Identity and Access Management

User Guide

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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: https://www.huawei.com

Email: support@huawei.com

Contents

1 Service Overview

1.1 What Is IAM?

Identity and Access Management (IAM) is a basic service that provides permissions management to help you securely control access to your cloud services and resources.

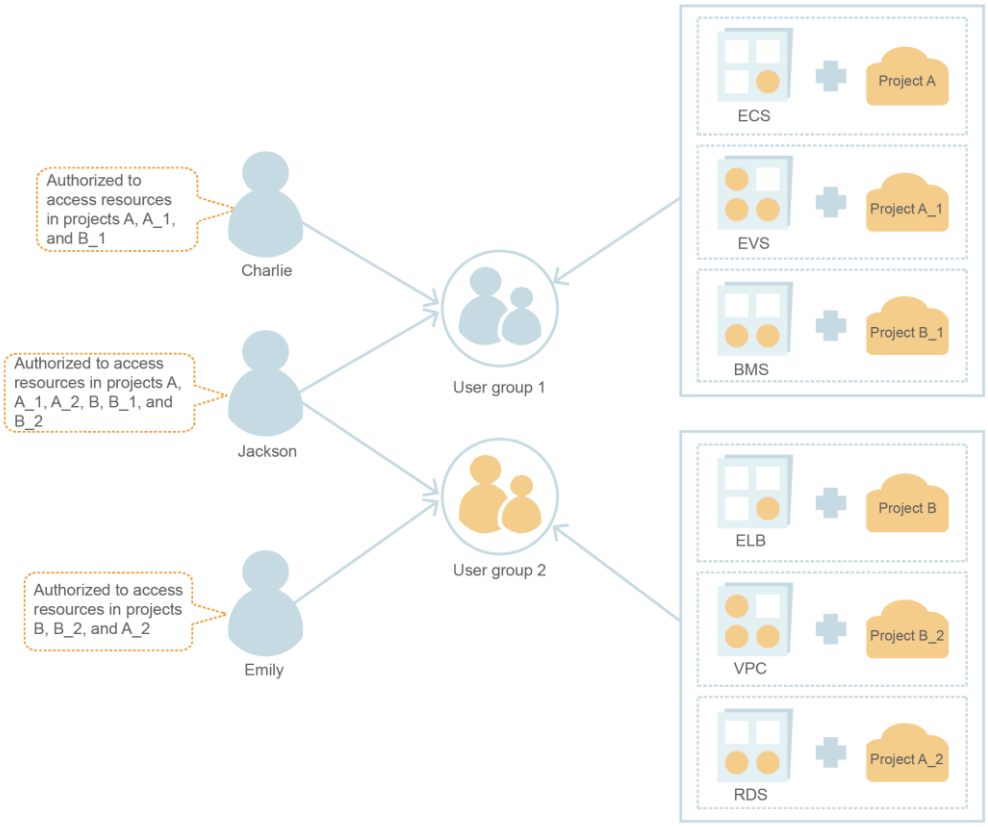
Advantages

Fine-grained access control for resources

An account is created after you successfully register with the cloud platform. Your account has full access permissions for your cloud services and resources.

If you create multiple resources on the cloud platform, such as Elastic Cloud Servers (ECSs), Elastic Volume Services (EVSs), and Bare Metal Servers (BMSs), for different teams or applications in your enterprise, you can create IAM users for the team members or applications and grant them permissions required to complete tasks. The IAM users use their own usernames and passwords to log in to the cloud platform and access resources in your account.

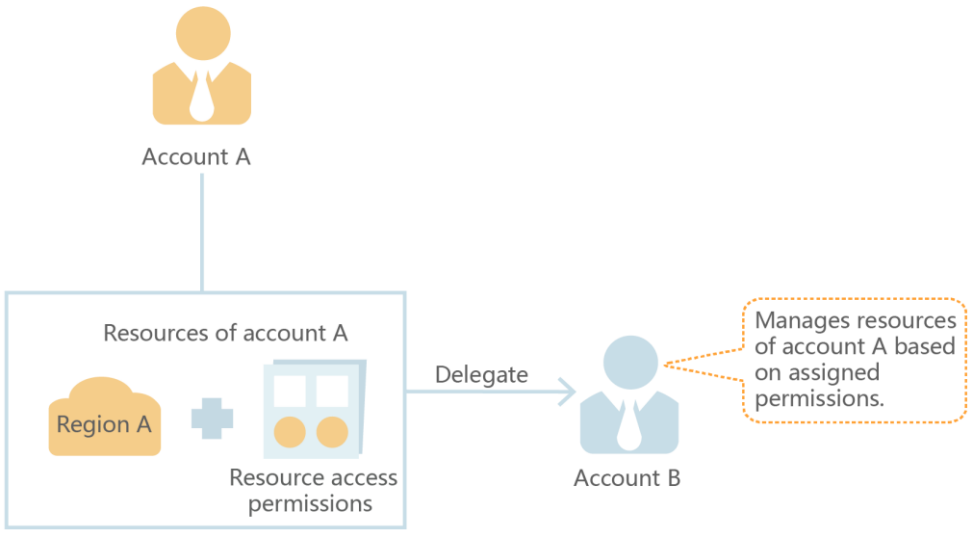
In addition to IAM, you can use Enterprise Management to control access to cloud resources. Enterprise Management supports more fine-grained permissions management and enterprise project management. You can choose either IAM or Enterprise Management to suit your requirements.



Cross-account resource access delegation

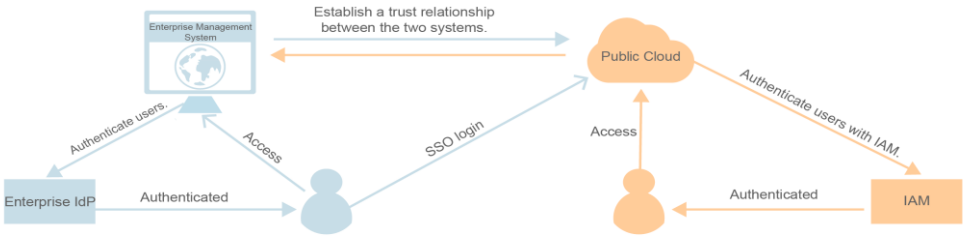
If you create multiple resources on the cloud platform, you can delegate another account to manage specific resources for efficient O&M.

For example, you create an agency for a professional O&M company to manage specific resources with the company's own account. You can cancel or modify the delegated permissions at any time if the delegation changes. In the following figure, account A is the delegating party, and account B is the delegated party.



Federated access to the cloud platform with existing enterprise accounts

If your enterprise has an identity system, you can create an identity provider in IAM to provide single sign-on (SSO) access to the cloud platform for employees in your enterprise. The identity provider establishes a trust relationship between your enterprise and the cloud platform, allowing the employees to access the cloud platform using their existing accounts.



Access Methods

You can access IAM using either of the following methods:

- **Management console**

  Access IAM through the management console — a browser-based visual interface.
- **REST APIs**

  Access IAM using REST APIs in a programmable way.

1.2 Basic Concepts

The following are basic concepts that you need to understand before you get started with the IAM service.

Account

An account is created after you successfully register with the cloud platform. Your account has full access permissions for your cloud resources. You can use the account to reset user passwords and assign permissions.

IAM User

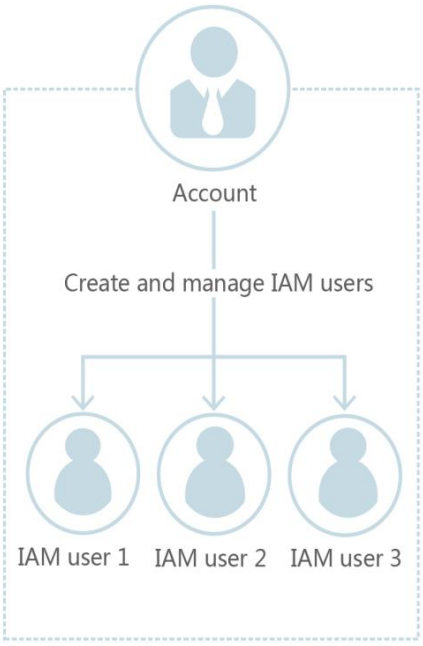
You can use your account to create IAM users and assign permissions for specific resources. Each IAM user has their own identity credentials (password and access keys) and uses cloud resources based on assigned permissions.

If an IAM user forgets their password, the user can reset the password by referring to "What Can I Do If My Password Is Forgotten?" in *IAM FAQs*.

Relationship Between an Account and Its IAM Users

An account and its IAM users share a parent-child relationship. IAM users are created using an account, and only have the permissions granted by the account. The account administrator can modify or cancel the IAM users' permissions at any time.

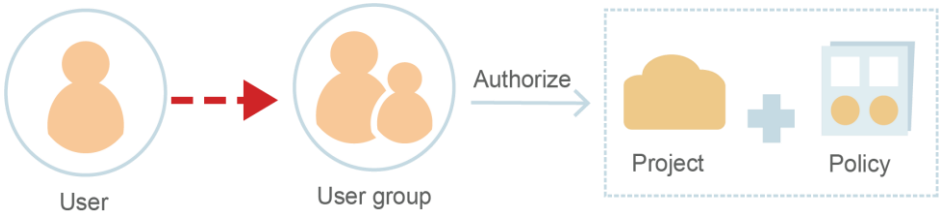
Figure 1-1 Account and IAM users



Authorization

Authorization is the process of granting required permissions for a user to perform a task. After a system-defined or custom policy is assigned to a user group, users in the group inherit the permissions defined by the policy to manage resources.

Figure 1-2 Authorization process

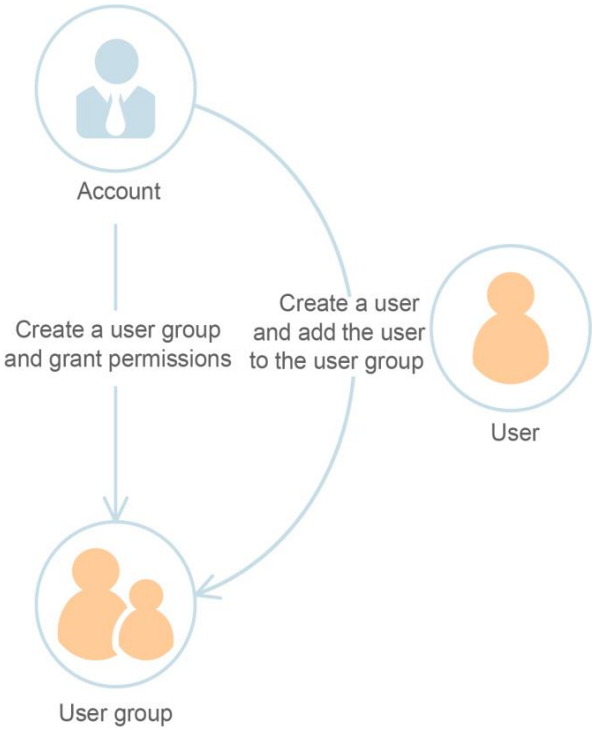


User Group

You can use user groups to assign permissions to IAM users. IAM users added to a user group automatically obtain the permissions assigned to the group. If a user is added to multiple user groups, the user inherits the permissions assigned to all these groups.

The default user group **admin** has all the permissions required to use all of the cloud resources. Users in this group can perform operations on all resources, including but not limited to creating user groups and users, assigning permissions, and managing resources.

Figure 1-3 User group and users



Permission

You can grant permissions by using roles and policies.

- Roles: A type of coarse-grained authorization mechanism that defines service-level permissions based on user responsibilities. There are only a limited number of roles for granting permissions to users.
- Policies: A type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization and secure access control. For example, you can grant ECS users only the permissions required for managing a certain type of ECS resources. IAM supports both system-defined and custom policies.
  - A **system-defined policy** defines the common actions of a cloud service. System-defined policies can be used to assign permissions to user groups, and cannot be modified. If you need to assign permissions for a specific service to a user group or agency on the IAM console but cannot find corresponding policies, it indicates that the service does not support permissions management through IAM.
  - You can create **custom policies** using the actions supported by cloud services and use custom policies to supplement system-defined policies for more refined access control. You can create custom policies in the visual editor or in JSON view.

Figure 1-4 Example of permissions

Credentials

Credentials confirm the identity of a user when the user accesses the cloud platform through the console or APIs. Credentials include a password and access keys. You can manage your credentials and the credentials of IAM users you have created.

- Password: A common credential for logging in to the management console or calling APIs.
- Access key: An access key ID/secret access key (AK/SK) pair, which can only be used to call APIs. Each access key provides a signature for cryptographic authentication to ensure that access requests are secret, complete, and correct.

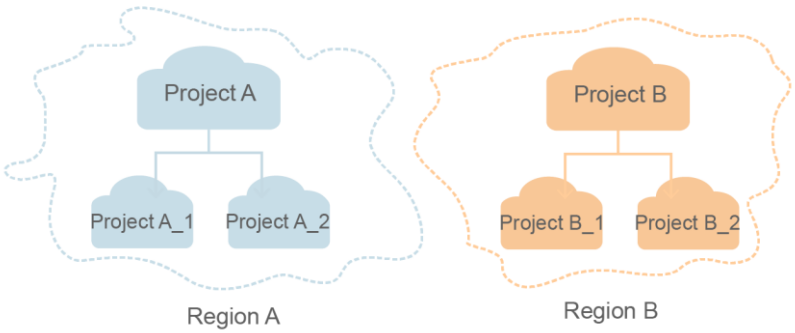
Virtual MFA Device

A virtual MFA device is an application that generates 6-digit verification codes in compliance with the Time-based One-time Password Algorithm (TOTP) standard. MFA devices can be hardware- or software-based. Currently, the cloud platform supports software-based virtual MFA devices, which are application programs running on smart devices such as mobile phones.

Project

A region corresponds to a project. Default projects are defined to group and physically isolate resources (including computing, storage, and network resources) across regions. You can grant users permissions in a default project to access all resources in the region associated with the project. If you need more refined access control, you can create subprojects under a default project and create resources in subprojects. Then you can assign required permissions for users to access only resources in specific subprojects.

Figure 1-5 Project



Enterprise Project

Enterprise projects allow you to group and manage resources across regions. Resources in enterprise projects are logically isolated from each other. An enterprise project can contain resources of multiple regions, and you can easily add resources to or remove resources from enterprise projects.

Agency

A trust relationship that you can establish between your account and another account or a cloud service to delegate resource access.

- Account delegation: You can delegate another account to implement O&M on your resources based on assigned permissions.
- Cloud service delegation: Services of the cloud platform interwork with each other, and some cloud services are dependent on other services. You can create an agency to delegate a cloud service to access other services.

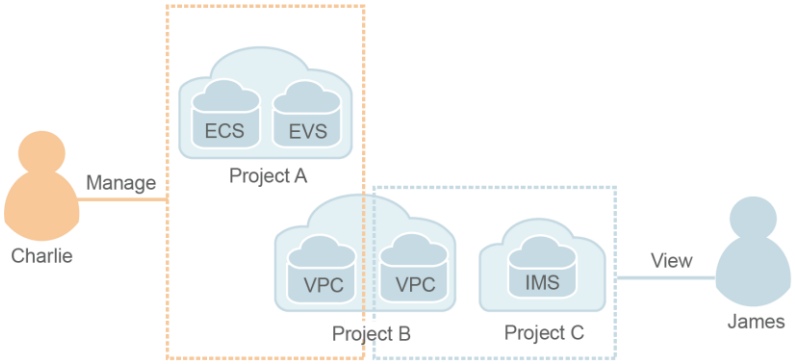
1.3 Functions

IAM provides the following functions: refined permissions management, secure access, critical operation protection, user group–based permissions assignment, project-based resource isolation, federated identity authentication, resource management delegation, and account security settings.

Refined Permissions Management

You can grant IAM users permissions to manage different resources in your account. For example, Charlie is granted only the permissions required to manage Virtual Private Cloud (VPC) resources in project B.

Figure 1-6 Permissions management model



Secure Access

Instead of sharing your account password with others, you can create IAM users for employees or applications in your organization and generate identity credentials for them to securely access specific resources based on assigned permissions.

Critical Operation Protection

IAM provides login protection and critical operation protection, making your account and resources more secure. When you or users created using your account log in to the console or perform a critical operation, you and the users need to complete authentication by email, SMS, or virtual MFA device.

User Group–based Permissions Assignment

With IAM, you do not need to assign permissions to single users. Instead, you can manage users by group and assign permissions to the group. Each user then inherits permissions from the groups of which they are members. To change the permissions of a user, you can remove the user from the original groups or add the user to other groups.

Project-based Resource Isolation

You can create subprojects in a region to isolate resources.

Federated Identity Authentication

The federated identity authentication function allows enterprises with identity authentication systems to access the cloud platform through single sign-on (SSO), eliminating the need to create users on the cloud platform.

Resource Management Delegation

You can delegate more professional, efficient accounts or other cloud services to manage specified resources.

Account Security Settings

Login authentication and password policies and access control list (ACL) improve security of user information and system data.

Eventual Consistency

Results of your IAM operations, such as creating users and user groups and assigning permissions, may not take effect immediately because data is replicated across different servers in our data centers around the world. Ensure that the operation results have taken effect before you perform any other operations that depend on them.

1.4 Personal Data Protection Mechanism

To prevent personal data, such as the username, password, and mobile number, from being accessed by unauthorized entities or individuals, IAM encrypts the data before storing it. IAM also controls access to the data and records all operations performed on the data.

Personal Data

Table 1-1 lists the personal data generated or collected by IAM.

Table 1-1 Personal data

Type	Source	Modifiable	Mandatory
Username.	• Entered when you create a user on the management console. • Entered when you call an API.	No	Yes Usernames are used to identify users.
Password	• Entered when you create a user, modify user credentials, or reset the password on the management console. • Entered when you call an API.	Yes	No You can also choose AK/SK authentication.
Email address	Entered when you create a user, modify user credentials, or change the email address on the management console.	Yes	No
Mobile number	Entered when you create a user, modify user credentials, or change the mobile number on the management console.	Yes	No
AK/SK	Created on the **My Credentials** page or the IAM console.	No AK/SK cannot be modified, but they can be deleted and created again.	No AK/SK are used to sign the requests sent to call APIs.

Personal Data Storage

IAM uses encryption algorithms to encrypt user data before storing it.

- Usernames and AKs: non-sensitive data, which is stored in plaintext.
- Passwords, email addresses, mobile numbers, and SKs: sensitive data, which is encrypted before storage.

Access Control

Personal data is stored in the IAM database after being encrypted. Access to the database is controlled through the whitelist mechanism.

MFA Authentication

You can enable login protection and critical operation protection by choosing **Security Settings** > **Critical Operations**. If you enable these functions, users under your account must verify their identity by SMS, email, or virtual MFA device before they log in or perform a critical operation.

API Constraints

- AK/SK authentication is required for calling APIs. You can create an access key (AK/SK) and download the file containing the access key. If you are unable to locate the file, you can create an access key again and download the file. Do not share your access key with anyone else.
- IAM does not provide APIs for batch querying and modifying personal data.

Operation Logs

IAM logs all personal data operations, including adding, modifying, querying, and deleting personal data. It uploads operation logs to CTS, and allows users to query only their own operation logs.

1.5 Permissions Management

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

With IAM, you can create IAM users under your account, and assign permissions to these users to control their access to specific resources. For example, you can grant permissions to allow certain project planners in your enterprise to view IAM data but disallow them to perform any high-risk operations, for example, deleting IAM users and projects. For all permissions of the services supported by IAM, see "Permissions".

IAM Permissions

By default, new IAM users do not have permissions. To assign permissions to new users, add them to one or more groups, and grant permissions to these groups. The users then inherit permissions from the groups to which the users belong, and can perform specific operations on cloud services.

IAM is a global service that you can access from all regions. You can assign IAM permissions to users in the global service project. In this way, users do not need to switch regions when they access IAM.

You can grant permissions by using roles and policies.

- Roles: A type of coarse-grained authorization mechanism that defines service-level permissions based on user responsibilities. There are only a limited number of roles for granting permissions to users. When you grant permissions using roles, you need to also assign dependency roles.
- Policies: A type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization and secure access control. For example, you can grant ECS users only the permissions required for managing a certain type of ECS resources. Most policies contain permissions for specific APIs, and permissions are defined using API actions. For the API actions supported by IAM, see "API Reference" > "Permissions Policies and Supported Actions".

Table 1-2 lists all the system-defined roles and policies supported by IAM.

Table 1-2 System-defined roles and policies supported by IAM

Role/Policy Name	Description	Type	Content
FullAccess	Full permissions for all services that support policy-based authorization. Users with these permissions can perform operations on all services.	System-defined policy	Content of the FullAccess Policy
IAM ReadOnlyAccess	Read-only permissions for IAM. Users with these permissions can only view IAM data.	System-defined policy	Content of the IAM ReadOnlyAccess Policy
Security Administrator	IAM administrator with full permissions, including permissions for creating and deleting IAM users.	System-defined role	Content of the Security Administrator Role
Agent Operator	IAM operator (delegated party) with permissions for switching roles and access resources of a delegating party.	System-defined role	Content of the Agent Operator Role
Tenant Guest	Read-only permissions for all services except IAM.	System-defined policy	Content of the Tenant Guest Role
Tenant	Administrator permissions for all	System-defin	Content of the

Role/Policy Name	Description	Type	Content
Administrator	services except IAM.	ed policy	Tenant Administrator Role

Table 1-3 lists the common operations supported by each system-defined policy or role of IAM. Choose appropriate policies or roles as required.

NOTE

Tenant Guest and **Tenant Administrator** are basic roles provided by IAM and do not contain any specific permissions for IAM. Therefore, the two roles are not listed in the following table.

Table 1-3 Common operations supported by system-defined policies or roles

Operation	Security Administrator	Agent Operator	FullAccess	IAM ReadOnlyAccess
Creating IAM users	Yes	No	Yes	No
Querying IAM user details	Yes	No	Yes	Yes
Modifying IAM user information	Yes	No	Yes	No
Querying security settings of IAM users	Yes	No	Yes	Yes
Modifying security settings of IAM users	Yes	No	Yes	No
Deleting IAM users	Yes	No	Yes	No
Creating user groups	Yes	No	Yes	No
Querying user group details	Yes	No	Yes	Yes
Modifying user group information	Yes	No	Yes	No
Adding users to user groups	Yes	No	Yes	No

Operation	Security Administrator	Agent Operator	FullAccess	IAM ReadOnlyAccess
Removing users from user groups	Yes	No	Yes	No
Deleting user groups	Yes	No	Yes	No
Assigning permissions to user groups	Yes	No	Yes	No
Removing permissions of user groups	Yes	No	Yes	No
Creating custom policies	Yes	No	Yes	No
Modifying custom policies	Yes	No	Yes	No
Deleting custom policies	Yes	No	Yes	No
Querying permission details	Yes	No	Yes	Yes
Creating agencies	Yes	No	Yes	No
Querying agencies	Yes	No	Yes	Yes
Modifying agencies	Yes	No	Yes	No
Switching roles	No	Yes	Yes	No
Deleting agencies	Yes	No	Yes	No
Granting permissions to agencies	Yes	No	Yes	No
Removing permissions of agencies	Yes	No	Yes	No
Creating	Yes	No	Yes	No

Operation	Security Administrator	Agent Operator	FullAccess	IAM ReadOnlyAccess
projects				
Querying projects	Yes	No	Yes	Yes
Modifying projects	Yes	No	Yes	No
Deleting projects	Yes	No	Yes	No
Creating identity providers	Yes	No	Yes	No
Importing metadata files	Yes	No	Yes	No
Querying metadata files	Yes	No	Yes	Yes
Querying identity providers	Yes	No	Yes	Yes
Querying protocols	Yes	No	Yes	Yes
Querying mappings	Yes	No	Yes	Yes
Updating identity providers	Yes	No	Yes	No
Updating protocols	Yes	No	Yes	No
Updating mappings	Yes	No	Yes	No
Deleting identity providers	Yes	No	Yes	No
Deleting protocols	Yes	No	Yes	No
Deleting mappings	Yes	No	Yes	No
Querying quotas	Yes	No	Yes	No

If an IAM user wants to manage the access keys of other IAM users, see Table 3. For example, if IAM user A wants to create an access key for IAM user B, IAM user A must have the Security Administrator or FullAccess permission.

Table 1-4 Access key operations supported by system-defined policies or roles

Operation	Security Administrator	Agent Operator	FullAccess	IAM ReadOnlyAccess
Creating access keys (for other IAM users)	Yes	No	Yes	No
Querying access keys (for other IAM users)	Yes	No	Yes	Yes
Modifying access keys (for other IAM users)	Yes	No	Yes	No
Deleting access keys (for other IAM users)	Yes	No	Yes	No

Content of the FullAccess Policy

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Action": [
                "*:*:*"
            ],
            "Effect": "Allow"
        }
    ]
}
```

Content of the IAM ReadOnlyAccess Policy

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Action": [
                "iam:*:get*",
                "iam:*:list*",
                "iam:*:check*"
            ],
            "Effect": "Allow"
        }
```



```
    ]
}
```

Content of the Security Administrator Role

```
{
    "Version": "1.0",
    "Statement": [
        {
            "Action": [
                "iam:agencies:*",
                "iam:credentials:*",
                "iam:groups:*",
                "iam:identityProviders:*",
                "iam:mfa:*",
                "iam:permissions:*",
                "iam:projects:*",
                "iam:quotas:*",
                "iam:roles:*",
                "iam:users:*",
                "iam:securitypolicies:*"
            ],
            "Effect": "Allow"
        }
    ]
}
```

Content of the Agent Operator Role

```
{
    "Version": "1.0",
    "Statement": [
        {
            "Action": [
                "iam:tokens:assume"
            ],
            "Effect": "Allow"
        }
    ]
}
```

Content of the Tenant Guest Role

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Action": [
                "obs:*:get*",
                "obs:*:list*",
                "obs:*:head*"
            ],
            "Effect": "Allow"
        },
        {
            "Condition": {
```



```
            "StringNotEqualsIgnoreCase": {
                "g:ServiceName": [
                    "iam"
                ]
            }
        },
        "Action": [
            "*:*:get*",
            "*:*:list*",
            "*:*:head*"
        ],
        "Effect": "Allow"
    }
  ]
}
```

Content of the Tenant Administrator Role

```
{
  "Version": "1.1",
  "Statement": [
    {
      "Action": [
        "obs:*:*"
      ],
      "Effect": "Allow"
    },
    {
      "Condition": {
        "StringNotEqualsIgnoreCase": {
          "g:ServiceName": [
            "iam"
          ]
        }
      },
      "Action": [
        "*:*:*"
      ],
      "Effect": "Allow"
    }
  ]
}
```


2 Getting Started

2.1 Before You Start

Reading this document will help you to:

- Create Identity and Access Management (IAM) users.
- Create user groups based on your organization's business functions.
- Assign permissions to user groups.
- Create IAM users for employees in your organization.
- Enable IAM users to log in to the cloud platform.

Prerequisites

You already have an account. If you do not have an account, create one.

Example Scenario

A is a website development company that has three functional teams. Instead of creating an account for each employee in company A, the company's administrator can register an account to create resources and control access permissions. The administrator can create IAM users for employees and assign permissions to the users.

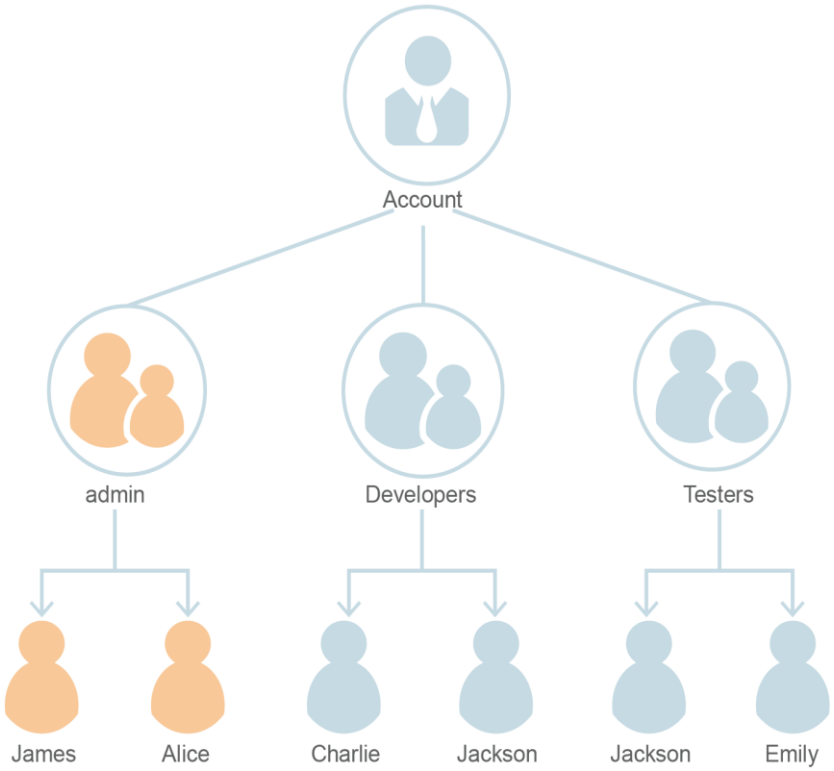
Company A is used as an example to demonstrate how an enterprise can use IAM to configure cloud service permissions.

Organizational Structure

- Management team (**admin** group in Figure 2-1): manages employees and resources, assigns permissions, and allocates resources. The team members include James and Alice.
- Development team (**Developers** group in Figure 2-1): develops websites. The team members include Charlie and Jackson.

- Test team (**Testers** group in Figure 2-1): tests websites. The team members include Jackson and Emily. Jackson develops and tests websites, so he needs to join both the **Developers** and **Testers** groups to obtain the required permissions.

Figure 2-1 User management model



User Groups and Required Resources

- **admin** group: manages user permissions using IAM.
- **Developers** group: develops websites using Elastic Cloud Server (ECS), Elastic Load Balance (ELB), Virtual Private Cloud (VPC), Relational Database Service (RDS), Elastic Volume Service (EVS), and Object Storage Service (OBS).
- **Testers** group: performs functional and performance testing on websites by using the Application Performance Management (APM) service.

User Management Process

1. The administrator of company A logs in to the cloud platform, creates user groups **Developers** and **Testers**, and grants them permissions. For details, see Step 1: Create User Groups and Assign Permissions.
2. The administrator creates IAM users for members of the three functional teams. The members then log in to the cloud platform as IAM users. For details, see Step 2: Create IAM Users and Log In.

2.2 Step 1: Create User Groups and Assign Permissions

Company A has three functional teams, including the management (**admin** group), development, and test teams. The default group **admin** is generated after company A's administrator registers an account. The administrator needs to create another two groups in IAM for the development and test teams.

Creating User Groups

Step 1 Log in to the management console, and choose **Identity and Access Management**.

Step 2 Log in to the console as an administrator.

Step 3 On the IAM console, choose **User Groups** and click **Create User Group**.

Step 4 Enter **Developers** for **Name**, and click **OK**.

Step 5 Repeat steps Step 3 and Step 4 to create the **Testers** group.

----End

Assigning Permissions to User Groups

Developers in company A need to use ECS, RDS, ELB, VPC, EVS, and OBS, so the administrator needs to assign the required permissions to the **Developers** group to enable access to these services. Testers in this company need to use APM, so the administrator needs to assign the required permissions to the **Testers** group to enable access to the service. After permissions are assigned, users in the two groups can access the corresponding services. **For details about the permissions of all cloud services, see "Permissions"**.

Step 1 Determine the permissions policies to be attached to each user group.

Determine the policies (see Table 2-1). Regions are geographic areas where services are deployed. If a project-level service policy is attached to a user group for a project in a specific region, the policy takes effect only for that project.

Table 2-1 Required permissions policies

User Group	Cloud Service	Region	Policy or Role
Developers	ECS	Specific regions	ECS Admin
	RDS	Specific regions	RDS Admin
	ELB	Specific regions	ELB Admin
	VPC	Specific regions	VPC Administrator
	EVS	Specific regions	EVS Admin
	OBS	Global	OBS Buckets Viewer
Testers	CTS	Specific regions	APM Admin CTS Administrator

Step 2 In the user group list, click **Manage Permissions** in the row containing the user group **Developers**.

Step 3 On the **Permissions** tab page, click **Assign Permissions** above the permission list.

Step 4 Assign permissions to the user group for region-specific projects.

1. All the services in Table 2-1 except OBS are deployed in specific projects. Specify the scope as **Region-specific projects**, and select a project from the drop-down list.
2. Select policies and click **OK**.

Step 5 Assign permissions to the user group for the global service project.

1. Specify the scope as **Global service project**.
2. Select **OBS Buckets Viewer**, and click **OK**.

Step 6 Repeat steps 2 to 5 to attach the **CTS Administrator** role to the **Testers** group.

----End

2.3 Step 2: Create IAM Users and Log In

Use the account of company A to create IAM users for employees and add the users to the user groups created in the previous section. The IAM users have their own passwords to log in to the cloud platform, and can use resources based on assigned permissions.

Creating IAM Users

Step 1 Choose **Users** from the navigation pane, and click **Create User**.

Step 2 Specify the user details and access type. To create more users, click **Add User**. A maximum of 10 users can be created at a time.

NOTE

- Users can log in to the cloud platform using the username, email address, or mobile number.
- If users forget their password, they can reset it through email address or mobile number verification. If no email addresses or mobile numbers have been bound to users, users need to request the administrator to reset their passwords.

Table 2-2 User information

Parameter	Description
Username	Username that will be used to log in to the cloud platform, for example, **James** and **Alice**. This field is required.
Email Address	Email address of the IAM user that can be used as a login credential. IAM users can bind an email address after they are created. This field is required if you have selected **Set by user** for **Credential Type**.
Mobile Number	Mobile phone number of the IAM user that can be used as a login credential. IAM users can bind a mobile number after they are created. This field is optional.
Description	Additional information about the IAM user. This field is optional.

- **Programmatic access**: Select this option to allow the user to access cloud services using development tools, such as APIs, CLI, and SDKs. You can generate an **access key** or set a **password** for the user.
- **Management console access**: Select this option to allow the user to access cloud services using the management console. You can set or generate a password for the user or request the user to set a password at first login.

NOTE

- If the user **accesses cloud services only by using the management console**, select **Management console access** for **Access Type** and **Password** for **Credential Type**.
- If the user **accesses cloud services only through programmatic calls**, select **Programmatic access** for **Access Type** and **Access key** for **Credential Type**
- If the user **needs to use a password as the credential for programmatic access** to certain APIs, select **Programmatic access** for **Access Type** and **Password** for **Credential Type**
- If the user needs to **perform access key verification** when using certain services in the console, such as creating a data migration job in the Cloud Data Migration (CDM) console, select **Programmatic access** and **Management console access** for **Access Type** and **Access key** and **Password** for **Credential Type**.

Step 3 (Optional) Click **Next** to add the users to specific user groups.

- The users will inherit the permissions assigned to the user groups.
- You can also create new groups as required.

NOTE

The default user group **admin** has the administrator permissions and the permissions required to use all cloud resources. For the mapping relationships between company A's employees and the user groups, see Figure 2-1.

Step 4 Click **Create**. If you have specified the access type as **Programmatic access**, you can download the access keys on the **Finish** page.

Step 5 Repeat steps Step 1 through Step 4 to create users Charlie, Jackson, and Emily, and add them to the corresponding groups.

----End

IAM User Login

After using the account of company A to create users **James**, **Alice**, **Charlie**, **Jackson**, and **Emily**, provide the account name, IAM user names, and IAM users' initial passwords to corresponding employees. Employees can use their own usernames and passwords to access the cloud platform.

Step 1 Click **IAM User Login** on the login page, and then enter your **Account name**, **IAM user name or email**, and **Password**.

Step 2 Click **Log In**.

----End

3 User Guide

3.1 Before You Start

Intended Audience

The Identity and Access Management (IAM) service is intended for administrators, including:

- Account administrator (with full permissions for all services, including IAM)
- IAM users added to the **admin** group (with full permissions for all services, including IAM)
- IAM users assigned the **Security Administrator** role (with permissions to access IAM)

If you want to view, audit, and track the records of key operations performed on IAM, enable Cloud Trace Service (CTS). For details, see Enabling CTS.

Account

An account has full permissions to access the resources under the account.

IAM User

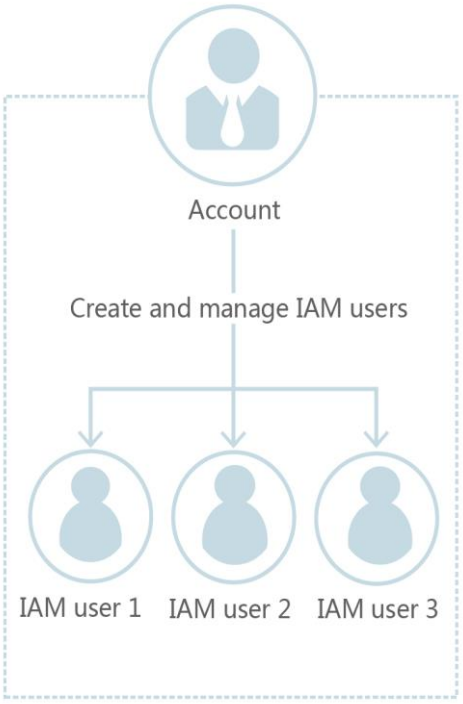
The administrator can create users in IAM and assign permissions for specific resources. IAM users can log in to the cloud platform using their account name, username, and password, and then use resources based on assigned permissions. IAM users do not own resources.

Relationship Between an Account and Its IAM Users

An account and its IAM users share a parent-child relationship. The account owns the resources and has full permissions for these resources.

IAM users are created by the account administrator, and only have the permissions granted by the administrator. The administrator can modify or revoke the IAM users' permissions at any time.

Figure 3-1 Relationship between an account and its IAM users

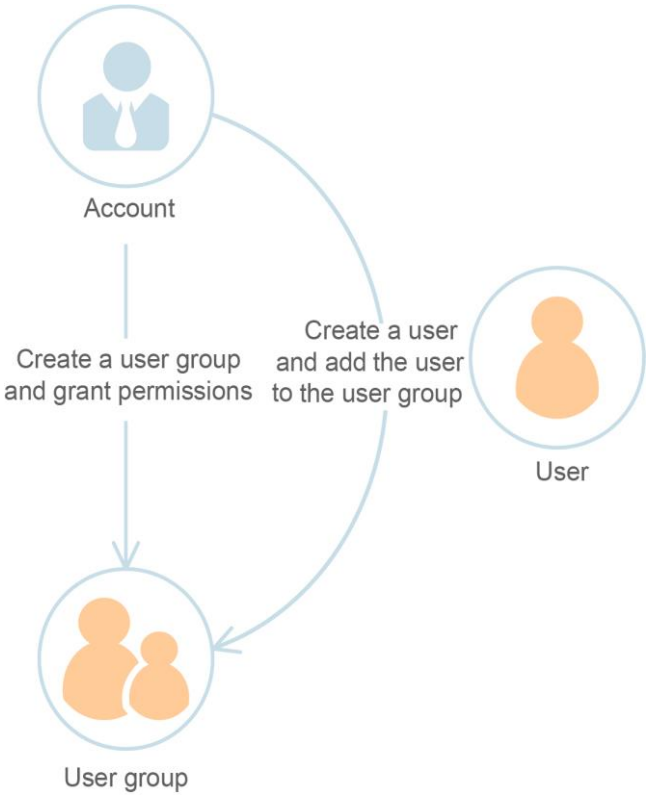


User Group

You can use user groups to assign permissions to IAM users. By default, new IAM users do not have permissions. To assign permissions to new users, add them to one or more groups, and grant permissions to these groups. The users then inherit permissions from the groups to which the users belong, and can perform specific operations on cloud services.

The default user group **admin** has all permissions required to use all of the cloud resources. Users in this group can perform operations on all the resources, including but not limited to creating user groups and users, modifying permissions, and managing resources.

Figure 3-2 User group



Permission

IAM provides common permissions of different services, such as administrator and read-only permissions, which you can assign to users. By default, new IAM users do not have permissions. To assign permissions to new users, add them to one or more groups, and attach permissions policies or roles to these groups. The users then inherit permissions from the groups to which the users belong, and can perform specific operations on cloud services.

- Roles: a type of coarse-grained authorization mechanism that defines service-level permissions based on user responsibilities. There are only a limited number of roles for granting permissions to users. When using roles to grant permissions, you also need to assign dependency roles. Roles are not an ideal choice for fine-grained authorization and secure access control.
- Policies: a type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization on a principle of least privilege (PoLP) basis. For example, you can grant Elastic Cloud Server (ECS) users only the permissions required for managing a certain type of ECS resources.

3.2 IAM Users

3.2.1 Creating an IAM User

If you are an administrator and have created multiple resources on the cloud platform, such as Elastic Cloud Servers (ECSs), Elastic Volume Service (EVS) disks, and Bare Metal Servers (BMSs), you can create IAM users grant them permissions required to perform operations on specific resources. You do not need to share the password of your account.

By default, **new IAM users do not have permissions**. You can assign permissions to new users, or add them to one or more groups and grant permissions to these groups by referring to Assigning Permissions to a User Group so that the users can inherit the permissions of the groups. The users then can perform specific operations on cloud services as specified by the permissions.

The default user group **admin** has all permissions required to use all of the cloud resources. Users in this group can perform operations on all the resources, including but not limited to creating user groups and users, modifying permissions, and managing resources.

NOTE

If you delete a user and create a new user with the same name, you need to grant the required permissions to the new user again.

Procedure

Step 1 Log in to the IAM console as an administrator.

Step 2 On the IAM console, choose **Users** from the navigation pane, and click **Create User** in the upper right corner.

Step 3 Specify the user information on the displayed page. To create more users, click **Add User**. You can add a maximum of 10 users at a time.

NOTE

- A username, mobile number, or an email address can be bound to one IAM user or one account only.
- Users who have access to the management console can log in to the cloud platform using their usernames, email addresses, or mobile numbers.
- The mobile number is optional. If the mobile number of an IAM user has been bound to an account or another user, bind an email address or virtual MFA device to the user for identity verification.
- If a user forgets their password, they can reset it through email address or mobile number verification. If no email address or mobile number has been bound to the user, they need to request the administrator to reset their password.

Step 4 Select an access type.

- **Programmatic access**: Select this option to allow the user to access cloud services using development tools, such as APIs, CLI, and SDKs. You can generate an **access key** or set a **password** for the user.
- **Management console access**: Select this option to allow the user to access cloud services using the management console. You can set or generate a password for the user or request the user to set a password at first login.

Step 5 Configure login protection. This parameter is available only when you have selected **Management console access** for **Access Type**.

Step 6 (Optional) Click **Next** and add the user to one or more user groups.

- The user will inherit the permissions assigned to the user groups.
- You can also create new groups and add the user to these groups.

NOTE

- If the user will be an administrator, add the user to the default group **admin**.
- You can add a user to a maximum of 10 user groups.

Step 7 Click **Create**.

- If you have selected **Programmatic access** for **Access Type** in Step 4, you can download the access key on the **Finish** page.
- If you have selected **Password** > **Automatically generated** for **Credential Type** in Step 4, you can download the password file on the **Finish** page.

----End

3.2.2 Assigning Permissions to an IAM User

IAM users created without being added to any groups **do not have permissions**. You can assign permissions to these IAM users on the IAM console. After authorization, the users can use cloud resources in your account as specified by their permissions.

An IAM user obtains permissions from the user groups to which the user belongs. After you attach policies or roles to a group and add a user to the group, the user inherits the permissions defined by the policies or roles.

- If you do not add an IAM user to any group, the user will not have permissions for accessing any cloud services. For details on how to assign permissions to an IAM user, see Creating a User Group and Assigning Permissions and Adding Users to or Removing Users from a User Group.
- If you add an IAM user to the default group **admin**, the user becomes an administrator and has full permissions to perform all operations on all cloud services.
- **For the system permissions of all cloud services supported by IAM, see "Permissions".**
- If you add a user to multiple user groups, the user inherits the permissions that are assigned to all the groups.

3.2.3 Logging In as an IAM User

You can log in to the cloud platform as an IAM user by clicking **IAM User Login** on the login page or by using the IAM user login link.

Method 1: Logging In by Clicking IAM User Login

Step 1 Click **IAM User Login** on the login page, and then enter your account name, IAM user name/email address, and password.

- **Account name**: The name of the account that was used to create the IAM user. You can obtain the account name from the administrator.
- **IAM user name or email**: The username or email address of the IAM user. You can obtain the username and password from the administrator.
- **Password**: The password of the IAM user.

Step 2 Click **Log In**.

NOTE

- If you have not been added to any group, you do not have permissions for accessing any cloud services. In this case, contact the administrator and request for required permissions (see Creating a User Group and Assigning Permissions and Adding Users to or Removing Users from a User Group).
- If you have been added to the default group **admin**, you have administrator permissions and you can perform all operations on all cloud services.

----End

Method 2: Logging In Using the IAM User Login Link

You can obtain the IAM user login link from the administrator and then log in using this link. When you visit the link, the system displays the login page and automatically populates the account name. You only need to enter your username and password.

Step 1 Obtain the IAM user login link from the administrator.

Step 2 Paste the link into the address bar of a browser, press **Enter**, and enter the IAM user name/email address and password, and click **Log In**.

----End

3.2.4 Viewing or Modifying IAM User Information

As an administrator, you can modify the basic information about an IAM user, change the security settings of the user and the groups to which the user belongs, and view or delete the assigned permissions. To view or modify user information, click **Security Settings** in the row containing the IAM user.

Basic Information

You can view the basic information of each IAM user. The username, user ID, and creation time cannot be modified.

- **Status**: New IAM users are enabled by default. You can set **Status** to **Disabled** to disable an IAM user. A disabled user is no longer able to log in to the cloud platform through the management console or programmatic access.
- **Description**: You can modify the description of the IAM user.

User Groups

An IAM user inherits permissions from the groups to which the user belongs. **You can change the permissions assigned for an IAM user by changing the groups to which the user belongs to.** To modify the permissions of a user group, see Viewing or Modifying User Group Information.

Your account belongs to the default group **admin**, which cannot be changed.

- Click **Add to User Groups**, and select one or more groups to which the user will belong. The user then inherits permissions of these groups.
- Click **Remove** on the right of a user group and click **Yes**. The user no longer has the permissions assigned to the group.

Security Settings

As an administrator, you can modify the MFA device, login credential, login protection, and access keys of an IAM user on this page. If you are an IAM user and need to change your mobile number, email address, or virtual MFA device, see Account Security Settings Overview.

- **MFA Authentication**: You can change the multi-factor authentication (MFA) settings of an IAM user on the **Security Settings** page.
  - Change the mobile number or email address of the user.

  NOTE

  The mobile number and email address of the IAM user cannot be the same as those of your account or other IAM users.
  - Remove the MFA device from the user. For more information about MFA authentication and virtual MFA device, see MFA Authentication and Virtual MFA Device.
- **Login Credentials**: You can change the login password of the IAM user. For more information, see Changing the Login Password of an IAM User.
- **Login Protection**: You can change the login verification method of the IAM user. Three verification methods are available: virtual MFA device, SMS, and email.

  This option is disabled by default. If you enable this option, the user will need to enter a verification code in addition to the username and password when logging in to the console.
- **Access Keys**: You can manage access keys of the IAM user. For more information, see Managing Access Keys for an IAM User.

3.2.5 Deleting an IAM User

CAUTION

After an IAM user is deleted, they can no longer log in and their username, password, access keys, and authorizations will be cleared and cannot be recovered.

- Make sure that the users to be deleted are no longer needed. If you are not sure, disable them rather than delete them so that they can be enabled if any service failures occur. To disable an individual IAM user, see Basic Information.
- To remove an IAM user from a user group, see Adding Users to or Removing Users from a User Group.

Deleting an IAM User

Step 1 Log in to the IAM console. In the navigation pane, choose **Users**.

Step 2 Click **Delete** in the row containing the IAM user you want to delete, and click **Yes**.

----End

3.2.6 Changing the Login Password of an IAM User

As an administrator, you can reset the password of an IAM user if the user has forgotten the password and no email address or mobile number has been bound to the user.

To reset the login password of an IAM user, click **Security Settings** in the row containing the user, click  next to **Login Password** in the **Login Credentials** area, and select a password type.

NOTE

- You can reset the password of an IAM user on the **Security Settings** page.
- The password of the IAM user automatically generated for your account cannot be changed on the **Security Settings** tab page. To change the password, go to the **Basic Information** page of My Account.
- IAM users can change their passwords on the Account Settings tab page.

- **Set by user**: A one-time login URL will be emailed to the user. The user can then click on the link to set a password.
- **Automatically generated**: A password will be automatically generated and then sent to the user by email.
- **Set now**: You set a new password and send the new password to the user.

3.2.7 Managing Access Keys for an IAM User

An access key consists of an access key ID (AK) and secret access key (SK) pair. You can use an access key to access the cloud platform using development tools, including APIs, CLI, and SDKs. Access keys cannot be used to log in to the console. AK is a unique identifier used in conjunction with SK to sign requests cryptographically, ensuring that the requests are secret, complete, and correct.

As an administrator, you can manage access keys for IAM users who have forgotten their access keys and do not have access to the console.

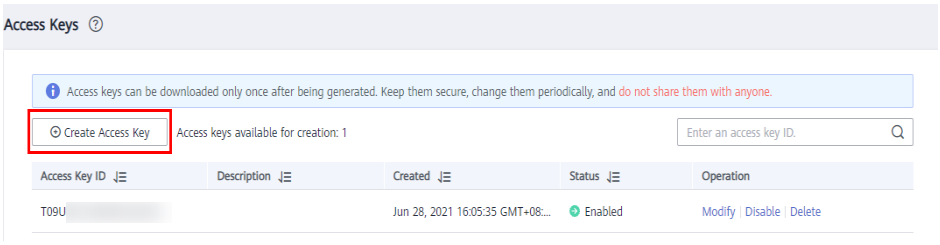
Click **Security Settings** in the row containing the IAM user, and then create or delete access keys.

NOTE

- If a user is authorized to use the console, the user can manage access keys on the **My Credentials** page.
- Access keys are identity credentials used to call APIs. The account administrator and IAM users can only use their own access keys to call APIs.

- Creating an access key
  a. Click **Create Access Key**.

Figure 3-3 Creating an access key



NOTE

Each user has a maximum of two access keys, and the access keys are permanently valid. For security purposes, change the access keys of IAM users periodically.

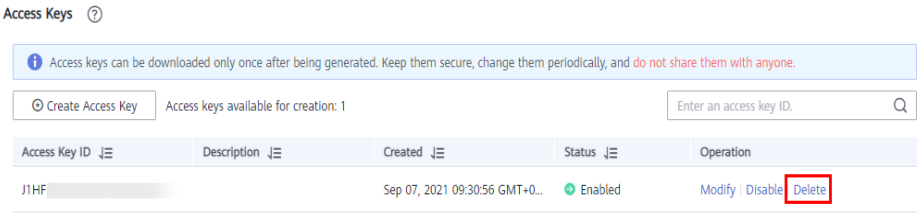
b. (Optional) If operation protection is enabled, you need to enter a verification code or password.

c. Click **OK**. An access key is automatically generated. Download the access key and provide it to the user.

- Deleting an access key

  a. In the access key list, click **Delete** in the row containing the access key to be deleted.

  Figure 3-4 Deleting an access key



  b. (Optional) If operation protection is enabled, you need to enter a verification code or password.

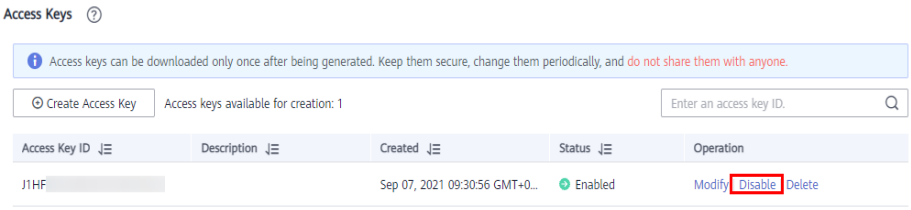
  c. Click **Yes**.

- Enabling/Disabling an access key

  New access keys are enabled by default. To disable an access key, perform the following steps:

  a. In the access key list, click **Disable** in the row containing the access key you want to disable.

Figure 3-5 Disabling an access key



b. (Optional) If operation protection is enabled, you need to enter a verification code or password, and click **Yes**.

The method of enabling an access key is similar to that of disabling an access key.

3.3 User Groups and Authorization

3.3.1 Creating a User Group and Assigning Permissions

As an administrator, you can create user groups, and grant them permissions by attaching policies or roles. Users you add to the user groups inherit permissions of the policies or roles. IAM provides general permissions (such as administrator or read-only permissions) for each cloud service, which you can assign to user groups. Users in the groups can then use cloud services based on the assigned permissions. For details, see Assigning Permissions to an IAM User. **For details about the system permissions of all cloud services, see "Permissions".**

Prerequisites

Before creating a user group, learn about the following:

- Understand the basic concepts of permissions.
- **Know "Permissions" provided by IAM.**

Creating a User Group

Step 1 Log in to the IAM console as an administrator.

Step 2 On the IAM console, choose **User Groups** from the navigation pane, and click **Create User Group** in the upper right corner.

Step 3 On the displayed page, enter a user group name.

Step 4 Click **OK**.

NOTE

You can create a maximum of 20 user groups. To create more user groups, increase the quota by referring to How Do I Increase My Quota?

----End

Assigning Permissions to a User Group

To assign permissions to a user group, do as follows:

Step 1 In the user group list, choose **Manage Permissions** in the row containing the target user group, for example, **Developers**.

Step 2 On the **Permissions** tab page, click **Assign Permissions**.

Step 3 Specify the scope. If you select **Region-specific projects**, select one or more projects in the drop-down list.

- **Global service project**: Services deployed without specifying physical regions are called global services, such as Object Storage Service (OBS), and Tag Management Service (TMS). Permissions for these services must be assigned in the global service project.
- **Region-specific projects**: Services deployed in specific regions are called project-level services. Permissions for these services need to be assigned in region-specific projects and take effect only for the corresponding regions.
  - **All projects**: Permissions take effect for both the global service project and region-specific projects, including projects created later.
  - Specific projects: Permissions take effect only for the region-specific projects you select.

Step 4 Select policies or roles and click **OK**.

----End

3.3.2 Adding Users to or Removing Users from a User Group

A user inherits permissions from the groups to which the user belongs. To change the permissions of a user, add the user to a new group or remove the user from an existing group.

Adding Users to a User Group

Step 1 In the user group list, click **Manage User** in the row containing the target user group, for example, **Developers**.

Step 2 In the **Manage User** dialog box, select the usernames to be added.

Step 3 Click **OK**.

----End

Removing Users from a User Group

Step 1 In the user group list, click **Manage User** in the row containing the target user group, for example, **Developers**.

Step 2 In the **Selected Users** area, click the **x** icon on the right of the usernames to be removed and click **OK**.

----End

3.3.3 Deleting a User Group

Procedure

To delete a user group, do the following:

Step 1 Log in to the IAM console. In the navigation pane, choose **User Groups**.

Step 2 In the user group list, click **Delete** in the row that contains the user group to be deleted.

Step 3 In the displayed dialog box, click **Yes**.

----End

3.3.4 Viewing or Modifying User Group Information

Viewing User Group Information

In the user group list, click next to a user group to view its basic information, assigned permissions, and managed users.

Modifying User Group Permissions

You can assign new permissions to or revoke the existing permissions of a user group in the policy view or project view.

NOTE

- Modifying the permissions of a user group affects the permissions of all users in the user group. Exercise caution when performing this operation.
- Permissions of the default user group **admin** cannot be modified.

- **Changing the authorization scope in the policy view**
  a. Choose **User Groups** in the navigation pane, and click **Manage Permissions** in the row containing the user group you want to modify. On the **Permissions** tab page, select **Policy View**.
  b. Click **Change Project** on the right of a policy or role.
  c. On the **Change Project** page, select or deselect desired projects.
  d. Click **OK**.
- **Modifying permissions for certain projects in the project view**
  a. Choose **User Groups** in the navigation pane, and click **Manage Permissions** on the right of a user group. On the **Permissions** tab page, select **Project View**.
  b. Click **Modify Permissions** on the right of a project.
  c. Select or deselect desired policies or roles, and click **OK**.

Modifying a User Group Name and Description

In the user group list, click **Modify** in the row containing the user group whose name and description you want to modify, and modify the name and description.

NOTE

If a user group name has been configured in the identity conversion rules of an identity provider, modifying the user group name will cause the identity conversion rules to fail. Exercise caution when performing this operation.

Managing Users

Step 1 In the user group list, click **Manage User** in the row containing the user group you want to modify.

Step 2 In the **Available Users** area, select users you want to add to the user group.

Step 3 In the **Selected Users** area, remove users from the user group.

----End

NOTE

For the default group **admin**, you can only manage its users and cannot modify its description or permissions.

3.3.5 Revoking Permissions of a User Group

Procedure

To revoke a policy or role attached to a user group, do the following:

Step 1 Log in to the IAM console. In the navigation pane, choose **User Groups**.

Step 2 Click the name of the user group to go to the group details page.

Step 3 On the **Permissions** tab page, select **Policy View**, and then click **Remove** in the row containing the policy or role you want to remove.

Step 4 In the displayed dialog box, click **Yes**.

----End

3.3.6 Assigning Dependency Roles

Cloud services interwork with each other. Roles of some services take effect only if they are assigned along with roles of other services.

Procedure

Step 1 When assigning permissions to users or user groups, search for a role in the search box.

Step 2 Select the role to be attached to the target user, user group, or agency.

Step 3 Click next to the role to view the dependencies.

For example, the **DNS Administrator** role contains the **Depends** parameter which specifies the dependency roles. When you assign the **DNS Administrator** role to a user group, you also need to assign the **Tenant Guest** and **VPC Administrator** roles to the group for the same project.

Step 4 Search for and select **Tenant Guest** and **VPC Administrator** and assign them to the user group for the same project as **DNS Administrator**.

Step 5 Click **OK**.

----End

3.4 Permissions

3.4.1 Basic Concepts

Permission

By default, IAM users do not have permissions. To assign permissions to IAM users, add them to one or more groups, and attach policies or roles to these groups. The users then inherit permissions from the groups to which the users belong, and can perform specific operations on cloud services.

Permission Type

You can grant users permissions by using roles and policies.

- Roles: a type of coarse-grained authorization mechanism that defines service-level permissions based on user responsibilities. IAM provides a limited number of roles for permissions management. When using roles to grant permissions, you also need to assign dependency roles. Roles are not an ideal choice for fine-grained authorization and secure access control.
- Policies: a type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization and secure access control. For example, you can grant ECS users only the permissions required for managing a certain type of ECS resources.

  IAM supports both system-defined policies and custom policies.

System-Defined Policy

A system-defined policy defines the common actions of a cloud service. System-defined policies can be used to assign permissions to user groups, and they cannot be modified. **For details about the system-defined policies of all cloud services, see "Permissions".**

If there are no system-defined policies for a specific service, it indicates that IAM does not support this service.

Custom Policy

You can create custom policies using the actions supported by cloud services to supplement system-defined policies for more refined access control. You can create custom policies in the visual editor or in JSON view.

3.4.2 Roles

Roles are a type of coarse-grained authorization mechanism that defines service-level permissions based on user responsibilities. IAM provides a limited number of roles for permissions management.

Services on the cloud platform interwork with each other. Roles of some services take effect only if they are assigned along with roles of other services. For more information, see Assigning Dependency Roles.

Role Content

When using roles to assign permissions, you can select a role and click to view the details of the role. This section uses the **DNS Administrator** role as an example to describe the role content.

```
{
    "Version": "1.0",
    "Statement": [
        {
            "Action": [
                "DNS:Zone:*",
                "DNS:RecordSet:*",
                "DNS:PTRRecord:*"
            ],
            "Effect": "Allow"
        }
    ],
    "Depends": [
        {
            "catalog": "BASE",
            "display_name": "Tenant Guest"
        },
        {
            "catalog": "VPC",
            "display_name": "VPC Administrator"
        }
    ]
}
```

Parameter Description

Table 3-1 Parameter description

Parameter		Description	Value
Version		Role version.	**1.1**: indicates role-based access control.
Statement	Action	Operations to be performed on the service.	Format: "*Service name*:*Resource type*:*Operation*". **DNS:Zone:***: Permissions for performing all operations on Domain Name Service (DNS) zones.
	Effect	Determines	• Allow

Parameter		Description	Value
		whether to allow or deny the operations defined in the action.	• Deny **NOTE** If the roles used to grant a user permissions contain both Allow and Deny for the same action, the Deny takes precedence.
Depends	catalog	Name of the service to which a dependency role belongs.	Service name. Example: **BASE** and **VPC**.
	display_name	Name of the dependency role.	Role name. **NOTE** When you assign the **DNS Administrator** role to a user group, you also need to assign the **Tenant Guest** and **VPC Administrator** roles to the group for the same project. For more information about dependencies, see "Permissions".

3.4.3 Policies

3.4.3.1 Policy Content

When you assign permissions to a user group, you can click on the left of a policy name to view its details. This section uses the system-defined policy **IAM ReadOnlyAccess** as an example.

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Action": [
                "iam:*:get*",
                "iam:*:list*",
                "iam:*:check*"
            ],
            "Effect": "Allow"
        }
    ]
}
```

3.4.3.2 Policy Syntax

The following uses a custom policy for OBS as an example to describe the syntax.

```
{
    "Version": "1.1",
    "Statement": [
        {
```

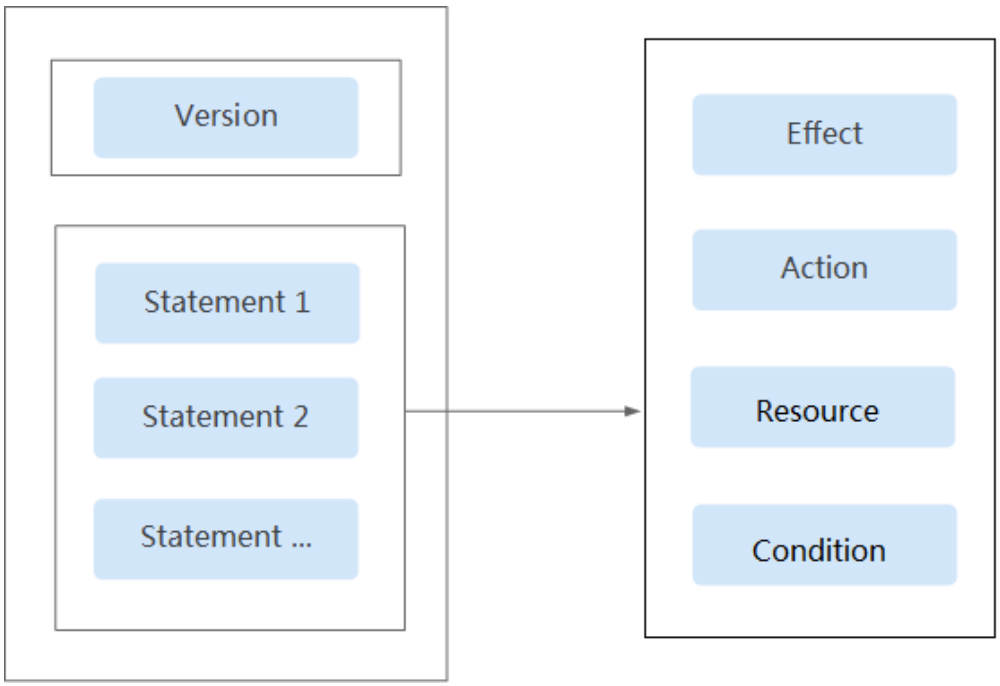


```
            "Effect": "Allow",
            "Action": [
                "obs:bucket:ListAllMyBuckets",
                "obs:bucket:HeadBucket",
                "obs:bucket:ListBucket",
                "obs:bucket:GetBucketLocation"
            ],
            "Condition": {
                "StringEndWithIfExists": {
                    "g:UserName": [
                        "specialCharactor"
                    ]
                },
                "Bool": {
                    "g:MFAPresent": [
                        "true"
                    ]
                }
            },
            "Resource": [
                "obs:*:*:bucket:*"
            ]
        }
    ]
}
```

Policy Structure

A policy consists of a version and one or more statements (indicating different actions).

Figure 3-6 Policy structure



Policy Parameters

Policy parameters include **Version** and **Statement**, which are described in the following table. You can create custom policies by specifying the parameters. For details, see Custom Policy Use Cases.

Table 3-2 Policy parameters

Parameter		Description	Value
Version		Policy version.	**1.1**: indicates policy-based access control.
Statement	Effect	Determines whether to allow or deny the operations defined in the action.	• Allow • Deny **NOTE** If the policies used to grant a user permissions contain both Allow and Deny for the same action, the Deny takes precedence.
	Action	Operations to be performed on the service.	Format: "*Service name*:*Resource type*:*Operation*". Wildcard characters (*) are supported, indicating all options. Example: **obs:bucket:ListAllMybuckets**: Permissions for listing all OBS buckets. View all actions of the service in its *API Reference*.
	Condition	Determines when a policy takes effect. A condition consists of a condition key and an operator.	Format: "*Condition operator*:{*Condition key*:[*Value 1*,*Value 2*]}" If you set multiple conditions, the policy takes effect only when all the conditions are met. Example: **StringEndWithIfExists":{"g:UserName":["specialCharactor"]}**: The statement is valid for users whose names end with **specialCharactor**.
	Resource	Resources on which the policy takes effect.	Format: *Service name*:*Region*:*Account ID*:*Resource type*:*Resource path*. Wildcard characters (*) are supported. Example: • **obs:*:*:bucket:***: All OBS buckets. • **obs:*:*:object:my-bucket/my-object/***: All objects in the **my-object** directory of the **my-bucket** bucket.

- **Condition key**

  A condition key is a key in the **Condition** element of a statement. There are global and service-level condition keys.

  - Global condition keys (starting with **g:**) apply to all operations. IAM provides **common global condition keys** and **special global condition keys**.
    - Common global condition keys: Cloud services do not need to provide user identity information. Instead, IAM automatically abstracts user information and authenticates users. For details, see Common global condition keys.
    - Special global condition keys: IAM obtains condition information from cloud services for authentication.
  - Service-level condition keys (starting with a service name abbreviation, for example, **obs:**) apply only to operations on the specified service. For details, see the user guide of the corresponding cloud service.

Table 3-3 Common global condition keys

Global Condition Key	Type	Description
g:CurrentTime	Time	Time when an authentication request is received. The time is expressed in the format defined by ISO 8601, for example, **2012-11-11T23:59:59Z**.
g:DomainName	String	Account name.
g:MFAPresent	Boolean	Indicates whether to obtain a token through MFA authentication.
g:MFAAge	Number	Validity period of a token obtained through MFA authentication. This condition must be used together with **g:MFAPresent**.
g:ProjectName	String	Project name.
g:ServiceName	String	Service name.
g:UserId	String	IAM user ID.
g:UserName	String	IAM user name.

Table 3-4 Special global condition keys

Global Condition Key	Type	Description
g:SourceIp	IP Address	IP address of the user sending a request.

Global Condition Key	Type	Description
g:SourceVpc	String	VPC ID of the user sending a request.
g:SourceVpce	String	VPC endpoint ID of the user sending a request.
g:TagKeys	String	Resource tag key.
g:ResourceTag/{TagKey}	String	Resource tag value.

- **Operator**

  An operator (see Operators), a condition key, and a condition value together constitute a complete condition statement. A policy takes effect only when its request conditions are met. The operator suffix **IfExists** indicates that a policy takes effect if a request value is empty or meets the specified condition. For example, if the operator **StringEqualsIfExists** is selected for a policy, the policy takes effect if a request value is empty or equal to the specified condition value.

Table 3-5 Operators (String operators are not case-sensitive unless otherwise specified.)

Operator	Type	Description
StringEquals	String	(Case-sensitive) The request value is the same as the condition value.
StringNotEquals	String	(Case-sensitive) The request value is different from the condition value.
StringEqualsIgnoreCase	String	The request value is the same as the condition value.
StringNotEqualsIgnoreCase	String	The request value is different from the condition value.
StringLike	String	The request value contains the condition value.
StringNotLike	String	The request value does not contain the condition value.
StringStartWith	String	The request value starts with the condition value.
StringEndWith	String	The request value ends with the condition value.
StringNotStartWith	String	The request value does not start with the condition value.
StringNotEndWith	String	The request value does not end with the condition value.
StringEqualsAnyOf	String	(Case-sensitive) The request value is the same as any of the configured condition values.
StringNotEqualsAny	String	(Case-sensitive) The request value is different from

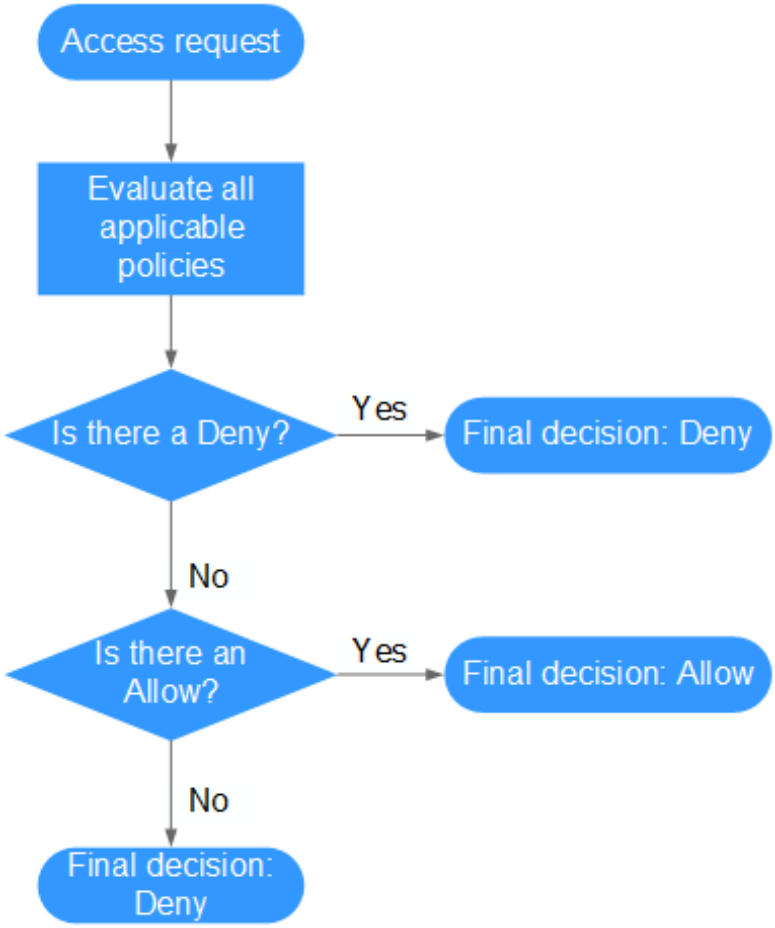
Operator	Type	Description
Of		all of the configured condition values.
StringEqualsIgnoreCaseAnyOf	String	The request value is the same as any of the configured condition values.
StringNotEqualsIgnoreCaseAnyOf	String	The request value is different from all of the configured condition values.
StringLikeAnyOf	String	The request value contains any of the configured condition values.
StringNotLikeAnyOf	String	The request value does not contain any of the configured condition values.
StringStartWithAnyOf	String	The request value starts with any of the configured condition values.
StringEndWithAnyOf	String	The request value ends with any of the configured condition values.
StringNotStartWithAnyOf	String	The request value does not start with any of the configured condition values.
StringNotEndWithAnyOf	String	The request value does not end with any of the configured condition values.
NumberEquals	Number	The request value is equal to the condition value.
NumberNotEquals	Number	The request value is not equal to the condition value.
NumberLessThan	Number	The request value is less than the condition value.
NumberLessThanEquals	Number	The request value is less than or equal to the condition value.
NumberGreaterThan	Number	The request value is greater than the condition value.
NumberGreaterThanEquals	Number	The request value is greater than or equal to the condition value.
NumberEqualsAnyOf	Number	The request value is equal to any of the configured condition values.
NumberNotEqualsAnyOf	Number	The request value is not equal to any of the configured condition values.
DateLessThan	Time	The request value is earlier than the condition value.
DateLessThanEquals	Time	The request value is earlier than or equal to the condition value.
DateGreaterThan	Time	The request value is later than the condition value.
DateGreaterThanEquals	Time	The request value is later than or equal to the condition value.
Bool	Boolean	The request value is equal to the condition value.
IpAddress	IP address	The request value is within the IP address range set in

Operator	Type	Description
		the condition value.
NotIpAddress	IP address	The request value is beyond the IP address range set in the condition value.
IsNullOrEmpty	Null	The request value is null or an empty string.
IsNull	Null	The request value is null.
IsNotNull	Null	The request value is not null.

3.4.3.3 Authentication Process

When a user initiates an access request, the system authenticates the request based on the actions in the policies that have been attached to the group to which the user belongs. The following diagram shows the authentication process.

Figure 3-7 Authentication process



1. A user initiates an access request.

2. The system looks for a Deny among the applicable actions of the policies from which the user gets permissions. If the system finds an applicable Deny, it returns a decision of Deny, and the authentication ends.
3. If no Deny is found applicable, the system looks for an Allow that would apply to the request. If the system finds an applicable Allow, it returns a decision of Allow, and the authentication ends.
4. If no Allow is found applicable, the system returns a decision of Deny, and the authentication ends.

3.4.4 Custom Policies

3.4.4.1 Creating a Custom Policy

You can create custom policies to supplement system-defined policies and implement more refined access control.

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

- Visual editor: Select a cloud service, specify actions and resources, and add request conditions. You do not need to have knowledge of JSON syntax.
- JSON: Create a policy in the JSON format from scratch or based on an existing policy.

Creating a Custom Policy in the Visual Editor

Step 1 Log in to the IAM console.

Step 2 On the IAM console, choose **Permissions** from the navigation pane, and click **Create Custom Policy** in the upper right corner.

Step 3 Enter a policy name.

Step 4 Select a scope based on the type of services related to this policy. For more information about service types, see "Permissions".

- **Global services**: Select this option if the services to which the policy is related must be deployed in the Global region. When creating custom policies for globally deployed services, specify the scope as **Global services**. Custom policies of this scope must be attached to user groups for the global service project.
- **Project-level services**: Select this option if the services to which the policy is related must be deployed in specific regions. When creating custom policies for regionally deployed services, specify the scope as **Project-level services**. Custom policies of this scope must be attached to user groups for specific projects except the global service project.

For example, when creating a custom policy containing the action **evs:volumes:create** for EVS, specify the scope as **Project-level services**.

NOTE

A custom policy can contain actions of multiple services that are globally accessible or accessible through region-specific projects. To define permissions required to access both global and project-level services, create two custom policies and specify the scope as **Global services** and **Project-level services** respectively.

Step 5 Select **Visual editor** for **Policy View**.

Step 6 Set the policy content.

1. Select **Allow** or **Deny**.
2. Select a cloud service.

NOTE

- Only one cloud service can be selected for each permission block. To configure permissions for multiple cloud services, click **Add Permissions**, or switch to the JSON view (see Creating a Custom Policy in JSON View).
- A custom policy can contain permissions for either global or project-level services. To define permissions required to access both global and project-level services, enclose the permissions in two separate policies for refined authorization.

3. Select actions.
4. (Optional) Select all resources, or select specific resources by specifying their paths.

Table 3-6 Resource type

Parameter	Description
Specific	Permissions for specific resources. For example, to define permissions for buckets whose names start with **TestBucket**, specify the bucket resource path as **OBS:*:*:bucket:TestBucket***. **NOTE** • Specifying bucket resources Format: "OBS:*:*:bucket:*Bucket name*". For bucket resources, IAM automatically generates the prefix of the resource path: **obs:*:*:bucket:**. For the path of a specific bucket, add the *bucket name* to the end. You can also use a wildcard character (*) to indicate any bucket. For example, **obs:*:*:bucket:*** indicates any OBS bucket. • Specifying object resources Format: "OBS:*:*:object:*Bucket name or object name*". For object resources, IAM automatically generates the prefix of the resource path: **obs:*:*:object:**. For the path of a specific object, add the *bucket name/object name* to the end of the resource path. You can also use a wildcard character (*) to indicate any object in a bucket. For example, **obs:*:*:object:my-bucket/my-object/*** indicates any object in the **my-object** directory of the **my-bucket** bucket.
All	Permissions for all resources.

5. (Optional) Add request conditions by specifying condition keys, operators, and values.

Table 3-7 Condition parameters

Name	Description
Condition Key	A key in the **Condition** element of a statement. There are global and service-level condition keys. Global condition keys (starting with **g:**) are available for operations of all services, whereas service-level condition keys (starting with a service abbreviation name such as **obs:**) are available only for operations of the corresponding service. For details, see the user guide of the corresponding cloud service.
Operator	Used together with a condition key and condition value to form a complete condition statement.

Name	Description
Value	Used together with a condition key and an operator that requires a keyword, to form a complete condition statement.

Table 3-8 Global condition keys

Global Condition Key	Type	Description
g:CurrentTime	Time	Time when an authentication request is received. The time is expressed in the format defined by ISO 8601, for example, **2012-11-11T23:59:59Z**.
g:DomainName	String	Account name.
g:MFAPresent	Boolean	Whether to obtain a token through MFA authentication.
g:MFAAge	Number	Validity period of a token obtained through MFA authentication. This condition must be used together with **g:MFAPresent**.
g:ProjectName	String	Project name.
g:ServiceName	String	Service name.
g:UserId	String	IAM user ID.
g:UserName	String	IAM user name.

Step 7 (Optional) Switch to the JSON view and modify the policy content in the JSON format.

NOTE

If the modified policy content is incorrect, check and modify the content again, or click **Reset** to cancel the modifications.

Step 8 (Optional) To add another permission block for the policy, click **Add Permissions**. Alternatively, click the plus (+) icon on the right of an existing permission block to clone its permissions.

Step 9 (Optional) Enter a brief description for the policy.

Step 10 Click **OK**.

Step 11 Attach the policy to a user group. Users in the group then inherit the permissions defined in this policy.

NOTE

You can attach custom policies to a user group in the same way as you attach system-defined policies. For details, see Creating a User Group and Assigning Permissions.

----End

Creating a Custom Policy in JSON View

Step 1 Log in to the IAM console.

Step 2 On the IAM console, choose **Permissions** from the navigation pane, and click **Create Custom Policy** in the upper right corner.

Step 3 Enter a policy name.

Step 4 Select a scope based on the type of services related to this policy. For more information about service types, see "Permissions".

- **Global services**: Select this option if the services to which the policy is related must be deployed in the Global region. When creating custom policies for globally deployed services, specify the scope as **Global services**. Custom policies of this scope must be attached to user groups for the global service project.
- **Project-level services**: Select this option if the services to which the policy is related must be deployed in specific regions. When creating custom policies for regionally deployed services, specify the scope as **Project-level services**. Custom policies of this scope must be attached to user groups for specific projects except the global service project.

For example, when creating a custom policy containing the action **evs:volumes:create** for EVS, specify the scope as **Project-level services**.

NOTE

A custom policy can contain actions of multiple services that are globally accessible or accessible through region-specific projects. To define permissions required to access both global and project-level services, create two custom policies and specify the scope as **Global services** and **Project-level services** respectively.

Step 5 Select **JSON** for **Policy View**.

Step 6 (Optional) Click **Select Existing Policy/Role**, and select a policy/role to use it as a template, for example, select **EVS Admin**.

NOTE

If you select multiple policies, all of them must have the same scope, that is, either **Global services** or **Project-level services**. To define permissions required to access both global and project-level services, enclose the permissions in two separate custom policies for refined authorization.

Step 7 Click **OK**.

Step 8 Modify the statement in the template.

- **Effect**: Set it to **Allow** or **Deny**.
- **Action**: Enter the actions listed in the API actions table (see Figure 3-8) of the EVS service, for example, **evs:volumes:create**.

Figure 3-8 API actions

Permission	API	Action
Listing IAM Users	GET /v3/users	iam:users:listUsers

NOTE

The version of each custom policy is fixed at **1.1**.

Step 9 (Optional) Enter a brief description for the policy.

Step 10 Click **OK**. If the policy list is displayed, the policy is created successfully. If a message indicating incorrect policy content is displayed, modify the policy.

Step 11 Attach the policy to a user group. Users in the group then inherit the permissions defined in this policy.

NOTE

You can attach custom policies to a user group in the same way as you attach system-defined policies. For details, see Creating a User Group and Assigning Permissions.

----End

3.4.4.2 Modifying or Deleting a Custom Policy

You can modify or delete custom policies.

Modifying a Custom Policy

Modify the name, description, or content of a custom policy.

1. In the navigation pane of the IAM console, choose **Permissions**.
2. Locate the custom policy you want to modify and click **Modify** in the **Operation** column, or click the custom policy name to go to the policy details page.
3. Modify the name or description of the policy as required.
4. Modify the policy content by following the instructions provided in Creating a Custom Policy in the Visual Editor as required.
5. Click **OK** to save the modifications.

Deleting a Custom Policy

NOTE

Only custom policies that are not attached to any user groups or agencies can be deleted. If a custom policy has been attached to certain user groups or agencies, detach the policy and then delete it.

1. In the navigation pane of the IAM console, choose **Permissions**.
2. In the row containing the custom policy you want to delete, click **Delete**.
3. Click **Yes**.

3.4.4.3 Custom Policy Use Cases

Using a Custom Policy Along with Full-Permission System-Defined Policies

If you want to assign full permissions to a user but disallow them from accessing a specific service, such as Cloud Trace Service (CTS), create a custom policy for denying access to CTS and then attach this custom policy together with the **FullAccess** policy to the user. As an explicit deny in any policy overrides any allows, the user can perform operations on all services except CTS.

Example policy denying access only to CTS:

```
{
    "Version": "1.1",
    "Statement": [
        {
            "Effect": "Deny",
            "Action": [
                  "cts:*:*"
            ]
        }
    ]
}
```

NOTE

- **Action**: Operations to be performed. Each action must be defined in the format "*Service name*:*Resource type*:*Operation*".

  For example, **cts:*:*** refers to permissions for performing all operations on all resource types of CTS.
- **Effect**: Determines whether to deny or allow the operation.

Using a Custom Policy Along with a System-Defined Policy

- If you want to assign full permissions to a user but disallow them from creating BMSs, create a custom policy denying the **bms:servers:create** action and then attach this custom policy together with the **BMS FullAccess** policy to the user. As an explicit deny in any policy overrides any allows, the user can perform all operations on BMS except creating BMSs.

  Example policy denying BMS creation:

  ```
  {
      "Version": "1.1",
      "Statement": [
          {
              "Effect": "Deny",
              "Action": [
                    "bms:servers:create"
              ]
          }
      ]
  }
  ```

- If you want to assign OBS read-only permissions to all users but disallow certain users from viewing specific resources, for example, disallow users whose names start with **TestUser** from viewing buckets whose names start with **TestBucket**, create a custom policy denying such operations and attach this custom policy together with the OBS

Viewer policy to those users. As an explicit deny in any policy overrides any allows, certain users cannot view buckets whose names start with **TestBucket**.

Example policy denying users whose names start with **TestUser** from viewing buckets whose names start with **TestBucket**:

```
{
       "Version": "1.1",
       "Statement": [
              {
                     "Effect": "Deny",
                     "Action": [
                            "obs:bucket:ListAllMybuckets",
                            "obs:bucket:HeadBucket",
                            "obs:bucket:ListBucket",
                            "obs:bucket:GetBucketLocation"
                     ],
                     "Resource": [
                        "obs:*:*:bucket:TestBucket*"
                     ],
                     "Condition": {
                        "StringStartWith": {
                           "g:UserName": [
                              "TestUser"
                  ]
              }
           }
              }
       ]
}
```

NOTE

Currently, only certain cloud services (such as OBS) support resource-based authorization. For services that do not support this function, you cannot create custom policies containing resource types.

Using Only a Custom Policy

You can create a custom policy and attach only the custom policy to the group to which the user belongs.

- The following is an example policy that allows access only to ECS, EVS, VPC, ELB, and Application Operations Management (AOM).

```
{
       "Version": "1.1",
       "Statement": [
              {
                     "Effect": "Allow"
                     "Action": [
                            "ecs:*:*",
                            "evs:*:*",
                            "vpc:*:*",
                            "elb:*:*",
                            "aom:*:*"
                     ],
              }
       ]
}
```


- The following is an example policy that allows only IAM users whose names start with **TestUser** to delete all objects in the **my-object** directory of the bucket **my-bucket**.

```
{
       "Version": "1.1",
       "Statement": [
              {
                     "Effect": "Allow",
                     "Action": [
                        "obs:object:DeleteObject"
                     ],
                     "Resource": [
                        "obs:*:*:object:my-bucket/my-object/*"
                     ],
                     "Condition": {
                        "StringStartWith": {
                           "g:UserName": [
                              "TestUser"
                  ]
              }
       ]
}
```

- The following is an example policy that allows access to all services except ECS, EVS, VPC, ELB, AOM, and APM.

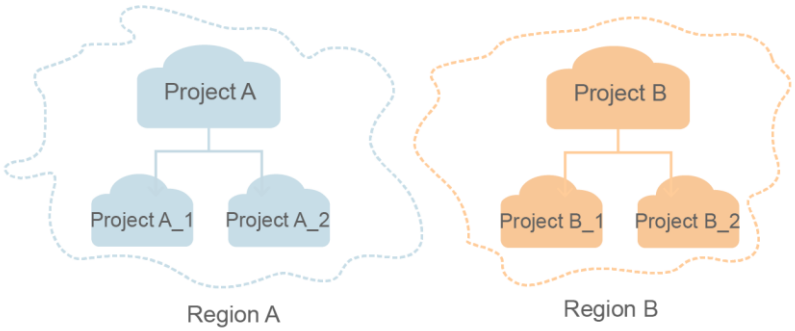
```
{
       "Version": "1.1",
       "Statement": [
              {
                     "Effect": "Allow"
                     "Action": [
                           "*:*:*"
                     ],
              },
              {
                     "Action": [
                           "ecs:*:*",
                  "evs:*:*",
                  "vpc:*:*",
                  "elb:*:*",
                  "aom:*:*",
                  "apm:*:*"
                     ],
                     "Effect": "Deny"
              }
       ]
}
```

3.5 Projects

Projects are used to isolate resources (including compute, storage, and network resources) among physical regions. A project is provided for each region by default, and permissions are assigned based on projects.

For more refined access control, create subprojects under a project and create resources in the subprojects. Then, provide users with permissions to access resources in specific subprojects.

Figure 3-9 Project isolation



NOTE

Resources cannot be transferred across IAM projects.

Creating a Project

Step 1 On the IAM console, choose **Projects** from the navigation pane, and click **Create Project**.

Step 2 Select a region in which you want to create a subproject.

Step 3 Enter a project name.

NOTE

- The project name will be in the format "*Name of the default project for the selected region_Custom project name*". The name of default projects cannot be modified.
- The project name can only contain letters, digits, hyphens (-), and underscores (_). The total length of the project name cannot exceed 64 characters.

Step 4 (Optional) Enter a description for the project.

Step 5 Click **OK**.

----End

Granting a User Group Permissions for a Project

You can assign permissions based on projects. For more refined permissions control, you can grant a user group access to resources in a specific subproject.

Step 1 In the user group list, click **Manage Permissions** in the row containing the target user group.

Step 2 On the **Permissions** tab page, click **Assign Permissions**.

Step 3 Specify the authorization scope. If you select **Region-specific projects**, select one or more projects in the drop-down list.

Step 4 Select policies or roles and click **OK**.

NOTE

For more information about user group authorization, see Creating a User Group and Assigning Permissions.

----End

Switching Regions or Projects

For project-level services, switch to a region or project in which you have been authorized to access cloud services. You don't need to switch regions or projects for global services.

Step 1 Log in to the management console.

Step 2 Go to a project-level cloud service page. Click the drop-down list box in the upper left corner of the page and select a region.

----End

3.6 Agencies

3.6.1 Account Delegation

3.6.1.1 Delegating Resource Access to Another Account

The agency function enables you to delegate another account to implement O&M on your resources based on assigned permissions.

NOTE

You can delegate resource access only to accounts. The accounts can then delegate access to IAM users under them.

The following is the procedure for delegating access to resources in one account to another account. Account A is the delegating party and account B is the delegated party.

Step 1 Account A creates an agency in IAM to delegate resource access to account B.

Step 2 (Optional) Account B assigns permissions to an IAM user to manage specific resources for account A.

1. Create a user group, and grant it permissions required to manage account A's resources.
2. Create a user and add the user to the user group.

Step 3 Account B or the authorized user manages account A's resources.

1. Log in to account B's account and switch the role to account A.
2. Switch to region A and manage account A's resources in this region.

----End

3.6.1.2 Creating an Agency (by a Delegating Party)

By creating an agency, you can share your resources with another account, or delegate an individual or team to manage your resources. You do not need to share your security credentials (the password and access keys) with the delegated party. Instead, the delegated

party can log in with its own account credentials and then switches the role to your account and manage your resources.

Prerequisites

Before creating an agency, complete the following operations:

- Understand the basic concepts of permissions.
- Determine the system permissions to be assigned to the agency, and check whether the permissions have dependencies. For more details, see Assigning Dependency Roles.

Procedure

Step 1 Log in to the IAM console.

Step 2 On the IAM console, choose **Agencies** from the navigation pane, and click **Create Agency** in the upper right corner.

Step 3 Enter an agency name.

Step 4 Specify the agency type as **Account**, and enter the name of an account.

NOTE

- **Account**: Share resources with another account or delegate an individual or team to manage your resources. You can specify the delegated account only as another account, and you cannot specify it as a federated user or IAM user.
- **Cloud service**: Delegate a specific service to access other services. For more information, see Cloud Service Delegation.

Step 5 Set the validity period and enter a description for the agency.

Step 6 Click **Assign Permissions**, select the permissions you want to grant to the agency, and click **OK**.

NOTE

- Assigning permissions to an agency is similar to assigning permissions to a user group. The two operations differ only in the number of available permissions. For details about how to assign permissions to a user group, see Assigning Permissions to a User Group.
- Agencies cannot be assigned the **Security Administrator** role. For account security, grant only the permissions required to agencies according to your business requirements.

Step 7 Click **OK**.

NOTE

After creating an agency, provide your account name, agency name, agency ID, and agency permissions to the delegated party. The delegated party can then switch the role to your account and manage specific resources based on the assigned permissions.

----End

3.6.1.3 (Optional) Assigning Permissions to an IAM User (by a Delegated Party)

When a trust relationship is established between your account and another account, you become a delegated party. By default, only your account and the members of the **admin** group

can manage resources for the delegating party. To authorize IAM users to manage these resources, assign permissions to the users.

You can authorize an IAM user to manage resources for all delegating parties, or authorize the user to manage resources for a specific delegating party.

Prerequisites

- A trust relationship has been established between your account and another account.
- You have obtained the name of the delegating account and the name and ID of the created agency.

Procedure

Step 1 Create a custom policy.

NOTE

This step is used to create a policy containing permissions required to manage resources for a specific agency. If you want to authorize an IAM user to manage resources for all agencies, go to Step 2.

1. On the **Permissions** page, click **Create Custom Policy**.
2. Enter a policy name.
3. Select **Global services** for **Scope**.
4. Select **JSON** for **Policy View**.
5. In the **Policy Content** area, enter the following content:

```
{
       "Version": "1.1",
       "Statement": [
              {
                     "Action": [
                            "iam:agencies:assume"
                     ],
                     "Resource": {
                            "uri": [

"/iam/agencies/b36b1258b5dc41a4aa8255508xxx..."
                            ]
                     },
                     "Effect": "Allow"
              }
       ]
}
```

NOTE

- Replace *b36b1258b5dc41a4aa8255508xxx...* with the agency ID obtained from a delegating party. Do not make any other changes.
- For more information about permissions, see Permissions.

6. Click **OK**.

Step 2 Create a user group and grant permissions to it.

1. On the **User Groups** page, click **Create User Group**.
2. Enter a user group name.
3. Click **OK**.

4. In the row containing the user group, click **Manage Permissions**.
5. On the **Permissions** tab page, click **Assign Permissions** above the policy or project list.
6. Specify the scope. If you select **Region-specific projects**, select one or more projects in the drop-down list.
7. Select the policy created in Step 1 or the **Agent Operator** role.
   - Custom policy: Allows a user to manage resources only for a specific agency.
   - **Agent Operator** role: Allows a user to manage resources for all agencies.
8. Click **OK**.

Step 3 Create an IAM user and add the user to the user group.

1. On the **Users** page, click **Create User**.
2. On the **Create User** page, enter a username.
3. For the access type, select **Management console access** and **Set by user**.
4. Enable login protection and click **Next**.
5. Select the user group created in Step 2 and click **Create**.

NOTE

After the authorization is complete, the IAM user can switch to the account of the delegating party and manage specific resources under the account.

----End

Related Operations

The delegated account or the authorized IAM users can switch their roles to the delegating account to view and use its resources.

3.6.1.4 Switching Roles (by a Delegated Party)

When an account establishes a trust relationship with your account, you become a delegated party. You and all the users you have authorized can switch to the delegating account and manage resources under the account based on assigned permissions.

Prerequisites

- A trust relationship has been established between your account and another account.
- You have obtained the delegating account name and agency name.

Procedure

Step 1 Log in to the management console using your account or log in as the IAM user created in Step 3.

NOTE

The IAM user created in Step 3 of (Optional) Assigning Permissions to an IAM User (by a Delegated Party) can switch roles to manage resources for the delegating party.

Step 2 Hover the mouse pointer over the username in the upper right corner and choose **Switch Role**.

Step 3 On the **Switch Role** page, enter the account name of the delegating party.

NOTE

- After you enter an account name, the agencies created under this account will be automatically displayed after you click the agency name text box. Select an authorized one from the drop-down list.

Step 4 Click **OK** to switch to the delegating account.

----End

Follow-Up Procedure

To return to your own account, hover the mouse pointer over the username in the upper right corner, choose **Switch Role**, and select your account.

3.6.2 Cloud Service Delegation

Services on the cloud platform interwork with each other, and some cloud services are dependent on other services. To delegate a cloud service to access other services and perform resource O&M, create an agency for the service.

IAM provides two methods to create a cloud service agency:

1. Creating a cloud service agency on the IAM console

   Take an OBS agency as an example. The agency allows OBS to call cloud services, for example, to read monitoring data from AOM.

2. Automatically creating a cloud service agency to use certain resources

   The following takes Scalable File Service (SFS) as an example to describe the procedure for automatically creating a cloud service agency:

   a. Go to the SFS console.

   b. On the **Create File System** page, enable static data encryption.

   c. A dialog box is displayed requesting you to confirm the creation of an SFS agency. After you click **OK**, the system automatically creates an SFS agency with **KMS CMKFullAccess** permissions for the current project. With the agency, SFS can obtain KMS keys for encrypting or decrypting file systems.

   d. You can view the agency in the agency list on the IAM console.

Creating a Cloud Service Agency on the IAM Console

Step 1 Log in to the IAM console.

Step 2 On the IAM console, choose **Agencies** from the navigation pane, and click **Create Agency**.

Step 3 Enter an agency name.

Step 4 Select the **Cloud service** agency type, and then select a service.

Step 5 Select a validity period.

Step 6 (Optional) Enter a description for the agency to facilitate identification.

Step 7 Click **Assign Permissions**, select the permissions you want to grant to the agency, and click **OK**.

Step 8 Click **OK**.

----End

3.6.3 Deleting or Modifying Agencies

Modifying an Agency

To modify the permissions, validity period, and description of an agency, click **Modify** in the row containing the agency you want to modify.

NOTE

- You can change the cloud service, validity period, description, and permissions of cloud service agencies, but you cannot change the agency name and type.
- Modifying the permissions of cloud service agencies may affect the usage of certain functions of cloud services. Exercise caution when performing this operation.

Deleting an Agency

To delete an agency, click **Delete** in the row containing the agency to be deleted and click **Yes**.

NOTE

After you delete an agency, all permissions granted to the delegated accounts will be revoked.

3.7 Account Security Settings

3.7.1 Account Security Settings Overview

You can configure the account settings, critical operation authentication, login authentication policy, password policy, and access control list (ACL) on the **Account Security Settings** page. For details, see Account Settings, Critical Operation Protection, Login Authentication Policy, Password Policy, and ACL. This section describes how to access the **Account Security Settings** page and who is the intended audience.

Intended Audience

Table 3-9 lists the intended audience of different functions provided on the **Account Security Settings** page and their access permissions for the functions.

Table 3-9 Intended audience

Function	Intended Audience
Account Settings	IAM users: Full access
Critical Operations	• Administrator: Full access • IAM users: No access
Login Authentication Policy	• Administrator: Full access • IAM users: Read-only access
Password Policy	• Administrator: Full access • IAM users: Read-only access

Function	Intended Audience
ACL	• Administrator: Full access • IAM users: No access

Accessing the Account Security Settings Page

Step 1 Log in to the IAM console as an administrator.

Step 2 In the navigation pane, choose **Account Security Settings**.

----End

3.7.2 Account Settings

As an account administrator, both you and your IAM users can manage basic information on this page.

NOTE

- A mobile number or an email address can be bound only to one account or IAM user.
- Only one mobile number, email address, and virtual MFA can be bound to an account or IAM user.

Changing the Login Password, Mobile Number, Virtual MFA Device, or Email Address

The methods for changing the login password, mobile number, virtual MFA device, and email address are similar. To change the login password, do as follows:

Step 1 Go to the Account Security Settings page.

Step 2 Click the **Basic Information** tab, and click **Change** in the **Login Password** row.

Step 3 (Optional) Select email address or mobile number verification, and enter the verification code.

NOTE

The two verification modes are available only if you have bound both an email address and a mobile number.

Step 4 Enter the old password and new password, and enter the new password again.

NOTE

- The password cannot be the username or the username spelled backwards. For example, if the username is **A12345**, the password cannot be **A12345**, **a12345**, **54321A**, or **54321a**.
- To prevent password cracking, the administrator can configure the password policy to define password requirements, such as minimum password length. For details, see Password Policy.

Step 5 Click **OK**.

----End

3.7.3 Critical Operation Protection

Only an administrator can configure critical operation protection, and IAM users can only view the configurations. If an IAM user needs to modify the configurations, the user can request the administrator to perform the modification or grant the required permissions.

NOTE

Federated users do not need to verify their identity when performing critical operations.

Login Protection

After login protection is enabled, you and IAM users created using your account will need to enter a verification code in addition to the username and password during login. **Enable this function for account security.**

For the account, only the account administrator can enable login protection for it. For IAM users, both the account administrator and other administrators can enable this feature for the users.

- **(Administrator) Enabling login protection for an IAM user**

  To enable login protection for an IAM user, go to the **Users** page and choose **More** > **Security Settings** in the row that contains the IAM user. In the **Login Protection** area on the displayed **Security Settings** tab, click  next to **Verification Method**, and select a verification method from SMS, email, or virtual MFA device.

- **Enabling login protection for your account**

  To enable login protection, click the **Critical Operations** tab on the Account Security Settings page, click **Enable** next to **Login Protection**, select a verification method, enter the verification code, and click **OK**.

Operation Protection

- **Enabling operation protection**

  After operation protection is enabled, you and IAM users created using your account need to enter a verification code when performing a critical operation, such as deleting an ECS. This function is enabled by default. To ensure resource security, keep it enabled.

  The verification is valid for 15 minutes and you don't need to be verified again when performing critical operations within the validity period.

Step 1 Go to the Account Security Settings page.

Step 2 Click the **Critical Operations** tab on the **Account Security Settings** page, click **Enable** next to **Operation Protection**, select **Enable**, and click **OK**.

Step 3 Select **Enable**.

- **Self-verification**: You or IAM users themselves perform verification when performing a critical operation.
- **Verification by another person**: The specified person completes verification when you or IAM users perform a critical operation. Only SMS and email verification are supported.

Step 4 Click **OK**.

----End

- **Disabling operation protection**

  If operation protection is disabled, you and IAM users created using your account do not need to enter a verification code when performing a critical operation.

Step 1 Go to the Account Security Settings page.

Step 2 Click the **Critical Operations** tab on the **Account Security Settings** page, and click **Change** in the **Operation Protection** row.

Step 3 Select **Disable** and click **OK**.

Step 4 Enter a verification code.

Step 5 Click **OK**.

----End

NOTE

- Each cloud service defines its own critical operations.
- When IAM users created using your account perform a critical operation, they will be prompted to choose a verification method from email, SMS, and virtual MFA device.
- If a user is only associated with a mobile number, only SMS verification is available.
- If a user is only associated with an email address, only email verification is available.
- If a user is not associated with an email address, mobile number, or virtual MFA device, the user will need to associate at least one of them before the user can perform any critical operations.
- Email or SMS verification codes may not be received due to communication errors. You are advised to use a virtual MFA device.
- If operation protection is enabled, IAM users need to enter a verification code when performing a critical operation. The verification code is sent to the mobile number or email address bound to the IAM users.

3.7.4 Login Authentication Policy

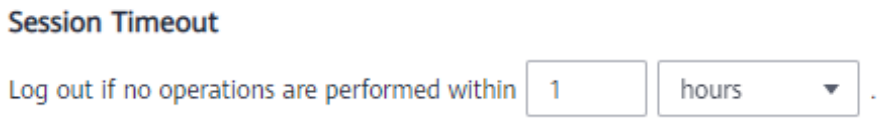
The **Login Authentication Policy** tab of the Account Security Settings page provides the Session Timeout, Account Lockout, Account Disabling, Recent Login Information, and Custom Information settings. These settings take effect for both your account and the IAM users created using the account.

Only the administrator can configure the login authentication policy, and IAM users can only view the configurations. If an IAM user needs to modify the configurations, the user can request the administrator to perform the modification or grant the required permissions.

Session Timeout

Set the session timeout that will apply if you or users created using your account do not perform any operations within a specific period.

Figure 3-10 Session Timeout

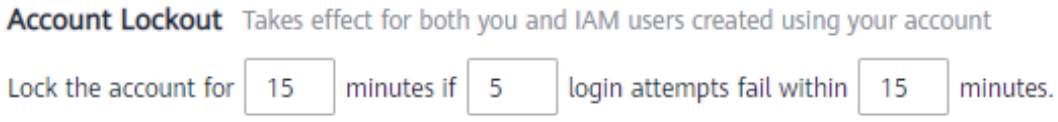


The timeout ranges from 15 minutes to 24 hours, and the default timeout is 1 hour.

Account Lockout

Set a duration to lock users out if a specific number of unsuccessful login attempts has been reached within a certain period. You cannot unlock your own account or an IAM user's account. Wait until the lock time expires.

Figure 3-11 Account Lockout



You can set the time for resetting the account lockout counter, maximum number of unsuccessful login attempts, and account lock duration.

- Time for resetting the account lockout counter: The value ranges from 15 to 60 minutes, and the default value is **15 minutes**.
- Maximum number of unsuccessful login attempts: The value ranges from 3 to 10, and the default value is **5**.
- Lockout duration: The value ranges from 15 to 30 minutes, and the default value is **15 minutes**.

Account Disabling

Set a validity period to disable IAM users if they have not accessed the cloud platform using the console or APIs within a certain period.

This option is disabled by default. The validity period ranges from 1 to 240 days.

If you enable this option, the setting will take effect only for IAM users created using your account. If an IAM user is disabled, the user can request the administrator to enable their account again.

Recent Login Information

Configure whether you want the system to display the previous login information after you log in. If incorrect login information is displayed on the **Login Verification** page, change your password immediately.

This option is disabled by default and can be enabled by the administrator.

Custom Information

Set custom information that will be displayed upon successful login. For example, enter the word **Welcome**.

No information is displayed by default, and the administrator can set custom information that will be displayed.

You and all the IAM users created using your account will see the same information upon successful login.

3.7.5 Password Policy

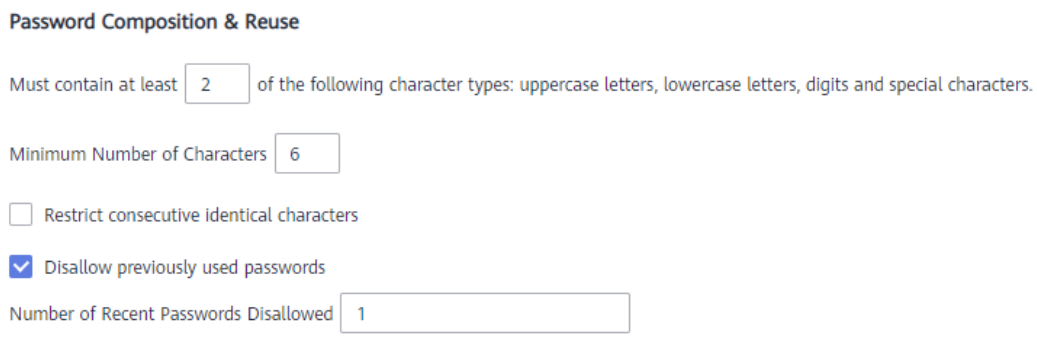
The **Password Policy** tab of the Account Security Settings page provides the Password Composition & Reuse, Password Expiration, and Minimum Password Age settings.

Only the administrator can configure the password policy, and IAM users can only view the configurations. If an IAM user needs to modify the configurations, the user can request the administrator to perform the modification or grant the required permissions.

You can configure the password policy to ensure that IAM users create strong passwords and rotate them periodically. In the password policy, you can define password requirements, such as minimum password length, whether to allow consecutive identical characters in a password, and whether to allow previously used passwords.

Password Composition & Reuse

Figure 3-12 Password Composition & Reuse



- Set the minimum number of characters that a password must contain. The value ranges from 6 to 32, and the default value is **6**.
- (Optional) Enable the **Restrict consecutive identical characters** option and set the maximum number of times that a character is allowed to be consecutively present in a password. For example, value **1** indicates that consecutive identical characters are not allowed in a password.
- (Optional) Enable the **Disallow previously used passwords** option and set the number of previously used passwords that are not allowed. For example, value **3** indicates that the user cannot set the last three passwords that the user has previously used when setting a new password.

Changes to the password policy take effect the next time you or your IAM users change passwords. IAM users created later will also adhere to the updated password policy

Password Expiration

Set a validity period for passwords so that users need to change their passwords periodically. The users will be prompted to change their passwords 15 days before password expiration. Expired passwords cannot be used to log in to the cloud platform.

This option is disabled by default. The validity period ranges from 1 to 180 days.

The changes will take effect immediately for your account and all IAM users under your account.

NOTE

After the password expires, users need to set a new password through the URL sent by email. The new password must be different from the old password.

Minimum Password Age

To prevent password loss due to frequent password changes, you can set a minimum period after which users are allowed to make a password change.

This option is disabled by default. If you enable this option, you can set a period from 0 to 1440 minutes.

The changes will take effect immediately for your account and all IAM users under your account.

3.7.6 ACL

The **ACL** tab of the Account Security Settings page provides the IP Address Ranges, IPv4 CIDR Blocks, and VPC Endpoints settings for allowing user access only from specified IP address ranges, IPv4 CIDR blocks, or VPC endpoints.

Only the administrator can configure the ACL. If an IAM user needs to configure the ACL, the user can request the administrator to perform the configuration or grant the required permissions.

Access type:

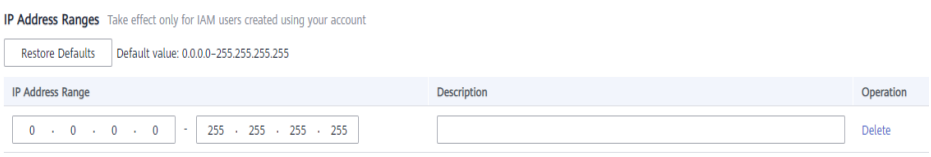
- **Console Access** (recommended): The ACL takes effect only for IAM users who are created using your account and have access to the console.
- **API Access**: The ACL controls users' API access through API Gateway and takes effect only for IAM users two hours after you complete the configuration.

NOTE

- You can configure a maximum of 200 access control items.

IP Address Ranges

Figure 3-13 IP Address Ranges



Specify IP address ranges from 0.0.0.0 to 255.255.255.255 to allow access to the cloud platform. The default value is **0.0.0.0–255.255.255.255**. If this parameter is left blank or the default value is used, your IAM users can access the management console from anywhere.

IPv4 CIDR Blocks

Specify IPv4 CIDR blocks to allow access to the cloud platform. For example, set **IPv4 CIDR block** to **10.10.10.10/32**.

VPC Endpoints

Specify VPC endpoints, such as **0ccad098-b8f4-495a-9b10-613e2a5exxxx**, to allow API-based access to the cloud platform.

NOTE

- User access is allowed if any of **IP Address Ranges**, **IPv4 CIDR Blocks**, and **VPC Endpoints** is met.
- To restore **IP Address Ranges** to the default settings (0.0.0.0–255.255.255.255) and clear the settings in **IPv4 CIDR Blocks** and **VPC Endpoints**, click **Restore Defaults**.

3.8 Identity Providers

3.8.1 Introduction

The cloud platform provides the identity provider function to implement federated identity authentication based on Security Assertion Markup Language (SAML). This function allows users in your enterprise management system to access the cloud platform through single sign-on (SSO).

IAM supports two types of federated identity authentication:

- Web SSO: Browsers are used as the communication media. This authentication type enables common users to access the cloud platform using browsers.
- API calling: Development tools (such as OpenStack Client and ShibbolethECP Client) are used as the communication media. This authentication type enables enterprise users and common users to access the cloud platform by calling APIs.

Basic Concepts

- Identity Provider (IdP)

  An identity provider collects and stores user identity information, such as usernames and passwords, and authenticates users during login. For federated identity authentication between an enterprise and the cloud platform, the identity authentication system of the enterprise is an identity provider and is also called "enterprise IdP". Popular third-party IdPs include Microsoft Active Directory Federation Services (AD FS) and Shibboleth.

- Service Provider (SP)

  A service provider establishes a trust relationship between an IdP and itself, and uses the user information provided by the IdP to provide services. For federated identity authentication between an enterprise and the cloud platform, the cloud platform is a service provider.

- Federated identity authentication

Federated identity authentication is a process in which a trust relationship is established between an IdP and SP to implement SSO.

- Single sign-on (SSO)

  SSO is an access type that allows users to access a trusted SP after logging in to the enterprise IdP. For example, after a trust relationship is established between an enterprise management system and the cloud platform, users in the enterprise management system can use their existing accounts and passwords to access the cloud platform through the login link in the enterprise management system.

- SAML 2.0

  SAML 2.0 is an XML-based protocol that uses securityTokens containing assertions to pass information about an end user between an IdP and an SP. It is an open standard ratified by the Organization for the Advancement of Structured Information Standards (OASIS) and is being used by many IdPs. For more information about this standard, see SAML 2.0 Technical Overview. The cloud platform implements federated identity authentication in compliance with SAML 2.0. To successfully federate existing users to the cloud platform, ensure that your enterprise IdP is compatible with this protocol.

Advantages of Federated Identity Authentication

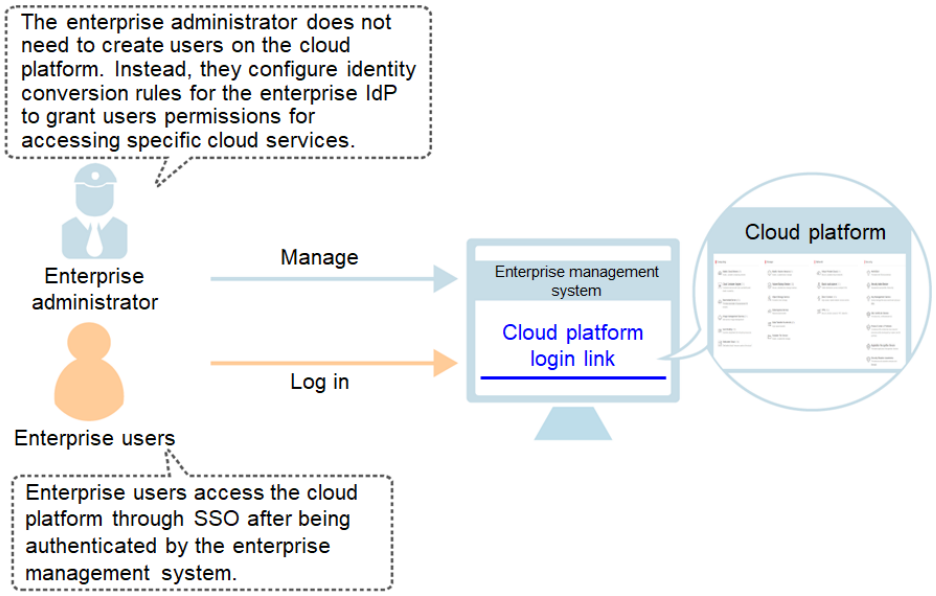
- Easy user management

  As an administrator, you only need to create users in your enterprise management system. The users can use their own accounts to access both the enterprise management system and the cloud platform.

- Simplified operations

  Users can log in to the cloud platform through the enterprise management system.

Figure 3-14 Advantages of federated identity authentication



Precautions

- To implement federated identity authentication, ensure that your enterprise IdP server and the cloud platform use Greenwich Mean Time (GMT) time in the same time zone.

- Federated users are virtual identities that your enterprise IdP maps to the cloud platform. The identity information of federated users is stored in the enterprise IdP, so their access to the cloud platform has the following restrictions:
  - Federated users cannot perform verification when performing critical operations. The critical operation protection settings do not apply to federated users.
  - Federated users cannot create access keys with unlimited validity, but they can obtain temporary access credentials (access keys and securityTokens) using user or agency tokens.

    If a federated user needs an access key with unlimited validity, the user can contact the account administrator or an IAM user to create one. An access key contains the permissions granted to a user, so it is recommended that the federated user request an IAM user in the same group to create an access key.

3.8.2 SAML-based Federated Identity Authentication

3.8.2.1 Configuration of SAML-based Federated Identity Authentication

This section describes the process and configuration of SAML-based federated identity authentication between an enterprise IdP and the cloud platform.

CAUTION

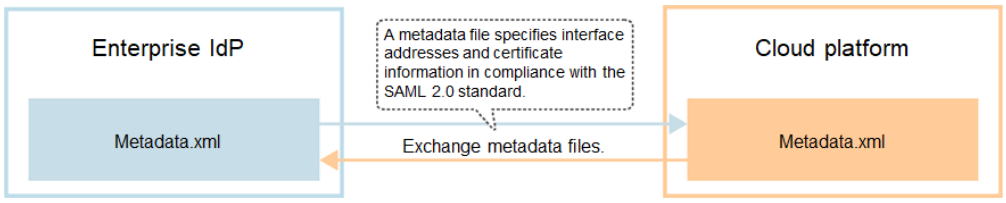
Ensure that your enterprise IdP supports SAML 2.0.

Configuring Federated Identity Authentication

To implement federated identity authentication between an enterprise management system and the cloud platform, complete the following configuration:

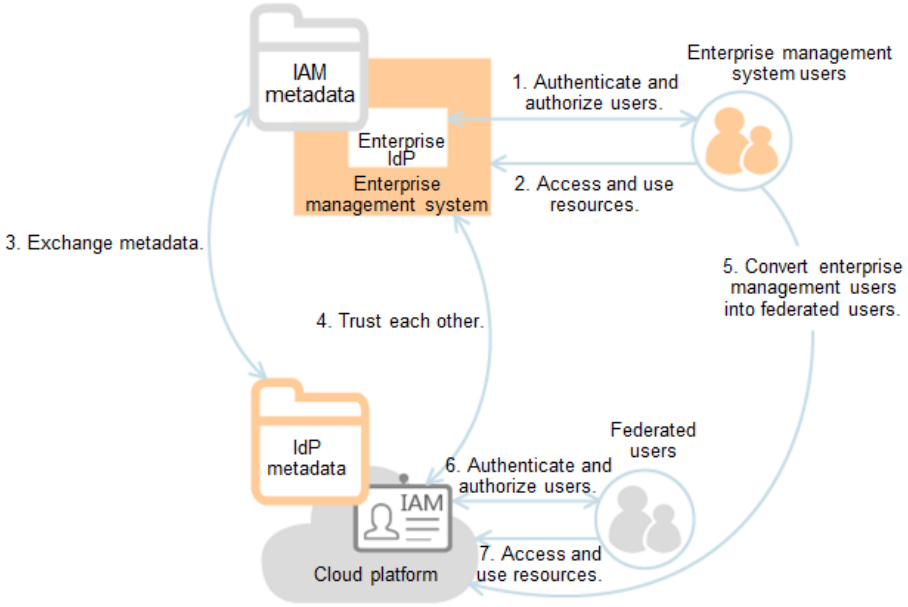
1. Establish a trust relationship and create an identity provider: Exchange the metadata files of the enterprise IdP and the cloud platform.

   Figure 3-15 Metadata file exchange model

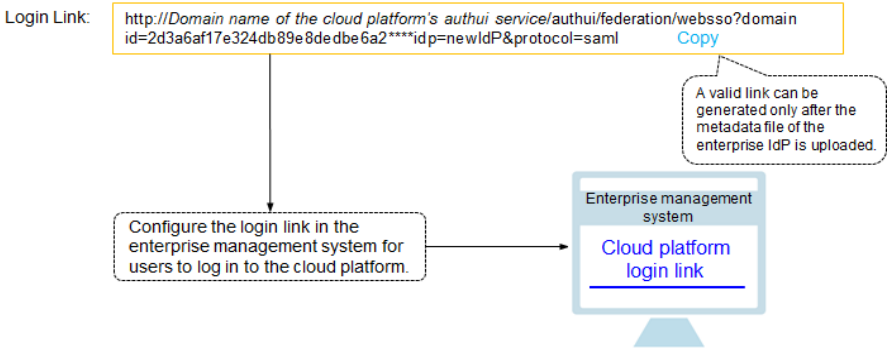
2. Configure identity conversion rules: Map the users, user groups, and permissions in the enterprise IdP to the cloud platform (see Figure 3-16).

Figure 3-16 User identity conversion model



3. Configure a login link: Configure a login link in the enterprise management system to allow users to access the cloud platform through SSO.

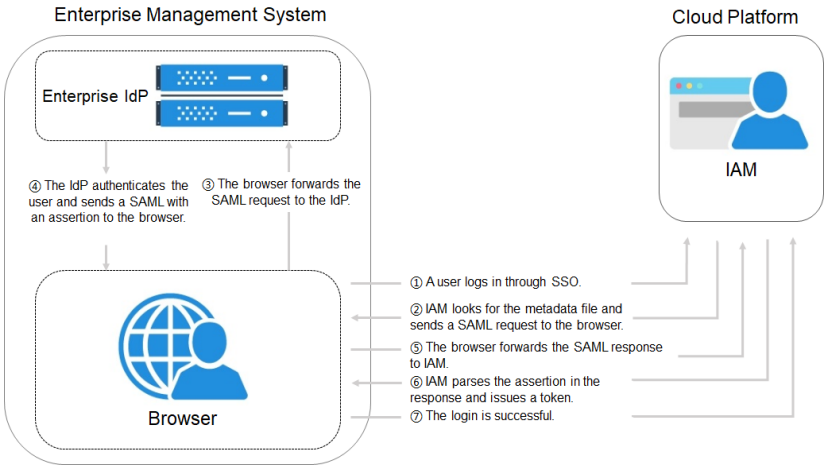
Figure 3-17 SSO login model



Process of Federated Identity Authentication

Figure 3-18 shows the interaction between an enterprise management system and the cloud platform after a user initiates an SSO request.

Figure 3-18 Process of federated identity authentication



NOTE

To view interactive requests and assertions with a better experience, you are advised to use Google Chrome and install the SAML Message Decoder plug-in.

The process of federated identity authentication is as follows:

1. A user uses a browser to visit the login link of the identity provider, and the browser sends an SSO request to the cloud platform.
2. The cloud platform searches for a metadata file based on the login link, and sends a SAML request to the browser.
3. The browser forwards the SAML request to the enterprise IdP.
4. The user enters their username and password on the login page displayed in the enterprise IdP. After the enterprise IdP authenticates the user's identity, it constructs a SAML assertion containing the user information, and sends the assertion to the browser as a SAML response.
5. The browser responds and forwards the SAML response to the cloud platform.
6. The cloud platform parses the assertion in the SAML response, and issues a token to the user after identifying the group to which the user is mapped, according to the configured identity conversion rules.
7. If the login is successful, the user accesses the cloud platform successfully.

NOTE

The assertion must carry a signature; otherwise, the login will fail.

3.8.2.2 Step 1: Create an Identity Provider

To establish a trust relationship between an enterprise IdP and the cloud platform, upload the metadata file of the cloud platform to the enterprise IdP, and then create an identity provider and upload the metadata file of the identity provider on the IAM console.

Prerequisites

- You have registered an account on the cloud platform as an enterprise administrator, and have created user groups and granted them permissions in IAM. For details, see Creating

a User Group and Assigning Permissions. The user groups created in IAM will be used to assign permissions to enterprise IdP users mapped to the cloud platform.

- You have read the documentation of the enterprise IdP or have understood how to use the enterprise IdP. Configurations of different enterprise IdPs differ greatly, so they are not described in this document. For details about how to obtain the enterprise IdP's metadata file and how to upload the cloud platform's metadata to the enterprise IdP, see the IdP documentation.

Establishing a Trust Relationship Between the Enterprise IdP and the Cloud Platform

The metadata file of the cloud platform needs to be configured on the enterprise IdP to establish a trust relationship between the two systems.

Step 1 Download the metadata file of the cloud platform.

- WebSSO: Visit **https://***Domain name of the authui service on the cloud platform***/authui/saml/metadata.xml**, right-click on the page, choose **Save As**, and set a file name, for example, **websso-metadata.xml**.
- API calling: Visit **https://***Endpoint address of a region***/v3-ext/auth/OS-FEDERATION/SSO/metadata**, right-click on the page, choose **Save As**, and set a file name, for example, **api-metadata-region.xml**.

  The cloud platform provides different API gateways for users in different regions to call APIs. To allow users to access resources in multiple regions, download metadata files of all these regions.

Step 2 Upload the metadata file to the enterprise IdP server. For details about how to upload the metadata file, see the documentation of your enterprise IdP.

Step 3 Obtain the metadata file of the enterprise IdP. For details about how to obtain the metadata file, see the documentation of your enterprise IdP.

----End

Creating an Identity Provider on the Cloud Platform

Create an identity provider and configure the metadata file in IAM.

Step 1 Log in to the IAM console, choose **Identity Providers** from the navigation pane, and click **Create Identity Provider** in the upper right corner.

Step 2 Specify the name, protocol, SSO type, status, and description of the identity provider.

NOTE

The identity provider name must be unique under your account.

Step 3 Click **OK**.

----End

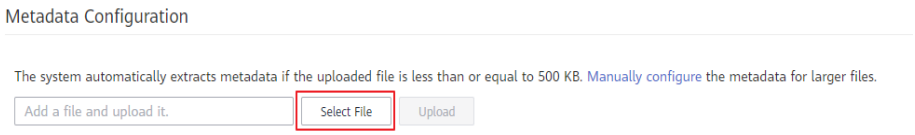
Configuring the Metadata File of the Identity Provider

Configure the metadata file of the enterprise IdP obtained in Step 3 of section "Creating an Identity Provider on the Cloud Platform" on the cloud platform. You can upload or manually edit metadata configurations in IAM. For a metadata file larger than 500 KB, manually

configure the metadata. If the metadata has changed, upload the latest metadata file or edit the existing metadata to ensure that the federated users can log in to the cloud platform successfully.

- **Upload a metadata file.**
  a. Click **Modify** in the row containing the identity provider.
  b. Click **Select File** and select the metadata file you have obtained.

  Figure 3-19 Uploading a metadata file

  c. Click **Upload**. The metadata extracted from the uploaded file is displayed. Click **OK**.
     - If the uploaded metadata file contains multiple identity providers, select the identity provider you want to use from the **Entity ID** drop-down list.
     - If a message is displayed indicating that no entity ID is specified or the signing certificate has expired, check the metadata file and upload it again, or configure the metadata manually.
  d. Click **OK**.
- **Manually configure metadata.**
  a. Click **Manually configure**.
  b. In the **Configure Metadata** dialog box, set the metadata parameters, such as the entity ID, signing certificate, and **SingleSignOnService**.

Parameter	Mandatory	Description
Entity ID	Yes	The unique identifier of an identity provider. Enter the value of **entityID** displayed in the enterprise IdP's metadata file. If the metadata file contains multiple identity providers, choose the one you want to use.
Protocol	Yes	The SAML protocol is used for federated identity authentication between an enterprise IdP and SP.
NameIdFormat	No	Enter the value of **NameIdFormat** displayed in the metadata file. This parameter indicates the username and ID format used for communication between the identity provider and federated users.
Signing Certificate	Yes	Enter the value of **<X509Certificate>** displayed in the metadata file. A signing certificate is a public key certificate used for signature verification. For security purposes, enter a

Parameter	Mandatory	Description
		public key containing no less than 2048 bits. The signing certificate is used during federated identity authentication to ensure that assertions are credible and complete.
SingleSignOnService	Yes	Enter the value of **SingleSignOnService** displayed in the metadata file. This parameter defines how SAML requests are sent during the SSO process. The **SingleSignOnService** parameter in the metadata file must support HTTP Redirect or HTTP POST.
SingleLogoutService	No	Enter the value of **SingleLogoutService** displayed in the metadata file. This parameter indicates the address to which federated users will be redirected after logging out their sessions. The **SingleLogoutService** parameter in the metadata file must support HTTP Redirect or HTTP POST.

The following example shows the metadata file of an enterprise IdP and the metadata information that needs to be completed during manual configuration.

Figure 3-20 Metadata file of an enterprise IdP

c. Click **OK**.

- Click **OK** to save the settings.

Logging In as a Federated User

Step 1 Click the login link displayed on the identity provider details page and check if the login page of the enterprise IdP server is displayed.

1. On the **Identity Providers** page, click **View** in the **Operation** column of the identity provider. Copy the login link displayed on the identity provider details page and visit the link using a browser.
2. If the login page is not displayed, check the metadata file and configurations of the enterprise IdP server.

Step 2 Enter the username and password of a user that was created in the enterprise management system.

- If the login is successful, add the login link to the enterprise's website.
- If the login fails, check the username and password.

NOTE

Federated users only have read permissions for the cloud platform by default. To assign permissions to federated users, configure identity conversion rules for the identity provider. For more information, see Step 2: Configure Identity Conversion Rules.

----End

Related Operations

- Viewing identity provider information: In the identity provider list, click **View** in the row containing the identity provider, and view its basic information, metadata, and identity conversion rules.

NOTE

To modify the configurations of an identity provider, click **Modify** at the bottom of the details page.

- Modifying an identity provider: In the identity provider list, click **Modify** in the row containing the identity provider, and then change its status and modify the description, metadata, and identity conversion rules.
- Deleting an identity provider: In the identity provider list, click **Delete** in the row containing the identity provider, and click **Yes**.

Follow-Up Procedure

- In the **Identity Conversion Rules** area, configure identity conversion rules to map enterprise IdP users to IAM user groups and grant the users permissions. For details, see Step 2: Configure Identity Conversion Rules.
- Configure the enterprise management system to allow users to access the cloud platform through SSO. For details, see (Optional) Step 3: Configure Login Link in the Enterprise Management System.

3.8.2.3 Step 2: Configure Identity Conversion Rules

Federated users are named **FederationUser** by default on the cloud platform. These users can only log in to the cloud platform and they do not have any other permissions. You can configure identity conversion rules on the IAM console to achieve the following:

- Display enterprise management system users with different names on the cloud platform.
- Grant enterprise management system users permissions to use cloud resources by mapping these users to IAM user groups. Ensure that you have created the required user groups. For details, see Creating a User Group and Assigning Permissions.

NOTE

- Modifications to identity conversion rules will take effect only after the federated users log in again.
- To modify the permissions of a user, modify the permissions of the user group to which the user belongs. Then restart the enterprise IdP for the modifications to take effect.

Prerequisites

An identity provider has been created, and the login link of the identity provider is accessible. (For details about how to create and verify an identity provider, see Step 1: Create an Identity Provider.)

Procedure

If you configure identity conversion rules by clicking **Create Rule**, IAM converts the rule parameters to the JSON format. Alternatively, you can click **Edit Rule** to configure rules in the JSON format. For details, see Syntax of Identity Conversion Rules.

- **Creating a Rule**
  a. Choose **Identity Providers** from the navigation pane.
  b. In the identity provider list, click **Modify** in the row containing the identity provider.
  c. In the **Identity Conversion Rules** area, click **Create Rule**. Then, configure the rule in the **Create Rule** dialog box.

Table 3-10 Parameter description

Parameter	Description	Remarks
Username	Username of federated users to be displayed on the cloud platform.	To distinguish federated users from users of the cloud platform, it is recommended that you set the username to "**FederationUser-***IdP_XXX*". *IdP* indicates an identity provider name, for example, AD FS and Shibboleth. *XXX* indicates a custom name. **NOTICE** • Each federated user name must be unique under the identity provider. Identical federated user names under the same identity provider will be identified as the same IAM user on the cloud platform. • The username can only contain letters, digits, spaces, hyphens (-), underscores (_), and periods (.). It cannot start with a digit and cannot contain the following special characters: ", \", \\, \n, \r
User Groups	User groups to which the federated users will belong on the cloud platform.	The federated users will inherit permissions from the groups to which they belong. **NOTE** The user group name can only contain letters, digits, spaces, hyphens (-), underscores (_), and periods (.). It cannot start with a digit and cannot contain the following special characters: ", \", \\, \n, \r
Rule Conditions	Conditions that a federated user must meet to obtain permissions from the selected user groups.	Federated users who do not meet these conditions cannot access the cloud platform. You can create a maximum of 10 conditions for an identity conversion rule. The **Attribute** and **Value** parameters are used for the enterprise identity provider to transfer user information to the cloud platform through SAML assertions. The **Condition** parameter can be set to **empty**, **any_one_of**, or **not_any_of**. For details about these parameters, see

Parameter	Description	Remarks
		Syntax of Identity Conversion Rules. **NOTE** • An identity conversion rule can have multiple conditions. It takes effect only if all of the conditions are met. • An identity provider can have multiple identity conversion rules. If a federated user does not meet any of the rules, the user will not be allowed to access the cloud platform.

For example, set an identity conversion rule for administrators in the enterprise management system.

- Username: **FederationUser-IdP_admin**
- User group: **admin**
- Rule condition: **_NAMEID_** (attribute), **any_one_of** (condition), and **000000001** (value).

  Only the user with ID 000000001 is mapped to IAM user **FederationUser-IdP_admin** and inherits permissions from the **admin** user group.

d. In the **Create Rule** dialog box, click **OK**.

e. On the **Modify Identity Provider** page, click **OK**.

- **Editing a Rule**

a. Log in to the cloud platform as an administrator, and go to the IAM console. Then, choose **Identity Providers** from the navigation pane.

b. In the identity provider list, click **Modify** in the row containing the identity provider.

c. In the **Identity Conversion Rules** area, click **Edit Rule**. Then configure the rule in the **Edit Rule** dialog box.

d. Edit the identity conversion rule in the JSON format. For details, see Syntax of Identity Conversion Rules.

e. Click **Validate** to verify the syntax of the rule.

f. If the rule is correct, click **OK** in the **Edit Rule** dialog box, and click **OK** on the **Modify Identity Provider** page.

If a message indicating that the JSON file is incomplete is displayed, modify the statement or click **Cancel** to cancel the modifications.

Verifying Federated User Permissions

After configuring identity conversion rules, verify the permissions of federated users.

Step 1 Log in as a federated user, such as user **ID1**.

On the **Identity Providers** page of the IAM console, click **View** in the row containing the identity provider. Copy the login link displayed on the identity provider details page, open the link using a browser, and then enter the username and password used in the enterprise management system.

Step 2 Check that the federated user has the permissions assigned to the user group to which the user belongs.

For example, an identity conversion rule has defined full permissions for all cloud services for federated user **ID1** in the **admin** user group. On the management console, select any cloud service, and check if you can access the service.

----End

Related Operations

Viewing identity conversion rules: Click **View Rule** on the **Modify Identity Provider** page. The identity conversion rules are displayed in the JSON format. For details about the JSON format, see Syntax of Identity Conversion Rules.

3.8.2.4 (Optional) Step 3: Configure Login Link in the Enterprise Management System

Configure the login link of the identity provider in the enterprise management system so that enterprise users can use this link to access the cloud platform.

Prerequisites

- An identity provider has been created, and the login link of the identity provider is accessible. (For details about how to create and verify an identity provider, see Step 1: Create an Identity Provider.)
- The login link of the identity provider has already been configured in the enterprise management system for logging in to the cloud platform.

Procedure

Step 1 Log in to the IAM console, and choose **Identity Providers** from the navigation pane.

Step 2 Click **View** in the row containing the identity provider.

Step 3 Click **Copy** next to the login link.

Step 4 Add the following statement to the page file of the enterprise management system:

```
<a href="<Login link>"> Login </a>
```

Step 5 Log in to the enterprise management system, and then click the configured login link to access the cloud platform.

----End

3.8.3 Syntax of Identity Conversion Rules

An identity conversion rule is a JSON object which can be modified. The following is an example JSON object:

```
[
        {
                "local": [
                        {
                                "<user> or <group> or <groups>"
                        }
                ],
                "remote": [
```

```
                        {
                                "<condition>"
                        }
                ]
        }
]
```

Parameter description:

- **local**: Identity information of a federated user mapped to IAM. The value of this field can contain placeholders, such as **{0..n}**. The attributes **{0}** and **{1}** represent the first and second remote attributes of the user information, respectively.
- **remote**: Information about a federated user of the identity provider. This field is an expression consisting of assertion attributes and operators. The value of this field is determined by the assertion.
  - **condition**: Conditions for the identity conversion rule to take effect. The following three types of conditions are supported:
    - **empty**: The rule is matched to all claims containing the attribute type. This condition does not need to be specified. The condition result is the argument that is passed as input.
    - **any_one_of**: The rule is matched only if any of the specified strings appear in the attribute type. The condition result is Boolean, not the argument that is passed as input.
    - **not_any_of**: The rule is not matched if any of the specified strings appear in the attribute type. The condition result is Boolean, not the argument that is passed as input.

NOTICE

The user information mapped to IAM can only contain letters, digits, spaces, hyphens (-), underscores (_), and periods (.), and cannot start with a digit.

Examples of the empty Condition

The **empty** condition returns character strings to replace the local attributes **{0..n}**.

- In the following example, the username of a federated user will be "the value of the first remote attribute+space+the value of the second remote attribute" in IAM, that is, *FirstName LastName*. The group to which the user belongs is the value of the third remote attribute *Group*. This attribute has only one value.

```
[
    {
        "local": [
            {
                "user": {
                    "name": "{0} {1}"
                }
            },
            {
                "group": {
                    "name": "{2}"
                }
```



```
            }
        ],
        "remote": [
            {
                "type": "FirstName"
            },
            {
                "type": "LastName"
            },
            {
                "type": "Group"
            }
        ]
    }
]
```

If the following assertion (simplified for easy understanding) is received, the username of the federated user will be **John Smith** and the user will only belong to the **admin** group.

```
{FirstName: John}
{LastName: Smith}
{Group: admin}
```

- If a federated user will belong to multiple user groups in IAM, the identity conversion rule can be configured as follows:

  In the following example, the username of a federated user will be "the value of the first remote attribute+space+the value of the second remote attribute" in IAM, that is, *FirstName LastName*. The groups to which the user belongs are the value of the third remote attribute *Groups*.

```
[
    {
        "local": [
            {
                "user": {
                    "name": "{0} {1}"
                }
            },
            {
                "groups":  "{2}"
            }
        ],
        "remote": [
            {
                "type": "FirstName"
            },
            {
                "type": "LastName"
            },
            {
                "type": "Groups"
            }
        ]
    }
]
```


If the following assertion is received, the username of the federated user will be **John Smith** and the user will belong to the **admin** and **manager** groups.

```
{FirstName: John}
{LastName: Smith}
{Groups: [admin, manager]}
```

Examples of the "any one of" and "not any of" Conditions

Unlike the **empty** condition, the **any one of** and **not any of** conditions return Boolean values. These values will not be used to replace the local attributes. In the following example, only **{0}** will be replaced by the returned value of the first **empty** condition in the **remote** block. The value of **group** is fixed as **admin**.

- The username of the federated user in IAM is the value of the first remote attribute, that is, *UserName*. The federated user belongs to the **admin** group. This rule takes effect only for users who are members of the **idp_admin** group in the identity provider.

```
[
    {
        "local": [
            {
                "user": {
                    "name": "{0}"
                }
            },
            {
                "group": {
                    "name": "admin"
                }
            }
        ],
        "remote": [
            {
            "type": "UserName"
            },
            {
                "type": "Groups",
                "any_one_of": [
                    "idp_admin"
                ]
            }
        ]
    }
]
```

- If a federated user will belong to multiple user groups in IAM, the identity conversion rule can be configured as follows:

  The username of the federated user in IAM is the value of the first remote attribute, that is, *UserName*. The federated user belongs to the **admin** and **manager** groups. This rule takes effect only for users who are members of the **idp_admin** group in the identity provider.

```
[
    {
        "local": [
            {
                "user": {
```



```
                    "name": "{0}"
                }
            },
            {
                "groups": {
                    "name":"admin"
                }
            },
            {
                "groups": {
                    "name":"manager"
                }
            }
        ],
        "remote": [
            {
            "type": "UserName"
            },
            {
                "type": "Groups",
                "any_one_of": [
                    "idp_admin"
                ]
            }
        ]
    }
]
```

- The following assertion indicates that the federated user John Smith is a member of the **idp_admin** group. Therefore, the user can access the cloud platform.

  ```
  {UserName: John Smith}
  {Groups: [idp_user, idp_admin, idp_agency]}
  ```

- The following assertion indicates that the federated user John Smith is not a member of the **idp_admin** group. Therefore, the rule does not take effect for the user and the user cannot access the cloud platform.

  ```
  {UserName: John Smith}
  {Groups: [idp_user, idp_agency]}
  ```

Example Condition Containing a Regular Expression

You can add **"regex": true** to a condition to calculate results using a regular expression.

This rule takes effect for any user whose username ends with **@mail.com**. The username of each applicable federated user is *UserName* in IAM and the user belongs to the **admin** group.

```
[
    {
        "local": [
            {
                "user": {
                    "name": "{0}"
                }
            },
            {
                "group": {
                    "name": "admin"
```



```
                }
            }
        ],
        "remote": [
            {
            "type": "UserName"
            },
            {
                "type": "Groups",
                "any_one_of": [
                    ".*@mail.com$"
                ],
                "regex": true
            }
        ]
    }
]
```

Examples of Combined Conditions

Multiple conditions can be combined using the logical operator AND.

This rule takes effect only for the federated users who do not belong to the **idp_user** or **idp_agent** user group in the identity provider. The username of each applicable federated user is *UserName* in IAM and the user belongs to the **admin** group.

```
[
    {
        "local": [
            {
                "user": {
                    "name": "{0}"
                }
            },
            {
                "group": {
                    "name": "admin"
                }
            }
        ],
        "remote": [
            {
            "type": "UserName"
            },
            {
                "type": "Groups",
                "not_any_of": [
                    "idp_user"
                ]
            },
            {
                "type": "Groups",
                "not_any_of": [
                    "idp_agent"
                ]
            }
```



```
            ]
        }
]
```

The preceding rule is equivalent to the following:

```
[
    {
        "local": [
            {
                "user": {
                    "name": "{0}"
                }
            },
            {
                "group": {
                    "name": "admin"
                }
            }
        ],
        "remote": [
            {
            "type": "UserName"
            },
            {
                "type": "Groups",
                "not_any_of": [
                    "idp_user",
                    "idp_agent"
                ]
            }
        ]
    }
]
```

Examples of Combined Rules

If multiple rules are combined, the methods for matching usernames and user groups are different.

The name of a federated user will be the username matched in the first rule that takes effect, and the user will belong to all groups matched in all rules that take effect. A federated user can log in only if at least one rule takes effect to match the username. For easy understanding, username and user group rules can be configured separately.

In the following example, the rules take effect for users in the **idp_admin** group. The username of each applicable federated user is *UserName* in IAM and the user belongs to the **admin** group.

```
[
    {
        "local": [
            {
                "user": {
                    "name": "{0}"
                }
            }
```



```
        ],
        "remote": [
            {
                "type": "UserName"
            }
        ]
    },
    {
        "local": [
            {
                "group": {
                    "name": "admin"
                }
            }
        ],
        "remote": [
            {
                "type": "Groups",
                "any_one_of": [
                    "idp_admin"
                ]
            }
        ]
    }
]
```

The following assertion indicates that user John Smith is a member of the **idp_admin** group in the identity provider and therefore meets the rules. The username of this user will be **John Smith** in IAM, and the user will belong to the **admin** group.

```
{UserName: John Smith}
{Groups: [idp_user, idp_admin, idp_agency]}
```

3.9 MFA Authentication and Virtual MFA Device

3.9.1 MFA Authentication

What Is MFA Authentication?

MFA authentication provides an additional layer of protection on top of the username and password. If you enable MFA authentication, users need to enter the username and password as well as a verification code before they can log in to the console.

MFA authentication can also be enabled to verify a user's identity before the user is allowed to perform critical operations.

MFA Authentication Methods

MFA authentication can be performed through SMS, email, and virtual MFA device.

Application Scenarios

MFA authentication is suitable for login protection and critical operation protection.

- Login protection: When you or an IAM under your account logs in to the console, you and the user need to enter a verification code in addition to the username and password.
- Operation protection: When you or an IAM under your account attempts to perform a critical operation, such as deleting an ECS resource, you and the user need to enter a verification code to proceed.

For more information about login protection and critical operation protection, see Critical Operation Protection.

3.9.2 Virtual MFA Device

This section describes how to bind and unbind a virtual MFA device. If the bound virtual MFA device of an IAM user is deleted or the mobile phone on which it runs is unavailable, you can remove the virtual MFA device for the IAM user.

What Is a Virtual MFA Device?

An MFA device generates 6-digit verification codes in compliance with the Time-based One-time Password Algorithm (TOTP) standard. MFA devices can be hardware- or software-based. Currently, software-based virtual MFA devices are supported. They are application programs running on smart devices such as mobile phones.

Binding a Virtual MFA Device

Before binding a virtual MFA device, ensure that you have installed an MFA application on your mobile device.

Step 1 On the IAM console, choose **Account Security Settings** in the navigation pane.

Step 2 Click the **Account Settings** tab, and then click **Bind** next to **Virtual MFA Device**.

Step 3 Set up the MFA application by scanning the QR code or entering the secret key.

- Scan the QR code

  Open the MFA application on your mobile phone, and use the application to scan the QR code on the displayed page. Your account and secret key are then added to the application.

- Enter the secret key

  Open the MFA application on your mobile phone, and enter the secret key.

  NOTE

  - The secret key is a one-time credential that you can use to obtain an MFA verification code. To ensure account security, do not share the secret key with anyone.
  - To ensure that you can perform MFA-based verification successfully, confirm that you have enabled the automatic time setup option on your mobile phone.

Step 4 View the verification code on the MFA application. The code is automatically updated every 30 seconds.

Step 5 On the **Bind Virtual MFA Device** page, enter two consecutive verification codes and click **OK** to bind the virtual MFA device.

----End

Obtaining an MFA Verification Code

If virtual MFA–based login protection or operation protection is enabled, you need to enter an MFA verification code when you log in to the console or performing a critical operation.

Open the MFA application on your smart device, view the verification code displayed next to your account, and then enter the code on the console.

Unbinding a Virtual MFA Device

You can unbind the virtual MFA device as long as the mobile phone bound to the virtual MFA device is available and the virtual MFA device is still installed on your phone.

Step 1 On the IAM console, choose **Account Security Settings** in the navigation pane.

Step 2 Click the **Account Settings** tab, and then click **Unbind** next to **Virtual MFA Device**.

Step 3 Enter a verification code generated by the MFA application.

Step 4 Click **OK**.

----End

Removing the Virtual MFA Device

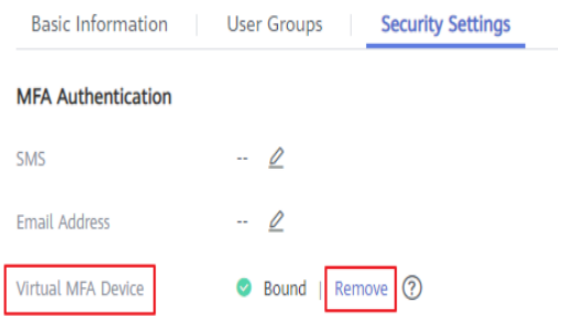
If the mobile phone of an IAM user is unavailable or the virtual MFA device has been deleted from the user's phone, as an administrator, you can remove the virtual MFA device by performing the following procedure:

Step 1 Log in to the IAM console.

Step 2 On the **Users** page, click **Security Settings** in the row containing the user for whom you want to remove the bound virtual MFA device.

Step 3 On the **Security Settings** tab page, click **Remove** in the **Virtual MFA Device** row.

Figure 3-21 Removing the virtual MFA device for an IAM user



Step 4 Click **Yes**.

----End

3.10 Viewing IAM Operation Records

3.10.1 Enabling CTS

CTS records operations performed on cloud resources in your account. The operation logs can be used to perform security analysis, track resource changes, perform compliance audits, and locate faults.

It is recommended that you enable the CTS service to record key IAM operations, such as creating and deleting users.

Procedure

Step 1 Log in to the management console.

Step 2 Click **Service List** and choose **Management & Deployment** > **Cloud Trace Service**.

Step 3 Click **Trackers** in the navigation pane.

Step 4 Click **Enable CTS**.

Step 5 In the displayed dialog box, click **Enable**. The system automatically creates a tracker.

After you enable CTS, you can view the tracker information on the **Trackers** page.

----End

CTS records all operations performed on IAM, such as creating users and user groups. Table 3-11 shows the IAM operations that can be recorded by CTS.

Table 3-11 IAM operations that can be recorded by CTS

Operation	Resource Type	Trace Name
Login	user	login
Logging in as a user of the Cloud Alliance	user	cloudLoginBySaml
Login failure	user	loginFailed
Logout	user	logout
Logging in as a federated user	user	tenantLoginBySamlSuccess/ oidcLoginSuccess
(IAM user) Changing the password at first login, when the password will expire, or after the password expires	user	changePassword
Creating a user	user	createUser
Modifying user information	user	updateUser
Deleting a user	user	deleteUser
Creating an access key	user	createCredential and

Operation	Resource Type	Trace Name
(AK/SK)		addCredential
Deleting an access key (AK/SK)	user	deleteCredential
Disabling or enabling an access key (AK/SK)	user	changeCredentialStatus
Modifying an access key (AK/SK)	user	updateCredential
Changing the email address	user	modifyUserEmail
Changing the mobile number	user	modifyUserMobile
Changing the password	user	modifyUserPassword
Setting a password for a user (by the administrator)	user	setPasswordByAdmin
Creating a user group	userGroup	createUserGroup
Modifying user group information	userGroup	updateGroup and updateUserGroup
Deleting a user group	userGroup	deleteUserGroup
Adding users to a user group	userGroup	addUserToGroup and updateUser/updateUserGroup
Removing users from a user group	userGroup	removeUserFromGroup and updateUser/updateUserGroup
Creating a project	project	createProject
Modifying a project	project	updateProject
Deleting a project	project	deleteProject
Creating an agency	agency	createAgency
Modifying an agency	agency	updateAgency
Deleting an agency	agency	deleteAgency
Switching roles	agency	switchRole
	Token	createToken
Creating an identity provider	identityProvider	createIdentityProvider
Modifying an identity provider	identityProvider	updateIdentityProvider
Deleting an identity provider	identityProvider	deleteIdentityProvider
Uploading IdP metadata	identityProvider	updateMetaConfigure and uploadMetadataFile

Operation	Resource Type	Trace Name
Editing IdP metadata	identityProvider	updateMetaConfigure
Registering a mapping	mapping	createMapping
Updating a mapping	mapping	updateMapping
Deleting a mapping	mapping	deleteMapping
Registering a protocol	protocol	createProtocol
Updating a protocol	protocol	updateProtocol
Deleting a protocol	protocol	deleteProtocol
Creating a custom policy	role	createRole
Modifying a custom policy	role	updateRole
Deleting a custom policy	role	deleteRole
Modifying the login authentication policy	domain	updateSecurityPolicies
Modifying the password policy	domain	updatePasswordPolicies
Modifying the ACL	domain	updateACLPolicies

3.10.2 Viewing IAM Audit Logs

After CTS is enabled, it records key operations performed on IAM and other supported services. CTS retains operation records for the last 7 days.

Procedure

Step 1 On the IAM console, perform an operation, such as creating a user named **CTS-Test**.

Step 2 Log in to the CTS console and view the operation records of IAM.

Step 3 Click ⌄ next to a trace to view its basic information.

Step 4 Click **View Trace** on the right of a trace to view the trace structure.

----End

3.11 Quotas

What Is a Quota?

A quota is a limit on the quantity or capacity of a certain type of service resources that a user can use, for example, the maximum number of IAM users or user groups that you can create.

If the current resource quota cannot meet your service requirements, you can apply for a higher quota.

How Do I View My Quotas?

1. Log in to the management console.
2. Click  in the upper left corner and select a region and project.
3. Click  (the **My Quotas** icon) in the upper right corner.

   The **Service Quota** page is displayed.
4. On the **Service Quota** page, view the used and total quotas of each type of resources.

   If the quota cannot meet your service requirements, increase the quota.

How Do I Increase My Quota?

The system does not support online quota adjustment. To increase a quota, contact customer service by calling the hotline or sending an email. We will process your request as soon as possible and will inform you of the processing progress by phone or email.

Before you contact customer service, prepare the following information:

- Account name, project name, and project ID

  To obtain the preceding information, log in to the management console, click the username in the upper-right corner, and choose **My Credentials** from the drop-down list.
- Quota information, including:
  - Service name
  - Quota type
  - Required quota

Click here to obtain our service hotline and email address.

4 FAQs

4.1 User Groups and Permissions Management

4.1.1 How Do I Grant Cloud Service Permissions in the AP-Kuala Lumpur-OP6 Region to IAM Users?

Symptom

You have enabled cloud services in the **AP-Kuala Lumpur-OP6** region as an administrator, and need to authorize IAM users in your account to use cloud services in this region.

Users access cloud services in the **AP-Kuala Lumpur-OP6** region as virtual users authorized through federated authentication. They are not real users who exist in the cloud service system, and need to be authorized in HUAWEI CLOUD's default regions and the **AP-Kuala Lumpur-OP6** region, respectively.

Prerequisites

You have created an IAM user in a default region of HUAWEI CLOUD and added the user to a user group. For example, you have created IAM user **User-001** and added them to user group **UserGroup-001**. For details, see Creating a User and Managing Users and Permissions.

Procedure

Step 1 Log in to HUAWEI CLOUD as an administrator, click  on the console homepage, and select the **AP-Kuala Lumpur-OP6** region.

Step 2 On the console of the **AP-Kuala Lumpur-OP6** region, choose **Management & Deployment** > **Identity and Access Management**.

Step 3 On the IAM console, choose **User Groups** from the navigation pane, and click **Create User Group** in the upper right corner to create a group with the same name (**UserGroup-001**).

Step 4 On the **User Groups** page, click **Modify** in the row that contains the user group created in 3.

Step 5 In the **Group Permissions** area, click **Attach Policy** in the row that contains the target region for user authorization, select desired permissions, and click **OK**.

The permissions assigned to this group will also apply to IAM users in the user group in HUAWEI CLOUD.

Step 6 Click **OK**. IAM user authorization for the **AP-Kuala Lumpur-OP6** region is completed.

----End

After the authorization, log in to the HUAWEI CLOUD console as an IAM user, switch to the **AP-Kuala Lumpur-OP6** region, and use cloud resources as specified by the assigned permissions.

4.2 IAM User Management

4.2.1 Why Does IAM User Login Fail?

Symptom

An IAM user fails to log in and sees a message indicating that the username or password is incorrect or login from the current device is not allowed due to the access control rules set by the administrator.

Troubleshooting

- **Incorrect username or password**
  a. You selected an incorrect login entry.

     Click **IAM User Login** on the login page.
  b. Incorrect account name or IAM user name.

     Enter the correct account name and IAM username. If you do not know your IAM user name or the name of the account used to create the IAM user, contact the administrator.
  c. Incorrect password.

     Enter the correct password. If you have forgotten your password, reset it by referring to How Do I Reset My Password?
  d. You did not clear the browser cache after changing or resetting the password.

     Clear the browser cache and log in again.

- **Login from the current device is not allowed due to the access control rules set by the administrator.**
  a. The administrator has set access control rules on the IAM console to limit cloud platform access to specific IP address ranges, IPv4 CIDR blocks, or VPC endpoints.
     Solution: Contact the administrator to check the ACL rules on the console and log in to the cloud service platform from an allowed device, or ask the administrator to modify the ACL rules.

4.2.2 How Do I Control IAM User Access to the Console?

To ensure user information and system security, you can configure an ACL that allows user access only from specific IP addresses.

Procedure

Step 1 Log in to the IAM console.

Step 2 In the navigation pane, choose **Account Security Settings** > **ACL**.

NOTE

The ACL will take effect only for the IAM users you have created using your account.

Step 3 Click the **Console Access** tab, and set IP addresses or IPv4 CIDR blocks that are allowed to access the console.

- **IP Address Ranges**: Allow users to access the system using IP addresses in specific ranges.
- **IPv4 CIDR Blocks**: Allow users to access the system using specific IPv4 CIDR blocks.
  For example: **10.10.10.10/32**.

NOTE

If you specify both **IP Address Ranges** and **IPv4 CIDR Blocks**, users are allowed to access the system if their IP addresses meet the conditions specified by either of the two parameters.

Step 4 Click **Save**.

----End

4.3 Security Settings

4.3.1 How Do I Enable Login Authentication?

To ensure account security, you are advised to enable login authentication.

After you enable this function, you and IAM users created using your account need to enter a verification code generated by the bound virtual MFA device, an SMS verification code, or an email verification code on the **Login Verification** page during login.

If you disable this function, you and the IAM users only need to enter the account name/username and password during login.

Procedure

- Enabling login authentication for an IAM user on the IAM console as an administrator

Step 1 In the navigation pane, choose **Users**.

Step 2 Click **Security Settings** in the row containing the target user.

Step 3 On the **Security Settings** tab page, select a verification method and enter a verification code in the **Login Protection** area.

Step 4 Click **OK**.

----End

- Enabling login authentication for yourself (account administrator) on the **Account Security Settings** page

Step 1 On the IAM console, choose **Account Security Settings** in the navigation pane.

Step 2 Click the **Critical Operations** tab, and click **Enable** next to **Login Protection**.

Step 3 On the **Login Protection** page, select **Enable**, select a verification method, and enter a verification code.

Step 4 Click **OK**.

----End

Related Operations

You can change the login verification method of your IAM users or account:

- To change the login verification method of an IAM user, go to the user list on the IAM console, click **Security Settings** in the row that contains the user, click next to **Verification Method** under **Login Protection**, and then change the verification method.
- To change the login verification method of your account, go to the **Account Security Settings** page, click the **Critical Operations** tab, click **Change** next to **Login Protection**, and then change the verification method.

4.3.2 How Do I Disable Login Authentication?

To ensure account security, you are advised to enable login authentication.

After you enable this function, you and IAM users created using your account need to enter a verification code generated by the bound virtual MFA device, an SMS verification code, or an email verification code on the **Login Verification** page during login.

If you disable this function, you and the IAM users only need to enter the account name/username and password during login.

Disabling IAM User Login Authentication as an Administrator

- An administrator can disable login authentication for an IAM user on the IAM console as follows:

Step 1 In the navigation pane, choose **Users**.

Step 2 Click **Security Settings** in the row containing the target user.

Step 3 On the **Security Settings** tab page, click next to **Verification Method** under **Login Protection**, and select **Disabled**.

Step 4 Click **OK**.

----End

Disabling Administrator Login Authentication

- Disabling login authentication for yourself (account administrator) on the **Account Security Settings** page

Step 1 On the IAM console, choose **Account Security Settings** in the navigation pane.

Step 2 Click the **Critical Operations** tab, and click **Change** next to **Login Protection**.

Step 3 On the **Login Protection** page, select **Disable**.

Step 4 Click **OK**.

----End

4.3.3 How Do I Disable Operation Protection?

Symptom

If operation protection is enabled, users under your account must perform verification to proceed with a critical operation (such as deleting a resource and creating an access key). To disable operation protection, perform the following procedure.

Procedure

Step 1 On the IAM console, choose **Account Security Settings** in the navigation pane.

Step 2 On the **Account Security Settings** page, click the **Critical Operations** tab, and click **Change** next to **Operation Protection**.

Step 3 Select **Disable** and click **OK**. Enter the verification code and click **OK**.

----End

4.3.4 How Do I Bind a Virtual MFA Device?

Multi-factor authentication (MFA) adds an extra layer of protection on top of your username and password. After you enable MFA-based login authentication, you need to enter a verification code after authenticating your username and password. MFA, together with your username and password, ensures the security of your account and resources.

MFA devices can be based on hardware or software. However, IAM supports only virtual MFA devices.

A virtual MFA device is an application that generates 6-digit codes in compliance with the Time-Based One-Time Password Algorithm (TOTP). MFA applications can run on mobile devices (including smartphones) and are easy to use.

Prerequisites

You have installed an MFA application (for example, Google Authenticator) on your mobile phone.

Procedure

Step 1 On the IAM console, choose **Account Security Settings** in the navigation pane.

Step 2 Click the **Account Settings** tab, and click **Bind** next to **Virtual MFA Device**.

Step 3 Set up the MFA application by scanning the QR code or entering the secret key.

- Scan the QR code

  Open the MFA application on your mobile phone, and use the application to scan the QR code displayed on the **Bind Virtual MFA Device** page. Your account is then added to the application.

- Enter the secret key

  Open the MFA application on your mobile phone, and enter the secret key.

NOTE

To ensure that you can perform MFA-based verification successfully, confirm that you have enabled the automatic time setup option on your mobile phone.

Step 4 View the verification code on the MFA application. The code is automatically updated every 30 seconds.

Step 5 On the **Bind Virtual MFA Device** page, enter two consecutive verification codes and click **OK**.

----End

Related FAQs

How Do I Obtain a Virtual MFA Verification Code?

How Do I Unbind or Remove a Virtual MFA Device?

Why Does MFA Authentication Fail?

4.3.5 How Do I Obtain a Virtual MFA Verification Code?

If you enable virtual MFA–based login protection or operation protection, you need to provide an MFA verification code when you log in to the cloud platform or perform a critical operation. The following figure shows the login verification page.

Open the bound MFA application and view the verification code displayed for your account.

NOTE

If the verification fails, resolve the problem by referring to Why Does MFA Authentication Fail?

4.3.6 How Do I Unbind or Remove a Virtual MFA Device?

- If the virtual MFA device bound to your account is available, you can unbind the MFA device by referring to Unbinding a Virtual MFA Device.
- If the virtual MFA device bound to your account is unavailable, you cannot unbind the MFA device, but you can remove it by referring to Removing the Virtual MFA Device.

IAM users can bind another virtual MFA device on the **Account Security Settings** page. For details, see How Do I Bind a Virtual MFA Device?

Unbinding a Virtual MFA Device

1. On the IAM console, choose **Account Security Settings** in the navigation pane.
2. Click the **Account Settings** tab, and click **Unbind** next to **Virtual MFA Device**.
3. Enter a verification code generated by the MFA application.
4. Click **OK**.

Removing the Virtual MFA Device

If the mobile phone of an **IAM user** is unavailable or the bound virtual MFA device of the user has been deleted from the phone, the user can request the administrator to remove the virtual MFA device. The procedure of removing a virtual MFA device is as follows:

1. Log in to the IAM console.
2. On the **Users** page, click **Security Settings** on the right of the target user.
3. On the **Security Settings** tab page, click **Remove** next to **Virtual MFA Device**.
4. Click **Yes**.

4.3.7 Why Does MFA Authentication Fail?

Symptom

MFA authentication fails when you log in or perform a critical operation, or bind or unbind a virtual MFA device.

Possible Causes

- The verification code is incorrect.
- The verification code has expired.
- The verification code belongs to another account.
- When you bound a virtual MFA device again after unbinding the previous one, you did not add your account to the MFA device.
- The generation of MFA verification codes is subject to the time. If the time difference between your mobile phone and the virtual MFA device is greater than 30 seconds, the MFA verification code generated on your mobile phone will fail the verification.

Solutions

- Enter the correct verification code.
- The verification code is automatically updated every 30 seconds. Enter two consecutive verification codes.
- Ensure that the account name displayed next to the verification code on the authenticator is the same as the name of the account used to request MFA authentication.
- To bind a virtual MFA device again, delete your account information in the MFA device, and then add your account to it.
- Ensure that the time on your mobile phone is the same as the time on the virtual MFA device, and try again. (You do not need to consider the time zone on your mobile phone, because the MFA authentication will be based on UTC time.)

4.3.8 Why Am I Not Getting the Verification Code?

When you bind or change the mobile number or email address or reset the password, you need to obtain a verification code for authentication. If you cannot obtain the code, perform the operations described in this section.

Why Am I Not Getting the SMS Verification Code?

- Check whether the mobile number you entered is correct. If it is incorrect, enter the correct mobile number and try again.
- Check whether your mobile service has been suspended due to arrears. If it has been suspended, clear the outstanding amount and try again after your mobile service is resumed. You can also change the mobile number associated with your account.
- In some scenarios, SMS messages may not be delivered due to network issues. In this case, send a verification code again or try again later. Alternatively, install the SIM card in another phone and try again.

If the fault persists after you perform the preceding operations, try email or virtual MFA verification.

Why Am I Not Getting the Email Verification Code?

- Check whether the email address you entered is correct. If it is incorrect, enter the correct email address and try again.
- Check whether your mailbox is normal and check the junk mail folder.
- Mails may not be delivered due to network issues. In this case, send a verification code again or try again later.

If the fault persists after you perform the preceding operations, try SMS or virtual MFA verification.

4.4 Passwords and Credentials

4.4.1 How Do I Reset My Password?

If you have forgotten the password of your IAM user or account, reset the password by referring to Resetting IAM User Password or Account Password.

Resetting IAM User Password or Account Password

If you are an IAM user and have not bound any email address or mobile number to your account, request the administrator to reset your password by following the instructions in "IAM Users" of the *User Guide*.

Step 1 On the login page, click **Forgot Password**.

Step 2 Specify the account or IAM user for whom you want to reset the password, and enter the CAPTCHA code.

NOTE

- Account: Created upon successful registration with the cloud platform. The account has full access permissions for all of its cloud services and resources. After account login, you will see the account marked **Enterprise administrator** on the **Users** page.

- IAM user: Created using your account. IAM users can log in to the cloud platform using the account name, username, and password, and then use resources based on assigned permissions. IAM users do not own resources.
- If you are an IAM user and have not bound an email address or mobile phone number to your account, ask the administrator to reset your password. For details, see *User Guide* > "IAM Users" > "Changing the Login Password of an IAM User".

Step 3 Select account name/email address or mobile number verification, enter the verification information as prompted, and click **Next**.

NOTE

- Ensure that the mobile number or email address you entered is correct. Otherwise, the password cannot be reset.
- If you do not receive the verification code, see Why Am I Not Getting the Verification Code?

Step 4 Enter a new password, enter it again, and click **Next**.

Step 5 Click **Log In** to log in using the new password.

----End

4.4.2 What Are Temporary Security Credentials (AK/SK and SecurityToken)?

Temporary Security Credentials

Temporary security credentials include temporary access keys (AK/SK) and securityTokens. They only have **temporary access permissions** and are slightly different from permanent security credentials.

Differences Between Temporary and Permanent Security Credentials

The following table provides the differences between the two types of security credentials.

Table 4-1 Credential differences

Item	Temporary Credentials	Permanent Credentials
Validity period	15 minutes to 24 hours	Unlimited validity
Number of credentials	Unlimited	2 credentials for each IAM user
Obtaining method	Call the API used to obtain a temporary AK/SK.	Create an access key on the **My Credentials** page.
Usage	Cannot be embedded into applications or stored for later use, and must be obtained again after expiration.	N/A

Advantages of Temporary Security Credentials

Temporary security credentials are useful to grant federated users only required permissions with a specific validity period.

Usage of Temporary Security Credentials

An access key must be used together with a securityToken. When you use temporary security credentials for authentication, add the **x-security-token** field to the request header.

4.4.3 How Do I Obtain a Token with Security Administrator Permissions?

A token is an access credential issued to an IAM user to bear its identity and permissions. When calling the APIs of IAM or other cloud services, you can use this API to obtain a user token for authentication.

Permissions of a token are determined by permissions of the user who obtains the token. Only users who have been assigned the **Security Administrator** role can obtain a token with **Security Administrator** permissions.

Methods

- Account administrator: Create an IAM user, assign the **Security Administrator** role to the user, and then call the API used to obtain a user token. The obtained token has the **Security Administrator** permissions.
- IAM user: Request the administrator to assign you the **Security Administrator** role, and then obtain a token.

Security Administrator Permissions

Table 4-2 Security Administrator permissions

Permission Name	Scope	Description
Security Administrator	Global	Administrator permissions for IAM, including but not limited to the following permissions: • Creating, modifying, and deleting IAM users • Creating, modifying, and deleting user groups, and granting them permissions • Creating, modifying, and deleting custom policies • Creating and modifying projects • Creating, modifying, and deleting agencies • Creating, modifying, and deleting identity providers • Configuring account security settings

4.4.4 How Do I Obtain an Access Key (AK/SK) in the AP-Kuala Lumpur-OP6 Region?

Symptom

You have enabled cloud services in the **AP-Kuala Lumpur-OP6** region as an administrator. You and IAM users in your account need to use access keys in this region for encryption and signing.

Users access cloud services in the **AP-Kuala Lumpur-OP6** region as virtual users authorized through federated authentication. They are not real users who exist in the cloud service system, and need to obtain an access key in HUAWEI CLOUD's default regions and the **AP-Kuala Lumpur-OP6** region, respectively.

The procedure below guides you through creating a permanent access key for yourself as an administrator or for your IAM users. Both you and your IAM users can create temporary access keys on the **My Credentials** page.

Procedure

Step 1 Create an IAM user in the **AP-Kuala Lumpur-OP6** region as an administrator. To create an access key for yourself, go to 2.

1. Log in to HUAWEI CLOUD as an administrator, click  on the console homepage, and select the **AP-Kuala Lumpur-OP6** region.
2. On the console of the **AP-Kuala Lumpur-OP6** region, choose **Management & Deployment** > **Identity and Access Management**.
3. In the navigation pane of the IAM console, choose **Users**.
4. Click **Create User** in the upper right corner.
5. On the **Create User** page, set user information. For details, see Creating an IAM User.

   To identify the entity that uses an access key, create an IAM user with the same name as the corresponding IAM user or your account.
6. Click **OK**.

Step 2 Obtain an access key for the IAM user.

1. Log in to the IAM console in the **AP-Kuala Lumpur-OP6** region as an administrator.
2. On the **Users** page of the IAM console, click **Set Credentials** in the **Operation** column of the row that contains the IAM user created in 1.
3. On the **Set Credentials** page, click **Create Access Key**.
4. (Optional) Enter a description for the access key.
5. Click **OK**. The access key is created.
6. Download the access key file.

   NOTE

   - Each user can have a maximum of two access keys with unlimited validity. To ensure account security, keep them properly.
   - You and the IAM user can use the access key only in the **AP-Kuala Lumpur-OP6** region.
7. (Optional) Provide the access key to the IAM user.

----End

4.5 Agency Management

4.5.1 How Can I Obtain Permissions to Create an Agency?

Symptom

You do not have permissions for creating an agency on the IAM console.

Possible Causes

You do not have permissions to use IAM.

Only the following users can use IAM:

- Account administrator (with full permissions for all services, including IAM)
- IAM users added to the **admin** group (with full permissions for all services, including IAM)
- IAM users assigned the **Security Administrator** role or an **xxx FullAccess** policy (with permissions to access IAM)

Solutions

- Request the administrator to create an agency.
- Request the administrator to grant the permissions you require.

4.6 Others

4.6.1 Why Is the Field-Level Help Always Displayed?

When you register with or log in to the cloud platform, bind an account, create a user, or reset or change the password, field-level help, such as "Enter at least 5 characters." is always displayed because you may be using Internet Explorer 8 or an earlier version. In this case, fix the issue using the following methods.

- Upgrade the browser.

  Upgrade to Internet Explorer 9 or a later version.
- Use another browser.

  Use Mozilla Firefox (version 38.0 or later) or Google Chrome (version 43.0 or later).

4.6.2 How Do I Disable Autofill Password on Google Chrome?

When you use Google Chrome to log in to the cloud platform for the first time, a message will appear asking you to confirm whether you want to save the password. This is because **Offer to save passwords** and **Auto Sign-in** in the **Passwords** area of the **Settings** page in Google Chrome are selected by default after the Google Chrome browser is installed. If you confirm to save the password, the password will be automatically filled during your next login. To ensure the security of your account and password, perform the following operations to disable this function. This section uses Google Chrome 61.0.3163.100 as an example to describe how to disable this function.

Procedure

Step 1 Open the Google Chrome browser, click in the upper right corner of the browser, and choose **Settings**.

Step 2 In the **Autofill** area, click **Passwords**.

Step 3 Deselect **Offer to save passwords** and **Auto Sign-in**.

----End

Follow-up Procedure

To delete a saved password, in the **Saved Passwords** area, click next to the password, and click **Remove**. The password will be deleted.

5 Change History

Table 5-1 Change history

Released On	Change History
2022-08-15	This issue is the first official release.

