IBM Cloud Orchestrator
Content Pack for NetApp ONTAP-8
Version 2.0

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IBM

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Contents

Preface

This publication documents how to use the IBM® Cloud Orchestrator Content Pack for NetApp ONTAP-8.

Audience

This information is intended for content developers of IBM Cloud Orchestrator who implement the NetApp ONTAP-8 content pack.

Chapter 1. Introduction

You can use NetApp Clustered Data ONTAP environment for provisioning or deprovisioning network file systems by using this content pack. In addition, you can also mount or unmount network file systems.

Installing and configuring

To use this content pack, you must have a good knowledge of the NetApp environment and its administration.

A good knowledge of IBM Cloud Orchestrator and of the Business Process Manager programming model is required for using the toolkit as a software development kit (SDK) for building new content.

Supported versions
- IBM Cloud Orchestrator version 2.4
- NetApp ONTAP 8 Cluster mode version 8.2

Download the content pack from the marketplace. The compressed content pack file contains the following items:
- The IBM Cloud Orchestrator Content Pack for NetApp ONTAP-8 toolkit: `ICOrchestrator_StorageNAS_NetApp_CMode_Toolkit_<YYYYMMDD>.twx`
- Product documentation
- The XML definition file for NetApp for NAS Storage Offerings and Actions to be automatically created through the IBM Cloud Orchestrator Self-Service Catalog Population Tool: `storage-offerings.xml`

To use this content pack, ensure you have the following prerequisites on the device:
- Install the `ICOrchestrator_StorageNAS_NetApp_CMode_Toolkit_<YYYYMMDD>.twx` toolkit into Business Process Manager.
- Create Offerings, Categories, and Orchestrator Actions for the operations exposed by the toolkit.
- Import the `manageontap.jar` file.
- Register at least one NetApp Storage Host into IBM Cloud Orchestrator.

Prerequisites for connection using NetApp ONTAP 8.x

Before you can use the content pack, you must install and configure NetApp storage.

The prerequisites for connection using NetApp ONTAP 8.x are as follows:
1. Install Data ONTAP 8.x and configure nodes and cluster on it.
2. Perform Cluster admin level tasks like creation of aggregates.
3. Create and properly configure VServer(s) for the cluster.
4. Enable and run NFS server for the cluster.
5. Add NFS protocol to the Vserver. Vserver(s) are accessible through Logical Interfaces (created for Vserver).

Note: The supported software versions are Data ONTAP 8.2 and manageontap.jar 5.2. The Jar name must be manageontap.jar.

Importing manageontap Jar file

As a prerequisite, you must import `manageontap` Jar file.

Before you begin

You can get the `manageontap.jar` Netapp SDK version 5.2 jar file from the machine on which the NetApp Management console is installed. In general, the location is `Install_Directory\plugins\com.netapp.nmf.libraries.manageontap-1.5.0\lib` directory. You can also follow the procedure in http://communities.netapp.com/docs/DOC-1152.

Procedure

1. Log in to the Process Center.
2. Select the `ICOrchestrator_StorageNAS_NetApp_CMode_Toolkit_<YYYYMMDD>.twx` and click **Manage**.
3. Select **Allow users to update the toolkit**.
4. Open the content pack in the Process Designer.
5. Click **Files** > **Server**.
6. Browse to the directory and select the Jar.
7. Click **OK**.
8. Click **Save** icon to save the changes made to the toolkit.

Chapter 2. Toolkit scenarios

There are a number of scenarios that are immediately available from the toolkit.

First, you register the required Self-Service Offerings and Orchestrator Actions, based on the configuration parameters specified in each of the scenarios.

The following scenarios are available:

For more information about operation registration, see the following topics in the IBM Cloud Orchestrator section of the IBM Knowledge Center:

- IBM Cloud Orchestrator > Managing orchestration workflows > IBM Cloud Orchestrator content development > Automating the creation of categories, offerings, and user actions
- IBM Cloud Orchestrator > Managing orchestration workflows > Orchestration workflows > Self-service offerings
- IBM Cloud Orchestrator > Managing orchestration workflows > Orchestration workflows > User actions
- IBM Cloud Orchestrator > Managing orchestration workflows > Orchestration workflows > Event-triggered actions
- IBM Cloud Orchestrator > Working with self-service > Managing self-service offerings
- IBM Cloud Orchestrator > Working with self-service > Using self-service
- IBM Cloud Orchestrator > Managing orchestration workflows > Working with Business Process Manager > Making a process available as an orchestration action

Alternatively, to automatically create all scenarios at once, in IBM Cloud Orchestrator Self-Service Catalog Population Tool, provide the required configuration file that is available with the content pack.

Note: The Self-Service Catalog Population Tool is available with IBM Cloud Orchestrator.

Process	UI	Self-service	Event-triggered	User action	Comments
`RegisterStorageHostOnNetAppCmode`	Same name	X			
`UnregisterStorageHostOnNetappCMode`	Same name	X			A storage host must be registered
`CreateVserverMember`	Same name	X			A storage host must be registered

Process	UI	Self-service	Event-triggered	User action	Comments
ModifyVserverMember	Same name	X			A file system must be created
DeleteVserverMember	Same name	X			A file system must be created
MountFileSystemOnNetAppCmode	Same name			X	A file system must be shared
UnmountFileSystemOnNetAppCMode	Same name			X	A file system must be mounted

Registering a NetApp storage host

You can register the basic configuration parameters to access a NetApp server in IBM Cloud Orchestrator.

This use case is available as a self-service offering.

As an administrator, register this custom operation as a self-service offering in the user interface of IBM Cloud Orchestrator. Here, this custom operation is registered as Register Storage Host on NetApp.

Procedure
1. Log in to the IBM Cloud Orchestrator UI.
2. Click **SELF-SERVICE CATALOG**.
3. Click **Storage on NetApp**.
4. Click **Register Storage Host on NetApp**.
5. In the Register Storage host on NetApp page, enter the following details:

   Hostname
   Host name or IP address of the storage manager.

   Port For cluster mode, the port is 443.

   Username
   User name of the privileged user to run commands on the storage device.

   Password
   Password of the privileged user to run commands on the storage device

   Confirm password
   Confirm the password.
6. If you want to register only if IBM Cloud Orchestrator can connect to the Netapp Server, then select **Abort the operation if the NetApp Storage Host is unreachable**. Clear the selection for offline registration
7. Click **Register**.

Unregistering a NetApp storage host

You can unregister the basic configuration parameters to access a NetApp server in IBM Cloud Orchestrator.

This use case is available as a self-service offering.

As an administrator, register this custom operation as a self-service offering in the user interface of IBM Cloud Orchestrator. Here, this custom operation is registered as Unregister Storage Host on NetApp.

Procedure

1. Log in to the IBM Cloud Orchestrator UI.
2. Click **SELF-SERVICE CATALOG**.
3. Click **Storage on NetApp**.
4. Click **Unregister Storage Host on NetApp**.
5. Select the Storage Manager that you want to unregister.
6. Click **Unregister**.

Note: The host is unregistered even if it has active file systems that were created using this content pack.

Creating a file system on NetApp

You can create a file system on NetApp from the user interface of IBM Cloud Orchestrator.

This use case is available as a self-service offering.

As an administrator, register this custom operation as a self-service offering in the user interface of IBM Cloud Orchestrator. Here, this custom operation is registered as Create FileSystem on NetApp.

Procedure

1. Log in to the IBM Cloud Orchestrator UI.
2. Click **SELF-SERVICE CATALOG**.
3. Click **Storage on NetApp**.
4. Click **Create FileSystem on NetApp**.
5. In the Create FileSystem on NetApp page:
   a. Select the Storage Manager from the list. If only one Storage Manager is registered, the UI connects to the unique NetApp Storage Manager registered. Click **Next**.
   b. Enter the following information for the file system:

      Name   Name of the file system

      Description
               Description of the file system

      Vserver
               VServer on a NetApp cluster

      Size   Size in GB of the file system

               Note: The range of GB size is from 1 to 999.

6. Click **Next**.

   Note: If you want to bypass the configuration details and create a filesystem, then click **Create**. It associates both protocols on the file system of a policy and the export policy contents are created in mixed mode. This content pack supports CIFS protocol and NFS protocol.

7. For CIFS, enter the following details to create a file share:
   - In **CIFS Sharing Settings** section, select **Enable CIFS**.
   - Click + icon to add **User Permissions**.
   - In **User Permissions** section, enter a name of the user. From the **Permissions** list, select a value. The available values are `NoAccess`, `Read`, `Change`, and `Full`.
   - You can also set specific host permissions.

8. For NFS, enter the following details to create a file share:
   - In **NFS Sharing Settings** section, **Enable NFS**.
   - In **Map anonymous user to**, enter the user having anonymous access.
   - If you select **Do not allow set UID option**, then any program on all folders will only be run with owner privileges. A program can run with either privileges of the owner or the anonymous user.
   - From the **Security setting** list, select a value. The available values are `None`, `Kerberos v5 integrity`, `Kerberos v5`, `Kerberos privacy`, `Unix style`.
   - From **All hosts permissions** list, select a value. The available values are `ReadOnly` and `ReadWrite`.
   - In **Specific hosts permissions** section, click + to add hosts. If you select `ReadOnly` for **All hosts permissions**, then **Specific hosts permissions** will have `ReadWrite` access and vice versa.

9. Click **Next**. A summary is displayed.
10. Click **Create**.

Modifying a file system on NetApp

You can modify the total size of a file system on NetApp from the user interface of IBM Cloud Orchestrator.

This use case is available as a self-service offering.

As an administrator, register this custom operation as a self-service offering in the user interface of IBM Cloud Orchestrator. Here, this custom operation is registered as Modify FileSystem on NetApp.

Procedure

1. Log in to the IBM Cloud Orchestrator UI.
2. Click **SELF-SERVICE CATALOG**.
3. Click **Storage on NetApp**.
4. Click **Modify FileSystem on NetApp**.
5. In the Modify FileSystem on NetApp page:
   a. Select the Storage Manager from the list. If only one Storage Manager is registered, the UI connects to the unique NetApp Storage Manager registered. Click **Next**.
   b. Select the file system to modify. Click **Next**.

c. Enter the new value for the size in GB of the file system.

   Note: The range of GB size is from 1 to 999.

d. Click **Modify**.

Deleting a file system on NetApp

You can delete a file system on NetApp from the user interface of IBM Cloud Orchestrator.

This use case is available as a self-service offering.

As an administrator, register this custom operation as a self-service offering in the user interface of IBM Cloud Orchestrator. Here, this custom operation is registered as Delete FileSystem on NetApp.

Procedure

1. Log in to the IBM Cloud Orchestrator UI.
2. Click **SELF-SERVICE CATALOG**.
3. Click **Storage on NetApp**.
4. Click **Delete FileSystem on NetApp**.
5. In the Delete FileSystem on NetApp page:
   a. Select the Storage Manager from the list. If only one Storage Manager is registered, the UI connects to the unique NetApp Storage Manager registered. Click **Next**.
   b. Select the file system to delete.
   c. Click **Delete**.

   The file system is deleted irrespective of whether it is used in the backend or is mounted.

Mounting a file system on NetApp

You can mount an existing shared file system from the user interface of the IBM Cloud Orchestrator.

This use case is available as a user action.

As an administrator, register this custom operation as a self-service offering in the user interface of IBM Cloud Orchestrator. Here, this custom operation is registered as Mount FileSystem on NetApp. Run this action on a virtual system instance.

The virtual system instance must have a registered public/private key pair.

Procedure

1. Log in to the IBM Cloud Orchestrator UI.
2. Click **Assigned Resources**.
3. Select a virtual instance and note the **Actions** menu on the left.
4. Select **Mount FileSystem on NetApp**.
5. In the Mount FileSystem on NetApp page:
   a. Select the Storage Manager from the list. If only one Storage Manager is registered, the UI connects to the unique NetApp Storage Manager registered. Click **Next**.

b. Select the file system to mount and click **Next**. The option shows NFS support.

   Note: NFS volumes are mounted on Linux servers and CIFS on Windows servers.

c. Enter the **Mount Point** name and the **Type** of the share.

   Important: If you try to use a mount point that already exists, then the action fails after 'n' number of trials. To successfully create a mount point directory, always use a mount point that is not already in use.

d. Click **Mount**.

6. Automatic mount of CIFS share has limitations and is not supported in this toolkit. Follow these steps to manually map CIFS Share on the Windows server:

a. Add the Windows server to domain and add the domain user to have remote access permission to the server.

b. Log in to the Windows server with domain user

c. To map the CIFS share, right click on Computer > Map Network Drive > Select a drive letter and Folder is the CIFS share exportPath.

Unmounting a file system on NetApp

You can unmount an existing mounted file system from the user interface of the IBM Cloud Orchestrator.

This use case is available as a user action.

As an administrator, register this custom operation as a self-service offering in the user interface of IBM Cloud Orchestrator. Here, this custom operation is registered as Unmount FileSystem on NetApp. Run this action on a virtual system instance.

The virtual system instance must have a registered public/private key pair.

Procedure
1. Log in to the IBM Cloud Orchestrator UI.
2. Click **Assigned Resources**.
3. Select a virtual instance and note the **Actions** menu on the left.
4. Select **Unmount FileSystem on NetApp**.
5. In the Unmount FileSystem on NetApp page:

a. Select the Storage Manager from the list. If only one Storage Manager is registered, the UI connects to the unique NetApp Storage Manager registered. Click **Next**.

b. Select the file system to unmount.

c. Click **Unmount**.

Chapter 3. Toolkit developer's reference

There are Business Process Manager artifacts exposed in the `ICOrchestrator_StorageNAS_NetApp_CMode_Toolkit` contained in the content pack.

It is intended to be used by IBM Cloud Orchestrator content developers who want to extend the already available scenarios or who want to write new scenarios leveraging the building blocks available from the toolkit.

The `ICOrchestrator_StorageNAS_NetApp_CMode_Toolkit` has dependencies against the following basic toolkits that are delivered as a part of IBM Cloud Orchestrator:
* `SCOrchestrator_Scripting_Utilities_Toolkit`
* `SCOrchestrator_Toolkit`

The following items are the main building blocks of the toolkit:
* "Business objects"
* "Coach view" on page 11
* "Human services" on page 14
* "Business processes" on page 14
* "General system services" on page 15
* "Integration services" on page 16

Business objects

There are Business Process Manager business objects defined in the toolkit.

StorageManager

This object is used for storing information about the parameters associated to a Storage Host.

RegisterStorageManagerBO

This object is used for storing the Storage Manager registration info: the data of the Storage Manager to register and checking the connection to the Storage Manager when registering it.

Dataset

This object is used for storing ID and name information of a dataset.

DatasetDetails

This object is used for storing detailed information of a dataset.

DatasetMember

This object is used for storing main information of a file system.

DatasetMemberDetails

This object is used for storing detailed information of a file system.

FilteredDatasetMemberDetails

This object is used for storing detailed information of a file system on the file systems view.

ProvisioningMemberRequestInfo

This object is used for storing information, included sharing the information of a file system.

DatasetMemberSpaceInfo

This object is used for storing information about the file system space.

SpaceCondition

This object is used in the DatasetMemberSpaceInfo business object for storing further space information.

ResourcePool

This object is used for storing information about the resources in a dataset object.

CreateFileSystemBO

This object is used for storing information about the status of a CreateFileSystem action.

ModifyFileSystemBO

This object is used for storing information about the status of a ModifyFileSystem action.

DeleteFileSystemBO

This object is used for storing information about the status of a DeleteFileSystem action.

MountFileSystemBO

This object is used for storing information about the status of a MountFileSystem action.

MountFileSystem

This object is used for storing information about the file system to mount or unmount.

ExportInfo

This object is used for storing all the share information of a file system.

ExportViewInfo

This object is used for storing all the share information used by the export view.

NfsExportSetting

This object is used for storing NFS share information of a file system.

NfsExportHost

This object is used for storing the host information of an NFS share.

NFSACLViewInfo

This object is used for storing ACL information of an NSF share, used by the ACL NFS view.

NFSACLViewPermission

This object is used for storing information about the host permission of an NFS share, used by the ACL NFS view.

CifsExportSetting

This object is used for storing CIFS shares information of a file system.

CifsSharePermission

This object is used for storing the permission of a user of a CIFS share.

CifsShareInfo

This object is used for storing the share name and the share permissions of a CIFS share.

CifsACLViewPermission

This object is used for storing the information of a CIFS share, used by the CIFS ACL view.

CifsACLViewInfo

This object is used for storing the ACL information of a CIFS share, used by the CIFS share view.

NetAppBreadcrumbData

This object is used for storing the temporary properties to manage the breadcrumb widget that appears on the bottom part of some user interfaces.

Coach view

There are a number of coach views that are bundled with the storage toolkit.

Button Click Listener

This is a generic utility view used to capture click events of a bound button and to trigger a corresponding Boundary Event. Upon triggering the Boundary Event, the view can also be configured to activate a loading overlay screen, for example, by leveraging the "Overlay View" view.

Change Event Listener

This is a generic utility view used to capture "onchange" events related to the variable bound to the view and to trigger a corresponding Boundary Event. Upon triggering the Boundary Event, the view can also be configured to activate a loading overlay screen, for example, by leveraging the "Overlay View" view.

CustomHeadingView

This view is used by some Human Services to display a header information when they are embedded inside other UI wizards.

NetAppBreadcrumb

This view is used to show a quick summary information about what the user has already selected and about what they have yet to specify before submitting the operation.

Overlay View

This utility view is used to show a loading overlay screen that inhibits any user interaction with the UI. It is used during long running Ajax operations to prevent the user from triggering other operations until the current one completes. In the toolkit, it is used in conjunction with the "Change Event Listener" view.

ConfirmPasswordView

The ConfirmPassword coach view renders a double password field as a masked input.

TriggerButton

This view is used to publish an event when a button is clicked.

Trigger Boundary Event

This view is used to capture the data from the coach view and pass it onto the coach. This allows it to subscribe to an event on which it needs to act.

TwistieSection

This view is used to display a generic view with a twistie widget for opening or closing the view.

SummaryRow

This view is used to display a generic row in a summary page.

Number Spin With Id Parameter

This view is used to display a number spinner widget that has the HTML ID customizable so as to allow the display of more than one number spinners in the same page.

ListFileSystemsView

This view is used to display the list of the file systems.

NetAppExportView

This view is used to display the share settings of a file system.

CIFSView

This view is included in NetAppExportView to display the CIFS share settings of a file system.

ModifyCIFSView

This view is included in NetAppExportView to display the CIFS share settings of a file system for modifications

CIFSACLTable

This view is included in CIFSView to display the ACL list for CIFS share of a file system.

CifsTwistieSection

This is the twistie view specific for CIFS share settings. It allows one to open or close the CIFS share settings in the export settings page.

EnableCifsEventListener

This view is used to listen to the event for enabling or disabling the CIFS settings.

NFSView

This view is included in NetAppExportView to display the NFS share settings of a file system.

NFSACLTable

This view is included in NFSView to display the ACL list for NFS share of a file system.

NfsTwistieSection

This is the twistie view specific for NFS share settings. It allows one to open or close the NFS share settings in the export settings page.

ModifyNFSView

This view is included in NetAppExportView to display the NFS share settings of a file system for modifications.

EnableNfsEventListener

This view is used to listen to the event for enabling or disabling the NFS settings.

Human services

There are a number of human services available in the toolkit.

RegisterStorageHostOnNetAppCmode

This is the Human Service that is used to collect the parameters corresponding to an Storage Host configuration to be created in IBM Cloud Orchestrator.

UnregisterStorageHostOnNetAppCmode

This is the Human Service that is used to remove the parameters corresponding to an Storage Host from the IBM Cloud Orchestrator Persistence.

CreateVserverMember

This is the Human Service that is used to collect the parameters required to create a file system.

ModifyVserverMember

This is the Human Service that is used to collect the parameters required to modify a file system.

DeleteVserverMember

This is the Human Service that is used to collect the parameters required to delete a file system.

MountFileSystemOnNetAppCmode

This is the Human Service that is used to collect the parameters required to mount a file system.

UnmountFileSystemOnNetAppCmode

This is the Human Service that is used to collect the parameters required to unmount a file system.

Business processes

There are a number of business processes available in the toolkit.

RegisterStorageHostOnNetAppCmode

The RegisterStorageHostOnNetAppCmode Business Process Definition takes input parameters from the human service and creates the storage host URL to store the

information in the database. Finally, it makes a generic rest call to persist the host details into the IBM Cloud Orchestrator Persistence.

GetVserverDetails

The Business Process Definition retrieves detailed information on a list of Vservers.

UnregisterStorageHostOnnetAppCMode

The UnregisterStorageHostonnetAppCMode Business Process Definition takes input parameters from the human service and removes the data from IBM Cloud Orchestrator Persistence.

CreateVserverMember

The CreateVserverMember Business Process Definition takes the data that are passed from the human service and creates a file system by invoking the NetApp APIs.

ModifyVserverMember

The ModifyVserverMember Business Process Definition takes the data that are passed from the human service and modifies a file system by invoking the NetApp APIs.

DeleteVserverMember

The DeleteVserverMember Business Process Definition retrieves the details of a file system selected from the human service and deletes it from the Storage Host by invoking the NetApp APIs.

MountFileSystemOnNetAppCmode

The MountFileSystemOnNetAppCmode Business Process Definition takes the following information from the Human Interface and runs the script to execute the mount command:
- Mount point
- Share type: NFS

UnmountFileSystemOnNetAppCMode

The UnmountFileSystemOnNetAppCMode Business Process Definition runs the command to unmount the file system and remove the mount point.

General system services

There are some general system services available in the toolkit.

GetTranslatedMessage

This service returns the translated version of a string given its message key.

Integration services

All the integration services artifacts that are available in the toolkit. The services can be reused by a IBM Cloud Orchestrator content developer to build new use cases besides the ones already provided. Most of these services use the NetApp APIs.

CheckConnection

This service checks the connection to the Storage Manager.

CreateCmodeVserverMember

This service creates a file system on a specified Cmode Vserver that is on a NetApp Storage Manager. If specified, it also creates the shares for the created file system.

DeleteCmodeVserverMembers

This service deletes a file system and its shares from a specified Cmode Vserver that is on a NetApp Storage Manager.

ModifyCmodeVserverMember

This service modifies the total size of a file system on a NetApp Storage Manager.

GetVserverMembers

This service retrieves a list of the file system of a specified Cmode Vserver that is on a NetApp Storage Manager.

GetVserverMembersDetails

This service retrieves the details of a set of file systems on a NetApp Storage Manager.

GetVserverMembersDetailsFromVservers

This service retrieves the details of all file systems that belong to a set of Cmode Vserver on a NetApp Storage Manager.

GetVservers

This service retrieves the list of Cmode Vservers on a NetApp Storage Manager.

GetVserverDetails

This service retrieves the details of a set of Cmode Vservers on a NetApp Storage Manager.

GetStorageManagers

This service retrieves the list of the NetApp Storage Managers that are registered on the IBM Cloud Orchestrator Persistence.

RemoveStorageManager

This service removes a registered Storage Manager from the IBM Cloud Orchestrator Persistence.

MountFileSystem

This service runs the command for mounting a shared file system.

UmountFileSystem

This service runs the command to unmount an already mounted file system.

Chapter 4. Importing XML into IBM Cloud Orchestrator

Refer to this sample XML file that you can use, with the Catalog Importer Tool, to create all the Offerings and Orchestration Actions required to leverage the capabilities provided by this content pack in IBM Cloud Orchestrator.

```
<catalog>
    <automation-categories>
        <category>
            <name>NAS Storage on NetApp Clustered Ontap</name>
            <description>Self-Service offerings for storage on
            NetApp ONTAP-8 Clustered Mode related tasks</description>
            <icon>Storage</icon>
        </category>
    </automation-categories>
    <offerings>
        <offering>
            <name>Register Storage Host-Clustered Ontap</name>
            <description>Register a new NetApp Clustered Ontap storage host</description>
            <icon>Storage</icon>
            <category-name>NAS Storage on NetApp Clustered Ontap</category-name>
            <process>
                <name>RegisterStorageHostOnNetAppCmode</name>
            </process>
            <user-interface>
                <name>RegisterStorageHostOnNetAppCmode</name>
            </user-interface>
        </offering>
        <offering>
            <name>Create File System-Clustered Ontap</name>
            <description>Creates a new File System on NetApp Clustered Ontap</description>
            <icon>Storage</icon>
            <category-name>NAS Storage on NetApp Clustered Ontap</category-name>
            <process>
                <name>CreateVserverMember</name>
            </process>
            <user-interface>
                <name>CreateVserverMember</name>
            </user-interface>
        </offering>
        <offering>
            <name>Unregister Storage Host-Clustered Ontap</name>
            <description>Unregister a NetApp Clustered Ontap storage host</description>
            <icon>Storage</icon>
            <category-name>NAS Storage on NetApp Clustered Ontap</category-name>
            <process>
                <name>UnregisterStorageHostOnNetAppCMode</name>
            </process>
            <user-interface>
                <name>UnregisterStorageHostOnNetappCmode</name>
            </user-interface>
        </offering>
        <offering>
            <name>Modify File System-Clustered Ontap</name>
            <description>Modify a File System on NetApp Clustered Ontap</description>
            <icon>Storage</icon>
            <category-name>NAS Storage on NetApp Clustered Ontap</category-name>
            <process>
                <name>ModifyVserverMember</name>
            </process>
            <user-interface>
                <name>ModifyVserverMember</name>
            </user-interface>
```

```
            </offering>
            <offering>
                <name>Delete File System-Clustered Ontap</name>
                <description>Delete a File System on NetApp Clustered Ontap</description>
                <icon>Storage</icon>
                <category-name>NAS Storage on NetApp Clustered Ontap</category-name>
                <process>
                    <name>DeleteVserverMember</name>
                </process>
                <user-interface>
                    <name>DeleteVserverMember</name>
                </user-interface>
            </offering>
        </offerings>
        <instance-action selection-type="single">
            <name>Mount an exported (NFS) NetApp Cluster Mode FileSystem</name>
            <description>Mount an exported (NFS) NetApp Cluster Mode FileSystem</description>
            <icon>Storage Icon</icon>
            <instance-type>openstackvms</instance-type>
            <process>
                <name>MountFileSystemOnNetAppCmode</name>
            </process>
            <user-interface>
                <name>MountFileSystemOnNetAppCmode</name>
            </user-interface>
        </instance-action>
        <instance-action selection-type="single">
            <name>Unmount a mounted (NFS) NetApp Cluster Mode FileSystem</name>
            <description>Unmount a mounted (NFS) NetApp Cluster Mode FileSystem</description>
            <icon>Storage Icon</icon>
            <instance-type>openstackvms</instance-type>
            <process>
                <name>UnmountFileSystemOnNetAppCmode</name>
            </process>
            <user-interface>
                <name>UnmountFileSystemOnNetAppCmode</name>
            </user-interface>
        </instance-action>
    </catalog>
```

Chapter 5. Error messages

This is the list of the error codes that can be directly issued by the content pack and their probable causes:

Error code	Description
CTJCA0510E	Enter a valid host name.
CTJCA0512E	Enter a valid IP address.
CTJCA0513E	Enter a password.
CTJCA0514E	Passwords do not match.
CTJCA0516E	No value is selected from the list.
CTJCA0517E	Enter a valid input.
CTJCA0521E	Enter a valid port number.
CTJCA0522E	Unable to contact the specified Storage Manager. Check that the Storage Manager is running and that the provided parameters (address and credentials) are correct.

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