

Function Compute

Developer Guide

Developer Guide

Programming guide

Concepts

Handler

When creating a function, you must specify an event handler function that can be called by Function Compute (FC) during code running. The signature of the Node.js handler function is:

```
exports.myHandler = function(event, context, callback) {  
  ...  
  
  // Use callback() to return information to the caller.  
}
```

myHandler is the name of the function called by FC. You must export this function so that it is visible to FC. For example, if your logic entrance is in helloworld.js, helloworld.myHandler ({filename}.{handlername}) is the function handler. For more information, see [Create a function](#).

- event: event payload in **Buffer** type.
- context: object that contains useful runtime information of the called function which is in **Context** type.
- callback: function that informs FC that the function call can be stopped and returns data to callers.

Function example:

```
exports.myHandler = function(event, context, callback) {
```

```
// Assume that the given event is a JSON string.
var eventObj = JSON.parse(event.toString());

console.log("value1 = " + eventObj.key1);
console.log("value2 = " + eventObj.key2);

// The first callback parameter is of the error type and null indicates that the function execution is successful.
callback(null, "some success message");
// or
// callback("some error type");
}
```

The preceding example shows an event handling function. The given event is converted to a JSON object first, and `console.log()` statement, and then stores the event data to Alibaba Cloud Log Service. When callback is called, the function exits, and "some success message" is returned.

Event format

When a function is called, FC passes the Body of `InvokeFunction` request to the function. FC does not restrict the event format. You can select a format such as JSON, XML, Image, or Video based on your business requirements. The interpretation of the event is completely controlled by developers.

The following example shows that if you use an OSS trigger, then the event is in JSON format.

```
{
  "events": [
    {
      "eventName": "ObjectCreated:PutObject",
      "eventSource": "acs:oss",
      "eventTime": "2017-04-21T12:46:37.000Z",
      "eventVersion": "1.0",
      "oss": {
        "bucket": {
          "arn": "acs:oss:cn-shanghai:123456789:bucketname",
          "name": "testbucket",
          "ownerIdentity": "123456789",
          "virtualBucket": ""
        },
        "object": {
          "deltaSize": 122539,
          "eTag": "688A7BF4F233DC9C88A80BF985AB7329",
          "key": "image/a.jpg",
          "size": 122539
        },
        "ossSchemaVersion": "1.0",
        "ruleId": "9adac8e253828f4f7c0466d941fa3db81161e853"
      },
      "region": "cn-shanghai",
      "requestParameters": {
        "sourceIPAddress": "140.205.128.221"
      },
      "responseElements": {
        "requestId": "58F9FF2D3DF792092E12044C"
      }
    }
  ]
}
```

```
},  
"userIdentity": {  
  "principalId": "123456789"  
}  
}  
]  
}
```

Callback usage

The callback parameter is used to return the function execution result to the caller. The callback function signature is defined as follows:

```
callback(Error error, Object result)
```

When callback is called, the FC terminates the call.

error: An optional parameter which indicates that the function fails and returns the error information to the caller.

result: An optional parameter that returns the successful function execution result to the caller. When the **error** parameter is passed into callback, this parameter is ignored.

Example of callback usage.

```
callback(); // function execution is successful with no information to return.  
callback(null); // function execution is successful with no information to return.  
callback(null, null); // function execution is successful with no information to return.  
callback(null, "success"); // function execution is successful with a "success" string as returned value.  
callback(new Error("error")); // function execution fails with an "error" message as returned value.  
callback(new Error("error"), "ignored message") // function execution fails with an "error" message and the second  
parameter is ignored.  
callback("error"); // function execution fails with an "error" message
```

Note:

- You must call the callback function to inform FC that function execution is completed. Otherwise, the function execution cannot be finished until a timeout error occurs.
- When an error message is returned using the callback error parameter, FC automatically records the error message in the logstore that is associated to the service. If the size of the error message is larger than 256 KB, only the first 256 KB of data is stored and "Truncated by FunctionCompute" is displayed. For more information about how to configure function log, see [relevant documentation](#).
- If the function is called synchronously, the error message or result data is added to the HTTP body and returned to the client. If the function is called asynchronously, the error

message or result data is not returned.

Context

A context object is provided by the Function Compute for users to obtain useful runtime information. For example, you can obtain the ID of the current request and record it in the running log. Thus, you use it to track the details of request execution.

Context object (Node.js)

```
{
  // Request ID of the current request
  requestId: "...",

  // Credentials contains your identity verification information that is required for you to access other services.
  // For example, you need them to access data in the specified OSS directory.
  // You must explicitly assign roles to the service on creation to use them.
  // For more information, see the permission management documentation.
  credentials: {
    accessKeyId: "...",
    accessKeySecret: "...",
    securityToken: "..."
  },

  // Related function information
  function: {
    name: "...",
    handler: "...",
    memory: 128, // Integer, in MB.
    timeout: 60 // Integer, in seconds.
  }
}
```

Note: Currently, all attributes of the context objects are read-only.

Error message

Two types of errors may occur during a function operation:

- Handled error: an error proactively captured by the user function and returned through callback.
- Unhandled error: an error that is not captured by the user function, such as a syntax error, request timeout, out of memory and so on.

Function Compute encodes errors into JSON strings and returns them to the caller.

Handled error

When user function captures an error and returns it through `callback(err)`, if the `err` parameter is an object whose type is `Error`, the stack trace is also returned.

```
// User function.
exports.handler = function(event, context, callback) {
  var error = new Error("something is wrong");
  callback(error);
};

// Function response.
{
  "errorMessage": "something is wrong",
  "errorType": "Error",
  "stackTrace": [
    "export.handler (/var/task/index.js:3:16)"
  ]
}
```

If the callback parameter is a non-error object, the stack trace is not returned.

```
// User function.
exports.handler = function(event, context, callback) {
  callback("something is wrong");
};

// Function response.
{
  "errorMessage": "something is wrong"
}
```

Unhandled error

When the user function does not capture any errors, Function Compute tries to capture errors as far as possible and returns the detailed information. If an error fails to be captured by the system, for example, a user function crashes unexpectedly and exits during execution, the system returns a general error.

Typical error scenarios

Error type	Scenario	Error information
------------	----------	-------------------

Handled	An error returned through callback(err), in which the type of err is error.	{ "errorMessage" : "oops" , "errorType" : "Error" , "stackTrace" : ["exports.handler (/var/task/index.js:5:14)"] }
Handled	An error returned through callback(obj), in which obj is a non-error object.	{ "errorMessage" : "oops" }
Unhandled	The function reference does not exist.	{ "errorMessage" : "Cannot find module '/code/X.js" }
Unhandled	The specified handler function does not exist.	{ "errorMessage" : "Handler 'X' missing on module 'Y' " }
Unhandled	The function execution times out.	{ "errorMessage" : "Task timed out after X seconds" }
Unhandled	An error related to and handled by another user program.	{ "errorMessage" : "Process exited unexpectedly before completing request" }

Logging

You can use the following codes in function to record logs at different levels:

- console.log()
- console.error()
- console.warn()
- console.info()

Log format

<Timestamp> <Request ID> <Log Level> <Message>

For example, when you run the following code:

```
console.log('hello world');
```

The log output is:

```
2016-08-18T05:38:41.401Z 1234567890 verbose hello world
```

If you have set a Log Service logstore for the service of the function, the "hello world" log from the

preceding example is collected to the configured logstore.

View logs

By using command line tool fcli, you can conveniently view the logs at service or function level. Try the following commands in fcli shell mode:

- To view logs of a service dimension, run `logs service_name`.
- To view logs of a function dimension, run `logs service_name/function_name`.
- You can also view the logs generated during a certain period. Run `logs --help` for more information.

For more information about how to enable service/function log by using fcli, see [relevant documentation](#).

API reference

Request parameter

Request headers

Parameter name	Description	Required
Host	Format: \${accountID}.\${region}.fc.aliyuncs.com, accountID is your Alibaba Cloud account ID, and region is the region where your Function Compute instance locates. For a detailed example, see service entry .	Yes
Date	Request time, in UTC format, for example: Mon, 08 May 2017 02:20:49 UTC.	Yes
Authorization	Signature authorization string. The format is FC \${accessKeyID}:\${signature}. For example: FC LTAIJZbrgNpFmhrr:HeAESktL6PiPGDmZVlpSz5Xe7Zr40JjM	Yes

	uINL5qTyr5M=. For more information about how to generate the string, see signature authentication .	
Content-Type	MIME type of the request content. For an InvokeFunction request, the type can be application/json or application/octet-stream. For other requests, the type can only be application/json.	Yes
Content-Length	Length of the request content.	Yes
Content-MD5	MD5 value of the request content.	No

Response headers

Parameter name	Description
X-Fc-Request-Id	Request ID of this request. It is critical for troubleshooting.
Date	Request response time, in UTC format.
Content-Type	MIME type of the response content. For an InvokeFunction request, the type is application/octet-stream. For other requests, the type is application/json.
Content-Length	Length of the response content.

Authorization

For every request, Function Compute (FC) checks the Authorization field in the request headers for the request authorization. Only requests from clients that use the same signature algorithm as the FC server can pass verification. For a request that neither contains a signature header nor has a valid signature, Function Compute returns a HTTP 403 error.

Signature algorithm

```
signature = base64(hmac-sha256(HTTP_METHOD + "\n"
```

```
+ CONTENT-MD5 + "\n"
+ CONTENT-TYPE + "\n"
+ DATE + "\n"
+ CanonicalizedFCHeaders
+ CanonicalizedResource))
```

```
Authorization = "FC " + accessKeyID + ":" + signature
```

- HTTP_METHOD indicates the HTTP Method in uppercase (such as PUT, GET, POST, and DELETE).
- CONTENT-MD5 indicates the MD5 value of the request content. If the request header does not contain Content-MD5, leave this field blank.
- CONTENT-TYPE indicates the request content type.
- DATE indicates the time of request occurred. It cannot be blank and only currently supports the GMT format.
 - Note: The difference between the DATE that is provided by clients and the system time of the FC server processing the request must be less than 15 minutes. Otherwise, FC rejects the request.
- CanonicalizedFCHeaders indicates a string that consists of all the HTTP headers prefixed with x-fc-. The following section describes how the string is generated.
- CanonicalizedResource indicates the request URL path, for example, /2016-08-15/services/my-service/functions?limit=100.
- hmac-sha256 uses your AccessKeySecret as its key.

CanonicalizedFCHeaders

Follow these steps to generate CanonicalizedFCHeaders:

1. Locate all the fields starting with x-fc- in request headers (case insensitive).
 - For fields that match the specified prefix, convert the field names into lowercase letters, and then sort these field names by ascending order.
2. Generate a string \${key}:\${value}\n for each field,
 - \${key} is the key of the HTTP header (in lowercase).
 - \${value} is the value of the HTTP header.
 - For example: X-Fc-Invocation-Type: Sync is converted to x-fc-invocation-type:Sync\n.
3. Combine all previously generated strings into a new string.

The following pseudocode details CanonicalizedFCHeaders generation:

```
// javascript
// prefix = 'x-fc-'
function buildCanonicalHeaders(headers, prefix) {
  var list = [];
  var keys = Object.keys(headers);
  for (let i = 0; i < keys.length; i++) {
    var key = keys[i];
```

```
if (key.startsWith(prefix)) {  
  list.push(key);  
}  
}  
list.sort();  
  
var canonical = '';  
for (let i = 0; i < list.length; i++) {  
  const key = list[i];  
  canonical += `${key}:${headers[key]}\n`;  
}  
  
return canonical;  
}
```

Sample request

Request:

```
GET /2016-08-15/services?limit=100&nextToken=&prefix=&startKey= HTTP/1.1  
Host: 1237050315505682.fc.cn-shanghai.aliyuncs.com  
User-Agent: go-sdk-0.1  
Accept: application/json  
Authorization: FC LTAIUyt0Yeq1rgqo:GBmoz6OwC7bobTID1jboBZ9PkaZ1e4cKsQ+5/dLLTns=  
Date: Mon, 08 May 2017 03:08:31 GMT  
X-User-Agent: go-resty v0.11 - https://github.com/go-resty/resty  
Accept-Encoding: gzip
```

Response:

```
HTTP/1.1 200 OK  
Content-Type: application/json; charset=utf-8  
X-Fc-Request-Id: ab7c7602-0922-f04f-b4ee-923cd7df7fb0  
Date: Mon, 08 May 2017 03:08:31 GMT  
Transfer-Encoding: chunked
```

Sample code

You can also see released SDKs for FC signature generation:

- fc-nodejs-sdk

API specification

Alibaba Cloud Function Compute API Specification

Overview

Version information

Version : 0.1

URI scheme

Host : \$account-id.\$region.fc.aliyuncs.com *BasePath* : /2016-08-15 *Schemes* : HTTP, HTTPS

Tags

- Service : Service operations
- Function : Function operations
- Trigger : Trigger operations

Consumes

- application/json

Produces

- application/json

Resources

Service

Service operations

CreateService

ListServices

GetService

UpdateService

DeleteService

Function

Function operations

CreateFunction

ListFunctions

GetFunction

UpdateFunction

DeleteFunction

GetFunctionCode

InvokeFunction

Trigger

Trigger operations

CreateTrigger

ListTriggers

GetTrigger

UpdateTrigger

DeleteTrigger

Operations

CreateFunction

```
POST /services/{serviceName}/functions
```

Description

Create a function

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Path	serviceName <i>required</i>	Service name	string
Body	body <i>required</i>	Function resource	Function

Responses

HTTP Code	Description	Schema
200	Successfully created the resource. Headers : ETag (string) : Ensures that the function that will be updated or deleted matches the etag.	FunctionResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error

404	Service does not exist. Error code is ServiceNotFound.	Error
409	Function already exists. Error code is FunctionAlreadyExists.	Error
500	Internal server error. Error code is InternalServerError.	Error

CreateService

POST /services

Description

create service

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Body	body <i>required</i>	Service resource	Service

Responses

HTTP Code	Description	Schema
200	Successfully created the resource. Headers : ETag (string) : Ensures that the service that will be updated or deleted matches the etag.	ServiceResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
409	Service already exists. Error code is ServiceAlreadyExists.	Error
500	Internal server error. Error	Error

	code is InternalServerError.	
--	------------------------------	--

CreateTrigger

POST /services/{serviceName}/functions/{functionName}/triggers

Description

Create a trigger

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string
Body	body <i>required</i>	Trigger resource	Trigger

Responses

HTTP Code	Description	Schema
200	Successfully created the resource Headers : ETag (string) : Ensures that the trigger that will be updated or deleted matches the etag.	TriggerResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service or function does not exist. Error code is ServiceNotFound , FunctionNotFound.	Error
409	Trigger already exists. Error	Error

	code is TriggerAlreadyExists.	
500	Internal server error. Error code is InternalServerError.	Error

DeleteFunction

```
DELETE /services/{serviceName}/functions/{functionName}
```

Description

Deletes the function

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Header	If-Match <i>optional</i>	Ensures the resource that' s to be updated is the requested one. The value is included in the Create/Get/Update Service/Function/Trigger API response.	string
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string

Responses

HTTP Code	Description	Schema
204	Successfully deleted the requested resource.	No Content
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service or function does not	Error

	exist. Error code is ServiceNotFound , Function NotFound.	
409	Function has at least one trigger. Error code is FunctionNotEmpty.	Error
500	Internal server error. Error code is InternalServerError.	Error

DeleteService

DELETE /services/{serviceName}

Description

Deletes the service

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Header	If-Match <i>optional</i>	Ensures the resource that' s to be updated is the requested one. The value is included in the Create/Get/Update Service/Function/Trigger API response.	string
Path	serviceName <i>required</i>	Service name	string

Responses

HTTP Code	Description	Schema
204	Successfully deleted the requested resource.	No Content
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch ,	Error

	RequestTimeTooSkewed.	
404	Service does not exist. Error code is ServiceNotFound.	Error
409	Service has at least one function. Error code is ServiceNotEmpty.	Error
500	Internal server error. Error code is InternalServerError.	Error

DeleteTrigger

```
DELETE /services/{serviceName}/functions/{functionName}/triggers/{triggerName}
```

Description

Deletes the trigger

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Header	If-Match <i>optional</i>	Ensures the resource that' s to be updated is the requested one. The value is included in the Create/Get/Update Service/Function/Trigger API response.	string
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string
Path	triggerName <i>required</i>	Trigger name	string

Responses

HTTP Code	Description	Schema
204	Successfully deleted the requested resource.	No Content

400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service , function , trigger does not exist. Error code is ServiceNotFound , FunctionNotFound , TriggerNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

GetFunction

```
GET /services/{serviceName}/functions/{functionName}
```

Description

Get function resource

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string

Responses

HTTP Code	Description	Schema
200	Successfully retrieved the function Headers : ETag (string) : Ensures that the function that will be updated or deleted matches the etag.	FunctionResponse
400	Invalid arguments. Error code is InvalidArgument.	Error

403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service or function does not exist. Error code is ServiceNotFound , FunctionNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

GetFunctionCode

GET /services/{serviceName}/functions/{functionName}/code

Description

Get function code

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string

Responses

HTTP Code	Description	Schema
200	Successfully retrieved function	FunctionCodeResponse
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service or function does not exist. Error code is ServiceNotFound , FunctionNotFound.	Error

500	Internal server error. Error code is InternalServerError.	Error
-----	---	-------

GetService

GET /services/{serviceName}

Description

Get service information

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Path	serviceName <i>required</i>	Service name	string

Responses

HTTP Code	Description	Schema
200	Successfully retrieved the service Headers : ETag (string) : Ensures that the service that will be updated or deleted matches the etag.	ServiceResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service does not exist. Error code is ServiceNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

GetTriaaer

```
GET /services/{serviceName}/functions/{functionName}/triggers/{triggerName}
```

Description

Get trigger resource

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string
Path	triggerName <i>required</i>	Trigger name	string

Responses

HTTP Code	Description	Schema
200	Successfully retrieved trigger Headers : ETag (string) : Ensures that the trigger that will be updated or deleted matches the etag.	TriggerResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service , function , trigger does not exist. Error code is ServiceNotFound , FunctionNotFound , TriggerNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

InvokeFunction

POST /services/{serviceName}/functions/{functionName}/invocations

Description

Invoke function synchronously or asynchronously

Parameters

Type	Name	Description	Schema	Default
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string	
Header	X-Fc-Invocation-Type <i>optional</i>	Invocation type, Sync or Async. Defaults to Sync.	string	"Sync"
Path	functionName <i>required</i>	Function name	string	
Path	serviceName <i>required</i>	Service name	string	
Body	body <i>required</i>	Event , binary type. This value is passed to function without any transformation. It' s function' s responsibility to interpret the value.	object	

Responses

HTTP Code	Description	Schema
200	Successfully invoked function synchronously. Headers : X-Fc-Error-Type (string) : Error type, including HandledInvocationError and UnhandledInvocationError.	InvokeResponse
202	The async invocation request has been accepted, and the corresponding function will be invoked as soon as possible.	No Content
403	Denied requests. Error code	Error

	is AccessDenied , InvalidAccess KeyId , SignatureNotMatch , RequestTimeTooSkewed.	
404	Service or function does not exist. Error code is ServiceNotFound , Function NotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

ListFunctions

GET /services/{serviceName}/functions

Description

Retrieve function records

Parameters

Type	Name	Description	Schema	Default
Header	Host <i>required</i>	Host name, \$account- id.\$region.fc.ali yuncs.com	string	
Path	serviceName <i>required</i>	Service name	string	
Query	limit <i>optional</i>	Limits the number of returned resource records. Defaults to 20 and cannot exceed 100.	integer (int32)	20
Query	nextToken <i>optional</i>	Is used to query more resource records. The token is included in the List API response.	string	
Query	prefix <i>optional</i>	Limits the resource names that begin with the specified	string	

		prefix.		
Query	startKey <i>optional</i>	Specifies the resource name where to start the query.	string	

Responses

HTTP Code	Description	Schema
200	Successfully retrieved functions	Response 200
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service does not exist. Error code is ServiceNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

Response 200

Name	Schema
functions <i>optional</i>	<functions > array
nextToken <i>optional</i>	NextToken

functions

Name	Description	Schema
codeChecksum <i>optional</i>	The checksum (crc64) of the function code. Example : "5434025278388143772"	string
codeSize <i>optional</i>	The size of the function code, in bytes. Example : 1024	integer (int64)
createdTime <i>optional</i>	The UTC time string indicating the time the function was created Example : "2016-08-15T15:00:00.000+0000"	string

description <i>optional</i>	Example : "This is a demo hello world function."	string
functionId <i>optional</i>	A unique id generated by Function Compute to identify a function. Example : "2d28e0e9-9ba5-4eed-8b1a-d3d9cd24e737"	string
functionName <i>optional</i>	Example : "helloworld"	string
handler <i>optional</i>	The function execution entry point. Example : "hello_world.main"	string
lastModifiedTime <i>optional</i>	The UTC time string indicating the last time the function was updated Example : "2016-08-15T17:00:00.000+0000"	string
memorySize <i>optional</i>	The amount of memory that' s used to execute function, in MB. Function Compute uses this value to allocate CPU resources proportionally. Example : 512	integer (int32)
runtime <i>optional</i>	The function runtime environment. Supporting nodejs6, nodejs8, python2.7, python3, java8 Example : "nodejs4.4"	string
timeout <i>optional</i>	The maximum time duration a function can execute, in seconds. After which Function Compute terminites the execution. Example : 10	integer (int32)

ListServices

GET /services

Description

Retrieve service records

Parameters

Type	Name	Description	Schema	Default
Header	Host	Host name,	string	

	<i>required</i>	\$account-id.\$region.fc.aliyuncs.com		
Query	limit <i>optional</i>	Limits the number of returned resource records. Defaults to 20 and cannot exceed 100.	integer (int32)	20
Query	nextToken <i>optional</i>	Is used to query more resource records. The token is included in the List API response.	string	
Query	prefix <i>optional</i>	Limits the resource names that begin with the specified prefix.	string	
Query	startKey <i>optional</i>	Specifies the resource name where to start the query.	string	

Responses

HTTP Code	Description	Schema
200	Successfully retrieved services	Response 200
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
500	Internal server error. Error code is InternalServerError.	Error

Response 200

Name	Schema
nextToken <i>optional</i>	NextToken

services <i>optional</i>	<services > array
------------------------------------	-------------------

services

Name	Description	Schema
createdTime <i>optional</i>	The UTC time string indicating the time the service was created. Example : "2016-08-15T16:06:05.000+0000"	string
description <i>optional</i>	Service description Example : "This is a demo service."	string
internetAccess <i>optional</i>	Set it to true to enable internet access. Example : true	boolean
lastModifiedTime <i>optional</i>	The UTC time string indicating the last time the function was updated Example : "2016-08-16T18:00:00.000+0000"	string
logConfig <i>optional</i>	Log configuration. Function Compute pushes function execution logs to the configured log store.	LogConfig
role <i>optional</i>	The role grants Function Compute the permission to access user' s cloud resources, such as pushing logs to user' s log store. The temporary STS token generated from this role can be retrieved from function context and used to access cloud resources. Example : "acs:ram::1234567890:role/fc-test"	string
serviceId <i>optional</i>	A unique id generated by Function Compute to identify a service. Example : "2d28e0e9-9ba5-4eed-8b1a-d3d9cd24e737"	string
serviceName <i>optional</i>	Example : "demo-service"	string
vpcConfig <i>optional</i>	VPC configuration. Function Compute uses the config to setup ENI in the specific VPC.	VPCCConfig

ListTriggers

GET /services/{serviceName}/functions/{functionName}/triggers

Description

Retrieve trigger records

Parameters

Type	Name	Description	Schema	Default
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string	
Path	functionName <i>required</i>	Function name	string	
Path	serviceName <i>required</i>	Service name	string	
Query	limit <i>optional</i>	Limits the number of returned resource records. Defaults to 20 and cannot exceed 100.	integer (int32)	20
Query	nextToken <i>optional</i>	Is used to query more resource records. The token is included in the List API response.	string	
Query	prefix <i>optional</i>	Limits the resource names that begin with the specified prefix.	string	
Query	startKey <i>optional</i>	Specifies the resource name where to start the query.	string	

Responses

HTTP Code	Description	Schema
-----------	-------------	--------

200	Successfully retrieved functions	Response 200
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service or function does not exist. Error code is ServiceNotFound , FunctionNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

Response 200

Name	Schema
nextToken <i>optional</i>	NextToken
triggers <i>optional</i>	<TriggerResponse > array

UpdateFunction

```
PUT /services/{serviceName}/functions/{functionName}
```

Description

Update the function

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Header	If-Match <i>optional</i>	Ensures the resource that' s to be updated is the requested one. The value is included in the Create/Get/Update Service/Function/Tri	string

		gger API response.	
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string
Body	function <i>required</i>	Function object that's to be updated	FunctionUpdateFields

Responses

HTTP Code	Description	Schema
200	Successfully updated function Headers : ETag (string) : Ensures that the function that will be updated or deleted matches the etag.	FunctionResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service or function does not exist. Error code is ServiceNotFound , FunctionNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

UpdateService

```
PUT /services/{serviceName}
```

Description

Update the service

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-	string

		id.\$region.fc.aliyuncs.com	
Header	If-Match <i>optional</i>	Ensures the resource that' s to be updated is the requested one. The value is included in the Create/Get/Update Service/Function/Trigger API response.	string
Path	serviceName <i>required</i>	Service name	string
Body	body <i>required</i>	Service object that will be updated.	ServiceUpdateFields

Responses

HTTP Code	Description	Schema
200	Successfully updated the service Headers : ETag (string) : Ensures that the service that will be updated or deleted matches the etag.	ServiceResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service does not exist. Error code is ServiceNotFound.	Error
500	Internal server error. Error code is InternalServerError.	Error

UpdateTrigger

```
PUT /services/{serviceName}/functions/{functionName}/triggers/{triggerName}
```

Description

Update the trigger

Parameters

Type	Name	Description	Schema
Header	Host <i>required</i>	Host name, \$account-id.\$region.fc.aliyuncs.com	string
Header	If-Match <i>optional</i>	Ensures the resource that' s to be updated is the requested one. The value is included in the Create/Get/Update Service/Function/Trigger API response.	string
Path	functionName <i>required</i>	Function name	string
Path	serviceName <i>required</i>	Service name	string
Path	triggerName <i>required</i>	Trigger name	string
Body	body <i>required</i>	Trigger object that will be updated.	TriggerUpdateFields

Responses

HTTP Code	Description	Schema
200	Successfully updated the trigger Headers : ETag (string) : Ensures that the trigger that will be updated or deleted matches the etag.	TriggerResponse
400	Invalid arguments. Error code is InvalidArgument.	Error
403	Denied requests. Error code is AccessDenied , InvalidAccessKeyId , SignatureNotMatch , RequestTimeTooSkewed.	Error
404	Service , function , trigger does not exist. Error code is ServiceNotFound , FunctionNotFound , TriggerNotFound.	Error
500	Internal server error. Error	Error

	code is InternalServerError.	
--	------------------------------	--

Definitions

Code

Provides two ways to upload code 1. By specifying the OSS BucketName and ObjectName 2. By specifying zipFile with base64 encoded zip file content.

Name	Description	Schema
ossBucketName <i>optional</i>	OSS bucket name	string
ossObjectName <i>optional</i>	OSS object name	string
zipFile <i>optional</i>	Base64 encoded zip file content	string

Error

Error

Name	Description	Schema
errorCode <i>optional</i>	Error code	string
errorMessage <i>optional</i>	Error message	string

Function

Name	Description	Schema
code <i>required</i>	The code that contains the function implementation.	Code
description <i>optional</i>		string
functionName <i>required</i>	Function name	string
handler <i>required</i>	The function execution entry point.	string
memorySize	The amount of memory	integer

<i>optional</i>	that' s used to execute function, in MB. Function Compute uses this value to allocate CPU resources proportionally. Defaults to 128MB. It should be multiple of 64 MB and between 128MB and 3072MB.	
runtime <i>required</i>	The function runtime environment. Supporting nodejs6, nodejs8, python2.7, python3, java8	string
timeout <i>optional</i>	The maximum time duration a function can execute, in seconds. After which Function Compute terminates the execution. Defaults to 3 seconds, and should be between 1 to 300 seconds.	integer

FunctionCodeResponse

Name	Description	Schema
checksum <i>optional</i>	crc64 checksum Example : "1234567890"	string
url <i>optional</i>	A pre-signed OSS url that can be used to download function code. Example : "http://func-code.oss-cn-shanghai.aliyuncs.com/1a2b3c4d5e6f"	string

FunctionResponse

Name	Description	Schema
codeChecksum <i>optional</i>	The checksum (crc64) of the function code. Example : "5434025278388143772"	string
codeSize <i>optional</i>	The size of the function code, in bytes. Example : 1024	integer (int64)
createdTime <i>optional</i>	The UTC time string indicating the time the function was created	string

	Example : "2016-08-15T15:00:00.000+0000"	
description <i>optional</i>	Example : "This is a demo hello world function."	string
functionId <i>optional</i>	A unique id generated by Function Compute to identify a function. Example : "2d28e0e9-9ba5-4eed-8b1a-d3d9cd24e737"	string
functionName <i>optional</i>	Function Name Example : "helloworld"	string
handler <i>optional</i>	The function execution entry point. Example : "hello_world.main"	string
lastModifiedTime <i>optional</i>	The UTC time string indicating the last time the function was updated Example : "2016-08-15T17:00:00.000+0000"	string
memorySize <i>optional</i>	The amount of memory that's used to execute function, in MB. Function Compute uses this value to allocate CPU resources proportionally. Example : 512	integer (int32)
runtime <i>optional</i>	The function runtime environment. Supporting nodejs6, nodejs8, python2.7, python3, java8. Example : "nodejs4.4"	string
timeout <i>optional</i>	The maximum time duration a function can execute, in seconds. After which Function Compute terminates the execution. Example : 10	integer (int32)

FunctionUpdateFields

Function update fields

Name	Description	Schema
code <i>optional</i>	The code that contains the function implementation.	Code
description <i>optional</i>		string

handler <i>optional</i>	The function execution entry point.	string
memorySize <i>optional</i>	The amount of memory that' s used to execute function, in MB. Function Compute uses this value to allocate CPU resources proportionally. Defaults to 128MB. It should be multiple of 64 MB and between 128MB and 3072MB.	integer
runtime <i>optional</i>	The function runtime environment. Supporting nodejs6, nodejs8, python2.7, python3, java8	string
timeout <i>optional</i>	The maximum time duration function can execute, in seconds. After which Function Compute terminates the execution. Defaults to 3 seconds, and should be between 1 to 300 seconds.	integer

InvokeResponse

The response of invoke function. It' s in binary format. Users should interpret the data according to their function implementation.

Type : binary

LogConfig

Log configuration

Name	Description	Schema
logstore <i>optional</i>	The log store name of Logs service	string
project <i>optional</i>	The project name of Logs service	string

NextToken

Is used to query more resource records.

Type : string

Service

Service resource

Name	Description	Schema
description <i>optional</i>	Service description	string
internetAccess <i>optional</i>	Set it to true to enable internet access. Example : true	boolean
logConfig <i>optional</i>	Log configuration. Function Compute pushes function execution logs to the configured log store.	LogConfig
role <i>optional</i>	The role grants Function Compute the permission to access user' s cloud resources, such as pushing logs to user' s log store. The temporary STS token generated from this role can be retrieved from function context and used to access cloud resources. Example : "acs:ram::1234567890:role/fc-test"	string
serviceName <i>required</i>	Service name	string
vpcConfig <i>optional</i>	VPC configuration. Function Compute uses the config to setup ENI in the specific VPC.	VPCCConfig

ServiceResponse

Name	Description	Schema
createdTime <i>optional</i>	The UTC time string indicating the time the service was created Example : "2016-08-15T16:06:05.000+0000"	string
description <i>optional</i>	Service description Example : "This is a demo service."	string

internetAccess <i>optional</i>	Set it to true to enable internet access. Example : true	boolean
lastModifiedTime <i>optional</i>	The UTC time string indicating the last time the service was updated Example : "2016-08-16T18:00:00.000+0000"	string
logConfig <i>optional</i>	Log configuration. Function Compute pushes function execution logs to the configured log store.	LogConfig
role <i>optional</i>	The role grants Function Compute the permission to access user' s cloud resources, such as pushing logs to user' s log store. The temporary STS token generated from this role can be retrieved from function context and used to access cloud resources. Example : "acs:ram::1234567890:role/fc-test"	string
serviceId <i>optional</i>	A unique id generated by Function Compute to identify a service. Example : "2d28e0e9-9ba5-4eed-8b1a-d3d9cd24e737"	string
serviceName <i>optional</i>	Example : "demo-service"	string
vpcConfig <i>optional</i>	VPC configuration. Function Compute uses the config to setup ENI in the specific VPC.	VPCCConfig

ServiceUpdateFields

Service resource that can be updated.

Name	Description	Schema
description <i>optional</i>		string
internetAccess <i>optional</i>	Set it to true to enable internet access. Example : true	boolean
logConfig <i>optional</i>	Log configuration. Function Compute pushes function	LogConfig

	execution logs to the configured log store.	
role <i>optional</i>	The role grants Function Compute the permission to access user's cloud resources, such as pushing logs to user's log store. The temporary STS token generated from this role can be retrieved from function context and used to access cloud resources. Example : "acs:ram::1234567890:role/fc-test"	string
vpcConfig <i>optional</i>	VPC configuration. Function Compute uses the config to setup ENI in the specific VPC.	VPCConfig

Trigger

Name	Description	Schema
invocationRole <i>required</i>	The role grants event source the permission to invoke function on behalf of user. This is optional for some triggers. Example : "acs:ram::1234567890:role/fc-test"	string
sourceArn <i>required</i>	The Aliyun Resource Name (ARN) of event source. This is optional for some triggers. Example : "acs:oss:cn-shanghai:12345:mybucket"	string
triggerConfig <i>required</i>	Event source specific trigger configuration. The value is different according to trigger type.	object
triggerName <i>required</i>	Trigger name Example : "image_resize"	string
triggerType <i>required</i>	Trigger type, e.g. oss, timer, logs. This determines how the trigger config is interpreted. Example : "oss"	string

TriggerResponse

Name	Description	Schema
createdTime <i>optional</i>	The UTC time string indicating the time the trigger was created Example : "2016-08-15T15:00:00.000+0000"	string
invocationRole <i>optional</i>		string
lastModifiedTime <i>optional</i>	The UTC time string indicating the last time the trigger was updated Example : "2016-08-15T17:00:00.000+0000"	string
sourceArn <i>optional</i>		string
triggerConfig <i>optional</i>		object
triggerName <i>optional</i>		string
triggerType <i>optional</i>		string

TriggerUpdateFields

Name	Description	Schema
invocationRole <i>optional</i>	The role grants event source the permission to invoke function on behalf of user. This is optional for some triggers. Example : "acs:ram::1234567890:role/fc-test"	string
triggerConfig <i>optional</i>	Event source specific trigger configuration. The value is different according to trigger type.	object

VPCConfig

VPC configuration

Name	Description	Schema
------	-------------	--------

securityGroupId <i>required</i>	Security group ID	string
vSwitchIds <i>required</i>	List of VSwitch IDs	<string > array
vpcId <i>required</i>	VPC ID	string

SDK

SDK list

Language	Current version
nodejs	
java	
python	

SDKs for more languages are coming soon.

Tools

fccli

fccli is a powerful command line tool that helps you manage your Function Compute resources conveniently.

You can click [here](#) to download fccli. After the installation, you can run fccli shell to go to the shell

mode and complete the initial configurations.

```
fcli shell
Please input the endpoint (example: https://your_account_id.cn-shanghai.fc.aliyuncs.com):
https://123456.cn-shanghai.fc.aliyuncs.com
Please input the access key id:
fakeaccesskeyid
Please input the access key secret:
fakeaccesskeysecret
Store the configuration in: /Users/testuser/.fcli
Welcome to the function compute world. Have fun!
```

Note:

The account ID can be obtained in the console.

If you do not have a valid AccessKey, you can create one in **RAM**. You can use the AccessKey of the primary account, but this action is not recommended.

You can run the help command to view available commands.

```
>>> help

Commands:
attach attach the policy to a role
cd change the current resource
clear clear the screen
config config the fcli
detach detach the policy from a role
exit exit the program
grant grant the permission
help display help
info display the resource detail info
invk invoke the function
logs display the service/function logs
ls list the child resources of the current resource
mkf create the function
mkir create the invocation role
mkl create the log project and store
mkrp create the ram policy
mks create the service
mksr create the service role
mkt create the trigger
pwd display the current resource
rm delete the resource
sbox a sandbox environment for installing the 3rd party libraries and trouble shooting
upf update the function
ups update the service
upt update the trigger
```

For every command, you can run `cmd --help` to view detailed help information.

```
>>> mks --help
-d, --description string service description
--etag string service etag for update
--help
-p, --log-project string loghub project for logging
-l, --log-store string loghub logstore for logging
-r, --role string role arn for oss code copy, function execution and logging
```

In the Service Management, Function Management, and Trigger Management documents under the **Developer guide**, you can learn about more detailed descriptions and examples. If you have any questions, go to the [project](#) for a discussion.

fun

Fun

(have)Fun with Serverless



中文文档

Fun is a development tool for serverless applications. It could help you efficiently arrange cloud resources such as Function Compute, API Gateway, Log Service and so on. You can use it to develop , build and deploy FC by describing relative resources in a template.yml file.

If you want to use the old syntax, please refer to [README.md](#).

Installation

Fun is a command line tool developed by Node.js, however it also support Python, Java or other runtime enviroments. It can be installed by npm:

```
$ npm install @alicloud/fun -g
```

A fun command is available after installed completely. Type fun in the console will print usage:

```
$ fun -h
```

```
Usage: fun [options] [command]
```

The fun tool use template.yml to describe the API Gateway & Function Compute things, then publish it online.

Options:

-v, --version output the version number
-h, --help output usage information

Commands:

config Configure the fun
validate [options] Validate a fun template
deploy Deploy a project to AliCloud
build Build the dependencies

Usage

Before going ahead to develop, you need to create a directory which contains a file named `template.yml`. The directory will as project root directory.

We will define a series of resources in this template file. Resources that can be defined by fun can be found on [fun's specification document](#).

Before using fun, we need to configure it first by typing `fun config` and then following the prompts, configure Account ID, Access Key Id, Secret Access Key and Default Region Name.

After the fun config is completed, fun saves the configuration to the `.fcli/config.yaml` file in the user home directory.

Now you are ready to use the fun command.

Example

Here is an example. First create a `hello.js` file in the project root directory.

```
exports.handler = function(event, context, callback) {  
  var response = {  
    isBase64Encoded: false,  
    statusCode: 200,  
    body: 'hellow wrold'  
  };  
  callback(null, response);  
};
```

Then Let's configure related services. Create a `template.yml` file in the project root directory:

```
ROSTemplateFormatVersion: '2015-09-01'  
Transform: 'Aliyun::Serverless-2018-04-03'  
Resources:  
  fc: # service name  
    Type: 'Aliyun::Serverless::Service'  
    Properties:
```

```
Description: 'fc test'
helloworld: # function name
Type: 'Aliyun::Serverless::Function'
Properties:
Handler: helloworld.handler
Runtime: nodejs8
CodeUri: './'
Timeout: 60

HelloworldGroup: # Api Group
Type: 'Aliyun::Serverless::Api'
Properties:
StageName: RELEASE
DefinitionBody:
'/': # request path
get: # http method
x-aliyun-apigateway-api-name: hello_get # api name
x-aliyun-apigateway-fc:
arn: acs:fc:::services/${fc.Arn}/functions/${helloworld.Arn}/
```

After the template file and code are written, you can use the deploy command to deploy the service, function and api gateway to online.

```
$fun deploy

Waiting for service fc to be deployed...
service fc deploy success
Waiting for api gateway HelloworldGroup to be deployed...
URL: GET http://2c2c4629c42f45a1b73000dd2a8b34b2-cn-shanghai.alicloudapi.com/
stage: RELEASE, deployed, version: 20180627110526681
stage: PRE, undeployed
stage: TEST, undeployed
api gateway HelloworldGroup deploy success
```

Open the browser to access <http://2c2c4629c42f45a1b73000dd2a8b34b2-cn-shanghai.alicloudapi.com/> to view the result.

Configuration

In addition to configuring fun with fun config, you can also configure for fun with environment variables and .env.

The way of using environment variables is very simple. We briefly describe the configuration of fun through .env.

Create a file named .env in the project directory with the following content:

```
ACCOUNT_ID=xxxxxxx
REGION=cn-shanghai
ACCESS_KEY_ID=xxxxxxxxxxx
ACCESS_KEY_SECRET=xxxxxxxxxxx
```

It is recommended that add the .env into .gitignore file to prevent your account credentials be checked into code repository.

Configuring Priority

The priority of the fun configuration is decremented in the following order :

- .env
- environment variables
- ~/.fcli/config.yaml

More examples

You can find more complicated examples here:

- <https://github.com/aliyun/fun/tree/master/examples>
- 十分钟上线-在函数计算上部署基于django开发的个人博客系统

References

- 以函数计算作为 API 网关后端服务
- 函数计算
- API Gateway
- Fun 发布 2.0 新版本啦

License

The MIT License