



Introduction to data protection in SnapManager

SnapManager Oracle

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Introduction to data protection in SnapManager

SnapManager supports data protection to protect the backups on the secondary or tertiary storage systems. You must set up SnapMirror and SnapVault relationships between the source and the destination volumes.

You can use the post-backup scripts from both command-line interface (CLI) and graphical user interface (GUI) to protect the backups on a primary storage system.

How SnapManager retains backups on the local storage

SnapManager enables you to create backups that meet retention policies, which specify how many successful backups on local storage should be retained. You can specify the number of successful backups that should be retained in the profile for a given database.

You can create backups for the following:

- 10 days of daily backups on primary storage
- 2 months of monthly backups on primary storage
- 7 days of daily backups on secondary storage
- 4 weeks of weekly backups on secondary storage
- 6 months of monthly backups on secondary storage

For each profile in SnapManager, you can change the values for the following nonlimited retention classes:

- Hourly
- Daily
- Weekly
- Monthly

SnapManager determines whether a backup should be retained by considering both the retention count (for example, 15 backups) and the retention duration (for example, 10 days of daily backups). A backup expires when its age exceeds the retention duration set for its retention class or the number of backups exceeds the retention count. For example, if the backup count is 15 (SnapManager has taken 15 successful backups) and the duration requirement is set for 10 days of daily backups, the five oldest successful eligible backups expire.

After a backup expires, SnapManager either frees or deletes the expired backup. SnapManager always retains the last backup taken.

SnapManager counts only the number of successful backups for the retention count and does not consider the following:

Backups not included in the retention count	Additional details
---	--------------------

Failed backups	SnapManager retains the information about successful and unsuccessful backups. Although unsuccessful backups require only minimal space in the repository, you might want to delete them. Unsuccessful backups remain in the repository until you delete them.
Backups designated to be retained on an unlimited basis or backups for a different retention class	SnapManager does not delete backups designated to be retained on an unlimited basis. Additionally, SnapManager considers only those backups in the same retention class (for example, SnapManager considers only the hourly backups for the hourly retention count).
Backups mounted from local storage	When Snapshot copies are mounted, they are also cloned and so are not considered eligible for retention. SnapManager cannot delete the Snapshot copies if they are cloned.
Backups that are used to create a clone on local storage	SnapManager retains all the backups that are used to create clones, but does not consider them for the backup retention count.

SnapManager provides a default retention count and duration for each retention class. For example, for the hourly retention class count, SnapManager, by default, retains four hourly backups. You can override these defaults and set the values when creating or updating the profile or change the default values for retention count and duration in the smo.config file.

When local backups expire based on their retention policy, the backups are deleted.

In an archivelog-only backup operation, SnapManager does not archive the redo log files, unlike in the online database backup process. You must add a pretask script to archive the redo log files before performing the archivelog-only backup operation. The pretask script must run the alter system switch logfile command.

The following example shows the actions that SnapManager takes on various types of backups, based on a three-daily-backups retention policy (with the count set to retain 3):

Backup date	Status	Retention policy action taken	Explanation
5/10	Successful	Keep	This is the most recent successful backup, so it will be kept.
5/9	Successful, cloned	Skip	SnapManager does not consider backups used for cloning in the retention policy count. This backup is omitted from the count of successful backups.

5/8	Successful, mounted	Skip	SnapManager does not consider mounted backups in the retention policy count. This backup is omitted from the count of successful backups.
5/7	Failed	Skip	Failed backups are not counted.
5/5	Successful	Keep	SnapManager keeps this second successful daily backup.
5/3	Successful	Keep	SnapManager keeps this third successful daily backup.
5/2	Successful	Delete	SnapManager counts this successful backup, but after SnapManager reaches three successful daily backups, this backup is deleted.

Related information

Documentation on the NetApp Support Site: mysupport.netapp.com

Considerations for performing data protection

You must be aware of certain considerations for performing data protection.

- To perform clone or restore operations from secondary systems, you must mount the destination volume in the namespace and export it properly.
- You must disable the SnapDrive configuration parameter `check-export-permission-nfs-clone` by setting the value to off.

The SnapDrive for UNIX documentation on the NetApp Support Site contains additional information about the `check-export-permission-nfs-clone` parameter.

- You must configure the SnapMirror relationship for the requested secondary storage volumes in the secondary storage system.
- You must configure the SnapVault relationship for the requested secondary storage qtrees in the secondary storage system for Data ONTAP operating in 7-Mode.
- You must define a policy and rules for the user-defined SnapMirror label if you are using SnapVault post-script for clustered Data ONTAP.

SnapVault post-script supports clustered Data ONTAP volumes and the SnapMirror relation types DP and XDP. The ONTAP documentation on the NetApp Support Site contains information about configuring

Licences required for data protection in SnapManager

You must ensure that licenses required for data protection are installed and enabled on the primary and secondary storage systems.

Primary storage systems receive the latest transaction updates for the Oracle database, store the data, and provide local backup protection of the database. The primary storage system also maintains database data files, log files, and control files. Secondary storage systems act as remote storage for the protected backups.

For data protection, the following licenses must be installed and enabled on primary storage systems:



If you want to enable data protection on the secondary storage systems, you must also install and enable these licenses on the secondary storage systems.

- Either Data ONTAP operating in 7-Mode (7.3.1 or later) or clustered Data ONTAP (8.2 or later)
- SnapVault
- SnapRestore
- SnapMirror
- FlexClone is required for cloning.

FlexClone is also, required for Storage Area Network (SAN) only if SnapDrive is configured to use FlexClone in SAN environments.

- The appropriate protocol, for example, Internet Small Computer System Interface (iSCSI), or Fibre Channel (FC)

Protecting database backups by using postscripts

SnapManager enables you to protect database backups by using postscripts when SnapMirror or SnapVault relationship is established between the primary and secondary storage systems. You can use the default postscripts for post-processing activity of the backup operation from both the SnapManager CLI and GUI.

You can use the following default postscripts available at `default_install_directory\plugins\backup\create\post`:

- The SnapMirror postscript, `Mirror_the_backup.cmd` if you are using Data ONTAP operating in 7-Mode
- The SnapVault postscript, `Vault_the_backup.cmd` if you are using Data ONTAP operating in 7-Mode
- The SnapMirror postscript, `Mirror_the_backup_cDOT.cmd` if you are using clustered Data ONTAP
- The SnapVault postscript, `Vault_the_backup_cDOT.cmd` if you are using clustered Data ONTAP

For more information, see the `readme.txt` available at `default_install_directory\plugins`.

SnapManager 3.1 or earlier provides preprocessing or post-processing scripts only for clone operations. SnapManager 3.2 or later provides preprocessing and post-processing scripts for backup and restore operations. You can use these scripts to run before or after the backup or restore operations.



The scripts are provided for reference only. They have been tested with SnapDrive 7.0 for Windows or later or later but may not work in all environments. You should customize the scripts based on your secondary protection requirements. The scripts do not work with SnapDrive versions earlier than 6.2.

Sample post-scripts

You can refer the sample scripts and create customized scripts based on your environment to perform mirroring and vaulting. The sample scripts are available at default_install_directory\plugins\backup\create\post.

Mirror_the_backup.cmd

If you are using Data ONTAP operating in 7-Mode, you can use this sample script to mirror the backup. It includes three operations (check, describe, and execute) and executes them at the end of the script. The script also includes error message handling with codes of 0 to 4 and > 4:

```
@echo off
REM $Id:
//depot/prod/capstan/main/src/plugins/windows/examples/backup/create/post/
Mirror_the_backup.cmd#1 $
REM
REM Copyright \(c\) 2011 NetApp, Inc.
REM All rights reserved.
REM
REM
REM This is a sample post-task script to mirror the volumes to the
REM secondary storage after successful backup operation.
REM|-----
-----| |
REM| Pre-requisite/Assumption:
| |
REM| SnapMirror relationship for the requested secondary storage volumes
REM| must be configured in Secondary storage. |
REM|-----
-----| |
REM
REM
REM This script can be used from the SnapManager graphical user interface
REM (GUI) and command line interface (CLI).
REM
REM To execute the post-task script for the backup operation from
REM SnapManager GUI, follow these steps:
REM 1. From the Backup wizard > Task Specification page > Post-Tasks tab
REM > select the post-task scripts from the Available Scripts section.
REM
REM
```

```

REM To execute the post-task script for the backup operation from
SnapManager CLI, follow these steps:
REM 1. create a task specification XML file.
REM 2. Add the post-script name in the <post-tasks> tag of the XML file.
REM
REM Example:
REM           <post-tasks>
REM               <task>
REM                   <name>Mirror the backup</name>
REM                   <description>Mirror the backup</description>
REM               </task>
REM           <post-tasks>
REM
REM
REM
REM IMPORTANT NOTE: This script is provided for reference only. It has
been tested with SnapDrive 6.3.0 for Windows but may not work in all
environments. Please review and then customize based on your secondary
protection requirements.
REM
set /a EXIT=0
set name="Mirror the backup"
set description="Mirror the backup"
set parameter=()

if /i "%1" == "-check" goto :check
if /i "%1" == "-execute" goto :execute
if /i "%1" == "-describe" goto :describe

:usage
    echo usage: %0 ^{ -check ^| -describe ^| -execute ^}
    set /a EXIT=99
    goto :exit

:check
    set /a EXIT=0
    goto :exit

:describe
    echo SM_PI_NAME:%name%
    echo SM_PI_DESCRIPTION:%description%
    echo SM_PRIMARY_MOUNT_POINTS : %SM_PRIMARY_MOUNT_POINTS%
    set /a EXIT=0
    goto :exit

```

```

REM - Split the comma-separated PRIMARY_MOUNT_POINTS and Mirror the
PRIMARY_MOUNT_POINTS one-by-one.

:execute
    set /a EXIT=0

    echo "execution started"

    REM FOR %%G IN (%SM_PRIMARY_MOUNT_POINTS%) DO echo %%G
    FOR %%V IN (%SM_PRIMARY_MOUNT_POINTS%) DO sdcli snap update_mirror
-d %%V

    if "%ERRORLEVEL%" NEQ "0" (
        set /a EXIT=4
        exit /b %EXIT%
    )

    echo "execution ended"

    goto :exit

:exit
    echo Command complete.
    exit /b %EXIT%

```

Vault_the_backup.cmd

If you are using Data ONTAP operating in 7-Mode, you can use this sample script to vault the backup. It includes three operations (check, describe, and execute) and executes them at the end of the script. The script also includes error message handling with codes of 0 to 4 and > 4:

```

@echo off
REM $Id:
//depot/prod/capstan/main/src/plugins/windows/examples/backup/create/post/
Vault_the_backup.cmd#1 $
REM
REM Copyright \c\ 2011 NetApp, Inc.
REM All rights reserved.
REM
REM
REM This is a sample post-task script to vault the qtrees to the secondary
REM storage after successful backup operation.
REM|-----
-----| |
REM| Pre-requisite/Assumption:

```

```
|  
REM|   SnapVault relationship for the requested secondary storage qtrees  
must be configured in Secondary storage. |  
REM|-----|  
-----|  
REM  
REM  
REM This script can be used from the SnapManager graphical user interface  
(GUI) and command line interface (CLI).  
REM  
REM To execute the post-task script for the backup operation from  
SnapManager GUI, follow these steps:  
REM 1. From the Backup wizard > Task Specification page > Post-Tasks tab  
> select the post-task scripts from the Available Scripts section.  
REM  
REM  
REM To execute the post-task script for the backup operation from  
SnapManager CLI, follow these steps:  
REM 1. create a task specification XML file.  
REM 2. Add the post-script name in the <post-tasks> tag of the XML file.  
REM  
REM Example:  
REM           <post-tasks>  
REM               <task>  
REM                   <name>Vault the backup</name>  
REM                   <description>Vault the backup</description>  
REM               </task>  
REM           <post-tasks>  
REM  
REM IMPORTANT NOTE: This script is provided for reference only. It has  
been tested with SnapDrive 6.3.0 for Windows but may not work in all  
environments. Please review and then customize based on your secondary  
protection requirements.  
REM  
REM  
REM  
REM  
REM  
set /a EXIT=0  
set name="Vault the backup"  
set description="Vault the backup"  
set parameter=()  
  
if /i "%1" == "-check" goto :check
```

```

if /i "%1" == "-execute" goto :execute
if /i "%1" == "-describe" goto :describe

:usage
    echo usage: %0 ^{ -check ^| -describe ^| -execute ^}
    set /a EXIT=99
    goto :exit

:check
    set /a EXIT=0
    goto :exit

:describe
    echo SM_PI_NAME:%name%
    echo SM_PI_DESCRIPTION:%description%
    echo SM_PRIMARY_SNAPSHOTS_AND_MOUNT_POINTS :
%SM_PRIMARY_SNAPSHOTS_AND_MOUNT_POINTS%
    set /a EXIT=0
    goto :exit

REM Split the colon-separated SM_PRIMARY_SNAPSHOTS_AND_MOUNT_POINTS And
SnapVault the mountpoints one-by-one

:execute
    set /a EXIT=0

    echo "execution started"

    FOR %%A IN (%SM_PRIMARY_SNAPSHOTS_AND_MOUNT_POINTS%) DO FOR /F
"tokens=1,2 delims=:" %%B IN ("%%A") DO sdcli snapvault archive -a %%B
-DS %%C %%B

    if "%ERRORLEVEL%" NEQ "0" (
        set /a EXIT=4
        exit /b %EXIT%
    )
    echo "execution ended"

    goto :exit

:exit
    echo Command complete.
    exit /b %EXIT%

```

Mirror_the_backup_cDOT.cmd

If you are using clustered Data ONTAP, you can use this sample script to mirror the backup. It includes three operations (check, describe, and execute) and executes them at the end of the script. The script also includes error message handling with codes of 0 to 4 and > 4:

```
@echo off
REM $Id:
//depot/prod/capstan/main/src/plugins/windows/examples/backup/create/post/
Mirror_the_backup_cDOT.cmd#1 $
REM
REM Copyright \(c\)\ 2011 NetApp, Inc.
REM All rights reserved.
REM
REM
REM This is a sample post-task script to mirror the volumes to the
REM secondary storage after successful backup operation.
REM|-----
-----| |
REM| Pre-requisite/Assumption:
| |
REM| SnapMirror relationship should be set for the primary volumes and
REM| secondary volumes |
REM|-----
-----| |
REM
REM
REM This script can be used from the SnapManager graphical user interface
REM (GUI) and command line interface (CLI).
REM
REM To execute the post-task script for the backup operation from
REM SnapManager GUI, follow these steps:
REM 1. From the Backup wizard > Task Specification page > Post-Tasks tab
REM > select the post-task scripts from the Available Scripts section.
REM
REM
REM To execute the post-task script for the backup operation from
REM SnapManager CLI, follow these steps:
REM 1. create a task specification XML file.
REM 2. Add the post-script name in the <post-tasks> tag of the XML file.
REM
REM Example:
REM <preposttask-specification xmlns="http://www.netapp.com">
REM     <task-specification>
REM         <post-tasks>
REM             <task>
REM                 <name>"Mirror the backup for cDOT"</name>
```

```

REM                               </task>
REM                               </post-tasks>
REM                               </task-specification>
REM                               </preposttask-specification>
REM
REM
REM
REM IMPORTANT NOTE: This script is provided for reference only. It has
been tested with SnapDrive 7.0 for Windows but may not work in all
environments. Please review and then customize based on your secondary
protection requirements.
REM
set /a EXIT=0
set name="Mirror the backup cDOT"
set description="Mirror the backup cDOT"
set parameter=()

if /i "%1" == "-check" goto :check
if /i "%1" == "-execute" goto :execute
if /i "%1" == "-describe" goto :describe

:usage
    echo usage: %0 ^{ -check ^| -describe ^| -execute ^}
    set /a EXIT=99
    goto :exit

:check
    set /a EXIT=0
    goto :exit

:describe
    echo SM_PI_NAME:%name%
    echo SM_PI_DESCRIPTION:%description%
    set /a EXIT=0
    goto :exit

REM - Split the comma-separated SM_PRIMARY_MOUNT_POINTS then Mirror the
REM PRIMARY_MOUNT_POINTS one-by-one.

:execute
    set /a EXIT=0

    echo "execution started"

    REM FOR %%G IN (%SM_PRIMARY_MOUNT_POINTS%) DO powershell.exe -file

```

```

"c:\snapmirror.ps1" %%G < CON

powershell.exe -file "c:\snapmirror.ps1"
%SM_PRIMARY_FULL_SNAPSHOT_NAME_FOR_TAG% < CON

if "%ERRORLEVEL%" NEQ "0" (
    set /a EXIT=4
    exit /b %EXIT%
)

echo "execution ended"

goto :exit

:exit
echo Command complete.
exit /b %EXIT%

```

Vault_the_backup_cDOT.cmd

If you are using clustered Data ONTAP, you can use this sample script to vault the backup. It includes three operations (check, describe, and execute) and executes them at the end of the script. The script also includes error message handling with codes of 0 to 4 and > 4:

```

@echo off
REM $Id:
//depot/prod/capstan/main/src/plugins/windows/examples/backup/create/post/
Vault_the_backup_cDOT.cmd#1 $
REM
REM Copyright \(c\) 2011 NetApp, Inc.
REM All rights reserved.
REM
REM
REM This is a sample post-task script to do vault update to the secondary
REM storage after successful backup operation.
REM| -----
-----| |
REM| Pre-requisite/Assumption:
| |
REM| Vaulting relationship with policy and rule needs to be established
REM| between primary and secondary storage volumes |
REM| -----
-----| |
REM
REM

```

```

REM This script can be used from the SnapManager graphical user interface
(GUI) and command line interface (CLI).
REM
REM To execute the post-task script for the backup operation from
SnapManager GUI, follow these steps:
REM
REM 1. From the Backup wizard > Task Specification page > Post-Tasks tab
> select the post-task scripts from the Available Scripts section.
REM 2. You can view the parameters available in the post-task script in
the Parameter section of the Task Specification page.
REM 3. Provide values to the following parameters:
REM     SNAPSHOT_LABEL      - Label Name to be set for snapshots before
doing the vault update
REM
REM FOR WINDOWS ITS ADVISED TO USE THE post-task script FROM THE GUI BY
SAVING THE BELOW SPEC XML AND GIVING THIS IN THE GUI LOAD XML FILE .
REM
REM To execute the post-task script for the backup operation from
SnapManager CLI, follow these steps:
REM 1. create a task specification XML file.
REM 2. Add the post-script name in the <post-tasks> tag of the XML file .
REM Example:
REM             <preposttask-specification xmlns="http://www.netapp.com">
REM                 <task-specification>
REM                     <post-tasks>
REM                         <task>
REM                             <name>"Vault the backup for cDOT"</name>
REM                             <parameter>
REM                                 <name>SNAPSHOT_LABEL</name>
REM                                 <value>TST</value>
REM                             </parameter>
REM                         </task>
REM                     </post-tasks>
REM                 </task-specification>
REM             </preposttask-specification>
REM
REM
REM IMPORTANT NOTE: This script is provided for reference only. It has
been tested with SnapDrive 7.0.0 for Windows but may not work in all
environments.
Please review and then customize based on your secondary protection
requirements.
REM
REM
REM Need to take care of the parameter variable, its not like shell script
array handling, so declare a new variable

```

```
REM for one more argument and set that variable SM_PI_PARAMETER in the
describe method. Then only that variable will be
REM Visible in the GUI task specification wizard else it wont list.
```

```
set /a EXIT=0
set name="Vault the backup for cDOT"
set description="Vault the backup For cDOT volumes"
set parameter=SNAPSHOT_LABEL :

if /i "%1" == "-check" goto :check
if /i "%1" == "-execute" goto :execute
if /i "%1" == "-describe" goto :describe

:usage
    echo usage: %0 ^{ -check ^| -describe ^| -execute ^}
    set /a EXIT=99
    goto :exit

:check
    set /a EXIT=0
    goto :exit

:describe
    echo SM_PI_NAME:%name%
    echo SM_PI_DESCRIPTION:%description%
    echo SM_PI_PARAMETER:%parameter%

    set /a EXIT=0
    goto :exit

REM Split the colon-separated SM_PRIMARY_SNAPSHOTS_AND_MOUNT_POINTS And
SnapVault the mountpoints one-by-one

:execute
    set /a EXIT=0

    echo "execution started"

    powershell.exe -file "c:\snapvault.ps1"
%SM_PRIMARY_FULL_SNAPSHOT_NAME_FOR_TAG% %SNAPSHOT_LABEL% < CON

    if "%ERRORLEVEL%" NEQ "0" (
        set /a EXIT=4
        exit /b %EXIT%
    )
    echo "execution ended"
```

```
    goto :exit

:exit
    echo Command complete.
    exit /b %EXIT%
```

Creating or updating the post scripts

You can either create new post scripts or use the scripts available at `default_install_directory\plugins\backup\create\post`.

You must structure the script in a particular manner so that it can be executed within the context of a SnapManager operation. Create the script based on the expected operations, available input parameters, and return code conventions.

1. Create a new script or use the available sample scripts.
2. Modify or include the functions, variables, and parameters as required.
3. Save the custom script.
4. Add the script name and required inputs in the post-processing task specification XML file or provide the inputs from the GUI by selecting the proper script and input parameter.



You do not have to provide secondary storage details in the task specification XML file.

Related information

[Creating task specification file and scripts for SnapManager operations](#)

Creating post-processing, task-specification files

SnapManager enables you to create post-processing, task-specification XML files for the backup operation that include the SnapMirror or SnapVault post-scripts. The scripts allow you to mirror or vault the backup to secondary storage.

1. Open a new XML file.

You can see the sample task-specification XML file available at `default_install_directory\plugins\examples`.

2. Add the script name as an input parameter.
3. Save the task-specification XML file.

Using post-processing task specification to mirror volumes

SnapManager for Oracle enables you to use the script to mirror the volumes after the backup operation occurs in a Windows environment.

1. Create a task specification XML file.
2. In the XML file, enter the script name as an input parameter.

3. Save the task specification XML file.
4. Create a protected backup of the database to secondary storage using the following command.

While creating the protected backup, you must provide the complete path of the saved task specification XML file after the `-taskspec` option.

Example: `smobackup create -profile test_profile -full -online -taskspec "C:\\mirror\\snapmirror.xml"`

The following example shows a post-processing task specification structure if you are using Data ONTAP operating in 7-Mode:

```
# <post-tasks>
#   <task>
#     <name>Mirror the backup</name>
#     <description>Mirror the backup</description>
#   </task>
# <post-tasks>
```

The following example shows a post-processing task specification structure if you are using clustered Data ONTAP:

```
# <task-specification>
#   <post-tasks>
#     <task>
#       <name>"Vault the backup for cDOT"</name>
#       <parameter>
#         <name>SNAPSHOT_LABEL</name>
#         <value>TST</value>
#       </parameter>
#     </task>
#   </post-tasks>
# </task-specification>
# </preposttask-specification>
```

Using post-processing task specification to vault qtrees

SnapManager for Oracle enables you to use the script to vault the qtrees after the backup operation takes place in a Windows environment.

1. Create a task specification XML file.
2. In the XML file, enter the script name as an input parameter.
3. Save the task specification XML file.
4. Create a protected backup of the database to secondary storage using the following command.

While creating the protected backup, you must provide the complete path of the saved task specification XML file after the `-taskspec` option.

```
Example: smobackup create -profile test_profile -full -online -taskspec "C:\\mirror\\snapvault.xml"
```

The following example shows the post-processing task specification structure if you are using Data ONTAP operating in 7-Mode:

```
# <post-tasks>
#   <task>
#     <name>Vault the backup</name>
#     <description>Vault the backup</description>
#   </task>
# <post-tasks>
```

The following example shows the post-processing task specification structure if you are using clustered Data ONTAP:

```
# <task-specification>
#   <post-tasks>
#     <task>
#       <name>"Vault the backup for cDOT"</name>
#       <parameter>
#         <name>SNAPSHOT_LABEL</name>
#         <value>TST</value>
#       </parameter>
#     </task>
#   </post-tasks>
# </task-specification>
# </preposttask-specification>
```

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