

## Face Recognition Service

# Product Introduction

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# 1 What Is FRS?

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Face Recognition Service (FRS) is an intelligent service that uses computers to process, analyze, and understand facial images based on human facial features. It provides services through open Application Programming Interfaces (APIs). You can obtain the face recognition results by accessing and calling APIs in real time. It recognizes and compares faces automatically and provides you with the similarity degrees, thereby improving service efficiency.

Currently, FRS provides the following sub-services:

- [Face Detection](#)
- [Face Verification](#)
- [Face Retrieval](#)
- [Face LiveDetect](#)

## Face Detection

Face Detection accurately locates faces in an image and identifies the size of each face. With this sub-service, you can detect front and side faces with different tilts in the image.

**Figure 1-1** An example of Face Detection



## Face Verification

Face Verification returns the similarity degree between two faces in two images by comparing the facial features. If the two images contain multiple faces, the system compares the similarity between the largest faces in the two images.

**Figure 1-2** An example of Face Verification



## Face Retrieval

Face Retrieval provides APIs for operating face sets. You can use specific APIs to create a face set, add facial images to the face set, search for  $N$  facial images that are most similar to the input one, delete facial features you no longer use from the face set, and delete the face set you created.

Face Retrieval is perfect for enterprise and residential security management of public security. However, it cannot be used for preventing photo recapture because it cannot distinguish fake photos and real photos.

**Figure 1-3** An example of Face Retrieval



## Face LiveDetect

Face LiveDetect determines whether a person in a video is alive by checking whether the person's actions in the video are consistent with those in the input action list. If multiple faces appear, the largest face is selected.

# 2 Application Scenarios

## Identity Verification

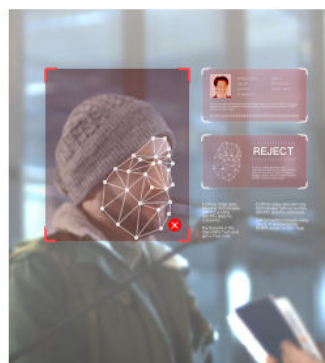
The Face Detection and Verification functions can be used for identity verification in scenarios such as airports and customs where consistency between a certificate and a person must be checked.

**Figure 2-1** Identity verification

Facial verification succeeded



Facial verification failed



## e-Attendance

The Face Detection and Verification functions allow enterprise customers to implement e-attendance for employees.

## Customer Attribute Analysis

Customer attribute analysis is of large value to shopping malls. Face detection and retrieval technologies help achieve precise marketing.

# 3 Billing

## Billing Items

**Table 3-1** FRS Billing

| Billing Item            | Description   |
|-------------------------|---|
| Number of FRS API calls | Pay-per-use. You are billed based on the number of FRS API calls. |

## Billing Modes

- Pay-per-Use

You are billed based on the total number of successful FRS API calls in a calendar month. After a calendar month ends, the number of API calls is cleared.

For details about pricing, contact [customer service](#).

### NOTE

- An API call is counted only when it is successfully called. Remaining free API calls at the end of the month do not roll over to subsequent months.
- Billing rule: You will be billed based on the number of API calls. The API calls are accumulated by calendar month and settled by the end of each month. After a calendar month ends, the number of API calls are cleared.
- Each user can use 10 facial image libraries free of charge. Each library contains a maximum of 100,000 facial features.
- Default concurrency: 1 QPS for Action LiveDetect and 10 QPS for other APIs. If the number of concurrent requests exceeds the default value, FRS.0033 is displayed and the upper limit of traffic for handling these requests has been reached.

## Renewal

For more information about renewing resource packages, see [Renewal Management](#).



## Expiration and Overdue Payment

If the account balance is insufficient for an automatic renewal, fee deductions will fail and bills overdue. In this case, a grace period is granted. If outstanding bills are not cleared in the grace period, your account enters the retention period. Resources are not available during the retention period. If outstanding bills are still not cleared in the retention period, your data stored in the cloud will be deleted and the cloud resources will be released.

If your account is in arrears, some operations will be restricted. You are advised to renew your account as soon as possible. The restricted operations are as follows:

- Enabling FRS
- Calling APIs in pay-per-use billing mode

# 4 Related Services

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## IAM

FRS uses Identity and Access Management (IAM) for authentication and authorization.

## OBS

FRS allows users to read facial images from Object Storage Service (OBS).

## CTS

FRS uses Cloud Trace Service (CTS) to record FRS operation events for future querying, auditing, and backtracking. [Table 4-1](#) lists the operation events. For more information about CTS, see the [Cloud Trace Service User Guide](#).

**Table 4-1** FRS operations supported by CTS

| Operation                       | Resource Type | Event         |
|---------------------------------|---------------|---------------|
| Creating a facial image library | faceset       | createFaceSet |
| Deleting a facial image library | faceset       | deleteFaceSet |

## Cloud Eye

FRS uses Cloud Eye to monitor the number of API calls and latency of its sub-services. [Table 4-2](#) shows the details. For more information about Cloud Eye, see the [Cloud Eye User Guide](#).

**Table 4-2** Monitoring metrics of FRS

| Metric                      | Description   | Value Range     | Monitored Object |
|-----------------------------|---|-----------------|------------------|
| Successful Calls of Service | Number of successful API calls<br>The unit is <b>times</b> .  | $\geq 0$ times  | FRS              |
| Failed Calls of Service     | Number of failed API calls due to 5xx errors<br>The unit is <b>times</b> .  | $\geq 0$ times  | FRS              |
| Average Latency             | Average latency of APIs<br>The unit is <b>ms</b> .  | $\geq 0$ ms     | FRS              |
| Face Counts                 | Number of faces in a facial image library<br>Do not start the name of a facial image library with an underscore (_). Otherwise, the Cloud Eye service cannot collect the number of faces.<br>The unit is <b>count</b> . | $\geq 0$ counts | FRS              |

# 5 How to Use FRS

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You can access FRS on a web-based service management platform, that is, the management console, or using HTTPS-based APIs. FRS provides services through open Application Programming Interfaces (APIs). To use it, you need to integrate FRS to a third-party system.

Enable FRS on the management console and then call APIs to use it on the third-party system. The process is as follows:

1. Apply for the service.

Before using the service, log in to the [FRS management console](#) to enable the service. You only need to enable the service once.

## NOTE

To operate OBS data when using FRS, authorize FRS to access OBS first. On the page for enabling services, click **Service Authorization** in the upper right corner to complete OBS authorization.

2. Obtain request authentication.

You can use either of the following authentication methods when calling APIs. For details about the authentication, see [Authentication](#).

- Token authentication: Requests are authenticated using tokens.
- AK/SK authentication: Encrypts API calling requests using the access key ID (AK) and secret access key (SK). The AK/SK authentication is more secure.

3. Call an API.

FRS provides services as APIs. For details, see the [Face Recognition Service API Reference](#).

4. View service usage.

You can view the number of successful service API calls on the [FRS management console](#).

# 6 Restrictions and Limitations

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Due to various factors such as technology and cost, FRS has some restrictions. The system-wide restrictions affect all sub-services. In addition to system-wide restrictions, sub-services have their independent restrictions.

## System-Wide Restrictions

- Only images in JPG, PNG, JPEG, or BMP format can be recognized.
- Each user can use 10 facial image libraries. Each library contains a maximum of 100,000 facial features.
- Use standard JSON format in the body of the **application/json** request.
- Do not use carriage return characters in Base64 code.
- The system does not save images or videos of users.

## Face Detection/Verification/Retrieval

- The total size of the two images input for face verification is **less than 8 MB**.
- The image size must be **less than 8 MB**. If the image size is too large, the image transmission will take a long time. It is recommended that the image size be **less than 1 MB**.
- The image resolution must be **less than 4096 x 2160**. The face resolution in an image must be **greater than 80 x 80**. It is recommended that the face resolution be **greater than 120 x 120**.
- To ensure the recognition effect, facial images need to meet the following requirements:
  - a. The illumination should be greater than 200 lux and there is no light reflection or shadow caused by strong light.
  - b. The overall image is clear without obvious motion blur and the face in it is not blocked.
  - c. The side face angle does not exceed 30°, and the tilt angle and horizontal angle do not exceed 15°. The face in an image must be a vertically placed front face.

## Face LiveDetect

- Currently, only video files and Base64-encoded videos can be detected. User clients need to obtain the video streams, save them as files, and then call the LiveDetect API.
- The size of a video file cannot exceed 8 MB. It is recommended that the video file be compressed to **200 KB to 2 MB** on the client.
- The video duration must be **1 to 15** seconds.
- The recommended frame rate is **10 fps to 30 fps**.
- The encapsulation format can be MP4, AVI, FLV, WEBM, ASF, or MOV.
- The video encoding format can be H.261, H.263, H.264, HEVC, VC-1, VP8, VP9, or WMV3.

# 7 Permission Management

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## 7.1 Permission Management

If you need to assign different permissions to employees in your enterprise to access your FRS resources, IAM is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you efficiently manage access to your FRS resources.

If your HUAWEI CLOUD account does not require individual IAM users for permissions management, skip this section.

With IAM, you can use your HUAWEI CLOUD account to create IAM users, and assign permissions to the users to control their access to specific resources. For example, some software developers in your enterprise need to use FRS but should not be allowed to delete other FRS resources or perform any other high-risk operations. In this scenario, you can create IAM users for the software developers and grant them only the permissions required for using FRS resources.

IAM can be used free of charge. You pay only for the resources in your account. For more information about IAM, see [What Is IAM](#).

### FRS Permissions

By default, new IAM users do not have permissions assigned. You need to add a user to one or more groups, and attach permissions policies or roles to these groups. Users inherit permissions from the groups they are added to and can perform specified operations on FRS based on the permissions.

FRS is a project-level service deployed and accessed in specific physical regions. To assign FRS permissions to a user group, set the scope to **Region-specific projects** and select projects (for example, AP-Bangkok) in the corresponding region (for example, **ap-southeast-2**) for the permissions to take effect. If **All projects** is selected, the permissions will take effect for the user group in all region-specific projects. When accessing FRS, you need to switch to a region where you have been authorized to use this service.

[Table 7-1](#) lists all the system roles supported by FRS.

**Table 7-1** System policies

| Policy Name        | Description      | Policy Type   | Dependencies |
|--------------------|------------------|---------------|--------------|
| FRS FullAccess     | All permissions  | System policy | None         |
| FRS ReadOnlyAccess | Read-only access | System policy | None         |

**Table 7-2** lists the common operations supported by each system policy.

**Table 7-2** Common operations supported by each system policy

| Action                               | Description   | FRS FullAccess | FRS ReadOnlyAccess |
|--------------------------------------|---|----------------|--------------------|
| frs:faceSearch:subscribe             | Subscribe to Face Retrieval.                                      | Yes            | No                 |
| frs:faceSearch:unsubscribe           | Unsubscribe from Face Retrieval.                                  | Yes            | No                 |
| frs:faceSearch:getSubscribeUserList  | Query the list of users who have subscribed to Face Retrieval.    | Yes            | Yes                |
| frs:faceSearch:subscribeAllUsers     | Subscribe to Face Retrieval for all subusers.                     | Yes            | No                 |
| frs:faceSearch:unsubscribeAllUsers   | Unsubscribe from Face Retrieval for all subusers.                 | Yes            | No                 |
| frs:faceCompare:subscribe            | Subscribe to Face Verification.                                   | Yes            | No                 |
| frs:faceCompare:unsubscribe          | Unsubscribe from Face Verification.                               | Yes            | No                 |
| frs:faceCompare:getSubscribeUserList | Query the list of users who have subscribed to Face Verification. | Yes            | Yes                |
| frs:faceCompare:subscribeAllUsers    | Subscribe to Face Verification for all subusers.                  | Yes            | No                 |
| frs:faceCompare:unsubscribeAllUsers  | Unsubscribe from Face Verification for all subusers.              | Yes            | No                 |
| frs:faceDetect:subscribe             | Subscribe to Face Detection.                                      | Yes            | No                 |
| frs:faceDetect:unsubscribe           | Unsubscribe from Face Detection.                                  | Yes            | No                 |



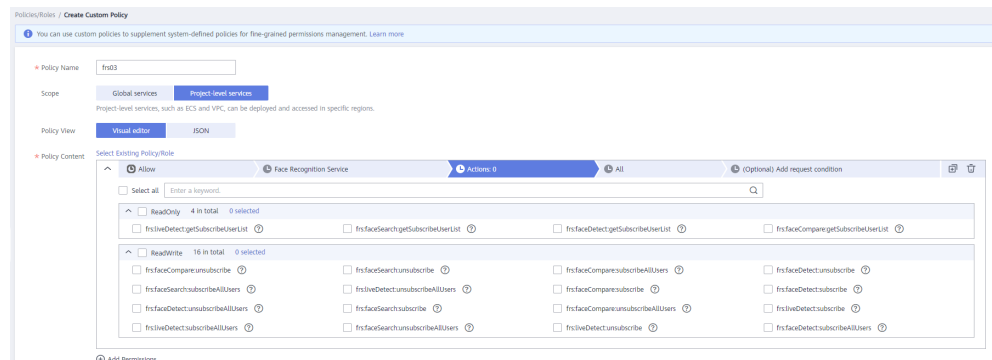
| Action                             | Description   | FRS FullAccess | FRS ReadOnlyAccess |
|------------------------------------|---|----------------|--------------------|
| frs:faceDetect:getSubscriberList   | Query the list of users who have subscribed to Face Detection.  | Yes            | Yes                |
| frs:faceDetect:subscribeAllUsers   | Subscribe to Face Detection for all subusers.                   | Yes            | No                 |
| frs:faceDetect:unsubscribeAllUsers | Unsubscribe from Face Detection for all subusers.               | Yes            | No                 |
| frs:liveDetect:subscribe           | Subscribe to Face LiveDetect.                                   | Yes            | No                 |
| frs:liveDetect:unsubscribe         | Unsubscribing from Face LiveDetect.                             | Yes            | No                 |
| frs:liveDetect:getSubscriberList   | Query the list of users who have subscribed to Face LiveDetect. | Yes            | Yes                |
| frs:liveDetect:subscribeAllUsers   | Subscribe to Face LiveDetect for all subusers.                  | Yes            | No                 |
| frs:liveDetect:unsubscribeAllUsers | Unsubscribe from Face LiveDetect for all subusers.              | Yes            | No                 |

## 7.2 FRS Custom Policies

Custom policies can be created to supplement system-defined policies. For details about the actions supported by custom policies, see [Permission Management](#).

You can create custom policies in either of the following ways:

- Visual editor: Select cloud services, actions, resources, and request conditions. You do not need to have knowledge of the policy syntax.



- JSON: Edit JSON policies from scratch or based on an existing policy.

Policies/Roles / Create Custom Policy

**i** You can use custom policies to supplement system-defined policies for fine-grained permissions management. [Learn more](#)

\* Policy Name

Scope Global services Project-level services  
Project-level services, such as ECS and VPC, can be deployed and accessed in specific regions.

Policy View Visual editor JSON

\* Policy Content [Select Existing Policy/Role](#)

```
1 {
2   "Version": "1.1",
3   "Statement": [
4     {
5       "Effect": "Allow",
6       "Action": [
7         "frs:liveDetect:getSubscribeUserList",
8         "frs:faceSearch:getSubscribeUserList",
9         "frs:faceDetect:getSubscribeUserList",
10        "frs:faceCompare:getSubscribeUserList"
11      ]
12    }
13  ]
14 }
```

For details, see [Creating a Custom Policy](#).

# 8 Monitoring

## 8.1 FRS Monitoring Metrics

### Function

This section describes metrics reported by FRS to Cloud Eye as well as their namespaces, list, and dimensions. You can use the management console or [APIs](#) provided by Cloud Eye to query the metric and alarm information generated for FRS.

### Namespace

SYS.FRS

### Monitoring Metrics

Table 8-1 FRS metrics

| Metric ID | Metric                         | Description   | Value Range | Monitored Object | Monitoring Period (Original Metric) |
|-----------|--------------------------------|---|-------------|------------------|-------------------------------------|
| api_calls | Successful Calls of Service    | Number of successful API calls<br>Unit: Times               | ≥ 0 times   | API              | 1 minute                            |
| error_4xx | Failed Calls Due to 4xx Errors | Number of failed API calls due to 4xx errors<br>Unit: Times | ≥ 0 times   | API              | 1 minute                            |

| Metric ID       | Metric                         | Description   | Value Range | Monitored Object     | Monitoring Period (Original Metric) |
|-----------------|--------------------------------|---|-------------|----------------------|-------------------------------------|
| error_5xx       | Failed Calls Due to 5xx Errors | Number of failed API calls due to 5xx errors<br>Unit: Times | ≥ 0 times   | API                  | 1 minute                            |
| average_latency | Average Latency                | Average latency of APIs<br>Unit: ms                         | ≥ 0 ms      | API                  | 1 minute                            |
| face_number     | Face Counts                    | Number of faces in a facial image library<br>Unit: Count    | ≥ 0 counts  | Facial image library | 1 minute                            |

## Dimensions

| Key         | Value                |
|-------------|----------------------|
| call_of_api | API                  |
| face_set    | Facial image library |

## 8.2 Viewing Monitoring Metrics

1. Log in to the [FRS management console](#).
2. In the navigation pane, choose **Service List > Management & Deployment > Cloud Eye**.
3. In the navigation pane on the left, choose **Cloud Service Monitoring** and select **Face Recognition Service**.
4. Click **View Metric** in the **Operation** column.
5. In the monitoring area, you can select a duration to view the monitoring data. You can view the monitoring data of FRS in last 1 hour, last 3 hours, last 12 hours, last 24 hours, and last 7 days based on your requirements.