

# Alibaba Cloud

Data Online Migration  
Migrate data between Alibaba  
Cloud Object Storage Service  
(OSS) buckets

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# Document conventions

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

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# 1. Background information

This tutorial describes how to migrate data between Alibaba Cloud Object Storage Service (OSS) buckets that are owned by multiple accounts or deployed in the same or multiple regions.

Alibaba Cloud Data Online Migration is a data channel between different storage services. You can use Data Online Migration to migrate data from third-party data stores to OSS or between OSS buckets.

When you use Data Online Migration, you need only to log on to the console, specify a source data address and a destination OSS data address, and then create a migration job. After the migration job starts, you can manage the job in the console. For example, you can view the progress and traffic information of the job. You can also generate a migration report to check the list of migrated files and the list of files that fail to be migrated.

## Notice

- When you read data from the source data address during a migration job, a fee is incurred for the outbound Internet traffic. You are charged by the storage service provider of the source data address.
- By default, Data Online Migration does not support cross-border data migration. For example, you cannot migrate data from a bucket that is deployed in the China (Beijing) region to a bucket that is deployed in the US (Silicon Valley) region. Before you create a migration job to migrate data across borders, you must [submit a ticket](#) to apply for the permissions that are required for creating cross-border migration jobs. You must commit that your business is legitimate, data transit conforms to local rules and regulations, and your data does not contain illegal information.
- You cannot migrate data between OSS buckets if the data at the source data address is stored in a bucket of the Archive type.

This tutorial includes the following topics:

- [Preparations](#)
- [Implement migration](#)
- [Subsequent operations](#)

## 2. Before you begin


This topic describes the operations that you must perform before you migrate data.

### Apply to use the service

The Data Online Migration service is in the public preview stage. If you need to use this service, [submit a ticket](#).


### Estimate the amount of data that you want to migrate

Estimate the size and number of files that you want to migrate. Log on to the [Object Storage Service \(OSS\) console](#). On the **Buckets** tab, click the name of a bucket in which the data that you want to migrate is stored. Then, click the **Overview** tab to view the bucket size and the number of files in the bucket.

 **Note** To ensure a successful migration, you must specify valid values for the size and number of files when you [create a migration job](#).

### Restore data in the source bucket

Data Online Migration does not restore data in archived files during migration. Before you create a migration job to migrate data of the Archive storage class, you must manually restore the data. Otherwise, the files that are not restored or are being restored cannot be migrated. For more information about how to restore data of the Archive storage class, see [Solutions to migrate archived data](#).


 **Note**

- Before you create a source data address and a migration job, make sure that data of the Archive storage class is restored.
- The time required to restore data of the Archive storage class is based on the amount of data. Make sure that you specify an appropriate value for the restoration duration. This can prevent data from entering the archived state during migration.
- You may be charged for the restoration operation. For information about the billing methods, contact the service provider that offers the source bucket.

### Create a destination bucket


Create a destination bucket to store the migrated data. For more information, see [Create buckets](#).

### Create a Resource Access Management (RAM) user and grant required permissions to the RAM user.

 **Note** If you need to migrate data across accounts, you must create RAM users for the Alibaba Cloud account to which the source bucket belongs and the Alibaba Cloud account to which the destination bucket belongs. Then, you must grant the required permissions to both RAM users.

1. Log on to the [RAM console](#).

2. In the left-side navigation pane, choose **Identities > Users**.
3. On the **Users** page, click **Create User**.
4. On the **Create User** page, specify Logon Name and Display Name in the User Account Information section.
5. In the Access Mode section, select Console Access and OpenAPI Access. Then, save the generated logon name, password, AccessKey ID, and AccessKey secret.
  - Console Access: If you select this option, you must configure the console password, password reset settings, and multi-factor authentication settings.
  - OpenAPI Access: If you select this option, an AccessKey pair is automatically created for the RAM user. The RAM user can call API operations or use other development tools to access Alibaba Cloud resources.

 **Note** If you need to migrate data across accounts, you must save the logon name, password, AccessKey ID, and AccessKey secret that are generated for each RAM user by the corresponding Alibaba Cloud account.

6. After the RAM user is created, return to the **Users** page. Find the RAM user and click **Add Permissions** in the Actions column. In the panel that appears, select the AliyunOSSFullAccess and AliyunMGWFullAccess policies and click OK. This way, the RAM user is granted the permissions to read and write files from OSS and perform online data migrations.
7. In the left-side navigation pane, click **Overview**.
8. On the page that appears, navigate to the Account Management section and click the link under RAM user logon. On the page that appears, enter the logon name and password of the RAM user to log on to the Alibaba Cloud Management Console.


## 3. Migrate data

This topic describes the usage notes and procedure for data migration.

### Usage notes

When you run an online migration job, take note of the following items:

- A migration job occupies the network resources of the source and destination data addresses. To ensure business continuity, we recommend that you specify a rate limit for your migration job or run your migration job during off-peak hours.
- Before an online migration job starts, the system checks the files at the source data address and the destination data address. If the source and destination have files with the same name, and the last modification time of the source file is later than the last modification time of the destination file, the destination file is overwritten. If both files are important and contain different information, we recommend that you change the name of one file or back up the destination file.
- If symbolic links exist at the source data address, the files to which the symbolic links point are migrated to the destination data address. The migrated files are named based on the symbolic links. For example, a symbolic link named *a* exists at Source Data Address A. The file to which the symbolic link points is *b.jpg*. *b.jpg* is migrated to the destination data address and renamed *a*. For more information, see [Configure symbolic links](#).

 **Note** If the objects to be migrated contain symbolic links, the migration workload may be greater than estimated, and the migration may continue even if the displayed migration progress reaches 100%. The migration duration varies based on the actual migration workload.



- Data Online Migration allows you to migrate only the data of a single bucket per job. You cannot migrate all data that belongs to your account at a time.

### Step 1: Create a source data address

1. Log on to the [Alibaba Cloud Data Transport console](#).
2. In the left-side navigation pane, choose **Data Online Migration > Data Address**. On the page that appears, click **Create Data Address**.
3. In the **Create Data Address** panel, configure the parameters and click **OK**. The following table describes the parameters.

Parameter	Required	Description
<b>Data Type</b>	Yes	Select OSS.
<b>Data Name</b>	Yes	Enter a name. The name must be 3 to 63 characters in length. The name cannot contain special characters, except for hyphens (-) and underscores (_).
<b>Data Region</b>	Yes	Select the region where the source data address resides. Example: <b>China (Hangzhou)</b> .



Parameter	Required	Description
Enable Transfer Acceleration	No	<p>If you want to use Data Online Migration together with the transfer acceleration feature of Object Storage Service (OSS), enable the transfer acceleration feature for buckets. The transfer acceleration feature takes effect within 30 minutes after it is enabled. After you enable the feature, wait for 30 minutes before you create a migration job.</p> <div> <b>Notice</b> If you use the transfer acceleration feature to access OSS buckets, you are charged additional transfer acceleration fees. For more information, see <a href="#">Transfer acceleration</a>.</div>
OSS Endpoint	Yes	<p>Select an endpoint based on the region where your data is stored. For more information, see <a href="#">Regions and endpoints</a>.</p> <ul style="list-style-type: none"><li>◦ <a href="http://oss-cn-endpoint.aliyuncs.com">http://oss-cn-endpoint.aliyuncs.com</a>: specifies that an HTTP-based endpoint is used to access OSS over the Internet.</li><li>◦ <a href="https://oss-cn-endpoint.aliyuncs.com">https://oss-cn-endpoint.aliyuncs.com</a>: specifies that an HTTPS-based endpoint is used to access OSS over the Internet.</li><li>◦ <a href="http://oss-cn-qingdao-internal.aliyuncs.com">http://oss-cn-qingdao-internal.aliyuncs.com</a>: specifies that a private HTTP-based endpoint is used to access OSS.</li><li>◦ <a href="https://oss-cn-qingdao-internal.aliyuncs.com">https://oss-cn-qingdao-internal.aliyuncs.com</a>: specifies that a private HTTPS-based endpoint is used to access OSS.</li></ul> <div> <b>Notice</b> For example, a private OSS endpoint is used as the source data address when you create a migration job. In this case, the destination data address must be an Apsara File Storage NAS or OSS data address in the same region.</div>



Parameter	Required	Description
AccessKey Id	Yes	Specify the AccessKey pair that you can use to migrate data. For more information, see <a href="#">Create a Resource Access Management (RAM) user and grant the required permissions to the RAM user.</a>
AccessKey Secret	Yes	
OSS Bucket	Yes	Select the bucket in which the data that you want to migrate is stored.
OSS Prefix	Yes	An OSS prefix cannot start with a forward slash (/). An OSS prefix must end with a forward slash (/). For example, you can specify <code>data/to/oss/</code> as the OSS prefix.

- (Optional) If the system prompts that this feature is in public preview, click **Application** to apply to use this feature.
- (Optional) Enter the required information and submit the application for the feature in public preview. After the application is approved, the system sends a text message to notify you.

## Step 2: Create a destination data address

- In the left-side navigation pane, choose **Data Online Migration > Data Address**. On the page that appears, click **Create Data Address**.
- In the **Create Data Address** panel, configure the parameters and click **OK**. The following table describes the parameters.


Parameter	Required	Description
Data Type	Yes	Select OSS.
Data Name	Yes	Enter a name. The name must be 3 to 63 characters in length. The name cannot contain special characters, except for hyphens (-) and underscores (_).
Data Region	Yes	Select the region where the destination data address resides.

Parameter	Required	Description
Enable Transfer Acceleration	No	<p>If you want to use Data Online Migration together with the transfer acceleration feature of Object Storage Service (OSS), enable the transfer acceleration feature for buckets. The transfer acceleration feature takes effect within 30 minutes after it is enabled. After you enable the feature, wait for 30 minutes before you create a migration job.</p> <div>  <b>Notice</b> If you use the transfer acceleration feature to access your OSS buckets, you are charged additional transfer acceleration fees. For more information, see <a href="#">Transfer acceleration</a>. </div>
OSS Endpoint	Yes	Select an endpoint in the region where your data is stored. For more information, see <a href="#">Regions and endpoints</a> .
AccessKey Id	Yes	Specify the AccessKey pair that is used to migrate data. For more information, see <a href="#">Create a Resource Access Management (RAM) user and grant required permissions to the RAM user</a> .
AccessKey Secret	Yes	<div>  <b>Note</b> If you want to migrate data across accounts, you must specify the AccessKey pair of your Alibaba Cloud account. </div>
OSS Bucket	Yes	Select a bucket to store the migrated data.
OSS Prefix	Yes	<p>The value cannot start with a forward slash (/). The value must end with a forward slash (/). For example, you can specify <code>data/to/oss/</code> as the OSS prefix. If you want to migrate data to the root directory of the specified bucket, do not configure this parameter.</p>

### Step 3: Create a migration job

1. In the left-side navigation pane, choose **Data Online Migration > Migration Jobs**. On the page that appears, click **Create Job**.
2. In the **Create Job** panel, read the terms of the migration service and select **I understand the above terms and conditions, and apply for opening data migration service**. Then, click **Next**.

3. In the **Fee Reminder** dialog box, click **Yes, Go Ahead**.
4. In the **Job Config** step, configure the parameters and click **Next**. The following table describes the parameters.

Parameter	Required	Description
<b>Job Name</b>	Yes	Enter a job name. The name must be 3 to 63 characters in length and can contain only lowercase letters, digits, and hyphens (-). It cannot start or end with a hyphen (-).
<b>Source Data Address</b>	Yes	Select the source data address that you created.
<b>Destination Data Address</b>	Yes	Select the destination data address that you created.
<b>Specified Directory</b>	No	<p>Specify directories in which the files and subdirectories are migrated or not migrated.</p> <ul style="list-style-type: none"> <li>◦ <b>Do not filter</b>: All data from the source data address is migrated.</li> <li>◦ <b>Exclude</b>: The files and subdirectories in the specified directories are not migrated.</li> <li>◦ <b>Contain</b>: Only the files and subdirectories in the specified directories are migrated.</li> </ul> <div style="background-color: #e6f2ff; padding: 10px; margin-top: 10px;"> <p> <b>Note</b></p> <ul style="list-style-type: none"> <li>◦ Before you configure the Specified Directory parameter, you must configure a whitelist. For more information, see <a href="#">Advanced features</a>.</li> <li>◦ A directory name cannot start with a forward slash (/) or a backslash (\), and cannot contain double slashes (//), double periods (..), or double quotation marks ("). The character string that consists of all the specified directory names cannot exceed 10 KB in length.</li> <li>◦ A directory name must end with a forward slash (/). For example, you can specify <i>docs/</i> as the directory name.</li> <li>◦ You can specify up to 20 directories of the Exclude or Contain type.</li> </ul> </div>
		<p>Select the data migration mode.</p> <ul style="list-style-type: none"> <li>◦ <b>Full</b>: The system migrates all data from the source data address to the destination data address. You must configure the <b>Start Time</b></li> </ul>

Parameter	Required	Description
Migration Type	Yes	<p><b>Point of File</b> parameter. The system migrates all data whose last modification time is later than the specified time. After all data is migrated, the migration job ends.</p> <p>If you change the data at the source data address after the migration job is completed, you can submit another job to migrate all data. In this case, the system migrates only the changed data.</p> <ul style="list-style-type: none"> <li>◦ <b>Incremental</b>: The system runs a migration job based on the values that you specified for the <b>Migration Interval</b> and <b>Migration Times</b> parameters. <ul style="list-style-type: none"> <li>■ You must configure the <b>Start Time Point of File</b> parameter. During the first migration, the system migrates all data whose last modification time is later than the specified time. After the first migration job is completed, incremental migration jobs are performed based on the value that you specified for the <b>Migration Interval</b> parameter. For each incremental migration, the system migrates only the data that is created or modified after the previous migration starts and before the current migration starts.</li> <li>■ If you set the Migration Times parameter to N, full migration is performed once and then incremental migration is performed (N - 1) times.</li> </ul> </li> </ul> <p>For example, the current time is 08:00, March 10, 2019 and you set the Migration Interval parameter to 1, the Migration Times parameter to 5, and the <b>Start Time Point of File</b> parameter to 08:00, March 5, 2019. When the first migration starts, the system migrates all files whose last modification time is between 08:00, March 5, 2019 and 08:00, March 10, 2019. In this example, the first migration requires one hour to complete and the second migration starts at 10:00, March 10, 2019. The duration from 08:00 to 10:00 consists of one hour for the first migration process and one hour for the migration interval. During the second migration, the system migrates the files whose last modification time is between 08:00, March 10, 2019 and 10:00, March 10, 2019. The migration job consists of one full migration and four incremental migrations.</p>

Parameter	Required	Description
		<p><b>Notice</b> Before you start a full or incremental migration job, the system compares the files at the source data address with the files at the destination data address. If a source file has the same name as a destination file, the destination file is overwritten when one of the following conditions is met:</p> <ul style="list-style-type: none"> <li>◦ The Content-Type values of the source file and the destination file are different.</li> <li>◦ The last modification time of the source file is later than that of the destination file.</li> <li>◦ The size of the source file is different from that of the destination file.</li> </ul>
Start Time Point of File	Yes	<p>Specify a time to filter data to be migrated. Data will be migrated if it is created or modified after the specified time.</p> <ul style="list-style-type: none"> <li>◦ All: All files are migrated.</li> <li>◦ Assign: Only the files that are created or modified after the specified time are migrated.</li> </ul> <p>For example, if you set the time to 08:00:00, November 1, 2018, only the files that are created or modified after 08:00:00, November 1, 2018 are migrated.</p>




Parameter	Required	Description
Migration Interval	This parameter is required when you set the Migration Type parameter to Incremental.	The default value is 1 and the maximum value is 24. Unit: hours.
Migration Times	This parameter is required when you set the Migration Type parameter to Incremental.	The default value is 1 and the maximum value is 30.


Parameter	Required	Description
<b>File Overwrite Method</b>	Yes	<p>The method that is used to process the source file whose name is the same as that of a destination file. Valid values:</p> <ul style="list-style-type: none"> <li>◦ LastModified: If a source file has the same name as a destination file, the system compares the last modification time that is indicated by the LastModified property of the files. <ul style="list-style-type: none"> <li>■ If the last modification time of the source file is later than that of the destination file, the source file is migrated and the destination file is overwritten.</li> <li>■ If the last modification time of the source file is earlier than that of the destination file, the source file is not migrated and the destination file is retained.</li> <li>■ If the two files have the same last modification time, the system checks the values of the Size and Content-Type properties of the files. <p>If the files have the same Size and Content-Type values, the source file is not migrated. If the two files have different values of at least one property, the source file is migrated and the destination file is overwritten.</p> </li> </ul> </li> <li>◦ Condition: If a source file has the same name as a destination file, the system compares the values of the LastModified, Size, and Content-Type properties of the two files. <ul style="list-style-type: none"> <li>■ If all property values of the two files are the same, the source file is not migrated.</li> <li>■ If the two files have different values of at least one property, the source file is migrated and the destination file is overwritten.</li> </ul> </li> <li>◦ All: If a source file has the same name as a destination file, the system performs no comparison and directly overwrites the destination file with the source file.</li> <li>◦ No: If a source file has the same name as a destination file, the system performs no comparison and directly skips the source file in the migration.</li> </ul>

5. On the **Performance** tab, go to the **Data Prediction** section and configure the **Data Size** and **File Count** parameters.



 **Note** To ensure a successful migration job, we recommend that you estimate the amount of data to be migrated as accurately as possible. For more information, see [Estimate the amount of data that you want to migrate](#).

6. (Optional) In the **Performance** step, go to the **Flow Control** section, configure the **Time Range** and **Max Flow(MB/s)** parameters, and then click **Add**.

 **Note** To ensure business continuity, we recommend that you configure the **Time Range** and **Max Flow(MB/s)** parameters based on the workloads of peak hours and off-peak hours.

7. Click **Create** and wait until the migration job is completed.

## 4. Subsequent operations

This topic describes several subsequent operations after you create a migration job.


### View the status of a migration job

After you create a migration job, one of the following states is displayed for the job:

- **Migrating:** Data is being migrated. Wait until the migration job is completed.
- **Create Failed:** The migration job has failed to be created. You can view the cause of the failure and create another migration job.
- **Finished:** The migration job is completed. You can view the migration report.
- **Failed:** The migration job has failed. You can view the migration report and migrate the files that have failed to be migrated.

### Modify the throttling settings

During migration, you can modify the throttling settings of a migration job based on your needs.

1. Log on to the [Data Transport console](#).
2. Choose **Data Online Migration > Migration Jobs**. On the migration job list, find a migration job and click **Manage**.
3. Click **Stop** and verify that the job is stopped.
4. On the Flow Control Time Schedule chart, click **Reset**.
  - To add a throttling setting, select an appropriate time range and maximum flow and then click **Add**.
  - To delete a throttling setting, click  next to the throttling setting.
  - To modify a throttling setting, delete the current setting and then add a new throttling setting.
5. Click **Submit** and then click **Start** to rerun the migration job.

### View a migration report


1. On the migration job list, find the migration job and click **Manage**.
2. Click **Generate Migration Report**. After a report is generated, click **Export** to export the migration report.

In a migration report, the following files appear in the **File Lists** section:


- The file whose name ends with `_total_list`. This file lists all files to be migrated.
  - The file whose name ends with `_completed_list`. This file lists the files that have been migrated.
  - The file whose name ends with `_error_list`. This file lists the files that have failed to be migrated.
3. In the [Object Storage Service \(OSS\) console](#), find the automatically generated folder `aliyun_mgw_import_report/`. The folder includes the three files that appear in the migration report. You can download these files and view the detailed list that is included in each file. We recommend that you use the [ossbrowser](#) tool to view these files.

Each list consists of the following columns:

- o The columns of the file whose name ends with `_total_list` include the source data address, file name, source version ID, and destination version ID. The columns also display whether the job version is the latest at the source data address and whether the job version is deleted at the source data address. The last two columns display the file size (measured in bytes) and the time when the file was last modified. The format of a source data address is `<vendor>://<bucketName>/<prefix>/<objectName>`. The following string provides an example: `oss://bucket-test1022/myprefix/testfile.txt`.
- o The columns of the file whose name ends with `_completed_list` include the file name, the source version ID, and the destination version ID. The columns also display whether the job version is the latest at the source data address and whether the job version is deleted at the source data address. The last four columns display the file size (measured in bytes), CRC-64 checksum, time when the migration job was completed, and whether the migration was skipped.

 **Note** Skip migration: indicates whether the file that has the same name at the source data address and the destination data address has been skipped during migration. Valid values: 1 and 0. The value 1 indicates that the file has been skipped during migration. The value 0 indicates that the file has not been skipped during migration. The value of this field depends on the value of the **File Overwrite Method** parameter that you specify when you create the migration job.

- o The columns of the file whose name ends with `_error_list` include the file name, the source version ID, and the destination version ID. The columns also display whether the job version is the latest at the source data address and whether the job version is deleted at the source data address. The last three columns display the time when the migration job started, the time when the migration job ended, and the error description.

 **Note** The following four fields apply only if multi-version migration is enabled:

- Source version ID: the version ID of the file at the source data address.
- Destination version ID: the version ID of the file at the destination data address.
- Latest at source data address: indicates whether the current version is the latest version of the file at the source data address. Valid values: true and false.
- Deleted at source data address: indicates whether the current version is deleted at the source data address. Valid values: true and false.

## Rerun a failed migration job

If a migration job fails, you can check the generated file whose name ends with `_error_list` to identify the cause of the failure and resolve the issue. Then, on the migration job list, find the failed migration job, click **Manage**, and click **Retry** to migrate the failed files.