ALIBABA CLOUD

Alibaba Cloud

Server Migration Center

Best Practices

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Alibaba Cloud

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Document conventions

Style	Description	Example
Danger	A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	**Danger:** Resetting will result in the loss of user configuration data.
Warning	A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	**Warning:** Restarting will cause business interruption. About 10 minutes are required to restart an instance.
Notice	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	**Notice:** If the weight is set to 0, the server no longer receives new requests.
Note	A note indicates supplemental instructions, best practices, tips, and other content.	**Note:** You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click **Settings**> **Network**> **Set network type**.
Bold	Bold formatting is used for buttons , menus, page names, and other UI elements.	Click **OK**.
`Courier font`	Courier font is used for commands	Run the `cd /d C:/window` command to enter the Windows system folder.
Italic	Italic formatting is used for parameters and variables.	`bae log list --instanceid` *Instance_ID*
[] or [a|b]	This format is used for an optional value, where only one item can be selected.	`ipconfig [-all|-t]`
{} or {a|b}	This format is used for a required value, where only one item can be selected.	`switch {active|stand}`

Table of Contents

1.Overview

This topic describes the best practices for using Server Migration Center (SMC) in different scenarios.

Background information

SMC is a migration platform developed by Alibaba Cloud. You can use SMC to migrate your servers to Alibaba Cloud. SMC provides multiple features and benefits to simplify data migration. For more information, see What is SMC?.

Scenarios

You can use SMC to migrate servers in the following scenarios.

Scenario	Description
Migrate servers to Alibaba Cloud	SMC allows you to migrate servers that run various versions of Windows or Linux operating systems to Alibaba Cloud from data centers, on-premises VMs, or other cloud platforms.
Migrate between two ECS instances	To migrate between two ECS instances, you can also copy a custom image from a region to another within an Alibaba Cloud account, or share a custom image to a different Alibaba Cloud account. However, if you want to shrink disks, you can use SMC to migrate between two ECS instances.
Use the SMC plug-in of Cloud Assistant to import the information of a source server	If you have installed a Cloud Assistant client on your server, you can use the built-in SMC plug-in to import the server information in a convenient and efficient manner.
Use the Windows GUI version of an SMC client	If your server uses Windows, you can use the Windows GUI version of an SMC client to import the server information.
Migrate incremental data from a source server	If you want to synchronize data changes from your server to Alibaba Cloud, we recommend that you perform an incremental migration.
Migrate source servers to Container Registry	SMC allows you to migrate servers to Container Registry. You can use SMC to migrate containerized applications to Container Registry at low costs. Containerized applications are distributed applications that are automatically managed and deployed with high agility and low security risks. Application containerization improves resource usage and reduces computing costs.
Migrate servers to ECS instances	SMC allows you to migrate servers to ECS instances. After you purchase an ECS instance, you can migrate your server to the ECS instance.
Migrate servers over a VPC	If your server can connect to a virtual private cloud (VPC) from your data center, VM, or cloud host, we recommend that you migrate the server over a VPC. Compared with migration over the Internet, migration over a VPC is more efficient and stable.

Scenario	Description
Estimate the time required for migration and test the data transfer speed	You can estimate the migration duration and the data transfer rate.
Enable multi-threaded transfer acceleration	You can enable multithreading data transfer to utilize the maximum bandwidth. This improves transfer efficiency in high-bandwidth scenarios.
View source servers and migration tasks	You can view the status of each source server or migration task on the Overview page of the SMC console. This allows you to identify and troubleshoot issues that may occur during migration.
Use tags to manage migration sources and migration tasks	A tag is a key-value pair that consists of a tag key and a tag value. Tags are used to identify resources. You can use tags to group migration sources and migration tasks for easy searching and batch operations.
Use tags to implement fine-grained access control	You can use tags to control the permissions of Resource Access Management (RAM) users and Security Token Service (STS) roles so that different users can be granted different access and operation permissions on cloud resources.
Install GRUB on a Linux server	SMC allows you to migrate a Linux server to Alibaba Cloud. However, for earlier operating systems, such as CentOS 5, Red Hat 5, and Debian 7, you must upgrade GRUB to version 1.99 or later. For Amazon Linux, you must upgrade GRUB to version 2.02 or later.

2.Migrate servers to Alibaba Cloud

Server Migration Center (SMC) allows you to migrate servers that run various versions of Windows or Linux operating systems to Alibaba Cloud. Servers can be deployed in data centers, on-premises virtual machines (VMs), or on other cloud platforms. This topic describes the preparations and procedure of migrating servers to Alibaba Cloud by using SMC.

Context

SMC allows you to migrate data from servers in data centers, on-premises VMs, and third-party cloud platforms to Alibaba Cloud. Supported VMs include VMware, Xen, KVM, and Hyper-V. Third-party cloud platforms can be Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), and Tencent Cloud. Before you migrate a server, complete the following preparations on the server based on its operating system:

- Prepare for the migration of a Windows-based server to Alibaba Cloud
- Prepare for the migration of a Linux-based server to Alibaba Cloud

After you complete the preparations, you can start the migration. For more information, see Migrate a server to Alibaba Cloud.

In addition, you can use SMC to migrate data between Alibaba Cloud Elastic Compute Service (ECS) instances. For more information, see Migrate between two ECS instances.

Prepare for the migration of a Windows-based server to Alibaba Cloud

Before you migrate a Windows-based server, perform the following operations on the server:

- Create snapshots to back up data.
- Make sure that the system time of the server is the same as the standard time of the region where the server resides.
- Make sure that the server has access to the following URLs and ports:
  - SMC endpoint: `https://smc.aliyuncs.com:443`.
  - Ports 8080 and 8703 that are required to connect to the intermediate instance during the migration process.

    > **Note** During the migration process, SMC creates, starts, stops, and releases the intermediate instance `No_Delete_SMC_Transition_Instance`. The default security group of the intermediate instance allows access to ports 8080 and 8703. Both ports are the migration service ports of the intermediate instance.

- Make sure that the Volume Shadow Copy Service (VSS) is enabled.
- Check whether the QEMU Guest Agent is installed. If the QEMU Guest Agent is installed, you must uninstall it. For more information, see What can I do if Windows server migration stops in the "Prepare For Rsync Disk 0" stage?
- Check the validity of your application licenses. After you migrate the server to Alibaba Cloud, the application licenses that are associated with the underlying hardware may become invalid.

- Perform a more detailed check on the server based on its type.
  - If you migrate data from a physical server, check its virtualized applications. Elastic Compute Service (ECS) instances of Alibaba Cloud do not support built-in virtualized applications. After the migration, software such as VMware Workstation Pro, VirtualBox, and Hyper-V is not supported because such software can be used only on a physical server.
  - If you migrate a server from AWS, Azure, or GCP, you need to check the network environment.
    - For information about how to perform migration across regions outside the Chinese mainland, see Migrate a server to Alibaba Cloud across regions outside the Chinese mainland.
    - If a virtual private cloud (VPC) is available, we recommend that you perform migration over the VPC. Compared with migration over the Internet, migration over a VPC is more efficient and stable.
  - If you migrate data from a Windows-based cloud server, check whether the QEMU Guest Agent VSS Provider service is installed.

    If the QEMU Guest Agent VSS Provider service is installed, find the uninstall.bat script in the *C:\Program Files (x86)\virtio\monitor* directory and run the script to uninstall the service.

Prepare for the migration of a Linux-based server to Alibaba Cloud

Before you migrate a Windows-based server, perform the following operations on the server:

- Create snapshots to back up data.
- Make sure that the system time of the server is the same as the standard time of the region where the server resides.
- Make sure that the server has access to the following URLs and ports:
  - SMC endpoint: `https://smc.aliyuncs.com:443`.
  - Ports 8080 and 8703 that are required to connect to the intermediate instance during the migration process.

    > **Note** During the migration process, SMC creates, starts, stops, and releases the intermediate instance `No_Delete_SMC_Transition_Instance`. The default security group of the intermediate instance allows access to ports 8080 and 8703. Both ports are the migration service ports of the intermediate instance.

- Check Security-Enhanced Linux (SELinux). You need to check whether SELinux is disabled on the Community Enterprise Operating System (CentOS) and Red Hat operating systems. If SELinux is enabled, you can disable it by using one of the following methods:
  - Run the **setenforce 0** command to disable SELinux temporarily.
  - Modify the */etc/selinux/config* file to set `SELINUX` to disabled to disable SELinux permanently. For more information, see Enable or disable SELinux.
- Check the version of GRand Unified Bootloader (GRUB). You must use GRUB V2.02 or later for earlier versions of operating systems such as CentOS 5, Red Hat 5, Debian 7, Amazon Linux, and Oracle Linux. For more information, see Install GRUB on a Linux server.
- Check the validity of your application licenses. After you migrate the server to Alibaba Cloud, the application licenses that are associated with the underlying hardware may become invalid.
- Perform a more detailed check on the server based on its type.

- If you migrate data from a physical server, check its virtualized applications. Elastic Compute Service (ECS) instances of Alibaba Cloud do not support built-in virtualized applications. After the migration, software such as VMware Workstation Pro, VirtualBox, and Hyper-V is not supported because such software can be used only on a physical server.
- If you migrate a server from AWS, Azure, or GCP, you need to check the network environment.
  - For information about how to perform migration across regions outside the Chinese mainland, see Migrate a server to Alibaba Cloud across regions outside the Chinese mainland.
  - If a VPC is available, we recommend that you perform migration over the VPC. Compared with migration over the Internet, migration over a VPC is more efficient and stable.
- If you migrate data from an Amazon EC2 Linux instance, check cloud-init configurations.

  Cloud-init is developed to initialize cloud instances across platforms. However, the cloud-init service configurations of AWS and Alibaba Cloud are not cross-compatible. Instances that are migrated from AWS to Alibaba Cloud may fail to start and the network may fail to connect. We recommend that you use the cloud-init configurations of Alibaba Cloud on the Amazon EC2 instance. For more information, see Install cloud-init. You can also uninstall cloud-init from the Amazon EC2 instance.
- If you migrate data from a Linux-based Google Cloud VM, make sure that cloud-init is installed. For more information, see Install cloud-init.
- If you migrate data from a Linux-based UCloud VM, check whether the Linux kernel is customized by UCloud.

  If the Linux kernel is customized by UCloud, the Linux instance may fail to be started or stopped in the ECS console after the migration. This is because some Linux kernels are incompatible with Alibaba Cloud. You can change the Linux kernel. For example, if your server runs CentOS, you can change the kernel to an official one. For technical support, see Contact us.

Migrate a server to Alibaba Cloud across regions outside the Chinese mainland

To migrate an Amazon EC2 instance, Azure VM, or Google Cloud VM to Alibaba Cloud and create ECS instances based on a custom image, perform the following steps:

1. Migrate a server to Alibaba Cloud across regions outside the Chinese mainland. Select ECS Image as the destination image type. For more information, see Migrate a server to Alibaba Cloud.

   If an AWS EC2 instance resides in the United States, you can migrate the instance to an Alibaba Cloud region in the United States. For information about regions and region IDs, see Regions and zones.
2. After the migration is complete, copy the custom image to the destination Alibaba Cloud region. For more information, see Copy a custom image.
3. Create ECS instances by using the custom image. For more information, see Create an ECS instance by using a custom image.

   By default, root logon by using Secure Shell (SSH) is disabled in Amazon EC2 Linux instances. You can log on to Alibaba Cloud ECS instances by using an AWS account and SSH key.

Migrate a server to Alibaba Cloud

Before you start the migration, create an Alibaba Cloud account. For more information, see Before you begin.

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What's next

3.Migrate between two ECS instances

You can use Server Migration Center (SMC) to migrate servers in data centers, on-premises virtual machines (VMs), or third-party cloud platforms to Alibaba Cloud. You can also migrate an Alibaba Cloud ECS instance to another ECS instance within the same Alibaba Cloud account or across different Alibaba Cloud accounts. This topic describes how to use SMC to migrate between two ECS instances within an Alibaba Cloud account or across different Alibaba Cloud accounts.

Prerequisites

Make sure that you have created an Alibaba Cloud account, completed real-name verification, activated Activate Resource Access Management (RAM), and authorized SMC to access your cloud resources. For more information, see Before you begin.

Context

To migrate between two ECS instances, you can also copy a custom image from a region to another within an Alibaba Cloud account, or share a custom image to a different Alibaba Cloud account. For more information, see Copy a custom image and Share or unshare a custom image.

When you use SMC, you are charged only for the Alibaba Cloud Elastic Compute Service (ECS) resources that you use during migration. For more information, see Billing.

Usage notes

If you migrate a server for the first time, we recommend that you perform a test migration. Before the migration, take note of the information in the following table.

Item	Description
Account	If you migrate between two ECS instances across different Alibaba Cloud accounts, you need to download and install an SMC client on the source ECS instance. Then, you need to enter the AccessKey pair of the Alibaba Cloud account that owns the destination ECS instance.
Data security	To prevent data loss, we recommend that you create snapshots for your cloud disk. For more information, see Create a snapshot of a disk.
Network	In the following cases, a network environment may affect the migration speed: • If you perform migration across regions outside the Chinese mainland, the network may become unstable. • If a VPC is available, we recommend that you perform migration over the VPC. Compared with migration over the Internet, migration over a VPC is more efficient and stable.

Scenarios

Migration between two ECS instances has the following scenarios:

- Migrate between ECS instances across different Alibaba Cloud accounts

In this scenario, you can migrate between two ECS instances across different Alibaba Cloud accounts. The ECS instances can reside in the same region or different regions. For example, you can migrate an ECS instance that belongs to Alibaba Cloud account A to another instance that belongs to Alibaba Cloud account B.

- Migrate between ECS instances within the same account

  In this scenario, you can migrate between two ECS instances within the same Alibaba Cloud account. The ECS instances can reside in the same region or different regions. For example, you can migrate between an ECS instance and an ECS image or another instance within Alibaba Cloud account A.

  In this scenario, you can also scale in the cloud disk of an ECS instance by migrating the instance to a custom image or another instance that has a smaller cloud disk. This is because ECS does not support the scale-out of system disks or data disks. For more information, see Shrink a disk.

Step 1: Download an SMC client and upload it to the source ECS instance

Before the migration, you need to download an SMC client and upload it to the source ECS instance.

1. Log on to the SMC console by using the Alibaba Cloud account that owns the destination ECS instance. In the upper-right corner of the page, move the pointer over **Download Latest SMC Client** and right-click **Copy link**.

   > **Notice** You must distinguish the Alibaba Cloud accounts that own the source and destination ECS instances.

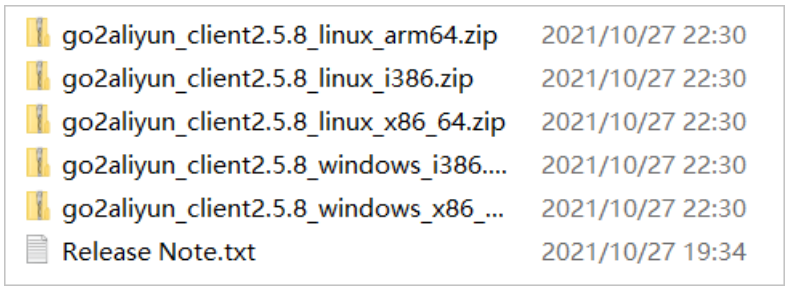
2. Log on to the source ECS instance and download an SMC client.
   - Windows ECS instance: Copy the download URL of the SMC client package and paste it in the browser to download an SMC client.
   - Linux ECS instance: Run the **wget** command to download an SMC client. Example: **wget https://p2v-tools.oss-cn-hangzhou.aliyuncs.com/smc/Alibaba_Cloud_Migration_Tool.zip**.
3. Decompress the compilation of SMC client packages.

   Select one of the following methods to decompress the SMC client package based on the operating system of the source ECS instance:

   Windows ECS instance

i. Use the decompression tool provided by Windows or a decompression tool installed on the source ECS instance to decompress the compilation of SMC client packages `Alibaba_Cloud_Migration_Tool.zip`.

> **Note** The decompressed package shown in the following figure is for reference only. For more information, see Step 1: Import the information of a migration source.



ii. Decompress the client package that is compatible with the operating system of your source ECS instance.

In this topic, `go2aliyun_client2.5.8_windows_x86_64.zip` is used as an example.

> **Note** For information about the SMC client package, see Step 1: Import the information of a migration source.

Linux ECS instance

i. Run the following command to decompress the compilation of SMC client packages:

```
unzip Alibaba_Cloud_Migration_Tool.zip
```

> **Note** Make sure that the unzip utility is installed on the source ECS instance. For example, you can run the **yum -y install unzip** command to install the unzip utility in CentOS 7.

ii. Run the following command to decompress the SMC client package:

Decompress the client package that is compatible with the operating system of your source ECS instance. In this topic, `go2aliyun_client2.5.8_linux_x86_64.zip` is used as an example.

```
unzip go2aliyun_client2.5.8_linux_x86_64
```

Step 1: Import the information of the source ECS instance

Run the SMC client on the source ECS instance and import the information of the instance to the SMC console. For more information, see Step 1: Import the information of a migration source.

> **Notice** Do not close the client until the migration is complete. Otherwise, the source ECS instance will be disconnected from the SMC console and the migration fails.

1. Enter the SMC client directory and run the SMC client.
   - Windows ECS instance: Use one of the following methods to run the SMC client:
     - To run the Windows GUI version, double-click the *go2aliyun_gui.exe* file.
     - To run the Windows CLI version, double-click the *go2aliyun_client.exe* file.

     > **Note** When you run the program, you must click **OK** to confirm that you have the administrator privilege.

   - Linux ECS instance:

     In the directory of the *go2aliyun_client* file, run the following commands:

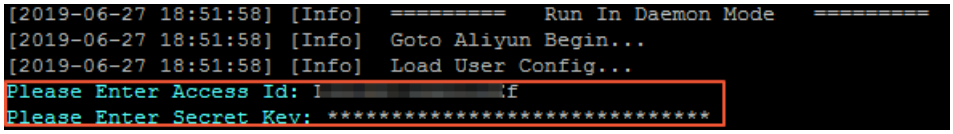
     ```
     cd go2aliyun_client2.5.8_linux_x86_64
     chmod +x go2aliyun_client
     ./go2aliyun_client
     ```

2. Enter the AccessKey pair of the Alibaba Cloud account that owns the destination ECS instance.

   > **Notice** You must distinguish the Alibaba Cloud accounts that own the source and destination ECS instances.

   - Windows ECS instance
     - If you use the Windows GUI version, enter the AccessKey ID in the **Access Id** field, enter the AccessKey secret in the **Secret Key** field, and then click *Start*. For more information, see Use the Windows GUI version of an SMC client.
     - If you use the Windows CLI version, enter the AccessKey ID and AccessKey secret, and then press *Enter*.
   - Linux ECS instance

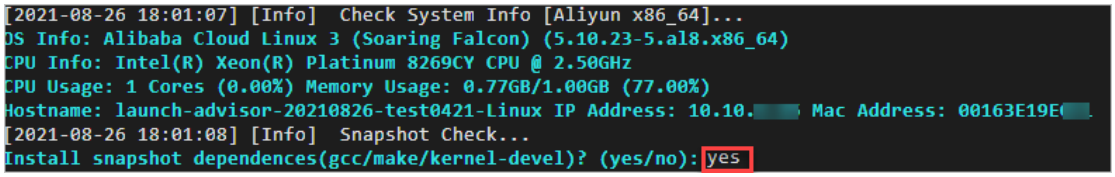
     Enter the AccessKey ID and AccessKey secret, and then press *Enter*.

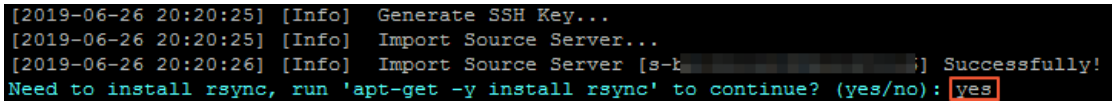
     The following prompts may appear:

- If no snapshot dependency is installed on your source ECS instance, the following prompt appears, as shown in the following figure. Decide whether to install one based on whether you need to enable block replication.
  - If you need to enable block replication for the migration, enter *yes* to automatically install a snapshot dependency.
  - If you do not need to enable block replication for the migration, enter *no*.

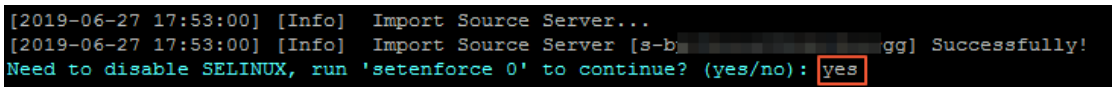
  > **Note** If the snapshot dependency fails to be installed, do not enable block replication when you create a migration task. Otherwise, the migration may fail.



- The rsync tool is installed in most mainstream migration sources. If rsync is not installed on the source ECS instance, the SMC client displays a prompt. Enter *yes* to install rsync, as shown in the following figure.



- If SELinux is enabled on the source ECS instance, you are prompted to disable SELinux. Enter *yes* to disable SELinux, as shown in the following figure.



3. Check whether the information of the source ECS instance is imported.
   - If `Import Source Server [s-bxxxxxxxxxxxx] Successfully!` appears, the information of the source ECS instance has been imported to the SMC console.
   - If `Error` or `Goto Aliyun Not Finished!` appears, the information of the ECS instance has failed to be imported, as shown in the following figure. We recommend that you find the root cause of the issue, and then run the client again. For more information, see SMC FAQ.

Step 2: Create and start a migration task

1. Log on to the SMC console by using the Alibaba Cloud account that owns the destination ECS instance.

   > **Notice** You must distinguish the Alibaba Cloud accounts that own the source and destination ECS instances.

2. In the left-side navigation pane, click **Migration Sources**.
3. Find the source ECS instance, and click **Create Migration Job** in the **Actions** column.
4. In the **Create Migration Job** panel, read the instructions and set the parameters for the migration task. For more information, see Step 1: Import the information of a migration source.

> **Note** We recommend that you select VPC as the network type when you create a migration task. Compared with migration over the Internet, migration over a VPC is more efficient and stable.

What's next

After the migration is complete, perform the following steps based on your needs:

- If you migrate an ECS instance to an ECS image, create an ECS instance based on the image. For more information, see Create an ECS instance by using a custom image.
- If you migrate an ECS instance to an ECS instance, view the destination ECS instance in the ECS console.

> **Note** After you migrate between two ECS instances, the application licenses that are associated with the underlying hardware may become invalid.

4.Use the SMC plug-in of Cloud Assistant to import the information of a source server

If you have installed a Cloud Assistant client on your source server, you can use the SMC plug-in to import the information of the source server in a convenient and efficient manner. This topic describes how to use the SMC plug-in to import the information of a source server in Linux and Windows.

Prerequisites

- The preparations for using SMC are completed. For more information, see Before you begin.
- A Cloud Assistant client later than 2.2.1.107 is installed on the source server.
  - If your source server is an ECS instance, a Cloud Assistant client is installed by default. You can call the DescribeCloudAssistantStatus API operation to view the version of the Cloud Assistant client installed on the ECS instance. If you are using an early version of Cloud Assistant, you must upgrade the client to a version later than 2.2.1.107. For more information, see Upgrades or disable upgrades for the Cloud Assistant client.
  - If your source server is not an ECS instance, you must manually install a Cloud Assistant client later than 2.2.1.107. For more information, see Install the Cloud Assistant client.

Context

To ensure stable migration, we recommend that you exclude directories that store dynamic data, such as the data directories of large databases. Then, you can stop the services that are running on the server and start the migration task. For information about how to exclude directories that store dynamic data without stopping services, see Step 1: Import the information of a migration source.

> **Note** If the data stored on the source server is required after migration, you can save the data and upload it to the destination server.

Import the information of the source server in Linux

1. Run the following command to view the list of Cloud Assistant plug-ins and make sure that the plug-ins are available:

   ```
   acs-plugin-manager -l
   ```

   The following command output indicates that the `smc-client-plugin` plug-in is available.

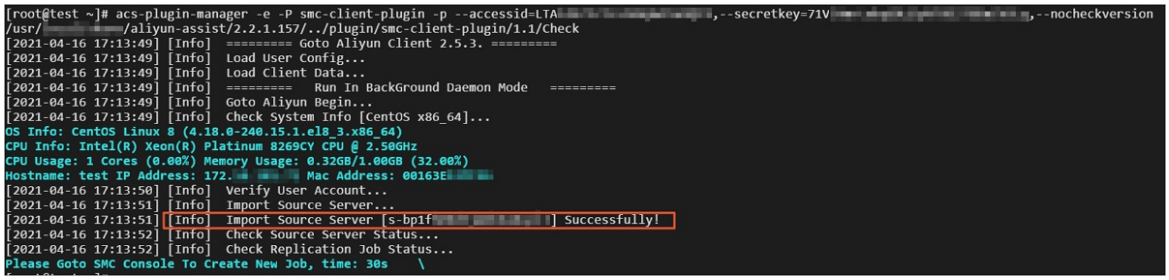
```
[root@test ~]# acs-plugin-manager -l
+-----------------------------------------------------------+
|                          Name|   version| publisher|      os|
+-----------------------------------------------------------+
|                  ecsgo-helper|       0.7|    aliyun|   LINUX|
|             ecs-hibernate-linux|       0.3|    aliyun|   LINUX|
|                          sysak|      0.34|    aliyun|   LINUX|
|              smc-client-plugin|       1.1|    aliyun|   LINUX|
|             app-snapshot-plugin|       1.2|    aliyun|   LINUX|
|                        oosutil|       1.8|    aliyun|   LINUX|
|ecs_disable_intel_hyper-threading|       1.0|    aliyun|   LINUX|
|                 ecs-utils-ipv6|       1.0|    aliyun|   LINUX|
|                multi-nic-util|       1.0|    aliyun|   LINUX|
|           ecs_tools_multiqueue|       1.2|    aliyun|   LINUX|
|                ecs_dump_config|       1.0|    aliyun|   LINUX|
|       bare_metal_shutdown_util|       1.0|    aliyun|   LINUX|
|              ecs_inventory_test|       3.3|    aliyun|   LINUX|
+-----------------------------------------------------------+
```

2. Run the following command to import the information in Linux:

```
acs-plugin-manager -e -P smc-client-plugin -p --accessid=<AccessKey ID>,--secretkey=<AccessKey Secret>,--nocheckversion
```

<AccessKey ID> and *<AccessKey Secret>* indicates the AccessKey pair of your Alibaba Cloud account. Make sure that you have created an AccessKey pair. For more information, see Create AccessKey pairs.

The following command output indicates that the information of the source server is imported.



After the information of the source server is imported, SMC automatically generates a record for the migration source. You must create and start a migration task for the migration source in the SMC console. For more information, see Step 2: Create and start a migration task.

Import the information of the source server in Windows

1. Go to the installation directory of the Cloud Assistant client.
   - If your source server is an ECS instance, the default installation directory of the Cloud Assistant client is *C:\ProgramData\aliyun\assist\<Cloud Assistant version number>*, for example, `C:\ProgramData\aliyun\assist\2.1.1.140`.

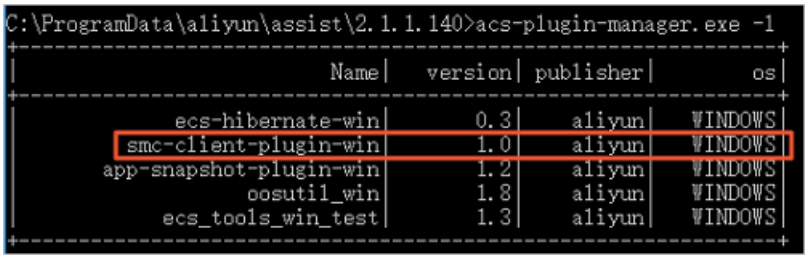
     > **Note** The `C:\ProgramData` folder is hidden. Therefore, you must show hidden folders in advance. You must also ensure the data security of this folder to prevent system exceptions caused by unintentional errors.

   - If your source server is not an ECS instance, you must go to the installation directory of the Cloud Assistant client.
2. In the installation directory of the Cloud Assistant client, press the *Shift* key and right-click the blank area at the same time. Then, click **Open command window here**.

3. Run the following command to view the list of Cloud Assistant plug-ins and make sure that the plug-ins are available:

```
acs-plugin-manager.exe -l
```

The following command output indicates that the `smc-client-plugin` plug-in is available.

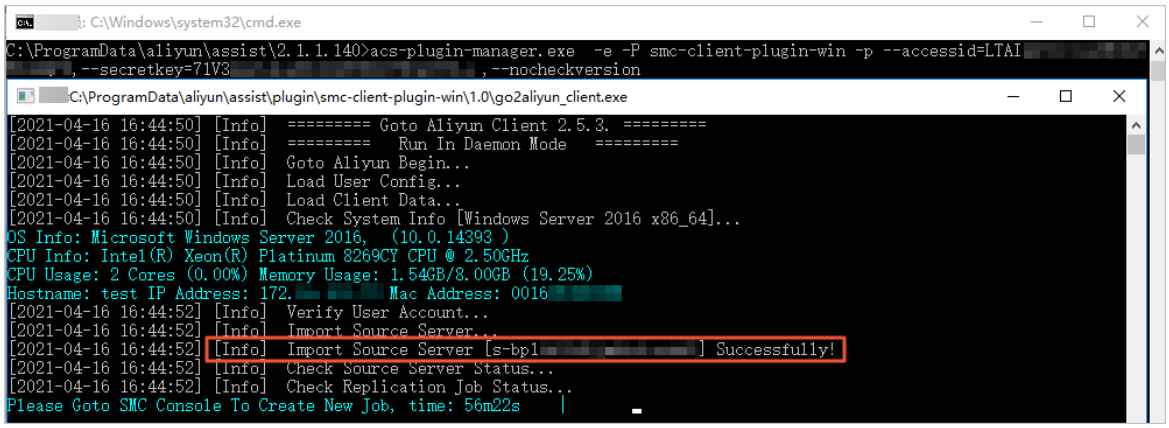


4. Run the following command to import the information in Linux:

```
acs-plugin-manager.exe -e -P smc-client-plugin-win -p --accessid=<AccessKey ID>,--secretkey=<AccessKey Secret>,--nocheckversion
```

<AccessKey ID> and *<AccessKey Secret>* indicates the AccessKey pair of your Alibaba Cloud account. Make sure that you have created an AccessKey pair. For more information, see Create AccessKey pairs.

Then, a command window appears. The following command output indicates that the information of the source server is imported.



After the information of the source server is imported, SMC automatically generates a record for the migration source. You must create and start a migration task for the migration source in the SMC console. For more information, see Step 2: Create and start a migration task.

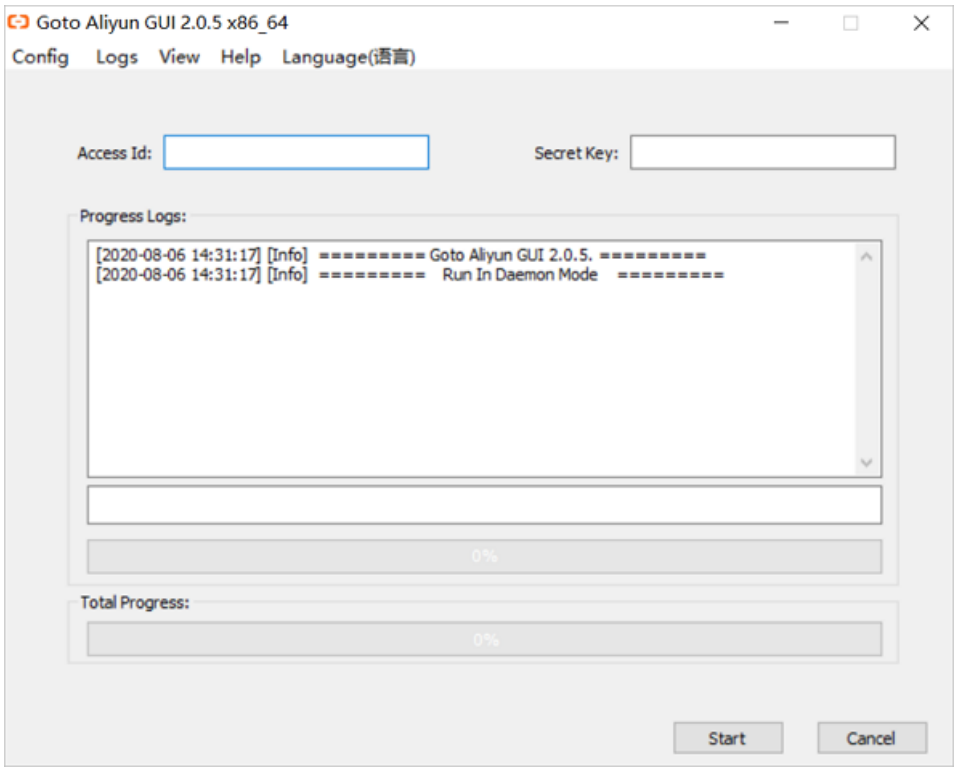
5.Use the Windows GUI version of an SMC client

You can use the Windows GUI version of a Server Migration Center (SMC) client to migrate Windows servers to Alibaba Cloud. The settings for the SMC client on the GUI are the same as those on the CLI. The Windows GUI version is compatible with the CLI version.

Daemon mode

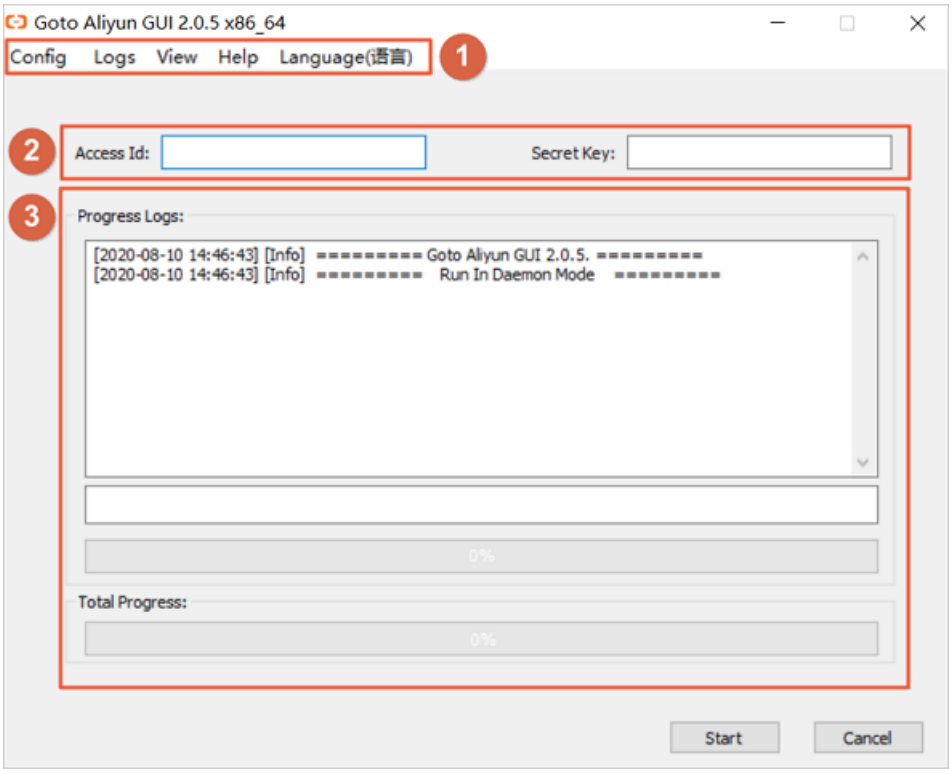
In daemon mode, you can import migration source information by using the SMC client. Then, you can log on to the SMC console to complete the migration. You only need to configure **Access Id** and **Secret Key**. For more information, see Migration process.

The following figure shows the Windows GUI in daemon mode.



Menu items on the GUI

The following figure shows the menu items of the Windows GUI client.



The following table describes the menu items.

No.	Section	Description

1	Top navigation bar	Consists of the **Config**, **Logs**, **View**, **Help**, and **Language** menus.
		• **Config**:
		  ○ Click **Rsync** to set the bandwidth limit for data transmission. Unit: KB/s.
		  ○ Click **Save User Config** to save the current settings for batch operations.
		  ○ Click **Clear Client Data** to initialize the client configuration file.
		• **Logs**:
		  ○ Click **Open Log File** to open the migration log file.
		  ○ Click **Open Logs Dir** to find the path of the migration log file.
		• **View**: Select **Hide Progress Log** to hide the **Progress Logs** column.
		• **Help**: Obtain online documentation or the version information of the SMC client.
		• **Language**: Select the display language of the GUI.

No.	Section	Description
2	Custom configuration section	Allows you to configure Access Id and Secret Key. • **Access Id**: Enter the AccessKey ID. • **Secret Key**: Enter the AccessKey secret. **Note** • Create an AccessKey pair in advance. For more information, see Obtain an AccessKey pair. • The settings you configure are written to the *user_config.json* file of the SMC client.
3	Task progress and logs section	Allows you to view the task progress or troubleshoot issues as prompted after you run the SMC client.

6.Migrate incremental data from a source server

SMC allows you to migrate incremental data from source servers to Alibaba Cloud. You can specify the time interval between incremental migration tasks. Incremental migration reduces the service downtime and the total time of migration. This topic describes the best practices for incremental migration.

Prerequisites

- Incremental migration is supported by SMC client V2.0.0 and later. Therefore, we recommend that you use SMC client V2.0.0 and later to import the information of the migration source.
- The information of the server is imported to the SMC console. For more information, see Step 1: Import the information of a migration source.

Context

- Make sure that the SMC client is running during migration. If data transfer is interrupted, you can restart the client and the migration task to resume migration.
- Each incremental migration task creates an intermediate instance to facilitate the migration process. The intermediate instance incurs a small fee. For more information, see Pay-as-you-go. The intermediate instance is released only when the incremental migration task is in the **Expired** state or when the task is deleted.

(Optional) Step 1: Exclude dynamic data directories

To ensure stable migration, we recommend that you exclude dynamic data directories, such as data directories of large databases. Then, you can stop the services on the source server and start the migration task. Skip this step if you do not need to exclude dynamic data directories from migration.

To exclude dynamic data directories, perform the following steps. You do not need to stop the services that are running on the source server.

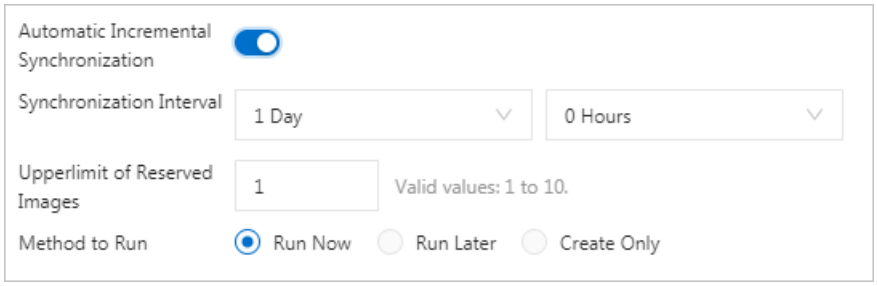
1. Log on to the source server.
2. Configure the SMC client and exclude dynamic data directories.

   For more information, see How do I exclude files or directories from a migration task?.

Step 2: Create and start an incremental migration task

You can perform the following steps to exclude dynamic data directories. You do not need to stop your services that are running on the source server.

1. Log on to the SMC console.
2. In the left-side navigation pane, click **Migration Sources**.
3. Find the source server from which you want to migrate data. Click **Create Migration Task** in the **Actions** column.
4. On the **Create Migration Task** page, turn on the **Automatic Incremental Synchronization** switch, and set the **Synchronization Interval** and **Upperlimit of Reserved Images** parameters. Set other parameters based on your needs and then click **OK**.



You can specify the following parameters. For more information, see the "Migration task parameters" table in the Step 2: Create and start a migration task topic.

- **Synchronization Interval**: Specify the time interval between two consecutive incremental migration tasks. Minimum value: 1 hour. Maximum value: 7 days.
- **Upperlimit of Reserved Images**: Specify the maximum number of reserved images. Valid values: 1 to 10. Each incremental migration task generates new images. If the total number of generated image files exceeds the upper limit, the earliest unused images are deleted.
- **Method to Run**: Select a method to run the migration task. In this example, **Run Now** is selected.

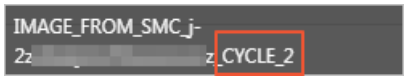
The migration task immediately starts after it is created. Then, the migration task enters the Finished or InError state.

i. The first incremental migration task migrates all data except the excluded directories and files, and generates a full image. You can use this image to create an instance for verification.

ii. After the first incremental migration task is completed, SMC migrates incremental data and generates images at specific points in time based on the specified **synchronization interval**.

> **Note** The image generated for each incremental migration task is a full image of the source server at a specific time. The image includes the incremental data and all migrated data.

In the image names that are generated during incremental migration, `CYCLE_X` indicates that the image is generated by the Xth incremental migration task. For example, if an image name contains CYCLE_2, it indicates that the image is generated by the second incremental migration task, as shown in the following figure.

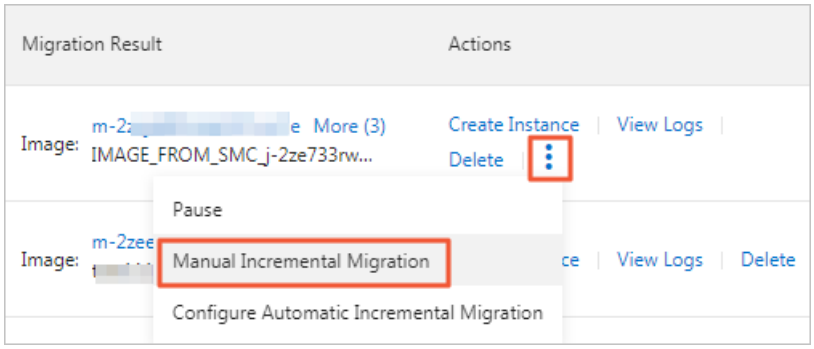


Step 3: Stop the services on the source server and run an incremental migration task

After you stop the services on the source server, perform the following steps to skip the excluded data directories and run an incremental migration task again:

1. Log on to the source server. Stop the services that run on the source server and skip the excluded data directories.
2. In the SMC console, manually run the incremental migration task or wait for the task to automatically run. To manually run the incremental migration task, perform the following steps:
   i. On the **Migration Tasks** page, find the incremental migration task.

ii. Click the icon and then choose **Manual Incremental Migration** in the **Actions** column.



iii. In the **Start Migration Task** message, click **OK**.

Result

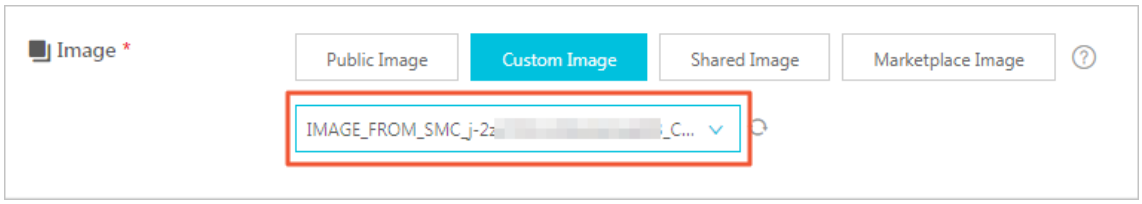
On the **Migration Tasks** page, wait until the task is completed.

- If the migration task is in the **Waiting** state, the migration succeeded and you can obtain the image that was generated during the migration. This image contains all the data of the first full migration and each subsequent incremental migration of the source server.
- If the migration task is in the **InError** state, the migration has failed. You must check logs to fix the issue, and then restart the task. For information about common errors and solutions, see SMC FAQ.

What's next

After you obtain the latest full image, you can perform the following operations:

- Create an instance to verify the image:
  i. On the **Migration Tasks** page, find the migration task and click **Create Instance** in the **Actions** column.
  ii. On the **Custom Launch** tab, the **Image** section shows the latest full image. Configure other parameters based on your needs and purchase the instance. For more information, see Create an instance by using the wizard.



  iii. Connect to the instance and check the system of the destination server. For more information, see How can I check my system after migrating a Windows server? or How can I check my system after migrating a Linux server?
- Stop the incremental migration task:

> **Note** You can pause an incremental migration task only when the task is in the **Syncing** or **Waiting** state.

  i. On the **Migration Tasks** page, find the migration task, and click the icon in the **Actions** column.

ii. Click **Pause**.

iii. In the **Stop Migration Task** message, click **OK**.

- Delete the incremental migration task:
  i. On the **Migration Tasks** page, find the migration task, and click **Delete** in the **Actions** column.
  ii. In the **Delete Migration Tasks** message, click **OK**.

7.Migrate source servers to Container Registry

SMC allows you to migrate servers to Container Registry. You can use SMC to migrate containerized applications to Container Registry at low costs. Containerized applications are distributed applications that are managed in an automatic manner and deployed with high agility and low security risks. Application containerization improves resource usage and reduces computing costs. This topic describes how to migrate a server to Container Registry.

Prerequisites

- A Linux operating system is installed and used on the server.
- Container Registry is activated and a container image repository is created. For more information, see Create a repository and build images.
- A Resource Access Management (RAM) role is created for the intermediate instance that is generated by SMC for migration. The following parameters are used to configure the RAM role. For more information, see Create a RAM role for a trusted Alibaba Cloud service.
  - Trusted Entity Type: Select **Alibaba Cloud Service**.
  - Role Type: Select **Normal Service Role**.
  - Select **Elastic Compute Service**.
- A custom policy is created for the RAM role of the intermediate instance. The policy grants the minimum permissions that are required to migrate a server to Container Registry. The following example shows a sample policy. This policy is attached to the RAM role. For more information, see Create a custom policy and Grant permissions to a RAM role.

```
{
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "cr:GetAuthorizationToken",
                "cr:PushRepository",
                "cr:PullRepository",
                "cr:CreateRepository"
            ],
            "Resource": "*"
        }
    ],
    "Version": "1"
}
```

- The information of the server is imported to the SMC console. For more information, see Step 1: Import the information of a migration source.

> **Notice**
>
> - The SMC client V2.3.0 and later support server migration to Container Registry. You can use these SMC clients to import the information about the source server. Download the latest version of the SMC client.
> - Make sure that the SMC client is running during migration. If data transfer is interrupted, you can restart the client and the migration task to resume migration.

Context

- For information about Docker container images, see Terms.
- During migration, SMC creates an intermediate instance. The intermediate instance incurs a small fee. For more information, see Pay-as-you-go.
- SMC releases the intermediate instance after the migration task enters the **Finished** or **Expired** state, or when the task is deleted.

(Optional) Step 1: Exclude dynamic data directories

To ensure stable migration, we recommend that you exclude dynamic data directories, such as data directories of large databases. Then, you can stop the services on the source server and start the migration task. Skip this step if you do not need to exclude dynamic data directories from migration.

To exclude dynamic data directories, perform the following steps. You do not need to stop the services that are running on the source server.

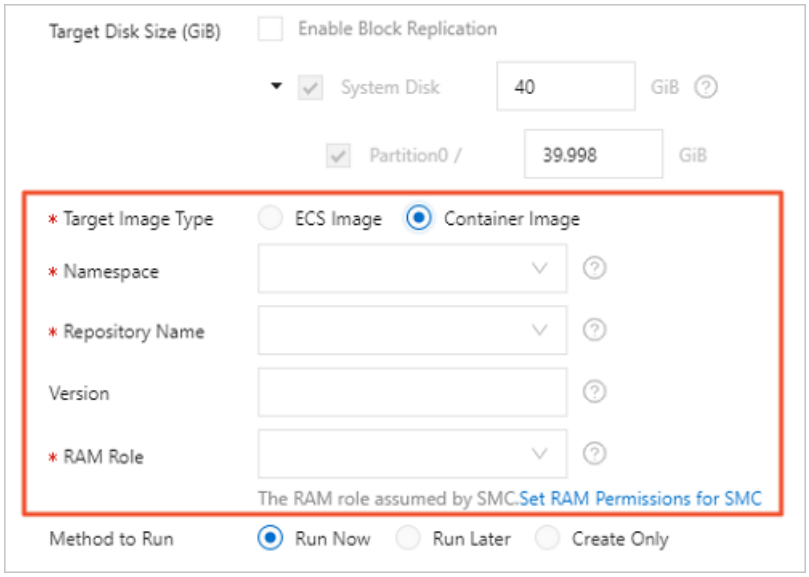
1. Log on to the source server.
2. Configure the SMC client and exclude dynamic data directories.

   For more information, see How do I exclude files or directories from a migration task?

Step 2: Create and start a migration task

You can perform the following steps to exclude dynamic data directories. You do not need to stop your services that are running on the source server.

1. Log on to the SMC console.
2. In the left-side navigation pane, click **Migration Sources**.
3. Find the source server from which you want to migrate data. Click **Create Migration Task** in the **Actions** column.
4. On the **Create Migration Task** page, set the container image parameters.



Set the following parameters to configure the container image: For more information about other parameters, see Step 2: Create and start a migration task.

- **Target Image Type**: the type of the destination image. Select **Container Image**.
- **Namespace**: the namespace of the destination image. For more information, see
- **Repository Name**: the name of the repository where the destination image is stored. For more information, see Create a repository and build images.
- **Version**: the version of the destination image.
- **RAM Role**: the RAM role that is attached to the intermediate instance. For more information, see

The migration task immediately starts after it is created. Then, the migration task enters the Finished or InError state.

- If the migration task enters the Finished state, the task is completed and a container image is generated.
- If the migration task enters the **InError** state, the task fails. You can check the logs to troubleshoot the failure. Then, restart the migration task. For information about common errors and solutions, see SMC FAQ.

Step 3: Verify the container image

After you migrate the source server to Container Registry, a container image is created. Perform the following steps to verify the container image. A container image on which NGINX is deployed is used as an example.

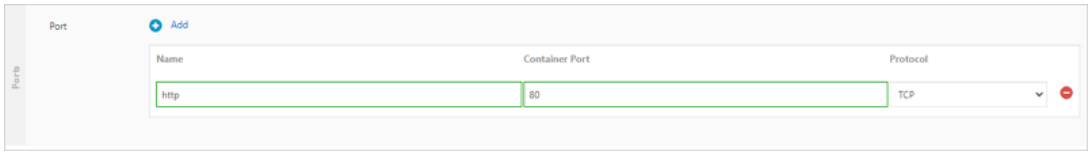
1. Create a Kubernetes cluster in the Container Service for Kubernetes (ACK) console. For more information, see Create an ACK dedicated cluster.
2. Log on to the ACK console.
3. In the left-side navigation pane, click **Clusters** to view the created Kubernetes cluster.
4. In the **Actions** column, click **Applications**.
5. On the **Deployments** tab, click **Create from Image**.

   Set the following parameters. For information about other parameters and operations, see Create a stateless application by using a Deployment.

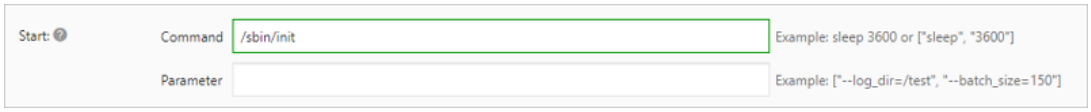
i. In the **Basic Information** step, set the following parameters:
   - **Name**: the name of the application. Set the value to nginx.
   - **Replicas**: the number of application replicas. Set the value to 1.
   - **Type**: the type of the application. Set the value to **Deployments**.

ii. Click **Next**.

iii. In the **Container** step, set the following parameters:
   - **Image Name**: Click **Select Image** to select the container image that is generated after the migration is completed. If the container image repository and the Kubernetes cluster are deployed in the same region, you can use the Virtual Private Cloud (VPC) endpoint of the container image to pull the image.
   - **Image Version**: Click **Select Image Version** to select the version of the container image that is generated after the migration is completed.
   - **Set Image Pull Secret**: This parameter is required if the container image is a private image. You can also use a plug-in to pull the image. This method does not require a secret key. For more information, see Use the aliyun-acr-credential-helper component to pull images without a password.
   - **Port**: Add port 80.



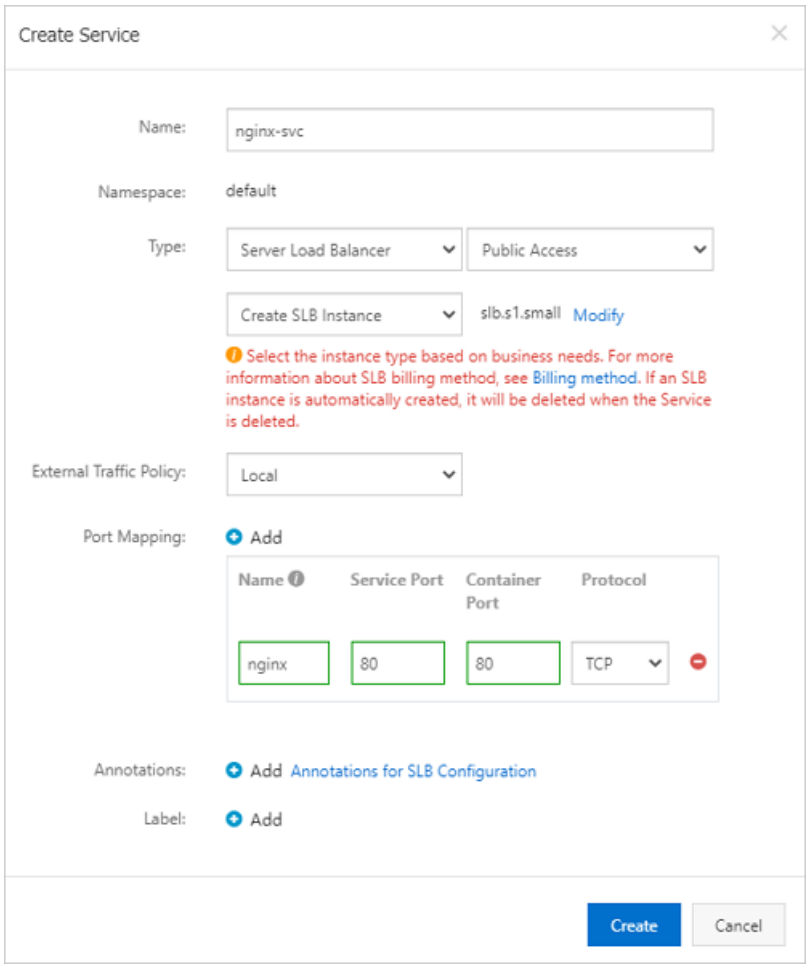
   - **Start**: Enter the **/sbin/init** command.



iv. Click **Next**.

v. In the **Advanced** step, create a service to access the application.

Use the example values in the following figure when you set the required parameters.



6. Click **Create**.
7. After the service is created, click **View Details** to view the application status.
8. In the left-side navigation pane, click **Services**. On the Services page, view the **External Endpoint** of the service.
9. You can use a browser to access the external endpoint.

8.Migrate servers to ECS instances

Server Migration Center (SMC) allows you to migrate servers to Elastic Compute Service (ECS) instances. After you purchase an ECS instance, you can migrate your source server to an ECS instance. This topic describes how to migrate a server to an ECS instance.

Prerequisites

- The migration preparations are complete. For more information, see Before you begin.
- An ECS instance is created. Make sure that the instance has no data or the data of the instance has been backed up by using images, snapshots, or other resources.

  > **Warning**
  > - After a migration task is created, all original data on the destination ECS instance is deleted. If the ECS instance contains important data, we recommend that you select ECS Image as the destination image type, and then create an ECS instance by using a custom image.
  > - If you migrate data from an ECS instance, you must make sure that the source ECS instance and the destination ECS instance are different. Otherwise, the migration may fail and data in the cloud disk of the source instance may be lost.

- The information of the server is imported to the SMC console. For more information, see Step 1: Import the information of a migration source.

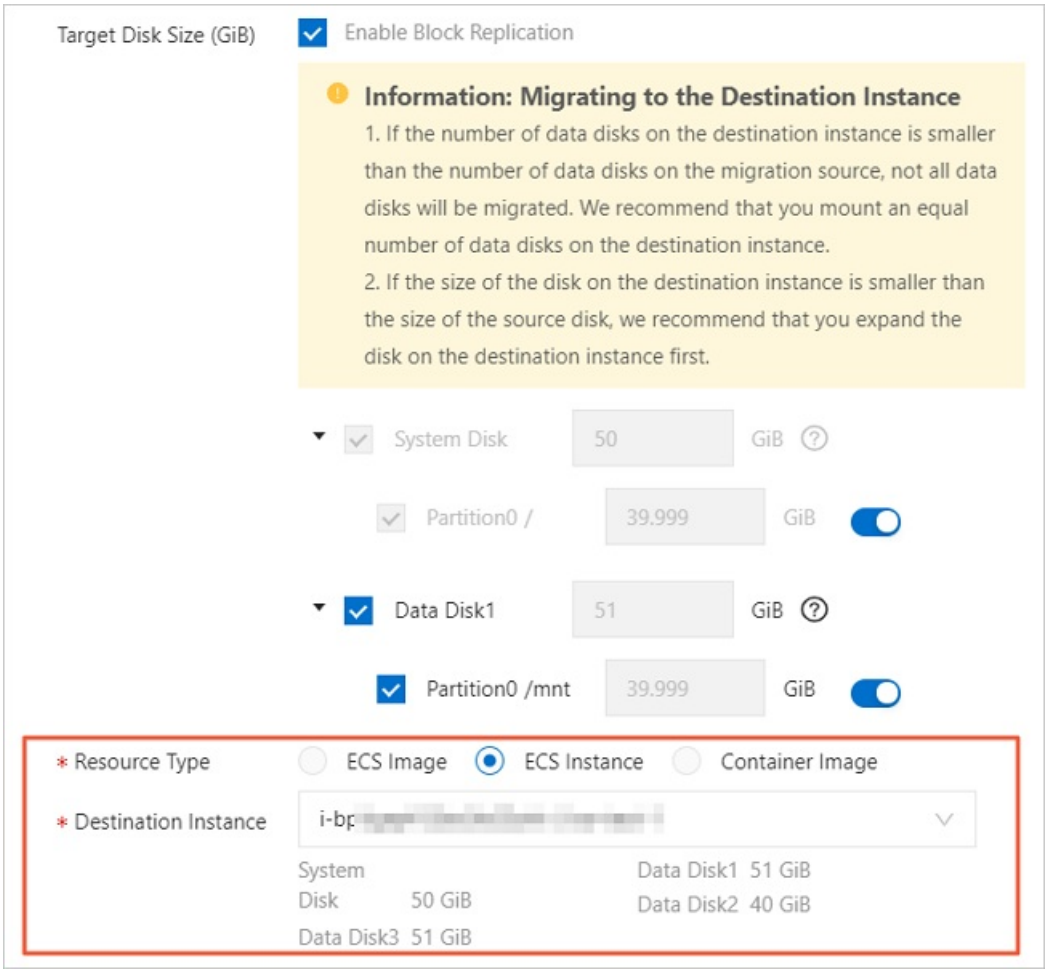
  > **Note** Make sure that the SMC client is running during migration. If data transfer is interrupted, you can restart the client and the migration task to resume the migration.

- The operating system of the ECS instance is the same as that of the server.
- The number of data disks attached to the ECS instance is greater than or equal to that of the data disks attached to the server. Otherwise, you must attach more data disks to the ECS instance. For more information, see Attach a data disk.
- The size of the system disks and data disks attached to the ECS instance is greater than or equal to that of the system disks and data disks attached to the server. Otherwise, you must scale up the data disks and system disks. For more information, see Overview.

Procedure

1. Log on to the SMC console.
2. In the left-side navigation pane, click **Migration Sources**.
3. Find the source server from which you want to migrate data. Click **Create Migration Task** in the **Actions** column.
4. On the **Create Migration Task** page, set the required parameters.

   Set the following parameters to configure the ECS instance. For information about other parameters, see Step 2: Create and start a migration task.



- **Target Image Type**: Select **ECS Instance**.
- **Target Instance**: Select an ECS instance based on your needs. After you select an ECS instance, the disk information of the instance is displayed.
- **Tag and Network (Optional)**: By default, the value of the **Network Type** parameter is the VPC that the ECS instance resides.

The migration task immediately starts after it is created. Then, the migration task enters the Finished or InError state.

- If the migration task enters the **Finished** state, the task is completed and you can view the ECS instance.
- If the migration task enters the **InError** state, the task failed. You must check logs to troubleshoot the failure and restart the migration task. For information about common errors and solutions, see SMC FAQ.

Related information

- CreateReplicationJob

9.Migrate servers over a VPC

If your server can connect to a virtual private cloud (VPC) from your data center, virtual machine, or cloud host, we recommend that you migrate data over a VPC. Compared with migration over the Internet, migration over a VPC is more efficient and stable.

Prerequisites

- A server is connected to a VPC by using VPN Gateway, Express Connect, or Smart Access Gateway (SAG). For more information, see Connect a data center to a VPC.
- Ports 8703 and 8080 are configured on the firewall of your server. This ensures that data can be transferred between the server and the intermediate instance.

Context

The following table lists the scenarios where you can migrate servers over a VPC. The table also provides the solutions for these scenarios.

Scenario	Solution
Your server cannot access the Internet.	Connect the server to a VPC by using VPN Gateway, Express Connect, or SAG, configure a proxy server, and then use the proxy server to access SMC.
Your server can access the Internet and you can migrate the server to SMC over the Internet. However, you want to increase the data transfer rate.	Connect the server to a VPC by using VPN Gateway, Express Connect, or SAG. Then, specify VPC as the network type when you create a migration task. Compared with migration over the Internet, migration over a VPC is more efficient.

Migration process

Migration process:

1. Download the SMC client package and install the SMC client on the source server.
2. Run the SMC client on the source server and use the proxy server to import the information of the source server to the SMC console. For more information about proxy servers, see Forward proxies.
3. Create a migration task, specify VPC as the network type, and then start the task.
4. SMC creates resources based on the task configurations and migrates data from the source server to Alibaba Cloud over a VPC.
5. During the migration, the proxy server replaces the source server and receives instructions from the SMC console. For example, if an error occurs during the migration task, SMC stops the migration and sends an error log to the SMC client.

Perform the following steps during the migration:

1. Create a proxy server in the VPC used to access the source server.

   > **Note** If your source server can access the Internet, skip this step.

   You can deploy a proxy server on the cloud by using the image of a forward proxy provided by Alibaba Cloud. After the proxy server is deployed, you must ensure that it is connected to the source server and can access the SMC console (`smc.aliyuncs.com`). To obtain the image of a

forward proxy, you can join the technical support group on DingTalk. For more information, see Contact us.

2. Download and install an SMC client on the source server, and import the information of the source server to the SMC console.

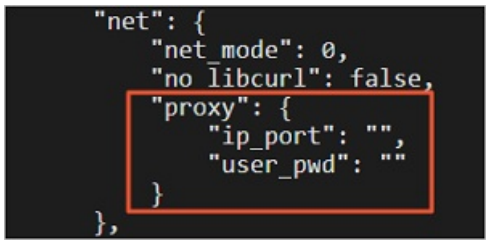
   For more information, see Step 1: Import the information of a migration source. Before you import the information of the source server, take note of the following items:

   - If you do not need a proxy server, you can directly import the information of the source server.
   - If you need a proxy server, you must configure the proxy server information in the configuration file of your SMC client. Then, you can run the client to import the information of the source server. In the following example, Linux is used to show the procedure of configuring the proxy server:

     a. In the `go2aliyun_client` directory, run the following command to open the `client_data` file:

     ```
     vim client_data
     ```

     b. Find the parameters of `proxy`, as shown in the following figure.

     c. Set the `ip_port` parameter to the IP address and port number of the proxy server.

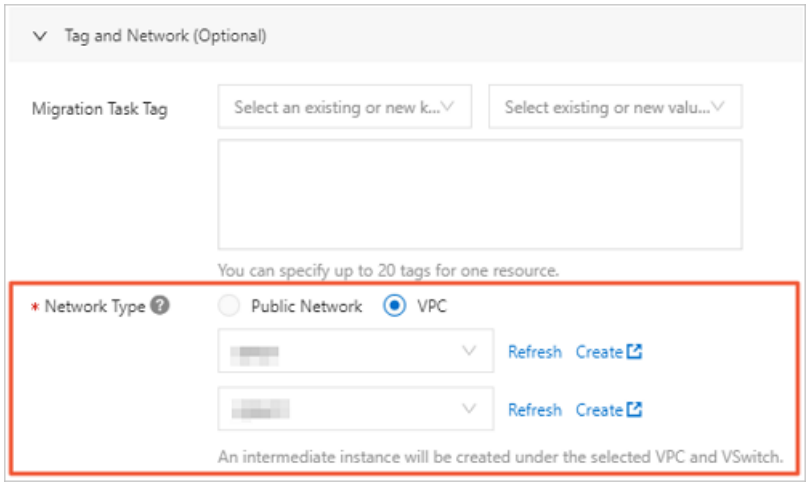
     Example:

     ```
     "proxy": {
         "ip_port": "172.31.**.**:8080",
         "user_pwd": ""
     }
     ```

     After the configuration is complete, press the *Esc* key, enter `:wq`, and then press the Enter key to save and exit the configuration file.

3. In the SMC console, import and run the migration task.

   For more information, see Step 2: Create and start a migration task. When you create a migration task, you must set **Network Type** to **VPC**, and specify a VPC and vSwitch. Make sure that the VPC can be connected to the source server.



Forward proxies

If your source server cannot be accessed over the Internet, you must migrate the server over a private network. Make sure that the source server meets the following conditions:

- The server is connected to a VPC by using VPN Gateway, Express Connect, or SAG.
- A proxy server is configured for the source server and the information of the source server is imported to the SMC console.

This section describes forward proxies.

A forward proxy is a proxy server that is located between a client and a server. If the client cannot access the server over the Internet, a proxy server can be configured to communicate with the client and then send requests to the server. After the server receives the requests, it sends responses to the proxy server. Then, the proxy server sends the responses to the client.

A forward proxy has the following benefits:

- Allows clients to access data resources on the Internet.
- Caches Internet data that clients frequently access. When such data is accessed for the second time, it can be directly retrieved from the cache. This increases the resource access efficiency for the clients.
- Grants access permissions to clients and ensures data security on client computers.
- Hides client information and stores access logs when clients access Internet resources.

Related information

- What is SMC?
- SMC FAQ

10.Estimate the time required for migration and test the data transfer speed

You can estimate the time required for a migration task based on the migration period. The migration period is divided into three phases: pre-migration, migration, and post-migration. The migration period is proportional to the number of servers that you want to migrate and the volume of data. We recommend that you perform a test migration to estimate the time required for a migration task. This topic describes how to estimate the time required for migration and how to test the data transfer speed.

Context

If you need to migrate a server, Server Migration Center (SMC) first creates an intermediate instance for your account. Then, the system transfers data from the source server to the intermediate instance and creates an Elastic Compute Service (ECS) image for the intermediate instance. Therefore, the migration time is the sum of the data transfer time and the time needed to create an image. For more information, see Estimate the time required for migration.

During a migration process, the speed of data transfer from the source server to the intermediate instance is the primary factor that determines the migration time. For more information, see Test the data transfer speed.

In some cases, errors may occur.

- The following table lists the possible causes and solutions if the data transfer speed is lower than the measured speed.

Possible cause	Solution
The source server and the intermediate instance are in different regions or countries. Data transfer across regions and countries is sometimes slower than that in the same region.	Check whether the network for the source server is the same as that for the intermediate instance in the destination Alibaba Cloud region. If the problem is caused by cross-region transfer, you can perform the following steps: ◦ Migrate the source server to Alibaba Cloud by generating an image in the same region, and then copy the image to the destination region. For more information, see Copy a custom image. ◦ Check whether the problem stems from the network service provider.

Possible cause	Solution
The outbound bandwidth of the source server and the inbound bandwidth of the intermediate instance are used for migration. The bandwidth of the intermediate instance is limited. By default, the maximum inbound public bandwidth is 100 Mbit/s. Therefore, the maximum transfer speed over the Internet is 100 Mbit/s by default.	To resolve this error, you can use one of the following methods: ○ Method 1: Find the intermediate instance or destination instance in the ECS console. Convert the public IP address of the instance to a pay-as-you-go elastic IP address (EIP). Increase the peak bandwidth of the pay-as-you-go EIP to 200 Mbit/s. You are charged for upgrading the peak bandwidth of a pay-as-you-go EIP. For more information, see Convert the public IP address of a VPC-type instance to an EIP and Modify the bandwidth of an EIP. Note If the public IP address of an instance is converted to a pay-as-you-go EIP, the IP address cannot be restored to its initial state. Therefore, you must manually release the pay-as-you-go EIP after the migration to prevent additional charges. For more information, see Release a pay-as-you-go EIP. ○ Method 2: If the source server can access a virtual private cloud (VPC) network in an Alibaba Cloud region, we recommend that you perform migration over the **VPC network**. Compared with migration over the Internet, migration over a VPC is more efficient and stable. You can use VPN Gateway, Express Connect, and Smart Access Gateway to connect a migration source to a VPC. For more information, see Connect a data center to a VPC.
The source server has performance bottlenecks. For example, limited CPU, memory, and disk performance result in poor SMC transfer efficiency.	Improve the performance of the source server. You can improve the CPU, memory, and disk performance.
By default, the SMC client uses a single-threaded data transfer model, which may have bottlenecks in some network environments.	Enable multi-threaded transfer acceleration to maximize bandwidth utilization. For more information, see Enable multi-threaded transfer acceleration.

- This section describes the solutions to low outbound bandwidth.

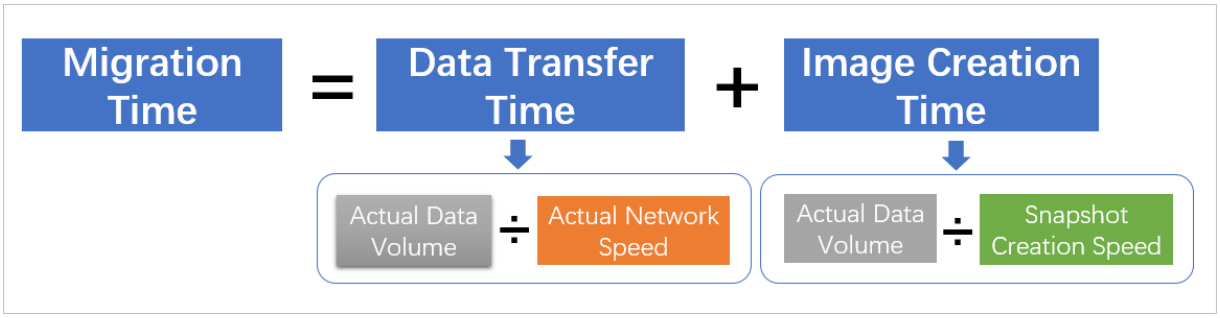
  If the outbound bandwidth of the source server is low, for example, lower than 10 Mbit/s, you can modify the **Compression Level** parameter in the **Advanced Settings (Optional)** section. A high compression ratio improves transfer efficiency.

Note The examples in this topic are for reference only.

Estimate the time required for migration

The following figure shows how to estimate the time required for migration. Take note of the following information:

- A snapshot is created at a speed of about 30 MB/s.
- For information about how to test the network speed, see Test the data transfer speed.



If a server has an actual disk usage of 10 GB and an outbound bandwidth of 10 Mbit/s, you can use the following method to estimate the migration time:

1. Convert units.
   - Actual data volume: 10 GB = 10 × 1024 = 10240 MB
   - Actual network speed: 10 Mbit/s = 10/8 = 1.25 MB/s
2. Calculate the data transfer time.

   Data transfer time: 10240/1.25 = 8192 seconds = 2.27 hours
3. Calculate the time required to create an image.

   Image creation time: 10240/30 = 341 seconds = 0.09 hours
4. Calculate the time required for migration.

   Migration time: 2.27 + 0.09 = 2.36 hours

Test the data transfer speed

The speed of data transfer from the source server to the intermediate instance is determined by the outbound bandwidth of the source server and the inbound bandwidth of the intermediate instance. By default, the inbound bandwidth of the intermediate instance is 100 Mbit/s. You can submit a ticket to increase the bandwidth.

For example:

- Assume that the outbound bandwidth of the source server is 50 Mbit/s and the inbound bandwidth of the intermediate instance is 100 Mbit/s. The actual transfer speed is limited by the source server and does not exceed 50 Mbit/s.
- Assume that the outbound bandwidth of the source server is 150 Mbit/s and the inbound bandwidth of the intermediate instance is 100 Mbit/s. The actual transfer speed is limited by the source server and does not exceed 100 Mbit/s.

> **Note** The instance bandwidth of 1 Mbit/s displayed in the ECS console is the outbound bandwidth of the intermediate instance. The 1 Mbit/s bandwidth does not affect the actual migration speed because the inbound bandwidth of the intermediate instance is used during migration.

To test the transfer speed by using iPerf, perform the following steps:

1. Create a pay-as-you-go ECS instance in the destination Alibaba Cloud region.
2. In the ECS instance, perform the following steps:
   i. Install iPerf.
   ii. Start iPerf as a server.
   iii. Add a rule to the security group of the instance to allow traffic on the ports required by iPerf.
3. On the source server, perform the following steps:
   i. Install iPerf.
   ii. Start iPerf as a client. Set the IP address of the destination server to the public IP address of the pay-as-you-go instance created in Step 1.

Example of how to perform a transfer speed test on a Linux instance

A CentOS 7 instance is used in the following example. The operations may vary with the version of your operating system.

1. Create a pay-as-you-go CentOS 7 instance in the destination Alibaba Cloud region.
2. Add an inbound rule to the security group of the ECS instance to allow traffic on the ports required by iPerf.

   The default port for iPerf, TCP 5001, is used in this example.
3. Connect to the CentOS 7 instance.
4. In the CentOS 7 instance, perform the following steps:
   i. Run the following command to install iPerf:

   ```
   yum -y install iperf3
   ```

   ii. Run the following command to start iPerf as a server:

   ```
   iperf3 -s
   ```
5. On the source server, perform the following steps:
   i. Download and install iPerf.
   ii. Run the following command to start iPerf as a client:

   Replace `<Instance IP address>` in the command with the public IP address of the created instance.

   ```
   iperf3 -c <Instance IP address> -i 1 -d
   ```
6. Wait until the iPerf test is complete, and then record the test results.

Example of how to perform a transfer speed test on a Windows instance

A Windows Server 2008 instance is used in the following example. The operations may vary with the version of your operating system.

1. Create a pay-as-you-go Windows Server 2008 instance in the destination Alibaba Cloud region.
2. Add an inbound rule to the security group of the ECS instance to allow traffic on the ports required by iPerf.

   The default port for iPerf, TCP 5001, is used in this example.

3. Connect to the GPU-accelerated instance.
4. In the Windows Server 2008 instance, perform the following steps:
   i. Download and install iPerf.
   ii. Open Command Prompt.
   iii. Run the `cd <directory where iPerf is located>` command to go to the tool directory.
   iv. Run the `iperf3.exe -s` command to start iPerf as a server.
5. On the source server, perform the following steps:
   i. Download and install iPerf.
   ii. Run the following command to start iPerf as a client:

   Replace `<Instance IP address>` in the command with the public IP address of the created instance.

   ```
   iperf3.exe -c <Instance IP address> -i 1 -d
   ```
6. Wait until the iPerf test is complete, and then record the test results.

Related information

- Create an instance by using the wizard
- Add a security group rule
- Connection methodsGuidelines on instance connection

11.Enable multi-threaded transfer acceleration

By default, the SMC client uses the single-threaded data transfer model, which may have bottlenecks in some network environments. You can enable multi-threaded transfer acceleration to maximize bandwidth utilization and improve transmission efficiency in high-bandwidth scenarios. SMC client V1.5.1.7 and later support multi-threaded transfer acceleration.

Context

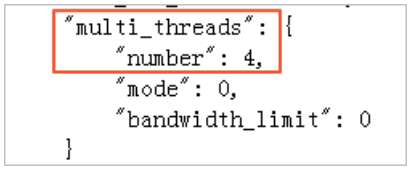
Enabling multithreading increases CPU and bandwidth consumption on the source server. The more the threads, the more resources are consumed. Therefore, you must determine the number of threads based on the CPU cores and bandwidth conditions of the source server.

In a network environment with single-stream limit or low bandwidth, multi-threaded transfer may be not as efficient as single-threaded transfer. If conditions permit, upgrade the CPU of the source server to improve transmission efficiency.

Procedure

1.
2. Go to the directory of the SMC client.
3. Open the *client_data* file and configure the parameters required for multithreading.

   You only need to set `extra.rsync.multi_threads.number` to a value greater than or equal to 2 to enable multithreading. The following figure shows that four threads have been configured for the SMC client.



Multithreading parameters

Parameter	Type	Description
extra.rsync.multi_threads.number	Integer	The number of threads. ○ If this parameter is set to 0 (default value), multithreading is disabled. ○ If this parameter is set to a value greater than or equal to 2, multithreading is enabled.
extra.rsync.multi_threads.mode	Integer	The multithreading mode. This is a reserved parameter that does not need to be modified. Default value: 0.

Parameter	Type	Description
extra.rsync.multi_threads.bandwidth_limit	Integer	The maximum bandwidth of each thread. Unit: KB/s. The default value is 0, which indicates unlimited bandwidth.

4. Close the *client_data* file and perform migration.

   For detailed steps on how to use SMC for a migration, see Migration process.

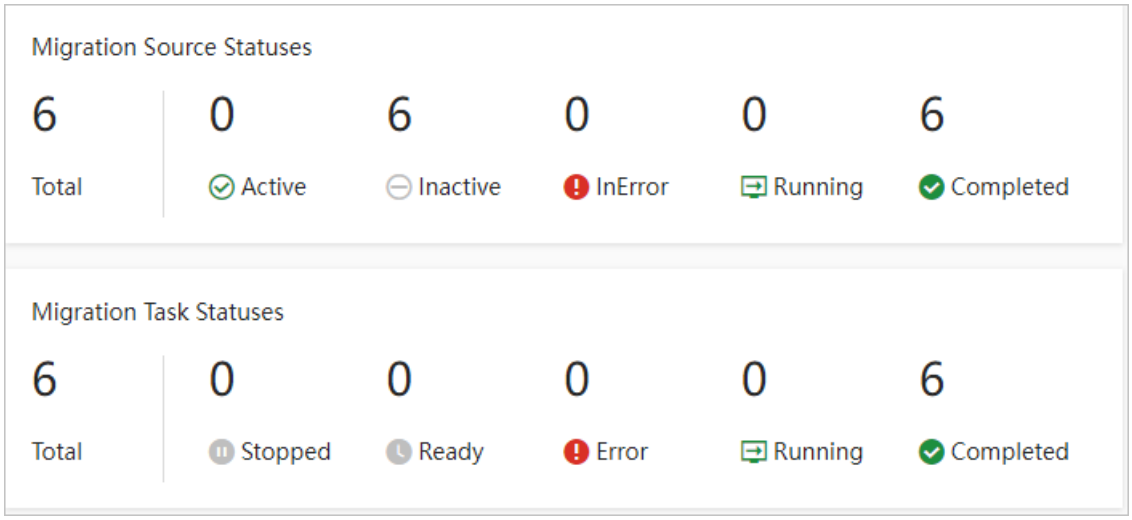
12.View source servers and migration tasks

You can view the status of each source server or migration task on the Overview page of the Server Migration Center (SMC) console. This allows you to identify and troubleshoot issues that may occur during migration.

View source servers and migration tasks

1. Log on to the SMC console.
2. In the left-side navigation pane, click **Overview**.
3. View source servers and migration tasks.

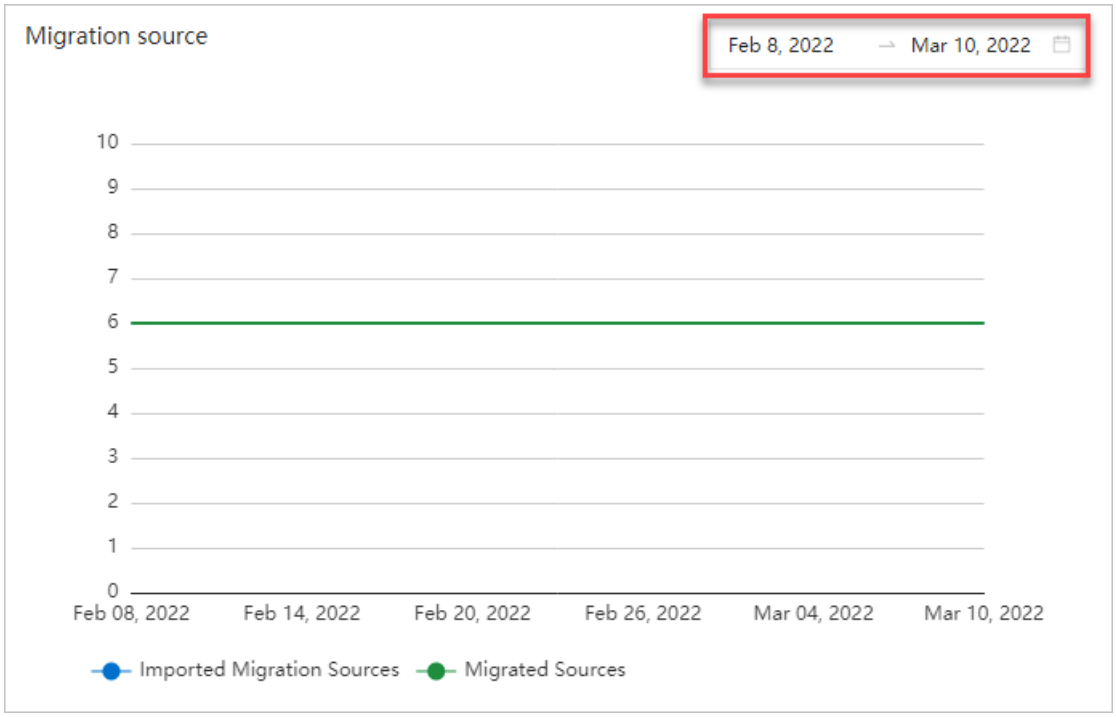
   You can click source servers or migration tasks that are in a specific status to view the detailed information.



View source servers in a specified time period

SMC allows you to view the number of imported or migrated source servers of a specified time period.

1. Log on to the SMC console.
2. In the left-side navigation pane, click **Overview**.
3. By default, the **Migration source** section displays a line chart of imported and migrated source servers of the last 31 days.
4. In the upper-right corner, select a time period to view the number of imported and migrated source servers.


Migration source
Feb 8, 2022
Mar 10, 2022
10
9
8
7
6
5
4
3
2
1
0
Feb 08, 2022
Feb 14, 2022
Feb 20, 2022
Feb 26, 2022
Mar 04, 2022
Mar 10, 2022
Imported Migration Sources
Migrated Sources

13.Use tags to manage migration sources and migration tasks

Tags are used to categorize resources. Each tag consists of a key-value pair. You can use tags to group migration sources and migration tasks for easy searching and batch operations.

Context

To help you manage an increasing number of migration sources and migration tasks, Server Migration Center (SMC) allows you to attach tags to the specified migration sources and migration tasks based on your needs. After you attach tags to migration sources and migration tasks, you can filter migration sources and migration tasks by tag to perform management operations.

For more information, see Best practices for tag design.

Limits

Each tag consists of a key-value pair. The following limits apply to tags:

- The keys of tags that are attached to the same migration source or migration task must be unique. If two tags attached to the same migration source or migration task have the same key but different values, the tag attached later overwrites the previously attached tag. For example, if a migration source is attached the `department:MD` tag and then attached the `department:FD` tag, the `department:MD` tag is automatically detached.
- You can attach up to 20 tags to each migration source or migration task. Tags are case-sensitive.
- If you delete all migration sources or migration tasks that a tag is attached to, the tag is automatically deleted.
- After a tag is detached from a migration source or migration task, the tag is automatically deleted if it is not attached to another migration source or migration task.
- The following limits apply when you create a tag:
  - The key is required and can be up to 64 characters in length. It cannot start with aliyun or acs:, or contain http:// or https://. We recommend that you keep the key short.
  - The value is optional and can be up to 128 characters in length. It cannot start with aliyun or acs:, or contain http:// or https://. We recommend that you keep the value short.

Attach tags to a migration source or migration task

You can attach tags to a migration source only after you import the migration source. You can attach tags to a migration task when or after you create the migration task. In this example, tags are attached to an imported migration source and an existing migration task.

1. Log on to the SMC console.
2. In the left-side navigation pane, click **Migration Sources** or **Migration Tasks**.
3. Find the migration source or migration task to which you want to attach tags, move the pointer over the icon in the **Migration Source Tag** or **Migration Task Tag** column, and then click **Edit**.

You can also attach tags to a migration task when you create it. For more information, see Step 2: Create and start a migration task.

4. In the **Edit Tag** dialog box, configure one or more tags.

   You can enter tag keys and tag values, or select existing tag keys and tag values.

   > **Note** A maximum of 20 tags can be attached to each migration source or migration task.

5. Click **OK**.

   After you attach tags to the migration task, move the pointer over the icon in the **Migration Task Tag** column to view the tags.

   > **Note** To detach a tag from the migration task, move the pointer over the icon and click **Edit**. In the **Edit Tag** dialog box, click **x** next to the tag.

Filter migration sources or migration tasks by tag

After you attach tags to migration sources or migration tasks, you can filter migration sources or migration tasks by tag and perform management operations.

1. Log on to the SMC console.
2. In the left-side navigation pane, click **Migration Sources** or **Migration Tasks**.
3. On the **Migration Sources** or **Migration Tasks** page, click **Tag**.
4. Select a tag key and a tag value.

   The migration sources or migration tasks that contain the specified tag are displayed on the page.

   > **Note**
   > - You can select only tag keys. In this case, all migration sources or migration tasks that are attached the tag keys are displayed.
   > - To remove a selected tag, click **x** next to the tag.

14.Use tags to implement fine-grained access control

After you attach tags to your Server Migration Center (SMC) resources, you can use the tags to categorize and control access to the resources. This topic describes how to use tags to control the permissions of Resource Access Management (RAM) users and Security Token Service (STS) roles so that different users can be granted different access and operation permissions on cloud resources.

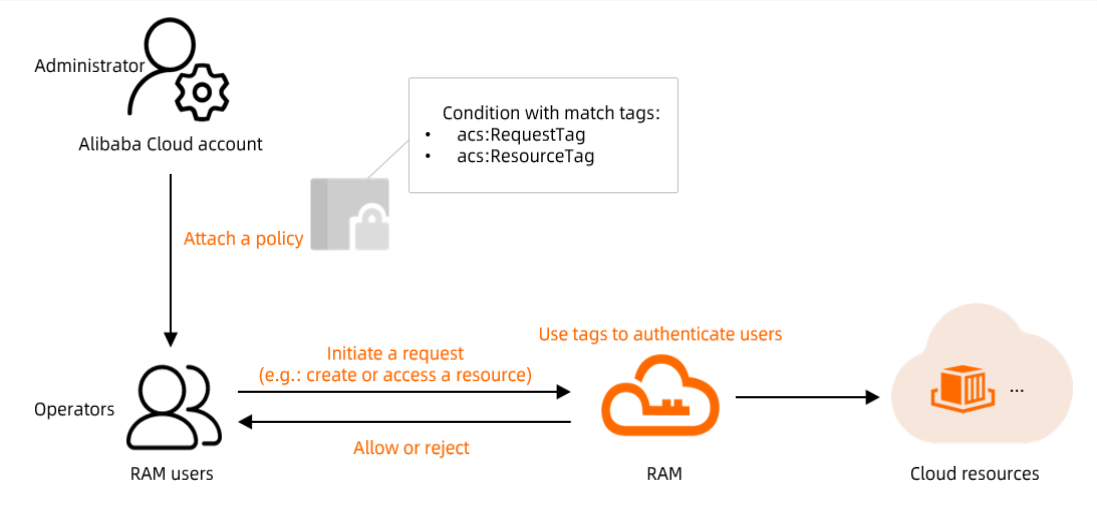
Prerequisites

A RAM user is created by using your Alibaba Cloud account. For more information, see Create a RAM user.

Context

Tags are used to identify and categorize cloud resources. RAM manages the access and operation permissions of RAM users on cloud resources based on permission policies. You can use tags as conditions in RAM policies to implement fine-grained access control on resources.

The following figure shows how to use tags to manage the access and operation permissions of RAM users on cloud resources. The process is called tag-based authentication.

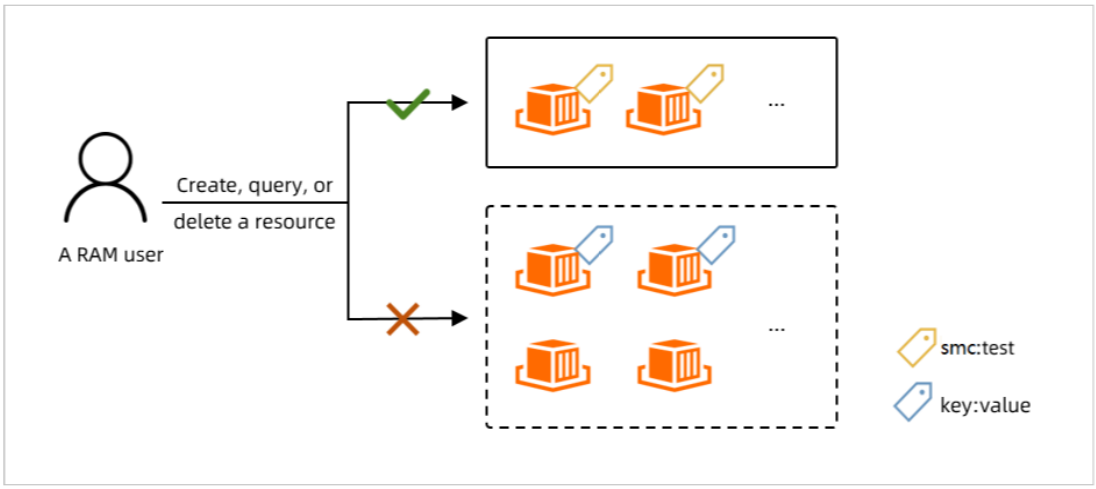


Note You can attach tags to SMC resources such as migration sources and migration tasks. You can attach tags to migration sources only after they are created. For more information, see Use tags to manage migration sources and migration tasks.

Scenarios

The scenarios in this topic are used to describe how to perform tag-based authentication.

For example, you need to grant a RAM user the permissions only on the SMC resources to which the smc:test tag is bound, as shown in the following figure.



Scenarios:

- Scenario 1: You can create migration tasks only if the `smc:test` tag is attached to the tasks.
- Scenario 2: You can modify, delete, and attach tags only to the resources to which the `smc:test` tag is attached.

Step 1: Create a custom policy and attach the policy to the RAM user

In this step, a custom policy is created in the RAM console. You can also call the CreatePolicy operation to create a custom policy. For more information, see Configure the policy.

1. Use your Alibaba Cloud account to log on to the RAM console.
2. In the left-side navigation pane, choose **Permissions > Policies**.
3. On the **Policies** page, click **Create Policy**.
4. On the **Create Policy** page, click the **JSON** tab.
5. Configure the policy.

   A policy contains a set of permissions. Each policy includes a version number and one or more individual statements. Each statement includes the following elements: Effect, Action, Resource, and Condition. The Condition element is optional. For more information, see Policy elements and Policy structure and syntax.

   i. Modify the policy as needed and click **Next: Edit Basic Information**.

   You can configure multiple tag-based conditions for cloud resources in the `Condition` element of the custom policy to restrict operation permissions. The following table describes supported tag-based authentication conditions.

Tag-based authentication condition	Description

Tag-based authentication condition	Description
`acs:RequestTag`	Specifies that a specific tag must be included in each API request. If an API request does not include tag-related parameters, the acs:RequestTag condition cannot be used. Otherwise, the authentication fails.
`acs:ResourceTag`	Specifies that a specific tag must be attached to the specified resource. If an API request does not include a resource ID, you cannot use the acs:ResourceTag condition. Otherwise, the authentication fails.

Note When you configure a policy, you can use the `acs:RequestTag` or `acs:ResourceTag` condition based on whether you need to specify the resource ID and whether tags can be included in the API request. For more information, see Tag-based authentication of requests to different API operations.

```
{
    "Statement": [
        {
            "Action": "smc:CreateReplicationJob",
            "Condition": {
                "StringEquals": {
                    "acs:RequestTag/smc": "test"
                }
            },
            "Effect": "Allow",
            "Resource": "*"
        },
        {
            "Action": "smc:*",
            "Condition": {
                "StringEquals": {
                    "acs:ResourceTag/smc": "test"
                }
            },
            "Effect": "Allow",
            "Resource": "*"
        },
        {
          "Action": [
                "*:TagResources",
                "*:UntagResources"
             ],
            "Effect": "Deny",
            "Resource": "*"
        },
        {
            "Action": [
                "*:List*",
                "*:Describe*"
            ],
            "Effect": "Allow",
            "Resource": "*"
        }
    ],
    "Version": "1"
}
```

The preceding policy can provide access control for the following scenarios.

Scenario	Policy

Scenario	Policy

Scenario 1: You can create migration tasks only if the `smc:test` tag is attached to the tasks.	{
	"Statement": [
	{
	"Action": "smc:CreateReplicationJob",
	"Condition": {
	"StringEquals": {
	"acs:RequestTag/smc": "test"
	}
	},
	"Effect": "Allow",
	"Resource": "*"
	},
	{
	"Action": [
	"*:List*",
	"*:Describe*"
	],
	"Effect": "Allow",
	"Resource": "*"
	}
	],
	"Version": "1"
	}

Scenario	Policy

Scenario 2: You can modify and delete only the resources to which the `smc:test` tag is attached.	<pre>{
	"Statement": [
	{
	"Action": "smc:*",
	"Condition": {
	"StringEquals": {
	"acs:ResourceTag/smc": "test"
	}
	},
	"Effect": "Allow",
	"Resource": "*"
	},
	{
	"Action": [
	"*:TagResources",
	"*:UntagResources"
	],
	"Effect": "Deny",
	"Resource": "*"
	},
	{
	"Action": [
	"*:List*",
	"*:Describe*"
	],
	"Effect": "Allow",
	"Resource": "*"
	}
	],
	"Version": "1"
	}</pre>

ii. In the **Basic Information** section, enter a policy name in the Name field, and then click **OK**.

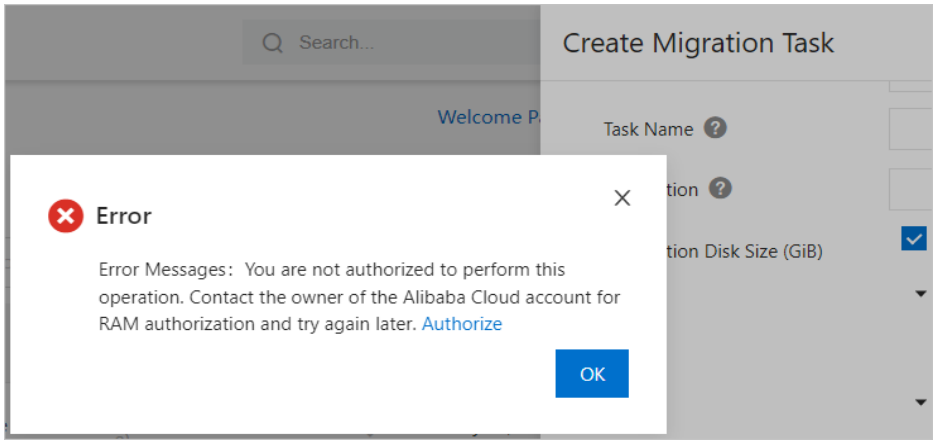
6. Attach the policy to the RAM user.
   i. In the left-side navigation pane, choose **Identities > Users**.
   ii. Attach the policy to the RAM user.
   For more information, see Grant permissions to a RAM user.

Step 2: Check whether the policy is in effect

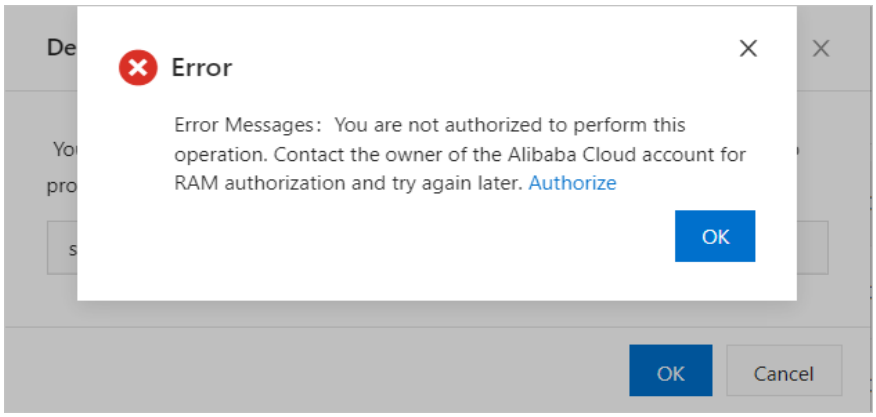
1. Log on to the SMC console or OpenAPI Explorer as a RAM user.
   In this step, the SMC console is used.
2. Check whether the policy is in effect.
   Perform the following operations:
   - Create a migration task:
     - You can create a migration task for a migration source to which you attach the `smc:test`

tag.

- You cannot create a migration task for a migration source to which you do not attach the smc:test tag. You are prompted that you do not have the permission to create the migration task.



- Delete a migration source:
  - You can delete a migration source to which you attach the `smc:test` tag.
  - You cannot delete a migration source to which you do not attach the `smc:test` tag. You are prompted that you do not have the permission to create the migration task.



Tag-based authentication of requests to different API operations

After policies that contain tag-based conditions are attached to a RAM user, requests made by the RAM user to API operations are authenticated based on the tags specified in the policy conditions. The following table describes various cases in which requests to different API operations are authenticated based on tags.

API operation	Authentication description
CreateReplicationJob	You do not need to specify the resource ID in a request. The request is matched against the `acs:RequestTag` policy condition. • If the request contains no tags from the policy condition, the authentication fails. • If the request contains tags that match or include the tags from the policy condition, the authentication succeeds.

API operation	Authentication description
ModifyReplicationJobAttribute	You must specify the resource ID in a request. The request is matched against the `acs:ResourceTag` policy condition. • If the tags attached to the resource do not match the tags specified in the policy condition, the authentication fails. • If the tags attached to the resource match the tags specified in the policy condition, the authentication succeeds. • If you update tags for the resource and the request contains the new tag of the resource, the authentication succeeds only when the tag matches the tags specified in the policy condition. Otherwise, the authentication fails.
StartReplicationJob, StopReplicationJob, and DeleteSourceServer	You must specify the resource ID in a request. The request is matched against the `acs:ResourceTag` policy condition. • If the tags of the resource do not match the tags specified in the policy condition, the authentication fails. • If the tags of the resource match the tags specified in the policy condition, the authentication succeeds.