<https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/put-get-object-directory.html#GUID-7E6472F5-5256-4D18-B262-469D012437FC>

## Create Directory in Autonomous Database

To create directories use the database CREATE DIRECTORY command. Using CREATE DIRECTORY you specify the path as a relative path for the new directory.

CREATE DIRECTORY creates the database directory object and also creates the file system directory if it does not already exist. If the file system directory exists then CREATE DIRECTORY only creates the database directory object. For example, the following command creates the database directory named staging and creates the file system directory stage:

**CREATE** DIRECTORY staging **AS** 'stage';

You can also create subdirectories. For example, the following command creates the database directory object sales\_staging and the file system directory stage/sales:

**CREATE** DIRECTORY sales\_staging **AS** 'stage/sales';

When you create subdirectories you do not have to create the initial file system directory. For example, in the previous example if the directory stage does not exist then the CREATE DIRECTORY command creates both directories stage and stage/sales.

To add a directory, you must have the CREATE ANY DIRECTORY system privilege. The ADMIN user is granted the CREATE ANY DIRECTORY system privilege. The ADMIN user can grant CREATE ANY DIRECTORY system privilege to other users.

See [CREATE DIRECTORY](https://docs.oracle.com/pls/topic/lookup?ctx=en/cloud/paas/autonomous-database/adbsa&id=SQLRF-GUID-8E9C569A-1B06-42C4-9586-0EF83437001A) for more information.

**Notes:**

* CREATE DIRECTORY creates the database directory object in the database and also creates the file system directory. For example the directory path could be:

/u03/dbfs/7C149E35BB1000A45FD/data/stage

* You can create a directory in the root file system to see all the files with the following commands:

**CREATE** **OR** **REPLACE** DIRECTORY ROOT\_DIR **AS** '';

After you create the ROOT\_DIR directory, use the following command to list all files:

**SELECT** \* **FROM** DBMS\_CLOUD.list\_files('ROOT\_DIR');

To run DBMS\_CLOUD.LIST\_FILES with a user other than ADMIN you need to grant read privileges on the directory to that user. See [LIST\_FILES Function](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/dbms-cloud-subprograms.html#GUID-78F49B25-C072-45E1-BE83-E306ACC998EE) for more information.

* Space in the file system allocated for the directories you create and their contents is part of your storage allocation. See [Database Dashboard Overview](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/monitor-performance-intro.html#GUID-3620E2F4-69BA-43FD-A73E-598EE2AD8526) to view the total space allocated.

## Copy Files Between Object Store and a Directory in Autonomous Database

Use the procedure DBMS\_CLOUD.PUT\_OBJECT to copy a file from a directory to Object Store. Use the procedure DBMS\_CLOUD.GET\_OBJECT to copy a file from Object Store to a directory.

For example, to copy a file from Object Store to the stage directory, run the following command:

**BEGIN**

DBMS\_CLOUD.GET\_OBJECT(

credential\_name => 'DEF\_CRED\_NAME',

object\_uri => 'https://objectstorage.usphoenix-1.oraclecloud.com/n/*namespace-string*/b/*bucketname*/o/cwallet.sso',

directory\_name => 'STAGE');

**END**;

/

Creating a credential to access Oracle Cloud Infrastructure Object Store is not required if you enable resource principal credentials. See [Use Resource Principal to Access Oracle Cloud Infrastructure Resources](https://docs.oracle.com/pls/topic/lookup?ctx=en/cloud/paas/autonomous-database/adbsa&id=ADBSA-GUID-E283804C-F266-4DFB-A9CF-B098A21E496A)for more information.

In this example, *namespace-string* is the Oracle Cloud Infrastructure object storage namespace and *bucketname* is the bucket name. See [Understanding Object Storage Namespaces](https://docs.cloud.oracle.com/iaas/Content/Object/Tasks/understandingnamespaces.htm) for more information.

To run DBMS\_CLOUD.GET\_OBJECT with a user other than ADMIN you need to grant write privileges on the directory to that user.

To run DBMS\_CLOUD.PUT\_OBJECT with a user other than ADMIN you need to grant read privileges on the directory to that user.

See [GET\_OBJECT Procedure and Function](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/dbms-cloud-subprograms.html#GUID-3DB888C9-18C7-4A26-8DA8-EDFB260E2B14) and [PUT\_OBJECT Procedure](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/dbms-cloud-subprograms.html#GUID-716F0DE7-C669-477E-8AB8-EA42E41ACB12) for more information

## Access Network File System from Autonomous Database

You can attach a Network File System to a directory location in your Autonomous Database.

This allows you to load data from Oracle Cloud Infrastructure File Storage in your Virtual Cloud Network (VCN) or from any other Network File System in on-premises data centers.

Supporting Network File System allows you to do the following:

* Connect to an Autonomous Database instance from a legacy application and use the file system to load and unload data.
* Analyze data from different sources in an Autonomous Database.
* Secure access to data in an Autonomous Database from the file systems in an on-premises data center or Private Virtual Cloud Networks (VCNs).

**Topics**

* [Attach Network File System to Autonomous Database](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/load-oci-file-storage.html#GUID-7C396A7A-D20A-40F7-99D7-50B85B9B18DC)
* [Detach Network File System from Autonomous Database](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/load-oci-file-storage.html#GUID-31B2CAA9-E7FA-4A87-AC27-E89DA6A9CC07)
* [DBA\_CLOUD\_FILE\_SYSTEMS View](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/load-oci-file-storage.html#GUID-C8BFEE4F-27EE-49CB-8D13-2A798600347B)

### **Attach Network File System to Autonomous Database**

Use DBMS\_CLOUD\_ADMIN.ATTACH\_FILE\_SYSTEM to attach a file system to a directory in your Autonomous Database.

**Note:**

The DBMS\_CLOUD\_ADMIN.ATTACH\_FILE\_SYSTEM procedure can only attach a private File Storage Service to databases that are on private endpoints.

To access data in an Autonomous Database from the file systems in an on-premises data center you must set up FastConnect or a Site-to-Site VPN to connect to the on-premises data center. See [FastConnect](https://docs.oracle.com/en-us/iaas/Content/Network/Concepts/fastconnect.htm) and [Site-to-Site VPN](https://docs.oracle.com/en-us/iaas/Content/Network/Tasks/overviewIPsec.htm) for more information.

1. Create a directory or use an existing directory to attach a Network File System in your Autonomous Database. You must have WRITE privilege on the directory object on your Autonomous Database instance to attach a file system to a directory location in the database.

For example, the following command creates the database directory named FSS\_DIR and creates the file system directory fss:

**CREATE** DIRECTORY FSS\_DIR **AS** ‘fss’;

See [Create Directory in Autonomous Database](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/create-directory.html#GUID-4DE91325-5D60-49E8-8D82-159AAA8994D2) for more information.

1. Run DBMS\_CLOUD\_ADMIN.ATTACH\_FILE\_SYSTEM to attach a file system to a directory in your Autonomous Database. To run this procedure, you must be logged in as the ADMIN user or have EXECUTE privilege on DBMS\_CLOUD\_ADMIN.

**BEGIN**

DBMS\_CLOUD\_ADMIN.ATTACH\_FILE\_SYSTEM (

file\_system\_name => 'FSS',

file\_system\_location => 'myhost.sub000445.myvcn.oraclevcn.com:/results',

directory\_name => 'FSS\_DIR',

description => 'Source NFS for sales data'

);

**END**;

/

This example attaches the network file system specified in the file\_system\_name parameter to the Autonomous Database.

The file\_system\_location parameter specifies the location of the file system. The value you supply with file\_system\_location consists of a Fully Qualified Domain Name (FQDN) and a file path in the form: *FQDN*:*file\_path*.

For example:

* + FQDN: myhost.sub000445.myvcn.oraclevcn.com

For Oracle Cloud Infrastructure File Storage set the FQDN in **Show Advanced Options** when you create a file system. See [Creating File Systems](https://docs.oracle.com/en-us/iaas/Content/File/Tasks/creatingfilesystems.htm) for more information.

* + File Path: /results

The directory\_name parameter specifies the directory name in the Autonomous Database where you want to attach the file system. This is the directory you created in Step 1, or another directory you previously created.

The description parameter specifies the description for the task.

After you attach a file system you can query the DBA\_CLOUD\_FILE\_SYSTEMS view to retrieve information about the attached file system.

For example:

**SELECT** file\_system\_name, file\_system\_location, directory\_path

**FROM** dba\_cloud\_file\_systems

**WHERE** file\_system\_name = 'FSS';

This query returns details for the FSS file system name.

See [DBA\_CLOUD\_FILE\_SYSTEMS View](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/load-oci-file-storage.html#GUID-C8BFEE4F-27EE-49CB-8D13-2A798600347B) for more information.

With an attached file system you can read and write to files on an attached file system using any PL/SQL API that accepts a directory name. For example, you can use any of the following methods to work with an attached NFS directory:

* The UTL\_FILE package.
* Data Pump Export and Import utilities.
* The DBMS\_CLOUD APIs that work with directories such as DBMS\_CLOUD.LIST\_FILES and DBMS\_CLOUD.PUT\_OBJECT.

Example showing a write a file on an attached file system using UTL\_FILE:

**DECLARE**

l\_file UTL\_FILE.FILE\_TYPE;

l\_location VARCHAR2(100) := 'FSS\_DIR';

l\_filename VARCHAR2(100) := 'test.csv';

**BEGIN**

-- Open the file.

l\_file := UTL\_FILE.FOPEN(l\_location, l\_filename, 'w');

UTL\_FILE.PUT(l\_file, 'Scott, male, 1000');

-- Close the file.

UTL\_FILE.FCLOSE(l\_file);

**END**;

/

Example showing a read a file on an attached file system using UTL\_FILE:

**DECLARE**

l\_file UTL\_FILE.FILE\_TYPE;

l\_location VARCHAR2(100) := 'FSS\_DIR';

l\_filename VARCHAR2(100) := 'test.csv';

l\_text VARCHAR2(32767);

**BEGIN**

-- Open the file.

l\_file := UTL\_FILE.FOPEN(l\_location, l\_filename, 'r');

UTL\_FILE.GET\_LINE(l\_file, l\_text, 32767);

-- Close the file.

UTL\_FILE.FCLOSE(l\_file);

**END**;

/

Example showing list files on an attached file system using DBMS\_CLOUD.LIST\_FILES:

**SELECT** object\_name **FROM** DBMS\_CLOUD.LIST\_FILES('FSS\_DIR');

Notes for using DBMS\_CLOUD\_ADMIN.ATTACH\_FILE\_SYSTEM:

* Oracle Cloud Infrastructure File Storage uses NFS Version 3 to share
* If you attach to non-Oracle Cloud Infrastructure File Storage systems, the procedure supports NFS Version 2 and NFS Version 3
* DBMS\_CLOUD\_ADMIN.ATTACH\_FILE\_SYSTEM does not support NFS Version 4

See the following for more information:

* [UTL\_FILE](https://docs.oracle.com/en/database/oracle/oracle-database/19/arpls/UTL_FILE.html#GUID-EBC42A36-EB72-4AA1-B75F-8CF4BC6E29B4)
* [LIST\_FILES Function](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/dbms-cloud-subprograms.html#GUID-78F49B25-C072-45E1-BE83-E306ACC998EE)
* [OCI File Storage Service](https://docs.oracle.com/en-us/iaas/Content/File/Concepts/filestorageoverview.htm)
* [ATTACH\_FILE\_SYSTEM Procedure](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/dbms-cloud-admin.html#GUID-1C562DE9-066C-4D8B-B058-53F30E9061C3)

### **Detach Network File System from Autonomous Database**

Use the DBMS\_CLOUD\_ADMIN.DETACH\_FILE\_SYSTEM procedure to detach a file system from a directory in your Autonomous Database.

**Note:**

The DBMS\_CLOUD\_ADMIN.DETACH\_FILE\_SYSTEM procedure can only detach a private File Storage Service from the databases that are on private endpoints.

You must have the WRITE privilege on the directory object to detach a file system from a directory location.

Run DBMS\_CLOUD\_ADMIN.DETACH\_FILE\_SYSTEM procedure to detach a file system from a directory location in your Autonomous Database. To run this procedure, you must be logged in as the ADMIN user or have the EXECUTE privilege on DBMS\_CLOUD\_ADMIN.

**BEGIN**

DBMS\_CLOUD\_ADMIN.DETACH\_FILE\_SYSTEM (

file\_system\_name => 'FSS'

);

**END**;

/

This example detaches the network file system specified in the file\_system\_name parameter from the Autonomous Database. You must provide a value for this parameter.

The information about this file system is removed from the DBA\_CLOUD\_FILE\_SYSTEMS view.

See the following for more information:

* [OCI File Storage Service](https://docs.oracle.com/en-us/iaas/Content/File/Concepts/filestorageoverview.htm)
* [Creating and Managing Directories on Autonomous Database](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/create-manage-directory.html#GUID-5EC418F4-2084-4884-8D1E-BACA56F143F9)
* [DETACH\_FILE\_SYSTEM Procedure](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/dbms-cloud-admin.html#GUID-DCDEDC04-BA2C-4FE0-82AF-28203521ECAB)

### **DBA\_CLOUD\_FILE\_SYSTEMS View**

The DBA\_CLOUD\_FILE\_SYSTEMS view lists the information about the network file system attached to a directory location in the database.

| **Column** | **Description** |
| --- | --- |
| FILE\_SYSTEM\_NAME | File system name |
| FILE\_SYSTEM\_LOCATION | File system location |
| DIRECTORY\_NAME | Attached directory name |
| DIRECTORY\_PATH | Attached directory path |
| DESCRIPTION | The value provided for the description parameter when you run DBMS\_CLOUD\_ADMIN.ATTACH\_FILE\_SYSTEM |
| CREATION\_TIME | Creation timestamp |

## Load Data from Directories in Autonomous Database

As an alternative to an object store location URI, you can specify a directory with DBMS\_CLOUD procedures to load or unload data from files in a local directory, including directories created on attached network file systems.

The following procedures support specifying files in a directory with the file\_uri\_list parameter:

* DBMS\_CLOUD.COPY\_COLLECTION
* DBMS\_CLOUD.COPY\_DATA
* DBMS\_CLOUD.CREATE\_EXTERNAL\_TABLE

The following procedures support specifying files in a directory with the partitioning\_clause parameter:

* DBMS\_CLOUD.CREATE\_EXTERNAL\_TABLE
* DBMS\_CLOUD.CREATE\_HYBRID\_PART\_TABLE

You can specify one directory and one or more file names or use a comma separated list of directories and file names. The format to specify a directory is:'*MY\_DIR*:*filename.ext*'. By default the directory name *MY\_DIR* is a database object and is case-insensitive. The file name is case sensitive.

When you use the file\_uri\_list parameter to specify a directory you do not need to include the credential\_name parameter, but you need READ object privileges on the directory.

For example, with a call to DBMS\_CLOUD.COPY\_DATA, use the file\_uri\_list parameter to specify files in a directory:

**BEGIN**

DBMS\_CLOUD.COPY\_DATA(

table\_name => 'HRDATA1',

file\_uri\_list => 'HR\_DIR:test.csv',

**format** => JSON\_OBJECT('type' **value** 'csv') );

**END**;

/

This example copies the data from test.csv in the local directory HR\_DIR to the table HRDATA1.

You can use wildcards to specify file names in a directory. The character "\*" can be used as the wildcard for multiple characters, the character "?" can be used as the wildcard for a single character. For example:'*MY\_DIR*:\*" or '*MY\_DIR*:test?'

To specify multiple directories, use a comma separated list of directories: For example:'*MY\_DIR1*:\*, *MY\_DIR2*:test?'

Use double quotes to specify a case-sensitive directory name. For example:'"*my\_dir1*":\*, "*my\_dir2*":Test?'

To include a quote character, use two quotes. For example:'*MY\_DIR*:''filename.ext'. This specifies the filename starts with a quote (').

See [Attach Network File System to Autonomous Database](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/load-oci-file-storage.html#GUID-7C396A7A-D20A-40F7-99D7-50B85B9B18DC) for information on attaching network file systems.

**Notes for Using Directories with DBMS\_CLOUD Procedures**

Note the following when you use DBMS\_CLOUD procedures and specify a directory with the file\_uri\_list parameter:

* Compression options for files such as GZIP are not supported for directory files. See the compression format option in [DBMS\_CLOUD Package Format Options](https://docs.oracle.com/en/cloud/paas/autonomous-database/adbsa/format-options.html#GUID-08C44CDA-7C81-481A-BA0A-F7346473B703) for more information.
* Special characters such as colon (:), single quote('), and comma(,) are not supported in the directory name.