

IBM i  
Version 1 Release 1

*IBM Cloud Storage Solutions for i  
User's Guide*

**IBM**



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Version 1 Release 1

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User's Guide*

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**Note**

Before using this information and the product it supports, read the information in "Notices" on page 37.

This edition applies to version 1, release 1, modification 0 of IBM Cloud Storage Solutions for i (product number 5733-ICC) and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

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# IBM Cloud Storage Solutions for i V1.1.0 User's Guide

IBM® Cloud Storage Solutions for i V1.1.0 User's Guide

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## What's new as of March 2017

### Support for AWS S3 and IBM Cloud Object Storage services

You can now store files in AWS S3 and IBM Cloud Object Storage (formerly Cleversafe) buckets. Both web service providers use the AWS S3 protocol, and in Cloud Storage Solutions you work with their resources and files using the same commands and APIs.

Before you can store files, you must obtain object storage space on an AWS S3 or IBM Cloud Object Storage cloud server. For information on obtaining storage space, go to the web sites at <https://aws.amazon.com> or <https://www.ibm.com/cloud-computing/products/storage/object-storage/cloud/>, create an object storage account, and then create a bucket. For information on creating accounts and buckets, see the Amazon or IBM documentation.

The following commands are new for the IBM Cloud Storage Solutions for i licensed program:

- “Creating AWS S3 or IBM Cloud Object Storage resources” on page 6
- “Changing AWS S3 or IBM Cloud Object Storage resources” on page 7
- “Displaying AWS S3 or IBM Cloud Object Storage resources” on page 8

The following APIs are new:

- “Create AWS S3 or IBM Cloud Object Storage Resource API” on page 18
- “Change AWS S3 or IBM Cloud Object Storage Resource API” on page 18
- “Get AWS S3 or IBM Cloud Object Storage Resource Information API” on page 19
- “Qicc AWS S3 Resource Info structure” on page 33

### Product license keys are required

You can use Cloud Storage Solutions for a 70-day trial period. After that you must purchase the product and install the product license key. See “Licensing Cloud Storage Solutions” on page 3.

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## PDF file for IBM Cloud Storage Solutions for i V1.1.0 User's Guide

You can view and print a PDF file of this information.

To view or download the PDF version of this document, select IBM Cloud Storage Solutions for i V1.1.0 User's Guide.

### Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF link in your browser.
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.

4. Click **Save**.

## Downloading Adobe Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free copy from the Adobe Web site

(<https://get.adobe.com/reader/>) .

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## IBM Cloud Storage Solutions for i

IBM Cloud Storage Solutions for i is the IBM cloud solution for backing up IBM i data.

You can use Cloud Storage Solutions to store IBM i files securely in the cloud, eliminating the need for tape drives, tape cartridges, and courier services for off-site storage. To store files, you must obtain server space from a cloud service provider. Then you must create a Cloud Storage Solutions resource that defines the cloud server location and authorization information needed to access it. Then you can copy files between the Integrated File System (IFS) on the IBM i computer and the cloud server.

You cannot use Cloud Storage Solutions to work with files in the /QSYS.LIB file system.

You can work with resources and files directly using Cloud Storage Solutions commands, or your applications can work with resources and files using the Cloud Storage Solutions API.

Cloud Storage Solutions passes information about cloud file transfers to a registered IBM i exit point. To have your applications receive that information, you can register the applications as exit programs and associate them with the Cloud Storage Solutions exit point.

You can use Backup, Recovery, and Media Services (BRMS) for i5/OS™ with Cloud Storage Solutions to transfer virtual save media to and from the cloud. For more information on using Cloud Storage Solutions with BRMS, see the [Using BRMS with Cloud Storage Solutions for i](#) wiki page.

## Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, frequently asked questions (FAQs), technical notes, troubleshooting information, and downloads, are available from the web.

To find service updates and support information, see the following website:

<https://www-947.ibm.com/support/entry/portal/support?lnk=msdTS-supo-usen>

## Product documentation and updates

IBM Cloud Storage Solutions for i information is available on the web. You can receive updates to Cloud Storage Solutions information automatically by registering with the IBM My Notifications service.

## Information on the web

You can access Cloud Storage Solutions documentation in the IBM i 7.1, 7.2 and 7.3 sections of the IBM Knowledge Center:

<http://www.ibm.com/support/knowledgecenter>

## Receiving documentation updates automatically

To automatically receive emails that notify you when new technote documents are released, when existing product documentation is updated, and when new product documentation is available, you can register with the IBM My Notifications service. You can customize the service so that you receive information about only those IBM products that you specify.

To register with the My Notifications service:

1. Go to <http://www.ibm.com/support/mysupport>
2. Enter your IBM ID and password, or create one by clicking **Create an IBM id**.
3. When the My Notifications page is displayed, click **Subscribe** to select those products that you want to receive information updates about.
4. Click **Continue** to specify the types of updates that you want to receive.
5. Click **Submit** to save your profile.

## Accessibility features

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

The following list includes the major accessibility features in this product:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

Also see the IBM<sup>®</sup> Human Ability and Accessibility Center for more information about the commitment that IBM has to accessibility.

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## Cloud Storage Solutions prerequisites

Before you use Cloud Storage Solutions, you must have a location to store the files. If you will store files on a cloud server, you must create an account with a supported web services provider and obtain storage space on their cloud servers. If you will store files on an IBM i server using FTP, you must install and start FTP on the source and target computers.

## Licensing Cloud Storage Solutions

You can use Cloud Storage Solutions for a 70-day trial period. After that you must purchase the product and install the product license key.

When you purchase Cloud Storage Solutions, you can choose a single partition license or an unlimited license. With a single partition license you can install one instance on one partition. With an unlimited license you can install one instance

per partition on an unlimited number of partitions on a single system. When you purchase the product, IBM sends you license information, including the license key. If you are upgrading the product, installing the new key overrides the previous key. You cannot uninstall license keys. For more information on IBM i license keys, see the topic Software license keys.

Take the following steps to install the Cloud Storage Solutions license.

1. Log in to the IBM i computer as a user with \*ALLOBJ authority.
2. To prompt the **Work with License Information** command, type the following command and press Enter:

```
WRKLICINF
```

3. In the **Opt** field next to the product, type 1 and press Enter.
4. In the **Add License Key Information** panel, enter the required license information provided by IBM, and press Enter.

**Note:** In the **User limit** field, enter either 1 if you purchased a license for a single partition, or \*NOMAX if you purchased an unlimited license.

## Obtaining SoftLayer cloud storage space

Before you can copy IBM i files to a SoftLayer® cloud server, you must create a SoftLayer account and purchase object storage. SoftLayer will then provide you with cloud server location and the credentials needed to access that location.

Go to the following web site to create an account and purchase SoftLayer object storage: <http://www.softlayer.com/object-storage>.

After you purchase storage, use the information that SoftLayer provides to create a resource. For more information, see “Creating SoftLayer resources” on page 8.

## Obtaining AWS S3 cloud storage space

Before you can copy IBM i files to an AWS S3 cloud server, you must create an AWS S3 account and purchase object storage. Amazon will then provide you with the cloud server location and the credentials needed to access that location.

Go to the Amazon Web Services web site at <https://aws.amazon.com>, create an Amazon Web Services account, and sign in. Then obtain storage space and create a bucket. For information, see the AWS S3 documentation.

Create an AWS S3 resource. For more information, see “Creating AWS S3 or IBM Cloud Object Storage resources” on page 6.

## Obtaining IBM Cloud Object Storage space

Before you can copy IBM i files to an IBM Cloud Object Storage cloud server, you must create an IBM Cloud Object Storage account and purchase object storage. IBM will then provide you with the cloud server location and the credentials needed to access that location.

Go to the IBM Cloud Object Storage web site at <https://www.ibm.com/cloud-computing/products/storage/object-storage/cloud/>, create an object storage account, and sign in. Then obtain object storage space and create a bucket. For information, see the IBM Cloud Object Storage documentation.

Create an AWS S3 resource. For more information, see “Creating AWS S3 or IBM Cloud Object Storage resources” on page 6.

## Installing FTP on IBM i

To use Cloud Storage Solutions to store files on a server than runs IBM i, you must install FTP on the source and target servers.

You must have a registered user name and password on the source and target computers. The name and password can be different on each server.

In this configuration, the source and target servers are both IBM i.

To use File Transfer Protocol (FTP), IBM TCP/IP Connectivity Utilities for i must be installed on the server.

To confirm that FTP is available or install it if necessary, complete the following steps on the source server, which is the server that hosts Cloud Storage Solutions, and on the server that will store files.

1. Open a 5250 session with the server.
2. To confirm that FTP is available, complete the following steps:
  - a. Log in as QSECOFR or with a profile that has Security Officer type authorities.
  - b. On the command line, enter the following command:  
`GO LICPGM`
  - c. On the command line, enter 10 to display installed licensed programs.
  - d. In the list of licensed programs, look for 5770TC1 IBM TCP/IP Connectivity Utilities for i. If the list contains this program, the FTP server is installed. If the list does not contain this program, press Enter to return to the **Work with Licensed Programs** menu.
  - e. On the command line, enter 11 to install licensed programs.
  - f. Locate the program 5770TC1 IBM TCP/IP Connectivity Utilities for i.
  - g. Enter 1 beside the program name. The licensed program is installed.
3. To start FTP, complete the following steps:
  - a. Log in as QSECOFR or with a profile that has Security Officer type authorities.
  - b. Enter the following command:  
`STRTCPSVR *FTP`

---

## Working with resources in Cloud Storage Solutions

Use Cloud Storage Solutions commands to create, change, and display resources. A resource defines a cloud server location and the credentials needed to access that location.

Your cloud service provider provides the location and credentials for the resource. Cloud Storage Solutions supports several cloud service providers, including SoftLayer and Amazon Simple Storage Service (Amazon S3).

After you create a resource, you can use Cloud Storage Solutions commands or the Cloud Storage Solutions API to copy files between IFS directories on the IBM i computer and the cloud server. You cannot work with files in the /QSYS.LIB file system.

## Creating AWS S3 or IBM Cloud Object Storage resources

Use the **CRTS3RICC** command to create a Cloud Storage Solutions AWS S3 or IBM Cloud Object Storage resource. A resource defines a cloud server location and the credentials needed to access that location. After you create a resource, you can copy files between IFS directories and the cloud server location.

You must obtain storage space on an AWS S3 or IBM Cloud Object Storage cloud server. See “Obtaining AWS S3 cloud storage space” on page 4 or “Obtaining IBM Cloud Object Storage space” on page 4 for information.

You must decide on a unique resource name. The name must have a maximum of 10 characters, and must be unique among Cloud Storage Solutions resources. Resource names are IBM i basic names that must adhere to the \*NAME type restrictions. Every basic name can begin with the characters A-Z, \$, #, or @ and can be followed by up to nine characters. The remaining characters can include the same characters as the first but can also include numbers 0-9, underscores (\_), and periods (.). Lowercase letters are changed to uppercase letters by the system. For more information, and information on names in quoted form, see the topic *Names (\*NAME)* in the IBM Knowledge Center.

Obtain the following information from the web service:

- The name of a user who is authorized to access the cloud server location.
- The authorization key required to access the cloud server location.
- The name of the resource bucket. A bucket is the root directory of the cloud server location. When you copy IBM i files to the cloud they are placed below the bucket directory.
- The Uniform Resource Identifier (URI) of the storage location. For AWS S3 resources this is always `s3.amazonaws.com`. For IBM Cloud Object Storage resources, ask the account owner. Or if the storage location is configured inside your enterprise network, ask your administrator.

You cannot use Cloud Storage Solutions to work with files in the /QSYS.LIB file system. This command is not threadsafe.

1. On the IBM i command line, type **CRTS3RICC** and press F4.
2. Complete the following required fields, and press Enter:

Field	Action
Resource name	Type a resource name that is a maximum of 10 characters and follows the *NAME restrictions for an IBM i basic name.
Resource description	Type a description that is a maximum of 50 characters.
Access key id	Type the name of the authorized user.
Secret access key	Type the authorization key.
Bucket	Type the name of the bucket. Files are copied below this directory.
Resource URI	Type one of the following resource URIs: <ul style="list-style-type: none"><li>• For AWS S3 resources type: <code>s3.amazonaws.com</code></li><li>• For IBM Cloud Object Storage resources, ask the account owner or your administrator.</li></ul>

Field	Action
Full qualified IFS Dir name	[This parameter is not currently implemented.] Optional. To display, press F10 and page down. Type the fully-qualified path location of the directory to associate with the resource. After you copy files from this directory to the cloud server, the files in both locations are kept in sync. The default value is *NONE.

To copy files to the resource, see “Copying files to the cloud” on page 15.

## Changing AWS S3 or IBM Cloud Object Storage resources

Use the **CHGS3RICC** command to change an AWS S3 or IBM Cloud Object Storage resource. A resource defines an AWS S3 or IBM Cloud Object Storage cloud server location and the credentials needed to access that location. Change a resource to use different credentials to access the same bucket, or to specify a different bucket.

You cannot change the resource name with this command. This command is not threadsafe.

1. On the IBM i command line, type **CHGS3RICC** and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, press F4 to display a list of resources.
3. Edit one or more of the following fields, and press Enter:

Field	Action
Resource description	Change the description.
Access key id	Change the name of the authorized user. For security reasons, the default value is *SAME. To keep the original name, do not change the *SAME value.
Secret access key	Change the authorization key. For security reasons, the default value is *SAME. To keep the original key, do not change the *SAME value.
Bucket	Change the bucket name. This does not change the name of the bucket on the cloud server. It changes which bucket the resource will access.
Resource URI	Change the resource URI. For AWS S3 resources the URI must be s3.amazonaws.com. You can change IBM Cloud Object Storage URIs.
Full qualified IFS Dir name	[This parameter is not currently implemented.] Optional. To display, press F10 and page down. Change the fully-qualified path location of the directory to associate with the resource. After you copy files from this directory to the resource, Cloud Storage Solutions keeps the files in both locations synchronized. Type *NONE to remove the current data and set the value to *NONE.

## Displaying AWS S3 or IBM Cloud Object Storage resources

Use the **DS3R1CC** command to display an AWS S3 or IBM Cloud Object Storage resource. A resource defines an AWS S3 or IBM Cloud Object Storage cloud server location and the credentials needed to access that location.

For security reasons, the **DS3R1CC** command does not display the **Access key id** and **Secret access key** fields. This command is not threadsafe.

1. From the IBM i command line, type **DS3R1CC** and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, press F4 to display a list of resources.

## Creating SoftLayer resources

Use the **CRSLR1CC** command to create a Cloud Storage Solutions SoftLayer resource. A resource defines a cloud server location and the credentials needed to access that location. After you create a resource, you can copy files between IFS directories and the cloud server location.

You must create storage space on a SoftLayer cloud server. That space is called a container. See “Creating SoftLayer resources” for information.

You must decide on a unique resource name. The name must have a maximum of 10 characters, and must be unique among Cloud Storage Solutions resources. Resource names are IBM i basic names that must adhere to the \*NAME type restrictions. Every basic name can begin with the characters A-Z, \$, #, or @ and can be followed by up to nine characters. The remaining characters can include the same characters as the first but can also include numbers 0-9, underscores (\_), and periods (.). Lowercase letters are changed to uppercase letters by the system. For more information, and information on names in quoted form, see the topic *Names (\*NAME)* in the IBM Knowledge Center.

Obtain the following information from SoftLayer:

- The name of a user who is authorized to access the cloud server location.
- The authorization key required to access the cloud server location.
- The name of the resource container. A container is the root directory of the cloud server location. When you copy IBM i files to the cloud they are placed below the container directory.
- The Uniform Resource Identifier (URI) of the server.

You cannot use Cloud Storage Solutions to work with files in the /QSYS.LIB file system. This command is not threadsafe.

1. On the IBM i command line, type **CRSLR1CC** and press F4.
2. Complete the following required fields, and press Enter:

Field	Action
<b>Resource name</b>	Type a resource name that is a maximum of 10 characters and follows the *NAME restrictions for an IBM i basic name.
<b>Resource description</b>	Type a description that is a maximum of 50 characters.
<b>Authorized user</b>	Type the name of the authorized user.
<b>Authorization key</b>	Type the authorization key.

Field	Action
Container	Type the name of the container. Files are copied below this directory.
Resource URI	Type the resource URI.
Full qualified IFS Dir name	[This parameter is not currently implemented.] Optional. To display, press F10 and page down. Type the fully-qualified path location of the directory to associate with the resource. After you copy files from this directory to the cloud server, the files in both locations are kept in sync. The default value is *NONE.

To copy files to the resource, see “Copying files to the cloud” on page 15.

## Changing SoftLayer resources

Use the **CHGSLRICC** command to change a SoftLayer resource. A resource defines a SoftLayer cloud server location and the credentials needed to access that location.

You cannot change the resource name with this command. This command is not threadsafe.

1. On the IBM i command line, type **CHGSLRICC** and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, press F4 to display a list of resources.
3. Edit one or more of the following fields, and press Enter:

Field	Action
Resource description	Change the description.
Authorized user	Change the name of the authorized user. For security reasons, the default value is *SAME. To keep the original name, do not change the *SAME value.
Authorization key	Change the authorization key. For security reasons, the default value is *SAME. To keep the original key, do not change the *SAME value.
Container	Change the container name.
Resource URI	Change the resource URI.
Full qualified IFS Dir name	[This parameter is not currently implemented.] Optional. To display, press F10 and page down. Change the fully-qualified path location of the directory to associate with the resource. After you copy files from this directory to the resource, Cloud Storage Solutions keeps the files in both locations synchronized. Type *NONE to remove the current data and set the value to *NONE.

## Displaying SoftLayer resources

Use the **DSPSLRICC** command to display a SoftLayer resource. A resource defines a SoftLayer cloud server location and the credentials needed to access that location.

For security reasons, the **DSPSLRICC** command does not display the **Authorized user** and **Authorization key** fields. This command is not threadsafe.

1. From the IBM i command line, type **DSPSLRICC** and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, press F4 to display a list of resources.

## Creating FTP resources

Use the **CRTFPRICC** command to create an FTP resource. After you create the resource, you can copy files between IFS directories and the resource.

Choose a unique resource name that is a maximum of 10 characters. Resource names must be unique among all providers and transfer types. A resource name is an IBM i basic name that must adhere to the \*NAME type restrictions. Every basic name can begin with the characters A-Z, \$, #, or @ and can be followed by up to nine characters. The remaining characters can include the same characters as the first but can also include numbers 0-9, underscores (\_), and periods (.). Lowercase letters are changed to uppercase letters by the system. For more information, and information on names in quoted form, see the topic *Names (\*NAME)* in the IBM Knowledge Center.

Obtain the following information from the server administrator:

- The ID and password of a user who is authorized to log into the FTP server, and who has access to the root directory.
- The server root directory. The directory must begin with a forward slash (/). Files are copied below this directory.
- The resource Uniform Resource Identifier (URI) of the FTP server including the fully-qualified name of computer that hosts the FTP server, for example, myserver.enterprise.com. The protocol (ftp://) is optional and if the FTP port is 21 it is optional as well. The port number must be included if a value other than 21 is in use. For example:

```
ftp://myserver.enterprise.com  
ftp://myserver.enterprise.com:23  
myserver.enterprise.com
```

You cannot use Cloud Storage Solutions to work with files in the /QSYS.LIB file system. This command is not threadsafe.

1. From the IBM i command line, type **CRTFPRICC**, and press F4.
2. Complete the following required fields, and press Enter:

Field	Action
<b>Resource name</b>	Type a unique name that is a maximum of 10 characters. Resource names must be unique within and across resource types, for example a SoftLayer resource cannot have the same name as any other SoftLayer resource or resource of other type. A resource name is an IBM i basic name that must adhere to the *NAME type restrictions.

Field	Action
Resource description	Type a description that is a maximum of 50 characters.
Login ID	Type the log in ID of the authorized user.
Login password	The password of the authorized user.
Root directory	Type the root directory, for example /home/backups. The directory path must start with a slash (/). Files are copied below this directory.
Resource URI	Type the resource URI including the fully-qualified name of the FTP server. If the port number is not the default of 21 you must include it, for example: myserver.enterprise.com:23. The protocol (ftp://) is optional.
Full qualified IFS Dir name	[This parameter is not currently implemented.] Optional. To display, press F10 and page down. Type the fully-qualified path location of the directory to associate with the resource. After you copy files from this directory to the resource, Cloud Storage Solutions keeps the files in both locations synchronized. The default value is *NONE.

To copy files to the resource, see “Copying files to the cloud” on page 15.

## Changing FTP resources

Use the **CHGFPRICC** command to edit the parameters of an FTP resource.

Obtain new resource information from the server administrator.

You cannot use this command to change the resource name. This command is not threadsafe.

1. From the IBM i command line, type **CHGFPRICC**, and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, press F4 to display a list of resources.
3. Edit one or more of the following fields, and press Enter:

Field	Description
Resource description	Edit the description.
Login ID	Change the name of the authorized user. For security reasons, the default value is *SAME. To keep the original value, leave the *SAME value in the field.
Login Password	Change the login password. For security reasons, the default value is *SAME. To keep the original value, leave the *SAME value in the field.
Root directory	Change the root directory. The directory path must start with a slash (/).
Resource URI	Change the resource URI. Include the fully-qualified name of the FTP server.

Field	Description
Full qualified IFS Dir name	[This parameter is not currently implemented.] Optional. To display, press F10 and page down. Type the fully-qualified path location of the directory to associate with the resource. After you copy files from this directory to the resource, Cloud Storage Solutions keeps the files in both locations synchronized. Type *NONE to remove the current data and set the value to *NONE.

## Displaying FTP resources

Use the **DSPFPRICC** command to display an FTP resource.

For security reasons, the **DSPFPRICC** command does not display the **Login ID** and **Login Password** fields. This command is not threadsafe.

1. From the IBM i command line, type **DSPFPRICC**, and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, press F4 to display a list of resources.

## Deleting resources

Use the **DLTRSCICC** command to delete a resource. After you delete a resource, you cannot copy files between the IFS and the resource.

This command is not threadsafe.

1. From the IBM i command line, type **DLTRSCICC**, and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, press F4 to display a list of resources.
3. In the **Delete ICC Resource** panel, press Enter. The resource is deleted.

## Working with resources

Use the **WRKCFGICC** command to create, change, delete, and display resources.

This command is not threadsafe.

1. From the IBM i command line, type **WRKCFGICC**, and press F4.
2. In the **Resource name** field, type the name of the resource, and press Enter. If you do not know the resource name, or you want to work with multiple resources, leave the value \*ALL and press Enter to display all resources. To find a resource using a wild card, type the first few characters of a resource name followed by an asterisk (\*), and then press Enter.
3. Perform one of the following steps:
  - To create a new resource, type 1 in the **Opt** column of the first row. Type the resource name in the **Resource Name** column using a maximum of 10 characters. Type the resource type in the **Type** column, and press Enter. Complete the resource by following steps in the appropriate topic: “Creating SoftLayer resources” on page 8, “Creating FTP resources” on page 10, or “Creating AWS S3 or IBM Cloud Object Storage resources” on page 6.
  - To work with an existing resource, type one of the options from the following table in the **Opt** column beside the resource, and press Enter:

Option	Action
2	Change a resource. You can change everything except the resource name. For information see "Changing SoftLayer resources" on page 9 or "Changing FTP resources" on page 11.
4	Delete a resource. To delete multiple resources, type 4 beside each resource. After you delete a resource, you cannot copy files between the two locations.
5	Display a resource. View the information that defines the resource.

## Working with status

When you copy or delete files, the operations are run in jobs. You can use the **WRKSTSICC** command to view the status of those jobs, and end them if necessary.

When you copy files to or from the cloud, the operation is run asynchronously, meaning in its own batch job instead of in the same job as the command. When you copy files asynchronously, you do not have to wait a long time for large files to finish copying before running other commands. Also, you can use the IBM i facilities to work with asynchronous jobs, for example by scheduling when the jobs run. Before you view jobs, you can specify a **Job type** filter that can display only synchronous or only asynchronous jobs. For information on copying files, see Copy file to cloud (CPYTOCLD) and Copy file from cloud (CPYFRMCLD).

This command is not threadsafe.

1. From the IBM i command line, type **WRKSTSICC**, and press F4.
2. Enter values in the following fields to filter the list of jobs to display, and then press Enter:

**Note:** To see the possible values for a field, position the cursor in the field and press F4.

Field	Action
<b>Resource type</b>	Type the resource type of the jobs to display, for example to display SoftLayer jobs type SoftLayer. To display jobs of all resource types, type *ALL.
<b>Status</b>	Type one of the following values to specify the status of transfer jobs to display: <ul style="list-style-type: none"> <li>• *ALL - Jobs of any status</li> <li>• *ACTIVE - Jobs that are currently running (default)</li> <li>• *WAITING - Jobs in the job queue</li> <li>• *FAILED - Jobs that failed</li> <li>• *SUCCESSFUL - Jobs that completed successfully</li> <li>• *ENDED - Jobs that failed or completed successfully</li> <li>• *NOTENDED - Jobs that are waiting or active</li> </ul>

Field	Action
<b>Job type</b>	Type one of the following values to specify the type of jobs to display: <ul style="list-style-type: none"> <li>• *ALL - Jobs run synchronously and asynchronously (default)</li> <li>• *ASync - Jobs run asynchronously</li> <li>• *Sync - Jobs run synchronously</li> </ul>
<b>Age in days</b>	Type the maximum age of the jobs to display, in days. For example, leaving the default value of 7 means the command displays jobs that were run seven days old or younger.
<b>Operation</b>	Type one of the following values to specify the operation of the jobs to display: <ul style="list-style-type: none"> <li>• *ALL - All operations (default)</li> <li>• *FRMCLD - Copy file from cloud operations</li> <li>• *TOCLD - Copy file to cloud operations</li> <li>• *COPY - All copy operations to and from the cloud</li> <li>• *DELETE - Delete from cloud operations</li> </ul>
<b>Job name</b>	Type a job name to display that job. Leave the *ALL value to display jobs of any name. You can add an asterisk after a set of characters to search for names that begin with those characters, for example specify L00000006* to find jobs whose names start with L00000006.
<b>Job user</b>	Type a user name to display jobs run by that user. Leave the *ALL value to display jobs run by all users.
<b>Position to</b>	Leave the *LAST value to display the bottom of the job list, with the newest jobs. Type *FIRST to display the top of the job list, with the oldest jobs. After you display the list you can page up or down to scroll through the list.

The resulting list has the following columns:

Column	Content
<b>Opt</b>	An option field to take actions on jobs.
<b>File name/Date Time</b>	Two combined columns: The path and name of the file being copied or deleted, and the date and time that the job was started. The path and file name are truncated if too long for the display.
<b>Name</b>	The name of the job.
<b>User</b>	The user who started the job.
<b>Number</b>	The job number.
<b>Status</b>	The current job status, for example <b>Active</b> means that the job is running.
<b>Oper</b>	The operation being run, for example <b>TOCLD</b> is a copy to cloud operation.

Column	Content
Graphic% / Complete%	<p>Two combined columns: <b>Graphic %</b> is a graphic representation of how much of the operation is complete. Each asterisk represents 10 percent of the operation, and the appended number represents units in the current 10 percent. For example, the following value represents 95% completion, with the 9 asterisks equal to 90 percent, plus 5:</p> <pre>*****5</pre> <p><b>Complete %</b> is a numeric representation of how much of the operation is complete, for example 95 means the operation is 95 percent complete.</p>

3. Optional: To end jobs, type 4 in the **Opt** column beside the jobs and press Enter.
4. Optional: Press F17 to change the filter choices.

---

## Working with files in Cloud Storage Solutions

Use commands to copy files to and from a cloud resource, and to delete files from the cloud.

### Copying files to the cloud

Use the **CPYTOCLD** command to copy files from the IFS to a cloud resource.

- You must create a cloud resource.
- You must have IBM i Read (\*R) authority on the file that you will copy, and Execute (\*X) authority on all directories in the path leading to the file. For example, if you will copy the file `/home/user/jdoe/file.txt`, you must have Execute authority on the `home`, `user`, and `jdoe` directories, and Read authority on `file.txt`. For information on authorities, see *Planning integrated file system security* in the IBM Knowledge Center.

You cannot use Cloud Storage Solutions to work with files in the `/QSYS.LIB` file system.

The size of files that you can copy to a resource is determined by the web service provider. SoftLayer currently allows a maximum file size of 5GB. If you copy a file larger than 5GB to a SoftLayer resource, Cloud Storage Solutions will divide it into smaller files of approximately 100MB each. These segments are visible in the SoftLayer account.

If you copy the file from the SoftLayer account, the file is reassembled before it is copied to the IBM i computer. If you delete the file from the cloud using the Delete file from cloud (DLTCLDF) command, all of the segments are deleted.

SoftLayer currently only allows 1,000 segments per file. If your file is over 100GB, the size of its segments will be the file size divided by 1,000.

When you copy files to or from the cloud, the operation is run asynchronously, meaning in its own batch job instead of in the same job as the command. When you copy files asynchronously, you do not have to wait a long time for large files

to finish copying before running other commands. Also, you can use the IBM i facilities to work with asynchronous jobs, for example by scheduling when the jobs run. In the **Submit to batch** field, you can specify instead that the copy operation be run in the same job as the command.

This command is not threadsafe.

1. From the IBM i command line, type **CPYTOCLD**, and press F4.
2. Complete the following required fields, and press Enter:

Field	Action
<b>Resource name</b>	Type the name of an existing resource.
<b>Submit to batch</b>	Type *N0 to run the copy operation in the same job as the command. Leave the *YES value to run the copy operation in its own job.
<b>Local file name</b>	Type the IFS path and the name of the file to copy, for example: /home/user/jdoe/file.txt  The path must begin with a forward slash (/).
<b>Cloud file name</b>	Type a path and name for the cloud copy of the file, for example: dir1/dir2/file.txt  Do not include the container or bucket that is defined in the resource. The cloud file name path is appended to those directories to construct the full path for the cloud copy of the file.  If the path directories do not exist, they are created.  With SoftLayer resources, if you are overwriting a file that you copied earlier, the directory and file names are case-sensitive. For example, specifying a <b>Cloud file name</b> of dir1/dir2/FILE.txt will create a second file named FILE.txt next to file.txt.

## Copying files from the cloud

Use the **CPYFRMCLD** command to copy files from a cloud resource to the IFS.

You must have Execute (\*X) authority on all directories in the path that you will copy the file to, and Write (\*W) authority on the last directory in the path. If the file was copied before and exists in the path, the user must have Write access to it. For example, to copy file.txt to /home/user/jdoe, you must have Execute authority on the home, user, and jdoe directories, and Write authority on jdoe. If file.txt is already there, you must have Write authority on it. For information on authorities, see *Planning integrated file system security* in the IBM Knowledge Center.

You cannot use Cloud Storage Solutions to work with files in the /QSYS.LIB file system.

If you copy a file from an FTP cloud server to the IBM i computer, and that file was not originally copied to the FTP server using Cloud Storage Solutions, Cloud Storage Solutions assigns the file a coded character set identifier (CCSID) of 66535. A CCSID of 66535 means the operating system treats the file as binary data and it is unreadable in an editor.

If you copy a file from a SoftLayer, Amazon S3, or IBM Cloud Object Storage cloud server to the IBM i computer, and that file was not originally copied to the cloud server using Cloud Storage Solutions, Cloud Storage Solutions reads the data and from it assigns the file a coded character set identifier (CCSID) of either 1208 (UTF-8) if it is text, or 65535 if it is binary.

If the CCSID of the downloaded file is not correct, you can change it. For information, see the topic *Changing the Coded Character Set Identifier (CCSID)* in the IBM Knowledge Center.

When you copy files to or from the cloud, the operation is run asynchronously, meaning in its own batch job instead of in the same job as the command. When you copy files asynchronously, you do not have to wait a long time for large files to finish copying before running other commands. Also, you can use the IBM i facilities to work with asynchronous jobs, for example by scheduling when the jobs run. In the **Submit to batch** field, you can specify instead that the copy operation be run in the same job as the command.

This command is not threadsafe.

1. From the IBM i command line, type **CPYFRMCLD**, and press F4.
2. Complete the following required fields, and press Enter:

Field	Action
<b>Resource name</b>	Type the name of the resource that contains the file.
<b>Submit to batch</b>	Type *N0 to run the copy operation in the same job as the command. Leave the *YES value to run the copy operation in its own job.
<b>Cloud file name</b>	Type the cloud path and the name of the file, for example: dir1/dir2/file.txt  Do not include the container or bucket defined in the resource. The cloud file name path is appended to those directories to construct the full path for the cloud copy of the file.  The path and file name are case-sensitive.
<b>Local file name</b>	Type the path and a name of the file being copied, for example: /home/user/jdoe/file.txt  The path must begin with a forward slash (/).  If the path directories do not exist, they are created.

## Deleting files from the cloud

Use the **DLTCLDF** command to delete files from a cloud resource.

Before you can delete a file from the cloud, you must know the name of the resource that contains the file, and the path and name of the file in the resource.

This command is not threadsafe.

1. From the IBM i command line, type **DLTCLDF**, and press F4.
2. In the **Resource** field, type the name of the resource that contains the file.
3. In the **Cloud file name** field, type a resource path and the name of the file to delete, and press Enter. The path and file name are case-sensitive.

---

## Cloud Storage Solutions APIs

Use the Cloud Storage Solutions API to configure and work with resources, copy files, manage storage space, and more.

### Cloud Storage Solutions Resource API

You can use the Resource API to create, change, delete, and get information on resources, get a list of resources, and get the information necessary to recreate all of your resources if something catastrophic happens to your system.

#### Create AWS S3 or IBM Cloud Object Storage Resource API

Use the `Qicc_create_AWSS3_resource` API to create an AWS S3 or IBM Cloud Object Storage resource.

Required Parameter Group:			
1	Resource information	Input	AWS S3 resource structure
2	Error code	Output	Error code information structure
Threadsafe: No			

#### Required Parameter Group

##### **resource\_info**

INPUT; AWS S3 resource structure

Provide the information required to create the resource. For the format of the structure, see “Qicc AWS S3 Resource Info structure” on page 33.

##### **Error code**

OUTPUT; Error code information structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

#### Change AWS S3 or IBM Cloud Object Storage Resource API

Use the `Qicc_update_AWSS3_resource` API to edit the parameters of an AWS S3 or IBM Cloud Object Storage resource.

Required Parameter Group:			
1	Resource information	Input	S3 resource structure
2	Error code	Output	Error code information structure

Threadsafe: No

## Required Parameter Group

### Resource information

INPUT; S3 resource structure

Provide the information required to change the resource. For the format of the structure, see “Qicc AWS S3 Resource Info structure” on page 33.

### Error code

OUTPUT; Error code information structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

## Get AWS S3 or IBM Cloud Object Storage Resource Information API

Use the Qicc\_get\_AWSS3\_resource\_info API to get information on an AWS S3 or IBM Cloud Object Storage resource.

Required Parameter Group:

1	Resource name	Input	Char(10)
2	Resource information	Output	S3 resource structure
3	Error code	Output	Error code structure

Threadsafe: No

## Required Parameter Group

### Resource name

INPUT; CHAR(10)

Specify the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

### Resource information

OUTPUT; S3 resource structure

Returned information on the cloud resource specified in the **Resource name** parameter. For the format of the structure, see “Qicc AWS S3 Resource Info structure” on page 33.

### Error code

OUTPUT; Error code structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

## Create SoftLayer Resource API

Use the Qicc\_create\_softlayer\_resource API to create a SoftLayer resource.

Required Parameter Group:

1	Resource information	Input	SoftLayer resource structure
2	Error code	Output	Error code information structure

Threadsafe: No

## Required Parameter Group

### resource\_info

INPUT; SoftLayer resource structure

Provide the information required to create the resource. For the format of the structure, see “Qicc SoftLayer Resource Info structure” on page 34.

### Error code

OUTPUT; Error code information structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

## Change SoftLayer Resource API

Use the `Qicc_update_softlayer_resource` API to edit the parameters of a SoftLayer resource.

Required Parameter Group:			
1	Resource information	Input	SoftLayer resource structure
2	Error code	Output	Error code information structure
Threadsafe: No			

## Required Parameter Group

### Resource information

INPUT; SoftLayer resource structure

Provide the information required to change the resource. For the format of the structure, see “Qicc SoftLayer Resource Info structure” on page 34.

### Error code

OUTPUT; Error code information structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

## Get SoftLayer Resource Information API

Use the `Qicc_get_softlayer_resource_info` API to get information on a SoftLayer resource.

Required Parameter Group:			
1	Resource name	Input	Char(10)
2	Resource information	Output	SoftLayer resource structure
3	Error code	Output	Error code structure
Threadsafe: No			

## Required Parameter Group

### Resource name

INPUT; CHAR(10)

Specify the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

### Resource information

OUTPUT; SoftLayer resource structure

Returned information on the cloud resource specified in the **Resource name** parameter. For the format of the structure, see “Qicc SoftLayer Resource Info structure” on page 34.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Create FTP Resource API**

Use the Qicc\_create\_ftp\_resource API to create an FTP resource.

Required Parameter Group:		
1 Resource information	Input	FTP resource structure
2 Error code	Output	Error code structure
Threadsafe: No		

**Required Parameter Group**

**resource\_info**

INPUT; FTP resource structure

Provide the information required to create the resource. For the format of the structure, see Qicc FTP Resource Info structure.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Change FTP Resource API**

Use the Qicc\_update\_ftp\_resource API to edit the parameters of an FTP resource.

Required Parameter Group:		
1 Resource information	Input	FTP resource structure
2 Error code	Output	Error code structure
Threadsafe: No		

**Required Parameter Group**

**Resource information**

INPUT; FTP resource structure

Provide the information required to create the resource. For the format of the structure, see Qicc FTP Resource Info structure.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

## Delete Resource API

Use the Qicc\_delete\_resource API delete a resource.

Required Parameter Group:			
1	Resource name	Input	Char(10)
2	Error code	Output	Error code structure
Threadsafe: No			

### Required Parameter Group

#### Resource name

INPUT; CHAR(10)

Specify the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

#### Error code

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

## Get Resource List API

Use the Qicc\_get\_resource\_list API to return a list of the names of existing resources.

Required Parameter Group:			
1	Resource name	Input	Char(10)
2	Resource list	Input/Output	Char(28)
3	Result buffer	Output	Char(*)
2	Error code	Output	Error code structure
Threadsafe: No			

### Required Parameter Group

#### Resource name

INPUT; CHAR(10)

Resource name in UTF-8 (30 bytes) or UTF-16 (20 bytes) to specify the resource name. Can be a simple name, a generic name, or \*ALL (must be upper case). A simple name will return at most one name. A generic name includes the first few letters of a set of similarly named resources followed by an asterisk, acting as a wild card. Entering generic name returns resources that start with the characters before the asterisk.

#### Resource list

Input; CHAR(28)

The specified buffer sizes and CCSID values, and the returned list content. See the *Get resource list format* section of this topic for a description of the format.

#### Result buffer

OUTPUT; CHAR(\*)

Buffer provided to hold result. Can be a null pointer if the **Buffer provided** field in the Get resource list format is zero. Allows an initial call to determine the length of the buffer needed.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Get Resource List format**

Table 1. Get resource list format

Offset		Use	Type	Field
Dec	Hex			
0	0x00	INPUT	SIZE_T	Buffer provided
4	0x04	INPUT	INT	Input CCSID
8	0x08	INPUT	INT	Output CCSID
12	0x0C	OUTPUT	SIZE_T	Buffer available
16	0x10	OUTPUT	SIZE_T	Name length
20	0x14	OUTPUT	INT	Returned names
24	0x18	OUTPUT	INT	Available names

**Field descriptions****Buffer provided**

The length of buffer provided in the **Result buffer** parameter, in bytes.

**Input CCSID**

The CCSID of the **Resource name** parameter. Must be 1200 or 1208.

**Output CCSID**

The CCSID of the **Result buffer** parameter. Must be 1200 or 1208.

**Buffer available**

The size of buffer needed to hold the names that match the value specified in the **Resource name** parameter, and that use the CCSID specified in the **Output CCSID** field.

**Name length**

The length of each name (in bytes) in the **Result buffer** parameter. If the **Output CCSID** field is 1200, the **Name length** value is 20. If the **Output CCSID** field is 1208, the **Name length** value is 30.

**Returned names**

A count of names returned in the **Result buffer** parameter.

**Available names**

The total number of names matching the name specified in the **Resource name** parameter.

**Cloud Storage Solutions File API**

Use the Cloud Storage Solutions API to work with files and the cloud.

**Copy File to Cloud API**

Use the `Qicc_copy_file_to_cloud` API to copy a file from the IFS to the cloud. If the file exists it is updated. If the file does not exist it is created.

You cannot use Cloud Storage Solutions to work with files in the `/QSYS.LIB` file system.

The size of files that you can copy to a resource is determined by the web service provider. SoftLayer currently allows a maximum file size of 5GB. If you copy a file larger than 5GB to a SoftLayer resource, Cloud Storage Solutions will divide it into smaller files of approximately 100MB each. These segments are visible in the SoftLayer account.

If you copy the file from the SoftLayer account, the file is reassembled before it is copied to the IBM i computer. If you delete the file from the cloud using Cloud Storage Solutions, all of the segments are deleted.

SoftLayer currently only allows 1,000 segments per file. If your file is over 100GB, the size of its segments will be the file size divided by 1,000.

Required Parameter Group:			
1	Resource name	Input	Char(10)
2	IFS file name	Input	Path name structure
3	Cloud file name	Input	Path name structure
4	User data	Input	Char(52)
5	Asynchronous flag	Input	Byte(4)
6	Handle	Output	Byte(4)
7	Error code	Output	Error code structure
Threadsafe: No			

## Required Parameter Group

### Resource name

INPUT; CHAR(10)

Specify the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

### IFS file name

INPUT; Path name structure

The path and name of the file to copy to the cloud. In C++ programs, this is the `Qlg_Path_Name_T` structure. The path must begin with a forward slash (/). You must have Read (\*R) authority on the file, and Execute (\*X) authority on all directories in the path leading to the file. For example, to copy `/home/user/jdoe/file.txt`, you must have Execute authority on the `home`, `user`, and `jdoe` directories, and Read authority on `file.txt`. For information on authorities, see *Planning integrated file system security* in the IBM Knowledge Center. For information on the path name structure, see *Path name format* in the IBM Knowledge Center.

### Cloud file name

INPUT; Path name structure

The path and name that the file should have in the cloud. In C++ programs, this is the `Qlg_Path_Name_T` structure. Do not include the container or bucket node specified in the resource. If the path directories do not exist, they are created. With SoftLayer resources, if you are overwriting a file that you copied earlier, the directory and file names are case-sensitive. For example, if the existing file name is `file.txt`, specifying `dir1/dir2/FILE.txt` will create a second file named `FILE.txt` next to `file.txt`. For information on the path name structure, see *Path name format* in the IBM Knowledge Center.

### User data

INPUT; CHAR(52)

Data provided by the caller and passed to the exit programs to help the caller identify which upload completed.

**Asynchronous flag**

INPUT; BYTE(4)

Specifies whether the copy operation is run in the same job as the command, or run asynchronously in its own separate batch job. When you copy files asynchronously, you do not have to wait for large files to finish copying before running other commands, which can take a long time. You can also use the IBM i facilities to work with asynchronous jobs, for example by scheduling when the job runs.

If zero, the function will wait for the copy to finish before returning to the caller. If non-zero, the function will initiate the copy and return without waiting for the copy to finish.

**Handle**

OUTPUT; BYTE(4)

An ID that uniquely identifies this file transfer. It will be passed to exit programs that are registered with the Cloud Connect exit point to uniquely identify which file transfer completed.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Copy Cloud to File API**

Use the Qicc\_copy\_cloud\_to\_file API to copy a file from the cloud to the IFS. If the file exists it is updated. If the file does not exist it is created.

You cannot use Cloud Storage Solutions to work with files in the /QSYS.LIB file system.

If you copy a file from an FTP cloud server to the IBM i computer, and that file was not originally copied to the FTP server using Cloud Storage Solutions, Cloud Storage Solutions assigns the file a coded character set identifier (CCSID) of 66535. A CCSID of 66535 means the operating system treats the file as binary data and it is unreadable in an editor.

If you copy a file from a SoftLayer, Amazon S3, or IBM Cloud Object Storage cloud server to the IBM i computer, and that file was not originally copied to the cloud server using Cloud Storage Solutions, Cloud Storage Solutions reads the data and from it assigns the file a coded character set identifier (CCSID) of either 1208 (UTF-8) if it is text, or 65535 if it is binary.

If the CCSID of the downloaded file is not correct, you can change it. See the topic *Changing the Coded Character Set Identifier (CCSID)* in the IBM Knowledge Center.

Required Parameter Group:

1	Resource name	Input	Char(10)
2	Cloud file name	Input	Path name structure
3	IFS file name	Input	Path name structure
4	User data	Input	Char(52)
5	Asynchronous flag	Input	Byte(4)
6	Handle	Output	Byte(4)

7 Error code	Output	Error code structure
Threadsafe: No		

## Required Parameter Group

### Resource name

INPUT; CHAR(10)

Specify the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

### Cloud file name

INPUT; Path name structure

The path and name of the file in the cloud, for example: `dir1/dir2/file.txt`. In C++ programs, this is the `Qlg_Path_Name_T` structure. Do not include the container or bucket node that is defined in the resource. The path and file name are case-sensitive. For information on the path name structure, see *Path name format* in the IBM Knowledge Center.

### IFS file name

INPUT; Path name structure

An IFS path and the name of the file to copy from the cloud. In C++ programs, this is the `Qlg_Path_Name_T` structure. The path must begin with a forward slash (/). If the directories do not exist, they are created. The user copying the file must have Execute (\*X) authority on all directories in the path, and Write (\*W) authority on the last directory in the path. If the file was copied before and exists in the path, the user must have Write access to it. For example, to copy `file.txt` to `/home/user/jdoe`, you must have Execute authority on the `home`, `user`, and `jdoe` directories, and Write authority on `jdoe`. If `file.txt` is already there, you must have Write authority on it. For information on authorities, see *Planning integrated file system security* in the IBM Knowledge Center. For information on the path name structure, see *Path name format* in the IBM Knowledge Center.

### User data

INPUT; CHAR(52)

Data provided by the caller and passed to the exit programs to help the caller identify which file copy completed.

### Asynchronous flag

INPUT; BYTE(4)

Specifies whether the copy operation is run in the same job as the command, or run asynchronously in its own separate batch job. When you copy files asynchronously, you do not have to wait for large files to finish copying before running other commands, which can take a long time. You can also use the IBM i facilities to work with asynchronous jobs, for example by scheduling when the job runs.

If zero, the function will wait for the copy to finish before returning to the caller. If non-zero, the function will initiate the copy and return without waiting for the copy to finish.

### Handle

OUTPUT; BYTE(4)

An ID that uniquely identifies this file transfer. It will be passed to exit programs that are registered with the Cloud Connect exit point to uniquely identify which file transfer completed.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Delete File from Cloud API**

Use the Qicc\_delete\_file\_from\_cloud API to delete a file from the cloud.

Required Parameter Group:			
1	Resource name	Input	Char(10)
2	Cloud file name	Input	Path name structure
3	Error code	Output	Error code structure
Threadsafe: No			

**Required Parameter Group**

**Resource name**

INPUT; CHAR(10)

Specify the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

**Cloud file name**

INPUT; Path name structure

The path and name of the file in the cloud. In C++ programs this is the Qlg\_Path\_Name\_T structure. Do not include the container or bucket node that is defined in the resource. For more information, see *Path name format* in the IBM Knowledge Center.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Get Restore Command API**

Use the Qicc\_get\_cl\_command API to return the information necessary to recreate all of your resources. If you store the information in a safe location, you can later use it to recreate the resources if something catastrophic happens to your system.

To get resource information, you provide the name of the resource, and the function returns (as a string) the full IBM i Control Language (CL) command required to recreate that resource.

Required Parameter Group:			
1	Resource name	Input	Char(10)
2	Control Language command	Output	Char(1024)
3	Error code	Output	Error code structure
Threadsafe: No			

## Required Parameter Group

### Resource name

INPUT; CHAR(10)

Specify the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

### Control Language command

OUTPUT; CHAR(1024)

The full Control Language (CL) command required to recreate the resource, as a string.

### Error code

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

## List Files in Cloud API

Use the `Qicc_list_files_in_cloud` API to list the files in a cloud resource. You can use this API to verify that particular files are in the cloud.

Required Parameter Group:		
1	Resource name	Input Char(10)
2	Cloud file name	Input Char(**)
3	Handle	I/O Byte(4)
4	File list	Output Char(**)
5	Error code	Output Error code structure
Threadsafe: No		

## Required Parameter Group

### Resource name

INPUT; CHAR(10)

This is the unique name of the resource. The name is between 1 and 10 characters long and must be left-justified and padded with spaces.

### Cloud file name

INPUT; CHAR(\*\*)

This is optional. You can specify characters and a wildcard to return files that are stored in the resource, for example you can specify `A*` to return files that start with `A`. If not specified, all files are returned.

### Handle

I/O; BYTE(4)

An ID that uniquely identifies the list, and the location in the list, that the function is working with. Set this value to 0 (zero) for the first function call. When the function returns it sets the handle value. Pass this handle back in on subsequent calls to this function.

### File list

OUTPUT; CHAR(\*\*)

The first file name in the list that matches the pattern defined in the **Cloud file name** parameter. Call the function repeatedly to get all names in the list; each call returns the next name in the list. When every name in the list has been returned, the value is empty.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Get Cloud Transfer State API**

Use the Qicc\_get\_cloud\_transfer\_state API to get the state of a particular file transfer to or from the cloud.

Required Parameter Group:			
1	Handle	Output	Byte(4)
2	Error code	Output	Error code structure
Threadsafe: No			

**Required Parameter Group****Handle**

OUTPUT; BYTE(4)

An ID that uniquely identifies this file transfer. It is returned by the “Copy File to Cloud API” on page 23 and “Copy Cloud to File API” on page 25. It will be passed to the exit point to uniquely identify which file transfer completed.

**Error code**

OUTPUT; Error code structure

The error code information structure in the ERRC0100 format. For information, see the *Error code parameter* topic in the IBM Knowledge Center.

**Cloud Storage Solutions exit point structures**

To have Cloud Storage Solutions call your programs and pass in data after it transfers files to and from the cloud, you can register exit programs with the Cloud Storage Solutions QIBM\_QICC\_XFER\_CLS exit point. When called, your exit programs must also pass a parameter to Cloud Storage Solutions specifying the success or failure of the call.

For general information about exit points and exit programs, including examples of exit programs, see the IBM Knowledge Center.

The Cloud Storage Solutions exit point uses the CLS00100 format, and is not threadsafe. The exit point is registered with the IBM i registration facility when Cloud Storage Solutions is installed, and deregistered when Cloud Storage Solutions is uninstalled.

When Cloud Storage Solutions calls an exit program it passes in two parameters. The first specifies whether the file was uploaded or downloaded; the second specifies information about the transfer. Each exit program that Cloud Storage Solutions calls returns a parameter that represents the success or failure of the call. All three parameters contain byte stream values that represents fields in a structure.

## Structures

Qicc Exit Description

Qicc Exit Operation

Qicc Exit Control Value

### Qicc Exit Description structure

The Qicc Exit Description structure contains the length of the structure byte stream and the type of operation being described.

#### Fields

- in `exit_description_len` (offset 0x00): byte [4]
- in `operation` (offset 0x04): byte [4]

#### Field descriptions

##### `exit_description_len`

The length of the Qicc Exit Description structure byte stream. The value is 4 bytes. In the byte stream, the value in hexadecimal format is 0x00000004.

##### `operation`

The type of operation being described: 0 means a file upload, 1 means a file download. In the byte stream, the value in hexadecimal format is 0x00 or 0x01.

### Qicc Exit Operation structure

The Qicc Exit Operation structure contains information on the operation.

#### Fields

- in `operation_info_len` (offset 0x00): byte [4]
- in `control_value_len` (offset 0x04): int [4]
- in `handle` (offset 0x08): byte [4]
- in `cloud_resource_name` (offset 0x0C): char [10]
- in `reserved` (offset 0x16): byte [2]
- in `cloud_service_name` (offset 0x18): char [20]
- in `cloud_resource_uri` (offset 0x2C): char [1024]
- in `operation` (offset 0x42C): byte [4]
- in `transfer_state` (offset 0x430): byte [4]
- in `transfer_error_code` (offset 0x434): byte [4]
- in `exit_user_data` (offset 0x438): char [52]
- in `async` (offset 0x46C): byte [4]
- in `cloud_path_name` (offset 0x470): `Qlg_Path_Name_T`

For information on the `Qlg_Path_Name_T` structure, see *Path name format* in the IBM Knowledge Center.

#### Field descriptions

##### `operation_info_len`

The length of the Qicc Exit Operation structure byte stream. The value will be 1168 plus the `cloud_path_name` length.

**control\_value\_len**

The length of the Qicc Exit Control Value structure byte stream. The value is an integer of 4 bytes. In the byte stream, the value in hexadecimal format is 0x00000004.

**handle**

An ID that uniquely identifies a file transfer.

**cloud\_resource\_name**

The unique name of the cloud resource involved in the operation.

**cloud\_service\_name**

The unique name of the cloud service that provides the resource involved in the operation.

**cloud\_resource\_uri**

The Uniform Resource Identifier (URI) of the resource involved in the operation.

**operation**

The type of operation: 0 means a file upload, 1 means a file download. In the byte stream, the value in hexadecimal format is 0x00000000 or 0x00000001.

**transfer\_state**

The file transfer status, with one of the following values:

- 0: Success
- 1: Failure
- 2: Failure (retriable error)

In the byte stream, the value in hexadecimal format is 0x00000000, 0x00000001, or 0x00000002.

**transfer\_error\_code**

The reason for a failed transfer, with one of the following values:

- 0000: No error
- 0001: Warning that the downloaded file was given a default value
- 0002: No connection to the server
- 0003: Communication error between the client and server
- 0004: Invalid password
- 0005: Invalid user
- 0006: Lost connection
- 0007: Connection timed out
- 0008: Ran out of storage
- 0009: Transfer canceled
- 0010: Maximum retries exceeded
- 0011: Data error
- 0012: Authority problem with the Cloud server
- 0013: Local file could not be opened, read, or written (io error)
- 0014: Cloud file not found
- 0015: Local file not found
- 0016: Internal program error

In the byte stream, an example of the value 0001 in hexadecimal format is 0x00000001.

**exit\_user\_data**

The user who called the cloud upload or download API. The information is passed to Cloud Storage Solutions by the program that called the upload or download API. This data can be used to identify a particular invocation of the API.

**async**

Indicates whether the operation should occur synchronously or asynchronously.

**cloud\_path\_name**

The path in the cloud that the file was uploaded to or downloaded from. The value uses the Qlg\_Path\_Name\_T path name format. See *Path name format* in the IBM Knowledge Center.

**Qicc Exit Control Value structure**

Your program uses the Qicc Exit Control Value structure to specify whether it succeeded or failed in receiving parameters from the Cloud Storage Solutions programs.

**Fields**

out process\_return\_code (offset 0x00): byte [4]

**Field descriptions****process\_return\_code**

Your exit program returns an integer of four bytes that specify whether it succeeded or failed in receiving parameters from the Cloud Storage Solutions programs: 0 means success; 1 means failure.

The Qicc Exit Control Value structure is an integer of 4 bytes. In the byte stream, the value in hexadecimal format is 0x00000001.

**Example:**

In the following example, the Qicc Exit Control Value byte stream (in hexadecimal format) is 4 bytes long and represents a successful call from the Cloud Storage Solutions programs:

```
0x00000000
```

**Cloud Storage Solutions resource structures**

Use the Cloud Storage Solutions resource structures to pass resource information in the API.

**Structures**

Qicc Base Resource Info

Qicc S3 Resource Info

Qicc SoftLayer Resource Info

Qicc FTP Resource Info

## Qicc Base Resource Info structure

The Qicc Base Resource Info structure contains information common to all resource types.

### Fields

in **resource\_id**: byte [4]

out **resource\_type**: byte [4]

out **resource\_name**: char [10]

out **resource\_desc**: char [50]

out **directory\_name**: char [1024] [This field is not currently supported.]

### Field descriptions

#### **resource\_id**

The unique ID that is assigned to the resource by Cloud Storage Solutions when the resource is created.

#### **resource\_type**

The cloud service provider. Values:

- 0: AWSS3
- 1: SoftLayer
- 4: FTP

#### **resource\_name**

The unique resource name. Names are a maximum of ten characters, and are IBM i basic names that must adhere to the \*NAME type restrictions. Every basic name can begin with the characters A-Z, \$, #, or @ and can be followed by up to nine characters. The remaining characters can include the same characters as the first but can also include numbers 0-9, underscores (\_), and periods (.). Lowercase letters are changed to uppercase letters by the system. Basic names used in IBM-supplied commands can be no longer than 10 characters. However, in your own commands you can define parameters of type \*NAME (specified on the TYPE parameter of the PARM or ELEM statements) with up to 256 characters. For more information, and information on names in quoted form, see the topic *Names (\*NAME)* in the IBM Knowledge Center.

#### **resource\_desc**

The resource description.

#### **directory\_name**

The name of the IFS directory to keep synchronized with the resource. [This field is not currently supported.]

## Qicc AWS S3 Resource Info structure

The APIs to get, create, and change AWS S3 and IBM Cloud Object Storage resources use the Qicc AWS S3 Resource Info structure. Both resources use the AWS S3 protocol.

## Fields

I/O **Qicc\_AWSS3\_Resource\_Info\_t**: Qicc Base Resource Info structure

I/O **resource\_uri**: char [2046]

I/O **bucket\_name**: char [126]

I/O **key\_id**: char [40]

I/O **secret\_key**: char [80]

## Field descriptions

### **Qicc\_AWSS3\_Resource\_Info\_t**

The Qicc Base Resource Info structure. See “Qicc Base Resource Info structure” on page 33.

### **resource\_uri**

The Uniform Resource Identifier (URI) of the bucket.

### **bucket\_name**

The name of the bucket, which is the root directory location on the cloud server.

### **key\_id**

The name of a user authorized to access the bucket.

### **secret\_key**

The authorization key required to access the bucket.

## **Qicc SoftLayer Resource Info structure**

The get, create, and change SoftLayer resource APIs use the Qicc SoftLayer Resource Info structure.

## Fields

I/O **resource\_info\_fields**: Qicc Base Resource Info structure

I/O **resource\_uri**: char [2046]

I/O **container\_name**: char [510]

I/O **auth\_user**: char [256]

I/O **auth\_key**: char [512]

## Field descriptions

### **resource\_info\_fields**

The Qicc Base Resource Info structure. See “Qicc Base Resource Info structure” on page 33.

### **resource\_uri**

The Uniform Resource Identifier (URI) of the container.

### **container\_name**

The name of the container, which is the root directory location on the cloud server.

**auth\_user**

The name of a user authorized to access the container.

**auth\_key**

The authorization key required to access the container.

**Qicc FTP Resource Info structure**

The create and change FTP resource APIs use the Qicc FTP Resource Info structure.

**Fields**

I/O **resource\_info\_fields**: Qicc Base Resource Info structure

I/O **resource\_uri**: char [2046]

I/O **container\_name**: char [510]

I/O **auth\_user**: char [256]

I/O **auth\_pwd**: char [512]

**Field descriptions****resource\_info\_fields**

The Qicc Base Resource Info structure. See “Qicc Base Resource Info structure” on page 33.

**resource\_uri**

The Uniform Resource Identifier (URI) of the storage location. Include the fully-qualified name of computer that hosts the FTP server, for example, myserver.enterprise.com. If the port number of the FTP server computer is not the default port number of 21 then you must include the port, for example, myserver.enterprise.com:23.

**container\_name**

The server root directory. The directory must begin with a forward slash (/).

**auth\_user**

The ID of a user who can log into the FTP server.

**auth\_pwd**

The password of the user specified in **auth\_user**.



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