Snap Creator® Framework 4.1.2

Administration Guide

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NetApp®

Contents

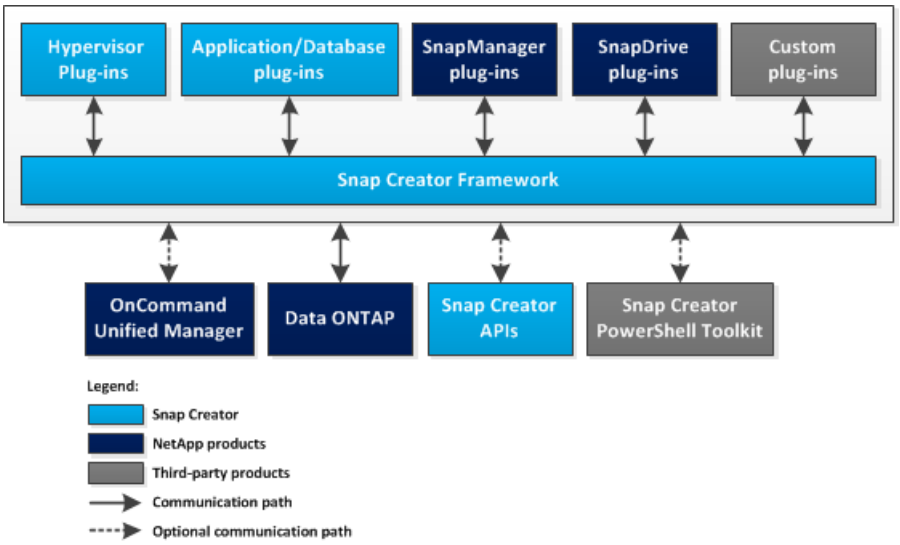
What the Snap Creator Framework does

The Snap Creator Framework enables you to use prepackaged and custom plug-ins that standardize and simplify data protection for a wide variety of third-party applications, databases, and hypervisors in Windows and UNIX (AIX, HP-UX, Linux, and Solaris) environments.

By leveraging Snapshot, SnapVault, Open Systems SnapVault, and SnapMirror functionalities, as well as NetApp Management Console data protection capabilities, the Operations Manager console, and FlexClone, Snap Creator provides the following:

- Application-consistent data protection
  A centralized solution for backing up critical information, integrating with existing application architectures to ensure data consistency and reduce operating costs.
- Extensibility
  Achieve fast integration using modular architecture and policy-based automation.
- Cloud readiness
  Operating system-independent Snap Creator functionality supports physical and virtual platforms and interoperates with IT-as-a-service and cloud environments.
- Cloning capability
  Space-efficient data cloning is supported for development and test purposes.

The following illustration shows Snap Creator Framework components:



Benefits of using Snap Creator

The Snap Creator Framework provides a useful solution to various storage needs.

Snap Creator provides a simple and flexible software framework that can be used to solve the following types of business needs:

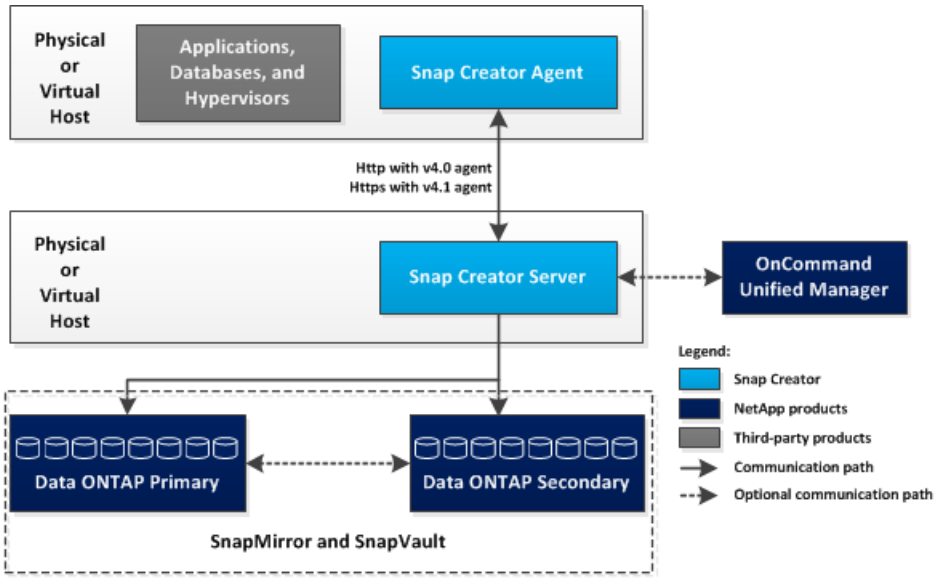
- Snap Creator is commonly used as a single interface to manage environments that have multiple operating systems, hypervisors, applications, and databases.
- Snap Creator is commonly used for backup, recovery, and cloning of applications or databases that do not have a SnapManager offering such as IBM DB2, MaxDB, or SAP HANA.

- Snap Creator can also be used if you have SnapManager for Exchange or SnapManager for SQL in your environment and want a centralized interface for backup and monitoring.
- Snap Creator is commonly used whenever you are using an application or database like Oracle that has a SnapManager offering, but the host environment does not meet IMT or similar requirements.
- Snap Creator is used to replace custom scripting for storage actions, offering a consistent method to create Snapshot copies, perform SnapVault or SnapMirror updates, clone volumes or LUNs, and call custom scripts anywhere through Snap Creator's workflow.

Snap Creator architecture

Snap Creator has a full-featured server and agent architecture, which consists of three main components: Snap Creator Server, Snap Creator Agent, and plug-ins.

Snap Creator interacts and integrates with various technologies and products as depicted in the following high-level diagram:



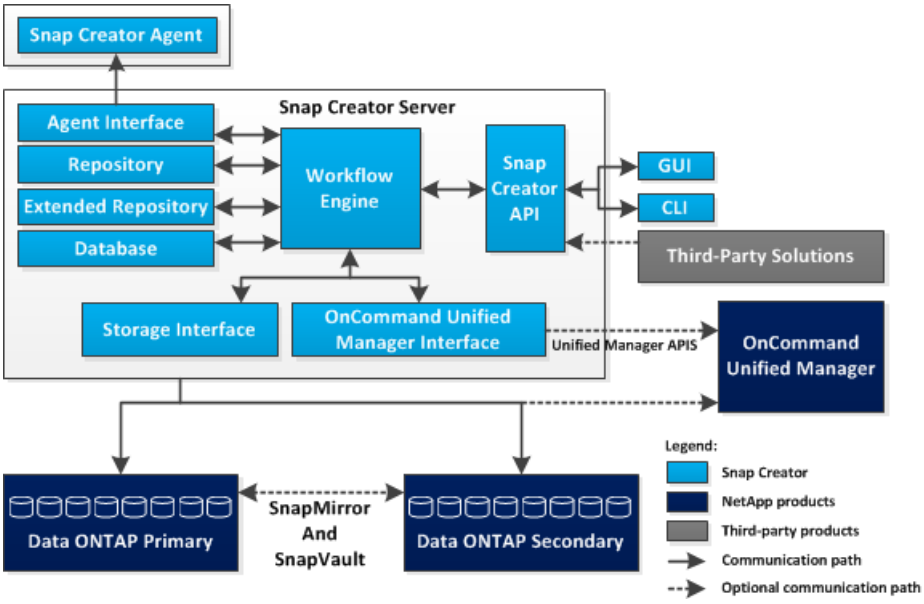
The NetApp software products in the high-level diagram are optional; except for Snapshot technology, the other software products are not required for the Snap Creator Framework to function.

Snap Creator Server overview

The Snap Creator Server is the main engine for the Snap Creator Framework.

Typically. the Snap Creator Server is installed on a physical or virtual host. The Server hosts the Snap Creator GUI and necessary databases for storing information about jobs, schedules, users, roles, profiles, configuration files, and metadata from plug-ins. The Server is sometimes shortened to scServer within Snap Creator.

The following illustration depicts the architecture for the Snap Creator Server:



The Snap Creator Server component, written in Java, is typically installed on a central backup server or, in smaller environments, can be installed on the same host as an application or database that you want to manage. This component includes the following parts:

Workflow engine

The central component of Snap Creator, this XML-driven, multi-threaded workflow engine is responsible for running all Snap Creator tasks and commands.

Snap Creator Applications Programming Interfaces (APIs)

These APIs are used by the Snap Creator graphic user interface (GUI) and command-line interface (CLI).

Snap Creator repository

The Snap Creator repository holds information about Snap Creator profiles and configuration files, including global configurations and profile-level global configurations.

Snap Creator extended repository

An extension of the repository, it provides a database location for every job run in Snap Creator, including important information about the job as well as metadata generated by plug-ins.

Snap Creator database

This database stores information about Snap Creator schedules and jobs as well as role-based access control (RBAC) users and roles.

Storage Interface

The Storage Interface provides Snap Creator with a common interface to NetApp storage systems, which uses Data ONTAP APIs to handle actions such as Snapshot copies, SnapVault and SnapMirror updates, and more.

OnCommand Unified Manager Interface

For optional communications with NetApp OnCommand Unified Manager, it uses Unified Manager APIs instead of Data ONTAP APIs for actions such as Snapshot copies, SnapVault updates, and SnapMirror updates.

Agent Interface

The Agent Interface communicates with Snap Creator Agents. The Snap Creator Agent is usually installed on a different physical or virtual host from the Snap Creator Server, but both can be installed on the same host.

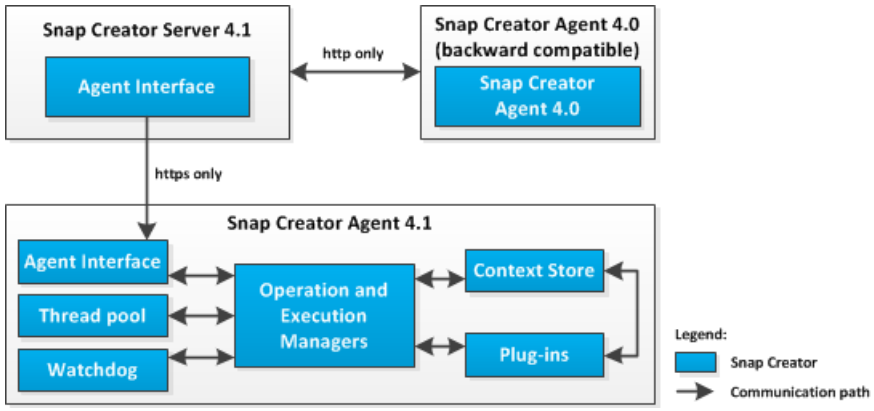
Note: Snap Creator 4.1 Server supports both Snap Creator 4.0 and 4.1 Agents.

Snap Creator Agent overview

The Snap Creator Agent, typically installed on the same host where an application or database is installed, handles quiesce and unquiesce commands from the Snap Creator Server to a given application, and is where the plug-ins are located. Agent is sometimes shortened to scAgent within Snap Creator.

The Snap Creator Agent receives communication from the Snap Creator Server's Agent Interface through the Agent RESTful interface, and through HTTPS only. This means secure and encrypted communication, which is a very important feature in multi-tenant and cloud environments. Self-signed certificates allow the use of a generated certificate with the Snap Creator Agent. Furthermore, the Snap Creator Agent is protected by a configurable user and password combination, which is stored on disk.

The following illustration depicts the architecture of the Snap Creator Agent:



The Snap Creator Agent (sometimes shortened to scAgent within Snap Creator itself) component includes the following parts:

Operation and Execution Managers

The Operation Manager takes care of the incoming, outgoing, and completed requests. The Execution Manager is responsible for executing the requests.

Thread pool

Consisting of worker threads, the thread pool is used to execute multiple tasks.

This determines the number of concurrent operations at any given time. The Execution Manager executes a plug-in, and it executes it in one of the threads in the thread pool. If the thread pool has eight threads, you can run eight plug-in operations concurrently. New incoming operations are queued, until threads become free again.

Watchdog

Triggered by the Execution Manager for certain operations, typically quiesce, the Watchdog calls back to the Execution Manager after a specified time to stop the operation, if necessary, and executes a corresponding undo operation. For example, the Plug-in quiesce function is called to put the application into a backup mode. The Watchdog starts listening. If the unquiesce is not executed within the specified time window, the Watchdog unquiesces the application, putting it back into normal operation mode. This is to ensure that the database does not get stuck in backup mode.

Context Store

Holding all information needed for the lifetime of the workflow, the Context Store provides context objects to the plug-in as needed, and, if a workflow fails or is never completed, the context object is deleted after a period of time.

For workflows that do not finish or that fail in an undefined state, there is a maximum context time specified in *install_path*`/etc/agent.properties`: `CONTEXT_LIFETIME_IN_MSEC=`**`1800000`** (the default value, 30 minutes). If this value is increased, the Snap Creator Agent occupies more memory.

Plug-in Factory

The Plug-in Factory starts the plug-in and ensures that it runs in an isolated space. The Plug-in Factory also communicates with the Context Store to access stored information. It also enables running Perl-based and native plug-ins from Snap Creator using the Plug-in Integration Engine.

The Snap Creator Agent can also use plug-ins written in languages other than Java.

Plug-ins for application integration

Plug-ins are used to put applications or databases into a consistent state. Snap Creator contains several plug-ins that are already part of the binary file and do not require any additional installation.

Types of applications that are supported include database, email, hypervisor, and custom applications. The following plug-ins are supported for use with Snap Creator. For more information, see the plug-in information required to configure Snap Creator.

- Application and database plug-ins:
  - DB2
  - IBM Domino (Domino)
  - MaxDB
  - MySQL

    Note: The MySQL plug-in does not support backup and restore operations for multiple databases.

  - Oracle
  - SAP High-Performance Analytic Appliance (HANA)
  - Sybase Adaptive Server Enterprise (ASE)
- SnapManager plug-ins:
  - SnapManager for Microsoft Exchange
  - SnapManager for Microsoft SQL Server
- Hypervisor plug-ins:
  - Citrix XenServer
  - Red Hat Kernel-based Virtual Machine (KVM)
  - VMware (vSphere for individual virtual machine backup and vCloud Director for vApp backup)

Custom (also called "community") plug-ins are written by the developer community, and can be enabled by Snap Creator but are not supported. These plug-ins leverage the interface provided by

Snap Creator and enable the developers to concentrate their development efforts on their target applications.

For more information, visit the *Snap Creator Framework Discussions Community forum* site.

Related references

Plug-in information required to configure Snap Creator on page 69

Managing Snap Creator Server

You can start, verify, and stop Snap Creator Server, as well as change the Server port, on your Windows and UNIX systems.

Starting, verifying, and stopping the Snap Creator Server on Windows

You can start and stop the Snap Creator Server service, and verify that the Server service is running on your Windows system.

Steps

1. If the Snap Creator GUI is not open, open it:
   a. Enter the URL of the Snap Creator Server in a web browser:

      https://*IP_address*:*gui_port*

      By default, the port is **8443**.

   b. Log in by using the Snap Creator GUI credentials.

   If the Snap Creator GUI opens, then the Snap Creator Server is running.

2. From a command prompt, you can start, verify, or stop the Snap Creator Server service, as applicable:

If you want to...	Enter the following...
Start the Snap Creator Server service	**sc start snapcreatorserverservice**
Verify that the Snap Creator Server service is running	**sc query snapcreatorserverservice**
Stop the Snap Creator Server service	**sc stop snapcreatorserverservice**

   If you want to run Snap Creator in the foreground, then instead of using the `sc start` command, perform the following steps:

   a. Open a command prompt on the host where Snap Creator Server is installed and navigate to the Snap Creator Server directory:

      cd *install_path*\scServer4.1.0\bin

   b. Start the Snap Creator Server:

      scServer.bat start

      Because the batch script (`scServer.bat`) runs Snap Creator in the foreground, the Snap Creator Server continues to run only as long as the command prompt is open. Closing the command prompt quits the Snap Creator Server. To run in the background, you should use the Snap Creator Server service.

Starting, verifying, and stopping the Snap Creator Server on UNIX

You can start and stop the Snap Creator Server, and verify that the Snap Creator Server is running on your UNIX system.

Steps

1. To start the Snap Creator Server:

   ***install_path*/scServer4.1.0/bin/scServer start**

2. Open Snap Creator GUI:

   a. Enter the URL of the Snap Creator Server in a web browser:

      https://*IP_address*:*gui_port*

      By default, the port is **8443**.

   b. Log in by using the Snap Creator GUI credentials.

3. Verify or stop the Snap Creator Server, as applicable:

If you want to...	Enter the following...
Verify that the Snap Creator Server is running	***install_path*/scServer4.1.0/bin/scServer status**
Stop the Snap Creator Server	***install_path*/scServer4.1.0/bin/scServer stop**

Changing the Snap Creator Server port after installation

To change the port that Snap Creator Server uses, you can edit the `snapcreator.properties` file and restart the server.

About this task

The procedure is the same for Windows and UNIX; the following procedure uses the UNIX environment in the examples.

Steps

1. Log in to the system where Snap Creator Server is running and change directories to the `etc` subdirectory within the installation directory:

   #### Example

   ```
   cd /install_path/scServer4.1.0/engine/etc
   ```

2. Using a text editor, open the `snapcreator.properties` file.

3. Change the value of the port (by default, 8443) in the following parameters to the new port:

   ```
   ...
   SNAPCREATOR_STARTUP_PORT=8443
   ...
   SNAPCREATOR_STORAGE_URL=https\://localhost\:8443/services/v1/
   ```

```
StorageService
...
```

4. Save and close the file.
5. Restart Snap Creator Server:

   Example

   ```
   /install_path/scServer4.1.0/bin/scServer restart
   ```

Setting Snap Creator Server Credentials

You can store the Snap Creator Server credentials (such as Server host name or IP address, port, user, and password settings) to avoid entering them on the command line each time.

About this task

The procedure is the same for Windows and UNIX; the following procedure uses the UNIX environment in the examples.

Steps

1. On the host where the Snap Creator Server is installed, from the Snap Creator Server installation directory, enter the following command:

   `/install_path/scServer4.1/snapcreator --credentials`

   The following output is displayed, enabling you to set the default Snap Creator Server credentials:

   ```
   Enter user: SCadmin

   Enter password:

   Enter Snap Creator server hostname or IP [localhost]:
   Enter Snap Creator server port [8443]:
   Enter Profile name ( or * for any profile: *
   Enter Config name ( or * for any config: *
   ```

2. Enter the appropriate information.

   After you enter your input for the `Config name` entry, the credentials are saved:
   `INFO: CLI credentials stored successfully`

Result

The Snap Creator Server credentials are stored in the `snapcreator.credentials` file in the `.snapcreator` directory or folder in the user's home directory. To remove the stored credentials, delete the `snapcreator.credentials` file.

Managing Snap Creator Agent

You can start, verify, and stop Snap Creator Agent, change the Agent port, and manage Agent security on your Windows and UNIX systems.

Starting, verifying, and stopping the Snap Creator Agent on Windows

You can start and stop the Snap Creator Agent service, and verify that the Snap Creator Agent service is running on your Windows system.

Step

1. From a command prompt, you can start, verify, or stop the Snap Creator Agent service, as applicable:

If you want to...	Enter the following...
Start the Snap Creator Agent service	`sc start snapcreatoragentservice`
Verify that the Snap Creator Agent service is running	`sc query snapcreatoragentservice`
Stop the Snap Creator Agent service	`sc stop snapcreatoragentservice`

   If you want to run Snap Creator in the foreground, then instead of using the `sc start` command, perform the following steps:

   a. Open a command prompt on the host where Snap Creator Agent is installed, and then navigate to the Snap Creator Agent directory:

      `cd \`*`install_path`*`\scAgent4.1.0\bin\`

   b. To start the Snap Creator Agent, enter the following command:

      `scAgent.bat start`

      Because the batch script (`scAgent.bat`) runs Snap Creator in the foreground, the Snap Creator Agent continues to run only as long as the command prompt is open. Closing the command prompt stops the Snap Creator Agent. To run Snap Creator in the background, you should use the Snap Creator Agent service.

Starting, verifying, and stopping the Snap Creator Agent on UNIX

You can start and stop the Snap Creator Agent, and verify that the Snap Creator Agent is running on your UNIX system.

Step

1. Start, verify, or stop the Snap Creator Agent, as applicable:

If you want to...	Enter the following...
Start the Snap Creator Agent	***install_path*/scAgent4.1.0/bin/scAgent start**
Verify that the Snap Creator Agent is running	***install_path*/scAgent4.1.0/bin/scAgent status**
Stop the Snap Creator Agent	***install_path*/scAgent4.1.0/bin/Agent stop**

Changing the Snap Creator Agent port after installation

To change the port where the Snap Creator Agent is listening, you can make a change in the Snap Creator `agent.properties` file and restart the Agent.

About this task

The procedure is the same for Windows and UNIX; the following procedure uses the UNIX environment in the examples.

To change the Snap Creator Agent port after installation, perform the following steps.

Steps

1. Log in to the system where the Snap Creator Agent is running and change directories to the `etc` subdirectory within the installation directory.

   Example

   ```
   cd /install_path/scAgent4.1.0/etc
   ```

2. Open the `agent.properties` file with a text editor.
3. Change the value of the `DEFAULT_PORT` parameter (by default, the port is 9090) to the new port.

   Example

   For example, to use port 9191, change the `DEFAULT_PORT` parameter as follows:

   ```
   DEFAULT_PORT=9191
   ```

   Save and close the file after making changes.

4. Restart the Snap Creator Agent.

   Example

   ```
   /install_path/scAgent4.1.0/bin/scAgent restart
   ```

   Note: Any changes to the `allowed_commands.config` or `agent.properties` files require restarting the Snap Creator Agent if it is running when the changes are made.

Snap Creator Agent security

Snap Creator Server communicates with Snap Creator Agent only through HTTPS, which ensures a secure and encrypted communication. This feature is important in a multitenant environment. Self-signed certificates enables you to use your own generated certificate with Snap Creator Agent.

Note: This is supported only for Snap Creator 4.1 and later.

Managing Snap Creator Agent security

You can manage Snap Creator Agent security by adding commands that can be used by Snap Creator, and you can restrict and limit communication to particular Snap Creator Servers.

About this task

Although the following procedure uses UNIX environment examples, the procedure is the same for both Windows and UNIX.

Steps

1. Log in to the system where Snap Creator Agent is running and change directories to the `etc` subdirectory within the installation directory:

   `cd /install_path/scAgent4.1.0/etc`

2. If you want to add commands that can be used by Snap Creator, perform the following steps:

   a. Open the `allowed_commands.config` file in a text editor.

   b. Add commands as needed, with each command on a separate line.

      Note: The commands entered in `allowed_commands.config` are case sensitive and must exactly match the commands as seen in the configuration file, including capitalization and quotation marks.

      Example

      ```
      command: "C:\Program Files\NetApp\SnapDrive\sdcli.exe"
      ```

      Note: If the command contains any spaces, then you must encapsulate the command within quotation marks.

   c. Save and close the file.

3. If you want to restrict and limit communication to particular Snap Creator Servers, perform the following steps:

   a. Open the `agent.properties` file in a text editor.

   b. Change the `AUTHORIZED_HOSTS` parameter, using commas to separate the host names.

      Both host names and IP addresses are supported.

      Example

      ```
      AUTHORIZED_HOSTS=Lyon, 10.10.10.192, Fuji01
      ```

   c. Save and close the file.

4. Restart Snap Creator Agent:

   `/install_path/scAgent4.1.0/bin/scAgent restart`

Customizing the default keystore

You can customize the default keystore or certificate by using the keytool binary available on Windows and UNIX.

Before you begin

- Stop the Snap Creator Agent.

About this task

The keytool command is provided by Java. In some environments, you might need to change to the Java installation directory to run the keytool command.

Note: Snap Creator does not support truststores.

Steps

1. Generate a new keystore with one certificate. Enter the following command:

   `keytool -genkeypair -alias` *`alias_name`* `-keystore` *`keystore_file`* `-keypass` *`private_key_password`* `-storepass` *`keystore_password`*

   #### Example

   Here is an example:

   ```
   keytool -genkeypair -alias servicekey -keystore serviceKeystore.jks -
   keypass kypswd123 -storepass kystrpswd123
   ```

2. Copy the keystore file to the `scAgent4.1.0/etc/` directory and update the `KEYSTORE_FILE=`*`keystore_file`* and `KEYSTORE_PASS=`*`keystore password`* in the Snap Creator Agent configuration file (`scAgent4.1.0/etc/allowed_commands.config`).

3. Start the Snap Creator Agent.

Related tasks

Starting, verifying, and stopping the Snap Creator Agent on Windows on page 17
Starting, verifying, and stopping the Snap Creator Agent on UNIX on page 17

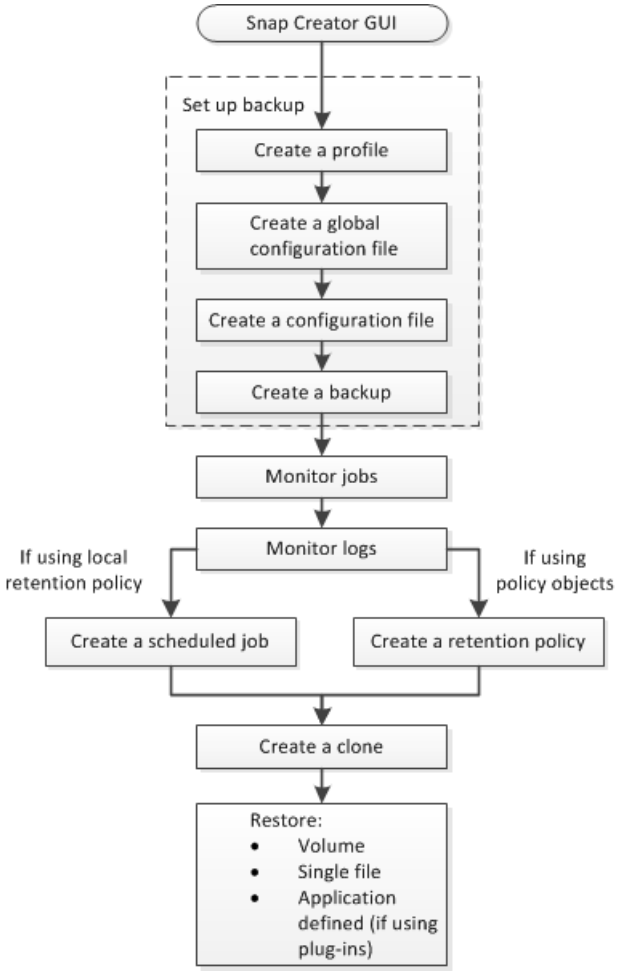
Backup and recovery workflow

You can use the workflow as a guideline for your backup and recovery process using the Snap Creator GUI.

When performing these tasks, Snap Creator must be running and the Snap Creator GUI must be open. If it is not, you can enter the URL of the Snap Creator Server in a web browser (`https://IP_address:gui_port`; by default, the port is 8443), and then log in by using the Snap Creator GUI credentials.

The following illustration depicts the complete set of tasks when performing a backup and recovery of your system when using plug-ins:

Note: The tasks outlined in the workflow can also be performed from the command-line interface (CLI). For details about the CLI, see the related references for information about the CLI command line.



Related references

Guidelines for using the Snap Creator command line on page 153

Creating profiles

You can create profiles to organize configuration files by using the Snap Creator GUI.

About this task

The first time that you open the Snap Creator GUI, the New Profile dialog box is displayed automatically, prompting you to create a new profile.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Profiles and Configurations** pane, click **Add Profile**.

   The New Profile dialog box is displayed.
3. Enter the name of the new profile, and then click **OK**.

   The new profile is listed in the **Profiles and Configuration**s pane, and the Configuration wizard is displayed in the right pane.

Creating global configuration files

You can create a global configuration file to separate storage controller/Storage Virtual Machine (SVM) or VMware credential configuration from the backup policy. This enables you to control access and handle backup and restore operations.

About this task

You can create two types of global configuration files:

- **Super Global**
  This configuration applies to all of the configurations in all of the profiles.
- **Profile Global**
  This configuration applies to all of the configurations created within a profile.

Steps

1. From the Snap Creator GUI main menu, select **Management > Global Configurations**.
2. In the **Global Configurations** pane, click **Create Global**.

   The Configuration wizard for Global Configurations is displayed in the right pane.
3. Complete the pages in the **Configuration** wizard to create the configuration file.

   a. In the **Configuration** page, the name for the configuration file defaults to **`global`**, which you cannot change; select the global configuration type (**Super Global** or **Profile Global**).

      If you select **Profile Global** as the type, select the profile.

      Note: By default, password encryption is enabled to prevent passwords from being displayed in clear text in the configuration file.

   b. In the **Plug-In Type** page, select the desired option as the type of plug-in.

      The next page that you advance to in the wizard depends on which option you selected. The following table describes the plug-in type options and the next pages that require your input:

Plug-in type option	Next page	Next page
Virtualization plug-in	**Virtualization plug-ins** Select the plug-in to configure.	**Authentication Information** Provide the authentication information for the selected plug-in option.
None	**Storage Connection Settings**	--

For more information about the required plug-in credential information, see the applicable plug-in documentation.

c. In the **Storage Connection Settings** page, select the transport method (HTTP or HTTPS).

The standard port for the selected method is displayed. If the storage system is using a nonstandard port, enter it in the port field.

d. In the **Controller/Vserver Credentials** page, enter the IP address and login credentials for each storage controller/SVM that contains the volumes in this configuration file.

Note: You must add at least one storage controller/SVM to the configuration.

e. In the **Controller Credentials** page, verify that the controllers display the correct information.

If changes are required, select a controller, and then click **Edit**.

f. In the **DFM/OnCommand Settings** page, if you want to integrate the Snap Creator configuration with NetApp OnCommand management tools, you can select and provide the relevant information.

g. Review the summary, and then click **Finish**.

Creating configuration files

You can create configuration files by using the Configuration wizard.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Profiles and Configurations** pane, right-click the profile that you want to contain the new configuration file, and then select **New Configuration**.

   The Configuration wizard is displayed in the right pane.
3. Complete the pages in the **Configuration** wizard to create the configuration file:

   a. In the **Configuration** page, enter a name for the configuration file.

   Note: By default, password encryption is enabled to prevent passwords from being displayed in clear text in the configuration file.

   b. In the **Plug-In Type** page, select the desired option as the type of plug-in.

   The next page that you advance to in the wizard depends on which option you selected. The following table describes the plug-in type options and the next pages that require your input:

Plug-in type option	Next page	Next page
Application plug-in	**Application plug-ins** Select the plug-in to configure.	**Plug-in Parameters** Provide the configuration details associated with the selected plug-in option.
Virtualization plug-in	**Virtualization plug-ins** Select the plug-in to configure.	**Plug-in Parameters** Provide the configuration details associated with the selected plug-in option.
Community plug-in	**Community plug-ins** Select the plug-in to configure.	**Plug-in Parameters** Provide the configuration details associated with the selected plug-in option.
None (if you are not using a plug-in)	**Agent Configuration**	--

For more information about the specific plug-in parameters and required configuration information, see the applicable plug-in documentation.

c. In the **Agent Configuration** page, enter the Snap Creator Agent configuration information.

d. In the **Storage Connection Settings** page, select the transport method (HTTP or HTTPS).

The standard port for the selected method is displayed. If the storage system uses a nonstandard port, enter it in the port field.

e. On the **Controller/Vserver Credentials** page, enter the IP address and login credentials for each storage controller/SVM that contains the volumes in this configuration file.

Note: You must add at least one storage controller/SVM to the configuration.

In the **Controller/Vserver Volumes** pane, select each volume that you want to include and either drag it to the right pane or click the right arrow to move the volume to the right pane, and then click **Save**.

Important: If you are planning to replicate Snapshot copies to a SnapMirrror or SnapVault destination, the name of the SVM you enter in this step must match exactly the name of the SVM you used when you created the SnapMirrror or SnapVault relationship. If you specified a fully qualified domain name when you created the relationship, you must specify a fully qualified domain name in this step, regardless of whether SnapCreator is able to find the SVM with the information you provide. Case is significant.

You can use the `snapmirror show` command to check the name of the SVM on the primary storage system:

```
snapmirror show -destination-path destination_SVM:destination_volume
```

where *`destination_SVM_name`* is the name of the SVM on the destination system and *`destination_volume`* is the volume.

f. On the **Controller Credentials** page, verify that the controllers display the correct information.

If changes are required, select a controller, and then click **Edit**.

g. On the **Snapshot Details** page, provide the Snapshot copy details.

Field	Description
Snapshot copy Name	Typically, the same name as the configuration file; however, this name can reflect the data that is being backed up **Note:** Do not use special characters when specifying the Snapshot copy name.
Snapshot copy Label	Snapshot copy label **Note:** For use with clustered Data ONTAP 8.2 or later. For Data ONTAP releases prior to clustered Data ONTAP 8.2, this field will not provide any functionality.
Policy Type	There are two options: • **Policy**: enables one of the built-in policies shown in the **Snapshot copy Policies** area, and specifies the retention (the number of backups to be retained) • **Use Policy Object**: select if a policy object has already been created
Snapshot copy Policies	Allows you to select the policy to enable
Prevent Snapshot copy Deletion	Determines whether to prevent the deletion of the Snapshot copy
Policy Retention Age	Specifies policy retention age
Naming Convention	Specifies the naming convention (**Recent** or **Timestamp**) of backups

h. On the **Snapshot Details Continued** page, configure any additional settings that are applicable to your environment.

i. On the **Data Protection** page, select whether integration with SnapMirror or SnapVault is required.

Additional information is requested if either SnapMirror or SnapVault is selected.

Note: For SnapMirror and SnapVault, you must provide the storage system name and not the IP address.

j. On the **DFM/OnCommand Settings** page, if you want to integrate the Snap Creator configuration with NetApp OnCommand management tools, you can select and provide the relevant information.

k. Review the summary, and then click **Finish**.

Creating backups

You can create backups by using the Snap Creator GUI.

Before you begin

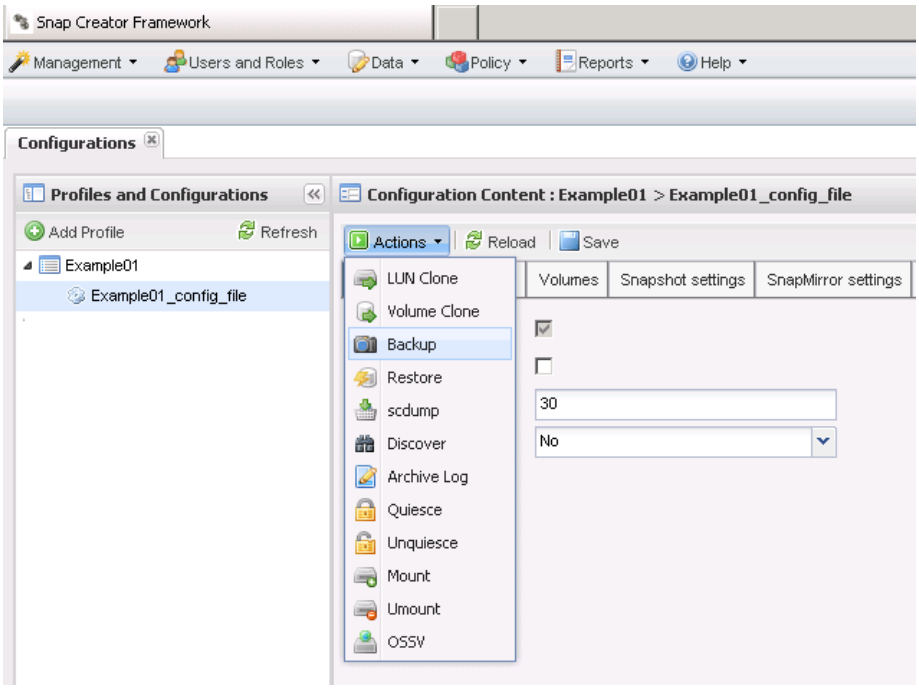
One of the following conditions must be met:

- A backup policy must be defined in the configuration file; or,
- A policy object must be configured and assigned to the profile.

  Note: If a policy object is defined, it will overrule any entries that might be in the configuration file.

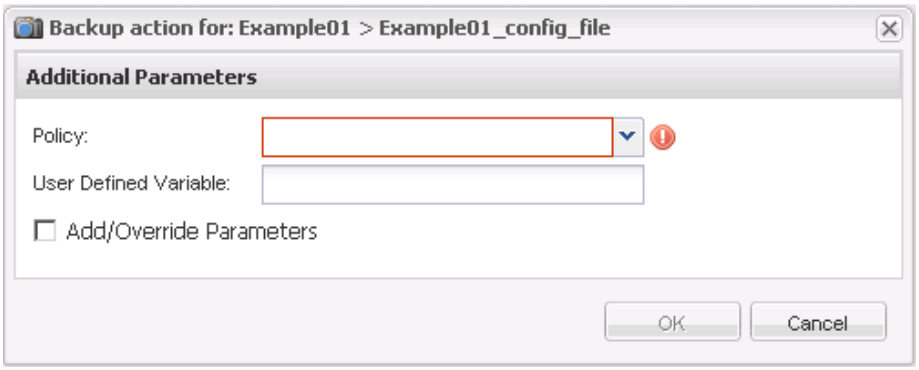
Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select the configuration file.
3. Select **Actions > Backup**.

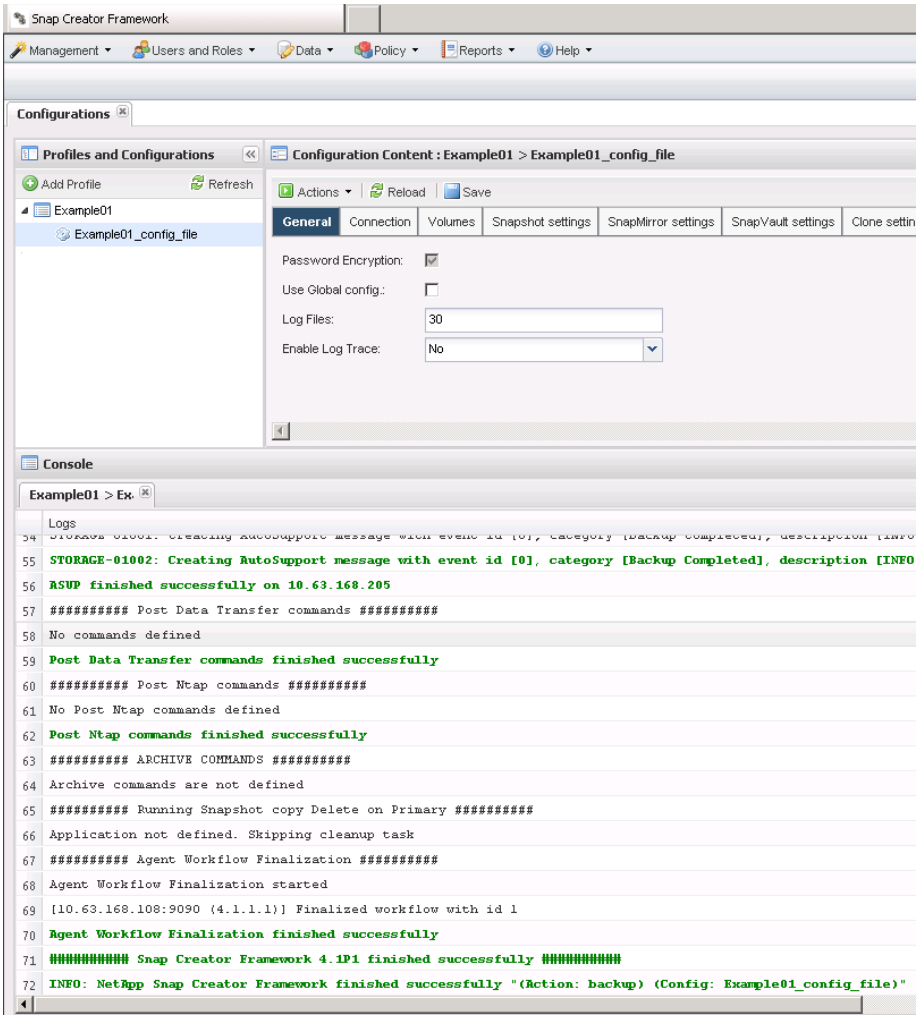


4. In the **Additional Parameters** dialog box, select the policy, and then click **OK** to start the backup.

   Note: If no user-created policy is assigned to the configuration, **`hourly`**, **`daily`**, **`weekly`**, and **`monthly`** are the available selections in the **Policy** drop-down list. If one or more user-created policies have been assigned to the configuration, they are displayed in the **Policy** drop-down list instead.



5. Verify that information about the backup job is displayed in the **Console** pane.



In this example, the output indicates that the Snap Creator operation finished successfully.

Note: The **Console** pane only displays the most pertinent information; this is the verbose mode. To see detailed information about the job that just ran, select **Reports > Logs** at the top of the page. From the Logs view, the profile, configuration file, log type, and specific log can be selected.

Monitoring jobs

You can monitor the status of the jobs being performed by Snap Creator by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Management** > **Job Monitor**.

   A list of the running jobs is displayed.

2. To stop a running job, select the job and click **Cancel**.

Monitoring logs

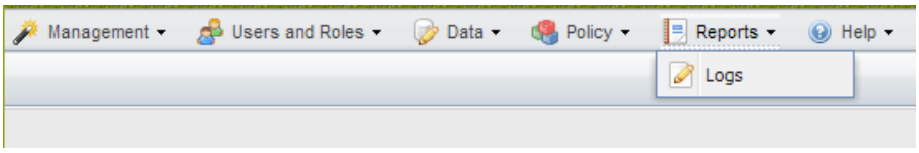
You can view the logs for every profile and configuration by using the Snap Creator GUI.

About this task

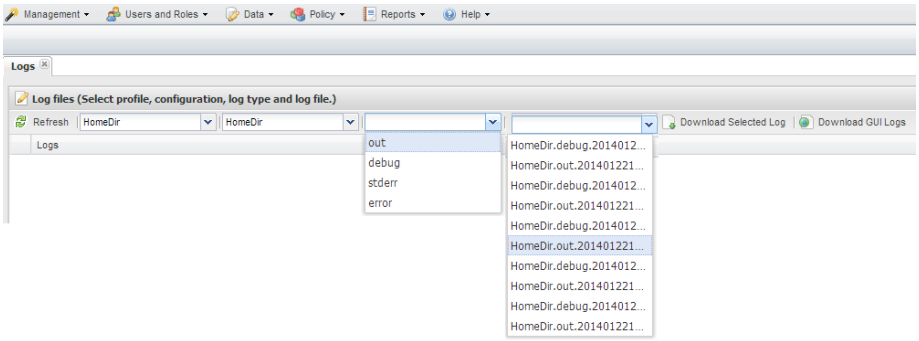
You can view the Out, Debug, Error, and Stderr logs to assist in troubleshooting operations. See the related references for more information about these troubleshooting logs.

Steps

1. From the Snap Creator GUI main menu, select **Reports** > **Logs**:



2. Select logs by profile, configuration file, log type, or specific log, as necessary:



The selected log can also be downloaded by clicking **Download Selected Log**. The downloaded log file is stored in the directory (or folder) that is specified by the browser for downloads.

Note: The out, debug, stderr, and agent logs are retained as defined by the `LOG_NUM` value in the configuration file, but the error log is always appended.

Related references

Types of error messages and troubleshooting logs on page 94

Creating scheduled jobs

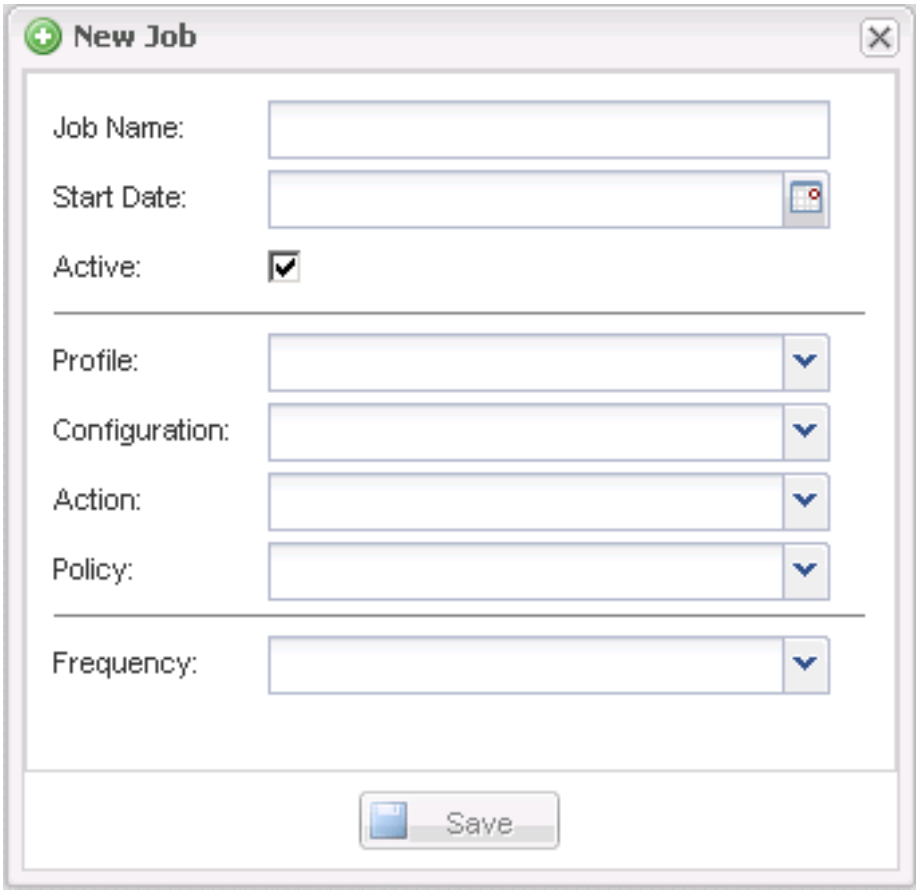
If you are using a local retention policy (located in a configuration file), you can use the Snap Creator GUI scheduler to create schedules and run the tasks. The scheduler, contained within Snap Creator Server, can schedule backups (Snapshot copies), LUN clones, volume clones, application-defined clones, Open Systems SnapVault (OSSV) transfers, archive jobs, and custom actions.

About this task

If you plan to use policy objects instead of a local retention policy, you should skip this procedure and create a policy schedule instead (see related tasks for more information about creating policy schedules).

Steps

1. From the Snap Creator GUI main menu, select **Management** > **Schedules**.
2. From the **Schedules** tab, click **Create**.
3. In the **New Job** window, enter the details for the job.



Field	Description
Job Name	Specify the name of the scheduled job.
Start Date	Select today's date or a future date.
Active	Set to Active, by default, to signify that the job will run as scheduled.
Profile	Select the applicable profile to be associated with this job.
Configuration	Select the applicable configuration to be associated with this job.
Action	Select one of the following options: • **Backup**: creates a backup by using the NetApp storage technology • **CloneLun**: creates a backup and clones one or more LUNs by using the `lun clone` command • **CloneVol**: creates a backup and clones a volume • **Clone**: performs a plug-in driven clone operation • **OSSV**: uses Open Systems SnapVault to perform the backup No primary backup is created. • **Arch**: does not create a backup; performs archive log management only • **Custom**: executes a plug-in defined cloning action
Policy	Select the applicable policy to be associated with this job.
Frequency	Select the applicable frequency to be associated with this job. Depending on your selection, you will need to select the appropriate time fields for running the scheduled job.

4. Click **Save**.

Related tasks

Creating policy schedules on page 32

Creating retention policies

If you plan to use policy objects instead of a local retention policy (contained in a configuration file), you can create a retention policy (referred to as “policy”).

As part of creating a retention policy, you can create a backup type and a policy schedule.

Guidelines to define Snap Creator policies

Snap Creator policies are user-defined Snapshot copy retentions that apply to the Snapshot copies on the primary storage and SnapVault and SnapMirror copies on the secondary storage. You can use a policy to define the number of Snapshot copies that you want to retain and the Snapshot copy age.

You must define at least one policy in the **Snapshot Retention Count** field. For SnapVault, you can associate the same policy with different SnapVault retention periods. For example, to create daily Snapshot copies and retain them for seven days on the primary storage and one month on the secondary storage, you must use the following Policy options and settings:

- **Snapshot Retention Count**:

  `daily:7`

- **SnapVault Retention Count**:

  `daily:28`

You can also specify the minimum number of days after which a Snapshot copy is deleted. Based on the preceding example, you should use the following options and settings:

- **Snapshot Retention Age**:

  `7`

- **SnapVault Retention Age**:

  `28`

Additionally, you can specify the Snapshot copy deletion by age by setting the following parameter in the configuration file:

`NTAP_SNAPSHOT_DELETE_BY_AGE_ONLY=`

`PRIMARY|SECONDARY|BOTH`

> **Note:** This parameter is not available through the Snap Creator GUI. See the related references for more information about configuration file parameters used to set up Snapshot copies.

Snap Creator can run only one policy at a time. The maximum age value is a global parameter that applies to all the policies. To configure an additional weekly policy, define the policy, and then call it in Snap Creator once a week by using cron or task manager with the Snap Creator variable `%SNAP_TYPE` set to

`weekly`

.

Related references

Parameters to set up Snapshot copies on page 140

Creating backup types

You can optionally create a backup type using the Snap Creator GUI to help identify the purpose of a policy.

Steps

1. From the Snap Creator GUI main menu, select **Policy** > **Backup Type**.
2. From the **Backup type** tab, click **Add**.
3. Enter the new backup type name, and then click **OK**.

The new backup type is listed under **Backup Type**.

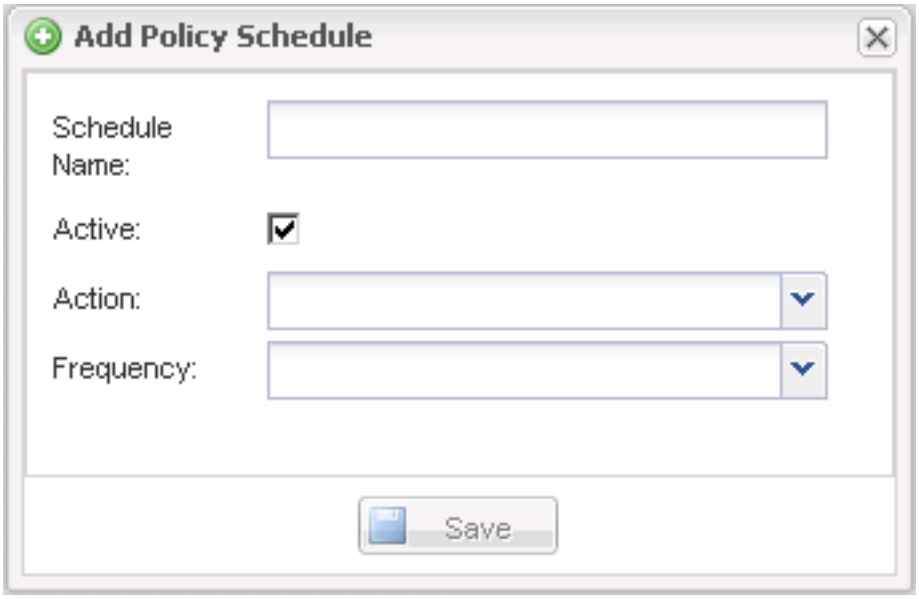
Creating policy schedules

You can optionally create policy schedules by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Policy > Policy Schedules**.
2. From the **Policy Schedules** tab, click **Create**.
3. Enter the schedule name and select the action and frequency, and then click **Save**.

   Depending on the frequency you select, you will need to select the appropriate time fields for running the scheduled job.



Creating policies

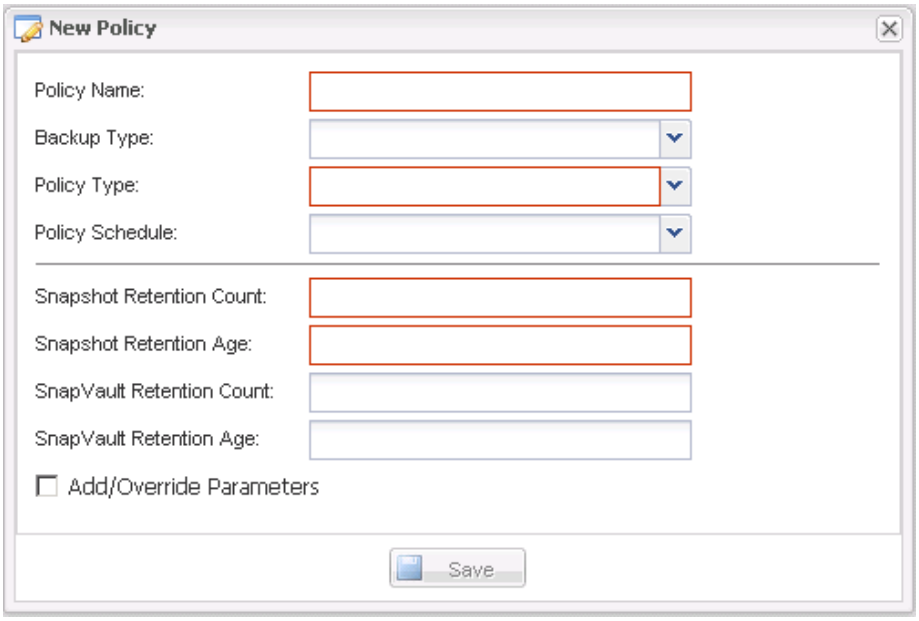
You can create a new retention policy by using the Snap Creator GUI.

Before you begin

Before you create a policy, you should understand the guidelines for defining Snap Creator policies.

Steps

1. From the Snap Creator GUI main menu, select **Policy > Policy Management**.
2. From the **Policy Manager** tab, click **Create**.
3. Enter the details, and then click **Save**.



Field	Description
Policy Name	Specify the name of the policy.
Backup Type	(Optional) Select the backup type.
Policy Type	Select the policy type: • `LOCAL`: Takes a Snapshot copy on the primary storage. • `SNAPVAULT`: Takes a Snapshot copy on the primary storage and performs a SnapVault update. SnapVault must be enabled for all volumes in the configuration. • `SNAPMIRROR`: Takes a Snapshot copy on the primary storage and performs a SnapMirror update. SnapMirror must be enabled for all volumes in the configuration.
Policy Schedule	(Optional) Select the policy schedule to be used. If no policy schedule is specified, actions do not run automatically.
Snapshot Retention Count	Enter the number of backups to be retained.
Snapshot Retention Age	Enter the minimum age that the backups must be before they can be deleted.
SnapVault Retention Count	If SnapVault was selected as the policy type, enter the retention count for SnapVault.
SnapVault Retention Age	If SnapVault was selected as the policy type, enter the retention age for SnapVault.
Add/Override Parameters	Certain parameters can be overridden for a policy. If desired, select this check box, and then add the parameters to be overridden.

Assigning policies

You can assign retention policies to the configuration files by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Policy > Policy Assignments**.
2. Select a profile from the **Profile** pane.
3. Select a policy or policies to assign to the profile by selecting the appropriate check box on the right pane, and then click **Save**.

   If configuration files already exist in the profile, a message displays, informing you that the assigned policy will overrule the settings in the configuration file.
4. Click **Yes** to assign the policy.

Creating clones

There are two methods for cloning volumes or LUNS: from a new backup and from an existing backup.

- Creating a clone from a new backup consists of taking a Snapshot, cloning the new Snapshot copy, and then mounting the cloned copy.
- Creating a clone from an existing backup consists of cloning an existing Snapshot copy, and then mounting the cloned copy.

Creating clones from a new backup

You can clone volumes or LUNs from a new backup.

Before you begin

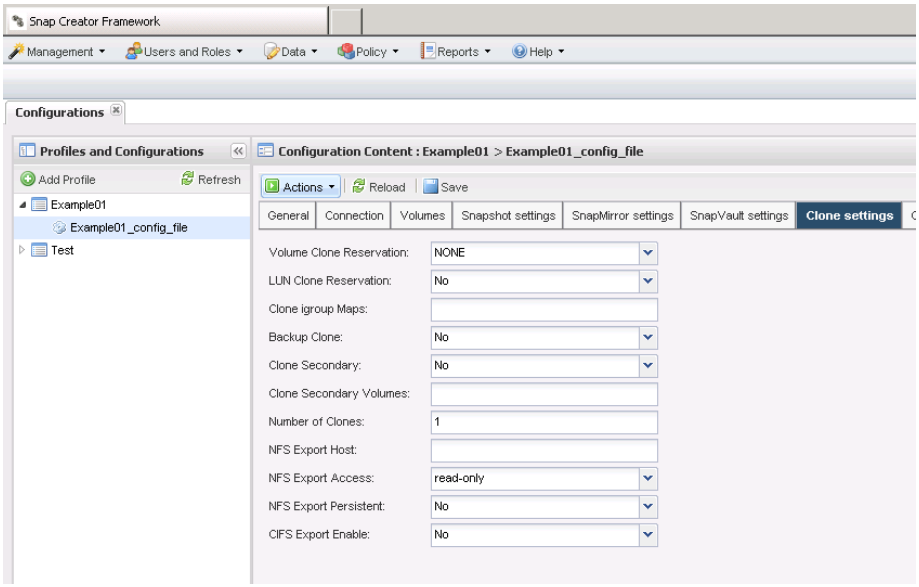
- The Snap Creator Server must be communicating with the storage system.
- You must be logged into Snap Creator with the proper permission to perform the cloning operation.

About this task

This cloning operation consists of taking a new Snapshot copy, and then cloning the new backup.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select a configuration file.
3. Select the **Clone settings** tab and verify that the settings are set properly.



4. Depending on the type of clone desired, select **Actions** and one of the following options:
   - LUN Clone
   - Volume Clone
5. In the **Additional Parameters** dialog box, select the appropriate policy, and then click **OK** to start the cloning process.
6. In the **Console** pane, verify that the cloning process was successful.

Creating clones from an existing backup

You can clone volumes or LUNS from an existing backup as your source.

Before you begin

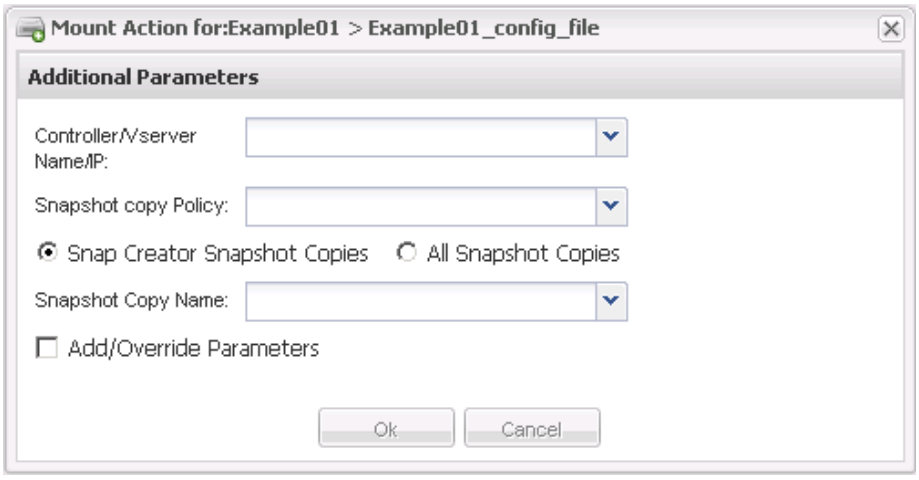
- The Snap Creator Server must be communicating with the storage system.
- You must be logged into Snap Creator with the proper permission to perform the cloning operation.

About this task

This cloning operation consists of mounting an existing Snapshot copy, and then cloning the existing backup.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select a configuration file.
3. Select **Actions > Mount**.
4. In the **Additional Parameters** dialog box, select the controller, volume, and policy containing the backup to be mounted, then select the Snapshot copy to be mounted (cloned), and then click **OK** to start the cloning process.



Note: Record the selected Snapshot copy name. When unmounting the backup, the same Snapshot copy name must be selected.

5. In the **Console** pane, verify that the cloning process was successful.

Performing restore operations

You can perform volume restore, single file restore, and application-defined restore operations using the Snap Creator GUI.

If you use SnapDrive for Windows, you must use SnapDrive to perform restore operations, which should be performed outside of Snap Creator.

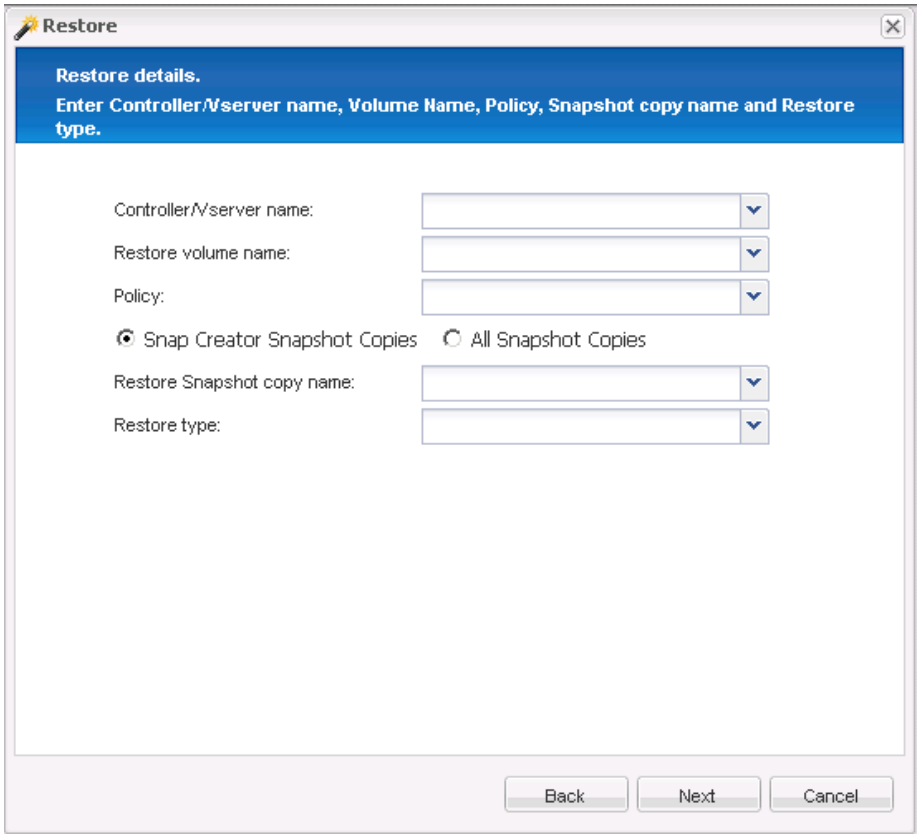
Performing volume restore

You can perform a volume restore by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select the configuration file.
3. Select **Action > Restore**.

   The Restore wizard is displayed in the right pane.
4. Complete the pages in the **Restore** wizard to perform the restore.
   a. In the **Restore details** page, select the controller/SVM name, Restore volume name, Policy, and Restore Snapshot copy name, and then select **Volume Restore** from the **Restore type** drop-down list.



b. Review the summary, and then click **Finish**.

A warning message appears asking whether there are more items to be restored.

5. Click **No**, and then click **OK** on the Restore confirmation page.
6. In the **Console** pane, verify that the restore was completed successfully by viewing the messages.

Performing single file restore operations

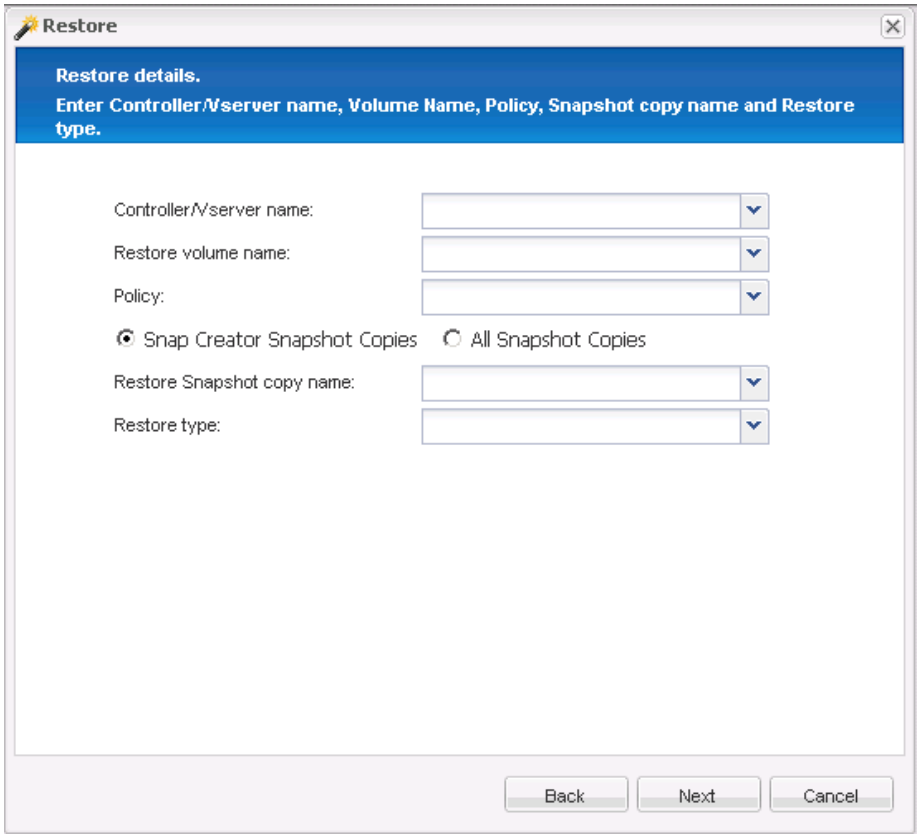
You can perform single file restore operations by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select the configuration file.
3. Select **Action > Restore**.

   The Restore wizard is displayed in the right pane.
4. Complete the pages in the **Restore** wizard.

   a. Under “Restore details,”, select a controller or Vserver name, a restore volume name, a policy, and a restore Snapshot copy name, and then select **Single File Restore** from the **Restore type** list.



b. Select the files to be restored.

c. Select the location to which the files should be restored.

d. Review the summary and click **Finish**.

A warning message appears, asking if there are more items to be restored.

5. Click **No**; then click **OK** on the **Restore** confirmation page.
6. In the **Console** pane, verify that the files were successfully restored by viewing the messages.

Performing application-defined restore operations

If you are using VMware, KVM, and Xen plug-ins, you can perform application-defined restore operations by using the Snap Creator GUI.

About this task

In certain VMware environments, restore operations can take a long time. In such cases, you can either use the Snap Creator CLI or set up two agents: one for backup and the other for restore.

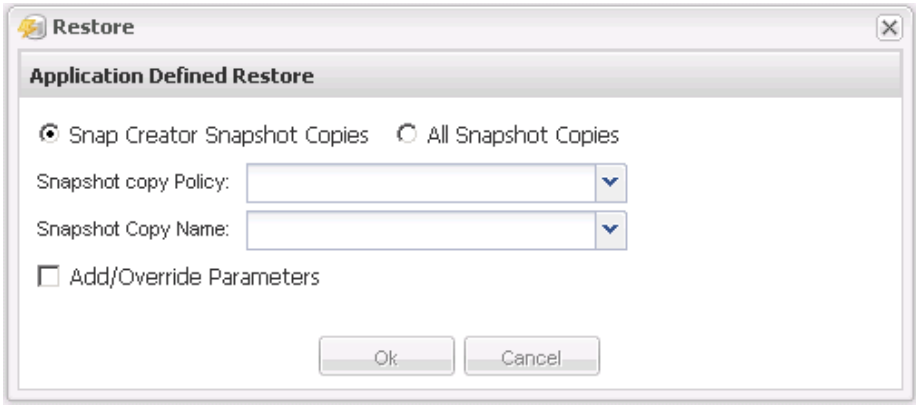
Note: VMware restore operations using the GUI are supported only for Snap Creator Agent.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select the configuration file.
3. Select **Action > Restore**.

The Application Defined Restore dialog box is displayed in the right pane.

4. Enter the restore details and click **OK**:



Managing user access

Snap Creator provides security features such as role-based access control (RBAC), which enables you to manage user access within Snap Creator.

RBAC involves users, roles, permissions, operations, and profiles. The users, roles, and permissions can be defined by Snap Creator users.

Users

- Users are uniquely identified by a user name and password.
- A user can be assigned and unassigned to one or more roles and profiles.
- The `SNAPCREATOR_USER` in the `snapcreator.properties` file is added as a user when the Snap Creator Server is started.
- The `SNAPCREATOR_USER` in the `snapcreator.properties` file is assigned the Default Administrator role when the user is created during startup.

Roles

Roles have one or more permissions. The assigned permissions determine the actions a user can perform and also which GUI elements the user can access. There are three built-in roles:

ADMINISTRATOR

Has full access to all the APIs. This is the only role which can create, edit, and delete users.

OPERATOR

This role is configured to be a super user and has access to all the APIs except RBAC.

VIEWER

Has very limited access. This role has access to read-only Snap Creator API calls.

These built-in roles cannot be added, removed, or modified.

Permissions

Permissions are a set of operations the user is authorized to perform. The following are built-in permissions:

BACKUP

Required to perform a backup or clone operation.

CONFIGURATION

Required to create, read, update, and delete configuration files.

CUSTOM

Required to start a custom plug-in operation.

EXTENDED_REPOSITORY

Required to perform catalog (also known as extended repository) operations.

GLOBAL

Required to create, edit, and delete global configuration files.

POLICY_ADMIN

Required to call policy operations (for example, addPolicy, updatePolicy, removePolicy).

POLICY_VIEWER

Required for read-only policy operations.

RBAC_ADMIN

Required to manage users (for example, create, update, delete users, and roles; also to assign and unassign roles, permissions).

RBAC_VIEW

Required to view user accounts, assigned roles, and assigned permissions.

RESTORE

Required to perform restore operations.

SCHEDULER

Required to perform scheduler operations.

VIEWER

Provides authorization for read-only operations.

Operations

Operations are the base values that Snap Creator checks for authorization. Some examples of operations are getTask, fileCloneCreate, createTask, dirCreate, and so on.

Note: Operations cannot be added, removed, or modified.

Profiles

- Profiles are assigned to users.
- Profiles in RBAC are created in the profile directory on the file system.
- Certain Snap Creator APIs check if a user is assigned to a profile and also check the permissions for operations.

  For example, if a user wants a job status, RBAC verifies if the user has authorization to call SchedulergetJob and then checks if the profile associated with the job is assigned to the user.
- If a user, who is assigned the Operator role, creates a profile, then that profile is automatically assigned to the user.

Managing user access for storage controllers

If you are not using the OnCommand Unified Manager proxy, you need a user name and password to communicate with the storage controllers. Passwords can be encrypted for security.

Note: You should not use the root user or the admin/vsadmin user. Best practice is to create a backup user with the necessary API permissions.

Network communications are through HTTP (80) or HTTPS (443), so you must have one or both of these ports open between the host where Snap Creator runs and the storage controllers. A user must be created on the storage controllers for authentication. For HTTPS, you must ensure that the user is enabled and configured on the storage controllers.

Related tasks

Encrypting Snap Creator user passwords on page 45

Creating Snap Creator users

You can create Snap Creator users and perform several actions, such as assigning profiles and roles to the users, by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Users and Roles > User management**.
2. In the **User management** tab, click **Add**.
3. In the **New User** dialog box, enter a user name password; then click **Save**.

   The new user name is displayed in the **Users** pane, under **User Name**.

Assigning profiles to Snap Creator users

You can assign profiles to Snap Creator users by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Users and Roles > User management**.
2. In the **User management** tab, select the desired user name, and then click **Assign Profiles**.
3. Move the desired profiles from the left column to the right column, and then click **Save**.

   You can select and drag the profiles between columns or click the arrow to move the profiles between columns.
4. Verify that the profile was assigned by selecting the user and viewing the assigned profile in the **Assigned Profiles and Roles** pane.

Viewing a list of Snap Creator users and assigned profiles by using the CLI

You can view a list of all Snap Creator user accounts that have profiles by using the command line interface (CLI) only.

Step

1. Enter the following command:

   snapcreator --server *host_name* --port *port_number* --user *sc_user_name* --passwd *sc_passwd* --profile *profile_name* --action userListForProfile –verbose

Example

Here is an example:

```
snapcreator --server localhost --port 8080
--user SCadmin --passwd passwd123 –profile FirstProfile
--action userListForProfile --verbose
```

Creating Snap Creator roles

You can create Snap Creator roles by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Users and Roles > Role management**.
2. In the **Role management** tab, click **Add**.
3. In the **Add Role** dialog box, enter the role name and description; then click **Save**.

   The new role is displayed in the **Roles** pane.

Assigning roles to Snap Creator users

You can assign roles to Snap Creator users by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Users and Roles > User management**.
2. In the **User management** tab, select the desired user name, and then click **Assign Profiles**.
3. Move the desired roles from the left column to the right column, and then click **Save**.

   You can select and drag the roles between columns or click the arrow to move the roles between columns.
4. Verify that the role was assigned by selecting the user and viewing the assigned role in the **Assigned Profiles and Roles** pane.

Viewing a list of Snap Creator users and assigned roles

You can view a list of Snap Creator users and their assigned roles by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Users and Roles > User management**.
2. View the list of users in the **Assigned Profiles and Roles** pane.
3. Select the desired user and view the assigned roles in the **Assigned Profiles and Roles** pane.

Viewing Snap Creator users assigned to a role by using the CLI

You can view a list of all the Snap Creator users assigned to each role by using the command-line interface (CLI) only.

Step

1. Enter the following command:

   ```
   snapcreator --server host_name --port port_number --user sc_user_name --
   passwd sc_passwd --action userListAssigned --roleName role_name –verbose
   ```

Example

Here is an example:

```
snapcreator --server localhost --port 8080 --user SCadmin
--passwd passwd123 –-action userListAssigned
–rolename ADMINISTRATOR –verbose
```

Creating Snap Creator permissions by using the CLI

You can create Snap Creator permissions that can be assigned to a role by using the command-line interface (CLI) only.

Step

1. Create the permissions:

   snapcreator --server *host_name* --port *port_number* --user *sc_user_name* --passwd *sc_passwd* --action permAdd -permName *permission_name* --perDesc *permission_description* –verbose

Example

```
snapcreator --server localhost --port 8080 --user SCadmin
--passwd passwd123 --action permAdd --permName backup
--permDesc "Permission to run a backup" –verbose
```

Assigning permissions to Snap Creator roles

You can assign permissions to Snap Creator roles by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Users and Roles > Role management**.
2. In the **Role management** tab, select the desired role and then click **Assign Permissions**.
3. Move the desired permissions from the left column to the right column and then click **Save**.

   You can select and drag the permissions between columns or click the arrow to move the permissions between columns.
4. Verify that the permission was assigned by selecting the role and viewing the assigned permission in the **Roles and assigned permissions** pane.

Creating a list of all Snap Creator permissions by using the CLI

You can create a list of all Snap Creator permissions that can be assigned to a role by using the command line interface (CLI) only.

Step

1. Enter the following command:

   snapcreator --server *host_name* --port *port_number* --user *sc_user_name* --passwd *sc_passwd* --action permissionsList -verbose

Example

Here is an example:

```
snapcreator --server localhost --port 8080 --user SCadmin
--passwd passwd123 --action permList --verbose
```

Viewing Snap Creator permissions assigned to a role

You can view a list of all the Snap Creator permissions assigned to a role by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Users and Roles > Role management**.
2. In the **Role management** tab, select the desired role.
3. Select the desired role and view the assigned permissions in the **Role and assigned permissions** pane.

Encrypting Snap Creator user passwords

You can encrypt the Snap Creator user passwords from the command-line interface (CLI).

Steps

1. Enter the following command:

   `snapcreator --cryptpasswd`

2. Enter the password that was used for the account:

   `Please Enter Password:`

   An encrypted password is displayed.

Example

Here is an example:

```
Your encrypted password is:
53616c7465645f5f614d4964d340f7f2d26eef38f443f5ea9c2f8020015a2dfa
```

This action prevents a plain text password from being inserted into a configuration file on the host on which Snap Creator is installed.

Managing profiles

You can create, view, and delete profiles.

A profile is essentially a folder used for organizing configuration files. Profiles also act as objects for role-based access control (RBAC), meaning that users can be allowed access to only certain profiles and the configuration files contained within.

Creating profiles

You can create profiles to organize configuration files by using the Snap Creator GUI.

About this task

The first time that you open the Snap Creator GUI, the New Profile dialog box is displayed automatically, prompting you to create a new profile.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Profiles and Configurations** pane, click **Add Profile**.

   The New Profile dialog box is displayed.
3. Enter the name of the new profile, and then click **OK**.

   The new profile is listed in the **Profiles and Configuration**s pane, and the Configuration wizard is displayed in the right pane.

Viewing profiles

You can list the existing Snap Creator profiles.

Step

1. From the Snap Creator GUI main menu, select **Management > Configurations**.

   The existing Snap Creator profiles are listed in the Profiles and Configurations pane.

Deleting profiles

You can delete Snap Creator profiles.

About this task

Deleting a profile also deletes any configuration files associated with the profile.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.

   The existing Snap Creator profiles are listed in the Profiles and Configurations pane.
2. Right-click the profile to be deleted and select **Delete**.

3. Click **Yes** in the confirmation message

   The profile and associated configuration files are permanently deleted from Snap Creator.

Managing configuration files

You can create, copy, download, list, and delete configuration files.

A configuration file is the center of Snap Creator and is composed of parameters that are set to affect the behavior of Snap Creator, such as enabling supported plug-ins to run, specifying required variables, and defining the volumes that are captured in Snapshot copies.

Creating configuration files

You can create configuration files by using the Configuration wizard.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Profiles and Configurations** pane, right-click the profile that you want to contain the new configuration file, and then select **New Configuration**.

   The Configuration wizard is displayed in the right pane.
3. Complete the pages in the **Configuration** wizard to create the configuration file:
   a. In the **Configuration** page, enter a name for the configuration file.

      Note: By default, password encryption is enabled to prevent passwords from being displayed in clear text in the configuration file.

   b. In the **Plug-In Type** page, select the desired option as the type of plug-in.

      The next page that you advance to in the wizard depends on which option you selected. The following table describes the plug-in type options and the next pages that require your input:

Plug-in type option	Next page	Next page
Application plug-in	**Application plug-ins** Select the plug-in to configure.	**Plug-in Parameters** Provide the configuration details associated with the selected plug-in option.
Virtualization plug-in	**Virtualization plug-ins** Select the plug-in to configure.	**Plug-in Parameters** Provide the configuration details associated with the selected plug-in option.
Community plug-in	**Community plug-ins** Select the plug-in to configure.	**Plug-in Parameters** Provide the configuration details associated with the selected plug-in option.
None (if you are not using a plug-in)	**Agent Configuration**	--

      For more information about the specific plug-in parameters and required configuration information, see the applicable plug-in documentation.

   c. In the **Agent Configuration** page, enter the Snap Creator Agent configuration information.

d. In the **Storage Connection Settings** page, select the transport method (HTTP or HTTPS).

   The standard port for the selected method is displayed. If the storage system uses a nonstandard port, enter it in the port field.

e. On the **Controller/Vserver Credentials** page, enter the IP address and login credentials for each storage controller/SVM that contains the volumes in this configuration file.

   Note: You must add at least one storage controller/SVM to the configuration.

   In the **Controller/Vserver Volumes** pane, select each volume that you want to include and either drag it to the right pane or click the right arrow to move the volume to the right pane, and then click **Save**.

   Important: If you are planning to replicate Snapshot copies to a SnapMirrror or SnapVault destination, the name of the SVM you enter in this step must match exactly the name of the SVM you used when you created the SnapMirrror or SnapVault relationship. If you specified a fully qualified domain name when you created the relationship, you must specify a fully qualified domain name in this step, regardless of whether SnapCreator is able to find the SVM with the information you provide. Case is significant.

   You can use the `snapmirror show` command to check the name of the SVM on the primary storage system:

   ```
   snapmirror show -destination-path destination_SVM:destination_volume
   ```

   where *`destination_SVM_name`* is the name of the SVM on the destination system and *`destination_volume`* is the volume.

f. On the **Controller Credentials** page, verify that the controllers display the correct information.

   If changes are required, select a controller, and then click **Edit**.

g. On the **Snapshot Details** page, provide the Snapshot copy details.

Field	Description
Snapshot copy Name	Typically, the same name as the configuration file; however, this name can reflect the data that is being backed up **Note:** Do not use special characters when specifying the Snapshot copy name.
Snapshot copy Label	Snapshot copy label **Note:** For use with clustered Data ONTAP 8.2 or later. For Data ONTAP releases prior to clustered Data ONTAP 8.2, this field will not provide any functionality.

Field	Description
Policy Type	There are two options: • **Policy**: enables one of the built-in policies shown in the **Snapshot copy Policies** area, and specifies the retention (the number of backups to be retained) • **Use Policy Object**: select if a policy object has already been created
Snapshot copy Policies	Allows you to select the policy to enable
Prevent Snapshot copy Deletion	Determines whether to prevent the deletion of the Snapshot copy
Policy Retention Age	Specifies policy retention age
Naming Convention	Specifies the naming convention (**Recent** or **Timestamp**) of backups

h. On the **Snapshot Details Continued** page, configure any additional settings that are applicable to your environment.

i. On the **Data Protection** page, select whether integration with SnapMirror or SnapVault is required.

Additional information is requested if either SnapMirror or SnapVault is selected.

Note: For SnapMirror and SnapVault, you must provide the storage system name and not the IP address.

j. On the **DFM/OnCommand Settings** page, if you want to integrate the Snap Creator configuration with NetApp OnCommand management tools, you can select and provide the relevant information.

k. Review the summary, and then click **Finish**.

Creating new configuration files by downloading existing configuration files

You can create new configuration files by downloading existing files and importing them under new file names by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Profiles and Configurations** pane, right-click the configuration file and select **Download**.
3. Save the file as `required-path/required-filename.ext`.

Note: Remember to provide a unique name for this new file; otherwise, make sure to rename the file before it is uploaded to avoid overwriting the original configuration file.

Creating new configuration files by copying existing configuration files, using the CLI

You can create new configuration files by copying existing configuration files, using the command-line interface (CLI), and then renaming the files.

Steps

1. Enter the following commands:

   cd *install_path*/scServer4.1/engine/configs

   cp *source_profile_name/configuration_name target_profile_name/new_configuration_name*

2. Customize the new configuration file for use with the applicable application or database.

Creating global configuration files

You can create a global configuration file to separate storage controller/Storage Virtual Machine (SVM) or VMware credential configuration from the backup policy. This enables you to control access and handle backup and restore operations.

About this task

You can create two types of global configuration files:

- **Super Global**
  This configuration applies to all of the configurations in all of the profiles.
- **Profile Global**
  This configuration applies to all of the configurations created within a profile.

Steps

1. From the Snap Creator GUI main menu, select **Management > Global Configurations**.
2. In the **Global Configurations** pane, click **Create Global**.

   The Configuration wizard for Global Configurations is displayed in the right pane.
3. Complete the pages in the **Configuration** wizard to create the configuration file.
   a. In the **Configuration** page, the name for the configuration file defaults to **`global`**, which you cannot change; select the global configuration type (**Super Global** or **Profile Global**).

      If you select **Profile Global** as the type, select the profile.

      Note: By default, password encryption is enabled to prevent passwords from being displayed in clear text in the configuration file.

   b. In the **Plug-In Type** page, select the desired option as the type of plug-in.

      The next page that you advance to in the wizard depends on which option you selected. The following table describes the plug-in type options and the next pages that require your input:

Plug-in type option	Next page	Next page
Virtualization plug-in	**Virtualization plug-ins** Select the plug-in to configure.	**Authentication Information** Provide the authentication information for the selected plug-in option.
None	**Storage Connection Settings**	--

For more information about the required plug-in credential information, see the applicable plug-in documentation.

c. In the **Storage Connection Settings** page, select the transport method (HTTP or HTTPS).

The standard port for the selected method is displayed. If the storage system is using a nonstandard port, enter it in the port field.

d. In the **Controller/Vserver Credentials** page, enter the IP address and login credentials for each storage controller/SVM that contains the volumes in this configuration file.

Note: You must add at least one storage controller/SVM to the configuration.

e. In the **Controller Credentials** page, verify that the controllers display the correct information.

If changes are required, select a controller, and then click **Edit**.

f. In the **DFM/OnCommand Settings** page, if you want to integrate the Snap Creator configuration with NetApp OnCommand management tools, you can select and provide the relevant information.

g. Review the summary, and then click **Finish**.

Viewing a list of configuration files assigned to a profile

You can view a list of configuration files assigned to a profile.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Profiles and Configurations** pane, expand the content for the profile.

The configuration files assigned to the profile are listed below the profile name.

Deleting configuration files from a profile

You can delete configuration files from a profile.

About this task

Attention: When deleting configuration files, schedules associated with the configuration are also removed as part of the process.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.

2. From the **Profiles and Configurations** pane, expand the content for the profile.

   The assigned configuration files assigned to the profile are listed below the profile name.

3. Right-click the configuration file and select **Delete**.

4. Click **Yes** in the confirmation window.

   The configuration file is removed from the list under the profile name and is permanently deleted from the Snap Creator Server.

Managing retention policies

You can create retention policies, as well as list and delete the policies.

A retention policy (referred to as “policy”) typically defines Snapshot retention settings, such as how many Snapshot copies to retain and for how long. For example, a daily policy might retain 30 days of Snapshot copies that must be at least 30 days old. (The retention age setting prevents multiple Snapshot copies created on the same day from bypassing service-level agreements (SLAs) that might state that a Snapshot copy must be 30 days old.) If SnapVault is used, the policy also defines any retention settings for the SnapVault copy.

Creating backup types

You can optionally create a backup type using the Snap Creator GUI to help identify the purpose of a policy.

Steps

1. From the Snap Creator GUI main menu, select **Policy > Backup Type**.
2. From the **Backup type** tab, click **Add**.
3. Enter the new backup type name, and then click **OK**.

   The new backup type is listed under **Backup Type**.

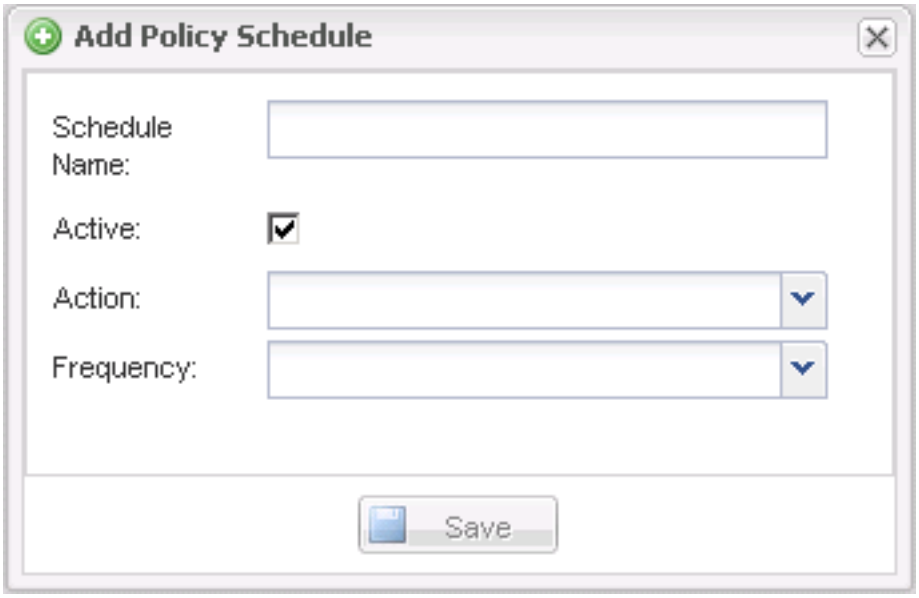
Creating policy schedules

You can optionally create policy schedules by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Policy > Policy Schedules**.
2. From the **Policy Schedules** tab, click **Create**.
3. Enter the schedule name and select the action and frequency, and then click **Save**.

   Depending on the frequency you select, you will need to select the appropriate time fields for running the scheduled job.



Creating policies

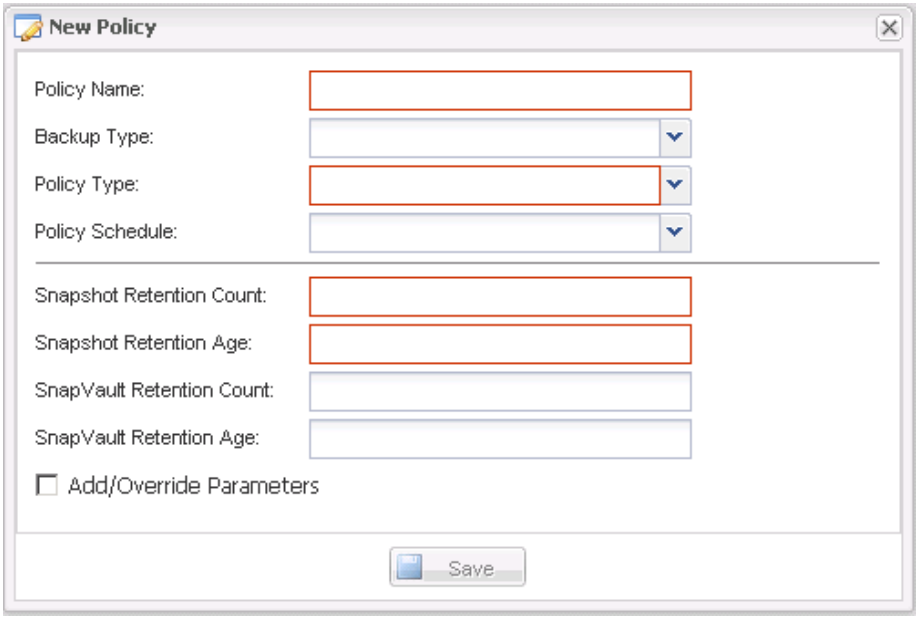
You can create a new retention policy by using the Snap Creator GUI.

Before you begin

Before you create a policy, you should understand the guidelines for defining Snap Creator policies.

Steps

1. From the Snap Creator GUI main menu, select **Policy** > **Policy Management**.
2. From the **Policy Manager** tab, click **Create**.
3. Enter the details, and then click **Save**.



Field	Description
Policy Name	Specify the name of the policy.
Backup Type	(Optional) Select the backup type.
Policy Type	Select the policy type: • `LOCAL`: Takes a Snapshot copy on the primary storage. • `SNAPVAULT`: Takes a Snapshot copy on the primary storage and performs a SnapVault update. SnapVault must be enabled for all volumes in the configuration. • `SNAPMIRROR`: Takes a Snapshot copy on the primary storage and performs a SnapMirror update. SnapMirror must be enabled for all volumes in the configuration.
Policy Schedule	(Optional) Select the policy schedule to be used. If no policy schedule is specified, actions do not run automatically.
Snapshot Retention Count	Enter the number of backups to be retained.
Snapshot Retention Age	Enter the minimum age that the backups must be before they can be deleted.
SnapVault Retention Count	If SnapVault was selected as the policy type, enter the retention count for SnapVault.
SnapVault Retention Age	If SnapVault was selected as the policy type, enter the retention age for SnapVault.
Add/Override Parameters	Certain parameters can be overridden for a policy. If desired, select this check box, and then add the parameters to be overridden.

Assigning policies

You can assign retention policies to the configuration files by using the Snap Creator GUI.

Steps

1. From the Snap Creator GUI main menu, select **Policy** > **Policy Assignments**.
2. Select a profile from the **Profile** pane.
3. Select a policy or policies to assign to the profile by selecting the appropriate check box on the right pane, and then click **Save**.

   If configuration files already exist in the profile, a message displays, informing you that the assigned policy will overrule the settings in the configuration file.
4. Click **Yes** to assign the policy.

Viewing retention policies

You can view a list of retention policies.

Steps

1. From the Snap Creator GUI main menu, select **Policy > Policy Management**.
2. From the **Policy Manager** tab, view the list of policies.

Deleting retention policies

You can delete retention policies.

Steps

1. From the Snap Creator GUI main menu, select **Policy > Policy Management**.
2. From the **Policy Manager** tab, select a policy and click **Delete**.

   Note: If you try to delete a policy that is assigned to a configuration file, the GUI displays the following error message:

   ```
   Policy cannot be deleted since the policy name is applied to
   configuration.
   Use Detach policy and then delete the policy.
   ```

3. Click **Yes** in the confirmation window.

   The policy is removed from the Policy Manager tab.

Managing backups

You can create backup copies, view a list of backup copies, and delete backup copies when they are no longer required.

In addition, you can automate backup operations. For details, see related tasks for information about creating scheduled jobs.

Related tasks

Creating scheduled jobs on page 29

What Snap Creator information should be backed up

Best practice is to make backup copies of specific directories to ensure proper backup of Snap Creator.

To backup Snap Creator, backup copies of the following directories:

Note: Optimally, backups should be scheduled at a time when the Snap Creator services or processes can be stopped to ensure a consistent backup of Snap Creator data.

- The Snap Creator 4.1 Server `engine` subdirectory:
  - Snap Creator database (`..\snapcreator`)
  - Snap Creator Server properties (`..\etc`)
  - Profiles and configuration (`..\configs`)
  - Logs (`..\logs`)
  - Plug-in repository, if enabled (`..\snapcreatorPlugin`)
- The Snap Creator Agent directory:
  - Snap Creator Agent properties (`..\etc`)
  - Logs, if enabled (`..\logs`)
  - Plug-ins (`..\plugins`)

Creating backups

You can create backups by using the Snap Creator GUI.

Before you begin

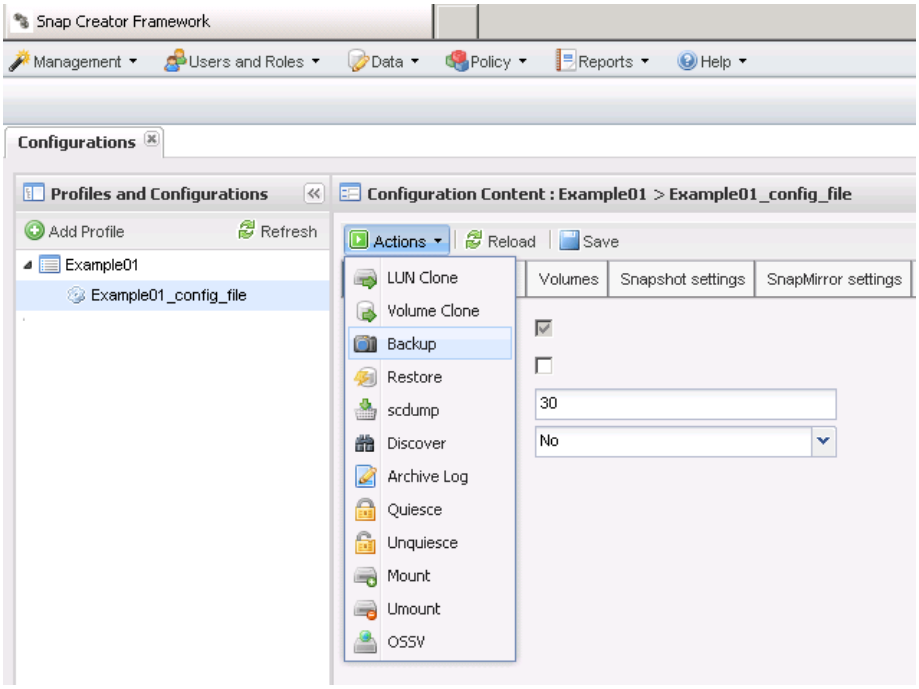
One of the following conditions must be met:

- A backup policy must be defined in the configuration file; or,
- A policy object must be configured and assigned to the profile.

  Note: If a policy object is defined, it will overrule any entries that might be in the configuration file.

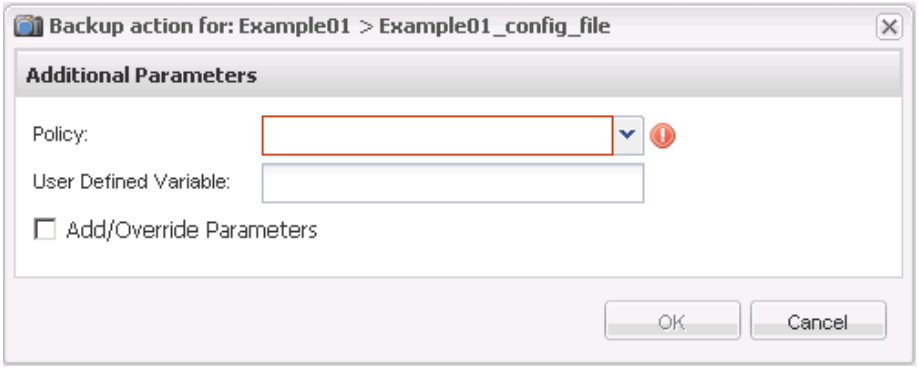
Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select the configuration file.
3. Select **Actions > Backup**.

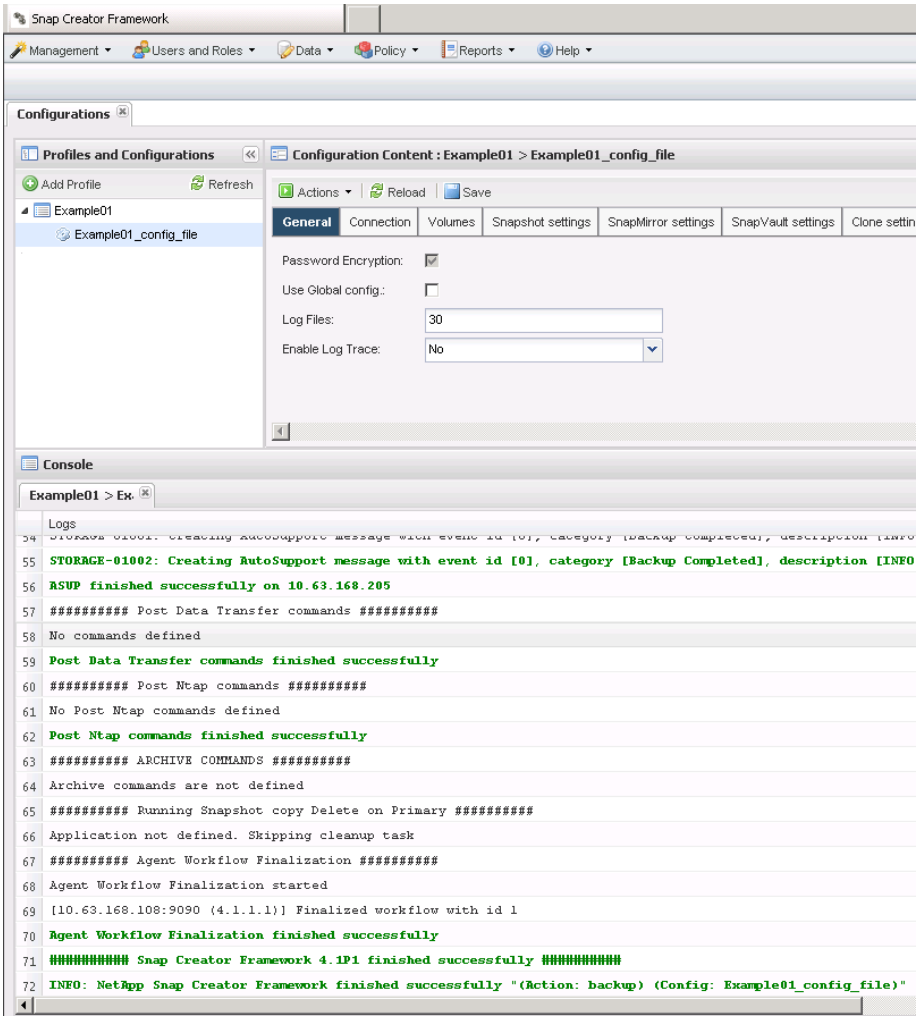


4. In the **Additional Parameters** dialog box, select the policy, and then click **OK** to start the backup.

   Note: If no user-created policy is assigned to the configuration, **`hourly`**, **`daily`**, **`weekly`**, and **`monthly`** are the available selections in the **Policy** drop-down list. If one or more user-created policies have been assigned to the configuration, they are displayed in the **Policy** drop-down list instead.



5. Verify that information about the backup job is displayed in the **Console** pane.



In this example, the output indicates that the Snap Creator operation finished successfully.

Note: The **Console** pane only displays the most pertinent information; this is the verbose mode. To see detailed information about the job that just ran, select **Reports > Logs** at the top of the page. From the Logs view, the profile, configuration file, log type, and specific log can be selected.

Viewing a list of configuration file backup copies

You can view a list of backup copies for a configuration file.

Steps

1. From the Snap Creator GUI main menu, select **Data > Backups**.
2. From the **Backups** tab, **Profiles and Configurations** pane, expand a profile and select a configuration file.

   The Backups pane displays a list of all backups of the volumes defined in the configuration file.

Deleting backups

You can delete backup copies for a configuration file.

Steps

1. From the Snap Creator GUI main menu, select **Data > Backups**.
2. From the **Backups** tab, **Profiles and Configurations** pane, expand a profile and select a configuration file.
3. From the **Backups** tab, select the desired backup and click **Delete**.

   Note: If the configuration file contains multiple volumes, you must select the Snapshot you want to delete on each of the volumes.

4. Click **Yes** in the confirmation window.

Managing scheduled jobs

You can manage scheduled jobs by creating them (to automate backup operations), as well list as by editing, listing, running, and deleting those scheduled jobs.

The Snap Creator Server contains a centralized scheduler that allows Snap Creator jobs to be scheduled, either through a policy schedule (part of Policy Objects) or by being created directly through the scheduler. The scheduler can run up to 10 jobs concurrently and can queue additional jobs until a running job completes.

Creating scheduled jobs

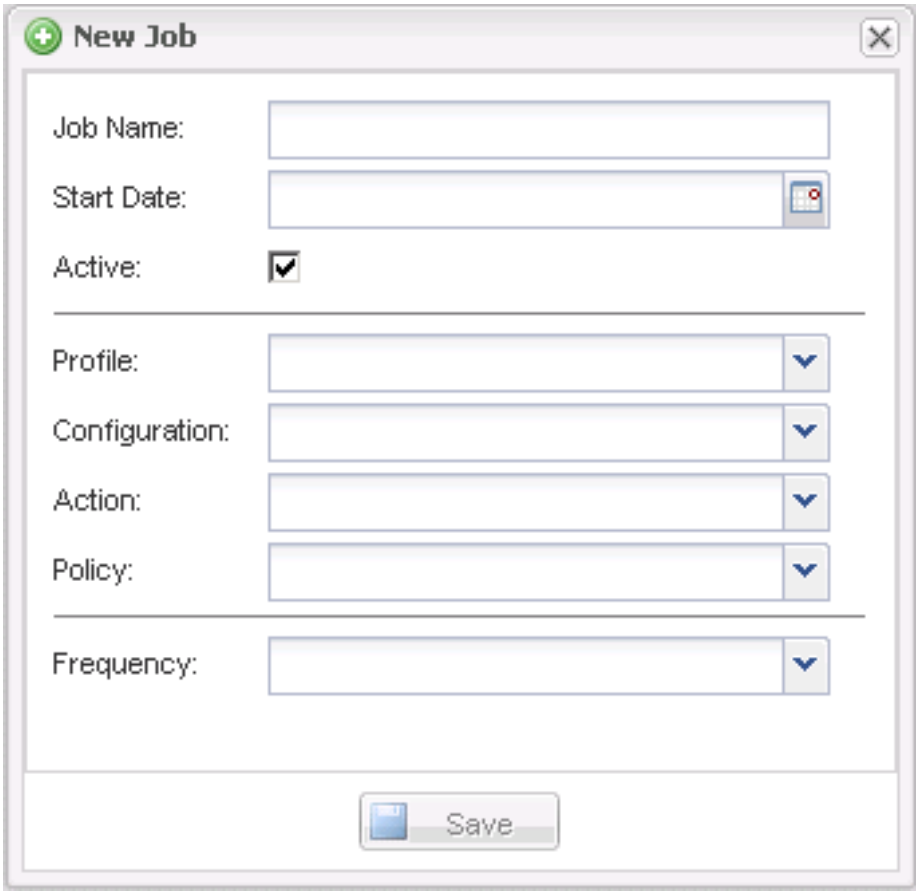
If you are using a local retention policy (located in a configuration file), you can use the Snap Creator GUI scheduler to create schedules and run the tasks. The scheduler, contained within Snap Creator Server, can schedule backups (Snapshot copies), LUN clones, volume clones, application-defined clones, Open Systems SnapVault (OSSV) transfers, archive jobs, and custom actions.

About this task

If you plan to use policy objects instead of a local retention policy, you should skip this procedure and create a policy schedule instead (see related tasks for more information about creating policy schedules).

Steps

1. From the Snap Creator GUI main menu, select **Management > Schedules**.
2. From the **Schedules** tab, click **Create**.
3. In the **New Job** window, enter the details for the job.



Field	Description
Job Name	Specify the name of the scheduled job.
Start Date	Select today's date or a future date.
Active	Set to Active, by default, to signify that the job will run as scheduled.
Profile	Select the applicable profile to be associated with this job.
Configuration	Select the applicable configuration to be associated with this job.

Field	Description
Action	Select one of the following options: • **Backup**: creates a backup by using the NetApp storage technology • **CloneLun**: creates a backup and clones one or more LUNs by using the `lun clone` command • **CloneVol**: creates a backup and clones a volume • **Clone**: performs a plug-in driven clone operation • **OSSV**: uses Open Systems SnapVault to perform the backup No primary backup is created. • **Arch**: does not create a backup; performs archive log management only • **Custom**: executes a plug-in defined cloning action
Policy	Select the applicable policy to be associated with this job.
Frequency	Select the applicable frequency to be associated with this job. Depending on your selection, you will need to select the appropriate time fields for running the scheduled job.

4. Click **Save**.

Related tasks

Creating policy schedules on page 32

Running scheduled jobs

You can run a scheduled job.

Steps

1. From the Snap Creator GUI main menu, select **Management** > **Schedules**.
2. From the **Schedules** tab, select a job from the list of scheduled jobs, and click **Run**.

Viewing a list of scheduled jobs

You can view of list of scheduled jobs.

Steps

1. From the Snap Creator GUI main menu, select **Management > Schedules**.
2. From the **Schedules** tab, review the list of scheduled jobs.

   The Last Run Result field shows the status of the last scheduled job. A green check mark in the field indicates that the job ran successfully, and a red "X" indicates that there was a failure.

Editing scheduled jobs

You can edit a scheduled job.

Steps

1. From the Snap Creator GUI main menu, select **Management > Schedules**.
2. From the **Schedules** tab, select a job from the list of scheduled jobs, and click **Edit**.
3. Modify the desired fields, and click **Save**.

   The scheduled job is saved with the modifications.

Deleting scheduled jobs

You can delete a scheduled job.

Steps

1. From the Snap Creator GUI main menu, select **Management > Schedules**.
2. From the **Schedules** tab, select a job from the list of scheduled jobs, and click **Delete**.
3. Click **Yes** in the confirmation window.

   The scheduled job is deleted from the list.

Managing clones

You can manage clones by creating clones (using the **Actions** setting or by mounting a backup copy as source), and deleting clones, or unmounting clones.

Creating clones from a new backup

You can clone volumes or LUNs from a new backup.

Before you begin

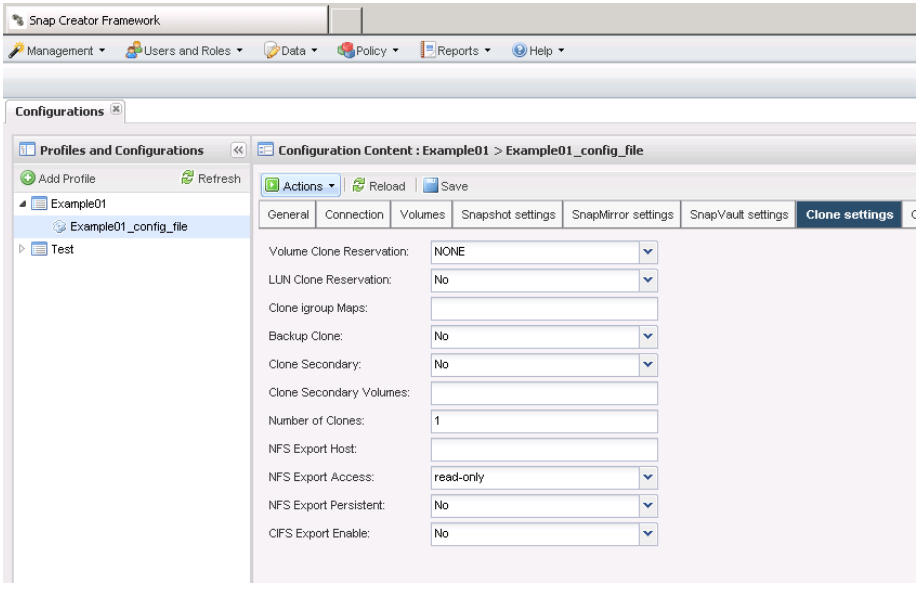
- The Snap Creator Server must be communicating with the storage system.
- You must be logged into Snap Creator with the proper permission to perform the cloning operation.

About this task

This cloning operation consists of taking a new Snapshot copy, and then cloning the new backup.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select a configuration file.
3. Select the **Clone settings** tab and verify that the settings are set properly.



4. Depending on the type of clone desired, select **Actions** and one of the following options:
   - LUN Clone
   - Volume Clone

5. In the **Additional Parameters** dialog box, select the appropriate policy, and then click **OK** to start the cloning process.
6. In the **Console** pane, verify that the cloning process was successful.

Creating clones from an existing backup

You can clone volumes or LUNS from an existing backup as your source.

Before you begin

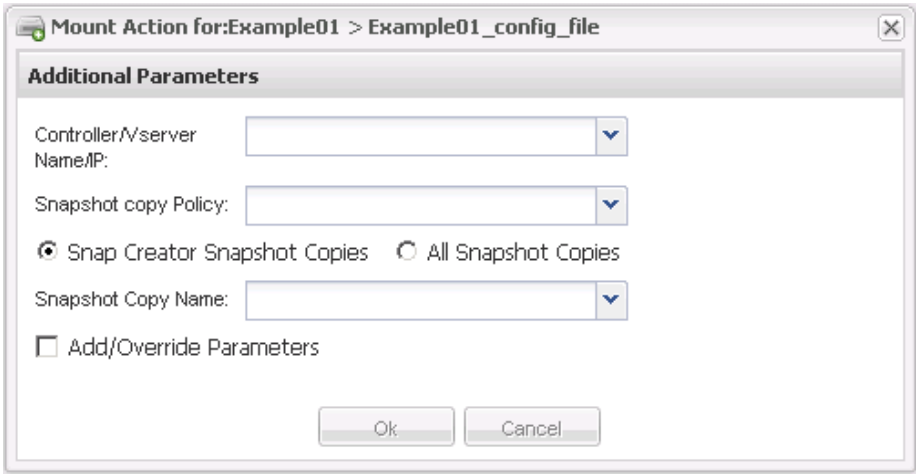
- The Snap Creator Server must be communicating with the storage system.
- You must be logged into Snap Creator with the proper permission to perform the cloning operation.

About this task

This cloning operation consists of mounting an existing Snapshot copy, and then cloning the existing backup.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, in the **Profiles and Configuration** pane, select a configuration file.
3. Select **Actions > Mount**.
4. In the **Additional Parameters** dialog box, select the controller, volume, and policy containing the backup to be mounted, then select the Snapshot copy to be mounted (cloned), and then click **OK** to start the cloning process.



Note: Record the selected Snapshot copy name. When unmounting the backup, the same Snapshot copy name must be selected.

5. In the **Console** pane, verify that the cloning process was successful.

Unmounting clones

You can unmount (or delete) clones.

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Configurations** tab, select a configuration file, and then select **Actions > Unmount**.
3. From the **Additional parameters** window, select the controller, volume, Snapshot copy policy containing the mounted backup, and specific Snapshot copy name on which the clone was created; then click **OK**.

   The clone is unmounted; the Snapshot copy is not deleted.

Plug-in information required to configure Snap Creator

Snap Creator supports the following built-in (or native) plug-ins: Oracle, DB2, MySQL, Sybase ASE, Domino, SnapManager for Microsoft SQL Server, SnapManager for Microsoft Exchange, MaxDB, VMware (vSphere and vCloud Director), Red Hat KVM, Citrix XenServer, and SAP HANA. Community plug-ins are not included in the package and must be downloaded separately.

The following table lists and describes the plug-in parameters and settings:

Parameters	Setting	Description
APP_NAME	oracle|db2|mysql|domino|vibe|smsql|sme|sybase|maxdb|kvm|xen|hana<plug-in>	Determines which application is being backed up. Snap Creator has built-in support for the listed applications. You can either use `APP_NAME` or configure `APP_QUIESCE_CMDXX`, `APP_UNQUIESCE_CMDXX`, and `PRE_EXIT_CMDXX`. If the application is not directly supported in Snap Creator, you can use a plug-in or run your own application quiesce or unquiesce commands or scripts. <PLUG-IN>: Copy the plug-in to the `/`*`path_to_scServer`*`|`*`scAgent`*`/plug-ins` directory and specify the plug-in in the `APP_NAME` parameter. Commands or Scripts: `APP_QUIESCE_CMD01=`*`path_to_quiesceCMD`* `APP_UNQUIESCE_CMD01=`*`path_to_unquiesceCMD`* `PRE_EXIT_CMD01=`*`path_to_unquiesceCMD`*
APP_IGNORE_ERROR	(Y|N)	Determines whether Snap Creator should ignore errors from application plug-ins. This is useful when you want to back up multiple databases and do not want to stop the backup if the quiesce or unquiesce operations of one database fails.
APP_DEFINED_BACKUP	(Y|N)	The application plug-in is expected to perform the entire backup operation including quiescing, creating a Snapshot copy, and unquiescing. The built-in plug-ins do not support this kind of backup.
APP_DEFINED_RESTORE	(Y|N)	Enables application-based restore operations. In the event of a restore operation, Snap Creator sends a request to the application plug-in and the plug-in handles the request.

Parameters	Setting	Description
APP_DEFINED_MOUNT	(Y|N)	The built-in mount abilities of Snap Creator are ignored. Instead, the plug-in is responsible for all mount activities including volume or LUN clone creation. The built-in plug-ins do not support this type of mount.
APP_DEFINED_UMOUNT	(Y|N)	The built-in unmount abilities of Snap Creator are ignored. Instead, the plug-in is responsible for handling all unmount activities including volume or LUN clone deletion. The built-in plug-ins do not support this type of unmount operation.
APP_AUTO_DISCOVERY	(Y|N)	Enables application automatic discovery. Snap Creator sends a discover request to the application plug-in and the plug-in is then responsible for the discovery of the storage configuration. This can be done dynamically or made persistent using the `APP_CONF_PERSISTENCE` parameter, if the information is to be saved to the configuration file.
APP_CONF_PERSISTENCE	(Y|N)	Enables automatic discovery to be persistent, which means changes are dynamically updated in configuration file.
APP_DEFINED_CLONE	(Y|N)	The built-in cloning abilities of Snap Creator are ignored. Instead, the plug-in is responsible for handling all clone activities, including volume or LUN clone creation and deletion. The built-in plug-ins do not support this type of clone.
FS_NAME	*`plug-in`*	Determines which plug-in is being used for file system operations.
JAVA_HOME	Text	This setting points to the Java Virtual Machine (JVM) that should be used for executing `.class` and `.jar` files.
JVM_ARGS	Text	This setting controls the JVM settings when native Java `.class` or `.jar` files are executed. The default setting is -Xms32M -Xmx128M.
JAVA_CLASSPATH	Text	This setting defines the Java classpath. By default, `plug-ins/native` is configured and can be completed using this environment variable, which is appended to the default.

Parameters	Setting	Description
META_DATA_VOLUME		Enables a Snapshot copy of the specified volume to be created after the unquiesce operation. This can be valuable for certain plug-ins for which the Snapshot copy of data must be created at different times. The parameter must not only specify the volume but the controller as well (for example, `controller1:volume1,volume2;controller2:volume3,volume4;controller3:volume5,volume6`).
PERL_HOME	Text	This setting points to the Perl interpreter that should be used for executing `.pl` files.
PERL_OPTS	Text	This setting controls the PERL interpreter settings when native Perl files are executed. Options for additional settings include directories (-I) that can be passed to the Perl interpreter.
PYTHON_HOME	Text	This setting points to the Python interpreter that should be used for executing `.py` files.
PYTHON_OPTS	Text	This setting controls the Python interpreter settings when native Python files are executed.
VALIDATE_VOLUMES	*data*	Validates that all the volumes in which the database resides are part of the backup operation. Currently, there are limitations: • Only Network File System (NFS) is supported. • Only the data files for the supported databases are checked.

Archive log plug-in

The Archive log plug-in works with Snap Creator Archive logs and not with the logs of any application or database.

The following table lists the Archive log plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
`ARCHIVE_LOG_ENABLE`	(Y|N|*policy*:*age*)	Enables archive log management (deletion of the old archive logs).

Parameter	Setting	Description
ARCHIVE_LOG_RETENTION	*number_of_days*	Specifies the number of days the archive logs are retained. This setting must be equal to or greater than NTAP_SNAPSHOT_RETENTIONS.
ARCHIVE_LOG_DIR	*change_info_directory*/logs	Specifies the path to the directory that contains the archive logs.
ARCHIVE_LOG_EXT	*file_extension*	Specifies the file extension of the archive logs. For example, if the archive logs are 10192091019.log, specify this parameter setting to LOG.
ARCHIVE_LOG_RECURSIVE_SEARCH	(Y|N)	Enables the management of archive logs within subdirectories. If the archive logs are located under subdirectories, you should use this parameter.

Citrix XenServer plug-in

Snap Creator supports the backup and restore of Citrix XenServer virtual machines (VMs) by using the Citrix XenServer plug-in.

Note: For the latest information about support or compatibility matrices, see the Interoperability Matrix.

The Citrix XenServer plug-in supports Windows and XenServer.

Consider the following when you use the Citrix XenServer plug-in:

- OnCommand Unified Manager server as a proxy is not supported.
- Mount, unmount, and backup operations using Open Systems SnapVault, and archive log management, are not supported.
- Volume restore operations are not supported; only application-defined restore operations are supported.
- Deleted VMs can be restored.
- Snap Creator Agent must be installed on the host where XenCenter is installed, and Snap Creator Server must not be installed on XenServer.
- The SC_AGENT_TIMEOUT value should be greater than the default value: 600 or higher.
- If the value of APP_DEFINED_RESTORE is Y, then the SnapVault restore operation using the GUI is not supported.
- If the pool master goes down in a server pool, then the Snap Creator configuration file should be modified manually with the new master server for further activity.
- XenServer tools must be installed on all the VMs.

- For Fibre Channel in a storage area network (SAN) environment, the `plink.exe` tool must be installed on a host where Snap Creator Agent is installed, and the `plink.exe` path must be added to the system environment variable.
  For detailed information about how to add the `plink.exe` path to the system environment variable, refer to the *Snap Creator Framework Installation Guide*.
- VM pause and unpause operations are performed serially.
  For multiple VMs, the duration of VM in the pause state during backup operation depends on the number of VMs.
- Automatic discovery of volumes is supported.

Supported Citrix XenServer configurations

The following Citrix XenServer configurations are supported:

- SAN
  - Supports guest virtual machines with one virtual disk image (VDI) per storage repository.
  - Supports data disks with one VDI per storage repository
- NAS
  - Supports guest VMs installed on NFS mounts.
  - Supports data disks on NFS mounts.

Parameters

The following table lists and describes the Citrix XenServer plug-in parameters:

Parameter	Setting	Description
XEN_VMS	*host IP*:*VM#*	Lists virtual machines of a particular host, separated by a slash (/). For example: `10.10.10.192:VM1/VM2/VM3`
XEN_HOST_USERS	*host IP*:*username*/*password*	Lists Xen hosts and the corresponding user name and password.
XEN_BIN_PATH	For example: `c:\Program Files\Citrix\XenCenter\xe.exe`	Specifies the path of the XenServer executable (xe). The XenCenter console is required for importing and exporting the VM metadata.
XEN_METADATA_PATH	For example: `c:\scmetadata`	Specifies the path on the server to which you can download the virtual machine metadata.
XEN_RESTORE_VMS	For example: `xenserver1:vm1,vm2;xenserver2:vm1,vm2`	Contains the VMs that must be restored. This parameter is required only during a restore operation.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

DB2 plug-in

The DB2 plug-in uses the `db2` command to communicate with the database.

Note: For the latest information about support or to view compatibility matrices, see the Interoperability Matrix.

The following table lists the DB2 plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
`APP_NAME`	db2	Application name
`DB2_DATABASES`	*`db_name`*`:`*`user_name`*	Lists the DB2 databases and the user name. Multiple databases and user names can be specified as a semicolon-separated list: for example, `db1:user1;db2:user2`.
`DB2_CMD`	*`path_to_db2cli_cmd`*	Specifies the path used to initialize the database connection so that further commands can be executed on database. • UNIX-based environment:*`db2_install_directory/`*`sqllib/bin/db2` (for example; `/home/db2inst1/sqllib/bin/db2`) • Windows: *`db2_install_directory`*`\SQLLIB\BIN\db2cmd.exe`: for example, `C:\"Program Files"\IBM\SQLLIB\BIN\db2cmd.exe`) If a path is not specified, then `sqllib/db2` is used.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

IBM Domino plug-in

The IBM Domino plug-in for the Snap Creator Framework offers a complete backup and recovery solution for Domino databases on NetApp storage. With the IBM Domino plug-in, you can back up

databases efficiently and restore them as needed without taking database servers offline. The plug-in uses IBM-provided APIs to ensure application consistency.

With key NetApp data protection technologies tightly integrated in the Snap Creator Framework, you can use the IBM Domino plug-in to:

- Create application-consistent Snapshot copies on primary storage
- Replicate Snapshot copies to secondary storage for disaster recovery and archiving

Integrated technologies include Snapshot, SnapMirror, and SnapVault.

Related information

Snap Creator Framework 4.1.1 IBM Domino Plug-in Operations Guide

MaxDB plug-in

The MaxDB plug-in automates backup and restore operations on MaxDB databases.

Note: For latest information about support or to view compatibility matrices, see the Interoperability Matrix.

The MaxDB plug-in provides the following features:

- A centralized framework to back up, restore, and clone MaxDB databases
- Integration with the database and provision of application consistency
- Utilization of Snapshot technology to create point-in-time copies of the database
- Utilization of SnapRestore to restore a previous Snapshot copy, and therefore an application-consistent database, in seconds, regardless of the capacity or number of files
- Utilization of FlexClone technology to create fast, space-efficient clones of databases based on Snapshot copy backups

The following table lists the MaxDB plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
`APP_NAME`	maxdb	Specifies the application name.
`XUSER_ENABLE`	(Y|N)	Enables or disables the use of an xuser for MaxDB so that a password is not required for the database user.
`HANDLE_LOGWRITER`	(Y|N)	Executes suspend logwriter (`N`) or resume logwriter (`Y`) operations.
`DBMCLICMD`	*`path_to_dbmcli_cmd`*	Specifies the path to the MaxDB `dbmcli` command. If not set, `dbmcli` on the search path is used. **Note:** If in a Windows environment, the path needs to be contained within double-quotes ("...").

Parameter	Setting	Description
SQLCLICMD		Specifies the path to the MaxDB `sqlcli` command. If not set, `sqlcli` on the search path is used.
MAXDB_UPDATE_HIST_LOG	(Y|N)	Instructs the MaxDB backup program whether or not to update the MaxDB history log.
MAXDB_DATABASES	*db_name*:*user_name*/*password*	Lists databases to be backed up with the user name and password. Multiple databases and user names can be specified using a comma-separated list: for example, `db1:user1/password,db2:user2/password`.
MAXDB_CHECK_SNAPSHOT_DIR	Example: `SID1:directory[,directory...];[SID2:directory[,directory...]`	Checks that a Snap Creator Snapshot copy operation is successful and ensures that the Snapshot copy is created. This applies to NFS only. The directory must point to the location that contains the `.snapshot` directory. Multiple directories can be included in a comma-separated list. Multiple databases can be specified as a semicolon-separated list. In MaxDB 7.8 and later versions, the database backup request is marked Failed in the backup history.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

MySQL plug-in

The MySQL plug-in uses Net-MySQL to communicate with the database.

Note: For latest information about support or compatibility matrices, see the Interoperability Matrix.

The MySQL plug-in does not support backup and restore operations for multiple databases.

The following table lists the MySQL plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
APP_NAME	mysql	Application name

Parameter	Setting	Description
MYSQL_DATABASES	*db_name*:*user_name*/*password*	List of MySQL databases, the user name, and the password. Multiple databases with user names and passwords can be specified as a semicolon-separated list. For example: `db1:user1/pwd1;db2:user2/pwd2`
HOST	*host_name*	Name of the host where the databases are located **Note:** `VALIDATE_VOLUMES` functions properly only if `HOST=localhost`. If `HOST=`*`IP_address`*, then `VALIDATE_VOLUMES` will not discover the MySQL database.
PORTS	*db_name*:*port_number*	List of databases and the ports they are listening on For example: `db1:3307;db2:3308`
MASTER_SLAVE	(Y|N)	Specifies the backup database environment: If set to Y, backs up the master database. If set to N, either backs up the slave database or the Master-Slave configuration is not used.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

Oracle plug-in

The Oracle plug-in uses SQL*Plus to communicate with the database.

To use C Shell (CSH) with the Oracle plug-in on UNIX or Linux platforms, the following conditions should be met:

- Snap Creator Agent must be started as the Oracle user, instead of the root user.
- The Oracle user must have the proper environmental variables (`ORACLE_HOME` and `ORACLE_SID`) set for the plug-in driven SQL*Plus commands to work.
  This can be accomplished using a shell startup file, such as `~/.cshrc`.

Note: For latest information about support or to view compatibility matrices, see the Interoperability Matrix.

The following table lists the Oracle plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
APP_NAME	oracle	Application name
ORACLE_DATABASES	*db_name*:*user_name*	List of Oracle databases and user names Multiple databases and user names can be specified as a semicolon-separated list: for example, `db1:user1;db2:user2`.
SQLPLUS_CMD		Path to the `sqlplus` command
CNTL_FILE_BACKUP_DIR		Path to the directory where the user should store the backup control files The Oracle user must have appropriate permissions to this directory.
ORA_TEMP		Path to the directory to store the temporary file (for example, `/tmp`) The Oracle user must have appropriate permissions to this directory.
ARCHIVE_LOG_ONLY	(Y|N|policy:<Y|N>)	Informs the Oracle plug-in to perform only a switch log operation This setting is useful if you are handling archive logs backups separately from data backups.
ORACLE_HOME		Path to the Oracle home directory
ORACLE_HOME_<SID>		Path to the Oracle home directory for a given system identifier (SID) When backing up multiple databases, it might be important to specify more than one Oracle home directory.
ORACLE_EXPORT_PARAMETERS	(Y|N)	The `ORACLE_HOME` and `ORACLE_SID` environment parameters are exported by using the `export` command. This is applicable only in UNIX or a Linux-based environment.
ORACLE_BACKUPMODE		Option to configure offline or online backups by using the Snap Creator policy. The default option is online. `ORACLE_BACKUPMODE=hourly:online,daily:offline`

Note: For the latest information about support or to view compatibility matrices, see the Interoperability Matrix.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

Red Hat KVM plug-in guidelines

Kernel-based Virtual Machine (KVM) is a virtualization solution for the Linux kernel. Snap Creator uses the KVM plug-in to back up and restore the guest virtual machines.

Note: For the latest information about support or for compatibility matrices, see the Interoperability Matrix.

The KVM plug-in supports guest operating systems such as Linux, Windows, and Solaris.

The plug-in internally uses `virsh` commands.

You must consider the following when you use the KVM plug-in:

- OnCommand Unified Manager server as a proxy is not supported.
- Mount, unmount, and backup operations using Open Systems SnapVault, and archive log management, are not supported.
- In a storage area network (SAN) environment, the Linux Host Utilities (LHU) kit is required to collect information about LUNs and volumes from the storage controller.
  The LHU kit should be installed on a KVM hypervisor, which is the same location as the Snap Creator Agent.

  Note: If the LHU kit is not installed and the configuration is a mix of network attached storage and storage area network environments, then the backup and restore operations work only on a Network File System (NFS).
- The KVM plug-in supports only the Linux version of the Snap Creator 4.0 and 4.1 Agent.
- Volume restore is not supported; only application-defined restore operations are supported.
- The deleted virtual machines (VMs) cannot be restored.
- The storage controller IPs and host should be either in `/etc/hosts` on the KVM host or in a Domain Name System (DNS).
- Only one KVM host per configuration is supported.
- If a virtual machine is created by using an ISO repository, then to perform any action, you should disconnect this repository from the virtual machine through the Virt Manager console in CD-ROM options.
- The `SC_AGENT_TIMEOUT` value should be more than the default value: 600 or higher.
- The volumes are automatically discovered using automatic detection.
  You cannot see the discovered destination volumes if the destination is not in a SnapMirror relationship. You should use `dpstatus` to check the status of the SnapMirror relationship. If a SnapMirror relationship does not exist, you must first create the SnapMirror relationship.
- If the value of `APP_DEFINED_RESTORE` is Y, then the SnapVault restore operation using the GUI is not supported.
- When creating a SnapMirror and SnapVault configuration by using the GUI, the volume details must be entered manually because the SnapMirror and SnapVault relationship is not detected automatically.
- Data disks mapped to the VMs are not backed up.
- VM suspend and resume operations are performed serially.

For multiple VMs, the duration of VM in suspend state during backup operation depends on number of VMs.

Supported KVM configurations

- SAN: Supports guest virtual machines installed on a raw multipath device (LUN with multiple paths).
- NAS: Supports guest virtual machines installed on NFS volumes.

Note: Configurations with multiple virtual machines installed on a single multipath device are not supported.

Guest virtual machines installed on LVM or on an image file in the SAN environment are not supported.

The following table describes the KVM plug-in parameters:

Parameter	Setting	Description
`KVM_RESTORE_VM_LIST`	Example: `VM1,VM2`	Specifies the list of VMs to be restored. This parameter is required only during restore.
`KVM_VM_MAPPING`	Example: `VM1:s_c1:/vol/vol1/lun1;VM2:s_c2:/vol/vol2/lun2;`	(Required) Specifies the mapping between the VM and its associated storage controller, LUN, or file path. This parameter is updated dynamically during the discovery process.
`KVM_VM_CONFIG_DIR`	Default: `/etc/libvirt/qemu`	(Optional) Specifies the path to the directory where all the XML configuration files of the VM are stored.
`KVM_CMD_RETRY_COUNT`	Default: `3`	(Optional) Specifies the number of times you rerun the command when running it fails in the KVM plug-in.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

SAP HANA plug-in

The SAP HANA plug-in enables you to create backups and perform point-in-time recovery of SAP HANA databases based on storage Snapshot copies.

This plug-in uses the SAP HANA hdbsql client to execute SQL commands to provide database consistency and to manage the SAP HANA backup catalog. The plug-in is supported for both SAP Certified Hardware Appliances and Tailored Datacenter Integration (TDI) programs.

The plug-in is installed as part of the Snap Creator Agent on a host that has access to the SAP HANA database nodes.

Related information

Snap Creator Framework 4.1.1 SAP HANA Plug-in Operations Guide

SnapManager for Microsoft Exchange plug-in

The SnapManager for Microsoft Exchange plug-in is used to centralize backup operations for Microsoft Exchange Server through Snap Creator. Using this plug-in, you can configure tens or hundreds of SnapManager for Exchange servers through Snap Creator, allowing you to view all of your SnapManager for Exchange backup jobs and statuses from a single interface.

Unlike the other plug-ins, the SnapManager plug-ins (SnapManager for Microsoft SQL Server and SnapManager for Microsoft Exchange) use PowerShell to communicate with an existing installation of SnapManager. The SnapManager plug-ins require that the SnapManager products are already installed and operating. The SnapManager plug-ins use the `new-backup` Powershell cmdlet to create a backup through SnapManager. All cloning and restore actions should continue to be driven through the SnapManager interface.

Note: For the latest information about support or to view compatibility matrices, see the Interoperability Matrix.

The SnapManager for Microsoft Exchange plug-in requires Snap Creator Agent to be installed on the same host as SnapManager for Microsoft Exchange. You should set the `SC_AGENT_TIMEOUT` value to 900 or higher.

The following table provides SnapManager for Microsoft Exchange plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
`SME_PS_CONF`	Example: `"C:\Program Files\NetApp\SnapManager for Exchange\smeShell.psc1"`	Specifies the path to the PowerShell configuration file for SnapManager for Microsoft Exchange.
`SME_BACKUP_OPTIONS`	Example: `Server 'EX2K10-DAG01' -GenericNaming -ManagementGroup 'Standard' -NoTruncateLogs $False -RetainBackups 8 -StorageGroup 'dag01_db01' -BackupCopyRemoteCCRNode $False`	Specifies the SnapManager for Microsoft Exchange backup options. Snap Creator uses a PowerShell cmdlet for a new backup.
`SME_SERVER_NAME`	Example: `EX2K10-DAG01`	Specifies the SnapManager for Microsoft Exchange server name.
`SME_32bit`	(Y|N)	Enables or disables the use of the 32-bit version of PowerShell.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

SnapManager for Microsoft SQL Server plug-in

The SnapManager for Microsoft SQL Server plug-in is used to centralize backup operations for Microsoft SQL Server through Snap Creator. Using this plug-in, you can configure tens or hundreds of SnapManager for Microsoft SQL servers through Snap Creator, allowing you to view all of your SnapManager for Microsoft SQL backup jobs and statuses from a single interface.

Unlike the other plug-ins, the SnapManager plug-ins (SnapManager for Microsoft SQL Server and SnapManager for Microsoft Exchange) use PowerShell to communicate with an existing installation of SnapManager. The SnapManager plug-ins require that the SnapManager products are already installed and operating. The SnapManager plug-ins use the `new-backup` Powershell cmdlet to create a backup through SnapManager. All cloning and restore actions should continue to be driven through the SnapManager interface.

Note: For the latest information about support or to view compatibility matrices, see the Interoperability Matrix.

When using the SnapManager for Microsoft SQL Server plug-in, you must be aware of the following considerations:

- Snap Creator Agent must be installed on the same host as SnapManager for Microsoft SQL Server. You should set the `SC_AGENT_TIMEOUT` value to 900 or higher.
- The Powershell should be installed in the Windows Powershell default installation location (for example, `C:\WINDOWS\system32\WindowsPowerShell\v1.0`).

The following table provides the SnapManager for Microsoft SQL Server plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
`SMSQL_PS_CONF`	Example: **`"C:\Program Files\NetApp\SnapManager for SQL Server\smsqlShell.psc1"`**	Specifies the path to the PowerShell configuration file for the SnapManager for Microsoft SQL Server.

Parameter	Setting	Description
SMSQL_BACKUP_OPTIONS	Example: **-svr 'SQL' -d 'SQL \SHAREPOINT', '1', 'WSS_Content' -RetainBackups 7 -lb -bksif -RetainSnapofSnapInfo 8 -trlog -gen -mgmt standard**	Specifies the SnapManager for Microsoft SQL Server backup options. Snap Creator uses a PowerShell cmdlet for new backup.
SMSQL_SERVER_NAME	Example: **SQL \SHAREPOINT**	Specifies the SnapManager for Microsoft SQL Server name.
SMSQL_32bit	(Y|N)	Enables or disables the use of the 32-bit version of PowerShell.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

Sybase ASE plug-in

The Sybase ASE plug-in uses the `isql` command to interact with the Sybase database.

Note: For latest information about support or to view compatibility matrices, see the Interoperability Matrix.

The following table lists the Sybase plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
SYBASE_USER	*user_name*	Specifies the operating system user who can run the `isql` command. Required for UNIX. This parameter is required if the user running the Snap Creator Agent start and stop commands (usually the root user) and the user running the `isql` command are different.
SYBASE_SERVER	*data_server_name*	Specifies the Sybase data server name (`-S` option on `isql` command). For example: `p_test`.

Parameter	Setting	Description
SYBASE_DATABASES	*db_name*:*user_name*/*password*	Lists the databases within the instance to back up. The master database is added: for example: `DBAtest2:sa/53616c7404351e`. If a database named +ALL is used, then database automatic discovery is used and the sybsyntax, sybsystemdb, sybsystemprocs, and tempdb databases are excluded. For example: `+ALL:sa/53616c71a6351e`. Encrypted passwords are supported if `NTAP_PWD_PROTECTION` is set.
SYBASE_DATABASES_EXCLUDE	*db_name*	Allows databases to be excluded if the +ALL construct is used. You can specify multiple databases by using a semicolon-separated list: for example, `pubs2;test_db1`.
SYBASE_TRAN_DUMP	*db_name*:*directory_path*	Enables you to perform a Sybase transaction dump after creating a Snapshot copy. For example: `pubs2:/sybasedumps/pubs2` You must specify each database requiring a transaction dump.
SYBASE_TRAN_DUMP_FORMAT	%S_%D_%T.cmn	Enables you to specify the dump naming convention. The following keys can be specified: • %S = Instance name from `SYBASE_SERVER` • %D = database from `SYBASE_DATABASES` • %T = unique timestamp Here is an example: `%S_%D_%T.log`.
SYBASE_TRAN_DUMP_COMPRESS	(Y|N)	Enables or disables native Sybase transaction dump compression.
SYBASE_ISQL_CMD	Example: `/opt/sybase/OCS-15_0/bin/isql`	Defines the path to the `isql` command.
SYBASE	Example: `/sybase`	Specifies the location of the Sybase installation.
SYBASE_LOGDIR	Example: `/usr/local/ntap/scServer/logs`	Defines the directory where Snap Creator logs are placed.

Parameter	Setting	Description
SYBASE_MANIFEST	Example: DBAtest2:/t_inf_nzl_devs/	Specifies the databases for which the manifest file should be created, along with the location where the manifest file should be placed.
SYBASE_MANIFEST_FORMAT	%S_%D_%T.manifest Example: %S_%D_%T.manifest	Enables you to specify the manifest file naming convention. The following keys can be specified: • %S = Instance name from SYBASE_SERVER • %D = database from SYBASE_DATABASES • %T = unique timestamp, which is the same as used for Snapshot copy naming
SYBASE_MANIFEST_DELETE	(Y|N)	Allows the manifest to be deleted after the Snapshot copy has been made. The manifest file should be captured in the Snapshot copy so that it is always available with the backup.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

VMware (VIBE) plug-in

Snap Creator supports the backup of VMware virtual machines and vApps through the VMware plug-in. The VMware plug-in is an integrated plug-in for both virtual machines with vSphere and vApps with vCloud Director.

Note: For latest information about support or to view compatibility matrices, see the Interoperability Matrix.

Consider the following when you use the VMware plug-in:

- The VMware plug-in is supported only on Windows and Linux.
  - If you are using a non-Windows or non-Linux Snap Creator Server, you need a Snap Creator Windows or Linux agent to run the VMware plug-in.
- OnCommand Unified Manager server as a proxy is not supported.
- Mount, unmount, and backup operations using Open Systems SnapVault, and archive log management, are not supported.
- VMware HA with VMware plug-in is not tested and not supported.
- VMware vCenter Linked Mode with VMware plug-in is not tested and not supported.
- The volumes are discovered using automatic detection.
  You cannot see a discovered destination volume if it is not in a SnapMirror relationship. Use dpstatus to check the SnapMirror relationship. If a SnapMirror relationship does not exist, you must first create the SnapMirror relationship.

- Before you perform restore operations, delete all of the VMware snapshot copies.
- After the restore operations are complete, you must run a Snap Creator backup of the restored virtual machines and vApps to ensure that the new environment is cleaned up and all VMware Snapshot copies are removed.
  If the plug-in is not able to clean up VMware Snapshot copies and displays an error, you must remove the VMware Snapshot copies manually. The VMware plug-in does not guarantee 100% VMware Snapshot copy removal and it is a known VMware issue.
- The VMware plug-in supports only 32-bit Snap Creator with a 32-bit Linux system and 64-bit Snap Creator with a 64-bit Linux system.
- The deleted virtual machines cannot be restored.
- The volume restore operation is not supported; only application-defined restore operations are supported.
- The `SC_AGENT_TIMEOUT` value should set to 1800 or higher.
- The default value of `VIBE_VMWARE_SNAPSHOT` (VMware Snapshot option) is `N`.
- If the value of `APP_DEFINED_RESTORE` is `Y`, then the SnapVault restore operation using the GUI is not supported.
- While creating a SnapMirror and SnapVault configuration by using the GUI, you must manually enter the SnapMirror and SnapVault parameters, because the SnapMirror and SnapVault relationship is not detected automatically.
- The VMware plug-in discovers the ISO-mounted path as a datastore.

The following table provides VMware plug-in parameters, provides their settings, and describes them:

Parameter	Setting	Description
`VIBE_DYNAMIC_VOLUMES_UPDATE`	(Y|N) Default: not set	If set to `N`, does not perform dynamic volume update, which means you have to set `VOLUMES`, `SNAPVAULT_VOLUMES`, `SNAPMIRROR_VOLUMES`, and `NTAP_DFM_DATA_SET` manually.
`VIBE_NOPING`	Default: `N`	Specifies that ICMP is not used to ping VMware or storage controllers
`VIBE_VCLOUD_IPADDR`		Specifies the IP address or the host name of the vCloud Director to log in to (vCloud only).
`VIBE_VCLOUD_USER`	Example: `administrator@system`	Specifies the user name to use to log in to the vCloud Director (vCloud only). You must set @<org> or @system (top-level vCloud database). **Note:** The vCloud Director system administrator user name must be used to perform the backup or restore operation. These operations fail if the user is an organization administrator or any other user.

Parameter	Setting	Description
VIBE_VCLOUD_PASSWD		Specifies the password associated with the specified VIBE_VCLOUD_USER (vCloud only).
VIBE_VCENTER_USER		Specifies the user name used to log in to vCenter.
VIBE_VCENTER_PASSWD		Specifies the password associated with the specified VIBE_VCENTER_USER.
VIBE_VCLOUD_NAMES	Example: ORG:VDC1,VDC2:VAPP1,VAPP2;ORG2:VDC3:;ORG3::VAPP6	Lists organization, virtual data center, and vApp object names to back up (vCloud only).
VIBE_VSPHERE_NAMES	Example: VCENTER1:DS1:VM1;VCENTER2;DS2,DS3:;VCENTER3::VM4	Lists the datastores and virtual machines to back up per vCenter (vSphere only).
VIBE_TRIM_VSPHERE_NAMES	Example: VCENTER1:VM99;VCENTER2:VM5,VM12	Lists the virtual machines to remove from backup per vCenter (vSphere only).
VIBE_RESTORE_INTERVAL	Default: 30 seconds	Specifies the time between each restore check.
VIBE_RESTORE_TIME	Default: 3600 seconds	Specifies the total time to wait for a complete restore operation to finish.
VIBE_VMWARE_SNAPSHOT	Default: N	Causes a VMware snapshot to be taken during backup.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

Requirements for vCloud vApp backup and restore operations using the VMware plug-in

Snap Creator supports the backup of vCloud vApp through the VMware plug-in. vApp and virtual machine backup copies are made by the VMware plug-in through the vCloud Director API and vSphere API, which are invoked on the VMware vCloud Director and VMware vCenter server, respectively.

For vApp backup and restore operations to be successful, you must provide the following details in the configuration file:

- vCloud IP and credentials
- vCloud organizations, virtual data centers (vDCs), and vApp names

Note: If more than one vCenter is attached to vCloud, then the password for the all vCenter servers should be same.

You must consider the following when performing the vCloud backup and restore operations:

- The backup and restore processes for both VMware and vCloud are very similar except for the discovery process, in which vCloud backups require additional discovery of the vCloud Director metadata using representational state transfer (REST) APIs.
- You should provide details of the vCloud with the organizations, vDCs, and vApps to be backed up.
- If a vDC is listed, all the vApps in the vDC are backed up.
- vCloud module discovers virtual machines associated with any vApp that must be backed up and puts them on a backup list.
- If a vApp selected for backup is contained within an organization or a vDC that is also selected for backup, the vApp is backed up only once.

Note: For Virtual Machine File System (VMFS) restore operations using the VMware plug-in, there must be enough space in the volume to create a LUN clone that is equal to the size of the LUN.

Virtual machine backup and restore by using the VMware plug-in

Snap Creator supports the backup of VMware virtual machines through the VMware plug-in. Virtual machine backups are taken through the vSphere API on the VMware vCenter server.

For virtual machine backup, you must provide the following details in the configuration file:

- vCenter IP or host name and credentials
- vSphere virtual machines and datastore names

Note: Snap Creator discovers vCenter only if vCenter is configured on the default port (443).

For the restore operation, you should provide the backup parameters and the Snapshot copy name.

Consider the following when performing the VMware backup and restore processes:

- If a virtual machine is listed and is not available, the plug-in displays an error message. It will not be able to restore a lost virtual machine even if it is backed up.
- If a datastore is listed, all the virtual machines in the datastore are backed up.
- Only the listed virtual machines or virtual machines located in the datastores specified are backed up.
- If a virtual machine selected for backup is contained within a datastore that is also selected for backup, it will be backed up only once.
- The VMware plug-in supports both Network File System (NFS) and VMware Virtual Machine File System (VMFS) datastores.
  - Virtual machine restores on an NFS datastore use Single File SnapRestore (SFSR) on the storage system, which avoids host copies.
  - To restore a virtual machine on a VMFS datastore, perform the following steps:
    1. Use FlexClone or LUN clone of the LUN contained in a specific restore Snapshot copy.
    2. Map it to the cluster.
    3. Use vCenter API calls to copy contents from the Snapshot copy of the VMFS datastore to the original VMFS datastore.

Using the plug-in framework to create custom plug-ins

The plug-in framework enables you to create your own plug-ins for Snap Creator or reuse the existing plug-ins. The plug-in provides Snap Creator with the steps for handling backup and recovery of a given application.

The plug-in framework defines the following methods:

- quiesce - Method for handling quiesce for a given application plug-in
- unquiesce - Method for handling unquiesce for a given application plug-in
- discover - Method for handling discovery of storage objects for a given application plug-in
- scdump - Method for handling collection of support information, database, operating system, and SnapDrive
- restore - Method for handling restore for a given application plug-in
- restore_pre - Method for handling prerestore operations for a given application plug-in (can use built-in restore CLI of Snap Creator)
- restore_post - Method for handling post-restore operations for a given application plug-in (can use built-in restore CLI of Snap Creator)
- clone_pre - Method for handling preclone operations for a given application plug-in
- clone_post - Method for handling post-clone operations for a given application plug-in
- describe - Method for describing what a plug-in implements. This is optional for Perl plug-ins but required for native plug-ins under `plug-ins/native`.
- clone_all - Method for handling cloning for a given application plug-in (cannot use built-in cloning interface)
- clone_cleanup - Method for handling cleanup if a clone operation fails
- restore_cleanup - Method for handling cleanup if a restore operation fails

Note:

- The plug-in framework supports Perl, PowerShell, Java, UNIX Shell, and Python for programming.
- The plug-in framework enables you to implement objects and functions that exist within the Snap Creator.
  For example, error handling is available, which means the plug-in can use the standard implementation Snap Creator uses. This reduces the work required to create a plug-in.
- Perl plug-ins are installed under `/plug-ins/`*`PLUG-IN-name/PLUG-IN`*`.pm`.
- Native plug-ins are installed under `/plug-ins/native/plug-in.sh`,`plug-in.java.plug-in.bat`, and so on.
- The plug-in must be installed where it is supposed to run. This can be Snap Creator Server or Snap Creator Agent depending on the set up of Snap Creator.

For more information about the plug-in framework, plug-ins, and a plug-in user guides, see the *Snap Creator Framework Discussions Community forum*.

Configuring Snap Creator for multilevel application quiesce operations when using hypervisor plug-ins

When you are using the hypervisor (also known as “virtualization”) plug-ins (VMware (VMware vCloud Director and VMware vSphere), KVM, and Citrix XenServer) and want to perform a multilevel application quiesce and backup operation, you need to configure Snap Creator for this type of setup.

About this task

This configuration allows you to quiesce an application that resides on a virtual machine, quiesce the virtual machine, and then make a Snapshot copy.

During this process, you will create a hypervisor and application configuration by specifying a parent configuration file with one or more child configuration files. This parent configuration file contains the typical configuration file information such as retention policy, SVM details, and information for the hypervisor plug-in. Each child configuration file contains the details necessary to perform Snap Creator Quiesce and Unquiesce actions using the specific application plug-in.

Steps

1. Create a new profile.
2. Create a new configuration.
   a. On the **Configuration** page, enter a name for the configuration file.

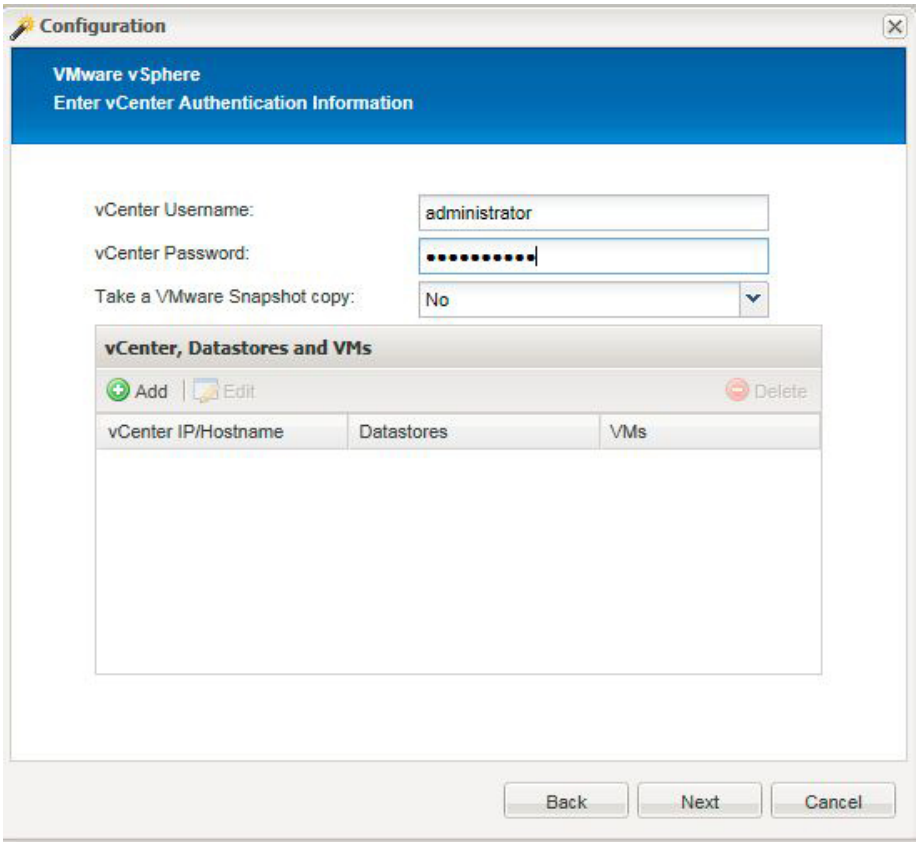
      Note: By default, password encryption is enabled to prevent passwords from being displayed in clear text in the configuration file.

   b. On the **Plug-In Type** page, select **Virtualization plug-in**.
   c. On the **Virtualization Plug-In** page, select the plug-in to configure.
   d. On the plug-in parameters page, provide the configuration details associated with the selected plug-in option.

      #### Example

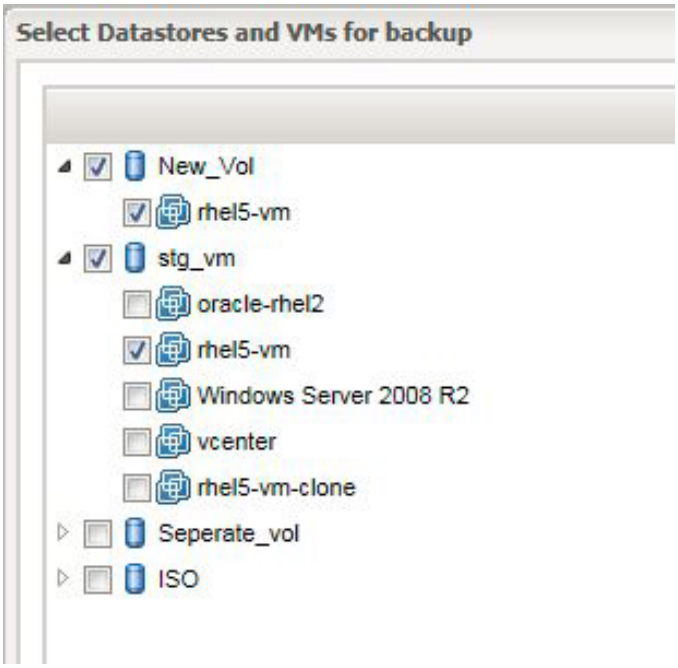
      In the following example, VMware vSphere is the selected Virtualization plug-in. The wizard screens that display depend on your selection.

      i. Provide the appropriate information and click **Add**.



ii. On the New vCenter page, provide the vCenter IP and Hostname, and click **Add**.

iii. Select the applicable datastores and virtual machines for backup.



iv. Verify the details you entered are correct.

v. On the Agent Configuration page, provide the VMware agent details, which are the details of the system where you have installed the agent.

Note: The Port is the port on which the agent is listening.

Click **Test agent connection** to make sure that the agent is running.

vi. On the Hypervisor + App Backup page, select **Yes** because both the hypervisor and application-consistent backups are required.

vii. On the Hypervisor + App configuration page, provide the parent configuration name for the hypervisor and application configuration.

viii. On the Plug-in Type page, select **Application plug-in**.

ix. On the Application Plug-ins page, select the application to be used for backup and restore.

x. Provide the details for the selected application.

xi. On the Agent Configuration page, provide the application Snap Creator Agent details, which are the details of the application or database host on which you have installed the agent.

Note: Typically, the host is a virtual machine being backed up that has an application running on it.

Click **Test agent connection** to make sure that the agent is running.

xii. On the Summary page, verify the information and click **Finish**.

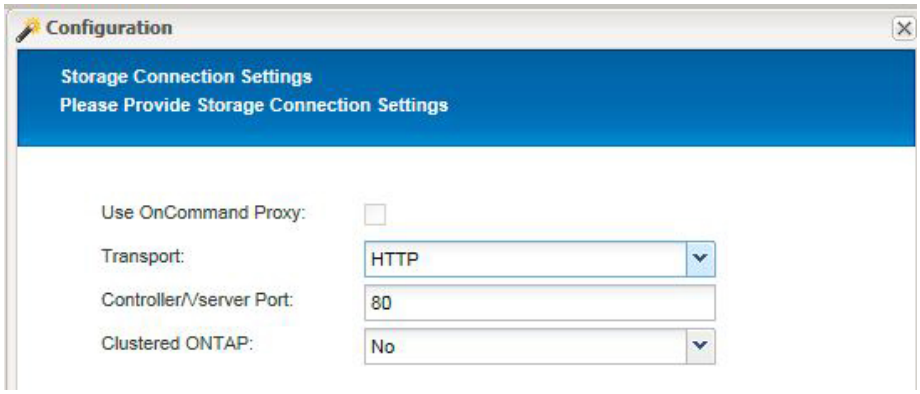
xiii. On the Hypervisor + App page, you have the following options:

- To add additional applications to this configuration, click **Add** and repeat steps vii through xii in this example.
- To delete applications from this configuration, select the item and click **Delete**.
- To continue with the main Configuration wizard, click **Next**.

Note: If you have multiple applications listed, you have the option to reorder this list by moving an application up or down in the list. Applications are backed up serially, so if an application needs to be quiesced before another one in the list, you need to place the applications in the proper sequence.

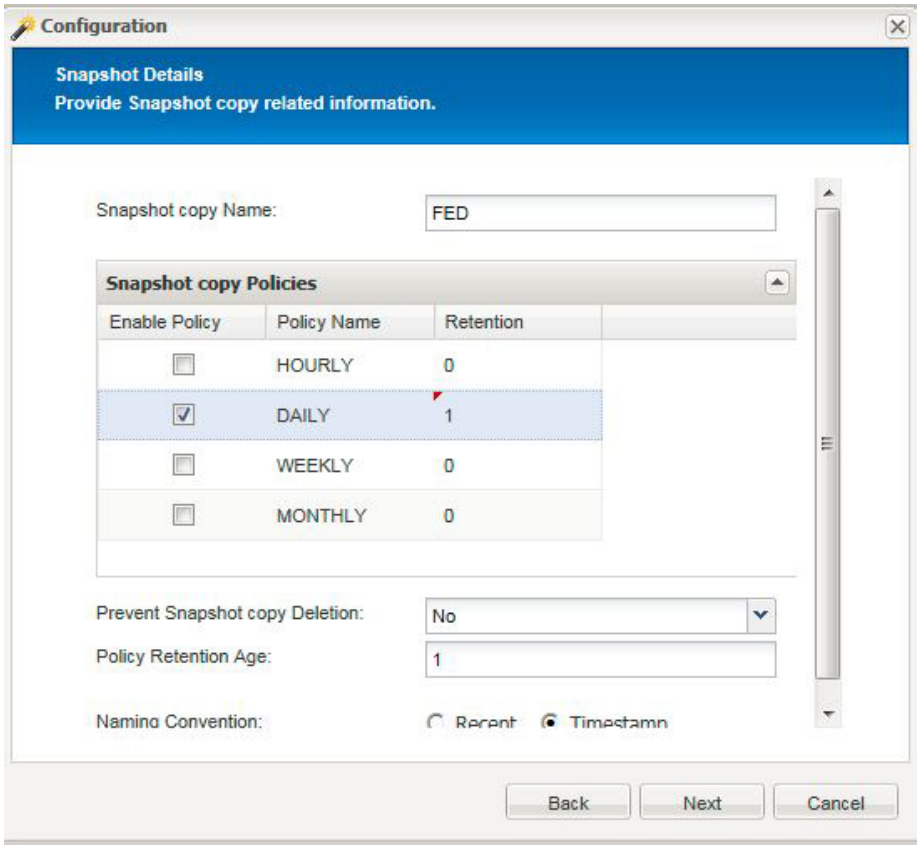
e. On the **Storage Connection Settings** page, provide the following information:

- For the **Transport** option, select **HTTPS**.
- For the **Controller/Vserver Port** option, leave the default setting (443).
- For the **Clustered ONTAP** option, select **Yes**.



f. On the **New Controller/Vserver** page, provide the controller IP address, username, and password.

g. Provide the Snapshot copy details.



h. On the **Snapshot Details Continued** page, do not select the **Consistency Group** option.

i. On the **Data Protection** page, do not select either of the **Data Transfer** options.

j. Verify the information on the **Summary** page and click **Finish**.

Related tasks

Creating profiles on page 22
Creating configuration files on page 23

Troubleshooting Snap Creator issues

You can troubleshoot Snap Creator issues by using the information in the Snap Creator logs and error messages.

Types of error messages and troubleshooting logs

Snap Creator provides useful error messages and troubleshooting logs.

The following types of error messages are provided by Snap Creator:

INFO

For standard, normally occurring operations.

CMD

External command or script that Snap Creator runs (according to configuration) and the return code from the command or script is logged. Typically, these are PRE, POST, or APP quiesce or unquiesce commands.

OUTPUT

For Data ONTAPI library calls.

DEBUG

For debug information.

WARN

To draw your attention, but it is considered to be a normal activity usually and does not require any action (for example, when you delete Snapshot copies)

ERROR

Indicates a problem and most likely requires manual action to fix the error. Snap Creator exits on any ERROR message. It is important to fix any problem that occurred before it runs again. Snap Creator does not automatically fix problems, but you can specify what is to be done before exiting Snap Creator by using `PRE_EXIT_CMD` defined in the configuration file.

The troubleshooting logs contain the output from any external commands or scripts run by Snap Creator (for example, SnapDrive). If you call other scripts through Snap Creator, it is important that you properly set up exit codes and output for those scripts. You should never exit with status 0 if a problem occurs.

There following logs are available for every Snap Creator profile and configuration:

Out

Contain only verbose logging information.

Debug

Contain verbose and debug logging information. If trace messages are enabled in the configuration file, which is the default setting, then the trace information is displayed in this log. The parameter that enables trace messages is `LOG_TRACE_ENABLE - (Y|N)`.

Error

Contain a history of all of the error events for a given configuration. The error log helps with viewing information about past errors so that users can correlate events and gain a historical perspective. It can be monitored and used as a way to integrate Snap Creator with a monitoring application.

Stderr

Contain information if issues with the Snap Creator code are encountered; however, the standard error streams log is typically empty.

The Out, Debug, and Stderr logs are retained as defined by the `LOG_NUM` value in the configuration file while the error log is always appended. All logs are written to the */scServer_install_path/*`engine/logs/`*profile* directory.

The Snap Creator Agent optionally creates the Out, Debug, and Stderr logs as well, and is enabled, by default, with the following parameter setting: `SC_AGENT_LOG_ENABLE=Y`.

Performing a Snap Creator dump

You can collect support information by using **scdump** from the Snap Creator GUI.

About this task

A Snap Creator dump (scdump) gathers the following support information at the profile level and places it into a `.zip` file:

- Configuration files for the profile
- Log files (Ouptut and Debug)
- Other log files (`server.log`, `gui.log`, and `sc_server.log`)
- Environmental information (`scdump.txt`), such as the following items:
  - Snap Creator version (build information, date, and so on)
  - Host operating system and architecture
  - Database and version
  - SnapDrive version

Steps

1. From the Snap Creator GUI main menu, select **Management > Configurations**.
2. From the **Profiles and Configurations** pane, expand the profile and select a configuration file.
3. Select **Actions > scdump**.

   Note: This process might take several minutes. Refrain from selecting the `scdump` option multiple times.

4. Save the .zip file.

   The zip file (`scdump_`*`profile_date/time`*`.zip`) is saved to the Snap Creator Server installation directory in the `engine` subdirectory.

Troubleshooting Snap Creator GUI errors

In UNIX environments, you might encounter some errors when accessing the Snap Creator GUI. You should be aware of these errors and know how to troubleshoot them.

Cannot connect to the Snap Creator GUI

In a UNIX environment, you might be unable to connect to the Snap Creator GUI; you must verify that certain conditions exist as you investigate the source of the problem.

Issue

In a UNIX environment, you cannot connect to the Snap Creator GUI.

Corrective action

Verify the following:

- The URL must start with HTTPS.

  Note: If you use HTTP instead of HTTPS, the result will either be that there is nothing on the page or a "?" depending on the browser you use.

- The correct port number is used in the URL and that nothing else is already using the selected port.
  You might try selecting a different port.
- Communication is allowed through the firewall of the operating system.

Error starting the Snap Creator GUI

In a UNIX environment, you might encounter an error when starting the Snap Creator GUI.

Issue

In a UNIX environment, you get an HTTP ERROR 503 when starting the Snap Creator GUI; for example: `HTTP ERROR 503Problem accessing /. Reason: SERVICE_UNAVAILABLE`

Cause

You might receive this error message when there is insufficient space for the `temp` file.

Corrective action

Verify that you have sufficient space in the `temp` folder in the respective operating system folders.

Example: In a Linux environment, check `/tmp`.

Troubleshooting network issues

You might encounter network issues in Snap Creator such as authorization failures. You should be aware of these issues and know how to troubleshoot them.

Issue

While within Snap Creator, you encounter an authorization failure issue.

Cause

An authorization failure might be due to the configuration, firewall permissions, or network address translation (NAT).

Corrective action

Verify the following:

- IP/Host name

Unless you use `host equiv`, the storage system name from the `hostname` command on the controller should be the same as that entered in the Snap Creator configuration file.

Do not use a fully qualified domain name (FQDN) when the host name of a storage system is abbreviated.

Ensure that the IP resolution matches the name you specified. If there is a mismatch, correct it by using `host equiv` on the storage system.

To enable `host equiv`, perform the following steps:

1. Enter the following command:

   `options https.admin.hostsequiv.enable on`

2. Edit the `/etc/hostsequiv` file and add the following: *`IP/Host_name_in_Snap_Creator config_file Snap_Creator_user`*

- The NetApp Management Console data protection capability

  The storage controller name defined in the Snap Creator configuration parameter `VOLUMES` must match the storage controller name in the NetApp Management Console data protection capability. If they do not match, you can use the operating system host file to force things to match.

- Firewall

  If there is a firewall between the host running Snap Creator and your storage system, ensure that you have access control lists (ACLs) (bi-directional) open for 80, 443, or both.

  - 80: Used to communicate with the storage system if HTTP is selected
  - 443: Used to communicate with the storage system if HTTPS is selected

  To use HTTPS (443) for Linux, Solaris, or AIX, install the openssl libraries, which are required to use SSL.

  If Snap Creator Agent is running, the port on which the Agent is running must be open. Ensure that the return traffic from the storage system can go to the system running Snap Creator, at least on the non-privileged ports.

- NAT

  If you use NAT, ensure that the source/destination IP addresses are not changed in the Transmission Control Protocol (TCP) packet. The host and storage systems need to know who they are talking to. Presenting a firewall IP instead of the actual host or controller IP might cause problems.

Troubleshooting Snap Creator Server or Agent issues

You might encounter some issues with the Snap Creator Server or Snap Creator Agent. You should be aware of these issues and know how to troubleshoot them.

Snap Creator Server or Agent not starting

The Snap Creator Server or Snap Creator Agent might not start.

Issue

The Snap Creator Server or Snap Creator Agent will not start.

Cause

The general causes of this issue are that Java is not installed, the wrong bit level of Java is installed, or the wrong version of Java is installed.

Corrective action

Verify that Java is installed by running the following command:

```
java -version
```

Verify that a supported version of Java is installed.

Also, verify that the bit level of Java installed matches the bit level of Snap Creator. For example, if 64-bit Snap Creator is installed, 64-bit Java must also be installed.

Snap Creator Agent not responding

The Snap Creator Agent is not responding.

Issue

The Snap Creator Agent is not responding.

Corrective action

Verify the following:

- The Snap Creator Agent is running.
- The selected port is not already in use.
- Communication on the Agent port is allowed through the firewall.

Troubleshooting CLI command errors

You should be aware of some errors you might encounter when attempting to run CLI commands, and know how to troubleshoot these issues.

CLI command results in 403 Forbidden error

In a UNIX environment, you might encounter the 403 Forbidden error when running a CLI command.

Issue

In a UNIX environment, you attempt to run a CLI command, but you encounter the 403 Forbidden error as seen in the following example:

```
403 Forbidden at //scServer4.1.0/snapcreator>SnapCreator/Service/
Engine.pm line 152
```

Cause

This error generally occurs when permission is denied due to an incorrect Snap Creator username or password.

Corrective action

Verify you have the correct Snap Creator username and password.

CLI command results in 404 Not Found error

In a UNIX environment, you might encounter the 404 Not Found error when running a CLI command.

Issue

In a UNIX environment, you attempt to run a CLI command; however, you encounter the 404 Not Found error. For example:

```
404 Not Found at //local/scServer4.1.0c/snapcreator>SnapCreator/
Service/Engine.pm line 152
```

Cause

This error generally occurs when something other than Snap Creator is using the selected port.

Corrective action

Verify that Snap Creator is running on the selected port and that nothing else is using the port.

CLI command results in 500 Cannot locate object error

In a UNIX environment, you might encounter the 500 Cannot locate object error after running a CLI command.

Issue

In a UNIX environment, you attempt to run a CLI command but encounter the 500 Cannot locate object error as seen in the following example:

```
500 Can't locate object method "new" via package
"LWP::Protocol::https::Socket"
```

Cause

There are two possible causes of this error message:

- The most probable cause of this error message is that the CLI SSL libraries are not linked.
- If the error message is not the result of the SSL libraries not being linked, another cause might be that the HTTPS Perl library is missing.

Corrective action

To resolve the library files linking issue, the simlinks need to be created manually. Consult the operating system administrator and verify the presence of the `libssl.so` and `libcrypto.so` files. SSL packages might need to be installed.

Assuming that the files are present, you must manually link the files. To do this, run one of the following sets of commands based on your operating system:

- For 32-bit:

```
cd /usr/lib
ln -s libssl.so.1.0.0 libssl.so.6
ln -s libcrypto.so.1.0.0 libcrypto.so.6
```

- For 3264it:

```
cd /usr/lib64
ln -s libssl.so.1.0.0 libssl.so.6
ln -s libcrypto.so.1.0.0 libcrypto.so.6
```

Corrective action

To resolve the missing HTTPS Perl library issue, install the `LWP::Protocol::https` library from CPAN mode.

Perform the following steps:

1. Open an SSH session of your Linux server and run the following command:

```
perl -MCPAN -e shell
```

Note: If this is the first time you used CPAN, you are prompted with the following:

```
Would you like me to configure as much as possible
automatically? [yes]
```

Press **Enter** to accept the default. The CPAN shell will open.

2. Run the following command:

   ```
   install LWP::Protocol::https
   ```

   The necessary packages are downloaded and installed. If additional packages are needed, you might be prompted to install those as well by selecting [yes].

3. After the installation is complete, enter

   ```
   exit
   ```

   to return to the normal shell.

CLI command results in 500 Connect Failed error

In a UNIX environment, you might encounter the 500 Connect Failed error when running a CLI command.

Issue

In a UNIX environment, you attempt to run a CLI command; however, you encounter the 500 Connect Failed error. For example:

```
500 Connect failed: connect: Connection refused; Connection
refused at //scServer4.1.0/snapcreator>SnapCreator/Service/
Engine.pm line 152
```

Cause

This error generally occurs when Snap Creator is not listening at the selected port.

Corrective action

Verify that Snap Creator is running on the selected port.

cloneVol reports that aggregate does not exist

For clustered Data ONTAP, the aggregate must be assigned to the Storage Virtual Machine (SVM) for cloning purposes. If not, the cloneVol action might return an error.

Issue

The cloneVol action returns an error similar to following example:

```
ERROR:
com.netapp.snapcreator.storage.executor.ZapiExecutorException:
netapp.manage.NaAPIFailedException: Aggregate [aggregate name]
does not exist (errno=14420)
```

Cause

The aggregate was not assigned to the SVM for cloning purposes.

Corrective action

Assign the aggregate to the SVM for cloning purposes:

```
vserver modify -vserver [vserver_name] -aggr-list [aggregate_name]
```

Error messages

You must be aware of the error messages associated with different Snap Creator operations.

Each error message includes an area code and a unique five-digit identifier, for example, ERROR: [<area code>-<unique area error identifier>] <error message>. The area code identifies where the error occurs. The different area codes are as follows:

- scf - Snap Creator Framework
- REPO - Repository
- STORAGE - Storage
- agt - Snap Creator Agent
- gui - Snap Creator GUI

Snap Creator Framework error messages

The Snap Creator Framework error messages can help you troubleshoot any issues that occur.

Error code	Error message	Description/resolution
scf-00001	Could not get the serial number %s	Make sure that the serial number is set or blank. The serial number when set can only be numeric. This means that the Snap Creator setup was not run. Run the `snapcreator --profile` setup command.
scf-00002	Backup handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application backup failed due to an application error. Check the logs and application settings.
scf-00003	Backup cleanup handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application backup cleanup failed due to an application error. Check the logs and application settings.
scf-00004	Clone handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application clone failed due to an application error. Check the logs and application settings.
scf-00005	Clone cleanup handling of plugin [%s] failed with error [%s] and exit code [%s], Exiting!	Application clone cleanup failed due to an application error. Check the logs and application settings.
scf-00006	Pre-clone handling of [%s] failed with error [%s] and exit code [%s], Exiting!	Application pre-clone operation failed due to an application error. Check the logs and application settings.

Error code	Error message	Description/resolution
scf-00007	Post-clone handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application post-clone operation failed due to an application error. Check the logs and application settings.
scf-00008	Cloned LUN igroup map of [%s] to igroup [%s] on [%s] failed, Exiting!	The igroup mapping for the LUN clone failed. Check the error. There might be a NetApp Manageability error that might reveal the cause of the problem.
scf-00009	NetApp Management Console backup list end for dataset [%s] failed with exit code [%s], Exiting!	Snap Creator started the backup delete operation in NetApp Management Console, but failed to list Snapshot copies. Make sure that Snap Creator is registering backup and check the configuration parameters `NTAP_PM_UPDATE` and `NTAP_DFM_DATA_SET`.
scf-00010	NetApp Management Console backup list is undefined, no backups for dataset [%s] exist, Exiting!	Snap Creator started the backup delete operation in NetApp Management Console, but the Snapshot copies exist. Make sure that Snap Creator is registering backup and check the configuration parameters `NTAP_PM_UPDATE` and `NTAP_DFM_DATA_SET`.
scf-00011	NetApp Management Console backup version ID [%s] Timestamp [%s] Delete for dataset [%s] failed with exit code [%s], Exiting!	Make sure that Snap Creator is registering backup and check the configuration parameters `NTAP_PM_UPDATE` and `NTAP_DFM_DATA_SET`.
scf-00012	Retrieving NetApp Management Console dataset status for dataset [%s] failed with exit code [%s], Exiting!	Make sure that the dataset exists and status is conformant. Also make sure that the dataset was created by Snap Creator. Datasets that are not created by Snap Creator are not application datasets and do not work.
scf-00013	Failed to register the Snapshot copies with dataset [%s] exit code [%s]	Check the configuration parameters `NTAP_PM_UPDATE` and `NTAP_DFM_DATA_SET`.
scf-00014	NetApp Management Console backup start for [%s] ([%s]) failed, Exiting!	Check the configuration parameters `NTAP_PM_UPDATE` and `NTAP_DFM_DATA_SET`.

Error code	Error message	Description/resolution
scf-00015	NetApp Management Console backup for job-id [%s] completed with errors - [%s]|[%s]|[%s]|[%s]	Snap Creator started the NetApp Management Console backup and getting the progress of the same failed. Check the configuration parameters `NTAP_PM_UPDATE` and `NTAP_DFM_DATA_SET`.
scf-00016	SnapMirror status for [%s] failed, Exiting!	Snap Creator was unable to find any SnapMirror relationships for the given controller. Log in to the storage controller and run a `snapmirror status` command and make sure that the relationship exists.
scf-00017	SnapMirror relationship for [%s]: [%s] does not exist, Exiting!	Snap Creator was unable to find SnapMirror relationships for the given controller:volumes. Log in to the storage controller and run a `snapmirror status` command and ensure that the relationships for the given controller name exist. If a different name is used, then you must configure the `SECONDARY_INTERFACES` parameter to tell Snap Creator what maps to the storage controller.
scf-00018	SnapVault Status list for [%s] failed, Exiting!	Snap Creator was unable to find any SnapVault relationships for the given controller. Log in to the storage controller and run the `snapvault status` command and make sure that the relationship exists.
scf-00019	SnapVault relationship for [%s]:[%s] does not exist, Exiting!	Snap Creator was unable to find the SnapVault relationship. Log in to the storage controller and run the `snapvault status` command and ensure that the SnapVault relationship for the given controller name exists. If a different name is used, then you must configure the `SECONDARY_INTERFACES` parameter to tell Snap Creator what maps to the storage controller.

Error code	Error message	Description/resolution
scf-00020	Running SnapVault update on destination [%s] using source [%s] failed!	Snap Creator was unable to start SnapVault update. Log in to the storage controller and run the `snapvault status` command and ensure that the SnapVault relationship for the given controller name exists. If a different name is used, then you must configure the `SECONDARY_INTERFACES` parameter to tell Snap Creator what maps to the storage controller.
scf-00021	SnapMirror transfer error detected - [%s], Exiting!	Check the error and storage controller settings for SnapMirror.
scf-00022	SnapMirror update on source [%s] failed to complete in [%s] minutes, Exiting!	The SnapMirror update took longer than the configured wait time. You can adjust the wait time by increasing the value for `NTAP_SNAPMIRROR_WAIT` in the configuration file.
scf-00023	SnapVault update on source [%s] failed to complete in [%s] minutes, Exiting!	The SnapVault update took longer than the configured wait time. You can adjust the wait time by increasing the value for `NTAP_SNAPVAULT_WAIT` in the configuration file.
scf-00024	SnapVault transfer Error detected - [%s], Exiting!	Check the error and storage controller settings for SnapVault.
scf-00025	Post restore handling of plug-in [%s] failed with error [%s] and exit code [%s]	Application post restore operation failed due to an application error. Check the logs and application settings.
scf-00026	Restore cleanup handling of plug-in [%s] failed with error [%s] and exit code [%s]	Application restore cleanup operation failed due to an application error. Check the logs and application settings.
scf-00027	Pre restore handling of plug-in [%s] failed with error [%s] and exit code [%s]	Application pre restore operation failed due to an application error. Check the logs and application settings.

Error code	Error message	Description/resolution
scf-00028	Auto Discovery for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application discovery failed due to an application error. Check the logs and application settings. In addition, automatic discovery can be disabled by setting `APP_AUTO_DISCOVERY=N` and commenting out `VALIDATE_VOLUMES`.
scf-00029	Auto Discovery for plug-in [%s] failed because environment is empty, Exiting!	The application plug-in is not supported to use automatic discovery. Disable automatic discovery by setting `APP_AUTO_DISCOVERY=N`.
scf-00030	File system quiesce for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	File system quiesce failed due to file system error. Check the logs and file system settings. To ignore errors and proceed with the backup, you can set `APP_IGNORE_ERROR=Y`.
scf-00031	File system quiesce for plug-in [%s] encountered errors, exit code [%s], proceeding with backup!	File system quiesce failed due to file system error. However, `APP_IGNORE_ERROR=Y`; Snap Creator will proceed with the backup. Check the logs and file system settings.
scf-00032	Application unquiesce failed due to application error. To ignore application errors and to proceed with backup, you can set `APP_IGNORE_ERROR=Y`	Check the logs and application settings.
scf-00033	Application unquiesce for plug-in [%s] failed with exit code [%s], proceeding with backup!	Application unquiesce failed due to application error. However, `APP_IGNORE_ERROR=Y`; Snap Creator will proceed with the backup. Check logs and application settings.
scf-00034	LUN clone create of [%s] from [%s] on [%s]:[%s] failed, Exiting!	The LUN clone creation failed. Check the error; there might be a NetApp Manageability error that might reveal the cause of the problem.
scf-00035	Inventory of LUNs on [%s] failed, Exiting!	The LUN list create failed. Check the error; there might be a NetApp Manageability error that might reveal the cause of the problem.

Error code	Error message	Description/resolution
scf-00036	Application quiesce for plug-in [%s] failed, no exit code returned from plug-in, Exiting!	Application quiesce finished with no exit code. Check the logs and application settings.
scf-00037	Application quiesce for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application quiesce failed due to application error. Check the logs and application settings. To ignore application errors and proceed with backup, you can set `APP_IGNORE_ERROR=Y`.
scf-00038	Application quiesce for plug-in [%s] failed with exit code [%s], continuing with backup.	Application quiesce failed due to application error. However, `APP_IGNORE_ERROR=Y`; Snap Creator will proceed with the backup. Check the logs and application settings.
scf-00039	The controller [%s] specified did not match any controllers specified in the configuration. Check the `NTAP_USERS` parameter in the configuration file.	Check `NTAP_USERS` and make sure that the storage controller is defined in the configuration file.
scf-00040	The volume [%s] specified did not match any storage system or volume specified in the configuration. Check the `VOLUMES` parameter in the configuration file.	Check the `VOLUMES` setting in the configuration file and ensure that the correct controller volumes are configured.
scf-00041	Clustered Data ONTAP detected but `CMODE_CLUSTER_NAME` is not configured correctly. Check the configuration parameter, Exiting!	The parameter `CMODE_CLUSTER_NAME` is required and used for AutoSupport and SnapMirror. Define this correctly in the configuration file.
scf-00042	Clustered Data ONTAP detected, but `CMODE_CLUSTER_USERS` is not configured correctly. Check the configuration parameter, Exiting!	The parameters `CMODE_CLUSTER_NAME` and `CMODE_CLUSTER_USERS` are required and used for AutoSupport and SnapMirror. Define these correctly in configuration file.
scf-00043	SnapVault is not supported in clustered Data ONTAP, set `NTAP_SNAPVAULT_UPDATE` to **`N`** in configuration.	Check configuration and change parameter. Clustered Data ONTAP does not support SnapVault.
scf-00044	The `META_DATA_VOLUME` parameter is defined, but storage system:volume specified does not match what is configured in VOLUMES parameter. Check the configuration.	This happens if the `META_DATA_VOLUME` parameter is not specified in `VOLUMES`. Add the metadata volume to `VOLUMES`.

Error code	Error message	Description/resolution
scf-00045	The `META_DATA_VOLUME` parameter is defined but it cannot be the only volume specified in `VOLUMES` parameter. The metadata volume must be a separate volume.	This happens if the volume specified in `META_DATA_VOLUME` is the only volume present in `VOLUMES`. There should be other volumes also. Do not use `META_DATA_VOLUME` for normal Snapshot operation.
scf-00046	NetApp Management Console supports only timestamp Snapshot copies.	Update the configuration file and set the `SNAP_TIMESTAMP_ONLY` option to **`Y`**.
scf-00047	Incompatible settings have been selected. The `NTAP_SNAPVAULT_UPDATE` and `NTAP_SNAPVAULT_SNAPSHOT` options both cannot be enabled	Edit the configuration file and disable one of the two options.
scf-00048	Mount handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application mount failed due to an application error. Check the logs and application settings.
scf-00049	Umount handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application umount failed due to an application error. Check the logs and application settings.
scf-00050	Custom action is supported only for application plug-ins	The `APP_NAME` parameter was not set in the configuration file. This determines which plug-in to use. The custom action is only supported with an application plug-in.
scf-00051	NetApp Management Console dataset creation failed for [%s] with exit code [%s], Exiting!	Check the debug error message. There could be a problem communicating with the OnCommand Unified Manager server.
scf-00052	Restore handling of plug-in [%s] failed with error [%s] exit code [%s], Exiting!	Restore failed due to an application error. Check the logs and application settings.
scf-00053	File system unquiesce for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	File system unquiesce failed due to file system error. However, `APP_IGNORE_ERROR=`**`Y`**; Snap Creator will proceed with the backup. Check logs and file system settings.

Error code	Error message	Description/resolution
scf-00054	File system unquiesce for plug-in [%s] encountered errors, exit code [%s], proceeding with backup!	File system unquiesce failed due to file system error. However, `APP_IGNORE_ERROR=Y`; Snap Creator will proceed with the backup. Check logs and file system settings.
scf-00055	NetApp Management Console driven backup [%s] of dataset [%s] with policy [%s] on storage controller [%s]	
scf-00056	Creating NetApp Management Console driven backup [%s] of dataset [%s] with policy [%s] on storage controller [%s] finished successfully	
scf-00057	Creating NetApp Management Console driven backup [%s] of dataset [%s] with policy [%s] on storage controller [%s] failed with error [%s]	Check the configuration parameters `NTAP_PM_UPDATE` and `NTAP_DFM_DATA_SET`.
scf-00058	Update configuration with application discovered value failed for [%s], Exiting!	Could not update the file. This is usually a permissions problem or failure to parse the values returned from the application. Check the permissions of the user running Snap Creator and ensure that the permissions are correct.
scf-00059	[%s] dump for plug-in [%s] failed with exit code [%s], Exiting!	The `scdump` action failed due to an application error. Check the logs and application settings.
scf-00060	Invalid DTO: [%s]	A required field in the DTO is not set or is invalid. This caused a validation error when processing the DTO. Correct the issue and resend the DTO.
scf-00061	Archive log deletion failed with error [%s], Exiting!	Snap Creator could not delete the archive logs for a given application. Check the permissions for the Snap Creator user; this could be the Snap Creator Server or Snap Creator Agent, depending on the configuration.
scf-00062	Authentication Failed!	Authentication failed, user does not have permission to perform the operation.

Error code	Error message	Description/resolution
scf-00063	Discovery for [%s] failed with return code [%s] and message [%s]	Application discovery using `VALIDATE_VOLUMES=`**`DATA`** failed due to an application error. Check the logs and application settings.
scf-00064	Discovery discovered no storage objects	Application discovery using `VALIDATE_VOLUMES=`**`DATA`** failed. Snap Creator was unable to discover any data volumes residing on the storage system. To disable automatic discovery, comment out `VALIDATE_VOLUMES`.
scf-00065	Volume [%s] on [%s] is not included in the configuration file	Application discovery detected that some volumes are missing. Check for the missing volumes and add them to `VOLUMES` parameter so they can be included in the backup.
scf-00066	Agent validation failed for [%s] with error [%s]	Configured agent is not reachable. This might be because the agent is down or there is a local firewall issue. Check the configuration parameter `SC_AGENT`.
scf-00067	Failed to list external Snapshot copy for [%s] with name pattern [%s]	Snap Creator could not find external Snapshot copy based on regx pattern `NTAP_EXTERNAL_SNAPSHOT_REGEX`. Log in to the controller and match the `snap list` output with regx pattern.
scf-00068	File system pre_restore for plug-in [%s] failed with exit code [%s], Exiting!	File system pre-restore failed due to file system error. Check the logs and file system settings.
scf-00069	File system pre_restore for plug-in [%s] encountered errors exit code [%s], proceeding with backup!	File system pre-restore failed due to file system error. However, `APP_IGNORE_ERROR=`**`Y`**; Snap Creator will proceed with other operations. Check logs and file system settings.
scf-00070	File system post_restore for plug-in [%s] failed with exit code [%s], Exiting!	File system post restore failed due to file system error. Check the logs and file system settings.

Error code	Error message	Description/resolution
scf-00071	File system post_restore for plug-in [%s] encountered errors, exit code [%s], proceeding with backup!	File system post restore failed due to file system error. However, `APP_IGNORE_ERROR=Y`; Snap Creator will proceed with other operations. Check the logs and file system settings.
scf-00072	Policy [%s] is not a defined Snapshot copy retention policy in the configuration, Exiting!	The policy you are using is not valid. Check the configuration file and configure `NTAP_SNAPSHOT_RETENTIONS` properly.

Snap Creator Agent error messages

The following table lists the Snap Creator Agent error messages.

Error code	Description/Resolution
agt-00001	The Snap Creator Agent or some other process is running on the port specified. Try a different port.
agt-00003	The parameters given were not correct to start the Snap Creator Agent. Check the required parameters.
agt-00004	The `SC_AGENT` configuration parameter must be defined when using a remote agent.
agt-00005	You are not allowed to perform back to back quiesce operations and one operation is already running. Wait or run unquiesce.
agt-00006	The watchdog process is unable to spawn. The system most likely has reached the maximum number of processes. Disable the watchdog in the configuration or check the operating system settings.
agt-00008	The quiesce and unquiesce operation did not complete and backup is only crash consistent. Check the logs. This can happen if the quiesce operation takes too long and you are using a watchdog. The watchdog process performs a forced unquiesce after x seconds as defined in the configuration.
agt-00009	Pre and Post commands must be allowed in the `agent.conf` on the agent side. Update the `agent.conf` and allow necessary commands.
agt-00010	The agent could not read its configuration file. Check the permissions on the `agent.conf` file.
agt-00011	A command was sent to the agent but is not allowed. Update the `agent.conf` to allow the command.

Error code	Description/Resolution
agt-00012	This error occurs while loading a plug-in. Check the plug-in and `APP_NAME` setting.
agt-00013	This error occurs while running the setENV method inside plug-in. Check the plug-in and ensure the syntax is correct.

Repository error messages

The following table lists the Repository error messages.

Error code	Error message	Description/resolution
REPO-01001	Global configuration does not exist	Check if the `global.conf` file exists in the `configs` folder.
REPO-01002	Global configuration already exists	The `global.conf` file already exists in the `configs` folder. Either delete the global configuration file first or update the existing file.
REPO-01103	Creating global configuration failed with error [%s]	Failed to create the `global.conf` file in the `configs` folder. Check the permissions of the user running Snap Creator against directory.
REPO-01203	Updating global configuration failed with error [%s]	Failed to update the `global.conf` file in the `configs` folder. Check the permissions of user running Snap Creator against directory.
REPO-01303	Removing global configuration failed with error [%s]	Failed to remove `global.conf` file in the `configs` folder. Check if the file is present in `configs` folder or check permissions of user running Snap Creator against directory
REPO-01403	Exporting global configuration failed with error [%s]	Failed to read `global.conf` file in the `configs` folder. Check if your global configuration file is deleted.
REPO-01503	Importing global configuration [%s] failed with error [%s]	Failed to update the `global.conf` file in the `configs` folder. Check permissions of user running Snap Creator against directory.

Error code	Error message	Description/resolution
REPO-01603	Retrieving global configuration failed with error [%s]	Failed to read `global.conf` file in the `configs` folder. Check if your global configuration file is deleted.
REPO-02002	Profile [%s] already exists, use a different name.	Profile with same name already exists. If the profile is not visible, then the user does not have permission on this profile.
REPO-02003	Profile [%s] does not exist	Check if your profile is renamed or deleted. Also, the user might not have permission on this profile.
REPO-02103	Creating global profile configuration [%s] failed with error [%s]	Failed to create `global.conf` file in the profile. Check permissions of user running Snap Creator against directory.
REPO-02106	Creating profile configuration [%s] failed with error [%s]	Failed to create profile in the `configs` folder. Check permissions of user running Snap Creator against directory.
REPO-02203	Updating profile configuration [%s] failed with error [%s]	Failed to update the profile in the `configs` folder. Check permissions of user running Snap Creator against directory.
REPO-02213	Renaming profile [%s] to [%s] failed with error [%s]	Failed to rename profile in the `configs` folder. Check permissions of user running Snap Creator against directory or check if your profile is already renamed or deleted.
REPO-02303	Removing profile configuration [%s] failed	
REPO-02403	Exporting profile configuration [%s] failed with error [%s]	
REPO-02503	Importing profile configuration [%s] failed with error [%s]	
REPO-02603	Retrieving global profile failed with error [%s]	
REPO-02606	Retrieving profile [%s] failed with error [%s]	
REPO-02703	Listing profiles failed with error [%s]	Listing profiles failed. Check the `configs` folder path.

Error code	Error message	Description/resolution
REPO-03002	Configuration [%s] already exists for profile [%s]	Configuration file with same name already exists for the given profile. Choose a different name.
REPO-03103	Creating configuration [%s] for profile [%s] failed with error [%s]	
REPO-03203	Updating configuration [%s] for profile [%s] failed with error [%s]	
REPO-03212	Renaming configuration [%s] for profile [%s] to [%s] failed	Failed to rename the configuration from profile. Check if your configuration is renamed or deleted and also check permissions of user running Snap Creator against directory.
REPO-03303	Removing configuration [%s] from profile [%s] failed	Failed to delete configuration from profile in the `configs` folder. Check permissions of user running Snap Creator against directory.
REPO-03403	Exporting configuration [%s] for profile [%s] failed with error [%s]	
REPO-03503	Importing configuration [%s] to profile [%s] failed with error [%s]	
REPO-03603	Retrieving configuration [%s] from profile [%s] failed with error [%s]	
REPO-03703	Listing configurations from profile [%s] failed with error [%s]	
REPO-04003	Reading catalog for profile [%s], configuration [%s] and timestamp [%s] failed with error [%s]	
REPO-04103	Writing catalog for profile [%s], configuration [%s] and timestamp [%s] failed with error [%s]	
REPO-04203	Purging catalog for profile [%s], configuration [%s] and timestamp [%s] failed with error [%s]	
REPO-04303	Inventoring catalog for profile [%s] and configuration [%s] failed with error [%s]	
REPO-04304	Configuration [%s] does not exist	
REPO-04309	Adding policy object failed [%s]	Database error; check stack trace for more information.
REPO-04313	Removing policy object failed for policy Id: %s	Database error; check stack trace for more information.

Error code	Error message	Description/resolution
REPO-04315	Updating policy object failed : %s	Database error; check stack trace for more information.
REPO-04316	Failed to list policies	Database error; check stack trace for more information.
REPO-04321	Adding backup type object failed [%s]	Database error; check stack trace for more information.
REPO-04323	Backup type entry does not exist for backup type id: %s	Pass a valid backup type.
REPO-04325	Removing backup type object failed for backup type Id: %s	Database error; check stack trace for more information.
REPO-04327	Updating backup type object failed : %s	Database error; check stack trace for more information.
REPO-04328	Failed to list backup types	Database error; check stack trace for more information.
REPO-04333	Adding scheduler job object failed [%s]	Database error; check stack trace for more information.
REPO-04335	Scheduler job entry does not exist for job id: %s	Pass a valid scheduler job.
REPO-04337	Removing scheduler job object failed for job Id: %s	Database error; check stack trace for more information.
REPO-04339	Updating scheduler job object failed : %s	Database error; check stack trace for more information.
REPO-04340	Failed to list scheduler jobs	Database error; check stack trace for more information.
REPO-04341	Adding policy object failed, policy [%s] with same name already exists	Policy with same name already exists; try with different name.
REPO-04342	Adding backup type object failed, backup type [%s] with same name already exists	Backup type with same name already exists; try with different name.
REPO-04343	Adding scheduler object failed, scheduler [%s] with same task name already exists	
REPO-04344	Failed to update profile [%s]. Profile is empty.	
REPO-04345	Policy Type cannot be null while adding new policy	
REPO-04346	Storage object cannot be null	
REPO-04347	Adding storage object failed, storage [%s] with same name/IP already exists	
REPO-04348	Failed to fetch the storage details. Database Error!	

Error code	Error message	Description/resolution
REPO-04349	Invalid host name. Storage with the host name/IP [%s] does not exist	
REPO-04350	Hostname cannot be null	Invalid host name
REPO-04351	Deleting storage [%s] failed with error [%s]	Failed to delete the storage. Database Error!
REPO-04355	Updating storage [%s] failed with error [%s]	Failed to update the storage. Database Error!
REPO-04356	Cluster object cannot be null	
REPO-04358	Adding storage [%s] failed with error [%s]	
REPO-04359	Updating cluster [%s] failed with error [%s]	
REPO-04360	Adding cluster object failed, cluster [%s] with same name/IP already exists	Cluster with same host name already exists

Storage error messages

The following table lists the Storage error messages.

Error code	Error message	Description/resolution
STORAGE-00001	Date format [%s] is not valid: [%s]	Volume clone is not created by Snap Creator or time stamp appended in clone name is not valid.
STORAGE-00002	Unable to retrieve executor	Failed to create executor for storage. Check the logs for NetApp Manageability errors that might reveal the cause of the problem.
STORAGE-00003	Cannot connect to the host	Host is not reachable. Ensure that the local firewall settings are correct and host is able to ping from the system where Snap Creator Server is installed.
STORAGE-01003	Creating AutoSupport message with event id [%s], category [%s], description [%s], level [%s], hostname [%s] failed with error [%s].	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-01004	For file restore, the source and destination volumes need to be the same volume.	Provide same source and destination volumes.

Error code	Error message	Description/resolution
STORAGE-02003	Creating consistency group Snapshot copy [%s] on volumes [%s] failed with error [%s];	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02006	Committing consistency group Snapshot copy on [%s] with CG Id [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02009	Creating Snapshot copy [%s] on volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02015	Removing Snapshot copy [%s] on volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02021	Restoring Snapshot copy [%s] of volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02025	Restoring file [%s] from Snapshot copy [%s] to [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02028	Creating primary SnapVault Snapshot copy schedule [%s] on volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02034	Removing primary SnapVault Snapshot copy schedules from volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02038	Creating clone [%s] of volume [%s] based on Snapshot copy [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02041	Cloning file [%s] on volume [%s] to [%s] based on Snapshot copy [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.

Error code	Error message	Description/resolution
STORAGE-02043	Listing files on path [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02046	Cloning LUN [%s] to [%s] based on Snapshot copy [%s] with space reservation [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02049	Deleting LUN [%s] from volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02052	Listing LUNs failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02062	Adding NFS export [%s] for host name [%s] with access [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02072	Retrieving SnapMirror status on controller [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02075	Retrieving SnapMirror relationships on controller [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02082	Updating SnapMirror relationship [%s] based on Snapshot copy [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02092	Listing Snapshot copies on volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02102	Renaming Snapshot copy [%s] on volume [%s] to [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.

Error code	Error message	Description/resolution
STORAGE-02112	Retrieving SnapVault status on controller [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02115	Retrieving SnapVault relationships on controller [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02122	Updating SnapVault relationship [%s] based on Snapshot copy [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02132	Listing cloned volumes based on volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02142	Deleting volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02152	Listing volumes failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02155	Listing volume [%s] failed with error message [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-02162	Restoring Snapshot copy [%s] of volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03001	Retrieving Vservers from Clustered ONTAP node [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-05003	Creating NetApp Management Console dataset [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.

Error code	Error message	Description/resolution
STORAGE-05006	Creating NetApp Management Console driven backup of dataset [%s] on storage controller [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-05009	Retrieving NetApp Management Console dataset status for dataset [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-05012	Validating NetApp Management Console dataset [%s] failed with error [%s].	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-05018	Creating OM Event [%s] on [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03002	Mapping igroup [%s] on LUN [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03005	Making LUN [%s] on volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03008	Creating primary SnapVault Snapshot copy [%s] on volume [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03011	Listing NetApp Management Console backup copies for dataset [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03014	Deleting NetApp Management Console backup version ID [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03019	NetApp Management Console backup start for [%s] ([%s]) failed, Exiting!	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.

Error code	Error message	Description/resolution
STORAGE-03022	NetApp Management Console backup progress start for job-id [%s] failed, Exiting!	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03025	Deletion of file on path [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03030	Discovery of Clustered Data ONTAP nodes on [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03033	Getting system version details of [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03036	Creation of directory on path [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03039	Deletion of directory on path [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03043	Creation of file on path [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03046	NetApp Management Console dataset modify failed for dataset [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03049	File contents for file [%s] could not be read	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03052	Options get for option [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.

Error code	Error message	Description/resolution
STORAGE-03055	Performance counters get for object [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03058	Performance instances get for object [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03061	NetApp Management Console dataset info for [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03064	System cli command [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03067	Deleting NetApp Management Console dataset [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03070	Restoring SnapVault relationship [%s] based on Snapshot copy [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03073	CIFS export for [%s]:[%s] failed!	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03076	Getting the root volume on controller [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03079	Junction path get for volume [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03082	System name get failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.

Error code	Error message	Description/resolution
STORAGE-03085	NFS service get on controller [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03088	NFS permission check for host [%s] path name [%s] permission [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03091	Network interface get on controller [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.
STORAGE-03094	Qtree list on volume [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error which might reveal the cause of the problem.

Snap Creator GUI error messages

The following table lists the Snap Creator GUI error messages.

Error code	Description/resolution
gui-00001	Ensure that the encrypted password in the configuration file is correct.
gui-00002	Ensure that you are using the correct Snap Creator executable. Verify that `/etc/snapcreatorgui.conf` is correct.
gui-00003	Ensure that the logs and corresponding profile folder exist.
gui-00004	Check if Snap Creator `home/logs/profilename` exists.
gui-00005	Check if the corresponding profile and configuration exists in the `configs` directory.
gui-00006	Try running `snapcreator profile setup`, if the `snapcreatorgui.conf` is lost.
gui-00007	Check if your configuration is renamed or deleted.
gui-00008	Check your user name and password and verify if you have run `snapcreator profile setup` command.
gui-00009	Check if permissions on file or folder exist.
gui-00010	Check if permissions on file or folder exist.

Error code	Description/resolution
gui-00011	Choose a different profile or delete the existing one.
gui-00012	Verify if `configs` directory exists and if have run `snapcreator profile setup` command.
gui-00013	Check the logs for more information.
gui-00014	Close the configuration and open it again.
gui-00015	Check the permissions on file and if they exist.
gui-00017	Check if your vCenter is correct and has a valid datacenter.
gui-00019	Try again, because the datastore might have been deleted during retrieval.
gui-00020	Try again, because the datastore might have been deleted during retrieval.
gui-00021	Try again, verify if your vCenter is correct.
gui-00022	Add datastores to your vCenter.
gui-00023	Try again, verify your vCenter.
gui-00024	The version of vCloud Director you are using is not supported.
gui-00025	Enter correct credentials and try again.
gui-00026	Organizations not found for vCD. Create organizations and retry.
gui-00027	Check your vCenter credentials.
gui-00028	Check the controller details/`NTAP_USERS`.
gui-00029	Verify the vCloud Director URL.
gui-00030	Check if vDCs exist for the organizations.
gui-00031	Check if vApps exist for the vDCs.

Snap Creator configuration file variables, parameters, and commands

You can define variables, parameters, and commands within the Snap Creator configuration file.

The configuration file is dynamic, which means that you can create and set variables within the configuration itself.

For example, when using SnapDrive instead of ONTAPI to create the Snapshot copies. Because the Snapshot copy names need to be unique, you must set a dynamic variable. The following is an example from a Windows SnapDrive configuration:

```
NTAP_SNAPSHOT_CREATE_CMD1="c:/Program Files/NetApp/SnapDrive/sdcli.exe"
snap create -m fx1b4 -s %SNAME-%SNAP_TYPE_%SNAP_TIME -D E:
```

or

```
NTAP_SNAPSHOT_CREATE_CMD1="c:/Program Files/NetApp/SnapDrive/sdcli.exe"
snap create -m fx1b4 -s %SNAME-%SNAP_TYPE_recent -D E:
```

Snap Creator variable and parameter descriptions

Snap Creator includes built-in variables and parameters required in a basic configuration.

Variables	Description
%SNAP_TYPE	Used when you run Snap Creator and it is your retention policy (daily, weekly, monthly)
%SNAP_TIME	The timestamp (YYYYMMDDhhmmss) used in the naming of Snapshot copies to create a guaranteed unique name for every Snapshot copy. It is also used to name the backup reports and Sybase transaction logs.
%ACTION	The list of actions you can perform when you run Snap Creator: `(backup|cloneVol|cloneLun|arch|restore| backupDel|backupList|cloneList|pmsetup|ossv)`
%MSG	Used to send an error message to another program such as email or Tivoli It can only be used with the SENDTRAP function.
%USER_DEFINED	Passes a user-defined argument to the Snap Creator configuration file For example, to integrate with a backup application such as NetBackup, CommVault, or Legato NetWorker, you might have to pass the desired backup product's schedule into the configuration file when you have multiple schedules and want to call NetBackup, CommVault, or Legato NetWorker with a certain schedule. You could also achieve this by having multiple configuration files for the different scenarios.

The following table lists and describes the Snap Creator parameters used in a basic configuration:

Parameter	Setting	Description
SNAME		Specifies the Snapshot copy naming convention It should be unique. Snapshot copies are deleted according to the naming convention.
SNAP_TIMESTAMP_ONLY	(Y|N)	Sets the Snapshot naming convention If set to Y, Snapshot copies end with YYYYMMDDHHMMSS. Otherwise, new Snapshot copies are renamed to end with YYYYMMDDHHMMSS.

VOLUMES		Lists the primary storage controllers and volumes of which you want to create a Snapshot copy
		For example:
		`controller1:vol1,vol2,vol3;`
		`controller2:vol1;`
		`controller3:vol2,vol3`

VOLUME_GROUPS	*vol_1*,*vol_2*,*vol_n*	Defines multiple volumes into a single group. Multiple volumes are specified as a comma-separated list
		For example:
		`VOLUMES_01=filer1:vol1,vol2,vol3;filer2:vol1`
		`VOLUMES_02=filer1:vol3,vol4`
		`VOLUMES_03=filer2:vol3,vol4`
		`VOLUME_GROUPS=VOLUMES_01,VOLUMES_02,VOLUMES_03`
		Note: VOLUME_GROUPS is only supported for backup operations. If this parameter is set, then the VOLUMES parameter will be ignored during the backup.

Parameter	Setting	Description
NTAP_SNAPSHOT_RETENTIONS		Determines the number of Snapshot copies to be retained for a given policy For example: `daily:7,weekly:4,monthly:1`
NTAP_USERS		Lists the storage systems and their corresponding user names and passwords For example: `controller1:joe/password1; controller2:bob/password2; controller3:ken/password3` **Note:** Password must contain a minimum of two characters.
NTAP_PWD_PROTECTION	(Y|N)	Enables or disables password protection You must encrypt all passwords (storage system and applications or plug-ins) and save encrypted passwords in configuration file.
TRANSPORT	HTTP|HTTPS	Enables you to use either HTTP or HTTPS to connect to the storage controller **Note:** HTTPS might require openssl-devel libraries.
PORT		Configures the port number the storage controllers use; normally: 80 and 443
LOG_NUM		Specifies the number of `.debug` and `.out` reports that Snap Creator has to retain
CONFIG_TYPE	PLUGIN|STANDARD	Specifies the configuration type There are two types of configurations: plug-in and standard. You can use multiple plug-in configurations to build complex quiesce and unquiesce backup workflows.

Parameter	Setting	Description
CMODE_CLUSTER_USERS		(Required for clustered Data ONTAP) Lists the primary and secondary clustered Data ONTAP clusters and their corresponding user names and passwords For example: `cluster1:joe/password1;cluster2:bob/password2` **Note:** Password must contain a minimum of two characters.
CMODE_CLUSTER_NAME		(Required for clustered Data ONTAP) Specifies the name of the primary clustered Data ONTAP cluster
CMODE_SNAPSHOT_FORCE_DELETE	(Y|N)	Ensures deletion of Snapshot copies that should be deleted based on the Snapshot copy policy In clustered Data ONTAP, Snapshot copies are not deleted if they have any dependencies, such as a clone.
LOG_TRACE_ENABLE	(Y|N)	Enables or disables logging of all events If disabled, the Manage ONTAP Solution result objects are not logged.
NTAP_TIMEOUT	Seconds	Sets the timeout value for all storage controller Manage ONTAP Solution calls; default is 60 seconds
USE_GLOBAL_CONFIG	(Y|N)	Enables you to use global configuration to store values
FEDERATED_APPLICATIONS		Lists the configuration and profile names for the federated applications under the configuration For example: `databases@db2;databases@oracle`

Parameter	Setting	Description
CMODE_SET	(Y|N)	Defines whether the configuration is for clustered Data ONTAP or Data ONTAP operating in 7-Mode
ALLOW_DUPLICATE_SNAME	(Y|N)	(Optional) Enables or disables the ability to create a configuration file with a duplicate Snapshot name This parameter will not work with global (Super Global or Profile Global) configuration files.
SNAPCREATOR_MISSEDJOB_RUN	(Y|N)	Sets whether misfired jobs (for example, a scheduled backup operation) will run when Snap Creator is restarted. **Note:** This does not affect any hourly schedules that have been created in Snap Creator.

Parameters used to configure the client and server

The following table lists and describes the parameters you can use to configure the client and server.

Parameter	Setting	Description
SC_AGENT	*host name or IP_address*:*port*	Snap Creator can to perform tasks on remote hosts. A task is either a defined plug-in (parameter APP_NAME) or a command specified with the parameters _CMD (for example, NTAP_SNAPSHOT_CREATE_CMD01). To specify a remote host, enter its name or IP address, followed by a colon and the port the Snap Creator Agent is listening on. On the remote host, start the Snap Creator Agent by running the command: <path to scAgent_v<#>>/bin/snapcreator --start-agent <port>

Parameter	Setting	Description
SC_CLONE_ TARGET	*host name or IP_address of the clone target*:*port*	Snap Creator has the capability to perform clone operations. Using the action `cloneVol` in combination with `{PRE|POST}_CLONE_CREATE_CMDx x`, you can handle the storage objects on the remote side (for example, mounting/unmounting file systems). To specify a clone target, enter its name or IP address, followed by a colon and the port the Snap Creator Agent is listening on.
SC_AGENT_ TIMEOUT	Time (in seconds) Default: 300 seconds	Specifies the timeout in seconds. The implemented client/server architecture uses a timeout mechanism. This means that if the client does not respond in the specified interval, the server fails with a timeout message. However, the task on the client is not aborted and requires further investigation. On a server with high load or known long-running tasks such as own scripts or complex SnapDrive operations, it might be necessary to extend the timeout and adapt this value to your own requirements. Set this parameter to the maximum time that an operation can take (for example, if quiesce takes 1800 minutes, this must be set to 1800). **Note:** Some plug-ins have specific SC_AGENT_TIMEOUT value requirement.

Parameter	Setting	Description
SC_AGENT_WATCHDOG_ENABLE	(Y|N) For all plug-ins, the default setting is **Y**. However, for the VIBE plug-in, the default setting is **N**, and it should always be **N**	Enables or disables the Agent Watchdog process. If enabled (**N**), when the Agent receives a quiesce request, the watchdog process starts. The watchdog process uses the `SC_AGENT_UNQUIESCE_TIMEOUT` as timeout to unquiesce the application. If disabled (**N**), the watchdog process will unquiesce the application, but it uses the `OPERATION_TIMEOUT_IN_MSEC` from `scAgent/etc/agent.properties` (default: 1 hour). **Note:** `SC_AGENT_WATCHDOG_ENABLE` is deprecated for use with Snap Creator Agent 4.1, and applicable only for use with Agent 4.0.
SC_AGENT_UNQUIESCE_TIMEOUT	Time (in seconds)	Only used when `SC_AGENT_WATCHDOG_ENABLE`=Y. This optional setting specifies the timeout, in seconds. If the communication with the agent is not possible and an application is in the quiesce state, the agent automatically returns the application into its normal mode of operation without communication from the server. If this setting is not set, then the unquiesce timeout is set to whatever the `SC_AGENT_TIMEOUT` is, plus five seconds.

Parameter	Setting	Description
SC_TMP_DIR	(Y|N)	Allows you to use a user-defined, alternate temporary directory to store Snap Creator-related files. The user creates the directory and manages the user access. The plug-ins use temporary files to interact with the database. The temporary files are created in the host's default `temp` directory, which has write access to all the users. If the directory is full, Snap Creator displays an error while creating the temporary files.
SC_AGENT_LOG_ENABLE	(Y|N)	Enables logging on the agent. Snap Creator Server sends operations to the agent. If something happens before the agent sends a callback to the server, the messages could be lost. This allows agent messages to be logged on the agent so that they are never lost.

Parameters to connect to vFiler units and interfaces

Several parameters are required to connect Snap Creator Server to vFiler units and interfaces.

Parameter	Setting	Description
`VFILERS`		List the vFiler units and their hosting storage systems or volumes. For example: `vFiler1@controller1:vol1,vol2,vol3;vFiler2@controller2:vol1;vFiler3@controller3:vol2,vol3` **Note:** HTTPS is not supported with vFiler units.
`MANAGEMENT_ INTERFACES`		Lists the primary storage controllers and their management interfaces used for communications. For example: `MANAGEMENT_INTERFACES=controller1:controller1-mgmt;controller2:controller2-mgmt`

Parameter	Setting	Description
SECONDARY_ INTERFACES		List the primary storage controllers or vFiler units and their secondary interfaces' source or destination for SnapVault and SnapMirror relationships. For example: `controller1:controller1-source/controller2-destination` **Note:** The SnapVault and SnapMirror relationships must be configured to use this secondary interface. Snap Creator does not manage SnapMirror and SnapVault relationships.
USE_PROXY	(Y|N)	Allows API calls to go through OnCommand Unified Manager server proxy instead of the storage controller directly. If this option is used, NTAP_USERS is not required.
ALLOW_IP_ADDR	(Y|N)	Allows the IP address to be used for the storage system. This applies to SnapVault, SnapMirror, and the NetApp Management Console data protection capability. Using IPs can create problems and should only be used under certain conditions.

Parameters to set up cloning operations

Several parameters are required to set up Snap Creator Server cloning operations.

Parameter	Setting	Description
NTAP_VOL_CLONE_RESERVE	none|file|volume	This is the space guarantee for a cloned volume.
NTAP_LUN_CLONE_RESERVATION	true|false	If set to **true**, space is reserved for the cloned LUNs if the cloneLun action is selected. Otherwise, space is not reserved.

Parameter	Setting	Description
NTAP_CLONE_IGROUP_MAP		Specifies the storage system, source volume, and an IGROUP. The IGROUP is then mapped to cloned LUNs that reside in the source volume or cloned LUNs that reside in the volume clone (for example, `controller1:src_volume1/igroup1,src_volume2/igroup1,src_volume3/igroup1;controller2:src_volume1/igroup2,src_volume2/igroup2,src_volume3/igroup2`). **Note:** • LUN clones assume the same name as their parent volume or LUN and end with `_CLONE`; that is, if the volume is called `myvol`, the clone would be `myvol_CLONE`. • Volume clones start with `cl_` and end with `-YYYYMMDDHHMMSS`.
NTAP_CLONE_FOR_BACKUP	(Y|N)	If enabled, clones (volume and LUN) are created and then deleted after the other operations are complete. Otherwise, clones are deleted before the operations are complete. **Note:** If you are backing up clones to tape, this should be set to **`Y`**. If you are doing database refreshes, then you should set it to **`N`**.
NTAP_CLONE_SECONDARY	(Y|N)	If enabled, clones are created on the SnapMirror destination after the SnapMirror update is complete. **Note:** This setting should be used with `NTAP_SNAPMIRROR_USE_SNAPSHOT`, `NTAP_SNAPMIRROR_WAIT`, and `NTAP_CLONE_SECONDARY_VOLUMES`, and the `cloneVol` action.

Parameter	Setting	Description
NTAP_CLONE_SECONDARY_VOLUMES		This is a mapping of primary or secondary storage systems and the secondary volumes. This is required so that Snap Creator can find the secondary volumes (for example, controller1:controller1-sec/vol1;controller1:controller1-sec/vol2).
NTAP_NUM_VOL_CLONES		This is the number of volume clones you want to retain. This works similarly to the Snapshot copy retention policy. **Note:** This only works for volume clones that require a FlexClone license on the storage controller.
NTAP_NFS_EXPORT_HOST	Host IP	The host name or IP address where the clone should be exported. This is the host where you mount the clone volume by using NFS.
NTAP_NFS_EXPORT_ACCESS	root|read-write|read-only	The host specified in NTAP_NFS_EXPORT_HOST receives access or permission to the clone volume. • **root** Root access is granted. • **read-only** Read-only access is granted. • **read-write** Read/Write access is granted.
NTAP_NFS_EXPORT_PERSISTENT	true|false	Determines whether NFS export is persistent. If **true** is selected, the clone volume is exported and the /etc/exports file on the storage controller is updated.
NTAP_CIFS_EXPORT_ENABLE	(Y|N)	Setting to share a cloned volume using CIFS.

Parameters to set up event management

Several parameters are required to set up Snap Creator Server event management.

Parameter	Setting	Description
NTAP_ASUP_ERROR_ ENABLE	(Y|N)	Enables Snap Creator error messages to also log an AutoSupport message on the storage controller. Snap Creator always creates an info AutoSupport message when the backup has started and is complete.
SENDTRAP		This command interfaces with your monitoring software or email, enabling you to pass alerts generated from Snap Creator into your own monitoring infrastructure. The *%MSG* variable is the message sent from Snap Creator. The following is an example of how to send an email on a UNIX system: `SENDTRAP=/usr/bin/mailx -s %MSG myaddress@mydomain.com </dev/null` For Windows, `cmd.exe /c` must be added before any command. For example: `SENDTRAP= cmd.exe /c echo %how`

Parameter	Setting	Description

SUCCESS_TRAP		This command interfaces with your monitoring software or email, enabling you to pass the success message generated from Snap Creator into your own monitoring infrastructure.
		The *%SUCCESS_MSG* variable is the success message for Snap Creator. The following is an example of how to send an email on a UNIX system:
		`SUCCESS_TRAP=/usr/bin/mailx -s %SUCCESS_MSG myaddress@mydomain.com </dev/null`
		For Windows, `cmd.exe /c` must be added before any command. For example:
		`SUCCESS_TRAP= cmd.exe /c echo %Hello`

SUCCESS_MSG		After a successful Snap Creator backup, this setting logs the message defined and also sends it to `SUCCESS_TRAP`, if defined, or to `SENDTRAP`, if `SENDTRAP` is defined.

Parameters to set up Operations Manager console

Several parameters are required to set up Operations Manager console.

Parameter	Setting	Description
OM_HOST		The name or IP address of the Operations Manager console host.
OM_USER		The user name of an Operations Manager console user who has permission to create events.
OM_PWD		The password for the Operations Manager console user. **Note:** The password must contain a minimum of two characters.

Parameter	Setting	Description
OM_PORT		The port to use for communications with Operations Manager console; 8088 is the default HTTP port and 8488 is the default HTTPS port that the Operations Manager console uses.
OM_EVENT_GENERATE	(Y|N)	Enables or disables event creation in Operations Manager console.

Parameters to set up OSSV

Several parameters are required to set up Open Systems SnapVault (OSSV).

Parameter	Setting	Description
NTAP_OSSV_ENABLE	(Y|N)	Enables OSSV integration. This parameter must be used in combination with the NTAP_OSSV_HOMEDIR parameter. OSSV is also required on the host running Snap Creator. **Note:** When this OSSV parameter is enabled, the path is specified as volumes. When specifying paths in Windows for OSSV, the colon (:) should not be used. For example, if the path is E:\DB, then it should be used as E\DB.
NTAP_OSSV_HOMEDIR	/usr/snapvault	The path to the OSSV home directory (/usr/snapvault).
NTAP_OSSV_FS_SNAPSHOT	(Y|N)	This setting also requires the NTAP_OSSV_FS_SNAPSHOT_CREATE_CMD## Enables you to create a file system Snapshot copy using the Open System or file system command. The file system Snapshot copy is then transferred to the storage system using SnapVault.
NTAP_OSSV_FS_SNAPSHOT_CREATE_CMD##		These are scripts or commands to be executed during or before the OSSV backup process, where ## is a number from 01- 99. This can be used to perform backup file system Snapshot copies by using OSSV.

Parameters to set up SnapMirror

Several parameters are required to set up SnapMirror for Snap Creator Server.

Parameter	Setting	Description
NTAP_SNAPMIRROR_UPDATE	(Y|N)	Enables you to turn on and off the SnapMirror update function.
NTAP_SNAPMIRROR_CASCADING_UPDATE	(Y|N)	Enables you to turn on and off the cascading SnapMirror update function. This is a SnapMirror update using a SnapVault destination volume. **Note:** This is not supported for clustered Data ONTAP.
SNAPMIRROR_VOLUMES		Specifies the list of source storage systems and volumes on which you want to perform a SnapMirror update (for example, controller1:vol1,vol2,vol3;controller2:vol1;controller3:vol2,vol3). **Note:** For the VMware plug-ins (vSphere and vCloud), the value should be set to **`auto:detect`**.
SNAPMIRROR_CASCADING_VOLUMES		Specifies the list of SnapVault destination storage systems and volumes where, after a SnapVault update, you want to perform a SnapMirror update; that is, sec-controller1:vol1-sec,vol2-sec. **Note:** This is not supported for clustered Data ONTAP.

Parameter	Setting	Description
NTAP_SNAPMIRROR_WAIT		Specifies the wait time (in minutes) for the SnapMirror update process to finish before creating a clone on the SnapMirror destination. If NTAP_CLONE_SECONDARY is set to **Y**, Snap Creator waits until the SnapMirror update is complete before proceeding. **Note:** This can only be used with NTAP_CLONE_SECONDARY and action cloneVol (only volume clones are currently supported).
NTAP_SNAPMIRROR_USE_SNAPSHOT	(Y|N)	If enabled, the SnapMirror update uses the newly created Snapshot copy, thus creating a Snapshot copy on the SnapMirror destination. **Note:** This is required for NTAP_CLONE_SECONDARY because a Snapshot copy is needed to create a clone on the SnapMirror destination.
NTAP_SNAPMIRROR_MAX_TRANSFER		Specifies the maximum bandwidth SnapMirror is allowed to use, in kbps. If it is not set, SnapMirror uses the maximum available bandwidth.
SNAPMIRROR_QTREE_INCLUDE		Specifies the list of primary storage controllers and qtree paths to include in the SnapMirror update (for example, controller1:/vol/qtree/qtree1,/vol/volume/qtree2;controller2:/vol/volume/qtree1). If this option is not used, then all qtrees under a volume will be backed up; by specifying a list using this option, only qtrees listed are backed up, and the remaining qtrees are ignored.

Parameters to set up Snapshot copies

Several configuration file parameters are required to set up Snapshot copies for Snap Creator Server.

Parameter	Setting	Description
NTAP_SNAPSHOT_ RETENTION_AGE		Enables you to define a retention age (in days) for Snapshot copies If configured, Snapshot copies are deleted only if they exceed the number defined in NTAP_SNAPSHOT_ RETENTIONS and if they are older than the retention age (in days).
SNAPDRIVE	(Y|N)	Enables you to use SnapDrive instead of the Data ONTAP API to create a Snapshot copy
SNAPDRIVE_DISCOVERY	(Y|N)	Enables you to use SnapDrive for storage discovery This is required in SAN or iSAN environment when using the VALIDATE_VOLUMES parameter.
NTAP_SNAPSHOT_ DISABLE	(Y|N)	Disables Snap Creator from creating a Snapshot copy so that Snap Creator can handle SnapVault or SnapMirror for SnapManager For this setting to work, SnapManager Snapshot copies need to follow this naming convention: *snapshot_copy_name-policy*_recent.
NTAP_SNAPSHOT_ NODELETE	(Y|N)	Overrides NTAP_SNAPSHOT_RETENTIONS and prevents Snapshot copies from being deleted Enabling this variable can make the volume full.
NTAP_SNAPSHOT_DELETE_BY_AGE_ONLY	(PRIMARY| SECONDARY| BOTH|N)	Allows the deletion of old Snapshot copies Requires NTAP_SNAPSHOT_RETENTION_ AGE and forces deletion based on Snapshot copy age rather than the number of Snapshot copies.

Parameter	Setting	Description
NTAP_SNAPSHOT_DEPENDENCY_IGNORE	(Y|N)	Applies only to Snapshot copy deletion using the backupDel action Manually deleting Snapshot copies with a dependency is not permitted.
NTAP_SNAPSHOT_ CREATE_CMD##		Creates a Snapshot copy and flushes the file system buffers, where ## is a number from 01-99 **Note:** This is required if you enable the SNAPDRIVE parameter. The Data ONTAP API is still used to perform everything else, but the SNAPDRIVE option creates Snapshot copies.
NTAP_ METADATA_SNAPSHOT_ CREATE_CMD##		SnapDrive command to create meta data volume Snapshot copy and flush the file system buffers, where ## is a number from 01-99
NTAP_CONSISTENCY_ GROUP_SNAPSHOT	(Y|N)	Enables use of consistency groups for creating consistent Snapshot copy across multiple volumes
NTAP_CONSISTENCY_ GROUP_SNAPSHOT_RETRY_COUNT		Number of times to retry consistency group Snapshot in case of failure
NTAP_CONSISTENCY_ GROUP_SNAPSHOT_RETRY_WAIT	Time (in seconds)	Specifies the time to wait between each retry of consistency group Snapshot
NTAP_CONSISTENCY_ GROUP_TIMEOUT	(URGENT| MEDIUM| RELAXED)	Specifies the wait time for storage controller to consistently group Snapshot copies
NTAP_CONSISTENCY_GROUP_WAFL_SYNC	(Y|N)	Improves the performance of a consistency group Snapshot copy by forcing a consistency point (CP) through a wafl-sync before the cg-start
NTAP_SNAPSHOT_RESTORE_AUTO_DETEC T	(Y|N)	Setting that, if disabled, always forces a SFSR (Single File SnapRestore) when doing a single file restore.
NTAP_SNAPSHOT_CLEANUP	(Y|N)	Removes any Snapshot copies created in the event of backup failure

Parameter	Setting	Description
NTAP_USE_EXTERNAL_SNAPSHOT	(Y|N)	Allows the import of a non-Snap Creator Snapshot copy; the most recent Snapshot copy is matched
NTAP_EXTERNAL_SNAPSHOT_REGEX		A regular expression for matching imported Snapshot copies; it requires the NTAP_USE_EXTERNAL_SNAPSHOT parameter

Parameters to set up SnapVault

Several parameters are required to set up SnapVault.

Parameter	Setting	Description
NTAP_SNAPVAULT_UPDATE	(Y|N)	Enables you to turn on and off the SnapVault update function.

Parameter	Setting	Description
SNAPVAULT_ VOLUMES		Lists the source storage systems and volumes on which you want to perform a SnapVault update (for example, controller1:vol1,vol2,vol3;controller2:vol1;controller3:vol2,vol3). **Note:** • For SnapVault and SnapMirror updates to work, the relationships must exist. Snap Creator does not create the relationships. • The host names in the SnapMirror or SnapVault relationship must be the same as specified in the VOLUMES, SNAPMIRROR_VOLUMES, and SNAPVAULT_VOLUMES options. Also, the host where Snap Creator runs must be able to resolve the host names. • For vSphere or vCloud, the value should be set to **auto:detect**. • Host names should be the short host name (name that appears on storage controller command prompt), not the FQDN.
SNAPVAULT_QTREE_INCLUDE		Lists the source storage systems and qtree paths that should be included in the SnapVault update. Without this option, all qtrees under a volume are vaulted by SnapVault if a relationship exists. Qtrees listed in the following example are vaulted by SnapVault and the rest are ignored by SnapVault: controller1:/vol/qtree/qtree1,/vol/volume/qtree2;controller2:/vol/volume/qtree1.

Parameter	Setting	Description
NTAP_SNAPVAULT_RETENTIONS		Determines the number of Snapshot copies on the SnapVault secondary that you want to retain for a given policy (for example, daily:**21**, weekly:**12**, monthly:**3**).
NTAP_SNAPVAULT_RETENTION_AGE		Enables you to define a retention age (in days) for SnapVault Snapshot copies. If configured, SnapVault Snapshot copies are deleted only if they exceed the number defined in NTAP_SNAPVAULT_RETENTIONS and if they are older than the retention age (in days).
NTAP_SNAPVAULT_SNAPSHOT	(Y|N)	Enables use of SnapVault Snapshot copies; that is, Snapshot copies that are compatible with the storage controller SnapVault scheduler. When using this option, Snapshot copy delete is handled by the storage controller and not by Snap Creator. Additionally, Snapshot copies are named as follows: sv_<POLICY>.<##>. The policy name comes from the NTAP_SNAPSHOT_RETENTIONS parameter and the retention set is also applied to the storage controller SnapVault schedule.
NTAP_SNAPVAULT_ NODELETE	(Y|N)	Overrides NTAP_SNAPVAULT_RETENTIONS and prevents Snapshot copies from being deleted. Leaving this on can cause your volume to fill up.
NTAP_SNAPVAULT_RESTORE_WAIT	(Y|N)	In the case of SnapVault restore, it forces Snap Creator to wait for the operation to finish. This is recommended because after the SnapVault restore is complete, Snap Creator prompts the user to delete the restore Snapshot copies that get created on primary storage and are no longer needed.

Parameter	Setting	Description
NTAP_SNAPVAULT_WAIT		The wait time (in minutes) for the SnapVault update process to finish before creating a Snapshot copy on the SnapVault secondary.
NTAP_SNAPVAULT_MAX_TRANSFER		The maximum bandwidth SnapVault is allowed to use, in kbps. If it is not set, SnapVault uses the maximum available bandwidth.

Parameters to set up the NetApp Management Console data protection capability

Several parameters are required to set up the NetApp Management Console data protection capability.

Parameter	Setting	Description
NTAP_PM_UPDATE	(Y|N)	Enables you to turn on and off the NetApp Management Console data protection capability update that registers Snap Creator Snapshot copies in the NetApp Management Console data protection capability. **Note:** If NTAP_PM_UPDATE is enabled, you must configure NTAP_DFM_DATA_SET.
NTAP_DFM_DATA_SET		Lists the storage systems and the NetApp Management Console data protection capability data sets to volume correlations; that is, controller1:dataset1/vol1,vol2;controller1:dataset2/vol3.
NTAP_PM_RUN_BACKUP	(Y|N)	Starts the NetApp Management Console data protection capability backup, checks the progress and status, and waits for it to finish.

Parameter	Setting	Description
NTAP_DFM_SNAPSHOT_FORMAT		Optional setting for the format of the secondary Snapshot copies when using the NetApp Management Console data protection capability. This option requires OnCommand 5.0 or later. Required variable: • Timestamp: *%T* Optional variables: • Retention type: *%R* • Dataset label: *%L* • Storage controller: *%H* • Volume name: *%N* • Application-specific data: *%A* If this option is not set, then the default naming convention for the NetApp Management Console data protection capability is used. The naming convention can only be set at the time of dataset creation.

APP commands

The following table lists the application (APP) commands.

Command	Description
APP_CLONE_FOLLOW_ UP_ CMD##	These are scripts or commands to be executed after the database is cloned, where *##* is a number between 01 and 99, inclusive. This can be used to perform application-specific followup activities on SAP systems, such as installing a SAP license, adjusting database tables, deleting or updating content, and starting up the application.
APP_QUIESCE_CMD##	These are scripts or commands that put your application into backup mode, where *##* is a number between 01 and 99, inclusive. **Note:** This is ignored if you use APP_NAME, because it is in that case handled internally in Snap Creator.

Command	Description
APP_UNQUIESCE_ CMD##	These are scripts or commands that take your application out of backup mode, where ## is a number from 01 to 99, inclusive. **Note:** This is ignored if you use APP_NAME because it is in that case handled internally in Snap Creator.
ARCHIVE_CMD##	This command handles database archiving; it can also be used as a wrapper to run other scripts, where ## is a number from 01 through 99.

Mount and unmount commands

When cloning, you should use the MOUNT_CMD and UMOUNT_CMD commands instead of the Snap Creator PRE or POST commands.

Command	Description
MOUNT_CMD##	Mount commands are used to mount the file system for cloning or mount actions, where ## is a number starting from 01-99.
UMOUNT_CMD##	Unmount commands are used to mount the file system for cloning or mount actions, where ## is a number starting from 01-99.

PRE commands

Snap Creator Server includes several configuration file PRE commands.

Note: For Windows, cmd.exe /c must be included before any PRE command.

Command	Description
PRE_APP_QUIESCE_ CMD##	This is the pre-application backup start command, where ## is a number from 01-99.
PRE_NTAP_CMD##	This is the pre-Snapshot command, where ## is a number from 01-99; it runs before all operations.
PRE_APP_UNQUIESCE_CMD ##	This is the pre-application backup stop command, where ## is a number from 01-99.

Command	Description
PRE_NTAP_CLONE_ DELETE_CMD##	This is the pre-clone delete command, where ## is a number from 01-99. **Note:** The purpose of the `clone delete` command is to call a mount script or commands so that cloned LUNs can be mounted for the purpose of backing up (probably to tape).
PRE_EXIT_CMD##	This is an optional command that is run after a fatal error occurs but before Snap Creator exits. This is useful to revert to the state it was before Snap Creator ran. **Note:** • This command returns an application into normal operation mode before Snap Creator exits due to an error. • This is ignored if you use APP_NAME because it is handled internally in Snap Creator.
PRE_RESTORE_CMD##	This is an optional command that can be run before you enter an interactive restore. This enables you to interact with the application being restored. For example, you might want to shut down the application before performing a restore. **Note:** This is not supported with the MySQL plug-in.
PRE_CLONE_CREATE _ CMD##	This is an optional command that can be run before ONTAPI cloning operations occur, where ## is a number from 01-99.

POST commands

Snap Creator Server includes several configuration file POST commands.

Command	Description
POST_APP_ QUIESCECMD##	This is a post-application backup start command, where ## is a number from 01-99.
POST_NTAP_CMD##	This is a post command, where ## is a number from 01-99. This runs after all operations are complete.
POST_APP_UNQUIESCE _CMD##	This is a post-application backup stop command, where ## is a number from 01-99.

Command	Description
`POST_NTAP_DATA_ TRANSFER_CMD##`	This is a post-data transfer command that runs after a SnapVault or SnapMirror transfer, where ## is a number from 01-99.
`POST_RESTORE_ CMD##`	This is an optional command that can be run after you complete an interactive restore. It enables you to interact with the application being restored. After your restore is complete, you might want to start the application. **Note:** This is not supported with the MySQL plug-in.
`POST_CLONE_CREATE_ CMD##`	This is an optional command that can be run after ONTAPI cloning operations occur, where ## is a number from 01-99. The commands are used to perform operations such as mounting cloned file systems.

Snap Creator terminology

Snap Creator consists of a few different constructs, and it is important to understand the language and concepts.

Action

Snap Creator can perform various actions on configuration files. This is typically a defined workflow to achieve a desired result. To execute an action, select a configuration file from the GUI, click **Action**, and select one of the following actions from the drop-down list:

Backup

Backs up the environment specified in a configuration file. The backup workflow is a multistep action that changes depending on the settings of the selected configuration file. An example of a backup action with a plug-in configured might be quiesce an application or database, take a Snapshot copy of all defined volumes, unquiesce the selected application or database, perform a SnapVault and/or SnapMirror update, act on any retention policies, or act on any archive log settings.

LUN clone

Creates a new Snapshot copy of a LUN and clones the new Snapshot copy.

Volume clone

Creates a new Snapshot copy of a volume and clones the new Snapshot copy.

Agent Monitor

The Agent Monitor queries the Snap Creator Server for all agents defined in the configuration files and queries the agents to check their status. The Agent Monitor reports if the agent is running, the port that the agent is listening, and the version of the agent is in use.

Archive log

The archive log action acts on any settings in the archive log management setting of the configuration file. This action typically purges logs that are no longer needed by Snap Creator.

Configuration file

A configuration file is the heart of Snap Creator. It configures Snap Creator, enables application plug-ins to run, sets necessary variables, and defines the volumes that are captured in Snapshot copies. Configuration files are composed of different parameters that can be set to affect the behavior of Snap Creator. Configuration file is often shortened to configuration or config.

Discover

The discover action performs storage-level discovery on the environment detailed in the configuration file. Not all plug-ins support discovery.

Global configuration file

A configuration file that can act at either a superglobal level (parameters will affect all configuration files in the entire Snap Creator Server environment) or a profile level (parameters will affect all configuration files in a specified profile). Superglobal parameters will be overridden with any parameters specified in a profile-level global. Likewise, parameters specified in a configuration file will override any parameters in a super or profile-level global configuration file. Global configuration file is often shortened to global config.

Job

All operations performed by Snap Creator are considered jobs. Some actions might consist of multiple jobs. All jobs executed by Snap Creator will be listed in the Job Monitor.

Job Monitor

The Job Monitor is an easy-to-use dashboard interface that allows for a simple glance of the status of Snap Creator jobs that are running or have run previously. The Job Monitor is enabled at setup and can store from 1 to 1,000 jobs.

Mount

The mount action allows you to specify an existing Snapshot copy that will be cloned and mounted.

OSSV

The OSSV (Open Systems SnapVault) action performs OSSV operations.

Profile

A profile is essentially a folder used for organizing configuration files. Profiles also act as objects for role-based access control (RBAC), meaning that you can be allowed access to only certain profiles and the configuration files contained within.

Policy

Policy is short for retention policy. A policy typically defines Snapshot retention policies (how many Snapshot copies to keep) and age (how old should a Snapshot copy be before deleting it). For example, a daily policy might keep 30 days' worth of Snapshot copies that must be at least 30 days old. (The retention age setting prevents multiple Snapshot copies taken on the same day from bypassing SLAs that might state a Snapshot copy needs to be 30 days old.) If SnapVault is used, the policy will also define any retention settings for the SnapVault copy. Currently policies can be stored either directly in a configuration file or as part of a policy object. If a policy is part of a configuration file, it might be called a local retention policy.

Policy object

A policy object is a retention policy that can be applied at the profile level. Like a policy, a policy object defines retention policies, but it also can define a schedule and a label. The following are components of a policy object:

Backup type

A backup type is a label that can be set by the policy object.

Policy assignments

Policy assignments assign a policy (created in policy management) to a specific profile of profiles.

Policy management

Policy management creates a policy within the policy object. This allows for definition of the retention count and age for Snapshot copies. If SnapVault is used, the associated retention count and age can also be set. Policy management also allows for optional selection of a policy schedule and backup type.

Policy schedules

Policy schedules define an action to take on a specified schedule.

Quiesce

The quiesce action performs actions necessary to place an application or database into a consistent state. Though the action is named quiesce, this might not be a true quiesce operation depending on the plug-in or configuration file setting. For example, the Domino plug-in performs Domino API calls to put Domino databases into a backup start state, whereas the DB2 plug-in performs the DB2 write suspend command.

Restore

The restore action performs a volume or single-file restore operation on one or more volumes specified in the configuration file. Depending on the plug-in used in the configuration files, additional restore operations might be available.

scdump

scdump is a troubleshooting operation that gathers all of the configuration files and log files at a profile level, as well as gathering some standard Snap Creator Server logs and environment information. All of these gathered files are compressed into a zip file, which you are prompted to download. The scdump zip file can then be e-mailed or uploaded to Support for analysis.

Schedules

The Snap Creator Server contains a centralized scheduler. This allows for Snap Creator jobs to be scheduled either through a policy schedule (part of policy objects) or directly created through the scheduler. The scheduler runs up to 10 jobs concurrently and queues additional jobs until a running job completes.

Snap Creator Agent

The Snap Creator Agent is typically installed on the same host as where an application or database is installed. The Agent is where the plug-ins are located. The Agent is sometimes shortened to scAgent within Snap Creator.

Snap Creator Framework

Snap Creator is a framework, and the complete product name is NetApp Snap Creator Framework.

Snap Creator plug-ins

Plug-ins are used to put applications or databases into a consistent state. Snap Creator contains several plug-ins that are already part of the binary file and do not require any additional installation.

Snap Creator Server

Snap Creator Server is typically installed on a physical or virtual host. The Server hosts the Snap Creator GUI and necessary databases for storing information about jobs, schedules, users, roles, profiles, configuration files, and metadata from plug-ins. The Server is sometimes shortened to scServer within Snap Creator.

Umount

The umount action allows you to specify an existing mount point to unmount.

Unquiesce

The unquiesce action performs actions necessary to return an application or database to normal operation mode. Though the action is named unquiesce, this might not be a true unquiesce operation depending on the plug-in or configuration file setting. For example, the Domino plug-in performs Domino API calls to put Domino databases into a backup stop state, whereas the DB2 plug-in performs the write resume command.

Watchdog

The Watchdog is part of Snap Creator Agent that monitors the status of jobs that the agent is executing. If the Agent does not respond within a specified amount of time, the Watchdog can restart the Agent or end specific actions. For example, if a quiesce operation exceeds the timeout value, the Watchdog can stop the quiesce action and initiate an unquiesce to return the database back to normal operating mode.

Guidelines for using the Snap Creator command line

Snap Creator provides command-line functionality that enables you to perform actions such as creating a backup, cloning a volume and LUN, and importing configuration files, without using the graphical user interface (GUI).

For a comprehensive list of all the commands and associated parameters, execute the Snap Creator at a command prompt with no arguments:

***/install_path*/scServer/snapcreator**

For example:

```
[root@lyon scServer4.1.0]# ./snapcreator
Usage: ./snapcreator --server <IP> --port <Port> --user <User> --passwd
<Passwd> --profile <Profile> --config <Config> --action <Action> --
policy <Policy> <Optional Arguments>

Connection Information
  --server <IP|Hostname>     The IP address or hostname of the Snap
Creator server
  --port <number>            The port number of the Snap Creator server
  --user <user>              The username used for Snap Creator server
authentication
  --passwd <password>        The password used for Snap Creator server
authentication

Configuration Information
  --profile <Profile>        The profile you want to run
                             Profiles are dir's located under configs dir
                             Uses default config, unless --config is
specified
  list                       Displays all configurations known to Snap
Creator

 Workflow Actions
  --action <Action>          The action you want Snap Creator to perform
  backup                     Takes a backup using NetApp storage
technology
  ossv                       Uses OSSV to perform the backup, no primary
backup is taken
  cloneLun                   In addition to backup will clones lun(s)
                             using lun clone
  cloneVol                   In addition to backup will clones volume
                             using vol clone
  cloneDel                   Deletes vol clones outside of normal
workflow
  clone                      Performs a plug-in driven clone operation
  restore                    Enters an interactive restore menu for a
given
                             Snap Creator policy, you can choose a file
or volume restore
  backupDel                  Enters an interactive backup delete menu
for a given
                             Snap Creator policy
  backupList                 Lists all backups under Snap Creator control
  volumeList                 Lists all volumes under Snap Creator control
  cloneList                  Lists all volume clones under Snap Creator
control
  dpstatus                   Shows the snapvault/snapmirror status
  pmsetup                    Creates a Protection Manager DataSet for
given config
  arch                       Does not take backup, only performs
                             archive log management
  quiesce                    Does not take backup, only performs
```

```
                              quiesce for given application defined in
APP_NAME
  unquiesce                   Does not take backup, only performs
                              unquiesce for given application defined in
APP_NAME
  discover                    Does not take backup, only performs
                              discover for given application defined in
APP_NAME
  mount                       Clone an existing backup and provide
optional mount commands
  umount                      Clone an existing backup and provide
optional umount commands
  scdump                      Dumps logs, configs, and support
information for a given profile
                              in a zip file called scdump located under
Snap Creator root directory
  custom                      A plug-in may define a custom action
  dispatch                    Executes any Snap Creator workflow that
exists
  ...
```

When using the CLI, there is only one error that might get generated, which occurs if the incorrect username or password was provided:

```
403 Forbidden ------- The username and password are not correct
```

Commands used to perform Snap Creator workflow actions

You can use CLI commands to perform Snap Creator workflow actions.

The following table provides command-line equivalents for Snap Creator GUI-based workflow actions:

Workflow area	Action description	Command and associated parameters
Backups	Create a backup copy. Performs a backup operation based on the configuration file associated with the profile.	**snapcreator** **--server *IP*** **--port *Port*** **--user *User*** **--passwd *Password*** **--profile *Profile*** **--config *Config*** **--action backup** **--policy *Policy*** **--verbose**
	Create an Open Systems SnapVault backup. Performs a backup operation using Open Systems SnapVault. This requires Snap Creator Agent. Snap Creator Server communicates with Snap Creator Agent and performs a SnapVault update. No primary backup copy is made.	snapcreator --server *IP* --port *Port* --user *User* --passwd *Password* --profile *Profile* --config *Config* --action ossv --policy *Policy* --verbose

Workflow area	**Action description**	**Command and associated parameters**
Backups (contd...)	Delete a backup copy (manually). Manually deletes an existing backup. This operation is menu driven.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action backupDel --policy Policy --verbose`
	Delete a backup copy (automatic).	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action backupDel --policy Policy --verbose --nonInteractive --cntName controller --volName volume --backupName name`
	List backup copies. Lists the Snap Creator backup copies on the primary and secondary storage systems.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action backupList --policy Policy --verbose`
	Mount a backup copy. Performs the mount operation on an existing backup. Creates a volume clone based on the backup and allows the mounting of the clone through Snap Creator Agent and MOUNT_CMD.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action mount --backupName name --verbose`

Workflow area	Action description	Command and associated parameters
Backups (contd...)	Unmount a backup copy. Performs the unmount operation on an existing backup. Deletes a volume clone based on the backup and allows the unmounting of the clone through Snap Creator Agent and UMOUNT_CMDs.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action umount --backupName name --verbose`
Backup types	Create a new backup type.	`snapcreator --server IP --port Port --user User --passwd Password --action backupTypeAdd --backupTypeName name --verbose`
	Update an existing backup type.	`snapcreator --server IP --port Port --user User --passwd Password --action backupTypeUpdate --backupTypeId 1 --backupTypeName name --verbose`
	Delete an existing backup type.	`snapcreator --server IP --port Port --user User --passwd Password --action backupTypeDelete --backupTypeId 1 --verbose`
	List the backup types.	`snapcreator --server IP --port Port --user User --passwd Password --action backupTypeList --verbose`

Workflow area	Action description	Command and associated parameters
Clones	Clone a LUN. Backs up the primary storage system and then clones the backup using a LUN clone. The volume mapping of igroups are also handled. This requires a SAN or iSAN environment.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action cloneLun --policy Policy --verbose`
	Clone a volume. Backs up the primary storage system and then clones the backup using a volume clone. The volume mapping of igroups, NFS, or CIFS is also handled. This requires a SAN or iSAN or NAS environment.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action cloneVol --policy Policy --verbose`
	Delete a clone. Performs a clone deletion operation based on the specified retention policy. Only one copy of the LUN clone is retained. Volume clones have policy-associated usage.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action cloneDel --policy Policy --verbose`
	List Snap Creator clones. Lists the Snap Creator volume clones for the given configuration.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action cloneList --verbose`
	List Snap Creator volumes. Lists the Snap Creator volumes for the specified configuration on the primary storage system.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action volumeList --verbose`

Workflow area	Action description	Command and associated parameters
Configuration files	Import a configuration.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action configImport --importFile file_path --verbose`
	Export a configuration.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action configExport --exportFile file_path --verbose`
	Import a global configuration file.	`snapcreator --server IP --port Port --user User --passwd Password --action globalImport --importFile file_path --verbose`
	Export a global configuration file.	`snapcreator --server IP --port Port --user User --passwd Password --action globalExport --ExportFile file_path --verbose`
	Delete a global configuration file from the repository.	`snapcreator --server IP --port Port --user User --passwd Password --action globalDelete --verbose`

Workflow area	Action description	Command and associated parameters
Configuration files (contd...)	Import a global configuration file for a profile to the repository.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileglobalImport --importFile file_path --verbose`
	Export a global configuration file for a profile from the repository.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileglobalExport --exportFile file_path --verbose`
	Delete a global configuration for a profile from the repository.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileglobalDelete --verbose`
Jobs	List all jobs and status.	`snapcreator --server IP --port Port --user User --passwd Password --action jobStatus --verbose`
Policy	Add a new policy - local.	`snapcreator --server IP --port Port --user User --passwd Password --action policyAdd --schedId 1 --backupTypeId 1 --policyType local --policyName testPolicy --primaryCount 7 --primaryAge 0 --verbose`

Workflow area	Action description	Command and associated parameters
Policy (contd...)	Add a new policy - SnapMirror.	`snapcreator --server IP --port Port --user User --passwd Password --action policyAdd --schedId 1 --backupTypeId 1 --policyType snapmirror --policyName testPolicy --primaryCount 7 --primaryAge 0 --verbose`
	Add a new policy - SnapVault.	`snapcreator --server IP --port Port --user User --passwd Password --action policyAdd --schedId 1 --backupTypeId 1 --policyType snapvault --policyName testPolicy --primaryCount 7 --primaryAge 0 --secondaryCount 30 --secondaryAge 0 --verbose`
	Update a policy - SnapMirror.	`snapcreator --server IP --port Port --user User --passwd Password --action policyUpdate --policyId 1 --schedId 1 --backupTypeId 1 --policyType snapmirror --policyName testPolicy --primaryCount 7 --primaryAge 0 --verbose`

Workflow area	Action description	Command and associated parameters
Policy (contd...)	Update a policy - SnapVault.	`snapcreator --server IP --port Port --user User --passwd Password --action policyUpdate --policyId 1 --schedId 1 --backupTypeId 1 --policyType snapvault --policyName testPolicy --primaryCount 7 --primaryAge 0 --secondaryCount 30 --secondaryAge 0 --verbose`
	Delete a policy.	`snapcreator --server IP --port Port --user User --passwd Password --action policyDelete --policyId 1 --verbose`
	List all policies.	`snapcreator --server IP --port Port --user User --passwd Password --action policyList --verbose`
	Show additional details for a policy.	`snapcreator --server IP --port Port --user User --passwd Password --action policyDetails --policyId 1 --verbose`
	Assign policies to a profile.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action policyAssignToProfile --policies testPolicy --verbose`

Workflow area	Action description	Command and associated parameters
Policy (contd...)	Unassign policies from a profile.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action policyUnassignFromProfile --verbose`
	List all policies assigned to a profile.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action policyListForProfile --verbose`
Policy schedules	Create an hourly policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedAdd --schedName HourlyBackup --schedFreqId 2 --schedActionId 1 --schedMin minute --schedActive true --verbose`
	Create a daily policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedAdd --schedName DailyBackup --schedFreqId 3 --schedActionId 1 --schedHour hour --schedMin minute --schedActive true --verbose`

Workflow area	**Action description**	**Command and associated parameters**
Policy schedules (contd...)	Create a weekly policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedAdd --schedName WeeklyBackup --schedFreqId 4 --schedActionId 1 --schedDayOfWeek day_of_week --schedHour hour --schedMin minute --schedActive true --verbose`
	Create a cron policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedAdd --schedName CronBackup --schedFreqId 5 --schedActionId 1 --schedCron '0 0/5 14,18 * * ?' --schedActive true --verbose`
	Update an hourly policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedUpdate --schedId 1 --schedName HourlyBackup --schedFreqId 2 --schedActionId 1 --schedMin minute --schedActive true --verbose`

Workflow area	Action description	Command and associated parameters
Policy schedules (contd...)	Update a daily policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedUpdate --schedId 1 --schedName DailyBackup --schedFreqId 3 --schedActionId 1 --schedHour hour --schedMin minute --schedActive true --verbose`
	Update a weekly policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedUpdate --schedId 1 --schedName WeeklyBackup --schedFreqId 4 --schedActionId 1 --schedDayOfWeek day_of_week --schedHour hour --schedMin minute --schedActive true --verbose`
	Update a cron policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedUpdate --schedId 1 --schedName CronBackup --schedFreqId 5 --schedActionId 1 --schedCron '0 0/5 14,18 * * ?' --schedActive true --verbose`

Workflow area	Action description	Command and associated parameters
Policy schedules (contd...)	Delete a policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedDelete --schedId 1 --verbose`
	List policy schedules.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedList --verbose`
	Show additional information about a policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedDetails --schedId 1 --verbose`
Profiles	Create a new profile.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileCreate --verbose`
	Delete a profile. **Note:** The configuration files in the profile are also deleted.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileDelete --verbose`

Workflow area	Action description	Command and associated parameters
Restore	Interactive restore. Performs an interactive restore operation for a given policy. You can choose to perform a file or a volume restore operation. You can also perform a non-interactive restore operation.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action restore --policy Policy --verbose`
	Non-interactive volume restore. Perform a non-interactive volume restore.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action restore --policy Policy --verbose --nonInteractive --cntName controller --volName volume --backupName name`
	Non-interactive file restore. Perform a non-interactive file restore.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action restore --policy Policy --verbose --nonInteractive --cntName controller --volName volume --backupName name --files file_path1,file_path2,etc.`

Workflow area	Action description	Command and associated parameters
Schedules	Create a new hourly schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedCreate --policy Policy --schedName HourlyBackup --schedFreqId 2 --schedActionId 1 --schedMin minute --schedActive true --schedStartDate date --verbose`
	Create a new daily schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedCreate --policy Policy --schedName DailyBackup --schedFreqId 3 --schedActionId 1 --schedHour hour --schedMin minute --schedActive true --schedStartDate date --verbose`
	Create a new weekly schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedCreate --policy Policy --schedName WeeklyBackup --schedFreqId 4 --schedActionId 1 --schedDayOfWeek day_of_week --schedHour hour --schedMin minute --schedActive true --schedStartDate date --verbose`

Workflow area	Action description	Command and associated parameters
Schedules (contd...)	Create a new cron schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedCreate --policy Policy --schedName CronBackup --schedFreqId 5 --schedActionId 1 --schedCron "0 0/5 14,18 * * ?" --schedActive true --schedStartDate date --verbose`
	Run a schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action schedRun --schedId 1 --verbose`
	Delete a schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action schedDelete --schedId 10 --verbose`
	Update an hourly schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedUpdate --policy Policy --schedName HourlyBackup --schedFreqId 2 --schedId 1 --schedActionId 1 --schedMin minute --schedActive true --schedStartDate date --verbose`

Workflow area	Action description	Command and associated parameters
Schedules (contd...)	Update a daily schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedUpdate --policy Policy --schedName DailyBackup --schedFreqId 3 --schedId 1 --schedActionId 1 --schedHour hour --schedMin minute --schedActive true --schedStartDate date --verbose`
	Update a weekly schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedUpdate --policy Policy --schedName WeeklyBackup --schedFreqId 4 --schedId 1 --schedActionId 1 --schedDayOfWeek day_of_week --schedHour hour --schedMin minute --schedActive true --schedStartDate date --verbose`
	Update a cron schedule.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action schedUpdate --policy Policy --schedName CronBackup --schedFreqId 5 --schedId 1 --schedActionId 1 --schedCron "0 0/5 14,18 * * ?" --schedActive true --schedStartDate date --verbose`

Workflow area	Action description	Command and associated parameters
Schedules (contd...)	List all schedules.	`snapcreator --server IP --port Port --user User --passwd Password --action schedList --verbose`
	List supported scheduler actions.	`snapcreator --server IP --port Port --user User --passwd Password --action schedActionList --verbose`
	List supported scheduler frequencies.	`snapcreator --server IP --port Port --user User --passwd Password --action schedFreqList --verbose`
	Show additional details for a schedule ID.	`snapcreator --server IP --port Port --user User --passwd Password --action schedDetails --schedId 1 --verbose`
scdump	Create an scdump file. Dumps logs, configuration files, and support information about a given profile in a .zip file called `scdump` located under the Snap Creator root directory.	`snapcreator --server IP --port Port --user User --passwd Password -- profile Profile --config Config --action scdump --policy Policy --verbose`
Snap Creator Server and Agent	List the status for all agents known to the Snap Creator Server.	`snapcreator --server IP --port Port --user User --passwd Password --action agentStatus --verbose`

Workflow area	Action description	Command and associated parameters
Snap Creator Server and Agent (contd...)	Ping a Snap Creator Server.	`snapcreator --server IP --port Port --user User --passwd Password --action pingServer --verbose`
	Ping a Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --action pingAgent --agentName host_name --agentPort port --verbose`
Archive	Performs archive log management according to the settings in the configuration file. This requires Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action arch --verbose`
Data protection capability	Configures the NetApp Management Console data protection capability dataset for a given configuration.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action pmsetup --verbose`
	Shows the data protection status of the SnapVault and SnapMirror relationship for a controller. If SnapVault or SnapMirror is not configured, the results are not displayed.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action dpstatus --verbose`

Workflow area	Action description	Command and associated parameters
Quiesce/ unquiesce	Performs the quiesce operation for a given application. This requires Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action quiesce --verbose`
	Performs the unquiesce operation for a given application. This requires Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action unquiesce --verbose`
Discover	Performs discovery for a given application. This requires Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action discover --verbose`

Commands used to manage Snap Creator user access

You can perform Snap Creator RBAC actions using CLI commands.

The following table provides the command-line equivalent for Snap Creator GUI-based RBAC actions:

RBAC area	Action	Command and associated parameters
Users	Create a new user.	`snapcreator --server IP --port Port --user User --passwd Password --action userAdd --username user_name --userPwd user_passwd --verbose`
	Delete a user.	`snapcreator --server IP --port Port --user User --passwd Password --action userDelete --username user_name --verbose`
	List all users.	`snapcreator --server IP --port Port --user User --passwd Password --action userList --verbose`
	List all assigned users for a role.	`snapcreator --server IP --port Port --user User --passwd Password --action userListAssigned --roleName role_name --verbose`
	List all users who are assigned a profile.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action userListForProfile --verbose`

RBAC area	Action	Command and associated parameters
Roles	Create a new role.	`snapcreator --server IP --port Port --user User --passwd Password --action roleAdd --roleName role_name --roleDesc role_description --verbose`
	Delete a role.	`snapcreator --server IP --port Port --user User --passwd Password --action roleDelete --roleName role_name --verbose`
	Assign a role to a user.	`snapcreator --server IP --port Port --user User --passwd Password --action roleAssign --userName user_name --roleName role_name --verbose`
	Unassign a role from a user.	`snapcreator --server IP --port Port --user User --passwd Password --action roleUnassign --userName user_name --roleName role_name --verbose`
	List all assigned roles for a user.	`snapcreator --server IP --port Port --user User --passwd Password --action roleListAssigned --userName user_name --verbose`

RBAC area	Action	Command and associated parameters
Permissions	Create a new permission.	`snapcreator --server IP --port Port --user User --passwd Password --action permAdd --permName permission_name --permDesc permission_description --verbose`
	Delete a permission.	`snapcreator --server IP --port Port --user User --passwd Password --action permDelete --permName permission_name --verbose`
	Assign a permission to a user.	`snapcreator --server IP --port Port --user User --passwd Password --action permAssign --permName permission_name --roleName role_name --verbose`
	Unassign a permission from a user.	`snapcreator --server IP --port Port --user User --passwd Password --action permUnaspermission_namesign --permName --roleName role_name --verbose`
	List all permissions.	`snapcreator --server IP --port Port --user User --passwd Password --action permList --verbose`
	List all permissions assigned to a role.	`snapcreator --server IP --port Port --user User --passwd Password --action permListAssigned --roleName role_name --verbose`

RBAC area	Action	Command and associated parameters
Operations	Assign an operation to a permission.	`snapcreator --server IP --port Port --user User --passwd Password --action opAssign --opName operation_name --permName permission_name --verbose`
	Unassign an operation from a permission.	`snapcreator --server IP --port Port --user User --passwd Password --action opUnassign --opName operation_name --permName permission_name --verbose`
	List all operations.	`snapcreator --server IP --port Port --user User --passwd Password --action opList --verbose`
	List all operations assigned to a permission.	`snapcreator --server IP --port Port --user User --passwd Password --action opListAssigned --permName permission_name --verbose`

RBAC area	Action	Command and associated parameters
Profiles	Assign a profile to a user.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileAssign --userName user_name --verbose`
	Unassign a profile from a user.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileUnassign --userName user_name --verbose`
	List all profiles assigned to a user.	`snapcreator --server IP --port Port --user User --passwd Password --action profileListForUser --userName user_name --verbose`

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