Install SnapCenter Plug-in for Oracle Database

SnapCenter Software 4.7

NetApp
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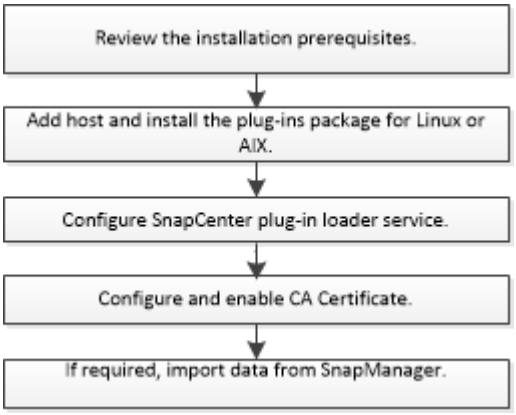
Installation workflow of SnapCenter Plug-in for Oracle Database

You should install and set up the SnapCenter Plug-in for Oracle Database if you want to protect Oracle databases.



Prerequisites for adding hosts and installing Plug-ins Package for Linux or AIX

Before you add a host and install the plug-ins packages, you must complete all the requirements.

- If you are using iSCSI, the iSCSI service must be running.
- You must have enabled the password-based SSH connection for the root or non-root user.

  SnapCenter Plug-in for Oracle Database can be installed by a non-root user. However, you should configure the sudo privileges for the non-root user to install and start the plug-in process. After installing the plug-in, the processes will be running as an effective root user.

- If you are installing the SnapCenter Plug-ins Package for AIX on AIX host, you should have manually resolved the directory level symbolic links.

  The SnapCenter Plug-ins Package for AIX automatically resolves the file level symbolic link but not the directory level symbolic links to obtain the JAVA_HOME absolute path.

- Create credentials with authentication mode as Linux or AIX for the install user.
- You must have installed Java 1.8.x, 64-bit, on your Linux or AIX host.

  For information to download JAVA, see:

  - Java Downloads for All Operating Systems
  - IBM Java for AIX
- For Oracle databases that are running on a Linux or AIX host, you should install both SnapCenter Plug-in for Oracle Database and SnapCenter Plug-in for UNIX.

You can use the Plug-in for Oracle Database to manage Oracle databases for SAP as well. However, SAP BR*Tools integration is not supported.

- If you are using Oracle database 11.2.0.3 or later, you must install the 13366202 Oracle patch.

UUID mapping in the /etc/fstab file is not supported by SnapCenter.

Linux Host requirements

You should ensure that the host meets the requirements before installing the SnapCenter Plug-ins Package for Linux.

Item	Requirements
Operating systems	• Red Hat Enterprise Linux • Oracle Linux If you are using Oracle database on LVM in Oracle Linux or Red Hat Enterprise Linux 6.6 or 7.0 operating systems, you must install the latest version of Logical Volume Manager (LVM). • SUSE Linux Enterprise Server (SLES)
Minimum RAM for the SnapCenter plug-in on host	1 GB
Minimum install and log space for the SnapCenter plug-in on host	2 GB You should allocate sufficient disk space and monitor the storage consumption by the logs folder. The log space required varies depending on the number of the entities to be protected and the frequency of data protection operations. If there is no sufficient disk space, the logs will not be created for the recently run operations.
Required software packages	Java 1.8.x (64-bit)Oracle Java and OpenJDK flavors If you have upgraded JAVA to the latest version, you must ensure that the JAVA_HOME option located at /var/opt/snapcenter/spl/etc/spl.properties is set to the correct JAVA version and the correct path.

For the latest information about supported versions, see the NetApp Interoperability Matrix Tool.

Configure sudo privileges for non-root users for Linux host

SnapCenter 2.0 and later releases allow a non-root user to install the SnapCenter Plug-ins Package for Linux and to start the plug-in process. You should configure sudo privileges for the non-root user to provide access to several paths.

What you will need

- Sudo version between 1.8.7 and 1.8.19P2.
- Ensure that the non-root user is part of the Oracle installation group.
- Edit the */etc/ssh/sshd_config* file to configure the message authentication code algorithms: MACs hmac-sha2-256 and MACs hmac-sha2-512.

  Restart the sshd service after updating the configuration file.

  Example:

```
#Port 22
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::
#Legacy changes
#KexAlgorithms diffie-hellman-group1-sha1
#Ciphers aes128-cbc
#The default requires explicit activation of protocol
Protocol 2
HostKey/etc/ssh/ssh_host_rsa_key
MACs hmac-sha2-256
```

About this task

You should configure sudo privileges for the non-root user to provide access to the following paths:

- /home/*SUDO_USER*/.sc_netapp/snapcenter_linux_host_plugin.bin
- /custom_location/NetApp/snapcenter/spl/installation/plugins/uninstall
- /custom_location/NetApp/snapcenter/spl/bin/spl

> If you are managing a RAC setup, the non-root user should be an Oracle user and it cannot be just any non-root OS user.

Steps

1. Log in to the Linux host on which you want to install the SnapCenter Plug-ins Package for Linux.
2. Add the following lines to the /etc/sudoers file by using the visudo Linux utility.

```
Cmnd_Alias SCCMD = sha224:checksum_value== /home/
SUDO_USER/.sc_netapp/snapcenter_linux_host_plugin.bin,
/opt/NetApp/snapcenter/spl/installation/plugins/uninstall,
/opt/NetApp/snapcenter/spl/bin/spl
Cmnd_Alias PRECHECKCMD = sha224:checksum_value== /home/
SUDO_USER/.sc_netapp/Linux_Prechecks.sh
SUDO_USER ALL=(ALL) NOPASSWD:SETENV: SCCMD, PRECHECKCMD
Defaults: SUDO_USER env_keep=JAVA_HOME
Defaults: SUDO_USER !visiblepw
Defaults: SUDO_USER !requiretty
```

SUDO_USER is the name of the non-root user that you created.

You can obtain the checksum value from the **oracle_checksum.txt** file, which is located at *C:\ProgramData\NetApp\SnapCenter\Package Repository*.

If you have specified a custom location, the location will be *custom_path\NetApp\SnapCenter\Package Repository*.

The example should be used only as a reference for creating your own data.

Best Practice: For security reasons, you should remove the sudo entry after completing every installation or upgrade.

AIX Host requirements

You should ensure that the host meets the requirements before installing the SnapCenter Plug-ins Package for AIX.

SnapCenter Plug-in for UNIX which is part of the SnapCenter Plug-ins Package for AIX, does not support concurrent volume groups.

Item	Requirements
Operating systems	AIX 6.1 or later
Minimum RAM for the SnapCenter plug-in on host	4 GB

Item	Requirements
Minimum install and log space for the SnapCenter plug-in on host	1 GB You should allocate sufficient disk space and monitor the storage consumption by the logs folder. The log space required varies depending on the number of the entities to be protected and the frequency of data protection operations. If there is no sufficient disk space, the logs will not be created for the recently run operations.
Required software packages	Java 1.8.x (64-bit)IBM Java If you have upgraded JAVA to the latest version, you must ensure that the JAVA_HOME option located at /var/opt/snapcenter/spl/etc/spl.properties is set to the correct JAVA version and the correct path.

For the latest information about supported versions, see the NetApp Interoperability Matrix Tool.

Configure sudo privileges for non-root users for AIX host

SnapCenter 4.4 and later allows a non-root user to install the SnapCenter Plug-ins Package for AIX and to start the plug-in process. You should configure sudo privileges for the non-root user to provide access to several paths.

What you will need

- Sudo version between 1.8.7 and 1.8.19P2.
- Ensure that the non-root user is part of the Oracle installation group.
- Edit the */etc/ssh/sshd_config* file to configure the message authentication code algorithms: MACs hmac-sha2-256 and MACs hmac-sha2-512.

  Restart the sshd service after updating the configuration file.

  Example:

```
#Port 22
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::
#Legacy changes
#KexAlgorithms diffie-hellman-group1-sha1
#Ciphers aes128-cbc
#The default requires explicit activation of protocol
Protocol 2
HostKey/etc/ssh/ssh_host_rsa_key
MACs hmac-sha2-256
```

About this task

You should configure sudo privileges for the non-root user to provide access to the following paths:

- /home/*AIX_USER*/.sc_netapp/snapcenter_aix_host_plugin.bsx
- /custom_location/NetApp/snapcenter/spl/installation/plugins/uninstall
- /custom_location/NetApp/snapcenter/spl/bin/spl

If you are managing a RAC setup, the non-root user should be an Oracle user and it cannot be just any non-root OS user.

Steps

1. Log in to the AIX host on which you want to install the SnapCenter Plug-ins Package for AIX.
2. Add the following lines to the /etc/sudoers file by using the visudo Linux utility.

```
Cmnd_Alias SCCMD = sha224:checksum_value== /home/
AIX_USER/.sc_netapp/snapcenter_aix_host_plugin.bsx,
/opt/NetApp/snapcenter/spl/installation/plugins/uninstall,
/opt/NetApp/snapcenter/spl/bin/spl
Cmnd_Alias PRECHECKCMD = sha224:checksum_value== /home/
AIX_USER/.sc_netapp/AIX_Prechecks.sh
AIX_USER ALL=(ALL) NOPASSWD:SETENV: SCCMD, PRECHECKCMD
Defaults: AIX_USER !visiblepw
Defaults: AIX_USER !requiretty
```

AIX_USER is the name of the non-root user that you created.

You can obtain the checksum value from the **oracle_checksum.txt** file, which is located at *C:\ProgramData\NetApp\SnapCenter\Package Repository*.

If you have specified a custom location, the location will be *custom_path\NetApp\SnapCenter\Package Repository*.

The example should be used only as a reference for creating your own data.

Best Practice: For security reasons, you should remove the sudo entry after completing every installation or upgrade.

Set up credentials

SnapCenter uses credentials to authenticate users for SnapCenter operations. You should create credentials for installing the plug-in package on Linux or AIX hosts.

About this task

The credentials are created either for the root user or for a non-root user who has sudo privileges to install and start the plug-in process.

For information, see: Configure sudo privileges for non-root users for Linux host or Configure sudo privileges for non-root users for AIX host

Best Practice: Although you are allowed to create credentials after deploying hosts and installing plug-ins, the best practice is to create credentials after you add SVMs, before you deploy hosts and install plug-ins.

Steps

1. In the left navigation pane, click **Settings**.
2. In the Settings page, click **Credential**.
3. Click **New**.
4. In the Credential page, enter the credential information:

For this field…	Do this…
Credential name	Enter a name for the credentials.

For this field…	Do this…
User name/Password	Enter the user name and password that are to be used for authentication. • Domain administrator Specify the domain administrator on the system on which you are installing the SnapCenter plug-in. Valid formats for the Username field are: ◦ *NetBIOS\UserName* ◦ *Domain FQDN\UserName* • Local administrator (for workgroups only) For systems that belong to a workgroup, specify the built-in local administrator on the system on which you are installing the SnapCenter plug-in. You can specify a local user account that belongs to the local administrators group if the user account has elevated privileges or the User Access control feature is disabled on the host system. The valid format for the Username field is: *UserName*
Authentication Mode	Select the authentication mode that you want to use. Depending on the operating system of the plug-in host, select either Linux or AIX.
Use sudo privileges	Select the **Use sudo privileges** check box if you are creating credentials for a non-root user.

5. Click **OK**.

After you finish setting up the credentials, you might want to assign credential maintenance to a user or group of users on the **User and Access** page.

Configure credentials for an Oracle database

You must configure credentials that are used to perform data protection operations on Oracle databases.

About this task

You should review the different authentication methods supported for Oracle database. For information, see Authentication methods for your credentials.

If you set up credentials for individual resource groups and the user name does not have full admin privileges, the user name must at least have resource group and backup privileges.

If you have enabled Oracle database authentication, a red padlock icon is shown in the resources view. You must configure database credentials to be able to protect the database or add it to the resource group to perform data protection operations.

If you specify incorrect details while creating a credential, an error message is displayed. You must click **Cancel**, and then retry.

Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. In the Resources page, select **Database** from the **View** list.
3. Click , and then select the host name and the database type to filter the resources.

   You can then click to close the filter pane.
4. Select the database, and then click **Database Settings** > **Configure Database**.
5. In the Configure database settings section, from the **Use existing Credential** drop-down list, select the credential that should be used to perform data protection jobs on the Oracle database.

   The Oracle user should have sysdba privileges.

   You can also create a credential by clicking .
6. In the Configure ASM settings section, from the **Use existing Credential** drop-down list, select the credential that should be used to perform data protection jobs on the ASM instance.

   The ASM user should have sysasm privilege.

   You can also create a credential by clicking .
7. In the Configure RMAN catalog settings section, from the **Use existing credential** drop-down list, select the credential that should be used to perform data protection jobs on the Oracle Recovery Manager (RMAN) catalog database.

   You can also create a credential by clicking .

   In the **TNSName** field, enter the Transparent Network Substrate (TNS) file name that will be used by the SnapCenter Server to communicate with the database.
8. In the **Preferred RAC Nodes** field, specify the Real Application Cluster (RAC) nodes preferred for backup.

   The preferred nodes might be one or all cluster nodes where the RAC database instances are present. The backup operation is triggered only on these preferred nodes in the order of preference.

   In RAC One Node, only one node is listed in the preferred nodes, and this preferred node is the node where the database is currently hosted.

   After failover or relocation of RAC One Node database, refreshing of resources in the SnapCenter Resources page will remove the host from the **Preferred RAC Nodes** list where the database was earlier hosted. The RAC node where the database is relocated will be listed in **RAC Nodes** and will need to be manually configured as the preferred RAC node.

   For more information, see Preferred nodes in RAC setup.

9. Click **OK**.

Add hosts and install Plug-ins Package for Linux or AIX using GUI

You can use the Add Host page to add hosts, and then install the SnapCenter Plug-ins Package for Linux or SnapCenter Plug-ins Package for AIX. The plug-ins are automatically installed on the remote hosts.

About this task

You can add a host and install plug-in packages either for an individual host or for a cluster. If you are installing the plug-in on a cluster (Oracle RAC), the plug-in is installed on all of the nodes of the cluster. For Oracle RAC One Node, you should install the plug-in on both active and passive nodes.

You should be assigned to a role that has the plug-in install and uninstall permissions, such as the SnapCenter Admin role.

You cannot add a SnapCenter Server as a plug-in host to another SnapCenter Server.

Steps

1. In the left navigation pane, click **Hosts**.
2. Verify that the **Managed Hosts** tab is selected at the top.
3. Click **Add**.
4. In the Hosts page, perform the following actions:

For this field…	Do this…
Host Type	Select **Linux** or **AIX** as the host type. The SnapCenter Server adds the host, and then installs the Plug-in for Oracle Database and the Plug-in for UNIX if the plug-ins are not already installed on the host.

For this field…	Do this…
Host name	Enter the fully qualified domain name (FQDN) or the IP address of the host. SnapCenter depends on the proper configuration of the DNS. Therefore, the best practice is to enter the FQDN. You can enter the IP addresses or FQDN of one of the following: • Stand-alone host • Any node in the Oracle Real Application Clusters (RAC) environment Node VIP or scan IP is not supported If you are adding a host by using SnapCenter and the host is part of a subdomain, you must provide the FQDN.
Credentials	Either select the credential name that you created or create new credentials. The credential must have administrative rights on the remote host. For details, see the information about creating credentials. You can view details about the credentials by positioning the cursor over the credential name that you specified. The credentials authentication mode is determined by the host type that you specify in the Add Host wizard.

5. In the Select Plug-ins to Install section, select the plug-ins to install.
6. (Optional) Click **More Options**.

For this field…	Do this…
Port	Either retain the default port number or specify the port number. The default port number is 8145. If the SnapCenter Server was installed on a custom port, that port number will be displayed as the default port. If you manually installed the plug-ins and specified a custom port, you must specify the same port. Otherwise, the operation fails.
Installation Path	The default path is */opt/NetApp/snapcenter*. You can optionally customize the path.
Add all hosts in the Oracle RAC	Select this check box to add all the cluster nodes in an Oracle RAC. In a Flex ASM setup, all the nodes irrespective of whether it is a Hub or Leaf node, will be added.
Skip preinstall checks	Select this check box if you already installed the plug-ins manually and you do not want to validate whether the host meets the requirements for installing the plug-in.

7. Click **Submit**.

   If you have not selected the Skip prechecks checkbox, the host is validated to verify whether the host meets the requirements for installing the plug-in.

   The precheck script does not validate the plug-in port firewall status if it is specified in the firewall reject rules.

   Appropriate error or warning messages are displayed if the minimum requirements are not met. If the error is related to disk space or RAM, you can update the web.config file located at *C:\Program Files\NetApp\SnapCenter WebApp* to modify the default values. If the error is related to other parameters, you should fix the issue.

   In an HA setup, if you are updating web.config file, you must update the file on both nodes.

8. Verify the fingerprint, and then click **Confirm and Submit**.

   In a cluster setup, you should verify the fingerprint of each of the nodes in the cluster.

   SnapCenter does not support ECDSA algorithm.

Fingerprint verification is mandatory even if the same host was added earlier to SnapCenter and the fingerprint was confirmed.

9. Monitor the installation progress.

   The installation-specific log files are located at */custom_location/snapcenter/logs*.

After you finish

All the databases on the host are automatically discovered and displayed in the Resources page. If nothing is displayed, click **Refresh Resources**.

Monitor installation status

You can monitor the progress of SnapCenter plug-in package installation by using the Jobs page. You might want to check the progress of installation to determine when it is complete or if there is an issue.

About this task

The following icons appear on the Jobs page and indicate the state of the operation:

- In progress
- Completed successfully
- Failed
- Completed with warnings or could not start due to warnings
- Queued

Steps

1. In the left navigation pane, click **Monitor**.
2. In the Monitor page, click **Jobs**.
3. In the Jobs page, to filter the list so that only plug-in installation operations are listed, do the following:
   a. Click **Filter**.
   b. Optional: Specify the start and end date.
   c. From the Type drop-down menu, select **Plug-in installation**.
   d. From the Status drop-down menu, select the installation status.
   e. Click **Apply**.
4. Select the installation job and click **Details** to view the job details.
5. In the Job Details page, click **View logs**.

Alternate ways to install Plug-ins Package for Linux or AIX

Install on multiple remote hosts using cmdlets

You should use the *Install-SmHostPackage* PowerShell cmdlet to install the SnapCenter Plug-ins Package for

Linux or SnapCenter Plug-ins Package for AIX on multiple hosts.

What you will need

You should be logged in to SnapCenter as a domain user with local administrator rights on each host on which you want to install the plug-in package.

Steps

1. Launch PowerShell.
2. On the SnapCenter Server host, establish a session using the *Open-SmConnection* cmdlet, and then enter your credentials.
3. Install the SnapCenter Plug-ins Package for Linux or SnapCenter Plug-ins Package for AIX using the *Install-SmHostPackage* cmdlet and the required parameters.

   You can use the *-skipprecheck* option when you have already installed the plug-ins manually and do not want to validate whether the host meets the requirements to install the plug-in.

   The precheck script does not validate the plug-in port firewall status if it is specified in the firewall reject rules.

4. Enter your credentials for remote installation.

The information regarding the parameters that can be used with the cmdlet and their descriptions can be obtained by running *Get-Help command_name*. Alternatively, you can also refer to the SnapCenter Software Cmdlet Reference Guide.

Install on cluster host

You should install SnapCenter Plug-ins Package for Linux or SnapCenter Plug-ins Package for AIX on both the nodes of the cluster host.

Each of the nodes of the cluster host has two IPs. One of the IPs will be the public IP of the respective nodes and the second IP will be the cluster IP that is shared between both the nodes.

Steps

1. Install SnapCenter Plug-ins Package for Linux or SnapCenter Plug-ins Package for AIX on both the nodes of the cluster host.
2. Validate that the correct values for SNAPCENTER_SERVER_HOST, SPL_PORT, SNAPCENTER_SERVER_PORT, and SPL_ENABLED_PLUGINS parameters are specified in the spl.properties file located at */var/opt/snapcenter/spl/etc/*.

   If SPL_ENABLED_PLUGINS is not specified in spl.properties, you can add it and assign the value SCO,SCU.

3. On the SnapCenter Server host, establish a session using the *Open-SmConnection* cmdlet, and then enter your credentials.
4. In each of the nodes, set the preferred IPs of the node using the *Set-PreferredHostIPsInStorageExportPolicy* sccli command and the required parameters.
5. In the SnapCenter Server host, add an entry for the cluster IP and corresponding DNS name in *C:\Windows\System32\drivers\etc\hosts*.

6. Add the node to the SnapCenter Server using the *Add-SmHost* cmdlet by specifying the cluster IP for the host name.

Discover the Oracle database on node 1 (assuming the cluster IP is hosted on node 1) and create a backup of the database. If a failover happens, you can use the backup created on node 1 to restore the database on node 2. You can also use the backup created on node 1 to create a clone on node 2.

There will be stale volumes, directories, and lock file if the failover happens while any other SnapCenter operations are running.

Install Plug-ins Package for Linux in silent mode or console mode

You can install the SnapCenter Plug-ins Package for Linux either in console mode or in silent mode by using the command-line interface (CLI).

What you will need

- You should review the prerequisites for installing the plug-ins package.
- You should ensure that the DISPLAY environment variable is not set.

  If the DISPLAY environment variable is set, you should run unset DISPLAY, and then try to manually install the plug-in.

About this task

You are required to provide the necessary installation information while installing in console mode, whereas in silent mode installation you do not have to provide any installation information.

Steps

1. Download the SnapCenter Plug-ins Package for Linux from the SnapCenter Server installation location.

   The default installation path is *C:\ProgramData\NetApp\SnapCenter\PackageRepository*. This path is accessible from the host where the SnapCenter Server is installed.

2. From the command prompt, navigate to the directory where you downloaded the installation file.
3. Depending on your preferred mode of installation, perform one of the following step.

Install mode	Steps
Console mode	a. Run: `./SnapCenter_linux_host_plugin.bin -i console` b. Follow the on-screen prompts to complete the installation.

Install mode	Steps
Silent mode	Run: `./SnapCenter_linux_host_plugin.bin-i silent-DPORT=8145-DSERVER_IP=SnapCenter_Server_FQDN-DSERVER_HTTPS_PORT=SnapCenter_Server_Port-DUSER_INSTALL_DIR==/opt/custom_path`

4. Edit the spl.properties file located at */var/opt/snapcenter/spl/etc/* to add SPL_ENABLED_PLUGINS=SCO,SCU, and then restart the SnapCenter Plug-in Loader service.

> The installation of the plug-ins package registers the plug-ins on the host and not on the SnapCenter Server. You should register the plug-ins on the SnapCenter Server by adding the host using the SnapCenter GUI or PowerShell cmdlet. While adding the host, select “None” as the credential. After the host is added, the installed plug-ins are automatically discovered.

Install Plug-ins Package for AIX in silent mode

You can install the SnapCenter Plug-ins Package for AIX in silent mode by using the command-line interface (CLI).

What you will need

- You should review the prerequisites for installing the plug-ins package.
- You should ensure that the DISPLAY environment variable is not set.

  If the DISPLAY environment variable is set, you should run unset DISPLAY, and then try to manually install the plug-in.

Steps

1. Download the SnapCenter Plug-ins Package for AIX from the SnapCenter Server installation location.

   The default installation path is *C:\ProgramData\NetApp\SnapCenter\PackageRepository*. This path is accessible from the host where the SnapCenter Server is installed.

2. From the command prompt, navigate to the directory where you downloaded the installation file.
3. Run

   ```
   ./snapcenter_aix_host_plugin.bsx-i silent-DPORT=8145-DSERVER_IP=SnapCenter_Server_FQDN-DSERVER_HTTPS_PORT=SnapCenter_Server_Port-DUSER_INSTALL_DIR==/opt/custom_path-DINSTALL_LOG_NAME=SnapCenter_AIX_Host_Plug-in_Install_MANUAL.log-DCHOSEN_FEATURE_LIST=CUSTOMDSPL_USER=install_user
   ```

4. Edit the spl.properties file located at */var/opt/snapcenter/spl/etc/* to add SPL_ENABLED_PLUGINS=SCO,SCU, and then restart the SnapCenter Plug-in Loader service.

The installation of the plug-ins package registers the plug-ins on the host and not on the SnapCenter Server. You should register the plug-ins on the SnapCenter Server by adding the host using the SnapCenter GUI or PowerShell cmdlet. While adding the host, select “None” as the credential. After the host is added, the installed plug-ins are automatically discovered.

Configure the SnapCenter Plug-in Loader service

The SnapCenter Plug-in Loader service loads the plug-in package for Linux or AIX to interact with the SnapCenter Server. The SnapCenter Plug-in Loader service is installed when you install the SnapCenter Plug-ins Package for Linux or SnapCenter Plug-ins Package for AIX.

About this task

After installing the SnapCenter Plug-ins Package for Linux or SnapCenter Plug-ins Package for AIX, the SnapCenter Plug-in Loader service starts automatically. If the SnapCenter Plug-in Loader service fails to start automatically, you should:

- Ensure that the directory where the plug-in is operating is not deleted
- Increase the memory space allotted to the Java Virtual Machine

The spl.properties file, which is located at */custom_location/NetApp/snapcenter/spl/etc/*, contains the following parameters. Default values are assigned to these parameters.

Parameter name	Description
LOG_LEVEL	Displays the log levels that are supported. The possible values are INFO, DEBUG, TRACE, ERROR, FATAL, and WARN.
SPL_PROTOCOL	Displays the protocol that is supported by SnapCenter Plug-in Loader. Only the HTTPS protocol is supported. You can add the value if the default value is missing.
SNAPCENTER_SERVER_PROTOCOL	Displays the protocol that is supported by SnapCenter Server. Only the HTTPS protocol is supported. You can add the value if the default value is missing.
SKIP_JAVAHOME_UPDATE	By default, the SPL service detects the java path and update JAVA_HOME parameter. Therefore the default value is set to FALSE. You can set to TRUE if you want to disable the default behavior and manually fix the java path.

Parameter name	Description
SPL_KEYSTORE_PASS	Displays the password of the keystore file. You can change this value only if you change the password or create a new keystore file.
SPL_PORT	Displays the port number on which the SnapCenter Plug-in Loader service is running. You can add the value if the default value is missing. You should not change the value after installing the plug-ins.
SNAPCENTER_SERVER_HOST	Displays the IP address or host name of the SnapCenter Server.
SPL_KEYSTORE_PATH	Displays the absolute path of the keystore file.
SNAPCENTER_SERVER_PORT	Displays the port number on which the SnapCenter Server is running.
LOGS_MAX_COUNT	Displays the number of SnapCenter Plug-in Loader log files that are retained in the */custom_location/snapcenter/spl/logs* folder. The default value is set to 5000. If the count is more than the specified value, then the last 5000 modified files are retained. The check for the number of files is done automatically every 24 hours from when SnapCenter Plug-in Loader service is started. If you manually delete the spl.properties file, then the number of files to be retained is set to 9999.
JAVA_HOME	Displays the absolute directory path of the JAVA_HOME which is used to start SPL service. This path is determined during installation and as part of starting SPL.
LOG_MAX_SIZE	Displays the maximum size of the job log file. Once the maximum size is reached, the log file is zipped, and the logs are written into the new file of that job.

Parameter name	Description
RETAIN_LOGS_OF_LAST_DAYS	Displays the number of days up to which the logs are retained.
ENABLE_CERTIFICATE_VALIDATION	Displays true when CA certificate validation is enabled for the host. You can enable or disable this parameter either by editing the spl.properties or by using the SnapCenter GUI or cmdlet.

If any of these parameters are not assigned to the default value or if you want to assign or change the value, then you can modify the spl.properties file. You can also verify the spl.properties file and edit the file to troubleshoot any issues related to the values that are assigned to the parameters. After you modify the spl.properties file, you should restart the SnapCenter Plug-in Loader service.

Steps

1. Perform one of the following actions, as required:
   - Start the SnapCenter Plug-in Loader service as a root user:

     ```
     `/custom_location/NetApp/snapcenter/spl/bin/spl start`
     ```

   - Stop the SnapCenter Plug-in Loader service:

     ```
     `/custom_location/NetApp/snapcenter/spl/bin/spl stop`
     ```

     You can use the -force option with the stop command to stop the SnapCenter Plug-in Loader service forcefully. However, you should use caution before doing so because it also terminates the existing operations.

   - Restart the SnapCenter Plug-in Loader service:

     ```
     `/custom_location/NetApp/snapcenter/spl/bin/spl restart`
     ```

   - Find the status of the SnapCenter Plug-in Loader service:

     ```
     `/custom_location/NetApp/snapcenter/spl/bin/spl status`
     ```

   - Find the change in the SnapCenter Plug-in Loader service:

     ```
     `/custom_location/NetApp/snapcenter/spl/bin/spl change`
     ```

Configure CA certificate with SnapCenter Plug-in Loader (SPL) service on Linux host

You should manage the password of SPL keystore and its certificate, configure the CA certificate, configure root or intermediate certificates to SPL trust-store, and configure CA signed key pair to SPL trust-store with SnapCenter Plug-in Loader service to activate the installed digital certificate.

SPL uses the file 'keystore.jks', which is located at '/var/opt/snapcenter/spl/etc' both as its trust-store and key-store.

Manage password for SPL keystore and alias of the CA signed key pair in use

Steps

1. You can retrieve SPL keystore default password from SPL property file.

   It is the value corresponding to the key 'SPL_KEYSTORE_PASS'.

2. Change the keystore password:

   ```
   keytool -storepasswd -keystore keystore.jks
   ```

3. Change the password for all aliases of private key entries in the keystore to the same password used for the keystore:

   ```
   keytool -keypasswd -alias "<alias_name>" -keystore keystore.jks
   ```

   Update the same for the key SPL_KEYSTORE_PASS in spl.properties file.

4. Restart the service after changing the password.

Password for SPL keystore and for all the associated alias password of the private key should be same.

Configure root or intermediate certificates to SPL trust-store

You should configure the root or intermediate certificates without the private key to SPL trust-store.

Steps

1. Navigate to the folder containing the SPL keystore: */var/opt/snapcenter/spl/etc*.
2. Locate the file 'keystore.jks'.
3. List the added certificates in the keystore:

```
keytool -list -v -keystore keystore.jks
```

4. Add a root or intermediate certificate:

```
keytool -import -trustcacerts -alias <AliasNameForCerticateToBeImported>
-file /<CertificatePath> -keystore keystore.jks
```

5. Restart the service after configuring the root or intermediate certificates to SPL trust-store.

You should add the root CA certificate and then the intermediate CA certificates.

Configure CA signed key pair to SPL trust-store

You should configure the CA signed key pair to the SPL trust-store.

Steps

1. Navigate to the folder containing the SPL's keystore /var/opt/snapcenter/spl/etc.
2. Locate the file 'keystore.jks'.
3. List the added certificates in the keystore:

```
keytool -list -v -keystore keystore.jks
```

4. Add the CA certificate having both private and public key.

```
keytool -importkeystore -srckeystore <CertificatePathToImport>
-srcstoretype pkcs12 -destkeystore keystore.jks -deststoretype JKS
```

5. List the added certificates in the keystore.

```
keytool -list -v -keystore keystore.jks
```

6. Verify that the keystore contains the alias corresponding to the new CA certificate, which was added to the keystore.
7. Change the added private key password for CA certificate to the keystore password.

   Default SPL keystore password is the value of the key SPL_KEYSTORE_PASS in spl.properties file.

```
keytool -keypasswd -alias "<aliasNameOfAddedCertInKeystore>" -keystore
keystore.jks
```

8. If the alias name in the CA certificate is long and contains space or special characters ("*",","), change the alias name to a simple name:

```
keytool -changealias -alias "<OrignalAliasName>" -destalias
"<NewAliasName>" -keystore keystore.jks
```

9. Configure the alias name from the keystore located in spl.properties file.

   Update this value against the key SPL_CERTIFICATE_ALIAS.

10. Restart the service after configuring the CA signed key pair to SPL trust-store.

Configure certificate revocation list (CRL) for SPL

You should configure the CRL for SPL

About this task

- SPL will look for the CRL files in a pre-configured directory.
- Default directory for the CRL files for SPL is */var/opt/snapcenter/spl/etc/crl*.

Steps

1. You can modify and update the default directory in spl.properties file against the key SPL_CRL_PATH.
2. You can place more than one CRL file in this directory.

   The incoming certificates will be verified against each CRL.

Enable CA Certificates for plug-ins

You should configure the CA certificates and deploy the CA certificates in the SnapCenter Server and the corresponding plug-in hosts. You should enable the CA certificate validation for the plug-ins.

What you will need

- You can enable or disable the CA certificates using the run *Set-SmCertificateSettings* cmdlet.
- You can display the certificate status for the plug-ins using the *Get-SmCertificateSettings*.

The information regarding the parameters that can be used with the cmdlet and their descriptions can be obtained by running *Get-Help command_name*. Alternatively, you can also refer to the SnapCenter Software Cmdlet Reference Guide.

Steps

1. In the left navigation pane, click **Hosts**.
2. In the Hosts page, click **Managed Hosts**.
3. Select single or multiple plug-in hosts.

4. Click **More options**.
5. Select **Enable Certificate Validation**.

After you finish

The Managed Hosts tab host displays a padlock and the color of the padlock indicates the status of the connection between SnapCenter Server and the plug-in host.

- indicates that the CA certificate is neither enabled nor assigned to the plug-in host.
- indicates that the CA certificate is successfully validated.
- indicates that the CA certificate could not be validated.
- indicates that the connection information could not be retrieved.

When the status is yellow or green, the data protection operations completes successfully.

Import data from SnapManager for Oracle and SnapManager for SAP to SnapCenter

Importing data from SnapManager for Oracle and SnapManager for SAP to SnapCenter enables you to continue to use your data from previous versions.

You can import data from SnapManager for Oracle and SnapManager for SAP to SnapCenter by running the import tool from the command-line interface (Linux host CLI).

The import tool creates policies and resource groups in SnapCenter. The policies and resource groups created in SnapCenter correspond to the profiles and operations performed using those profiles in SnapManager for Oracle and SnapManager for SAP. The SnapCenter import tool interacts with the SnapManager for Oracle and SnapManager for SAP repository databases and the database that you want to import.

- Retrieves all the profiles, schedules, and operations performed using the profiles.
- Creates a SnapCenter backup policy for each unique operation and each schedule attached to a profile.
- Creates a resource group for each target database.

You can run the import tool by executing the sc-migrate script located at */opt/NetApp/snapcenter/spl/bin*. When you install the SnapCenter Plug-ins Package for Linux on the database host that you want to import, the sc-migrate script is copied to */opt/NetApp/snapcenter/spl/bin*.

Importing data is not supported from SnapCenter graphical user interface (GUI).

SnapCenter does not support Data ONTAP operating in 7-Mode. You can use the 7-Mode Transition Tool to migrate data and configurations that are stored on a system running Data ONTAP operating in 7-Mode to an ONTAP system.

Configurations supported for importing data

Before you import data from SnapManager 3.4.x for Oracle and SnapManager 3.4.x for SAP to SnapCenter, you should be aware of the configurations that are supported with the SnapCenter Plug-in for Oracle Database.

The configurations that are supported with the SnapCenter Plug-in for Oracle Database are listed in the NetApp Interoperability Matrix Tool.

What gets imported to SnapCenter

You can import profiles, schedules, and operations performed using the profiles.

From SnapManager for Oracle and SnapManager for SAP	To SnapCenter
Profiles without any operations and schedules	A policy is created with default backup type as Online and backup scope as Full.
Profiles with one or more operations	Multiple policies are created based on a unique combination of a profile and operations performed using that profile. The policies created in SnapCenter contain the archive log pruning and retention details retrieved from the profile and corresponding operations.
Profiles with Oracle Recovery Manager (RMAN) configuration	Policies are created with the **Catalog backup with Oracle Recovery Manager** option enabled. If external RMAN cataloging was used in SnapManager, you must configure the RMAN catalog settings in SnapCenter. You can either select the existing credential or create a new credential. If RMAN was configured through control file in SnapManager, then you do not have to configure RMAN in SnapCenter.
Schedule attached to a profile	A policy is created just for the schedule.
Database	A resource group is created for each database that is imported. In a Real Application Clusters (RAC) setup, the node on which you run the import tool becomes the preferred node after importing and the resource group is created for that node.

When a profile is imported, a verification policy is created along with the backup policy.

When SnapManager for Oracle and SnapManager for SAP profiles, schedules, and any operations performed using the profiles are imported to SnapCenter, the different parameters values are also imported.

SnapManager for Oracle and SnapManager for SAP parameter and values	SnapCenter parameter and values	Notes
Backup Scope • Full • Data • Log	Backup Scope • Full • Data • Log	
Backup Mode • Auto • Online • Offline	Backup Type • Online • Offline Shutdown	If the backup mode is Auto, then the import tool checks the database state when the operation was performed, and appropriately sets the backup type as either Online or Offline Shutdown.
Retention • Days • Counts	Retention • Days • Counts	SnapManager for Oracle and SnapManager for SAP uses both Days and Counts to set the retention. In SnapCenter, there is either Days *OR* Counts. So, the retention is set with respect to days as the days get preference over counts in SnapManager for Oracle and SnapManager for SAP.
Pruning for Schedules • All • system change number (SCN) • Date • Logs created before specified hours, days, weeks, and months	Pruning for Schedules • All • Logs created before specified hours and days	SnapCenter does not support pruning based on SCN, Date, weeks, and months.
Notification • Emails sent only for successful operations • Emails sent only for failed operations • Emails sent for both success and failed operations	Notification • Always • On failure • Warning • Error	The email notifications are imported. However, you must manually update the SMTP server using the SnapCenter GUI. The subject of the email is left blank for you to configure.

What does not get imported to SnapCenter

The import tool does not import everything to SnapCenter.

You cannot import the following to SnapCenter:

- Backup metadata
- Partial backups
- Raw device mapping (RDM) and Virtual Storage Console (VSC) related backups
- Roles or any credentials available in the SnapManager for Oracle and SnapManager for SAP repository
- Data related to verification, restore, and clone operations
- Pruning for operations
- Replication details specified in the SnapManager for Oracle and SnapManager for SAP profile

  After importing, you must manually edit the corresponding policy created in SnapCenter to include the replication details.

- Cataloged backup information

Prepare to import data

Before you import data to SnapCenter, you must perform certain tasks to run the import operation successfully.

Steps

1. Identify the database that you want to import.
2. Using SnapCenter, add the database host and install SnapCenter Plug-ins Package for Linux.
3. Using SnapCenter, set up the connections for the storage virtual machines (SVMs) used by the databases on the host.
4. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
5. In the Resources page, ensure that the database to be imported is discovered and displayed.

   When you want to run the import tool, the database must be accessible or else the resource group creation fails.

   If the database has credentials configured, you must create a corresponding credential in SnapCenter, assign the credential to the database, and then re-run discovery of the database. If the database is residing on Automatic Storage Management (ASM), you must create credentials for the ASM instance, and assign the credential to the database.

6. Ensure that the user running the import tool has sufficient privileges to run SnapManager for Oracle or SnapManager for SAP CLI commands (such as the command to suspend schedules) from SnapManager for Oracle or SnapManager for SAP host.
7. Run the following commands on the SnapManager for Oracle or SnapManager for SAP host to suspend the schedules:
   a. If you want to suspend the schedules on the SnapManager for Oracle host, run:
      - `smo credential set -repository -dbname repository_database_name -host host_name -port port_number -login -username user_name_for_repository_database`

- `smo profile sync -repository -dbname repository_database_name -host host_name -port port_number -login -username host_user_name_for_repository_database`
- `smo credential set -profile -name profile_name`

  You must run the smo credential set command for each profile on the host.

b. If you want to suspend the schedules on the SnapManager for SAP host, run:

- `smsap credential set -repository -dbname repository_database_name -host host_name -port port_number -login -username user_name_for_repository_database`
- `smsap profile sync -repository -dbname repository_database_name -host host_name -port port_number -login -username host_user_name_for_repository_database`
- `smsap credential set -profile -name profile_name`

  You must run the smsap credential set command for each profile on the host.

8. Ensure that fully qualified domain name (FQDN) of the database host is displayed when you run hostname -f.

   If FQDN is not displayed, you must modify /etc/hosts to specify the FQDN of the host.

Import data

You can import data by running the import tool from the database host.

About this task

The SnapCenter backup policies that are created after importing have different naming formats:

- Policies created for the profiles without any operations and schedules have the SM_PROFILENAME_ONLINE_FULL_DEFAULT_MIGRATED format.

  When no operation is performed using a profile, the corresponding policy is created with default backup type as online and backup scope as full.

- Policies created for the profiles with one or more operations have the SM_PROFILENAME_BACKUPMODE_BACKUPSCOPE_MIGRATED format.
- Policies created for the schedules attached to the profiles have the SM_PROFILENAME_SMOSCHEDULENAME_BACKUPMODE_BACKUPSCOPE_MIGRATED format.

Steps

1. Log in to the database host that you want to import.
2. Run the import tool by executing the sc-migrate script located at */opt/NetApp/snapcenter/spl/bin*.
3. Enter the SnapCenter Server user name and password.

   After validating the credentials, a connection is established with SnapCenter.

4. Enter the SnapManager for Oracle or SnapManager for SAP repository database details.

   The repository database lists the databases that are available on the host.

5. Enter the target database details.

   If you want to import all the databases on the host, enter all.

6. If you want to generate a system log or send ASUP messages for failed operations, you must enable them either by running the *Add-SmStorageConnection* or *Set-SmStorageConnection* command.

   If you want to cancel an import operation, either while running the import tool or after importing, you must manually delete the SnapCenter policies, credentials, and resource groups that were created as part of import operation.

Results

The SnapCenter backup policies are created for profiles, schedules, and operations performed using the profiles. Resource groups are also created for each target database.

After importing the data successfully, the schedules associated with the imported database are suspended in SnapManager for Oracle and SnapManager for SAP.

After importing, you must manage the imported database or file system using SnapCenter.

The logs for every execution of the import tool are stored in the */var/opt/snapcenter/spl/logs* directory with the name spl_migration_timestamp.log. You can refer to this log to review import errors and troubleshoot them.

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