a request to refresh the page to be recorded.

- Request body parameter description
- Sample request body
- Response parameter description
- Sample response parameters

Parameter	Type	Required	Description
Action	string	Yes	Requested operation type. To refresh recording, set it to `Refresh`.
Data	object	Yes	Request protocol parameter.
Data.TaskID	string	Yes	ID of the recording task to be refreshed, which can be obtained in the response parameters of the recording start API.

Recording stop API

This API is used to initiate a recording stop request.

- Request body parameter description
- Sample request body
- Response parameter description
- Sample response parameters

Parameter	Type	Required	Description
Action	string	Yes	Requested operation type. To stop recording, set it to `Stop`.
Data	object	Yes	Request protocol parameter.
Data.TaskID	string	Yes	ID of the recording task to be stopped, which can be obtained in the response parameters of the recording start API.

Recording task information query API

This API is used to initiate a request to query the recording task information.

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- Request body parameter description
- Sample request body
- Response parameter description
- Sample response parameters

Parameter	Type	Required	Description
Action	string	Yes	Requested operation type. To query a recording task, set it to `Describe`.
Data	object	Yes	Request protocol parameter.
Data.TaskID	string	Yes	ID of the recording task to be queried, which can be obtained in the response parameters of the recording start API.

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Using SCF to Input Online Media Streams for SCF +TRTC

Last updated：2022-01-05 17:22:23

Use Cases

Cases

Online education

In one-to-one or one-to-many small classes, you can record streams in multiple dimensions for different students:

- For one single student, you can record the student's separate data stream to compose relevant data. In this way, you can record the highlights of each student and push them to their parents.
- You can directly record the data in the room and generate videos that students can play back and watch repeatedly for learning.
- In order to facilitate repeated watches, redundant data can be removed during recording.

Customer service center

- In smart customer service scenarios, you can record the separate data streams of users and combine the data with recognition APIs to implement information verification during card application and smart account opening.
- You can record the speeches of the customer service representatives and users separately and automatically recognize keywords, so as to evaluate the service quality and iteratively train the smart customer service.
- You can save and archive the data generated in the course of service.

Social networking

- You can record only the desired video streams in the room for data retention, which helps reduce the costs of storage and stream mix.
- You can record the specified data in the room, call moderation APIs for content moderation, and set different moderation standards for different users.
- You can directly generate segment files based on live streams.

Business process

This document describes how to use API Gateway and SCF to record a single anchor's audio/video stream in a TRTC room and upload the recording file to COS for storage. This solution provides out-of-the-box, flexible, convenient, and programmable live recording capabilities. SCF offers 512 MB of memory by default for recording file storage. If you

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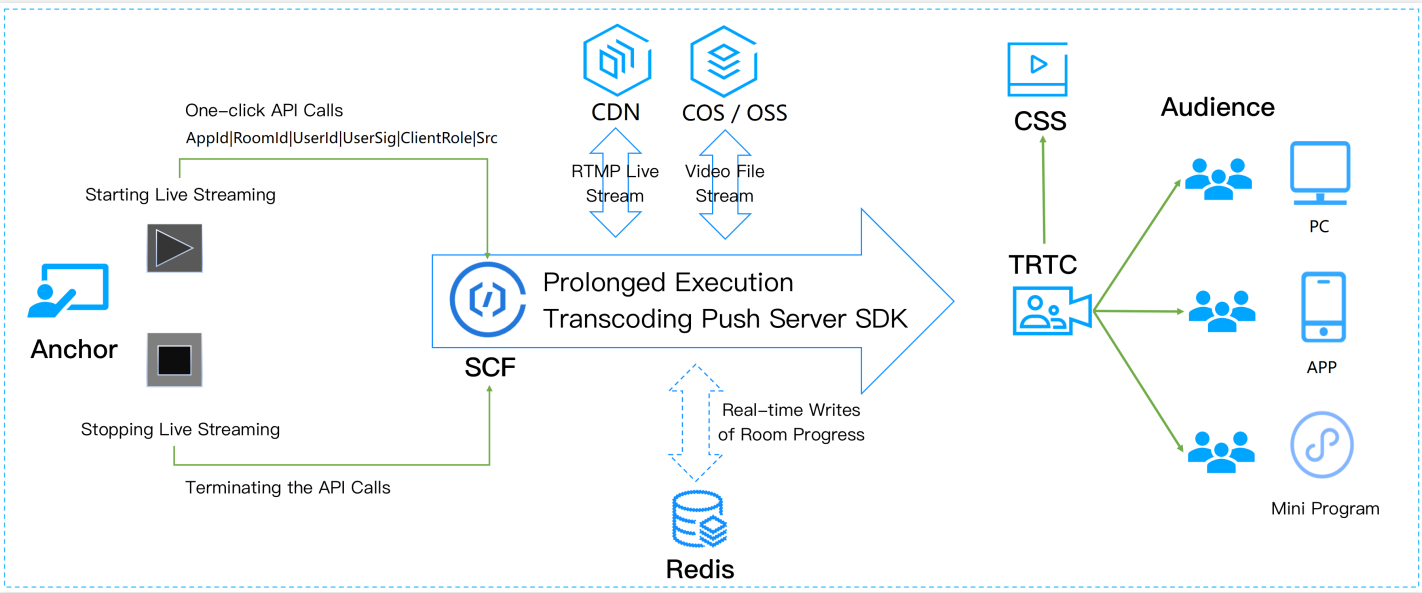
need more storage space, you can choose to use the mount capability of CFS. The workflow is as shown below:



The parameters for calling APIs are as follows:

Parameter	Type	Required	Description
SdkAppId	Int	Yes	Application ID, which is used to distinguish different TRTC applications.
RoomId	Int	Yes	Room ID in integer type, which is used to uniquely identify a room in a TRTC application.
StrRoomId	String	No	Room ID in string type. Either `RoomId` or `StrRoomId` must be configured. If both are configured, `RoomId` will be used.
UserId	String	Yes	Recorded user ID, which is used to uniquely identify a user in a TRTC application.
UserSig	String	Yes	Recorded user signature, which is used to authenticate the user login.
CosConfig	cosConfig	Yes	COS storage configuration for recording file storage.
Callback	String	No	Callback address after recording. The POST method is used for callback.
Mode	String	No	• 00: single audio stream output in MP3 format (default mode). • 01: single video stream output in MP4 format. • 02: single audio/video stream output in MP4 format.

// The parameters involved in `CosConfig` are as follows:

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Parameter	Type	Required	Description
SecretId	String	No	`SecretId` of Tencent Cloud account. For more information, please see Root Account Access Key Management.
SecretKey	String	No	`SecretKey` of Tencent Cloud account. For more information, please see Root Account Access Key Management.
Region	String	Yes	COS region, such as `ap-guangzhou` .
Bucket	String	Yes	Bucket name, such as `susu-123456789` .
Path	String	Yes	Path in the bucket. For example, for `/test` , the root directory is `/` .

Note：

- `UserId` is the specified user ID. Idempotency is not guaranteed for multiple requests to API Gateway.
- If `SecretId` and `SecretKey` are not configured in `CosConfig` , the function will use the permission of the execution role `SCF_ExecuteRole` when accessing COS.

Trigger conditions for stopping recording:

- The TRTC room is terminated. When there is no anchor in the TRTC room for more than 300s, the room will be automatically terminated.
- The user removal API is actively called to kick the recorded user out of the room.
- To stop recording for users with `RoomId` , you need to call the RemoveUser API.
- To stop recording for users with `StrRoomId` , you need to call the RemoveUserByStrRoomId API.

After recording is stopped, the data returned by the function is as follows:

Parameter	Type	Required	Description
SdkAppId	String	Yes	Application ID.
RoomId	String	Yes	Room ID in integer type.
UserId	String	Yes	Recorded user ID.
StrRoomId	String	Yes	Room ID in string type.
Files	Array	Yes	[{},{},{},{}]

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Note：
If callback is configured, after the stop, SCF will pass the returned data to the callback address in POST method.

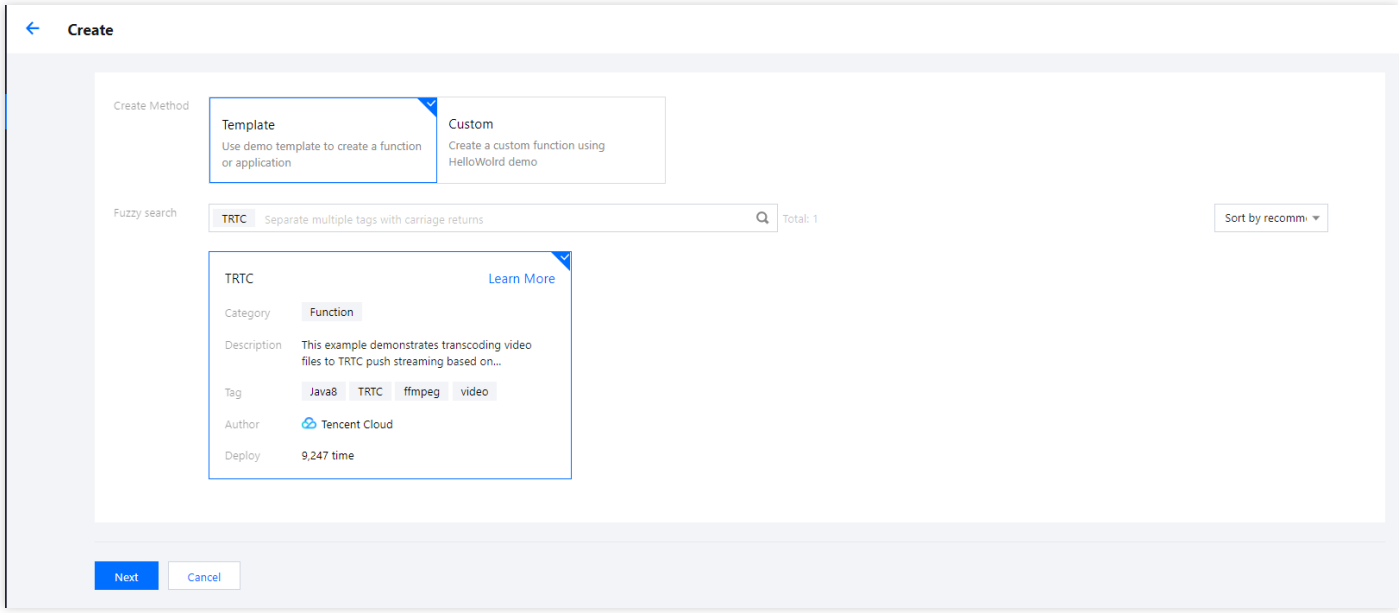
Each item in the `Files` array is a JSON object as follows:

Parameter	Type	Required	Description
UserId	String	Yes	Recorded user ID.
RecordFile	String	Yes	URL of the recording file uploaded to COS.
Status	Int	Yes	• 0: failure. • 1: success.
Message	String	Yes	Execution result of the recording task, such as recording failed, transcoding failed, and write to COS failed.

Directions

Creating function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Guangzhou** region and click **Create** to enter the function creating page and configure the function as shown below:



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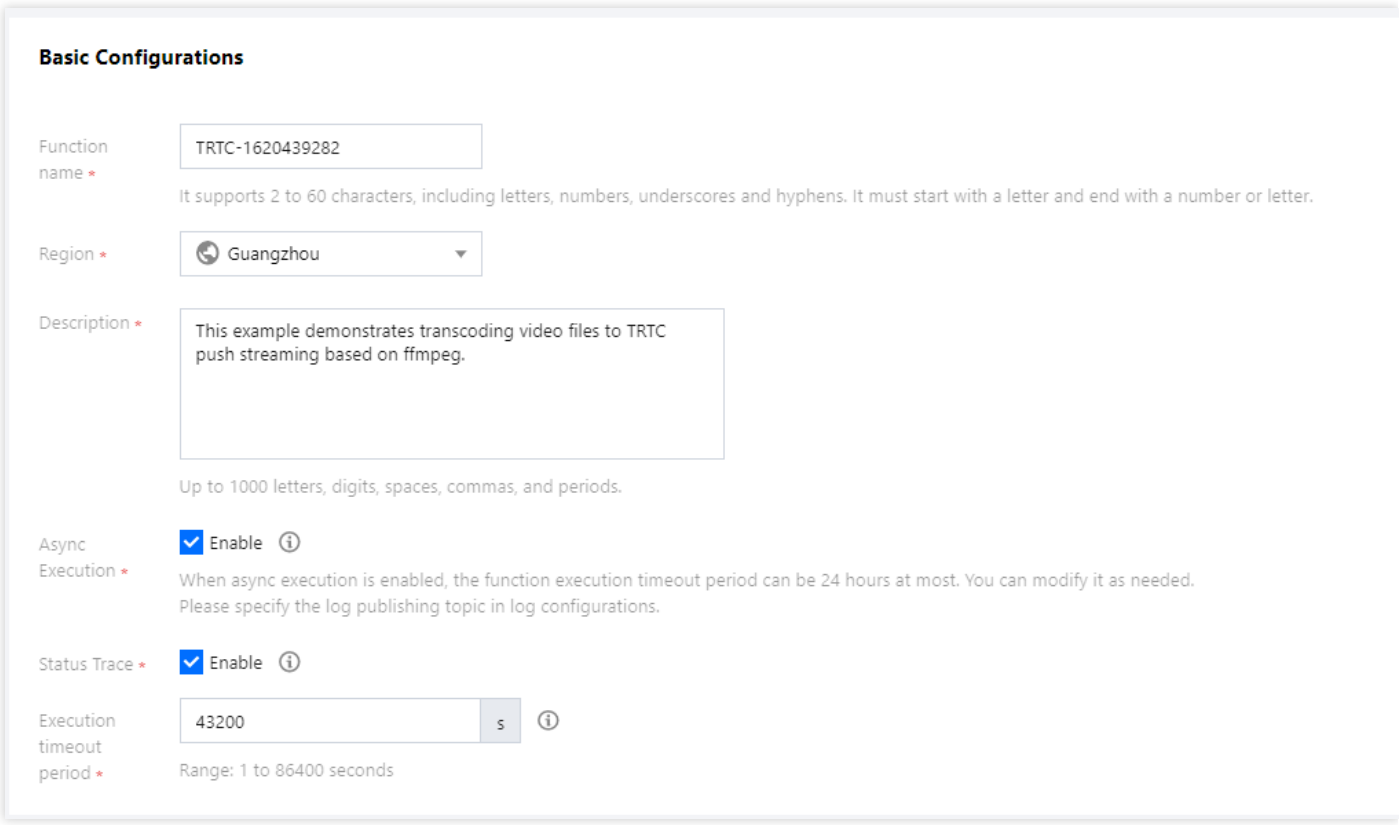
- **Creation method**: select **Template**.
- **Fuzzy search**: enter "TRTC", search, and select the **Single audio/video stream recording** template. Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

3. Click **Next** and configure the related information as shown below:



- **Function Name**: the function name is automatically generated by default.
- **Async Execution**: select the checkbox to enable the async execution. When it's enabled, the function will respond to the event in async execution mode. The event goes to async execution status after being invoked without waiting for the processing result.
- **Status Trace**: select the checkbox to enable the status trace. When it's enabled, it will keep the logs of real-time status of response for async function events. You can query and stop the event and check the related statistics. Data of event status will be retained for three days.
- **Execution Timeout Period**: it can be modified as needed.
- **Execution Role**: **SCF_ExecuteRole** is used as the execution role by default, which grants the access permissions of **QcloudCOSFullAccess** and **QcloudCFSFullAccess**.

4. Configure an API Gateway trigger. An API service is created by default and the integration response is disabled. You can customize the trigger, but please ensure that the integration response is disabled as shown below:

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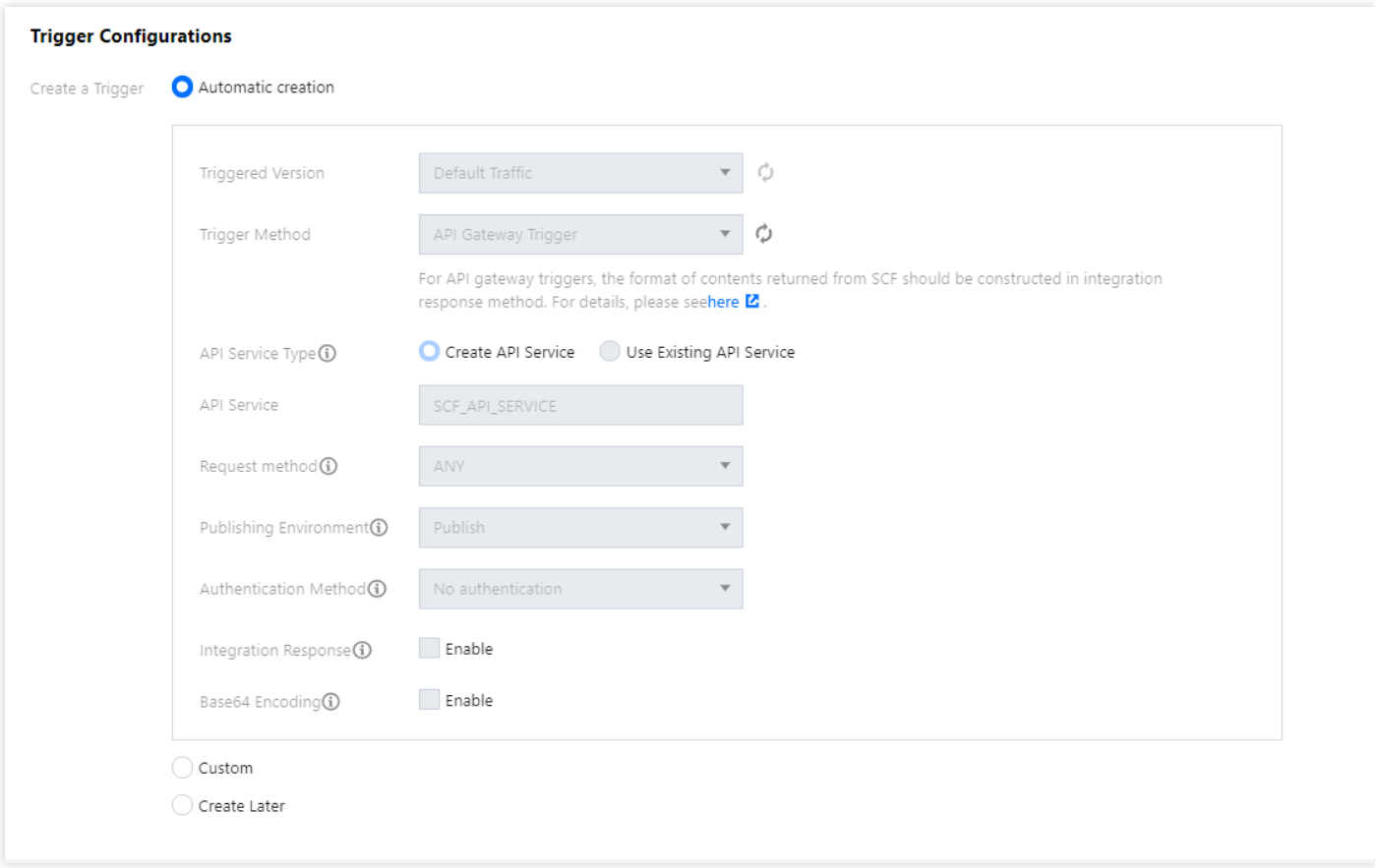
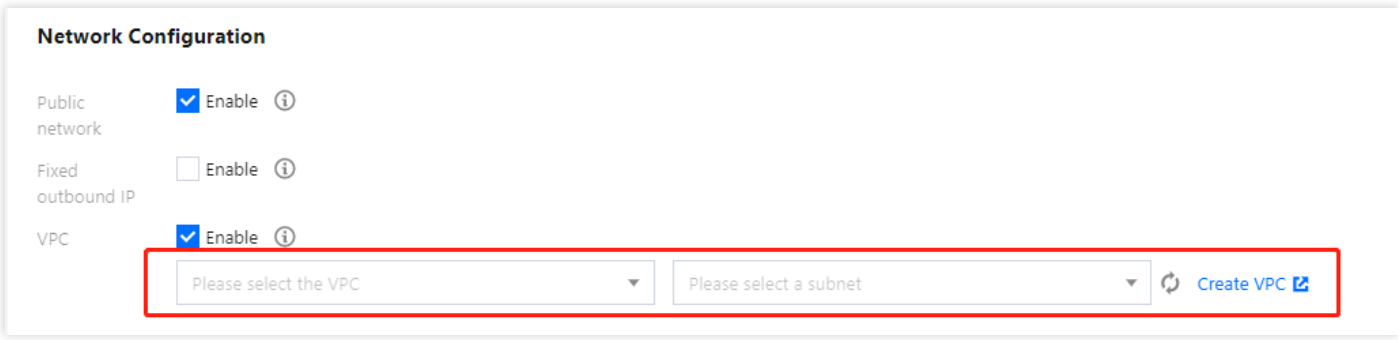


5. Click **Complete**.
6. If you need to use the mount capability of CFS, as CFS can only be accessed in VPC, you should use the VPC of CFS as the VPC of the function as shown below:



Note：

To enable CFS, you need to set the environment variable `CFS_PATH` to a local directory, such as `/mnt/audio/` .

Creating TRTC application

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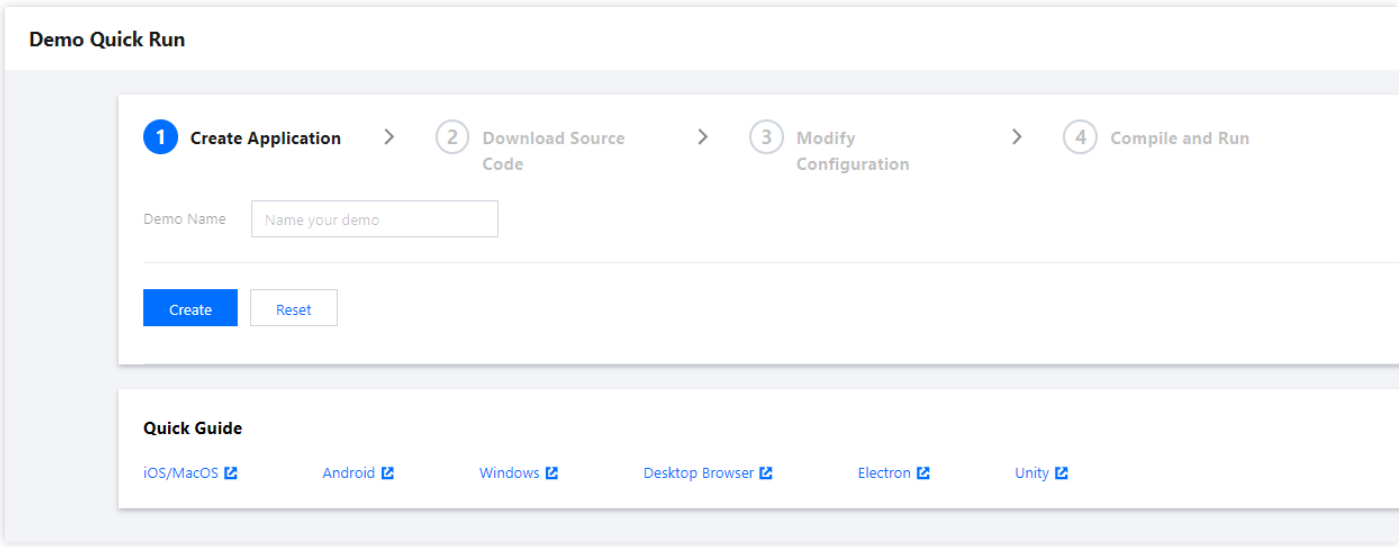
1. Log in to the TRTC console and select **Development Assistance** > **Demo Quick Run** on the left sidebar.
2. Enter the demo name and click **Create**. You can choose a template for test run according to your client, such as the demo for desktop browser.



Testing function

1. Create a TRTC application and enter the application.
2. Use Postman to construct an HTTP request, where `roomId` is the room ID of the created TRTC application, and `userId` is the ID of another random user (which must be unique). Below is the sample code:

```
{
"SdkAppId": 1400000000,
"RoomId": 43474,
"UserId": "user_55952145",
"Mode": "02",
"UserSig": "eJwtzNEKgkAUBNB-2efQ3e3eUqG3tMCKJJEIIxxxxxxxxxxxxxxxhvmweLWzGlUxj0m
Ls1GXKVf3mgrq*GFUdUR0UQrAYWDyW6Y15cwTwDm4UkxF36iXpkq1joiSc9xxxxxxxxxxxxx-S*CZeO
k9sHfnEhCwlUW*fE4oWusw3dULlJ7HoSJ2e6d9fM8Y98fxUAzWA__",
"CosConfig": {
"Region": "ap-shanghai",
"Bucket": "test-123456789",
"Path": "/trtc"
}
}
```

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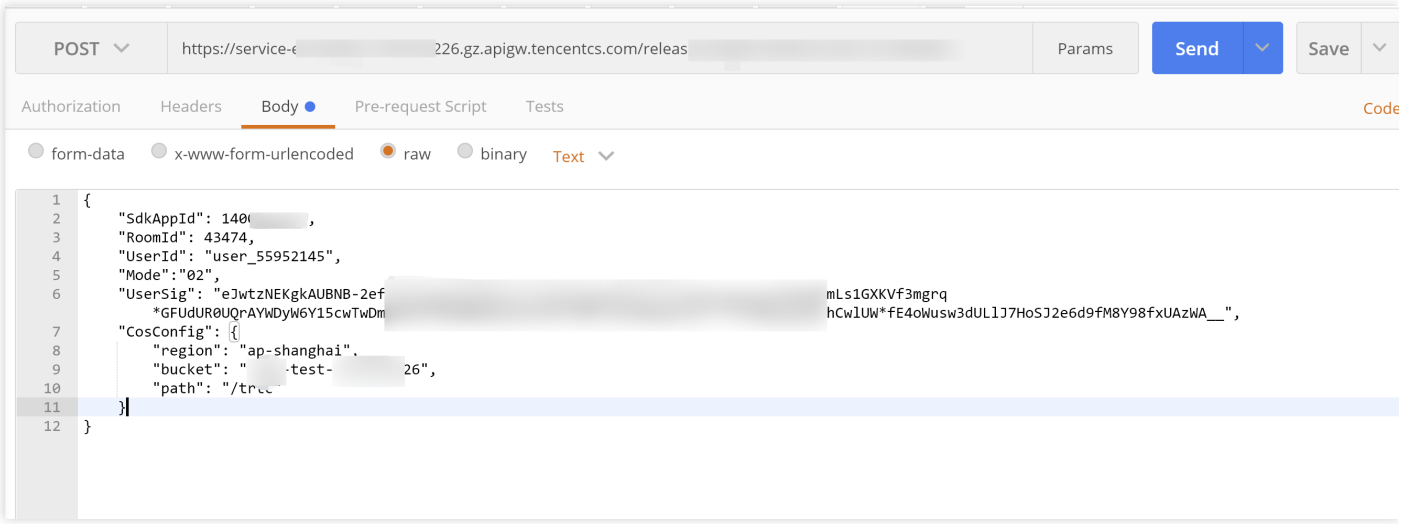
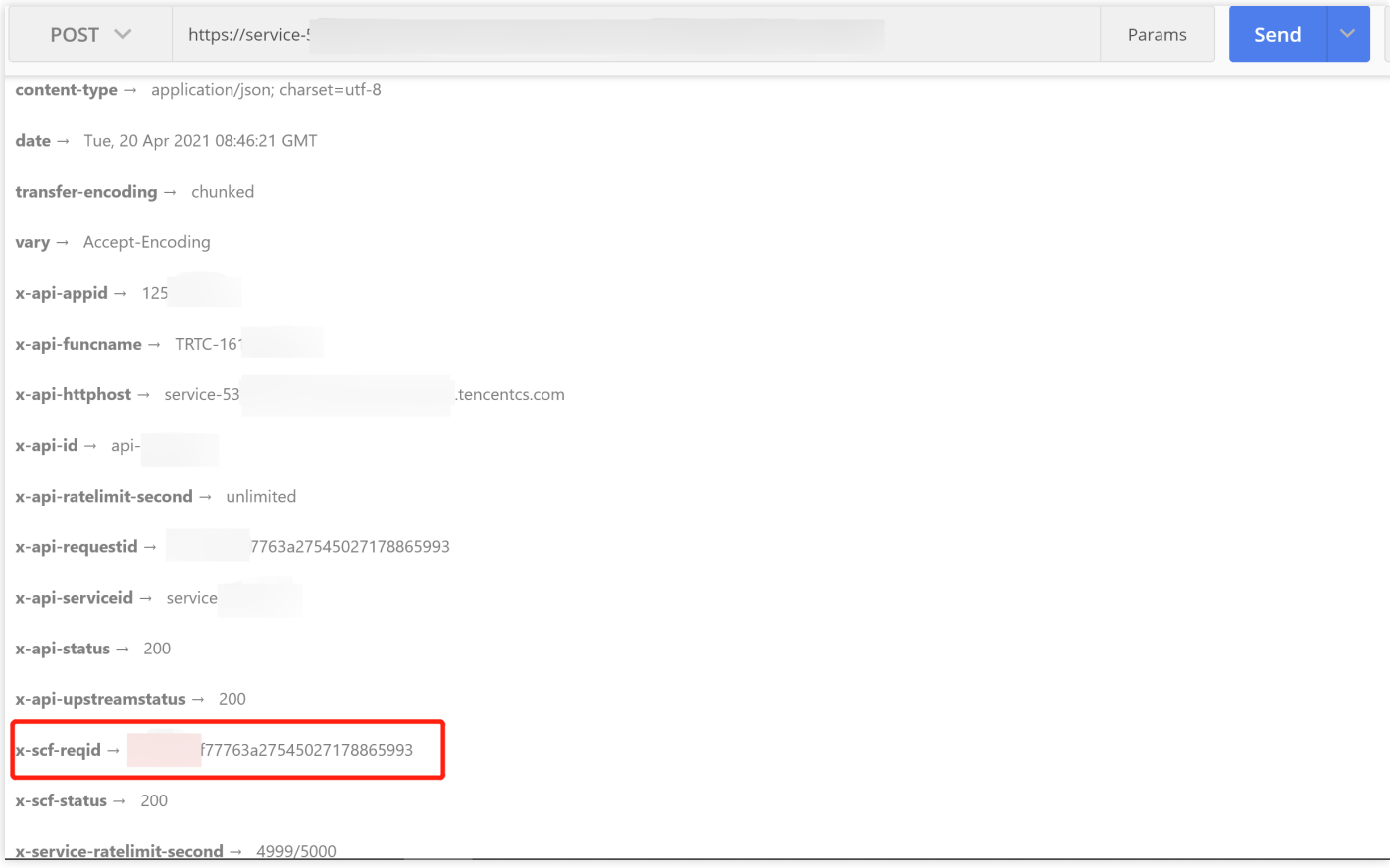
See the figure below:



3. After the request is sent, an async function response "Async run task submitted" will be received. The `RequestId` of this function will be returned through `x-scf-reqid` in the HTTP header as shown below:



4. On the **Function Service** page in the SCF console, click the name of the function created in the Creating function step above to enter the function details page.
5. Select the **Log Query** tab on the function details page to view the printed recording log information as shown below:

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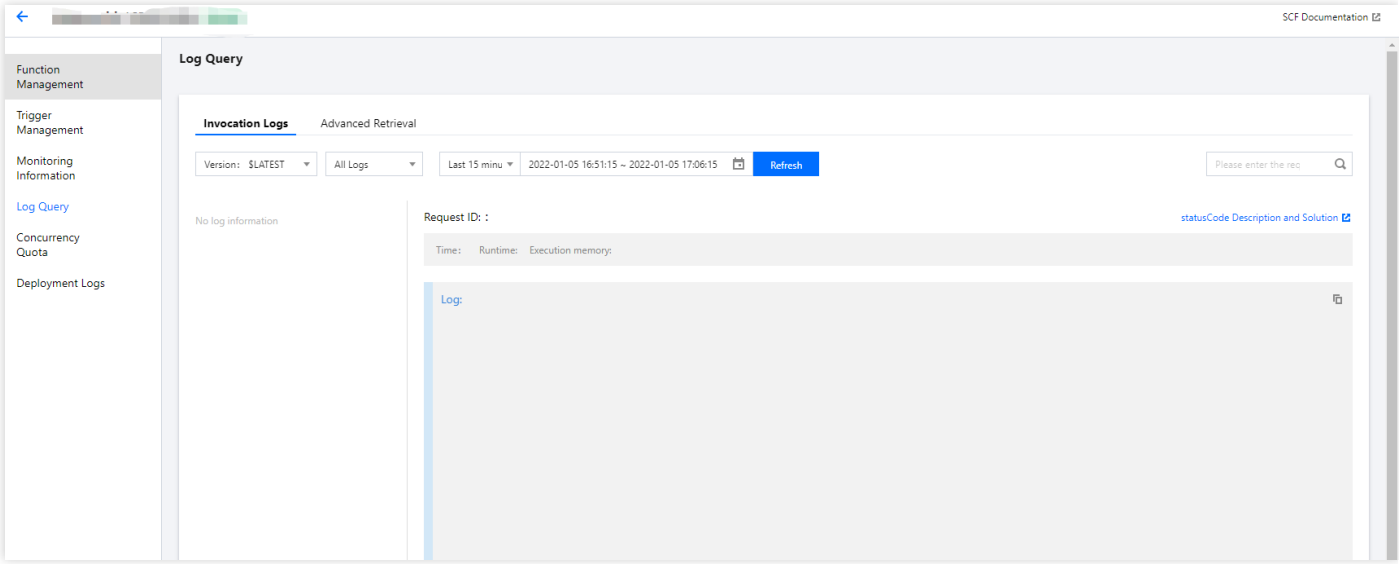

6. Log in to the TRTC console and click the room ID on the **Monitoring Dashboard** page to view all users in the room, one of whom is the recorded user
7. To stop recording, you can call the RemoveUser or RemoveUserByStrRoomId API to move the user out of the room.

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SCF + TRTC for Stream Single Recording

Last updated：2022-02-10 15:14:04

Use Cases

Cases

Online education

In one-to-one or one-to-many small classes, you can record streams in multiple dimensions for different students:

- For one single student, you can record the student's separate data stream to compose relevant data. In this way, you can record the highlights of each student and push them to their parents.
- You can directly record the data in the room and generate videos that students can play back and watch repeatedly for learning.
- In order to facilitate repeated watches, redundant data can be removed during recording.

Customer service center

- In smart customer service scenarios, you can record the separate data streams of users and combine the data with recognition APIs to implement information verification during card application and smart account opening.
- You can record the speeches of the customer service representatives and users separately and automatically recognize keywords, so as to evaluate the service quality and iteratively train the smart customer service.
- You can save and archive the data generated in the course of service.

Social networking

- You can record only the desired video streams in the room for data retention, which helps reduce the costs of storage and stream mix.
- You can record the specified data in the room, call moderation APIs for content moderation, and set different moderation standards for different users.
- You can directly generate segment files based on live streams.

Business process

This document describes how to use API Gateway and SCF to record a single anchor's audio/video stream in a TRTC room and upload the recording file to COS for storage. This solution provides out-of-the-box, flexible, convenient, and programmable live recording capabilities. SCF offers 512 MB of memory by default for recording file storage. If you

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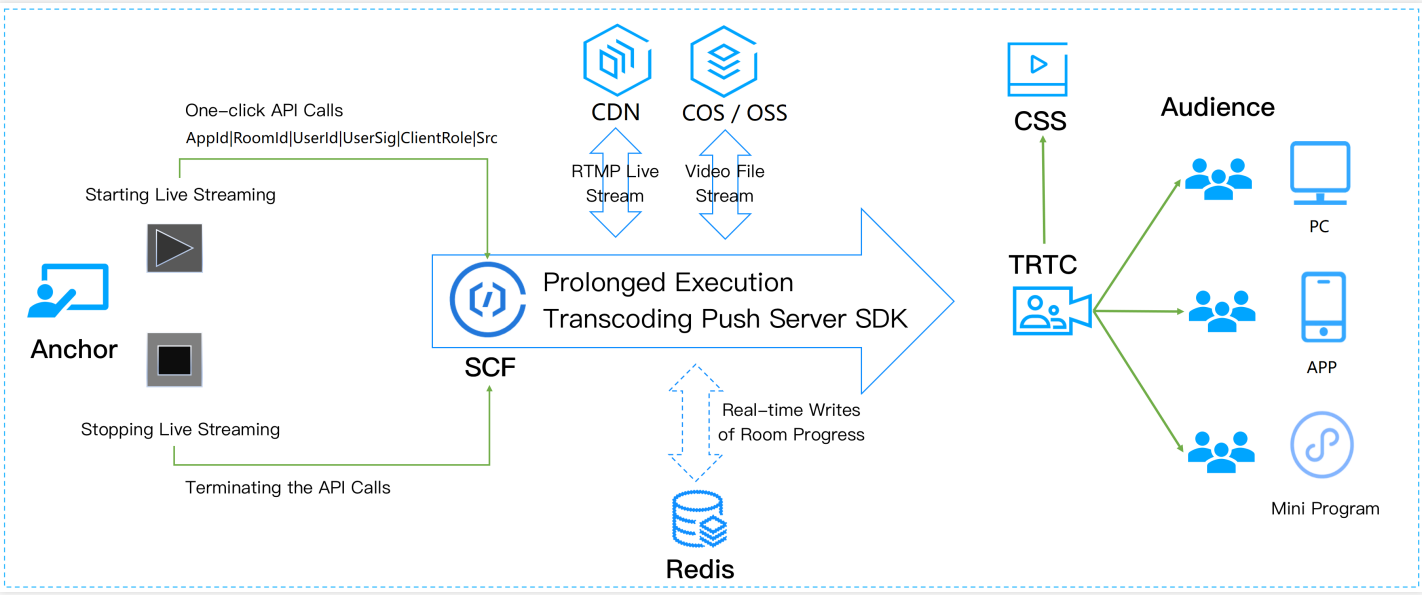
need more storage space, you can choose to use the mount capability of CFS. The workflow is as shown below:



The parameters for calling APIs are as follows:

Parameter	Type	Required	Description
SdkAppId	Int	Yes	Application ID, which is used to distinguish different TRTC applications.
RoomId	Int	Yes	Room ID in integer type, which is used to uniquely identify a room in a TRTC application.
StrRoomId	String	No	Room ID in string type. Either `RoomId` or `StrRoomId` must be configured. If both are configured, `RoomId` will be used.
UserId	String	Yes	Recorded user ID, which is used to uniquely identify a user in a TRTC application.
UserSig	String	Yes	Recorded user signature, which is used to authenticate the user login.
CosConfig	cosConfig	Yes	COS storage configuration for recording file storage.
Callback	String	No	Callback address after recording. The POST method is used for callback.
Mode	String	No	• 00: single audio stream output in MP3 format (default mode). • 01: single video stream output in MP4 format. • 02: single audio/video stream output in MP4 format.

// The parameters involved in `CosConfig` are as follows:

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Parameter	Type	Required	Description
SecretId	String	No	`SecretId` of Tencent Cloud account. For more information, please see Root Account Access Key Management.
SecretKey	String	No	`SecretKey` of Tencent Cloud account. For more information, please see Root Account Access Key Management.
Region	String	Yes	COS region, such as `ap-guangzhou` .
Bucket	String	Yes	Bucket name, such as `susu-123456789` .
Path	String	Yes	Path in the bucket. For example, for `/test` , the root directory is `/` .

Note：

- `UserId` is the specified user ID. Idempotency is not guaranteed for multiple requests to API Gateway.
- If `SecretId` and `SecretKey` are not configured in `CosConfig` , the function will use the permission of the execution role `SCF_ExecuteRole` when accessing COS.

Trigger conditions for stopping recording:

- The TRTC room is terminated. When there is no anchor in the TRTC room for more than 300s, the room will be automatically terminated.
- The user removal API is actively called to kick the recorded user out of the room.
- To stop recording for users with `RoomId` , you need to call the RemoveUser API.
- To stop recording for users with `StrRoomId` , you need to call the RemoveUserByStrRoomId API.

After recording is stopped, the data returned by the function is as follows:

Parameter	Type	Required	Description
SdkAppId	String	Yes	Application ID.
RoomId	String	Yes	Room ID in integer type.
UserId	String	Yes	Recorded user ID.
StrRoomId	String	Yes	Room ID in string type.
Files	Array	Yes	[{},{},{},{}]

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Note：
If callback is configured, after the stop, SCF will pass the returned data to the callback address in POST method.

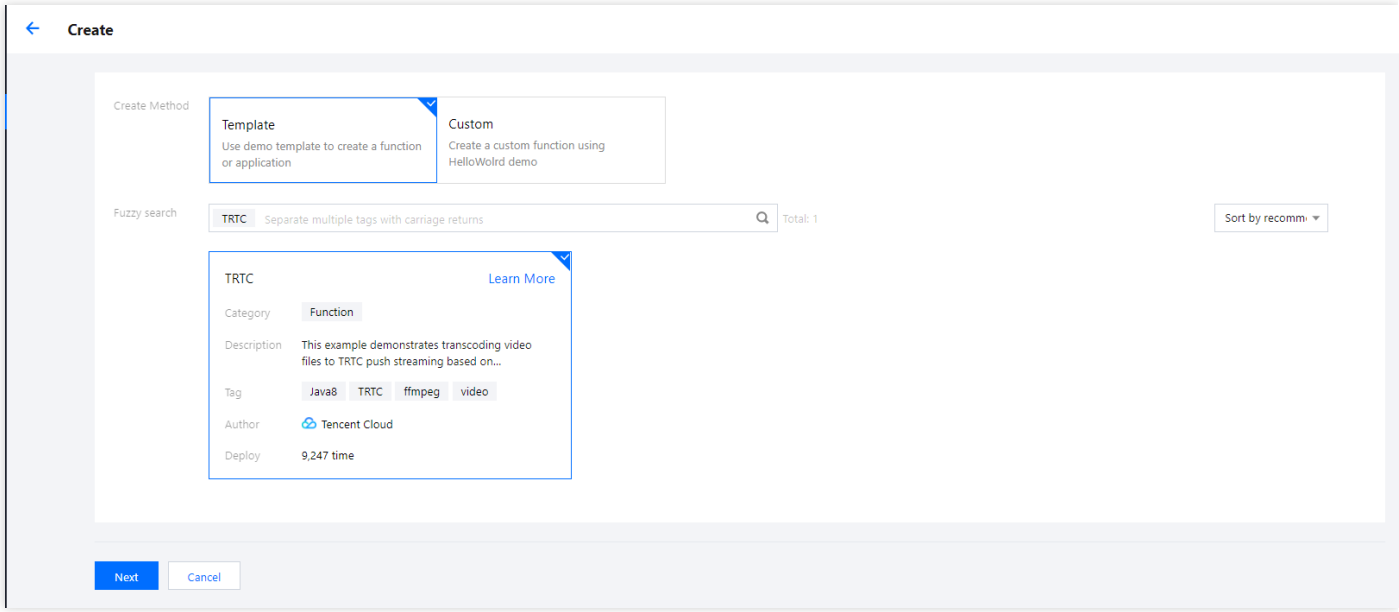
Each item in the `Files` array is a JSON object as follows:

Parameter	Type	Required	Description
UserId	String	Yes	Recorded user ID.
RecordFile	String	Yes	URL of the recording file uploaded to COS.
Status	Int	Yes	• 0: failure. • 1: success.
Message	String	Yes	Execution result of the recording task, such as recording failed, transcoding failed, and write to COS failed.

Directions

Creating function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Guangzhou** region and click **Create** to enter the function creating page and configure the function as shown below:



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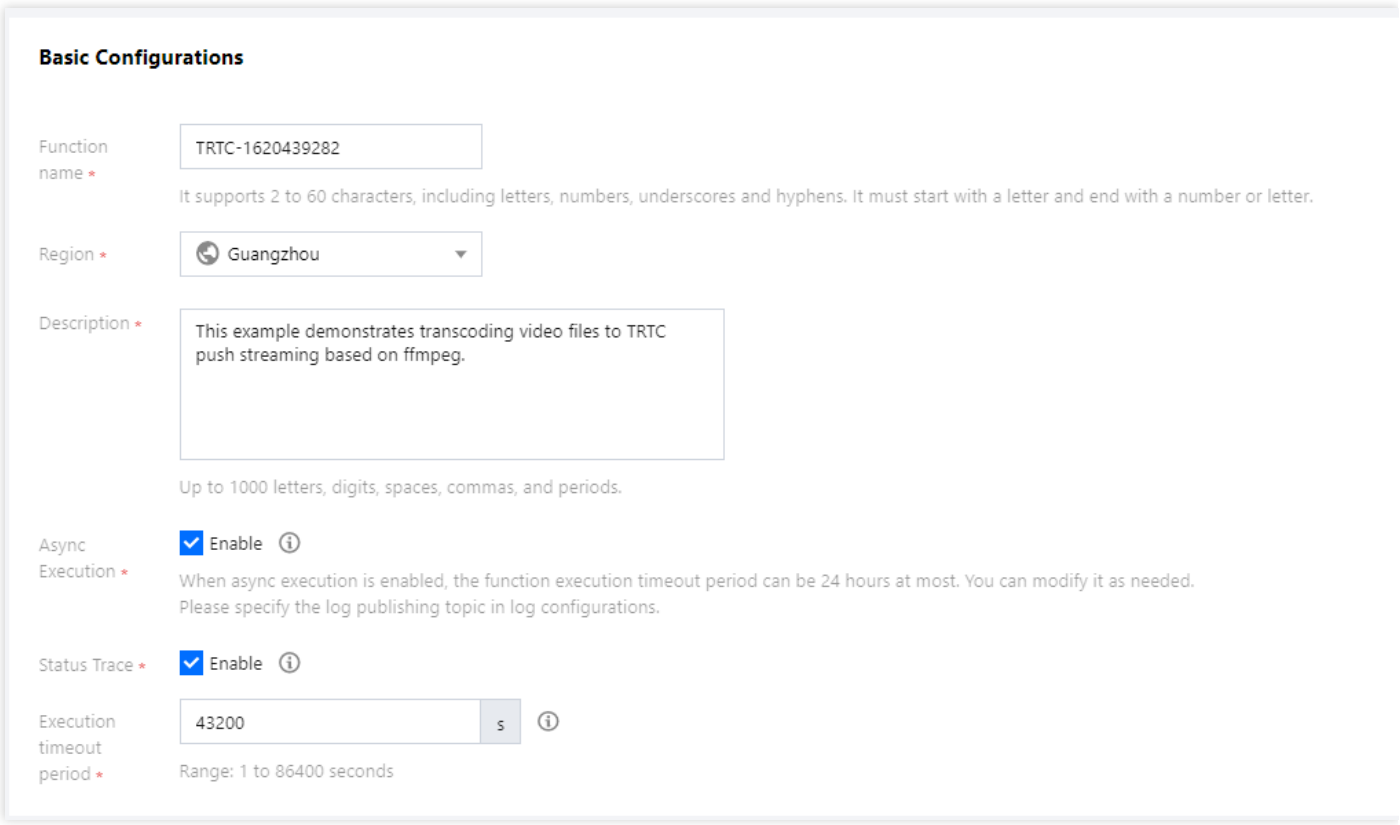
- **Creation method**: select **Template**.
- **Fuzzy search**: enter "TRTC", search, and select the **Single audio/video stream recording** template. Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

3. Click **Next** and configure the related information as shown below:



- **Function Name**: the function name is automatically generated by default.
- **Async Execution**: select the checkbox to enable the async execution. When it's enabled, the function will respond to the event in async execution mode. The event goes to async execution status after being invoked without waiting for the processing result.
- **Status Trace**: select the checkbox to enable the status trace. When it's enabled, it will keep the logs of real-time status of response for async function events. You can query and stop the event and check the related statistics. Data of event status will be retained for three days.
- **Execution Timeout Period**: it can be modified as needed.
- **Execution Role**: **SCF_ExecuteRole** is used as the execution role by default, which grants the access permissions of **QcloudCOSFullAccess** and **QcloudCFSFullAccess**.

4. Configure an API Gateway trigger. An API service is created by default and the integration response is disabled. You can customize the trigger, but please ensure that the integration response is disabled as shown below:

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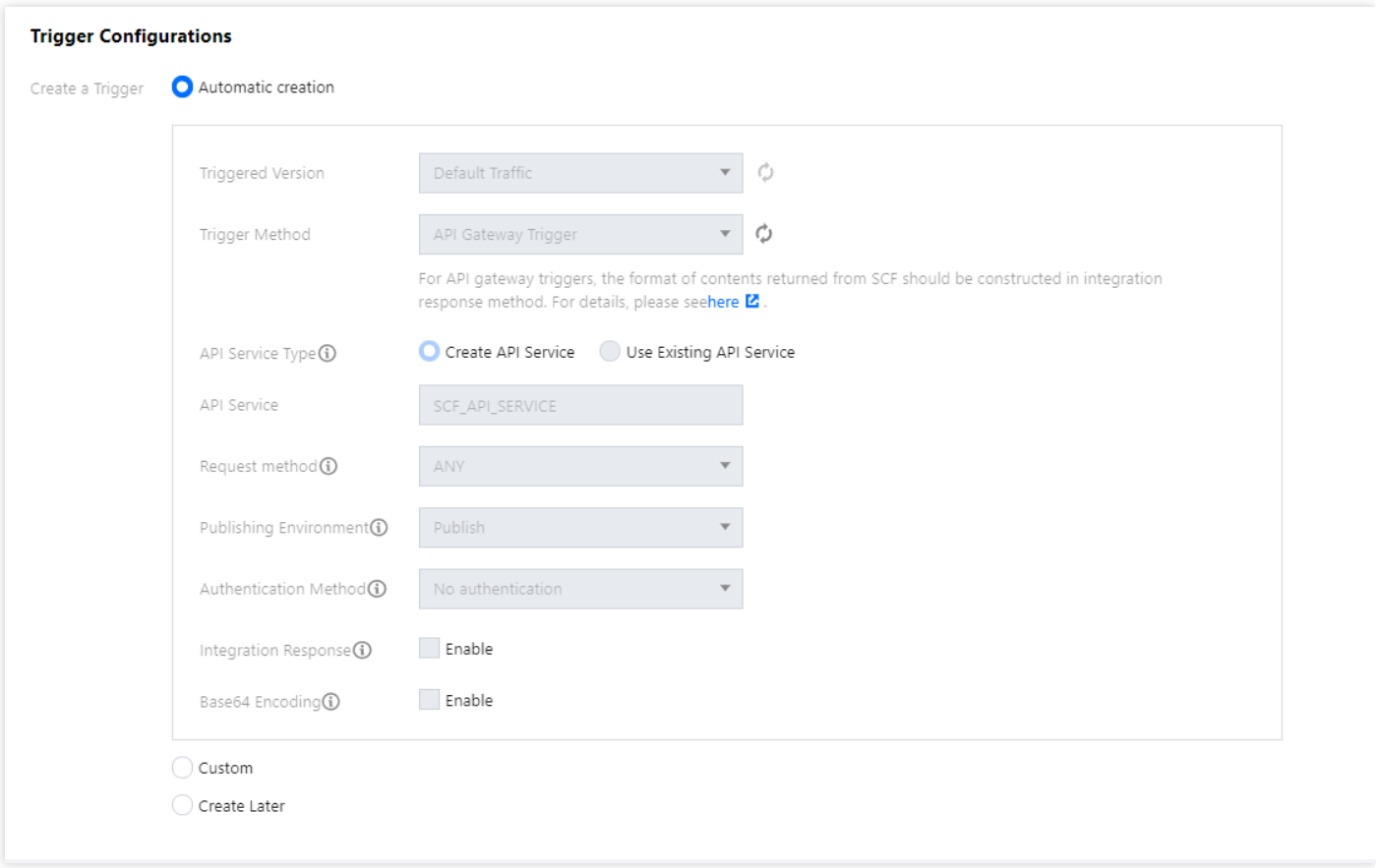
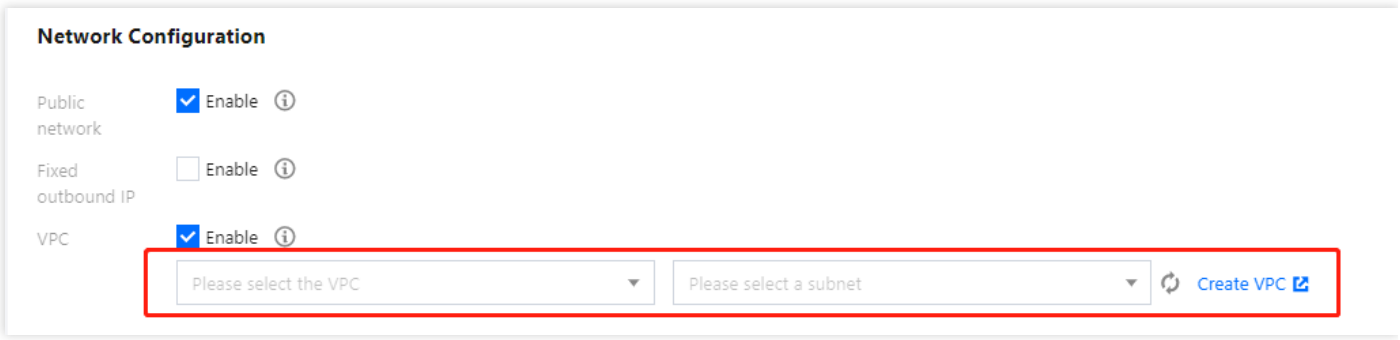


5. Click **Complete**.
6. If you need to use the mount capability of CFS, as CFS can only be accessed in VPC, you should use the VPC of CFS as the VPC of the function as shown below:



Note：

To enable CFS, you need to set the environment variable `CFS_PATH` to a local directory, such as `/mnt/audio/` .

Creating TRTC application

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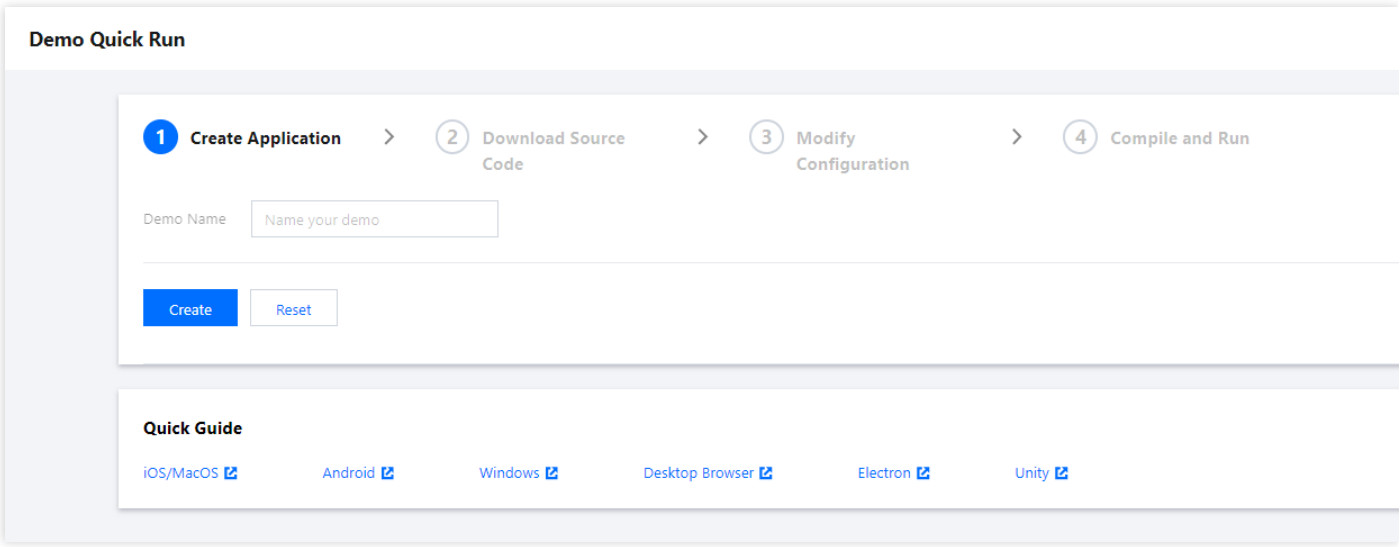
1. Log in to the TRTC console and select **Development Assistance** > **Demo Quick Run** on the left sidebar.
2. Enter the demo name and click **Create**. You can choose a template for test run according to your client, such as the demo for desktop browser.



Testing function

1. Create a TRTC application and enter the application.

2. Use Postman to construct an HTTP request, where `roomId` is the room ID of the created TRTC application, and `userId` is the ID of another random user (which must be unique). Below is the sample code:

```
{
"SdkAppId": 1400000000,
"RoomId": 43474,
"UserId": "user_55952145",
"Mode": "02",
"UserSig": "eJwtzNEKgkAUBNB-2efQ3e3eUqG3tMCKJJEIIxxxxxxxxxxxxxxxhvmweLWzGlUxj0m
Ls1GXKVf3mgrq*GFUdUR0UQrAYWDyW6Y15cwTwDm4UkxF36iXpkq1joiSc9xxxxxxxxxxxxx-S*CZeO
k9sHfnEhCwlUW*fE4oWusw3dULlJ7HoSJ2e6d9fM8Y98fxUAzWA__",
"CosConfig": {
"Region": "ap-shanghai",
"Bucket": "test-123456789",
"Path": "/trtc"
}
}
```

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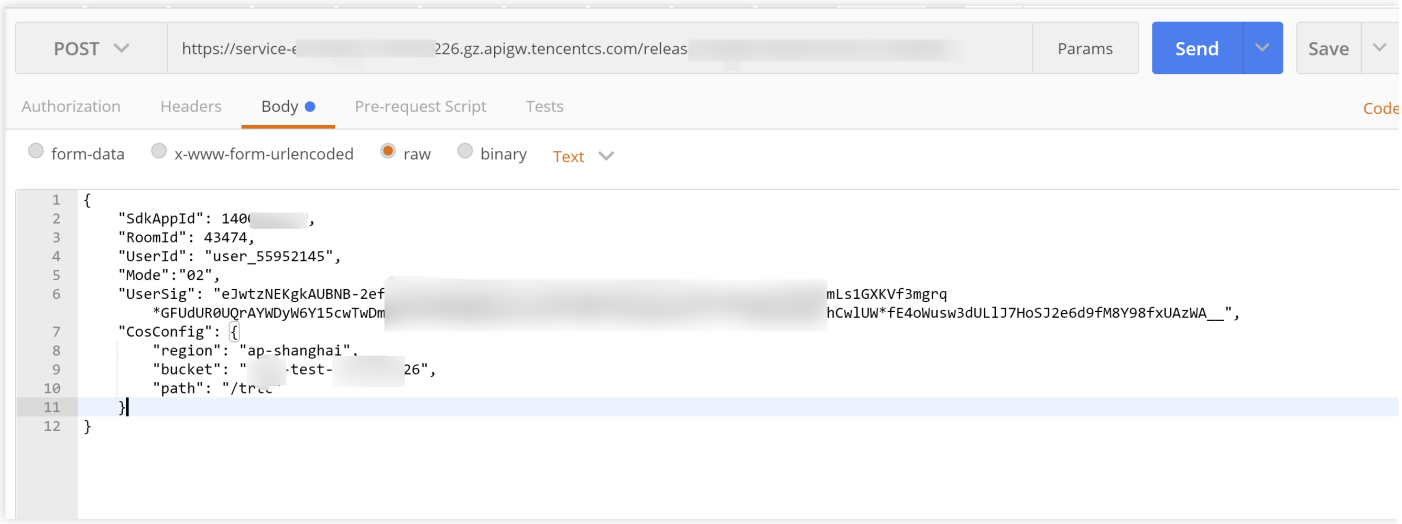
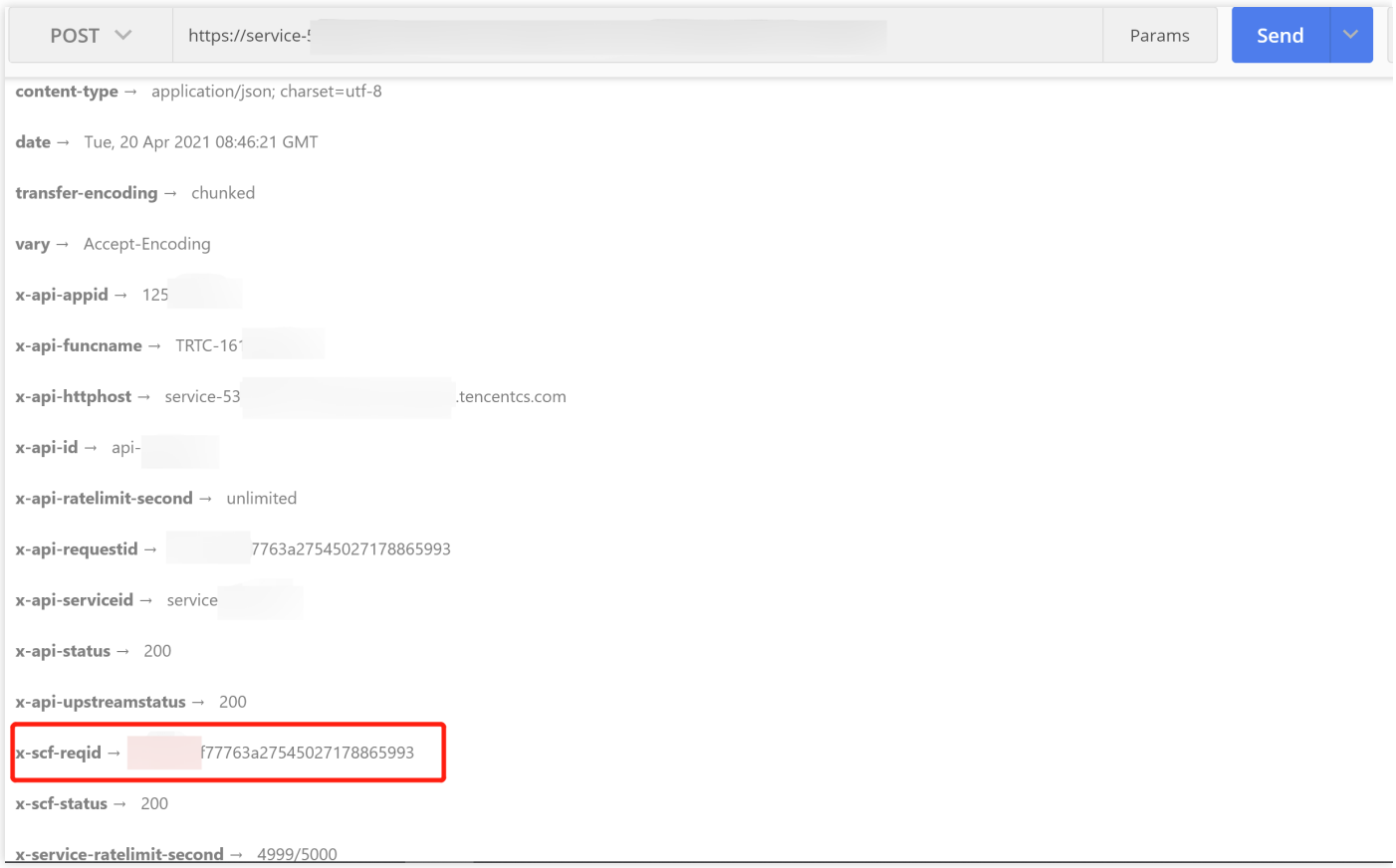
See the figure below:



3. After the request is sent, an async function response "Async run task submitted" will be received. The `RequestId` of this function will be returned through `x-scf-reqid` in the HTTP header as shown below:



4. On the **Function Service** page in the SCF console, click the name of the function created in the Creating function step above to enter the function details page.

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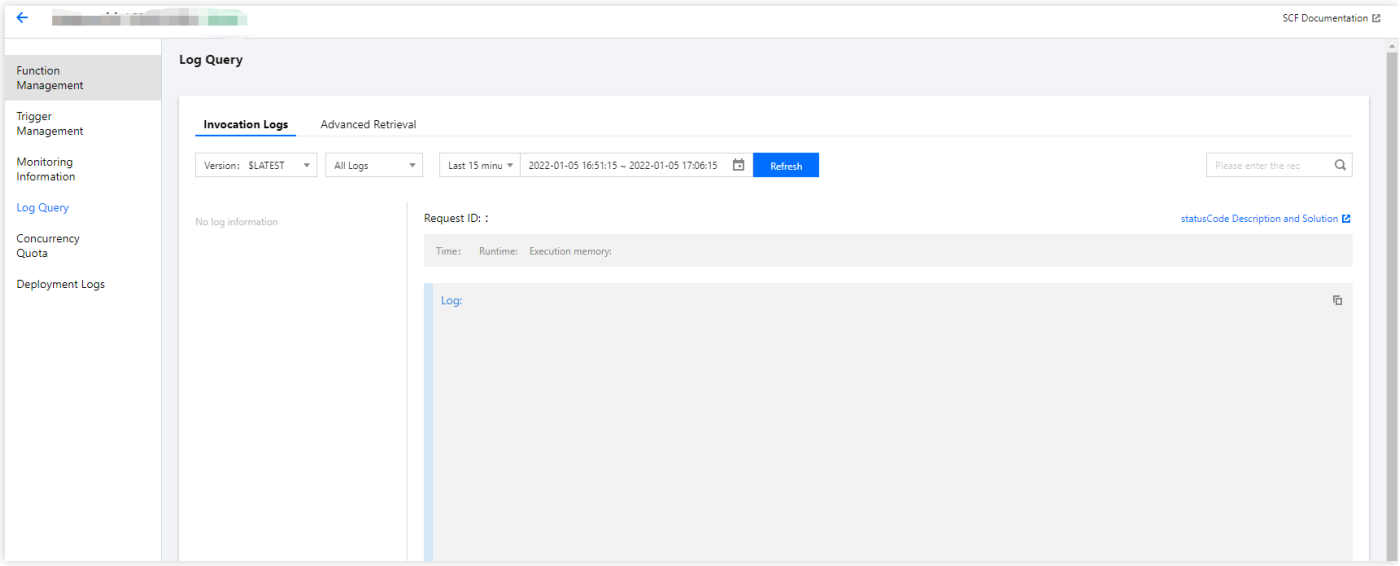
5. Select the **Log Query** tab on the function details page to view the printed recording log information as shown below:



6. Log in to the TRTC console and click the room ID on the **Monitoring Dashboard** page to view all users in the room, one of whom is the recorded user .

7. To stop recording, you can call the RemoveUser or RemoveUserByStrRoomId API to move the user out of the room.

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SCF + TRTC for Stream Mix Recording

Last updated：2022-01-23 16:11:23

Use Cases

Cases

Online education

In the online education scenario, this solution can compose and record the audios/videos of the teacher and students during class and add other materials and AI analysis capability to restore the in-person class experience. It can also add other business features to enrich the video playback effect.

Social live streaming

During live streaming, this solution can use the stream mix recording method to mix multiple streams and relay them for audit, thereby reducing the audit costs. It can also store the recording files according to applicable regulations to meet regulatory requirements.

Financial regulation

In scenarios such as online account opening and financial audiovisual recording, this solution can record all transaction processes from a global perspective and archive the recording files to meet subsequent service or regulatory requirements.

Others

In customer service and complaint handling scenarios, this solution can record the service process and complaint content in real time, making it easier to optimize the service quality, check the reasonableness of complaints, and improve the efficiency of complaint handling.

Business process

This document describes how to use API Gateway and SCF to mix record the anchor audio/video streams in a TRTC room and upload the recording file to COS for storage. This solution provides out-of-the-box, flexible, convenient, and programmable live recording capabilities. SCF offers 512 MB of memory by default for recording file storage. If you need more storage space, you can choose to use the mount capability of CFS. The workflow is as shown below:

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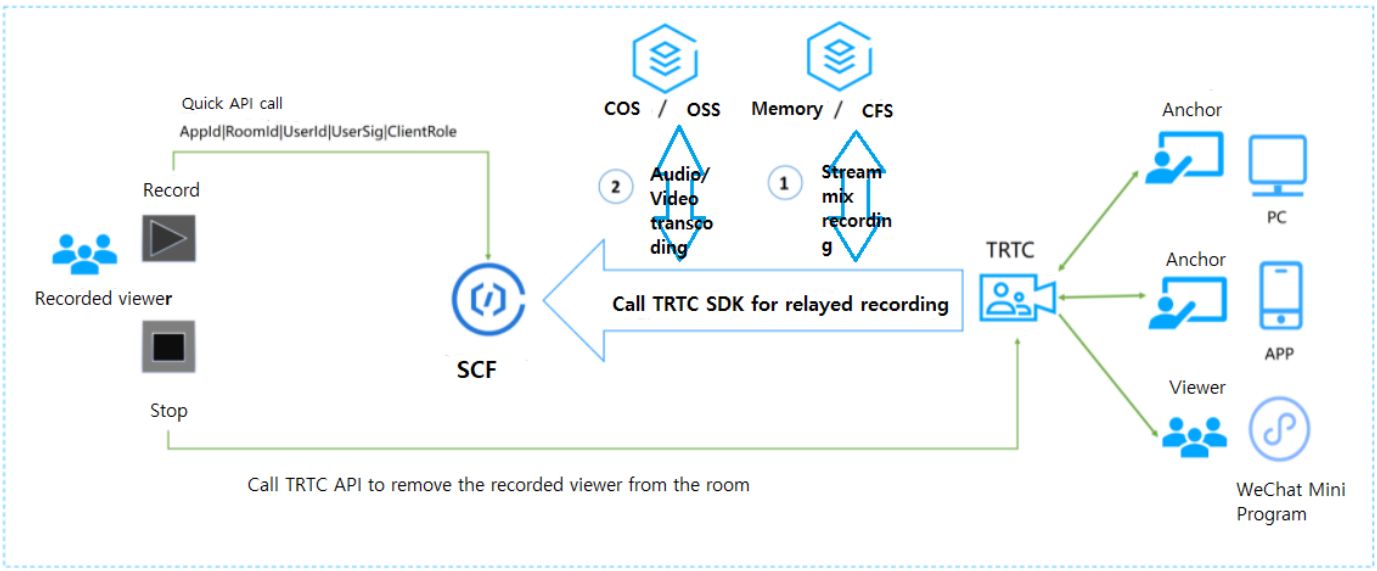

The recording rules are as follows:

- Up to 6 audio/video streams can be recorded.
- If there are less than 6 users in the room, streams of subsequent users entering the room will be automatically mixed. If there are more than 6 users in the room, only streams of the first 6 users entering the room will be recorded.
- If `IsReserve` is true, after the user exits the room, the user's stream will still be in the stream mix task, and the last frame of video image and mute will be used to complement the stream. If `IsReserve` is false, after the user exits the room, the user's stream will be deleted from the stream mix task. If a new user enters the room later, the new user's stream will be added to the stream mix.

The parameters for calling APIs are as follows:

Parameter	Type	Required	Description
SdkAppId	Int	Yes	Application ID, which is used to distinguish different TRTC applications.
RoomId	Int	Yes	Room ID in integer type, which is used to uniquely identify a room in a TRTC application.
StrRoomId	String	No	Room ID in string type. Either `RoomId` or `StrRoomId` must be configured. If both are configured, `RoomId` will be used.
UserId	String	Yes	Recorded user ID, which is used to uniquely identify a user in a TRTC application.

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Parameter	Type	Required	Description
UserSig	String	Yes	Recorded user signature, which is used to authenticate the user login.
CosConfig	cosConfig	Yes	COS storage configuration for recording file storage.
Callback	String	No	Callback address after recording. The POST method is used for callback.
Mode	String	No	• 10: mixed audio stream output in MP3 format (default mode). • 11: mixed video stream output in MP4 format. • 12: mixed audio/video stream output in MP4 format.
IsReserve	Boolean	No	• false: when the anchor exits the room, the stream being mixed will be automatically deleted. • true: when the anchor exits the room, the last frame of the video image and mute will be used to complement the stream in the stream mix task. The default value is `true`.

// The parameters involved in `CosConfig` are as follows:

Parameter	Type	Required	Description
SecretId	String	No	`SecretId` of Tencent Cloud account. For more information, please see Root Account Access Key Management.
SecretKey	String	No	`SecretKey` of Tencent Cloud account. For more information, please see Root Account Access Key Management.
Region	String	Yes	COS region, such as `ap-guangzhou`.
Bucket	String	Yes	Bucket name, such as `susu-123456789`.
Path	String	Yes	Path in the bucket. For example, for `/test`, the root directory is `/`.

Note：

- `UserId` is the specified user ID. Idempotency is not guaranteed for multiple requests to API Gateway.
- If `SecretId` and `SecretKey` are not configured in `CosConfig`, the function will use the permission of the execution role `SCF_ExecuteRole` when accessing COS.

Trigger conditions for stopping recording:

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- The TRTC room is terminated. When there is no anchor in the TRTC room for more than 300s, the room will be automatically terminated.
- The user removal API is actively called to kick the recorded user out of the room.
- To stop recording for users with `RoomId`, you need to call the RemoveUser API.
- To stop recording for users with `StrRoomId`, you need to call the RemoveUserByStrRoomId API.

After recording is stopped, the data returned by the function is as follows:

Parameter	Type	Required	Description
SdkAppId	String	Yes	Application ID.
RoomId	String	Yes	Room ID in integer type.
UserId	String	Yes	Recorded user ID.
StrRoomId	String	Yes	Room ID in string type.
Files	Array	Yes	[{},{},{},{}]

Note：
If callback is configured, after the stop, SCF will pass the returned data to the callback address in POST method.

Each item in the `Files` array is a JSON object as follows:

Parameter	Type	Required	Description
UserId	String	Yes	Recorded user ID.
RecordFile	String	Yes	URL of the recording file uploaded to COS.
Status	Int	Yes	• 0: failure. • 1: success.
Message	String	Yes	Execution result of the recording task, such as recording failed, transcoding failed, and write to COS failed.

Directions

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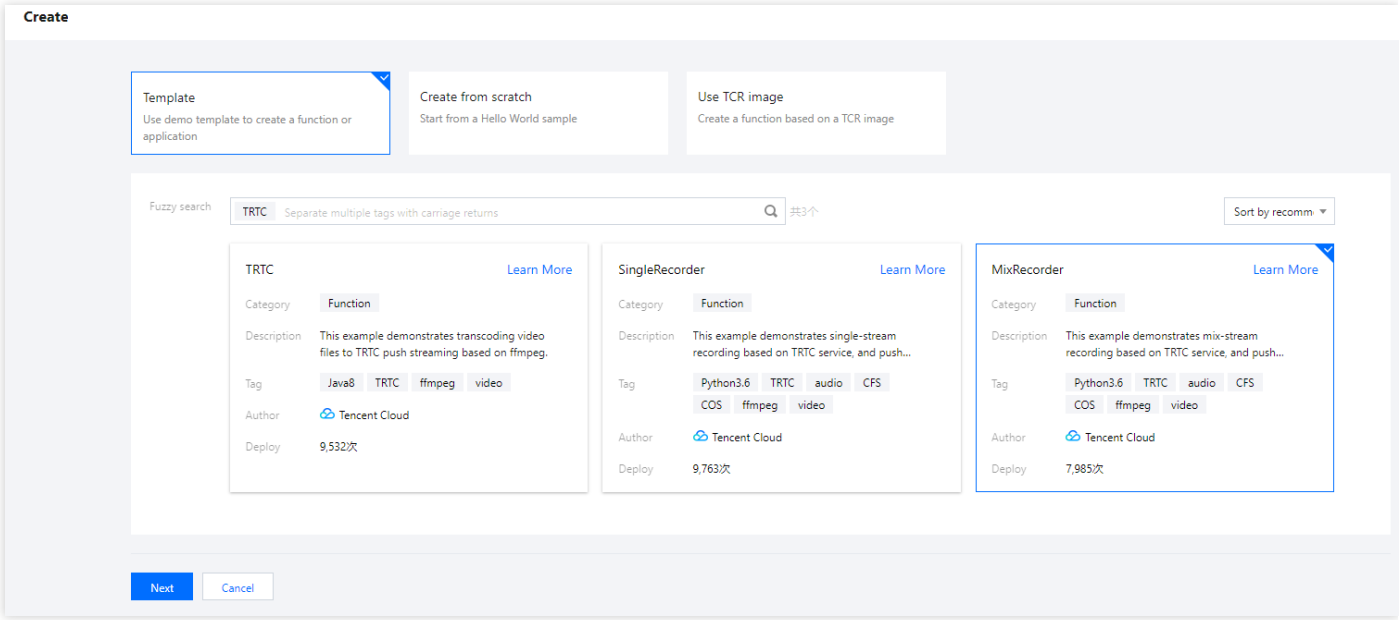
Creating function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Guangzhou** region and click **Create** to enter the function creating page and configure the function as shown below:



- **Creation method**: select **Template**.
- **Fuzzy search**: enter "TRTC", search, and select the **Mix audio/video stream recording** template.
  Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

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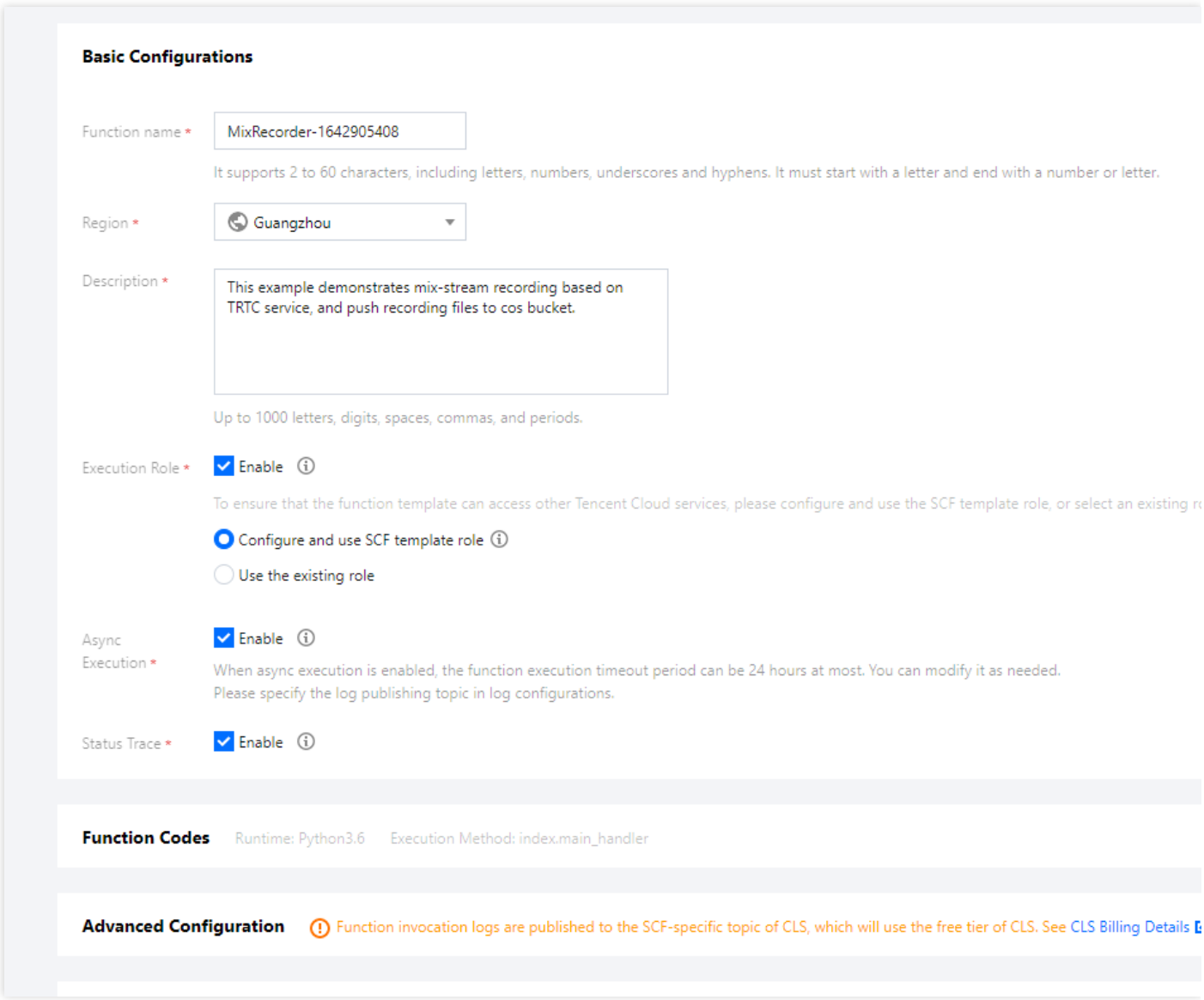
3. Click **Next** and configure the related information as shown below:



- **Function Name**: the function name is automatically generated by default.
- **Async Execution**: select the checkbox to enable the async execution. When it's enabled, the function will respond to the event in async execution mode. The event goes to async execution status after being invoked without waiting for the processing result.
- **Status Trace**: select the checkbox to enable the status trace. When it's enabled, it will keep the logs of real-time status of response for async function events. You can query and stop the event and check the related statistics. Data of event status will be retained for three days.
- **Execution Timeout Period**: it can be modified as needed.
- **Execution Role**: **SCF_ExecuteRole** is used as the execution role by default, which grants the access permissions of **QcloudCOSFullAccess** and **QcloudCFSFullAccess**.

4. Configure an API Gateway trigger. An API service is created by default and the integration response is disabled. You can customize the trigger, but please ensure that the integration response is disabled as shown below:

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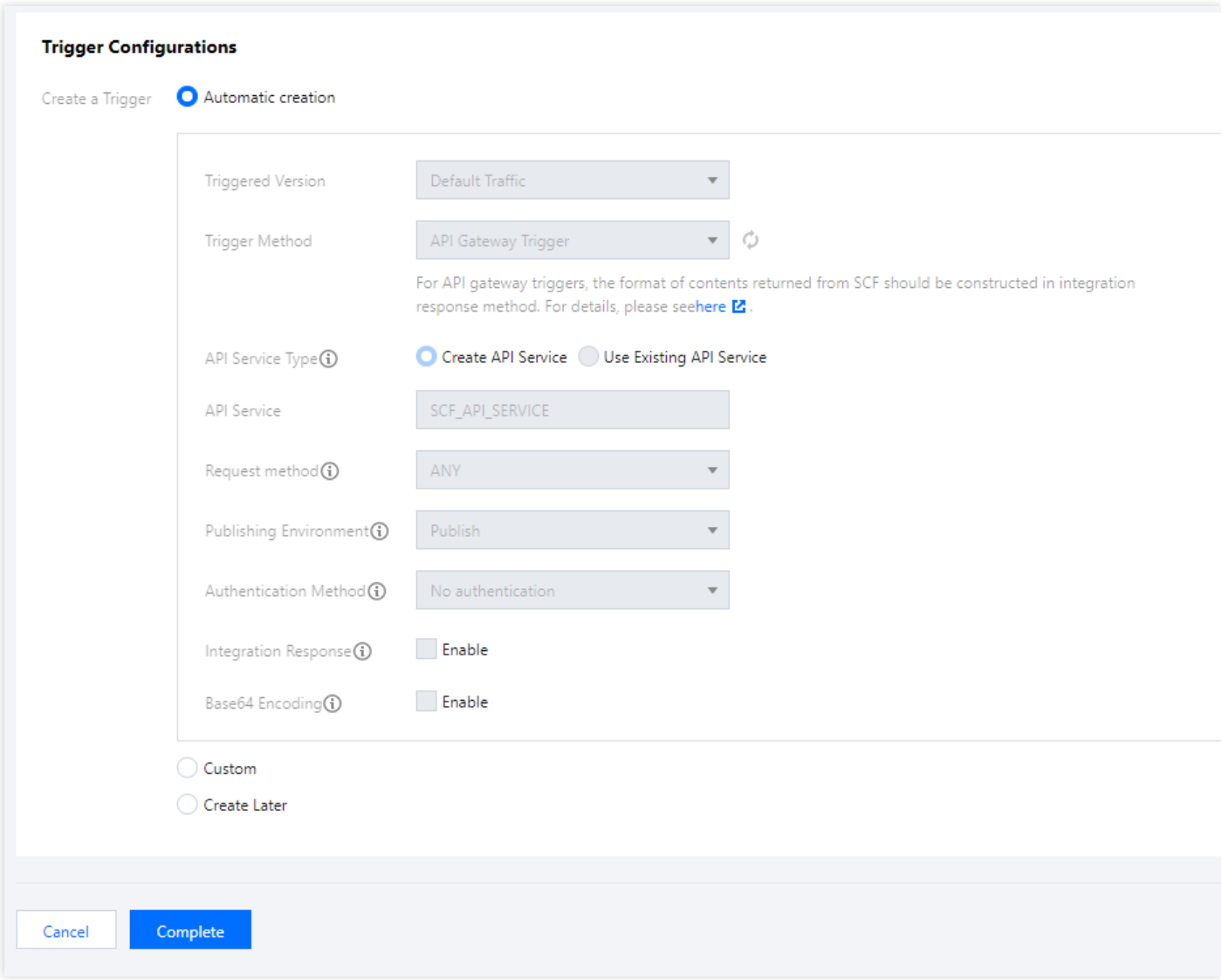

5. Click **Complete**.
6. If you need to use the mount capability of CFS, as CFS can only be accessed in VPC, you should use the VPC of CFS as the VPC of the function as shown below:

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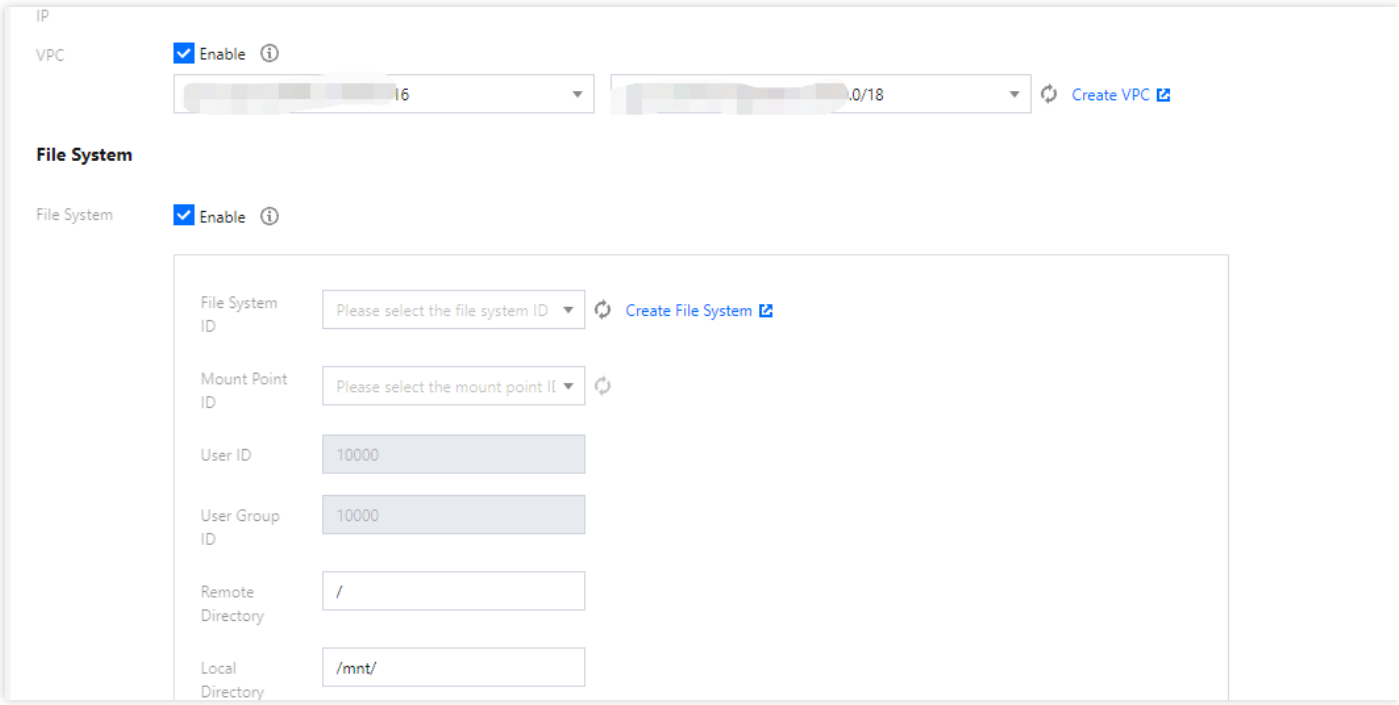

Note：

To enable CFS, you need to set the environment variable `CFS_PATH` to a local directory, such as `/mnt/audio/` .

Creating TRTC application

1. Log in to the TRTC console and select **Development Assistance** > **Demo Quick Run** on the left sidebar.
2. Enter the demo name and click **Create**. You can choose a template for test run according to your client, such as the demo for desktop browser.

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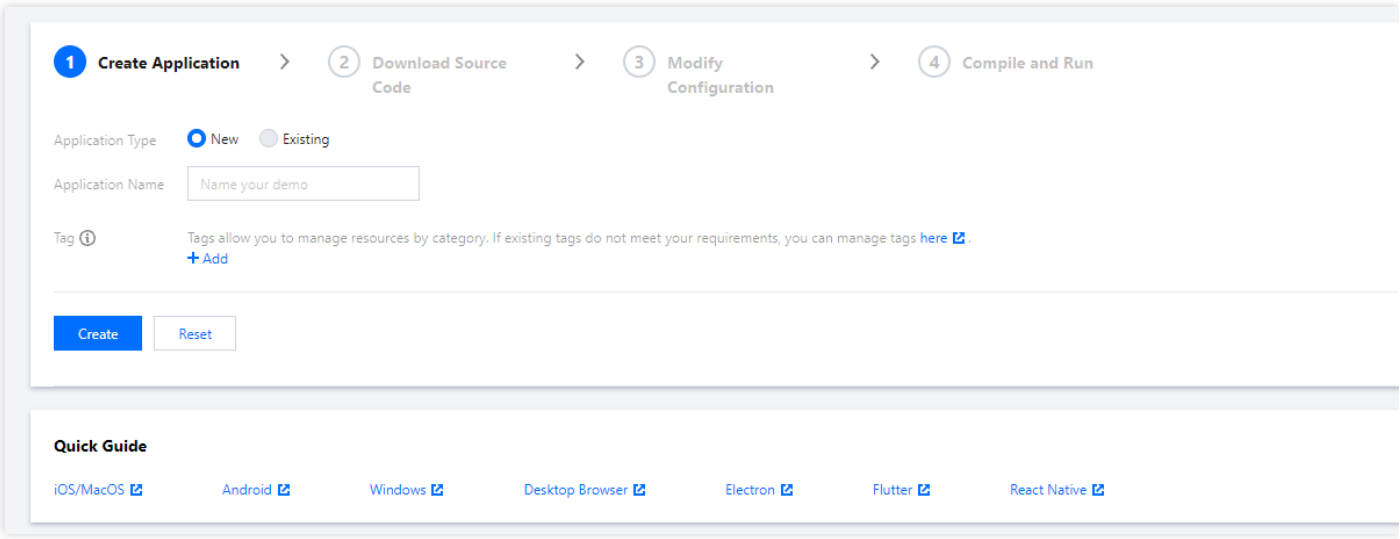

Testing function

1. Refer to Web to make user_00001 and user_00002 enter the TRTC room.
2. Use Postman to construct an HTTP request, where `roomId` is the room ID of the created TRTC application, and `userId` is the ID of another random user (which must be unique). Below is the sample code:

```
{
"SdkAppId": 1400000000,
"RoomId": 43474,
"UserId": "user_55952145",
"Mode":"12",
"UserSig": "eJwtzNEKgkAUBNB-2efQ3e3eUqG3tMCKJJEIIxxxxxxxxxxxxxxxhvmweLWzGlUxj0mLs1GXKVf3mgrq*GFUdUR0UQrAYWDyW6Y15cwTwDm4UkxF36iXpkq1joiSc9xxxxxxxxxxxxx-S*CZeOk9sHfnEhCwlUW*fE4oWusw3dULlJ7HoSJ2e6d9fM8Y98fxUAzWA__",
"CosConfig": {
"Region": "ap-shanghai",
"Bucket": "test-123456789",
"Path": "/trtc"
},
"IsReserve":false,
"Callback":"https:xxxxxxxx.com/post/xxx"
}
```

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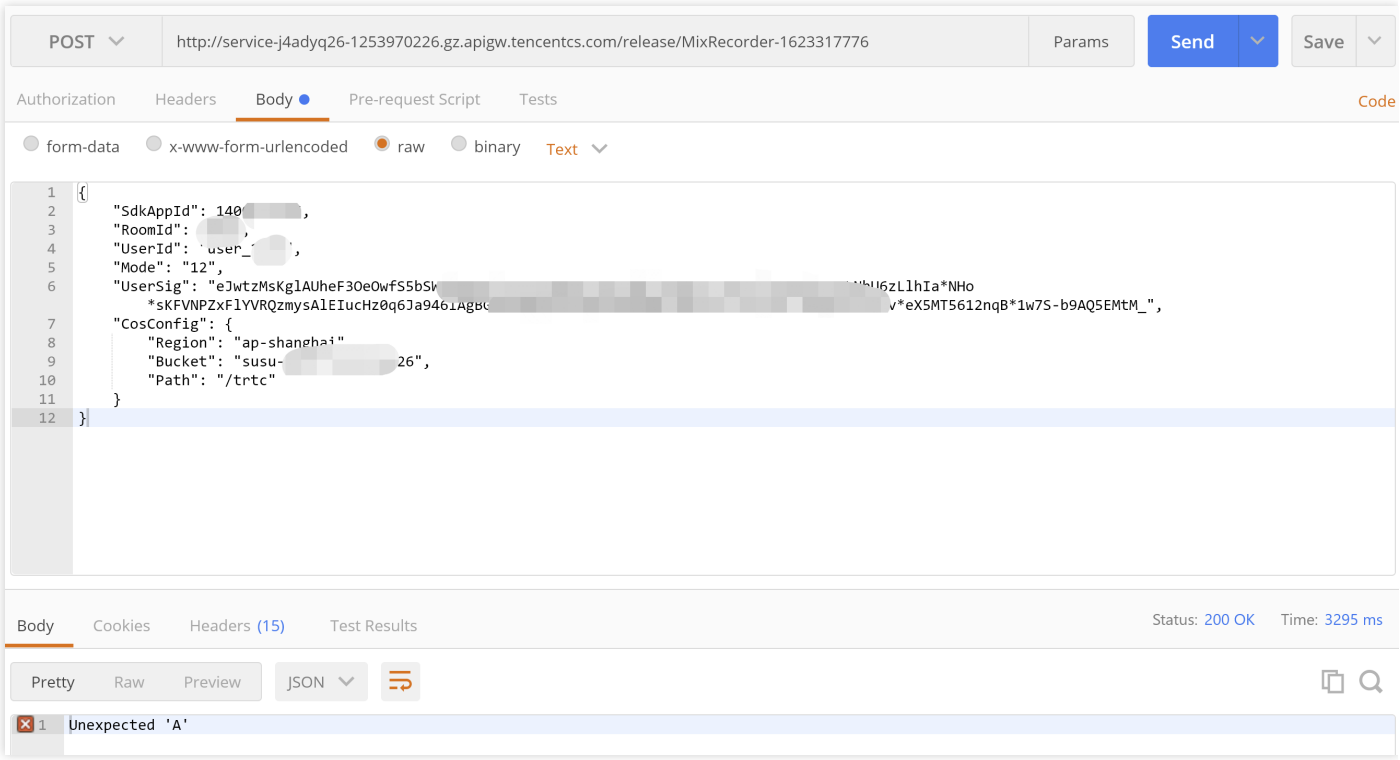
See the figure below:



3. After the request is sent, an async function response "Async run task submitted" will be received. The `RequestId` of this function will be returned through `x-scf-reqid` in the HTTP header as shown below:

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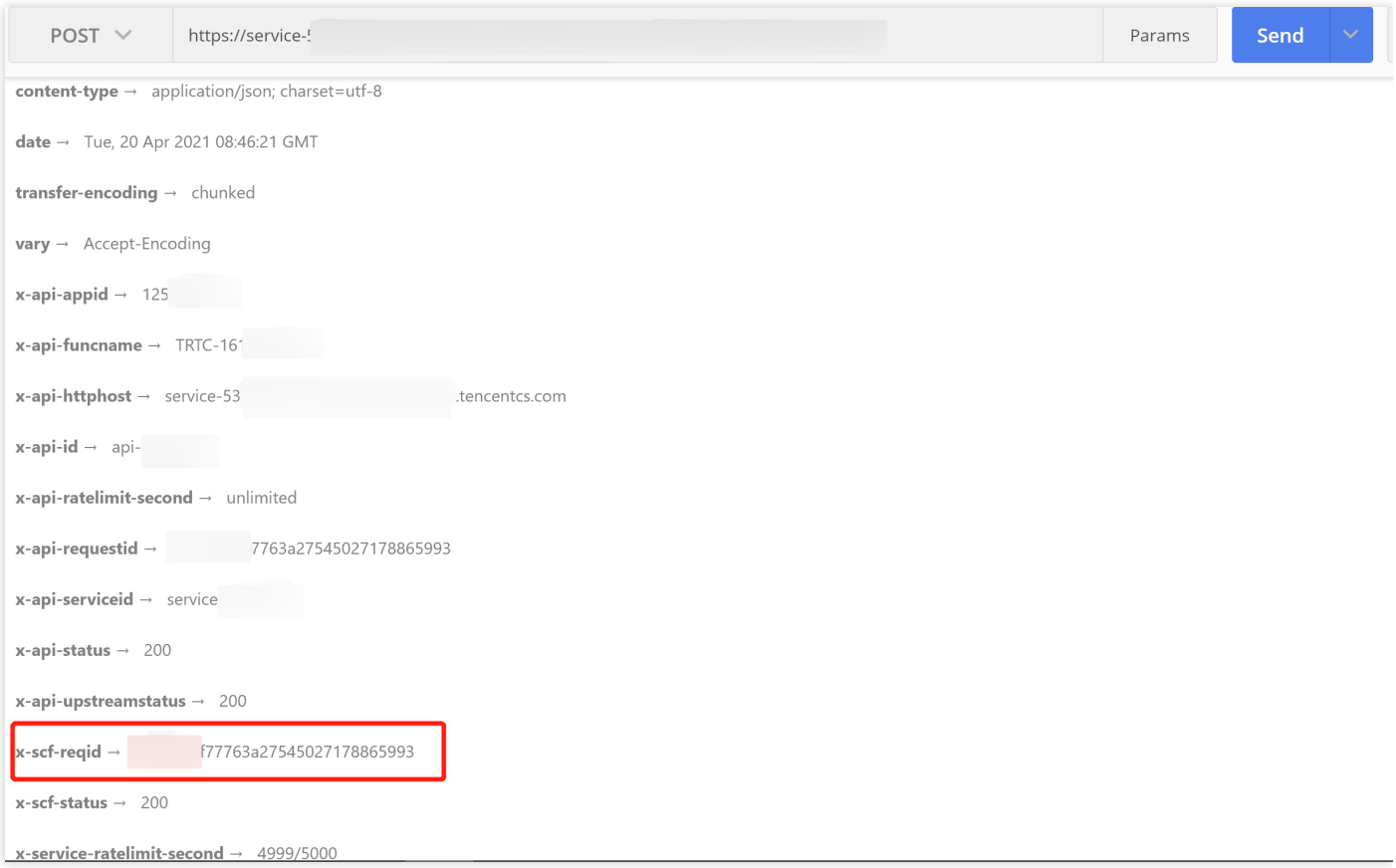
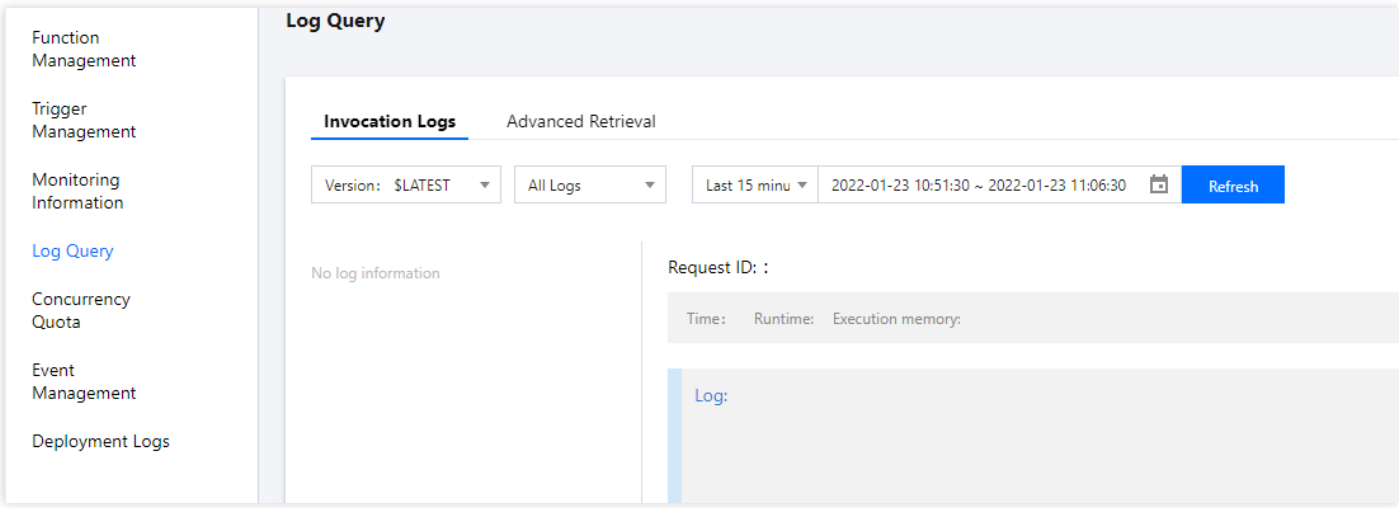


4. On the **Function Service** page in the SCF console, click the name of the function created in the Creating function step above to enter the function details page.
5. Select the **Log Query** tab on the function details page to view the printed recording log information as shown below:



6. Log in to the TRTC console and click the room ID on the **Monitoring Dashboard** page to view all users in the room, one of whom is the recorded user.

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7. To stop recording, you can call the RemoveUser or RemoveUserByStrRoomId API to move the user out of the room.

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COS Practices
Audio/Video Transcoding

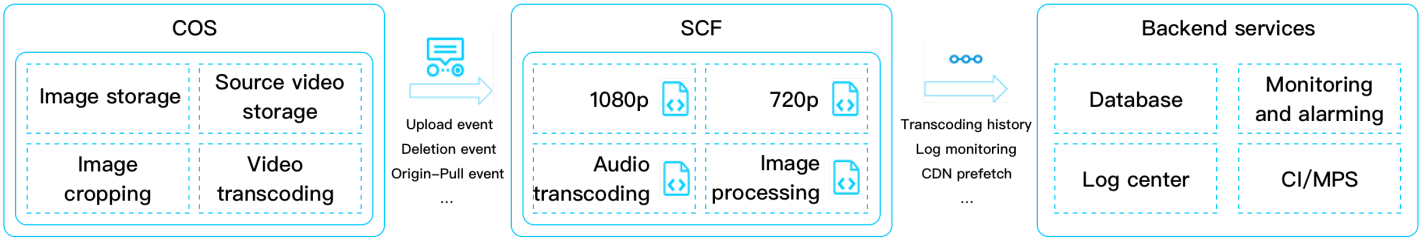
Last updated：2021-01-29 16:21:48

Overview

In use cases such as video and social networking, users upload high numbers of images and audio/video files frequently, which has high requirements for the real-timeness and concurrency capabilities of the processing system. Multiple functions can be used to process uploaded videos with different definitions in order to meet the needs of users in diversified scenarios and adapt to small-bandwidth and unstable mobile networks.

How It Works

SCF, FFmpeg, and COS can be used in combination as shown below to transcode audio and video files:



In SCF, you can write custom business logic in different programming languages (Python, Node, PHP, Java, and Go). Taking transcoding as an example, the steps are as follows:

1. Create a function and deploy the FFmpeg resource package and transcoding logic in it.
2. Configure a COS bucket trigger to process the source video in real time and generate logs, monitoring data, and alarms in a relayed manner.
3. Return the transcoded video to COS and trigger automatic prefetch.

Comparison with TKE

Compared with TKE, the combination of SCF and FFmpeg has the following advantages and disadvantages in audio/video transcoding:

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Item	TKE-based Implementation	SCF-based Implementation	Analysis
Implementation method	• FFmpeg is run in a Docker container. • FFmpeg is customized, and different versions have different binary dependencies, all of which are packaged as images. • Docker image tags can be autonomously controlled. Different services load different Docker images, which contain different FFmpeg versions.	• Different FFmpeg versions can be compiled into different executable files, deployed to "layers" of SCF functions, and decoupled from the business logic. • Different functions can be written and bound to different FFmpeg versions at the "layers" to provide different transcoding features. • A scheduling function can be written to segment videos and schedule different transcoding services.	The implementation methods do not differ greatly.
Development/Testing/Deployment experience	• After local development and testing, the CI/CD process will be triggered, and an image will be burnt to complete the deployment. • The grayscale release system needs to be maintained, and TKE cluster updates are slow.	• After local development and testing, the CI/CD process will be triggered to complete the deployment. • SCF offers beta test/release/rollback features, which allow you to integrate APIs directly to fully automate the deployment process. • Sub-accounts can use the CLI tool to perform development and debugging in real time in the test environment, thus improving the efficiency.	SCF makes the development process easier and more efficient.
Logging/Monitoring/Alarming	It is necessary to launch the agent in	SCF offers logging/monitoring/alarming	SCF offers a wider range of

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	the TKE cluster and connect it to the logging platform, monitoring center, and alarming platform.	capabilities and APIs for connection to third-party logging/monitoring platforms. It supports launching the agent process in the runtime and reporting data synchronously.	capabilities, but for connection to self-created platforms, it is more complex to launch the agent in SCF than in TKE.
OPS	TKE clusters need to be maintained on your own and have low auto-scaling efficiency.	Maintenance is not required, as SCF guarantees cluster availability, load balancing, and auto scaling.	SCF is easier to use.
Fees	It is necessary to reserve container resources based on the peak values, which may cause a waste of resources.	Resources are auto-scalable and pay-as-you-go, saving more than 30% of costs.	SCF has obvious advantages.

Through comparison with TKE in multiple dimensions above, the following conclusions can be drawn:

Advantages:

- SCF provides a standard runtime environment, ensures the high availability and auto scalability of resources, and requires no dedicated maintenance.
- SCF is billed by actual usage, eliminating the waste of resources.
- Development and debugging in SCF are more efficient, and dependencies are decoupled from the business and can be hot updated separately in real time.
- Runtime environments are isolated, so the failure of one single request will not affect the normal execution of other requests.

Disadvantages:

- The introduction of SCF needs to be integrated with the existing CI/CD process, so there may be some changes in the development method.
- The existing business code requires modifications mainly in terms of FFmpeg encoding/decoding. SCF can provide encoding/decoding tools and development assistance to facilitate the modifications.

Prerequisites

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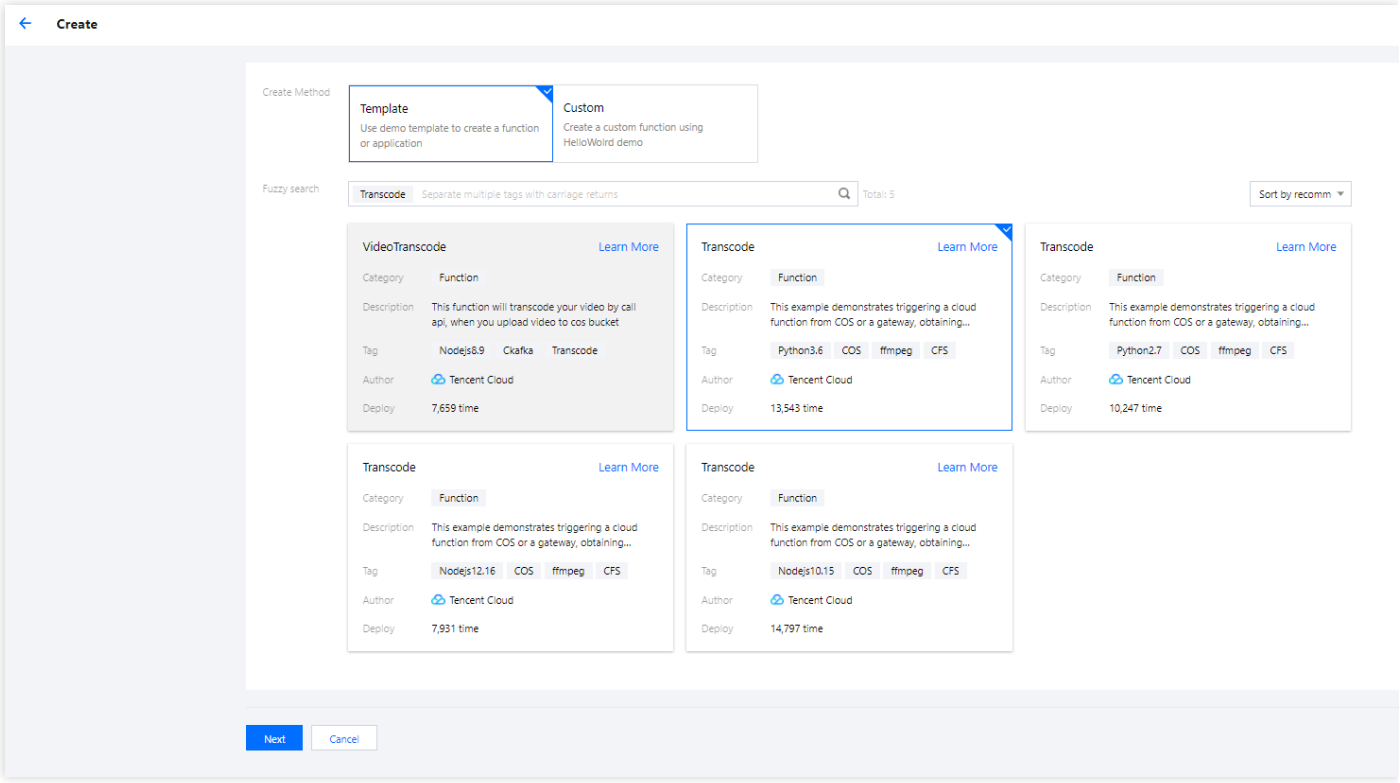
This document uses the Guangzhou region as an example:

- Go to the COS console, create a bucket, and set the access permission of the bucket to **public read/private write**.
- (Optional) If the video file is above 500 MB in size, you need to go to the CFS console to activate the CFS service so as to expand the local storage space of SCF. For more information, please see Mounting CFS File System.
- Go to the CAM console, create an execution role for SCF, and grant the role COS and CFS read/write permissions to authorize SCF to access the corresponding services. For more information, please see Role and Authorization.

Directions

Creating function

1. Log in to the SCF console and click **Function Service** on the left sidebar.
2. Select the region where to create a function at the top of the **Function Service** page and click **Create** to enter the function creation process.
3. Select a function template as follows on the **Create Function** page as shown below:



- **Creation method**: select **Template**.
- **Fuzzy search**: enter **VideoTranscode** and search. This document uses the Python 3.6 runtime environment as an example.

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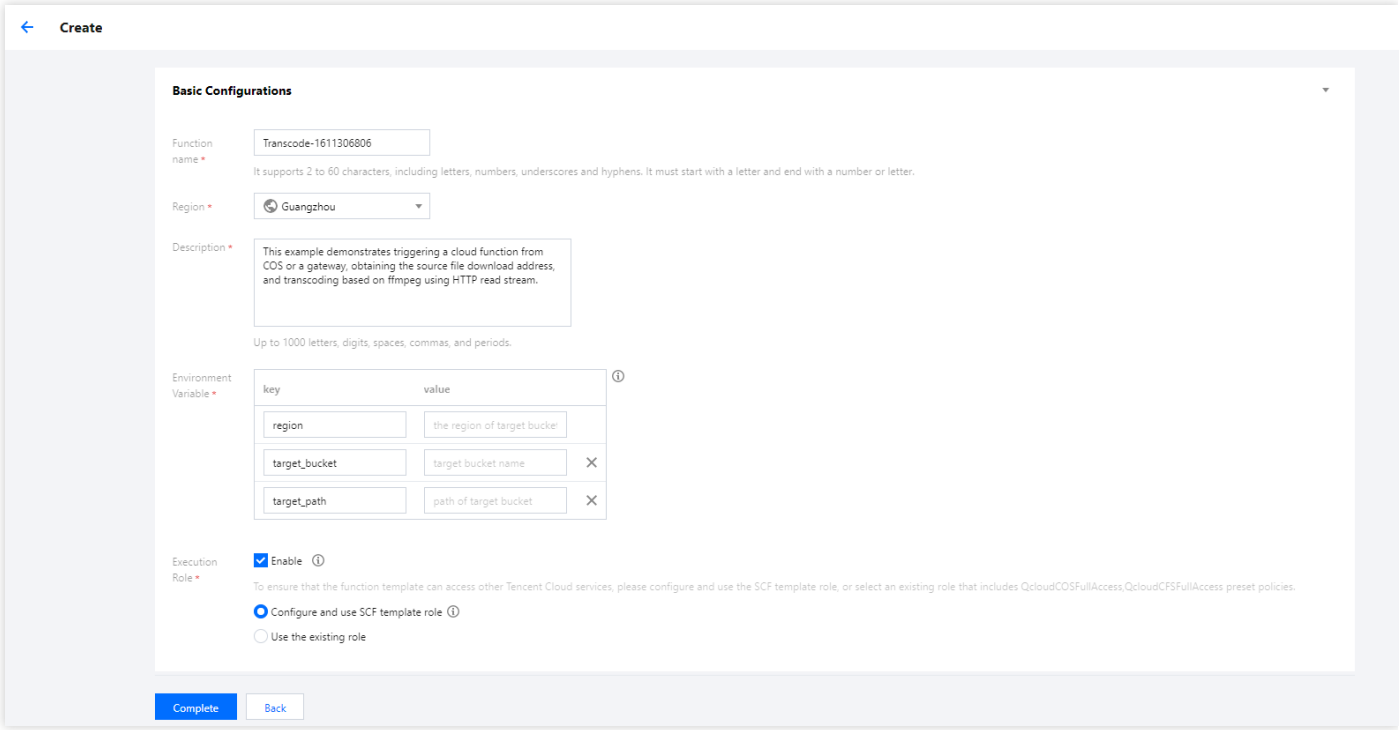
Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

4. Click **Next**. The function name is automatically generated by default and can be modified as needed. Follow the prompts to configure the environment variables and execution role as shown below:



- **Environment Variable**: enter as shown below:

key	value
region	COS bucket region.
target_bucket	The created COS bucket to which the output video will be uploaded after being transcoded.
target_path	The specified directory of the bucket to which the output video will be uploaded after being transcoded.

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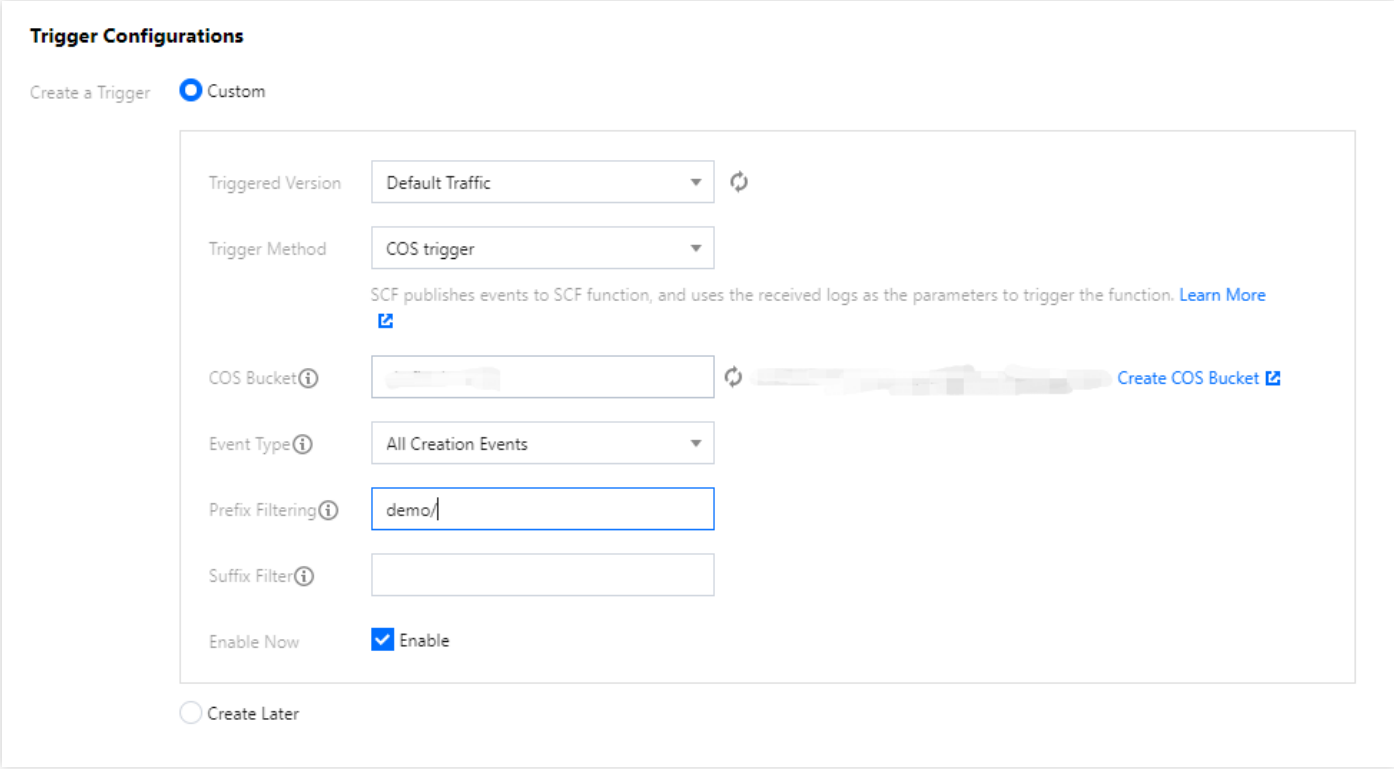
- **Execution Role**: check **Enable**, select **Configure and use SCF template role**, and the system will automatically create and select an SCF template execution role associated with full access permissions of COS and CFS. You can also check **Use the existing role** and select the existing role created in Prerequisites in the drop-down list. This document takes **Configure and use SCF template role** as an example.
  During execution, the function will use the execution role to get a temporary key to read and write resources in the COS bucket.

5. In the **Trigger Configurations** section, configure the COS trigger as shown below:



The main parameter information is as follows. Keep the remaining options as default:

- **Trigger Method**: select **COS trigger**.
- **COS Bucket**: select a bucket. **If you want to store the source video and the output video in the same bucket, you need to configure the trigger with a prefix filtering rule `/`, such as `demo/`.**

6. Click **Complete**.

(Optional) Configuring CFS mounting

Note：

If you have activated the CFS service, please enable both the VPC and file system mounting capabilities in the function by following the steps below.

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1. On the **Function configuration** page of the function, click **Edit** in the top-right corner and configure the function.
   - **VPC**: check **Enable** and select a VPC and subnet.
   - **File System**: check **Enable** and select the file system created in Prerequisites.
2. Click the **Function code** tab to enter the function code editing page and modify the file upload path as shown below:

```
75    logger.info('key: '+ key)
76    # upload_path = '/tmp/new-'+ key.split('/')[-1]
77    upload_path = '/mnt/new-'+ key.split('/')[-1]
78    logger.info('upload_path: '+ upload_path)
```

   Comment on line 76 of the code and add the following code to line 77.

```
upload_path = '/mnt/new-'+ key.split('/')[-1]
```

Testing Features

Log in to the COS console, enter the corresponding bucket directory, upload a video file, and check whether a compressed video file is generated in the corresponding transcoding directory as shown below:

Note：

The time it takes to compress a video varies by video size. If a video is large, it will take longer to compress the video and display the output video.

Scalability

You can add automated CDN purge/prefetch capabilities to the demo in this document. For example, when the output video is returned to the COS bucket, a new function can be triggered to execute the CDN purge/prefetch features. For more information, please see CDN Cache Purging.

You can also leverage the high concurrence of SCF to implement fast transcoding or segmenting. For example, function A can schedule tasks while function B can perform actual transcoding/segmenting tasks. With the aid of the CFS mounting capabilities, you can also implement cross-function file sharing with ease.

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Acquire Image on COS and Create a Thumbnail
Example illustration

Last updated：2022-06-06 11:44:22

Implementation Scenario

Note：

1. Two COS buckets must be used. If you use the same bucket as both source and target buckets, each thumbnail uploaded to the source bucket may trigger another object creation event that will invoke the function again and thus cause an infinite loop.
2. Make sure that the function and the COS bucket are in the same region.

In this tutorial, suppose that:

- A user is going to upload a photo to a specific COS bucket.
- You need to create a thumbnail for every image uploaded by the user.
- The created thumbnails need to be stored in another COS bucket.

Implementation Overview

The implementation process of this function is as follows:

- You create the event source mapping between the function and the COS buckets.
- The user uploads an object to the source COS bucket (object creation event).
- The COS bucket detects the object creation event.
- COS invokes the function and passes the event data as parameters to the function, thus publishing the `cos:ObjectCreated:\*` event to the function.
- The SCF platform receives the invocation request and executes the function.
- The function gets the bucket name and filename from the received event data, gets the file from the source bucket, uses the graphic database to create a thumbnail, and saves the thumbnail in the target bucket.

Note: after going through this tutorial, your account will have the following resources:

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- A SCF function used to create thumbnails.
- Two COS buckets: the source bucket for storing uploaded original images and the target bucket for storing cropped images.

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Step 1. Prepare COS Bucket

Last updated：2023-05-04 18:08:19

Note

1. The source and target buckets must be in the same region as the function. In this tutorial, the Guangzhou region is used.

2. Two COS buckets must be used. If you use the same bucket as the source and target buckets, each thumbnail uploaded to the source bucket will trigger the function again and thus generate unnecessary recursion.

1. Log in to the COS console.

2. Click **Create Bucket** on the **Bucket List** tab to create a source COS bucket. For more information, see Console. Set the the following parameters:

Name: Set the value to `mybucket1` .

Region: Select `Guangzhou` .

Access permissions: Select `Private Read/Write` .

3. Perform the same steps to create the target bucket `mybucket-resized1` .

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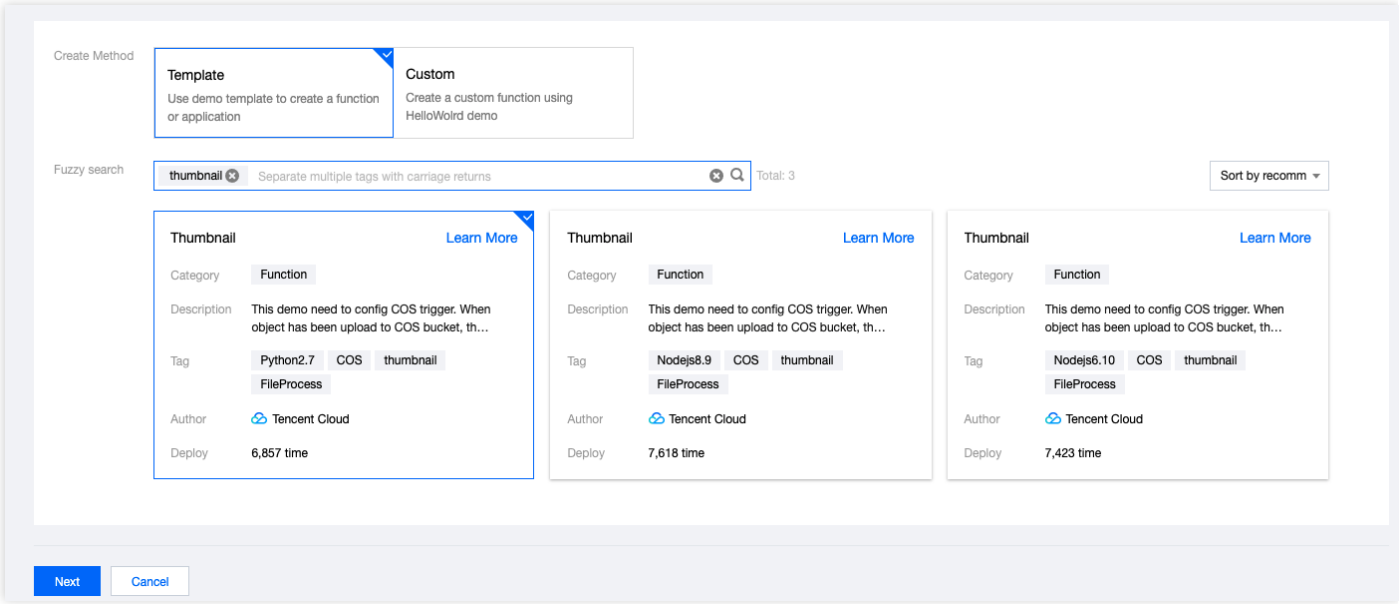
Step 2. Create and Test Thumbnail Function

Last updated：2021-08-10 15:37:53

Creating Thumbnail Function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Guangzhou** region and click **Create** to enter the function creating page and configure the function as shown below:



   - **Creation method**: select **Template**.
   - **Template search**: enter **compression** and search. This document uses the Python 2.7 runtime environment as an example.
     Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.
3. Click **Next**. The function name is automatically generated by default and can be modified as needed. Follow the prompts to configure the execution role:

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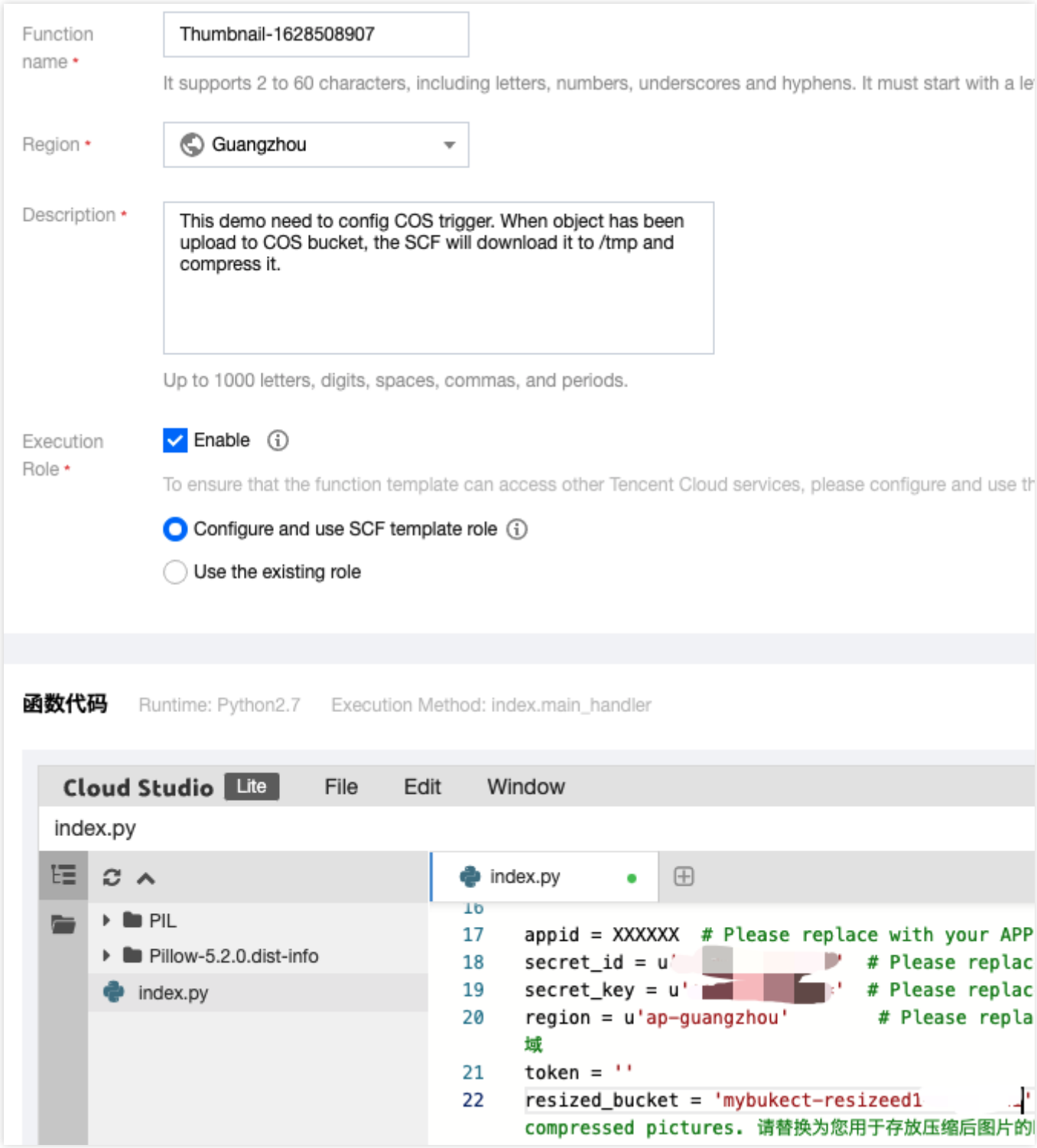

- **Execution Role**: check **Enable**. **Configure and use SCF template role** is selected here as an example as detailed below:
  - **Configure and use SCF template role**: select this option and the system will automatically create and select an SCF template execution role associated with full access permissions of COS.

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- **Use the existing role**: you need to select an existing role that contains the above permissions in the drop-down list.

> Note
> During execution, the function will use the execution role to get a temporary key to manipulate relevant Tencent Cloud resources.

4. When using this template function, you need to modify the configuration information in the function code as prompted.
   Click to expand the **Function Code** block and replace `appid`, `secret_id`, `secret_key`, `region`, and `resized_bucket` in the function code with your `APPID`, `SecretId`, `SecretKey`, `region`, and `resized_bucket`

> Note
> - You can get the `APPID` on the **Account Info** page in the console.
> - You can get `SecretId` and `SecretKey` on the **API Key Management** page in the console.

Configuring COS Trigger

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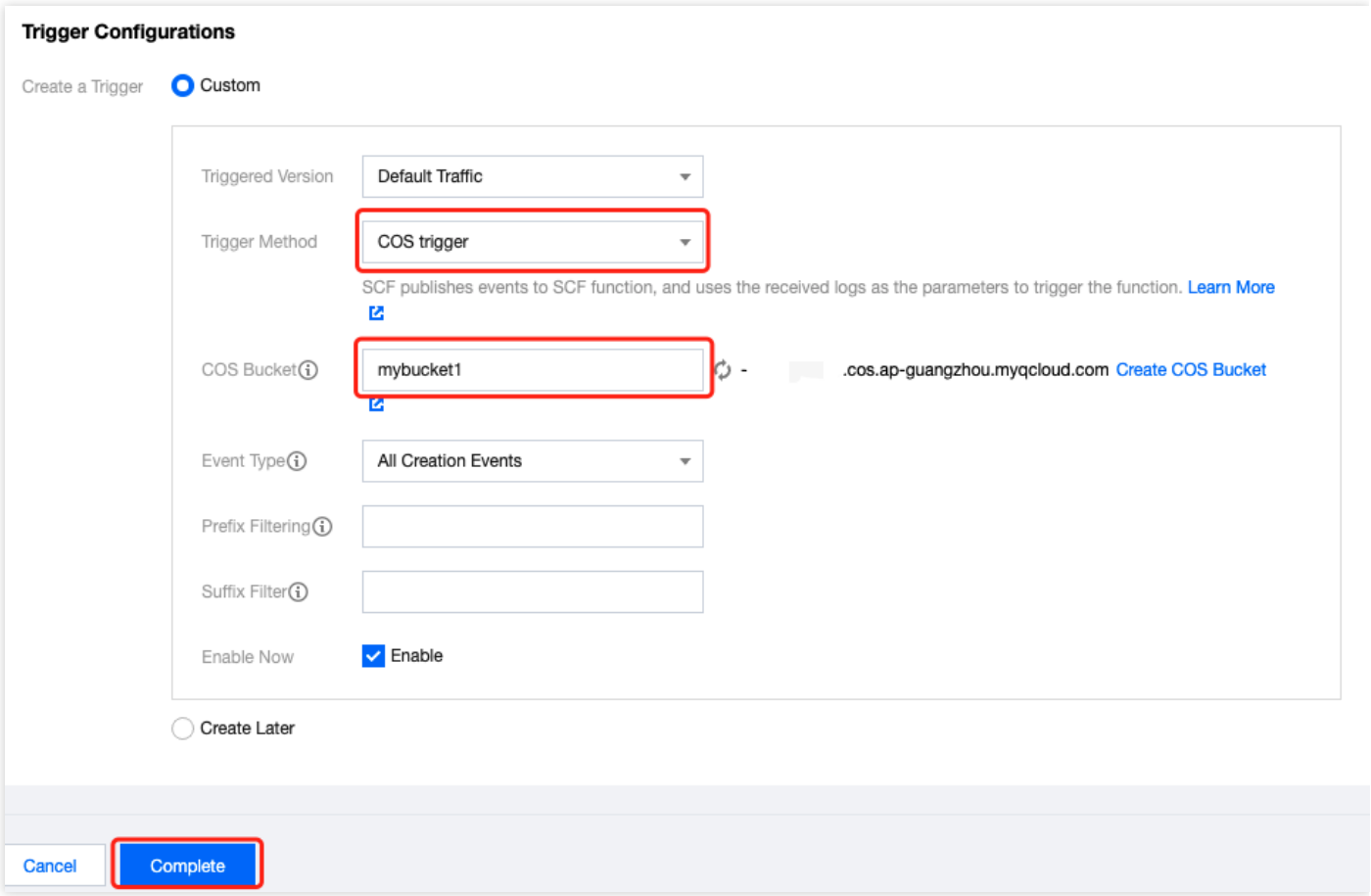
1. In the **Trigger Configurations** section, select **Custom** and configure as prompted as shown below:



Main parameters are as follows:

- **Trigger Method**: select **COS trigger**.
- **COS Bucket**: select the bucket `mybucket` created in Step 1.
- **Event Type**: select **All Creation Events**.

2. Click **Complete**.

Testing Function

1. Switch to the COS console, select the created bucket `mybucket1`, click **Upload File**, and select a random .jpg or .png image for upload.
2. Switch to another COS bucket `mybucket-resized1`, check whether there is a file with the same name generated, download it, and compare the size of the two images.
3. Go to the SCF console to view the execution result. You can see the printed log information in **Execution Logs**.

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Forming Data Lake with SCF + COS

Last updated：2022-07-21 11:22:21

Overview

The data lake formation scheme of the serverless architecture is to capture and record the information of a batch of data after starting a data call through a function trigger. This implements various capabilities such as structure conversion, data format conversion, and data compression in the function. In this document, SCF and COS are used to back up TDMQ messages.

Directions

Creating COS bucket

1. Log in to the COS console.
2. Select **Bucket List** on the left sidebar and click **Create Bucket** to create the source COS bucket.
3. Set the **Name** to **scf-data-lake**, the **Region** to **Guangzhou**, and the **Access Permission** to **Private Read/Write** (default), and click **OK**.

Creating TDMQ resources

1. Create resources such as cluster and topic in the TDMQ console. For more information, see Resource Creation and Preparation.
2. Connect the TDMQ cluster to a VPC. For more information, see VPC Access.

Configuring function through COS app integration

1. Log in to the COS console.
2. Select **App Integration** on the left sidebar and select **TDMQ Message Backup** in **Data Migration and Backup** as shown below:

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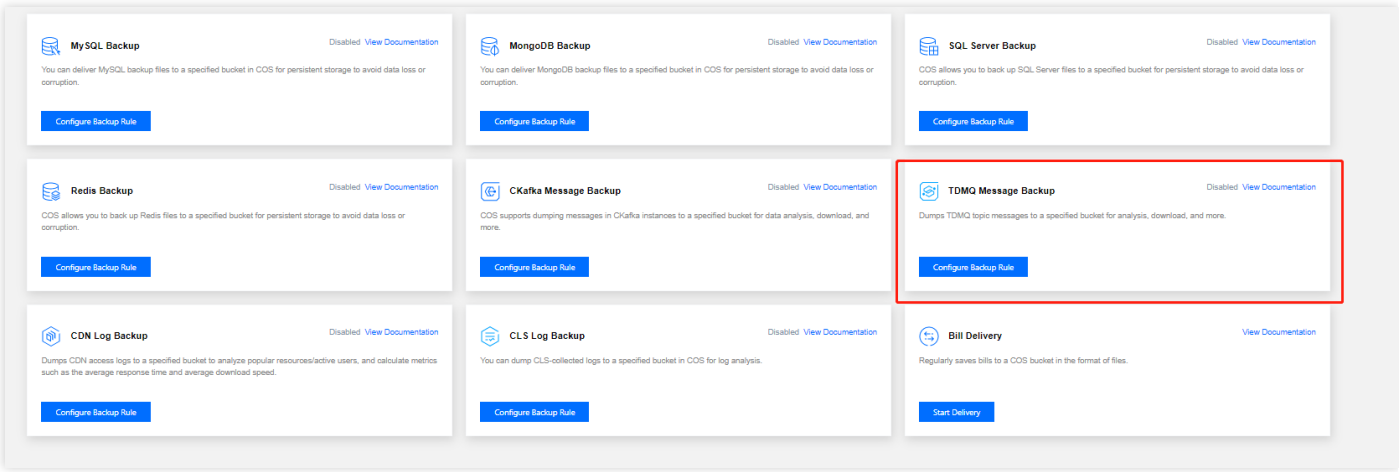

3. On the **TDMQ Message Backup** page, select the region of the created COS bucket and click **Add Function**.
4. In the **Create TDMQ Message Backup Function** pop-up window, enter the **Function Name** such as `data-lake`, associate the created `scf-data-lake` bucket, select **Authorize SCF Service**, and then click **Next**.
5. Click **Next** to configure TDMQ as follows:
   - **Cluster**: A TDMQ cluster as the message source. Only TDMQ clusters in the same region are supported.
   - **Namespace**: A namespace in the cluster
   - **Topic**: A topic used as the message source
   - **Subscription**: Select a subscription. If existing subscriptions cannot meet your needs, you can create a new one in Consumption Management in the TDMQ console.
   - **Start Point**: Start point of historical messages
   - **Role**: Select the TDMQ role (a TDMQ-specific concept, which is different from that mentioned in Tencent Cloud), which is the minimum unit for permission division within TDMQ. You can create multiple roles and grant them different message production/consumption permissions in different namespaces.
   - **Role Key**: Select the TDMQ role key, which is an authentication tool. You can add a key in the client to access TDMQ to produce/consume messages. Each role has a unique key corresponding to itself.
   - **Address**: It must be a VPC access address.

   > Note
   > There must be an available IP in the VPC subnet, and DHCP must be supported.

6. Click **Next** to configure delivery. The configuration item is as follows:
   - **Delivery Path**: It is the delivery path prefix of the backups. If it is not specified, backups will be stored in the root directory of the bucket. The specified prefix must end with a slash (/).
7. Click **Confirm**.

   You can perform the following operations on the created function:

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- Click **View Log** to view the historical running status of TDMQ message backup. If an error is reported, you can click **View Log** to quickly redirect to the SCF console to view the error log details.
- Click **Edit** to modify a TDMQ message backup rule.
- Click **Delete** to delete an unwanted TDMQ message backup rule.

Testing function

1. Log in to the TDMQ console.
2. Click **Topic Management** on the left sidebar and select the target region, cluster, and namespace.
3. On the **Topic Management** list page, click **Send Message** on the right of the associated topic.
4. Enter the message content of up to 64 KB in the pop-up window.
5. Click **Submit**.
6. Go to the details page of the associated COS bucket. For example, check whether a file has been created in the **Delivery Path** defined in `scf-data-lake` , and if so, the TDMQ message backup is successful.

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Implementing Custom Calculation of File Hash Value with SCF + COS

Last updated：2022-07-21 11:22:21

Overview

Errors may occur when data is being transmitted between the client and the server. Cloud Object Storage (COS) combined with Serverless Cloud Function (SCF) can ensure the integrity of uploaded data through data verification, for example, MD5 verification. When users upload files to COS, SCF will help verify the objects uploaded by the users to ensure the integrity and correctness of the uploaded data.

Background

None of the existing public cloud object storage services in the industry provides MD5 verification, and after a user uploads a file, the following situations may occur:

- Duplicated files and rising costs
- File errors and lower business efficiency
- File missing

Solution Strengths

- Visual operation: One-click configuration simplifies the development process without coding, greatly improving R&D efficiency
- Multiple options: MD5, SHA1, SHA256, and CRC64 are available, meeting user requirements in various scenarios
- Automatic execution: Once a file is uploaded to COS, the workflow for calculating the verification code is triggered

Directions

1. Log in to the COS console.
2. Create a workflow, customize the format filter rule, and create a custom function node. For detailed directions, see Configuring Workflow.

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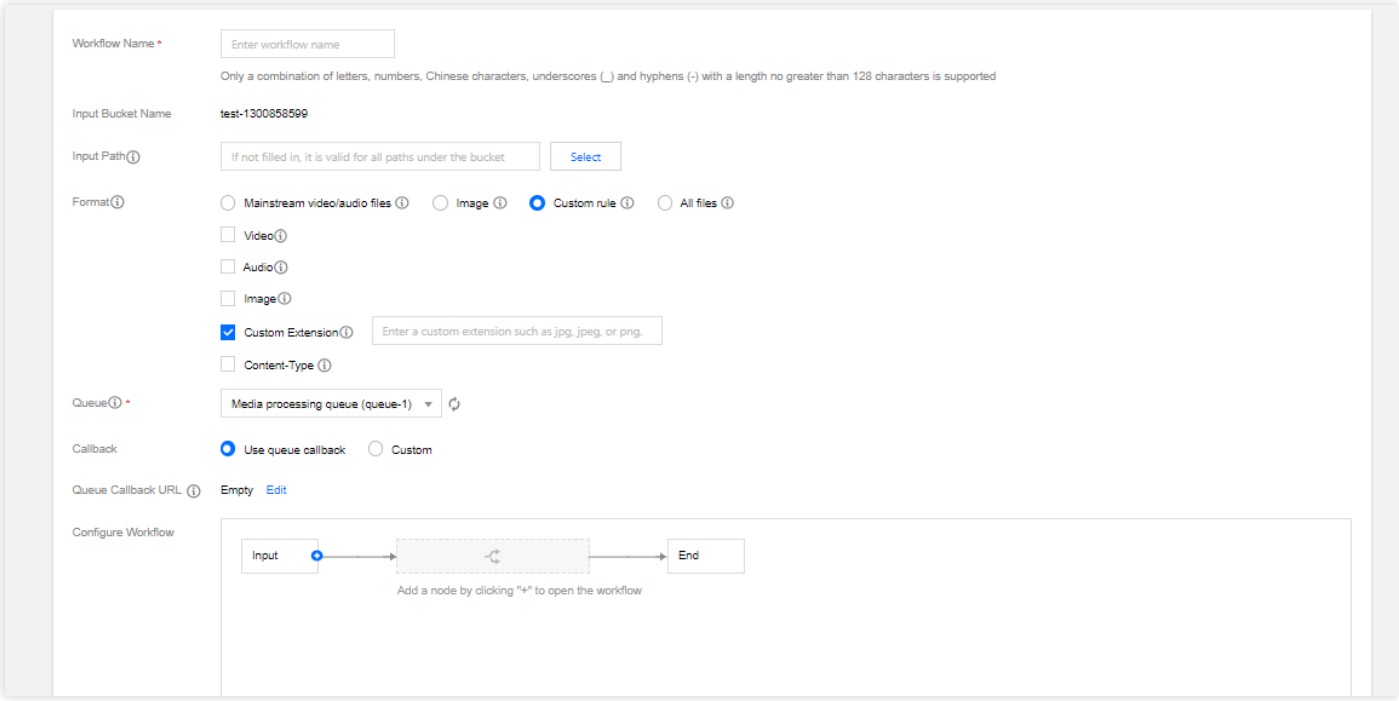
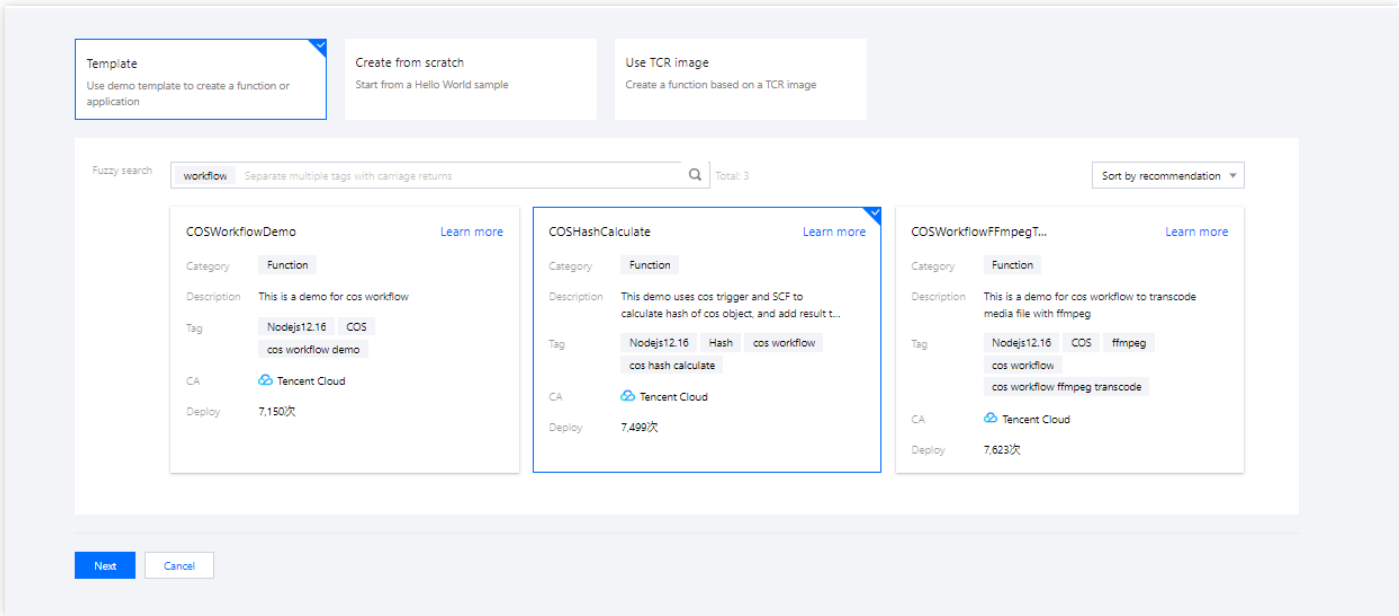


3. In the function node pop-up window, click **Add Function**.
4. On the SCF creation page, select the template for **COSHashCalculate**.



5. Based on the user's file size, configure the execution timeout duration in the basic settings and configure sufficient memory in the advanced settings.
6. Configure the function code. This function template supports the following two environment variables:

- hashTypeList: Indicates the list of calculation algorithms. This variable is optional. The default value is `["crc64", "md5", "sha1", "sha256"]`.

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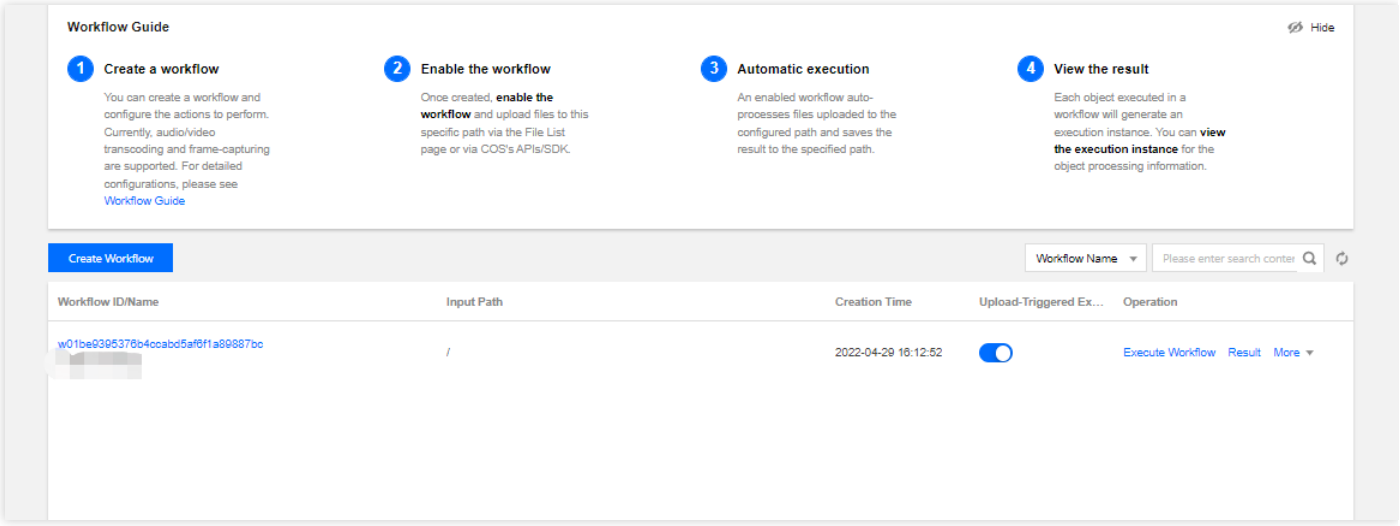
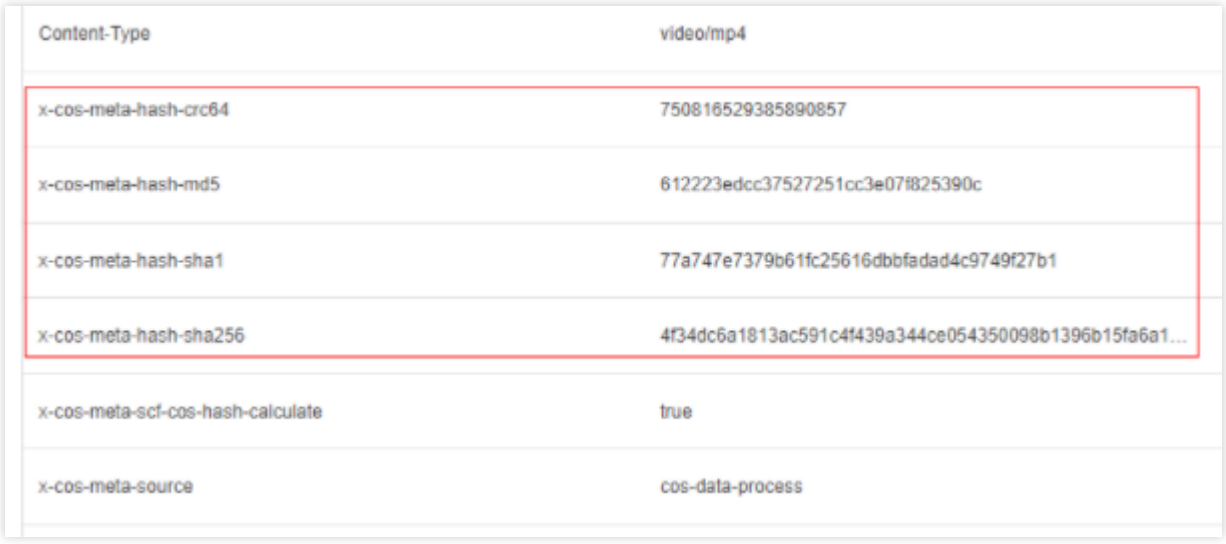
- caseType: Indicates the hash case. This variable is optional. The default value is `lowercase`. You can also pass in `uppercase`.

6. Enable permission configuration and bind a role that has the read/write permission of the current bucket. To create an execution role, see Role and Authorization.
7. Click **Complete**.
8. Go back to the previous workflow page, select the custom transcoding function created just now, and save the workflow.



9. Upload the file. After the workflow processing is successful, you can see that multiple hash headers are successfully added to the uploaded file.



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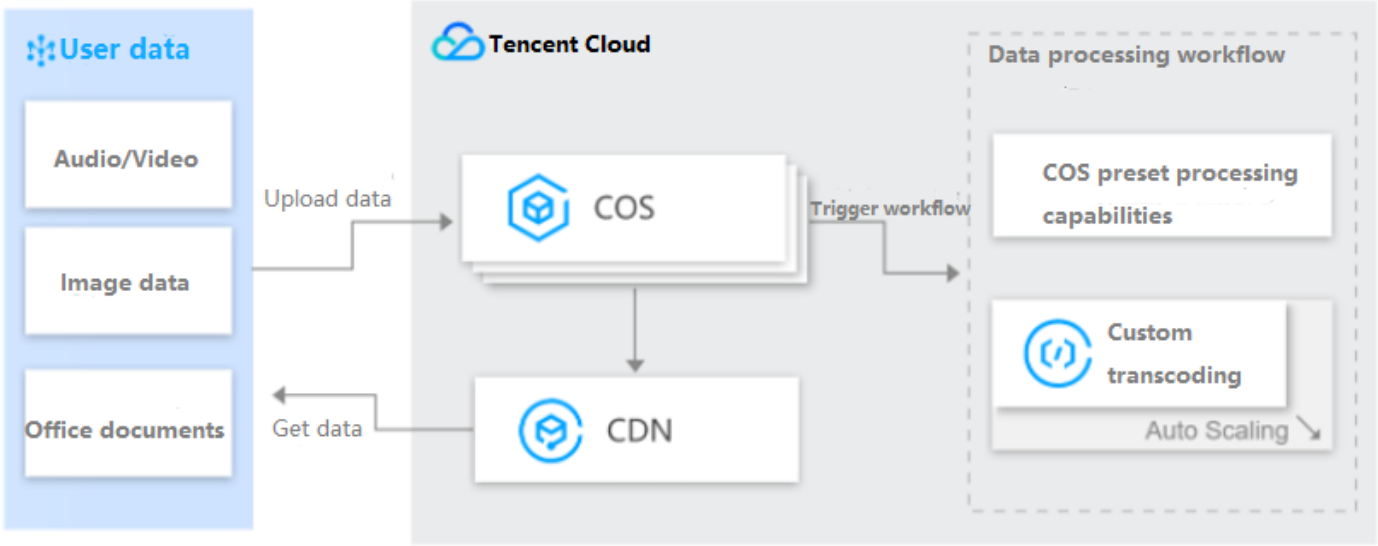
Implementing Custom Transcoding with SCF + COS

Last updated：2022-07-21 11:22:21

Overview

As the largest part of traffic in information dissemination, audio and video are very important in all industries, and the processing logic of audio and video in different business scenarios may be specific to the industry. Although public cloud provides a large number of video processing services for users to choose from, it still cannot fully cover users' requirements for special processes and customization. Using the workflow processing of Cloud Object Storage (COS) combined with the customization logic of Serverless Cloud Function (SCF) is an excellent choice to help users quickly create a variety of audio and video processing businesses to meet their needs.



Applications

- Fast access to users' self-built transcoding clusters, compatible with their existing businesses
- Formats and processing logic for special industries are supported, including movie and media.
- Supports custom processing logic, meeting process customization requirements of various scenarios
- Workflow for template-based batch processing, meeting common audio and video processing requirements of video websites, education, and social networking industries

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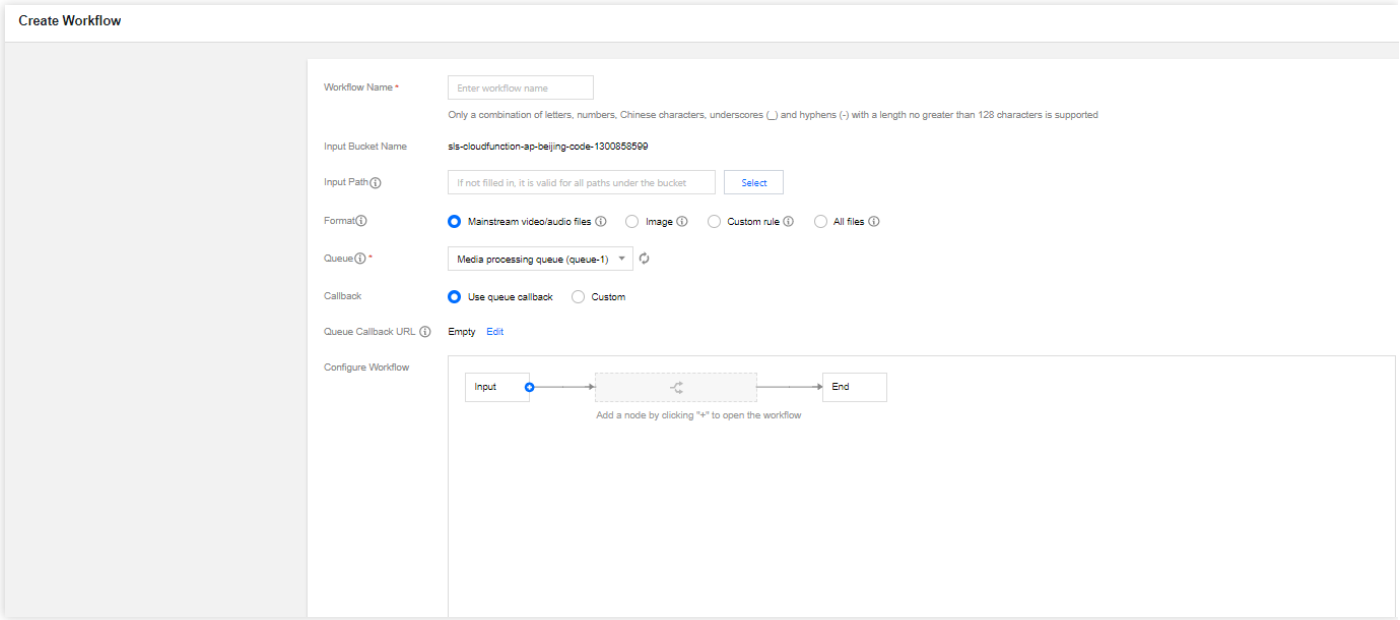
Solution Strengths

- Accelerated development: Eliminates the need to focus on resource Ops and component overhead, greatly reducing the complexity for constructing service structures.
- Reduced overhead: When the platform is idle, no resource is executed. When a function is executed, the service fee is determined by the number of requests and the running time of the computing resource. The price advantage is obvious.
- High availability and scalability: The platform automatically adjusts service resources in parallel based on requests, thus implementing near-infinite scalability and eliminating the risk of service interruption inherent in single-availability zone operations.

Directions

1. Log in to the COS console, create a workflow, customize the filter rule, and create a custom function node. For detailed directions, see Configuring Workflow.



2. In the function node pop-up window, click **Add Function**.

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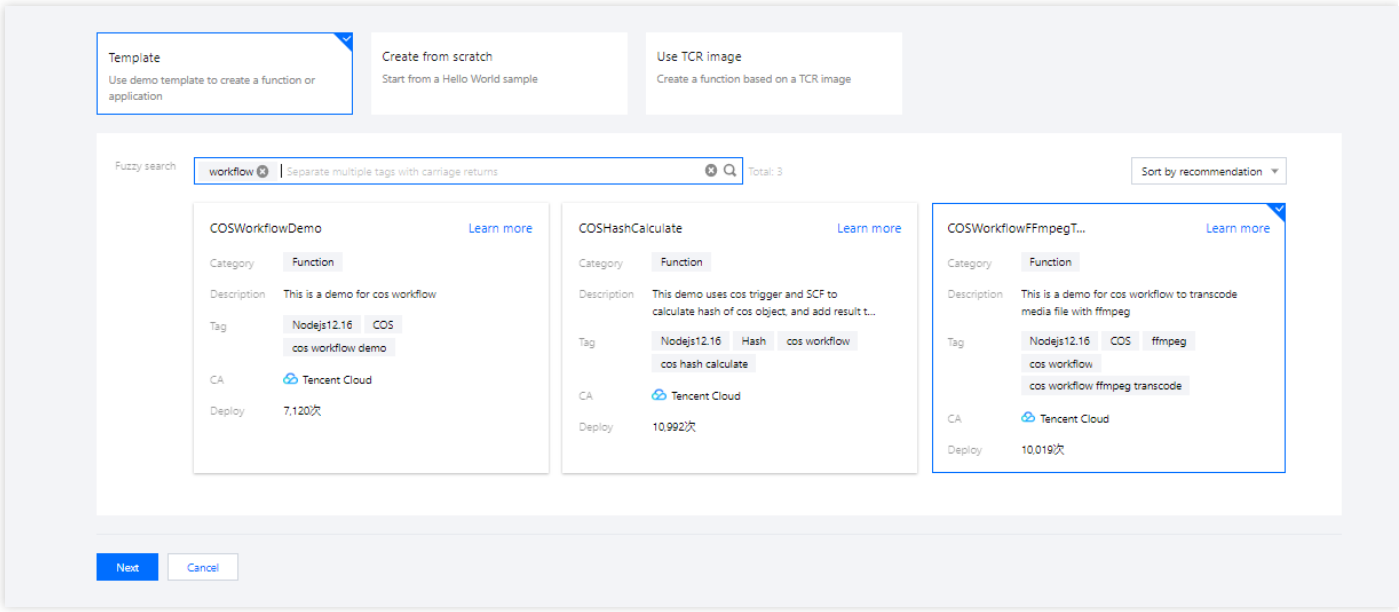
3. On the function creation page, select the template for **COSWorkflowFFmpegT...**.



4. Based on the user's file size, configure the execution timeout duration in the basic settings and configure sufficient memory in the advanced settings.
5. Configure environment variables in **Advanced configuration** > **Environment configuration**. The function template supports the following environment variables:

- targetBucket: Target bucket. Required.
- targetRegion: Region of the target bucket. Required.
- targetKeyTemplate: Target path template. Optional. Defaults to `${InputPath}${InputName}_transcode.${ext}`.
- ffmpegTemplate: Transcoding command template. Required. Example: `${ffmpeg} -loglevel error -i ${source} -r 10 -b:a 32k ${target}`.
- localTmpPath: Temporary save path. When CFS is bound, you can change the temporary path. Optional. Defaults to `/tmp`.

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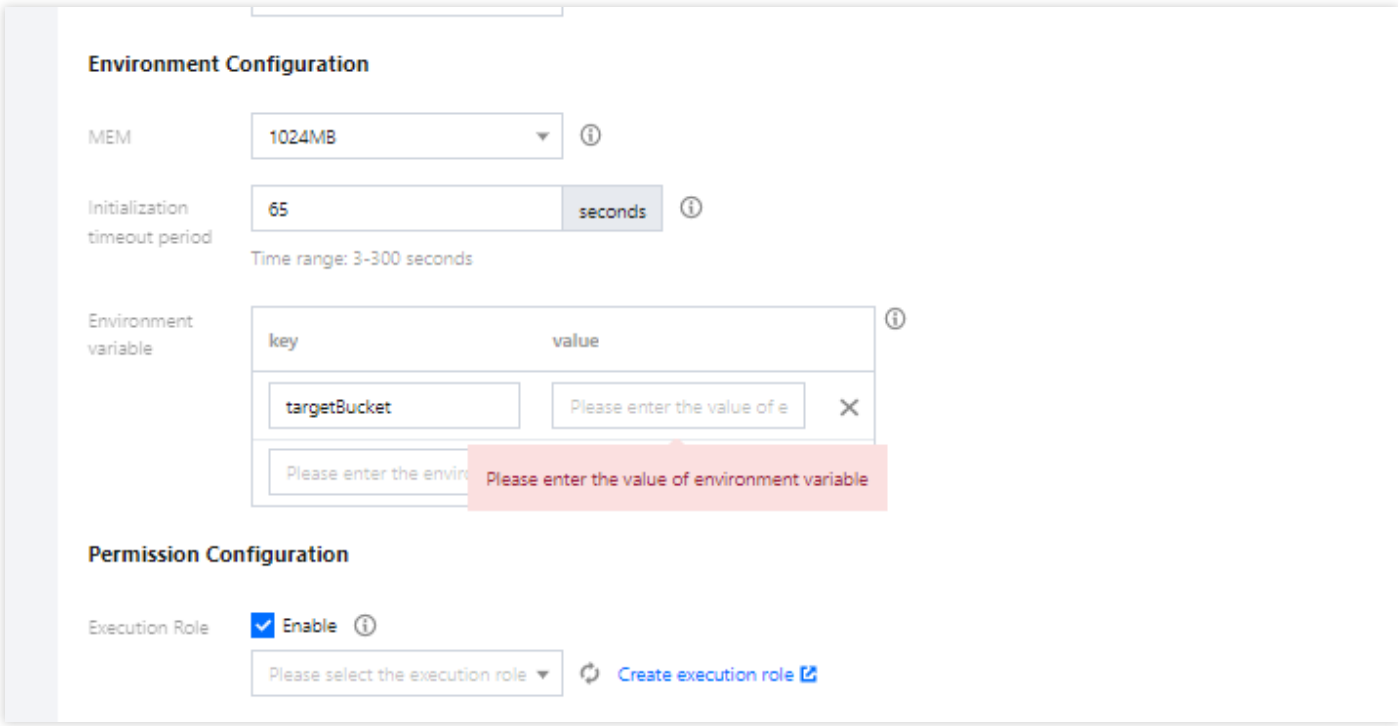
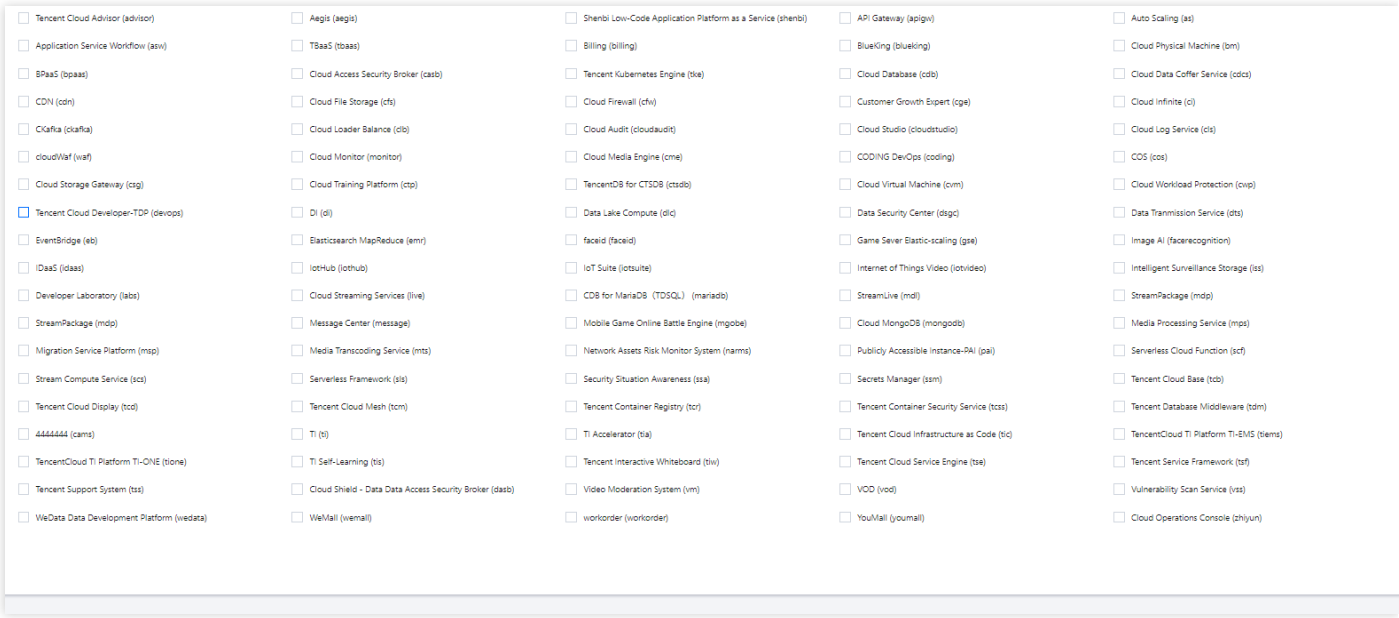


6. Enable permission configuration and bind a role that has the read/write permission of the current bucket. To create an execution role, see Role and Authorization.



7. Click **Complete**.
8. Go back to the previous workflow page, select the custom transcoding function created just now, and save the workflow. Start the workflow on the workflow list page.

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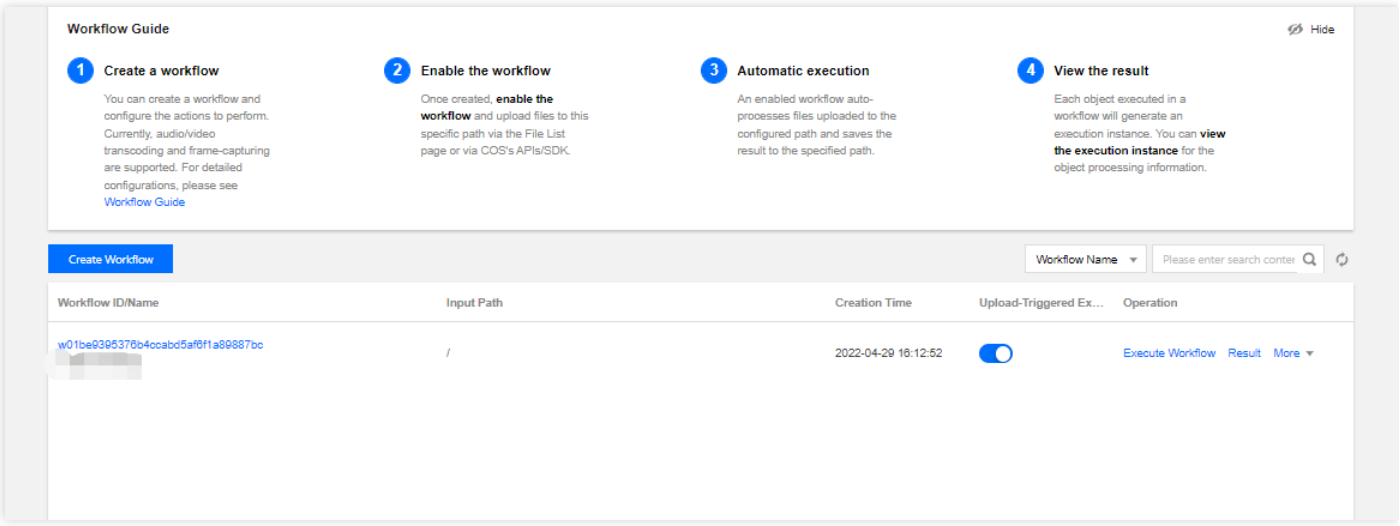
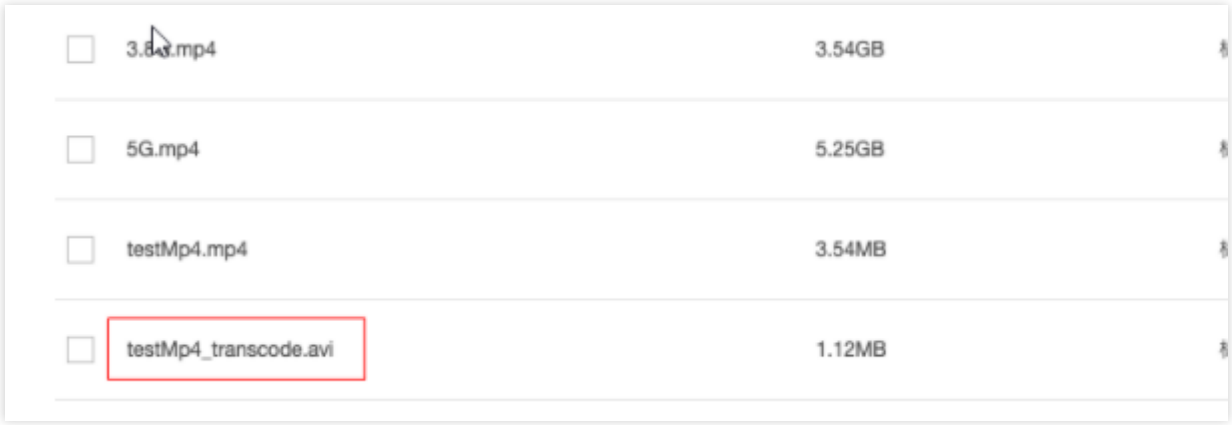


9. Upload the file. After the workflow processing is successful, you can see that the uploaded video is successfully transcoded and is saved as a new file.



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MapReduce Method that Uses WordCount as an Example
Example

Last updated：2020-07-21 17:38:39

In this tutorial, suppose that:

- You will upload some text files (such as logs) to a specific COS bucket from time to time.
- You need to count the words in these text files.

Implementation Overview

The implementation process of this function is as follows:

- You create functions and COS buckets.
- You upload an object to the source COS bucket (object creation event).
- The COS bucket detects the object creation event.
- COS invokes the function and passes the event data as parameters to the function, thus publishing the `cos:ObjectCreated:\*` event to the function.
- The SCF platform receives the invocation request and executes the function.
- The function gets the bucket name and filename from the received event data, gets the file from the source bucket, uses the `wordcount` implemented in the code to count the words, and saves the word count in the target bucket.

⚠ Note：

- Three COS buckets are used in this example. If you use the same bucket as both source and target buckets, each file uploaded to the source bucket may trigger another object creation event that will invoke the function again and thus cause an infinite loop.
- Make sure that the function and the COS buckets are in the same region.

Note: after going through this tutorial, your account will have the following resources:

- Two SCF functions: Mapper and Reducer.
- Three COS buckets: srcmr, middlestagebucket and destmr.

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- The Mapper function will be bound to `srcmr` for triggering, the Reducer function will be bound to `middlestagebucket` for triggering, and `destmr` will be used to receive the final statistics.

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Step 1: Prepare a COS Bucket

Last updated：2022-08-12 15:32:22

Make sure that you have obtained the permission to use SCF before implementing this sample.

1. Log in to the Tencent Cloud console and select **Cloud Product** > **Cloud Object Storage**.
2. Select **Bucket List** on the left sidebar to enter the "Bucket List" page.
3. Click **Create Bucket** on the "Bucket List" page.
4. In the **Create Bucket** pop-up window, create the source COS bucket as follows:
   Set the name of the COS bucket as `srcmr`, select `Chinese Mainland` > `Beijing` as the region, set the access permission to the default value of `private read/write`, and click **Next**.
5. Keep the default values for other options and click **Next** to create a COS Bucket.
6. Repeat steps 1–4 to create the intermediate bucket `middlestagebucket` and target bucket `destmr`.

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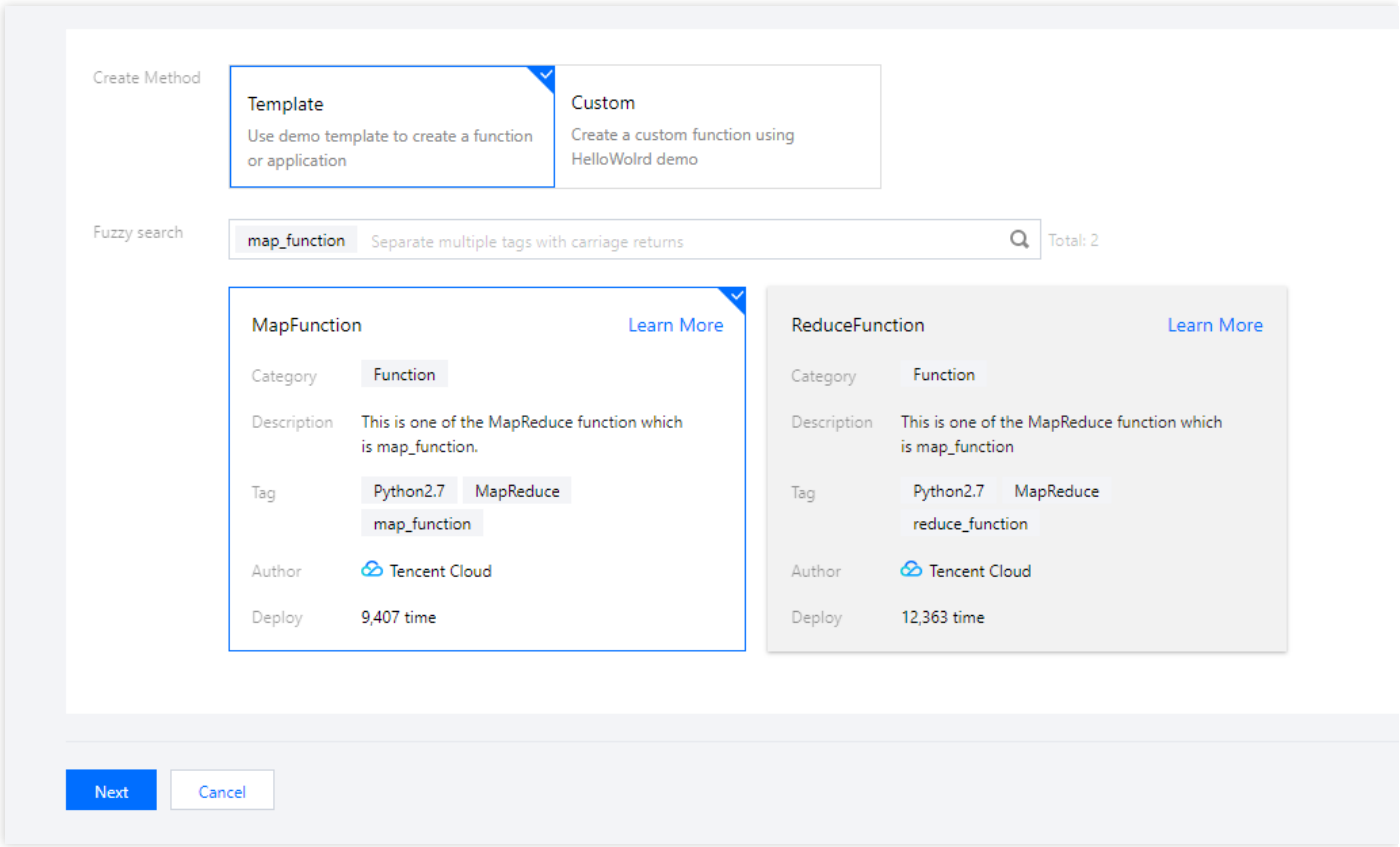
Step 2. Create Mapper and Reducer Functions

Last updated：2021-03-19 15:15:22

Creating Mapper Function

Creating in console through template function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creating page and configure the function as shown below:



- **Creation method**: select **Template**.
- **Fuzzy search**: enter "map_function", search, and select the "map_function" template.
  Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

3. Click **Next**. The function name is automatically generated by default and can be modified as needed. Follow the prompts to configure the execution role:

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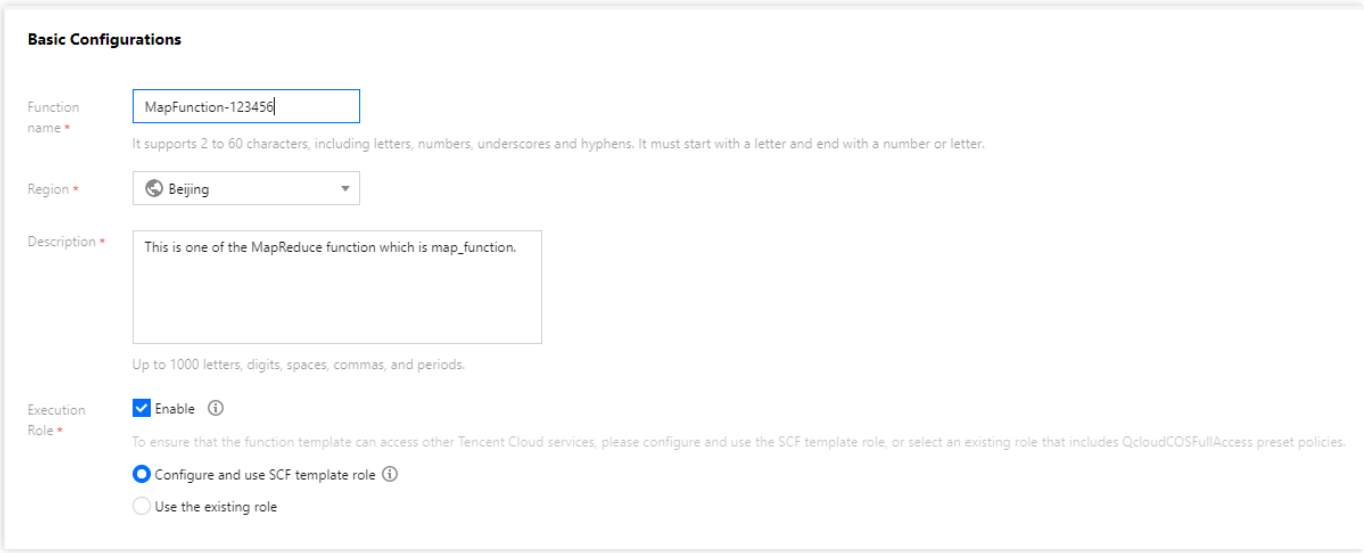
- **Execution Role**: check **Enable**. **Configure and use SCF template role** is selected here as an example as shown below:



- **Configure and use SCF template role**: select this option and the system will automatically create and select an SCF template execution role associated with full access permissions of COS.
- **Use the existing role**: you need to select an existing role that contains the above permissions in the drop-down list.

> **Note：**
>
> During execution, the function will use the execution role to get a temporary key to manipulate relevant Tencent Cloud resources.

4. Click to expand the **Function Code** tab, where you can browse the code information. If you want to modify the parameter values such as variables, you can modify and save them online.

Configuring COS trigger

1. In the **Trigger Configurations** section, select **Custom** and enter relevant information according to the displayed parameters as shown below:

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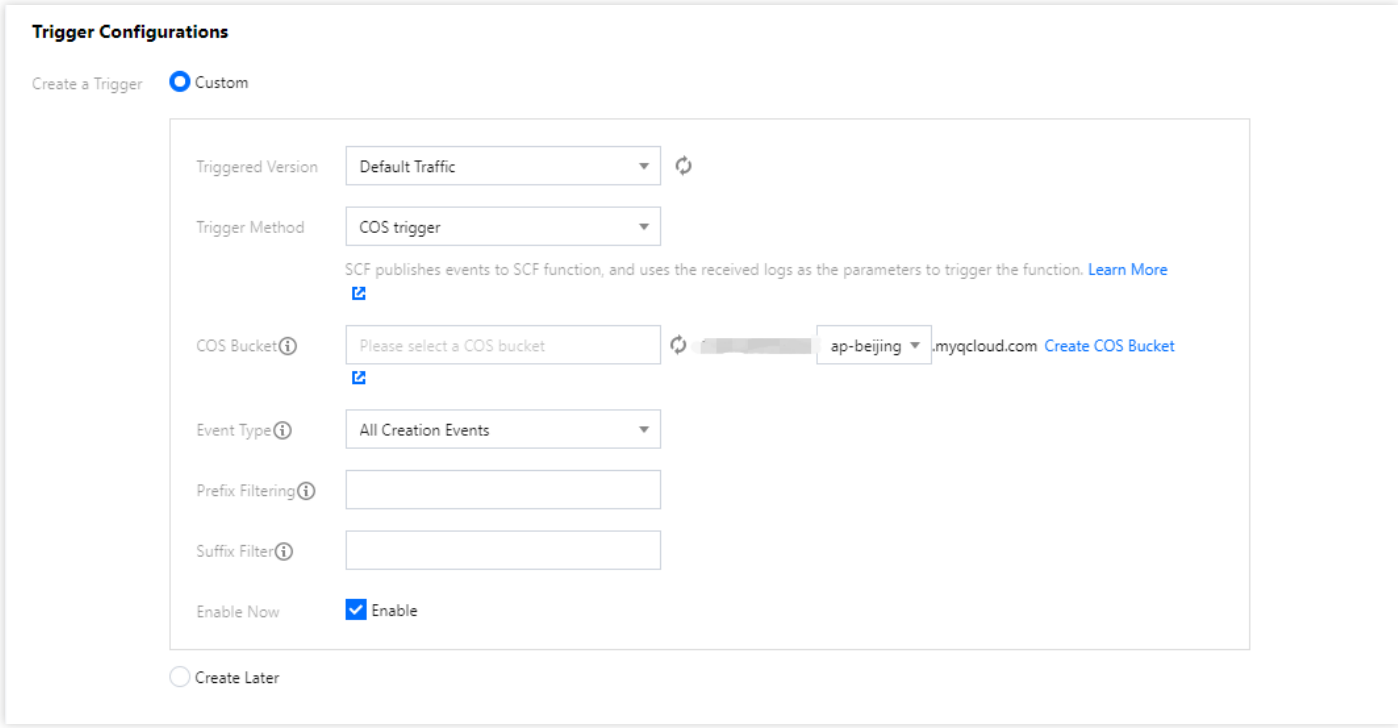

Main parameters are as follows:

- **Trigger Method**: select **COS trigger**.
- **COS Bucket**: select **srcmr**.
- **Event Type**: select **All Creation Events**.

2. Click **Complete**.

Creating Reducer Function

Creating in console through template function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creating page and configure the function as shown below:

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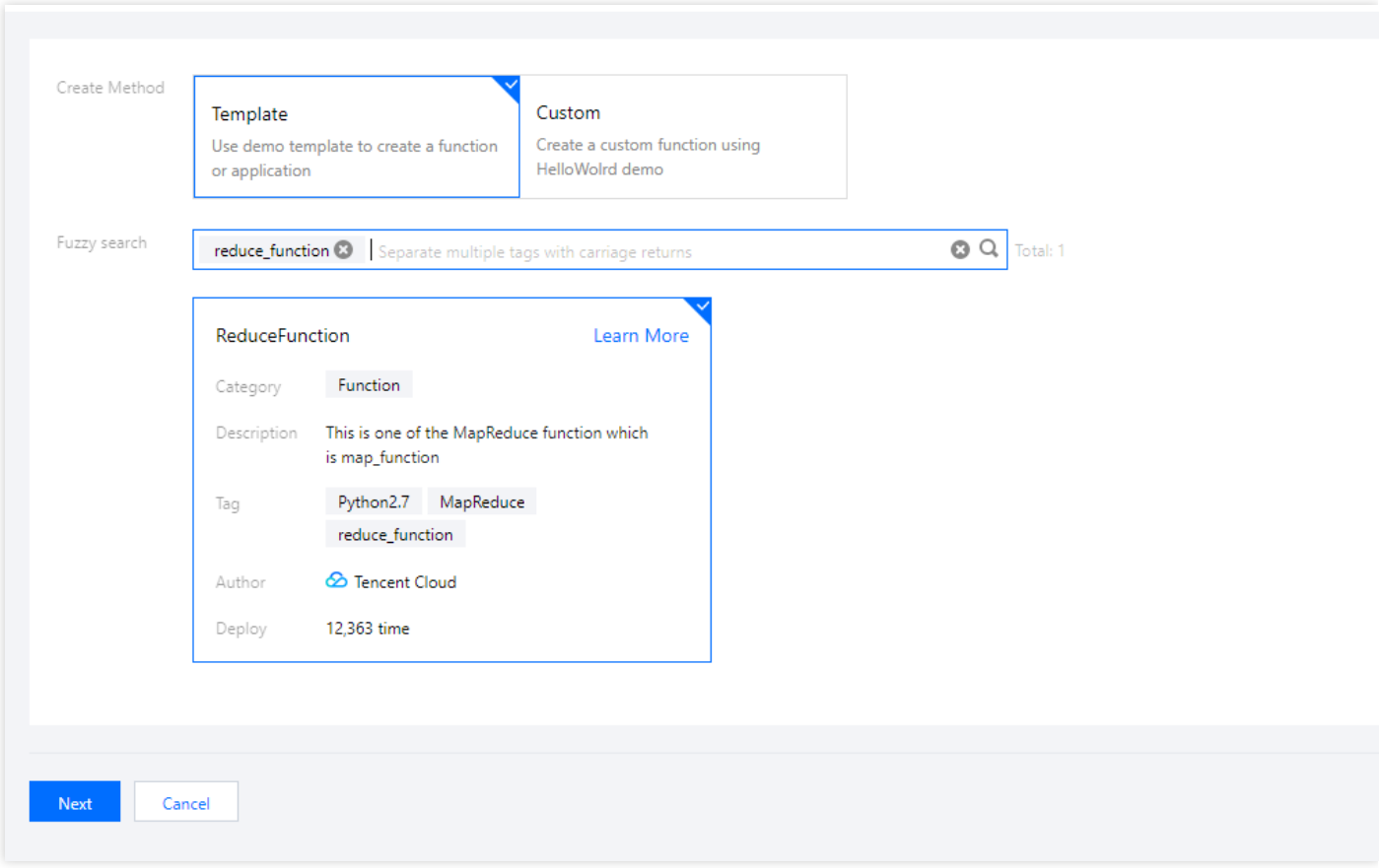

- **Creation method**: select **Template**.
- **Fuzzy search**: enter "reduce_function", search, and select the "reduce_function" template.
  Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

3. Click **Next**. The function name is automatically generated by default and can be modified as needed. Follow the prompts to configure the execution role:
   - **Execution Role**: check **Enable**. **Configure and use SCF template role** is selected here as an example as shown below:

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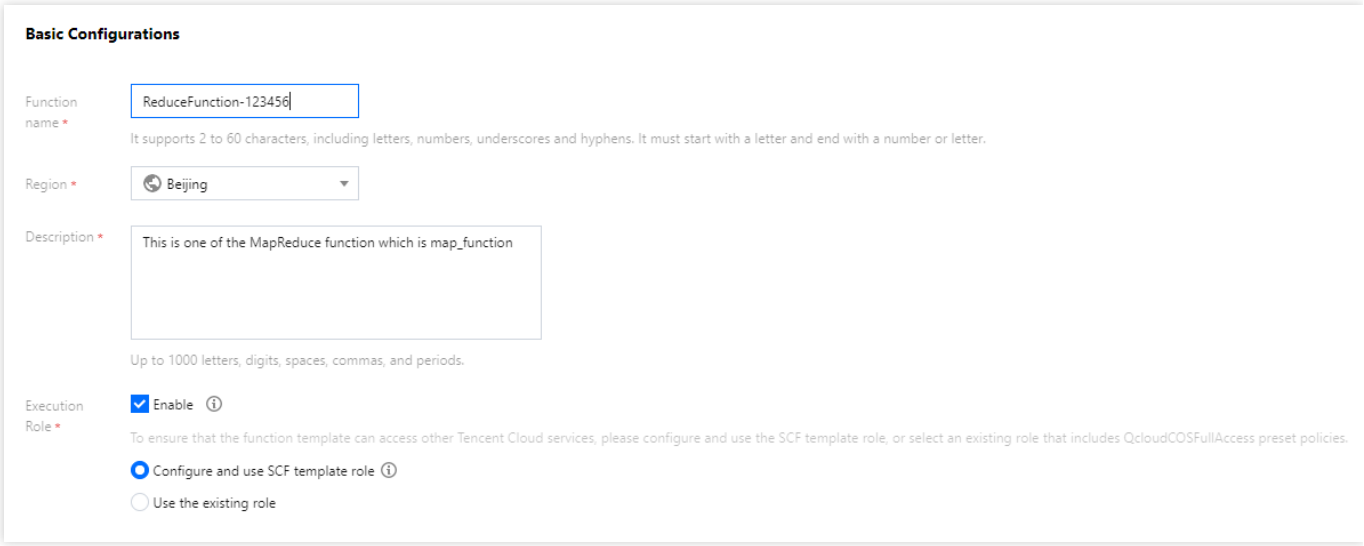

- **Configure and use SCF template role**: select this option and the system will automatically create and select an SCF template execution role associated with full access permissions of COS.
- **Use the existing role**: you need to select an existing role that contains the above permissions in the drop-down list.

4. Click to expand the **Function Code** tab, where you can browse the code information. If you want to modify the parameter values such as variables, you can modify and save them online.

Configuring COS trigger

1. In the **Trigger Configurations** section, select **Custom** and enter relevant information according to the displayed parameters as shown below:

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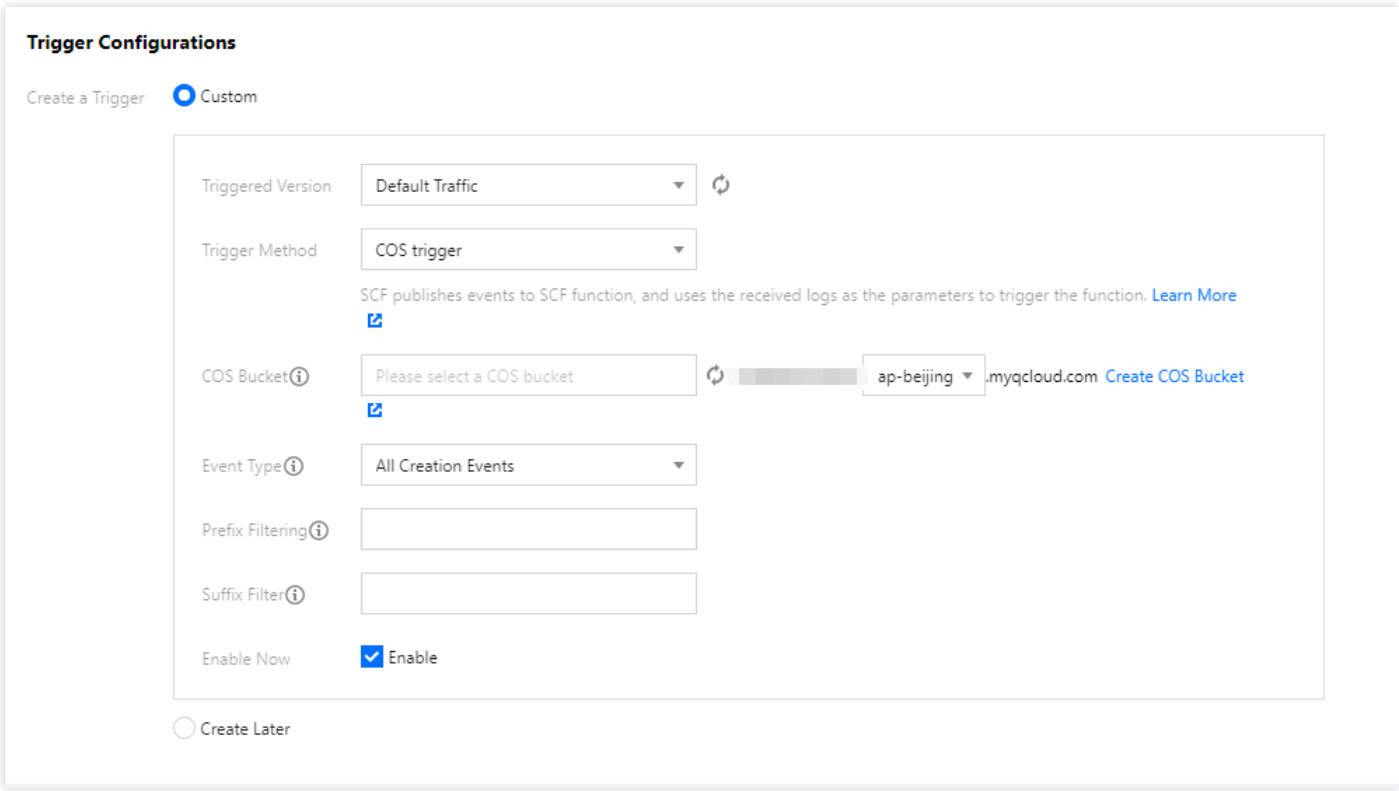

Main parameters include:

- **Trigger Method**: select **COS trigger**.
- **COS Bucket**: select **middlestagebucket**.
- **Event Type**: select **All Creation Events**.

2. Click **Complete**.

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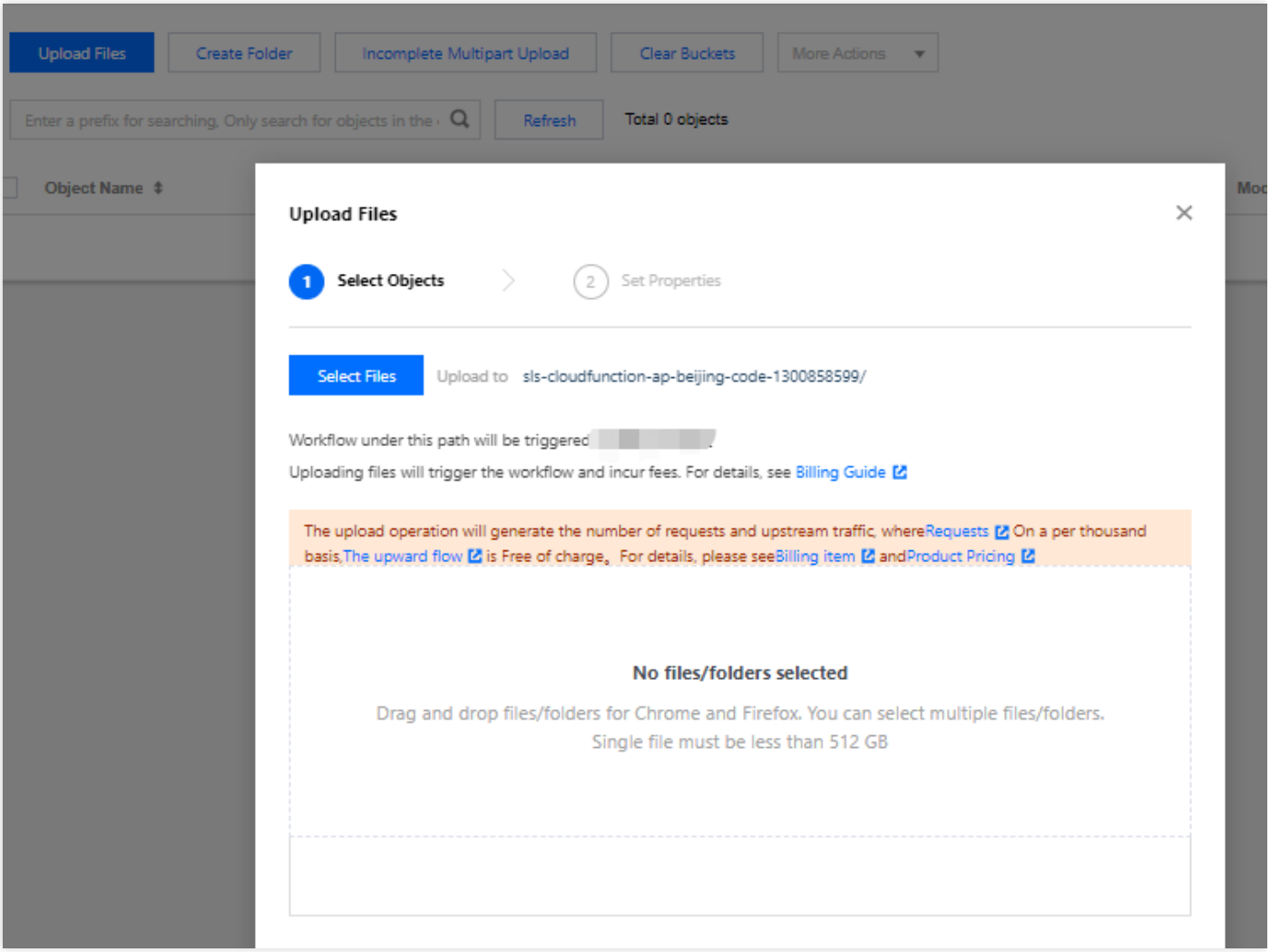
Step 3. Test Function

Last updated：2022-07-15 11:35:09

1. Download the text file in the test sample and extract `test.txt` .
2. Switch to the COS Console, select the created bucket `srcmr` , and click **Upload File**.
3. In the pop-up "Upload File" window, select the downloaded `test.txt` file and click **Upload** as shown below:



4. Switch to the SCF Console to view the execution result. You can see the printed log information in **Logs** as shown below:

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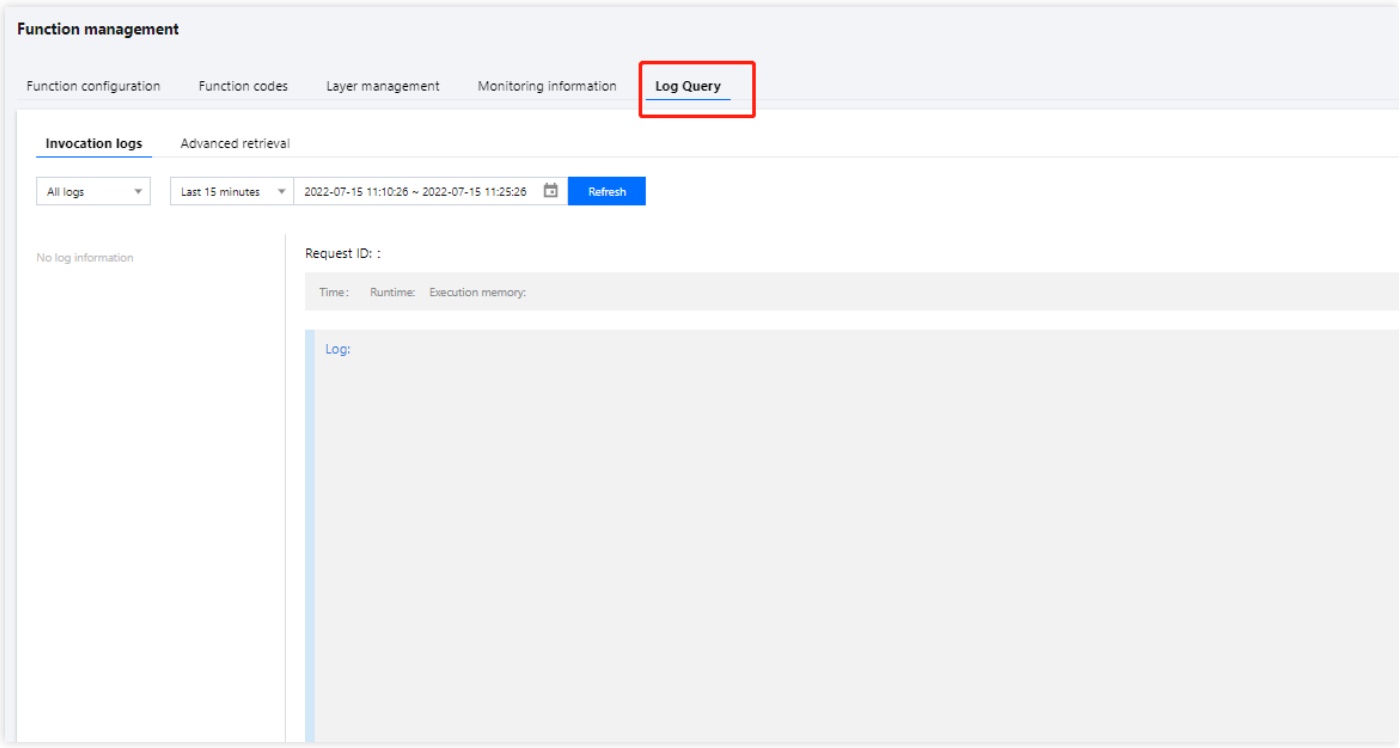
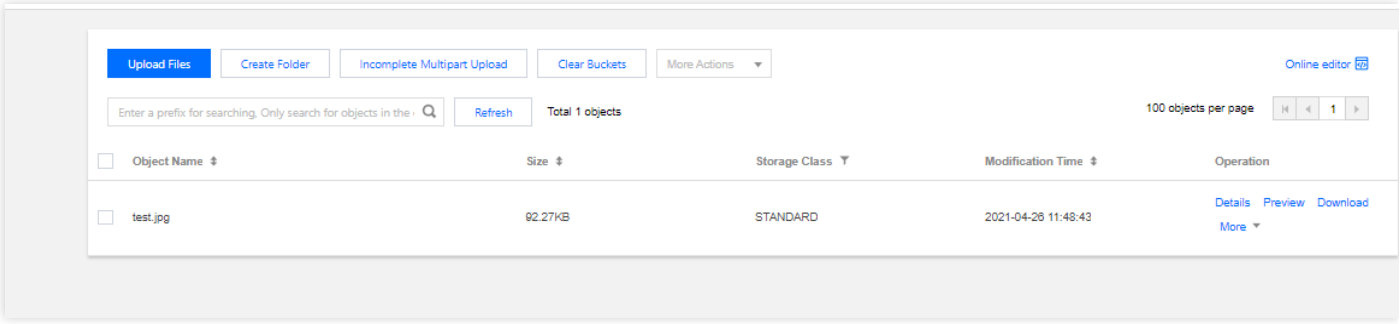


5. Switch to the COS Console, select the created bucket `destmr`, and view the generated file as shown below:



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CKafka Practice
Dumping CKafka Data to ES

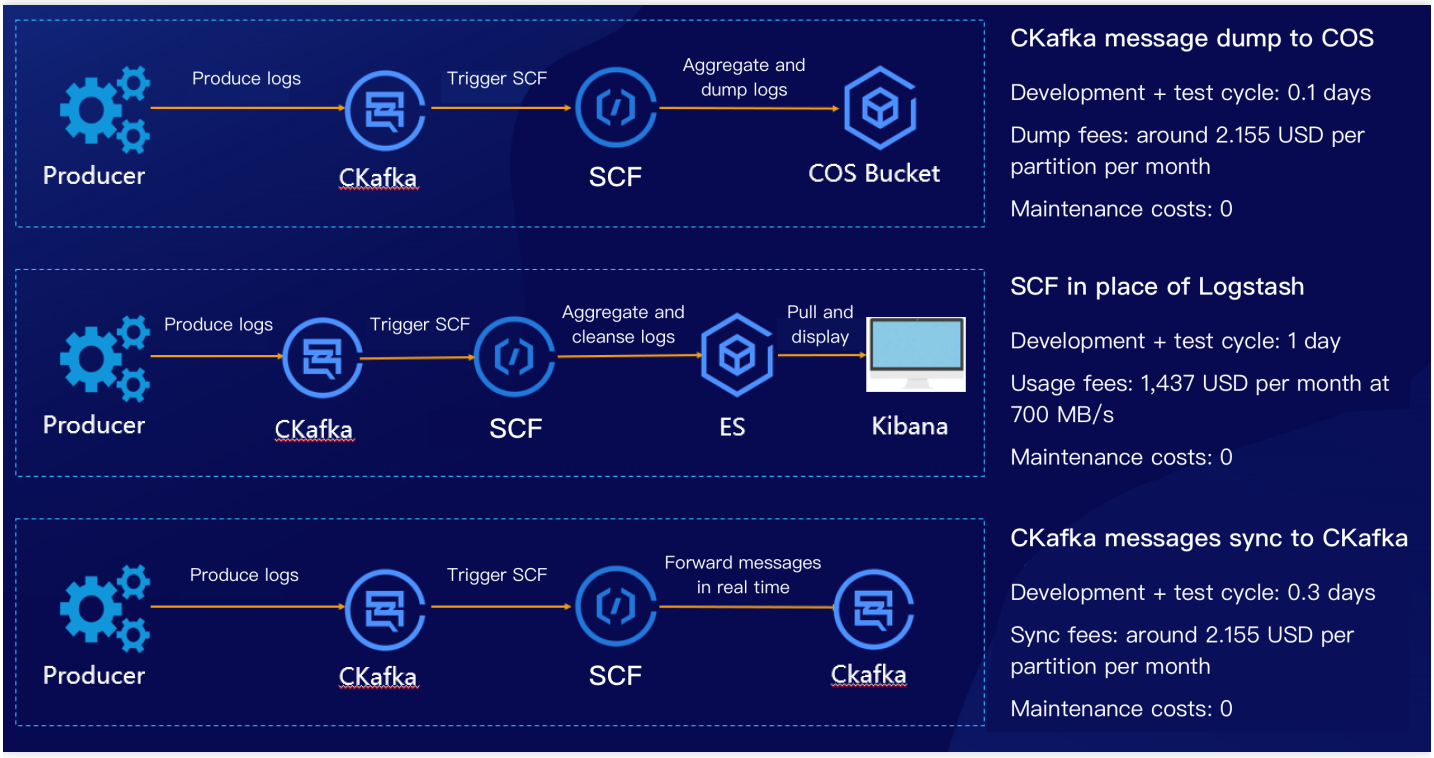
Last updated：2022-12-28 11:26:36

Overview

With the prosperity of the Kafka community, more and more users have started to use Kafka for activities such as log collection, big data analysis, and streaming data processing. CKafka has made the following optimizations on open-source Kafka:

- It features distributed architecture, high scalability, and high throughput based on Apache Kafka.
- It is 100% compatible with Apache Kafka APIs (0.9 and 0.10).
- It offers all features of Kafka with no need for deployment.
- It encapsulates all cluster details, eliminating the need for OPS on your side.
- Its message engine is optimized to deliver a performance 50% higher than that of open-source Kafka.

SCF has been deeply integrated with CKafka, and a lot of practical features have been launched. With the help of SCF and CKafka trigger, it is easy to dump CKafka messages to COS, ES, and TencentDB. This document describes how to use SCF in place of Logstash to dump CKafka messages to ES as shown below:



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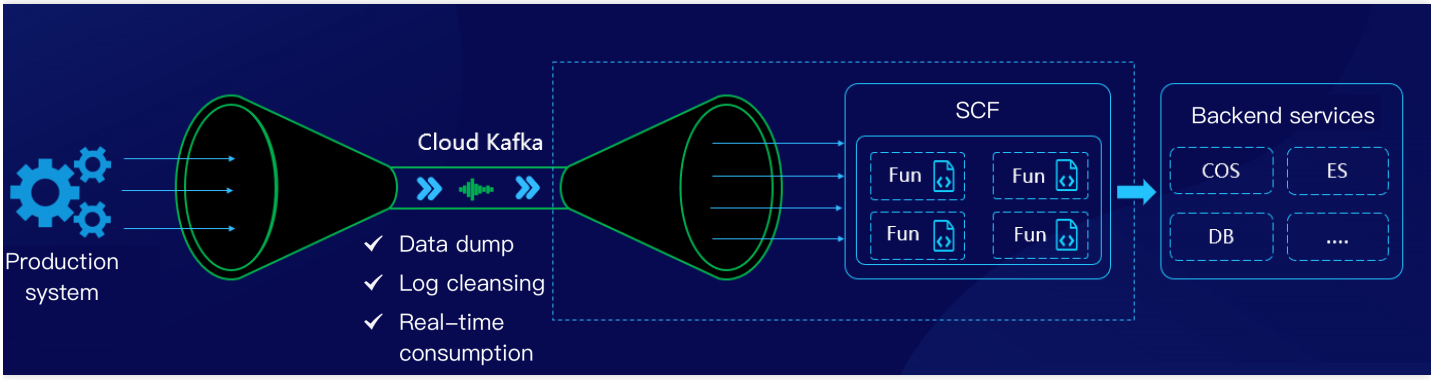
How It Works

SCF can consume messages in CKafka in real time in various scenarios such as data storage, log cleansing, and real-time consumption, and the data dump feature has been integrated in the CKafka console and can be enabled quickly, making it easier to use as shown below:



Scheme Advantages

Compared to a CVM-based self-created CKafka consumer, SCF has the following advantages:

- You can enable the CKafka trigger quickly in the SCF console to automatically create a consumer, and SCF will maintain the high availability of components.
- The CKafka trigger itself supports many practical configurations, such as the offset position, 1–10,000 messages to be aggregated, and 1–10,000 retry attempts.
- Business logic developed based on SCF naturally supports auto scaling, eliminating the need to build and maintain server clusters.

Compared to CVM-based self-created Logstash service, SCF has the following advantages:

- SCF comes with a consumer component that allows for aggregation.
- The scalable function template of SCF provides message aggregation and partial cleansing capabilities.
- SCF clusters are highly available and support log monitoring, enabling you to launch your business more quickly.
- SCF is pay-as-you-go and more cost effective than self-created clusters, saving 50% of costs.

Prerequisites

This document uses the **Guangzhou** region as an example:

- You need to activate Elasticsearch Service.

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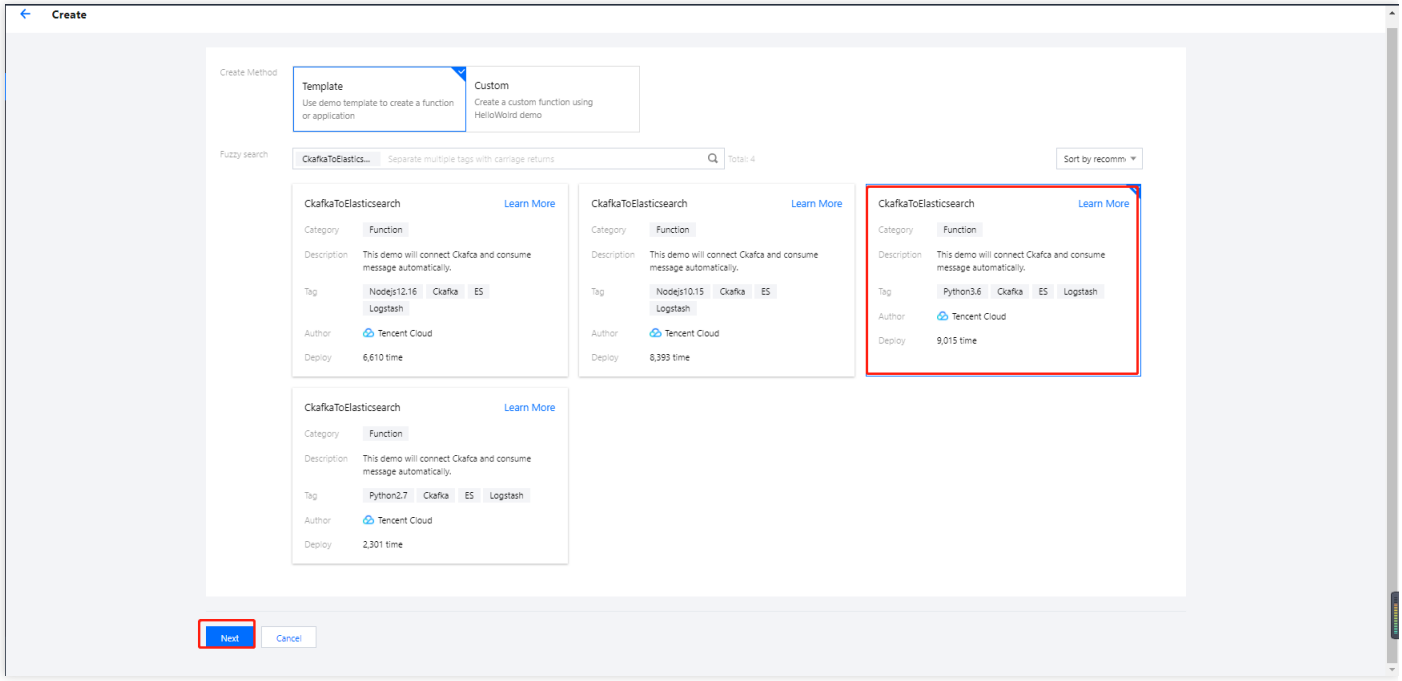
- You need to activate the CKafka service.

Directions

Creating function and CKafka trigger

1. Log in to the Serverless console and click **Function Service** on the left sidebar.
2. Select the region where to create a function at the top of the **Function Service** page and click **Create** to enter the function creation process.
3. Select a function template as follows on the **Create Function** page and click **Next** as shown below:



- **Creation method**: select **Template**.
- **Fuzzy search**: enter **CkafkaToElasticsearch** and search. This document uses the Python 3.6 runtime environment as an example.
  Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

4. In the **Basic Configurations** section, the function name has been automatically generated and can be modified as needed. Follow the prompts to configure environment variables, execution role, and VPC as shown below:

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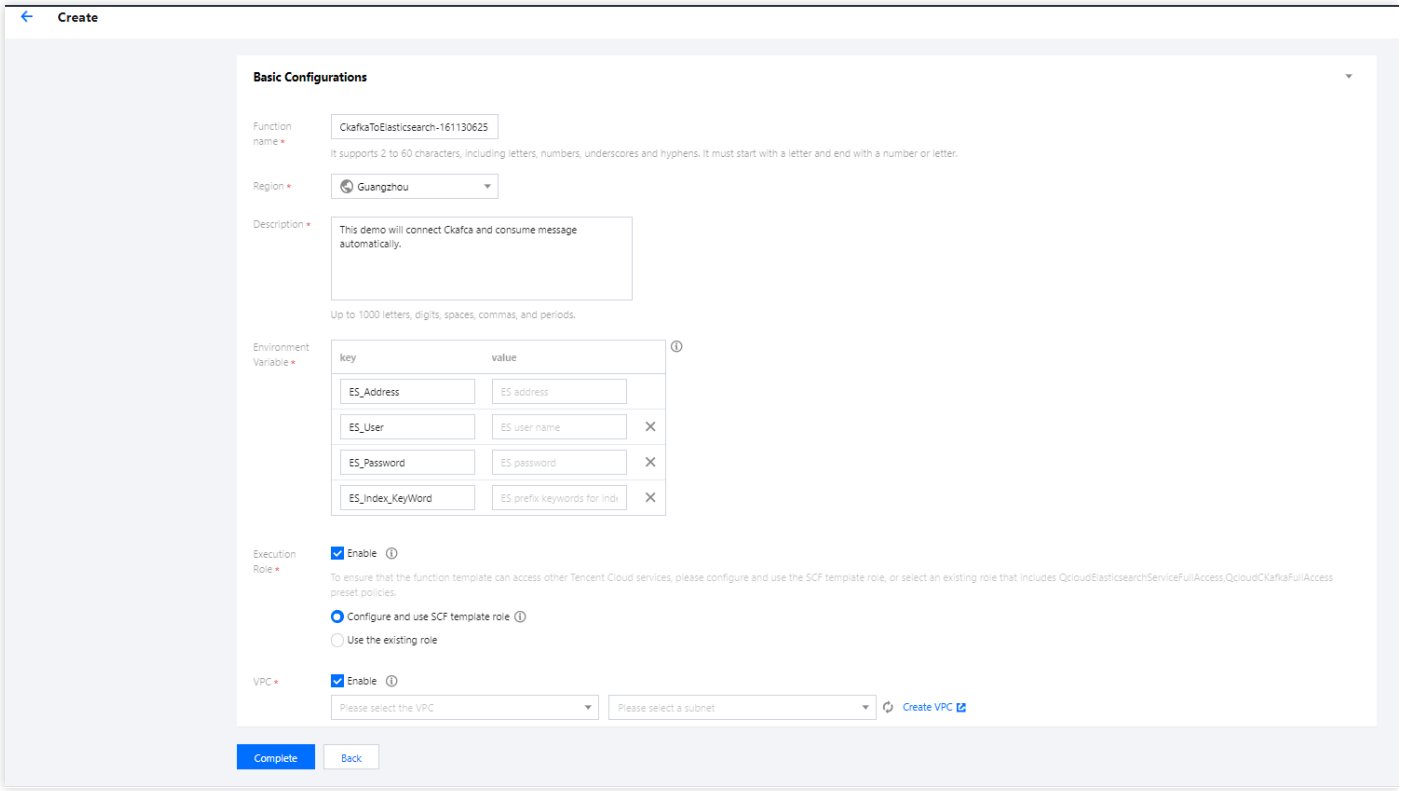
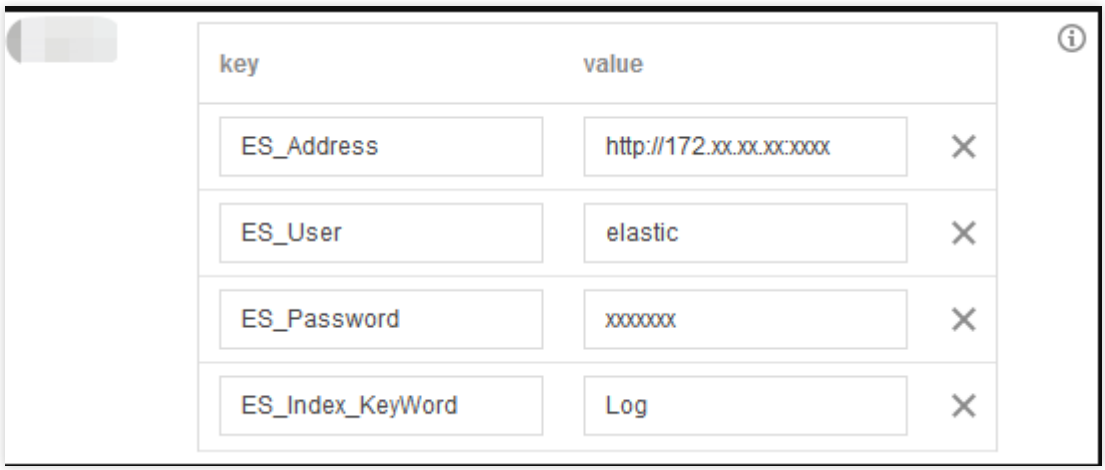


- **Environment Variable**: add the following environment variables and configure them as shown below:



key	value	Required
ES_Address	ES address.	Yes
ES_User	ES username, which is `elastic` by default.	Yes
ES_Password	ES password.	Yes
ES_Index_KeyWord	ES keyword index.	Yes

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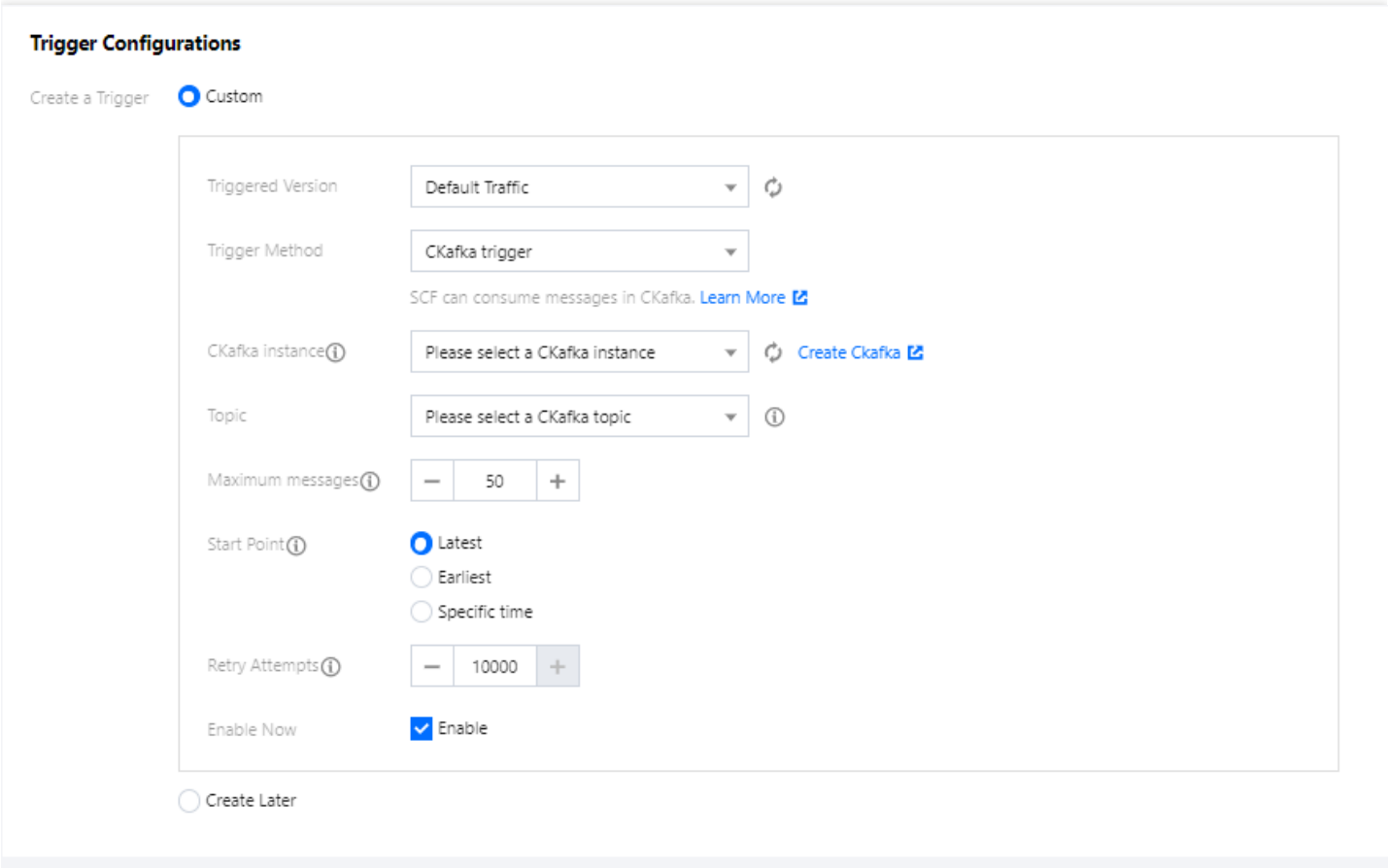
ES_Log_IgnoreWord	Keyword to be deleted. If this parameter is left empty, all keywords will be written. For example, you can enter `name` or `password`.	No
ES_Index_TimeFormat	Index by day or hour. If this parameter is left empty, the index will be by day. For example, you can enter `hour`.	No

- **Execution Role**: check **Enable**, select **Configure and use SCF template role**, and the system will automatically create and select an SCF template execution role associated with full access permissions of ES and CKafka. You can also check **Use the existing role** and select an existing role that has the above permissions in the drop-down list. This document takes **Configure and use SCF template role** as an example.
- **VPC**: check **Enable** and select the VPC of ES.

5. In the **Trigger Configurations** section, select **Custom** and enter relevant

   information according to the displayed parameters as shown below:



The main parameter information is as follows. Keep the remaining parameters as default:

- **Trigger Method**: select **CKafka trigger**.

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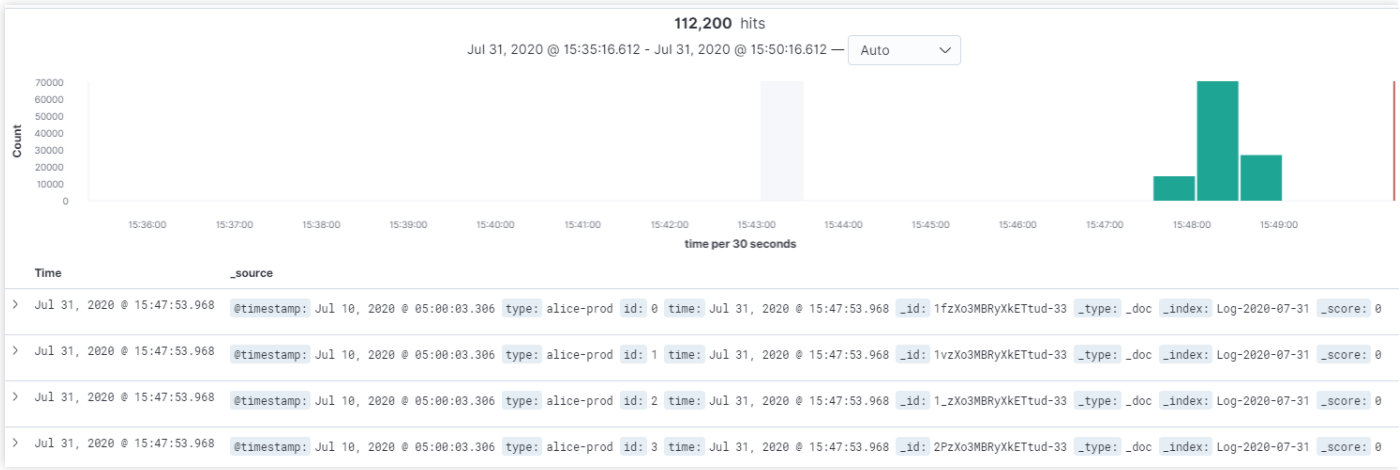
- **CKafka Instance and Topic**: select the corresponding topic as needed.
- **Start Point**: select **Earliest**.

6. Click **Complete**.

Viewing ES and function execution logs

> Note：
> If you have not ingested actual data into CKafka, you can use the client tool to simulate message production.

- Select **Log Query** on the sidebar of the function to view the function execution log.
- View Kibana. For more information, please see Accessing Clusters from Kibana.



Scalability

If you want to implement advanced log cleansing logic, you can modify the logic in the code location.

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```
def deallog(log):
    if ES_Log_IgnoreWord != None:
        for key in ES_Log_IgnoreWord.split(","):
            log.pop(key, None)
    log["time"] = datetime.datetime.now().isoformat()
    return log
```

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SCF + CKafka for Message Dump to TencentDB for MySQL

Last updated：2022-01-23 16:11:24

Overview

CKafka allows you to dump messages to TencentDB for MySQL to persistently store filtered data.

Prerequisites

Currently, this feature relies on the SCF and TencentDB for MySQL services, which should be activated first before you can use this feature.

Directions

Message dump to TencentDB for MySQL will be performed with the CKafka trigger in SCF.

1. Log in to the CKafka console.
2. Click **Instance List** on the left sidebar and click the **ID/Name** of the target instance to enter the instance details page.
3. On the instance details page, select the **Topic Management** tab and click **Message Dump** in the **Operation** column.
4. Click **Add Message Dump** and select **General template** as the dump type.
   - Dump Type: select **General template**.
   - Starting Position: the topic offset of historical messages when dumping.
   - SCF Authorization: indicate your consent to activating SCF and create a function. Then, you need to go to the function settings to set more advanced configuration items and view monitoring information.
5. After the creation is completed, click the **Function Management** link to enter the SCF console for the next step.

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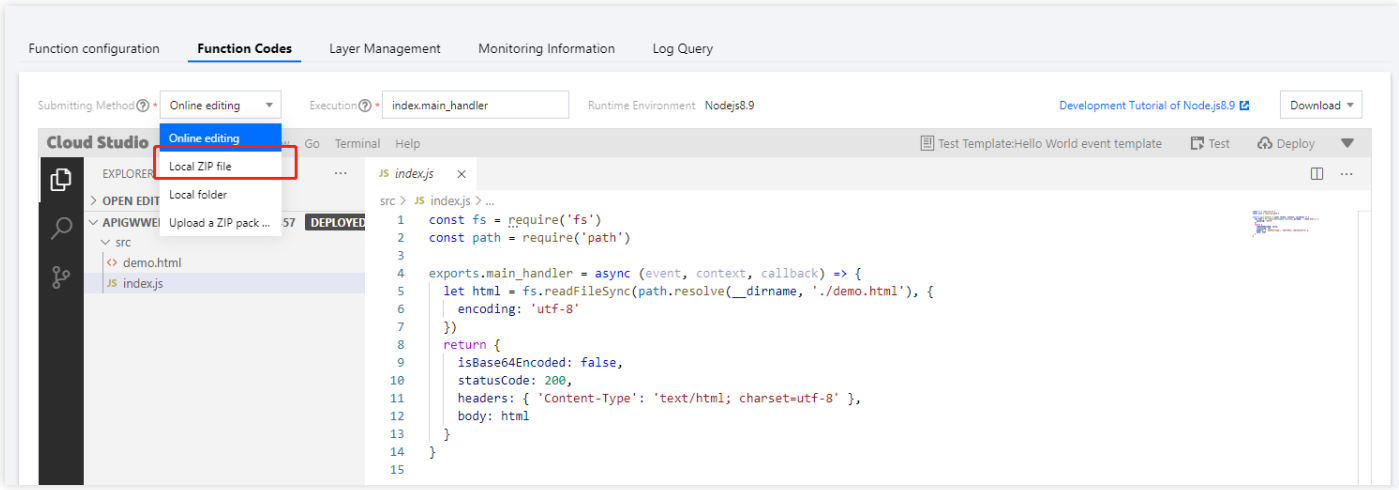
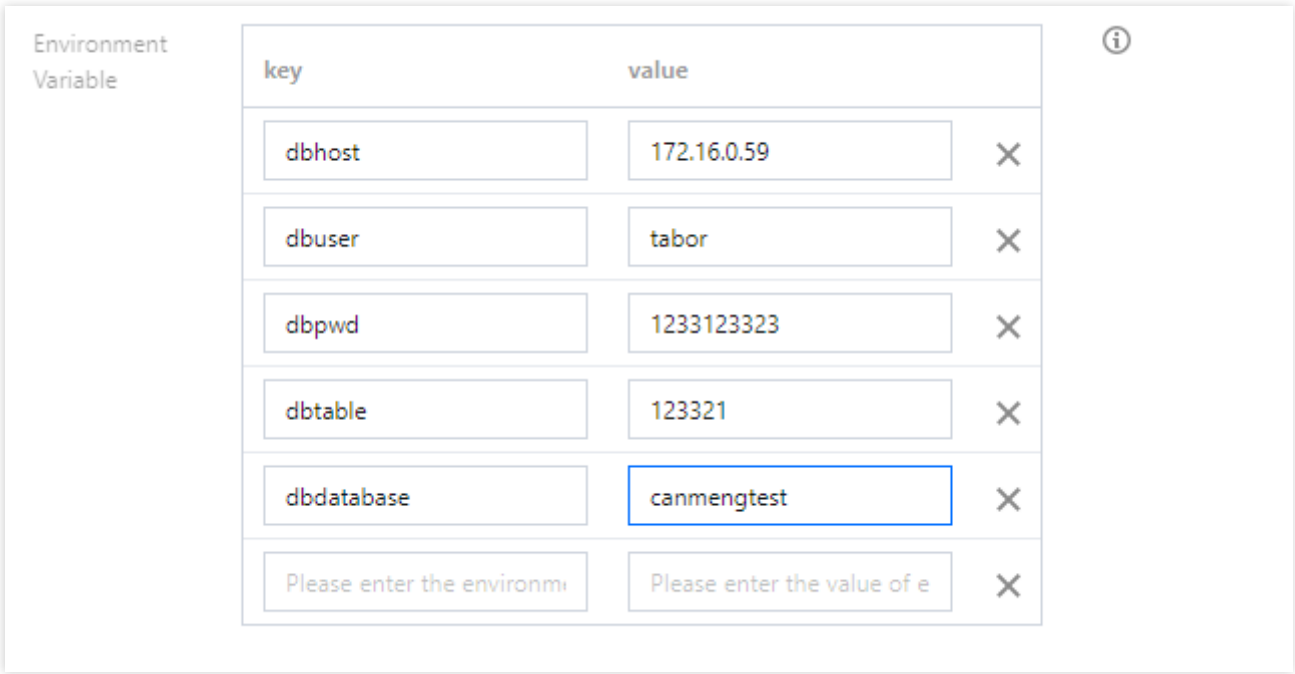
6. Upload the code of the CKafkaToMysql template (available on GitHub) to the SCF console.



7. Add the following environment variables in **Function Configuration** of the function.




```
dbhost=172.16.0.59 // Databases VPC host address
dbuser=tabor // Database username
dbpwd=1237018 // Database password
dbdatabase=canmengtest // Database name
dbtable=123321 // Table name
```

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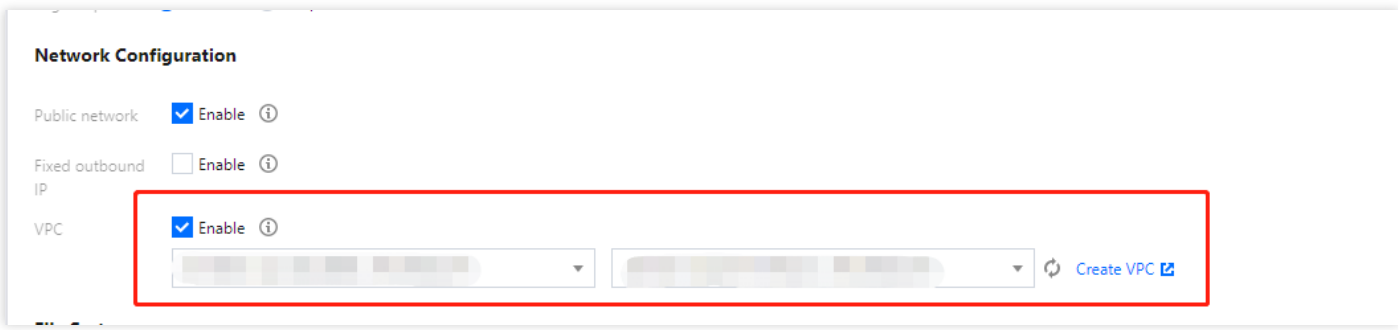
8. Modify the VPC in **Function Configuration** to make the VPC of the function the same as that of TencentDB.



9. In the TencentDB for MySQL DMC console, add the relevant databases, tables, and table structures.

   - Create a database with the same name as in the environment variables:
   - Create a table with the same name as in the environment variables:
   - Create a table structure with the same insertion structure as in the function code. `offset` and `Megs` will be inserted to by default. You can modify the insertion structure on line 33 in the `index.py` file.
     You can also run a TencentDB for MySQL command to directly create tables and data structures:

     ```
     CREATE TABLE `test_table` ( `offset` VARCHAR(255) NOT NULL , `Megs` LONGTEXT NOT NULL ) ENGINE = InnoDB;
     ```

0. Enable the CKafka trigger on the trigger management page in the SCF console.

Restrictions and Billing

- The dump speed is subject to the limit of the peak bandwidth of the CKafka instance. If the consumption is too slow, check the peak bandwidth settings.
- The `CKafkaToMySQL` scheme uses the CKafka trigger. For more information on related settings such as retry policy and maximum number of messages, see CKafka Trigger.
- When the dump to MySQL feature is used, the dumped messages are the `offset` and `msgBody` data of the CKafka trigger by default. If you want to process the logic by yourself, see Event Message Structure for CKafka Trigger.
- This feature is provided based on the SCF service that provides a free tier. For more information on the fees for excessive usage, see the billing rules of SCF.

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SCF + CKafka for Message Dump to CKafka

Last updated：2022-01-23 16:11:24

Overview

CKafka allows you to dump messages to another CKafka cluster to sync data between CKafka clusters.

Prerequisites

Currently, this feature relies on the SCF and CKafka services, which should be activated first before you can use this feature.

Directions

Dumping message

Message dump to CKafka will be performed with the CKafka trigger in SCF to sync messages to another CKafka cluster.

1. Log in to the CKafka console.
2. Click **Instance List** on the left sidebar and click the **ID/Name** of the target instance to enter the instance details page.
3. On the instance details page, select the **Topic Management** tab and click **Message Dump** in the **Operation** column.
4. Click **Add Message Dump** and select **CKafka** as the dump type.
   - Dump Type: select CKafka.
   - Dump Instance: pull the list of CKafka instances in the current region. If you want to dump data to an instance in another region or self-built Kafka, see Custom dump settings.
   - Dump Topic: pull the CKafka topic information of the selected instance.
   - Starting Position: the topic offset of historical messages when dumping.
   - Role Authorization: to use the SCF service, you need to grant a third-party role to perform access to related products for you.
   - SCF Authorization: indicate your consent to activating SCF and create a function. Then, you need to go to the function settings to set more advanced configuration items and view monitoring information.
5. After configuring the dump task, click **Submit**. After it is successfully created, dump will not start immediately; instead, you need to manually enable dump in the console.

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Custom dump settings

In the general creation process, dump cannot be performed directly across regions or in self-built Kafka. For such dump, you need to configure the network or delivery information for the function. The cross-region dump process is as follows:

1. Create a CKafka dump template, go to the SCF console, and configure the delivery instance and topic as needed.

2. Modify **Environment Variable** and **Network** settings in the function configuration.

   Environment variable configuration description:
   kafka_address: Kafka IP address.
   kafka_topic_name: Kafka topic name.

   > Note：
   > - To dump CKafka data across regions, simply modify the relevant environment variables. You need to configure a **peering connection** for VPC.
   > - For a CVM-based self-built Kafka instance, you need to change them to the VPC and Kafka topic of the instance.
   > - For other self-built Kafka instances, you need to change the IP and topic in the environment variable to the information of the instance. If there is no Direct Connect, data needs to be transferred over the SCF public network.

3. Save the configurations and enable the dump feature.

Notes

Access methods

SCF supports two CKafka access methods: `PLAINTEXT` and `SASL_PLAINTEXT`, which can be modified in the SCF code.

- `PLAINTEXT` access method:

```
kafka_to_kafka = KafkaToKafka(kafka_address)
```

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- `SASL_PLAINTEXT` access method:

```
kafka_to_kafka= KafkaToKafka(
kafka_address
security_protocol = "SASL_PLAINTEXT",
sasl_mechanism="PLAIN",
sasl_plain_username="ckafka-80o10xxx#Taborxx",
sasl_plain_password="Taborxxxx",
api_version=(0, 10, 2)
)
```

> Note：
> `sasl_plain_username` consists of **Instance ID** and **username** concatenated with **#**.

Viewing dump log and troubleshooting

CKafka dump capabilities are implemented based on SCF, and you can find relevant dump information and status in the SCF log.

Restrictions and Billing

- The dump speed is subject to the limit of the peak bandwidth of the CKafka instance. If the consumption is too slow, check the peak bandwidth settings.
- The `CKafkaToCKafka` scheme uses the CKafka trigger. For more information on related settings such as retry policy and maximum number of messages, see CKafka Trigger.
- When the dump to CKafka feature is used, the dumped messages are the `offset` and `msgBody` data of the CKafka trigger by default. If you want to process the logic by yourself, see Event Message Structure for CKafka Trigger.
- This feature is provided based on the SCF service that provides a free tier. For more information on the fees for excessive usage, see the billing rules of SCF.

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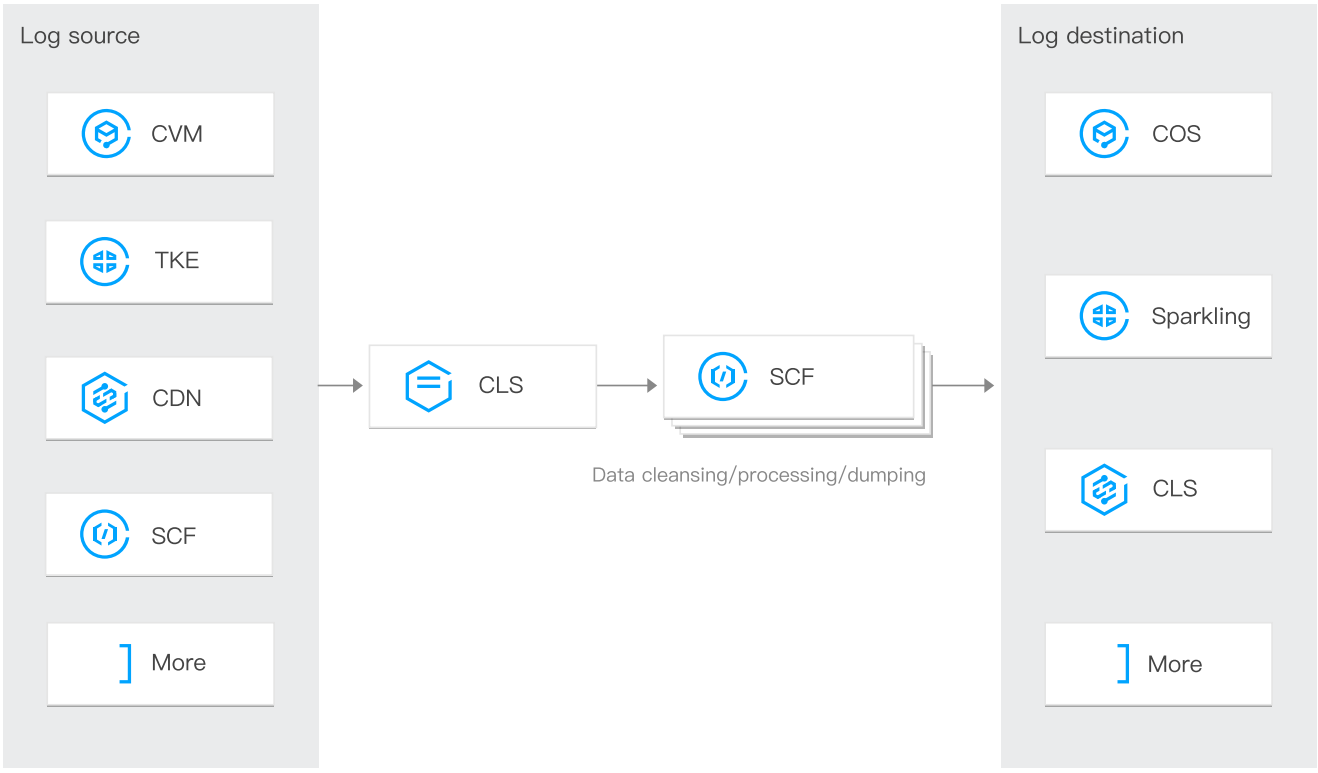
CLS

CLS Function Processing Overview

Last updated：2020-12-21 15:02:17

Through the function processing service, you can quickly complete complex log processing tasks such as execution log collection, ETL (extraction-transformation-loading), and message dumping for various Tencent Cloud services like CVM. Function processing is an async process. All data collected into CLS can be delivered to SCF for consumption and processing through configurations. You only need to complete simple configurations in the CLS console to connect CLS to SCF.

The source log data can be submitted to SCF through a CLS trigger, and then data processing and analysis, event triggering, and auto scaling can be implemented through function computing of Serverless Framework. The entire workflow requires no OPS and is pay-as-you-go as shown below:



Advantages of Function Processing

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- Data can be collected, stored, processed, analyzed, and displayed in a one-stop manner.
- Log processing tasks are fully managed and can be triggered regularly and retried automatically.
- More and more built-in function templates are added to reduce the development costs for log processing in popular use cases.
- Data processing logic and custom code logic are provided based on SCF.
- Computing power is provided based on SCF, with features such as auto scaling, OPS-free usage, and pay-as-you-go billing.

Multi-scenario Function Processing Practices

CLS can send data in a log topic to SCF for processing through a CLS trigger to satisfy the needs of various use cases such as log processing and log cleansing, as detailed below:

Function Processing Scenario	Description
Log ETL	Log data is cleansed, processed, or transformed through SCF
CLS data dump to CKafka	Log data is cleansed and delivered to CKafka through SCF
CLS data dump to COS	Log data is cleansed and delivered to COS through SCF
CLS data dump to ES	Log data is delivered to ES through SCF

⚠ Note：

Data is delivered to SCF, which incurs corresponding computation fees. For billing details, please see Billing Overview.

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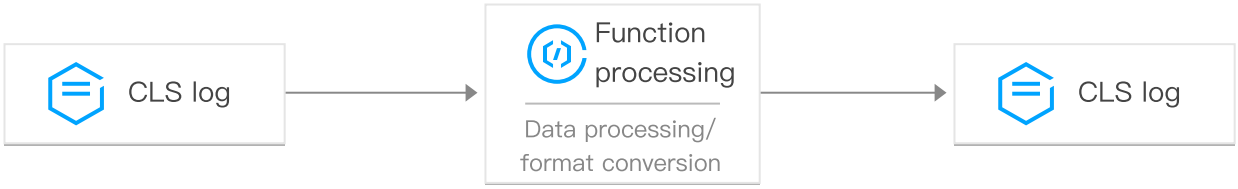
Log ETL

Last updated：2022-12-28 10:54:19

Overview

This document describes how to use SCF to process CLS logs. CLS is mainly used for log collection, while SCF mainly provides node computing capabilities for data processing.
The data flow is as follows:



Directions

Creating logset and topic

1. Log in to the CLS console and click **Log Topic** on the left sidebar.
2. On the logset management page, select the region of the logset at the top.
3. Click **Create Log Topic** and enter relevant information in the **Create Logset** pop-up window:
   - Log Topic Name: enter `project_test` for example.
   - Logset Name: enter `nginx` for example.
4. Click **OK**.
5. The log topic is successfully added, and you will be redirected to the log topic management

Note：
As both the source and destination of data ETL are CLS, you need to create at least two topics.

Creating SCF function

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1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creation page and configure the following parameters:
   - **Function name**: enter "CLSdemo".
   - **Runtime environment**: select **Python 2.7**.
   - **Creation method**: select **Function Template**.
   - **Fuzzy search**: enter "CLSLogETL" and search.
3. Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.
4. After configuring the basic information, click **Next** to enter the function configuration page.
5. Keep the default function configuration and click **Complete** to complete the function creation.

Configuring CLS trigger

1. Log in to the Serverless console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the region and namespace where the function for which to configure a CLS trigger resides.
3. Click the function name to enter the function details page.
4. On the function details page, select **Trigger Management** on the left to enter the trigger browsing and operation page. Click **Create a Trigger** to create a trigger.
5. Add the created function in the **Create a Trigger** pop-up window
6. After completing the trigger configuration, click **Submit** to create the trigger.

Testing function

1. Download the log file in the test sample, extract `demo-scf1.txt` , and import it to the source CLS service.
2. Switch to the Serverless console to view the execution result.
   Select the **Log Query** tab on the function details page to view the printed log information
3. Switch to the target CLS service to view the data processing result.

> Note：
> You can write specific data processing methods as needed.

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SCF +CLS Dump to CKafka

Last updated：2023-06-05 16:18:07

Overview

This document describes how to use SCF to dump CLS logs to CKafka. CLS is mainly used for log collection, SCF mainly provides node computing capabilities for data processing, and CKafka mainly provides terminal dumping capabilities for data streams. For the data processing flowchart, please see Function Processing Overview.

Directions

Creating logset and topic

1. Log in to the CLS console and click **Log Topic** on the left sidebar.
2. On the logset management page, select the region of the logset at the top.
3. Click **Create Log Topic** and enter relevant information in the **Create Logset** pop-up window:

- Log Topic Name: enter `project_test` for example.

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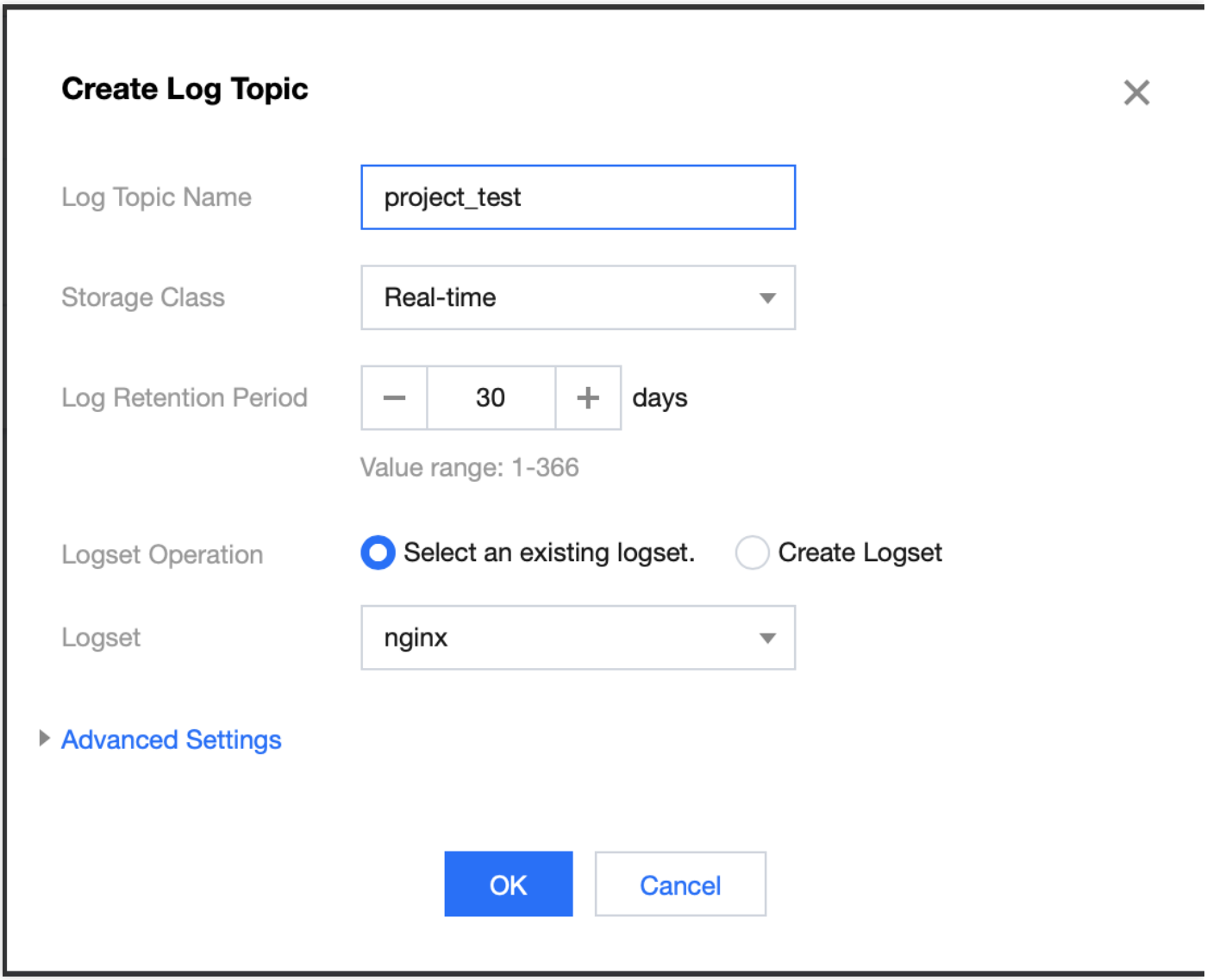
- Logset Name: enter `nginx` for example.



4. Click **OK**.

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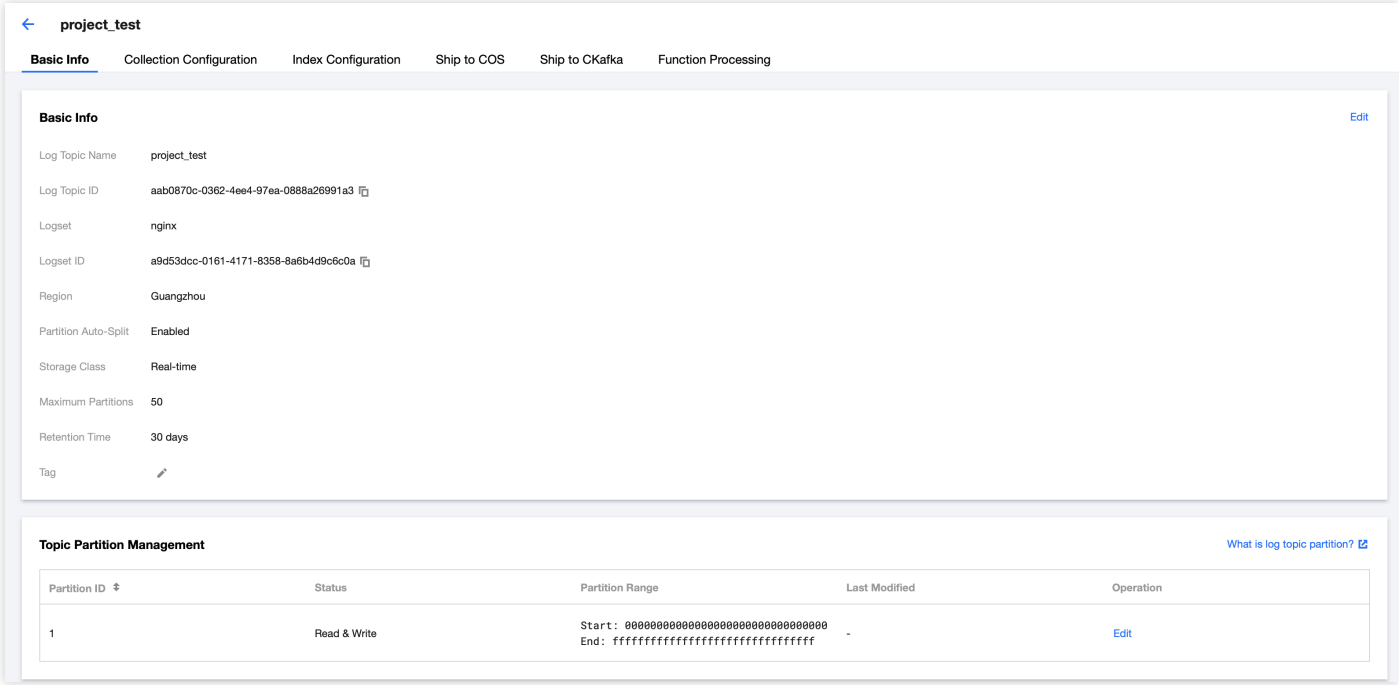
5. The log topic is successfully added, and you will be redirected to the log topic management page as shown below:



Creating SCF function

1. Log in to the Serverles console and enter the function service page.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creation page and configure the following parameters:

- **Function name**: enter "CLSdemo".
- **Runtime environment**: select **Python 2.7**.
- **Creation method**: select **Function Template**.
- **Fuzzy search**: enter "CLSToCkafka" and search.

3. Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.
4. After configuring the basic information, click **Next** to enter the function configuration page.
5. Keep the default function configuration and click **Complete** to complete the function creation.

> Note：
> You should select the same VPC and subnet of CKafka for the created function on the "Function Configuration" page as shown below:

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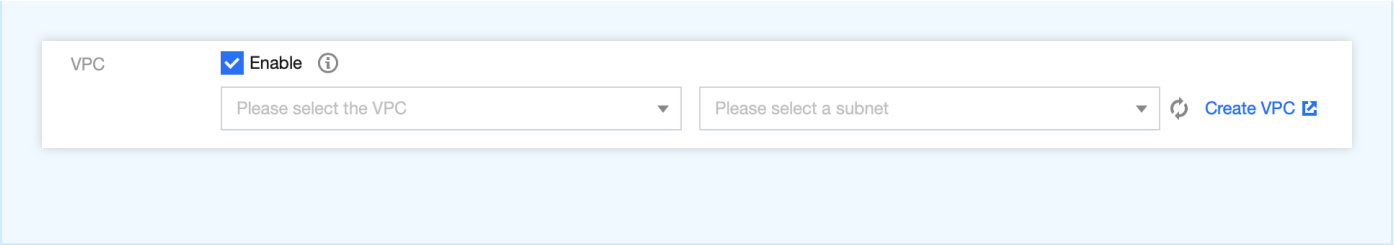
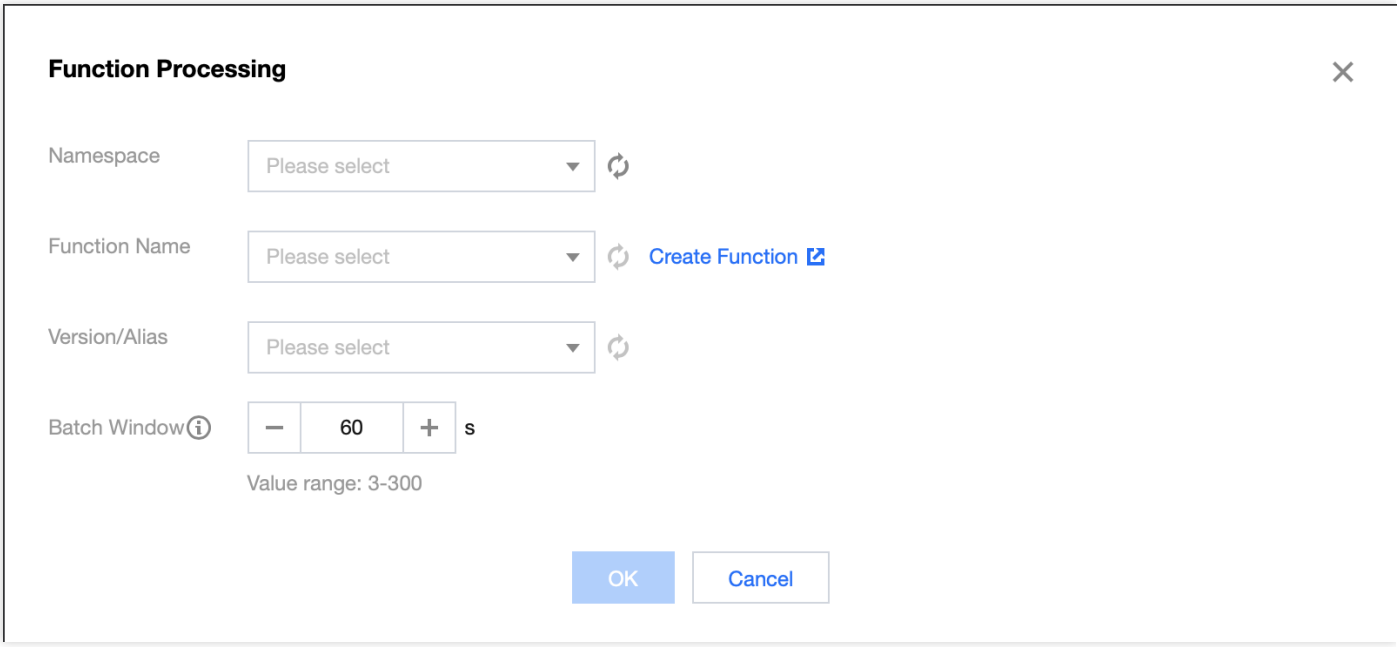


Configuring CLS trigger

1. Log in to the CLS console and click **Log Topic** on the left sidebar.
2. Find the created logset (such as "project_test") and click **View** in the **Operation** column on the right to enter the logset details page.
3. On the log topic details page, select **Function Processing** and click **Create** in the top-right corner. Add the created function in the pop-up "Function Processing" window as shown below:



The main parameter information is as follows. Keep the remaining configuration items as default:

- **Namespace**: select the function namespace.
- **Function name**: select the function created in the Creating SCF function step.
- **Alias**: select a function alias.
- **Maximum waiting time**: configure the longest waiting time for a single event pull. Default value: 60s.

Testing function

1. Download the log file in the test sample, extract `demo-scf1.txt` , and import it to the source CLS service.
2. Switch to the Serverless console to view the execution result.
   Select the **Log Query** tab on the function details page to view the printed log information as shown below:

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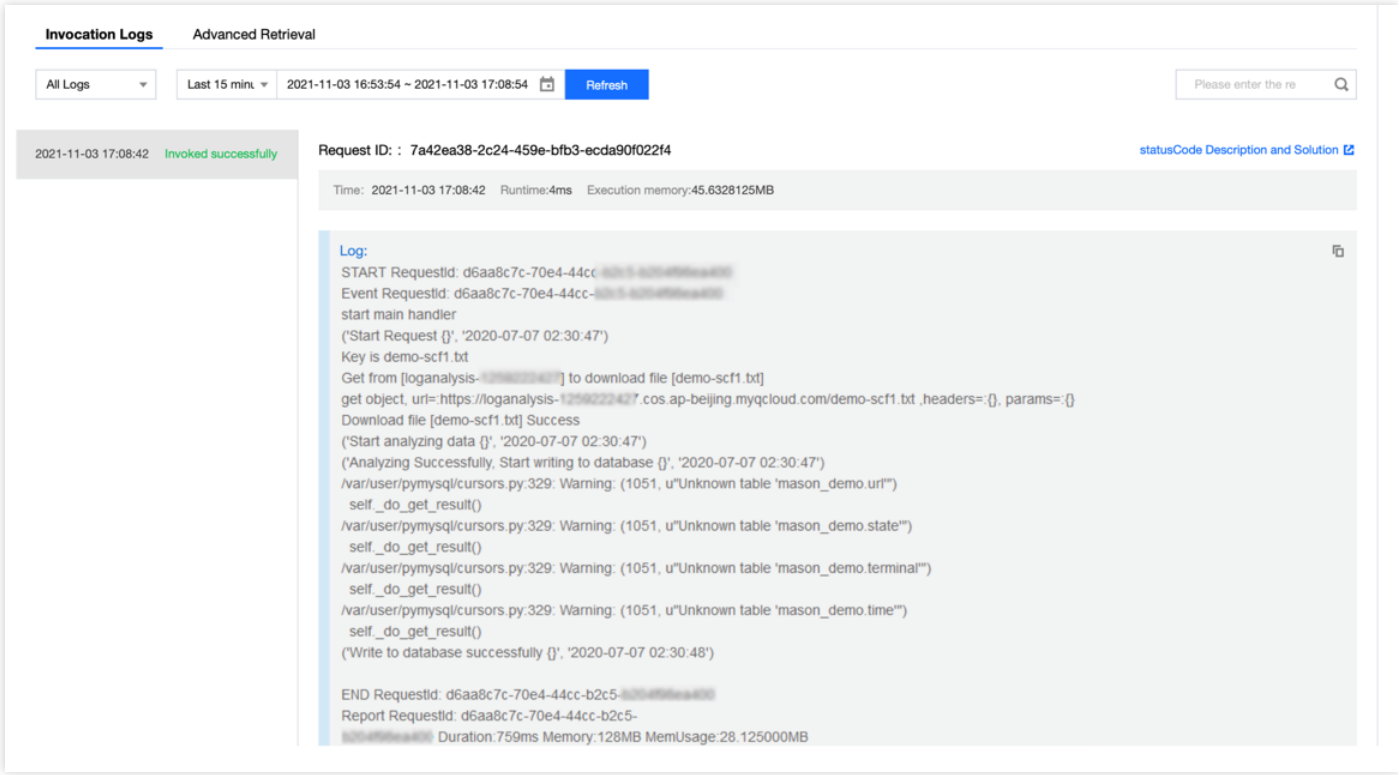

3. Log in to the CKafka console to view the data dumping and processing result.

> Note：
> You can write specific data processing methods as needed.

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SCF +CLS Dump to COS

Last updated：2023-06-05 16:09:59

Overview

This document describes how to use SCF to dump CLS logs to COS. CLS is mainly used for log collection, SCF mainly provides node computing capabilities for data processing, and COS mainly provides persistent data storage capabilities. For the data processing flowchart, please see Function Processing Overview.

Directions

Creating logset and topic

1. Log in to the CLS console and click **Log Topic** on the left sidebar.
2. On the logset management page, select the region of the logset at the top.
3. Click **Create Log Topic** and enter relevant information in the **Create Logset** pop-up window:
   - Log Topic Name: enter `project_test` for example.

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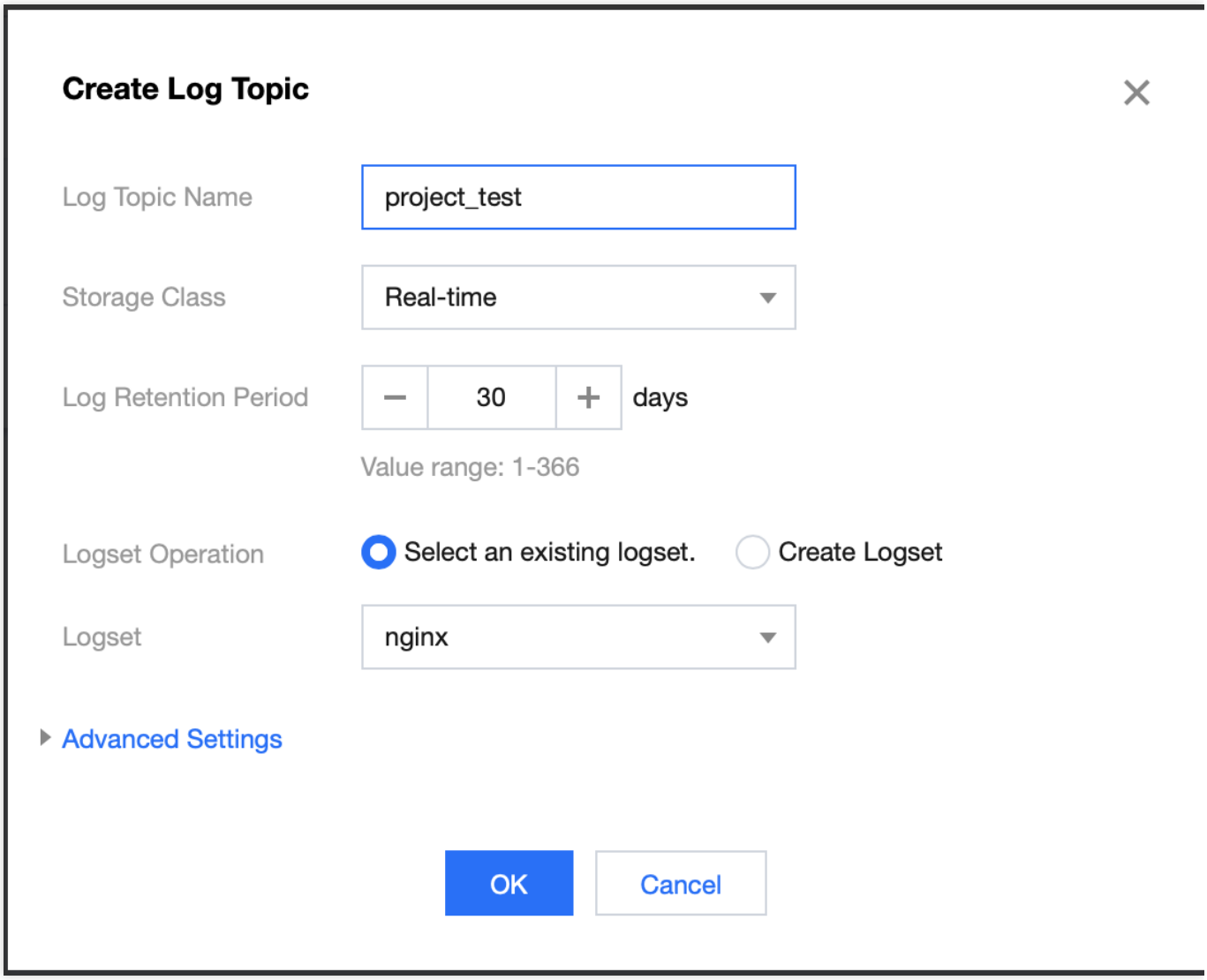
- Logset Name: enter `nginx` for example.



4. Click **OK**.

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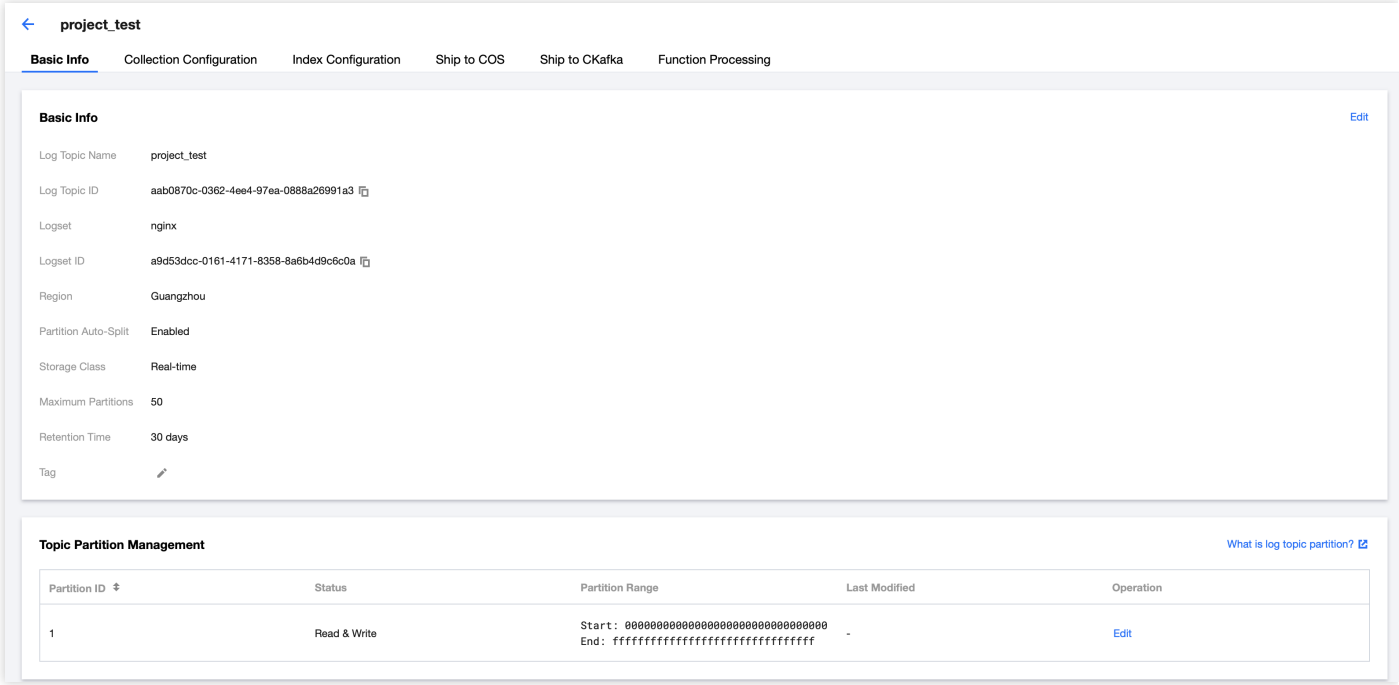
5. The log topic is successfully added, and you will be redirected to the log topic management page as shown below:



Creating SCF function

1. Log in to the Serverless console and enter the function service page.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creation page and configure the following parameters:

- **Creation method**: select **Template**.
- **Fuzzy search**: enter "CLSSCFCOS" and search.

3. Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

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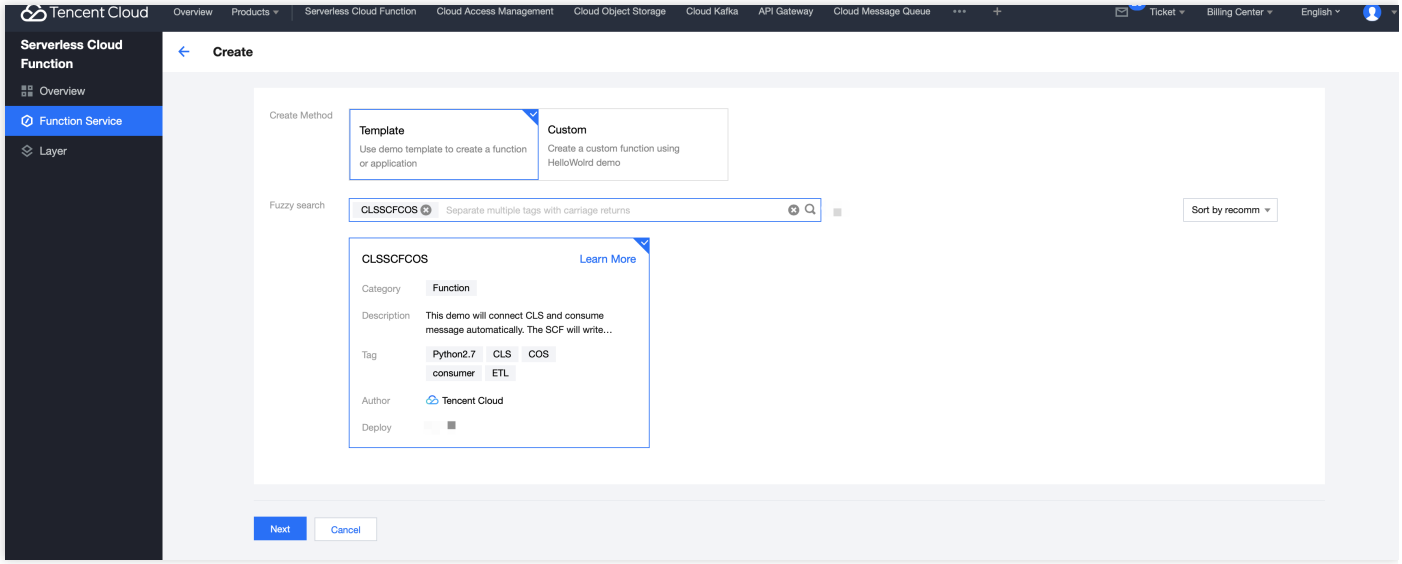

4. After configuring the basic information, click **Next** to enter the function configuration page.
   - **Function name**: enter "CLSdemo".
   - Select the **Beijing** region.
5. Keep the default function configuration and click **Complete** to complete the function creation.

Configuring CLS trigger

1. Log in to the CLS console and click **Logset** on the left sidebar.
2. Find the created logset and click **View** in the **Operation** column on the right to enter the logset details page.
3. On the log topic details page, select **Function Processing** and click **Create**. Add the created function in the pop-up "Function Processing" window as shown below:

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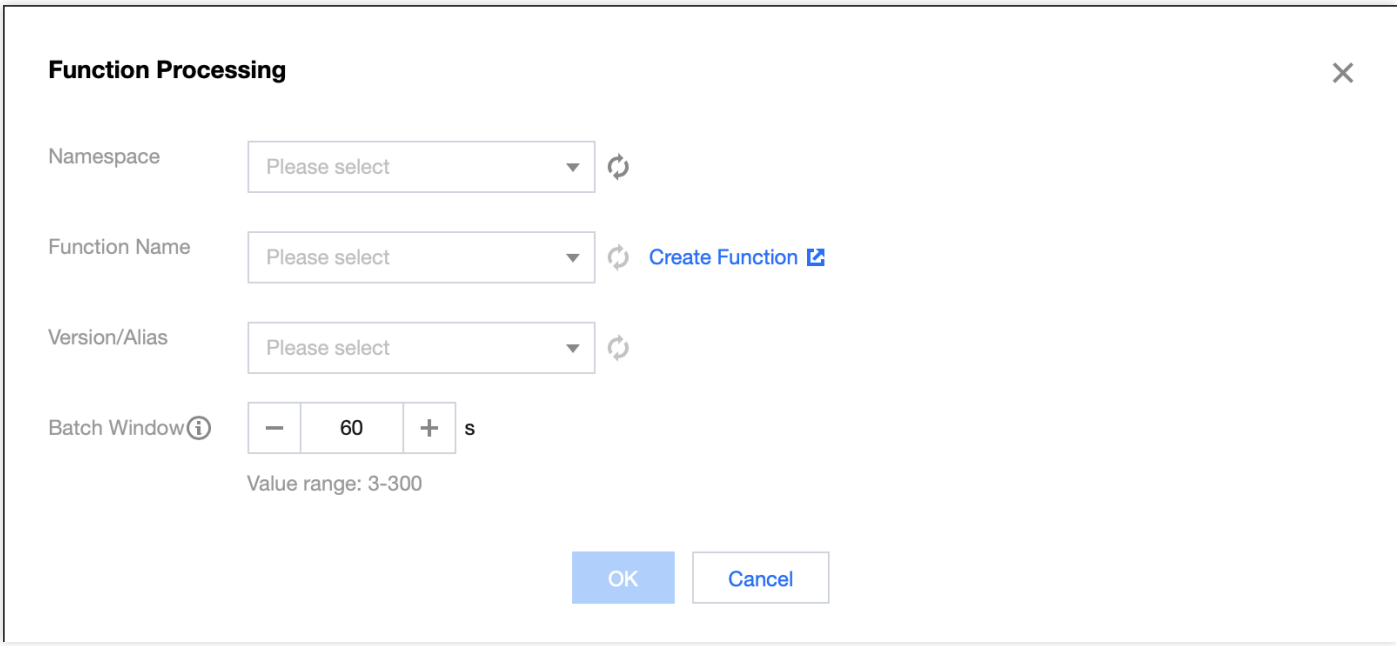

The main parameter information is as follows. Keep the remaining configuration items as default:

- **Namespace**: select the function namespace.
- **Function name**: select the function created in the Creating SCF function step.
- **Alias**: select a function alias.
- **Maximum waiting time**: configure the longest waiting time for a single event pull. Default value: 60s.

Testing function

1. Download the log file in the test sample, extract `demo-scf1.txt` , and import it to the source CLS service.
2. Switch to the Serverless console to view the execution result.

   Select the **Log Query** tab on the function details page to view the printed log information as shown below:

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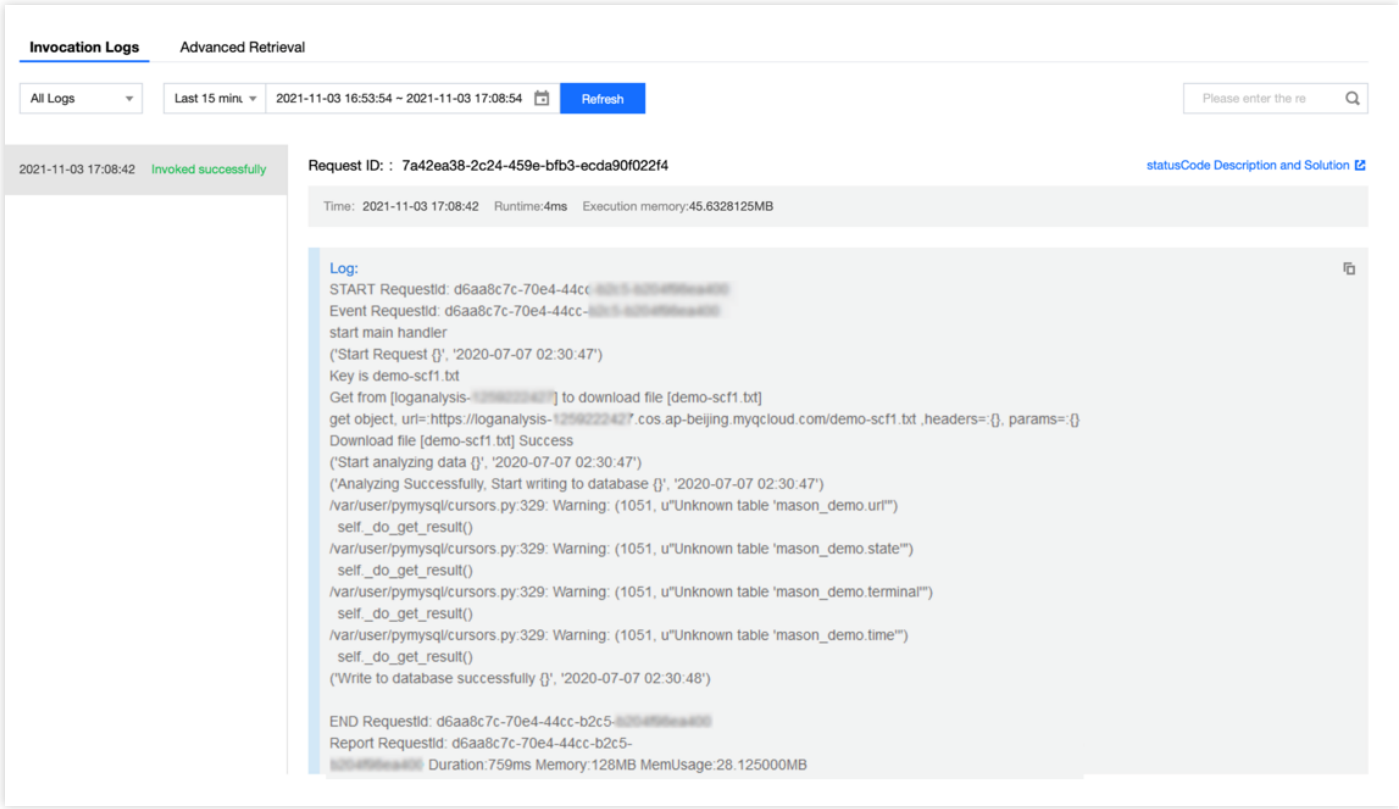

3. Log in to the COS console to view the data dumping and processing result.

> Note：
> You can write specific data processing methods as needed.

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Dumping Logs to ES with SCF + CLS

Last updated：2023-05-05 15:44:04

Scenario

This document describes how to use SCF to dump CLS logs to ES. CLS is mainly used for log collection, and SCF mainly provides node computing capabilities for data processing. For the data processing flowchart, see Function Processing Overview.

Directions

Creating logset and topic

1. Log in to the CLS console, and click **Log Topic** on the left sidebar.
2. On the logset management page, select the region of the logset at the top.
3. Click **Create Log Topic** and enter relevant information in the **Create Logset** pop-up window:
Log Topic Name: Enter `project_test` for example.
Logset Name: Enter `nginx` for example.

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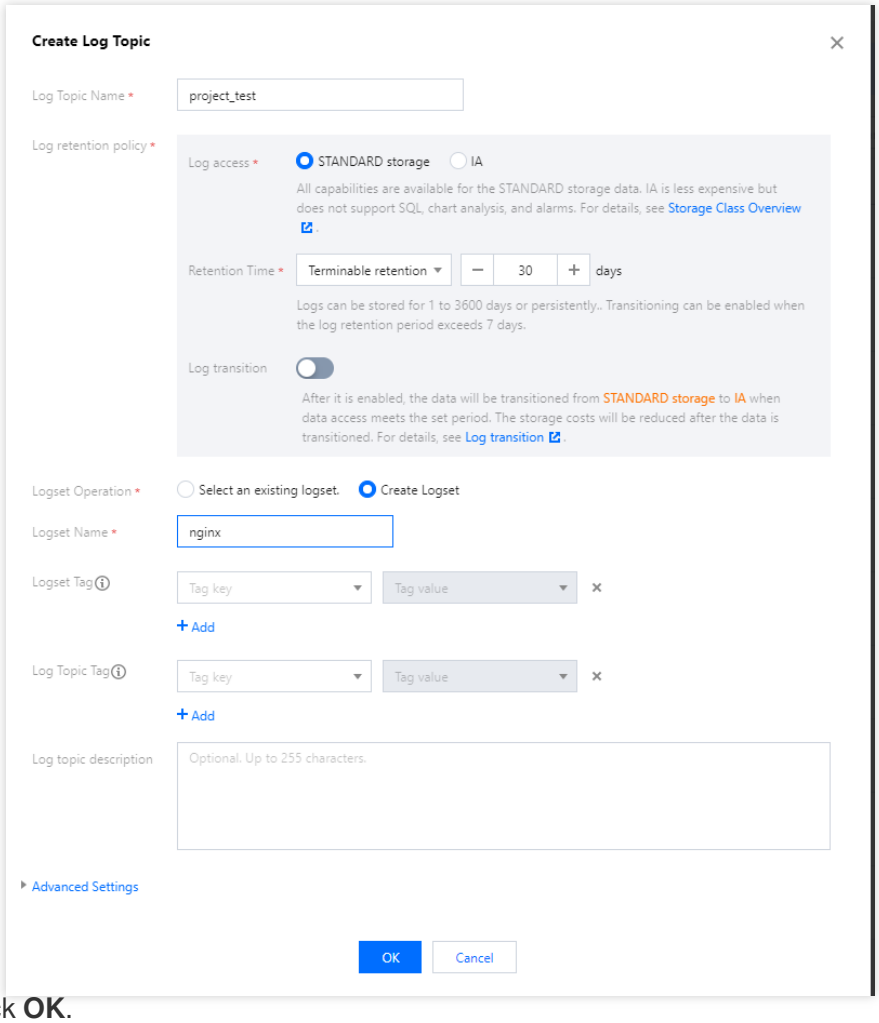

4. Click **OK**.

5. The log topic is successfully added, and you will be redirected to the log topic management page.

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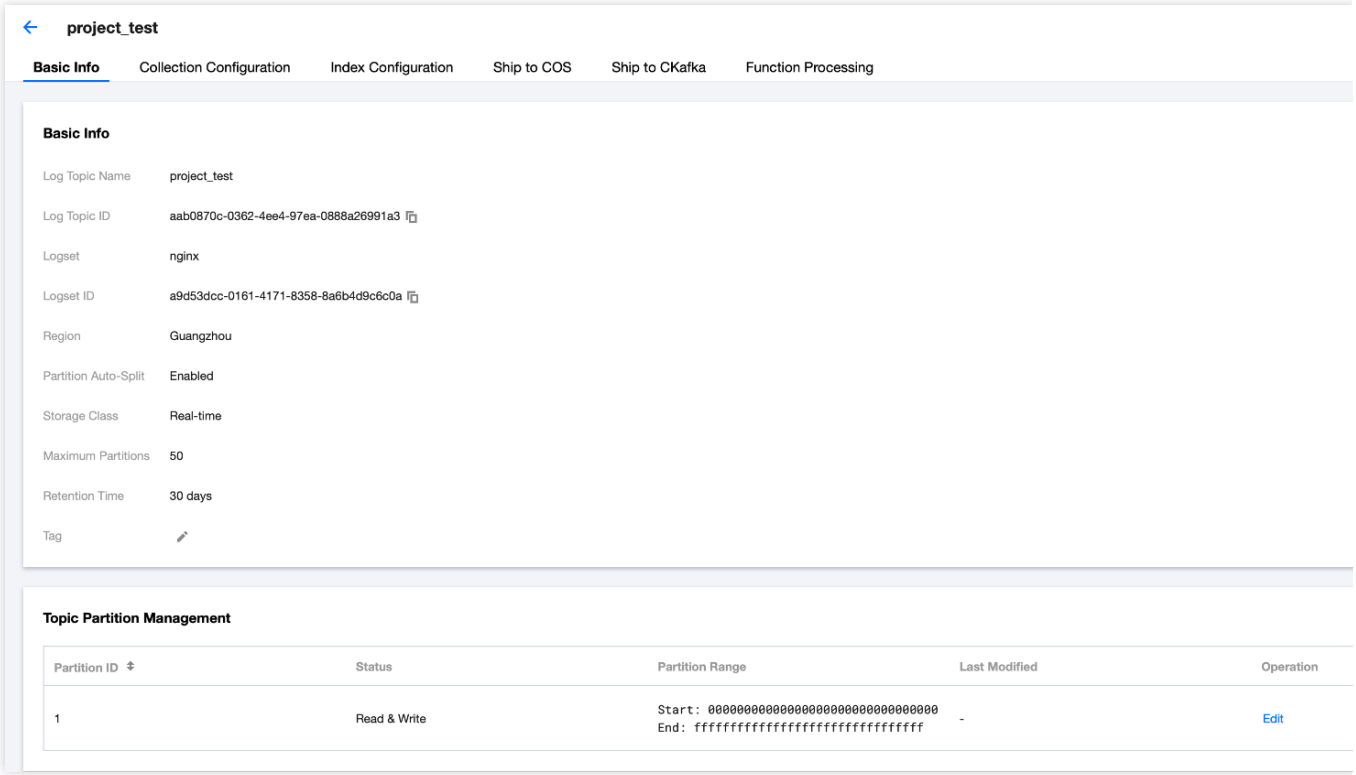

Creating an SCF function

1. Log in to the SCF console and enter the **Functions** page.

2. At the top of the **Functions** page, select the **Beijing** region and click **Create** to go to the function creating page and configure the following parameters:

Creation method: Select **Template**.

Fuzzy search: Enter **CLSToElasticsearch** and search.

3. You can click **Learn more** in a template to view its details or download the template. Click **Next** to enter the **Function configuration** page.

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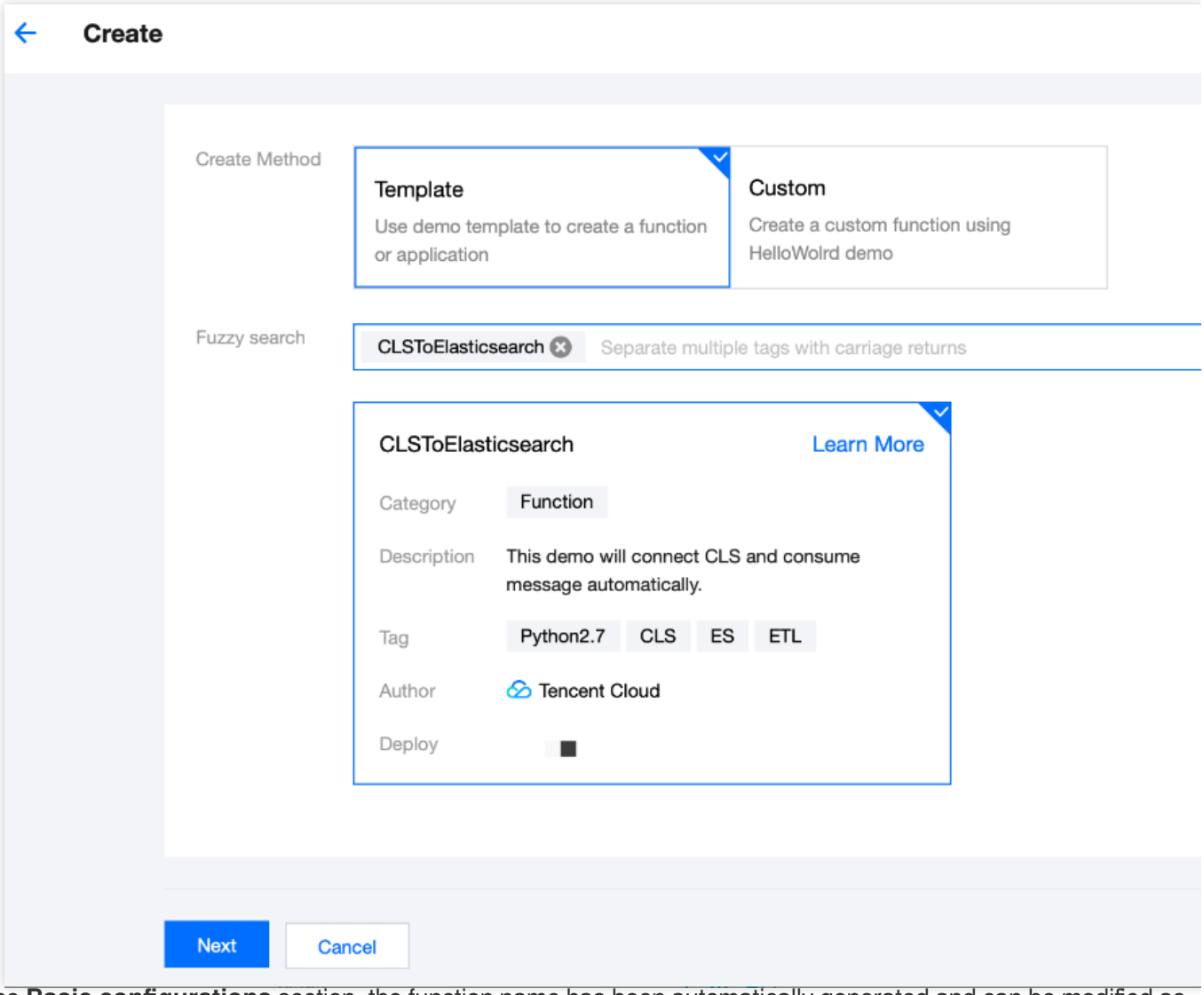
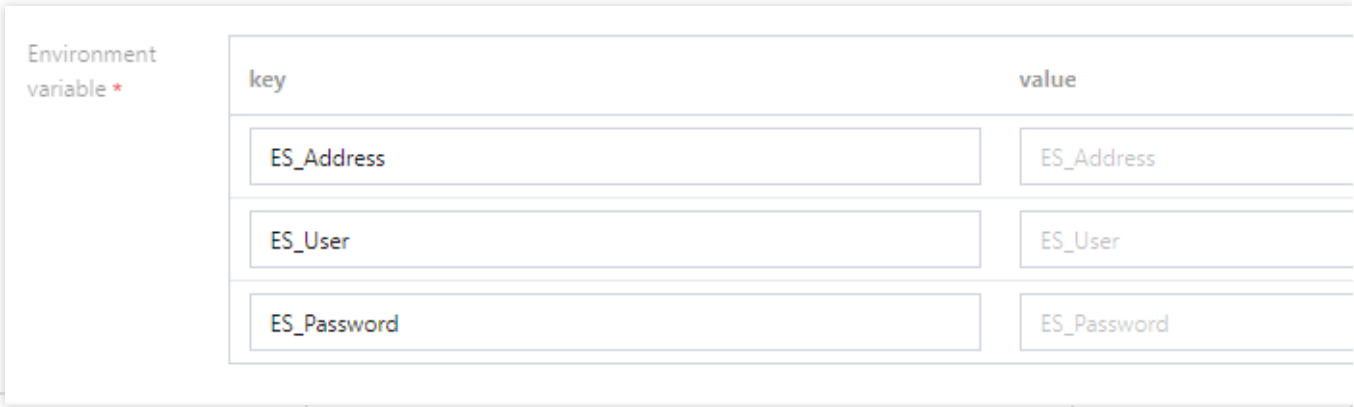


4. In the **Basic configurations** section, the function name has been automatically generated and can be modified as needed. Follow the prompts to configure environment variables and execution role.

Environment variable: Add the following environment variables and configure them.



key	value	Required/Optional
ES_Address	ES service address	Yes

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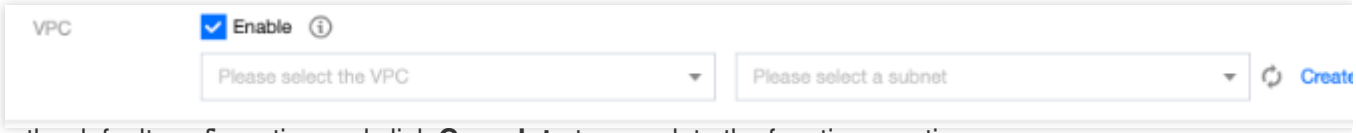
ES_User	ES username, which is `elastic` by default.	Yes
ES_Password	ES password.	Yes

Execution Role: Select **Enable** and click **Configure and use SCF template role**.

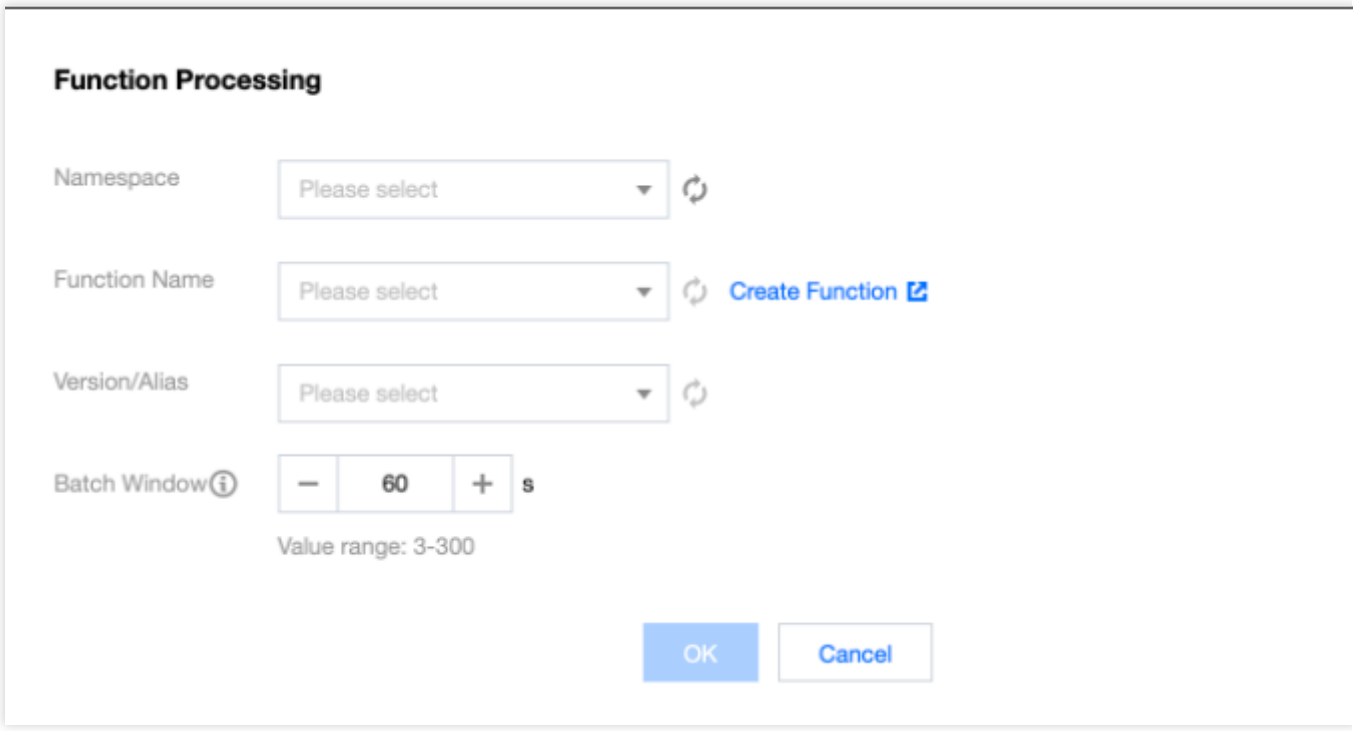
5. In **Network configuration**, select **Enable** for **VPC**, and select the same VPC and subnet as Elasticsearch.



6. Keep the default configuration and click **Complete** to complete the function creation.

Configuring CLS triggers

1. Log in to the CLS console and click **Logset** on the left sidebar.
2. Locate the existing logset you want, and click **View** under **Operation** on the right to go to the logset details page.
3. On the log topic details page, select **Function Processing** and click **Create**. Add the created function in the **Function Processing** pop-up window.



The main parameter information is as follows. Use the default values for the remaining configuration items.

Namespace: Select the function namespace.

Function name: Select the function created in the Creating SCF function step.

Alias: Select a function alias.

Max waiting time: Configure the longest waiting time for a single event pull. Default value: 60s.

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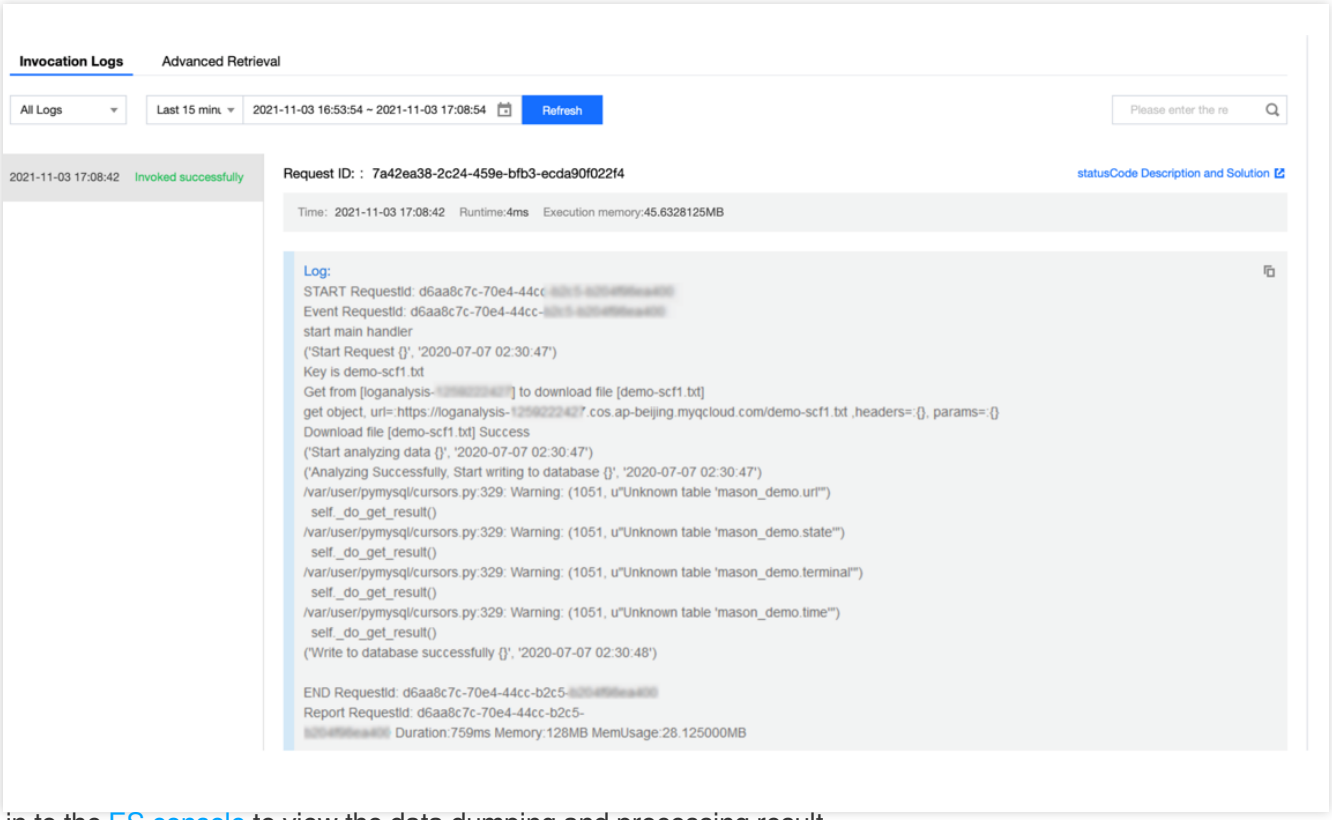
Testing the function

1. Download the log file in the test sample, extract `demo-scf1.txt` , and import it to the source CLS service.
2. Go to the SCF console to view the execution result.

Select the **Log Query** tab on the function details page to view the printed log information.



3. Log in to the ES console to view the data dumping and processing result.

Note

You can write specific data processing methods as needed.

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CLB Practice
Using SCF and CLB to Quickly Deploy Web Service

Last updated：2021-11-01 14:32:53

Overview

This document describes how to use CLB as the access entry of a serverless service and work with SCF to quickly deploy a web service. In this way, you can enjoy the strengths of Serverless services, such as low cost and OPS-free usage, and smoothly migrate your application to the cloud.

Directions

Creating VPC

Log in to the VPC console to create a VPC and subnet as instructed in Building Up an IPv4 VPC.

> Note
> The VPC should be deployed in the same region as the CLB instance and SCF webpage. This document uses **Shanghai** as an example.

Creating CLB instance

1. Log in to the CLB console to create a CLB instance as instructed in Getting Started with CLB.
   This document uses **Shanghai** as an example. Select the VPC created in the previous step.
2. After successful creation, find the target CLB instance on the **Instance Management** page and configure a listener for it as instructed in Configuring an HTTP Listener.
   This document uses the listener `clb-scf-web` and listening protocol port number `81` as an example.

Creating SCF function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Shanghai** region and click **Create** to enter the function creating page.

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Set the following parameter information and click **Next** as shown below:

- **Creation Method**: select **Template**.
- **Fuzzy Search**: enter "Web static page hosting" and "Python3.6" and search.

  Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

3. In **Basic Configuration**, enter the **function name** and select the **function region**.
   - Function Name: enter `clb-scf-web` for example.
   - Region: select the region of the CLB instance, such as **Shanghai**.
4. In **Trigger Configuration**, select **Custom Creation** and use the trigger to bind CLB to SCF.
   - Triggered Version: select **Default Traffic**.
   - Trigger Method: select **CLB Trigger**.
   - Instance ID: select the CLB instance created in the previous step, such as `clb_serverless_web` .
   - Listener: select the configured listener. In this example, the listener listens on port `81` .
   - Domain Name/Host: select **Create Rule**.
   - Add Domain Name: enter the VIP of the CLB instance in the added domain name.

     > Note
     > The VIP is the IP address through which CLB provides service to clients.

   - URL Path: enter the URL path of the website starting with `/` , such as `/demo` .
5. Click **Complete** to redirect to the **Deployment Log** page and view the function and trigger creation progress.

Testing CLB entry

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, click the created function `clb-scf-web` .
3. On the function details page, select **Trigger Management**.
4. On the **Trigger Management** page, get the trigger access path and view the webpage.

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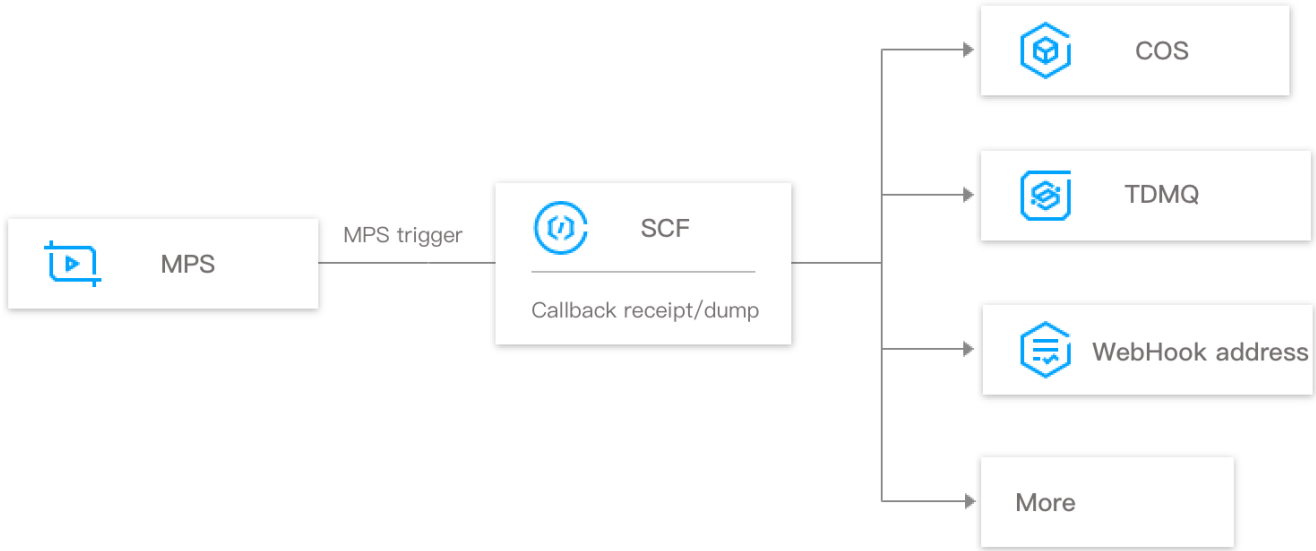
MPS

MPS Function Processing Overview

Last updated：2021-01-22 17:55:10

Through the function processing service, you can quickly process and operate on the callback events generated by MPS. Events are pushed to SCF through an MPS trigger, and then callback event processing and response are implemented through function computation of Serverless Framework.
The overall data processing flow is as shown below:



Function Processing Practices

CLS can send data in a log topic to SCF for processing through an MPS trigger to satisfy the needs of various use cases, such as video event notification, status monitoring, and alarm processing as detailed below:

Function Processing Scenario	Description
Video task callback backup to COS	Backs up task callbacks generated by MPS to COS through SCF promptly
Video task callback notification	Receives MPS data messages in real time and pushes them through WeCom,

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tool	email, etc.

⚠ Note：

Data is delivered to SCF, which incurs corresponding computation fees. For billing details, please see SCF Billing Overview.

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Video Task Callback Backup to COS

Last updated：2021-03-19 15:15:23

Overview

This document describes how to use SCF to back up task callbacks generated by MPS to COS. SCF is mainly used to process callback information, MPS is mainly used for video processing tasks, and COS mainly provides persistent storage capabilities.

Directions

Creating function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creating page and configure the function.
   - **Creation method**: select **Template**.
   - **Fuzzy search**: enter "MPS_SCF_COS" and search.
     Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.
3. Click **Next**. The function name is automatically generated by default and can be modified as needed.

Configuring MPS trigger

1. In the **Trigger Configurations** section, select **Custom** and enter relevant information according to the displayed parameters.
   - **Triggered Version**: select **Default Traffic**.
     - **Trigger Method**: select **MPS Trigger**.
     - **Event Type**: select **Workflow Task**.

> **Note：**
>
> - When creating an MPS trigger for the first time, you need to click **SCF_QcsRole** and **MPS_QcsRole** to authorize the relevant service role.
> - **Event type**: an MPS trigger pushes events in the account-level event type. Currently, two event types are supported: workflow task (`WorkflowTask`) and video editing task (`EditMediaTask`).

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- **Event processing**: an MPS trigger uses events generated at the service level as the event source, regardless of attributes such as region and resources. Only one single function can be bound to each event type for each account. If you need multiple functions to handle a task, please see SDK for Node.js.

2. Click **Complete**.

Testing function

1. Log in to the MPS console and execute a video processing workflow.
2. On the **Function Service** page in the SCF console, click the name of the function created in the Creating function step above to enter the function details page.
3. Select the **Log Query** tab on the function details page to view the printed log information.
4. Log in to the COS console to view the data dumping and processing result.

> **Note：**
>
> You can write specific data processing methods as needed.

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Video Task Callback Notification Tool

Last updated：2021-03-19 15:15:23

Overview

This document describes how to use SCF to push MPS callback information. SCF is mainly used to process callback information, while MPS is mainly used for video processing tasks.

Directions

Creating function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creating page and configure the function.
   - **Creation method**: select **Template**.
   - **Fuzzy search**: enter "MPSWebhookDemo" and search.
     Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.
3. Click **Next**. The function name is automatically generated by default and can be modified as needed.

Configuring MPS trigger

1. In the **Trigger Configurations** section, select **Custom** and enter relevant information according to the displayed parameters.
   - **Triggered Version**: select **Default Traffic**.
   - **Trigger Method**: select **MPS Trigger**.
   - **Event Type**: select **Workflow Task**.

> **Note：**
>
> - When creating an MPS trigger for the first time, you need to click **SCF_QcsRole** and **MPS_QcsRole** to authorize the relevant service role.
> - **Event type**: an MPS trigger pushes events in the account-level event type. Currently, two event types are supported: workflow task (`WorkflowTask`) and video editing task (`EditMediaTask`).

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- **Event processing**: an MPS trigger uses events generated at the service level as the event source, regardless of attributes such as region and resources. Only one single function can be bound to each event type for each account. If you need multiple functions to handle a task, please see SDK for Node.js.

2. Click **Complete**.

Testing function

1. Log in to the MPS console and execute a video processing workflow.
2. On the **Function Service** page in the SCF console, click the name of the function created in the Creating function step above to enter the function details page.
3. Select the **Log Query** tab on the function details page to view the printed log information.
4. Switch to **WeCom** to view the callback notification result.

Note：

You can write specific data processing methods as needed.

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CDN
SCF + CDN for Scheduled Prefetch/Purge

Last updated：2022-01-23 16:23:15

Scheduled purge/prefetch tasks can be triggered through SCF. Such tasks are included in the daily purge/prefetch quota and may fail to be executed if the quota is exceeded.

Configurations

Log in to the CDN console, select **Plugin Center** on the sidebar, click the scheduled purge/prefetch plugin feature block, and enable scheduled purge/prefetch to enter the task configuration page. After this feature is enabled, you can also click **Basic Configuration** at the bottom of the block to enter the scheduled purge/prefetch task list page for configuration.

On the **Create Scheduled Task** page, select the desired task type, set the cron scheduling expression (see the example below), enter the corresponding purge/prefetch URLs, and perform SCF authorization. Then, the system can automatically generate the corresponding SCF function and trigger the task as scheduled.

> Note：
> Do not delete this function in the SCF console.

On the task status page, you can view the last execution of the scheduled task.

Cron Expression

A cron expression contains seven values separated by spaces.

Value	Field	Value Range	Wildcard
1	Second	An integer between 0 and 59	, - * /
2	Minute	An integer between 0 and 59	, - * /
3	Hour	An integer between 0 and 23	, - * /

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Value	Field	Value Range	Wildcard
4	Day	An integer between 1 and 31 (the number of days in the month needs to be considered)	, - * /
5	Month	An integer between 1 and 12 or JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, or DEC	, - * /
6	Day of week	An integer between 0 and 6 or MON, TUE, WED, THU, FRI, SAT, or SUN, where 0 means Monday, 1 means Tuesday, and so on	, - * /
7	Year	An integer between 1970–2099	, - * /

Wildcards have the following meanings:

Wildcard	Description
, (comma)	It represents the union of characters separated by commas; for example, 1, 2, 3 in the "Hour" field means 1:00, 2:00 and 3:00
- (hyphen)	It contains all values in the specified range; for example, in the "Day" field, 1-15 contains the 1st to the 15th day of the specified month
* (asterisk)	It means all values; for example, in the "Hour" field, * means every o'clock
/ (forward slash)	It specifies the increment; for example, in the "Minute" field, you can enter 1/10 to specify repeating every ten minutes from the first minute on (e.g., at the 11th minute, the 21st minute, the 31st minute, and so on)

Note：
When both the "Day" and "Week" fields in a cron expression are specified, they are in an "or" relationship, i.e., the conditions of both are effective separately.

Example

One-Time task

- `33 22 11 6 7 * 2021` means triggering the task at 11:22:33 on July 6, 2021.
- `00 00 20 25 10 * 2021` means triggering the task at 20:00:00 on October 25, 2021.

Periodic task

- `*/5 * * * * * *` means triggering the task once every 5 seconds.

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- `0 0 2 1 * * *` means triggering the task once at 2 AM on the 1st day of every month.
- `0 15 10 * * MON-FRI *` means triggering the task once every day at 10:15 AM Monday through Friday.
- `0 0 10,14,16 * * * *` means triggering the task once every day at 10 AM, 2 PM, and 4 PM.
- `0 */30 9-17 * * * *` means triggering the task once every half hour from 9 AM to 5 PM every day.
- `0 0 12 * * WED *` means triggering the task once at 12:00 noon every Wednesday.

Billing Description

The scheduled purge/prefetch feature is free of charge. However, it will call SCF to create scheduled tasks, which may incur SCF fees if the free tier of SCF is exceeded. For more information, see Free Tier.

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CDWPG
SCF + CDWPG for CKafka Data Import

Last updated：2023-03-14 15:54:10

Overview

This document introduces a free-of-maintenance approach to import Kafka data to Cloud Data Warehouse PostgreSQL instances by using SCF.

Cloud Data Warehouse PostgreSQL (CDWPG) can sync messages from the messaging middleware for analysis.

Limits

- Only Tencent Cloud CKafka is supported as the data source. External Kafka services are not supported.
- One function can only import data to one table in CDWPG. To write data into multiple tables, you need to create one function for each table.

Directions

Step 1. Create a function

In the SCF console, select **Functions** > **Create**. In the **Create** page, enter **ckafka** and **CDW** in the **Fuzzy search** field, complete the settings and click **Next**.

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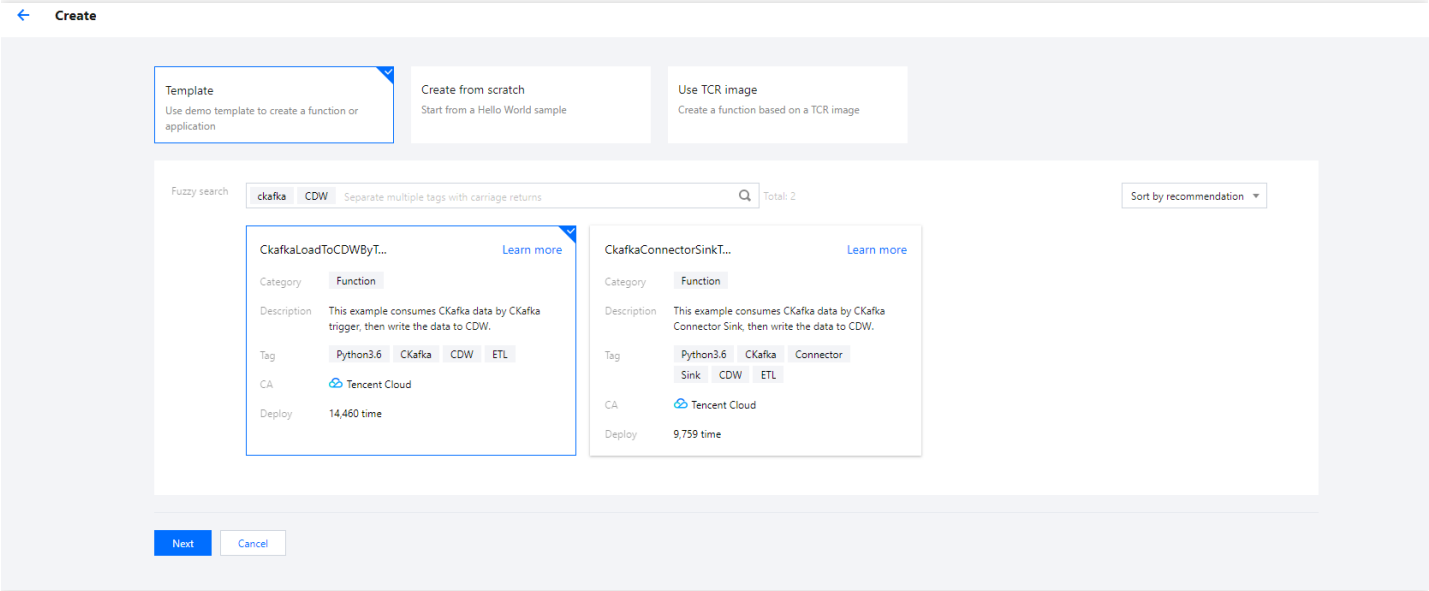

On the **Function configuration** page, complete the settings in **Environment configuration** and **Network configuration** in **Advanced configuration** as follows:

- **Environment configuration**
- Memory: Set the memory based on the actual running status, which is 128 MB by default. If it is insufficient during data import, you should increase it.
- Environment variable:

Parameter	Required	Description
DB_DATABASE	Supported	Database name
DB_HOST	Supported	If the function is deployed in a VPC and in the same subnet as CDWPG, you can enter the private IP of CDWPG; otherwise, enter the public IP and configure an allowlist.
DB_USER	Supported	Username
DB_PASSWORD	Supported	User password
DB_SCHEMA	Supported	Schema name. If it is not specified during table creation, it will be `public` in general.
DB_TABLE	Supported	Table name
DB_PORT	No	CDWPG port, which is 5436 by default.

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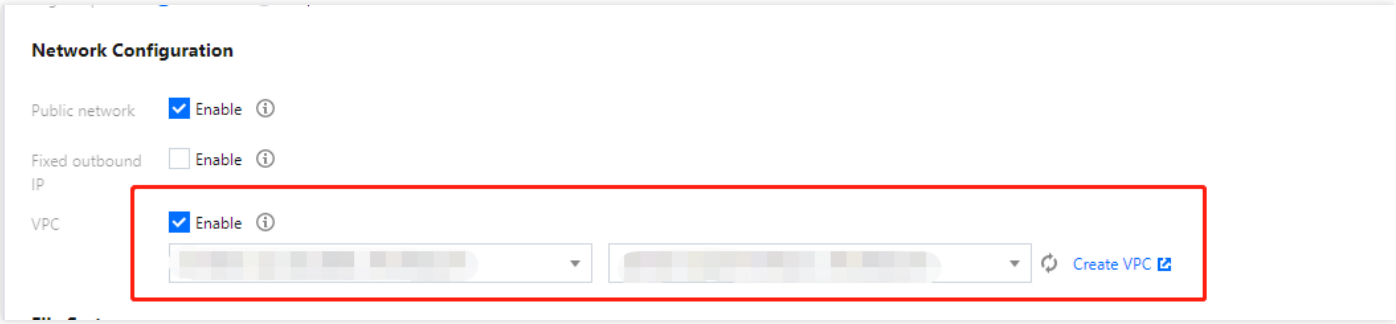
Parameter	Required	Description
MSG_SEPARATOR_ASCII	No	ASCII code of the data delimiter in CKafka, which is 39 (comma) by default. As commas usually show up in the business data, we recommend you set this parameter to 11 (vertical bar).
MSG_NULL	No	NULL value of CKafka consumption. The default value is `\N`
REPLACE_0X00	No	Whether to replace "0x00" in strings. The default value is 0 (1 indicates to replace).
ENABLE_DEBUG	No	Whether to print error records. The default value is 0 (1 indicates to print).
ENABLE_COS	No	Whether to dump unwritten records to COS. The default value is 0 (1 indicates to dump).
COS_SECRET_ID	No	`secret_id` for COS access. If `ENABLE_COS` is 1, this field is required.
COS_SECRET_KEY	No	`secret_key` for COS access. If `ENABLE_COS` is 1, this field is required.
COS_BUCKET	No	COS bucket name. If `ENABLE_COS` is 1, this field is required.
STATMENT_TIMEOUT	No	Query timeout period, which is 50 seconds by default.

- **Network configuration**
- VPC: **Activate** VPC and set the same VPC and subnet values as those of the CDWPG instance.



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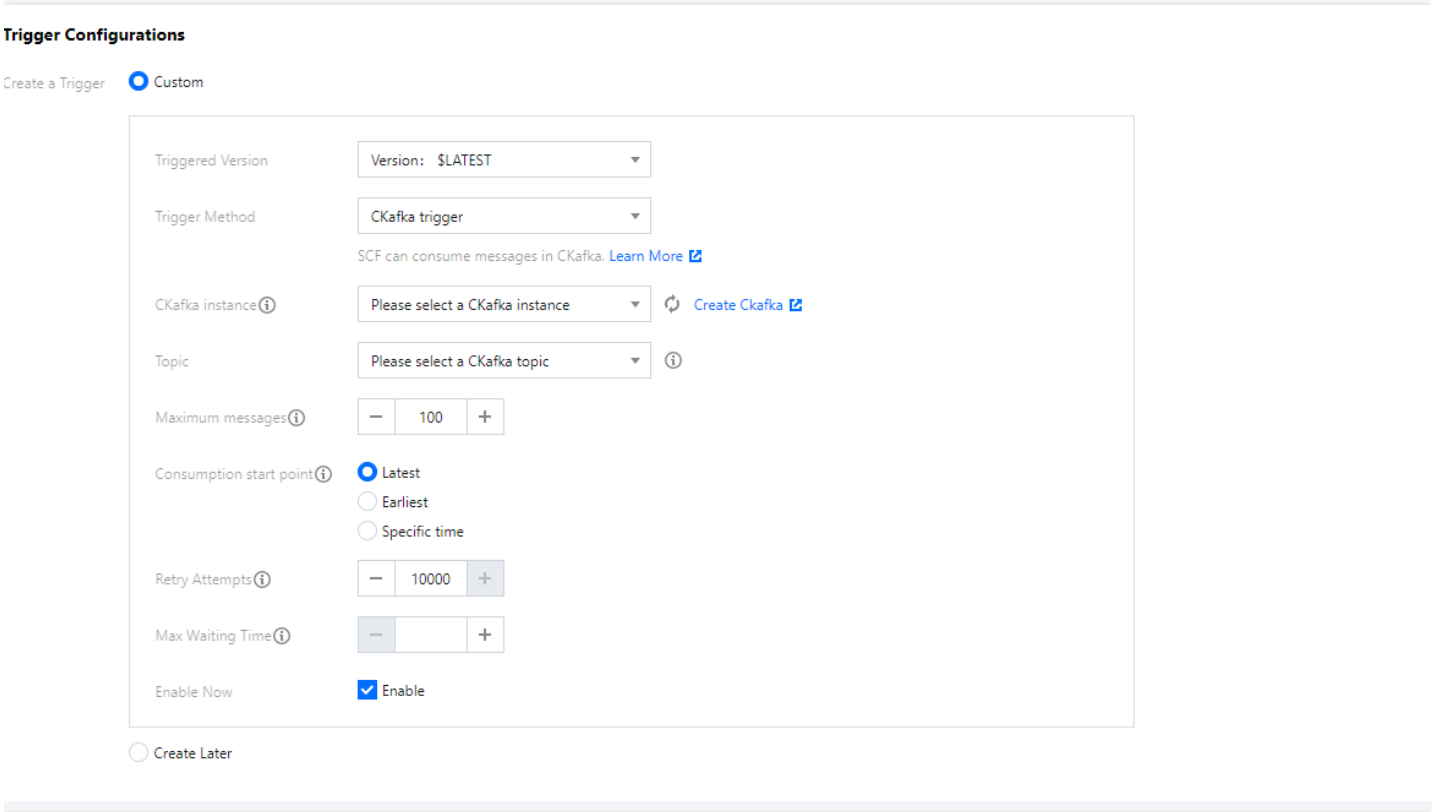
The corresponding values in CDWPG are as shown below:

- Public Network Access: **Enable**

Step 2. Configure a trigger

In the **Functions** list in the SCF console, click the name of the newly created function to enter the function details page and click **Trigger management** > **Create trigger** on the left to create a trigger. Here, set **CKafka trigger** for **Trigger method**.



For details of trigger settings, see CKafka Trigger Description.

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VOD
SCF + VOD for Event Notification Receipt

Last updated：2022-01-23 16:11:24

Overview

Demo features

This document uses the video upload and transcoding process as an example to describe how to use the event notification mechanism of VOD.

Architecture and process

An HTTP service is built based on SCF in the demo to receive event notification requests from VOD. It initiates video transcoding and gets the transcoding result by processing `NewFileUpload` (video upload completion) and `ProcedureStateChanged` (task flow status change) event notifications.

The system mainly involves four components: console, API Gateway, SCF, and VOD. Here, API Gateway and SCF are the deployment objects of this demo.

The specific business process is as follows:

1. Upload a video to VOD in the console.
2. The VOD backend initiates the `NewFileUpload` event notification request to the demo.
3. The demo parses the event notification content and calls the ProcessMedia API of VOD to initiate transcoding for the uploaded video with the `100010` and `100020` preset transcoding templates.
4. After completing the transcoding task, VOD initiates the `ProcedureStateChanged` event notification request to the demo.
5. The demo parses the event notification content and prints the URL of the transcoding output file into SCF logs.

> Note：
> The SCF code in the demo is developed based on Python 3.6. SCF also supports other programming languages such as Python 2.7, Node.js, Go, PHP, and Java for your choice as needed. For more information, please see Development Guide.

Fees

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The VOD event notification receipt service demo provided in this document is open-source and free of charge, but it may incur the following fees during service building and use:

- Fees for purchasing a Tencent Cloud CVM instance to run the service deployment script. For more information, please see Instance Billing Modes.
- Fees for using signature distribution service provided by SCF. For more information, please see Billing Mode and Free Tier.
- Fees for using Tencent Cloud API Gateway to provide public network APIs for SCF. For more information, please see Billing Overview.
- Fees for VOD storage of uploaded videos. For more information, please see Pay-as-You-Go (Postpaid Daily Billing Cycle).
- Fees for VOD video transcoding. For more information, please see Pay-as-You-Go (Postpaid Daily Billing Cycle).

Avoiding affecting production environment

The business logic of the event notification receipt service demo uses the VOD event notification mechanism; therefore, you need to set the event notification address during deployment. If there is already a VOD-based production environment under your account, changing the event notification address may cause business exceptions. **Before doing so, please confirm that this will not affect the production environment. If you are not sure, please use a new account to deploy the demo.**

Quickly Deploying Event Notification Receipt Service

Step 1. Prepare a CVM instance

The deployment script needs to be executed on a CVM instance meeting the following requirements:

- Region: not limited.
- Model: the minimum official configuration (1 CPU core and 1 GB memory) is sufficient.
- Public network: a public IP is required, and the bandwidth should be at least 1 Mbps.
- Operating system: official public image `Ubuntu Server 16.04.1 LTS 64-bit` or `Ubuntu Server 18.04.1 LTS 64-bit` .

For detailed directions on how to purchase a CVM instance and reinstall the system, please see Operation Guide - Creating Instances via CVM Purchase Page and Operation Guide - Reinstalling System, respectively.

Note：

- The event notification receipt service demo itself does not depend on CVM but only uses CVM to run the deployment script.

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- If you do not have a CVM instance satisfying the above conditions, you can also run the script on another Linux (such as CentOS or Debian) or macOS server with public network access, but you need to modify certain commands in the deployment script based on the operating system. Please search for the specific modification method by yourself.

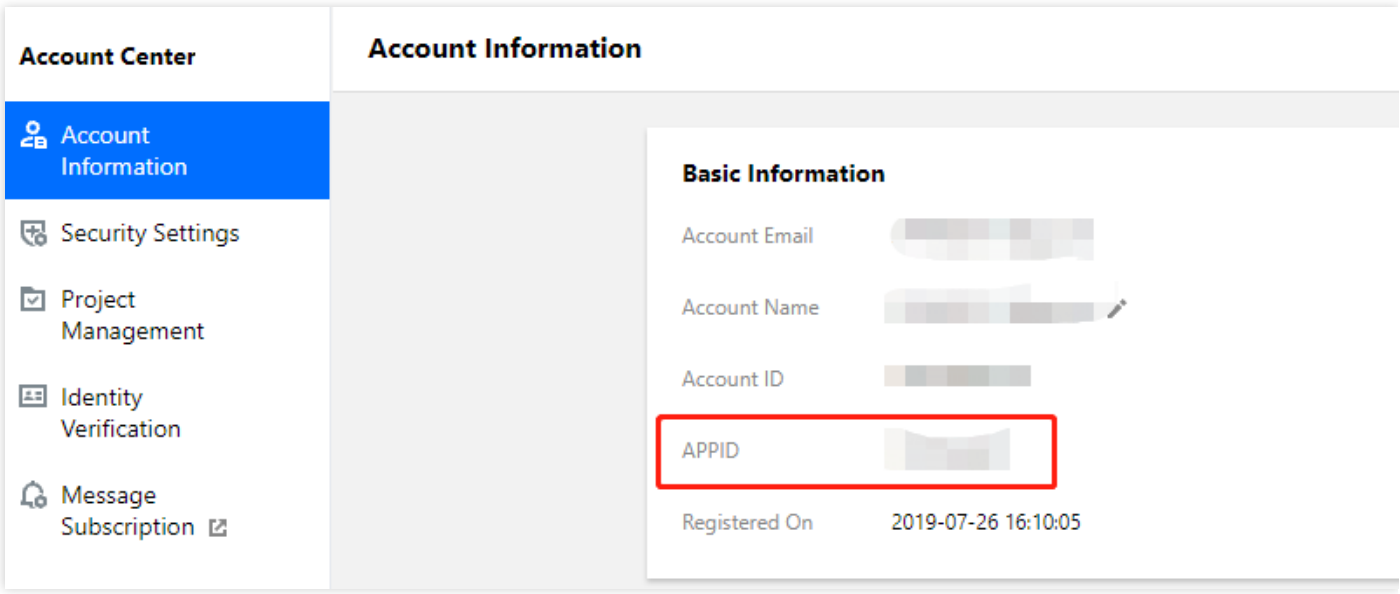
Step 2. Activate VOD

Please activate the VOD service as instructed in Getting Started - Step 1.

Step 3. Get the API key and APPID

Your API key (i.e., `SecretId` and `SecretKey`) and `APPID` are required for deploying and running the event notification receipt service demo.

- If you have not created an API key yet, please generate one as instructed in Root Account Access Key. If you have already created a key, please get it as instructed in the same document.
- You can view the `APPID` on the Account Information page in the console as shown below:



Step 4. Deploy the event notification receipt service

Log in to the CVM instance prepared in step 1 as instructed in Logging into Linux Instance in Standard Login Method and enter and run the following command on the remote terminal:

```
ubuntu@VM-69-2-ubuntu:~$ export SECRET_ID=AKxxxxxxxxxxxxxxxxxxxxxx; export SECRE
T_KEY=xxxxxxxxxxxxxxxxxxxx;export APPID=125xxxxxxx;git clone https://github.com/
tencentyun/vod-server-demo.git ~/vod-server-demo; bash ~/vod-server-demo/installe
r/callback_scf.sh
```

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Note：
Please assign the corresponding values obtained in step 3 to `SECRET_ID`, `SECRET_KEY`, and `APPID` in the command.

This command will download the demo source code from GitHub and automatically run the installation script. The installation process will take several minutes (subject to the CVM network conditions), during which the remote device will print the following information:

```
[2020-06-05 17:16:08] Start installing pip3.
[2020-06-05 17:16:12] pip3 is successfully installed.
[2020-06-05 17:16:12] Start installing Tencent Cloud SCF.
[2020-06-05 17:16:13] SCF is successfully installed.
[2020-06-05 17:16:13] Start configuring SCF.
[2020-06-05 17:16:14] SCF configuration is completed.
[2020-06-05 17:16:14] Start deploying the event notification receipt service of V
OD.
[2020-06-05 17:16:24] The event notification receipt service of VOD is deployed.
[2020-06-05 17:16:26] Service address: https://service-xxxxxxxx-125xxxxxxx.gz.api
gw.tencentcs.com/release/callback
```

Copy the address of the event notification receipt service in the output log (which is `https://service-xxxxxxxx-125xxxxxxx.gz.apigw.tencentcs.com/release/callback` in this example).

Note：
If the following warning is displayed in the output log, it is generally because the CVM instance cannot immediately parse the service domain name deployed just now. You can ignore this warning.

```
> [2020-04-25 17:18:44] Warning: the event notification receipt service fail
ed the test.
>
```

Step 5. Configure the event notification address

As described in Avoiding affecting production environment, please confirm that your business in the production environment does not depend on VOD event notifications before performing the following operations:

Log in to the VOD console, click **Settings**, select **Normal Callback** as the callback mode, enter the event notification receipt service address obtained in step 4 as the callback URL, check all callback events, and click **OK** as shown

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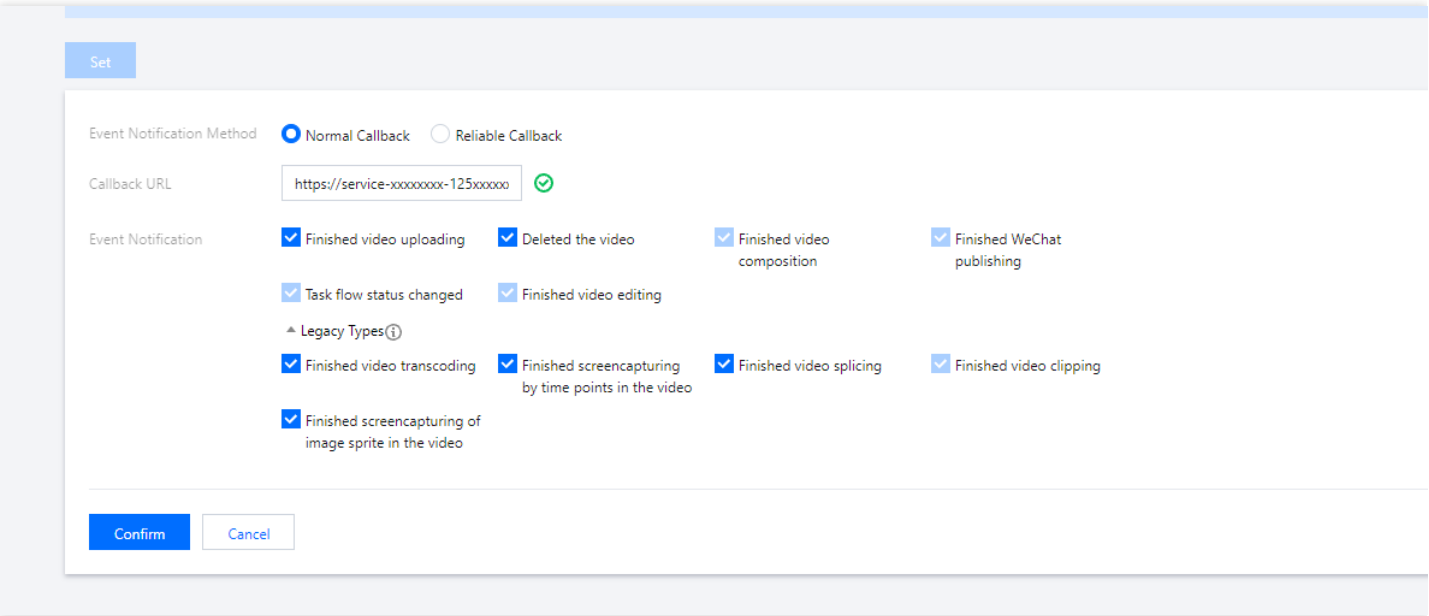
below:

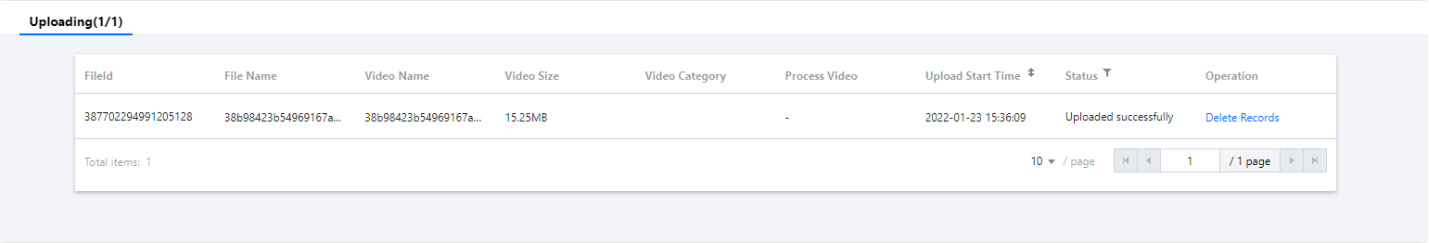


Note：

If two callback URL configuration items (v2.0 format and v3.0 format) are displayed at the same time in the console, please configure the v3.0 one

Step 6. Test the demo

Upload a test video to VOD as instructed in Uploading Video - Local Upload. Select the default option "No Processing After Upload" during the upload. After the upload is completed, you can see that the video status is "Processing" on the "Uploaded" tab, which indicates that the demo has received the `NewFileUpload` event notification and initiated a transcoding request.



Wait for the video processing to complete (indicated by the "Normal" status), click **Quick View**, and you can see that there are two output videos for the uploaded video on the right of the page as shown below:

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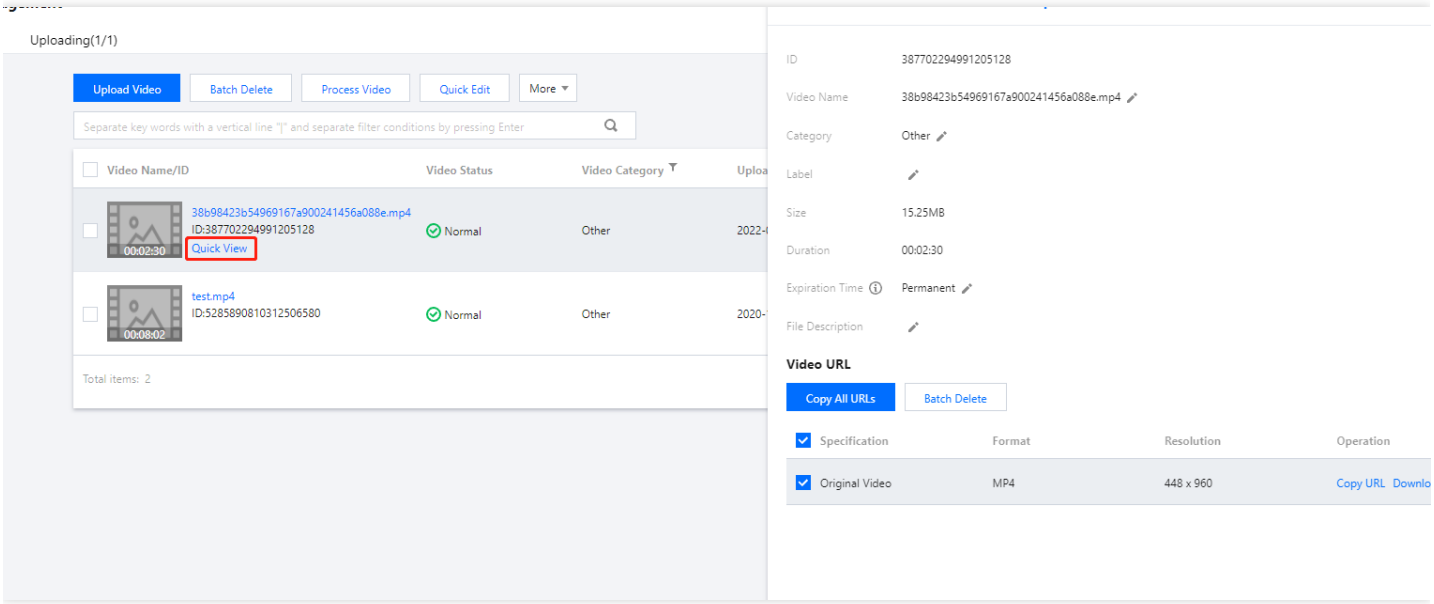
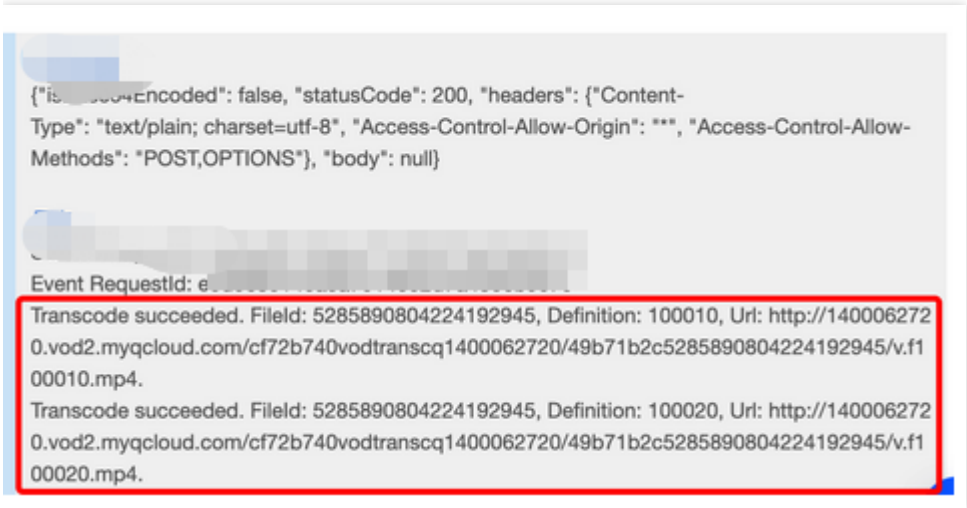


Log in to the SCF console and enter the log page to view the SCF logs. In the latest log, you can see that the URLs of the two output files have been printed out. In actual use cases, you can use SCF to record the URLs in your database or publish them to viewers through other channels.



Note：
SCF log generation may have a certain delay. If no logs are displayed on the page, please wait for one or two minutes and click **Reset** to refresh.
)

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System Design Description

API protocol

The event notification receipt function uses API Gateway to provide APIs. For the specific API protocols, please see Video Upload Completion and Task Flow Status Change.

Event notification receipt service code interpretation

1. `main_handler()` is the entry function.
2. Call `parse_conf_file()` and read the configuration information from the `config.json` file. The configuration items are as described below:

Field	Data Type	Description
secret_id	String	API key
secret_key	String	API key
region	String	TencentCloud API request region, which can be any region for VOD
definitions	Integer Array	Transcoding template
subappid	Integer	Whether the event notification is from a VOD subapplication

3. For `NewFileUpload` event notifications, call `deal_new_file_event()` to parse the request and get the `FileId` of the newly uploaded video from it.

```
if event_type == "NewFileUpload":
fileid = deal_new_file_event(body)
if fileid is None:
return ERR_RETURN
```

4. Call `trans_media()` to initiate transcoding, output the TencentCloud API's response packets to SCF logs, and send the response packets to the event notification service of VOD.

```
rsp = trans_media(configuration, fileid)
if rsp is None:
return ERR_RETURN
print(rsp)
```

5. In `trans_media()`, call the TencentCloud API SDK to initiate the `ProcessMedia` request:

```
cred = credential.Credential(conf["secret_id"], conf["secret_key"])
client = vod_client.VodClient(cred, conf["region"])
method = getattr(models, API_NAME + "Request")
```

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```
req = method()
req.from_json_string(json.dumps(params))
method = getattr(client, API_NAME)
rsp = method(req)
return rsp
```

6. For `ProcedureStateChanged` event notifications, call `deal_procedure_event()` to parse the request to get the transcoding output video URL and print it to SCF logs:

```
elif event_type == "ProcedureStateChanged":
rsp = deal_procedure_event(body)
if rsp is None:
return ERR_RETURN
```

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SMS

SCF + SMS for SMS Verification Code

Last updated：2022-01-23 16:11:24

Sending verification codes through SMS is the most popular and securest way to verify user identities. Currently, SMS verification codes are widely used in various application scenarios such as user registration, password reset, login protection, identity verification, random password generation, and transaction confirmation.
This document uses developing a verification code-enabled login and signup service based on SCF as an example to describe how to implement the SMS verification code feature.

In addition to SCF, you can also use the SendSms API for this purpose.

Preparations

- You have signed up for a Tencent Cloud account and verified your organizational identity.
- You have purchased an SMS package.
- Prepare SMS signature owner qualification certificates. For detailed file list and specifications, please see the signature review standards.
  This document takes a business license as a qualification certificate for example.
- Understand the SMS body content review standards.
- Get the `SDKAppID` of the SMS application.

Reference

- Demo source code
- Other products' documentation
  - VPC documentation
  - TencentDB for Redis documentation
  - SCF documentation

Step 1. Configure SMS content

After an SMS signature or body template is submitted, it will be reviewed within two hours generally. You can configure alarm contacts and set template/signature review notifications to receive review result notifications.

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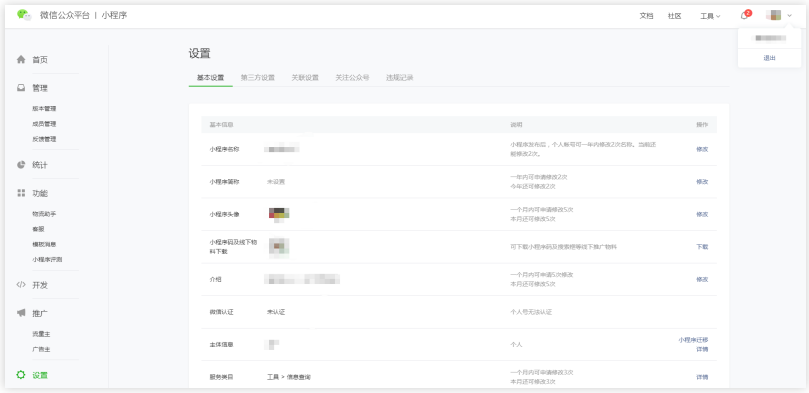
Step 1.1. Create a signature

1. Log in to the SMS console.
2. Select **Chinese Mainland SMS** > **Signature Management** on the left sidebar and click **Create Signature**.
3. Set the following parameters as needed and according to the signature review standards:

Parameter	Sample Value
Signature purpose	For self-use (the signature is a company name, website, product name, or something else verified under the current account)
Signature type	App
Signature content	Test demo
Certificate type	Screenshot of WeChat Mini Program settings page
Certificate upload	

4. Click **OK**.
   Wait for signature review. The SMS signature will be available only after its status changes to **approved**.

Step 1.2. Create a body template

1. Log in to the SMS console.
2. Select **Chinese Mainland SMS** > **Body Templates** on the left sidebar and click **Create Body Template**.
3. Set the following parameters as needed and according to the body template review standards:

Parameter	Sample Value
Template Name	Verification code SMS
SMS type	Regular SMS
SMS content	Your signup verification code is {1}. Please enter it within {2} minutes. If the signup was not initiated by you, please ignore this message.

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4. Click **OK**.
   Wait for body template review. The body template will be available only after its status changes to **approved**.
   Please note down the template ID.

Step 2. Set the SMS delivery rate limit (optional)

> Note：
> Individual users have no permission to modify the rate limit. To use this feature, change "Individual Identity" to "Organizational Identity". For detailed directions, see Identity Verification Change Guide.

To ensure business and channel security and minimize potential financial losses caused by malicious calls of SMS APIs, we recommend you set the SMS delivery rate limit.
This document uses the default SMS delivery rate limit policy as an example.

- For SMS messages with the same content, a maximum of one such message can be sent to the same mobile number within 30 seconds.
- A maximum of 10 messages can be sent to the same mobile number on a calender day.

Step 3. Configure the VPC and subnet

By default, SCF is deployed in the public network and can access public network only. If you need to access Tencent Cloud resources such as TencentDB instances, you need to build a VPC to ensure data and connection security.

1. Plan the network design as needed.
2. Create a VPC. For detailed directions, please see Creating VPC.

> Note：
> The CIDRs of the VPC and subnet cannot be modified after creation.

Parameter	Sample Value
Region	South China (Guangzhou)
Name	Demo VPC
IPv4 CIDR Block	10.0.0.0/16

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Subnet name	Demo subnet
IPv4 CIDR Block	10.0.0.0/16
Availability Zone	Guangzhou Zone 3

Step 4. Configure a TencentDB for Redis instance

The region and subnet AZ of the TencentDB for Redis instance must be the same as those of the VPC configured in step 3.

1. Purchase a TencentDB for Redis instance. For detailed directions, please see Creating TencentDB for Redis Instance.

Parameter	Sample Value
Billing Mode	Pay-as-you-go
Region	Guangzhou
Database version	Redis 4.0
Architecture	Standard architecture
Network	Demo VPC and demo subnet
Instance name	Demo database
Quantity	1

Step 5. Create a function

SCF currently supports development in Python, Node.js, PHP, Java, and Go. This document uses Node.js as an example.

1. Create a function in the region of the VPC created in step 3. For detailed directions, please see Writing Function.

Parameter	Sample Value
Function name	Demo
Runtime environment	Node.js 8.9

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Creation method	Template function: helloworld

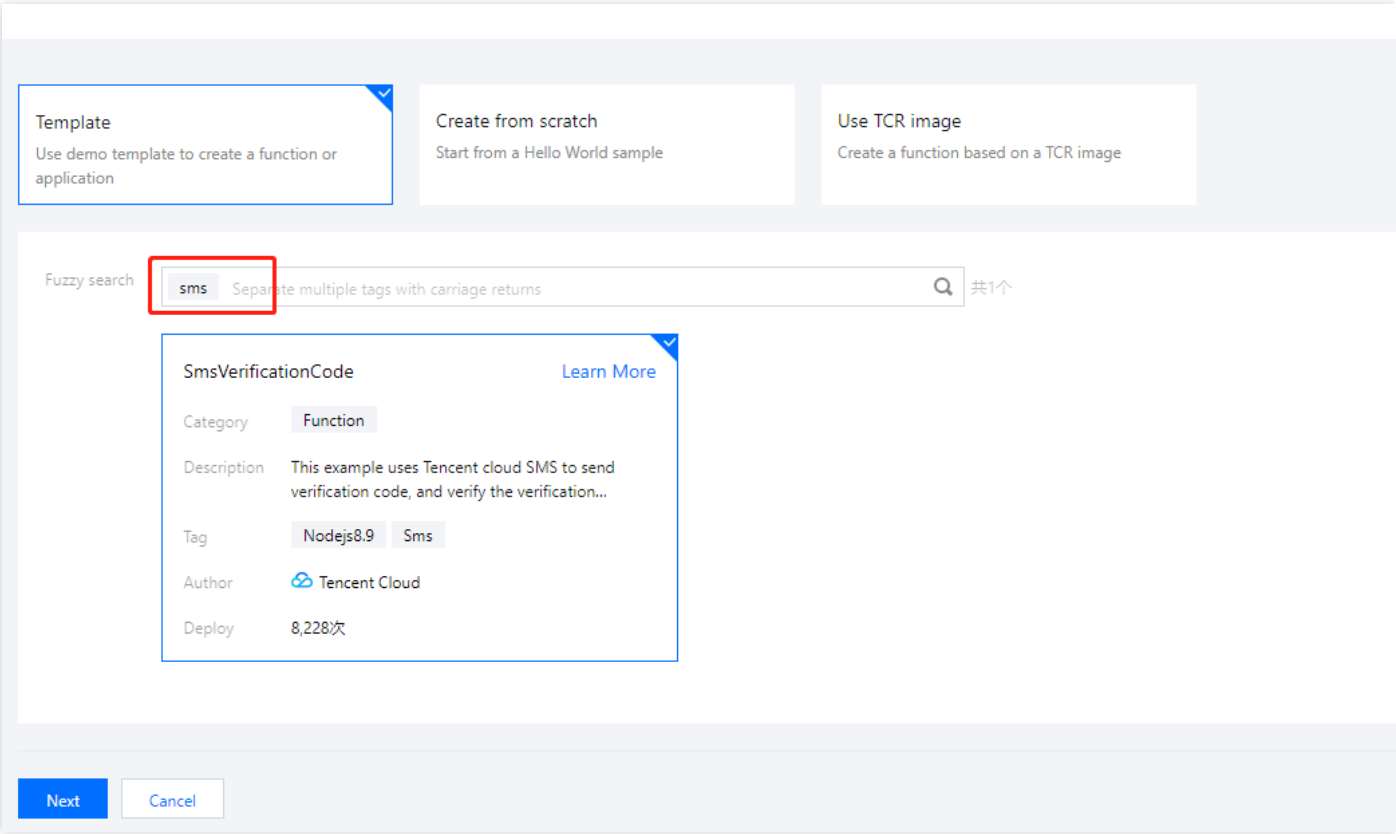
2. Deploy the function and set **API Gateway Trigger** as the trigger. For detailed directions, please see Deploying Function.

Step 6. Enable public network access (optional)

- Functions deployed in a VPC before April 29, 2020 are isolated from the public network by default. If you want them to have access to both private network and public network, you can do so by enabling public network access. Log in to the SCF console, select **Function Service**, click the name of the target function in the function list to enter the function configuration page. Click **Edit**, check **Public Network Access**, and click **Save** to save the configuration.
- Functions deployed on or after April 29, 2020 have public network access enabled by default, and no additional operations are required.

Step 7. Deploy the SMS demo

1. Go to the SCF console and select the SMS demo to deploy it.



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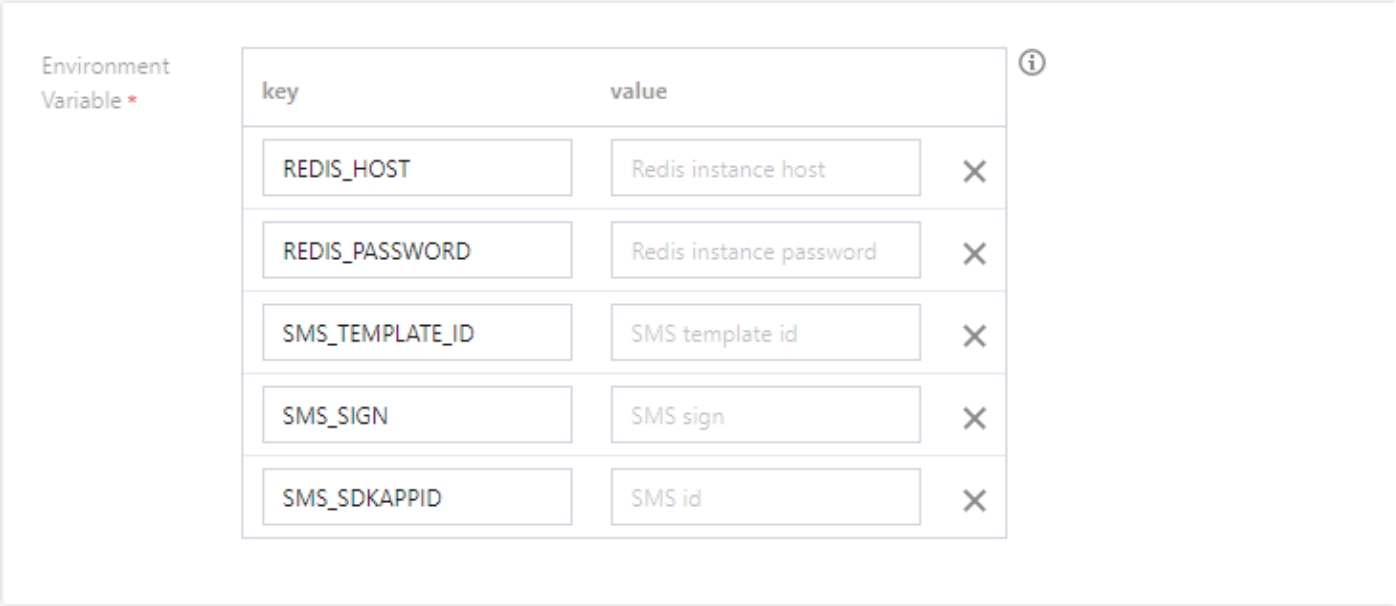
2. Set the environment variables of the demo in **Advanced Configuration**.



Field	Description
REDIS_HOST	Redis database address.
REDIS_PASSWORD	Redis database password.
SMS_TEMPLATE_ID	Template ID. You must enter the ID of an approved template, which can be viewed in the SMS console.
SMS_SIGN	Content of the SMS signature, which should be encoded in UTF-8. You must enter an approved signature, which can be viewed in the SMS console. Note: this parameter is required for Chinese Mainland SMS.
SMS_SDKAPPID	SMS `SdkAppid` actually generated after an application is added in the SMS console, such as 1400006666.

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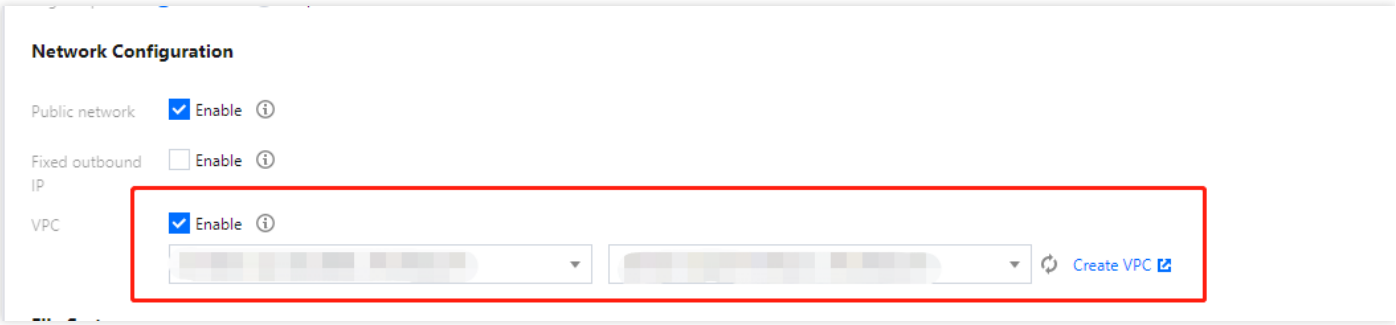
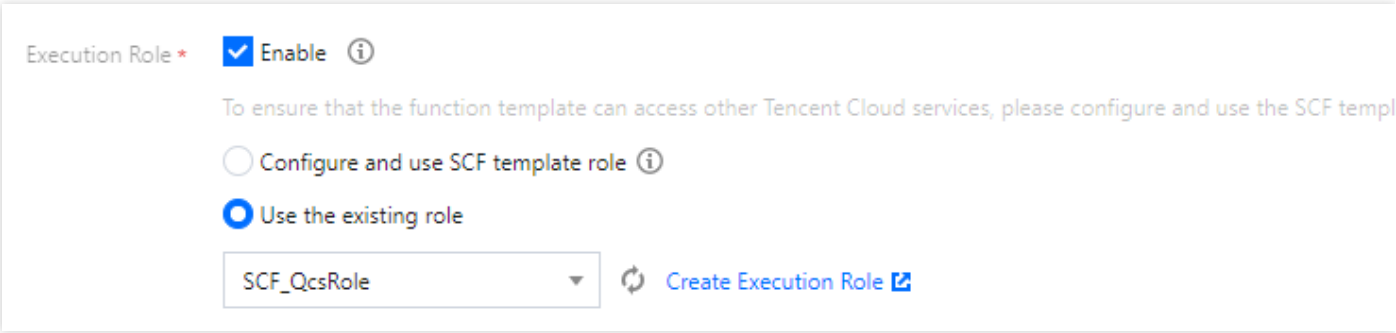
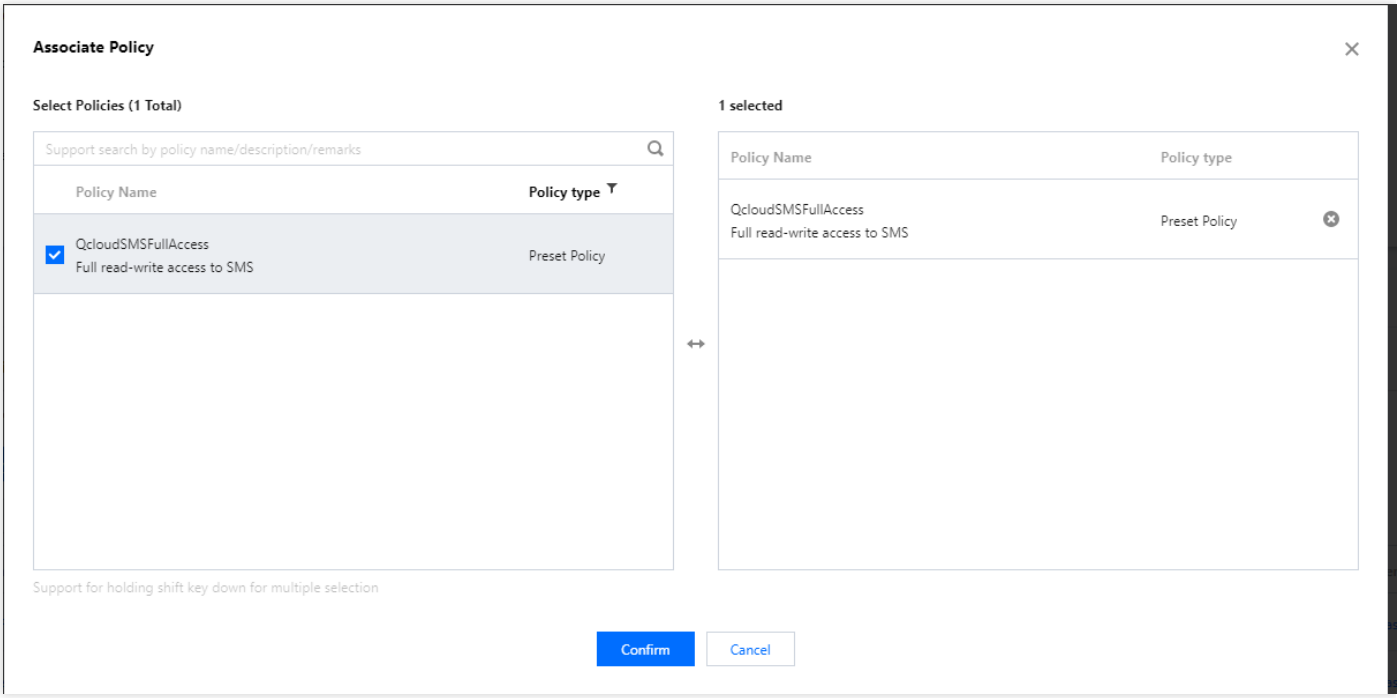
3. Set the same VPC environment as the Redis database in **Advanced Configuration**.



4. Set the permissions of SCF **execution role** in **Advanced Configuration**.



You need to associate the `QcloudSMSFullAccess` policy with the `SCF_QcsRole` role in the CAM console.



In this way, the ``TENCENTCLOUD_SECRETID`, `TENCENTCLOUD_SECRETKEY`,

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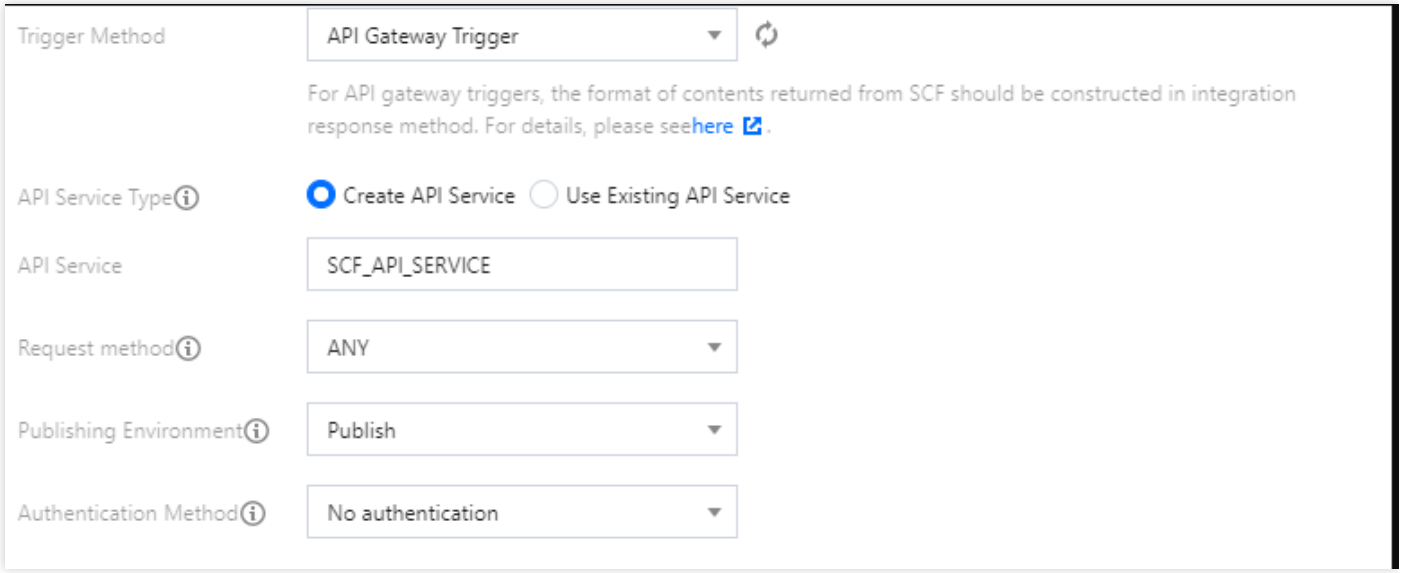
`and` TENCENTCLOUD_SESSIONTOKEN` environment variables can be obtained in the code, which will be used by the SMS SDK.

5. Click **Complete** to deploy the function.

6. Create an SCF **API Gateway trigger** and request the trigger address to use SMS capabilities.



Step 8. Use the features

Verification codes have a high requirement for timeliness. You can store verification codes in the memory or TencentDB for Redis and use the mobile number as a key to store information such as sending time, verification code, number of verification attempts, and verification result.

Features

Sending SMS verification code

Request parameters:

Field	Type	Description
method	string	Request method, whose value is `getSms`
phone	string	Mobile number in the format of area code + mobile number, such as 86185662466**

Verifying verification code (login)

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Request parameters:

Field	Type	Description
method	string	Request method, whose value is `login`
phone	string	Mobile number in the format of area code + mobile number, such as 86185662466**
code	string	6-digit verification code

Error codes

Field	Description
InValidParam	Missing parameter
MissingCode	Missing verification code parameter
CodeHasExpired	The verification code has expired
CodeHasValid	The verification code is invalid
CodeIsError	Please check whether the mobile number and verification code are correct

If you have any questions, contact SMS Helper for assistance.

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ES
SCF + ES for Quick Search Service

Last updated：2023-04-27 17:50:06

Search Service

Search services are everywhere, such as Google search in daily life, wiki search in work, and product search in shopping. Data in such scenarios is generally large in size and structured and has more reads than writes. However, due to their transaction characteristics, traditional databases cannot well utilize space in search scenarios and are slow in full-text searches (such as LIKE statement). Elasticsearch thus came into being.
Elasticsearch is an open-source search engine widely used in full-text search. It can quickly index, search, and analyze a massive amount of text data. Tencent Cloud ES is a highly available and scalable cloud-hosted Elasticsearch service. It well supports both structured and non-structured data and provides easy-to-use RESTful APIs and clients in multiple languages to help you quickly build stable search services.
This document describes how to use ES and SCF to quickly build a search service by referring to the official Tencent Cloud ES documentation.

Resource Preparations

Purchase an ES cluster. The cluster scale is subject to the search service QPS and data size of the stored documents. For more information, see Evaluation of Cluster Specification and Capacity Configuration.

Deploying Search Service

Use SCF to deploy the frontend page and backend service of the search service.
1. In the top-left corner of the **Functions** page in the **SCF console**, select the region of the purchased ES cluster.

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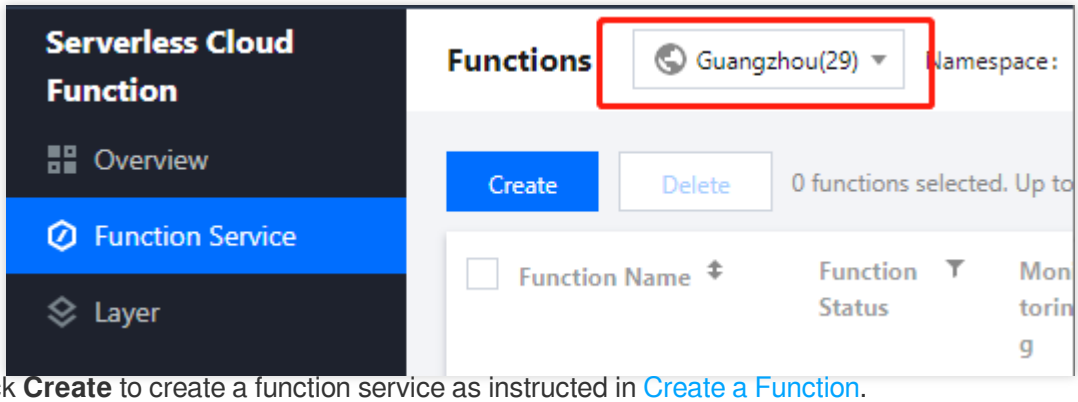
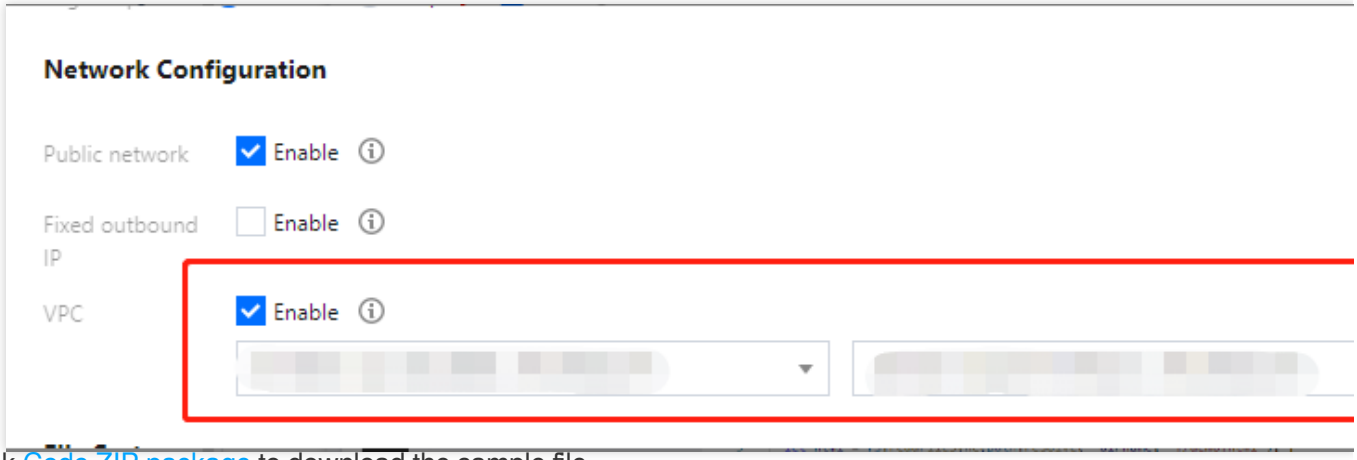


2. Click **Create** to create a function service as instructed in Create a Function.

3. After the function is created, click **Function name** to enter the function details page.

4. On the **Function configuration** page, click **Edit** in the top-right corner, enable **Private network access**, select the VPC selected during ES cluster creation, and click **Save**.



5. Click Code ZIP package to download the sample file.

6. In **Submitting method** on the **Function codes** page, select **Upload local ZIP package**, select the ZIP package just downloaded, and click **Deploy**.

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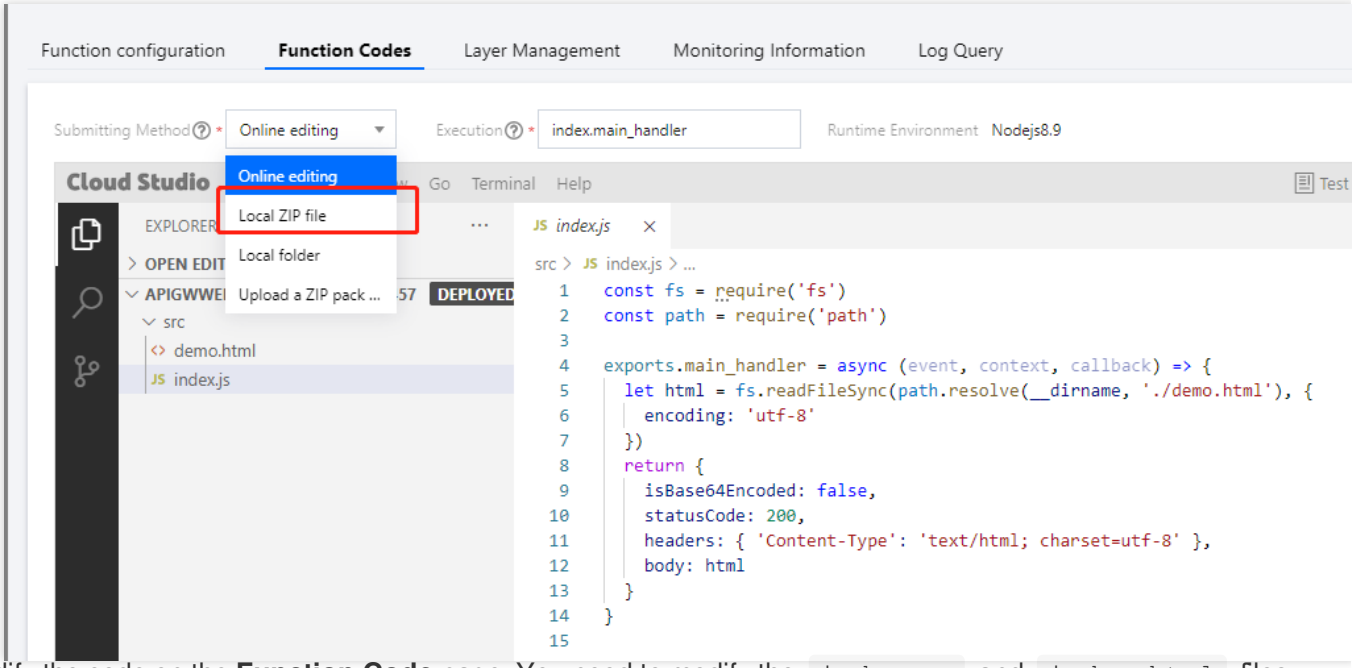

7. Modify the code on the **Function Code** page. You need to modify the `index.py` and `index.html` files:

Change `es_endpoint` in `index.py` to the private network address of your ES cluster, such as `http://10.0.3.14:9200` .

Change `es_password` in `index.py` to the password of ES Platinum Edition; if your ES is not Platinum Edition, leave it unchanged.

Change `server_name` in `index.html` to the name of the created SCF function, which is `myserver` by default.

Note:

`es_corpus_0126` is used as the index name by default in the sample. Make sure that the index is not used by other businesses. To modify it, modify the `es_index` variable in `index.py` .

8. Click **Add trigger method** on the **Trigger method** page, add an API Gateway trigger as shown below, enable integration response, and click **Save**.

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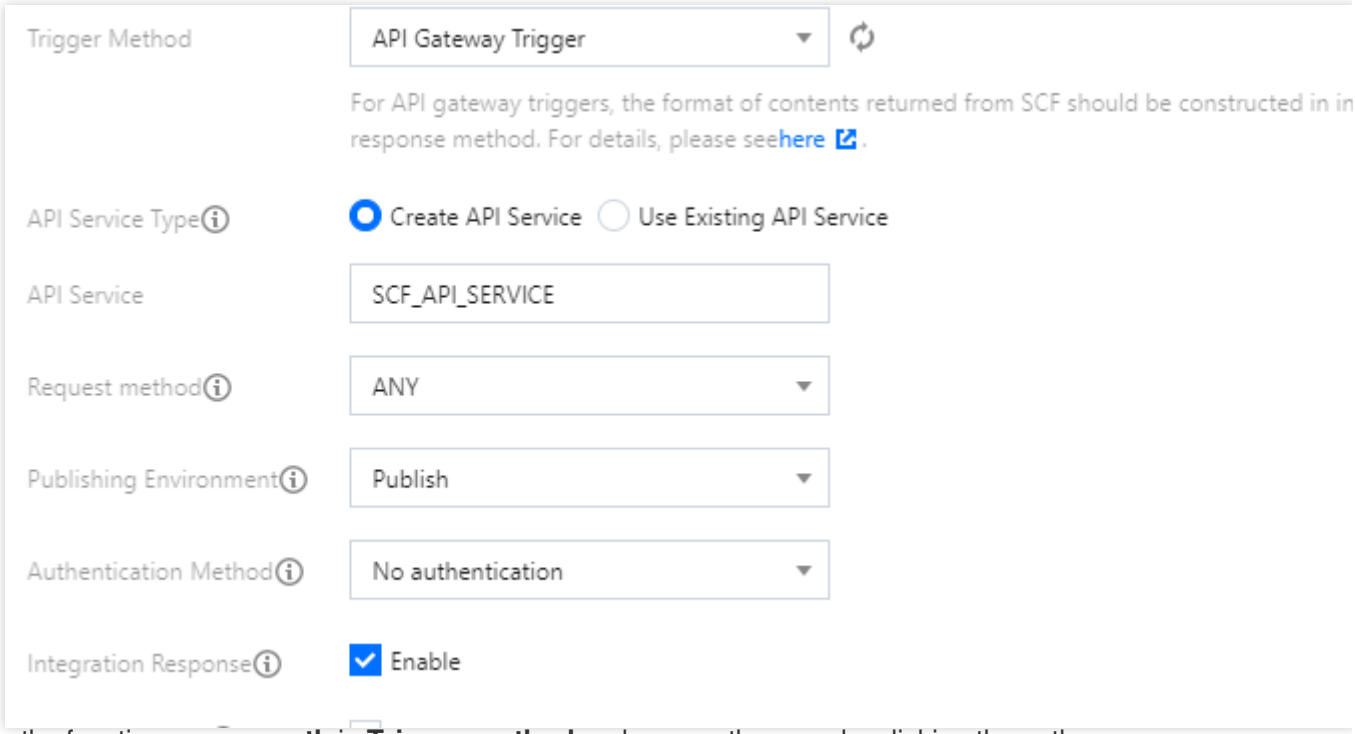
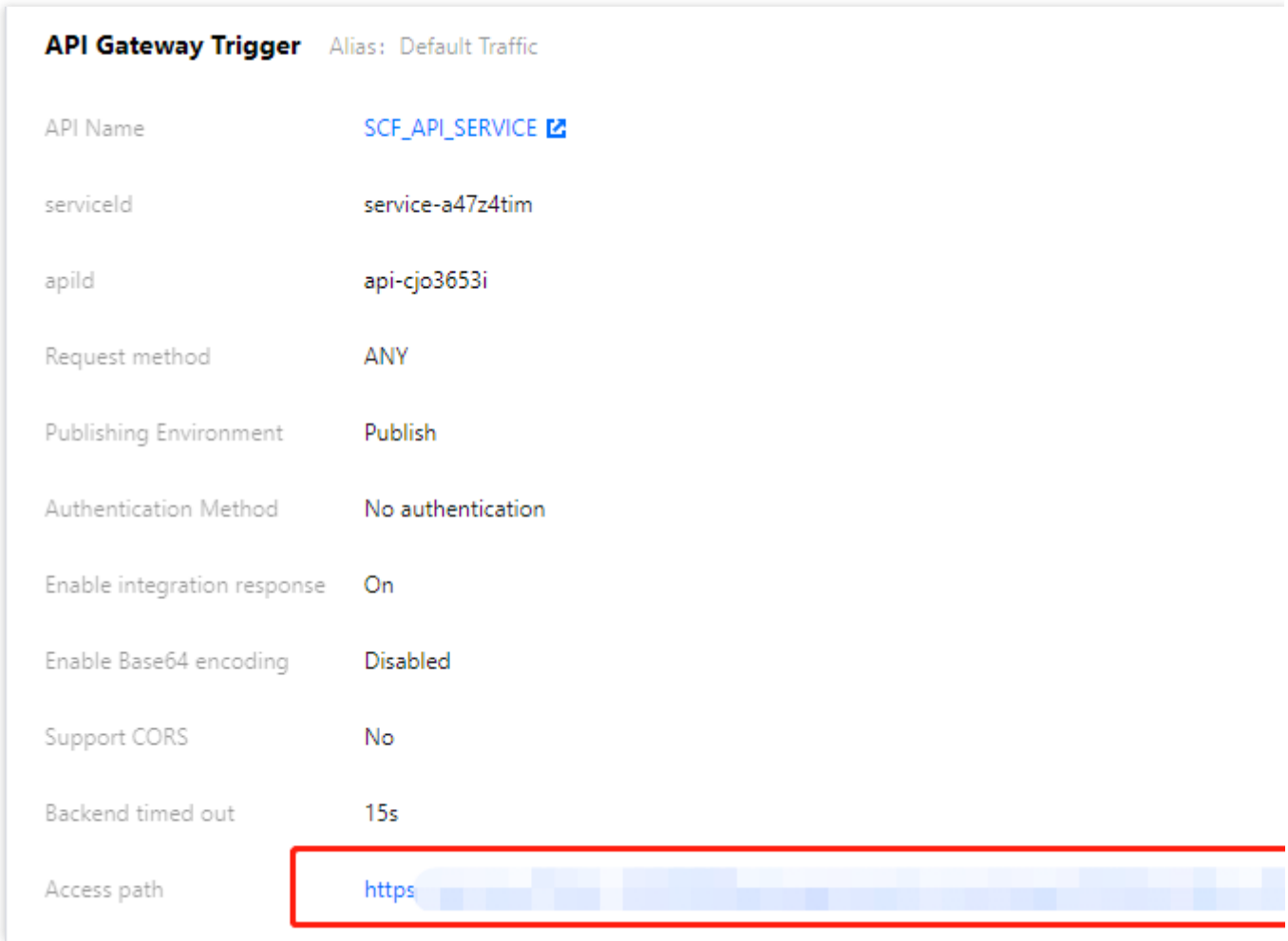


9. View the function **access path** in **Trigger method** and access the page by clicking the path.



10. Upload the sample data of Elasticsearch Service. Click the text above the search box to automatically import data.

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11. At this point, you have deployed a simple ES-based Q&A search service backend.

Learn More

Importing stopword and custom dictionary

Stopwords will not be searched by ES, and words in the custom dictionary will be retained during segmentation. In the previous sample, the default stopword dictionary and custom dictionary are imported. You can also import your own stopword and custom dictionaries in **Plugin List** > **Update Dictionary** on the ES cluster details page.

Synonym configuration

To configure synonyms, you need to specify them when creating an index. Synonyms in Solr and WordNet formats are supported. For more information on the format, see Solr synonyms.

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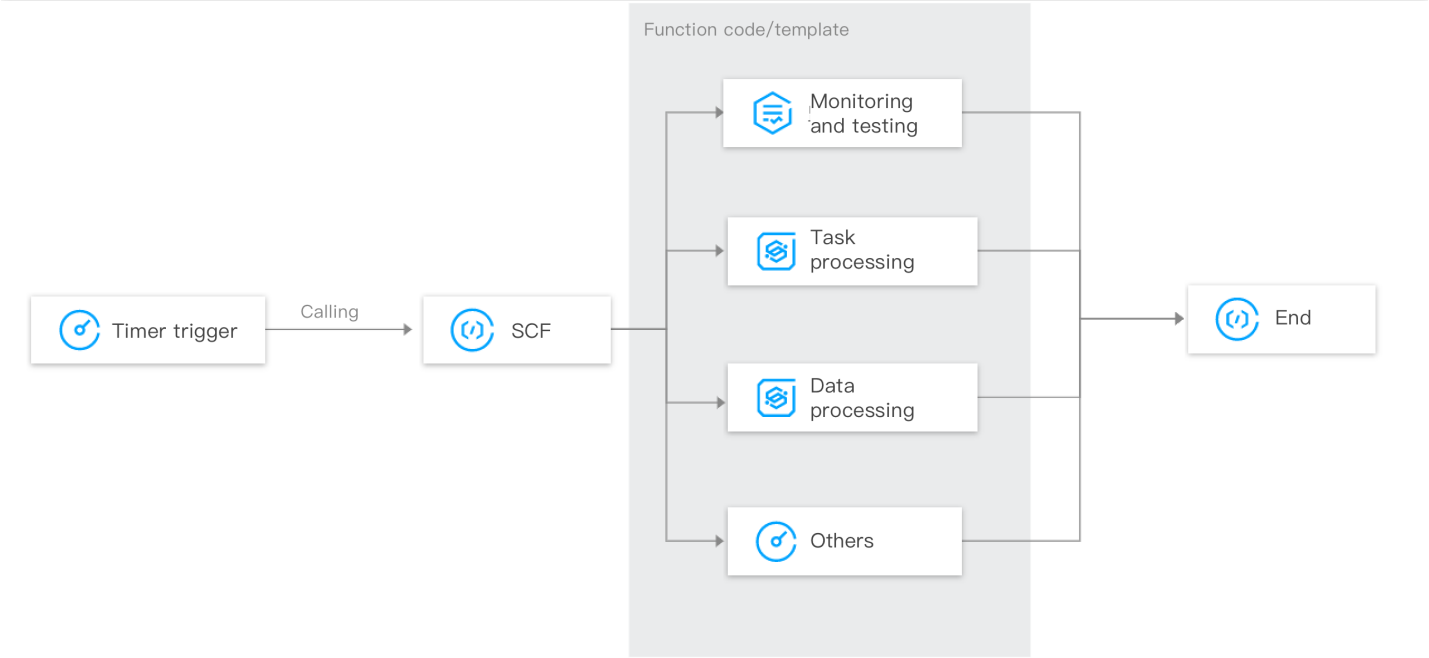
Scheduled Task

Scheduled Task Overview

Last updated：2022-02-11 10:36:49

With SCF scheduled triggers, you can quickly create scheduled tasks without having to purchase computing resources in advance. Such triggers leverage Serverless' powerful elastic scalability to provide stable and fast capabilities of scheduled task processing.

Unlike other event-based triggers, scheduled triggers can execute tasks by using scheduled time-driven functions. Specifically, you can configure Cron expressions to quickly use such triggers without relying on external invocations. They have natural advantages in typical scheduled task scenarios such as automated monitoring, testing, and alarming, automated task execution, and data archiving, cleansing, and backup. The relevant workflow is as shown below:



Advantages of Function Processing

- The full lifecycle of scheduled tasks can be managed to help you quickly build scheduled triggers.
- Tasks are fully managed and can be triggered regularly and retried automatically by standard Cron expressions.
- More and more built-in function templates are added to reduce the development costs for scheduled tasks in popular use cases

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- Computing power is provided based on SCF, with features such as auto scaling, OPS-free usage, and pay-as-you-go billing.

Multi-scenario Function Processing Practices

The following table lists existing templates for typical use cases and their specific descriptions:

Function Processing Scenario	Description
High-Availability scheduled testing	Use SCF to implement high-availability scheduled testing.
Scheduled task execution	Use SCF and Puppeteer to perform scheduled tasks on webpage content such as data collection and storage.
Scheduled data archiving and backup	Use SCF to regularly back up databases to COS.

Note：
SCF offers a free tier. You will be charged if you exceed the free tier limit. For billing details, please see SCF Billing Overview.

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Performing Scheduled Task

Last updated：2021-10-28 11:41:29

Overview

This document uses an SCF function and Puppeteer to perform scheduled tasks on webpage content such as data collection and storage. You can also perform complicated scheduled web tasks like data crawling, scheduled sign-in, and webpage inspection.

Directions

Creating function

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select the **Beijing** region and click **Create** to enter the function creating page and configure the function as shown below:

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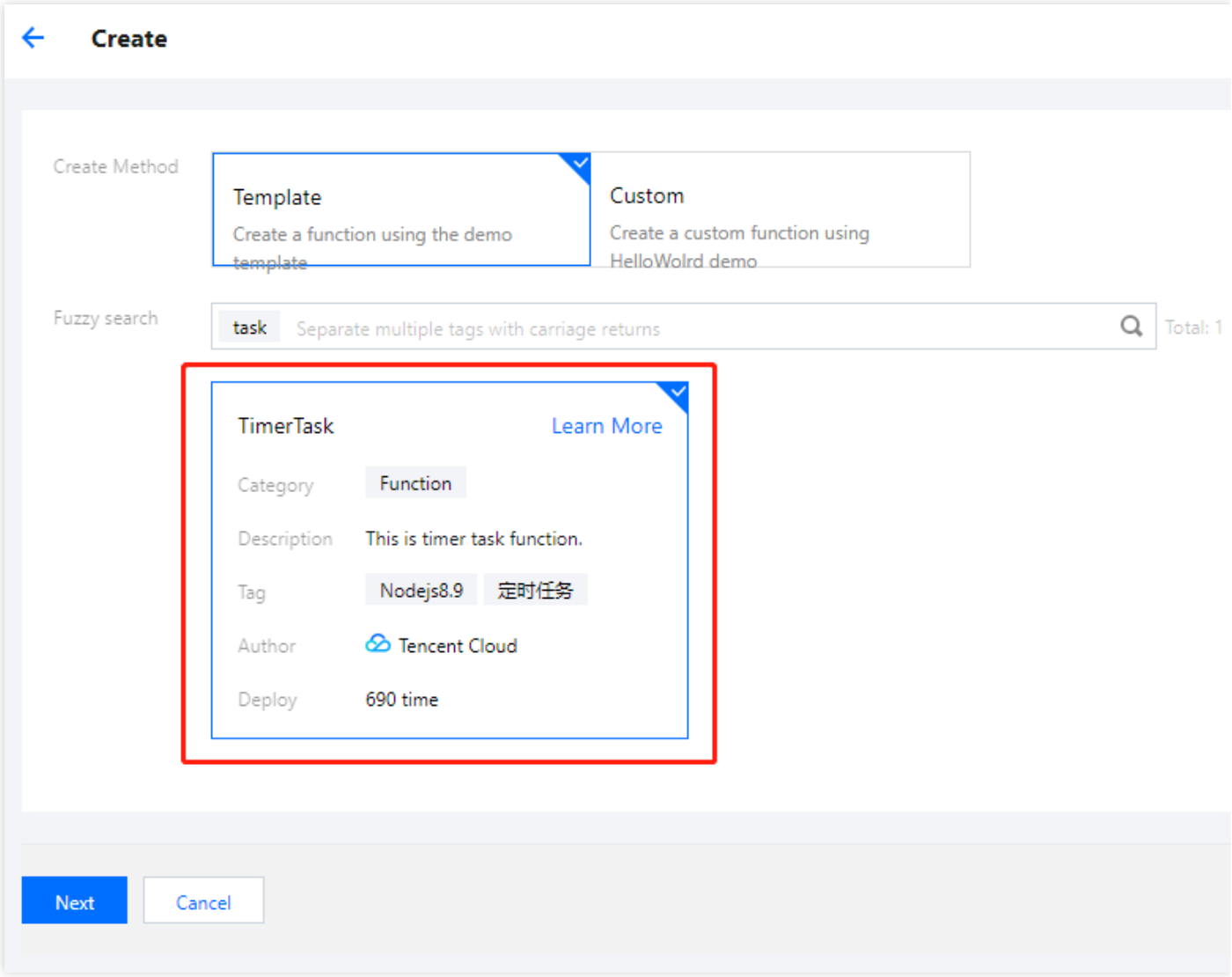

- **Creation method**: select **Template**.
- **Fuzzy search**: enter **TimerTask** and search.
  Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded.

3. Click **Next**, and the function name will be automatically generated by default. If you need to modify the function code, click to expand the **Function Code** block and make changes as instructed in Modifying function template.
4. In the **Trigger Configurations** section, select **Automatic creation**, and a scheduled trigger that will run on the hour will be created by default as shown below:

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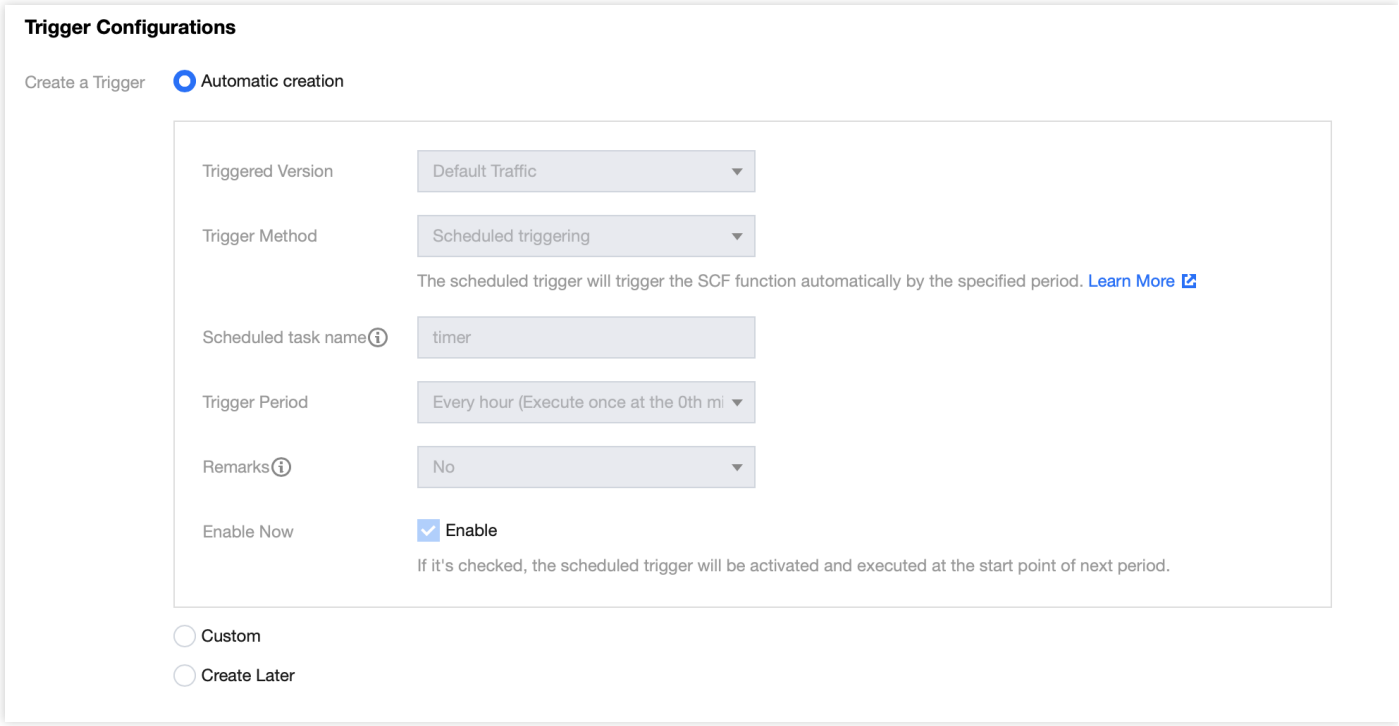

Note：

- If you need to adjust the trigger configuration according to your needs, please select **Custom**.
- To create a scheduled trigger after the test is successful, please select **Create Later**.

5. Click **Complete**.

Testing function

1. At the bottom of the function code page, click **Test** to view the execution log of the function.
2. After the test is passed, you can configure the scheduled trigger in the **Trigger Method** tab according to the actual situation and check the related Base64 value.

Relevant Operations

Modifying function template

The current template function references Puppeteer to screencapture the webpage content and convert it to a Base64 value for printout in the function log. You can modify the template according to your own scheduled task needs.
For example, run the following command to get the page title:

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```
// Sample page title
const title = await page.title();
console.log(title);
```

Add the following code to set the page click attribute.

```
// Sample page click attribute
await page.click('a');
```

For more information on how to use Puppeteer, please see here. With this tool, you can access page content at scheduled times and perform task operations on the page, such as data crawling and sign-in.

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Video Processing
Implementing Batch Automated Video Editing with SCF and FFmpeg

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Overview

Common video editing tools such as Premiere and AE can implement complex editing effects and are widely used in promotional and advertising video production. However, in the following scenarios, traditional editing tools and template-based video processing software programs cannot meet the requirements for **batch, automated, and custom** video editing:

- A school expects to output the highlight videos of all students during online class with the school logo and slogan added immediately after the students finish the classes and allow them to quickly share such videos. Suppose there are 10,000 students and one unique video should be produced for each student, then the school needs to complete the batch editing of 10,000 different videos automatically.
- Profile photo-based videos need to be generated for users to attract them to a marketing campaign. As each user has a different profile photo, the generated videos are also different. There may be tens of thousands of users; therefore, automatic editing is desired.
- An MCN company wants to generate unified promotional videos for 100 hosts. It may be acceptable to designate a person to edit 100 videos. However, it will be very troublesome if 100 videos need to be edited every week. Therefore, automated, batch, and custom editing is desired.

In these video editing scenarios, resource usage is concentrated within certain hours, and the volume of computed data is high. In this case, dedicated high-end servers may have a low utilization, while low-end servers' computing power cannot meet the requirements. By contrast, SCF perfectly satisfies such requirements with its pay-as-you-go billing mode and high-performance computing power. It not only achieves a 100% utilization but also provides high computing power on demand. In addition, it delivers a higher flexibility by supporting multiple programming environments for developers with different development habits.

Prerequisites

All video editing features mentioned in this document are implemented by FFmpeg.

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How to Use FFmpeg

FFmpeg is an open-source video processing tool. It supports video editing, transcoding, splicing, audio processing, text adding, and live stream push/pull. You can use different FFmpeg commands to program and implement different video editing features. You can also combine and orchestrate them to execute various batch automated tasks.

Below are common video editing scenarios:

1. Video transcoding
2. Video clipping
3. Text adding to video
4. Image adding to video
5. Video splicing
6. Audio adding to video
7. Video transition
8. Video special effect
9. Video playback speed adjusting

FFmpeg commands

Some FFmpeg commands are as described below. You can install FFmpeg locally first and then perform tests.

```
// Convert an .mov video to an .mp4 video
ffmpeg -i input.mov output.mp4
```

```
// Change the frame rate of the original video to 24 FPS
ffmpeg -i input.mp4 -r 24 -an output.mp4
```

```
// Convert an .mp4 video to a video stream suitable for live streaming
ffmpeg -i input.mp4 -codec: copy -bsf:v h264_mp4toannexb -start_number 0 -hls_tim
e 10 -hls_list_size 0 -f hls output.m3u8
```

```
// Change the video resolution to 480x360 and change the bitrate to 400 Kbps
ffmpeg -i input.mp4 -vf scale=480:360,pad=480:360:240:240:black -c:v libx264 -x26
4-params nal-hrd=cbr:force-cfr=1 -b:v 400000 -bufsize 400000 -minrate 400000 -max
rate 400000 output.mp4
```

```
// Add text such as subtitles and title to the video
// `fontfile` is the path of the font to be used, and `text` is the text to be ad
ded
// `fontcolor` is the font color, `fontsize` is the font size, and `box` is the t
```

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```
ext box
// `box=1` indicates to enable the text box, while `0` indicates to disable it. `boxcolor` is the box color. `black@0.5` indicates black with 50% transparency. `boxborderw` is the width between the box and the text
// `x` and `y` indicate the text position. They can be numbers or expressions. For more information, visit the FFmpeg website
ffmpeg -i input.mp4 -vf "drawtext=fontfile=/path/to/font.ttf:text='your text':fontcolor=white:fontsize=24:box=1:boxcolor=black@0.5:boxborderw=5:x=(w-text_w)/2:y=(h-text_h)/2" -codec:a copy output.mp4
```

```
// Add an image such as logo, profile photo, and sticker to the video. `filter_complex` indicates a complex filter, `overlay` indicates the X and Y coordinates of the image, and `enable` indicates the image display period (from second 0 to second 20)
ffmpeg -i input.mp4 -i avatar.JPG -filter_complex "[0:v][1:v] overlay=25:25:enable='between(t,0,20)'" -pix_fmt yuv420p -c:a copy output.mp4
```

```
// Splices videos. `list.txt` lists the paths of all video files to be spliced in sequence; for example:
// Note: If the videos have different resolutions, splicing will fail.
ffmpeg -f concat -safe 0 -i list.txt -c copy -movflags +faststart output.mp4
// `list.txt` is in the following format:
file 'xx.mp4'
file 'yy.mp4'
```

```
// Add audio to the video. `stream_loop` indicates whether to loop the audio (-1: infinite loop; 0: no loop). `shortest` indicates to complete encoding when the shortest .mp3 input stream ends.
ffmpeg -y -i input.mp4 -stream_loop -1 -i audio.mp3 -map 0:v -map 1:a -c:v copy -shortest output.mp4
```

Note：

FFmpeg also supports editing audio separately. For detailed directions, visit the FFmpeg website.

Running FFmpeg commands

This document uses Python as an example. You can refer to the following sample code to run FFmpeg commands:

```
child = subprocess.run('./ffmpeg -i input.mov output.mp4',
stdout=subprocess.PIPE,
stderr=subprocess.PIPE, close_fds=True, shell=True)
if child.returncode == 0:
```

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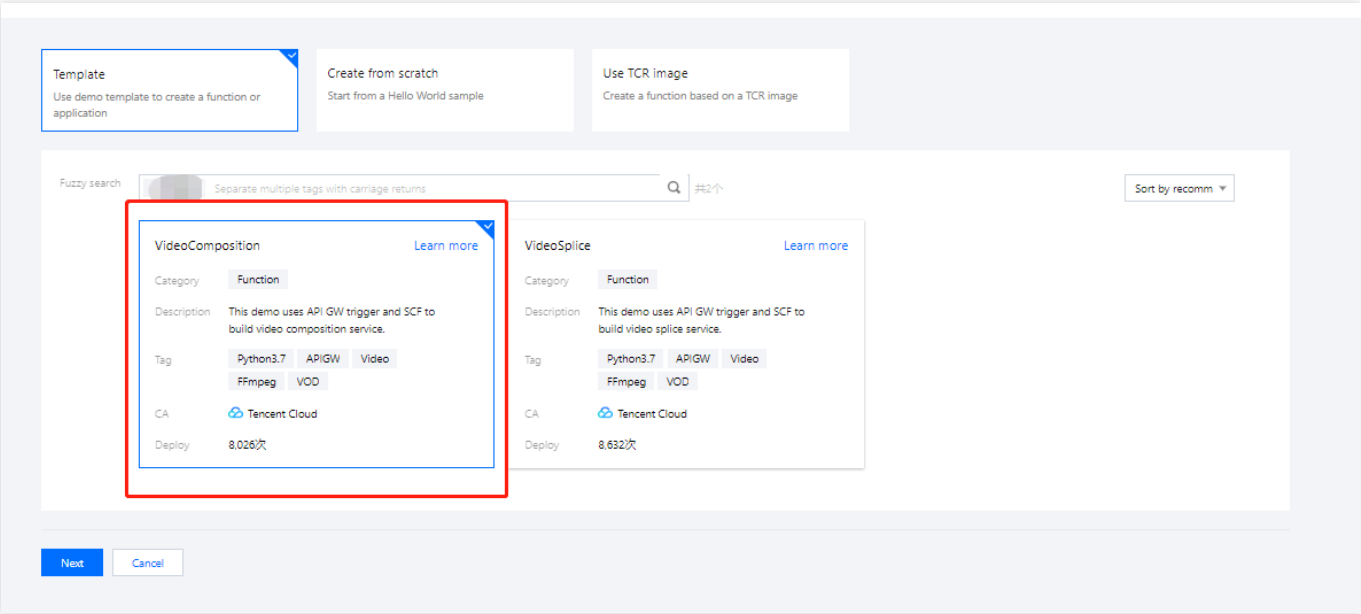
```
print("success:", child)
else:
print("error:", child)
raise KeyError("Failed to process the video. Error:", child)
```

Using FFmpeg in SCF

1. Log in to the SCF console and select **Function Service** on the left sidebar.
2. At the top of the **Function Service** page, select a region and click **Create** to enter the function creation page.
3. Set the following parameter information and click **Next** as shown below:
   - **Creation method**: Select **Template**.
   - **Fuzzy search**: Enter **video editing** and search.
     Click **Learn More** in the template to view relevant information in the **Template Details** pop-up window, which can be downloaded. You can click the GitHub address to get the template source code, where you can view the API call parameters and use methods.



4. In **Basic Configurations**, **Function Name** is generated by default, which can be modified as needed. You can configure async execution and execution role as follows:
   - Async Execution: Select **Enable**.
   - Execution Role: Select **Enable**, select **Configure and use SCF template role**, and the system will automatically create and select an SCF template execution role associated with full access permissions of VOD. You can also check **Use the existing role** and select an existing role that has the above permissions in the

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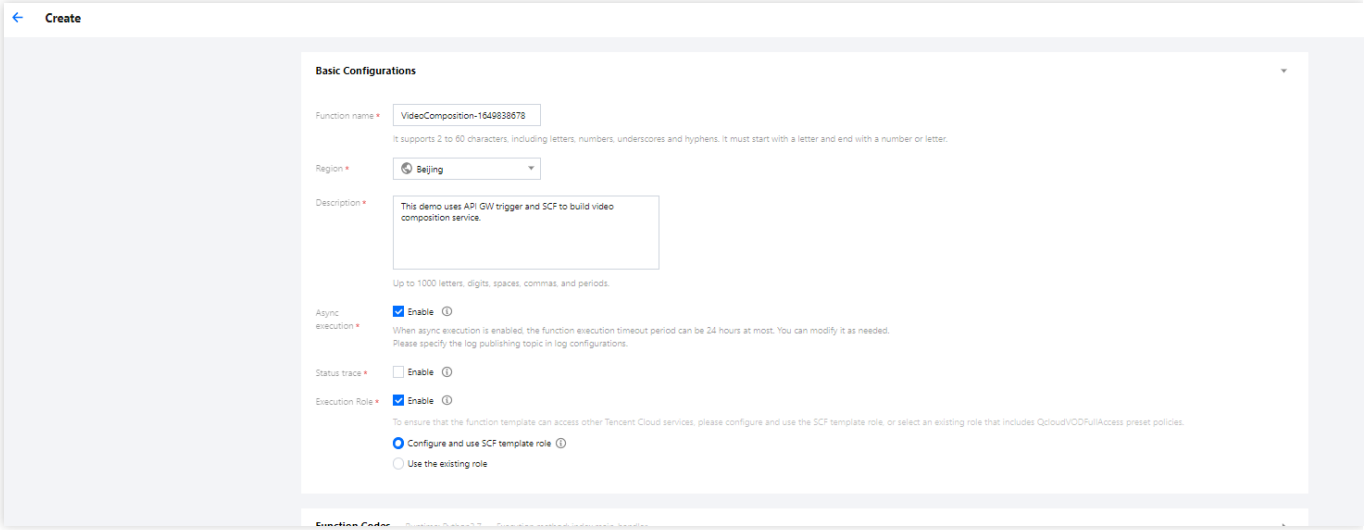
drop-down list. This document takes **Configure and use SCF template role** as an example, as shown below:



Note：
This example requires SCF to have the operation permissions of VOD. **Execution Role** has been enabled by default, and an execution role has been automatically created and associated with the required VOD permission policy `QcloudVODFullAccess`. If you need to make adjustments, select **Use the existing role** or disable **Execution Role**.

5. In **Trigger Configurations**, select **Automatic creation** as shown below:

Note：
To use an existing API service to create an API Gateway trigger or modify the trigger configuration, select **Custom**.

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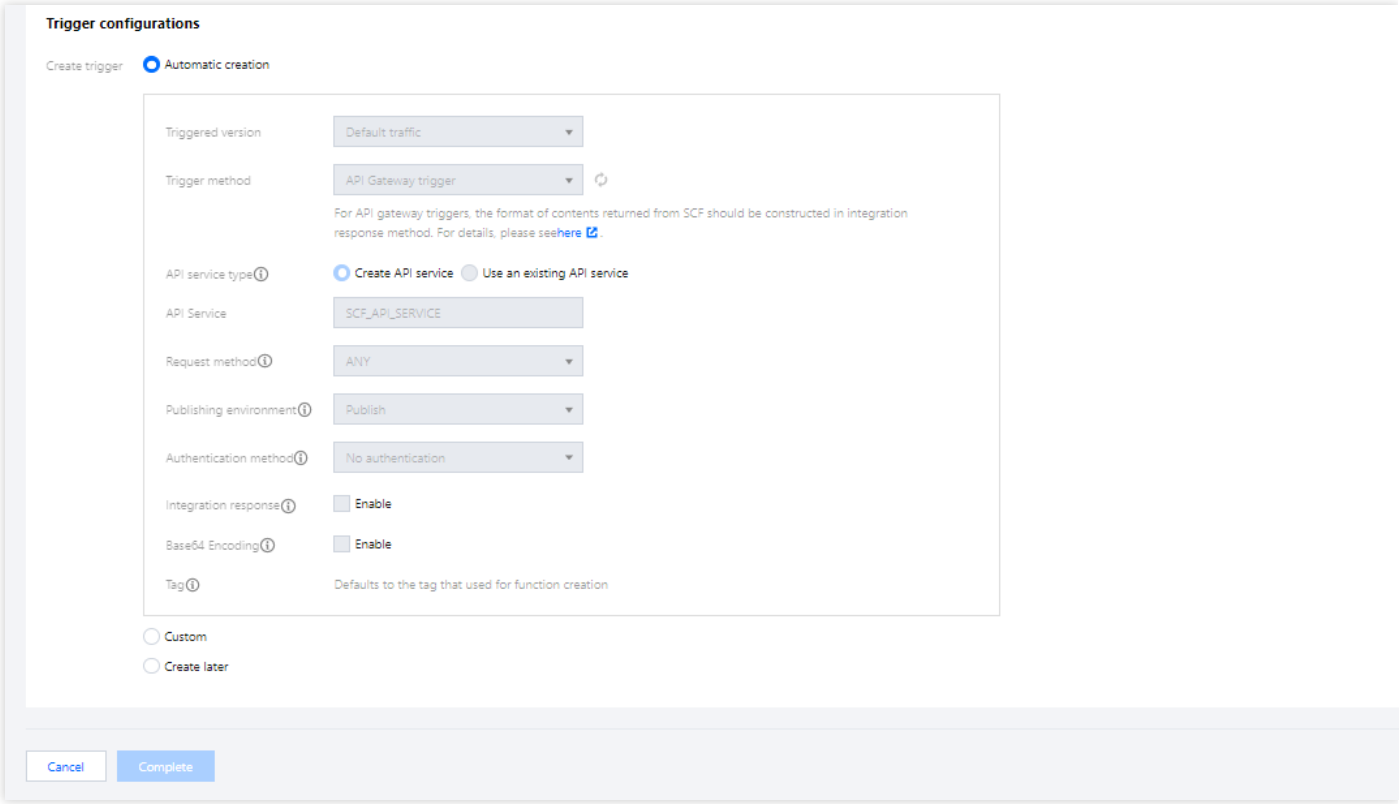

6. Click **Complete** to complete function and trigger creation and get the HTTP triggering domain of the function.

Success Story

The customer is an online education company. It needs to create 30-second videos as students' study results from online class recordings every time students finish classes. This case has the following key information:

1. Generally, a class has 200 students, so 200 videos need to be produced at the same time.
2. A one-hour class recording needs to be clipped into a 30-second video.
3. As the screen of each student is different, the recorded videos are also different.
4. Student names and profile photos need to be added to the final output videos.
5. The time points when students finish a class are concentrated; therefore, there may be a short time period of high concurrency during video production.
6. Videos need to be produced only after the class is over; therefore, video production start times are fixed and concentrated.

Based on the above characteristics, SCF has the following strengths for video editing:

1. SCF can sustain 200 concurrent video editing tasks, so the customer doesn't need to set up additional servers.
2. SCF incurs no fees during idle hours.
3. SCF has a high computing power to quickly produce videos.

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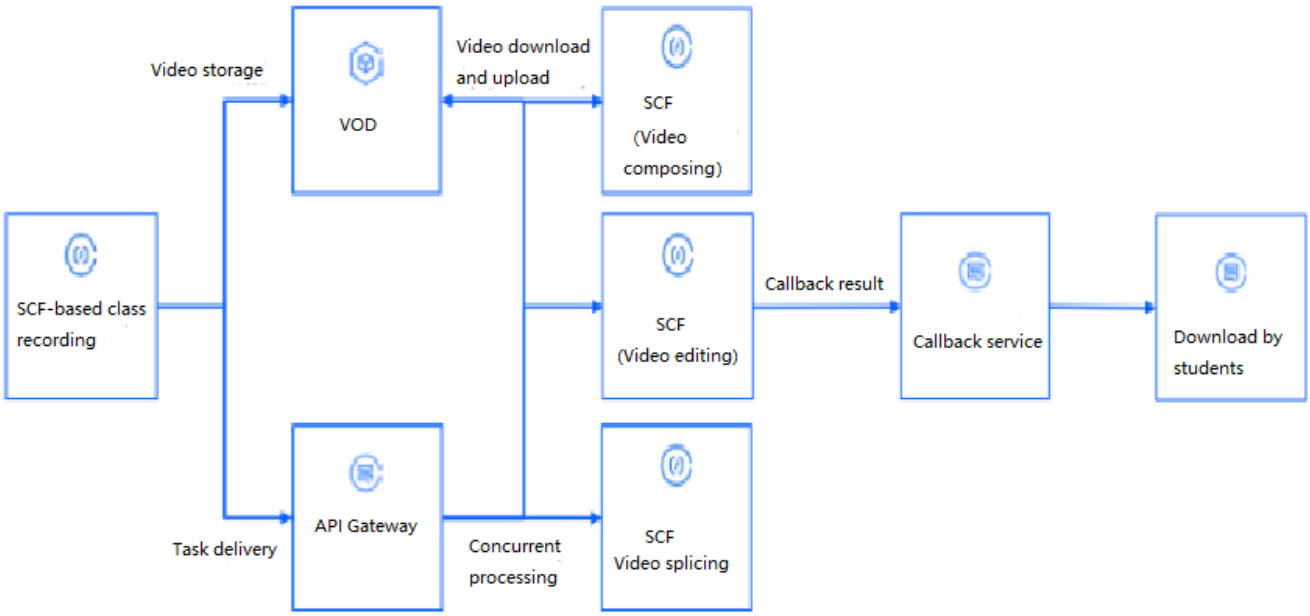
The reference architecture for this case is as shown below:



Summary

You can orchestrate, combine, and reuse the above audio/video editing capabilities to meet the requirements for various scenarios. You can also convert the parameters used to control various effects in video editing to the parameters passed in during service call in order to implement various custom effects.

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