Snap Creator Framework 4.3.3

Snap Creator Framework

NetApp
August 30, 2024

Table of Contents

Snap Creator Framework 4.3.3

Welcome to the Snap Creator Framework Information Library. Here you will find documentation for Snap Creator Framework 4.3.3 software including how to install and set up Snap Creator, how to manage Snap Creator Sever and Agent, and how to configure and use the IBM Domino plug-in.

Snap Creator Framework 4.3.3 Release Notes

The Snap Creator Framework 4.3.3 Release Notes describe new features, upgrade notes, fixed issues, known limitations, and known issues. You are required to sign on to the NetApp Support Site to access the Release Notes.

Installation Guide

This guide describes how to install and set up Snap Creator 4.3.3.

What 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.

Snap Creator provides the following 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:

- Application-consistent data protection

  A centralized solution for backing up critical information, integrating with existing application architectures to ensure data consistency and reduced operating costs.

- Extensibility

  Achieve fast integration using modular architecture and policy-based automation.

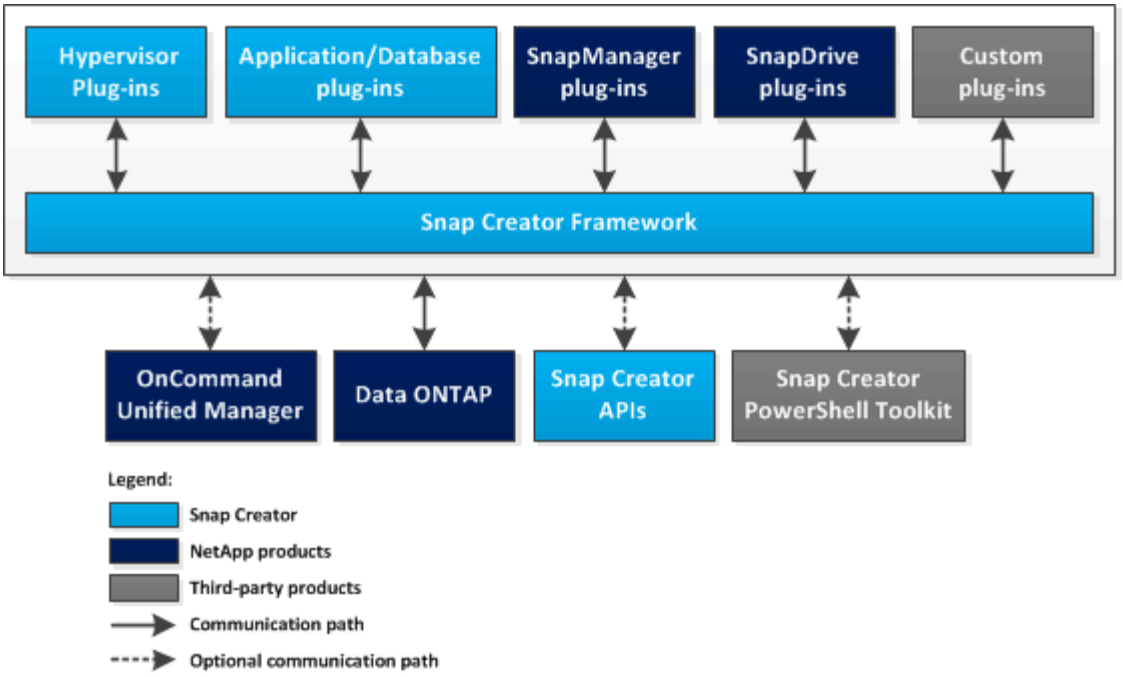
- Cloud readiness

  An operating system-independent Snap Creator functionality that 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 testing purposes.

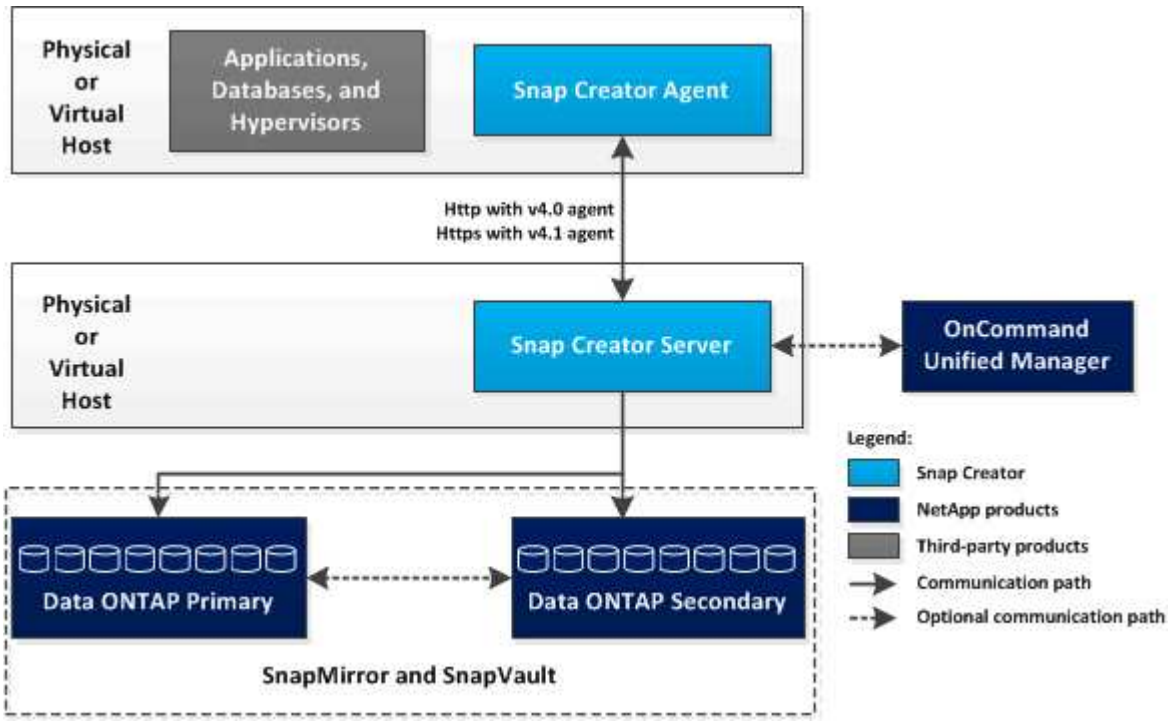
The following illustration shows the components of the Snap Creator Framework:



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

Snap Creator actions are initiated by the Snap Creator Server.

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 Server sends quiesce or unquiesce operations to the supported applications (database, email, hypervisor, or any other custom application) through the Snap Creator Agent. Communication between the Server and the Snap Creator Agent occurs by default on port 9090, but you can customize the port to fit your needs.

By default, the Snap Creator Server uses Data ONTAP API calls to communicate with the storage systems and other NetApp software products. Commands to the storage system from the Snap Creator Server occur over port 80 or port 443 and handle all Snapshot, SnapVault, and SnapMirror-type functions before committing changes to storage devices or pools.

The Snap Creator Server communicates with Active IQ Unified Manager through the Unified Manager API.

Related information

Snap Creator Framework 4.3.3 Administration Guide

Snap Creator Agent

The Snap Creator Agent is typically installed on the same host 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.

The Agent accepts application quiesce and unquiesce commands, as well as other PRE/POST commands, from the Snap Creator Server. The Snap Creator Agent is required when using plug-ins.

Snap Creator Framework 4.3.3 Administration Guide

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, or custom applications. The following plug-ins are supported for use with Snap Creator:

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

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.

Snap Creator Framework 4.3.3 Administration Guide

Preinstallation requirements for Snap Creator

There are system license, software, and hardware requirements that you should consider before you install Snap Creator.

In addition, you should perform the following tasks before installing Snap Creator:

- Download the Snap Creator software.
- Create a Data ONTAP user.
- Install Oracle Java or OpenJDK on the Snap Creator Server and Agent hosts.
- Synchronize time on Snap Creator Server and Agent hosts.
- Configure settings for the IBM Domino plug-in (required only if you are using the Domino plug-in).
- Add Secure Sockets Layer (SSL) libraries for the UNIX environment (required only when running Snap Creator using the CLI on UNIX platforms).

  For details, see the *Troubleshooting* section in the *Snap Creator Framework Administration Guide*.

Snap Creator installation and configuration requirements

Before you install the Snap Creator Framework, you should be aware of certain installation and configuration requirements for licenses, software, and hardware.

License requirements

Although Snap Creator does not require a license, the following licenses might be required, depending on the actions you want to perform while using Snap Creator:

- FlexClone (for volume cloning)
- Active IQ Unified Manager Core Package (for NetApp Management Console data protection capability and Operations Manager console)
- Open Systems SnapVault (for OSSV actions)
- SnapDrive (for SnapDrive actions)
- SnapMirror (for SnapMirror actions)
- SnapRestore (for restoring)
- SnapVault (for SnapVault actions)

See the Interoperability Matrix, which is online at mysupport.netapp.com/matrix, for details regarding the supported software.

Software information

The following software might be needed depending on your environment:

- Java (required)

  Snap Creator Framework 4.3.3 only supports OpenJDK and Oracle Java 1.8 Update 72 and later.

- Data ONTAP (required)
- Microsoft .NET Framework
- Operating system:

  Only U.S.-based operating systems are currently supported.

  - UNIX platforms:

    Snap Creator supports only Bash Shell for all UNIX platforms.

    - AIX
    - HP-UX
    - Linux
    - Solaris
  - Microsoft Windows
- Web browsers:
  - Internet Explorer
  - Firefox

See the Interoperability Matrix, which is online at mysupport.netapp.com/matrix, for details regarding the supported software.

Hardware requirements

The Snap Creator hardware requirements are as follows:

- Snap Creator Server requirements:

Hardware component	Minimum	Recommended
Processor	1 core	4 cores, 2 GHz or faster
Memory (for Snap Creator plus the operating system)	2 GB RAM	4 GB RAM
Disk space	5 GB	50 GB or greater (based on the number of logs to be stored)

- Snap Creator Agent requirements:

  Requires a minimum of 256 MB memory when either no plug-in is deployed or when prepackaged plug-ins are used.

  Prepackaged plug-ins should not need any additional memory requirements. Other plug-ins might have additional requirements.

Downloading the Snap Creator software

You download the Snap Creator software from the NetApp Support Site. Snap Creator is listed in the “Software Download” section under Snap Creator Framework.

1. Go to the Software page at the NetApp Support Site.

   Snap Creator is listed in the **Downloads** > **Software** section as **Snap Creator Framework**.

2. Select a platform, and then click **Go**.
3. Select the version of Snap Creator to download by clicking **View & Download**.
4. From Software download instructions, click **CONTINUE**.
5. Read and accept the End User License Agreement.
6. Select the operating system and bit level of the software package.

Related information

NetApp Support Site: mysupport.netapp.com

Creating a Snap Creator user for Data ONTAP

Prior to installing Snap Creator, you should create a Snap Creator user for Data ONTAP. The process that you follow to create the Snap Creator user depends on whether your systems are running Data ONTAP in 7-Mode or clustered Data ONTAP.

Creating a Snap Creator user for Data ONTAP operating in 7-Mode

Snap Creator uses the Data ONTAP APIs to communicate with the storage system. To ensure that the user account is granted access to only Snap Creator, create a new role, group, and user on each storage controller. The role is assigned to the group and the group contains the user. This controls the access and limits the scope of the Snap Creator account.

You must perform this procedure once for each storage controller on which Snap Creator is installed.

To create a Snap Creator user for Data ONTAP operating in 7-Mode by using the Data ONTAP CLI (SSH, console connection, or Telnet), complete the following steps.

You should not copy and paste commands directly from this document; errors might result such as incorrectly transferred characters caused by line breaks and hard returns. Copy and paste the commands from this procedure into a text editor, verify the commands, and then enter them in the CLI.

1. Create a role defining the rights required for Snap Creator on the storage system by running the following command:

```
useradmin role add rolename -a login-\*,api-snapshot-\*,api-system-\*,
api-ems-\*,api-snapvault-\*,api-snapmirror-\*,api-volume-\*,
api-lun-\*,api-cg-\*,api-nfs-\*,api-file-\*,api-license-\*,
api-net-\*api-clone-\*, api-options-get, api-wafl-sync
```

The command shown in this step includes all the API roles used by Snap Creator. However, you can restrict the user access by including only the required roles (for example, if SnapMirror will not be used, then api-snapmirror-* is not needed).

```
useradmin role add sc_role -a login-*,api-snapshot-*,api-system-*,api-
ems-*,api-snapvault-*,api-snapmirror-*,api-volume-*,
api-lun-*,api-cg-*,api-nfs-*,api-file-*,api-license-*, api-net-*, api-
clone-*, api-options-get, api-wafl-sync
```

2. Create a new group on the storage system and assign the newly created role to the group by running the following command:

```
useradmin group add groupname -r rolename
```

```
useradmin group add snap_creator_group -r snap_creator_role
```

3. Create a user account by running the following command:

```
useradmin user add username -g groupname
```

```
useradmin user add snap_creator_user -g snap_creator_group
```

4. Enter the password for the account.

Use this restricted account when creating configuration files for Snap Creator.

Creating a Snap Creator user for clustered Data ONTAP

For clustered Data ONTAP, you should create users for Snap Creator. However, the type of user that you create depends on the version of clustered Data ONTAP. The two types of users are a cluster user and a storage virtual machine (SVM) user.

Create the following users, with the appropriate roles as defined in the *Snap Creator Framework Administration Guide*, for your version of Data ONTAP:

- Data ONTAP releases prior to clustered Data ONTAP 8.2: Create a cluster and SVM user.
- Clustered Data ONTAP 8.2 or later: Create an SVM user.

For increased security, you should create a Data ONTAP user and role specifically for Snap Creator. Alternatively, you can use other user accounts, such as admin or vsadmin.

For more information about creating a Snap Creator role using the CLI, see Related references.

Both types of user require access to the Data ONTAPI library. In addition, a Management LIF is also needed for clustered Data ONTAP, regardless of the version.

The two users are not interchangeable. For example, the cluster user does not have access to the required APIs to perform certain actions, such as creating a Snapshot copy. This is true even if you use the default cluster admin account. SVM accounts should use the **vsadmin** role or a customer-created role for Snap Creator to work properly.

You must perform this procedure once on each SVM and cluster where Snap Creator is used.

For ease of use, the following instructions refer to admin and vsadmin roles; however, you can replace these role names with those roles that you create.

> You should not copy and paste commands directly from this document; errors (such as incorrectly transferred characters caused by line breaks and hard returns) might result. Copy and paste the commands from this procedure into a text editor, verify the commands, and then enter them in the CLI.

1. Create the SVM user svm_username01 with the appropriate role (vsadmin or the role created for the user) on the svm_nameSVM and enable access to the ONTAPI library by entering the following command and a user password:

```
security login create -username svm_username01
-vserver svm_name -application ontapi
-authmethod password -role vsadmin

Please enter a password for user 'svm_username01':
Please enter it again:
```

2. *(For versions prior to clustered Data ONTAP 8.2 only)* Create a cluster user by entering the following command and a user password:

```
security login create -username svm_username02
-vserver svm_clustername -application ontapi
-authmethod password -role admin

Please enter a password for user 'svm_username02':
Please enter it again:
```

Related information

CLI commands for creating a role for a Snap Creator user in clustered Data ONTAP

Installing Java on Snap Creator hosts

OpenJDK and Oracle Java Runtime Environment (JRE) 1.8 Update 72 or later must be installed on any Snap Creator Server and Agent host. To avoid the Transport Layer Security (TLS) vulnerability, it is best to install any later version of JRE 1.8 Update 72 on Snap Creator Server and Agent host.

1. Download and install JRE on each Snap Creator Server or Snap Creator Agent host.

   The bit levels (32-bit or 64-bit) of Java and Snap Creator must be the same.

   If necessary, download Java from the Java Downloads for All Operating Systems page.

2. After you install JRE, verify the version and bit level of Java: java -version

```
C:\Documents and Settings\Administrator>java -version
java version "1.7.0_04-ea"
Java(TM) SE Runtime Environment (build 1.7.0_04-ea-b01)
Java HotSpot(TM) Client VM (build 23.0-b03, mixed mode, sharing)
```

   The output of the command displays the installed version of Java. If the bit level is not displayed (as in the preceding example), then the installation is 32-bit.

Synchronizing time on Snap Creator Server and Agent hosts

Before installing Snap Creator, you should ensure that the time on the Snap Creator Server host is in sync with the time on the Agent host. You can do this by synchronizing the time of the hosts with the same Network Time Protocol (NTP) server.

For more information, refer to the following documentation:

- Clustered Data ONTAP--*Clustered Data ONTAP Software Setup Guide* for your version of Data ONTAP; in particular, refer to the information regarding verifying the system time and synchronizing the system time across the cluster.
- Data ONTAP operating in 7-Mode—Knowledgebase article 1011954 How to setup NTP time synchronization at How to set up NTP time synchronization in Data ONTAP 7-Mode.

Configuring settings for the Domino plug-in

You need to configure specific settings only if you plan to use the IBM Domino plug-in, which is included as part of the Snap Creator Agent installation.

It is a best practice to install Snap Creator Server and Snap Creator Agent on different hosts.

Depending on your operating system, you must configure these settings before installing the Snap Creator Agent for the IBM Domino plug-in to work properly.

- For a Windows environment, you must add the Domino path to the environment variables.
- For a UNIX environment, you must create symbolic links to link to Domino's shared object files.

Configuring Windows-specific settings: Adding path to the environment variables

If you are going to install the Snap Creator Agent on Windows, you must add the path to the Domino binary files to the environment variables for Windows.

1. Access the advanced settings for your Windows OS (for example, **My Computer** > **Properties** > **Advanced** > **Environment Variables**) and add the Domino path to the Path variable.

For details about modifying your system variables, see the documentation for your Windows operating system.

If you add the Domino path to the environment variables after the Snap Creator Agent is installed, you must restart the Snap Creator Agent service. For example, on the host where the Snap Creator Agent is installed, open a command prompt and enter the following commands:

```
sc stop SnapCreatorAgentService
sc start SnapCreatorAgentService
```

Configuring UNIX-specific settings: Creating symbolic links

If you are going to install the Snap Creator Agent on a UNIX operating system (AIX,

Linux, and Solaris), for the IBM Domino plug-in to work properly, three symbolic links (symlinks) must be created to link to Domino's shared object files.

Installation procedures vary slightly depending on the operating system. Refer to the appropriate procedure for your operating system.

Domino does not support the HP-UX operating system.

Creating symbolic links for the Domino plug-in on Linux and Solaris hosts

You need to perform this procedure if you want to create symbolic links for the Domino plug-in on Linux and Solaris hosts.

You should not copy and paste commands directly from this document; errors (such as incorrectly transferred characters caused by line breaks and hard returns) might result. Copy and paste the commands into a text editor, verify the commands, and then enter them in the CLI console.

The paths provided in the following steps refer to the 32-bit systems; 64-bit systems must create simlinks to /usr/lib64 instead of /usr/lib.

1. Add links to /usr/lib for the following files:
   - libxmlproc.so
   - libndgts.so
   - libnotes.so
   - libgsk8iccs.so (for Domino 9.0 or later only) A typical method of creating a symbolic link is to use the ln command:

   ln -s /path/to/source_file /usr/lib/linked_file

   + where:

   - -s instructs the operating system to make a symbolic link.
   - /path/to/source_file is the path to one of the Domino library files, including the file name.
   - linked_file is the name of the file that is being linked.

   ```
   ln -s /opt/ibm/domino/notes/latest/linux/libxmlproc.so
   /usr/lib/libxmlproc.so
   ln -s /opt/ibm/domino/notes/latest/linux/libndgts.so
   /usr/lib/libndgts.so
   ln -s /opt/ibm/domino/notes/latest/linux/libnotes.so
   /usr/lib/libnotes.so
   ln -s /opt/ibm/domino/notes/latest/linux/libgsk8iccs.so
   /usr/lib/libgsk8iccs.so
   ```

2. Verify the path to the files listed in Step 1.

Creating symbolic links for the Domino plug-in on AIX hosts

You must perform this procedure to add symbolic links for the Domino plug-in on AIX hosts.

You should not copy and paste commands directly from this document; errors (such as incorrectly transferred characters caused by line breaks and hard returns) might result. Copy and paste the commands into a text editor, verify the commands, and then enter them in the CLI console.

The paths provided in the following steps refer to the 32-bit systems; 64-bit systems must create simlinks to /usr/lib64 instead of /usr/lib.

1. Add links to /usr/lib for the following files:
   - libxmlproc_r.a
   - libndgts_r.a
   - libnotes_r.a
   - libgsk8iccs_r.a (for Domino 9.0 or later only) A typical method of creating a symbolic link is to use the ln command:

   ln -s /path/to/source_file /usr/lib/linked_file

   + where:

   - -s instructs the operating system to make a symbolic link.
   - /path/to/source_file is the path to one of the Domino library files, including the file name.
   - linked_file is the name of the file that is being linked.

   ```
   ln -s /opt/ibm/domino/notes/latest/ibmpow/libxmlproc_r.a
   /usr/lib/libxmlproc_r.a
   ln -s /opt/ibm/domino/notes/latest/ibmpow/libndgts_r.a
   /usr/lib/libndgts_r.a
   ln -s /opt/ibm/domino/notes/latest/ibmpow/libnotes_r.a
   /usr/lib/libnotes_r.a
   ln -s /opt/ibm/domino/notes/latest/linux/libgsk8iccs.so
   /usr/lib/libgsk8iccs_r.a
   ```

2. Verify the path to the files listed in Step 1.

   The commands in this example use the default path for AIX, but installations can vary.

Installing the Snap Creator Server

You can install the Snap Creator Server on Windows and UNIX hosts.

In a typical installation, the Snap Creator Server and the Snap Creator Agent are installed on separate hosts. However, in some instances, the Server and Agent can be installed at the same time. In this setup, only the Server is configured during the installation.

Installing the Snap Creator Server on a Windows host

You can install Snap Creator Server on a Windows host by using Windows installer.

- JRE 1.8 Update 72 or later must be installed.
- The person performing the installation must have admin-level privileges to perform the installation.
- The default port for the Snap Creator Server must be 8443.

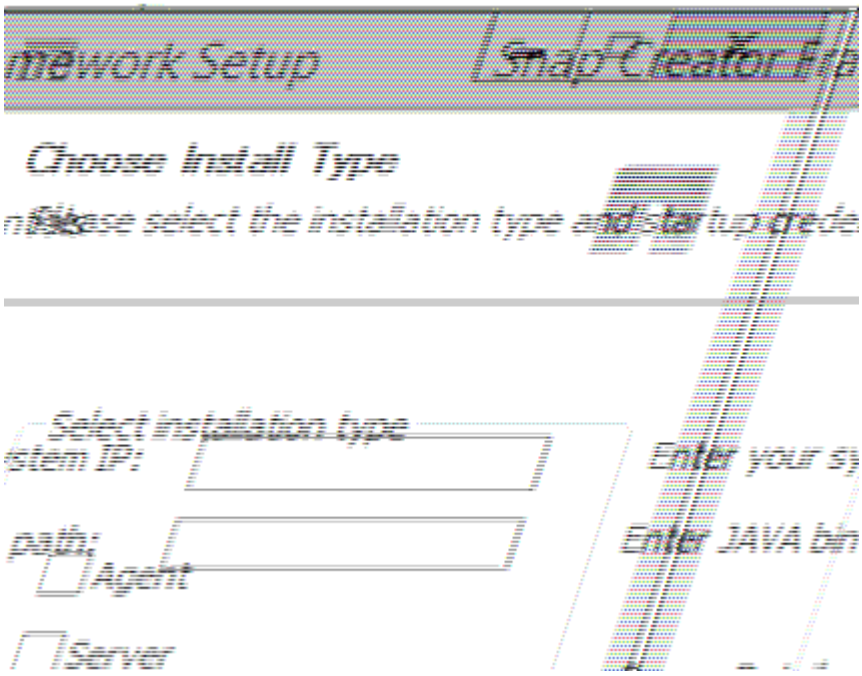
  You can use netstat or a similar tool to verify that the network port that you want to use (as long as the port supports HTTPS) is available and is not already in use (for example, Windows: `netstat -na | find "8443"`).

- You must have already downloaded Snap Creator.

1. Double-click the Snap_Creator_Frameworkrelease-Windowsversion.exe file.

   To launch the Snap Creator installer, you would use Snap_Creator_Framework4.1.0-Windows64.exe.

2. On the Welcome page, click **Next** to start the installation.
3. Read and accept the terms of the license agreement.
4. On the **Choose Install Type** page, change the settings to fit various installation types, and then click **Next**.



   - **Select installation type**

     Select **Server**. Both the Snap Creator Server and Snap Creator Agent can be installed at the same time if you want both on the same system.

   - **Start server as service**

     Select this option to automatically install and start the snapcreatorserverservice service immediately after the installation process is complete. If it is not selected, the **Server port** field is disabled.

If you do not select this option, the service is not installed and you need to manually start the Snap Creator Server by running a batch script from a command prompt.

- **Enter your system IP**

  Select this option to provide the IP address of the system on which Snap Creator Server or Snap Creator Agent is installed. This option is used for generating the SSL certificate during Snap Creator installation.

- **Enter JAVA bin path**

  Select this option to provide the Java bin path to locate the keytool utility. Keytool is used to generate an SSL certificate during the Snap Creator installation.

- **Server port**

  Accept the default port of `8443` or specify the port number.

5. Configure the **Profile Setup** page, and then click **Next**.

   The information entered on the **Profile Setup** page is used to set up the profile required for the Snap Creator GUI.

   - **Storage controller serial number**

     This parameter is optional. Enter the serial number of one of your storage controllers. When this information is provided, the controller serial number is embedded into the Snap Creator properties file and included in support and log outputs. This information can be used to help troubleshoot any issues that happen in the future.

   - **User name**

     Enter the name of the Snap Creator Server administrator.

   - **Password and confirmation**

     Enter the password for the Snap Creator Server administrator.

   - **Enable job monitor**

     If you want to enable job monitoring, select the **Enable job monitor** check box. Job Monitor is a separate section in the GUI that monitors all of the jobs that are run by Snap Creator and the status of these jobs.

   - **Job log size**

     Enter the number of jobs to keep in the history of the job log. The default is `100`; the size should be between 1 and 1000.

     Although the maximum accepted value for the **Job log size** is 10,000, the recommended maximum size that you provide is 1000.

6. On the **Choose Install Location** page, enter the Snap Creator installation path or accept the default (C:\Program Files\NetApp\Snap_Creator_Framework), and then click **Next**.

7. On the **Choose Start Menu Folder** page, customize the folder in which Snap Creator should appear in the Windows Start Menu or accept the default, and then click **Install**.
8. After the installation is complete, click **Next**.

   During the Snap Creator Server service installation, a command prompt is displayed if a service was selected as part of the installation options. This process attempts to start existing services; therefore, it is common to see failure messages listed as part of this step.

9. Click **Finish** to close the Windows installer.
10. Validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (https://IP_address:gui_port).

    You must connect using HTTPS; otherwise, the connection is not automatically redirected to an HTTPS connection and the GUI will not work.

Related information

Installing Java on Snap Creator hosts

Downloading the Snap Creator software

Starting the Server from a command prompt

Starting the Server from a command prompt

You can manually start the Snap Creator Server from a command prompt by running a batch script (scServer.bat).

Typically, you must follow this procedure only if you did not select the **Start server as service** option during installation.

You can also schedule the batch script (scServer.bat) to run at startup through the Windows task scheduler. For details about using the Windows task scheduler, see the documentation for your Windows operating system.

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, the Snap Creator Server service should be used.

1. Open a command prompt and enter the following commands:

```
cd \install_path\scServerrelease-version\bin\
scServer.bat start
```

```
cd \Program Files\NetApp\Snap_Creator_Framework\scServer4.1.0\bin\
scServer.bat start
```

Installing the Snap Creator Server on UNIX-based systems

For UNIX platforms (AIX, HP-UX, Linux, and Solaris), the process of installing Snap Creator consists of extracting the Snap Creator software package (a .tar file containing both the Snap Creator Server and the Snap Creator Agent), running a setup script, starting the service, and validating the port.

JRE 1.8 Update 72 or later must be installed.

The person performing the installation must have sufficient access and privileges to perform the installation.

> You must have root-level privileges to perform the initial setup.

The default port for the Snap Creator Server is 8443. You can use netstat or a similar tool to verify that the network port that you want to use supports HTTPS, is available, and is not already in use (for example, on UNIX hosts you can enter `netstat -nap | grep 8443`).

You must have already downloaded Snap Creator.

The UNIX Services (Server and Agent) feature provides a start script for Snap Creator Server and Snap Creator Agent. The start scripts are written in a UNIX shell script (Bourne shell) and are designed to run on all UNIX environments that are supported by Snap Creator.

1. Copy the downloaded Snap Creatortar.gz file to the location where you want to install Snap Creator Server:
   a. Create a subdirectory: mkdir snap_creator_directoryCreate a subdirectory:

      mkdir snap_creator_directory

      ```
      mkdir /SC_41
      ```

   b. Copy the Snap Creatortar.gz file to the newly created directory:

      ```
      cp NetApp_Snap_Creator_Frameworkrelease-os.tar.gz
      /snap_creator_directory
      ```

      ```
      cp NetApp_Snap_Creator_Framework4.1.0-Linux32.tar.gz
      /SC_41
      ```

2. Change to the directory where the Snap Creator Framework .tar file is located, and then extract the file:

   > Depending on the UNIX environment, you might be required to unzip the file before entering the tar command.

```
cd snap_creator_directory
tar -xvf NetApp_Snap_Creator_Frameworkrelease-os.tar.gz
```

- snap_creator_directory is the location where Snap Creator will be installed.
- release is the current release of the Snap Creator software package.
- os is the operating system.

```
cd /sc_41
tar -xvf NetApp_Snap_Creator_Framework4.1.0-Linux32.tar.gz
```

This extracts both the Server and the Agent software. Typically, only Snap Creator Server is configured. The agents typically reside on the database or application servers to be protected, as seen in the following example:

+

```
NetApp_Snap_Creator_Framework4.1.0-Linux32.tar.gz  scServer4.1.0
scAgent4.1.0
```

3. Perform the initial setup of Snap Creator:

```
cd scServer*
./snapcreator --setup
Welcome to the NetApp Snap Creator Framework release-version!
\#\#\# Installation options \#\#\#
01. NetApp Snap Creator Framework release-version Server
02. NetApp Snap Creator Framework release-version Remote CLI
Select install option (enter a number or "q" to quit):
```

Enter `01` to install Snap Creator Server.

- Option 01 performs the initial setup of Snap Creator Server by configuring a Snap Creator user and password, designating the GUI port where Snap Creator Server will run, and configuring other parameters.
- Option 02 sets up Snap Creator Server as a local binary and enables you to issue commands from your local system CLI to a remote Snap Creator Server.

4. Accept the end user license agreement by entering y here:

```
END USER LICENSE AGREEMENT
...the EULA displays...

Do you accept the End User License Agreement (y|n): <Enter y>

Enter controller serial number (Recommended): <OPTIONAL: Enter serial
number for one of your storage controllers>
```

5. Enter the controller serial number.

   The controller serial number is embedded in the Snap Creator properties file and included in support and log outputs. You can use this information to help troubleshoot any issues that might happen later.

6. Enter the server port, system IP, and JAVA bin path, and then continue with the prompts.

```
Enter Snap Creator server port [8443]: <Enter server port>

Enable job monitor (Y|N): <Enter Y>

Enter job monitor size, how many jobs to allow [100]: <Enter the number
of jobs from 1-1000>
```

   Although the maximum accepted value for the **job monitor size** is 10,000, the recommended maximum size that you provide is 1000.

```
Enter scServer Administrator Username: <Enter the Administrator
username>
Enter password for snap_creator_administrator: <Enter the password>
Confirm password for snap_creator_administrator: <Enter the password
again>

Enter JAVA Bin Path: /usr/java/default/bin
Enter Your System IP: 10.232.30.18
INFO: Updated NetApp Snap Creator Framework release-version
/install_path/scServerrelease-version/engine/etc/snapcreator.properties
INFO: Updated NetApp Snap Creator Framework release-version
/install_path/scServerrelease-version/bin/scServer

INFO: To start scServer please do the following:

/install_path/scServerrelease-version/bin/scServer start

INFO: To access NetApp Snap Creator Framework release-version GUI goto
https://hostname:gui_port
```

7. Start the Snap Creator Framework Server:

```
/install_path/scServerrelease-version/bin/scServer start
Checking Status of scServer:
Running
```

8. Validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (for

example, https://10.12.123.123:8443).

You must connect using HTTPS; otherwise, the GUI does not work.

If communication goes through a firewall, open the network port.

Related information

Installing Java on Snap Creator hosts

Downloading the Snap Creator software

Installing the Snap Creator Agent

You can install the Snap Creator Agent on Windows and UNIX hosts.

Although installing and running multiple agents on a single host is allowed, the best practice is to use a single agent per host.

If you plan to use the IBM Domino plug-in, the plug-in requires Snap Creator Agent to be installed in a location other than the Domino data folder.

Installing Snap Creator Agent on Windows

You can install Snap Creator Agent on Windows hosts by using the Windows installer.

- JRE 1.8 Update 72 or later must be installed.
- You must have administrator-level privileges.
- The default port (9090) or another network port must be available.
- Snap Creator must be downloaded.

1. Launch the Snap Creator installer by double-clicking the Snap_Creator_Frameworkrelease-Windowsversion.exe file icon (for example, Snap_Creator_Framework4.1.0-Windows64.exe).
2. On the Welcome page, click **Next** to start the installation.
3. Review and accept the terms of the license agreement.
4. On the Choose Install Type page, configure the following settings to suit various installation types:
   - **Select installation type**

     Select **Agent**.

   - **Start agent as service**

     Select this option to install and start the **snapcreatoragentservice** immediately after the installation process is complete.

     If this option is not selected, the Agent port field is disabled.

     If you do not select this option, the service is not installed, and you must manually start Snap Creator Agent by running a batch script from a command prompt.

- **Enter your system IP**

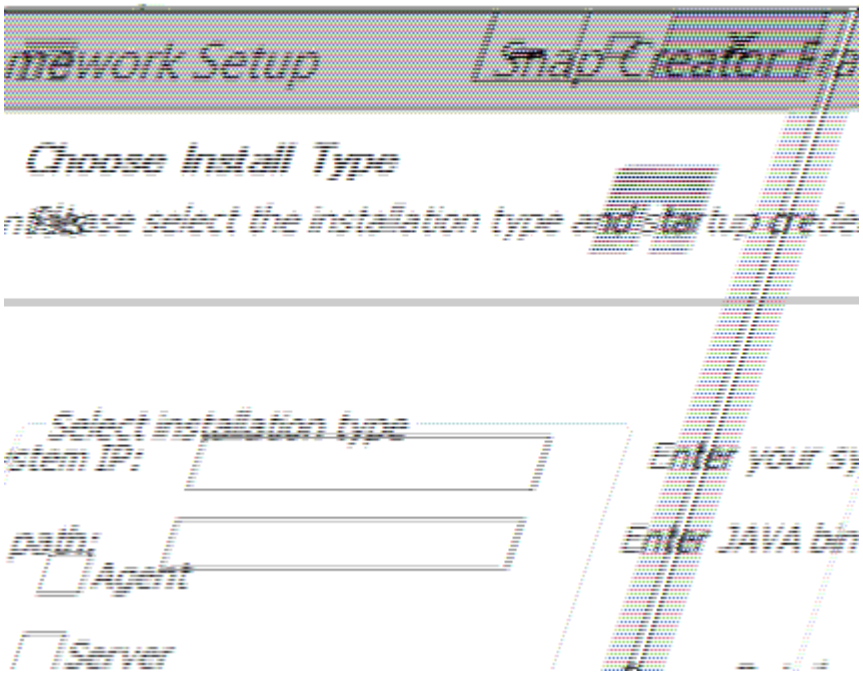
  Select this option to provide the IP address of the system on which Snap Creator Server or Snap Creator Agent is installed. This option is used for generating the SSL certificate during the Snap Creator installation process.

- **Enter JAVA bin path**

  Select this option to provide the Java bin path to locate the keytool utility. The keytool utility is used to generate an SSL certificate during the Snap Creator installation process.

- **Agent port**

  Accept the default port (9090) or specify a port number.



1. Click **Next**.
2. On the Choose Install Location page, either enter a Snap Creator installation path or accept the default path (C:\Program Files\NetApp\Snap_Creator_Framework), and then click **Next**.

   If you plan to use the IBM Domino plug-in, you must select a location other than the Domino data folder.

3. On the Choose Start Menu Folder page, either customize the folder in which Snap Creator should appear in the Windows Start Menu or accept the default folder option, and then click **Install**.
4. After the installation finishes, click **Next**.

   During the Snap Creator Agent service installation, a command prompt is displayed if a service was selected as part of the installation options. This process attempts to start existing services; therefore, it is common to see failure messages listed as part of this step, which you should ignore.

5. Click **Finish** to close the Windows installer.

If you did not select the **Start agent as service** option during the installation process, you must manually start

Snap Creator Agent.

Related information

Installing Java on Snap Creator hosts

Downloading the Snap Creator software

Starting the Agent from a command prompt

Starting the Agent from a command prompt

You can manually start the Snap Creator Agent from a command prompt by running a batch script (scAgent.bat).

Typically, you should follow this procedure only if you did not select the **Start agent as service** option during the installation process.

You can also schedule the batch script (scAgent.bat) to run at startup through the Windows task scheduler. For details about using the Windows task scheduler, see the documentation for your Windows operating system.

1. Open a command prompt and enter the following commands:

```
cd \install_path\scAgentrelease-version\bin\
scAgent.bat start
```

```
cd \Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.0\bin\
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 will quit the Snap Creator Agent. To run Snap Creator in the background, the Snap Creator Agent service should be used.

Installing the Snap Creator Agent on UNIX-based systems

The Snap Creator Agent runs on any open systems platform (AIX, HP-UX, Linux, and Solaris).

JRE 1.8 Update 72 or later must be installed. For details, see information in related links about installing Java on Snap Creator servers.

The person performing the installation must have sufficient access and privileges.

The default port for the Snap Creator Agent is 9090. Use netstat or a similar tool to verify that the network port (9090 or the port that you want to use) is available and is not already in use (for example, enter: `netstat -nap | grep 9090`).

Snap Creator should already be downloaded. For details, see information about downloading the Snap Creator software.

Linux is used here as the example platform.

1. Copy the downloaded Snap Creator tar.gz file to the location where you want to install Snap Creator Agent.

   If you plan to use the IBM Domino plug-in, select a location other than the Domino data folder.

   a. To make a subdirectory, enter the following command with the directory name:

   ```
   mkdir snap_creator_directory
   ```

   ```
   mkdir /SC_41
   ```

   b. Copy the Snap Creator tar.gz file to the newly created directory by entering the following command:

   ```
   cp NetApp_Snap_Creator_Frameworkrelease-os.tar.gz
   /snap_creator_directory
   ```

   ```
   cp NetApp_Snap_Creator_Framework4.1.0-Linux32.tar.gz
   /SC_41
   ```

2. Change to the directory to where the Snap Creator Framework .tar file is located and extract the file by entering the following commands:

   Depending on the UNIX environment, you might be required to unzip the file before entering the tar command.

   ```
   cd snap_creator_directory
   tar -xvf NetApp_Snap_Creator_Frameworkrelease-os.tar.gz
   ```

   - snap_creator_directory is the location where Snap Creator will be installed.
   - release is the current release of the Snap Creator software package.
   - os is the operating system.

   ```
   cd /sc_41
   tar -xvf NetApp_Snap_Creator_Framework4.1.0-Linux32.tar.gz
   ```

   This extracts both the Server and the Agent software. Typically, only the Snap Creator Server is configured. The agents normally reside on the database or application servers to be protected as seen in the following example:

+

```
NetApp_Snap_Creator_Framework4.1.0-Linux32.tar.gz  scServer4.1.0
scAgent4.1.0
```

3. Enter the following commands and respond to the prompts shown in the example to set up the Snap Creator Agent.

```
cd scAgent*
./snapcreator --setup
Welcome to the NetApp Snap Creator Framework release-version!
\#\#\# Installation options \#\#\#
01. NetApp Snap Creator Framework release-version Agent
Select install option (enter a number or "q" to quit): <Enter 01>

END USER LICENSE AGREEMENT
<...the EULA displays...>

Do you accept the End User License Agreement (y|n): <Enter y>

Enter Snap Creator server port [9090]: <Enter agent port>

INFO: Updated NetApp Snap Creator Framework release-version
/install_path/scAgentrelease-version/engine/etc/agent.properties


INFO: To start scAgent please do the following:

/install_path/scAgentrelease-version/bin/scAgent start
```

4. Start the Snap Creator Agent:

```
/install_path/scAgentrelease-version/bin/scAgent start
```

> To have the Snap Creator Agent run automatically at startup, add the start command to a script.

The steps to create a script differ slightly depending on the operating system used and the preferences of the system administrator managing the server. Generally, the start command for the Snap Creator Agent can be added to a file beginning with S9 (for example, S99scAgent) that is placed in the /path/to/rc2.d subdirectory. The rc2.d subdirectory is commonly located under /etc/, but this can depend on the host operating system and the particular configuration of the server. For more information, refer to the documentation of the operating system in use.

The following message appears:

```
Starting scAgent:
    Watchdog: Running
       Agent: Running
```

Related information

Installing Java on Snap Creator hosts

Downloading the Snap Creator software

Changing the Snap Creator Agent port after installation

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

The procedure for changing the Snap Creator Agent port is the same for Windows and UNIX. The following procedure uses examples from the UNIX environment.

1. Log in to the system on which the Snap Creator Agent is running, and switch to the etc subdirectory within the installation directory.

   ```
   cd /install_path/scAgent4.3.0/etc
   ```

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

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

   ```
   DEFAULT_PORT=9191
   ```

4. Save and close the agent.properties file.
5. Restart the Snap Creator Agent.

   ```
   /install_path/scAgent4.3.0/bin/scAgent restart
   ```

   If the Snap Creator Agent is running when any changes are made to the allowed_commands.config file or the agent.properties file, then the agent must be restarted.

Upgrading Snap Creator

You can upgrade to the latest version of Snap Creator from various supported versions.

If you have any questions about whether you can upgrade from releases posted on the Communities site, you can submit general questions to the NetApp Communities Forum. The NetApp Communities Forum is online at: https://communities.netapp.com/community/products_and_solutions/databases_and_enterprise_apps/snapcreator

Before upgrading to the latest version of Snap Creator, check the job monitor size for the currently installed version of Snap Creator. When you upgrade Snap Creator, you must set the job monitor size equal to or greater than the previous setting to avoid data loss in the job monitor database.

In addition, when upgrading Snap Creator, you must ensure the upgrade takes place on a host that uses the same operating system environment. For example, if you are upgrading in a Windows environment, you should make sure that when you copy backed-up data you also copy the data back to a Windows environment and not UNIX-based system.

Snap Creator does not have a downgrade (revert) option. During an upgrade process, you back up several files. It is important to keep the backed-up files until you are certain that you do not need to revert to an earlier version of Snap Creator.

Related information

Checking job monitor size

Checking job monitor size

Before upgrading to the latest version of Snap Creator, you should check the job monitor size for the currently installed version of Snap Creator.

When you upgrade Snap Creator, make sure that you set the job monitor size equal to or greater than the previous setting to avoid data loss in the job monitor database. Snap Creator retrieves jobs only up to the updated job monitor size limit.

For example, if the job monitor size is 500 in Snap Creator 4.0, make sure to set the job monitor size to a number equal to or greater than 500 when upgrading to the latest Snap Creator.

1. Check the job monitor size by performing one of the following options:
   - Open the Snap Creator Server properties files (/install_path/scServer4.1.x/engine/etc/snapcreator.properties) and check the SNAPCREATOR_JOB_MONITOR_SIZE variable.
   - From the Snap Creator GUI main menu, select **Management** > **Job Monitor** and then click **Size**.

     The Job Monitor Size dialog box is displayed with the current size in the top field.

Upgrading from releases earlier than Snap Creator 3.6

If you are upgrading from releases earlier than Snap Creator 3.6, you must first upgrade to Snap Creator 3.6 one version at a time.

For example, to upgrade from Snap Creator 3.5.x, you must first upgrade from 3.5.x to 3.6. After you are running Snap Creator 3.6, you can complete the upgrade to latest version. During this upgrade process, you can install the Snap Creator Agent at the same time as you upgrade the Snap Creator Server.

Related information

Upgrading the Snap Creator Server 3.6.x on Windows

Upgrading from Snap Creator 3.6.x

When you upgrade from Snap Creator 3.6.x, the database schema is upgraded and all the configuration file passwords are updated for compatibility with the latest Snap Creator.

Upgrading the Snap Creator Server 3.6.x on Windows

You can upgrade directly from the Snap Creator Server 3.6.x on Windows.

- If you have any Snap Create user names that contain special characters, you must have renamed those users using only alphabetic characters (a-z, A-Z) before performing the upgrade.
- You have stopped Snap Creator services (`snapcreatorserverservice` and `snapcreatoragentservice`) before backing up the Snap Creator directories to ensure that the backed up data is complete.

  For example, you can use the Services snap-in to stop the services:

  a. Select **Start** > **Run** and enter `services.msc`.
  b. Locate and select the Snap Creator service; then, stop the service. Alternatively, you can open a command prompt and enter the following commands:

```
sc stop snapcreatorserverservice
sc stop snapcreatoragentservice
```

- You have backed up the following directories and all associated subdirectories and files, within the Snap Creator 3.6.x Server directory (C:\Program Files\NetApp\NetApp_Snap_Creator_Framework\scServer3.6.x):
  - Snap Creator database (..\gui\snapcreator)
  - Profiles and configuration files (..\configs)
  - Logs (..\logs) **Note:** Do not delete the Snap Creator 3.6.x backup copies that you created.
- (Optional) If the Snap Creator Agent is installed on the same host as the Snap Creator Server, you should backup the agent.conf file (C:\Program Files\NetApp\NetApp_Snap_Creator_Framework\scServer3.6.x\config\agent.conf)

The paths provided in the following steps refer to the default installation path for Windows. Your path information might differ if the defaults were not used.

After the upgrade process is complete, consider the following issues:

- If the Snap Creator database that is upgraded contains some tasks marked a “in progress”, the state remains the same even after the upgrade process is complete.
- The default administrator in latest Snap Creator must be an administrator in Snap Creator 3.6.x. If the 3.6.x user is not an administrator, then the upgrade assigns an operator role to the 3.6.x user.

1. Stop the Snap Creator services if you have not already done so.

   For information about stopping the services, see the details provided earlier in this topic.

2. Uninstall the Snap Creator (for Windows) by selecting **Start** > **Programs** > **Snap Creator** > **Uninstall NetApp Snap Creator Framework**.

   For details, see information about uninstalling Snap Creator on Windows.

3. Install the latest Snap Creator Server.

   For details, see the information about installing the Snap Creator Server on Windows.

4. If you selected to start the Snap Creator Server as a service when you installed the latest Snap Creator Server, then stop the service.

   For information on stopping the service, see the details provided earlier in this topic.

5. Delete the latest Snap Creator Server database folder (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\snapcreator).
6. Copy the backed up Snap Creator 3.6.x database directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\snapcreator).
7. Copy the backed up Snap Creator 3.6.x profiles and configuration directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\configs).
8. Copy the backed up Snap Creator 3.6.x logs directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\logs).
9. Open a command prompt and change the directory to the engine subdirectory in the Snap Creator installation path (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine).
10. Upgrade Snap Creator by entering the following command: java -jar snapcreator.jar -upgrade

After the upgrade process is complete, start the Snap Creator Server service by doing one of the following:

- Use the Services snap-in and start the service.
- Enter the following command from a command prompt: `sc start snapcreatorserverservice`

Also, you must validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (https://IP_address:gui_port).

You must connect using HTTPS; otherwise, the connection is not automatically redirected to an HTTPS connection and the GUI will not work.

Related information

Installing the Snap Creator Server

Uninstalling Snap Creator on Windows

Upgrading the Snap Creator Server 3.6.x on UNIX-based systems

You can upgrade directly from the Snap Creator Server 3.6.x on UNIX-based systems.

- If you have any user names that contain special characters in Snap Creator, you must have renamed those

users using only alphabetic characters (a-z, A-Z) before performing the upgrade.

- You have stopped the Snap Creator processes before backing up the Snap Creator directories to ensure that the backed up data is complete.

  For example, enter the following commands:

```
/install_path/scServer3.6.x/bin/scServer stop
/install_path/scAgent3.6.x/bin/scAgent stop
```

- You have backed up the up the following directories and all associated subdirectories and files, within the Snap Creator 3.6.x Server directory (/install_path/scServer3.6.x):
  - Snap Creator database (../gui/snapcreator)
  - Profiles and configuration files (../configs)
  - Logs (../logs) **Note:** Do not delete the Snap Creator 3.6.x backup copies that you created.

The paths provided in the following steps refer to the default installation path. The path in the commands below might differ from your installation path.

After the upgrade process is complete, consider the following issues:

- If the Snap Creator database that is upgraded contains some tasks marked as “in progress”, the state remains the same even after the upgrade process is complete.
- The default administrator in the latest Snap Creator must be an administrator in Snap Creator 3.6.x. If the 3.6.x user is not an administrator, then the upgrade assigns an operator role to the 3.6.x user.

1. Stop the Snap Creator processes if you have not already done so.

   For information about stopping the processes, see the details provided earlier in this topic.

2. Install the latest Snap Creator, but do not start the Snap Creator Server service.

   For details, see information about installing the Snap Creator Server on UNIX.

3. Copy the backed up Snap Creator 3.6.x database directory to the latest database location (/install_path/scServer4.1.x/engine/snapcreator).
4. Copy the backed up Snap Creator 3.6.x profiles and configuration folder to the latest location (/install_path/scServer4.1.x/engine/configs).
5. Copy the backed up Snap Creator 3.6.x logs folder to the latest location (/install_path/scServer4.1.x/engine/logs).
6. Change directories to the engine subdirectory in the Snap Creator install path (/install_path/scServer4.1.x/engine).
7. Upgrade Snap Creator by entering the following command: java -jar snapcreator.jar -upgrade

After the upgrade process is complete, start the Snap Creator Server service by entering the following command:

/install_path/scServer4.1.x/bin/scServer start

Also, delete the Snap Creator 3.6.x install directory.

Do not delete your backup copies until you are certain you do not need to revert to an older version.

You must also validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (https://IP_address:gui_port).

You must connect using HTTPS; otherwise, the connection is not automatically redirected to an HTTPS connection and the GUI will not work.

Related information

Installing the Snap Creator Server on UNIX-based systems

Upgrading Snap Creator Agent 3.6.x on Windows

You can upgrade directly from Snap Creator Agent 3.6.x on Windows.

- You have stopped Snap Creator Agent service (`snapcreatoragentservice`) before backing up the Snap Creator Agent directories to ensure that the backed up data is complete.

  For example, you can use the Services snap-in to stop the service:

  a. Select **Start** > **Run** and enter `services.msc`.

  b. Locate and select the Snap Creator Agent service; then, stop the service. Alternatively, you can open a command prompt and enter the following command:

```
sc stop snapcreatoragentservice
```

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator Agent directory (C:\Program Files\NetApp\NetApp_Snap_Creator_Framework\scAgent3.6.x):
  - agent.conf file (..\config\agent.conf)

    If you have the Snap Creator Server installed on the same system, you might have already backed up this file when you upgraded the Snap Creator Server 3.6.x.

  - Logs directory, if enabled (..\logs)
  - Plug-ins directory (..\plugins)

Snap Creator Agent in versions prior to 4.1 used a file named agent.conf to list commands outside of Snap Creator that might be executed on Snap Creator Agent. In 4.1, the allowed_commands.config file is used.

Similarly, the agent.conf file listed hosts that the Snap Creator Agent was allowed to communicate with. By default, the Snap Creator Agent allowed communications with all Snap Creator Servers. However, if you chose to use this feature in previous versions of Snap Creator, the AUTHORIZED_HOSTS parameter in the agent.properties file now replaces that feature.

If you did not use these parameters, a simple installation of the new agent is all that is required.

The paths provided in the following steps refer to the default installation path for Windows. Path information might differ from your installation path if the defaults were not used.

1. Stop the Snap Creator Agent service if you have not already done so.

   For information about stopping the service, see the details provided earlier in this topic.

2. Uninstall Snap Creator (for Windows) by selecting **Start** > **Programs** > **Snap Creator** > **Uninstall NetApp Snap Creator Framework**.

   For details, see the information about uninstalling Snap Creator on Windows.

3. Install the latest Snap Creator Agent.

   For details, see the information about installing Snap Creator Agent on Windows.

4. Open the backed up copy of the agent.conf file in a text editor.

   Following is an example of agent.conf:

   ```
   host: scServer@Tampico
   command: sdcli.exe
   ```

5. Open the new allowed_commands.config file (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\etc\allowed_commands.config) in a text editor and copy the command line from agent.conf into the allowed_commands.config file; however, due to the enhanced security in the latest Snap Creator, make sure that the command is fully qualified.

   From the previous example, the allowed_commands.config file should contain the following:

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

   Because of the space between "`Program Files`", quotation marks must be included to encapsulate the command. If the command does not contain any spaces, then quotation marks are not needed.

   You can add commands as needed, with each command on a separate line.

6. Save and close the file.
7. Open the agent.properties file (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\etc\agent.properties) in a text editor and change the default entry of AUTHORIZED_HOSTS=* to reflect the host setting in the agent.conf file.

   From the previous example, the AUTHORIZED_HOSTS parameter should contain the following:

   ```
   AUTHORIZED_HOSTS=Tampico
   ```

   Hosts can be added as needed, using commas to separate host names. Both host names and IP addresses are supported:

```
AUTHORIZED_HOSTS=Tampico, 10.10.10.192, Fuji01
```

8. Save and close the file.
9. Start the Snap Creator Agent service by doing one of the following:
   - Use the Services snap-in and start the service.
   - From a command prompt, enter the following command: `sc start snapcreatoragentservice`

Related information

Installing Snap Creator Agent on Windows

Uninstalling Snap Creator on Windows

Upgrading the Snap Creator Agent 3.6.x on UNIX

You can upgrade directly from Snap Creator Agent 3.6.x on UNIX.

- You have stopped Snap Creator Agent before backing up the Snap Creator Agent directories to ensure that the backed up data is complete.

  For example, enter the following command:

  ```
  /install_path/scAgent3.6.x/bin/scAgent stop
  ```

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator Agent directory (/install_path/scAgent3.6.x):
  - agent.conf file (../config/agent.conf)
  - Logs directory, if enabled (../logs)
  - Plug-ins directory (../plugins)

The Snap Creator Agent in versions prior to 4.1 used a file named agent.conf to list commands outside of Snap Creator that could be executed on a Snap Creator Agent. In 4.1, the allowed_commands.config file is used.

Similarly, the agent.conf file listed hosts that the Snap Creator Agent was allowed to communicate with. By default, the Snap Creator Agent allowed communications with all Snap Creator Servers. However, if you chose to use this feature in previous versions of Snap Creator, the AUTHORIZED_HOSTS parameter in the agent.properties file now replaces that feature.

If you did not use these parameters, a simple installation of the new agent is all that is required.

The paths provided in the following steps refer to the default installation path. The paths in the commands below might differ from those in your installation path.

1. Stop Snap Creator Agent if you have not already done so.

   For information, see the details provided earlier in this topic.

2. Install the latest Snap Creator Agent, but do not start the Snap Creator Agent.

For details, see the information about installing Snap Creator Agent on UNIX.

3. Open the backed up copy of the agent.conf file in a text editor.

   The following is an example of agent.conf:

   ```
   host: scServer@Lyon
   command: rc_domino
   ```

4. Open the new allowed_commands.config file (/install_path/scAgent4.1.x/etc/allowed_commands.config) in a text editor and copy the command line from agent.conf into the allowed_commands.config file; however, due to the enhanced security in the latest Snap Creator, make sure that the command is fully qualified.

   From the previous example, the allowed_commands.config file should contain the following:

   ```
   command: /etc/init.d/rc_domino
   ```

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

   You can add commands as needed, with each command on a separate line.

   Save and close the file after making changes.

5. Open the agent.properties file (/install_path/scAgent4.1.x/etc/agent.properties) in a text editor and change the default entry of AUTHORIZED_HOSTS=* to reflect the host setting in the agent.conf file, then save and close the file.

   From the previous example, the AUTHORIZED_HOSTS parameter should contain the following:

   ```
   AUTHORIZED_HOSTS=Lyon
   ```

   Hosts can be added as needed, using commas to separate host names. Both host names and IP addresses are supported:

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

6. Start Snap Creator Agent by entering the following command:

   ```
   /install_path/scAgent4.1.x/bin/scAgent start
   ```

Related information

Installing the Snap Creator Agent on UNIX-based systems

Upgrading from Snap Creator 4.0.x

When you upgrade from Snap Creator 4.0.x, the database schema is upgraded.

Upgrading Snap Creator Server 4.0.x on Windows

You can upgrade directly from Snap Creator Server 4.0.x on Windows.

- If you have any user names that contain special characters in Snap Creator, you must have renamed those users using only alphabetic characters (a through z and A through Z).
- You must have stopped Snap Creator services (`snapcreatorserverservice` and `snapcreatoragentservice`) before backing up the Snap Creator directories to ensure that the backed up data is complete.

  For example, you can use the Services snap-in to stop the services:

  a. Select **Start** > **Run** and enter `services.msc`.
  b. Locate and select the Snap Creator service; then, stop the service. Alternatively, you can open a command prompt and enter the following commands:

```
sc stop snapcreatorserverservice
sc stop snapcreatoragentservice
```

- You must have backed up the following directories, and all associated subdirectories and files, must have been backed up within the Snap Creator 4.0.x Server engine subdirectory (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.0.x\engine):
  - Snap Creator database (..\snapcreator)
  - Snap Creator Server properties (..\etc)
  - Profiles and configuration (..\configs)
  - Logs (..\logs) **Note:** You must not have deleted the Snap Creator 4.0.x backup copies that you created.
- (Optional) If the Snap Creator Agent is installed on the same host as the Snap Creator Server, you should have already backed up the agent.conf file (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.0.x\config\agent.conf).

The paths provided in the following steps refer to the default installation path for Windows. Path information might differ from your installation path if the defaults were not used.

After the upgrade process is complete, consider the following issues:

- If the Snap Creator database that is upgraded contains some tasks marked as “in progress”, the state remains the same even after the upgrade process is complete.
- The default administrator in the latest Snap Creator must be an administrator in Snap Creator 4.0.x. If the 4.0.x user is not an administrator, then the upgrade assigns an operator role to the 4.0.x user.

  1. Stop the Snap Creator services if you have not already done so.

     For information about stopping the services, see the details provided earlier in this topic.

  2. Uninstall Snap Creator (for Windows) by selecting **Start** > **Programs** > **Snap Creator** > **Uninstall NetApp Snap Creator Framework**.

For details, see the information about uninstalling Snap Creator on Windows.

3. Install the latest Snap Creator Server.

   For details, see the information about installing the Snap Creator Server on Windows.

4. If you selected to start the Snap Creator Server as a service when you installed the latest Snap Creator Server, then stop the service.

   For information about stopping the service, see the details provided earlier in this topic.

5. Delete the latest Snap Creator Server database folder (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\snapcreator).
6. Copy the backed up Snap Creator 4.0.x database directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\snapcreator).
7. Copy the backed up Snap Creator 4.0.x profiles and configuration directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\configs).
8. Copy the backed up Snap Creator 4.0.x logs directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\logs).
9. Open a command prompt and change the directory to the engine subdirectory in the Snap Creator install path (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine).
10. Upgrade Snap Creator by entering the following command: java -jar snapcreator.jar -upgrade

After the upgrade process is complete, start the Snap Creator Server service by doing one of the following:

- Use the Services snap-in and start the service.
- From a command prompt, enter the following command: `sc start snapcreatorserverservice`

Also, you must validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (https://IP_address:gui_port).

You must connect using HTTPS; otherwise, the connection is not automatically redirected to an HTTPS connection and the GUI will not work.

Related information

Installing the Snap Creator Server

Uninstalling Snap Creator on Windows

Upgrading Snap Creator Server 4.0.x on UNIX-based systems

You can upgrade directly from Snap Creator Server 4.0.x on UNIX-based systems.

- If you have any user names that contain special characters in Snap Creator, you must have renamed those users using only alphabetic characters (a through z or A through Z).
- You have stopped the Snap Creator processes before backing up the Snap Creator directories to ensure that the backed up data is complete.

  For example, enter the following commands:

```
/install_path/scServer4.0.x/bin/scServer stop
/install_path/scAgent4.0.x/bin/scAgent stop
```

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator 4.0.x Server engine subdirectory (/install_path/scServer4.0.x/engine):
  - Snap Creator database (../snapcreator)
  - Snap Creator Server properties (../etc)
  - Profiles and configuration (../configs)
  - Logs (../logs) **Note:** You must not have deleted the Snap Creator 4.0.x backup copies that you created.

The paths provided in the following steps refer to the default installation path. The paths in the commands below might differ from your installation path.

After the upgrade process is complete, you should consider the following issues:

- If the Snap Creator database that is upgraded contains some tasks marked as "in progress," then the state remains the same even after the upgrade process is complete.
- The default administrator in the latest Snap Creator must be an administrator in Snap Creator 4.0.x. If the 4.0.x user is not an administrator, then the upgrade assigns an operator role to the 4.0.x user.

1. Stop the Snap Creator processes if you have not already done so.

   For information about stopping the processes, see the details provided earlier in this topic.

2. Install the latest Snap Creator, but do not start the Snap Creator Server service.

   For details, see information about installing the Snap Creator Server on UNIX.

3. Copy the backed up Snap Creator 4.0.x database directory to the latest location (/install_path/scServer4.1.x/engine/snapcreator).
4. Copy the backed up 4.0.x profiles and configuration directory to the latest location (/install_path/scServer4.1.x/engine/configs).
5. Copy the backed up 4.0.x logs directory to the latest location (/install_path/scServer4.1.x/engine/logs).
6. Change directories to the engine subdirectory in the Snap Creator install path (/install_path/scServer4.1.x/engine).
7. Upgrade Snap Creator by entering the following command: java -jar snapcreator.jar -upgrade

After the upgrade process is complete, start the Snap Creator Server service by entering the following command:

/install_path/scServer4.1.x/bin/scServer start

Also, delete the Snap Creator 4.0 installation directory.

Do not delete your backup copies until you are certain that you do not need to revert to an older version.

You must also validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (https://IP_address:gui_port).

You must connect using HTTPS; otherwise, the connection is not automatically redirected to an HTTPS connection and the GUI will not work.

Related information

Installing the Snap Creator Server on UNIX-based systems

Upgrading Snap Creator Agent 4.0.x on Windows

You can upgrade directly from Snap Creator Agent 4.0.x on Windows.

- You have stopped Snap Creator Agent service (`snapcreatoragentservice`) before backing up the Snap Creator Agent directories to ensure that the backed up data is complete.

  For example, you can use the Services snap-in to stop the service:

  a. Select **Start** > **Run** and enter `services.msc`.

  b. Locate and select the Snap Creator Agent service; then, stop the service. Alternatively, you can open a command prompt and enter the following command:

```
sc stop snapcreatoragentservice
```

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator Agent directory (C:\Program Files\NetApp\NetApp_Snap_Creator_Framework\scAgent4.0.x):
  - agent.conf file (..\config\agent.conf)

    If you have Snap Creator Server installed on the same system, you might have already backed up this file when you upgraded Snap Creator Server 4.0.x.

  - Logs directory, if enabled (..\logs)
  - Plug-ins directory (..\plugins)

Snap Creator Agent in versions prior to 4.1 used a file named agent.conf to list commands outside of Snap Creator that might be executed on Snap Creator Agent. In 4.1, the allowed_commands.config file is used.

Similarly, the agent.conf file listed hosts that Snap Creator Agent was allowed to communicate with. By default, Snap Creator Agent allowed communications with all Snap Creator Servers. However, if you chose to use this feature in previous versions of Snap Creator, the AUTHORIZED_HOSTS parameter in the agent.properties file now replaces that feature.

If you did not use these parameters, a simple installation of the new agent is all that is required.

The paths provided in the following steps refer to the default installation path for Windows. Path information might differ from your install path if the defaults were not used.

1. Stop the Snap Creator Agent service if you have not already done so.

   For information about stopping the service, see the details provided earlier in this topic.

2. Uninstall Snap Creator (for Windows) by selecting **Start** > **Programs** > **Snap Creator** > **Uninstall NetApp Snap Creator Framework**.

For details, see information about uninstalling Snap Creator on Windows.

3. Install the latest Snap Creator Agent.

   For details, see the information about installing the Snap Creator Agent on Windows.

4. Open the backed up copy of the agent.conf file in a text editor.

   Following is an example of agent.conf:

   ```
   host: scServer@Tampico
   command: sdcli.exe
   ```

5. Open the new allowed_commands.config file (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\etc\allowed_commands.config) in a text editor and copy the command line from agent.conf into the allowed_commands.config file; however, due to the enhanced security in the latest Snap Creator, make sure that the command is fully qualified.

   From the previous example, the allowed_commands.config file should contain the following:

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

   > Because of the space between "`Program Files`", quotation marks must be included to encapsulate the command. If the command does not contain any spaces, then quotation marks are not needed.

   You can add commands as needed, with each command on a separate line.

6. Save and close the file.
7. Open the agent.properties file (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\etc\agent.properties) in a text editor and change the default entry of AUTHORIZED_HOSTS=* to reflect the host setting in the agent.conf file.

   From the previous example, the AUTHORIZED_HOSTS parameter should contain the following:

   ```
   AUTHORIZED_HOSTS=Tampico
   ```

   Hosts can be added as needed, using commas to separate host names. Both host names and IP addresses are supported:

   ```
   AUTHORIZED_HOSTS=Tampico, 10.10.10.192, Fuji01
   ```

8. Save and close the file.
9. Start the Snap Creator Agent service by doing one of the following:
   - Use the Services snap-in and start the service.

- From a command prompt, enter the following command: `sc start snapcreatoragentservice`
  Note: Any changes to the allowed_commands.config or agent.properties files require restarting Snap Creator Agent if it is running when the changes are made.

Related information

Installing Snap Creator Agent on Windows

Uninstalling Snap Creator on Windows

Upgrading the Snap Creator Agent 4.0.x on UNIX

You can upgrade directly from Snap Creator Agent 4.0.x on UNIX.

- You have stopped Snap Creator Agent before backing up the Snap Creator Agent directories to ensure that the backed up data is complete.

  For example, enter the following command:

  ```
  /install_path/scAgent4.0.x/bin/scAgent stop
  ```

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator Agent directory (/install_path/scAgent4.0.x):
  - agent.conf file (../config/agent.conf)
  - Logs directory, if enabled (../logs)
  - Plug-ins directory (../plugins)

Snap Creator Agent in versions prior to 4.1 used a file named agent.conf to list commands outside of Snap Creator that might be executed on Snap Creator Agent. In 4.1, the allowed_commands.config file is used.

Similarly, the agent.conf file listed hosts that Snap Creator Agent was allowed to communicate with. By default, Snap Creator Agent allowed communications with all Snap Creator Servers. However, if you chose to use this feature in previous versions of Snap Creator, the AUTHORIZED_HOSTS parameter in the agent.properties file replaces that feature.

If you did not use these parameters, a simple installation of the new agent is all that is required.

The paths provided in the following steps refer to the default installation path. The paths in the commands below might differ from your installation path.

1. Stop Snap Creator Agent if you have not already done so.

   For information, see the details provided earlier in this topic.

2. Install the latest Snap Creator Agent, but do not start the Snap Creator Agent.

   For details, see the information about installing Snap Creator Agent on UNIX.

3. Open the backed up copy of the agent.conf file in a text editor.

   The following is an example of the agent.conf file:

```
host: scServer@Lyon
command: rc_domino
```

4. Open the new allowed_commands.config file (/install_path/scAgent4.1.x/etc/allowed_commands.config) in a text editor and copy the command line from agent.conf to the allowed_commands.config file; however, due to the enhanced security in the latest Snap Creator, make sure that the command is fully qualified.

   From the previous example, the allowed_commands.config file should contain the following:

   ```
   command: /etc/init.d/rc_domino
   ```

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

   You can add commands as needed, with each command on a separate line.

   Save and close the file after making changes.

5. Open the agent.properties file (/install_path/scAgent4.1.x/etc/agent.properties) in a text editor and change the default entry of AUTHORIZED_HOSTS=* to reflect the host setting in the agent.conf file.

   From the previous example, the AUTHORIZED_HOSTS parameter should contain the following:

   ```
   AUTHORIZED_HOSTS=Lyon
   ```

   Hosts can be added as needed, using commas to separate host names. Both host names and IP addresses are supported:

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

   Save and close the file after making changes.

6. Start Snap Creator Agent by entering the following command:

   ```
   /install_path/scAgent4.1.x/bin/scAgent start
   ```

   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.

Related information

Installing the Snap Creator Agent on UNIX-based systems

Upgrading from Snap Creator 4.1.x

You can upgrade from Snap Creator 4.1.x, including all currently available patch levels.

Upgrading Snap Creator Server 4.1.x on Windows

You can upgrade from Snap Creator Server 4.1.x on Windows.

- You must have stopped Snap Creator services (`snapcreatorserverservice` and `snapcreatoragentservice`) before backing up the Snap Creator directories to ensure that the backed up data is complete.

  For example, you can use the Services snap-in to stop the services:

  a. Select **Start** > **Run** and enter `services.msc`.

  b. Locate and select the Snap Creator service and then stop the service. Alternatively, you can open a command prompt and enter the following commands:

```
sc stop snapcreatorserverservice
sc stop snapcreatoragentservice
```

- You must have backed up the following directories, and all associated subdirectories and files, within the Snap Creator 4.1.x Server engine subdirectory (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine):
  - Snap Creator database (..\snapcreator)
  - Snap Creator Server properties (..\etc)
  - Configuration files (..\configs)
  - Logs (..\logs)
  - Plug-in repository, if enabled (..\snapcreatorPlugin)
- (Optional) If the Snap Creator Agent is installed on the same host as the Snap Creator Server, you should back up the following directories and all associated subdirectories and files within the Snap Creator Agent directory (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x):
  - Snap Creator Agent properties (..\etc), which contains the allowed_commands.config and agent.properties files
  - Logs (..\logs)
  - Plug-ins (..\plugins)
- If Snap Creator was manually started from a command prompt, you must close the command prompt and stop it.

> If Snap Creator was started from a service, the uninstaller stops the service as part of the uninstall process.

The paths provided in the following steps refer to the default installation path for Windows. Path information might differ from your installation path if the defaults were not used.

After the upgrade process is complete, consider the following issues:

- If the Snap Creator database that is upgraded contains some tasks marked as “in progress”, the state remains the same even after the upgrade process is complete.
- The default administrator in the latest Snap Creator must be an administrator in Snap Creator 4.1.

  If the 4.1.x user is not an administrator, then the upgrade assigns an operator role to the 4.1.x user.

1. Stop the Snap Creator services if you have not already done so.

   For information about stopping the services, refer to the details provided earlier in this topic.

2. Uninstall Snap Creator (for Windows) by selecting **Start** > **Programs** > **Snap Creator** > **Uninstall NetApp Snap Creator Framework**.

   For details, see the information about uninstalling Snap Creator on Windows.

3. Install the latest Snap Creator Server.

   For details, see the information about installing the Snap Creator Server on Windows.

4. If you chose to start the Snap Creator Server as a service when you installed the latest Snap Creator Server, then stop the service.

   For information about stopping the service, refer to the details provided earlier in this topic.

5. Delete the latest Snap Creator Server database folder at C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\snapcreator).
6. Copy the backed-up Snap Creator 4.1 database directory to the latest location at C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\snapcreator).
7. Copy the backed-up Snap Creator 4.1 configuration directory to the latest location at C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\configs).
8. Copy the backed-up Snap Creator 4.1 logs directory to the latest location at C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\logs).
9. Open a command prompt and change the directory to the engine subdirectory in the Snap Creator install path at C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine).
10. Upgrade Snap Creator by entering the following command: java -jar snapcreator.jar -upgrade

After the upgrade process is complete, start the Snap Creator Server service by doing one of the following:

- Use the Services snap-in and start the service.
- From a command prompt, enter the following command:

```
sc start snapcreatorserverservice
```

Also, you must validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (https://IP_address:gui_port).

You must connect using HTTPS; otherwise, the connection is not automatically redirected to an HTTPS connection and the GUI will not work.

Upgrading Snap Creator Server 4.1.x on UNIX-based systems

You can upgrade from Snap Creator Server 4.1.x on UNIX-based systems.

- You have stopped the Snap Creator processes before backing up the Snap Creator directories to ensure that the backed-up data is complete.

  For example, enter the following commands:

  ```
  /install_path/scServer4.1.0/bin/scServer stop
  /install_path/scAgent4.1.0/bin/scAgent stop
  ```

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator 4.1.x Server engine subdirectory (/install_path/scServer4.1.x/engine):
  - Snap Creator database (../snapcreator)
  - Snap Creator Server properties (../etc)
  - Configuration files (../configs)
  - Logs (../logs)
  - Plug-in repository, if enabled (../snapcreatorPlugin) **Note:** You must not delete the Snap Creator 4.1.x backup copies that you created.

The paths provided in the following steps refer to the default installation path. Path information might differ from your installation path if the defaults were not used.

After the upgrade process is complete, you should consider the following issues:

- If the Snap Creator database that is upgraded contains some tasks marked as “in progress”, the state remains the same even after the upgrade process is complete.
- The default administrator in the latest Snap Creator must be an administrator in Snap Creator 4.1.x.

  If the 4.1.x user is not an administrator, then the upgrade assigns an operator role to the 4.1.x user.

1. Stop the Snap Creator processes if you have not already done so.

   For information about stopping the processes, refer to the details provided earlier in this topic.

2. Install the latest version of Snap Creator, but do not start Snap Creator Server.

   For details, see the information about installing Snap Creator Server on UNIX.

3. Copy the backed-up Snap Creator 4.1.x database directory to the latest location at /install_path/scServer4.1.x/engine/snapcreator.
4. Copy the backed-up 4.1.x configuration directory to the latest location at /install_path/scServer4.1.x/engine/configs).
5. Copy the backed-up 4.1.x logs directory to the latest location at /install_path/scServer4.1.x/engine/logs.
6. Change directories to the engine subdirectory in the Snap Creator install path at /install_path/scServer4.1.x/engine.
7. Upgrade Snap Creator by entering the following command: java -jar snapcreator.jar -upgrade

After the upgrade process is complete, start Snap Creator Server by entering the following command:

```
/install_path/scServer4.1.x/bin/scServer start
```

Also, delete the Snap Creator 4.1.x installation directory.

> Do not delete your backup copies until you are certain that you do not need to revert to an older version.

You must also validate the Snap Creator Framework GUI startup by navigating to the local host on the specified port (https://IP_address:gui_port).

You must connect using HTTPS; otherwise, the connection is not automatically redirected to an HTTPS connection and the GUI will not work.

Upgrading Snap Creator Agent 4.1.x on Windows

You can upgrade from Snap Creator Agent 4.1.x on Windows.

- You have stopped Snap Creator Agent service (`snapcreatoragentservice`) before backing up the Snap Creator Agent directories to ensure that the backed up data is complete.

  For example, you can use the Services snap-in to stop the service:

  a. Select **Start** > **Run** and enter `services.msc`.

  b. Locate and select the Snap Creator Agent service; then, stop the service. Alternatively, you can open a command prompt and enter the following command:

  ```
  sc stop snapcreatoragentservice
  ```

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator Agent directory (C:\Program Files\NetApp\NetApp_Snap_Creator_Framework\scAgent4.1.x):
  - Snap Creator Agent properties (..\etc), which contains the allowed_commands.config and agent.properties files
  - Logs (..\logs)
  - Plug-ins (..\plugins) **Note:** Do not delete the Snap Creator 4.1.x backup copies that you created.

The paths provided in the following steps refer to the default installation path for Windows. Path information might differ from your installation path if the defaults were not used.

1. Stop the Snap Creator Agent service if you have not already done so.

   For information about stopping the service, refer to the details provided earlier in this topic.

2. Uninstall Snap Creator (for Windows) by selecting **Start** > **Programs** > **Snap Creator** > **Uninstall NetApp Snap Creator Framework**.

   For details, see the information about uninstalling Snap Creator on Windows.

3. Install the latest Snap Creator Agent.

   For details, see the information about installing the Snap Creator Agent on Windows.

4. If you chose to start the Snap Creator Agent as a service when you installed the latest Snap Creator Server, then stop the service.

   For information about stopping the service, refer to the details provided earlier in this topic.

5. Copy the backed-up Snap Creator 4.1.x logs directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\logs).
6. Copy the backed-up Snap Creator 4.1.x plug-ins directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\plugins).
7. Copy the backed-up Snap Creator 4.1.x agent properties directory to the latest location (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\etc).
8. Start the Snap Creator Agent service by doing one of the following:
   - Use the Services snap-in and start the service.
   - Enter the following at the command prompt:

     ```
     sc start snapcreatoragentservice
     ```

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

Upgrading Snap Creator Agent 4.1.x on UNIX-based systems

You can upgrade from Snap Creator Agent 4.1.x on UNIX-based systems.

- You have stopped Snap Creator Agent before backing up the Snap Creator Agent directories to ensure that the backed-up data is complete.

  For example, enter the following command:

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

- You have backed up the following directories, and all associated subdirectories and files, within the Snap Creator Agent directory (/install_path/scAgent4.1.x):
  - Snap Creator Agent properties (../etc), which contains the allowed_commands.config and agent.properties files
  - Logs (../logs)
  - Plug-ins (../plugins) **Note:** Do not delete the Snap Creator 4.1.x backup copies that you created.

The paths provided in the following steps refer to the default installation path. Path information might differ from your installation path if the defaults were not used.

1. Stop Snap Creator Agent if you have not already done so.

For information, refer to the details provided earlier in this topic.

2. Install the latest Snap Creator Agent, but do not start the Snap Creator Agent.

   For details, see the information about installing Snap Creator Agent on UNIX.

3. Copy the backed-up Snap Creator 4.1.x logs directory to the latest location at /install_path/scAgent4.1.x/logs).
4. Copy the backed-up Snap Creator 4.1.x plug-ins directory to the latest location at /install_path/scAgent4.1.x/plugins).
5. Copy the backed-up Snap Creator 4.1.x agent properties directory to the latest location at /install_path/scAgent4.1.x/etc).
6. Start Snap Creator Agent by entering the following command:

```
/install_path/scAgent4.1.x/bin/scAgent start
```

Any changes to the allowed_commands.config or agent.properties files require you to restart the Snap Creator Agent if it is running when the changes are made.

Upgrading from Snap Creator 4.3.x

You can upgrade from Snap Creator 4.3.x, including all currently available patch releases.

The upgrade procedure is the same for Snap Creator Framework 4.1.x and 4.3.x.

If you upgrade Snap Creator Framework 4.3.1 to a 4.3.1 patch release, you must omit the final step of running the java -jar snapcreator.jar -upgrade command.

Uninstalling Snap Creator

You can uninstall Snap Creator from your Windows and UNIX systems.

Uninstalling Snap Creator on Windows

You can uninstall Snap Creator using the Windows **Start** menu. The Windows uninstaller removes the Snap Creator components that are installed (for example, if both the Snap Creator Server and Snap Creator Agent are installed, both will be uninstalled). Similarly, if only one of the components is installed, that component will be uninstalled.

- Back up the following directories and all associated subdirectories and files, within the Snap Creator Server engine directory (C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.0\engine):
  - Snap Creator database (..\snapcreator)
  - Snap Creator Server properties (..\etc)
  - Configuration files (..\configs)
  - Logs (..\logs)

    - Plug-in repository, if enabled (..\snapcreatorPlugin)
- Back up the following directories and all associated subdirectories and files within the Snap Creator Agent directory (C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.0):
    - Logs (..\logs)
    - Plug-ins (..\plugins)
    - Snap Creator Agent properties (..\etc), which contains the allowed_commands.config and agent.properties files
- If Snap Creator was manually started from a command prompt, stop and quit Snap Creator by closing the command prompt.

> If Snap Creator was started from a service, the uninstaller stops the service as part of the uninstall process.

1. Select **Start** > **All programs** > **Snap Creator** > **Uninstall NetApp Snap Creator Framework**.
2. Click **Yes** when you are prompted as to whether you backed up the log and configurations files before uninstalling Snap Creator.
3. Click **Close** when prompted after the uninstall process is complete.

Uninstalling Snap Creator on UNIX

When uninstalling Snap Creator on UNIX, first uninstall the Snap Creator Agent, then uninstall the Snap Creator Server.

Uninstalling Snap Creator Agent on UNIX

You can uninstall Snap Creator Agent from UNIX by deleting the Snap Creator Agent installation folder.

Back up the following directories, and all associated subdirectories and files, within the Snap Creator Agent directory (/install_path/scAgent4.1.0):

- Logs (../logs)
- Plug-ins (../plugins)
- Snap Creator Agent properties (../etc), which contains the allowed_commands.config and agent.properties files

To uninstall the Snap Creator Agent, perform the following steps.

> The paths provided in the following steps refer to the generic installation path. You can modify the path in these commands to reflect the customized Snap Creator Agent installation path.

1. Stop the Snap Creator Agent by using the following script:

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

2. Delete the Snap Creator Agent installation folder.

For example, on a Linux system, run the following command:

```
rm -Rf /install_path/scAgent4.1.0
```

Uninstalling Snap Creator Server on UNIX

You can uninstall Snap Creator Server from UNIX by deleting the Snap Creator Server installation folder.

Back up the following directories, and all associated subdirectories and files, within the Snap Creator Server engine directory (/install_path/scServer4.1.0/engine):

- Snap Creator database (../snapcreator)
- Snap Creator Server properties (../etc)
- Configuration (../configs)
- Logs (../logs)
- Plug-in repository, if enabled (../snapcreatorPlugin)

> Make sure you back up these directories; otherwise, you will lose the user data and it will not be recoverable.

To uninstall the Snap Creator Server, perform the following steps.

> The paths provided in the following steps refer to the generic installation path. You can modify the path in these commands to reflect the customized Snap Creator Server installation path.

1. Stop the Snap Creator Server service (`snapcreatorserverservice`) by using the following script:

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

2. Delete the Snap Creator Server installation folder.

   For example, for a Linux system, run the following command:

   ```
   rm -Rf /install_path/scServer4.1.0
   ```

CLI reference

This section contains reference information for using Snap Creator from the command line interface.

CLI commands for creating a role for a Snap Creator user in clustered Data ONTAP

While creating a Snap Creator user in clustered Data ONTAP, you must create a role for a new cluster user or SVM user by running various commands.

CLI commands for creating cluster roles

The following table lists the commands that are required to create a role for a new cluster user.

Command directory name	Command to be run
cluster identity show	role create -role CRBAC_New -cmddirname "cluster identity show" -vserver clus3240rre
event	role create -role CRBAC_New -cmddirname "event" -vserver clus3240rre
event config	role create -role CRBAC_New -cmddirname "event config" -vserver clus3240rre
event destination	role create -role CRBAC_New -cmddirname "event destination" -vserver clus3240rre
event log	role create -role CRBAC_New -cmddirname "event log" -vserver clus3240rre
event mailhistory	role create -role CRBAC_New -cmddirname "event mailhistory" -vserver clus3240rre
event route	role create -role CRBAC_New -cmddirname "event route" -vserver clus3240rre
event snmphistory	role create -role CRBAC_New -cmddirname "event snmphistory" -vserver clus3240rre
event status	role create -role CRBAC_New -cmddirname "event status" -vserver clus3240rre
lun comment	role create -role CRBAC_New -cmddirname "lun comment" -vserver clus3240rre
lun create	role create -role CRBAC_New -cmddirname "lun create" -vserver clus3240rre
lun delete	role create -role CRBAC_New -cmddirname "lun delete" -vserver clus3240rre

Command directory name	Command to be run
lun geometry	role create -role CRBAC_New -cmddirname "lun geometry" -vserver clus3240rre
lun igroup add	role create -role CRBAC_New -cmddirname "lun igroup add" -vserver clus3240rre
lun igroup create	role create -role CRBAC_New -cmddirname "lun igroup create" -vserver clus3240rre
lun igroup set	role create -role CRBAC_New -cmddirname "lun igroup set" -vserver clus3240rre
lun igroup show	role create -role CRBAC_New -cmddirname "lun igroup show" -vserver clus3240rre
lun map	role create -role CRBAC_New -cmddirname "lun map" -vserver clus3240rre
lun mapping show	role create -role CRBAC_New -cmddirname "lun mapping show" -vserver clus3240rre
lun modify	role create -role CRBAC_New -cmddirname "lun modify" -vserver clus3240rre
lun move	role create -role CRBAC_New -cmddirname "lun move" -vserver clus3240rre
lun offline	role create -role CRBAC_New -cmddirname "lun offline" -vserver clus3240rre
lun online	role create -role CRBAC_New -cmddirname "lun online" -vserver clus3240rre
lun resize	role create -role CRBAC_New -cmddirname "lun resize" -vserver clus3240rre
lun show	role create -role CRBAC_New -cmddirname "lun show" -vserver clus3240rre
lun unmap	role create -role CRBAC_New -cmddirname "lun unmap" -vserver clus3240rre
network	role create -role CRBAC_New -cmddirname "network" -vserver clus3240rre

Command directory name	Command to be run
network fcp adapter show	role create -role CRBAC_New -cmddirname "network fcp adapter show" -vserver clus3240rre
network interface show	role create -role CRBAC_New -cmddirname "network interface show" -vserver clus3240rre
security login role show	role create -role CRBAC_New -cmddirname "security login role show" -vserver clus3240rre
security login show	role create -role CRBAC_New -cmddirname "security login show" -vserver clus3240rre
snapmirror	role create -role CRBAC_New -cmddirname "snapmirror" -vserver clus3240rre
storage aggregate	role create -role CRBAC_New -cmddirname "storage aggregate" -vserver clus3240rre
system license show	role create -role CRBAC_New -cmddirname "system license show" -vserver clus3240rre
system node	role create -role CRBAC_New -cmddirname "system node" -vserver clus3240rre
system node autosupport	role create -role CRBAC_New -cmddirname "system node autosupport" -vserver clus3240rre
system node autosupport invoke	role create -role CRBAC_New -cmddirname "system node autosupport invoke" -vserver clus3240rre
system node show	role create -role CRBAC_New -cmddirname "system node show" -vserver clus3240rre
system node run	role create -role CRBAC_New -cmddirname "system node run" -vserver clus3240rre
system services ndmp	role create -role CRBAC_New -cmddirname "system services ndmp" -vserver clus3240rre
version	role create -role CRBAC_New -cmddirname "version" -vserver clus3240rre
version	security login role create -role bainew1 -vserver SnapCreator -cmddirname "version" -access readonly

Command directory name	Command to be run
vserver export-policy rule create	role create -role CRBAC_New -cmddirname "vserver export-policy rule create" -vserver clus3240rre
vserver export-policy rule show	role create -role CRBAC_New -cmddirname "vserver export-policy rule show" -vserver clus3240rre
vserver export-policy show	role create -role CRBAC_New -cmddirname "vserver export-policy show" -vserver clus3240rre
vserver fcp	role create -role CRBAC_New -cmddirname "vserver fcp" -vserver Snapcreator -vserver clus3240rre
vserver fcp initiator show	role create -role CRBAC_New -cmddirname "vserver fcp initiator show" -vserver clus3240rre
vserver fcp show	role create -role CRBAC_New -cmddirname "vserver fcp show" -vserver clus3240rre
vserver fcp status	role create -role CRBAC_New -cmddirname "vserver fcp status" -vserver clus3240rre
vserver iscsi connection show	role create -role CRBAC_New -cmddirname "vserver iscsi connection show" -vserver clus3240rre
vserver iscsi	role create -role CRBAC_New -cmddirname "vserver iscsi" -vserver Snapcreator -vserver clus3240rre
vserver iscsi interface accesslist add	role create -role CRBAC_New -cmddirname "vserver iscsi interface accesslist add" -vserver clus3240rre
vserver iscsi interface accesslist show	role create -role CRBAC_New -cmddirname "vserver iscsi interface accesslist show" -vserver clus3240rre
vserver iscsi nodename	role create -role CRBAC_New -cmddirname "vserver iscsi nodename" -vserver clus3240rre
vserver iscsi session show	role create -role CRBAC_New -cmddirname "vserver iscsi session" show -vserver clus3240rre
vserver iscsi show	role create -role CRBAC_New -cmddirname "vserver iscsi show" -vserver clus3240rre
vserver iscsi status	role create -role CRBAC_New -cmddirname "vserver iscsi status" -vserver clus3240rre

Command directory name	Command to be run
vserver nfs	role create -role CRBAC_New -cmddirname "vserver nfs" -vserver Snapcreator -vserver clus3240rre
vserver nfs status	role create -role CRBAC_New -cmddirname "vserver nfs status" -vserver clus3240rre
vserver options	role create -role CRBAC_New -cmddirname "vserver options" -vserver clus3240rre
vserver services unix-group create	role create -role CRBAC_New -cmddirname "vserver services name-service unix-group create" -vserver clus3240rre
vserver services unix-user create	role create -role CRBAC_New -cmddirname "vserver services name-service unix-user create" -vserver clus3240rre
vserver services unix-group show	role create -role CRBAC_New -cmddirname "vserver services name-service unix-group show" -vserver clus3240rre
vserver services unix-user show	role create -role CRBAC_New -cmddirname "vserver services name-service unix-user show" -vserver clus3240rre
vserver show	role create -role CRBAC_New -cmddirname "vserver show" -vserver clus3240rre
volume autosize	role create -role CRBAC_New -cmddirname "volume autosize" -vserver clus3240rre
volume clone create	role create -role CRBAC_New -cmddirname "volume clone create" -vserver clus3240rre
volume create	role create -role CRBAC_New -cmddirname "volume create" -vserver clus3240rre
volume destroy	role create -role CRBAC_New -cmddirname "volume destroy" -vserver clus3240rre
volume efficiency off	role create -role CRBAC_New -cmddirname "volume efficiency off" -vserver clus3240rre
volume efficiency on	role create -role CRBAC_New -cmddirname "volume efficiency on" -vserver clus3240rre

Command directory name	Command to be run
volume efficiency show	role create -role CRBAC_New -cmddirname "volume efficiency show" -vserver clus3240rre
volume efficiency start	role create -role CRBAC_New -cmddirname "volume efficiency start" -vserver clus3240rre
volume file	role create -role CRBAC_New -cmddirname "volume file" -vserver clus3240rre
volume file clone create	role create -role CRBAC_New -cmddirname "volume file clone create" -vserver clus3240rre
volume file show-disk-usage	role create -role bainew1 -vserver SnapCreator -cmddirname "volume file show-disk-usage" -access all
volume modify	role create -role CRBAC_New -cmddirname "volume modify" -vserver clus3240rre
volume offline	role create -role CRBAC_New -cmddirname "volume offline" -vserver clus3240rre
volume show	role create -role CRBAC_New -cmddirname "volume show" -vserver clus3240rre
volume size	role create -role CRBAC_New -cmddirname "volume size" -vserver clus3240rre
volume snapshot create	role create -role CRBAC_New -cmddirname "volume snapshot create" -vserver clus3240rre
volume unmount	role create -role CRBAC_New -cmddirname "volume unmount" -vserver clus3240rre

CLI commands for creating SVM roles

The following table lists the commands that are required to create a role for a new SVM user.

Command directory name	Command to be run
adduser	role create -role VSERVERRBACROLE_New -cmddirname "adduser" -vserver Snapcreator

Command directory name	Command to be run
event generate-autosupport-log	role create -role VSERVERRBACROLE_New -cmddirname "event generate-autosupport-log" -vserver Snapcreator
lun comment	role create -role VSERVERRBACROLE_New -cmddirname "lun comment" -vserver Snapcreator
lun create	role create -role VSERVERRBACROLE_New -cmddirname "lun create" -vserver Snapcreator
lun delete	role create -role VSERVERRBACROLE_New -cmddirname "lun delete" -vserver Snapcreator
lun geometry	role create -role VSERVERRBACROLE_New -cmddirname "lun geometry" -vserver Snapcreator
lun igroup add	role create -role VSERVERRBACROLE_New -cmddirname "lun igroup add" -vserver Snapcreator
lun igroup create	role create -role VSERVERRBACROLE_New -cmddirname "lun igroup create" -vserver Snapcreator
lun igroup set	role create -role VSERVERRBACROLE_New -cmddirname "lun igroup set" -vserver Snapcreator
lun igroup show	role create -role VSERVERRBACROLE_New -cmddirname "lun igroup show" -vserver Snapcreator
lun map	role create -role VSERVERRBACROLE_New -cmddirname "lun map" -vserver Snapcreator
lun mapping show	role create -role VSERVERRBACROLE_New -cmddirname "lun mapping show" -vserver Snapcreator
lun modify	role create -role VSERVERRBACROLE_New -cmddirname "lun modify" -vserver Snapcreator
lun move	role create -role VSERVERRBACROLE_New -cmddirname "lun move" -vserver Snapcreator
lun offline	role create -role VSERVERRBACROLE_New -cmddirname "lun offline" -vserver Snapcreator
lun online	role create -role VSERVERRBACROLE_New -cmddirname "lun online" -vserver Snapcreator

Command directory name	Command to be run
lun resize	role create -role VSERVERRBACROLE_New -cmddirname "lun resize"-vserver Snapcreator
lun show	role create -role VSERVERRBACROLE_New -cmddirname "lun show" -vserver Snapcreator
lun unmap	role create -role VSERVERRBACROLE_New -cmddirname "lun unmap" -vserver Snapcreator
network	role create -role VSERVERRBACROLE_New -cmddirname "network" -vserver SnapCreator
network connections	role create -role VSERVERRBACROLE_New -cmddirname "network connections" -vserver SnapCreator
network connections active	role create -role VSERVERRBACROLE_New -cmddirname "network connections active" -vserver SnapCreator
network connections listening show	role create -role VSERVERRBACROLE_New -cmddirname "network connections listening show" -vserver SnapCreator
network interface	role create -role VSERVERRBACROLE_New -cmddirname "network interface" -vserver SnapCreator
network routing-groups	role create -role VSERVERRBACROLE_New -cmddirname "network routing-groups" -vserver SnapCreator
restore-file	role create -role VSERVERRBACROLE_New -cmddirname "restore-file" -vserver Snapcreator
snapmirror	role create -role VSERVERRBACROLE_New -cmddirname "snapmirror" -vserver SnapCreator
version	role create -role VSERVERRBACROLE_New -cmddirname "version" -vserver Snapcreator
volume	role create -role VSERVERRBACROLE_New -cmddirname "volume"
volume autosize	role create -role VSERVERRBACROLE_New -cmddirname "volume autosize" -vserver Snapcreator

Command directory name	Command to be run
volume clone	role create -role VSERVERRBACROLE_New -cmddirname "volume clone" -vserver Snapcreator
volume clone create	role create -role VSERVERRBACROLE_New -cmddirname "volume clone create" -vserver Snapcreator
volume create	role create -role VSERVERRBACROLE_New -cmddirname "volume create" -vserver Snapcreator
volume destroy	role create -role VSERVERRBACROLE_New -cmddirname "volume destroy" -vserver Snapcreator
volume efficiency off	role create -role VSERVERRBACROLE_New -cmddirname "volume efficiency off" -vserver Snapcreator
volume efficiency on	role create -role VSERVERRBACROLE_New -cmddirname "volume efficiency on" -vserver Snapcreator
volume efficiency start	role create -role VSERVERRBACROLE_New -cmddirname "volume efficiency start" -vserver Snapcreator
volume efficiency show	role create -role VSERVERRBACROLE_New -cmddirname "volume efficiency show" -vserver Snapcreator
volume file	role create -role VSERVERRBACROLE_New -cmddirname "volume file" -vserver Snapcreator
volume file clone	role create -role VSERVERRBACROLE_New -cmddirname "volume file clone" -vserver Snapcreator
volume file clone create	role create -role VSERVERRBACROLE_New -cmddirname "volume file clone create" -vserver Snapcreator
volume modify	role create -role VSERVERRBACROLE_New -cmddirname "volume modify" -vserver Snapcreator
volume mount	role create -role VSERVERRBACROLE_New -cmddirname "volume mount" -vserver Snapcreator

Command directory name	Command to be run
volume offline	role create -role VSERVERRBACROLE_New -cmddirname "volume offline" -vserver Snapcreator
volume show	role create -role VSERVERRBACROLE_New -cmddirname "volume show" -vserver Snapcreator
volume size	role create -role VSERVERRBACROLE_New -cmddirname "volume size" -vserver Snapcreator
volume snapshot create	role create -role VSERVERRBACROLE_New -cmddirname "volume snapshot create" -vserver Snapcreator
volume snapshot delete	role create -role VSERVERRBACROLE_New -cmddirname "volume snapshot delete" -vserver Snapcreator
volume snapshot restore	role create -role VSERVERRBACROLE_New -cmddirname "volume snapshot restore" -vserver Snapcreator
volume unmount	role create -role VSERVERRBACROLE_New -cmddirname "volume unmount" -vserver Snapcreator
vserver export-policy rule show	role create -role VSERVERRBACROLE_New -cmddirname "vserver export-policy rule show" -vserver Snapcreator
vserver export-policy show	role create -role VSERVERRBACROLE_New -cmddirname "vserver export-policy show" -vserver Snapcreator
vserver fcp	role create -role VSERVERRBACROLE_New -cmddirname "vserver fcp" -vserver Snapcreator
vserver fcp initiator show	role create -role VSERVERRBACROLE_New -cmddirname "vserver fcp initiator show" -vserver Snapcreator
vserver fcp show	role create -role VSERVERRBACROLE_New -cmddirname "vserver fcp show" -vserver Snapcreator
vserver fcp status	role create -role VSERVERRBACROLE_New -cmddirname "vserver fcp status" -vserver Snapcreator

Command directory name	Command to be run
vserver iscsi	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi" -vserver Snapcreator
vserver iscsi connection show	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi connection show" -vserver Snapcreator
vserver iscsi interface accesslist add	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi interface accesslist add" -vserver Snapcreator
vserver iscsi interface accesslist show	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi interface accesslist show" -vserver Snapcreator
vserver iscsi isns query	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi isns query" -vserver Snapcreator
vserver iscsi nodename	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi nodename" -vserver Snapcreator
vserver iscsi session show	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi session show" -vserver Snapcreator
vserver iscsi show	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi show" -vserver Snapcreator
vserver iscsi status	role create -role VSERVERRBACROLE_New -cmddirname "vserver iscsi status" -vserver Snapcreator
vserver nfs	role create -role VSERVERRBACROLE_New -cmddirname "vserver nfs" -vserver Snapcreator
vserver nfs status	role create -role VSERVERRBACROLE_New -cmddirname "vserver nfs status" -vserver Snapcreator
vserver services dns hosts show	role create -role VSERVERRBACROLE_New -cmddirname "vserver services name-service dns hosts show" -vserver SnapCreator

Command directory name	Command to be run
vserver services unix-group create	role create -role VSERVERRBACROLE_New -cmddirname "vserver services name-service unix-group create" -vserver Snapcreator
vserver services unix-group show	role create -role VSERVERRBACROLE_New -cmddirname "vserver services name-service unix-group show" -vserver Snapcreator
vserver services unix-user create	role create -role VSERVERRBACROLE_New -cmddirname "vserver services name-service unix-user create" -vserver Snapcreator
vserver services unix-user show	role create -role VSERVERRBACROLE_New -cmddirname "vserver services name-service unix-user show" -vserver Snapcreator

IBM Domino Plug-in Operations

You can configure and use the IBM Domino plug-in for Snap Creator 4.3.3 to back up and restore IBM Domino databases.

IBM Domino plug-in overview

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.

Understanding IBM Domino plug-in backup operations

Unlike other backup technologies, the IBM Domino plug-in allows data to be written to the database during backup operations. It ensures that the backup is consistent with application data by recording any changes to the database during backup operations in a temporary directory called changeinfo. At restore time, it applies these changes to the database after restoring data from the Snapshot copy.

During backup operations, database files are said to be in backup mode. Although the Snap Creator Framework refers to these files as “quiesced,” that is not the case. Data continues to be written to the files while the Snapshot copy is being made.

High-level steps are as follows:

1. List databases, templates, and mailboxes in the volumes to be backed up.
2. Put files in backup mode, one database at a time.
3. Check for inconsistent or corrupted databases.

> You can force the plug-in to proceed with backup operations despite errors, as described in step task_using_the_gui_to_create_a_configuration_file.md#STEP_AA41331683A24598B7845367CB967F99.

4. Make a Snapshot copy of each volume.
5. If Domino transaction logging is in use, archive copies of Domino transaction logs for use in up-to-the-minute restore operations.
6. Take files out of backup mode, one database at a time.

7. Record changes to the database since files were put in backup mode in the changeinfo directory.

Understanding IBM Domino plug-in restore operations

The IBM Domino plug-in restores database files from the Snapshot copy of the volume on which the database is stored. When the Snapshot restore operation is complete, the plug-in applies any changes recorded in the changeinfo directory.

High-level steps are as follows:

1. Restore database files from Snapshot copies.
2. Apply changes recorded in changeinfo directory.
3. Apply transaction log information, if available.

Restore options

The plug-in offers a wide variety of restore options:

Restore type	Description
Volume restore (point-in-time)	Restores the entire volume to its state at the time of the Snapshot copy.
Volume restore (up-to-the-minute)	Restores the entire volume to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to the most recent copy.
Volume restore (selectable up-to-the-minute)	Restores the entire volume to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to a specified time.
Single-file restore (point-in-time)	Restores a single file to its state at the time of the Snapshot copy (NFS only).
Single-file restore (up-to-the-minute)	Restores a single file to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to the most recent copy (NFS only).
Single-file restore (selectable up-to-the-minute)	Restores a single file to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to a specified time (NFS only).

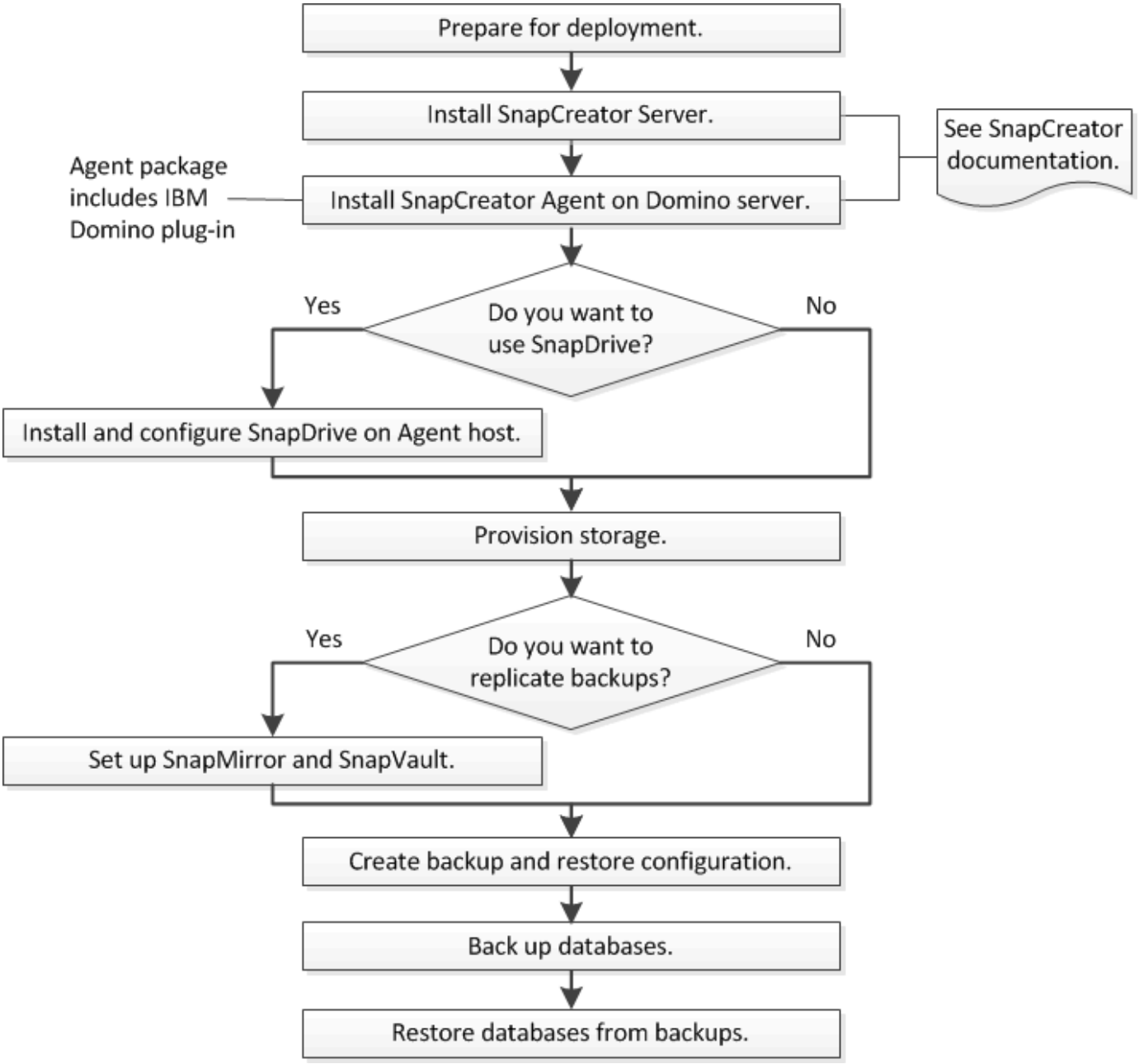
Note: For up-to-the-minute and selectable up-to-the-minute restores, Domino transaction logging must be enabled.

Transaction logs can only be played forward. Selecting a time before the Snapshot copy was created causes a restore error.

IBM Domino backup and recovery workflow

Before you can create backups with the IBM Domino plug-in, you need to install the Snap Creator Server and Agent software and provision NetApp storage. If you plan to replicate Snapshot copies to secondary storage for disaster recovery and archiving, you need to set up SnapMirror and SnapVault relationships.

Especially in a SAN environment, you might want to use SnapDrive on the Snap Creator Agent host to back up databases or to mount Snapshot copies for single-file restores. For more information, see Adding commands to the backup and restore configuration and Performing a single-file restore in a SAN environment.



Preparing for IBM Domino backup and restore

Before you deploy the IBM Domino plug-in, make sure that your storage system and hosts meet minimum resource requirements. You also need to configure storage system layouts for databases, and optionally set up SnapMirror and SnapVault relationships.

For Snap Creator Server and Agent installation requirements, see the Snap Creator Framework 4.1.2 Installation Guide. Pay particular attention to the IBM Domino preinstallation requirements for the Agent host:

- On UNIX hosts, you must create symbolic links to IBM Domino shared object files.
- On Windows hosts, you must add the IBM Domino installation path to the PATH environment variable.

Storage layout requirements

A typical IBM Domino environment has at least three Domino volumes, one each for Domino data, Domino transaction logs, and the plug-in changeinfo directory. Many sites also have volumes for Domino DAOS and for view rebuilds.

The IBM Domino plug-in uses the changeinfo directory for changes recorded during backup operations and for copies of transaction logs used in up-to-the-minute restore operations. It is a best practice to store the changeinfo directory on a separate volume, to avoid inadvertently overwriting the information and to make it easier to back up.

You may also find it useful to have separate volumes for Domino DAOS (if it is enabled) and for view rebuilds. When Domino rebuilds a view (for example, when a user opens a view whose index has been deleted or when updall --R is run), it may generate temporary files to sort the data for rapid view rebuilding.

By default, these temporary files are located in the system's temporary folder or in the Domino data folder. IBM recommends changing the location of the temporary files to a different drive to distribute disk I/O and to ensure adequate space to rebuild views. To change the temporary folder used for view rebuilds, add the View_Rebuild_Dir setting to the notes.ini file.

The following table shows the preferred volume layout:

Volume	Contents	Notes
Volume 1	Domino data	FC, SAS, or SSD drives preferred.
Volume 2	Domino transaction logs	FC, SAS, or SSD drives preferred.
Volume 3	changeinfo	Stores changes recorded during backup operations and copies of transaction logs for use in up-to-the-minute restore operations.
Volume 4	View rebuild	Optional. Stores temp files created during index updates. Can use RAM disk. Add View_Rebuild_Dir setting to notes.ini file.

Volume	Contents	Notes
Volume 5	DAOS repository	Optional. Contains .dlo files from DAOS. Low I/O requirements make this a good candidate for SATA drives.

In virtual environments, guest-mounted disks are preferred.

SnapMirror and SnapVault setup

SnapMirror is disaster recovery technology, designed for failover from primary storage to secondary storage at a geographically remote site. SnapVault is archiving technology, designed for disk-to-disk Snapshot copy replication for standards compliance and other governance-related purposes.

Before you can use Snap Creator with these products, you need to configure a data-protection relationship between the source and destination volumes, then initialize the relationship.

The procedures in this section describe how to set up replication relationships in clustered Data ONTAP. You can find information about setting up these relationships in Data ONTAP operating in 7-Mode in the .

Preparing storage systems for SnapMirror replication

Before you can use to mirror Snapshot copies, you need to configure a data-protection relationship between the source and destination volumes, then initialize the relationship. Upon initialization, SnapMirror makes a Snapshot copy of the source volume, then transfers the copy and all the data blocks that it references to the destination volume. It also transfers any other, less recent Snapshot copies on the source volume to the destination volume.

- You must be a cluster administrator.
- For Snapshot copy verification on the destination volume, the source and destination Storage Virtual Machines (SVMs) must have a management LIF as well as a data LIF.

  The management LIF must have the same DNS name as the SVM. Set the management LIF role to data, the protocol to none, and the firewall policy to mgmt.

You can use the Data ONTAP command-line interface (CLI) or OnCommand System Manager to create a SnapMirror relationship. The following procedure documents CLI usage.

If you are storing database files and transaction logs on different volumes, you must create relationships between the source and destination volumes for the database files and between the source and destination volumes for the transaction logs.

The following illustration shows the procedure for initializing a SnapMirror relationship:

1. Identify the destination cluster.
2. On the destination cluster, use the volume create command with the -typeDP option to create a SnapMirror destination volume that is either the same or greater in size than the source volume.

   The language setting of the destination volume must match the language setting of the source volume.

   The following command creates a 2 GB destination volume named dstvolB in SVM2 on the aggregate node01_aggr:

   ```
   cluster2::> volume create -vserver SVM2 -volume dstvolB -aggregate
   node01_aggr -type DP
   -size 2GB
   ```

3. On the destination SVM, use the snapmirror create command with the -type DP parameter to create a SnapMirror relationship.

   The DP type defines the relationship as a SnapMirror relationship.

   The following command creates a SnapMirror relationship between the source volume srcvolA on SVM1 and the destination volume dstvolB on SVM2, and assigns the default SnapMirror policy DPDefault:

   ```
   SVM2::> snapmirror create -source-path SVM1:srcvolA -destination-path
   SVM2:dstvolB
   -type DP
   ```

   Do not define a mirror schedule for the SnapMirror relationship. does that for you when you create a backup schedule.

   If you do not want to use the default SnapMirror policy, you can invoke the snapmirror policy create command to define a SnapMirror policy.

4. Use the snapmirror initialize command to initialize the relationship.

   The initialization process performs a baseline transfer to the destination volume. SnapMirror makes a Snapshot copy of the source volume, then transfers the copy and all the data blocks it references to the destination volume. It also transfers any other Snapshot copies on the source volume to the destination volume.

   The following command initializes the relationship between the source volume srcvolA on SVM1 and the destination volume dstvolB on SVM2:

   ```
   SVM2::> snapmirror initialize -destination-path SVM2:dstvolB
   ```

Preparing storage systems for SnapVault replication

Before you can use to perform disk-to-disk backup replication, you need to configure a data-protection relationship between the source and destination volumes, then initialize the relationship. On initialization, SnapVault makes a Snapshot copy of the source volume, then transfers the copy and all the data blocks it references to the destination volume.

- You must be a cluster administrator.

You can use the Data ONTAP command-line interface (CLI) or OnCommand System Manager to create SnapVault relationships. The following procedure documents CLI usage.

If you are storing database files and transaction logs on different volumes, you must create relationships between the source and destination volumes for the database files and between the source and destination volumes for the transaction logs.

The following illustration shows the procedure for initializing a SnapVault relationship:

1. Identify the destination cluster.
2. On the destination cluster, use the volume create command with the -typeDP option to create a SnapVault destination volume that is the same size as or larger than the source volume.

   The language setting of the destination volume must match the language setting of the source volume.

   The following command creates a 2 GB destination volume named dstvolB in SVM2 on the aggregate node01_aggr:

   ```
   cluster2::> volume create -vserver SVM2 -volume dstvolB -aggregate
   node01_aggr -type DP
   -size 2GB
   ```

3. On the destination SVM, use the snapmirror policy create command to create a SnapVault policy.

   The following command creates the SVM-wide policy SVM1-vault:

   ```
   SVM2::> snapmirror policy create -vserver SVM2 -policy SVM1-vault
   ```

   Do not define a cron schedule or Snapshot copy policy for the SnapVault relationship. does that for you when you create a backup schedule.

4. Use the snapmirror create command with the -type XDP parameter and the -policy parameter to create a SnapVault relationship and assign a vault policy.

   The XDP type defines the relationship as a SnapVault relationship.

The following command creates a SnapVault relationship between the source volume srcvolA on SVM1 and the destination volume dstvolB on SVM2, and assigns the policy SVM1-vault:

```
SVM2::> snapmirror create -source-path SVM1:srcvolA -destination-path
SVM2:dstvolB
-type XDP -policy SVM1-vault
```

5. Use the snapmirror initialize command to initialize the relationship.

   The initialization process performs a baseline transfer to the destination volume. SnapMirror makes a Snapshot copy of the source volume, then transfers the copy and all the data blocks it references to the destination volume.

   The following command initializes the relationship between the source volume srcvolA on SVM1 and the destination volume dstvolB on SVM2:

```
SVM2::> snapmirror initialize -destination-path SVM2:dstvolB
```

Creating a backup and restore configuration

You specify most of the information you need for backup and restore operations in a configuration file. The configuration file is the input for Snap Creator backup and restore operations.

You can create as many configuration files as you need, but you can specify only a single configuration file as input for an operation. You can use either the Snap Creator GUI or the Snap Creator CLI to create configuration files.

This guide shows how to use the GUI to create configuration files. For information on how to use the CLI, see the Snap Creator Framework 4.1.2 Administration Guide.

You organize configuration files in Snap Creatorprofiles. Profiles and configuration files reside in the \engine\configs subdirectory in the Snap Creator installation directory:

- On UNIX hosts, the directory to which the installation file was extracted
- On Windows hosts, C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x, by default

Related information

Logging in to the Snap Creator GUI Creating a configuration file Adding commands to the backup and restore configuration Cleaning up archived copies of Domino transaction logs Backing up the changeinfo directory

Logging into the Snap Creator GUI

You use a web browser to log in to the Snap Creator GUI. Check with your administrator for the Snap Creator Server IP address, port, and login credentials.

1. Enter the following URL in your web browser: `https://server_name:port`, where:
   - server_name is the name or IP address of the Snap Creator Server
   - port is the port for the Snap Creator Server (8443, by default)
2. Enter the login credentials for the Snap Creator Server.

The Snap Creator GUI is displayed in the browser. If you are launching the GUI for the first time, a welcome message appears on screen. Click **OK** to dismiss the message.

Creating a configuration file

Before you can back up IBM Domino databases, you need to create a configuration file. The configuration file is the input for Snap Creator backup and restore operations.

Only alphanumeric and underscore characters are allowed in configuration and profile names. Names cannot start with a number.

Many sites use a profile-wide or site-wide global configuration file to apply storage system or VMware credential information to backup and restore configurations. For details about how to create a global configuration file, see the Snap Creator Framework 4.1.2 Administration Guide.

1. In the Profiles and Configurations pane, click **Add Profile**.
2. In the New Profile dialog box, enter the name of the profile, and then click **OK**.

   Creating a new profile automatically launches the Snap Creator Framework Configuration wizard. To add a new configuration to an existing profile, right-click the profile, and then select **New Configuration**.

   Throughout the Configuration wizard, click **Next** to advance to the next page and click **Back** to return to the previous page.

3. On the Configuration page, enter the name of the configuration, and then specify whether you want to enable password encryption.

   Password encryption is enabled by default to prevent passwords from being displayed in clear text in the configuration file.

   Hover over a field in the wizard to display a tool tip.

4. On the Plug-in Type page, select **Application plug-in**.
5. On the Application Plug-ins page, select **IBM Domino**.
6. On the Plug-in parameters page, specify IBM Domino backup configuration details:

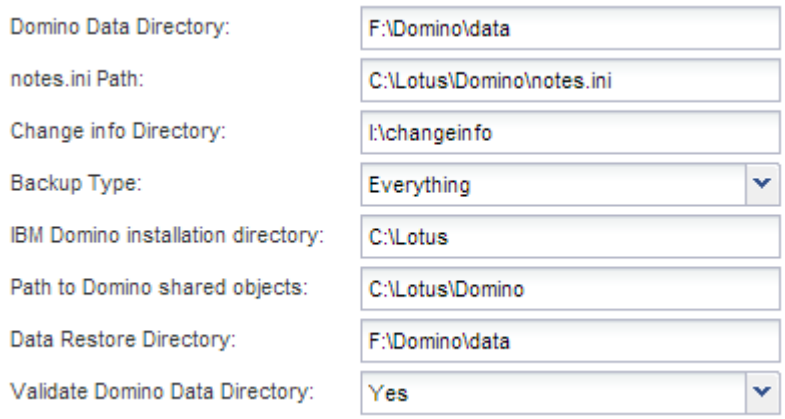
   The examples in the following table are for UNIX environments. You can view examples of the settings for Windows in the screenshot that follows the table.

GUI parameter	CLI parameter	Description
Domino Data Directory	DOMINO_DATA_ PATH	The path to the Domino data directory. For example, /Domino/data.

GUI parameter	CLI parameter	Description
notes.ini Path	DOMINO_INI_PATH	The path to the notes.ini file. For example, /Domino/data/notes.ini.
Change info Directory	DOMINO_CHANGE_ INFO_PATH	The path to changeinfo files. For example, /changeinfo. **Important:** Make sure that you store changeinfo files on a volume other than the Domino data volume.
Backup Type	DOMINO_ DATABASE_TYPE	The database files to be backed up. Select a value from the GUI drop-down, or specify the corresponding number in the CLI command: • Everything (recommended) (CLI = 0) • *.box files (CLI= 1) • *.nsf, *.nsg, and *.nsh files (CLI = 2) • *.ntf files (CLI = 3)
IBM Domino installation directory	LOTUS	The path to the directory where Domino binary files are installed. In Linux, for example, /opt/ibm/domino (assuming the default installation path). In Windows, the parent of the Domino Shared Objects directory. **Note:** This is not the path to IBM Notes, formerly Lotus Notes.
Path to Domino shared objects	Notes_ExecDirectory	The path that contains Domino shared object files (.so or .dll). For example, /opt/ibm/domino/notes/latest/linux.
Data Restore Directory	DOMINO_ RESTORE_DATA_ PATH	For volume restores (assuming you are restoring to the same location from which you took the backup), the Domino data directory path. For single-file restores (NFS only), a location on the same volume as the Domino Data Directory. For example, /Domino/data/restore.

GUI parameter	CLI parameter	Description
Validate Domino Data Directory	VALIDATE_ DOMINO_DATA_ PATH	If the Domino environment has multiple mount points, some mount points might be on NetApp storage, while others might not be. Select a value from the GUI drop-down, or specify the corresponding value in the CLI command: • Yes backs up files on the Domino data directory path only. • No backs up all files in the Domino environment regardless of their location on disk.

The following example shows how you might complete the fields in a Windows environment:



7. On the Agent Configuration page, specify Snap Creator Agent connection information:

For this field…	Do this…
IP/DNS	Enter the IP address or DNS host name of the Snap Creator Agent host.
Port	If you are not using the default port for the Snap Creator Agent (9090), enter the port number.
Timeout (secs)	Leave the default.

8. When you are satisfied with your entries, click **Test agent connection** to verify the connection to the Agent.

If the Agent is not responding, verify the Agent details and confirm that host name resolution is working correctly.

9. On the Storage Connection settings page, specify connection information for the Storage Virtual Machine (SVM, formerly known as Vserver) on the primary storage system:

For this field…	Do this…
Transport	Select the transport protocol for communications with the SVM: HTTP or HTTPS.
Controller/Vserver Port	If you are not using the default port for the SVM (80 for HTTP, 443 for HTTPS), enter the port number.

Note: For information about how to use an OnCommand proxy, see the Snap Creator Framework 4.1.2 Administration Guide.

10. On the Controller/Vserver Credentials page, specify the credentials for the SVM on the primary storage system:

For this field…	Do this…
Controller/Vserver IP or Name	Enter the IP address or DNS host name of the SVM host.
Controller/Vserver User	Enter the user name for the SVM host.
Controller/Vserver Password	Enter the password for the SVM host.

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 can 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. For more information about creating SnapMirrror and SnapVault relationships, see SnapMirror and SnapVault setup.

When you click **Next**, the Controller/Vserver Volumes window is displayed.

11. In the Controller/Vserver Volumes window, specify the volumes to be backed up by dragging and dropping from the list of available volumes in the left pane to the list of volumes to be backed up in the right pane, and then click **Save**.

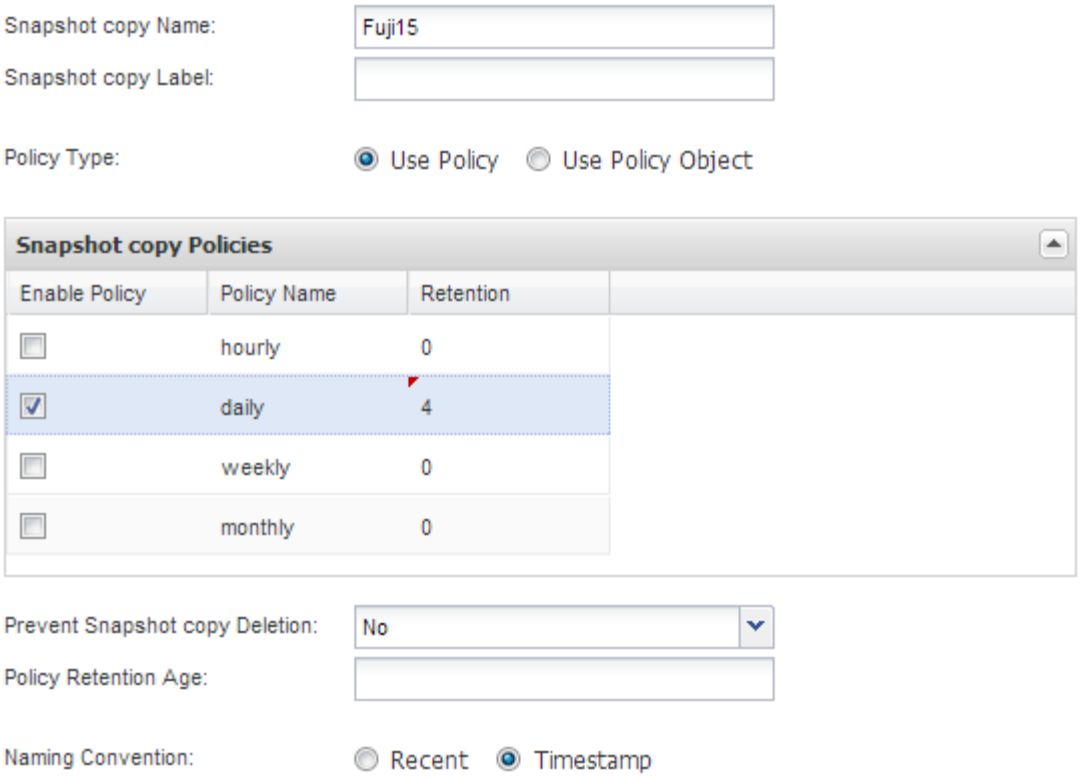
The specified volumes are displayed on the Controller/Vserver Credentials page.

If you plan to back up the changeinfo directory, you must configure the volume containing the directory as a metadata volume, as described in Backing up the changeinfo directory. This option tells the IBM Domino plug-in to create a Snapshot copy of the changeinfo volume *after* creating the Snapshot copy for database files.

12. On the Controller/Vserver Credentials page, click **Add** if you want to specify SVM details and volumes to be backed up for another primary storage system.
13. On the Snapshot details page, specify Snapshot configuration information:

For this field…	Do this…
Snapshot Copy Name	Enter the name of the Snapshot copy. **Tip:** Click **Allow Duplicate Snapshot Copy Name** if you want to reuse Snapshot copy names across configuration files.
Snapshot Copy Label	Enter descriptive text for the Snapshot copy.
Policy Type	Click **Use Policy**, and then select the built-in backup policies you want to make available for this configuration. After you select a policy, click in the **Retention** cell to specify how many Snapshot copies with that policy type you want to retain. **Note:** For information about how to use policy objects, see the Snap Creator Framework 4.1.2 Administration Guide.
Prevent Snapshot Copy Deletion	Specify Yes only if you do not want Snap Creator to automatically delete Snapshot copies that exceed the number of copies to be retained. **Note:** Specifying Yes might cause you to exceed the number of supported Snapshot copies per volume.
Policy Retention Age	Specify the number of days you want to retain Snapshot copies that exceed the number of copies to be retained. You can specify a retention age per policy type by entering policy type:age, for example, daily:15.
Naming Convention	Leave the default.

The configuration specified in the following example performs a daily backup and retains four Snapshot copies:



14. On the Snapshot details continued page, set **Ignore Application Errors** to Yes if you want to force the backup operation to proceed even if one or more databases are in an inconsistent or corrupted state.

    You should ignore the remaining fields.

    A Domino environment might consist of hundreds or thousands of databases. If even a single database is in an inconsistent or corrupted state, the backup will fail. Enabling **Ignore Application Errors** allows the backup to continue.

15. On the Data Protection page, specify whether you want to perform optional Snapshot copy replication to secondary storage:
    a. Click **SnapMirror** to mirror Snapshot copies.

       The policy for mirrored Snapshot copies is the same as the policy for primary Snapshot copies.

    b. Click **SnapVault** to archive Snapshot copies.
    c. Specify the policy for archived Snapshot copies.
    d. The instructions are in the following step13.
    e. In **SnapVault wait time**, enter the number of minutes you want Snap Creator to wait for the SnapVault operation to complete.
    f. You need to have set up SnapMirror and SnapVault relationships before performing replication to secondary storage. For more information, see SnapMirror and SnapVault setup.
16. On the Data Protection Volumes page, click **Add**, and then select the SVM for the primary storage system.

    When you click **Next**, the Data Protection Volume Selection window is displayed.

17. In the Data Protection Volume Selection window, specify the source volumes to be replicated by dragging and dropping from the list of available volumes in the left pane to the list of volumes in the SnapMirror and/or SnapVault areas in the right pane, and then click **Save**.

    The specified volumes are displayed on the Data Protection Volumes page.

18. On the Data Protection Volumes page, click **Add** if you want to specify SVM details and volumes to be replicated for another primary storage system.
19. On the Data protection relationships page, specify the credentials for the SVM on the SnapMirrror and/or SnapVault destination systems.
20. If you prefer to use NetAppOnCommand Unified Manager APIs instead of Data ONTAP APIs for Snapshot copies and SnapMirror/SnapVault updates, complete the fields on the DFM/OnCommand Settings page:
    a. Click **Operations Manager Console Alert** if you want to receive Unified Manager alerts, and then enter the required connection information for the Unified Manager virtual machine.
    b. Click **NetApp Management Console data protection capability** if you are using the NetApp Management Console data protection feature for 7-Mode SnapVault replication, and then enter the required connection information for the Unified Manager virtual machine.
21. Review the summary, and then click **Finish**.

Snap Creator lists the configuration file below the specified profile in the Profiles and Configurations pane. You can edit the configuration by selecting the configuration file and clicking the appropriate tab in the Configuration Content pane. You can rename the configuration by clicking **Rename** in the right-click menu. You can delete the configuration by clicking **Delete** in the right-click menu.

Adding commands to the backup and restore configuration

Occasionally, a backup or restore operation might need to run a command that is not available in Snap Creator. On Window hosts using FC or iSCSI, for example, you might prefer to use SnapDrive commands for backups instead of native Snap Creator commands, to ensure file system consistency at the OS level.

Where to run supplemental commands

By default, supplemental commands run on the Snap Creator Agent. You can run a supplemental command on the Server by prepending the command with the text SERVER, followed by a colon (:). For example, SERVER:C:\myscript.bat.

If you want to run a supplemental command on the Agent, you must explicitly permit the command to be executed by including it in the allowed_commands.config file on the Agent. There is no requirement to allow supplemental commands on the Server.

Where to add supplemental commands

You can use either the Snap Creator GUI or the Snap Creator CLI to add commands to your backup and restore configuration.

This guide shows how to use the GUI to add commands. For information on how to use the CLI, see the Snap Creator Framework 4.1.2 Administration Guide.

Related information

Allowing supplemental commands on the Snap Creator Agent

If you want to run a supplemental command on the Snap Creator Agent, you must explicitly permit the command to be executed by including it in the allowed_commands.config file on the Agent.

allowed_commands.config is located in the etc subdirectory of the Snap Creator Agent installation directory. For example:

- On UNIX hosts, /install/path/scAgent4.1.x/etc/allowed_commands.config
- On Windows hosts, C:\Program Files\NetApp\Snap_Creator_Framework\scAgent4.1.x\etc\allowed_commands.config

To allow supplemental commands on the Agent, open allowed_commands.config in an editor. Enter each command on its own line, exactly as you would enter the command at a command prompt. Case is significant. Make sure to specify the fully qualified pathname. Enclose the pathname in quotation marks if it contains spaces. For example:

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

Restart the Agent for the changes to take effect.

For security reasons, you should not use a wildcard entry (*) to allow all commands.

Adding supplemental commands to the configuration

You can add supplemental commands to your configuration after you create the configuration file. You can run the commands on the Snap Creator Server or Agent.

To run a supplemental command on the Agent, you should already have added the command to the allowed_commands.config file on the Agent.

By default, supplemental commands run on the Agent. You can run a supplemental command on the Server by prepending the command with the text SERVER, followed by a colon (:). For example, SERVER:C:\myscript.bat. There is no requirement to allow the command on the Server.

You can use either the Snap Creator GUI or the Snap Creator CLI to add commands to your backup and restore configuration.

This guide shows how to use the GUI to add commands. For information on how to use the CLI, see the Snap Creator Framework 4.1.2 Administration Guide.

1. In the Profiles and Configurations pane, select the configuration file and click the **Commands** tab.

   The following command types are available:

Command type	Description
Application Quiesce	For non-plug-in use only. Ignore this command type.
Application Un-Quiesce	For non-plug-in use only. Ignore this command type.
Pre Exit	Use this type to run commands that tell Snap Creator what to do after a fatal error.
Snapshot Copy Create	Use this type to run your own Snapshot copy create commands.

Only a subset of the supported commands are available in the GUI. For information on the APP, ARCHIVE, MOUNT/UNMOUNT, and POST commands, see the Snap Creator Framework 4.1.2 Administration Guide.

2. On the **Commands** tab, scroll to the section for the command type you want to use and click **Add**.
3. Type over the text **Add Command Here** to enter the command.

   To use SnapDrive for Windows to create a backup, you might enter the following in the section for the Snapshot Copy Create command type:

   ```
   "C:\Program Files\NetApp\SnapDrive\sdcli.exe" snap create -s %SNAME-
   %SNAP_TYPE_%SNAP_TIME -D F G H
   ```

   where:

   - "C:\Program Files\NetApp\SnapDrive\sdcli.exe" is the default installation path for the SnapDrive CLI.
   - %SNAME-%SNAP_TYPE_%SNAP_TIME specifies that the Snapshot copy name be formed from the configuration file name, the Snapshot policy (hourly, daily, or monthly), and the time and date the Snapshot copy was created.
   - D is the switch and F G H are the mount points for the data to be backed up. TIP: To run the command on the Server, prepend the command with the text SERVER, followed by a colon (:).
4. When you are satisfied with your entry, press **Enter**.
5. Repeat steps #STEP_3F9C83DD05D84075AD0277213FD67C56 through #STEP_FBEDD7AE105F42138EB35315EA9FA7CC to add another command.
6. Click **Save** in the Configuration Content pane to save your changes.

Cleaning up archived copies of Domino transaction logs

If you are using Domino transaction logging, the IBM Domino plug-in archives copies of Domino transaction logs to the changeinfo directory for use in up-to-the-minute restore operations. You need to enable transaction log management before Snap Creator will clean up the copies of the transaction logs you no longer need.

The Domino plug-in stores changeinfo files and archived copies of Domino transaction logs in the changeinfo

directory. The plug-in automatically cleans up .info files based on the retention policy for the configuration. It does not clean up unneeded copies of transaction logs unless you explicitly enable transaction log management in Snap Creator.

In setting up transaction log management, make sure to strike an appropriate balance between the number of archived copies of transaction logs you want to retain for up-to-the-minute restore operations and the size of the volume containing the changeinfo directory.

Do not set the Archive Log directory parameter to the path of Domino transaction logs. Doing so can damage your Domino environment.

1. In the Profiles and Configurations pane, select the configuration file and click the **Archive Log Management** tab.
2. In the **Archive Log Management** tab, specify the following values for the transaction log management settings:

Parameter	Setting	Description
Archive Log Enable	Y	Enables transaction log cleanup.
Archive Log Retention	Enter a value greater than or equal to the number of days Snapshot copies are retained.	The number of days to retain transaction logs.
Archive Log Directory	changeinfo/logs	The directory to clean up. **Important:** Do not specify the path of Domino transaction logs. Doing so can damage your Domino environment.
Archive Log Extension		The extension for copies of Domino transaction log files.
Archive Log Recursive Search	N	The Snap Creator plug-in puts .txn files in the logs subdirectory of the changeinfo directory, so a recursive search is not required.

3. Click **Save** in the Configuration Content pane to save your changes.

Backing up the changeinfo directory

If you plan to back up the changeinfo directory, you must configure the volume containing the directory as a metadata volume. Doing so tells the IBM Domino plug-in to create a Snapshot copy of the changeinfo volume *after* creating the Snapshot copy for database files.

You should already have identified the changeinfo volume as a volume to be backed up when you created the configuration file. For more information, see step task using the gui to create a configuration.

You use the META_DATA_VOLUME parameter in the configuration file to identify the changeinfo volume as a metadata volume. The parameter is not available in the GUI.

1. Open the configuration file in a text editor.

   Configuration files reside in the Snap Creator installation directory, in a subdirectory named for the profile. On a Windows host, for example, C:\Program Files\NetApp\Snap_Creator_Framework\scServer4.1.x\engine\configs\Domino\Fuji15.conf, where Domino is the name of the profile and Fuji15.conf is the name of the configuration file.

2. Enter the name of the changeinfo volume in the META_DATA_VOLUME parameter.

   The changeinfo volume should already be listed in the VOLUMES parameter.

   The following example shows how to configure Fuji15_DomChangeInfo as a metadata volume:

```
VOLUMES=domino_vserver:Fuji15_DomDAOS,Fuji15_DomChangeInfo,
Fuji15_DomTxn,Fuji15_DomData
META_DATA_VOLUME=domino_vserver:Fuji15_DomChangeInfo
```

Backing up databases

You can back up databases on demand or on a schedule. You can use either the Snap Creator GUI or the Snap Creator CLI to back up databases.

You can use the GUI to back up databases. For information on how to use the CLI, see the Snap Creator Framework 4.1.2 Administration Guide.

Related information

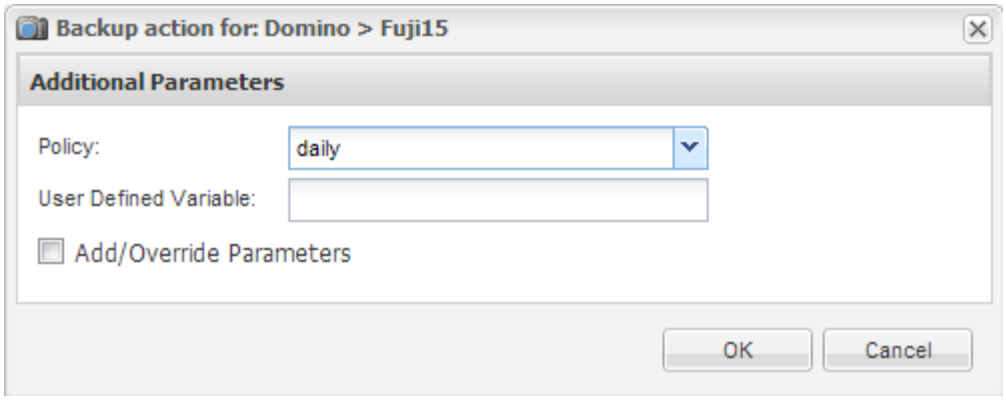
- Backing up databases on demand
- Scheduling backups

Backing up databases on demand

You should back up your databases as soon as they are available in NetApp storage. You can schedule recurring backups after the initial backup.

You should have created the configuration file for the backup, as described in Creating a configuration file.

1. In the Profiles and Configurations pane, select the configuration file and click **Actions** > **Backup**.
2. In the Additional Parameters dialog box, select the policy for the backup job in the **Policy** drop-down and click **OK**.



You must have configured the policy in the configuration file.

Snap Creator starts the backup job. Job information is displayed in the Console pane.

Scheduling backups

You can schedule recurring backup jobs after performing the initial backup.

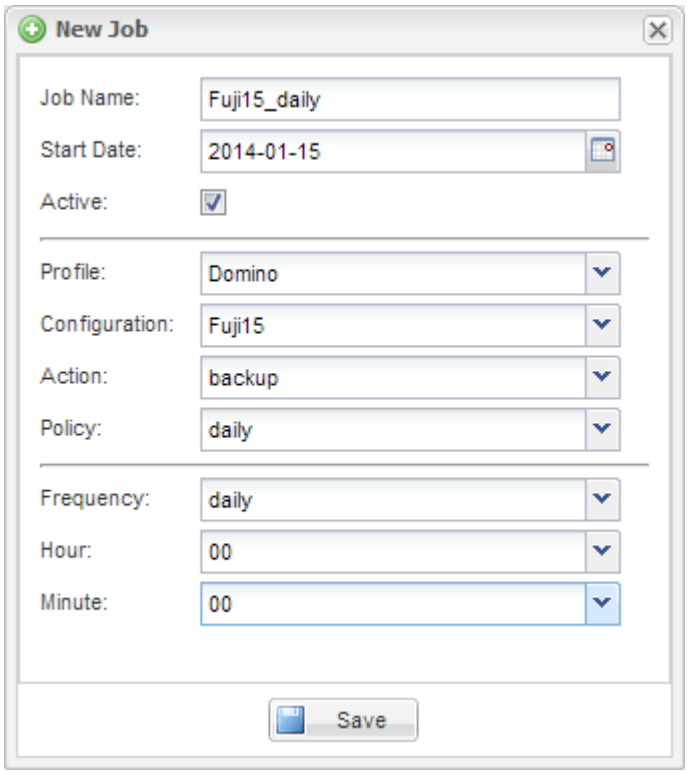
You should have created the configuration file for the backup, as described in Creating a configuration file.

1. In the Profiles and Configurations pane, select the configuration file and click **Management** > **Schedules** at the top of the Snap Creator Framework window.
2. In the Jobs pane, click **Create**
3. In the New Job dialog, specify the job information:

For this field…	Do this…
Job Name	Enter the name of the job.
Start Date	Use the calendar control to select the date on which the schedule should start.
Active	Select this box to activate the schedule. Deselect the box to deactivate the schedule.
Profile	Select the profile for the configuration file.
Configuration	Select the configuration file.
Action	Select backup.
Policy	Select the policy for the backup job. **Note:** You must have configured the policy in the configuration file.

For this field…	Do this…
Frequency	Select the frequency with which the job should run. Depending on your choice, new fields are displayed where you can specify the minute, hour, and day to run the job. If you want to use a cron job, select cron and enter the cron command.

The following example shows how to schedule a backup job to run every day at midnight:



4. Click **Save**.

The scheduled job is listed on the Schedules tab in the Jobs pane. Select the job to run, edit, or delete it.

Restoring databases

The IBM Domino plug-in restores database files from the Snapshot copy of the volume on which the database is stored. When the Snapshot restore is complete, the plug-in applies any changes recorded in the changeinfo directory.

Understanding SnapMirror and SnapVault restore operations

You cannot use Snap Creator to restore a SnapMirror copy of the data. If you want to restore a mirror copy, you need to break the mirror first, then manually restore the data. For more information, see the ONTAP 9 Volume Disaster Recovery Express Guide.

Only point-in-time volume restores are available when you restore a SnapVault copy from secondary storage. You cannot perform an up-to-the-minute volume restore or a single-file restore. You can work around this

limitation by first restoring from secondary storage to primary storage. From primary storage, you can then perform an up-to-the-minute volume restore or a single-file restore as needed.

Understanding destination directories

Volume restores and single-file restores typically have different destination directories. You specify the destination directory in the Data Restore Directory parameter in the backup and restore configuration file (see step task_using_the_gui_to_create_a_configuration_file.md#STEP_E6C507729B3647FD8B2E8D0818F22D3B):

- For a volume restore, you need to set Data Restore Directory to the Domino data directory.
- For a single-file restore, you need to set Data Restore Directory to a subdirectory on the Domino data volume.

This means that if you alternate restore types, you need to modify Data Restore Directory to point to the correct setting for each restore type. Otherwise, change information will not be applied correctly, and the data will be inconsistent with the database state you want to restore to. Of course, you can create different configurations for volume and single-file restores if you prefer.

Where to run a restore

With one exception, you can use either the Snap Creator GUI or the Snap Creator CLI to restore databases. For single-file restores in a SAN environment, you must use the CLI, as described in Performing a single-file restore in a SAN environment.

This guide shows how to use the CLI only for single-file restores in a SAN environment. Otherwise, it shows how to use the GUI to restore databases. For information on how to use the CLI, see the Snap Creator Framework 4.1.2 Administration Guide.

Related information

Performing a volume restore Performing a single-file restore Performing a single-file restore in a SAN environment

Performing a volume restore

You can use the IBM Domino plug-in to perform point-in-time, up-to-the-minute, or selectable up-to-the-minute volume restores for all major storage types.

Make sure to:

- Set the Data Restore Directory in the configuration file to the Domino data directory.
- Stop the Domino server.

Volume restore options are as follows:

Restore type	Description
Volume restore (point-in-time)	Restores the entire volume to its state at the time of the Snapshot copy.

Restore type	Description
Volume restore (up-to-the-minute)	Restores the entire volume to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to the most recent copy.
Volume restore (selectable up-to-the-minute)	Restores the entire volume to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to a specified time.

For up-to-the-minute and selectable point-in-time restores, Domino transaction logging must be enabled.

Transaction logs can only be played forward. Selecting a time before the Snapshot copy was created causes a restore error.

1. In the Profiles and Configurations pane, select the configuration file and click **Actions** > **Restore**.

   Selecting **Restore** automatically launches the Snap Creator Framework Restore wizard. Throughout the Restore wizard, click **Next** to advance to the next page. Click **Back** to return to the previous page.

   If you are restoring from a SnapVault copy, you are prompted to restore from primary or secondary storage. Your selection depends on how you are handling the limitation described in Restoring databases.

2. On the Restore details page, specify the restore details:

For this field…	Do this…
Controller/Vserver name	Select the SVM on the storage system you want to restore from.
Restore volume name	Select the volume you want to restore from.
Policy	Select the policy for the backup you want to restore from.
Snap Creator Snapshot Copies/All Snapshot Copies	Leave the default.
Restore Snapshot copy name	Select the Snapshot copy you want to restore from.
Restore type	Select **Volume Restore**.

3. On the following page, specify the volume restore type:

For this field…	Do this…
Restore Type	Click the volume restore type. If you choose **Selectable up the minute**, new fields are displayed where you can specify the date and time to which you want to play forward Domino transaction logs. Click **Ignore Validation** if the time on the Snap Creator Server does not match the time on the storage controller.
Disable Replication	Select this box to set a new Domino replica ID for restored database files.

4. Review the summary and click **Finish**.
5. In the Volume Restore dialog, click **OK**.

   Snap Creator starts the restore job. Job information is displayed in the Console pane.

Restart the Domino server when the restore operation is complete.

Performing a single-file restore

You can use the IBM Domino plug-in to perform point-in-time, up-to-the-minute, or selectable up-to-the-minute single-file restores for databases in NFS environments.

You must set the Data Restore Directoryparameter in the configuration file to the correct subdirectory on the Domino data volume.

You do not have to stop the Domino server for a single-file restore.

Single-file restore options are as follows:

Restore type	Description
Single-file restore (point-in-time)	Restores a single file to its state at the time of the Snapshot copy (NFS only).
Single-file restore (up-to-the-minute)	Restores a single file to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to the most recent copy (NFS only).
Single-file restore (selectable up-to-the-minute)	Restores a single file to its state at the time of the Snapshot copy, then plays forward Domino transaction logs to a specified time (NFS only).

For up-to-the-minute and selectable point-in-time restores, Domino transaction logging must be enabled.

Transaction logs can only be played forward. Selecting a time before the Snapshot copy was created causes a

restore error.

1. In the Profiles and Configurations pane, select the configuration file, and then click **Actions** > **Restore**.

   Selecting **Restore** automatically launches the Snap Creator Framework Restore wizard. Throughout the Restore wizard, click **Next** to advance to the next page and click **Back** to return to the previous page.

   If you are restoring from a SnapVault copy, you are prompted to restore from primary or secondary storage. Your selection depends on how you are handling the limitation described in concept_domino_database_restore_overview.md#GUID-4D864E27-DE54-43BF-9B9F-EF2F240F65D9.

2. On the Restore details page, specify the restore details:

For this field…	Do this…
Controller/Vserver name	Select the SVM on the storage system you want to restore from.
Restore volume name	Select the volume you want to restore from.
Policy	Select the policy for the backup you want to restore from.
Snap Creator Snapshot Copies/All Snapshot Copies	Leave the default.
Restore Snapshot copy name	Select the Snapshot copy you want to restore from.
Restore type	Select **Single File Restore**.

3. On the following page, select the file you want to restore.

   The file is displayed with its full path name in the **Source path** field.

   Copy the path name to your clipboard for later use.

4. On the following page, select the directory to which you want to restore the file.

   The name of the parent subdirectory for the file must be identical to the name of the parent subdirectory in the source path. If, for example, the source path is /domino/data/mail/user1.nsf, the restore path is /domino/data/restore/mail/user1.nsf.

   The directory is displayed with its full path name in the **Destination path** field.

5. On the following page, specify the single-file restore type:

For this field…	Do this…
Restore Type	Click the single-file restore type. If you choose **Selectable up the minute**, new fields are displayed where you can specify the date and time to which you want to play forward Domino transaction logs. Click **Ignore Validation** if the time on the Snap Creator Server does not match the time on the storage controller.
Disable Replication	Select this box to set a new Domino replica ID for the restored database file.

6. Review the summary, and then click **Finish**.
7. In the Single File Restore dialog, click **OK**.

   Snap Creator starts the restore job. Job information is displayed in the Console pane.

Performing a single-file restore in a SAN environment

For single-file restores in a SAN environment, you can use SnapDrive to mount the Snapshot copy on the Snap Creator Agent host. You can then copy the file you want to restore to the Data Restore Directory and use a Snap Creator custom action to complete restore processing.

Related information

Using SnapDrive to mount a Snapshot copy

Copying the file to the Data Restore Directory

Using a Snap Creator custom action to complete restore processing

Disconnecting the Snapshot Copy

Using SnapDrive to mount a Snapshot copy

You can use SnapDrive to mount the Snapshot copy for the file you want to restore. You can then manually copy the file to the Data Restore Directory.

The following procedure shows how to use SnapDrive for Windows to mount a Snapshot copy on a Windows Server 2008 host. SnapDrive for Windows and the Snap Creator Agent must be running on the host.

1. In Server Manager, click **Storage** > **SnapDrive** > **physical_server_name** > **Disks**.
2. In the Disk Identification pane, navigate to the Snapshot copy that contains the copy of the file you want to restore and choose **Connect Disk** in the right-click menu.

   The Connect Disk wizard opens.

   Throughout the Connect Disk wizard, click **Next** to advance to the next page. Click **Back** to return to the previous page.

Make a note of the name of the Snapshot copy. You will need the name when you copy the file to the Data Restore Directory.

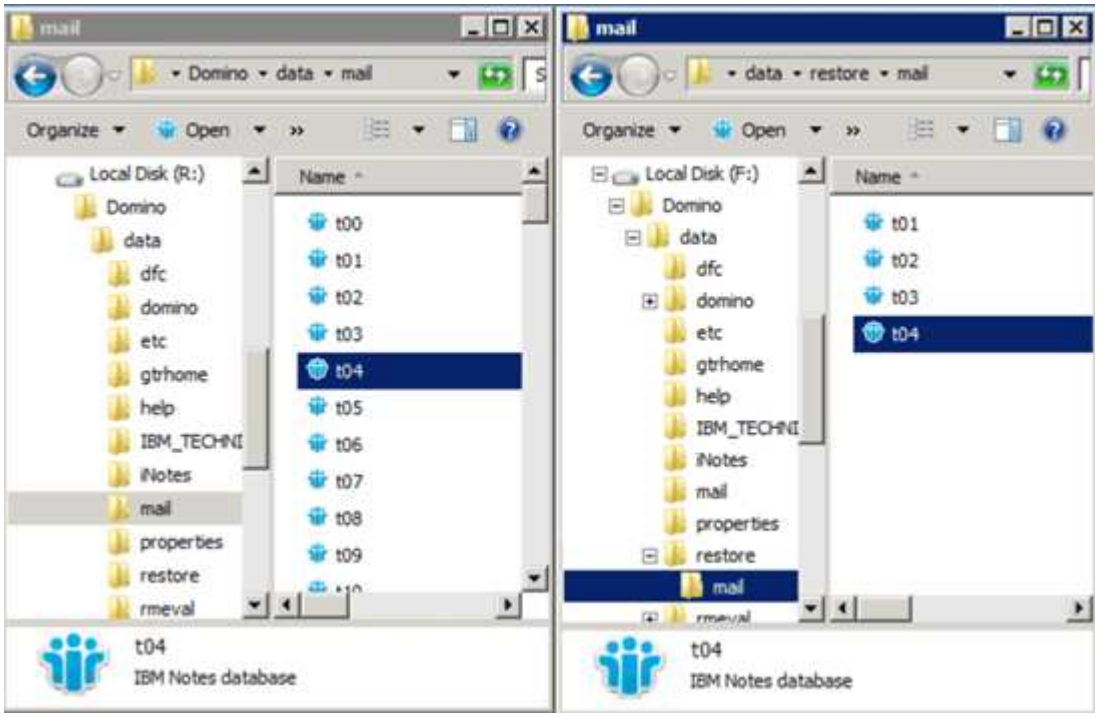
3. On the Provide a Storage System Name, Lun Path and Name page, optionally enter descriptive text for the LUN.
4. On theSelect a LUN Type page, leave the default.
5. On theSelect LUN Properties page, select the drive letter or mount point for the Snapshot copy.
6. On the iSCSI initiator/FC host bus adapter (HBA) page, select the iSCSI initiator or FC host bus adapter (HBA).
7. On the Management Type page, select the management type you want to use to map to the LUN: automatic or manual.
8. Click **Finish** to mount the Snapshot copy to the specified mount point.

Copying the file to the Data Restore Directory

After you have mounted the Snapshot copy for the file you want to restore, you can copy the file to the Data Restore Directory specified in the backup and restore configuration file.

1. Copy the file to be restored from the mounted Snapshot copy.
2. Paste the file in the Data Restore Directory specified in the backup and restore configuration file.

   The following example shows how you might copy the database file t04.nsf from the Snapshot copy mounted on the R: drive to the Data Restore Directory specified in the configuration file.



Using a Snap Creator custom action to complete restore processing

You can use a Snap Creator custom action to complete processing of restores originated

outside of Snap Creator.

You can perform this action in the Snap Creator CLI only.

1. In the Snap Creator CLI, enter the following command: snapcreator.exe ---action custom --server server --port port --user user --passwd password --profile profile --config config --params snapname=snapshot_name datapath=datapath restoretype=u2m | su2m restoretime="MM/DD/YYYY HH:MM:SS" disablereplication=Y|N

   where

   - server is the host name or IP address of the Snap Creator Server.
   - port is the port number where the Snap Creator Server is running.
   - user is the name of the Snap Creator user.
   - password is the Snap Creator user's password.

     You can omit the --passwd option if you do not want to type the password in clear text. Snap Creator will prompt for the password when you execute the command

   - profile is the name of the Snap Creator profile.
   - config is the name of the Snap Creator configuration file.
   - snapshot_name is the name of the Snapshot copy from which you want to restore the file.
   - datapath is the pathname of the directory to which you want to restore the file.
   - restoretype is the type of restore to be performed:
     - u2m performs an up-to-the-minute restore.
     - su2m performs a selectable up-to-the-minute restore. Specify the date and time to which you want to play forward Domino transaction logs in MM/DD/YYYY HH:MM:SS format in the --restoretime option. For example, 01/23/2014 12:45:00.
   - disablereplication disables Domino replication:
     - Enter N (default) to allow Domino replication. The plug-in uses an existing Domino replica ID for the restored database file.

       An alternative method to allow Domino replication is to leave this parameter out of the command.

     - Enter Y to disable Domino replication. The plug-in sets a new Domino replica ID for the restored database file. NOTE: Appending --verbose to the command will show additional information about the restore operation. Otherwise, you are immediately returned to the command prompt when the command finishes executing.

```
snapcreator.exe --action custom --server Tampico --port 8443
--user admin --profile Domino --config Nantes
--params snapname=Nantes-Test_Policy_20140123121459
datapath=F:\Domino\data\restore\mail\t04.nsf
restoretype=su2m restoretime="01/23/2014 12:45:00"
disablereplication=y
```

Disconnecting the Snapshot Copy

You need to disconnect the mounted Snapshot copy when the restore operation is complete.

The following procedure shows how to disconnect a mounted Snapshot copy on a Windows Server 2008 host. SnapDrive for Windows and the Snap Creator Agent must be running on the host.

1. In Server Manager, click **Storage** > **SnapDrive** > **physical_server_name** > **Disks**.
2. In the Disk Identification pane, select the mounted disk and click **Disconnect Disk** in the right-click menu.
3. In the Disconnect Disk dialog, click **Yes**.

Viewing job status and logs

You can view the status of a job in the Snap Creator Job Monitor. You can view a log of job actions in the Console pane while the job is running, or in the Out Log for the job. A number of specialized logs also are available.

You can view the following logs in the GUI:

Log	Description
Out	Provide verbose-level information for a job.
Debug	Provides verbose-level information plus information useful in debugging.
GUI	Provides information about Snap Creator GUI actions.
Stderr	Provides information about errors written to standard error (Reports pane only).
Error	Provides all error information (Reports pane only).

You can view all the logs in a text editor if you prefer not to use the Job Monitor or Reports pane. Logs reside in the installation directory for the Snap Creator Server.

Related information

Viewing job status and logs in the Job Monitor

Viewing logs in the Reports pane

Using scdump to gather logs in a compressed format

Viewing job status and logs in the Job Monitor

The Snap Creator Job Monitor is a dashboard-like interface for Snap Creator jobs. You can use the Job Monitor to view job status and download logs.

The Job Monitor indicates job status as follows:

-  indicates a job in progress.
-  indicates a job that has completed successfully.
-  indicates a job that completed with errors.
-  indicates a job that failed.

1. In the Profiles and Configurations pane, select the configuration file and click **Management** > **Job Monitor** at the top of the Snap Creator Framework window.

   The Job Monitor pane is displayed, where you can view job status.

2. Select a job, then click **Download Logs** > **Log_Type**, where Log_Type is one of the following:
   - **Out Logs** provide verbose-level information for a job.
   - **Debug Logs** provides verbose-level information plus information useful in debugging.
   - **GUI Logs** provides information about Snap Creator GUI actions.The GUI log is not specific to the job that is selected.
3. In the download dialog, click **Open** or **Save** as required.

Viewing logs in the Reports pane

You can view logs in the Snap CreatorReports pane, in the same format used to display them in the Console pane. You can view error logs as well as standard logs in the Reports pane.

1. At the top of the Snap Creator Framework window, click **Reports** > **Logs**.
2. In the Reports pane, select the profile, configuration file, log type, and log file, where log types are as follows:
   - **Out Logs** provide verbose-level information for a job.
   - **Debug Logs** provides verbose-level information plus information useful in debugging.
   - **Stderr Logs** provides information about errors written to standard error.
   - **Error Logs** provides all error information. **Note:** Depending on the job size, choosing **Debug Log** can cause the browser to become slow or unresponsive.
3. Click:
   - **Download Selected Log** to download the selected log.
   - **Download GUI Logs** to download the GUI logs. In the download dialog, click **Open** or **Save** as required.

Using scdump to gather logs in a compressed format

You can use the Snap Creatorscdump action to gather logs into a compressed file archive. You can then send the archive to technical support or a Snap Creator expert for review.

You should have created a backup and restore configuration file.

An scdump includes the following files:

File	Description
scdump.txt	Contains theSnap Creator Agent version and host operating system, the Data ONTAP release, and the Domino version.
engine.log	Contains information on Snap Creator workflow engine operations.
gui.log	Contains information on Snap Creator GUI operations and messages. Multiple logs may be included.
sc_server.log	Contains detailed information on Snap Creator Server operations. Multiple logs may be included.
out logs	Contain verbose-level information for jobs. Output logs for all configurations in the selected profile are included.
debug logs	Contain verbose-level information plus information useful in debugging. Debug logs for all configurations in the selected profile are included.
error logs	Contain error information for logs. Error logs for all configurations in the selected profile are included.
configuration files	All configuration files in the selected profile are included, including global configuration files.

Although a configuration file is the input for scdump, the utility gathers information for all configurations in the parent profile.

1. In the Profiles and Configurations pane, select a configuration file and click **Actions** > **scdump**.

   scdump gathers logs and other files into a compressed file archive.

2. In the download dialog, click **Open** or **Save** as required.

Troubleshooting Domino plug-in-specific errors

Common Snap Creator errors fall into two categories: generic Snap Creator errors and Domino plug-in-specific errors. Domino plug-in-specific errors typically involve preinstallation issues, bad databases, or problems with a custom restore action.

For information about generic Snap Creator errors, see the Snap Creator Framework 4.1.2 Administration Guide.

Domino plug-in is not supported on this platform

You typically receive this error when the prerequisites for the Domino plug-in have not been met. Generally, the error message is similar to the following:

```
Failed to load plug-in domino. Reason: ERROR: [ltd-00009] Domino plug-in
couldn't be loaded. Reasons could be 1) Domino plug-in is not supported
on this platform.
```

The following error message has also been known to appear:

```
ERROR: [tampico:9090(4.1.x)] SCF-00038: Application quiesce for
plug-in [domino] failed with exit code [99], continuing with backup.
```

As well as this one:

```
ERROR: [scf-00094] Application environment set for plug-in domino failed
[ERROR: [scf-00060] unknown application object [app] / application domino
at snapcreator.pl line 6410.
```

These errors messages appear if one of the following conditions is not met:

- Preinstallation steps were not performed or were performed incorrectly:
  - On UNIX hosts, you must create symbolic links to IBM Domino shared object files.
  - On Windows hosts, you must add the IBM Domino installation path to the PATH environment variable. For more information, see the Snap Creator Framework 4.1.2 Installation Guide.
- The bit level of Domino is different from the bit level of Snap Creator. For example, if you are using 32-bit Domino, you should use 32-bit Snap Creator.

Snap Creator backup fails because of a bad database

By default, a backup operation will fail if one or more databases are in an inconsistent or corrupted state. You can force the plug-in to proceed with backup operations despite errors, as described in step task using the gui to create a configuration file.

Domino restore using custom action fails

Restore errors typically occur when restore paths are not set correctly. Check the paths for extra characters and backslashes. Also, verify that the Data Restore Directory is set correctly.

Errors are similar to the following:

```
########## Custom plug-in action ##########
[Thu Apr 19 16:05:55 2012] DEBUG: Restoring to current time.
[Thu Apr 19 16:05:55 2012] DEBUG: Calling dominocore::postRestoreToTime
with
arguments(C:\Lotus\Domino\notes.ini,F:\Domino\data\,H:\changeinfo\fuji15-
daily_20120419130836,-1,F:\Domino\data\restore\mail\dadams.nsf,UP-TO-THE-
MINUTE,H:\changeinfo\logs\)
[Thu Apr 19 16:05:55 2012] TRACE: Notes API initialized
Applying Change info for:F:\Domino\data\restore\mail\dadams.nsf
Error: unable to open file 'H:\changeinfo\fuji15-
daily_20120419130836/restore_mail_dadams.nsf.info', for path
'F:\Domino\data\restore\mail\dadams.nsf'.
Error:5114
NSFRecoverDatabases failed for
database:F:\Domino\data\restore\mail\dadams.nsf
Recovery Manager: Recovery only supported for Backup Files.ERROR_CODE:5114
[Thu Apr 19 16:05:55 2012] ERROR: [ltd-00008] Restoring databases finished
with errors
[Thu Apr 19 16:05:55 2012] ERROR: [scf-00154] Action custom for plugin
domino failed with exit code 1, Exiting!
[Thu Apr 19 16:05:55 2012] DEBUG: Exiting with error code - 2
```

All Domino plug-in-specific errors

The following table lists the IBM Domino plug-in-specific error messages in reference format:

Error code	Error message	Description/resolution
ltd-00001	Domino plug-in cannot work with SNAP_TIMESTAMP_ONLY = N. SNAP_TIMESTAMP_ONLY should be set to Y.	For more information, see step task_using_the_gui_to_create_a_configuration_file.md#STEP_81795CF9D6294AC891BC3D0CE4827CA3.
ltd-00002	Quiescing databases finished with errors	Domino plug-in was unable to put all databases in backup mode. Check the logs to find the exact reason for the error or run Snap Creator in debug mode to find the error.
ltd-00003	Unquiescing databases finished with errors	Domino plug-in was unable to take all databases out of backup mode. Check the logs to find the exact reason for the error or run Snap Creator in debug mode to find the error.

Error code	Error message	Description/resolution
ltd-00004	Discovering databases failed	An application error caused application discovery to fail. Check the configuration and application settings. You can disable automatic discovery by setting APP_AUTO_DISCOVERY=N and commenting out VALIDATE_VOLUMES.
ltd-00005	Collection of operating system information failed - $@	An error collecting operating system information caused the scdump action to fail. Check the logs and try running the command manually.
ltd-00006	Collection of SnapDrive information failed - $@	An error collecting SnapDrive information caused the scdump action to fail. Check the logs and try running the command manually.
ltd-00008	Restoring databases finished with errors	Domino plug-in was unable to restore all the databases successfully. Check the logs to find the exact reason for the error or run Snap Creator in debug mode to find the error.
ltd-00009	Domino plug-in cannot be run as root	Reasons could be: • Domino plug-in is not supported on this platform. • Prerequisites for the Domino plug-in to run are not satisfied. For more information, see Domino plug-in is not supported on this platform.
ltd-00010	Errors encountered while opening databases	Check the logs to find the exact reason for the error or run Snap Creator in debug mode to find the error.

Where to go next

You can find more information about Snap Creator, including release-specific information, on the NetApp Support Site.

- Snap Creator Framework 4.3.3 Installation Guide

  Describes how to install the Snap Creator Agent and Snap Creator Server. The Snap Creator Agent installation includes the IBM Domino plug-in.

- Snap Creator Framework 4.3.3 Administration Guide

  Describes how to administer the Snap Creator Framework after installation is complete.

- Snap Creator Framework 4.3 Release Notes

  Describes new features of, important cautions for, known problems with, and limitations of Snap Creator Framework 4.1.1.

- SnapDrive 7.1 for Windows Installation Guide

  Describes how to install SnapDrive for Windows.

- ONTAP 9 Cluster Peering Express Guide

  Describes how to quickly configure peer relationships between clusters and Storage Virtual Machines (SVMs).

- ONTAP 9 Volume Disaster Recovery Preparation Express Guide

  Describes how to prepare a storage system for SnapMirror replication.

- ONTAP 9 Volume Disaster Recovery Express Guide

  Describes how to prepare a storage system for SnapMirror recovery.

- ONTAP 9 Volume Backup Using SnapVault Express Guide

  Describes how to prepare a storage system for SnapVault replication.

- NetApp Technical Report 3917: Best Practices for Domino on NetApp

  Describes best practices for the IBM Domino plug-in.

- Technical Report 3588: Integrating Domino 8.5 for Windows 2008 with a NetApp Storage System

  Describes how to integrate IBM Domino 8.5 for Windows 2008 with a NetApp storage system.

- Technical Report 3691: Integrating IBM Domino 8.5 for Linux with a NetApp Storage System

  Describes how to integrate IBM Domino 8.0.2 for Linux with a NetApp storage system.

- Technical Report 3723: Deploying Domino 8.0.2 in an AIX and NetApp Environment Using NFS

  Describes how to integrate IBM Domino 8.0.2 for AIX with a NetApp storage system.

- Snap Creator Framework Discussions

  Enables you to connect with peers, ask questions, exchange ideas, find resources, and share Snap Creator best practices.

- NetApp Video: SnapCreatorTV

  Enables you to view videos that demonstrate key Snap Creator technologies.

SAP HANA Plug-in Operations Guide

You can configure and use the SAP HANA plug-in for Snap Creator 4.3.3 to back up and restore SAP HANA databases.

SAP HANA backup and restore solution overview

Corporations today require their SAP applications to be available 24 hours a day, seven days a week. Consistent levels of performance are expected regardless of increasing data volumes and routine maintenance tasks such as system backups.

Running SAP database backups can have a significant performance effect on a production SAP system. Because backup windows are shrinking and the amount of data that needs to be backed up is increasing, it is difficult to define a point in time when backups can be performed with minimal effect on business processes. The time needed to restore and recover SAP systems is of particular concern because the downtime must be minimized.

Considerations for backing up SAP HANA systems

SAP HANA administrators must deliver a reliable level of service, minimizing downtime or performance degradation due to backups.

To deliver this level of service, SAP HANA administrators contend with challenges in the following areas:

- Performance effect on production SAP systems

  Backups typically have a significant performance impact on the production SAP system because there is a heavy load on the database server, the storage system, and the storage network during backups.

- Shrinking backup windows

  Backups can be created only during times with low I/O or batch activities occurring on the SAP system. It is very difficult to define a backup window when the SAP system is active all the time.

- Rapid data growth

  Rapid data growth together with shrinking backup windows result in ongoing investments in the backup infrastructure: more tape drives, new tape drive technology, faster storage networks. Growing databases also result in more tape media or disk space for backups. Incremental backups can address these issues, but result in a very slow restore process, which is usually not acceptable.

- Increasing cost of downtime

  Unplanned downtime of an SAP system always has a financial effect on the business. A significant part of the unplanned downtime is the time that is required to restore and recover the SAP system in case of a failure. The backup and recovery architecture must be designed based on an acceptable recovery time objective (RTO).

- Backup and recovery time

  Backup and recovery time are included in SAP upgrade projects. The project plan for a SAP upgrade always includes at least three backups of the SAP database. The time required to perform these backups

reduces the total available time for the upgrade process. The decision whether to backup and recover is generally based on the amount of time required to restore and recover the database from the backup that was created previously. The option to restore very quickly provides more time to solve problems that might occur during the upgrade rather than just restore the system back to its previous state.

The NetApp solution

A database backup can be created in minutes by using NetApp Snapshot technology. The time needed to create a Snapshot copy is independent of the size of the database because a Snapshot copy does not move any data blocks.

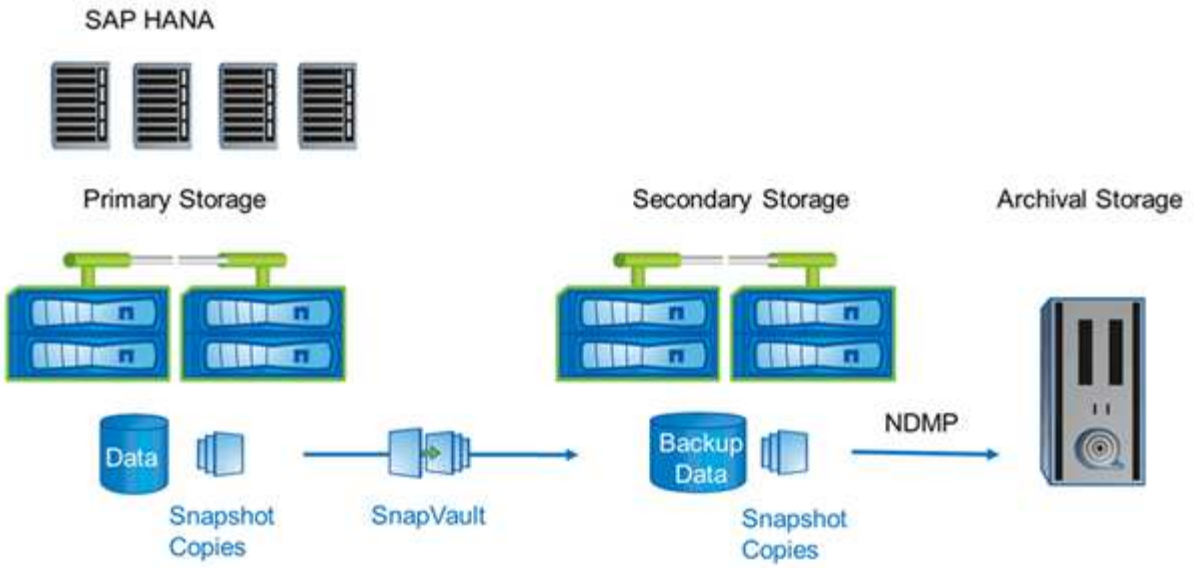
The use of Snapshot technology also has no performance effect on the production SAP system. Therefore, the creation of Snapshot copies can be scheduled without having to consider peak activity periods. SAP and NetApp customers typically schedule several online Snapshot backups during the day. For example, backups might occur every four hours. These Snapshot backups are typically kept for three to five days on the primary storage system.

Snapshot copies also provide key advantages for the restore and recovery operation. NetApp SnapRestore functionality allows restoring the entire database or parts of the database to the point in time when any available Snapshot copy was created. This restore process is done in a few minutes, independently of the size of the database. The time needed for the recovery process is also dramatically reduced, because several Snapshot copies have been created during the day, and fewer logs need to be applied.

Snapshot backups are stored on the same disk system as the active online data. Therefore NetApp recommends using Snapshot backups as a supplement, not a replacement for backups to a secondary location such as disk or tape. Although backups to a secondary location are still necessary, there is only a slight probability that these backups will be needed for restore and recovery. Most restore and recovery actions are handled by using SnapRestore on the primary storage system. Restores from a secondary location are only necessary if the primary storage system holding the Snapshot copies is damaged or if it is necessary to restore a backup that is no longer available from a Snapshot copy. For example, you might need to restore a backup from two weeks ago.

A backup to a secondary location is always based on Snapshot copies created on the primary storage. Therefore, the data is read directly from the primary storage system without generating load on the SAP database server. The primary storage communicates directly with the secondary storage and sends the backup data to the destination using the SnapVault disk-to-disk backup. The NetApp SnapVault functionality offers significant advantages compared to traditional backups. After an initial data transfer, in which all the data has to be transferred from the source to the destination, all subsequent backups copy only the changed blocks to the secondary storage. This significantly reduces the load on the primary storage system and the time needed for a full backup. A full database backup requires less disk space because SnapVault stores only the changed blocks at the destination.

Backing up data to tape as a long-term backup might still be required. This could be, for example, a weekly backup that is kept for a year. In this case, the tape infrastructure can be directly connected to the secondary storage, and the data could be written to tape by using the Network Data Management Protocol (NDMP).



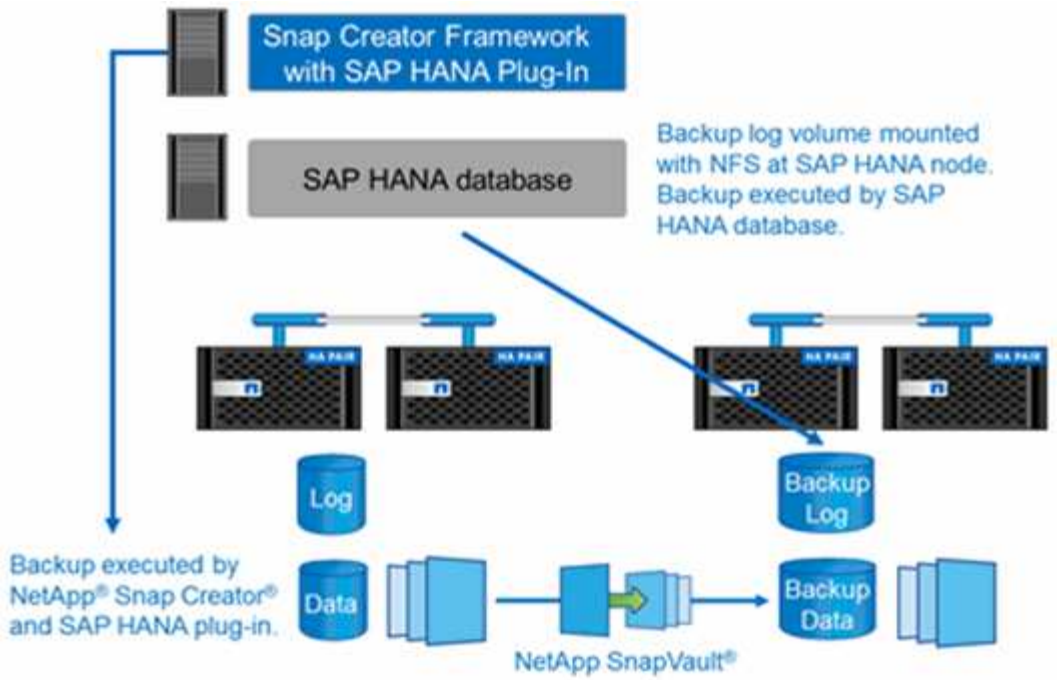
Backup solution components

The Snap Creator backup solution for SAP HANA consists of SAP HANA data file backup using storage-based Snapshot copies, replication of data file backups to a secondary offsite backup location, SAP HANA log file backup using the HANA database log backup functionality, database block integrity check using a file-based backup, and housekeeping of data file, log file backups, and the SAP HANA backup catalog.

Database backups are executed by Snap Creator in conjunction with a plug-in for SAP HANA. The plug-in ensures database consistency so that the Snapshot copies that are created on the primary storage system are based on a consistent image of the SAP HANA database.

Snap Creator allows you to replicate the consistent database images to a secondary storage using SnapVault. Typically, there will be different retention policies defined for the backups at the primary storage and the backups at the secondary storage. Snap Creator handles the retention at the primary storage as well as the secondary storage.

The log backup is executed automatically by the SAP HANA database tools. The log backup destination should not be on the same storage system where the log volume of the database is located. Configuring the log backup destination on the same secondary storage where the database backups get replicated with SnapVault is recommended. With this configuration, the secondary storage has similar availability requirements as the primary storage so that it is certain that the log backups can always be written to the secondary storage.



The backup schedules and retention policies must be defined based on customer requirements. The following table shows an example configuration of the different schedules and retention policies.

	Executed by Snap Creator	Primary storage	Secondary storage
Database backups	Schedule 1: every 4 hours	Retention: 6 (=> 6 hourly Snapshot copies)	Retention: 6 (=> 6 hourly Snapshot copies)
Schedule 2: once per day	Retention: 3 (=> 3 daily Snapshot copies)	Retention: 28 (4 weeks) (=> 28 daily Snapshot copies)	Log backups
SAP HANA database tools schedule: every 15 minutes	NA	Retention: 28 days (4 weeks)	Block integrity check

With this example, six hourly and three daily backups are kept at the primary storage. At the secondary storage, the database backups are kept for four weeks. To be able to recover any of the data backups, you must set the same retention for the log backups.

SAP HANA plug-in overview

The SAP HANA plug-in works in conjunction with the Snap Creator Framework to provide a backup solution for SAP HANA databases that rely on a NetApp storage back end. The Snapshot backups created by Snap Creator are registered in the HANA Catalog and are visible in HANA Studio.

Snap Creator Framework supports two types of SAP HANA databases: single containers and multitenant database containers (MDC) single tenant database.

Snap Creator and the SAP HANA plug-in are supported with Data ONTAP operating in 7-Mode and clustered Data ONTAP with the SAP HANA database nodes attached to the storage controllers using either NFS or Fibre Channel. The required interfaces to the SAP HANA database are available for Service Pack Stack (SPS) 7 and later.

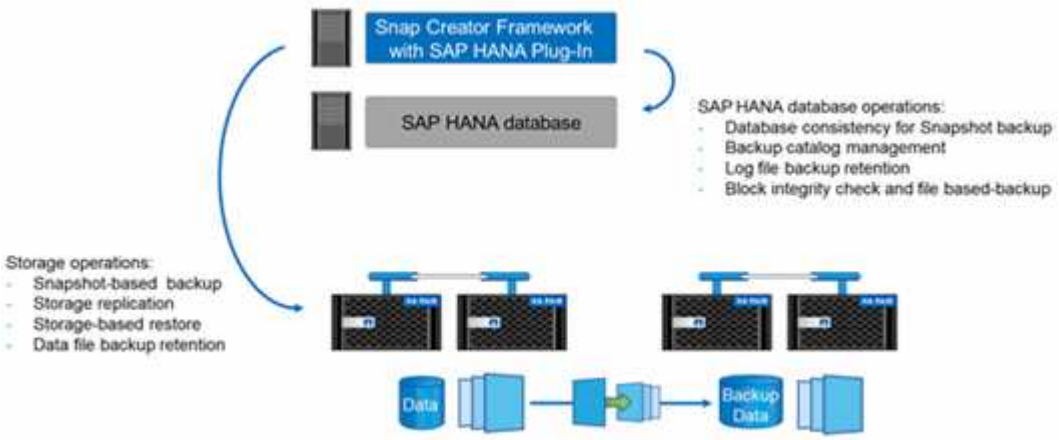
The Snap Creator Framework communicates with the storage systems to create Snapshot copies and to replicate the data to a secondary storage using SnapVault. Snap Creator is also used to restore the data either with SnapRestore at the primary storage or with SnapVault restore from the secondary storage.

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

The Snap Creator plug-in for SAP HANA uses the SAP HANA hdbsql client to execute SQL commands for the following tasks:

- Provide database consistency to prepare a storage-based Snapshot backup
- Manage log file backup retention on file system level
- Manage the SAP HANA backup catalog for data file and log file backups
- Execute a file-based backup for block integrity check

The following illustration shows an overview of the communication paths of Snap Creator with the storage and the SAP HANA database.



Snap Creator performs the following steps to back up the database:

1. Creates an SAP HANA database Snapshot copy to obtain a consistent image on the persistence layer.
2. Creates a storage Snapshot copy of the data volume(s).
3. Registers the storage Snapshot backup within the SAP HANA backup catalog.
4. Deletes the SAP HANA Snapshot copy.
5. Executes a SnapVault update for the data volume.
6. Deletes the storage Snapshot copies at the primary and/or secondary storage, based on the defined retention policies for backups at the primary and secondary storage.
7. Deletes the SAP HANA backup catalog entries if the backups do not exist anymore at the primary and the secondary storage.
8. Deletes all log backups that are older than the oldest data backup on the file system and within the SAP HANA backup catalog.

Requirements

The SAP HANA plug-in enables you to create backups and perform point-in-time recovery of HANA databases.

Support for the SAP HANA plug-in is as follows:

- Host operating system: SUSE Linux Enterprise Server (SLES), 32-bit and 64-bit
- Clustered Data ONTAP or Data ONTAP operating in 7-Mode
- At least one SAP HANA database node attached via NFS
- SAP HANA running Service Pack Stack (SPS) 7 or later

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

Required licenses

The primary storage controllers must have a SnapRestore and SnapVault license installed. The secondary storage must have a SnapVault license installed.

No license is required for Snap Creator and the Snap Creator SAP HANA plug-in.

Capacity requirements for Snapshot backups

A higher block change rate on the storage layer has to be considered compared to the change rate with traditional databases. Due to the table merge process of the column store, much more data than just the block changes is written to disk. Until more customer data is available, the current estimation for the change rate is 20% to 50% per day.

Installing and configuring required software components

For the SAP HANA backup and restore solution using the Snap Creator Framework and the SAP HANA plug-in, you need to install Snap Creator software components and the SAP HANA hdbsql client software.

You do not need to install the plug-in separately. It is installed with the Agent.

1. Install the Snap Creator Server on a host that shares network connectivity with the host where you install the Agent.
2. Install the Snap Creator Agent on a host that shares network connectivity with the Snap Creator Server host.
   - In a single SAP HANA node environment, install the Agent on the database host. Alternately, install the Agent on another host that has network connectivity to the database host and the Snap Creator Server host.
   - In a multinode SAP HANA environment, you should not install the Agent on the database host; the Agent needs to be installed on a separate host that has network connectivity to the database host and the Snap Creator Server host.
3. Install the SAP HANA hdbsql client software on the host where you installed the Snap Creator Agent.

Configure the user store keys for the SAP HANA nodes that you manage through this host.

```
mgmtsrv01:/sapcd/HANA_SP5/DATA_UNITS/HDB_CLIENT_LINUXINTEL # ./hdbinst

SAP HANA Database Client installation kit detected.

SAP HANA Database Installation Manager - Client Installation
1.00.46.371989
************************************************************************
***

Enter Installation Path [/usr/sap/hdbclient32]:
Checking installation...
Installing and configuring required software components | 13
Preparing package "Product Manifest"...
Preparing package "SQLDBC"...
Preparing package "ODBC"...
Preparing package "JDBC"...
Preparing package "Client Installer"...
Installing SAP HANA Database Client to /usr/sap/hdbclient32...
Installing package 'Product Manifest' ...
Installing package 'SQLDBC' ...
Installing package 'ODBC' ...
Installing package 'JDBC' ...
Installing package 'Client Installer' ...
Installation done
Log file written to '/var/tmp/hdb_client_2013-07-
05_11.38.17/hdbinst_client.log'
mgmtsrv01:/sapcd/HANA_SP5/DATA_UNITS/HDB_CLIENT_LINUXINTEL #
```

Related information

Snap Creator Framework Installation Guide

Setup assumptions in this guide

Though a typical Snap Creator installation assumes that the Server is installed on one host and the Agent is installed on a different host, the setup used in this guide is based on an SAP HANA multinode appliance.

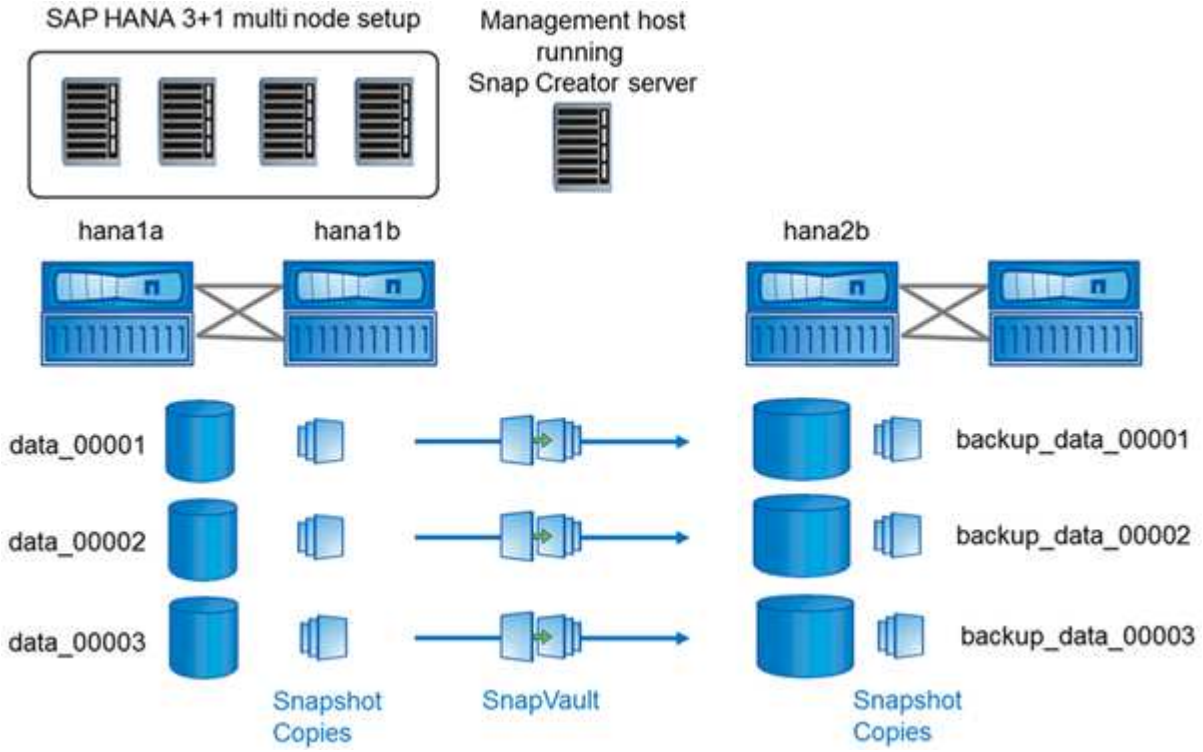
In this configuration, the SAP HANA database runs on a 3+1 database node configuration and all Snap Creator software components—Server, Agent, and plug-in—are installed on the same host.

The NetApp storage systems used in this setup are running Data ONTAP operating in 7-Mode. One high-availability (HA) controller pair is used on the storage layer. The data and log volumes of the three SAP HANA database nodes are distributed to both storage controllers. With the example setup, one storage controller of another HA controller pair is used as the secondary storage. Each data volume is replicated to a dedicated

backup volume on the secondary storage. The size of the backup volumes depend on the number of backups that will be kept at the secondary storage.

All Snap Creator and SAP HANA Studio operations described here are the same with storage systems running clustered Data ONTAP. However, the initial SnapVault configuration on the storage systems and all SnapVault commands that need to be executed directly on the storage are different with clustered Data ONTAP. The differences are highlighted and described in this guide.

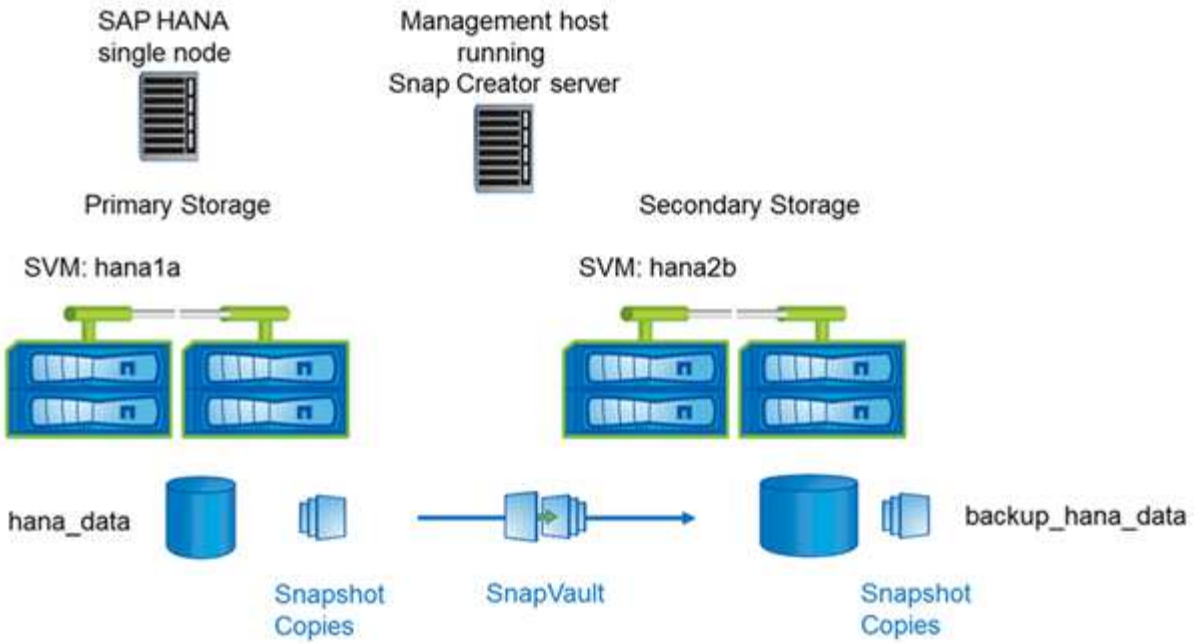
The following figure shows the data volumes on the primary storage and the replication path to the secondary storage:



All volumes that need to be backed up must be created on the secondary storage controller. In this example, the volumes backup_data_00001, backup_data_00002, and backup_data_00003 are created on the secondary storage controller.

Setup used with clustered Data ONTAP

The following figure shows the setup that has been used with clustered Data ONTAP. The setup is based on a single-node SAP HANA configuration with the storage virtual machines (SVMs) and volume names shown in the following illustration.



The way you prepare, start, resume, and restore SnapVault operations is different in clustered Data ONTAP and Data ONTAP operating in 7-Mode. These differences are called out in the corresponding sections of this guide.

Configuring data backups

After you install the required software components, follow these steps to complete the configuration:

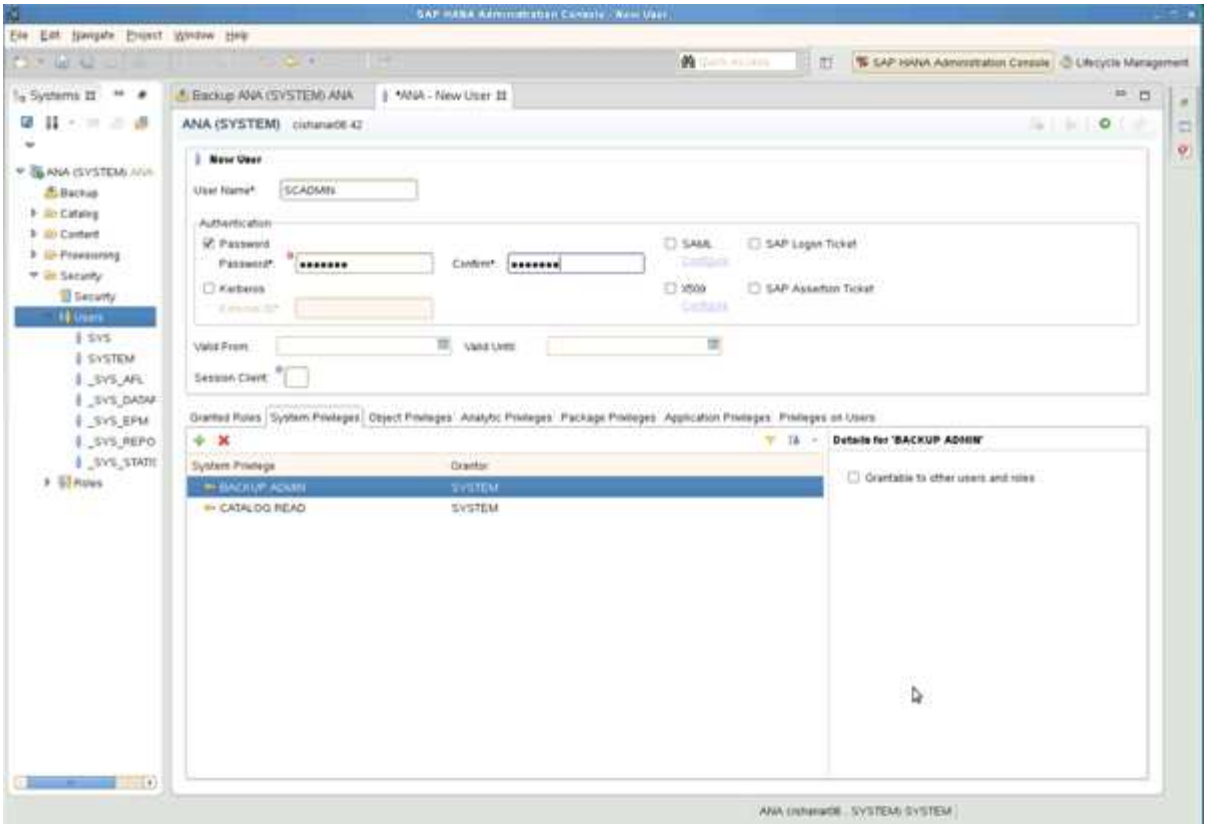
1. Configure a dedicated database user and the SAP HANA userstore.
2. Prepare SnapVault replication on all storage controllers.
3. Create volumes at secondary storage controller.
4. Initialize the SnapVault relationships for database volumes.
5. Configure Snap Creator.

Configuring the backup user and hdbuserstore

You should configure a dedicated database user within the HANA database to run the backup operations with Snap Creator. In a second step, you should configure a SAP HANA userstore key for this backup user. This userstore key is used within the configuration of the Snap Creator SAP HANA plug-in.

The backup user must have the following privileges:

- BACKUP ADMIN
- CATALOG READ



1. At the administration host, the host where Snap Creator got installed, a userstore key is configured for all database hosts that belong to the SAP HANA database. The userstore key is configured with the OS root user: hdbuserstore set keyhost 3[instance]15 userpassword
2. Configure a key for all four database nodes.

```
mgmtsrv01:/usr/sap/hdbclient32 # ./hdbuserstore set SCADMIN08
cishanar08:34215 SCADMIN Password
mgmtsrv01:/usr/sap/hdbclient32 # ./hdbuserstore set SCADMIN09
cishanar09:34215 SCADMIN Password
mgmtsrv01:/usr/sap/hdbclient32 # ./hdbuserstore set SCADMIN10
cishanar10:34215 SCADMIN password
mgmtsrv01:/usr/sap/hdbclient32 # ./hdbuserstore set SCADMIN11
cishanar11:34215 SCADMIN Password
mgmtsrv01:/usr/sap/hdbclient32 # ./hdbuserstore LIST
DATA FILE       : /root/.hdb/mgmtsrv01/SSFS_HDB.DAT

KEY SCADMIN08
  ENV : cishanar08:34215
  USER: SCADMIN
KEY SCADMIN09
  ENV : cishanar09:34215
  USER: SCADMIN
KEY SCADMIN10
  ENV : cishanar10:34215
  USER: SCADMIN
KEY SCADMIN11
  ENV : cishanar11:34215
  USER: SCADMIN
mgmtsrv01:/usr/sap/hdbclient32
```

Configuring SnapVault relationships

When you configure SnapVault relationships, the primary storage controllers must have a valid SnapRestore and SnapVault license installed. The secondary storage must have a valid SnapVault license installed.

1. Enable SnapVault and NDMP on the primary and the secondary storage controllers.

```
hana1a> options snapvault.enable on
hana1a> ndmp on
hana1a>
hana1b> options snapvault.enable on
hana1b> ndmpd on
hana1b
hana2b> options snapvault.enable on
hana2b> ndmpd on
hana2b>
```

2. On all primary storage controllers, configure the access to the secondary storage controller.

```
hana1a> options snapvault.access host=hana2b
hana1a>
hana1b> options snapvault.access host=hana2b
hana1b>
```

Using a dedicated network for replication traffic is recommended. In such cases, the host name of this interface at the secondary storage controller needs to be configured. Instead of hana2b, the host name could be hana2b-rep.

3. On the secondary storage controller, configure the access for all primary storage controllers.

```
hana2b> options snapvault.access host=hana1a,hana1b
hana2b>
```

Using a dedicated network for replication traffic is recommended. In such cases, the host name of this interface at the primary storage controllers needs to be configured. Instead of hana1b and hana1a the host name could be hana1a-rep and hana1b-rep.

Starting the SnapVault relationships

You need to start the SnapVault relationship with Data ONTAP operating in 7-Mode and clustered Data ONTAP.

Starting the SnapVault relationships with Data ONTAP operating in 7-Mode

You can start a SnapVault relationship with commands executed on the secondary storage system.

1. For storage systems running Data ONTAP operating in 7-Mode, you start the SnapVault relationships by running the following command:

```
hana2b> snapvault start -S hana1a:/vol/data_00001/mnt00001
/vol/backup_data_00001/mnt00001
Snapvault configuration for the qtree has been set.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
hana2b>
hana2b> snapvault start -S hana1a:/vol/data_00003/mnt00003
/vol/backup_data_00003/mnt00003
Snapvault configuration for the qtree has been set.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
hana2b>
hana2b> snapvault start -S hana1b:/vol/data_00002/mnt00002
/vol/backup_data_00002/mnt00002
Snapvault configuration for the qtree has been set.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
hana2b>
```

It is recommended that you use a dedicated network for replication traffic. In that case, configure the host name of this interface at the primary storage controllers. Instead of hana1b and hana1a, the host name could be hana1a-rep and hana1b-rep.

Starting the SnapVault relationships with clustered Data ONTAP

You need to define a SnapMirror policy before you start a SnapVault relationship.

1. For storage systems running clustered Data ONTAP, you start the SnapVault relationships by running the following command.

```
hana::> snapmirror policy create -vserver hana2b -policy SV_HANA
hana::> snapmirror policy add-rule -vserver hana2b -policy SV_HANA
-snapmirror-label daily -keep 20
hana::> snapmirror policy add-rule -vserver hana2b -policy SV_HANA
-snapmirror-label hourly -keep 10

hana::> snapmirror policy show -vserver hana2b -policy SV_HANA

                    Vserver: hana2b
    SnapMirror Policy Name: SV_HANA
               Policy Owner: vserver-admin
                Tries Limit: 8
           Transfer Priority: normal
 Ignore accesstime Enabled: false
   Transfer Restartability: always
                   Comment: -
     Total Number of Rules: 2
                 Total Keep: 8
                      Rules: Snapmirror-label  Keep Preserve Warn
                             ----------------- ---- -------- ----
                             daily              20  false      0
                             hourly             10  false      0
```

The policy must contain rules for all retention classes (labels) that are used in the Snap Creator configuration. The above commands show how to create a dedicated SnapMirror policy SV_HANA

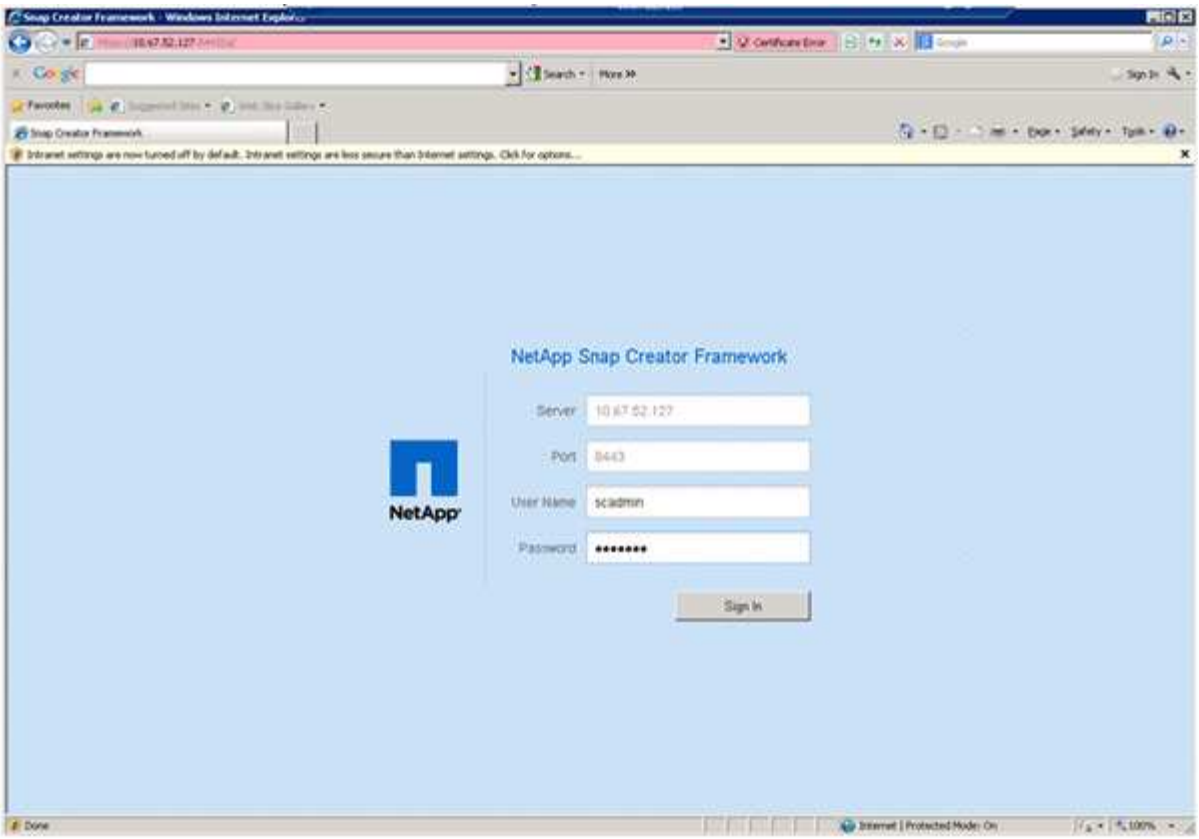
2. To create and start the SnapVault relationship on the cluster console of the backup cluster, run the following commands.

```
hana::> snapmirror create -source-path hana1a:hana_data -destination
-path
hana2b:backup_hana_data -type XDP -policy SV_HANA
Operation succeeded: snapmirror create the relationship with destination
hana2b:backup_hana_data.

hana::> snapmirror initialize -destination-path hana2b:backup_hana_data
-type XDP
```

Configuring the Snap Creator Framework and SAP HANA database backup

You must configure the Snap Creator Framework and the SAP HANA database backup.

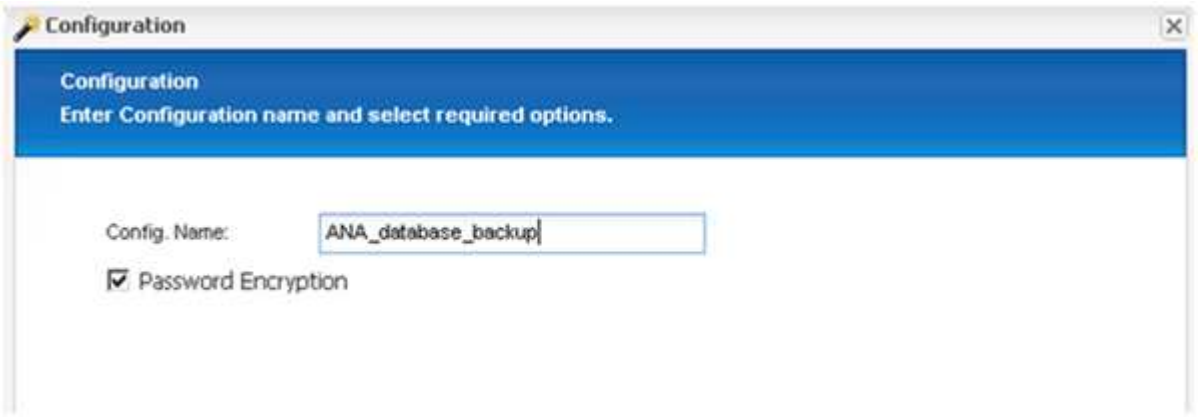
1. Connect to the Snap Creator graphical user interface (GUI): https://host:8443/ui/.
2. Log in using the user name and password that were configured during the installation. Click **Sign in**.



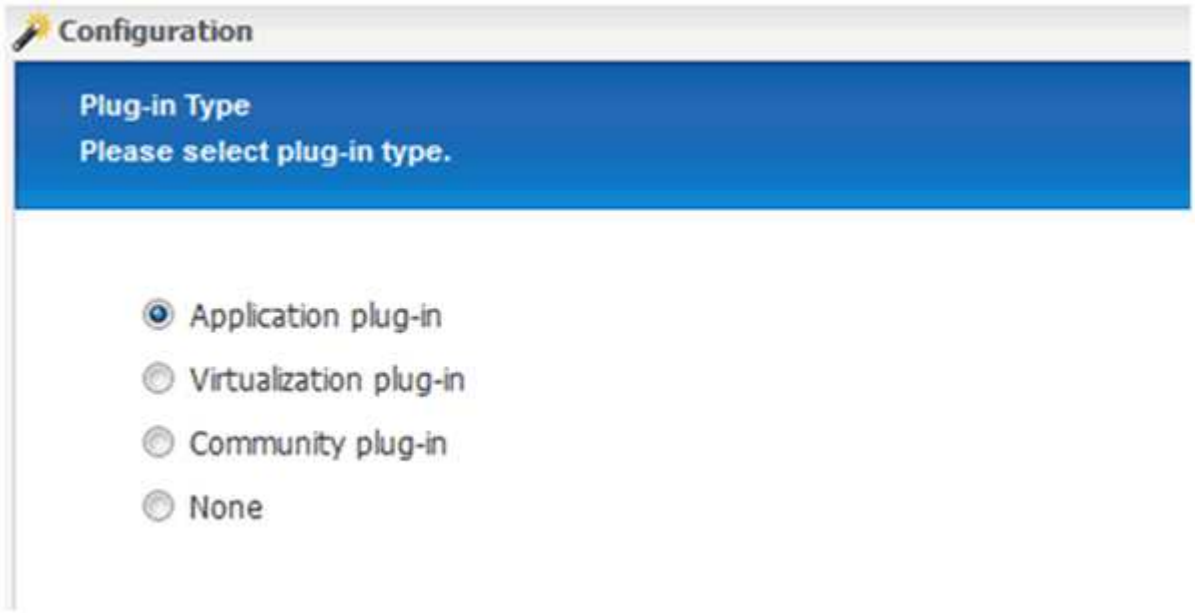
3. Enter a profile name and click **OK**.

For example, “ANA” is the SID of the database.

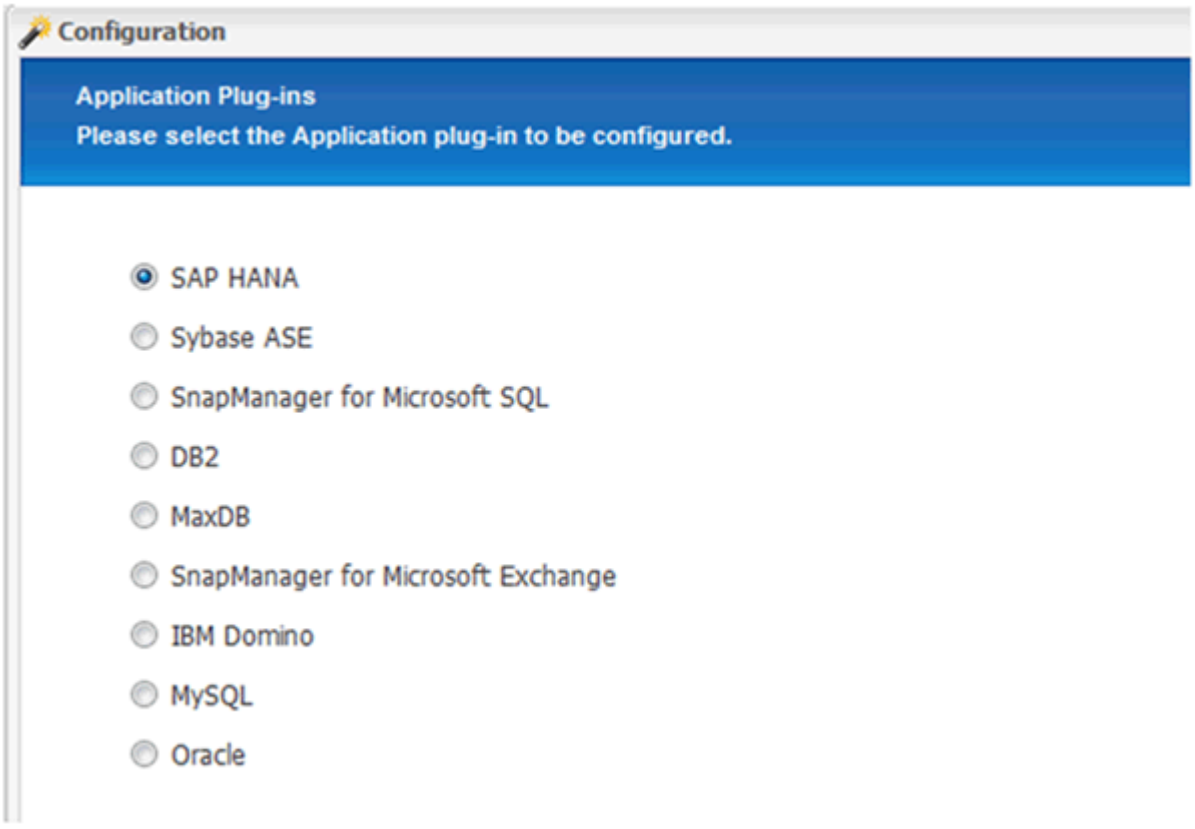
4. Enter the configuration name, and click **Next**.



5. Select **Application plug-in** as the plug-in type, and click **Next**.



6. Select **SAP HANA** as the application plug-in, and click **Next**.



7. Enter the following configuration details:

   a. Select **Yes** from the drop-down menu to use the configuration with a multitenant database. For a single container database select **No**.

   b. If Multitenant Database Container is set to **No**, you must provide the database SID.

   c. If Multitenant Database Container is set to **Yes**, you must add the hdbuserstore keys for each SAP

HANA node.

d. Add the name of the tenant database.

e. Add the HANA nodes on which the hdbsql statement must be executed.

f. Enter the HANA node instance number.

g. Provide the path to the hdbsql executable file.

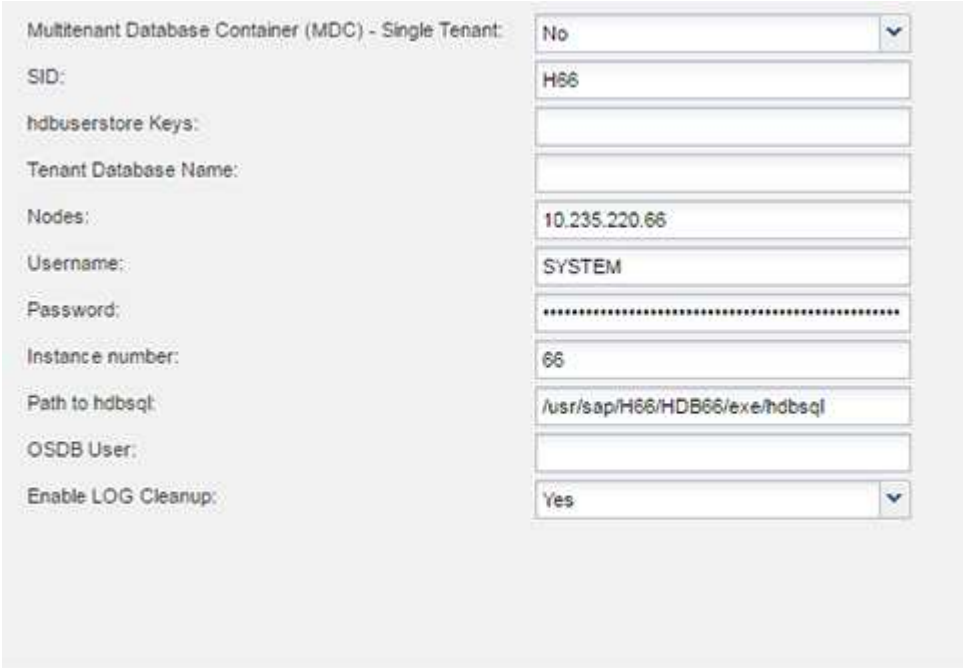
h. Add the OSDB user.

i. Select **Yes** from the drop-down list to Enable LOG Cleanup.

NOTE:

- Parameter `HANA_SID` is available only if the value for parameter `HANA_MULTITENANT_DATABASE` is set to `N`
- For multitenant database containers (MDC) with a “Single Tenant” resource type, the SAP HANA Snapshot copies work with UserStore Key based authentication. If the `HANA_MULTITENANT_DATABASE` parameter is set to `Y`, then the `HANA_USERSTORE_KEYS` parameter must be set to the appropriate value.
- Similar to non-multitenant database containers, the file-based backup and integrity check feature is supported

j. Click **Next**.



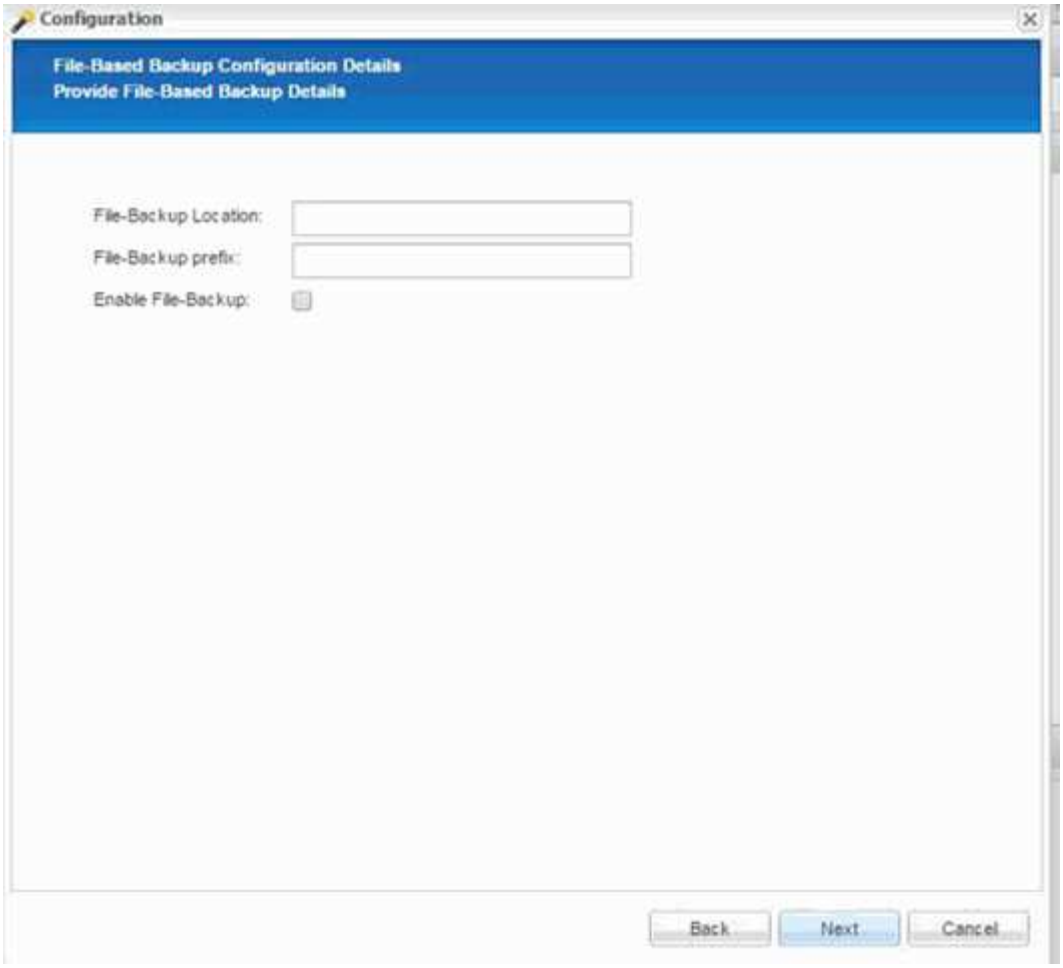
8. Enable the File-Based Backup operation:

a. Set the File-Backup Location.

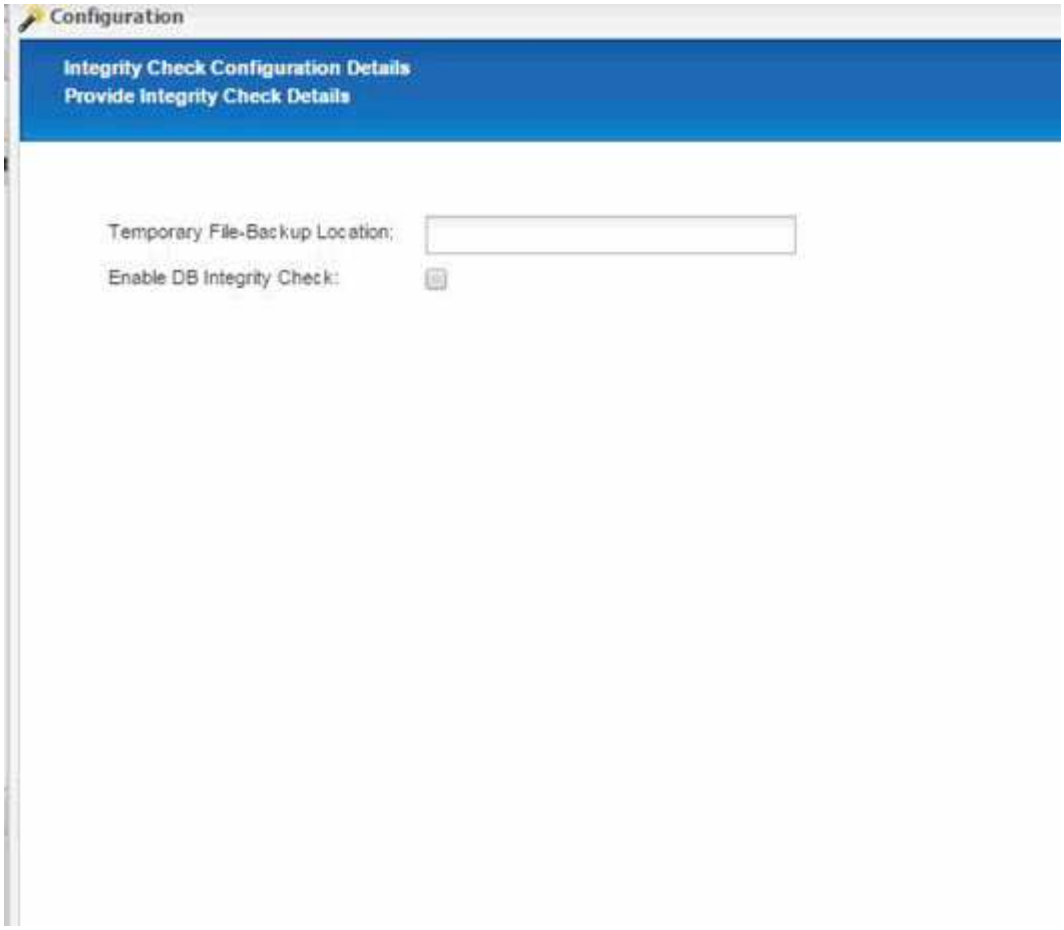
b. Specify the file-backup prefix.

c. Select the **Enable File-Backup** checkbox.

d. Click **Next**.

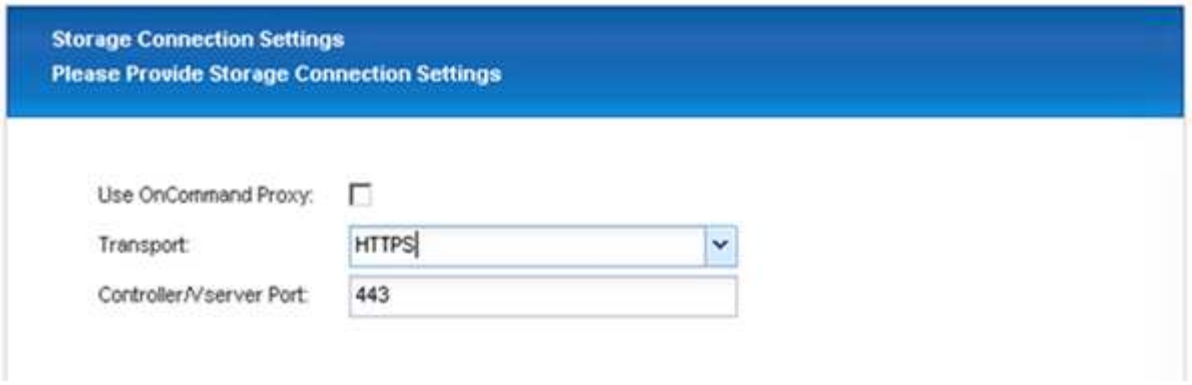


9. Enable the Database Integrity Check operation:
    a. Set the temporary File-Backup location.
    b. Select the **Enable DB Integrity Check** checkbox.
    c. Click **Next**.



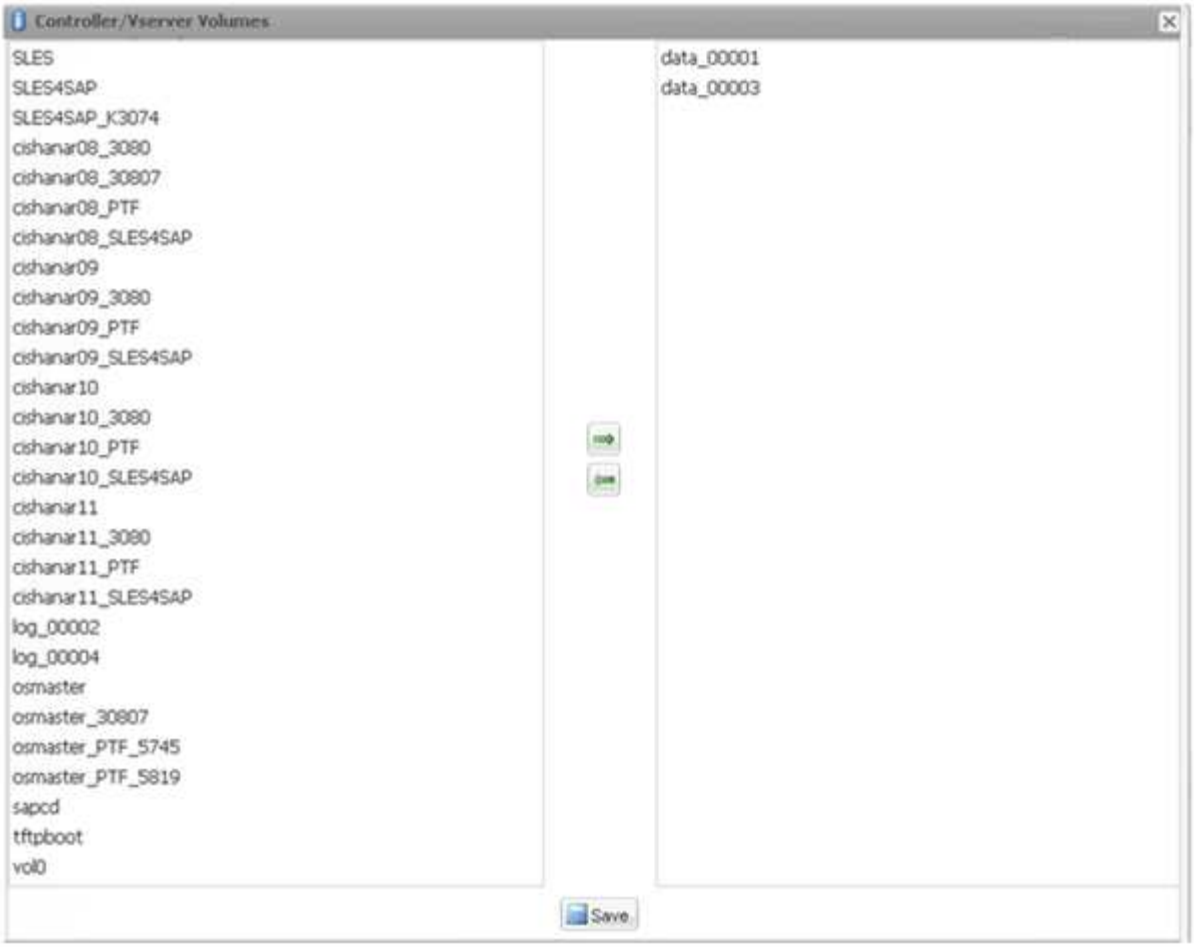
10. Enter the details for the agent configuration parameter, and click **Next**.

11. Enter the storage connection settings, and click **Next**.



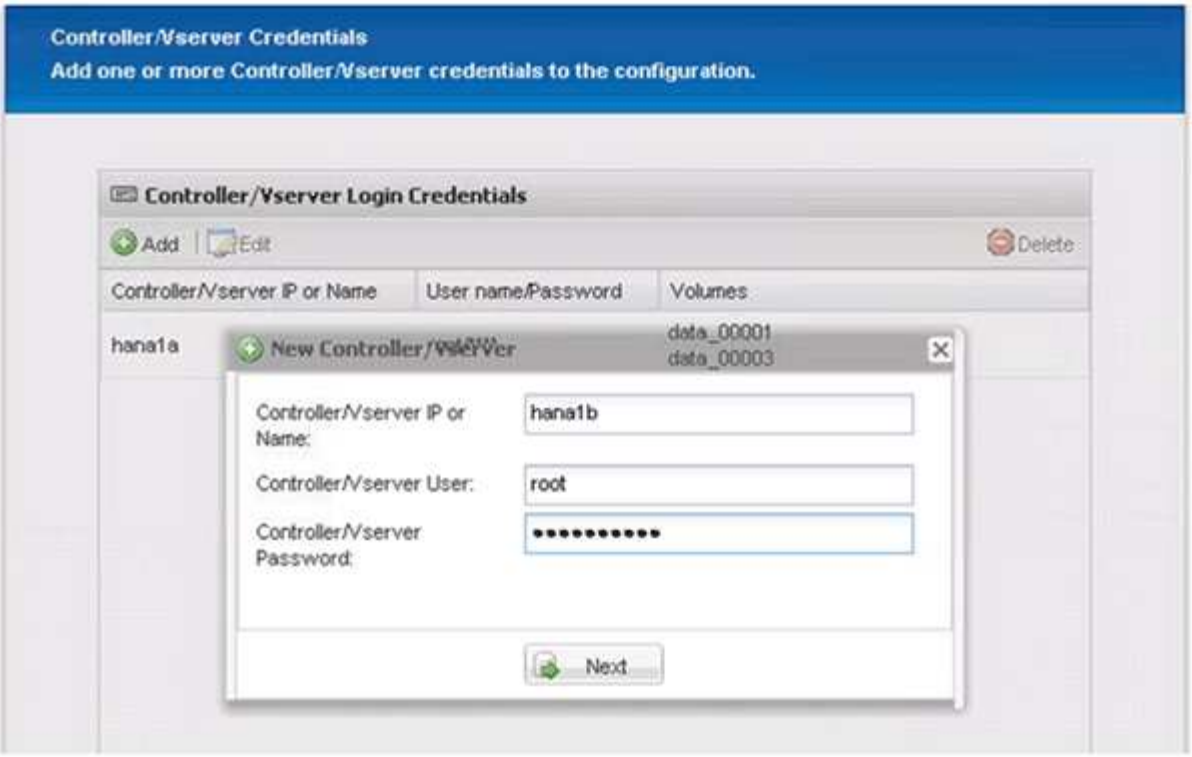
12. Enter the storage login credentials, and click **Next**.

13. Select the data volumes that are stored on this storage controller, and click **Save**.

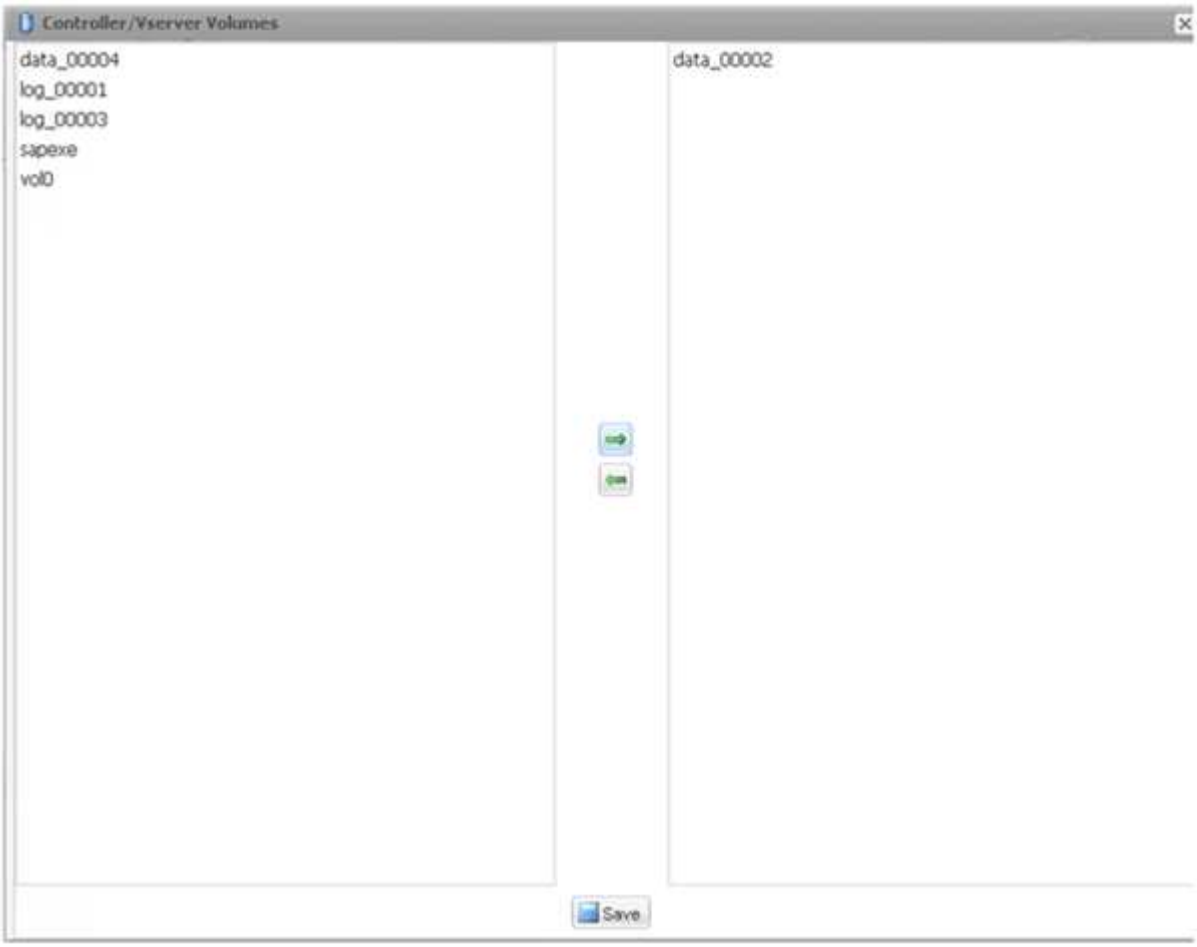


14. Click **Add** to add another storage controller.

15. Enter the storage login credentials, and click **Next**.

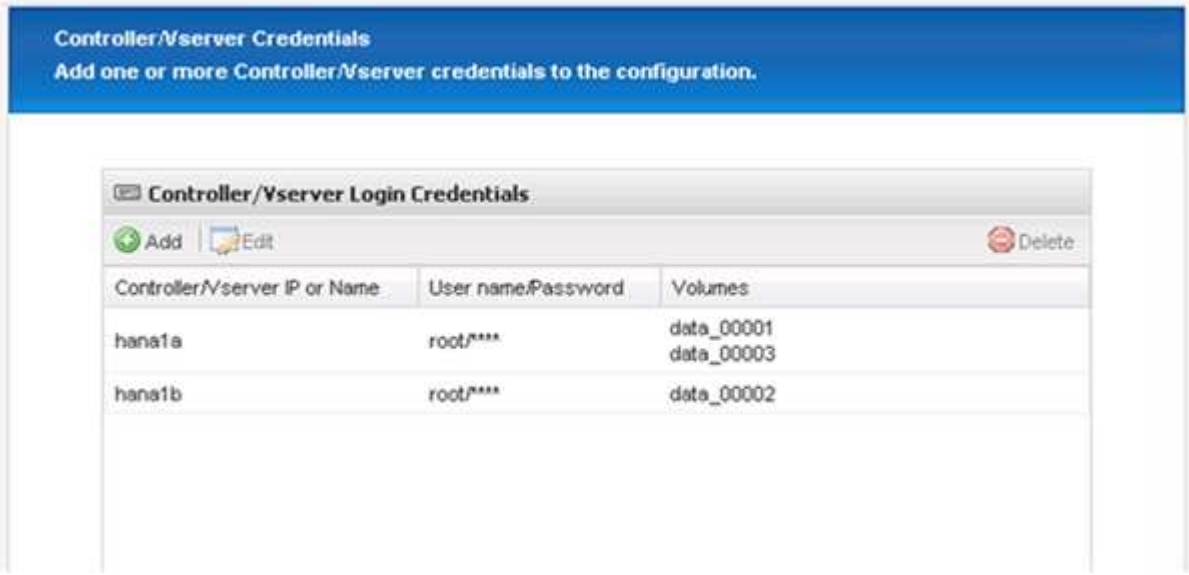


16. Select the data volumes that are stored on the second storage controller that you created, and click **Save**.



17. The Controller/Vserver Credentials window displays the storage controllers and volumes that you added.

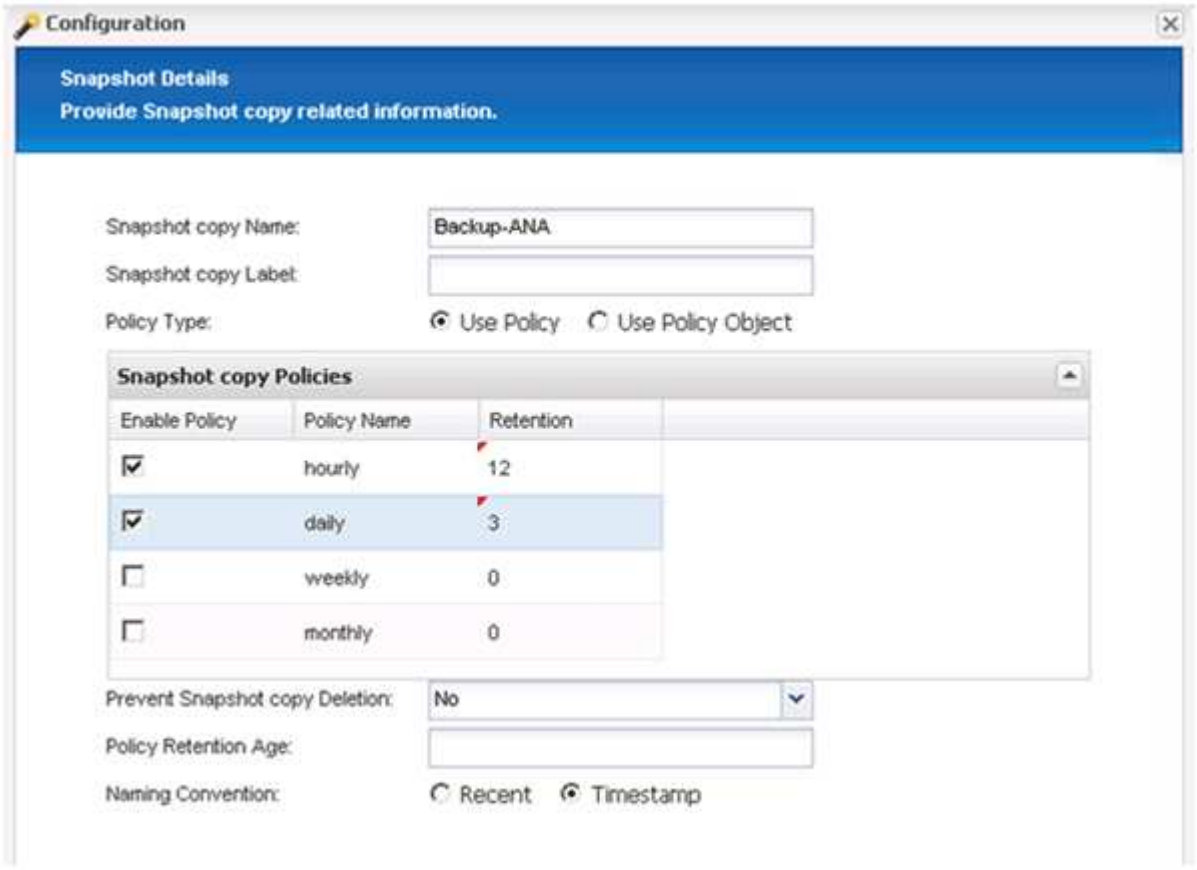
Click **Next**.



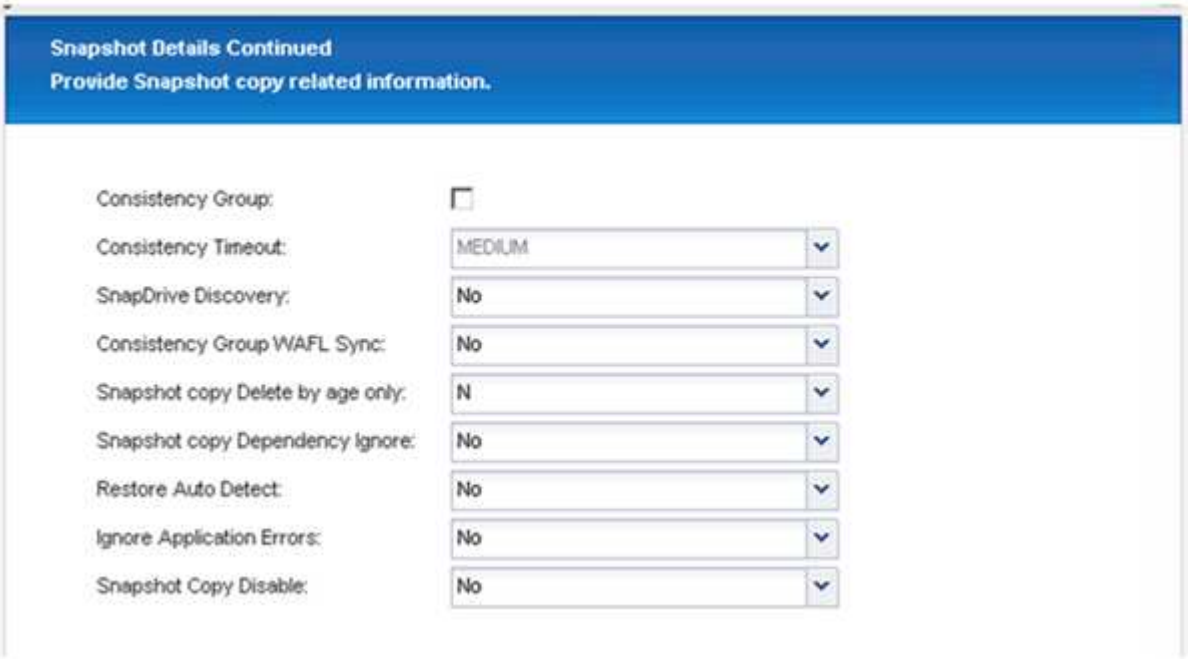
18. Enter the Snapshot policy and retention configuration.

    The retention of three daily and eight hourly Snapshot copies is just an example and could be configured differently depending on the customer requirements.

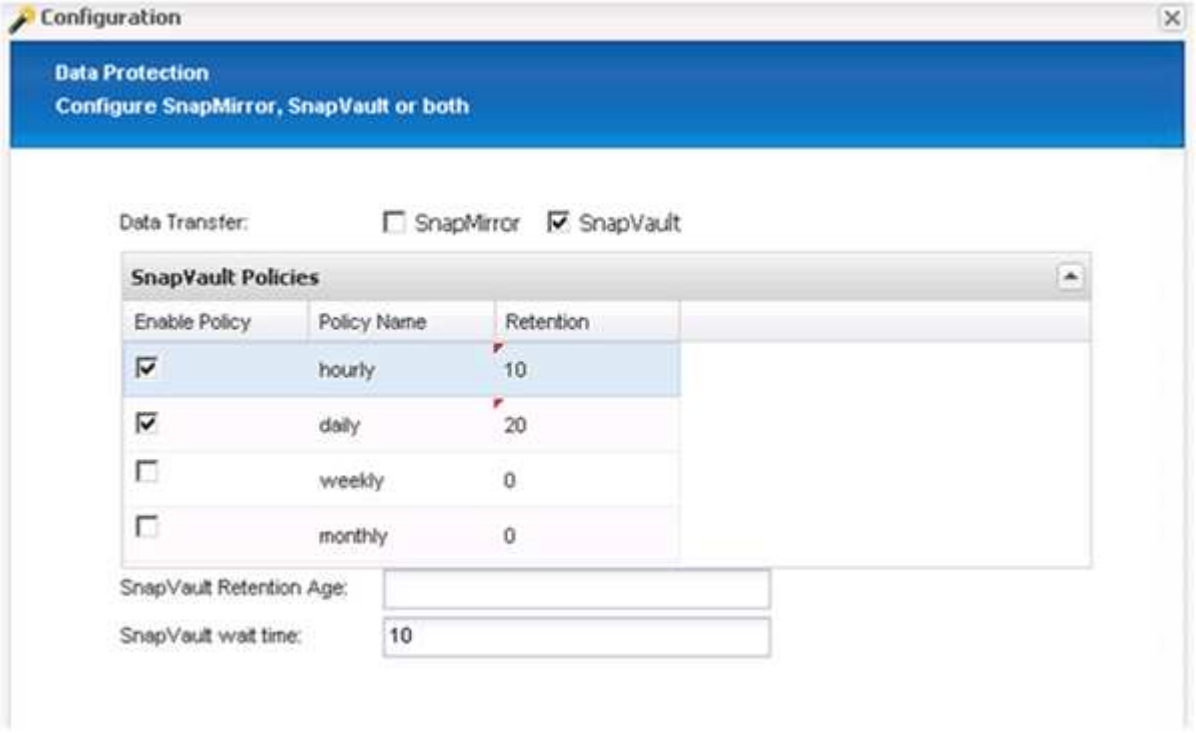
    Select **Timestamp** as the naming convention. The use of the naming convention **Recent** is not supported with the SAP HANA plug-in, because the timestamp of the Snapshot copy is also used for the SAP HANA backup catalog entries.



19. No changes required. Click **Next**.

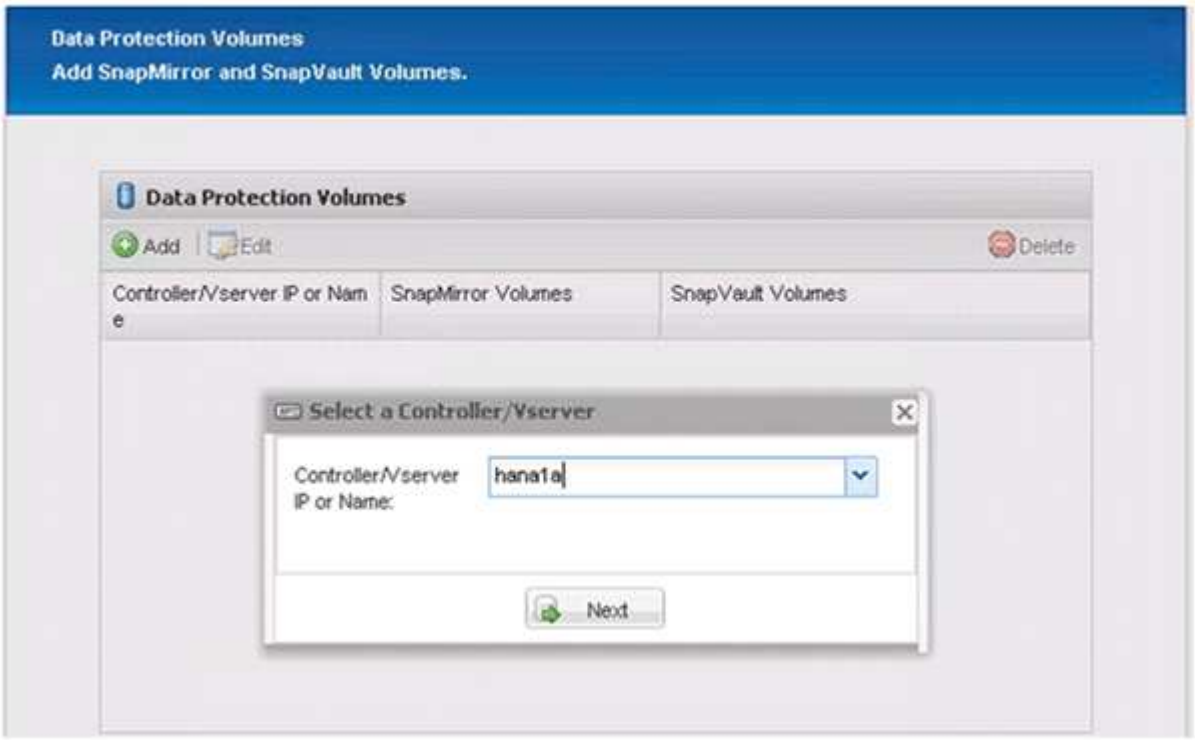


20. Select **SnapVault**, and configure the SnapVault retention policies and the SnapVault wait time.

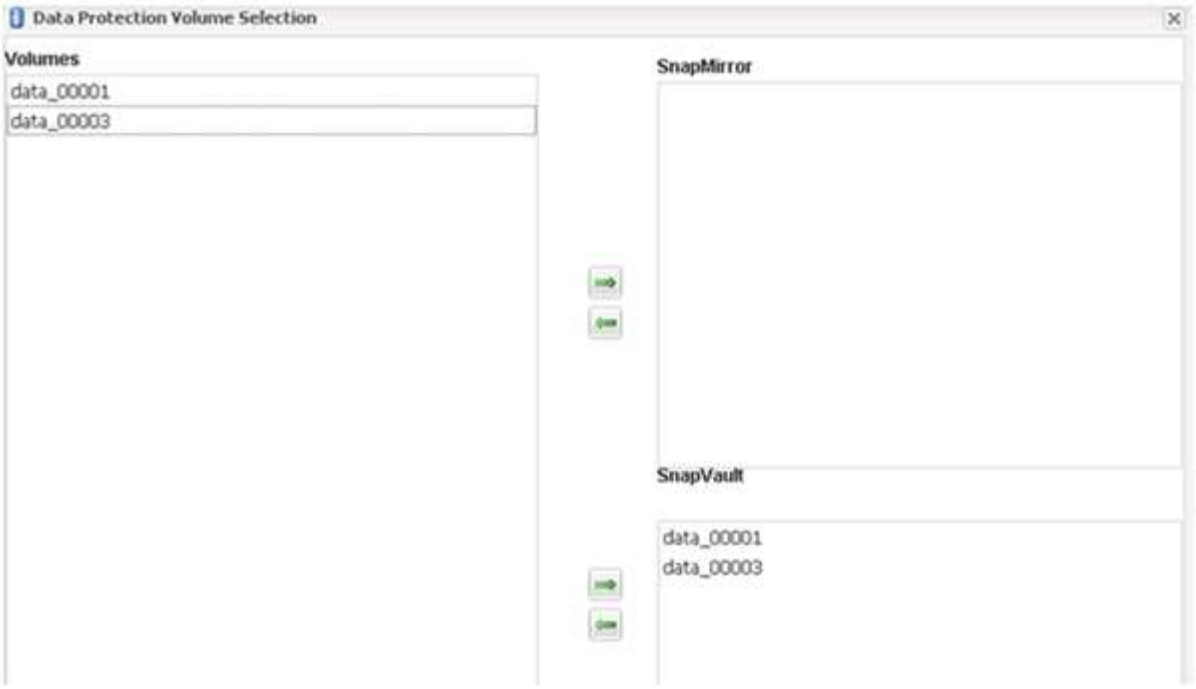


21. Click **Add**.

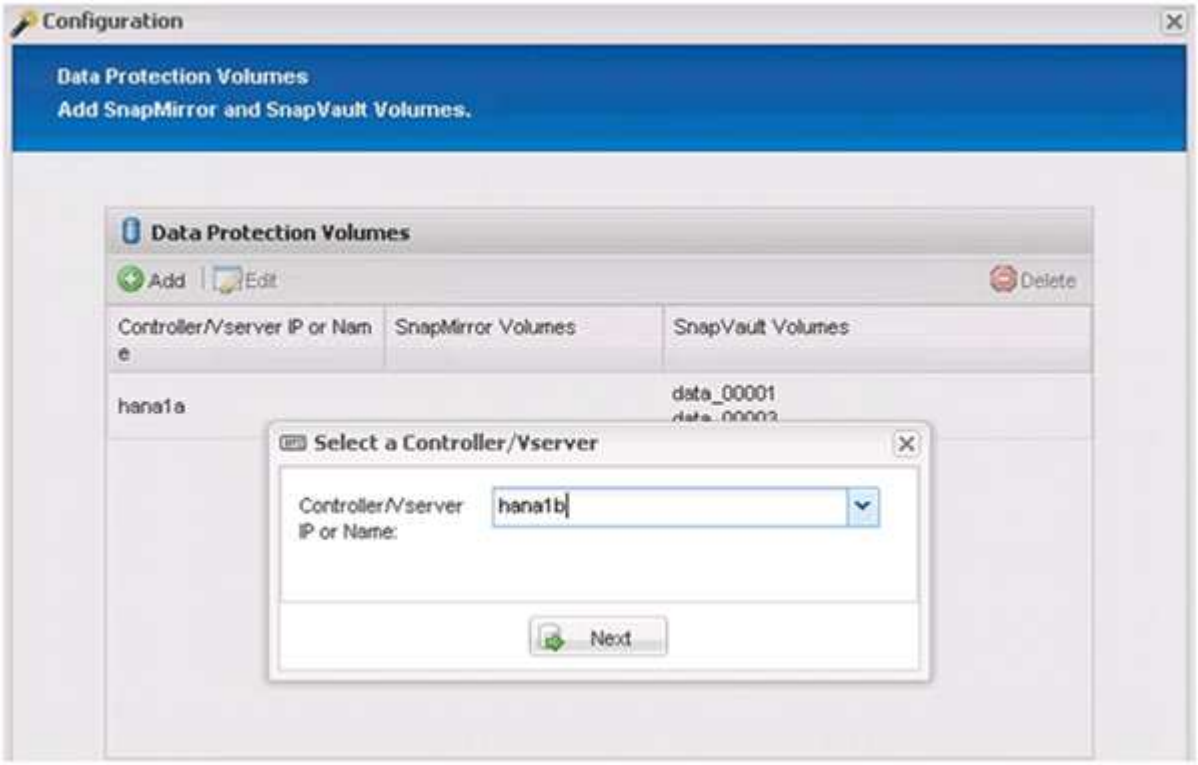
22. Select a source storage controller from the list, and click **Next**.



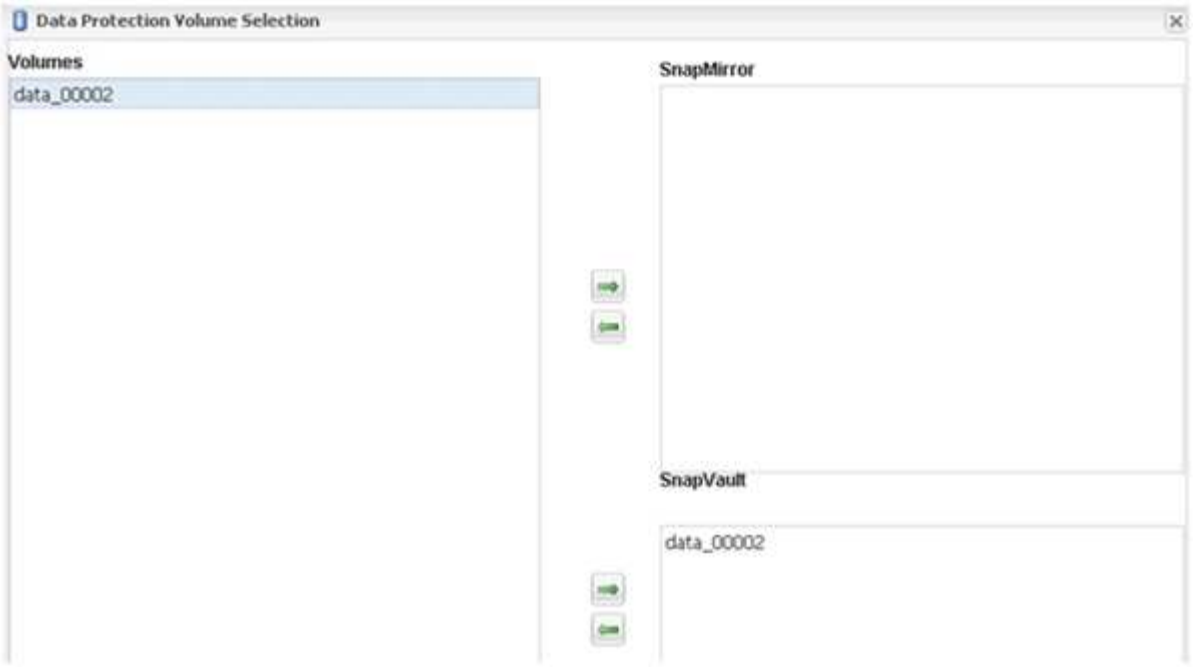
23. Select all the volumes that are stored on the source storage controller, and click **Save**.



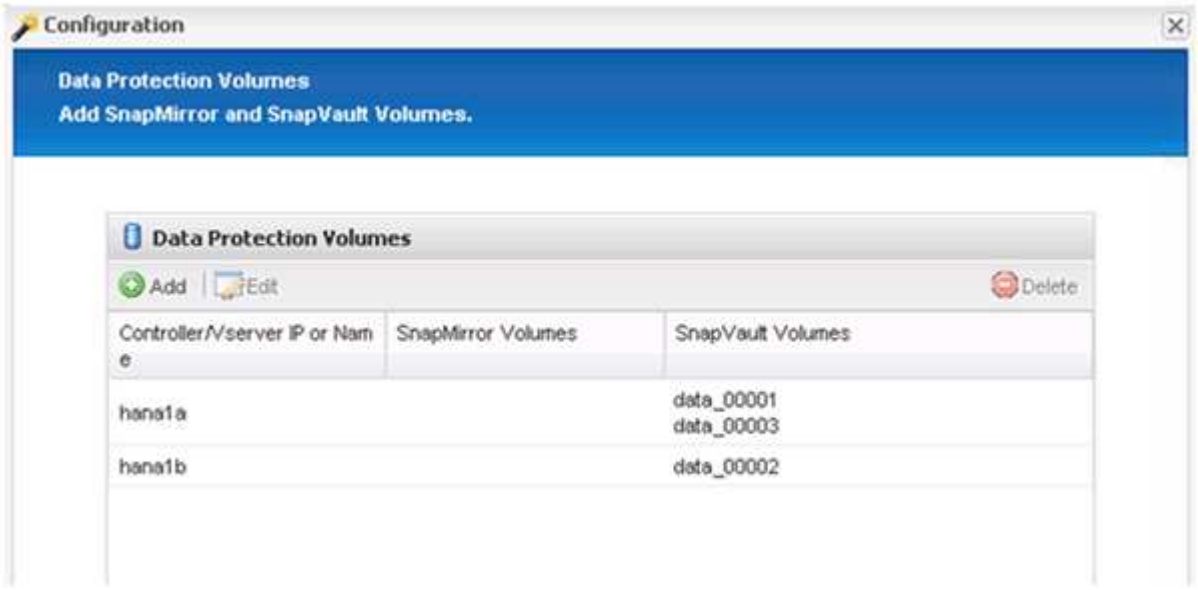
24. Click **Add**, and select the second source storage controller from the list, and then click **Next**.



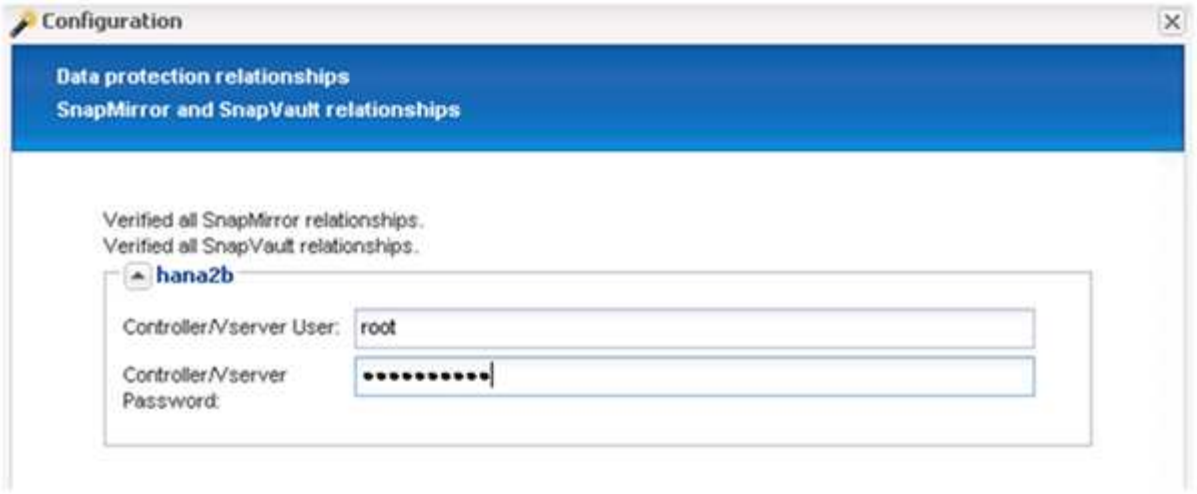
25. Select all the volumes that are stored on the second source storage controller, and click **Save**.



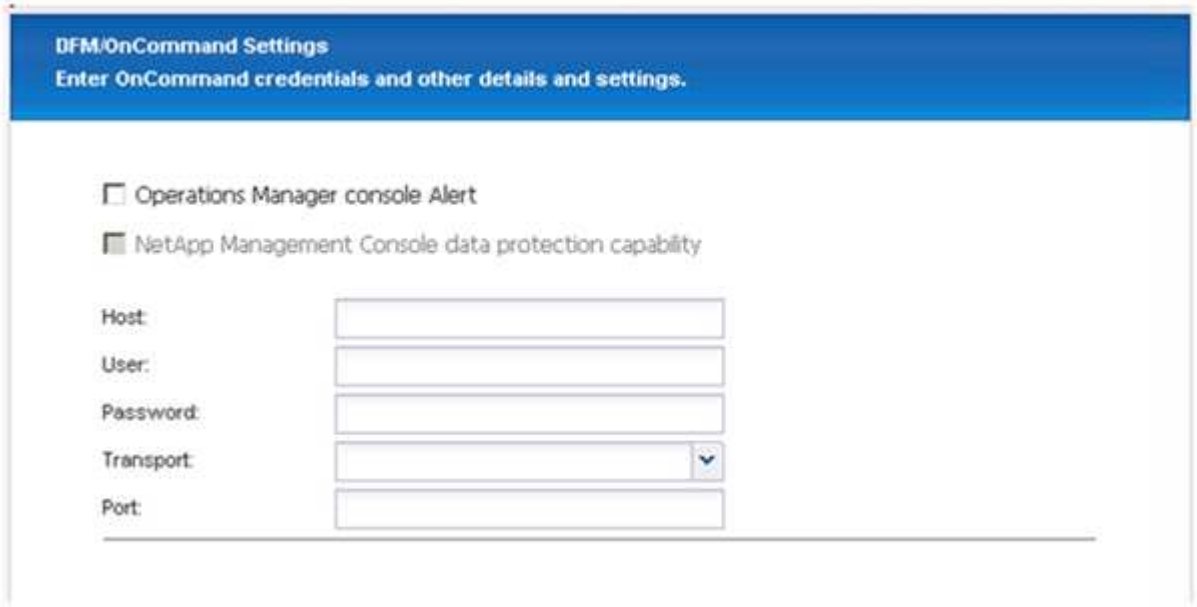
26. The Data Protection Volumes window displays all the volumes that should be protected in the configuration that you created. Click **Next**.



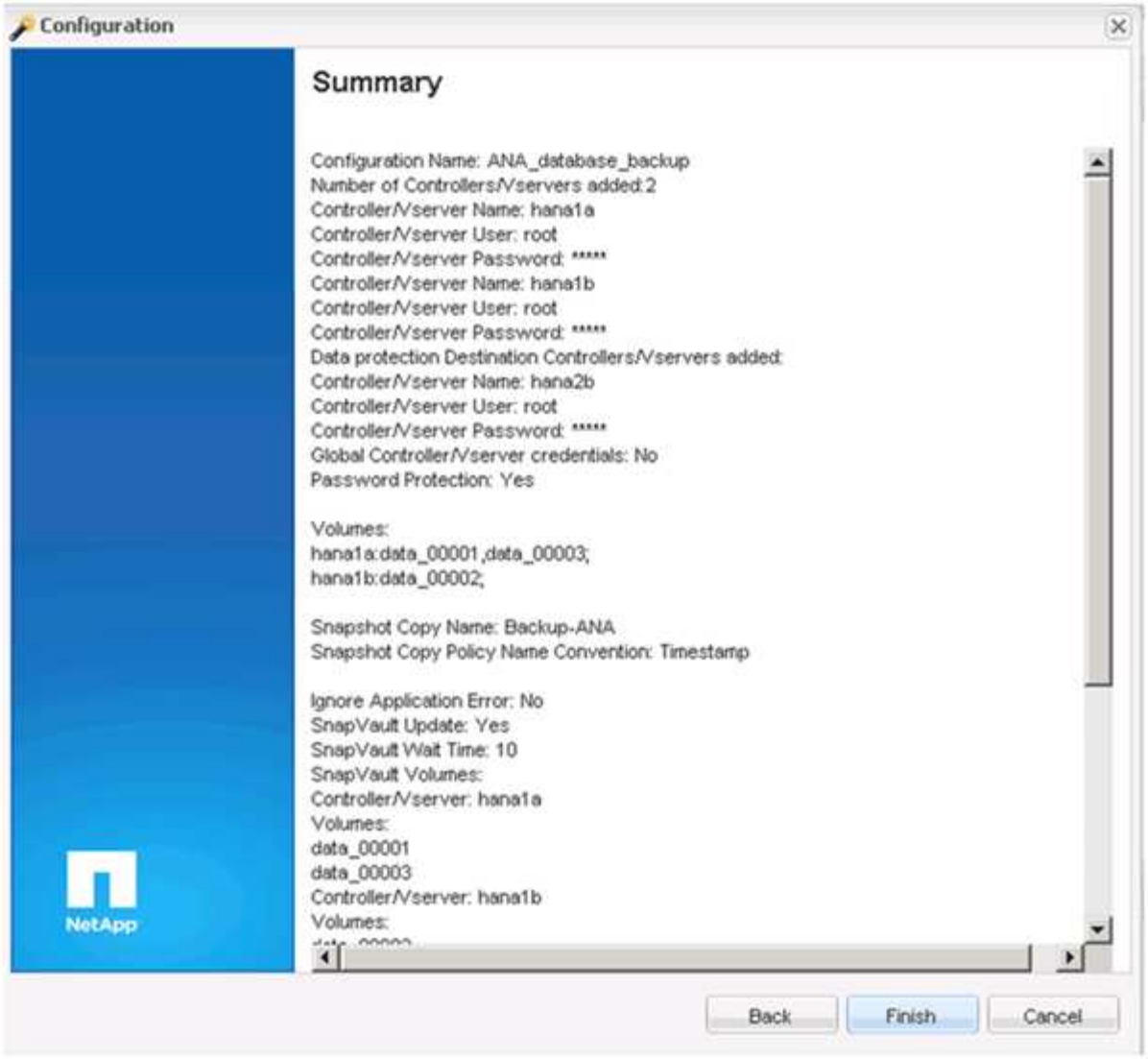
27. Enter the credentials for the target storage controllers, and click **Next**. In this example, the “root” user credentials are used to access the storage system. Typically, a dedicated backup user is configured on the storage system and is then used with Snap Creator.



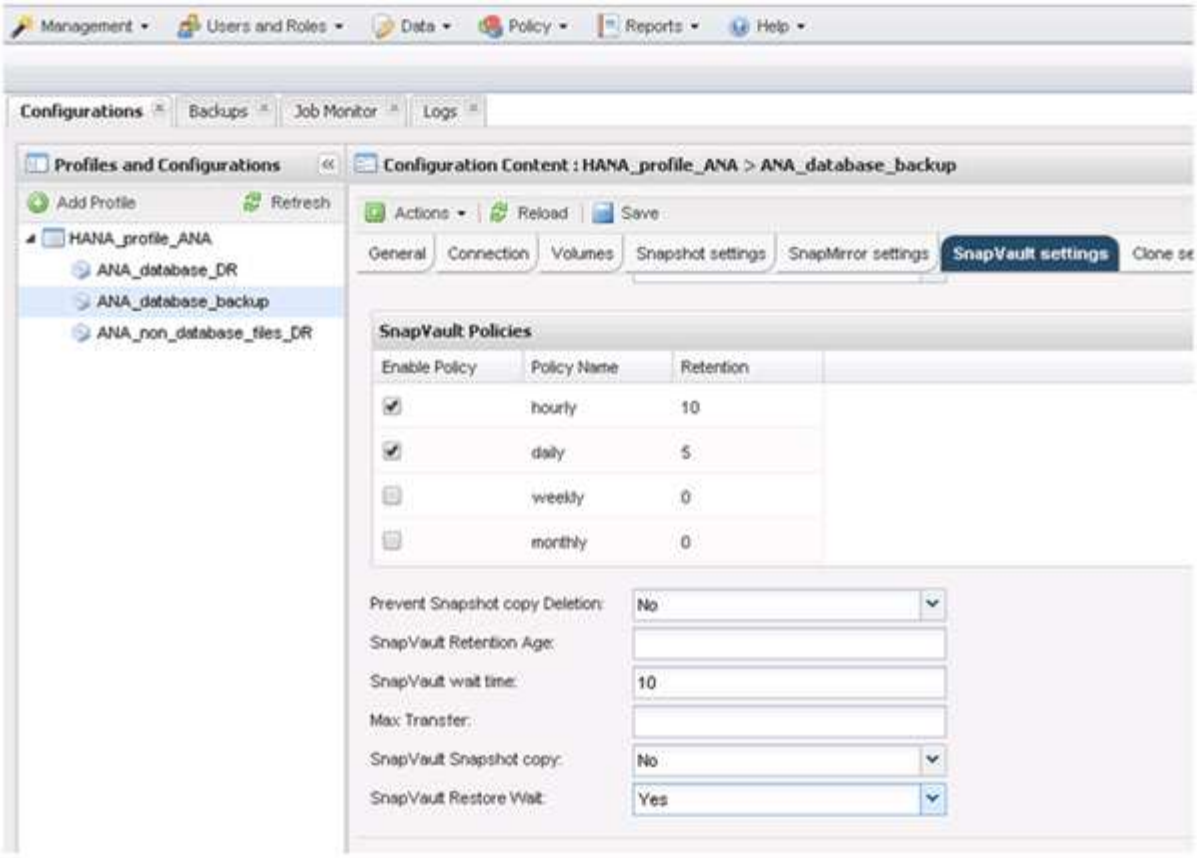
28. Click **Next**.



29. Click **Finish** to complete the configuration.



30. Click the **SnapVault settings** tab.
31. Select **Yes** from the drop-down list of the **SnapVault Restore Wait** option, and click **Save**.



It is recommended that you use a dedicated network for replication traffic. If you decide to do so, you should include this interface in the Snap Creator configuration file as a secondary interface.

You can also configure dedicated management interfaces so that Snap Creator can access the source or the target storage system by using a network interface that is not bound to the storage controller's host name.

```
mgmtsrv01:/opt/NetApp/Snap_Creator_Framework_411/scServer4.1.1c/engine/c
onfigs/HANA_profile_ANA
# vi ANA_database_backup.conf

#########################################################################
########################
#     Connection Options                                                #
#########################################################################
########################
PORT=443
SECONDARY_INTERFACES=hana1a:hana1a-rep/hana2b;hana1b:hana1b-rep/hana2b
MANAGEMENT_INTERFACES=hana2b:hana2b-mgmt
```

Configuring SAP HANA for SAN environments

After you configure the data backups, you will need to add a new command to the Snap

Creator configuration file in environments where a SAP HANA system is connected using Fibre Channel storage area network (SAN) to the storage controller(s).

When a global synchronized backup savepoint is triggered by Snap Creator within SAP HANA, the last step occurs when SAP HANA writes the /hana/data/SID/mnt00001/hdb00001/snapshot_databackup_0_1 file. This file is part of the data volume on the storage and is therefore part of the storage Snapshot copy. This file is mandatory when performing a recovery in case the backup is restored. Due to metadata caching with the 'X' File System (XFS) on the Linux host, the file is not immediately visible at the storage layer. The standard XFS configuration for metadata caching is 30 seconds.

Within Snap Creator, you need to add a post-application quiesce command, which waits until the XFS meta data cache is flushed to the disk layer.

You can check the configuration of the metadata caching by using the following command:

```
stlrx300s8-2:/ # sysctl -A | grep xfssyncd_centisecs
fs.xfs.xfssyncd_centisecs = 3000
```

1. In the configuration file (install_path/scServerversion_number/engine/configs), add the /bin/sleep command to the Post Commands section as shown in the following example:

```
############################################################
#     Post Commands      ###########################################
POST_NTAP_DATA_TRANSFER_CMD01=
POST_APP_QUIESCE_CMD01=/bin/sleep 60
POST_CLONE_CREATE_CMD01=
```

> ⓘ You should allow a wait time that is twice the value of the fs.xfs.xfssyncd_centisecs parameter. For example, with the default value 30 seconds, the sleep command should be configured with 60 seconds.

Configuring log backups

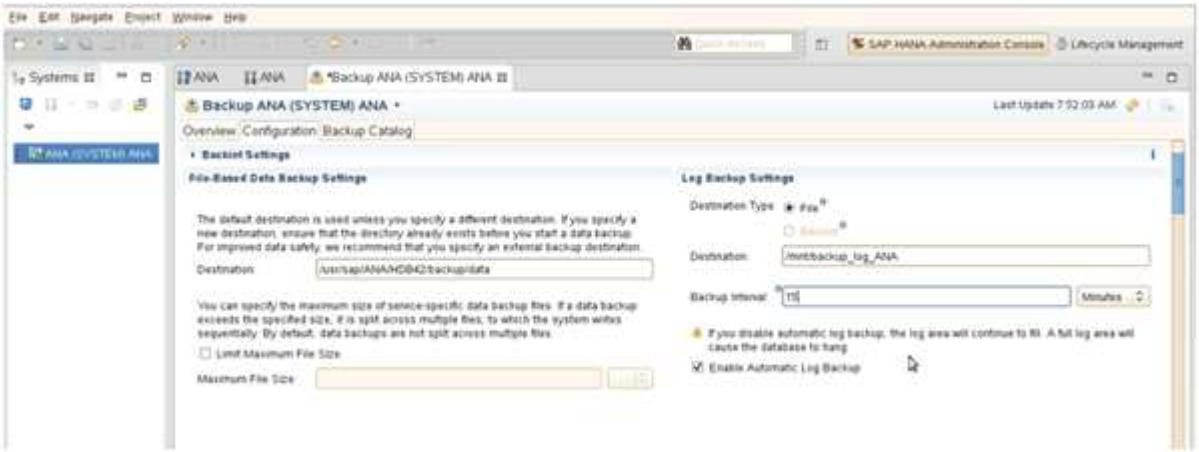
Log backups should be stored on a different storage system than the primary storage. The storage system that is used for the data backup can also be used for the log backup.

At the secondary storage, a volume needs to be configured to hold the log backups. Ensure that automatic Snapshot copies are switched off for this volume.

1. Mount the volume at each database node, either by running the mount command or editing the file system table (fstab) file.

```
hana2b:/vol/backup_log_ANA /mnt/backup_log_ANA nfs
rw,bg,vers=3,hard,timeo=600,rsize=65536,wsize=65536,actimeo=0,noatime
0  0
```

Within SAP HANA Studio, the log backup destination is configured as shown in the following figure.



Housekeeping of log backups

Housekeeping of log backups in SAP HANA is based on a function within the HANA Studio or based on an SQL statement that allows deleting all backups that are older than a selected backup.

Snap Creator handles the housekeeping of data backups (Snapshot copies) by deleting the Snapshot copies on the primary or secondary storage and by deleting the corresponding entries within the HANA catalog, based on a defined retention policy.

The log backups that are older than the latest data backup are deleted because they are not required.

Snap Creator handles the housekeeping of log file backups on file system level and within the SAP HANA backup catalog. As part of each Snapshot backup with Snap Creator, the following steps are executed:

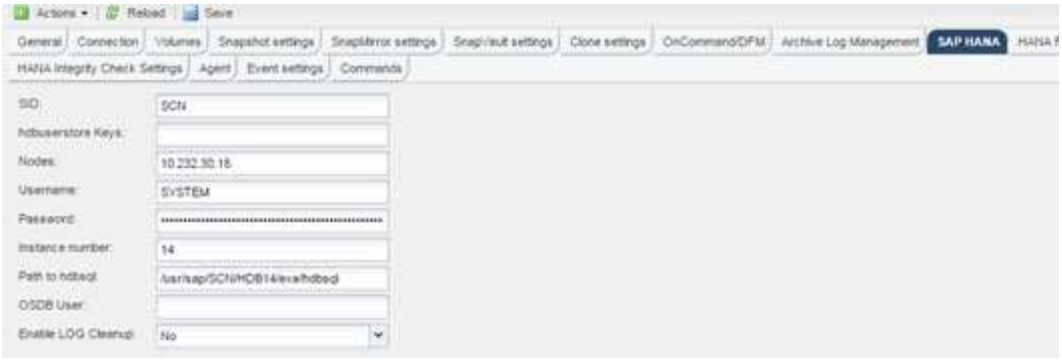
- Read backup catalog and obtain the backup ID of the oldest successful data or Snapshot backup.
- Delete all backups that are older than the oldest backup.

> Snap Creator only handles housekeeping for backups based on Snapshot copies. If additional file-based backups are created, you must ensure that the file-based backups are deleted from the backup catalog and file system. If such a data backup is not deleted manually from the backup catalog, it can become the oldest data backup, and the log backup housekeeping operation will fail.

Modifying the housekeeping of log backups

You can modify the parameters that are configured for the housekeeping of log backups if you want to disable the log cleanup operation.

1. Select the SAP HANA profile that you want to modify.
2. Select the configuration you want to modify, and click **SAP HANA Settings**.
3. Edit the Enable LOG cleanup parameter, and click **Save**.



Executing database backups

You can back up your SAP HANA database by using the Snap Creator GUI or the command line. To schedule backups, you can use the scheduler within the GUI, or you can use the command line in combination with an external scheduler like cron.

Overview of database backups

When Snap Creator is backing up the database, the following steps are executed.

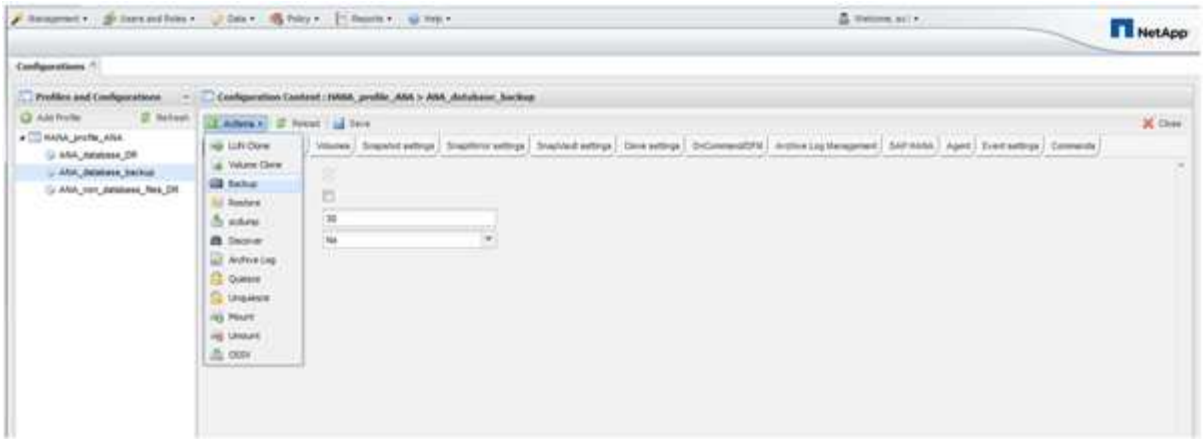
1. Create a global synchronized backup save point (SAP HANA Snapshot copy) to obtain a consistent image on the persistence layer.
2. Create storage Snapshot copies for all data volumes.

   In the example, there are three data volumes, which are distributed to both storage controllers, hana1a and hana1b.
3. Register the storage Snapshot backup within the SAP HANA backup catalog.
4. Delete the SAP HANA Snapshot copy.
5. Start SnapVault update for all data volumes.
6. Check SnapVault status and wait until finished or configurable timeout.
7. Delete storage Snapshot copies and delete backups in the SAP HANA backup catalog based on the defined retention policy for backups at the primary and secondary storage.
8. Delete all log backups, which are older than the oldest data backup on the file system and within the SAP HANA backup catalog.

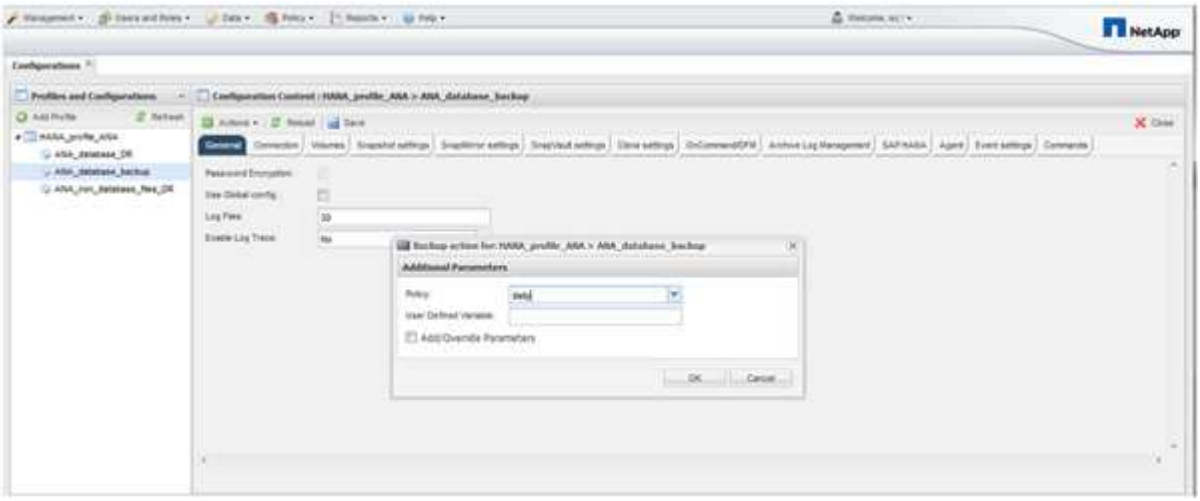
Backing up the database with the Snap Creator GUI

You can back up a database with the Snap Creator GUI.

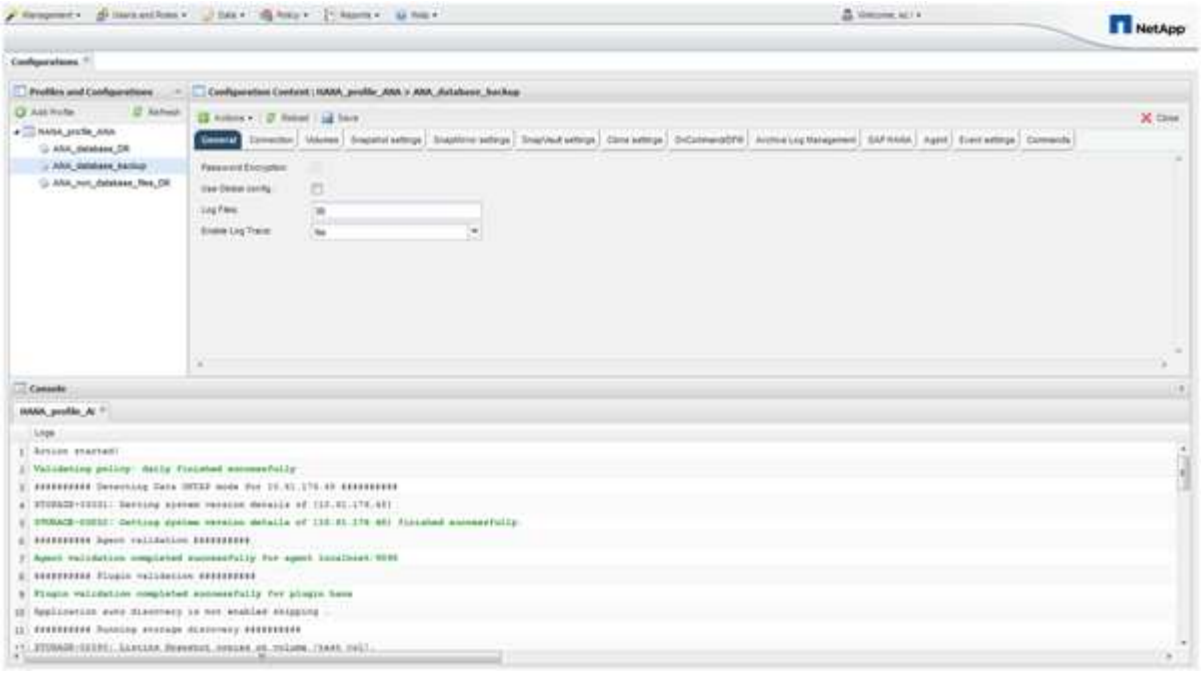
1. Select the **HANA_database_backup configuration** and then select **Actions** > **Backup**.



2. Select the backup policy and click **OK**.



The backup starts. Snap Creator triggers the “SnapVault update,” and Snap Creator waits until the data is replicated to the secondary storage. The wait time has been configured during the configuration and can be adapted in the SnapVault settings tab. Snap Creator triggers the SnapVault updates in parallel for each volume on the same storage controller, but in sequence for each storage controller.



Backing up the database with Snap Creator command line

You can also back up the database by using the Snap Creator command line.

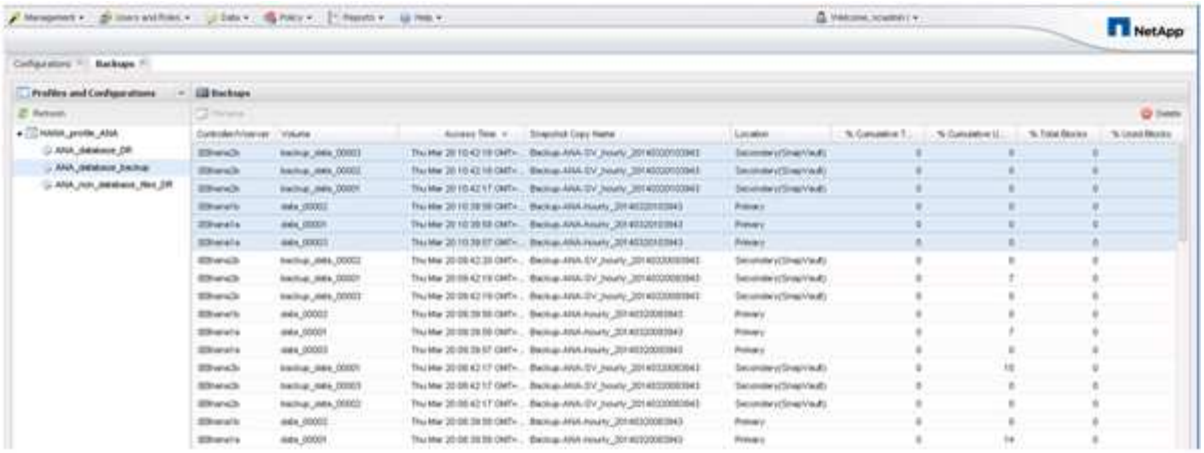
1. To back up the database, run the following command.

```
mgmtsrv01:~ #
/opt/NetApp/Snap_Creator_Framework_411/scServer4.1.1/snapcreator
--server
localhost --port 8443 --user scadmin --passwd scadmin --profile
HANA_profile_ANA --config
ANA_database_backup --action backup --policy daily --verbose
[Wed Mar 5 14:17:08 2014] INFO: Validating policy: daily finished
successfully

########## Detecting Data ONTAP mode for hana1a ##########

########## Detecting Data ONTAP mode for hana1b ##########
[Wed Mar  5 14:17:13 2014] INFO: STORAGE-03031: Getting system version
details of [hana2b]
[Wed Mar  5 14:17:13 2014] INFO: STORAGE-03032: Getting system version
details of [hana2b] finished successfully.
[Wed Mar  5 14:17:13 2014] INFO: STORAGE-03031: Getting system version
details of [hana1a]
[Wed Mar  5 14:17:13 2014] INFO: STORAGE-03032: Getting system version
details of [hana1a] finished successfully.
[Wed Mar  5 14:17:13 2014] INFO: STORAGE-03031: Getting system version
details of [hana1b]
[Wed Mar  5 14:17:13 2014] INFO: STORAGE-03032: Getting system version
details of [hana1b] finished successfully.

….
Truncated
…
```

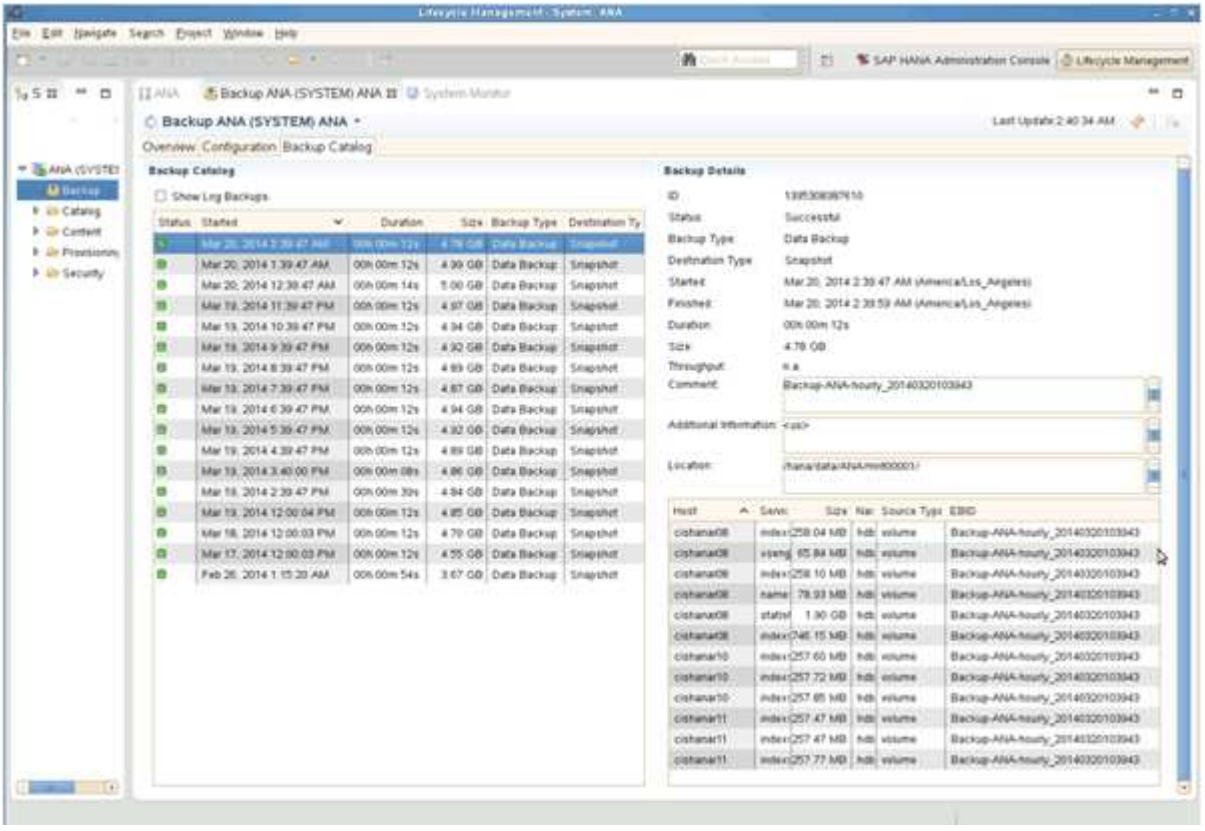
Reviewing available backups in SAP HANA Studio

You can see the list of storage Snapshot backups in the SAP HANA Studio.

The highlighted backup in the following figure shows a Snapshot copy named “Backup-ANA_hourly_20140320103943.” This backup includes Snapshot copies for all three data volumes of the SAP HANA system. The backup is also available at the secondary storage.



The Snapshot copy name is used by Snap Creator as a backup ID when Snap Creator registers the storage Snapshot copy in the SAP HANA backup catalog. Within the SAP HANA Studio, the storage Snapshot backup is visible in the backup catalog. The external backup ID (EBID) has the same value as the Snapshot copy name as shown in the following figure.



With every backup run, Snap Creator deletes Snapshot backups at the primary and at the secondary storage based on the retention policies defined for the different schedules (hourly, daily, and so on).

Snap Creator also deletes the backups within the SAP HANA backup catalog if the backup does not exist at the primary or secondary storage. The SAP HANA backup catalog always shows the complete list of backups that are available at the primary and/or the secondary storage.

SAP HANA File-Based Backup and Database Integrity Checks

SAP recommends combining storage-based Snapshot backups with a weekly file-based backup to execute a block integrity check. The block integrity check can be executed from within the Snap Creator graphical user interface (GUI) or command line interface (CLI).

The File-Based Data Backup operation is used when the backup copies of files are to be retained. The Database Integrity Checks operation is used when backup copies have to be discarded.

You can configure either one or both of the operations. During on demand backup, you can choose either one of the operations.

Modifying configuration for File-Based Backup

You can modify the parameters that are configured for File-Based Backup. The subsequent scheduled or on-demand File-Based Backup operation reflects the updated information.

1. Click on the SAP HANA profile.
2. Select the configuration that you want to modify, and click **HANA File Based Backup Settings**.

3. Edit the information, and click **Save**.

Modifying configuration for Database Integrity Checks

You can modify the parameters that are configured for Database Integrity Checks. The subsequent scheduled or on-demand Integrity Check operation reflects the updated information.

1. Click on the SAP HANA profile.
2. Select the configuration that you want to modify, and click **HANA Integrity Check Settings**.

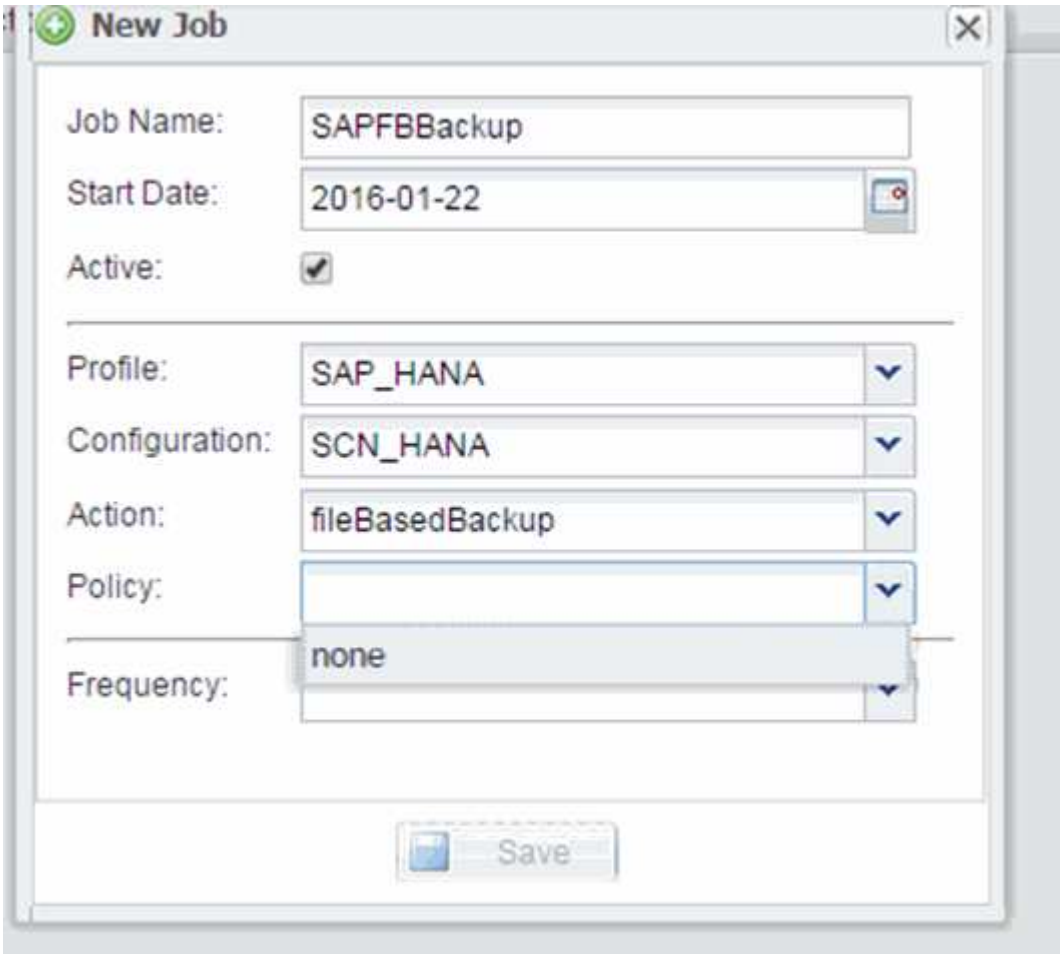
3. Edit the information, and click **Save**.

Scheduling file-based backup

For SAP HANA configurations, you can schedule additional operations such as file-based backup and database integrity checks. You can schedule the file-based backup operation to occur at specific intervals.

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

   The file-based backup policy is set to “none” by default.

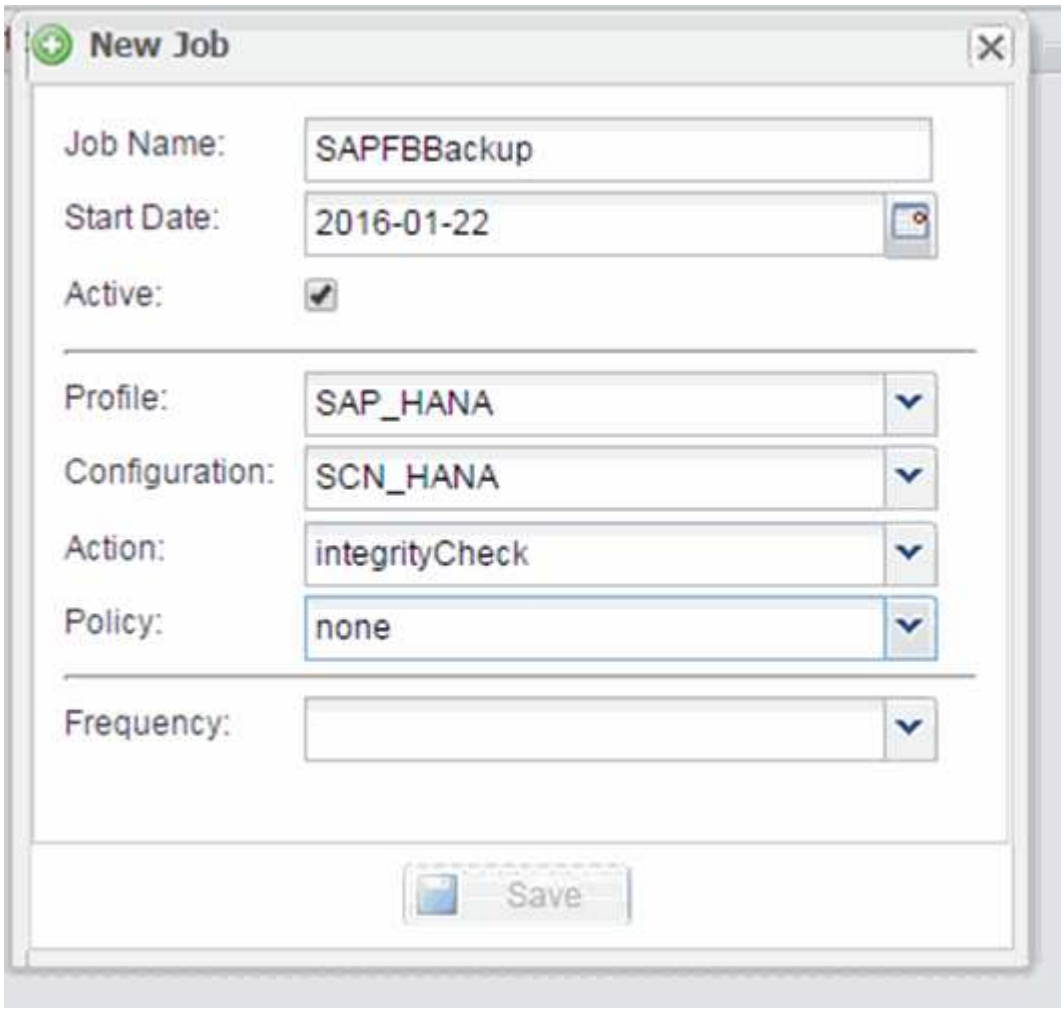


Scheduling database integrity checks

For SAP HANA configurations, you can schedule additional operations such as file-based backup and database integrity checks. You can schedule the database integrity checks operation to occur at specific intervals.

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

   The integrity check policy is set to “none” by default.

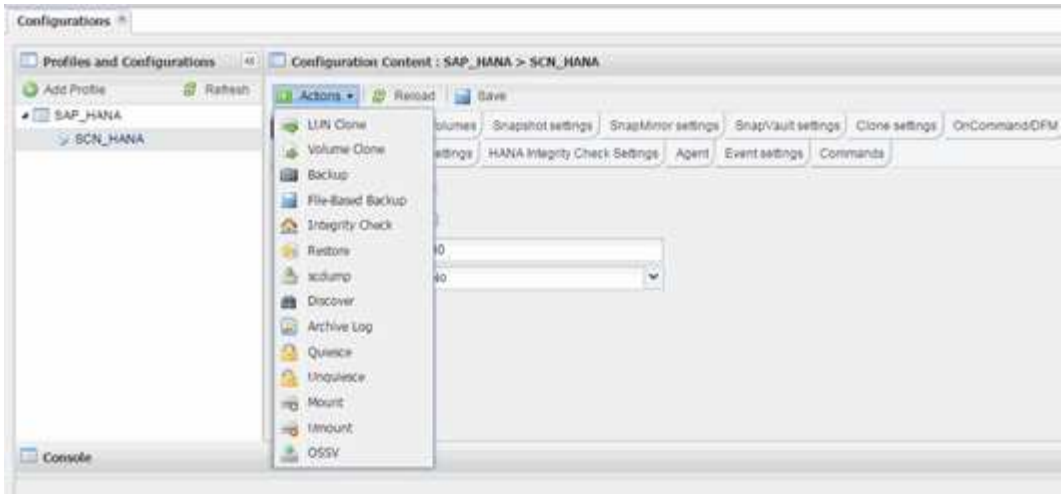


Performing File-Based Backup from the Snap Creator GUI

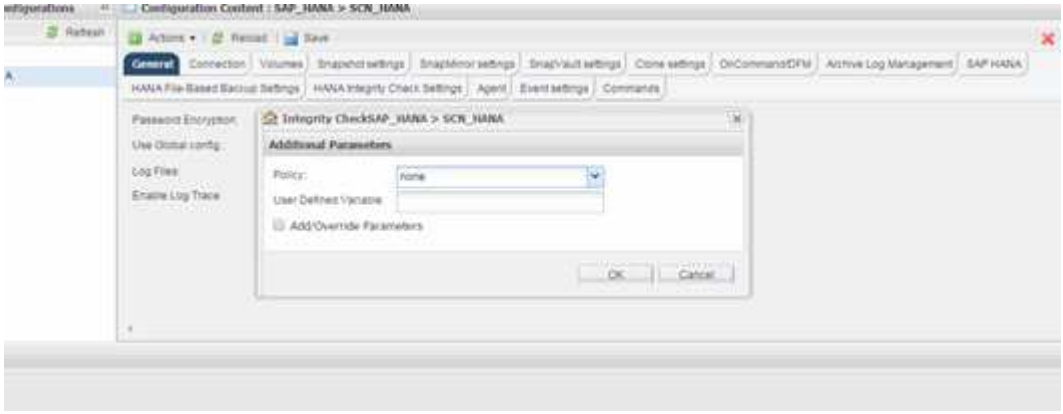
You can perform File-Based Backup from the Snap Creator graphical user interface (GUI).

You must have enabled the File-Based Backup parameter in the HANA File-Based Backup Settings tab.

1. Select the HANA_database_backup configuration.
2. Select **Actions** > **File-Based Backup**.



3. Set the Policy option to **None**, and click **OK**.



Performing File-Based Backup from Snap Creator command line

You can perform File-Based Backup using the Snap Creator command line.

1. To perform File-Based Backup, run the following command:

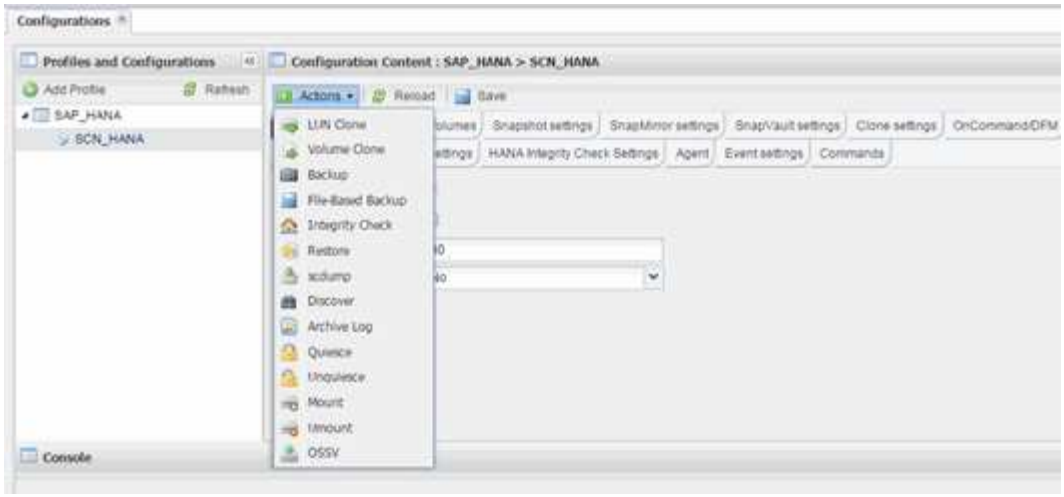
```
./snapcreator --server localhost --port 8443 --user sc --passwd sc
--profile hana_testing --config HANA_Test --action fileBasedBackup
--policy none --verbose
```

Performing Database Integrity Checks from Snap Creator GUI

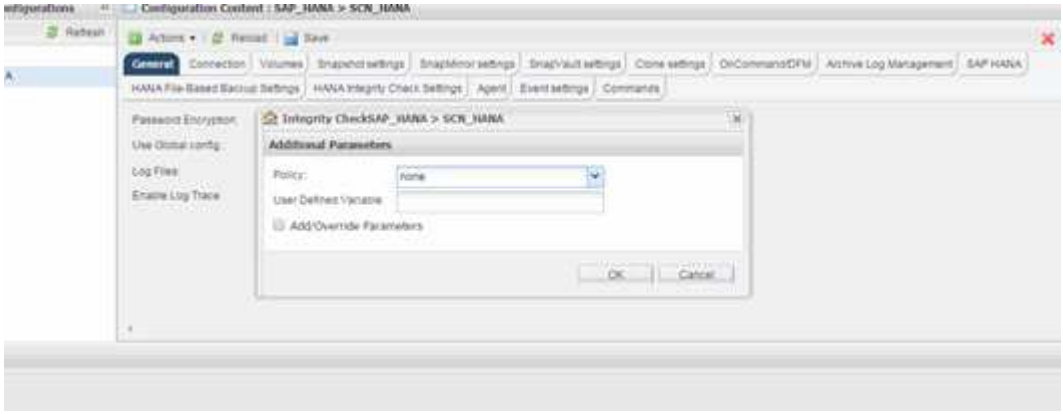
You can perform Database Integrity Checks from the Snap Creator graphical user interface (GUI).

You must have enabled the DB Integrity Check parameter in the HANA Integrity Check Settings tab.

1. Select the HANA_database_integrity_check configuration.
2. Select **Actions** > **Integrity Check**.



3. Set the Policy option to **None**, and click **OK**.



Performing Database Integrity Checks from Snap Creator command line

You can perform Database Integrity Checks using the Snap Creator command line.

1. To perform Database Integrity Checks, run the following command:

```
./snapcreator --server localhost --port 8443 --user sc --passwd sc
--profile hana_testing --config HANA_Test --action integrityCheck
--policy none --verbose
```

Restoring and recovering SAP HANA databases

You use SAP HANA Studio and Snap Creator to restore and recover SAP HANA databases.

1. Within SAP HANA Studio:
   a. Select Recover for the SAP HANA system.
   b. SAP HANA system is shut down.

c. Select the recovery type.
d. Provide log backup locations.
e. List of data backups is shown
f. Select backup to see the external backup ID.

2. For a storage system running clustered Data ONTAP only:
   a. Only required if any other backup than the latest has been used for the restore.
   b. Only required for “Volume SnapRestore” from primary storage.
   c. Deactivate SnapVault relationships
3. Within Snap Creator:
   a. Select “Restore” for the SAP HANA system.
   b. Select restore from primary or secondary storage, depending on the availability of the backup at the primary storage.
   c. Select storage controller, volume name, and Snapshot copy name. Snapshot copy name correlates with the backup ID earlier.
   d. For multinode SAP HANA systems, multiple volumes need to be restored:
      i. Choose **Add more restore items**.
      ii. Select storage controller, volume name, and Snapshot copy name.
      iii. Repeat this process for all required volumes.
   e. For multitenant database containers (MDC) single tenant database systems, both the SYSTEM and TENANT databases are restored.
   f. Restore process is started
   g. Restore finished for all volumes.
4. At the database nodes, unmount and mount all data volumes to clean "Stale NFS Handles."
5. Within SAP HANA Studio:
   a. Select **Refresh** on backup list.
   b. Select available backup for recovery (green item).
   c. Start recovery process.
   d. For multitenant database containers (MDC) single tenant database systems, start the recovery process first for the SYSTEM database, and then for the TENANT database.
   e. The SAP HANA system is started.
6. (Optional) Resume SnapVault relationships for all restored volumes.

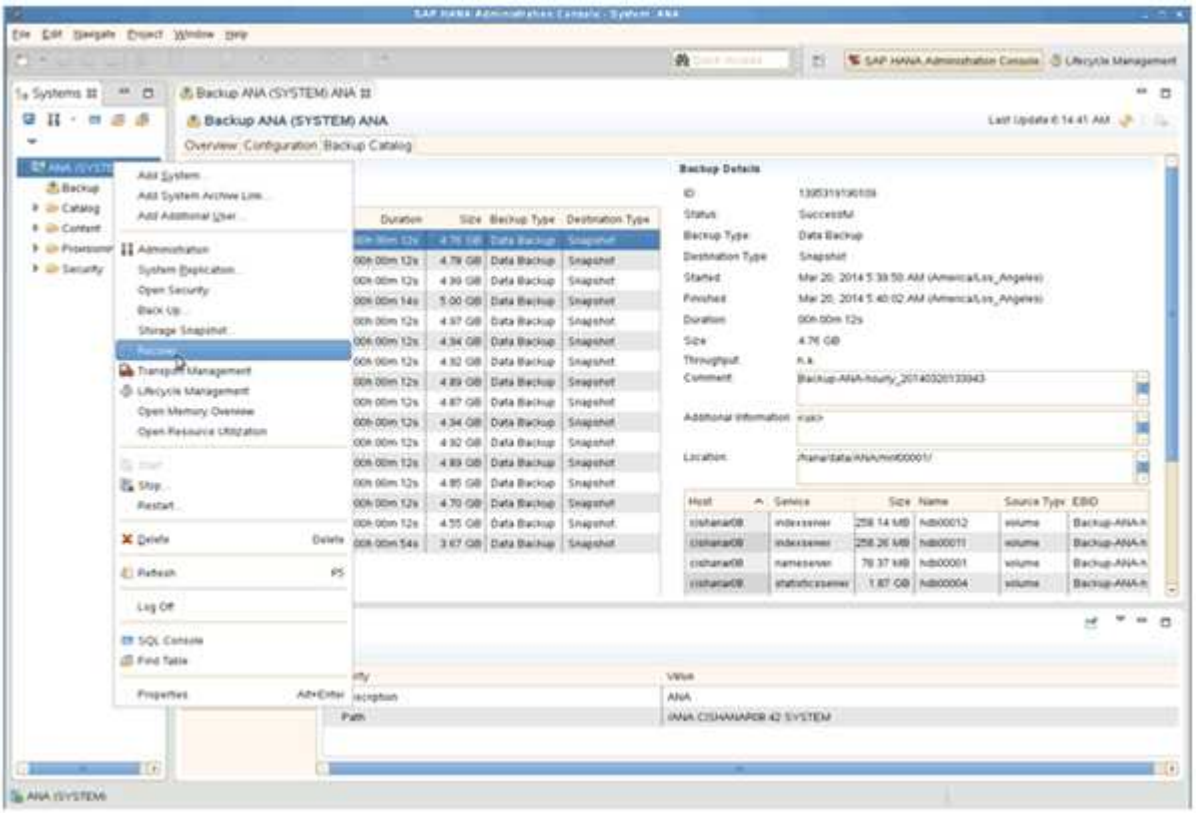
   At the storage systems, this step is only required if a backup other than the latest one has been used for the restore.

Restoring and recovering databases from primary storage

You can restore and recover the database from the primary storage.

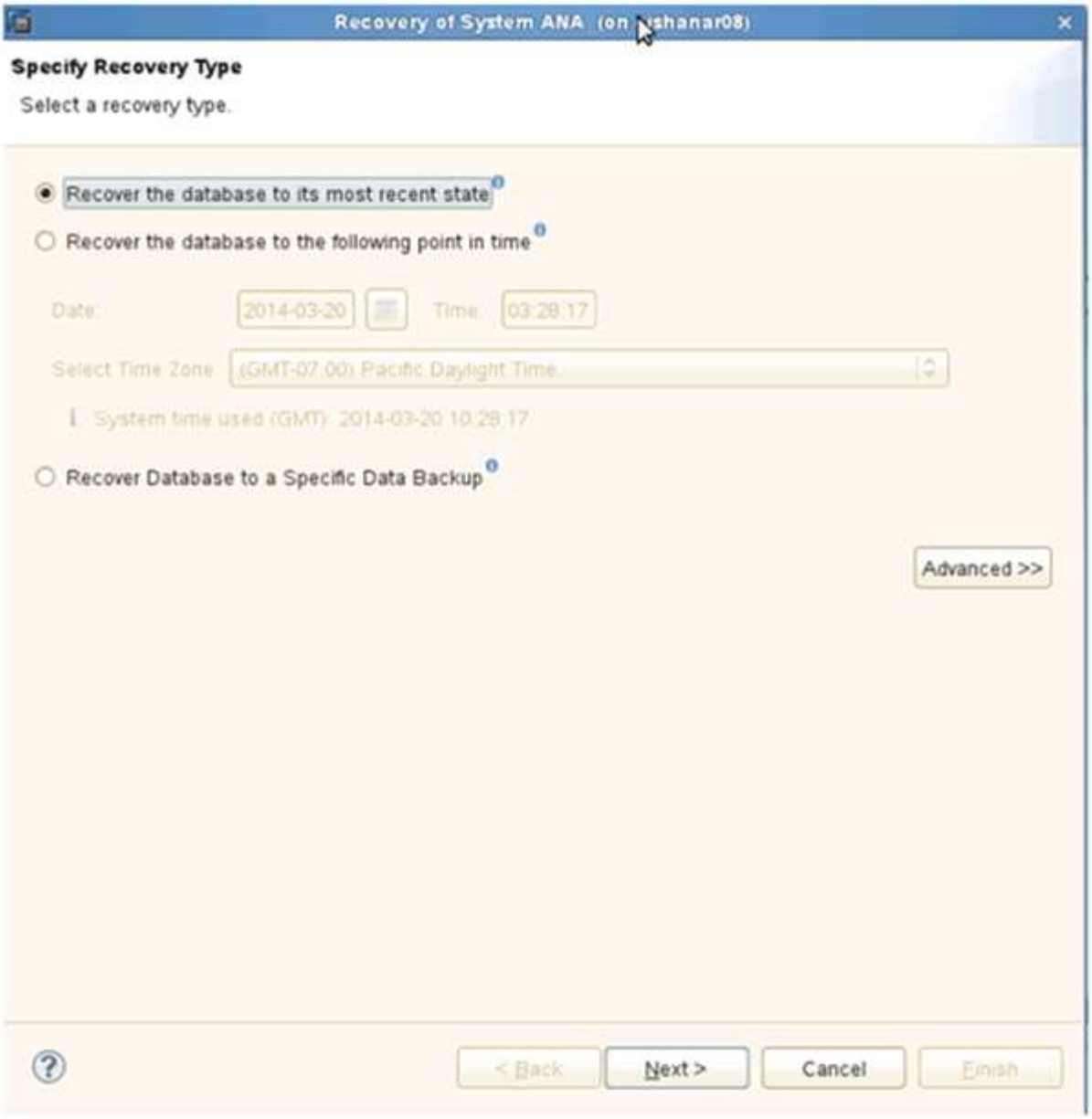
You cannot restore file-based backup copies from Snap Creator.

1. Within SAP HANA Studio, select **Recover** for the SAP HANA system.

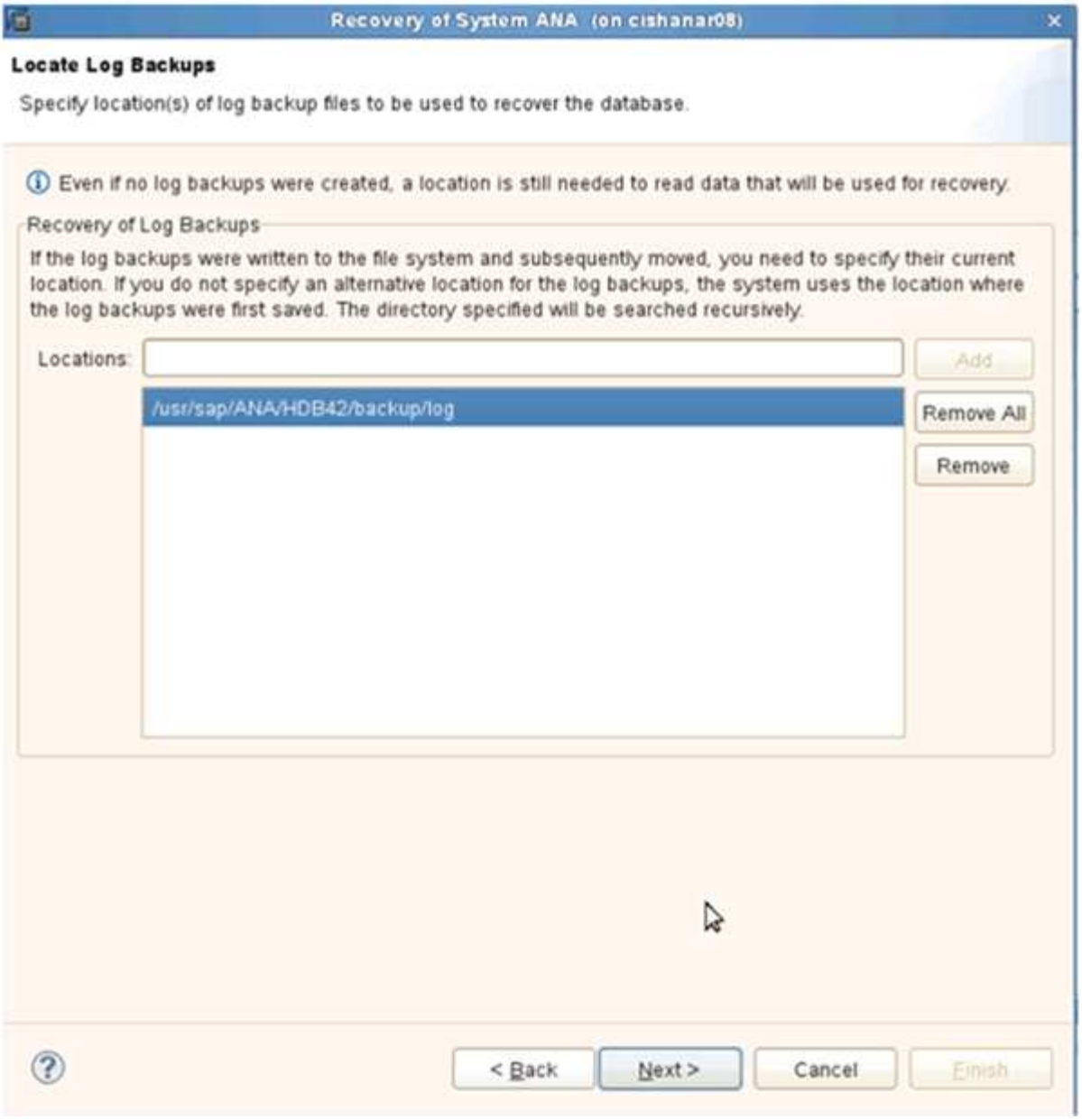


The SAP HANA system shuts down.

2. Select the recovery type and click **Next**.

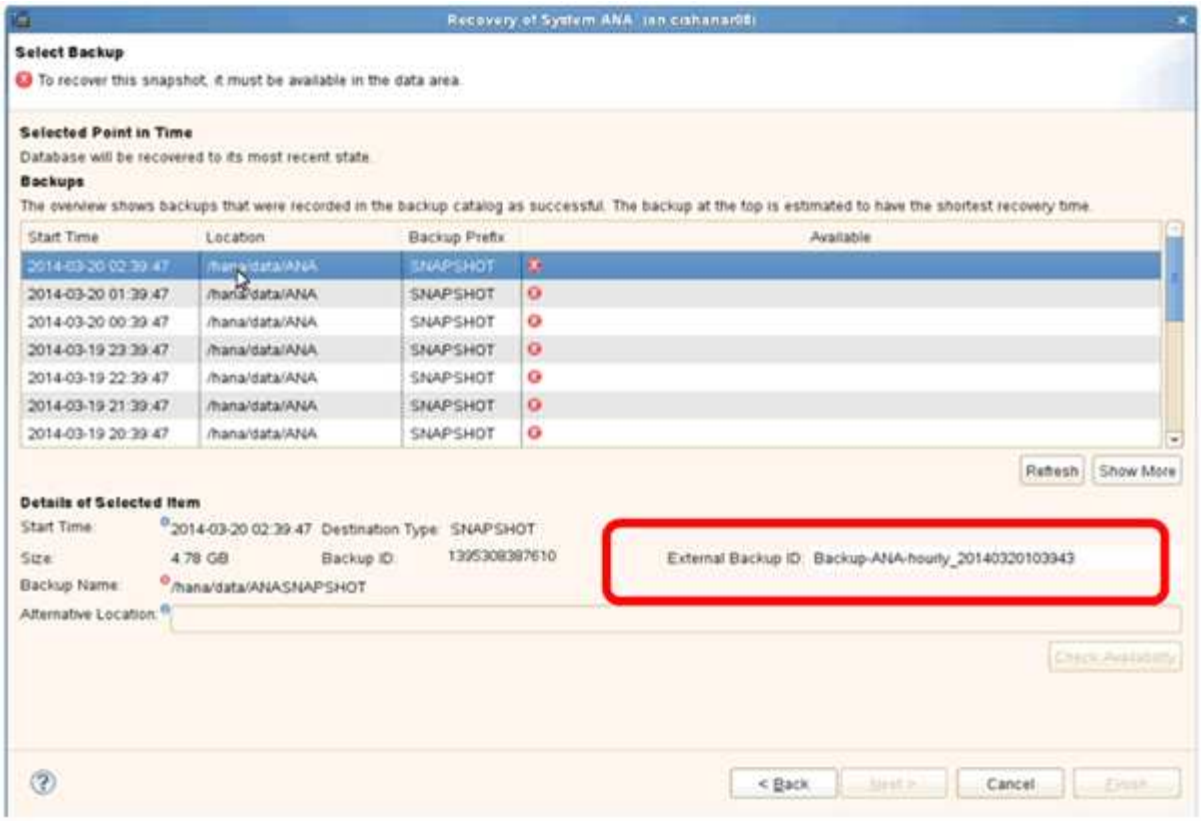


3. Provide the log backup locations and click **Next**.



The list of available backups you see is based on the content of the backup catalog.

4. Select the required backup and record the external backup ID.



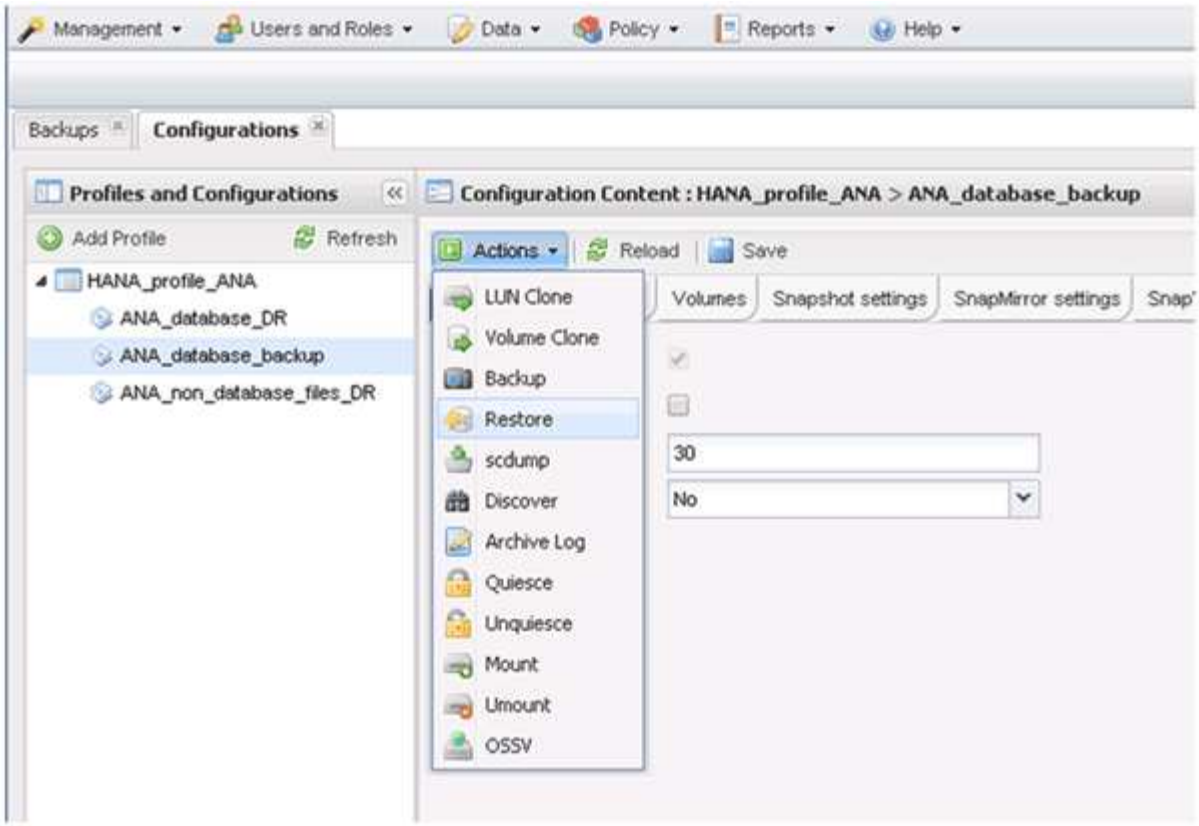
5. Deactivate the SnapVault relationship.

   This step is only required with clustered Data ONTAP.

   If you need to restore a Snapshot copy that is older than the Snapshot copy currently used as the base Snapshot copy for SnapVault, you must first deactivate the SnapVault relationship in clustered Data ONTAP. To do that, execute the following commands on the backup cluster console:

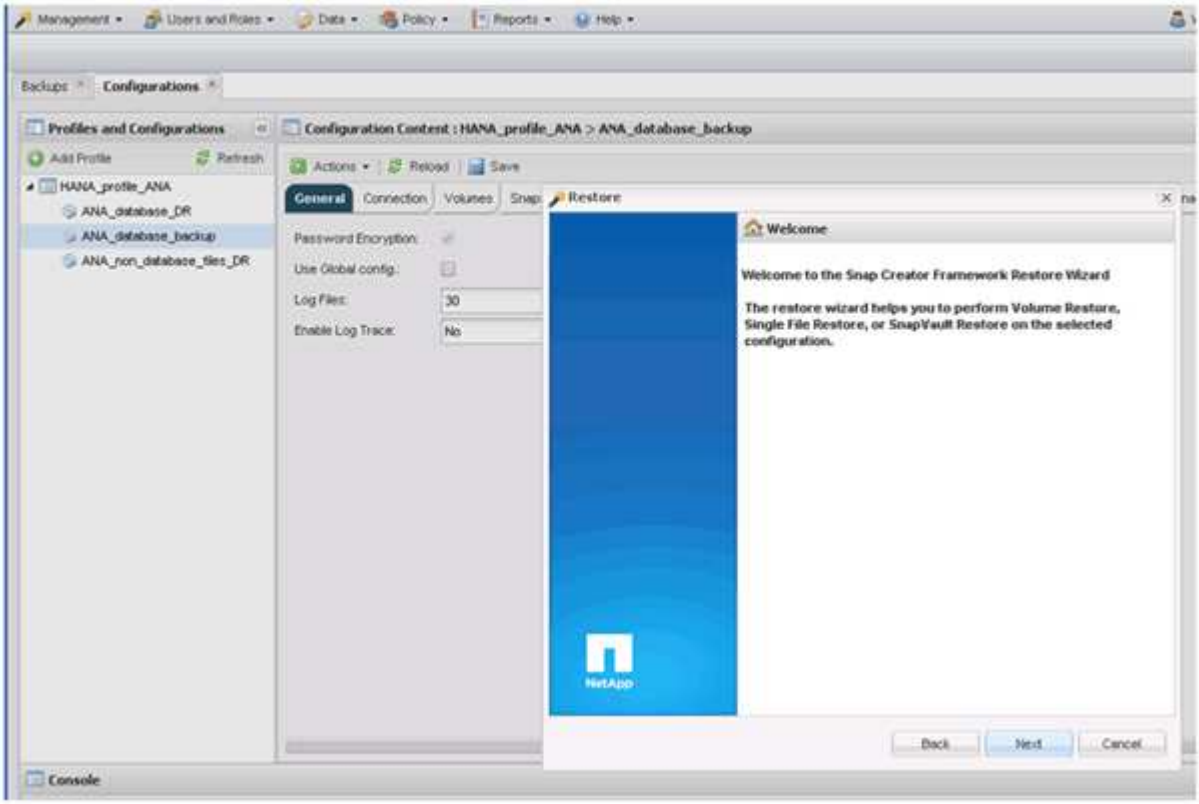
```
hana::> snapmirror quiesce -destination-path hana2b:backup_hana_data
Operation succeeded: snapmirror quiesce for destination
hana2b:backup_hana_data.

hana::> snapmirror delete -destination-path hana2b:backup_hana_data
Operation succeeded: snapmirror delete the relationship with destination
hana2b:backup_hana_data.

hana::> snapmirror release -destination-path hana2b:backup_hana_data
[Job 6551] Job succeeded: SnapMirror Release Succeeded
```

6. In the Snap Creator GUI, select the SAP HANA system, then select **Actions** > **Restore**.

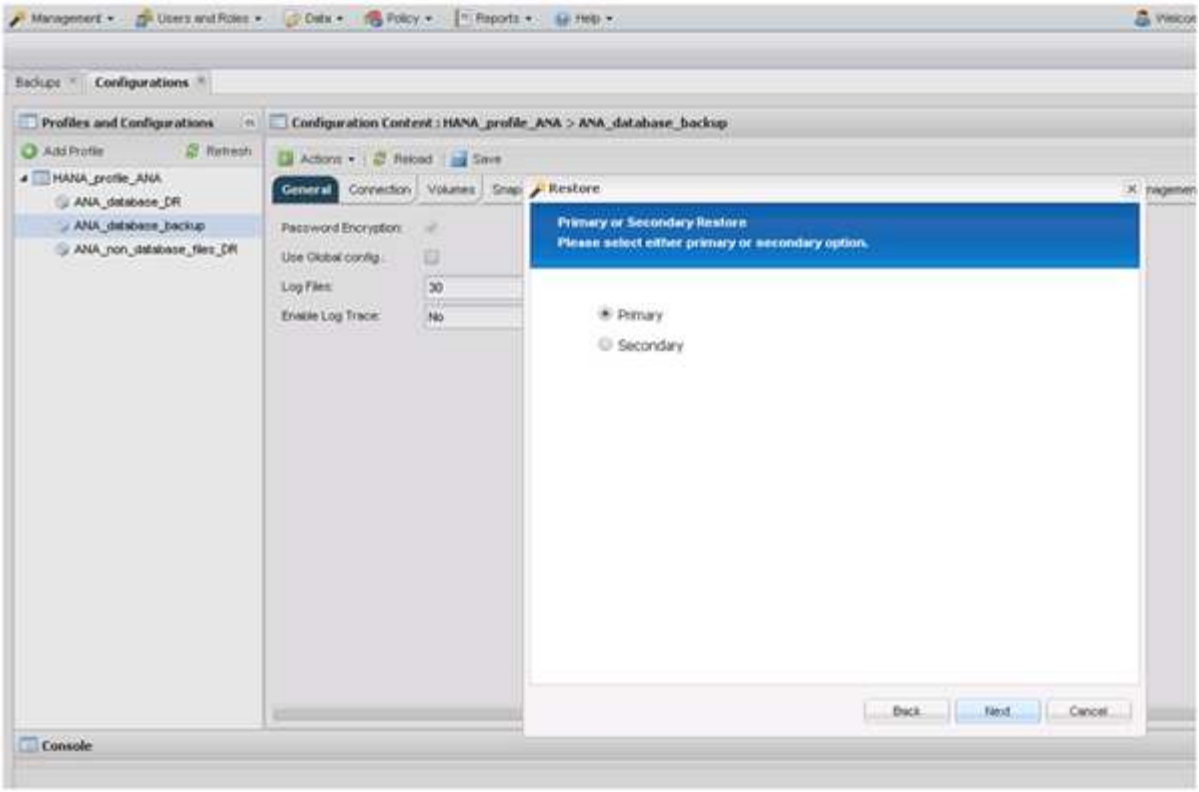


The Welcome to the Snap Creator Framework Restore Wizard screen appears.

7. Click **Next**.

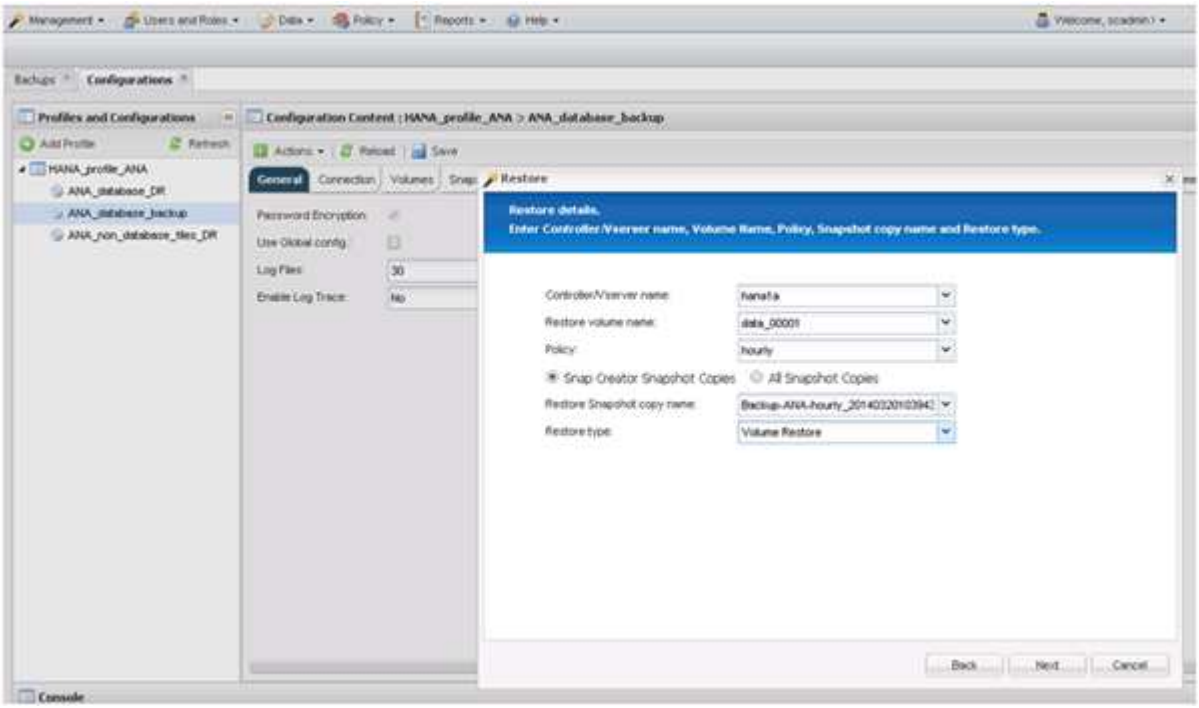


8. Select **Primary** and click **Next**.

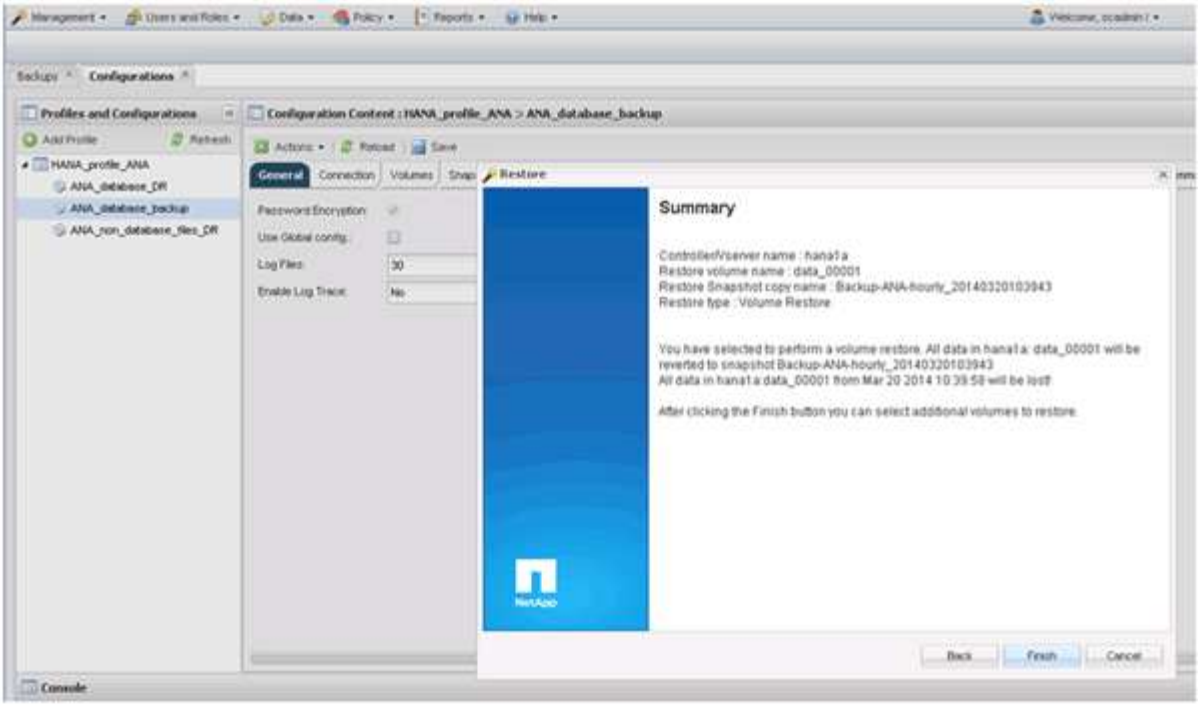


9. Select restore from primary storage.
10. Select the storage controller, the volume name, and the Snapshot name.

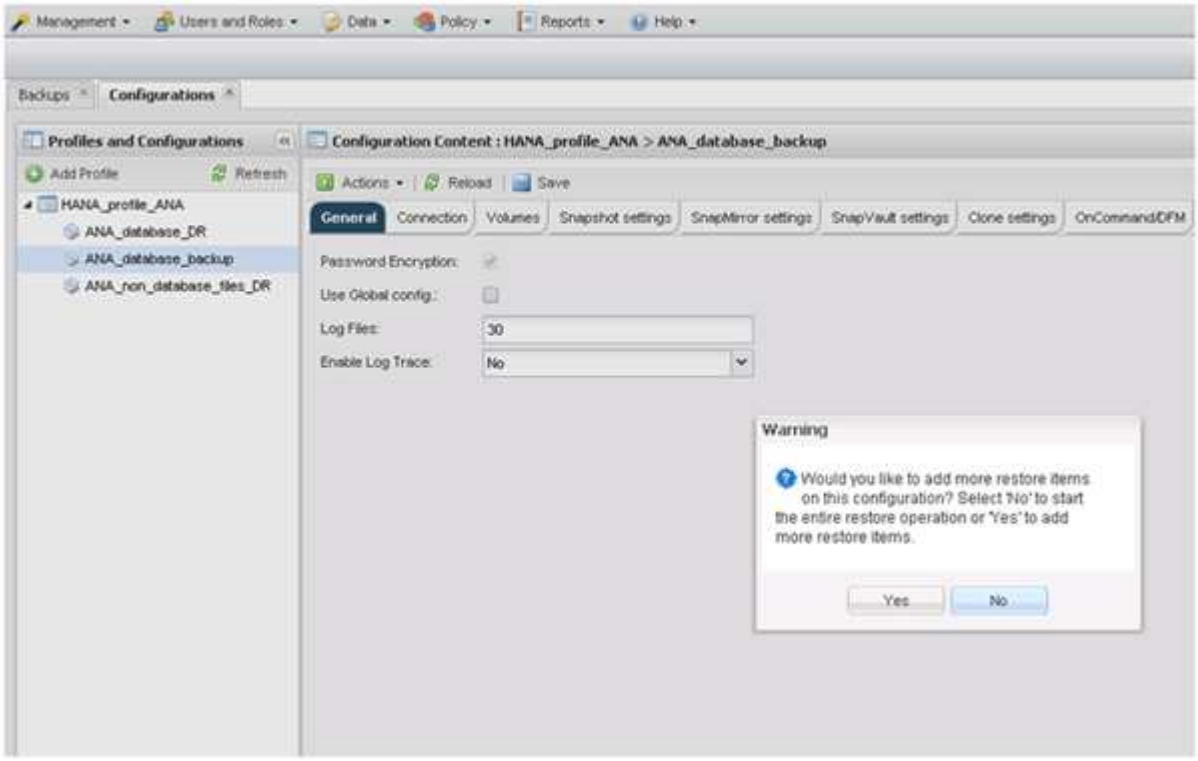
    The Snapshot name correlates with the backup ID that has been selected within SAP HANA Studio.



11. Click **Finish**.

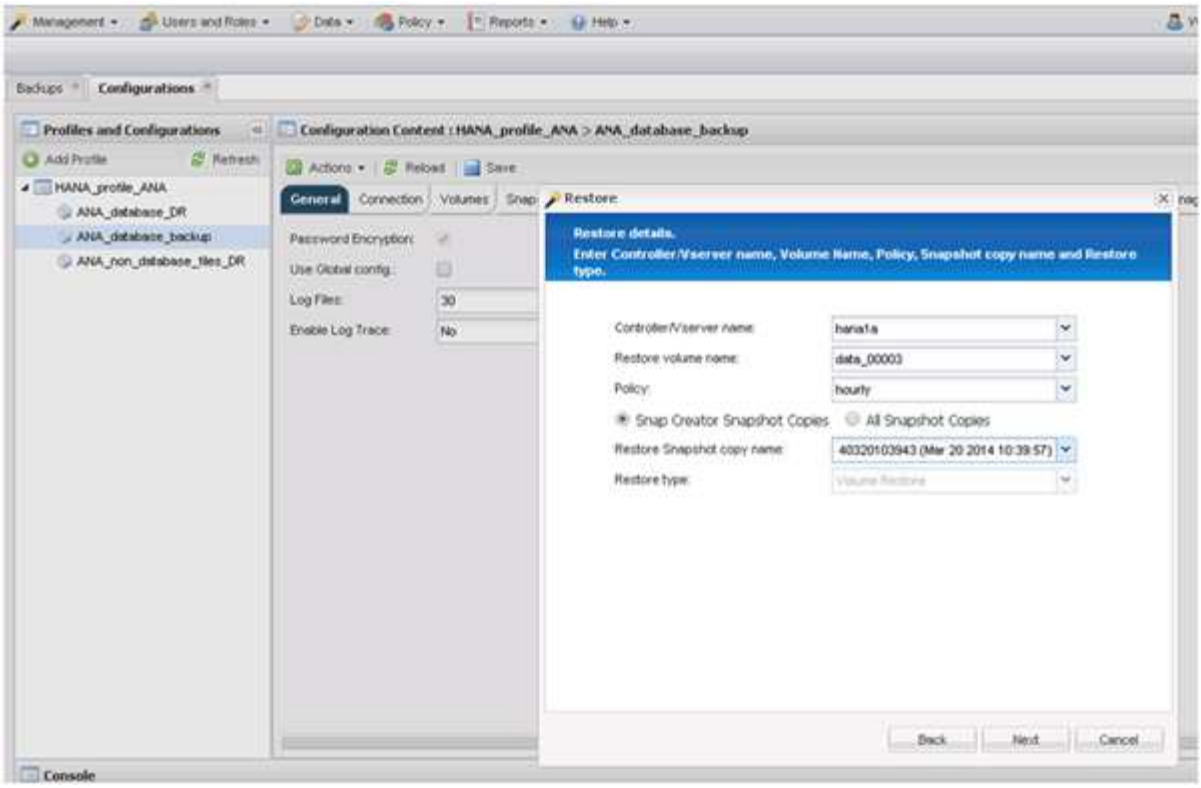


12. Click **Yes** to add more restore items.

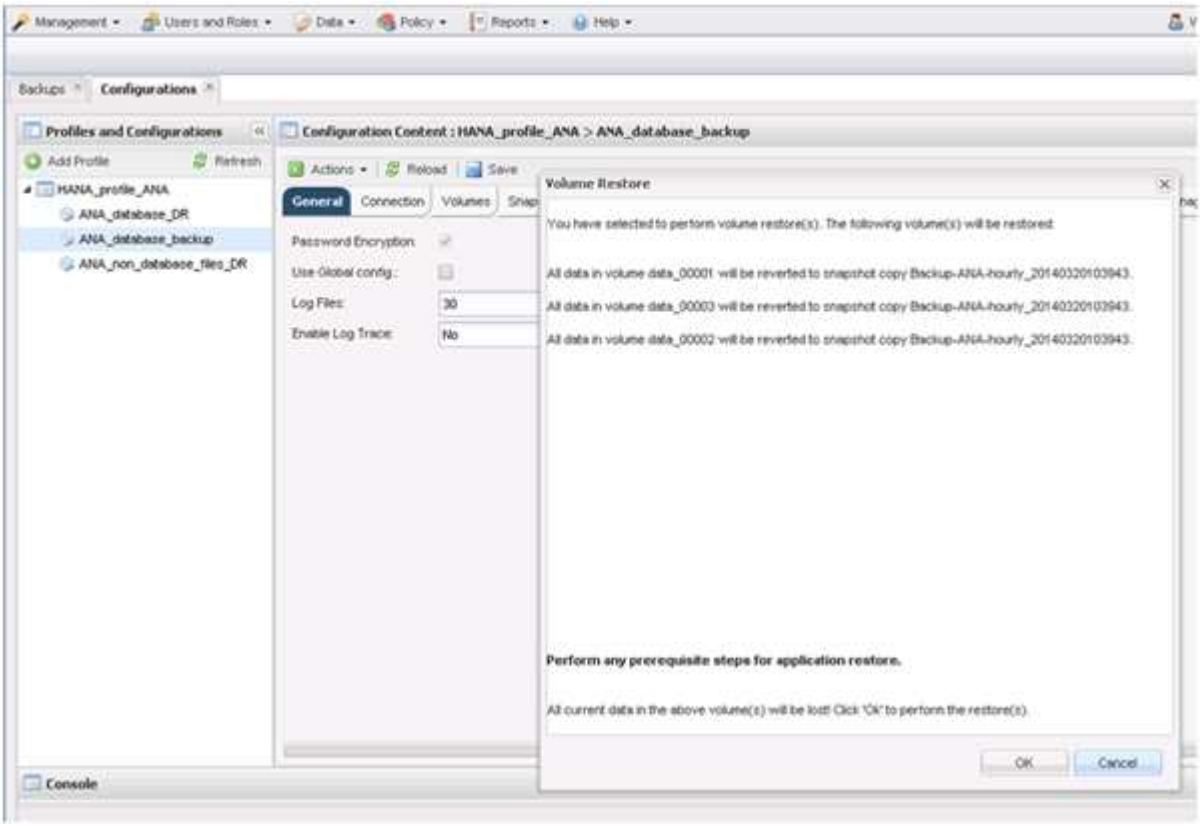


13. Select the storage controller, the additional volume name, and the Snapshot name.

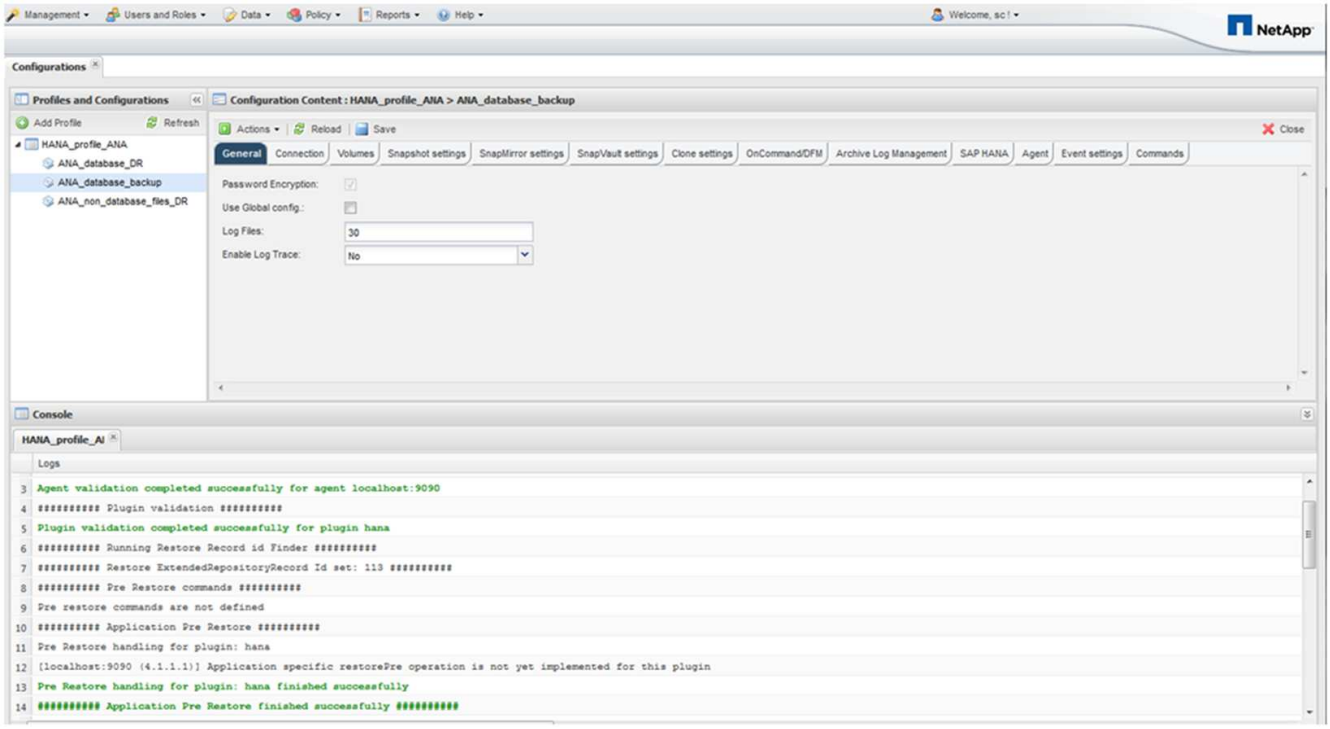
    The Snapshot name correlates with the backup ID that has been selected within SAP HANA Studio.



14. Repeat steps 10 through 13 until all required volumes are added; in our example, data_00001, data_00002, and data_00003 need to be selected for the restore process.
15. When all volumes are selected, click **OK** to start the restore process.



The restore process is started.



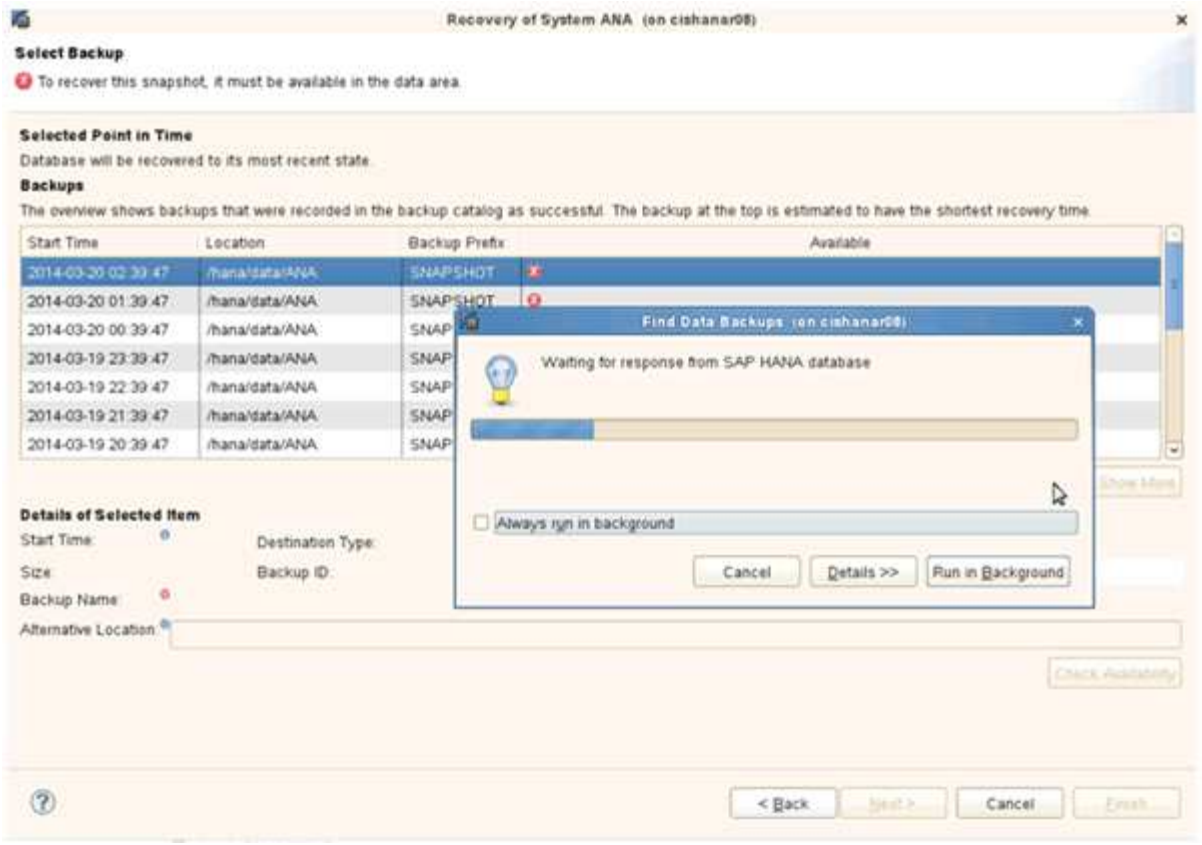
Wait until the restore process is finished.

16. On each database node, remount all data volumes to clean Stale NFS Handles.

    In the example, all three volumes need to be remounted at each database node.

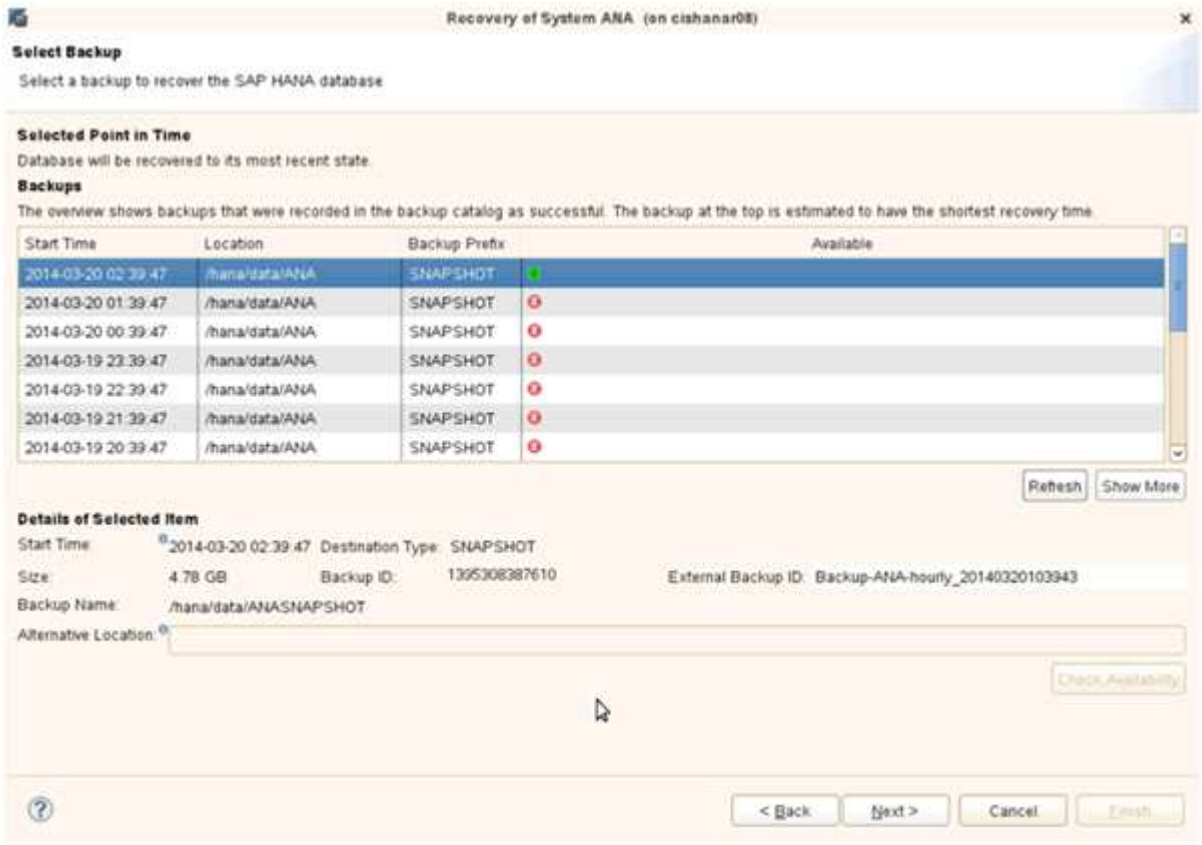
```
mount -o remount /hana/data/ANA/mnt00001
mount -o remount /hana/data/ANA/mnt00002
mount -o remount /hana/data/ANA/mnt00003
```

17. Go to SAP HANA Studio and click **Refresh** to update the list of available backups.

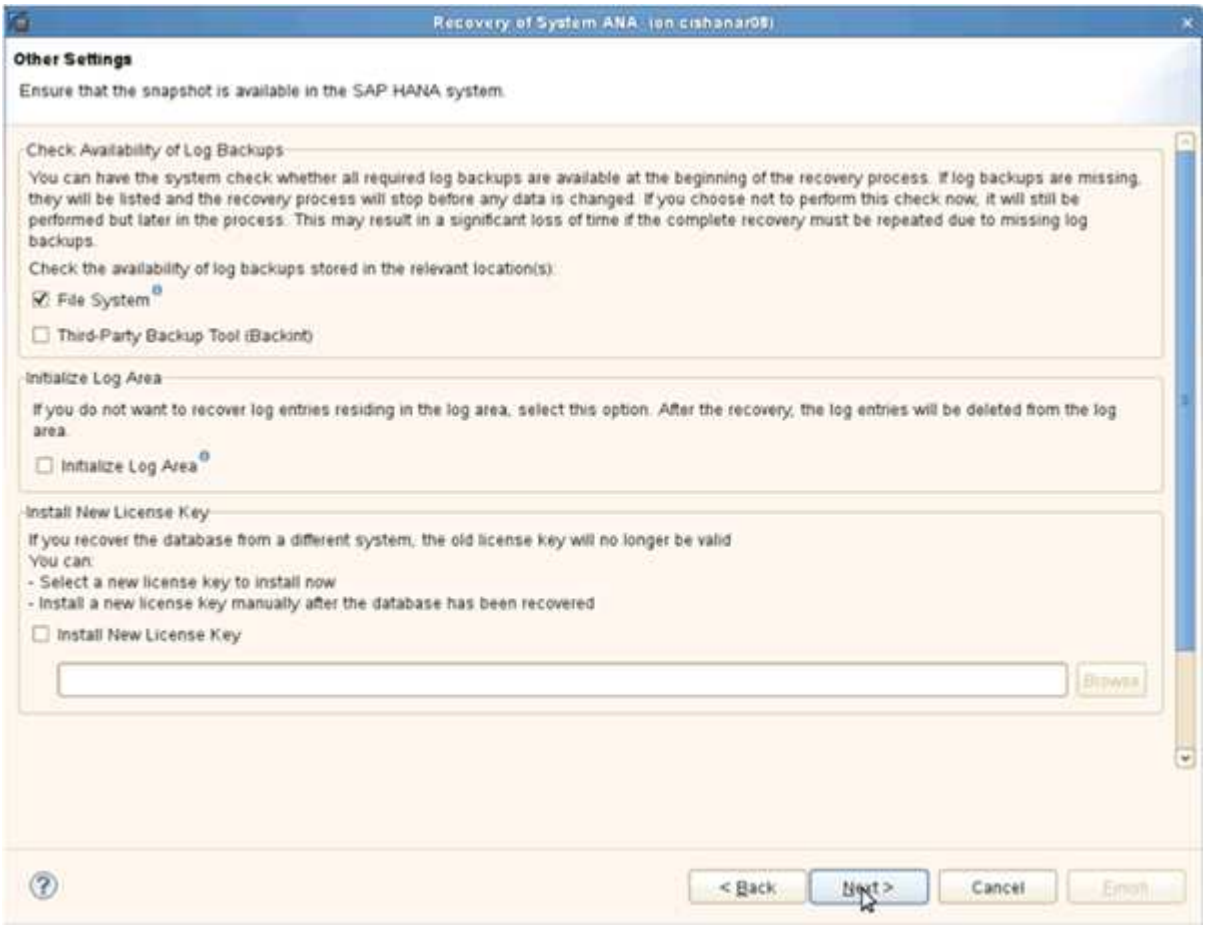


The backup that has been restored with Snap Creator is shown with a green icon in the list of backups.

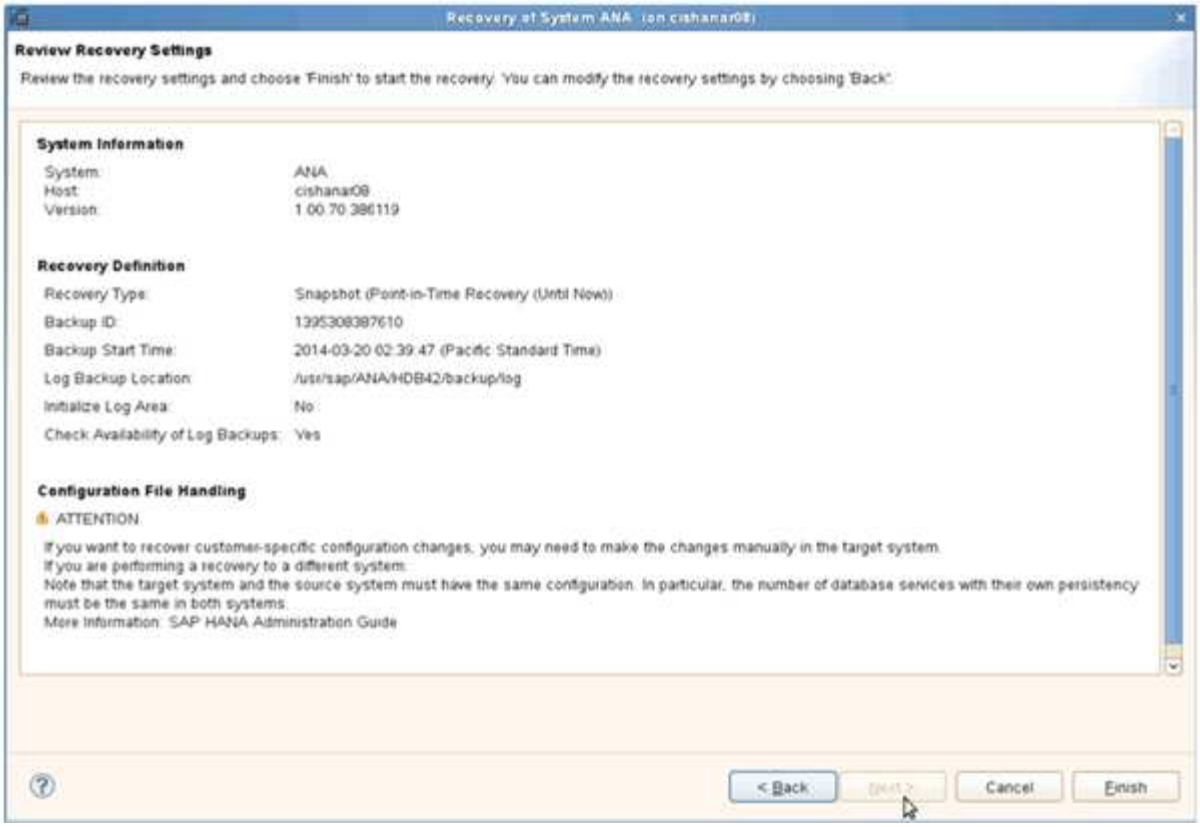
18. Select the backup and click **Next**.



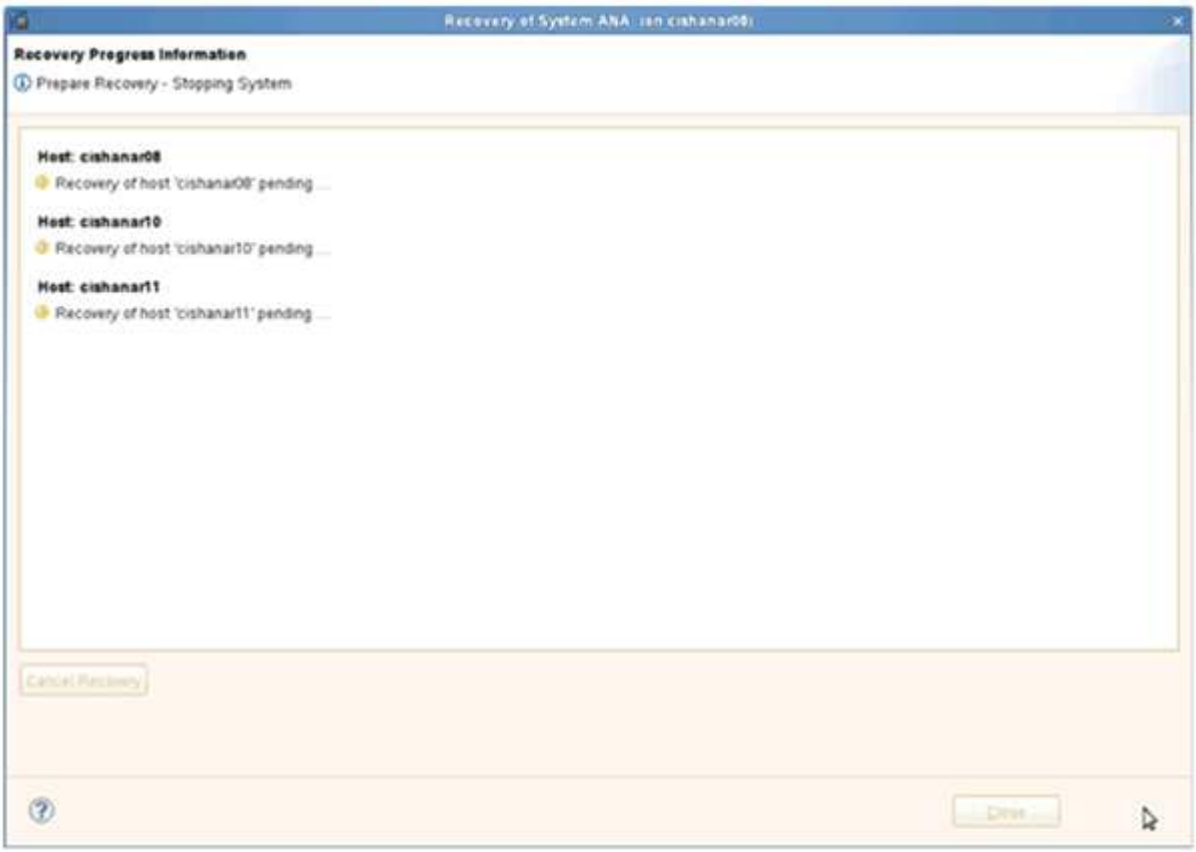
19. Select other settings as required and click **Next**.



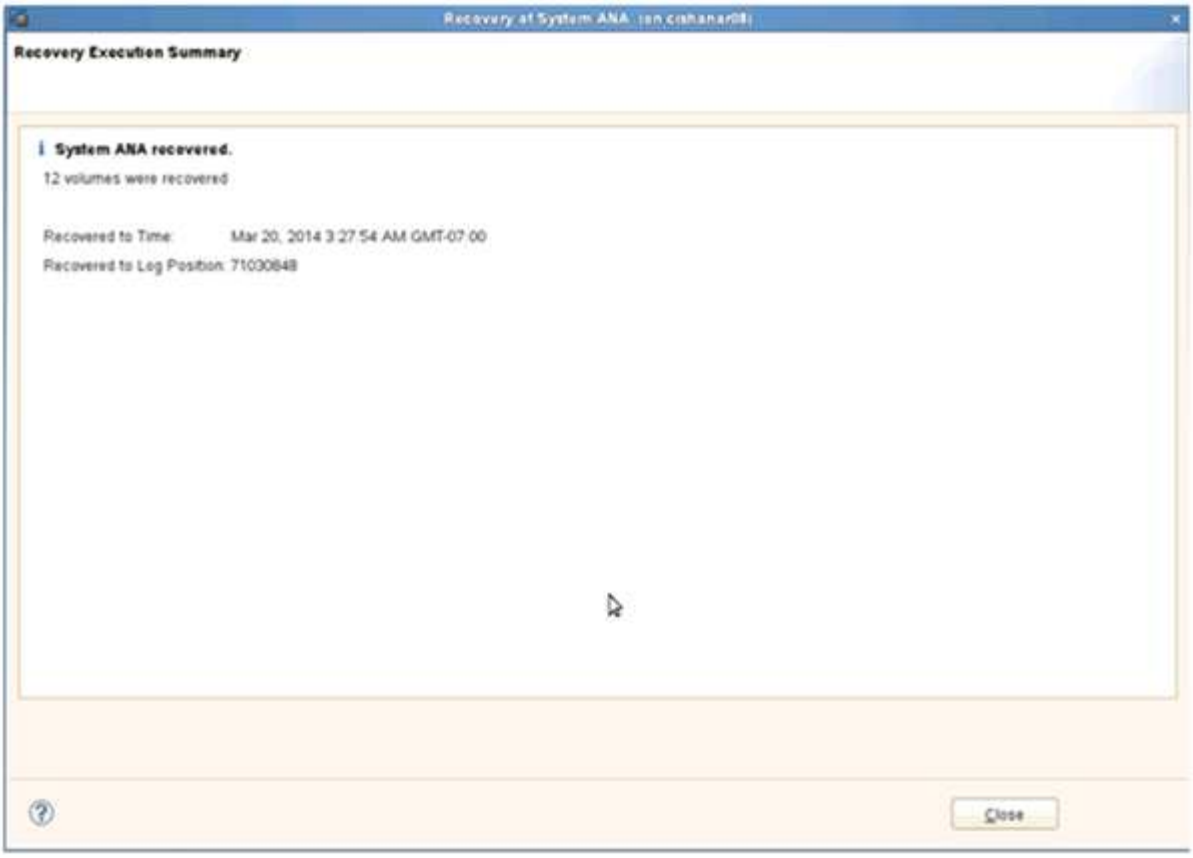
20. Click **Finish**.



The recovery process begins.



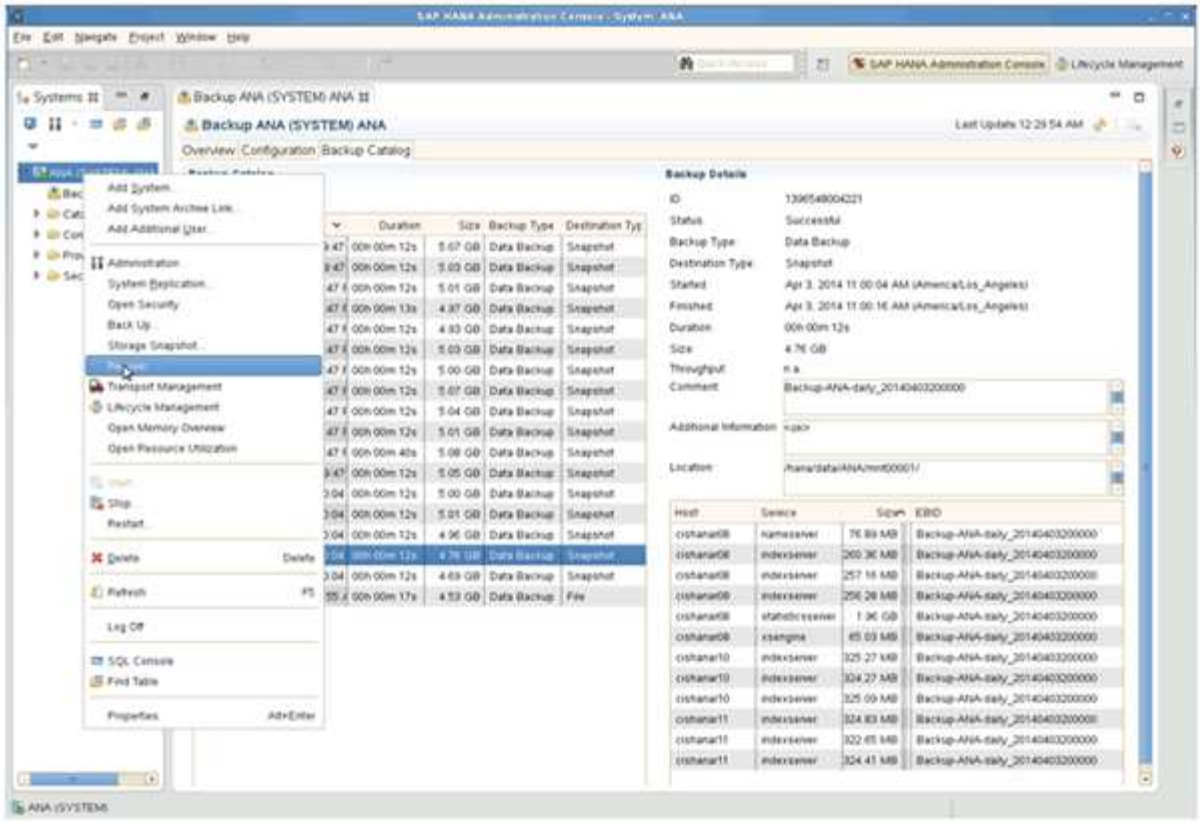
21. After recovery is finished, resume the SnapVault relationships, if required.



Restoring and recovering databases from secondary storage

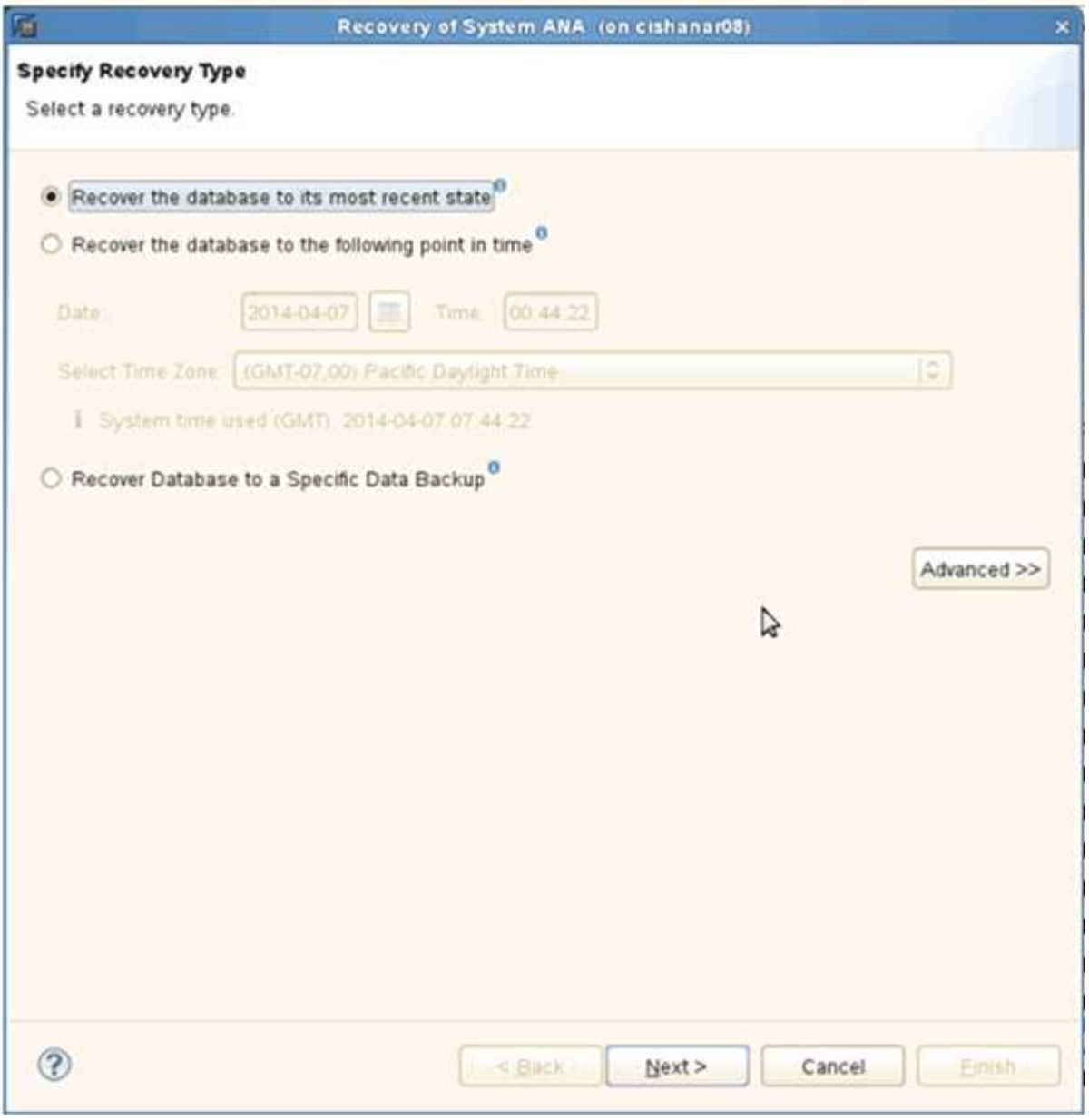
You can restore and recover the database from the secondary storage.

1. Within SAP HANA Studio, select **Recover** for the SAP HANA system.

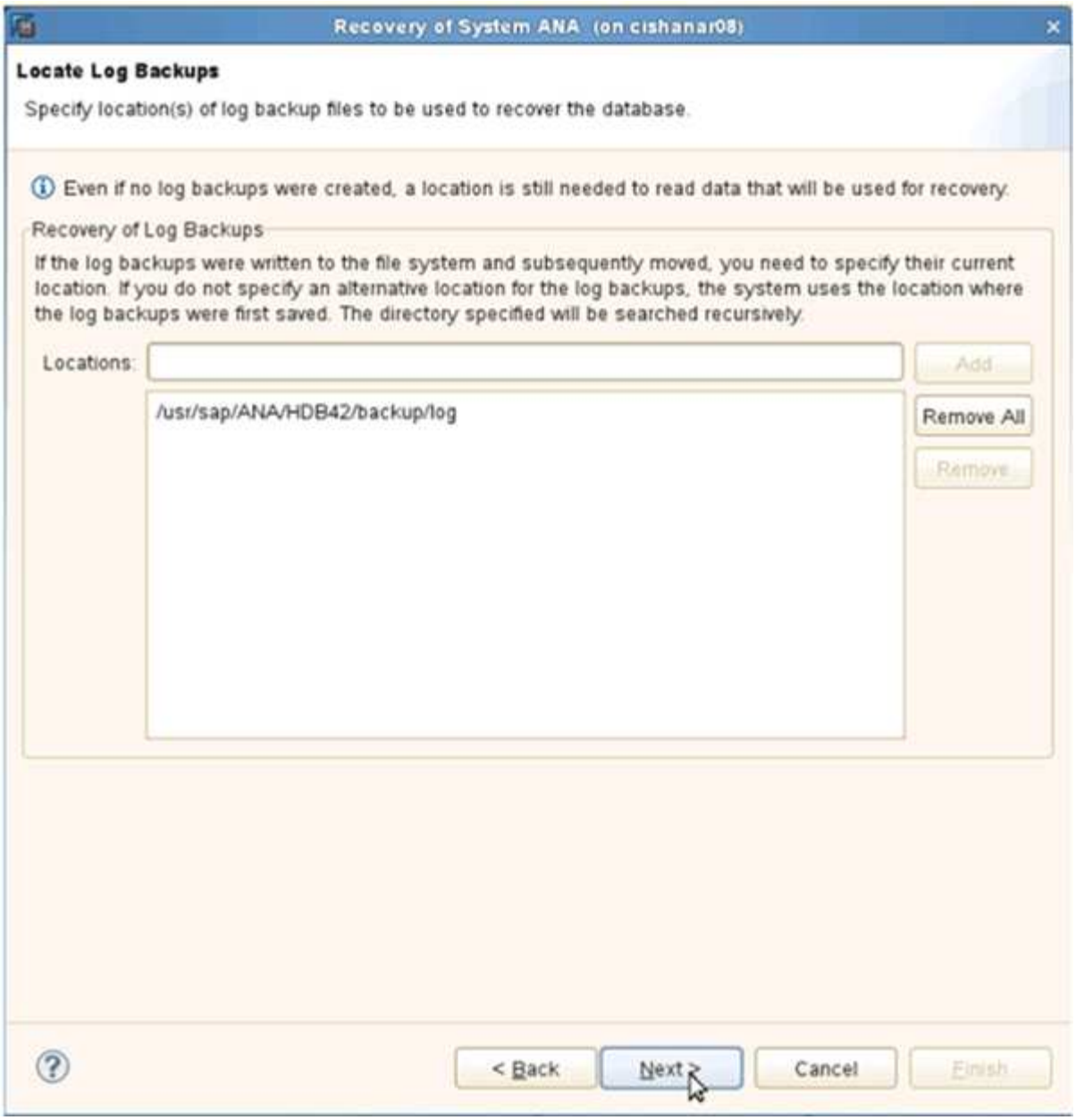


The SAP HANA system will be shut down.

2. Select the recovery type and click **Next**.

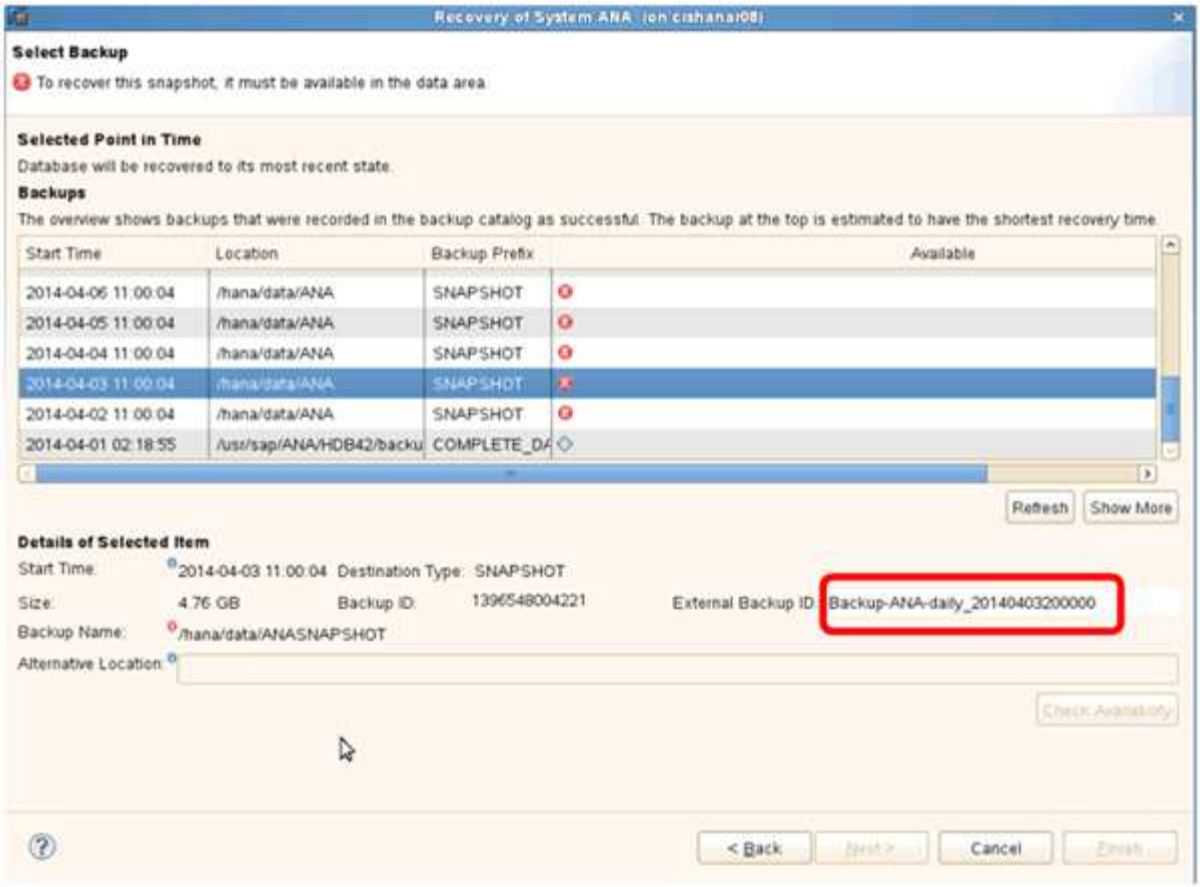


3. Provide log backup locations and click **Next**.

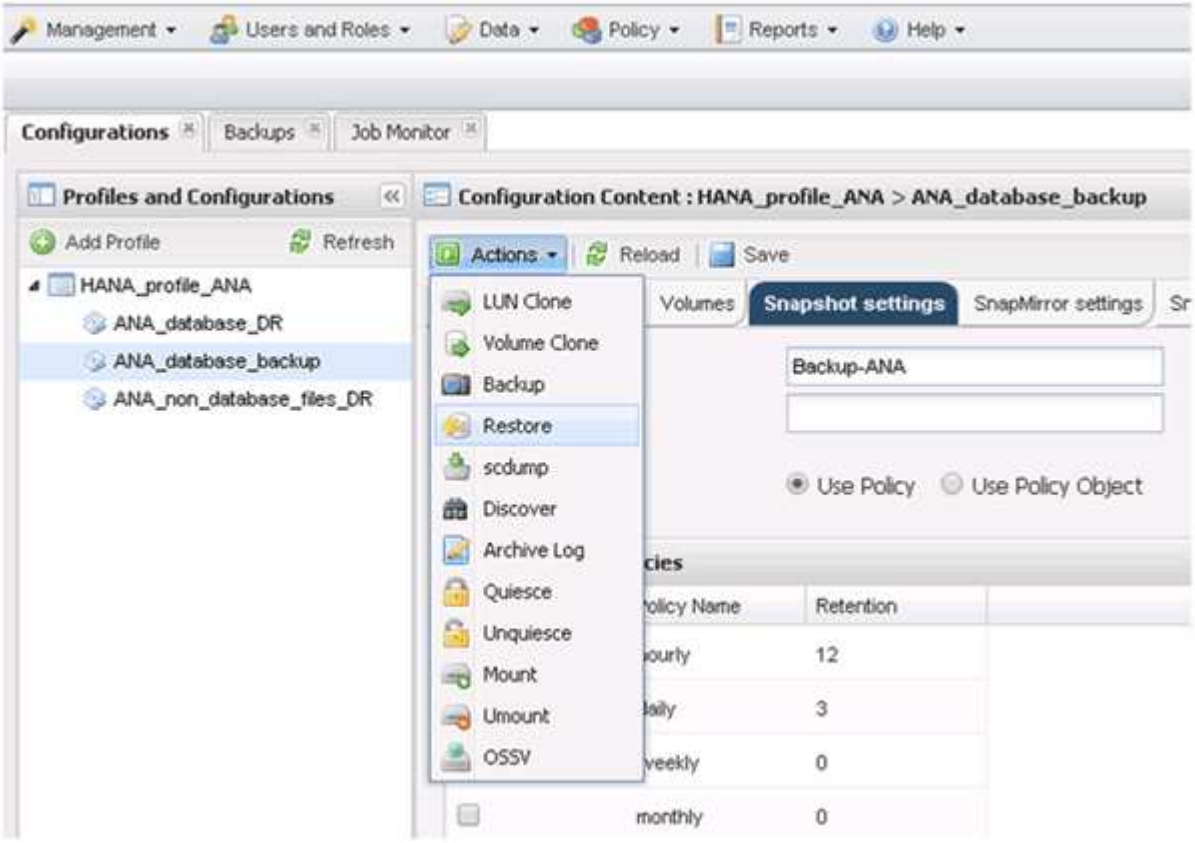


The list of available backups appear based on the content of the backup catalog.

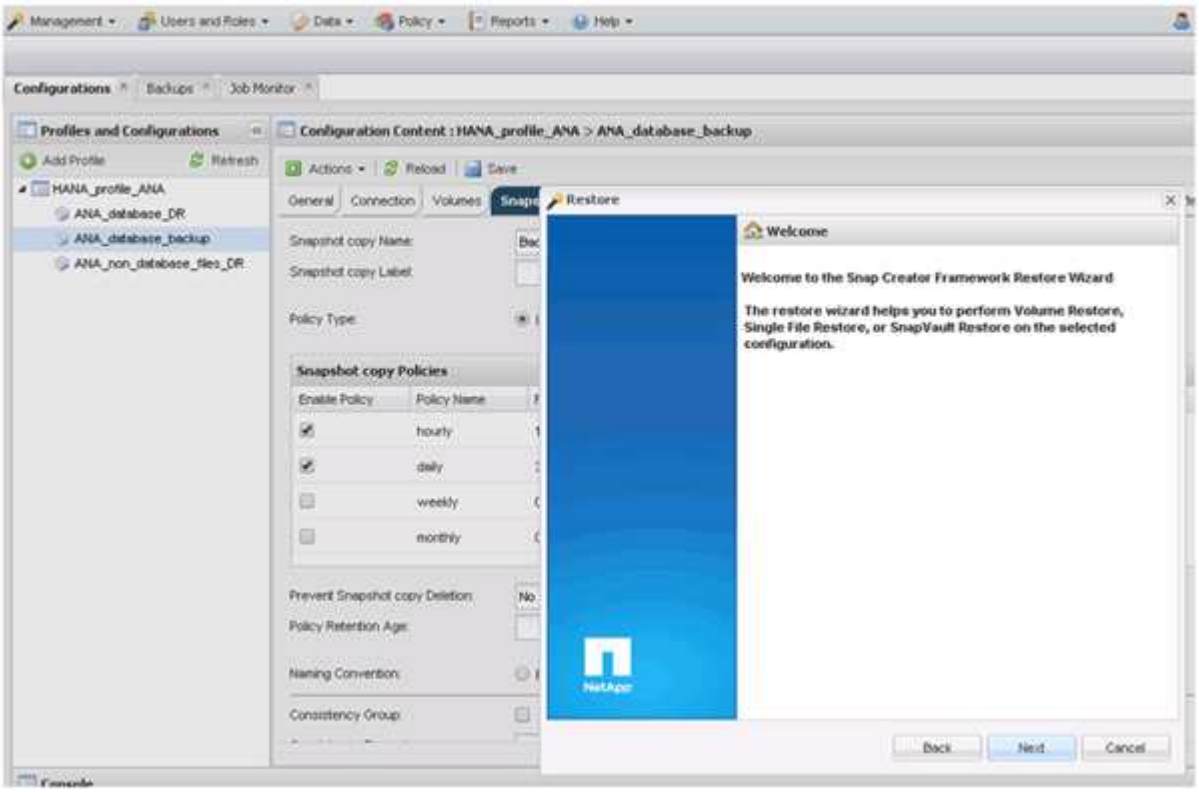
4. Select the required backup and write down external backup ID.



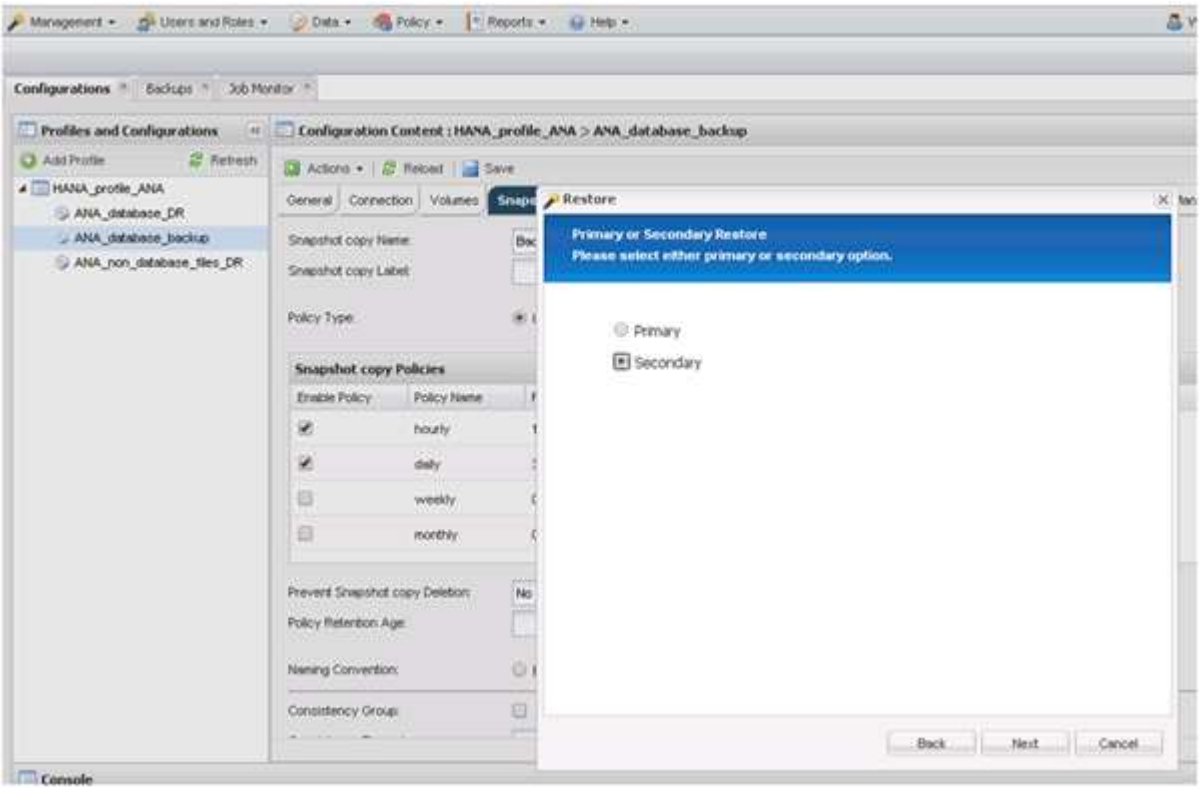
5. Go to the Snap Creator GUI.
6. Select the SAP HANA system, and then click **Actions** > **Restore**.



The Welcome screen appears.

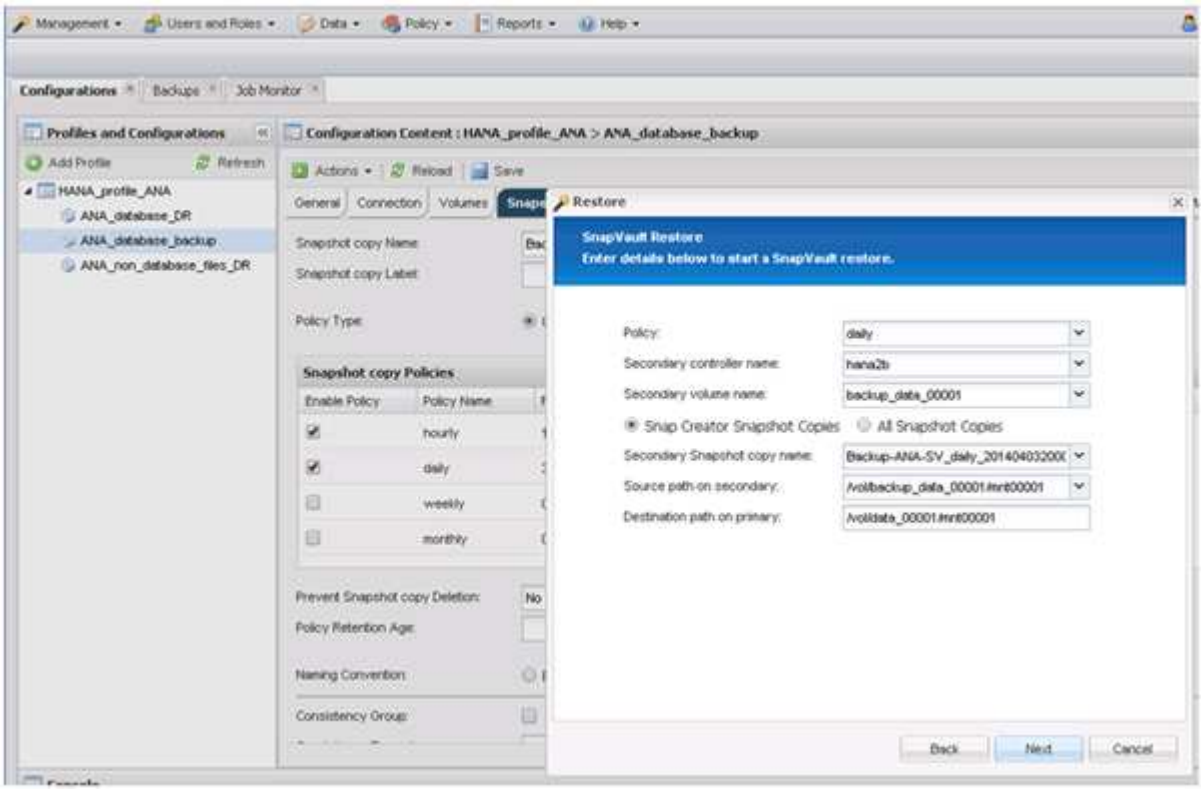


7. Click **Next**.
8. Select **Secondary** and click **Next**.

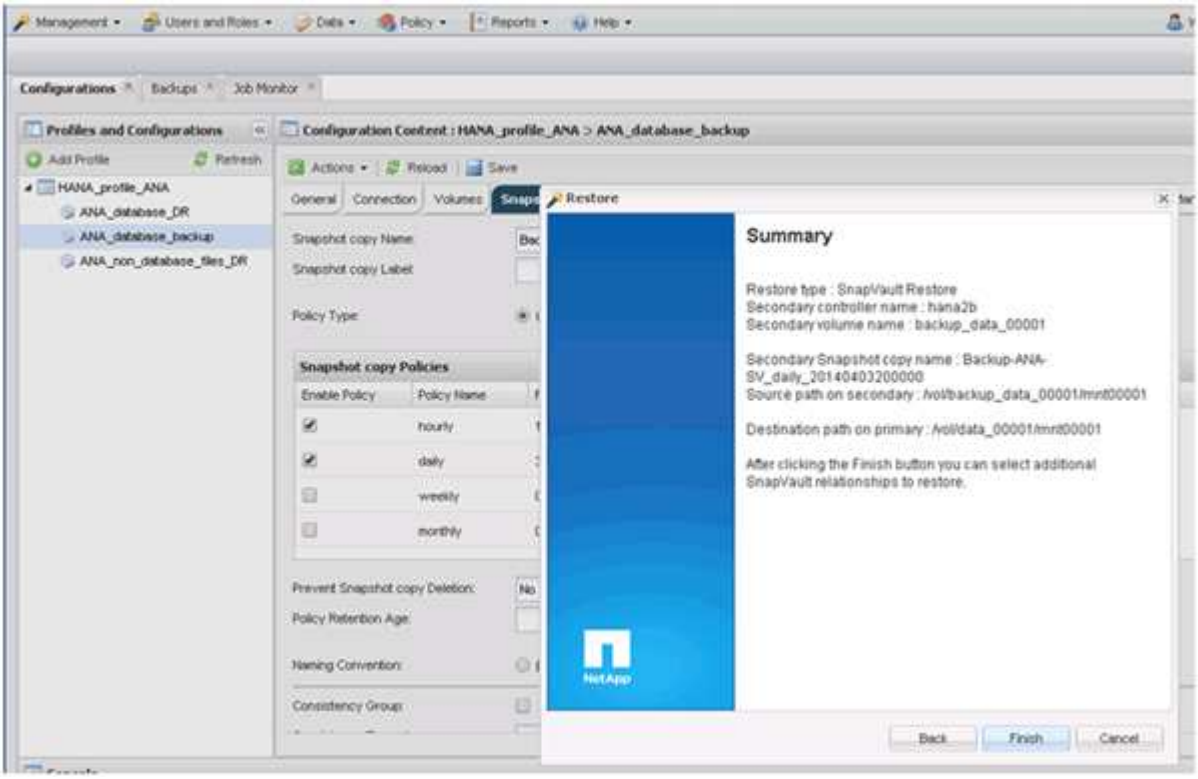


9. Enter the required information. The Snapshot name correlates with the backup ID that has been selected in

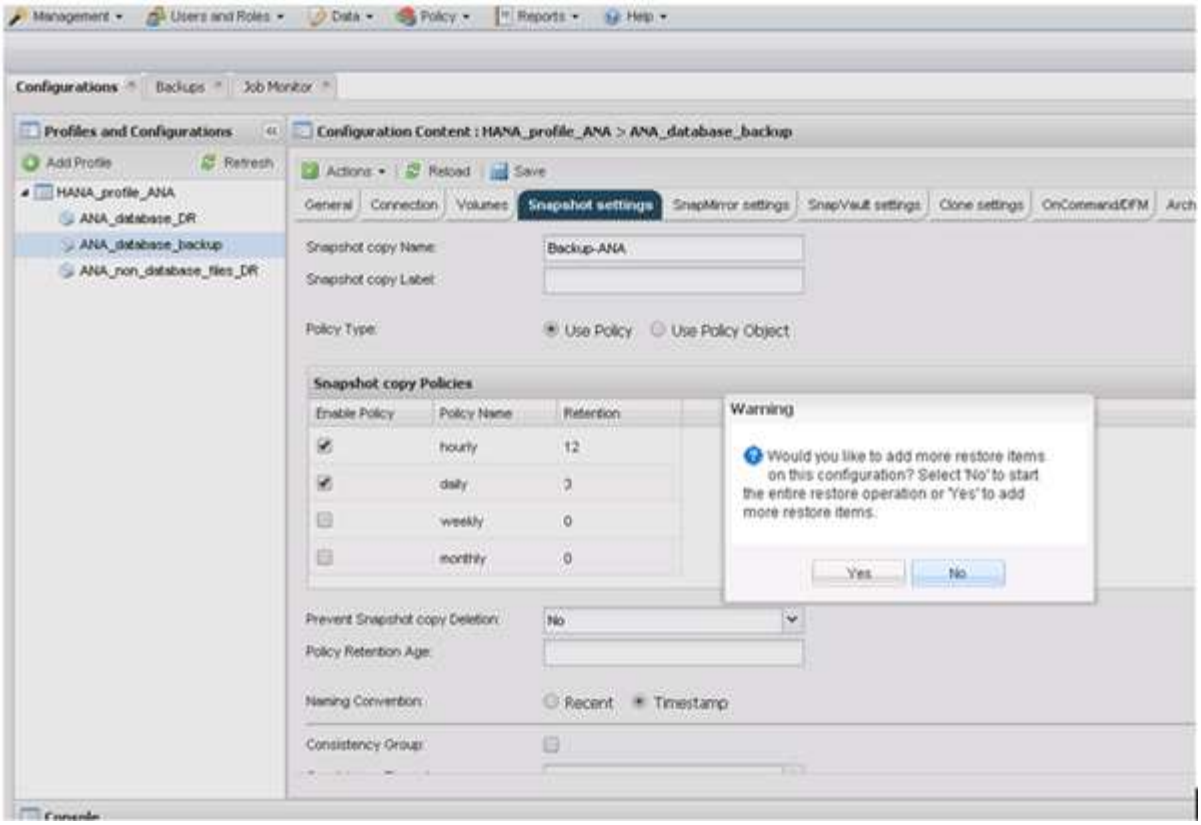
SAP HANA Studio.



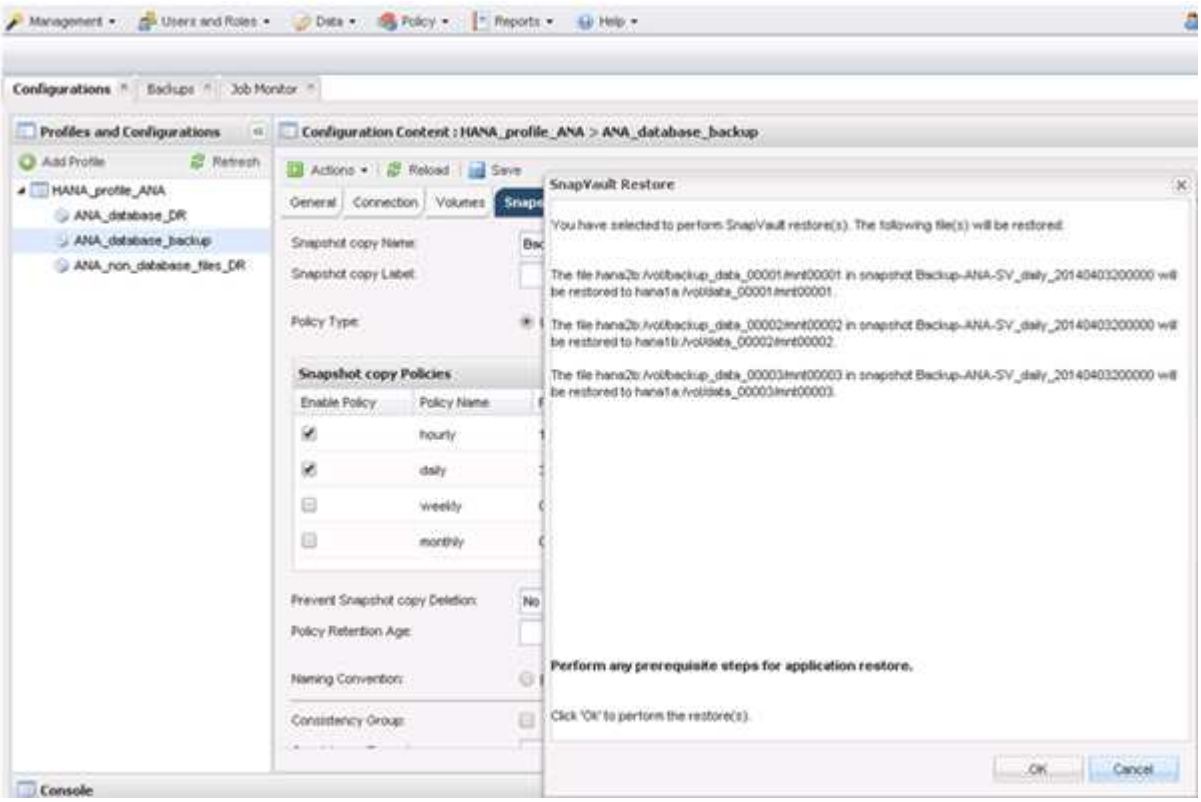
10. Select **Finish**.



11. Click **Yes** to add more items to restore.



12. Provide the required information for all volumes that need to be restored. In the setup data_00001, data_00002, and data_00003 need to be selected for the restore process.



13. When all volumes are selected, select **OK** to start the restore process.

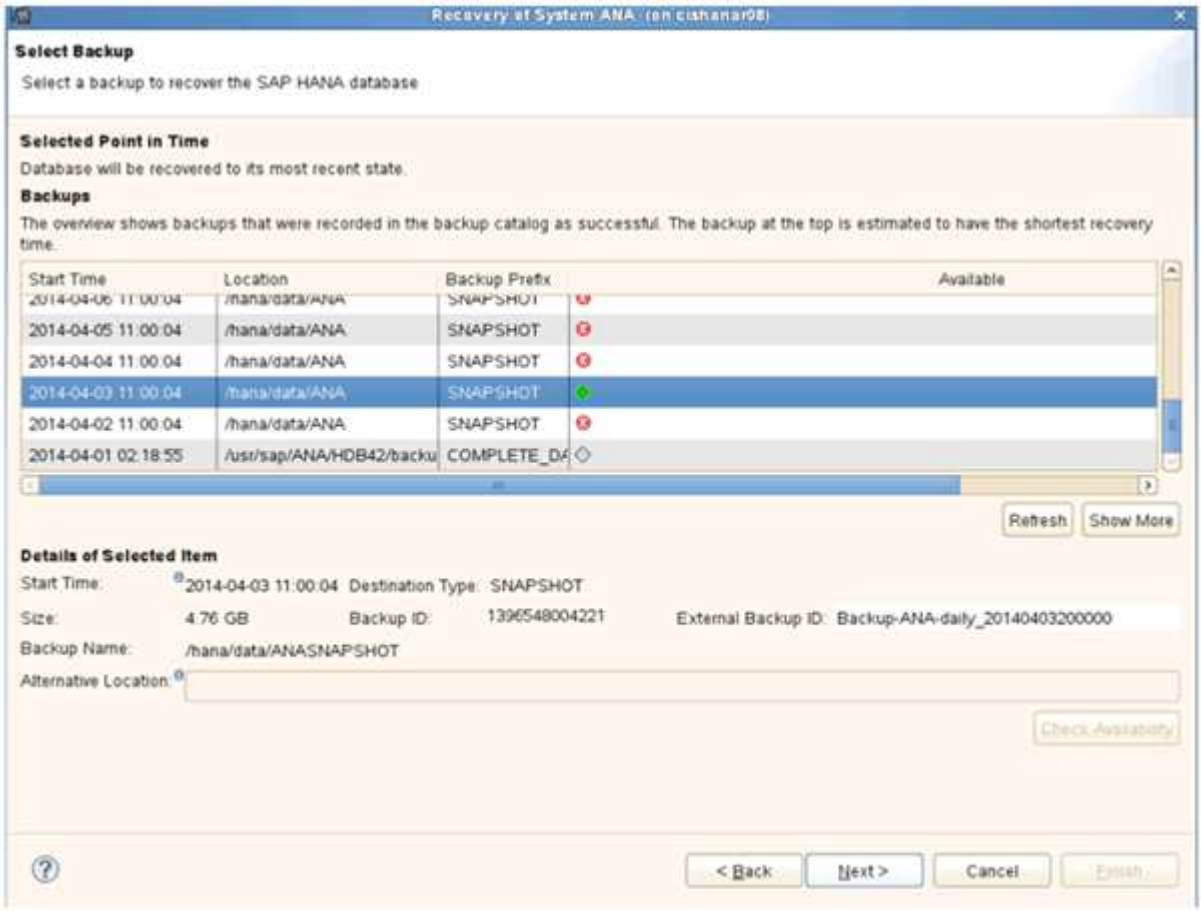
    Wait until the restore process is finished.

14. On each database node remount all data volumes to clean “Stale NFS Handles.”

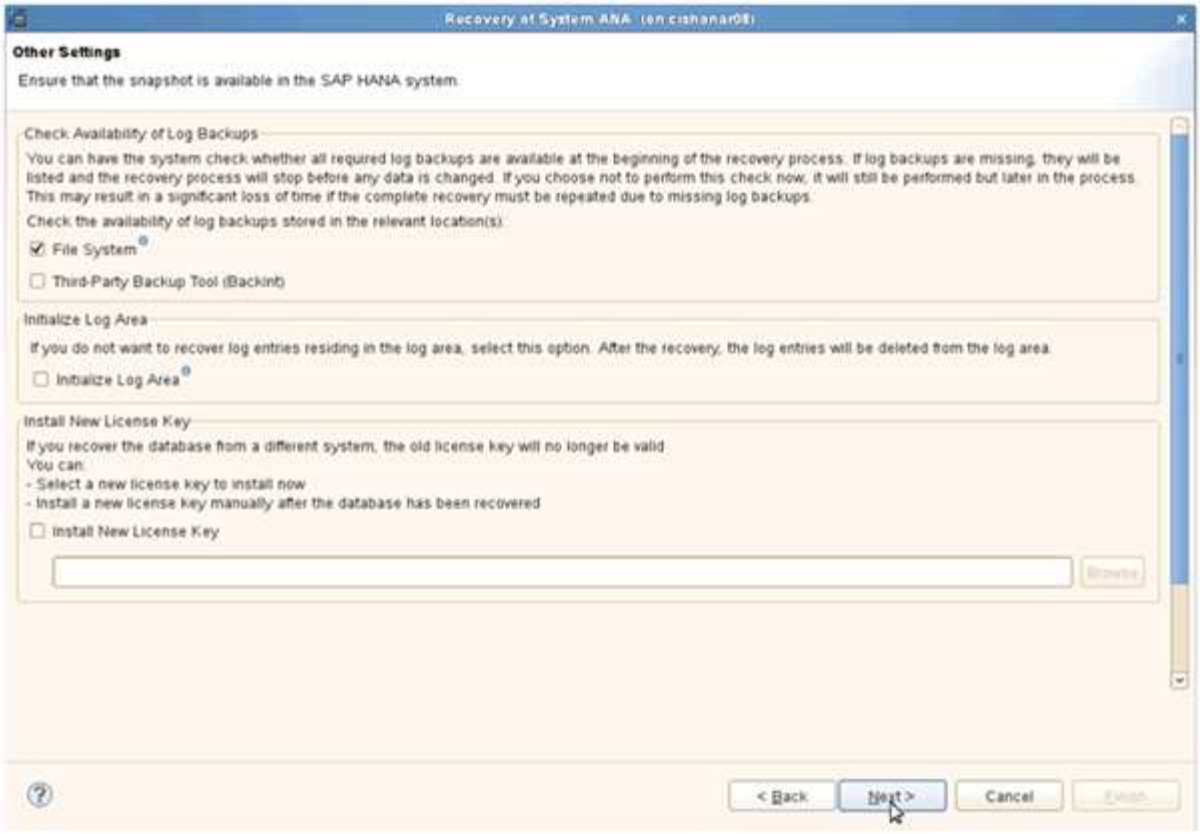
    In the example, all three volumes need to be remounted at each database node.

```
mount -o remount /hana/data/ANA/mnt00001
mount -o remount /hana/data/ANA/mnt00002
mount -o remount /hana/data/ANA/mnt00003
```

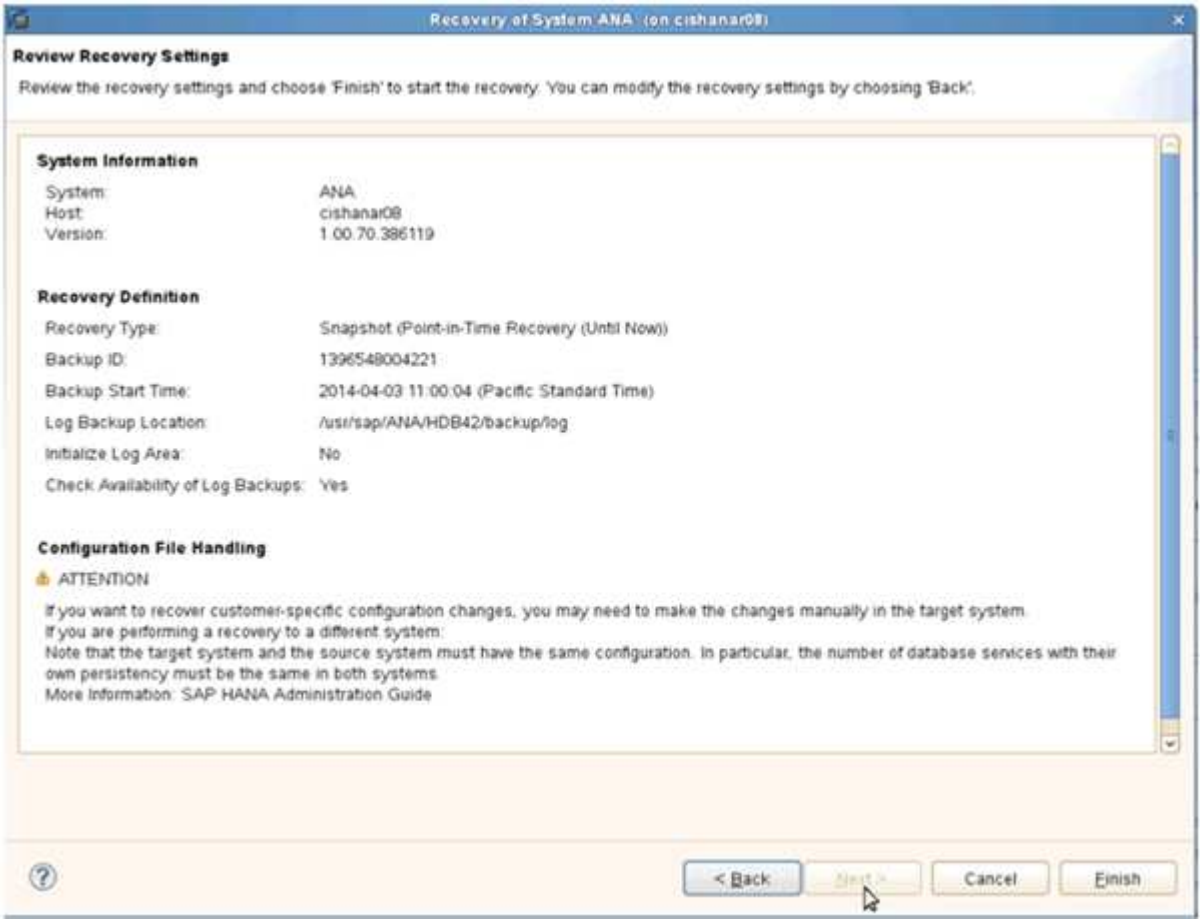
15. Go to SAP HANA Studio and click **Refresh** to update the backup list.



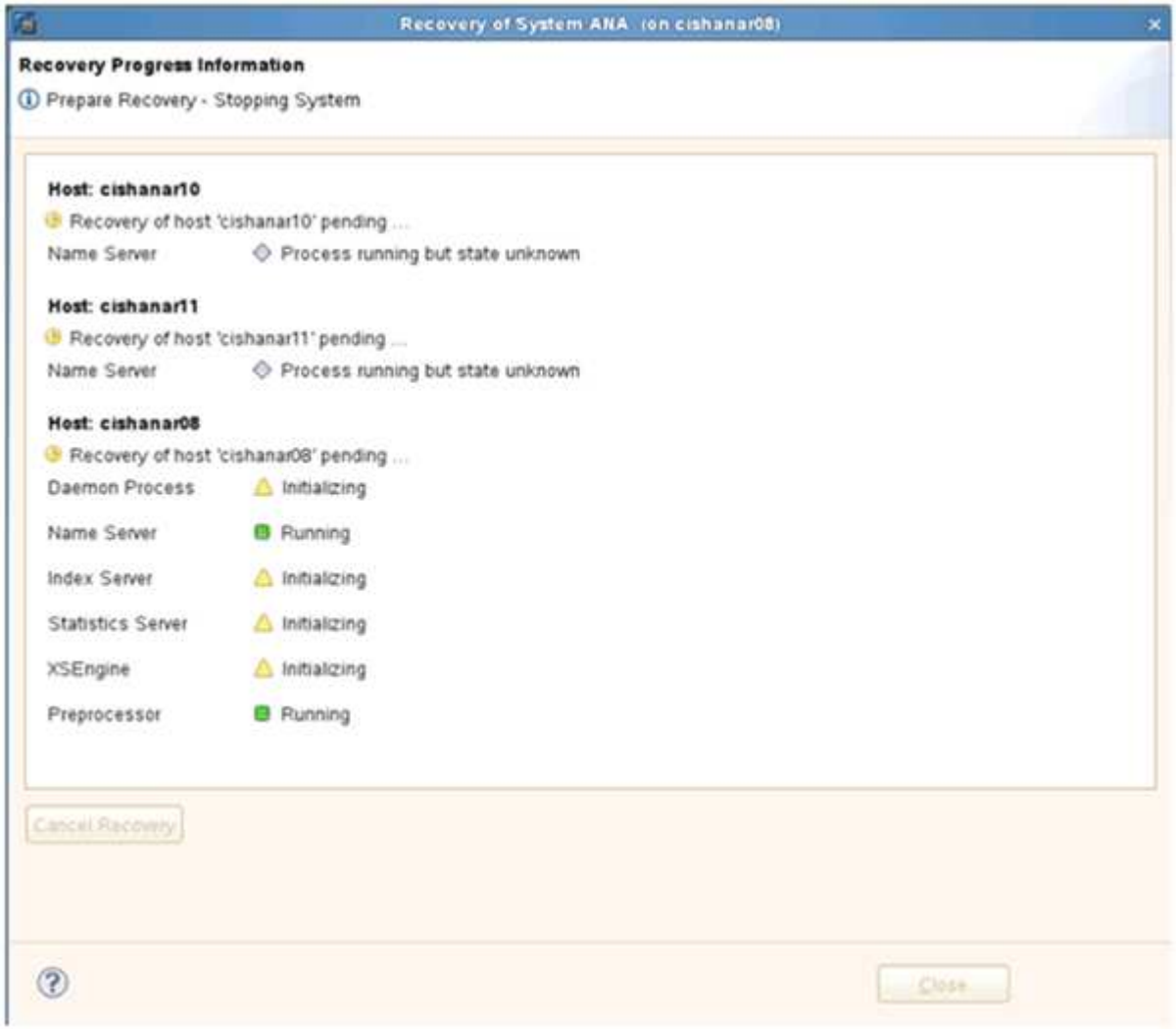
16. The backup that has been restored with Snap Creator is shown with a green icon in the list of backups. Select the backup and click **Next**.
17. Select other settings as required and click **Next**.



18. Click **Finish**.



The recovery process begins.



19. After the recovery process is finished, resume the SnapVault Relationships, if required.

Resuming a SnapVault relationship after a restore

Any restore that is not done using the latest Snapshot backup will delete the SnapVault relationship at the primary storage systems.

After the restore and recovery process is finished, the SnapVault relationship has to be resumed so that backups can be executed again with Snap Creator. Otherwise, Snap Creator will issue an error message, because it can't find the SnapVault relationship anymore at the primary storage systems.

The data transfer that is required will be based on a delta transfer, if there is still a common Snapshot copy between the source volume and the destination volume.

Resuming a SnapVault relationship with Data ONTAP operating in 7-Mode

If you restore using a Snapshot backup other than the latest one, you need to resume the SnapVault relationship so that Snap Creator can continue to run backups.

1. Resume the SnapVault relationship with Data ONTAP operating in 7-Mode by entering the following command. snapvault start -r -S source_controller:source_volumebackup_controller:backup_volume

   Perform this step for all volumes belonging to the SAP HANA database.

```
hana2b> snapvault start -r -S hana1a:/vol/data_00001/mnt00001
hana2b:/vol/backup_data_00001/mnt00001
The resync base snapshot will be: Backup-ANA-SV_daily_20140406200000
Resync may alter the data in this qtree.
Are you sure you want to resync the qtree? y
Mon Apr  7 14:08:21 CEST [hana2b:replication.dst.resync.success:notice]:
SnapVault resync of
/vol/backup_data_00001/mnt00001 to hana1a:/vol/data_00001/mnt00001 was
successful.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana2b> snapvault start -r -S hana1b:/vol/data_00002/mnt00002
hana2b:/vol/backup_data_00002/mnt00002
The resync base snapshot will be: Backup-ANA-SV_daily_20140406200000
Resync may alter the data in this qtree.
Are you sure you want to resync the qtree? y
Mon Apr  7 14:09:49 CEST [hana2b:replication.dst.resync.success:notice]:
SnapVault resync of
/vol/backup_data_00002/mnt00002 to hana1b:/vol/data_00002/mnt00002 was
successful.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana2b> snapvault start -r -S hana1a:/vol/data_00003/mnt00003
hana2b:/vol/backup_data_00003/mnt00003
The resync base snapshot will be: Backup-ANA-SV_daily_20140406200000
Resync may alter the data in this qtree.
Are you sure you want to resync the qtree? y
Mon Apr  7 14:10:25 CEST [hana2b:replication.dst.resync.success:notice]:
SnapVault resync of
/vol/backup_data_00003/mnt00003 to hana1a:/vol/data_00003/mnt00003 was
successful.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

When the data transfer is finished, you can again schedule backups by using Snap Creator.

Resuming a SnapVault relationship with clustered Data ONTAP

If you restore using a Snapshot backup other than the latest one, you need to resume the SnapVault relationship so that Snap Creator can continue to run backups.

1. Re-create and resynchronize the SnapVault relationship.

```
hana::> snapmirror create -source-path hana1a:hana_data -destination
-path
hana2b:backup_hana_data -type XDP
Operation succeeded: snapmirror create the relationship with destination
hana2b:backup_hana_data.

hana::> snapmirror resync -destination-path hana2b:backup_hana_data
-type XDP

Warning: All data newer than Snapshot copy sc-backup-
daily_20140430121000 on volume
hana2b:backup_hana_data will be deleted.
Do you want to continue? {y|n}: y
[Job 6554] Job is queued: initiate snapmirror resync to destination
"hana2b:backup_hana_data".
[Job 6554] Job succeeded: SnapMirror Resync Transfer Queued
```

2. To actually restart the SnapVault transfer, a manual Snapshot copy is required.

```
hana::> snapshot create -vserver hana1a -volume hana_data -snapshot
sv_resync

hana::> snapshot modify -vserver hana1a -volume hana_data -snapshot
sv_resync -snapmirror-label daily

hana::> snapmirror update -destination-path hana2b:backup_hana_data
Operation is queued: snapmirror update of destination
hana2b:backup_hana_data.
```

3. Verify that the SnapVault relationship appears in the destination list.

```
hana::> snapmirror list-destinations -source-path hana1a:hana_data
                                                    Progress
Source              Destination         Transfer   Last
Relationship
Path         Type  Path         Status Progress   Updated      Id
---------- ----- ------------ ------- --------- ------------
---------------
hana1a:hana_data
            XDP   hana2b:backup_hana_data
                              Transferring
                                      38.46KB   04/30 18:15:54
                                                             9137fb83-
cba9-11e3-85d7-123478563412
```

Restoring databases after primary storage failure

After a primary storage failure, or when all Snapshot copies are deleted from the volumes at the primary storage, Snap Creator will not be able to handle the restore, because there will no longer be a SnapVault relationship on the primary storage systems.

Restoring databases after a primary storage failure with Data ONTAP operating in 7-Mode

You can restore an SAP HANA database after a primary storage system running Data ONTAP operating in 7-Mode fails.

1. In this case, the restore has to be executed directly on the secondary storage system by using the following command: snapvault restore --s snapshot_name -S backup_controller:backup_volumesource_controller:source_volume

   Perform this step for all volumes belonging to the SAP HANA database.

```
hana1a>  snapvault restore -s Backup-ANA-SV_hourly_20140410103943 -S
hana2b:/vol/backup_data_00001/mnt00001 hana1a:/vol/data_00001/mnt00001
Restore will overwrite existing data in /vol/data_00001/mnt00001.
Are you sure you want to continue? y
Thu Apr 10 11:55:55 CEST [hana1a:vdisk.qtreePreserveComplete:info]:
Qtree preserve is complete for /vol/data_00001/mnt00001.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana1a>  snapvault restore -s Backup-ANA-SV_hourly_20140410103943 -S
hana2b:/vol/backup_data_00003/mnt00003 hana1a:/vol/data_00003/mnt00003
Restore will overwrite existing data in /vol/data_00003/mnt00003.
Are you sure you want to continue? y
Thu Apr 10 11:58:18 CEST [hana1a:vdisk.qtreePreserveComplete:info]:
Qtree preserve is complete for /vol/data_00003/mnt00003.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana1b>  snapvault restore -s Backup-ANA-SV_hourly_20140410103943 -S
hana2b:/vol/backup_data_00002/mnt00002 hana1b:/vol/data_00002/mnt00002
Restore will overwrite existing data in /vol/data_00002/mnt00002.
Are you sure you want to continue? y
Thu Apr 10 12:01:29 CEST [hana1b:vdisk.qtreePreserveComplete:info]:
Qtree preserve is complete for /vol/data_00002/mnt00002.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

When the restore process is finished, you use SAP HANA to perform the recovery.

Restoring databases after a primary storage failure with clustered Data ONTAP

You can restore an SAP HANA database after a primary storage system running clustered Data ONTAP fails.

Assuming the primary volume is lost completely, you need to create a new primary volume and then restore from the backup volume.

1. Create a primary volume with type data protection.

```
hana::> volume create -vserver hana1a -volume hana_data -aggregate
aggr_sas_101 -size 300G -state online -type DP -policy default -autosize
-mode grow_shrink -space-guarantee none
-snapshot-policy none -foreground true
[Job 6744] Job is queued: Create hana_data.
[Job 6744] Job succeeded: Successful
```

2. Restore all data from the backup volume.

```
hana::> snapmirror restore -destination-path hana1a:hana_data -source
-path hana2b:backup_hana_data -source-snapshot sc-backup-
daily_20140505121000
[Job 6746] Job is queued: snapmirror restore from source
"hana2b:backup_hana_data" for the
snapshot sc-backup-daily_20140505121000.

hana::> job show -id 6746
Owning
Job ID Name                 Vserver    Node           State
------ -------------------- ---------- -------------- ----------
6746   SnapMirror restore   hana        hana01        Running
       Description: snapmirror restore from source
"hana2b:backup_hana_data" for the snapshot sc-backup-
daily_20140505121000
```

When the restore process is finished, you use SAP HANA to perform the recovery.

SAP HANA plug-in parameters

The following table lists the SAP HANA plug-in parameters, provides the parameter settings, and describes the parameters.

Parameter	Setting	Description
HANA_SID	Example: ABC	HANA database SID.
HANA_NODES	Example: node1, node2, node3	Comma-separated list of HANA nodes on which the hdbsql statements can be executed.
HANA_USER_NAME	Example: backupUser	HANA database user name. The minimum privilege required for this user is BACKUP ADMIN privilege.

Parameter	Setting	Description
HANA_PASSWORD	Example: hfasfh87r83r	HANA database password.
HANA_INSTANCE	Example: 42	HANA node instance number.
HANA_HDBSQL_CMD	Example: /usr/sa p/hdbclient/ hdbsql	Path to the HANA hdbsql command. If this parameter is not set, hdbsql on the search path is used. The default is hdbsql.
HANA_OSDB_USER	Example: user1	The operating system user for executing hdbsql (usually sidadm) must have the hdbsql binary in the search path and the permission to execute it.
HANA_USERSTORE_KEYS	Example: node1:key1, node 2:key2, node3:ke y3	Comma-separated list of HANA userstore keys and node pairs using which the hdbsql statements can be executed.
HANA_FILE_BACKUP_ENABLE	“Y” or “N”	Determines whether Snap Creator should enable file-based backup for the SAP HANA plug-in. This setting is useful when you want to perform the SAP HANA file-based backup operation.
HANA_FILE_BACKUP_PATH	Example:/hana/data/SCN/mnt0000 1	(Optional) Path to the directory where database file backup can be stored. If this parameter is not set, use default.
HANA_FILE_BACKUP_PREFIX	Example: SnapCreator_<HANA_FILE_BACK UP_PREFIX>__<CURRENT_TIME STAMP>	(Optional) Adds a prefix to the backup file name. Default: SnapCreator__<CURRENT_TIME STAMP>
HANA_INTEGRITY_CHECK_ENA BLE	“Y” or “N”	Determines whether Snap Creator should enable Integrity Check for the SAP HANA plug-in. This setting is usual when you want to perform the SAP HANA Integrity Check operation.
HANA_TEMP_FILE_BACKUP_PA TH	Example:/temp	(Optional) Path where the temporary database file for Integrity Check can be stored. If not sure, use default.

Parameter	Setting	Description
HANA_LOG_CLEANUP_ENABLE	“Y” or “N”	Enables Log Catalog cleanup.

Troubleshooting

The troubleshooting section provides information about the error codes, error messages, and includes the description or resolution to solve the issue.

The following table lists the SAP HANA plug-in error messages.

Error code	Error message	Description/Resolution
hdb-00001	Unable to find an accessible HANA node for executing hdbsql commands using the provided configuration parameters. Verify and update HANA settings in the configuration and try again.	Verify that HANA nodes are running and reachable, and the instance number provided is correct.
hdb-00002	Creating database snapshot for [$sid] failed.	Check if a HANA database snapshot is already created on the database. If already created, delete the HANA database snapshot or run unquiesce operation. If not already created, check the logs for other error messages and details.
hdb-00003	Deleting database snapshot for [$sid] failed.	Check if a HANA database snapshot is already deleted. If yes, this error can be ignored. If no, check SAP HANA plug-in parameters and make sure that nodes are reachable and instance number provided is correct.
hdb-00004	Connection to [$hana_node] node with instance [$instance] failed as the connection was refused.	The HANA node with instance displayed in the message are not reachable. This can be just a warning as the plug-in will attempt to run hdbsql commands on other nodes. Check the logs to see if the operation was successful.
hdb-00005	Database [$sid] already has a snapshot!	HANA database snapshot already exists on the database. Delete the HANA database snapshot or run unquiesce operation to resolve this issue.

Error code	Error message	Description/Resolution
hdb-00006	Unable to resolve hostname [$hana_node].	The HANA node hostname cannot be resolved. Check your DNS server or etc hosts entries.
hdb-00007	Invalid username or password. Verify the credentials and try again.	The user name and password provided for HANA database is incorrect. Correct the entries in the configuration file and try again.
hdb-00008	Running command [$hdbsql_cmd] on [$hana_node] failed.	Plug-in failed to execute hdbsql command on all HANA nodes provided in the configuration. Verify the HANA nodes and instance parameters and ensure at least one HANA node is up and reachable.
hdb-00009	Unable to find HANA [$info].	The SAP HANA plug-in SCDUMP operation was unable to retrieve a particular information from the HANA databases. Verify the HANA nodes and instance parameters and make sure at least one HANA node is up and reachable.
hdb-00010	Collection of OS information failed.	The collection of OS information failed in the Windows environment; the SAP HANA plug-in is not supported on Windows. Use an SLES operating system instead.
hdb-00011	Collection of OS information failed.	Snap Creator was unable to collect OS information for the SCDUMP operation. Check your agent configuration file and correct the settings.
hdb-00012	Collection of SnapDrive information failed.	The SAP HANA plug-in is only supported in an NFS environment. Your configuration for HANA database has SnapDrive enabled; set SNAPDRIVE=Nin the configuration file.
hdb-00013	The HANA_NODES parameter is not set. Check HANA settings in the configuration file.	HANA nodes (HANA_NODES) parameter is required for the SAP HANA plug-in. Set the parameter and try again.

Error code	Error message	Description/Resolution
hdb-00014	Unable to find an accessible HANA node for executing hdbsqlcommands using the provided configuration parameters. Verify and update HANA settings in the configuration and try again.	Verify that HANA nodes are running and reachable, and the instance number provided is correct.
hdb-00015	The HANA_INSTANCE parameter is not set. Check HANA settings in the configuration file.	HANA instance (HANA_INSTANCE) parameter is required for the SAP HANA plug-in. Set the parameter and try again.
hdb-00016	The HANA_PASSWORD parameter is not set. Check HANA settings in the configuration file.	HANA password (HANA_PASSWORD) parameter is required for the SAP HANA plug-in. Set the parameter and try again.
hdb-00017	Path to hdbsql, value of parameter HANA_HDBSQL_CMD is invalid!	One of the following has occurred: • You have not provided the hdbsql path • The hdbsql path provided is incorrect. Ensure you have the HANA hdbsql client installed on the management host where Snap Creator Agent is installed, and provide the correct path of the hdbsql binary in HANA parameters; then, try again.

Where to go next

You can find more information about Snap Creator, including release-specific information, on the NetApp Support Site.

- Snap Creator Framework 4.3.3 Installation Guide

  Describes how to install the Snap Creator Server and Agent. The Agent installation includes the SAP Hana plug-in.

- Snap Creator Framework 4.3.3 Administration Guide

  Describes how to administer the Snap Creator Framework after installation is complete.

- Snap Creator Framework 4.3.3 Release Notes

  Describes new features, important cautions, known problems, and limitations for the Snap Creator Framework 4.1.1 product.

- Snap Creator Framework Discussions

  Connect with peers, ask questions, exchange ideas, find resources, and share Snap Creator best practices.

- NetApp Video: SnapCreatorTV

  View videos demonstrating key Snap Creator technologies.

Administration Guide

This guide describes how to manage Snap Creator Server and Agent for Snap Creator 4.3.3, including user access and profiles, policies, schedule jobs, and backup and recovery operations.

What 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.

Snap Creator provides the following 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:

- Application-consistent data protection

  A centralized solution for backing up critical information, integrating with existing application architectures to ensure data consistency and reduced operating costs.

- Extensibility

  Achieve fast integration using modular architecture and policy-based automation.

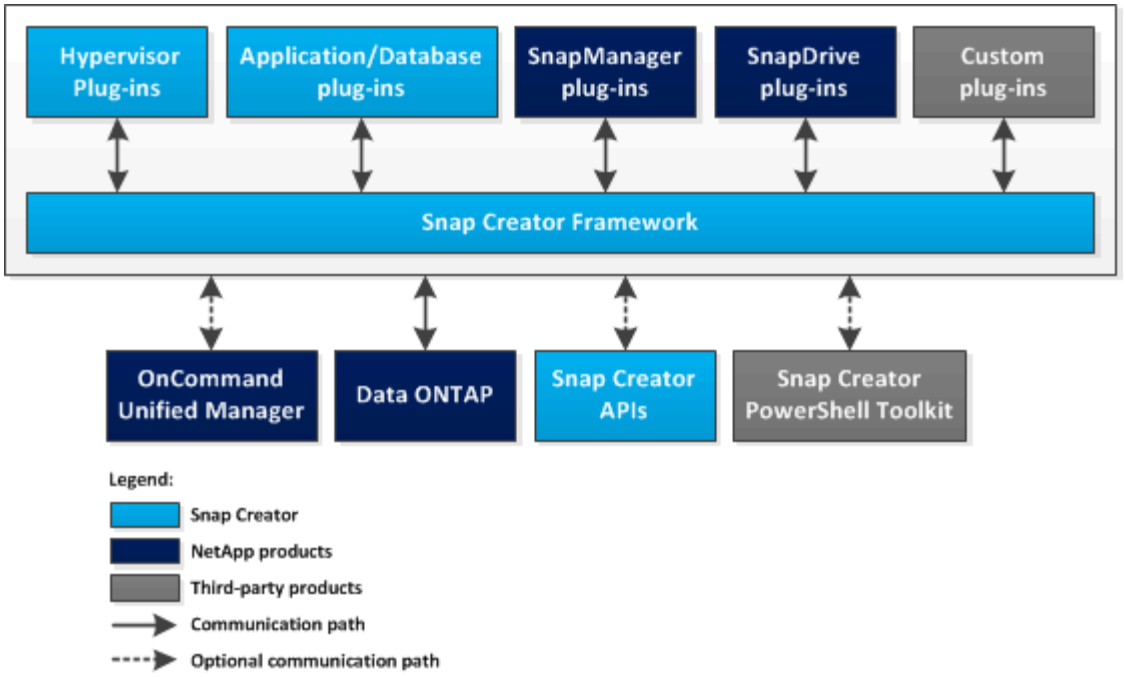
- Cloud readiness

  An operating system-independent Snap Creator functionality that 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 testing purposes.

The following illustration shows the components of the Snap Creator Framework:



Benefits of using Snap Creator

The Snap Creator Framework provides a simple and flexible software framework that addresses various storage requirements.

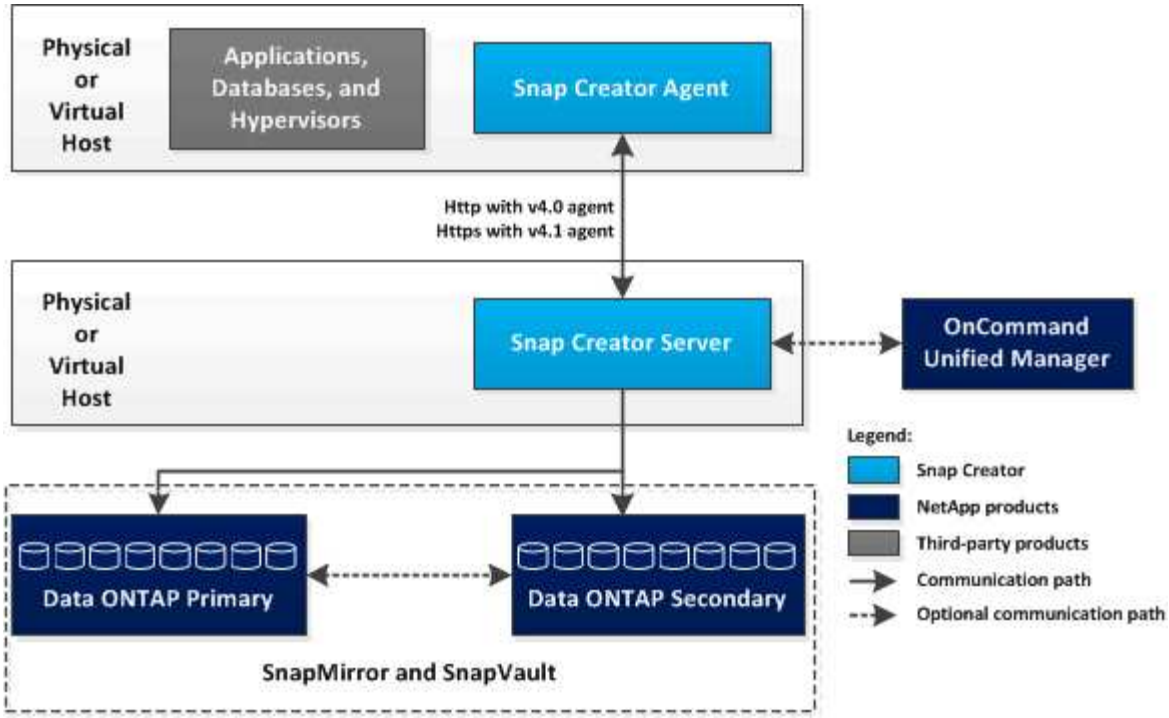
Snap Creator is used in the following contexts to address various storage requirements:

- As a single interface for managing environments that have multiple operating systems, hypervisors, applications, and databases.
- For backup, recovery, and cloning of applications or databases that do not have a SnapManager offering; for example, IBM DB2, MaxDB, or SAP HANA.
- As a centralized interface for backup and monitoring if SnapManager for Microsoft Exchange Server and SnapManager for Microsoft SQL Server have been set up in your environment.
- When an application or database (such as Oracle) that has a SnapManager offering is used, but the host environment does not meet Interoperability Matrix (IMT) or similar requirements.
- For replacing custom scripts for storage actions, thus offering a consistent method to create Snapshot copies, perform SnapVault updates or SnapMirror updates, clone volumes or LUNs, and call custom scripts anywhere through the Snap Creator 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:



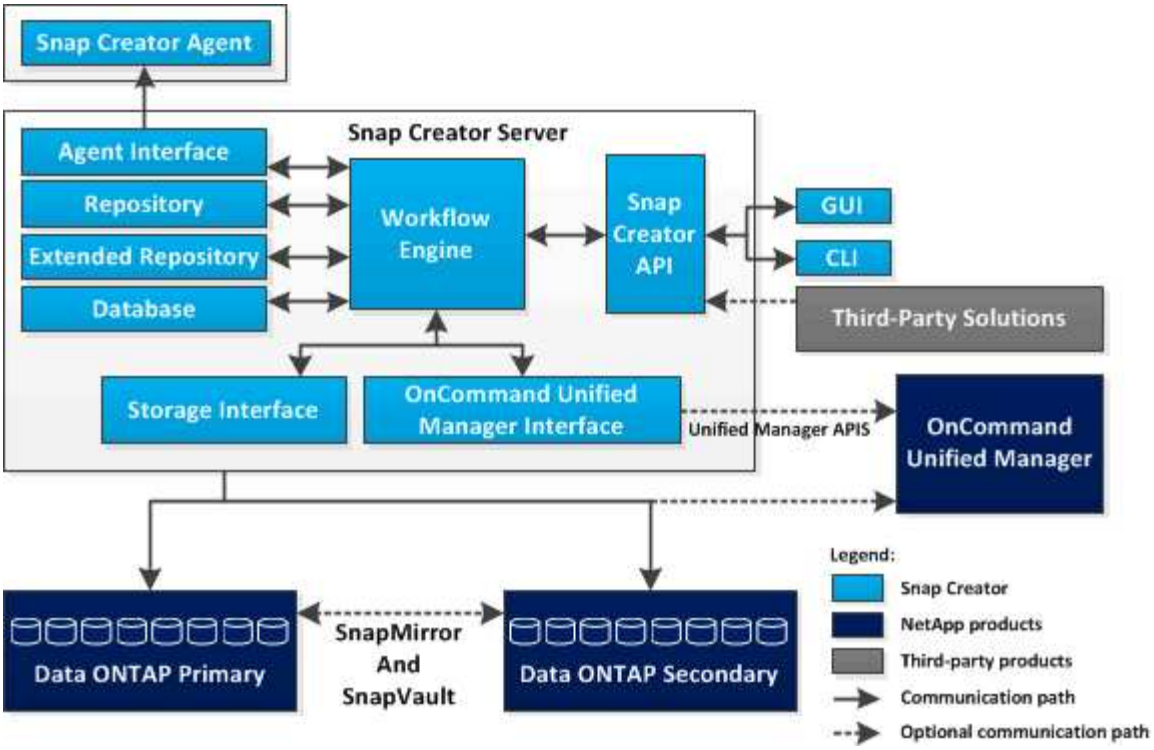
The NetApp software products in the high-level diagram are optional; except for Snapshot technology, the other software products are not required for the Snap Creator Framework to function.

Snap Creator Server overview

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

Typically, the Snap Creator Server is installed on a physical or virtual host. The server hosts the Snap Creator graphical user interface (GUI) and the databases required for storing information about jobs, schedules, users, roles, profiles, and configuration files, as well as metadata from plug-ins. The Snap Creator 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, which is written in Java, is typically installed on a central backup server. In smaller environments, this component can be installed on the host on which the application or database that you want to manage is installed. The Snap Creator Server component includes the following parts:

- **Workflow engine**

  Runs all the Snap Creator tasks and commands. The XML-driven, multi-threaded workflow engine is the central component of Snap Creator.

- **Snap Creator Application Programming Interfaces (APIs)**

  Used by the Snap Creator GUI and command-line interface (CLI).

- **Snap Creator repository**

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

- **Snap Creator extended repository**

  Provides a database location for every job that is run in Snap Creator, including important information about the job as well as metadata generated by plug-ins.

- **Snap Creator database**

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

- **Storage Interface**

  Serves as a common Snap Creator interface for NetApp storage systems, which uses Data ONTAP APIs to handle operations such as creating Snapshot copies, SnapVault updates, and SnapMirror updates.

- **Active IQ Unified Manager Interface**

  For optional communication with NetAppActive IQ Unified Manager, this interface uses Unified Manager APIs instead of Data ONTAP APIs for operations such as creating Snapshot copies, SnapVault updates, and SnapMirror updates.

- **Agent Interface**

  Communicates with Snap Creator agents. Although the Snap Creator Agent and Snap Creator Server are usually installed on different physical or virtual hosts, both can be installed on the same host.

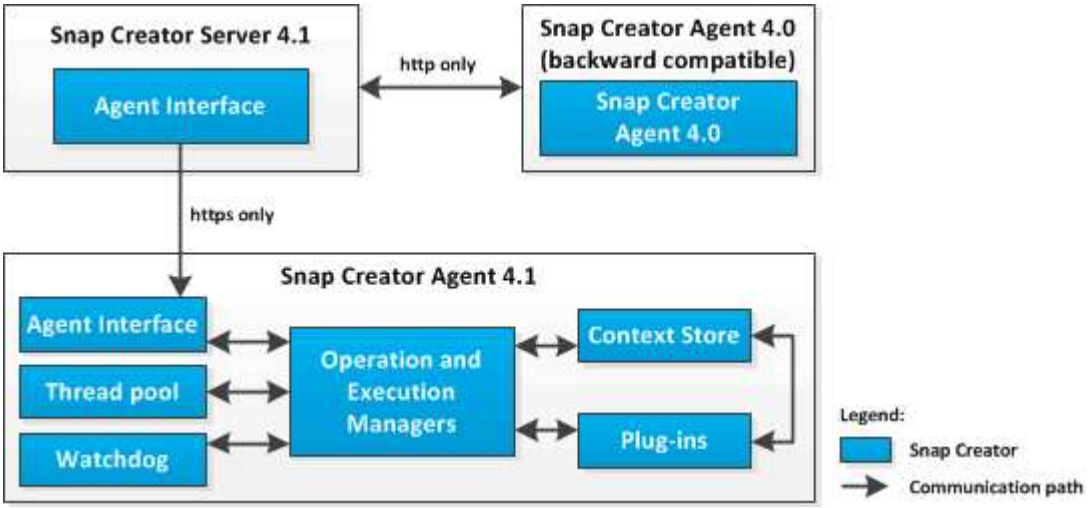
> Snap Creator Server 4.3.0 supports only Snap Creator Agent4.1.x and 4.3.x. Snap Creator Server 4.3.0 does not support Snap Creator Agent versions before 4.1.x.

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 part of the binary file and do not require any additional installation.

The types of applications that are supported include database, email, hypervisor, and custom applications. The following plug-ins are supported for use with Snap Creator:

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

> 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)

For more information, see the plug-in information required to configure Snap Creator.Custom plug-ins (also called "community plug-ins") are created by the developer community, and can be enabled by Snap Creator; however, custom plug-ins are not supported. These plug-ins leverage the interface provided by Snap Creator.

For more information, see Snap Creator Framework Discussions Community forum.

Related information

Plug-in information required to configure Snap Creator

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 Snap Creator Server on Windows

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

1. If the Snap Creator graphical user interface (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 credentials for the Snap Creator GUI.

   If the Snap Creator GUI opens, then the Snap Creator Server service is running.
2. From the command prompt, start or stop the Snap Creator Server service, or verify whether the Snap Creator Server service is running, as applicable:

If you want to…	Enter the following…
Start the Snap Creator Server service	sc start snapcreatorserverservice
Verify whether 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 the Snap Creator Server is installed, and then navigate to the Snap Creator Serverdirectory: `cd \install_path\scServer4.3.0\bin\`

b. To start the Snap Creator Server, run the batch script: `scServer.bat start`

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

Starting, verifying, and stopping Snap Creator Server on UNIX

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

1. Start the Snap Creator Server service: `install_path/scServer4.3.0/bin/scServer start`
2. Open the Snap Creator graphical user interface (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 credentials for the Snap Creator GUI.
3. Verify whether the Snap Creator Server service is running or stop the Snap Creator Server service, as applicable:

If you want to…	Enter the following…
Verify whether the Snap Creator Server service is running	`install_path/scServer4.3.0/bin/scServer status`
Stop the Snap Creator Server service	`install_path/scServer4.3.0/bin/scServer stop`

Changing the Snap Creator Server port after installation

To change the port that the Snap Creator Server uses, you can edit the

snapcreator.properties file and restart the server.

The procedure for changing the Snap Creator Server port is the same for Windows and UNIX. The following procedure uses examples from the UNIX environment.

1. Log in to the system on which the Snap Creator Server is running, and switch to the etc subdirectory within the installation directory.

```
cd /install_path/scServer4.3.0/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/StorageServ
ice
...
```

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

```
/install_path/scServer4.3.0/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 the credentials on the command-line interface (CLI) multiple times. When required, you can remove the stored credentials.

The procedure for setting the Snap Creator Server credentials is the same for Windows and UNIX. The following procedure uses examples from the UNIX environment.

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

   ```
   /install_path/scServer4.3/snapcreator --credentials
   ```

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

```
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 for each entry.

   After you enter your input for the Config name entry, the credentials are saved, and the following message is displayed: INFO: CLI credentials stored successfully. The credentials are stored in the snapcreator.credentials file in the .snapcreatordirectory or folder in the home directory.

3. If you want 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 Snap Creator Agent on Windows

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

1. From the command prompt, start or stop the Snap Creator Agent service, or verify whether the Snap Creator Agent service is running, as applicable:

If you want to…	Enter the following…
Start the Snap Creator Agent service	sc start snapcreatoragentservice
Verify whether 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 the Snap Creator Agent is installed, and then navigate to the Snap Creator Agentdirectory: cd `\install_path\scAgent4.3.0\bin\`

   b. To start the Snap Creator Agent service, run the batch script: scAgent.bat start

      Closing the command prompt stops the Snap Creator Agent service. Because the batch script (scAgent.bat) runs Snap Creator in the foreground, the Snap Creator Agent will run only as long as the

command prompt is open. To run Snap Creator in the background, you should use the Snap Creator Agent service.

Starting, verifying, and stopping Snap Creator Agent on UNIX

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

1. Start or stop the Snap Creator Agent, or verify whether the Snap Creator Server service is running, as applicable:

If you want to…	Enter the following…
Start the Snap Creator Agent service	install_path/scAgent4.3.0/bin/scAgent start
Verify whether the Snap Creator Agent service is running	install_path/scAgent4.3.0/bin/scAgent status
Stop the Snap Creator Agent service	install_path/scAgent4.3.0/bin/Agent stop

Changing the Snap Creator Agent port after installation

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

The procedure for changing the Snap Creator Agent port is the same for Windows and UNIX. The following procedure uses examples from the UNIX environment.

1. Log in to the system on which the Snap Creator Agent is running, and switch to the etc subdirectory within the installation directory.

```
cd /install_path/scAgent4.3.0/etc
```

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

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

```
DEFAULT_PORT=9191
```

4. Save and close the agent.properties file.
5. Restart the Snap Creator Agent.

```
/install_path/scAgent4.3.0/bin/scAgent restart
```

If the Snap Creator Agent is running when any changes are made to the allowed_commands.config file or the agent.properties file, then the agent must be restarted.

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.

This is supported only for Snap Creator 4.1 and later.

Managing Snap Creator Agent security

You can manage the security settings of the Snap Creator Agent by adding commands that can be used by Snap Creator. You can also limit communication to specific Snap Creator servers.

The procedure for managing Snap Creator Agent security is the same for Windows and UNIX. The following procedure uses examples from the UNIX environment.

1. Log in to the system where the Snap Creator Agent is running, and switch to the etc subdirectory within the installation directory.

   ```
   cd /install_path/scAgent4.3.0/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.

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

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

      If the command contains any spaces, then you must enclose the command within quotation marks.

   c. Save and close the file.
3. If you want to limit communication to specific 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.

      AUTHORIZED_HOSTS=Lyon, 10.10.10.192, Fuji01

c. Save and close the file.

4. Restart the Snap Creator Agent.

```
/install_path/scAgent4.3.0/bin/scAgent restart
```

Customizing the default keystore

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

The keytool command is provided by Java. In some environments, you might have to switch to the Java installation directory in order to run the keytool command.

Snap Creator does not support truststores.

1. Stop the Snap Creator Agent.
2. Generate a new keystore with a single certificate:

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

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

3. Copy the keystore file to the scAgent4.3.0/etc/ directory.
4. Update the KEYSTORE_FILE=keystore_file and KEYSTORE_PASS=keystore password parameters in the Snap Creator Agent configuration file (scAgent4.3.0/etc/allowed_commands.config).
5. Start the Snap Creator Agent.

Related information

Starting, verifying, and stopping Snap Creator Agent on Windows

Starting, verifying, and stopping Snap Creator Agent on UNIX

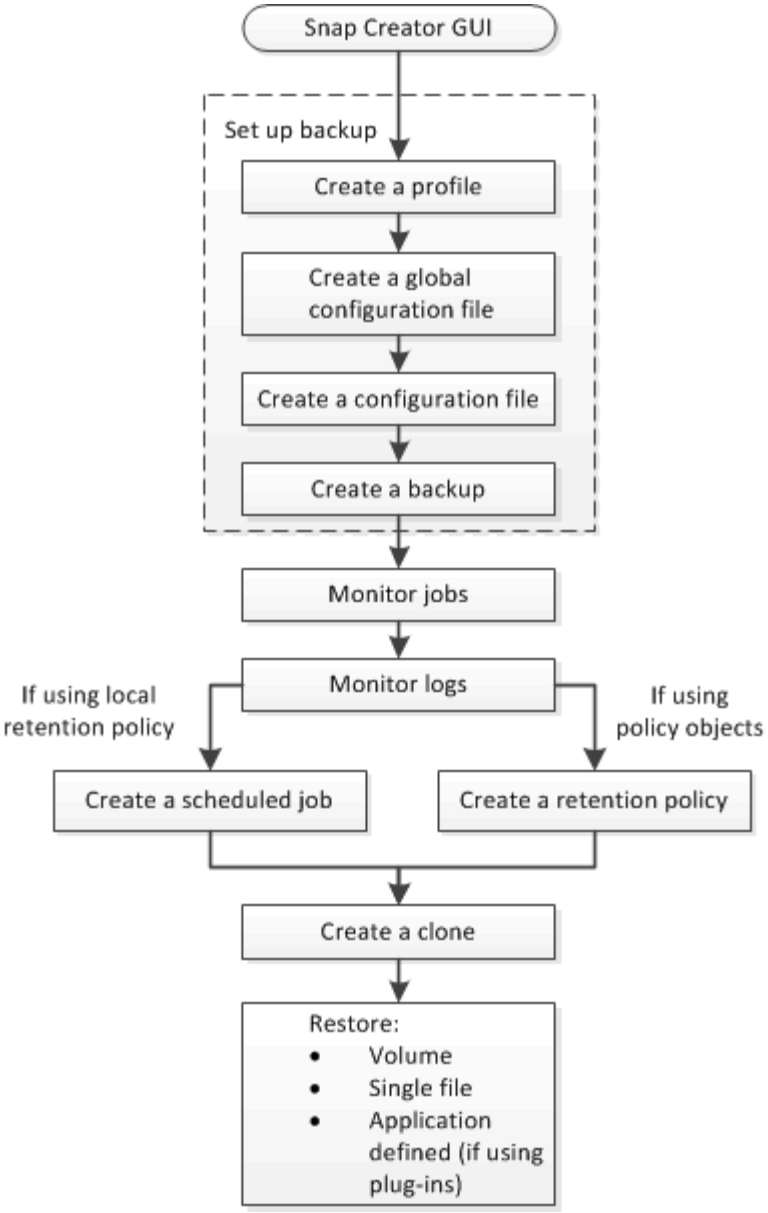
Backup and recovery workflow

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:

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 information

Guidelines for using the Snap Creator command-line interface

Creating profiles

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

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.

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 the storage controller, storage virtual machine (SVM), or VMware credential configuration from the backup policy.

Global configuration files enable you to control access and to handle backup and restore operations.

You can create two types of global configuration files:

- **Super Global**

  This configuration applies to all the configurations in all the profiles.

- **Profile Global**

  This configuration applies to all the configurations created within a profile.

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

   The Configuration wizard for Global Configurations opens in the right pane.

3. Complete the Configuration wizard to create the configuration file:
   a. On the **Configuration** page, select the global configuration type (Super Global or Profile Global).

      The name of the configuration file is set to global by default. You cannot change this name.

      If you selected Profile Global as the global configuration type, select the profile.

      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 the type of plug-in.

      The page that you advance to in the wizard depends on the option that you select.

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 plug-in credentials, see the plug-in documentation.

   c. On the Storage Connection Settings page, select the transport type (HTTP or HTTPS).

The standard port for the selected transport type is displayed. If the storage system uses a non-standard port, enter the port information in the port field.

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

> You must add at least one storage controller or SVM to the configuration. To use the vsim tunneling feature, select the **IP Tunneling** check box (for cluster only).

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

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

f. On the DFM/OnCommand Settings page, if you want to integrate the Snap Creator configuration with NetApp OnCommand management tools, select and provide the details.

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

Creating configuration files

You can create configuration files by using the Configuration wizard.

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

The Configuration wizard opens in the right pane.

3. a. On the Configuration page, enter a name for the configuration file.

> 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 the type of plug-in.

The page that you advance to in the Configuration wizard depends on the option that you select.

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.

Plug-in type option	Next page	Next page
None (if you are not using a plug-in)	**Agent Configuration**	

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

c. On the Agent Configuration page, enter the configuration information for Snap Creator Agent.

d. On the Storage Connection Settings page, select the transport type (HTTP or HTTPS).

The standard port for the selected transport type is displayed. If the storage system uses a non-standard port, enter the port information 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.

You must add at least one storage controller or SVM to the configuration.

f. 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**.

If you are planning to replicate Snapshot copies to a SnapMirrror or SnapVault destination, the name of the SVM that you enter in this step must be exactly the same as the name of the SVM that 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 Snap Creator is able to find the SVM with the information that you provide. The case that you use for the name (upper case or lower 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.

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

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

h. On the Snapshot Details page, provide the Snapshot copy details.

Field	Description
Snapshot copy Name	Enables you to specify the Snapshot copy name Typically, the Snapshot copy has the same name as the configuration file; however, the Snapshot copy 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	Enables you to specify the Snapshot copy label This option is valid for clustered Data ONTAP 8.2 and later. For Data ONTAP releases prior to clustered Data ONTAP 8.2, this field will not provide any functionality.
Policy Type	Enables you to select the policy type There are two options: • Policy: This option 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: This option should be selected if a policy object has already been created.
Snapshot copy Policies	Provides the option to select the policy that is to be enabled
Prevent Snapshot copy Deletion	Enables you to determines whether to prevent the deletion of the Snapshot copy
Policy Retention Age	Enables you to specify the policy retention age
Naming Convention	Enables you to specify the naming convention (Recent or Timestamp) of backups. “Recent” is not supported for Plug-ins like SAP HANA, Vibe, and Domino. +

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

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

   Additional information is required if either SnapMirror or SnapVault technology is selected. For SnapMirror and SnapVault technology, you must provide the storage system name and not the IP

address.

k. On the DFM/OnCommand Settings page, if you want to integrate the Snap Creator configuration with NetApp OnCommand management tools, select and provide the details.

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

Creating backups

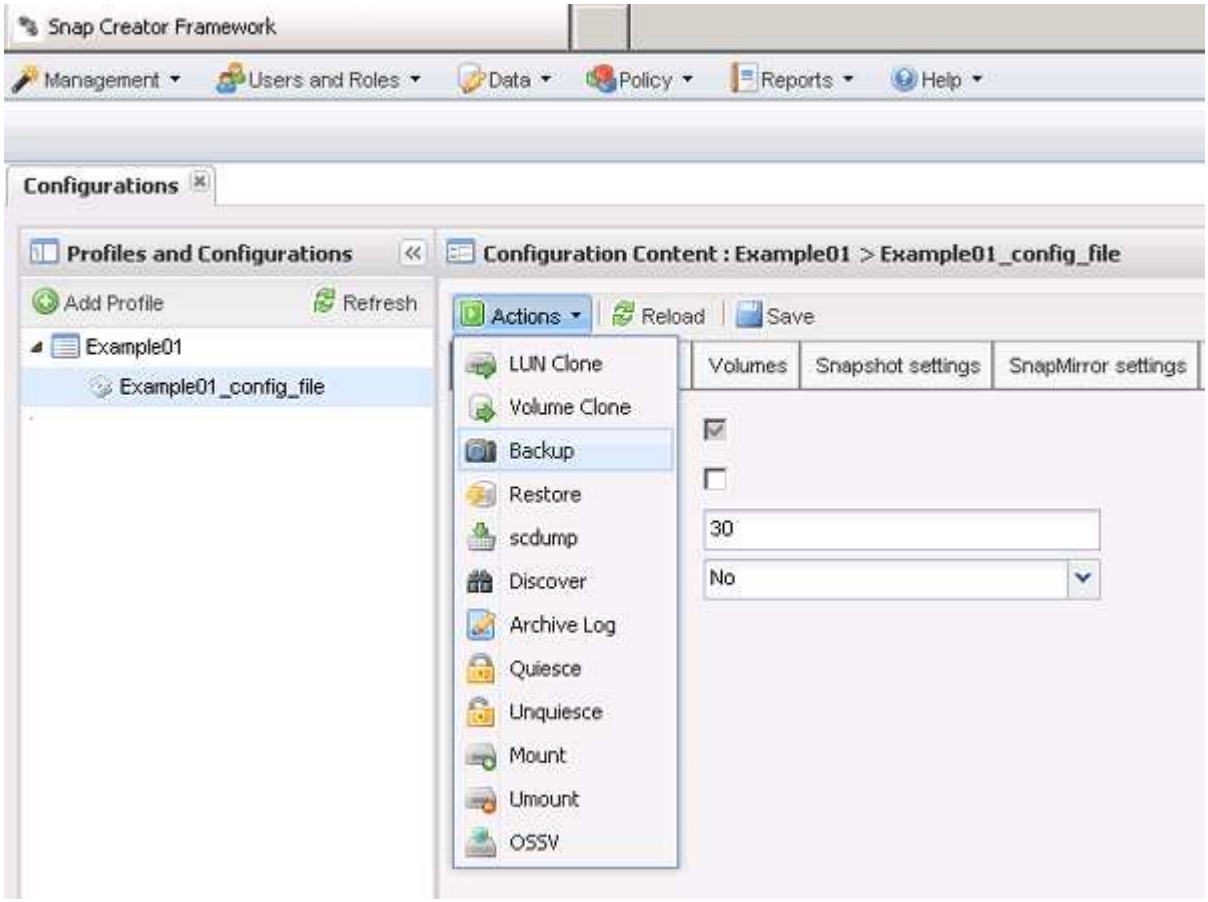
You can create backups by using the Snap Creator GUI.

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.

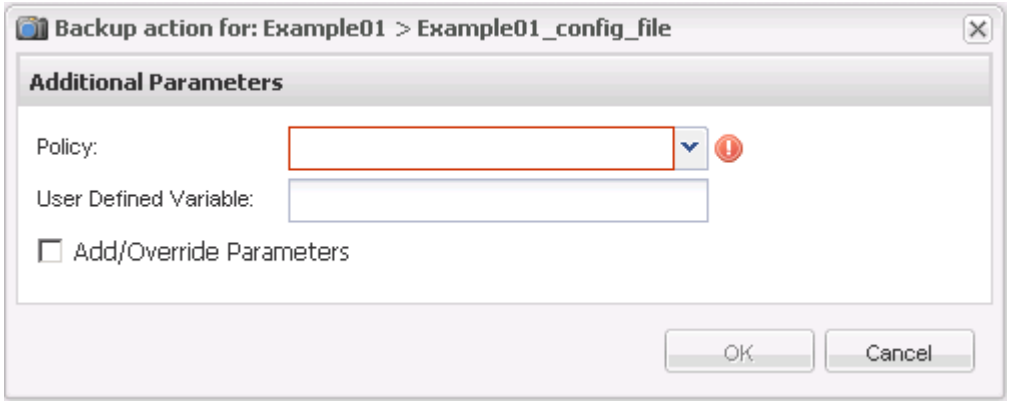
> If a policy object is defined, it will overrule any entries that might be in the configuration file.

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**.

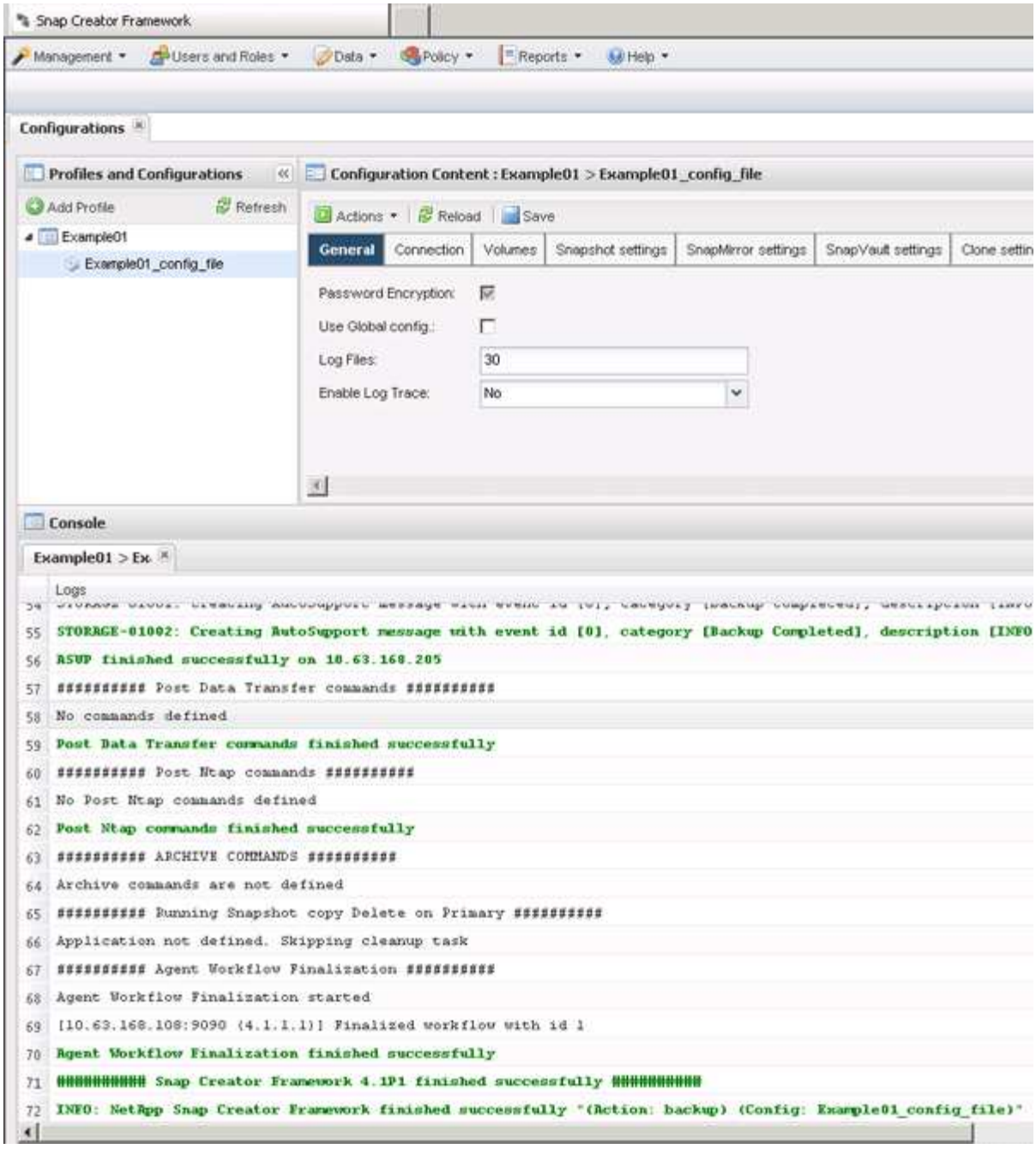


4. In the Additional Parameters dialog box, select the policy, and then click **OK** to start the backup.

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.

> 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.

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

A list of the running jobs is displayed.

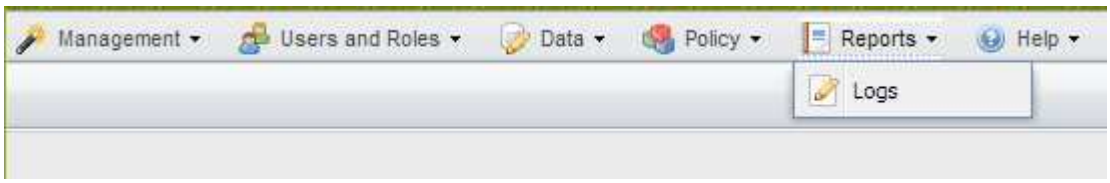
2. To stop a running job, select the job and click **Cancel**.

Monitoring logs

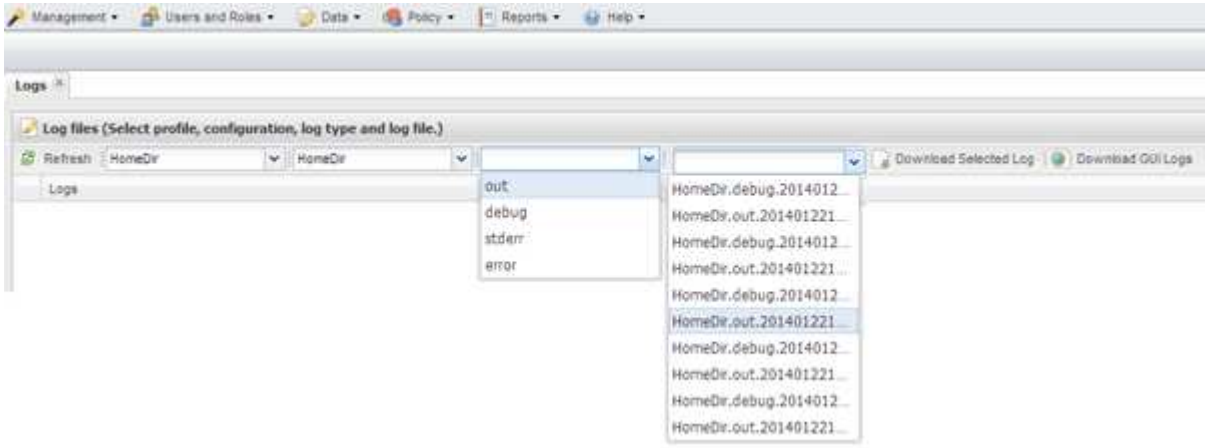
You can view the logs for every profile and configuration by using the Snap Creator GUI.

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.

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.

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 information

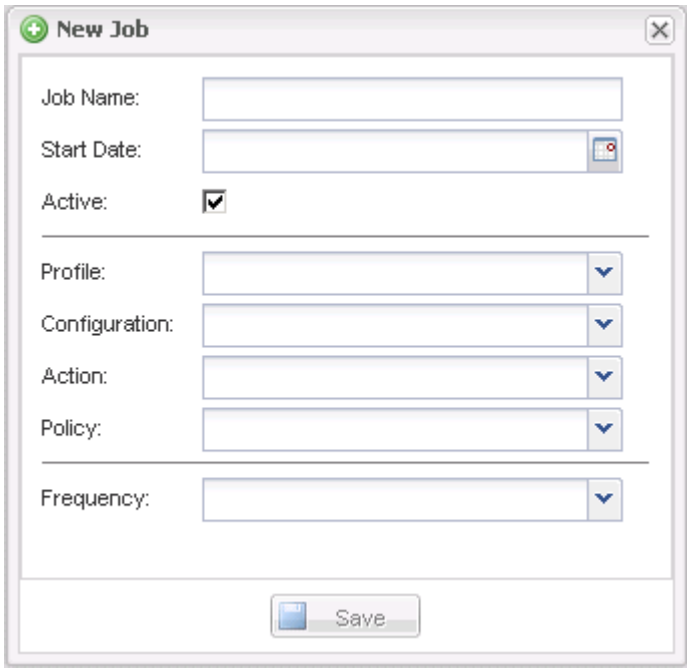
Types of error messages and troubleshooting logs

Creating scheduled jobs

If you are using a local retention policy (located in the configuration file), you can use the Snap Creator graphical user interface (GUI) scheduler to create schedules and run tasks. The scheduler—which is 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.

If you plan to use policy objects instead of a local retention policy, you should skip this procedure and create a policy schedule instead.

1. From the main menu of the Snap Creator GUI, select **Management** > **Schedules** and click **Create**.
2. 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 to signify that the job will run as scheduled. Active is the default setting.
Profile	Select the profile to be associated with this job.
Configuration	Select the configuration to be associated with this job.

Field	Description
Action	Select one of the following options: • **Backup**: Creates a backup by using 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**: Performs archive log management only. No backup is created. • **Custom**: Executes a plug-in-defined cloning action.
Policy	Select the policy to be associated with this job.
Frequency	Select the frequency for this job. Depending on your selection, you must select the appropriate time fields for running the scheduled job. +

3. Click **Save**.

Related information

Creating policy schedules

Creating retention policies

If you plan to use policy objects instead of a local retention policy (which is contained in the configuration file), you can create a retention 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

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 information

Parameters for setting up Snapshot copies

Creating backup types

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

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**.

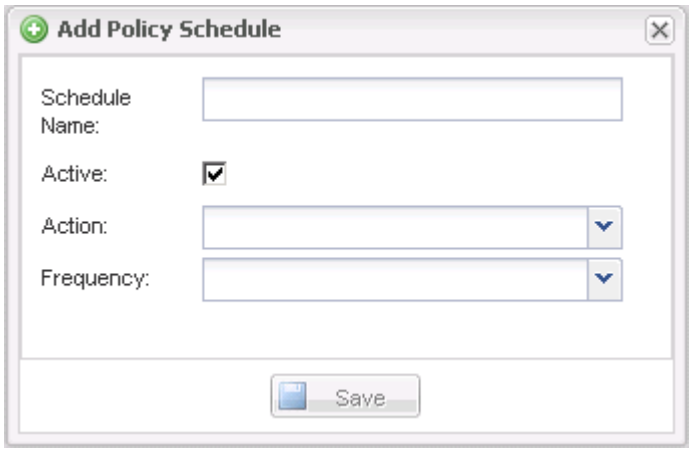
   The new backup type is listed under **Backup Type**.

Creating policy schedules

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

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.

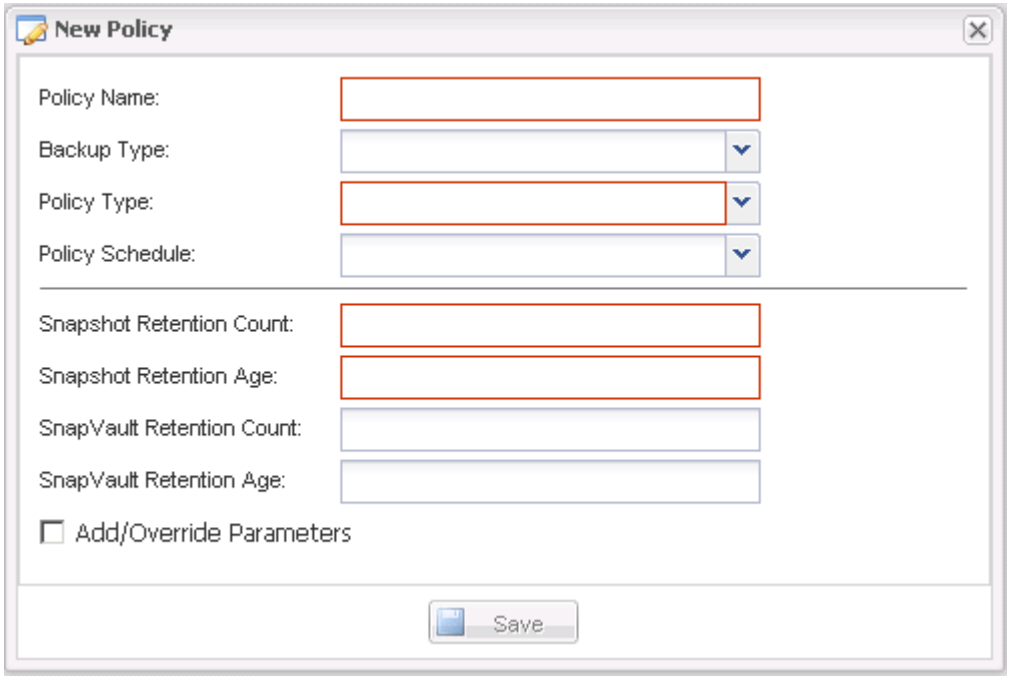


Creating policies

You can create a new retention policy by using the Snap Creator GUI to configure multiple Snapshot policies with different retention count.

You should understand the guidelines for defining Snap Creator policies.

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.

Field	Description
Backup Type	(Optional) Select the backup type.
Policy Type	Select the policy type: • **LOCAL** Takes a Snapshot copy on the primary storage. Select this type if there are no SnapMirror or SnapVault relationships. • SNAPVAULT Creates a Snapshot copy on the primary storage and performs a SnapVault update. SnapVault update must be enabled for all volumes in the configuration. • SNAPMIRROR Creates a Snapshot copy on the primary storage and performs a SnapMirror update. SnapMirror update 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, these 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 retained before they can be deleted.
SnapVault Retention Count	If you selected SnapVault as the policy type, enter the retention count for SnapVault.
SnapVault Retention Age	If you selected SnapVault 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.

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.

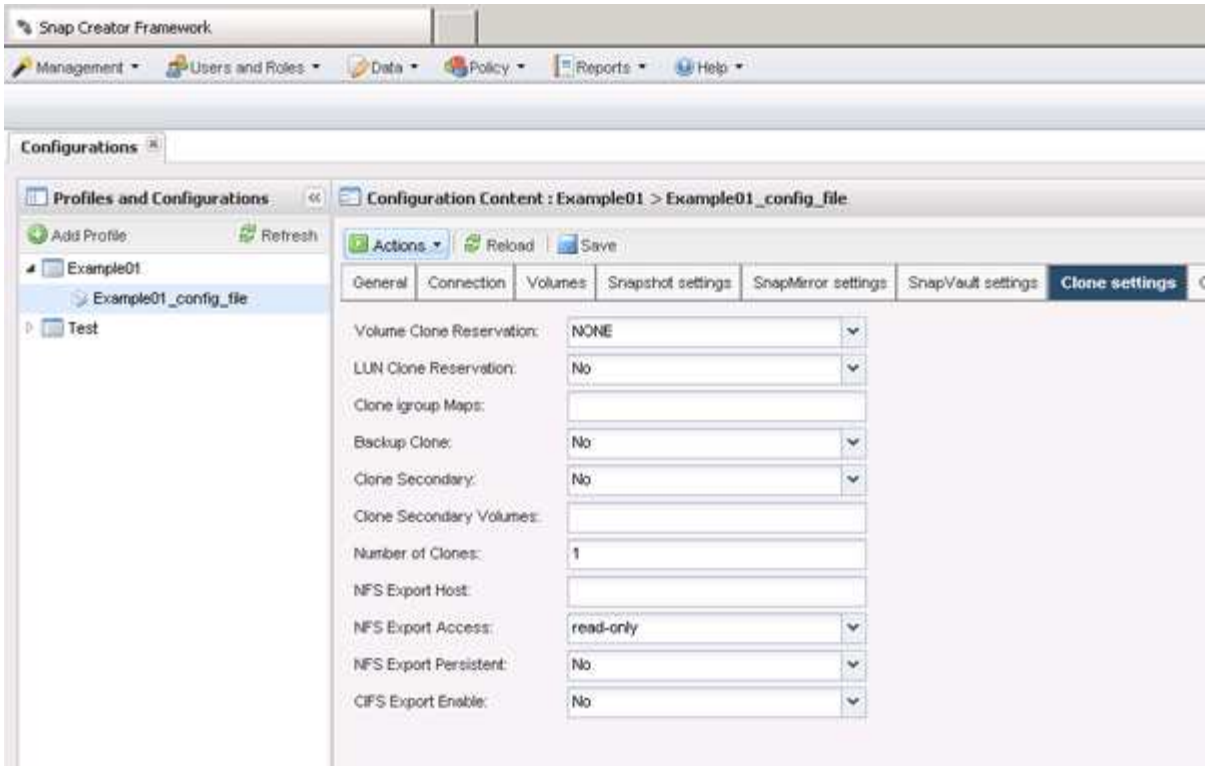
Creating clones from a new backup

You can clone volumes or LUNs from a new Snapshot copy.

- 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.

This cloning operation involves cloning a new Snapshot copy.

1. From the main menu of the Snap Creator graphical user interface (GUI), select **Management** > **Configurations**.
2. In the **Profiles and Configuration** pane, select a configuration file.
3. Navigate to the **Clone settings** tab, and verify that the settings are set properly.



4. Depending on the type of clone that you require, 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.

- 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.

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

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.

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

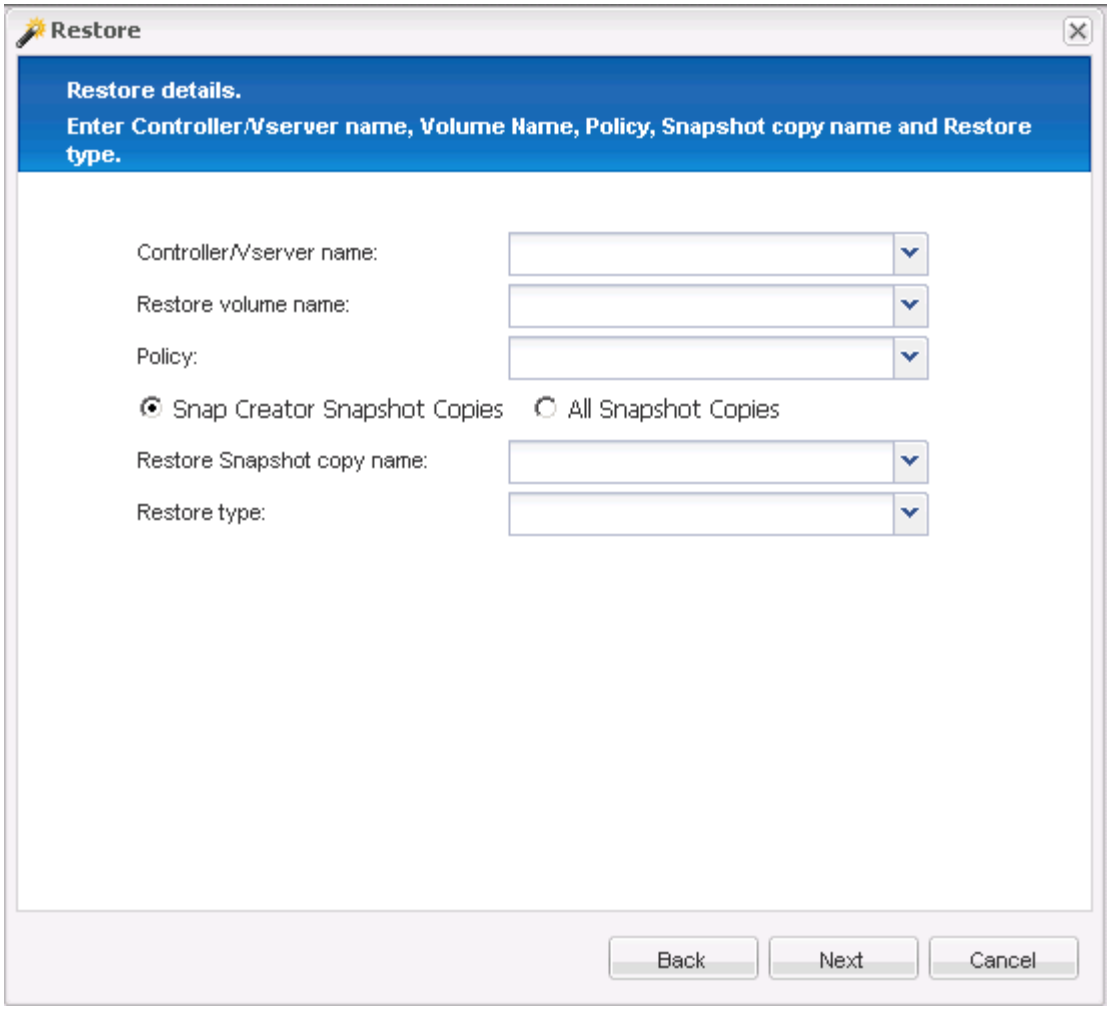
You can perform a volume restore by using the Snap Creator GUI.

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

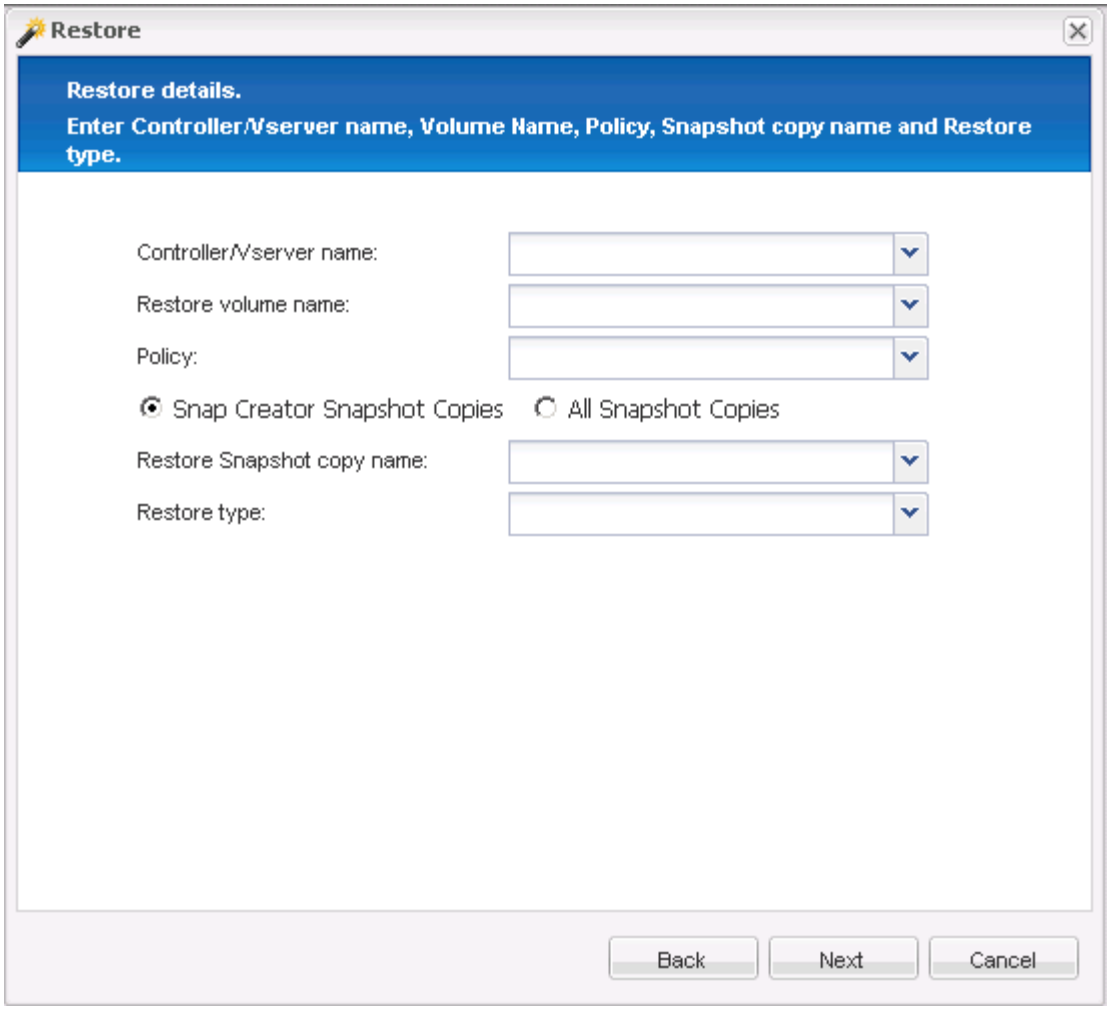
You can perform single file restore operations by using the Snap Creator GUI.

1. From the main menu of the Snap Creator GUI, 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 opens in the right pane.

4. Complete the Restore wizard:

   a. In the “Restore details” section, 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 that are 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 whether there are more items to be restored.

5. Click **No** if there are no more items to be restored, and then click **OK** on the Restore confirmation page.
6. In the Console pane, verify that the files that you selected were successfully restored by reviewing the messages that are displayed.

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.

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.

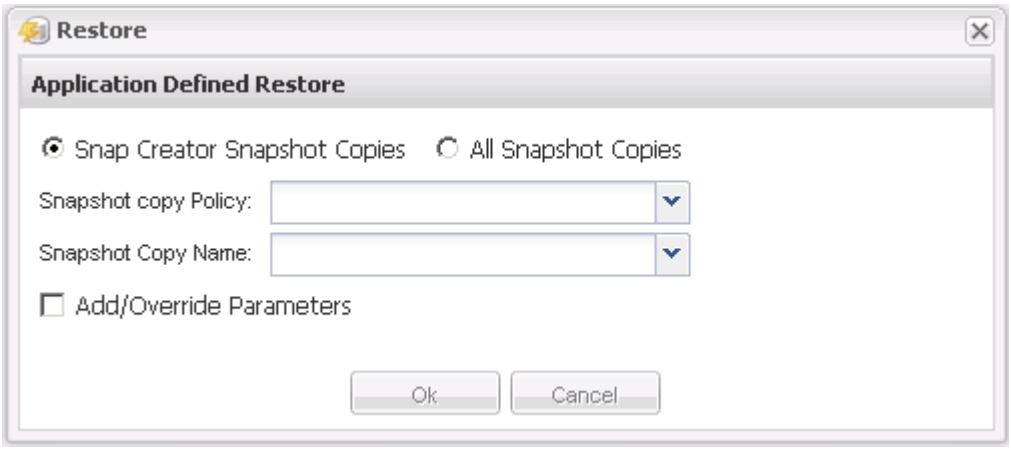
VMware restore operations using the GUI are supported only for Snap Creator Agent.

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.

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 Active IQ Unified Manager proxy, you need a user name and password to communicate with the storage controllers. Passwords can be encrypted for security.

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.

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.

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.

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.

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
   ```

   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.

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.

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.

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.

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
   ```

   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.

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
   ```

   ```
   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.

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.

1. Enter the following command:

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

   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.

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.

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.

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.

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.

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.

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

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.

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

   The Configuration wizard opens in the right pane.

3. a. On the Configuration page, enter a name for the configuration file.

   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 the type of plug-in.

   The page that you advance to in the Configuration wizard depends on the option that you select.

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 plug-in parameters and configuration, see the plug-in documentation.

   c. On the Agent Configuration page, enter the configuration information for Snap Creator Agent.

   d. On the Storage Connection Settings page, select the transport type (HTTP or HTTPS).

   The standard port for the selected transport type is displayed. If the storage system uses a non-standard port, enter the port information 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.

   You must add at least one storage controller or SVM to the configuration.

   f. 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**.

   If you are planning to replicate Snapshot copies to a SnapMirrror or SnapVault destination, the name of the SVM that you enter in this step must be exactly the same as the name of the SVM that 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 Snap Creator is able to find the SVM with the information that you provide. The case that you use for the name (upper case or lower 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.

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

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

h. On the Snapshot Details page, provide the Snapshot copy details.

Field	Description
Snapshot copy Name	Enables you to specify the Snapshot copy name Typically, the Snapshot copy has the same name as the configuration file; however, the Snapshot copy 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	Enables you to specify the Snapshot copy label This option is valid for clustered Data ONTAP 8.2 and later. For Data ONTAP releases prior to clustered Data ONTAP 8.2, this field will not provide any functionality.
Policy Type	Enables you to select the policy type There are two options: • Policy: This option 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: This option should be selected if a policy object has already been created.
Snapshot copy Policies	Provides the option to select the policy that is to be enabled
Prevent Snapshot copy Deletion	Enables you to determines whether to prevent the deletion of the Snapshot copy
Policy Retention Age	Enables you to specify the policy retention age

Field	Description
Naming Convention	Enables you to specify the naming convention (Recent or Timestamp) of backups. “Recent” is not supported for Plug-ins like SAP HANA, Vibe, and Domino. +

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

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

   Additional information is required if either SnapMirror or SnapVault technology is selected. For SnapMirror and SnapVault technology, you must provide the storage system name and not the IP address.

k. On the DFM/OnCommand Settings page, if you want to integrate the Snap Creator configuration with NetApp OnCommand management tools, select and provide the details.

l. 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.

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.

> 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 command-line interface (CLI), you can create a new configuration file by copying an existing configuration file, and then renaming the new file.

1. Switch to the configuration directory: `cd install_path/scServer4.3/engine/configs`
2. Copy the source configuration file: `cp source_profile_name/configuration_nametarget_profile_name/new_configuration_name`

   You must provide a name for the new configuration file.

3. Customize the new configuration file for use with the application or database that you want to manage.

Viewing a list of configuration files assigned to a profile

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

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.

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

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 typically defines Snapshot retention settings, such as how many Snapshot copies should be retained 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 that were 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 the 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.

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**.

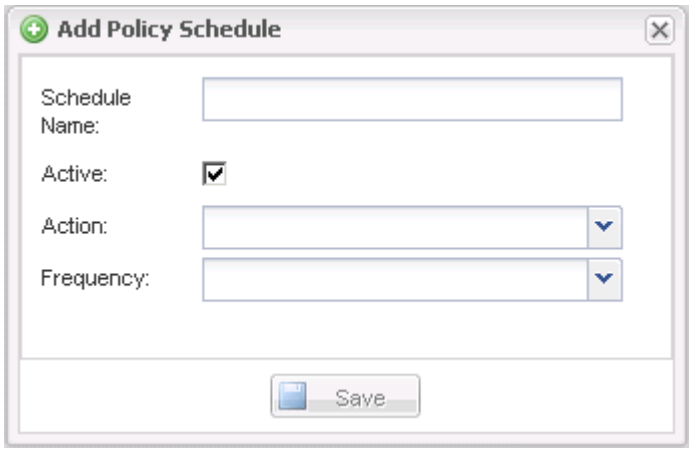
   The new backup type is listed under **Backup Type**.

Creating policy schedules

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

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.

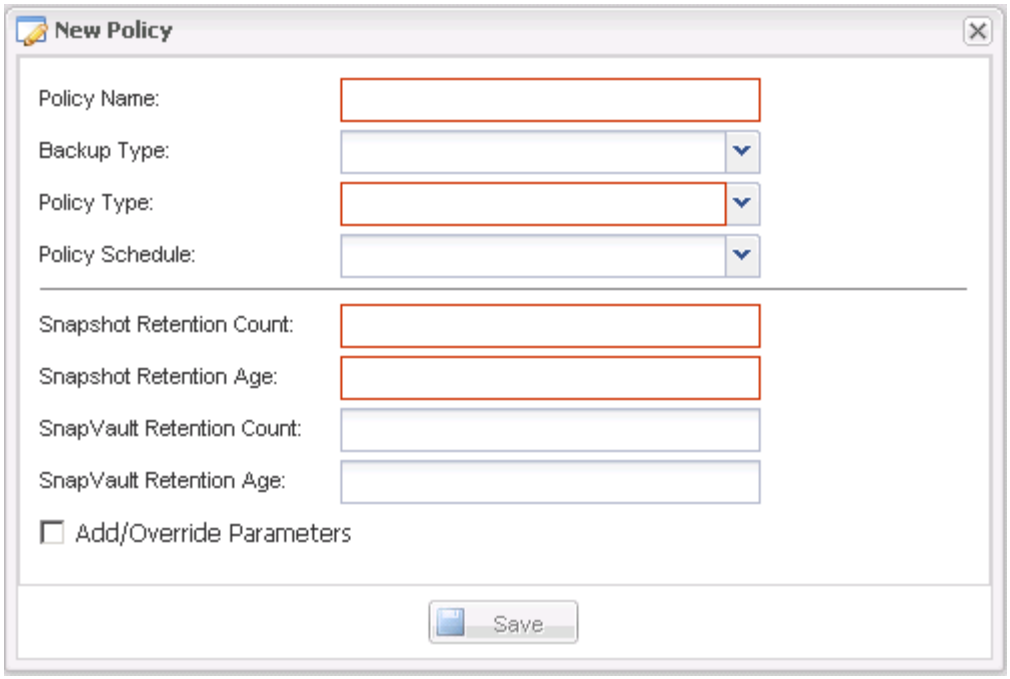


Creating policies

You can create a new retention policy by using the Snap Creator GUI to configure multiple Snapshot policies with different retention count.

You should understand the guidelines for defining Snap Creator policies.

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. Select this type if there are no SnapMirror or SnapVault relationships. • SNAPVAULT Creates a Snapshot copy on the primary storage and performs a SnapVault update. SnapVault update must be enabled for all volumes in the configuration. • SNAPMIRROR Creates a Snapshot copy on the primary storage and performs a SnapMirror update. SnapMirror update 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, these actions do not run automatically.

Field	Description
Snapshot Retention Count	Enter the number of backups to be retained.
Snapshot Retention Age	Enter the minimum age that the backups must be retained before they can be deleted.
SnapVault Retention Count	If you selected SnapVault as the policy type, enter the retention count for SnapVault.
SnapVault Retention Age	If you selected SnapVault 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.

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.

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.

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

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 information

Creating scheduled jobs

What Snap Creator information should be backed up

The best practice is to create backup copies of specific Snap Creator directories to help ensure that the Snap Creator data can be restored without loss.

You should create backup copies of the following directories:

- The Snap Creator Server 4.3 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)

> Optimally, backups should be scheduled to occur when the Snap Creator services or processes can be stopped in order to ensure that the Snap Creator data is backed up consistently.

Creating backups

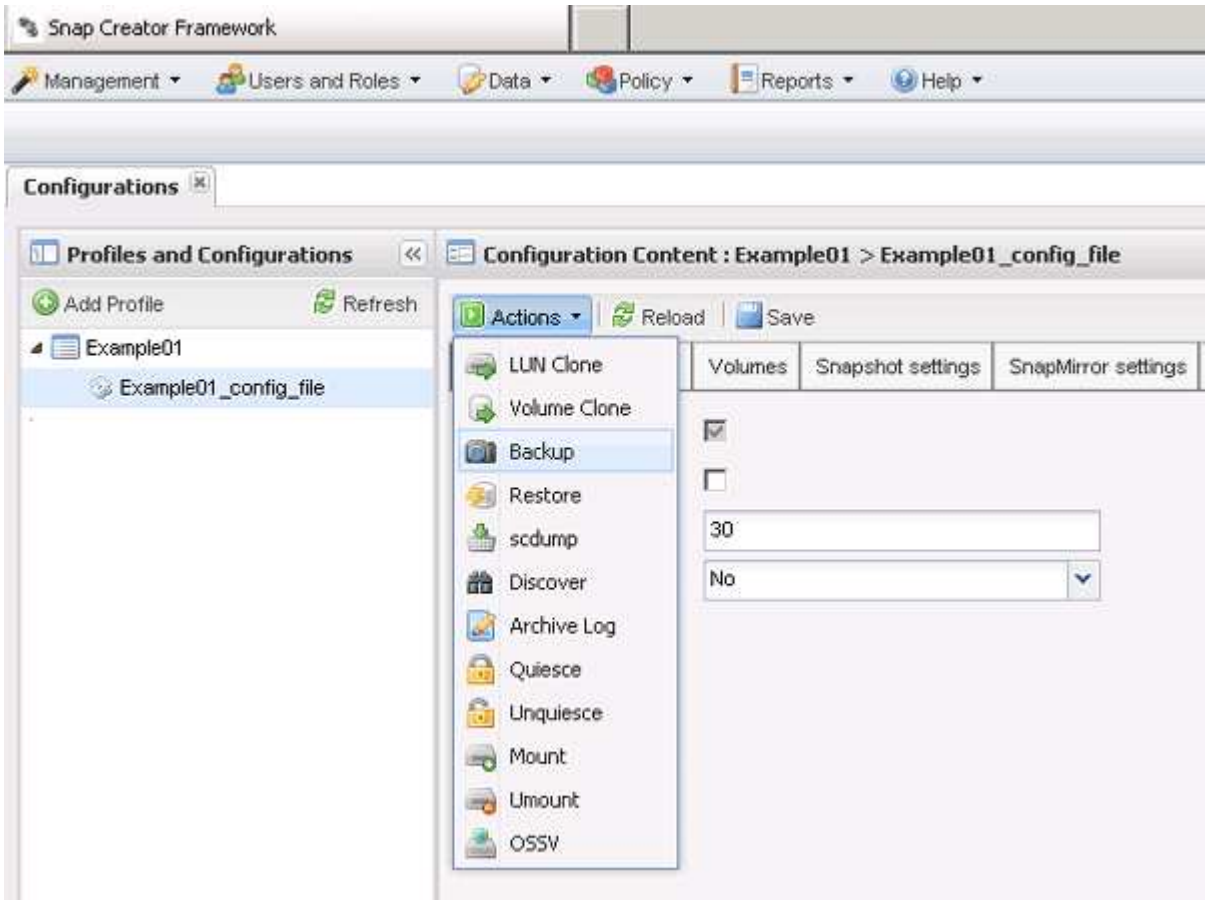
You can create backups by using the Snap Creator GUI.

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.

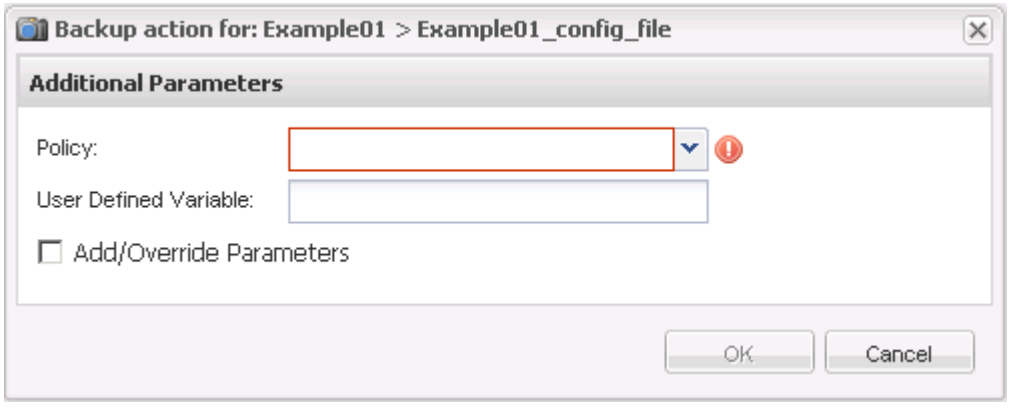
If a policy object is defined, it will overrule any entries that might be in the configuration file.

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**.

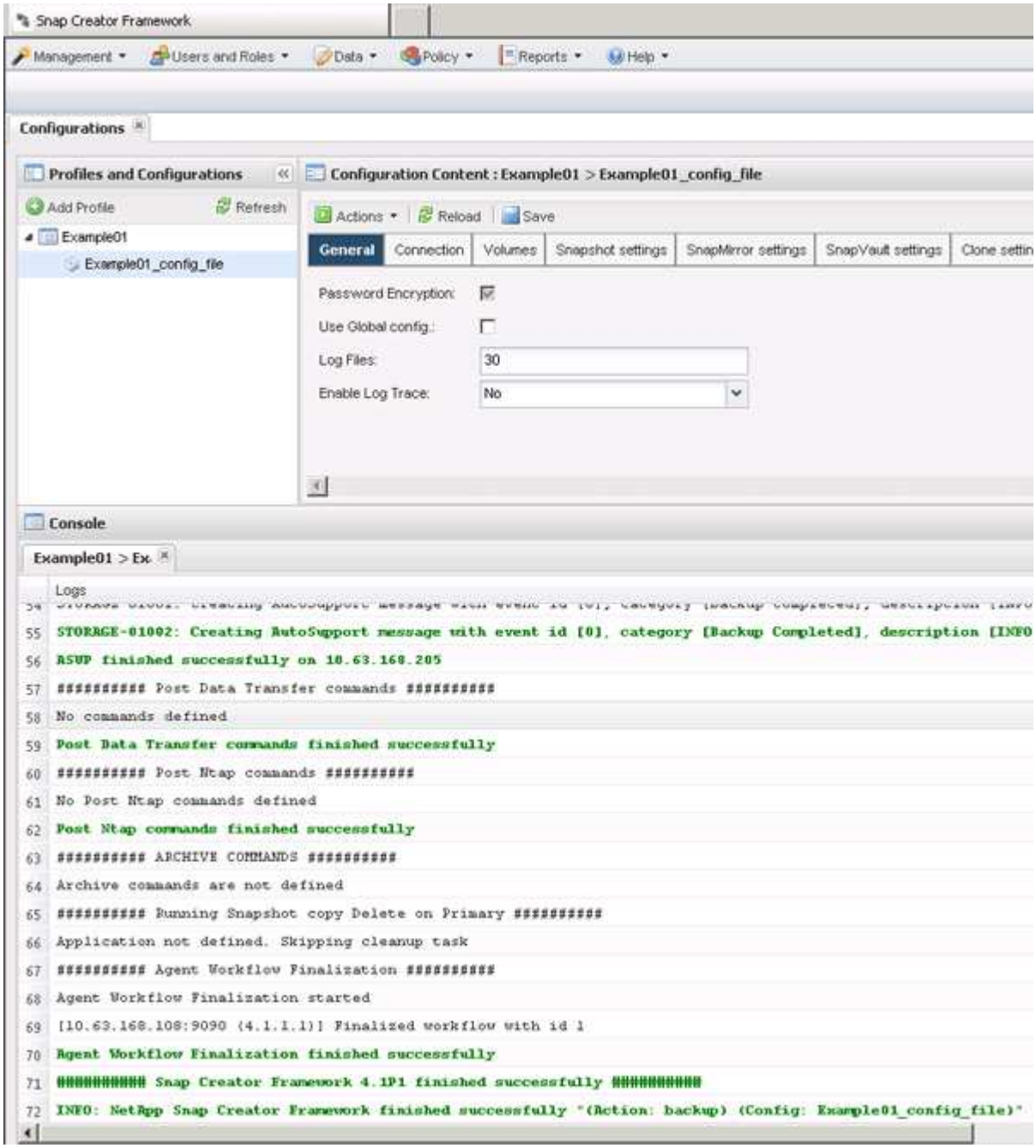


4. In the Additional Parameters dialog box, select the policy, and then click **OK** to start the backup.

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.

> 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 backup copies of a configuration file

You can view a list of the backup copies of ONTAP volumes that are defined in the configuration file. You can also get details about available backups and rename specific

backups based on the requirement.

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

   The Backups tab displays a list of all of the backup copies of the ONTAP volumes that are defined in the configuration file.

> Snap Creator 4.3 or an earlier release deletes a Snapshot copy based on the retention period, even if the copies are renamed. To retain Snapshot copies for an unlimited time, Snap Creator Framework has provided a button named “Unlimited Retention”, under the “data ->backup” tab on the Snap Creator Framework GUI. You can select a Snapshot copy that you want to keep for an unlimited time and click the “Unlimited Retention” button. The name of the selected Snapshot copy changes from <snapshot_name> to <snapshot_name_unlimited>.

Deleting backups

You can delete backup copies of a configuration file.

1. From the main menu of the Snap Creator graphical user interface (GUI), select **Data** > **Backups**
2. From the Profiles and Configurations pane of the Backups tab, expand a profile and select a configuration file.
3. Select the backup that you want to delete and click **Delete**.

> If the configuration file contains multiple Data ONTAP volumes, you must select the Snapshot copy that you want to delete on each of the Data ONTAP 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.

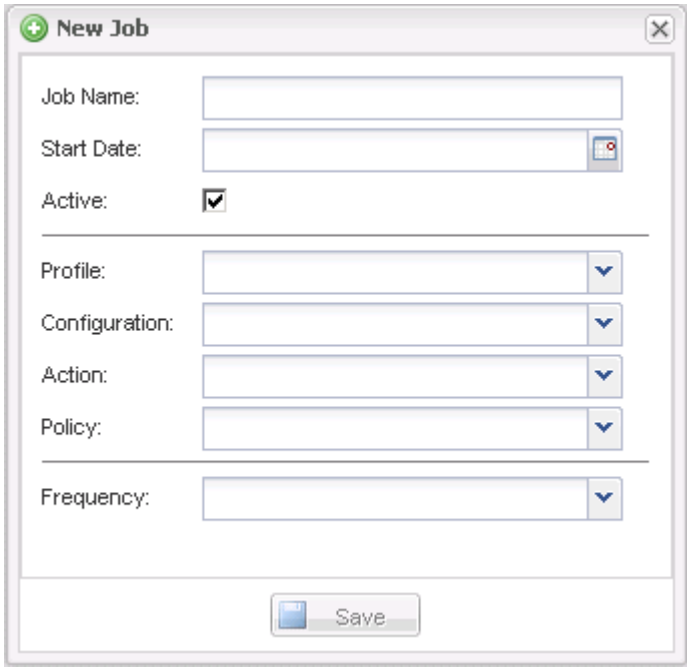
Creating scheduled jobs

If you are using a local retention policy (located in the configuration file), you can use the Snap Creator graphical user interface (GUI) scheduler to create schedules and run tasks. The scheduler—which is 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.

If you plan to use policy objects instead of a local retention policy, you should skip this procedure and create a

policy schedule instead.

1. From the main menu of the Snap Creator GUI, select **Management** > **Schedules** and click **Create**.
2. 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 to signify that the job will run as scheduled. Active is the default setting.
Profile	Select the profile to be associated with this job.
Configuration	Select the configuration to be associated with this job.

Field	Description
Action	Select one of the following options: • **Backup**: Creates a backup by using 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**: Performs archive log management only. No backup is created. • **Custom**: Executes a plug-in-defined cloning action.
Policy	Select the policy to be associated with this job.
Frequency	Select the frequency for this job. Depending on your selection, you must select the appropriate time fields for running the scheduled job. +

3. Click **Save**.

Related information

Creating policy schedules

Running scheduled jobs

You can run a scheduled job.

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.

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.

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.

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.

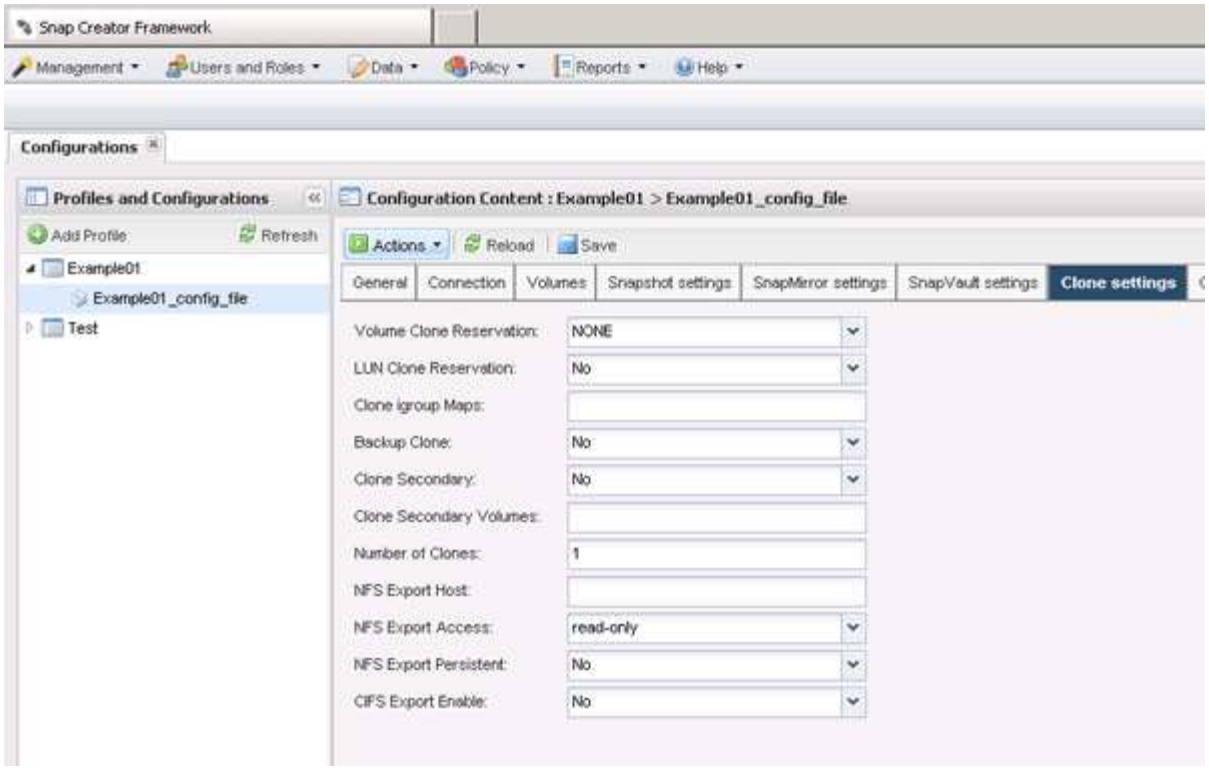
Creating clones from a new backup

You can clone volumes or LUNs from a new Snapshot copy.

- 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.

This cloning operation involves cloning a new Snapshot copy.

1. From the main menu of the Snap Creator graphical user interface (GUI), select **Management** > **Configurations**.
2. In the **Profiles and Configuration** pane, select a configuration file.
3. Navigate to the **Clone settings** tab, and verify that the settings are set properly.



4. Depending on the type of clone that you require, 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.

- 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.

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

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.

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.

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

Parameters	Setting	Description
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.
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

Parameters	Setting	Description
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

Parameters	Setting	Description
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.	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

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).	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_SE ARCH
(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.

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:

- Active IQ 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.

The following table lists the DB2 plug-in parameters, provides the parameter settings, and describes the parameters.

Parameter	Setting	Description
APP_NAME	db2	Provides the 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`.

Parameter	Setting	Description
DB2_CMD	path_to_db2cli_cmd	Specifies the path that is used to initialize the database connection so that further commands can be executed on the 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 as the path.

Note: The DB2 plug-in handles Write Anywhere File Layout (WAFL) operations by default. If you want to back up a consistency group backup with the DB2 plug-in, you should set the parameter to NTAP_CONSISTENCY_GROUP_WAFL_SYNC parameter to N. If you set this parameter to Y, additional and redundant synchronizing operations are performed.

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

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 4.1.2 IBM Domino Plug-in Operations Guide

MaxDB plug-in

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

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. If in a Windows environment, the path needs to be contained within double-quotes ("…").	SQLCLICMD

Parameter	Setting	Description
path_to_sqlcli_cmd	Specifies the path for the MaxDB sqlcli command.If not set, sqlcli is used on the search path.	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.
MAXDB_BACKUP_TEMPLATES	template_name Example: `na_snap`	Specifies a backup template for each database.The template must already exist and be an external type of backup template. To enable Snapshot copy integration for MaxDB 7.8 and later, you must have MaxDB background server functionality and already configured MaxDB backup template.

Parameter	Setting	Description
MAXDB_BG_SERVER_PREFIX	bg_server_prefix Example: `na_bg`	Specifies the prefix for the background server name. If the MAXDB_BACKUP_TEMPLATES parameter is set, you must also set the MAXDB_BG_SERVER_PREFIX parameter. If you do not set the prefix, the default value `na_bg_DATABASE` is used.

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

MySQL plug-in

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

The MySQL plug-in does not support backup and restore operations for multiple databases. The Interoperability Matrix contains the latest information about support and compatibility.

For Snap Creator configurations, the MySQL database user must have the LOCK TABLES privilege granted, along with other privileges, such as SUPER and RELOAD.

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

Parameter	Setting	Description
APP_NAME	mysql	Application name
MYSQL_DATABASES	db_name:user_name/password	List of MySQL databases, the user name, and the password.You can specify multiple databases with user names and passwords 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.

Parameter	Setting	Description
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. Snap Creator Framework backup deletes the required MySQL binary log files on the MySQL server with the Master_Slave option enabled. The MySQL (master) database backup using Snap Creator Framework removes all binary log files and leaves only a single empty binary log file with reset numbering (.000001). Because of this issue, the slave server fails to start up after the backup operation.	PURGE_BINARY_LOG	(Y

Related information

Interoperability Matrix Tool: mysupport.netapp.com/matrix

Oracle plug-in

The Oracle plug-in uses SQL*Plus to communicate with the database and quiesce & unquiesce oracle database for backup.

The Snap Creator Oracle plug-in supports Oracle Automatic Storage Management (offline or online backups) and online backup of a Real Application Clusters (RAC) database configuration. The Interoperability Matrix contains the latest information about support and compatibility.

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.

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 filesThe 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 operationThis setting is useful if you are handling archive log backups separately from data backups.
ORACLE_HOME		Path to the Oracle home directory

Parameter	Setting	Description
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	ORACLE_SHUTDOWNABORT	(Y

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.

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:

- Active IQ 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.

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.

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.

Parameter	Setting	Description
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 4.3.3 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.

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)

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.

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.
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)

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.

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. This parameter is required for UNIX. This parameter is required if the user running the Snap Creator Agentstart 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`
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 the NTAP_PWD_PROTECTION parameter 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 that requires a transaction dump.

Parameter	Setting	Description
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.	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 that used for Snapshot copy naming	SYBASE_MANIFEST_DELETE	(Y

Parameter	Setting	Description
N)	Allows the manifest to be deleted after the Snapshot copy has been created. The manifest file should be captured in the Snapshot copy so that it is always available with the backup.	SYBASE_EXCLUDE_TEMPDB
(Y	N)	Enables automatic exclusion of user-created temporary databases.

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 VIBE plug-in. The VMware plug-in is an integrated plug-in for both virtual machines with vSphere and vApps with vCloud Director.

You must consider the following when you use the VMware VIBE 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.

- 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 high availability (HA) with the VMware plug-in is not tested and is not supported.
- VMware vCenter Linked Mode with the VMware plug-in is not tested and is not supported.
- The VMware plug-in does not support raw device mapping (RDM).
- The volumes are discovered using automatic detection.

  You cannot view a discovered destination volume if it is not in a SnapMirror relationship. You can use the dpstatus command to check the SnapMirror relationship. If a SnapMirror relationship does not exist, you must first create the SnapMirror relationship.

- Before you perform restore operations, you must 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 so that the new environment is cleaned up and all VMware snapshot copies are removed.

  If the VMware plug-in cannot 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. This 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 value of the SC_AGENT_TIMEOUT parameter should be set to 1800 or higher.
- The default value of the VIBE_VMWARE_snapshot parameter (VMware snapshot option) is N.
- If the value of APP_DEFINED_RESTORE is Y, then the SnapVault restore operation using the graphical user interface (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 lists the VMware VIBE plug-in parameters, provides the parameter settings, and describes the parameters.

Parameter	Setting	Description
VIBE_DYNAMIC_VOLUMES_UPDATE	Y or NDefault: not set	If this parameter is set to N, dynamic volume update is not performed, which means you have to set the VOLUMES, SNAPVAULT_VOLUMES, SNAPMIRROR_VOLUMES, and NTAP_DFM_DATA_SET parameters manually.
VIBE_NOPING	Default: N	Specifies that Internet Control Message Protocol (ICMP) is not used to ping VMware plug-in or the storage controllers.
VIBE_VCLOUD_IPADDR	N/A	Specifies the IP address or the host name of the vCloud Director that is used for logging in to (vCloud only).

Parameter	Setting	Description
VIBE_VCLOUD_USER	N/A	Specifies the user name to be used for logging in to the vCloud Director (vCloud only). You must set @org or @system (top-level vCloud database). The vCloud Director system administrator user name must be used to perform the backup and restore operations. These operations fail if the organization administrator credentials or any other user credentials are used. Example: `administrator@system`
VIBE_VCLOUD_PASSWD	N/A	Specifies the password that is associated with the specified VIBE_VCLOUD_USER (vCloud only).
VIBE_VCENTER_USER	N/A	Specifies the user name to be used for logging in to vCenter.
VIBE_VCENTER_PASSWD	N/A	Specifies the password that is associated with the specified VIBE_VCENTER_USER.
VIBE_VCLOUD_NAMES	N/A	Lists the organization, virtual data center, and vApp object names that should be backed up (vCloud only).Example: `ORG:VDC1,VDC2:VAPP1,VAPP2;ORG2:VDC3:;ORG3::VAPP6`
VIBE_VSPHERE_NAMES	N/A	Lists the datastores and virtual machines that should be backed up per vCenter (vSphere only).Example: `VCENTER1:DS1:VM1;VCENTER2;DS2,DS3:;VCENTER3::VM4`

Parameter	Setting	Description
VIBE_TRIM_VSPHERE_NAMES	N/A	Lists the virtual machines that should be removed from backup per vCenter (vSphere only).Example: `VCENTER1:VM99;VCENTER2:VM5,VM12`
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	Creates a VMware snapshot copies during backup.
VIBE_IGNORE_EXPORTFS=Y or N	Default: N	You must manually add this parameter to the Snap Creator VIBE configuration file. When the value is set to Y, Data ONTAP operating in 7-Mode configurations ignores any exportfs values on the controller. Instead, Data ONTAP maps the volume export path as /vol/datastore_name, where a datastore name is specified for backup. Older environments using vFiler units might use this methodology because the exportfs information of individual datastores is not available from a vFiler unit. Instead, a configuration needs to map the path based on queries to vfiler0.

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

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.

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

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:
  i. Use FlexClone or LUN clone of the LUN contained in a specific restore Snapshot copy.
  ii. Map it to the cluster.
  iii. 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

> The plug-in framework supports Perl, PowerShell, Java, UNIX Shell, and Python for programming. NOTE: 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.

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.

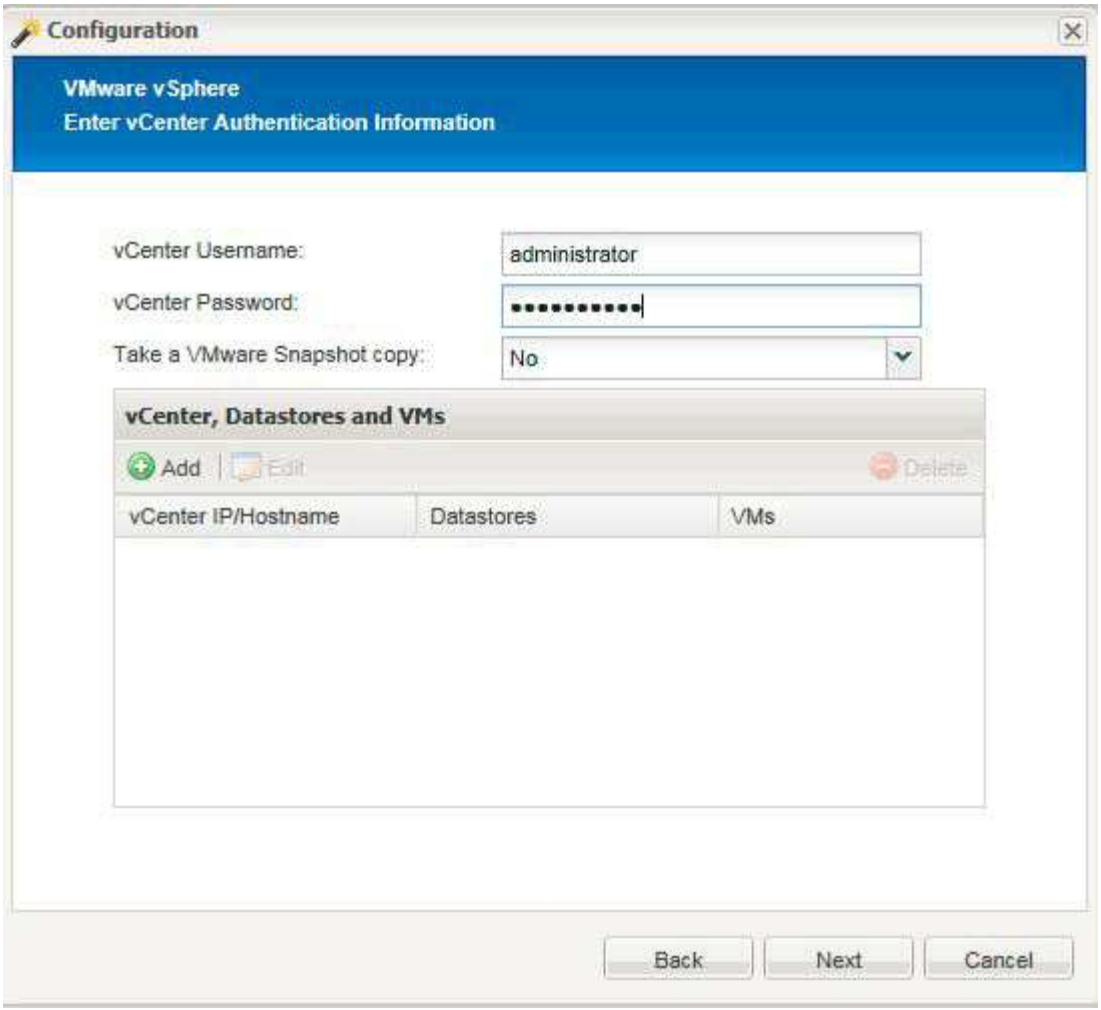
1. Create a new profile.
2. Create a new configuration.
   a. On the Configuration page, enter a name for the configuration file.

      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.

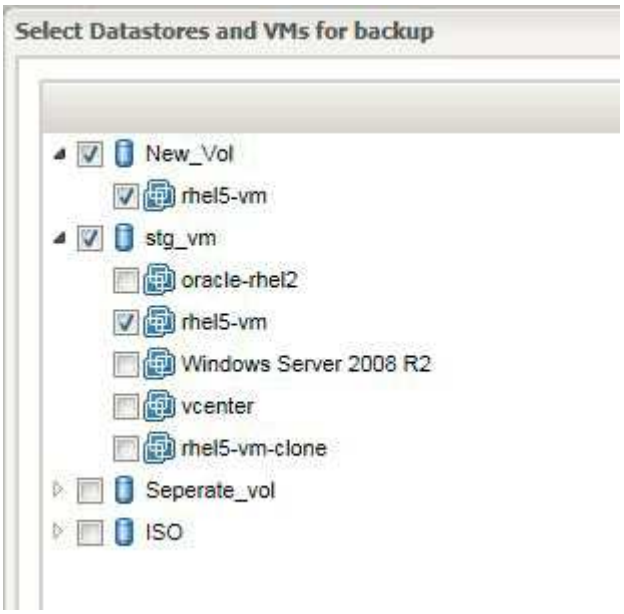
      In the following example, VMware vSphere is the selected Virtualization plug-in. The wizard screens that display depend on your selection.

      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.

> 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.

> 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**.

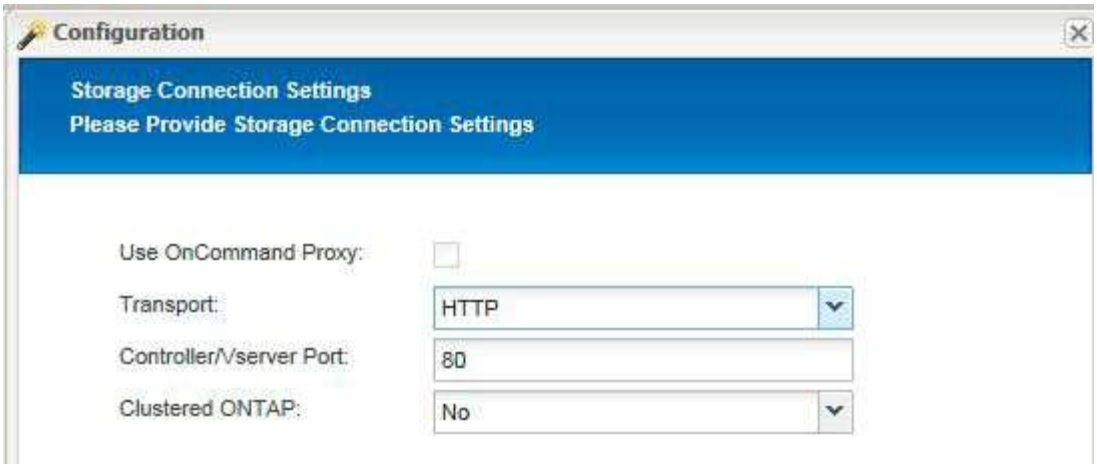
xiii. On the Hypervisor + App page, you have the following options:

- 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**.

> 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.

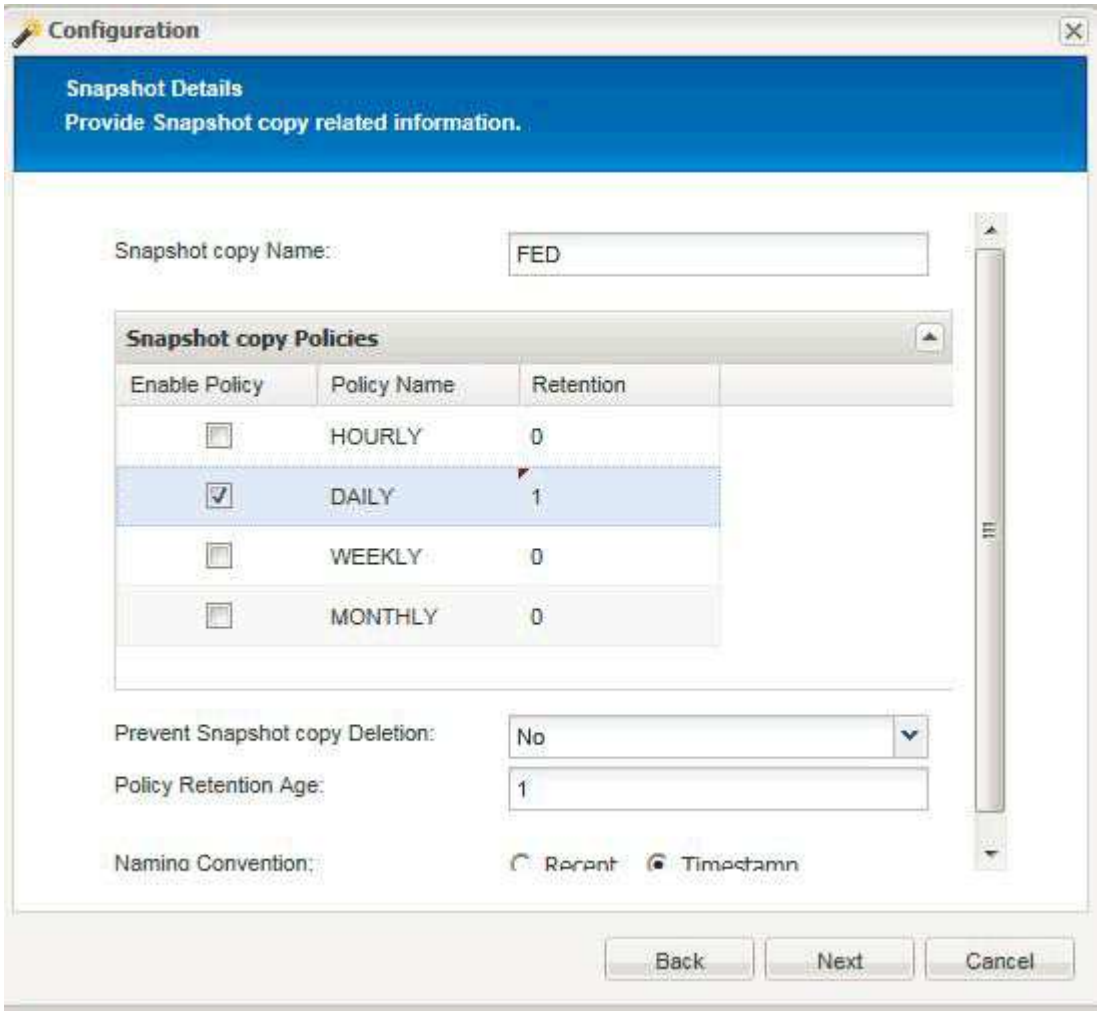
e. On the Storage Connection Settings page, provide the following information:

- 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 information

Creating profiles

Creating configuration files

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.

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

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**.

   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.

    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 what was 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 that 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:

    i. Enter the following command: options https.admin.hostsequiv.enable on

    ii. Edit the /etc/hostsequiv file, and add the following: IP/Host_name_in_Snap_Creator config_fileSnap_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 the storage controller names do not match, you can use the operating system host file to force the storage controller names to match.

  - Firewall

    If there is a firewall between the host that is running Snap Creator and your storage system, ensure that you have bi-directional access control lists (ACLs) 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 that is running Snap Creator, at least on the non-privileged ports.

  - Snap Creator Framework can communicate with both clustered Data ONTAP and Data ONTAP operating in 7-mode using TLS if SSL is disabled.

    In Snap Creator Framework you can disable SSLV3 in the host and the storage system:

- To disable SSLV3 on AIX, Unix, or Windows, you should update the jdk.tls.disabledAlgorithms parameter in the java.security file as follows:

  jdk.tls.disabledAlgorithms=sslv3

  The java.security file is located under the path: /java/jre/lib/security/

- To disable SSLV3 on the storage system, you should execute the system service web modify command, and configure the following parameters:

  TLSv1 Enabled: true

  SSLv3 Enabled: false

  SSLv2 Enabled: false

◦ 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 communicating with. Presenting a firewall IP instead of the actual host or controller IP might cause problems.

Troubleshooting security issues

You must be aware of certain security issues in Snap Creator and know how to troubleshoot them.

Cryptographic flaws in Transport Layer Security

- **Issue**

  TLS 1.0 has several cryptographic flaws. An attacker might exploit these flaws to conduct man-in-the-middle attacks or to decrypt communications between the affected service and clients.

- **Cause**

  The remote service accepts connections encrypted by using TLS 1.0.

- **Corrective action**

  Snap Creator has an option to enable or disable TLS 1.0 protocol .

  a. To support backward compatibility, set the ENABLE_SECURITY_PROTOCOL_TLS_V1 parameter as Y in the snapcreator.properties and agent.properties files. The ENABLE_SECURITY_PROTOCOL_TLS_V1 parameter is set as N by default.

> The ENABLE_SECURITY_PROTOCOL_TLS_V1 parameter can only be used in releases earlier than Snap Creator Framework 4.3.3. Because the Snap Creator Framework 4.3.3. release only supports Oracle Java and OpenJDK 1.8 and later, the support for TLS 1.0 was removed from Snap Creator Framework.

Self-signed SSL certificate not matching the URL

- **Issue**

  The self-signed SSL certificate provided with Snap Creator Framework does not match the URL.

- **Cause**

  The common name (CN) of the SSL certificate presented on the Snap Creator service is for a different machine, and so it does not match the host name.

- **Corrective action**

  System IP parameter has been introduced during the installation of Snap Creator Server and Snap Creator Agent to resolve host name.

  a. Enter the system IP address on which Snap Creator Framework is being installed in the System IP option.
     - The common name of the SSL certificate can be created using the same IP address.

CA-signed SSL certificate is required for Snap Creator Framework

- **Issue**

  The Certificate Authority (CA)-signed SSL certificate is required for Snap Creator Framework.

- **Cause**

  The server's X.509 certificate does not have a signature from a known public certificate authority.

- **Corrective action**

  Snap Creator Framework supports installation of a third-party certificate.

  a. Update the following parameter values in the snapcreator.properties and agent.properties files:

     snapcreator.properties file:

     SNAPCREATOR_KEYSTORE_PASS

     SNAPCREATOR_KEYSTORE_PATH

     agent.properties file:

     KEYSTORE_FILE

     KEYSTORE_PASS

  b. Restart the server and the agent services.

Troubleshooting Snap Creator Server or Snap Creator 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.

Snap Creator password reset

If you forget your Snap Creator password, you can reset your password.

To reset your Snap Creator password,

1. Navigate to the scServer/engine/etc folder.
2. Edit the snapcreator.properties file.
3. Enter the new password in the SNAPCREATOR_PASS parameter.

   You can provide the password in plain text. The password is encrypted automatically.

4. Click **Save**.

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:

  a. Open an SSH session of your Linux server and run the following command: perl -MCPAN -e shell

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.

b. 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].

c. 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 5-digit identifier----for example, ERROR: [<area code>-<unique area error identifier>] <error message>. The area code identifies where the error occurred. The different area codes are as follows:

- `scf`: Snap Creator Framework
- `REPO`: Repository
- `STORAGE`: Storage
- `agt`: Snap Creator Agent
- `gui`: Snap Creator graphical user interface (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]	The Snap Creator setup command is not run. Run the snapcreator --profile setup command. Ensure that the serial number is either blank or set to a numeric value.
scf-00002	Backup handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application backup failed because of 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 because of an application error. Check the logs and application settings.

Error code	Error message	Description/resolution
scf-00004	Clone handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application clone failed because of 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 because of 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 because of an application error. Check the logs and application settings.
scf-00007	Post-clone handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application post-clone operation failed because of 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 logs. You might have a NetApp Manageability SDK solution error. The logs 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 the NetApp Management Console, but failed to list the Snapshot copies. Ensure that Snap Creator is registering backups, and check the configuration of the NTAP_PM_UPDATE and NTAP_DFM_DATA_SET parameters.
scf-00010	NetApp Management Console backup list is undefined, no backups for dataset [%s] exist, Exiting!	Snap Creator started the backup delete operation in the NetApp Management Console, but the Snapshot copies exist. Ensure that Snap Creator is registering backups, and check the configuration of the NTAP_PM_UPDATE and NTAP_DFM_DATA_SET parameters.

Error code	Error message	Description/resolution
scf-00011	NetApp Management Console backup version ID [%s] Timestamp [%s] Delete for dataset [%s] failed with exit code [%s], Exiting!	Ensure that Snap Creator is registering backups, and check the configuration of the NTAP_PM_UPDATE and NTAP_DFM_DATA_SET parameters.
scf-00012	Retrieving NetApp Management Console dataset status for dataset [%s] failed with exit code [%s], Exiting!	Ensure that the dataset exists and the status is conformant. Also ensure that the dataset was created by Snap Creator. Datasets that are not created by Snap Creator are not application datasets; these datasets do not work.
scf-00013	Failed to register the Snapshot copies with dataset [%s] exit code [%s]	Check the configuration of the NTAP_PM_UPDATE and NTAP_DFM_DATA_SET parameters.
scf-00014	NetApp Management Console backup start for [%s] ([%s]) failed, Exiting!	Check the configuration of the NTAP_PM_UPDATE and NTAP_DFM_DATA_SET parameters.
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, but obtaining the progress of the backup operation failed. Check the configuration of the NTAP_PM_UPDATE and NTAP_DFM_DATA_SET parameters.
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 the snapmirror status command, and to ensure that the relationship exists.

Error code	Error message	Description/resolution
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, run the 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_INTERFACESparameter to inform 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. Ensure that the SnapVault 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. 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-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. 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.

Error code	Error message	Description/resolution
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 because of 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 because of 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 because of an application error. Check the logs and application settings.
scf-00028	Auto Discovery for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application discovery failed because of 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 does not support the use automatic discovery. Disable automatic discovery by setting APP_AUTO_DISCOVERY=N.

Error code	Error message	Description/resolution
scf-00030	File system quiesce for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	File system quiesce failed because of a 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 because of a 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 because of an application error. However, the APP_IGNORE_ERROR=Y; Snap Creator proceeds 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 logs. There might be a NetApp Manageability error. The logs might reveal the cause of the problem.
scf-00035	Inventory of LUNs on [%s] failed, Exiting!	The LUN list create failed. Check the error logs. There might be a NetApp Manageability error. The logs might reveal the cause of the problem.
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.

Error code	Error message	Description/resolution
scf-00037	Application quiesce for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application quiesce failed because of an 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 because of an application error. However, the APP_IGNORE_ERROR=Y; Snap Creator proceeds 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 ensure 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 CMODE_CLUSTER_NAME parameter is required and used for AutoSupport and SnapMirror. You should define this parameter 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. You should define these parameters correctly in the 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.

Error code	Error message	Description/resolution
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.	The META_DATA_VOLUME parameter is not specified in VOLUMES. Add the metadata volume to VOLUMES.
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.	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 because of an application error. Check the logs and application settings.
scf-00049	Unmount handling of plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	Application unmount failed because of an application error. Check the logs and application settings.
scf-00050	Custom action is supported only for application plug-ins	The APP_NAME parameter is not set in the configuration file. This parameter 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 while communicating with the Active IQ Unified Manager server.
scf-00052	Restore handling of plug-in [%s] failed with error [%s] exit code [%s], Exiting!	Restore failed because of an application error. Check the logs and application settings.

Error code	Error message	Description/resolution
scf-00053	File system unquiesce for plug-in [%s] failed with error [%s] and exit code [%s], Exiting!	File system unquiesce failed because of a file system error. However, the APP_IGNORE_ERROR=Y; Snap Creator proceeds with the backup. Check the logs and file system settings.
scf-00054	File system unquiesce for plug-in [%s] encountered errors, exit code [%s], proceeding with backup!	File system unquiesce failed because of file system error. However, the APP_IGNORE_ERROR=Y; Snap Creator proceeds with the backup. Check the logs and file system settings.
scf-00055	NetApp Management Console driven backup [%s] of dataset [%s] with policy [%s] on storage controller [%s]	N/A
scf-00056	Creating NetApp Management Console driven backup [%s] of dataset [%s] with policy [%s] on storage controller [%s] finished successfully	N/A
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 of the NTAP_PM_UPDATE and NTAP_DFM_DATA_SET parameters.
scf-00058	Update configuration with application discovered value failed for [%s], Exiting!	Could not update the file because of the permissions problem or a 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 because of an application error. Check the logs and application settings.

Error code	Error message	Description/resolution
scf-00060	Invalid DTO: [%s]	A required field in the DTO is either not set or is invalid, which 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 the 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 because the user does not have permission to perform the operation.
scf-00063	Discovery for [%s] failed with return code [%s] and message [%s]	Application discovery using VALIDATE_VOLUMES=DATA failed because of 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 the VOLUMES parameter so that they can be included in the backup.
scf-00066	Agent validation failed for [%s] with error [%s]	The configured agent is not reachable. The agent might be down, or there might be a local firewall issue. Check the configuration parameter SC_AGENT.

Error code	Error message	Description/resolution
scf-00067	Failed to list external Snapshot copy for [%s] with name pattern [%s]	Snap Creator could not find external Snapshot copy based on the regex pattern NTAP_EXTERNAL_SNAPSHOT_REGEX. Log in to the controller and match the snap list output with the regex pattern.
scf-00068	File system pre_restore for plug-in [%s] failed with exit code [%s], Exiting!	File system pre-restore failed because of a 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 because of a file system error. However, the APP_IGNORE_ERROR=Y; Snap Creator proceeds with other operations. Check the 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 because of a file system error. Check the logs and file system settings.
scf-00071	File system post_restore for plug-in [%s] encountered errors, exit code [%s], proceeding with backup!	File system post restore failed because of a file system error. However, the APP_IGNORE_ERROR=Y; Snap Creator proceeds 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.

Error code	Description/Resolution
agt-00003	The parameters given were not correct to start the Snap Creator Agent. Check the required parameters.
agt-00004	The SC_AGENTconfiguration 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.confand 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.
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.

Error code	Error message	Description/resolution
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.
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.

Error code	Error message	Description/resolution
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.
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]	

Error code	Error message	Description/resolution
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.

Error code	Error message	Description/resolution
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!	
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 storage-related error messages can help you troubleshoot any issues that occur.

The following table lists the error codes and messages along with a brief description of the error and the suggested resolution.

Error code	Error message	Description/resolution
STORAGE-00001	Date format [%s] is not valid: [%s]	Either the volume clone was not created by Snap Creator, or the time stamp that is appended to the clone name is not valid.
STORAGE-00002	Unable to retrieve executor	An executor was not created for storage. Check the logs for NetApp Manageability errors, which might reveal the cause of the problem.
STORAGE-00003	Cannot connect to the host	The host is not reachable. Ensure that the local firewall settings are correct, and that the 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. The logs might reveal the cause of the problem.
STORAGE-01004	For file restore, the source and destination volumes need to be the same volume.	The source and destination volumes are different.Provide the same volume as the source volume and the destination volume.
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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs might reveal the cause of the problem.

Error code	Error message	Description/resolution
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. The logs 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. The logs 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. The logs 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. The logs might reveal the cause of the problem.
STORAGE-02043	Listing files on path [%s] failed with error [%s]	Check the logs for errors. You most likely have a NetApp Manageability error. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs might reveal the cause of the problem.

Error code	Error message	Description/resolution
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. The logs 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. The logs might reveal the cause of the problem.
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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs might reveal the cause of the problem.
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. The logs might reveal the cause of the problem.

Error code	Error message	Description/resolution
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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs might reveal the cause of the problem.
STORAGE-03055	Performance counters get for object [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error. The logs 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. The logs 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. The logs might reveal the cause of the problem.

Error code	Error message	Description/resolution
STORAGE-03064	System CLI command [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs 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. The logs might reveal the cause of the problem.
STORAGE-03085	NFS service get on controller [%s] failed	Check the logs for errors. You most likely have a NetApp Manageability error. The logs 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. The logs 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. The logs 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. The logs might reveal the cause of the problem.
STORAGE-04119	Listing Vservers failed with error	Check the logs for errors. You most likely have a Manage ONTAP Solution error which may reveal the cause of the problem.

Error code	Error message	Description/resolution
VSERVER_TUNNEL_ENABLED	(Y/N)	Set the Vsim Tunneling. If set to Y, the Vsim Tunneling feature is enabled.

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.
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.

Error code	Description/resolution
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 the variables, parameters, and commands within the Snap Creator configuration file.

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

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

When using SnapDrive for Windows instead of Data ONTAP for Snapshot copy deletion, the NTAP_SNAPSHOT_DELETE_CMDparameter can be used. The %SNAPNAME parameter must be used in place of the Snapshot copy name in the SnapDrive for Windows command.

The following example is from a SnapDrive for Windows configuration:

NTAP_SNAPSHOT_DELETE_CMD01 = "C:\Program Files\NetApp\SnapDrive\sdcli" snap delete -s %SNAPNAME -D I:

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

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 conventionIf 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 listFor 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`
 	
VOLUME_GROUPS is only supported for backup operations. If this parameter is set, then the VOLUMES parameter will be ignored during the backup.
	NTAP_SNAPSHOT_RETENTIONS	

Determines the number of Snapshot copies to be retained for a given policyFor example: `daily:7,weekly:4,monthly:1`	NTAP_USERS	

Lists the storage systems and their corresponding user names and passwordsFor example:
`controller1:joe/password1;`
`controller2:bob/password2;`
`controller3:ken/password3`
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 typeThere are two types of configurations: plug-in and standard. You can use multiple plug-in configurations to build complex quiesce and unquiesce backup workflows.	CMODE_CLUSTER_USERS	

(Required for clustered Data ONTAP) Lists the primary and secondary clustered Data ONTAP clusters and their corresponding user names and passwordsFor example: `cluster1:joe/password 1; cluster2:bob/password 2` 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`	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)

Parameters for configuring the Snap Creator Agent host client and Snap Creator Server

You must be aware of the parameters for configuring the Snap Creator Agent host client and Snap Creator Server.

Parameter	Setting	Description
SC_AGENT_##	host name or IP_address:port	Runs commands or tasks on multiple remote hosts simultaneously using a single configuration. A task is either a defined plug-in (parameter APP_NAME) or a command specified with the _CMD command (for example, NTAP_SNAPSHOT_CREATE_CMD01). To specify a remote host, you should enter its name or IP address followed by a colon, and the port on which Snap Creator Agent is listening. For example: SC_AGENT_ number = IP address:Port SC_AGENT_01=Agent IP:Agent port SC_AGENT_02=Agent IP:Agent port On the remote host, you can start Snap Creator Agent by running the <path to scAgent_v<#>>/bin/scAgent start command.
SC_CLONE_TARGET	host name or IP_address of the clone target:port	Enables clone operations.Using the parameter **cloneVol** with the {PRE/POST}_CLONE_CREATE_CMDxx parameter, you can manage the remote storage objects on the remote side (for example, mounting or unmounting file systems). To specify a clone target, you should enter its name or IP address followed by a colon, and the port on which Snap Creator Agent is listening.

Parameter	Setting	Description
SC_AGENT_TIMEOUT	Time (in seconds)	Specifies the timeout in seconds of the Agent service. 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. The timeout is set to 300 seconds by default. On a server with a high load or known long-running tasks (such as, user-created scripts or complex SnapDrive operations), you should extend the timeout and modify this value according to your requirements. You should set this parameter to the maximum time that an operation can take (for example, if quiesce takes 1,800 minutes, this parameter must be set to 1800).  Some plug-ins have specific SC_AGENT_TIMEOUT value requirements.

Parameter	Setting	Description
SC_AGENT_WATCHDOG_ENABLE	“Y” or “N”	The SC_AGENT_WATCHDOG_ENABLE parameter applies only when the Snap Creator Agent version is earlier than 4.1. This parameter enables or disables the Watchdog process. For Snap Creator Agent 4.1 or later, this parameter is ignored because the Watchdog process is always enabled. If the parameter is enabled (that is, set to Y) and the Snap Creator Agent version is 4.1 or later, the Watchdog process starts when the Snap Creator Agentreceives a quiesce request. The Watchdog process uses the SC_AGENT_UNQUIESCE_TIMEOUT parameter as timeout to unquiesce the application. If the parameter is disabled (that is, set to N) and the Snap Creator Agentversion is earlier than 4.1, the Watchdog process unquiesces the application, but it uses the OPERATION_TIMEOUT_IN_MSEC parameter (default: 1 hour) from scAgent/etc/agent.properties path. The SC_AGENT_WATCHDOG_ENABLE parameter is deprecated for Snap Creator Agent 4.1, and applicable only for use with Snap Creator Agent 4.0. Beginning with Snap Creator Agent 4.1, the Watchdog process is enabled (as it is hard coded), regardless of the value set for this parameter.

Parameter	Setting	Description
SC_AGENT_UNQUIESCE_TIMEOUT	Time (in seconds)	Specifies the unquiesce timeout in seconds. With Snap Creator Agent versions earlier than 4.1, this parameter is only used when SC_AGENT_WATCHDOG_ENABLE is set to Y. With Snap Creator Agent 4.1 or later, the parameter is always applicable, because the Snap Creator Agent Watchdog process is always on.If communication with Snap Creator Agent is not possible and an application is in the quiesce state, the Snap Creator Agent automatically returns the application to its normal mode of operation without communication from the server. By default, the unquiesce timeout is set to whatever the SC_AGENT_TIMEOUT parameter value is, plus five seconds.
SC_TMP_DIR	“Y” or “N”	Enables the use of a user-defined, alternate temporary directory to store Snap Creator-related files. The user creates the directory and manages 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 for all users. If the temp directory is full, Snap Creator displays an error while creating the temporary files.

Parameter	Setting	Description
SC_AGENT_LOG_ENABLE	“Y” or “N”	Enables log creation for all operations executed by Snap Creator Server to Snap Creator Agent. If a failure occurs, you can check these logs. Snap Creator Server sends operations to Snap Creator Agent. If an error occurs before Snap Creator Agent sends a callback to Snap Creator Server, the Snap Creator Agent messages could be lost. This parameter helps Snap Creator Agent messages to be logged on Snap Creator Agent so that these messages are not 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 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 Active IQ Unified Manager server proxy instead of the storage controller directly. If this option is used, NTAP_USERS is not required.	ALLOW_IP_ADDR	(Y

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.	NTAP_CLONE_SECONDARY_VOLUMES

Parameter	Setting	Description
	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

Parameter	Setting	Description
(Y	N)	Setting to share a cloned volume using CIFS.

Parameters for setting up event management

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

Parameter	Setting	Description
NTAP_ASUP_ERROR_ ENABLE	“Y” or “N”	EnablesSnap 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 when the backup is complete.
FAILURE_MSG		Logs the failure message that is defined in case of a Snap Creator failure. This failure message can also be sent to SENDTRAP if SENDTRAP is defined.
SENDTRAP		Interfaces with your monitoring software or email, enabling you to pass the alerts that are 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 you can send an email on a UNIX system: SENDTRAP=/usr/bin/mailx -s %MSG myaddress@mydomain.com </dev/null To send an email on a Windows system, you must add `cmd.exe /c` before any command. For example: SENDTRAP= cmd.exe /c echo %how

Parameter	Setting	Description
SUCCESS_TRAP		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 you can send an email on a UNIX system: SUCCESS_TRAP=/usr/bin/mailx -s %SUCCESS_MSG myaddress@mydomain.com </dev/null To send an email on a Windows system, you must add `cmd.exe /c` 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 that is defined. The message is also sent to SUCCESS_TRAP, if SUCCESS_TRAP is 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)

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. In OSSV, the policy retention logic handles the policies based on the predefined Snap Creator policies only. It does not support any policy object. 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
Sets the path to the OSSV home directory (/usr/snapvault).	NTAP_OSSV_FS_SNAPSHOT	(Y

Parameter	Setting	Description
N)	Required to set the NTAP_OSSV_FS_SNAPSHOT_CREATE_CMD parameter.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

Parameters for setting up SnapMirror

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

Parameter	Setting	Description
NTAP_SNAPMIRROR_UPDATE	“Y” or “N”	Enables you to turn on and turn off the SnapMirror update function.
NTAP_SNAPMIRROR_CASCADING_UPDATE	“Y” or “N”	Enables you to turn on and turn off the cascading SnapMirror update function. This is a SnapMirror update using a SnapVault destination volume.  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.

Parameter	Setting	Description
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 (for example, sec-controller1:vol1-sec,vol2-sec).This is not supported with cascade replication if a source volume has multiple destinations. This is not supported for clustered Data ONTAP.
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 finished before proceeding. This can be used only with NTAP_CLONE_SECONDARY and the cloneVol action (only volume clones are currently supported).
NTAP_SNAPMIRROR_USE_SNAPSHOT	“Y” or “N”	If this parameter is 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 required to create a clone on the SnapMirror destination.
NTAP_SNAPMIRROR_MAX_TRANSFER		Specifies the maximum bandwidth (in kbps) that SnapMirror is allowed to use.If this parameter is not set, SnapMirror uses the maximum available bandwidth.

Parameter	Setting	Description
SNAPMIRROR_QTREE_INCLUDE		Specifies the list of primary storage controllers and qtree paths to be included 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 the qtrees under a volume will be backed up. By specifying a list using this option, only the qtrees that are listed will be backed up; the remaining qtrees will be ignored.

Parameters for setting 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 the retention age (in days) for Snapshot copies. If configured, Snapshot copies are deleted only if they exceed the number defined in theNTAP_SNAPSHOT_ RETENTIONS parameter, and if they are older than the retention age (in days).
SNAPDRIVE	“Y” or “N”	Enables you to use SnapDrive instead of the Data ONTAP API to create a Snapshot copy.
SNAPDRIVE_DISCOVERY	“Y” or “N”	Enables you to use SnapDrive for storage discovery. This is required in a SAN or an iSAN environment when using the VALIDATE_VOLUMES parameter.

Parameter	Setting	Description
NTAP_SNAPSHOT_ DISABLE	“Y” or “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, the SnapManager Snapshot copies must follow this naming convention: snapshot_copy_name-policy_recent.
NTAP_SNAPSHOT_ NODELETE	“Y” or “N”	Overrides the NTAP_SNAPSHOT_RETENTIONS parameter, and prevents Snapshot copies from being deleted. Enabling this variable can make the volume full.
NTAP_SNAPSHOT_DELETE_CMD		Deletes snapshots through SnapDrive instead of Snap Creator based on snapshot retention.**Note:** All the volumes (mount drives) used in this Snapdrive command for snapshot deletion should be included the configuration file as well.
NTAP_SNAPSHOT_DELETE_BY_AGE_ONLY	(PRIMARY	SECONDARY
BOTH	N)	Enables the deletion of old Snapshot copies. This parameter requires the NTAP_SNAPSHOT_RETENTION_AGE parameter, and forces deletion based on Snapshot copy age rather than the number of Snapshot copies.
NTAP_SNAPSHOT_DEPENDENCY_IGNORE	“Y” or “N”	Applies only to Snapshot copy deletion using the backupDel action. Manually deletion of Snapshot copies with a dependency is not permitted.

Parameter	Setting	Description
NTAP_SNAPSHOT_ CREATE_CMD ##		Creates a Snapshot copy and flushes the file system buffers; ## is a number from 1 to 99. **Note:** This setting 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 ##		Creates the metadata volume Snapshot copy, and flushes the file system buffers; ## is a number from 1 to 99.
NTAP_CONSISTENCY_ GROUP_SNAPSHOT	“Y” or “N”	Enables the use of consistency groups for creating consistent Snapshot copy across multiple volumes.
NTAP_CONSISTENCY_ GROUP_SNAPSHOT_RETRY_CO UNT		Specifies the number of times a consistency group Snapshot should be retried in case of failure.
NTAP_CONSISTENCY_ GROUP_SNAPSHOT_RETRY_W AIT	Time (in seconds)	Specifies the time to wait between each retry of a consistency group Snapshot.
NTAP_CONSISTENCY_ GROUP_TIMEOUT	(URGENT	MEDIUM
RELAXED)	Specifies the wait time for the storage controller to consistently group Snapshot copies.	NTAP_CONSISTENCY_GROUP_ WAFL_SYNC
“Y” or “N”	Improves the performance of a consistency group Snapshot copy by forcing a consistency point (CP) through a wafl-sync before the cg-start. **Note:** If you are performing consistency group backup with the DB2 plug-in, you must set this parameter to “N”.	NTAP_SNAPSHOT_RESTORE_A UTO_DETECT
“Y” or “N”	If disabled, this setting always forces a Single File SnapRestore (SFSR) when performing a single file restore.	NTAP_SNAPSHOT_CLEANUP

Parameter	Setting	Description
“Y” or “N”	Removes any Snapshot copies that were created in the event of backup failure.	NTAP_USE_EXTERNAL_SNAPSHOT
“Y” or “N”	Enables the import of a non-Snap Creator Snapshot copy. The most recent Snapshot copy is matched.	NTAP_EXTERNAL_SNAPSHOT_REGEX

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.
NTAP_ALLOW_MIRRORVAULT_AS_MIRROR	(Y/N)	Enables you to use the mirror_vault protection policy type as SnapVault or SnapMirror. (Default) N: Enables the mirror_vault protection policy type for SnapVault. Y: Enables the mirror_vault protection policy type for SnapMirror.
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). • 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.

Parameter	Setting	Description
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.
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.
NTAP_SNAPVAULT_WAIT		The wait time (in minutes) for the SnapVault update process to finish before creating a Snapshot copy on the SnapVault secondary.

Parameter	Setting	Description
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.	NTAP_DFM_SNAPSHOT_FORMAT

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.
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.

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.
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.

Command	Description
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.
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 interface

Snap Creator provides command-line functionality that enables you to perform various actions without using the graphical user interface (GUI). For instance, you can createa

backup, clonea volume or LUN, and import configuration files from the command-line interface (CLI).

To view a comprehensive list of all the commands and associated parameters, you should execute Snap Creator at the command prompt with no arguments: /install_path/scServer/snapcreator

```
[root@lyon scServer4.3.0]# ./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
  ...
```

If the incorrect username or password is provided when using theSnap Creator CLI, the following error message is displayed: 403 Forbidden ----- The username and password are not correct

Snap Creator CLI commands for workflow actions

You can use command-line interface (CLI) commands to perform various Snap Creator workflow actions that are based on the graphical user interface (GUI).

The following table provides the CLI commands for performing 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`
	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`

Workflow area	Action/description	Command and associated parameters
	Delete a backup copy (automatically).	`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 enables the mounting of the clone through Snap Creator Agent using the MOUNT_CMD command.	`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
	Unmount a backup copy. Performs the unmount operation on an existing backup. Deletes a volume clone based on the backup, and enables the unmounting of the clone through Snap Creator Agent using the UMOUNT_CMDs command.	`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`

Workflow area	Action/description	Command and associated parameters
	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`
Clones	Clone a LUN. Backs up the primary storage system and then clones the backup using a LUN clone. The volume mapping of igroups is 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`

Workflow area	Action/description	Command and associated parameters
	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, 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`

Workflow area	Action/description	Command and associated parameters
	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`
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`

Workflow area	Action/description	Command and associated parameters
	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`
	Import a global configuration file for a particular profile to the repository.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileglobalImport --importFile file_path --verbose`

Workflow area	Action/description	Command and associated parameters
	Export a global configuration file for a particular 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 particular profile from the repository.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action profileglobalDelete --verbose`
	Upgrade older configuration files in a profile. Adds newly introduced parameters to older configuration files. Before executing this command, all old configuration files must be copied to the scServer/engine/configs folder along with the profile folder.	`snapcreator --server IP --port port --user userid --passwd password --upgradeConfigs --profile profile_name --verbose`
Jobs	List all jobs and their status.	`snapcreator --server IP --port Port --user User --passwd Password --action jobStatus --verbose`

Workflow area	Action/description	Command and associated parameters
Policy	Add a new local policy.	`snapcreator --server IP --port Port --user User --passwd Password --action policyAdd --schedId 1 --backupTypeId 1 --policyType local --policyName testPolicy --primaryCount 7 --primaryAge 0 --verbose`
	Add a new SnapMirror policy.	`snapcreator --server IP --port Port --user User --passwd Password --action policyAdd --schedId 1 --backupTypeId 1 --policyType snapmirror --policyName testPolicy --primaryCount 7 --primaryAge 0 --verbose`

Workflow area	Action/description	Command and associated parameters
	Add a new SnapVault policy.	`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 SnapMirror policy.	`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
	Update a SnapVault policy.	`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`

Workflow area	Action/description	Command and associated parameters
	Show additional details for a particular 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`
	Undo the assignment of policies for 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`

Workflow area	Action/description	Command and associated parameters
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
	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`

Workflow area	Action/description	Command and associated parameters
	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`
	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`

Workflow area	Action/description	Command and associated parameters
	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`
	Delete a policy schedule.	`snapcreator --server IP --port Port --user User --passwd Password --action policySchedDelete --schedId 1 --verbose`

Workflow area	Action/description	Command and associated parameters
	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	Perform interactive restore. Performs an interactive file restore operation or an interactive volume restore operation for a given policy.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action restore --policy Policy --verbose`
	Perform non-interactive volume restore. Performs 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`

Workflow area	Action/description	Command and associated parameters
	Perform non-interactive file restore. Performs 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 --fileNames file_path1,file_path2,etc.`
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`

Workflow area	Action/description	Command and associated parameters
	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
	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`

Workflow area	Action/description	Command and associated parameters
	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`
	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`

Workflow area	Action/description	Command and associated parameters
	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
	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`

Workflow area	Action/description	Command and associated parameters
scdump	Create an scdump file.Dumps logs, configuration files, and support information about a particular 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`
	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`

Workflow area	Action/description	Command and associated parameters
Archive	Perform archive log management according to the settings in the configuration file. This operation requires Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action arch --verbose`
Data protection capability	Configure 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`
	Show 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	Perform the quiesce operation for a given application. This operation requires Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action quiesce --verbose`
	Perform the unquiesce operation for a given application. This operation requires Snap Creator Agent.	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --config Config --action unquiesce --verbose`
Discover	Perform discovery for a given application. This operation 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`

RBAC area	Action	Command and associated parameters
	List all users who are assigned a profile	`snapcreator --server IP --port Port --user User --passwd Password --profile Profile --action userListForProfile --verbose`
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`

RBAC area	Action	Command and associated parameters
	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`

RBAC area	Action	Command and associated parameters
	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`

RBAC area	Action	Command and associated parameters
	List all operations assigned to a permission	`snapcreator --server IP --port Port --user User --passwd Password --action opListAssigned --permName permission_name --verbose`
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`

RBAC area	Action	Command and associated parameters
	List all profiles assigned to a user	`snapcreator --server IP --port Port --user User --passwd Password --action profileListForUser --userName user_name --verbose`

Legal notices

Legal notices provide access to copyright statements, trademarks, patents, and more.

Copyright

http://www.netapp.com/us/legal/copyright.aspx

Trademarks

NETAPP, the NETAPP logo, and the marks listed on the NetApp Trademarks page are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.

http://www.netapp.com/us/legal/netapptmlist.aspx

Patents

A current list of NetApp owned patents can be found at:

https://www.netapp.com/us/media/patents-page.pdf

Privacy policy

https://www.netapp.com/us/legal/privacypolicy/index.aspx

Notice

Notice files provide information about third-party copyright and licenses used in NetApp software.

Notice for Snap Creator Framework 4.3.3

Copyright information

Trademark information