API Gateway

Service Overview

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Contents

1 APIG Infographics

HUAWEI

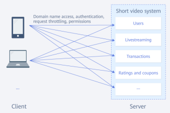
Infographics Show

The Navigator for Every Successful Service System

Background

Most enterprise service systems run on a client-server model, but this only works for simpler services. Complexity means that hundreds of servers must work together and risk problems:

- ☒ Difficult client code maintenance when too many domain names are involved
- ☒ Complex configurations for authentication, request throttling, and permission verification of each service
- ☒ Client reconstruction for splitting services that waste resources



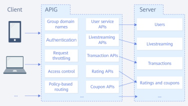
Huawei Cloud solves these issues with API Gateway (APIG). By easily building and managing open service APIs, you can decouple frontend applications from backend services, open your enterprise capabilities to partners, and monetize your services.

What Is APIG?

APIG uses custom APIs to encapsulate internal system architectures. It provides API lifecycle management (development, debugging, and publishing), authentication, access control, and monitoring.

Benefits of hosting short video service APIs on APIG:

- ✓ Unified API group domain names
- ✓ Authentication, request throttling, access control
- ✓ Decoupled client and server that do not need reconstruction in case of backend splitting



Features

Full API Lifecycle Management

Versioning and debugging for dark launch, upgrade, and rollback improves service opening efficiency and reduces development and maintenance costs.

Multiple Authentication Modes

App, IAM, custom, and zero-authentication modes are available for every single request.

Multi-Dimensional Control

Request throttling and access control ensure high performance and security.

Powerful Plug-ins

Cross-origin resource sharing (CORS), HTTP response header management, request throttling, and more ensure stability.

Monitoring

Visualized, real-time API monitoring displays API usage and identifies potential risks.

Advantages

Ease of Use

Create APIs, debug them online, and publish each API in multiple environments for efficient testing and iteration.

Easy Management

Build and deploy APIs at any scale, and manage them throughout design, development, testing, publishing, O&M, release, and removal.

Flexibility and Security

Guard your APIs with app/IAM/custom authentication, strict access, anti-replay, and audit rules. Protect your backend services through flexible, fine-grained quotas and request throttling.

Refined Monitoring

Keep visual track of API calls, latency, and error rates to avoid risking service stability and continuity.

High Adaptability

Call the same API in different scenarios (mobile devices and IoT) using Java, Go, Python, or C SDKs, without making changes to the backend.

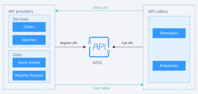
Scenarios

Shared Services and Data

Use standard APIs to expose your services, capabilities, and data to partners in an open ecosystem.

API Economy

Convert your services into standard APIs for monetization, or obtain out-of-the-box APIs to save on R&D and operational investment.

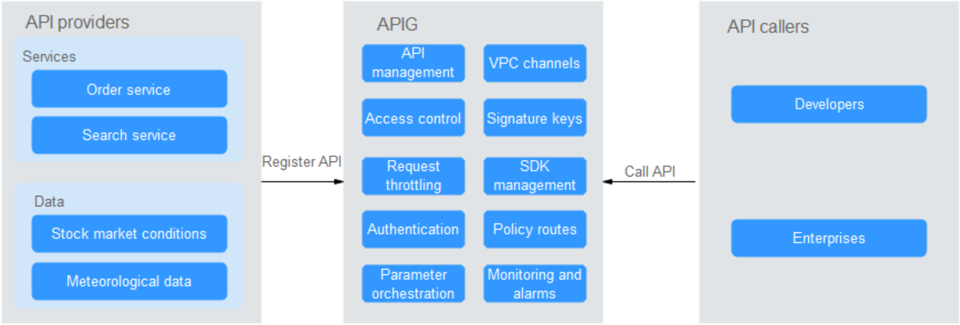


2 What Is APIG?

API Gateway (APIG) is your cloud native gateway service. With APIG, you can build, manage, and deploy APIs at any scale to package your capabilities. With just a few clicks, you can integrate internal systems, monetize service capabilities, and selectively expose capabilities with minimal costs and risks. APIG helps you monetize service capabilities and reduce R&D investment, and enables you to focus on core enterprise services to improve operational efficiency.

- To monetize your VM clusters, data, and microservice clusters, you can open them up by creating APIs in APIG. Then you can provide the APIs for API callers using offline channels.
- You can also obtain open APIs from APIG to reduce your development time and costs.

Figure 2-1 APIG architecture



Product Functions

- **API lifecycle management**

  The lifecycle of an API involves creating, publishing, removing, and deleting the API. API lifecycle management enables you to quickly and efficiently expose service capabilities.

- **Cloud native gateway**

  APIG integrates traffic ingress (Kubernetes Ingress) and microservice governance (Kubernetes Gateway API) in one gateway, improving performance, simplifying the architecture, and reducing deployment and O&M costs.

- **Built-in debugging tool**

  With the built-in debugging tool, you can debug APIs using different HTTP headers and request bodies. This tool simplifies the API development process and reduces the API development and maintenance costs.

- **Version management**

  An API can be published in different environments. Publishing an API again in the same environment will override the API's previous version. APIG displays the publication history (including the version, description, date and time, and environment) of each API. You can roll back an API to any historical version to meet dark launch and version upgrade requirements.

- **Environment variables**

  Environment variables are manageable and specific to environments. Variables of an API will be replaced by the values of the variables in the environment where the API will be published. You can create variables in different environments to call different backend services using the same API.

- **Refined request throttling**
  - For different service demands and user levels, you can control the frequency at which an API can be called by a user, app (credential), or IP address, ensuring that backend services can run stably.
  - Configure different request throttling limits with API path, query, and header parameters.
  - The throttling can be accurate to the second, minute, hour, or day.
  - Set throttling limits for excluded applications (credentials) and tenants.

- **Monitoring and alarms**

  APIG provides visualized, real-time API monitoring, and displays multiple metrics, including number of requests, invocation latency, and number of errors. The metrics help you understand the API usage, allowing you to identify potential service risks.

- **Security**
  - Domain name access can be authenticated with TLS 1.1 and TLS 1.2. mTLS two-way authentication is supported.
  - Access control policies limit API access from specific IP addresses or accounts. You can blacklist or whitelist certain IP addresses and accounts to access your APIs.
  - Circuit breaker policies protect your backend services through degradation if they are abnormal.
  - Identity authentication can be based on AK/SK, function-based custom authorizers, and tokens. APIG verifies your backend services via certificates and is verified by your backend services through signature keys.

- **VPC channels (load balance channels)**

  Virtual Private Cloud (VPC) channels (load balance channels) can be created for accessing resources in VPCs and exposing backend services deployed in VPCs. VPC channels balance API requests to backend services and can be connected to servers and microservice registration centers. Backend load balancing and dark launch policies are supported.

- **Mock response**

  Mock backends simulate API responses for circuit breakers, service degradation, and redirection.

- **HTTP2.0**

  APIG supports HTTP/2, which is a major revision of HTTP and was originally named HTTP 2.0. It provides binary encoding, request multiplexing over a single connection, and request header compression, improving transmission performance and throughput with a lower latency.

  NOTE

  - HTTP 2.0 strongly depends on network stability. To use HTTP 2.0, ensure that your network is stable and your client supports this protocol.
  - If your gateway does not support HTTP 2.0, contact technical support to upgrade it.
  - To disable HTTP 2.0, turn off **HTTP/2** under the **request_custom_config** parameter on the **Parameters** tab page of the APIG console.

  – Binary encoding

    Unlike HTTP 1.x where data is transmitted in text format, data in HTTP 2.0 is split into messages and frames for binary encoding. Compared with string (text) parsing, binary parsing is easier and less error-prone and delivers higher transmission performance.

  – Multiplexing

    With binary encoding, HTTP 2.0 no longer relies on multiple connections to process and send requests and responses concurrently.

    For the same domain name, all requests are completed on a single connection, and each connection can process any number of messages. A message consists of one or more frames, which can be sent out of order and finally recombined based on the stream ID in the header of each frame. This shortens the latency and improves the efficiency.

  – Header compression

    HTTP 2.0 uses an encoder to reduce the size of the headers to transmit. Both the client and server store a header field table to avoid transmitting same headers repeatedly, achieving high throughput.

3 Product Advantages

Available Out-of-the-Box

You can quickly create APIs by configuring the required settings on the APIG console. APIG provides an inline debugging tool to simplify API development, and allows you to publish an API in multiple environments for easy testing and fast iteration.

Convenient API Lifecycle Management

APIG provides full-lifecycle API management, including design, development, test, publish, and O&M, to help you quickly build, manage, and deploy APIs at any scale.

Refined Request Throttling

APIG combines synchronous and asynchronous traffic control and multiple algorithms to throttle requests at the second level. You can flexibly define request throttling policies to ensure stability and continuity of API services.

Simplified Architecture with Higher Performance

APIG integrates the nodes for security, load balancing, inbound traffic governance, and microservice governance, improving performance while reducing deployment and O&M costs.

Operation Quality Assurance

Hosting open APIs of all Huawei Cloud services, APIG helps improve the quality process system with ensured reliability and stability.

Function Invocation

APIG seamlessly works with **FunctionGraph**, enabling you to selectively expose FunctionGraph functions in the form of APIs.

Visualized API Monitoring

APIG monitors the number of API calls, data latency, and number of errors, helping you identify potential service risks.

Comprehensive Security Protection

APIG provides multiple measures to secure API calling, such as Secure Sockets Layer (SSL) transfer, strict access control, IP address blacklist/whitelist, authentication, anti-replay, anti-attack, and multiple audit rules. In addition, APIG implements flexible and refined quota management and request throttling to help you flexibly and securely open your backend services.

Flexible Policy Routes

You can configure backends for an API to forward requests according to multiple policies. This facilitates dark launch and environment management.

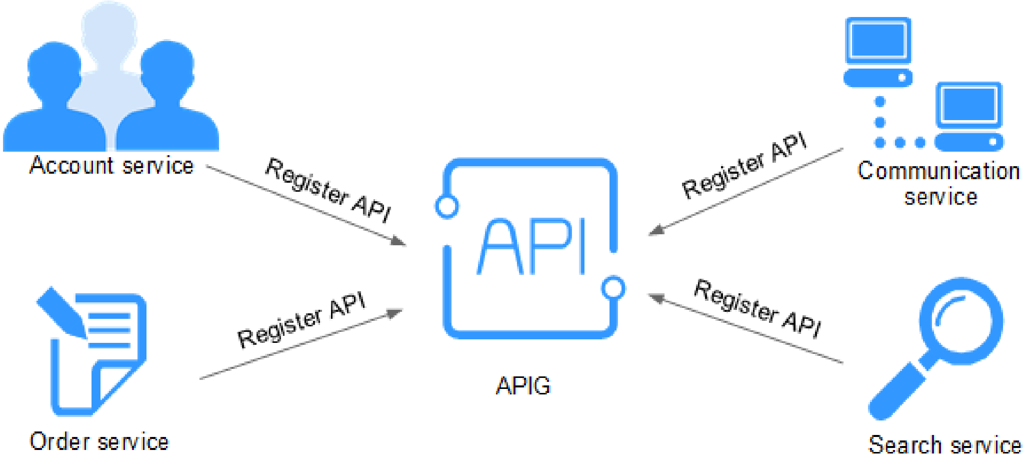
SDKs of Different Programming Languages

SDKs of different programming languages (such as Java, Go, Python, and C) are available for access from clients. Because the backends do not need to be modified, only one system is required to adapt to different service scenarios (such as mobile devices and IoT).

4 Application Scenarios

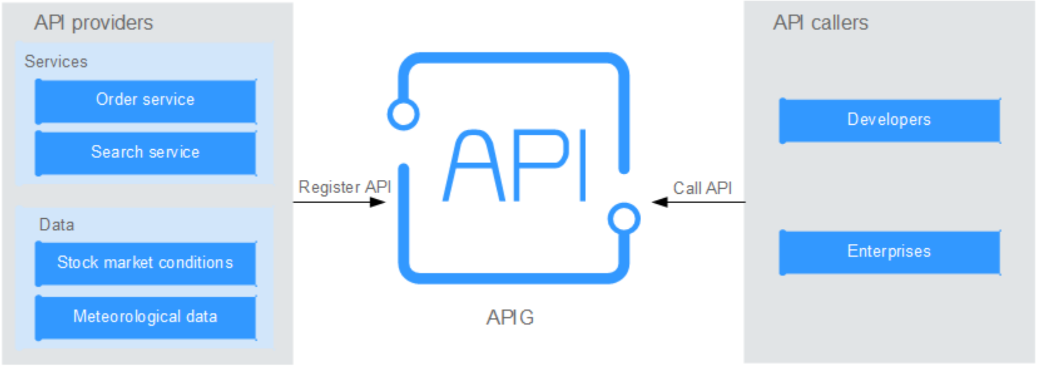
Internal System Decoupling

As enterprises develop rapidly with quick business changes, internal systems of enterprises need to keep pace with the development. However, it is difficult to ensure system universality and stability because internal systems are dependent on each other. APIG uses standard RESTful APIs to simplify the service architecture, decouples internal systems, and separates the frontend from backend. Existing capabilities can be reused to avoid repetitive development.



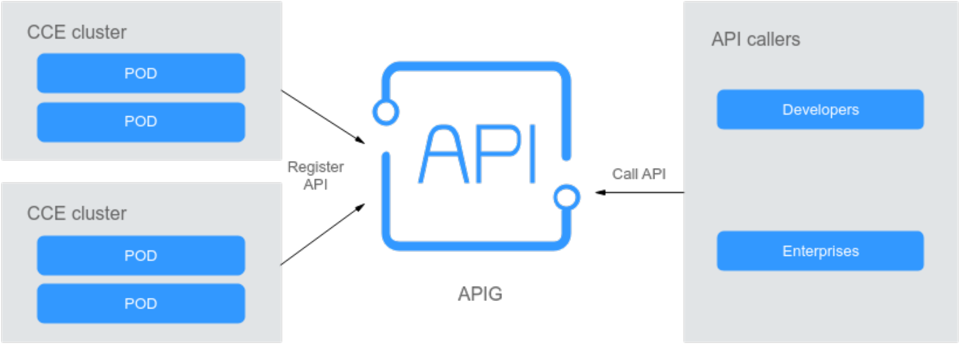
Enterprise Capabilities Opening

An enterprise cannot develop without partners' capabilities, such as a third-party payment platform and partner account login. APIG enables you to selectively expose capabilities to partners by using standard APIs and share services and data with partners to build a new ecosystem.



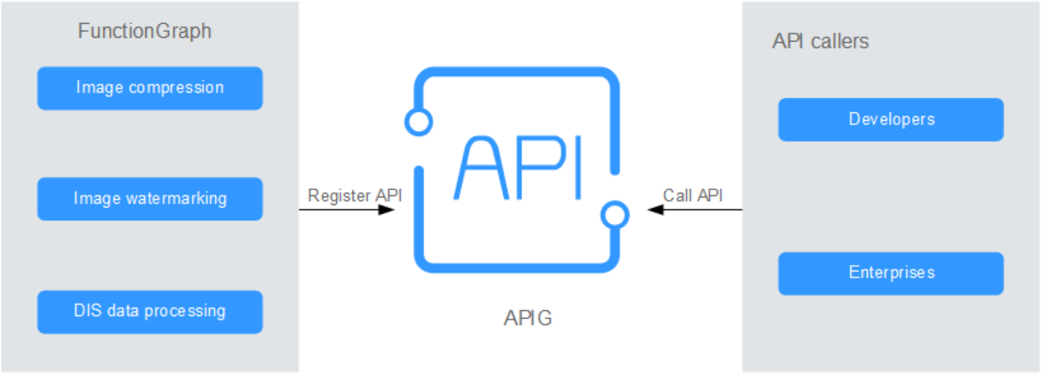
Cloud Native API Opening

APIG can connect to both traditional services and microservice clusters. After **connecting to CCE clusters**, APIG automatically discovers microservices, and routes traffic to microservice containers as specified by load balancing policies for dark launch purposes.



FunctionGraph Services Opening

APIG can also help you selectively expose serverless services (FunctionGraph services) to partners. FunctionGraph services are easier to develop, deploy, and maintain than traditional services. You can use FunctionGraph to quickly build backend service logic, and use APIG to expose service logic functions for linear concurrency expansion.



5 Specifications

Dedicated Gateway Specifications

The query per second (QPS) throughput of a dedicated gateway is affected by multiple factors, such as the response size, whether HTTPS access is enabled, and whether gzip compression is enabled. The following table lists the APIG QPS reference values at 30% CPU usage in non-authentication and single node scenarios.

The **security watermark** enables APIG to maintain high throughput and low latency even when the burst traffic doubles.

Table 5-1 QPS Reference

Edition				Basic	Professional	Enterprise	Platinum	Platinum 2
Connection Type	Number of Response Bytes (KB)	Whether to Use HTTPS	Whether to Use gzip	QPS Reference at 30% CPU Usage				
Non-persistent connection	1	No	No	1,600	3,600	9,000	55,000	72,000
		Yes	No	1,000	1,100	2,800	16,000	20,000
Persistent connection	1	No	No	2,500	4,200	13,000	79,000	105,000
		Yes	No	2,000	4,000	11,000	67,000	95,000
	10	No	No	2,200	4,000	10,000	67,000	85,000
		Yes	No	1,800	3,800	9,500	65,000	80,000

The **bandwidth** and **private network connections** vary depending on the gateway edition. Refer to the following table for optimal settings.

Table 5-2 Bandwidth and connections

Edition	Bandwidth	Private Network Connections per Second
Basic	Single-AZ: 50 Mbit/s Dual-AZ or more: 100 Mbit/s	1,000
Professional	Single-AZ: 100 Mbit/s Dual-AZ or more: 200 Mbit/s	1,000
Enterprise	Single-AZ: 200 Mbit/s Dual-AZ or more: 400 Mbit/s	1,000
Platinum	Single-AZ: 400 Mbit/s Dual-AZ or more: 800 Mbit/s	1,000
Platinum 2	Single-AZ: 2 Gbit/s Dual-AZ or more: 4 Gbit/s	1,000
Platinum 3	Single-AZ: 2 Gbit/s Dual-AZ or more: 4 Gbit/s	1,000
Platinum 4	Single-AZ: 2 Gbit/s Dual-AZ or more: 4 Gbit/s	1,000
Platinum 5	Single-AZ: 2 Gbit/s Dual-AZ or more: 4 Gbit/s	1,000
Platinum 6	Single-AZ: 2 Gbit/s Dual-AZ or more: 4 Gbit/s	1,000
Platinum 7	Single-AZ: 2 Gbit/s Dual-AZ or more: 4 Gbit/s	1,000
Platinum 8	Single-AZ: 2 Gbit/s Dual-AZ or more: 4 Gbit/s	1,000

NOTE

- If some new features (such as gateway specification modification and circuit breaker policy) are not available for the gateway, contact technical support to upgrade it.
- The **default** API-related quotas of dedicated gateways are the same as those of the shared gateway.
- For details about how to modify the specifications of a dedicated gateway, see **Modifying Gateway Specifications**.
- Currently, platinum edition 2 and later are available only in CN North-Beijing4, CN East2, ME-Riyadh, and CN-Hong Kong.

Shared Gateway (Old Console) Specifications

The shared gateway on the old console does not provide any specification settings. View the quotas for creating and using APIs in **Notes and Constraints**.

NOTE

The shared gateway has been brought offline and can be used only by existing users. You are advised to use dedicated gateways.

Differences Between Dedicated and Shared Gateways

APIG provides a shared gateway and dedicated gateways. You can use the shared gateway right out of the box or purchase dedicated gateways to manage APIs.

Dedicated gateways facilitate decoupling internal systems within an enterprise. Services deployed in VPCs communicate with each other through RESTful APIs with high network security. Dedicated gateways support the deployment of frontend or backend services on public networks, and these services can be accessed using elastic IPs (EIPs).

Table 5-3 Basic differences between the shared and dedicated API gateways

Dimension	Shared Gateway	Dedicated Gateway
Billing item	API calls and public network traffic.	Specifications and public network egress bandwidth.
Network access	APIs are accessed over public networks.	Gateways run in VPCs. APIs in a VPC are called using the access address of the VPC. You can enable access to API resources in a gateway over public networks or access to resources on public networks through APIs in a gateway.
Target users	Small enterprises that have low physical isolation requirements and want to selectively expose API capabilities.	Large and medium enterprises that want to selectively expose and call internal APIs. Dedicated gateways are deployed in physically isolated clusters with different bandwidths for inbound and outbound access.

The following table shows the **functional differences** between the shared and dedicated API gateways.

Table 5-4 Functional differences between the shared and dedicated API gateways

Category	Feature	Shared Gateway	Dedicated Gateway
Basic functions	Refined request throttling	√	√
	Access control by IP address and account	√	√
	Security authentication	√	√
	API lifecycle management	√	√
	Custom domain names	√	√
	Swagger API import and export	√	√
	VPC channels (load balance channels)	√	√
	API parameter orchestration	√	√
	API group variable management	√	√
Advanced functions	Custom authentication	√	√
	Policy-based routing	√	√
	API monitoring	√	√
	Backend load balancing	×	√
	Internal API management	×	√
	Access to backend services in private clouds	×	√
	Service access through Direct Connect	×	√
	Plug-ins	×	√
	Log analysis	×	√

Category	Feature	Shared Gateway	Dedicated Gateway
Performance indicators	**Physically isolated clusters**	×	√
	Different bandwidths for inbound and outbound access	×	√
	TPS	200	4,000–10,000

6 Security

6.1 Shared Responsibilities

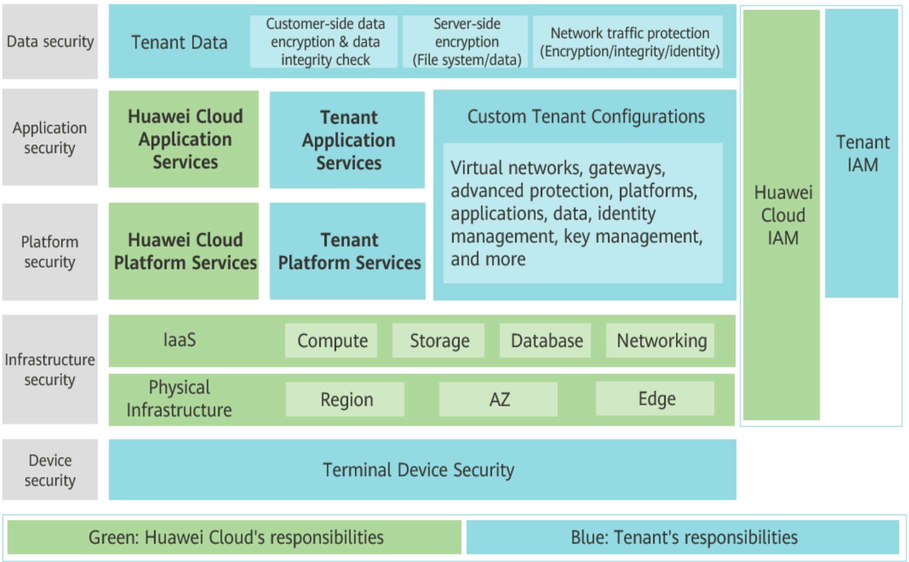
Huawei guarantees that its commitment to cyber security will never be outweighed by the consideration of commercial interests. To cope with emerging cloud security challenges and pervasive cloud security threats and attacks, Huawei Cloud builds a comprehensive cloud service security assurance system for different regions and industries based on Huawei's unique software and hardware advantages, laws, regulations, industry standards, and security ecosystem.

Figure 6-1 illustrates the responsibilities shared by Huawei Cloud and users.

- **Huawei Cloud**: Ensure the security of cloud services and provide secure clouds. Huawei Cloud's security responsibilities include ensuring the security of our IaaS, PaaS, and SaaS services, as well as the physical environments of the Huawei Cloud data centers where our IaaS, PaaS, and SaaS services operate. Huawei Cloud is responsible for not only the security functions and performance of our infrastructure, cloud services, and technologies, but also for the overall cloud O&M security and, in the broader sense, the security and compliance of our infrastructure and services.
- **Tenant**: Use the cloud securely. Tenants of Huawei Cloud are responsible for the secure and effective management of the tenant-customized configurations of cloud services including IaaS, PaaS, and SaaS. This includes but is not limited to virtual networks, the OS of virtual machine hosts and guests, virtual firewalls, API Gateway, advanced security services, all types of cloud services, tenant data, identity accounts, and key management.

Huawei Cloud Security White Paper elaborates on the ideas and measures for building Huawei Cloud security, including cloud security strategies, the shared responsibility model, compliance and privacy, security organizations and personnel, infrastructure security, tenant service and security, engineering security, O&M security, and ecosystem security.

Figure 6-1 Huawei Cloud shared security responsibility model


Data security
Tenant Data
Customer-side data encryption & data integrity check
Server-side encryption (File system/data)
Network traffic protection (Encryption/integrity/identity)
Application security
Huawei Cloud Application Services
Tenant Application Services
Custom Tenant Configurations
Virtual networks, gateways, advanced protection, platforms, applications, data, identity management, key management, and more
Platform security
Huawei Cloud Platform Services
Tenant Platform Services
Infrastructure security
IaaS
Compute
Storage
Database
Networking
Physical Infrastructure
Region
AZ
Edge
Huawei Cloud IAM
Tenant IAM
Device security
Terminal Device Security
Green: Huawei Cloud's responsibilities
Blue: Tenant's responsibilities

6.2 Identity Authentication and Access Control

Identity Authentication

AK/SK and token **authentication**

Custom authentication

Backend service **certificate verification**

Identity authentication with signature keys

Access Control

API request throttling by credential, API, or IP address

System- and API-level IP **blacklist/whitelist**

Load balancing and **automatic fallbreak**

6.3 Data Protection

Secure network transmission through HTTPS; backend service access through secure channels

Anti-replay and anti-tampering with internal algorithms

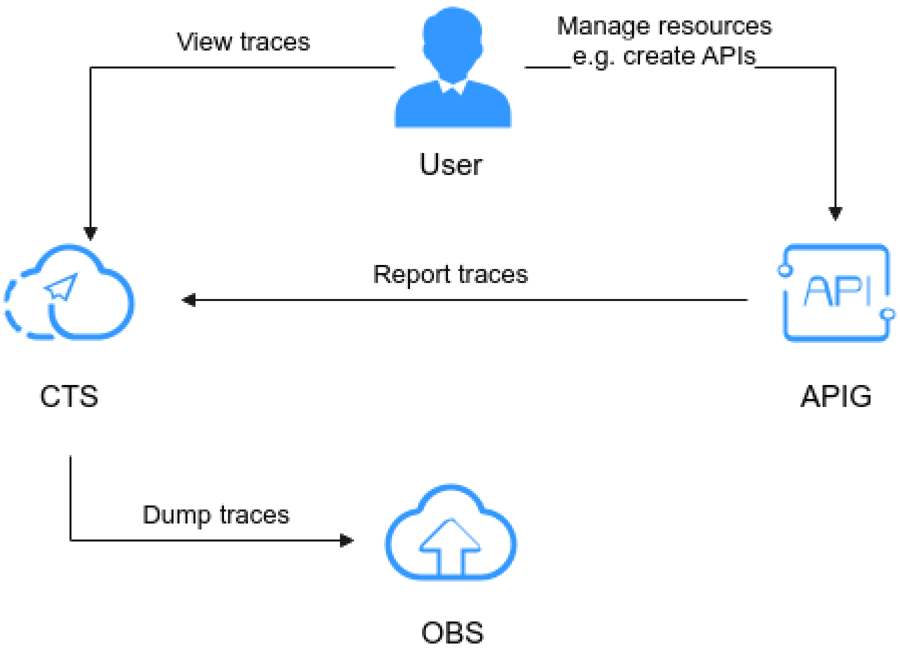
6.4 Audit and Logs

Audit

Cloud Trace Service (CTS) records operations on the cloud resources in your account. You can use the logs generated by CTS to perform security analysis, trace resource changes, audit compliance, and locate faults.

After you enable CTS, it starts recording operations on APIG resources and stores the operation records of the last seven days. For details about the APIG operations that can be recorded by CTS, see **APIG Operations Recorded by CTS**.

Figure 6-2 CTS



For details about how to enable and configure CTS, see **Enabling CTS**.

For details about how to view CTS logs, see **Querying Audit Logs**.

Logs

APIG supports custom log analysis templates, which you can use to collect and manage logs and trace and analyze API request exceptions.

For details about how to configure APIG log collection, see **Log Analysis**.

6.5 Security Risk Monitoring

Cloud Eye provides multi-dimensional monitoring for your resources on the cloud. It allows you to view the resource usage and service running status, and respond to exceptions in a timely manner to ensure smooth running of services.

APIG monitors resources and operations based on Cloud Eye, enabling you to learn about the service running status by viewing different metrics on the console.

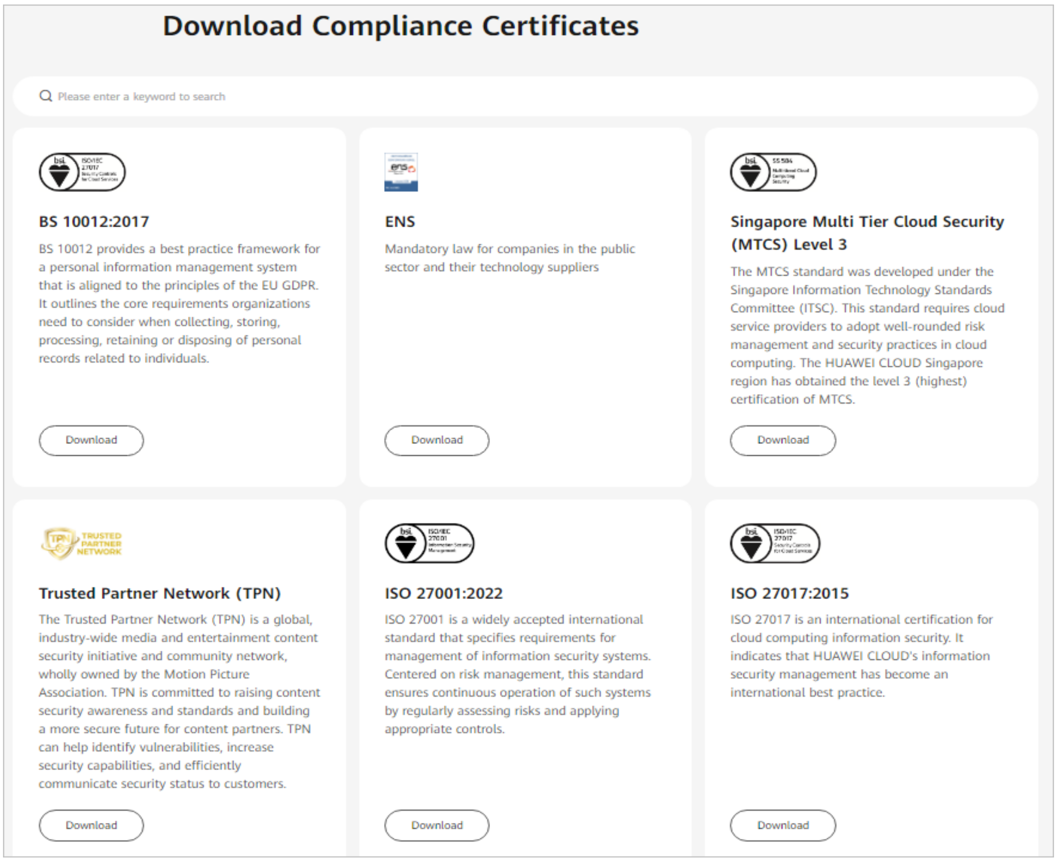
For details about APIG metrics and how to create alarm rules, see **API Monitoring**.

6.6 Certificates

Compliance Certificates

Huawei Cloud services and platforms have obtained various security and compliance certifications from authoritative organizations, such as International Organization for Standardization (ISO). You can **download** them from the console.

Figure 6-3 Downloading compliance certificates



Download Compliance Certificates

BS 10012:2017

BS 10012 provides a best practice framework for a personal information management system that is aligned to the principles of the EU GDPR. It outlines the core requirements organizations need to consider when collecting, storing, processing, retaining or disposing of personal records related to individuals.

ENS

Mandatory law for companies in the public sector and their technology suppliers

Singapore Multi Tier Cloud Security (MTCS) Level 3

The MTCS standard was developed under the Singapore Information Technology Standards Committee (ITSC). This standard requires cloud service providers to adopt well-rounded risk management and security practices in cloud computing. The HUAWEI CLOUD Singapore region has obtained the level 3 (highest) certification of MTCS.

Trusted Partner Network (TPN)

The Trusted Partner Network (TPN) is a global, industry-wide media and entertainment content security initiative and community network, wholly owned by the Motion Picture Association. TPN is committed to raising content security awareness and standards and building a more secure future for content partners. TPN can help identify vulnerabilities, increase security capabilities, and efficiently communicate security status to customers.

ISO 27001:2022

ISO 27001 is a widely accepted international standard that specifies requirements for management of information security systems. Centered on risk management, this standard ensures continuous operation of such systems by regularly assessing risks and applying appropriate controls.

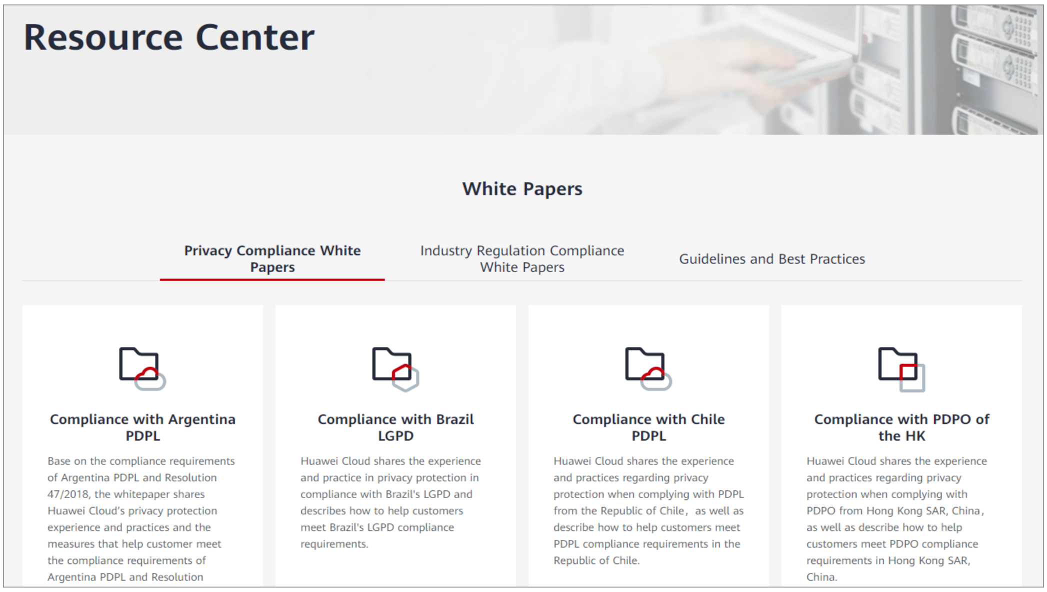
ISO 27017:2015

ISO 27017 is an international certification for cloud computing information security. It indicates that HUAWEI CLOUD's information security management has become an international best practice.

Resource Center

Huawei Cloud also provides the following resources to help users meet compliance requirements. For details, see **Resource Center**.

Figure 6-4 Resource center



Resource Center

White Papers

Privacy Compliance White Papers | Industry Regulation Compliance White Papers | Guidelines and Best Practices

Compliance with Argentina PDPL

Base on the compliance requirements of Argentina PDPL and Resolution 47/2018, the whitepaper shares Huawei Cloud's privacy protection experience and practices and the measures that help customer meet the compliance requirements of Argentina PDPL and Resolution

Compliance with Brazil LGPD

Huawei Cloud shares the experience and practice in privacy protection in compliance with Brazil's LGPD and describes how to help customers meet Brazil's LGPD compliance requirements.

Compliance with Chile PDPL

Huawei Cloud shares the experience and practices regarding privacy protection when complying with PDPL from the Republic of Chile，as well as describe how to help customers meet PDPL compliance requirements in the Republic of Chile.

Compliance with PDPO of the HK

Huawei Cloud shares the experience and practices regarding privacy protection when complying with PDPO from Hong Kong SAR, China，as well as describe how to help customers meet PDPO compliance requirements in Hong Kong SAR, China.

7 Notes and Constraints

Gateway

Table 7-1 Gateway notes and constraints

Item	Restrictions
Permissions	● You must be assigned both the **APIG Administrator** and **VPC Administrator** roles so that you can create gateways. ● Alternatively, you must be attached the **APIG FullAccess** policy. ● For details about how to use custom policies, see **APIG Custom Policies**.
Network	● If you use **192.x.x.x** or **10.x.x.x**, APIG uses **172.31.32.0/19** as the internal subnet. ● If you use **172.x.x.x**, APIG uses **192.168.32.0/19** as the internal subnet.
Number of available private IP addresses in the subnet	The basic, professional, enterprise, and platinum editions of APIG require 3, 5, 6, and 7 private IP addresses. A platinum *X* requires 4 more private IP addresses than the previous edition. For example, platinum 2 requires 11 private addresses, and platinum 4 requires 19 private addresses. Check that the subnet you choose has sufficient private IP addresses on the VPC console.
Load	● VPCs (workloads) where gateways have been deployed cannot be changed. ● The LVS and ELB load balancing modes are available. Currently, the LVS mode is supported only in **LA-Mexico City1** and **CN North-Beijing1**. The ELB mode is supported in other regions.

Item	Restrictions
Specifications	- During the specification change, the persistent connection is intermittently disconnected and needs to be re-established. You are advised to change the specification during off-peak hours. - Specifications can be upgraded but cannot be downgraded. - Changing the gateway edition will also change the private network access IP addresses. Modify your firewall or whitelist configuration if necessary for service continuity. Do not perform any other operations on the gateway. After the change is complete, adjust the firewall or whitelist configuration based on service requirements.
Security group	Security groups do not take effect after gateways are purchased in regions except **LA-Mexico City1** and **CN North-Beijing1**. To disable access from specific IP addresses, see **Configuring API Access Control**.

API

Table 7-2 API notes and constraints

Item	Restrictions
API group	Each API can belong to only one group.
SSL Certificate	- Only SSL certificates in PEM format are supported. - SSL certificates support only the RSA and ECDSA encryption algorithms.

Item	Restrictions
Domain name	● By default, the debugging domain name of an API group can only be resolved to a server in the same VPC as the gateway. If you want to resolve the domain name to a public network, bind an EIP to the gateway. ● The debugging domain name cannot be used for production services and can be used only for application debugging. ● Groups under the same gateway cannot be bound with a same independent domain name. ● If a domain name is already bound to a port, it cannot be bound to the same port again. ● If different ports are used for the same domain name, all ports take effect no matter whether any of them are bound to, modified, or unbound from the SSL certificate or whether client authentication is enabled or disabled. ● If you access backend services through a load balance channel, the port bound to the independent domain name must be the same as the access port of the backend server in the load balance channel. ● After an independent domain name is bound to a port, if you use an IP address to access an API in a custom group, you need to add the header parameter **host** to the request. The **host** value should include the port number for access, unless you are using the default ports **80** or **443**, in which case the **host** value is not necessary. ● Accessing APIs by IP address is not advised, it requires IP certificates for SSL. Otherwise, the connection may be insecure. ● HTTP-to-HTTPS redirection is only suitable for GET and HEAD requests. Redirecting other requests may cause data loss due to browser restrictions. Redirection takes effect only when the API request protocol is **HTTPS** or **HTTP&HTTPS** and an SSL certificate has been bound to the independent domain name.

Item	Restrictions
API policies	● An API can be bound with only one policy of the same type (request throttling, proxy cache, or third-party authorizer) for a given environment, but each policy can be bound to multiple APIs. ● Policies are independent of APIs. A policy takes effect for an API only after they are bound to each other. When binding a policy to an API, you must specify an environment where the API has been published. The policy takes effect for the API only in the specified environment. ● After you bind a policy to an API, unbind the policy from the API, or update the policy, you do not need to publish the API again. ● Taking an API offline does not affect the policies bound to it. The policies are still bound to the API if the API is published again. ● Policies that have been bound to APIs cannot be deleted.
Credential	● A credential can be bound to a maximum of 1,000 APIs. ● You can create a maximum of five AppCodes for each credential.

Quota Limits

To change the default restrictions, **increase the quota**. For details about parameter configuration of a dedicated gateway, see **Modifying Configuration Parameters**.

NOTICE

- It takes 5 to 10 seconds for a new or modified APIG resource to take effect.
- The maximum quota may be slightly exceeded in case of high concurrency, but resource usage will not be affected.

Table 7-3 Dedicated API gateway quotas

Item	Default Restriction	Modifiable
Gateways	5	√
API groups	1500	√

Item	Default Restriction	Modifiable
APIs	Number of APIs for each gateway edition: ● Basic: 250 ● Professional: 800 ● Enterprise: 2000 ● Platinum: 8000	√
APIs	1000 for each group	x
Backend policies	5	√
Credentials	50. The credential quota includes the apps you have created.	√
Request throttling policies	● You can create a maximum of 300 request throttling policies for each gateway. ● The call limit for a single user cannot exceed that for the target API. ● The call limit for a single app (credential) cannot exceed that for a single user. ● The call limit for a single IP address cannot exceed that for the target API.	√
Environments	10	√
Signature keys	200	√
Access control policies	100	√
VPC channels (load balance channels)	200	√
Variables	You can create a maximum of 50 variables for an API group in each environment.	√
Independent domain names	A maximum of five independent domain names can be bound to an API group.	√
ECSs	A maximum of 10 ECSs can be added to a VPC channel.	√
Parameters	A maximum of 50 parameters can be created for an API.	√

Item	Default Restriction	Modifiable
API publication records	A maximum of 10 publication records of an API can be retained for each environment.	√
API access rate	Up to 6000 times per second	√
Excluded applications (Credentials)	A maximum of 30 excluded apps can be added to a request throttling policy.	√
Excluded tenants	A maximum of 30 excluded tenants can be added to a request throttling policy.	√
Access to a subdomain name (debugging domain name)	A subdomain name can be accessed up to 1000 times a day.	x
Maximum size of an API request package	12 MB	√
TLS protocol	TLS 1.1 and TLS 1.2 are supported. TLS 1.2 is recommended.	√
Custom authorizers	50	x
Plug-ins	500	√
HTTP protocol	When the HTTP protocol is used, the maximum size of URL+Header is 32 KB.	x

Table 7-4 Quotas of shared API gateway on the old console

Item	Default Restriction	Modifiable
API groups	50	√
APIs	200	√
Backend policies	5	√
Apps	50. The app quota includes created apps and apps generated when APIs are purchased from KooGallery.	√

Item	Default Restriction	Modifiable
Request throttling policies	● You can create a maximum of 30 request throttling policies. ● The call limit for a single user cannot exceed that for the target API. ● The call limit for a single app cannot exceed that for a single user. ● The call limit for a single IP address cannot exceed that for the target API.	√
Environments	10	√
Signature keys	30	√
Access control policies	100	√
VPC channels	30	√
Variables	You can create a maximum of 50 variables for an API group in each environment.	√
Independent domain names	A maximum of five independent domain names can be bound to an API group.	√
ECSs	A maximum of 200 ECSs can be added to a VPC channel.	√
Parameters	A maximum of 50 parameters can be created for an API.	√
API publication records	A maximum of 10 publication records of an API can be retained for each environment.	√
API access rate	Up to 200 times per second	√
Excluded apps	A maximum of 30 excluded apps can be added to a request throttling policy.	√
Excluded tenants	A maximum of 30 excluded tenants can be added to a request throttling policy.	√
Access to a subdomain name	A subdomain name can be accessed up to 1000 times a day.	x
Maximum size of an API request package	12 MB	x

Item	Default Restriction	Modifiable
Custom authorizers	20	√

8 Permissions Management

If you need to assign different permissions to personnel in your enterprise to access your APIG resources, Identity and Access Management (IAM) is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you securely access your Huawei Cloud resources.

With IAM, you can use your Huawei Cloud account to create IAM users for your employees, and assign permissions to the employees to control their access to specific resources.

If your Huawei Cloud account does not require individual IAM users for permissions management, skip this chapter.

IAM is free of charge. You pay only for the resources in your account. For more information about IAM, see **IAM Service Overview**.

APIG Permissions

By default, new IAM users do not have any permissions assigned. You need to add a user to one or more groups, and attach policies or roles to these groups. The user then inherits permissions from the groups to which the user belongs, and can perform specified operations on cloud services based on the permissions.

APIG is a project-level service deployed and accessed in specific physical regions. To assign APIG permissions to a user group, you need to specify region-specific projects (for example, **ap-southeast-1** for **Hong Kong**) for which the permissions will take effect. If you select **All projects**, the permissions will be granted for both the global service project and all region-specific projects. When accessing APIG, the users need to switch to a region where they have been authorized to use this service.

You can grant permissions by using roles and policies.

- Roles: A type of coarse-grained authorization mechanism that defines permissions related to user responsibilities. This mechanism provides only a limited number of service-level roles for authorization. When using roles to grant permissions, you need to also assign other dependent roles for permissions to take effect. However, roles are not an ideal choice for fine-grained authorization and secure access control.

- Policies: A fine-grained authorization strategy that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization and meets requirements for secure access control. For example, you can grant APIG users only the permissions for performing specific operations. Most policies define permissions based on APIs. For the API actions supported by APIG, see **Permissions Policies and Supported Actions**

Table 8-1 lists all the system-defined roles and policies supported by APIG.

Table 8-1 System-defined roles and policies supported by APIG

Role/ Policy Name	Description	Type	Dependency
APIG Administrator	Administrator permissions for APIG. Users with this permission can use all functions of the **dedicated gateways**, and **shared gateway on the old console**.	System-defined role	If a user needs to create, delete, or change resources of other services, the user must also be granted administrator permissions of the corresponding services in the same project.
APIG FullAccess	Full permissions for APIG. Users granted these permissions can use all functions of **dedicated** gateways.	System-defined policy	None
APIG ReadOnly Access	Read-only permissions for APIG. Users granted these permissions can only view **dedicated** gateways.	System-defined policy	None

You can view the content of the preceding roles and policies on the IAM console. For example, the content of the **APIG FullAccess** policy is as follows:

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Action": [
                "apig:*:*",
                "vpc:*:get*",
                "vpc:*:list*",
                "vpc:ports:create",
                "vpc:ports:update",
                "vpc:ports:delete",
                "vpc:publicIps:update",
                "FunctionGraph:function:listVersion",
                "FunctionGraph:function:list",
                "FunctionGraph:function:getConfig",
                "ecs:servers:list",
                "lts:groups:list",
                "lts:logs:list",
                "lts:topics:list"
            ],
            "Effect": "Allow"
        }
    ]
}
```

9 Basic Concepts

API

A set of predefined functions that encapsulates application capabilities. You can create APIs and make them accessible to users.

When creating an API, you need to configure the basic information and the frontend and backend request paths, parameters, and protocols.

API Group

A collection of APIs used for the same service. API groups facilitate API management.

Environment

A stage in the lifecycle of an API. An environment, such as API testing or development environment, specifies the usage scope of APIs, facilitating API lifecycle management. The same API can be published in different environments.

To call an API in different environments, you need to add the **x-stage** header parameter to the request sent to call the API. The value of this parameter is an environment name.

Environment Variable

A variable that is manageable and specific to an environment. You can create variables in different environments to call different backend services using the same API.

Request Throttling

Controls the number of times APIs can be called by a user, app (credential), or IP address during a specific period to protect backend services.

Request throttling can be accurate to the minute and second.

Access Control

Access control policies are one of the security measures provided by APIG. They allow or deny API access from specific IP addresses or accounts.

App (Credential)

An entity that requests for APIs. An app can be authorized to access multiple APIs, and multiple apps can be authorized to access the same API.

Signature Key

Consists of a key and secret, which are used by backend services to verify the identity of API Gateway and ensure secure access.

When an API bound with a signature key is called, API Gateway adds signature information to the API requests. The backend service of the API signs the requests in the same way, and verifies the identity of API Gateway by checking whether the signature is consistent with that in the **Authorization** header sent by API Gateway.

VPC Channel (Load Balance Channel)

A method for accessing VPC resources from API Gateway, allowing you to selectively expose backend services deployed in VPCs to third-party users.

Custom Authentication

A mechanism defined with custom rules for API Gateway to verify the validity and integrity of requests initiated by API callers. The mechanism is also used for backend services to verify the requests forwarded by API Gateway.

The following two types of custom authentication are provided:

- Frontend custom authentication: A custom authorizer is configured with a function to authenticate requests for an API.
- Backend custom authentication: A custom authorizer can be configured to authenticate requests for different backend services, eliminating the need to customize APIs for different authentication systems and simplifying API development. You only need to create a function-based custom authorizer in API Gateway to connect to the backend authentication system.

Simple Authentication

Simple authentication facilitates quick response for API requests by adding the **X-Apig-AppCode** parameter (whose value is an AppCode) to the HTTP request header. API Gateway verifies only the AppCode and does not verify the request signature.

Gateway Response

Gateway responses are returned if API Gateway fails to process API requests. API Gateway provides default responses for multiple scenarios and allows you to customize response status codes and content. You can add a gateway response in JSON format on the **API Groups** page.