

# Setting Up the DR Series System as a CIFS, NFS and iSCSI-VTL Target on Tivoli Storage Manager (TSM) v7.1

## Technical White Paper

Quest Engineering

October 2017



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## Legend



**WARNING:** A WARNING icon indicates a potential for property damage, personal injury, or death.



**CAUTION:** A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.



**IMPORTANT, NOTE, TIP, MOBILE, or VIDEO:** An information icon indicates supporting information.

Setting Up the DR Series System as a CIFS, NFS and iSCSI-VTL Target on Tivoli Storage Manager v7.1

Updated – December 22, 2017

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# Revisions

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Date	Description
January 2014	Initial release
November 2016	Updated the guide with new DR-4.0 GUI screens
October 2017	Updated with Quest-branded DR Series GUI screenshots (v4.0.3)

# Executive Summary

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This paper provides information about how to set up the DR Series system as a backup target for IBM Tivoli Storage Manager (TSM).

For additional information, see the DR Series system documentation and other data management application best practices whitepapers for your specific DR Series system at:

<http://support.quest.com/DR-Series>

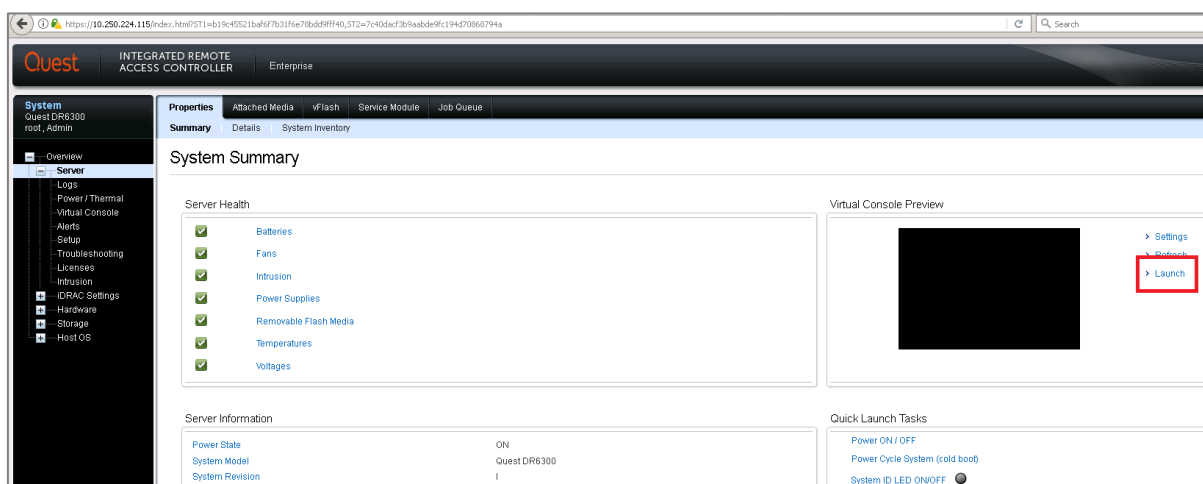
For more information about Tivoli Storage Manager, refer to the IBM documentation at:

[https://www.ibm.com/support/knowledgecenter/en/SSEQVQ\\_8.1.2/tsm/welcome.html](https://www.ibm.com/support/knowledgecenter/en/SSEQVQ_8.1.2/tsm/welcome.html)

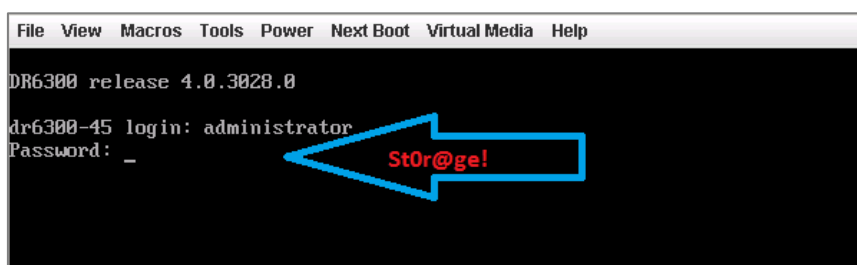
**i** **NOTE:** The DR Series system/TSM build version and screenshots used in this document might vary slightly, depending on the version of the DR Series system/TSM Software version you are using.

# Installing and configuring the DR Series system

- 1 Rack and cable the DR Series system, and power it on. In the Dell DR Series System Administrator Guide, refer to the sections “iDRAC Connection”, “Logging in and Initializing the DR Series System”, and “Accessing iDRAC6/Idrac7 Using RACADM” for information about using the iDRAC connection and initializing the appliance.
- 2 Log on to iDRAC at the default address, 192.168.0.120, or the IP address that is assigned to the iDRAC interface, with the user name and password: root/calvin.
- 3 Launch the virtual console.



- 4 After the virtual console is open, log on to the system as the user **administrator** with the password **St0r@ge!** (The “0” in the password is the numeral zero).



- 5 Set the user-defined networking preferences.

```
Would you like to use DHCP (yes/no) ?

Please enter an IP address:

Please enter a subnet mask:

Please enter a default gateway address:

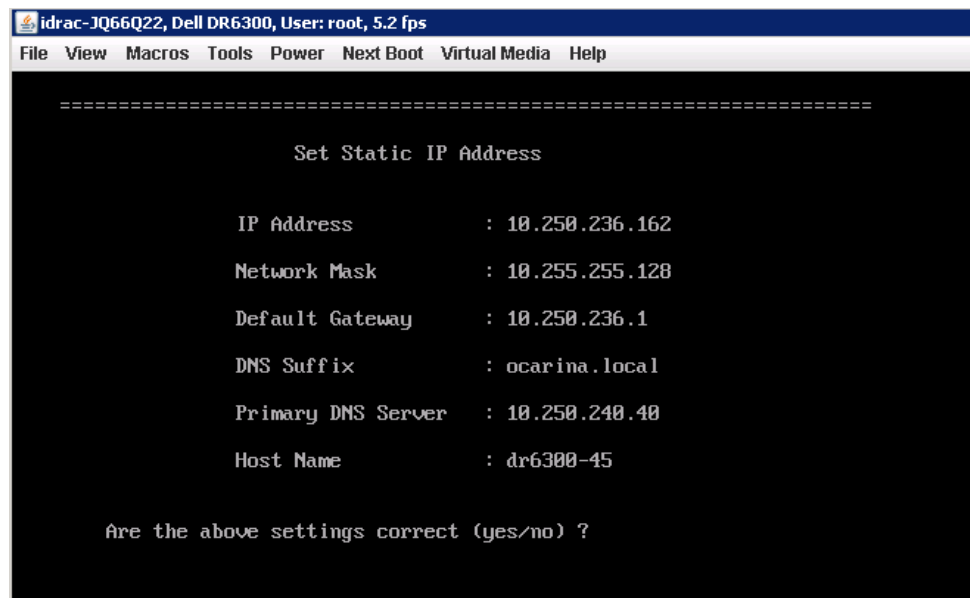
Please enter a DNS Suffix (example: abc.com):

Please enter primary DNS server IP address:

Would you like to define a secondary DNS server (yes/no) ?

Please enter secondary DNS server IP address:
```

- 6 View the summary of preferences and confirm that it is correct.



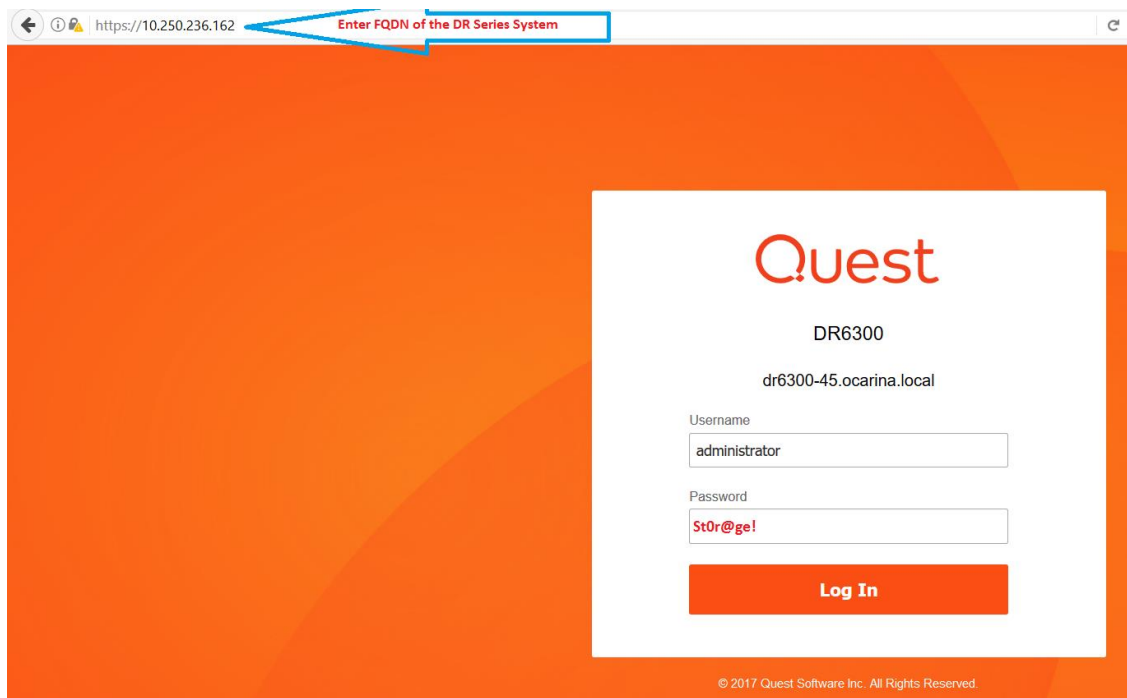
The screenshot shows the iDRAC web interface for a Dell DR6300. The title bar indicates 'idrac-Q66Q22, Dell DR6300, User: root, 5.2 fps'. The menu bar includes 'File', 'View', 'Macros', 'Tools', 'Power', 'Next Boot', 'Virtual Media', and 'Help'. The main content area is titled 'Set Static IP Address' and displays the following configuration summary:

IP Address	: 10.250.236.162
Network Mask	: 10.255.255.128
Default Gateway	: 10.250.236.1
DNS Suffix	: ocarina.local
Primary DNS Server	: 10.250.240.40
Host Name	: dr6300-45

At the bottom, it asks: 'Are the above settings correct (yes/no) ?'

- 7 Log on to the DR Series system administrator console with the Hostname or the IP address you just provided for the DR Series system with the username: **administrator** and password: **St0r@ge!** (The "0" in the password is the numeral zero.).

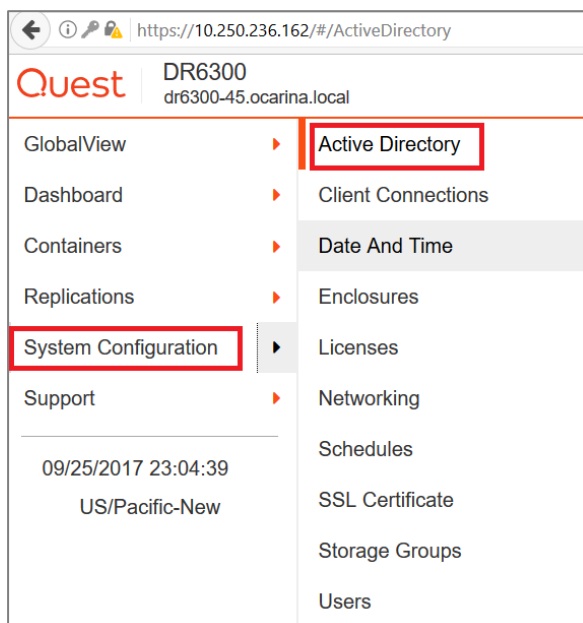




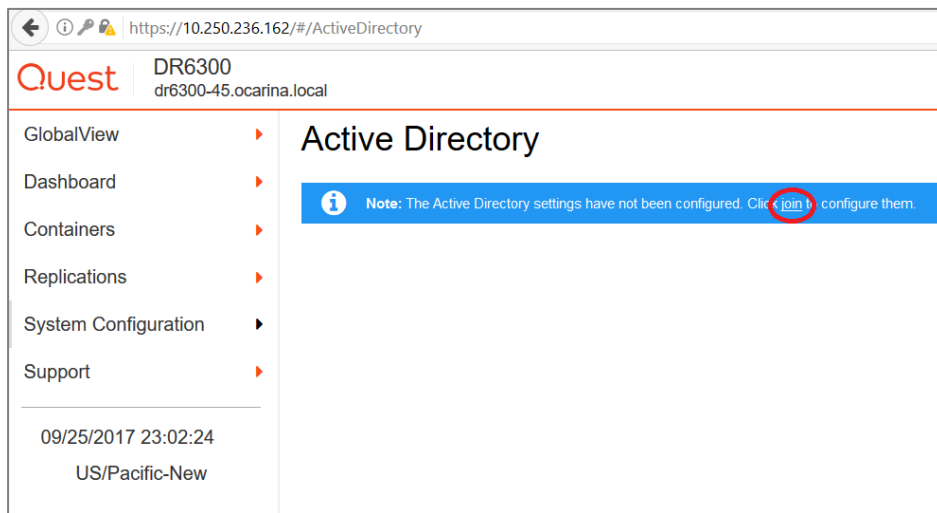
**NOTE** if you do not want to add the DR Series system to Active Directory, see the *DR Series System Owner's Manual* for guest login instructions.

8 Join the DR Series system into the Active Directory domain.

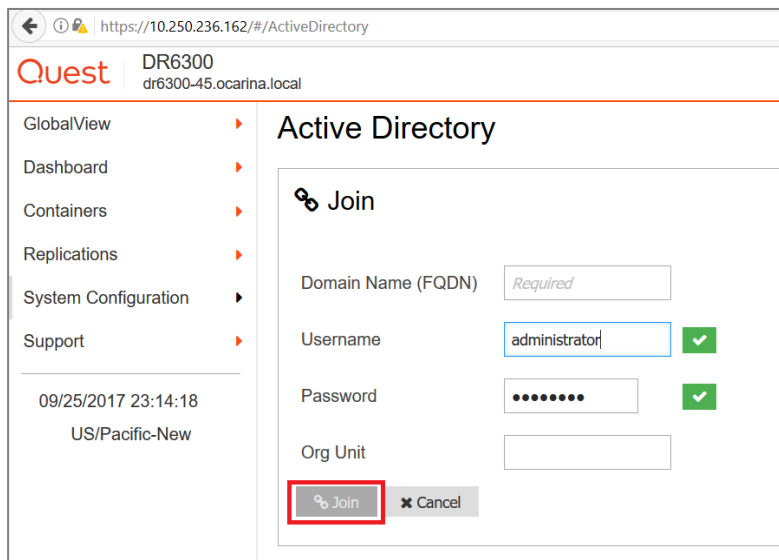
- a Select **System Configuration > Active Directory** from the left navigation area of the DR Series system GUI.



- b Click the **Join** link.



- c Enter valid credentials, and then click the **Join** button.



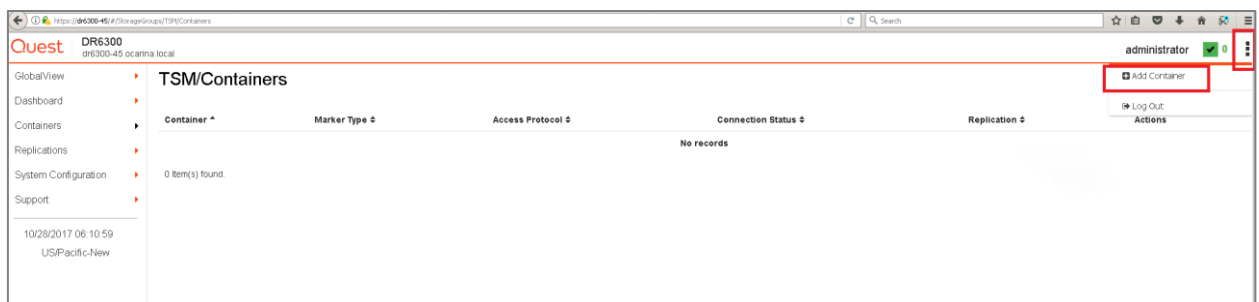
# Creating a container with an NFS or CIFS connection

- 1 Create a container by selecting **Containers** in the left navigation area, and then selecting the required **Storage Group**.

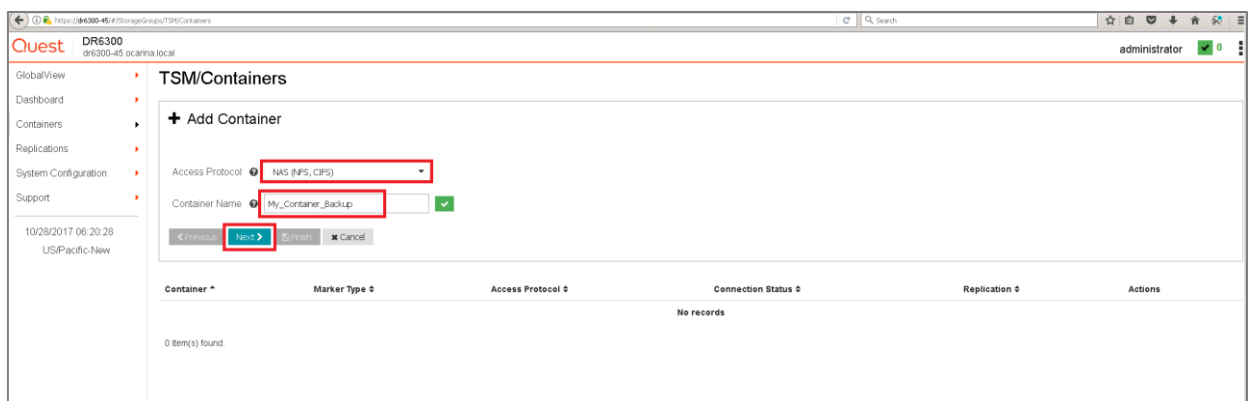


**NOTE:** For more information about storage groups in the DR Series system, see the *DR Series System Administrator's Guide*.

- 2 On the Action Menu in the upper right corner of the page, click **Add Container**.



- 3 Enter a container name, select the access protocol as **NAS (NFS, CIFS)**, and click **Next**.



- 4 Select the storage access protocol you want to use, set the marker type as **AUTO/TSM** and then click **Next**.

Quest DR6300  
dr6300-45 ocarina.local administrator 0

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 06:22:36  
US/Pacific-New

### TSM/Containers

+ Add Container

Access Protocols ☒ NFS ☒ CIFS

Marker Type TSM

< Previous Next > Finish Cancel

Container ^	Marker Type ^	Access Protocol ^	Connection Status ^	Replication ^	Actions
No records					

0 item(s) found.

- 5 For NFS, select the preferred client access credentials, and click **Next**.

Quest DR6300  
dr6300-45 ocarina.local administrator 0

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 06:24:35  
US/Pacific-New

### TSM/Containers

+ Add Container

NFS Options ☒ Read Write Access ☐ Read Only Access

Map Root To Root

Client Access ☒ Open (allow all clients) ☐ Create Client Access List

Client FQDN or IP Address

Allow Clients

< Previous Next > Finish Cancel

Container ^	Marker Type ^	Access Protocol ^	Connection Status ^	Replication ^	Actions
No records					

0 item(s) found.

- 6 For CIFS, select the preferred client access credentials, and click **Next**.

Quest DR6300  
dr6300-45 ocarina.local administrator 0

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 06:25:51  
US/Pacific-New

### TSM/Containers

+ Add Container

CIFS Client Access ☒ Open (allow all clients) ☐ Create Client Access List

Client FQDN or IP Address

Allow Clients

< Previous Next > Finish Cancel

Container ^	Marker Type ^	Access Protocol ^	Connection Status ^	Replication ^	Actions
No records					

0 item(s) found.

- 7 Review the summary and then click **Save** to add the container.

Quest DR6300  
dr6300-45 ocarina.local

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 06:26:57  
USIPacific-New

TSM/Containers

+ Add Container

Storage Access Protocol  
Access Protocol: NAS (NFS, CIFS)  
Container Name: My\_Container\_Backup

Configure NAS Access & Marker  
NAS Access Protocol: NFS, CIFS  
Marker Type: TSM

Configure NFS Client Access  
NFS Options: Read Write Access  
Map Root To: Root  
Client Access: Open (allow all clients)

Configure CIFS Client Access  
Client Access: Open (allow all clients)

Previous Next **Save** Cancel

Container ^	Marker Type ^	Access Protocol ^	Connection Status ^	Replication ^	Actions
No records					

0 item(s) found.

- 8 Confirm that the Container has been added.

Quest DR6300  
dr6300-45 ocarina.local

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 06:28:02  
USIPacific-New

TSM/Containers

Success: Successfully added container 'My\_Container\_Backup'. Container is being established. Information updates may be briefly delayed until the process is fully completed.

Container ^	Marker Type ^	Access Protocol ^	Connection Status ^	Replication ^	Actions
My_Container_Backup	TSM	NFS,CIFS	Available, Available	Not Configured	

1 item(s) found.

## Creating a VTL container with an iSCSI connection

- 1 Select **Containers** in the left navigation area, and, on the **Action Menu** in the upper right corner of the page, select **Add Container**.

Quest DR6300  
dr6300-45 ocarina.local

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 07:09:36  
USIPacific-New

TSM/Containers

Log Out

Container ^	Marker Type ^	Access Protocol ^	Connection Status ^	Replication ^	Actions
My_Container_Backup	TSM	NFS,CIFS	Available, Available	Not Configured	

1 item(s) found.

- 2 Enter the name of the container, select **Virtual Tape Library (VTL)** as the access protocol, and click **Next**.

Quest DR6300  
dr6300-45 ocarina.local

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 07:11:05  
USIPacific-New

### TSM/Containers

**+ Add Container**

Access Protocol: **Virtual Tape Library (VTL)**  
Container Name: **TSM-iscsi** ✓

Previous **Next** Refresh Cancel

Container	Marker Type	Access Protocol	Connection Status	Replication	Actions
My_Container_Backup	TSM	NFS,CIFS	Available, Available	Not Configured	

1 item(s) found.

- 3 Select the required tape size, access protocol, marker type, and initiator details, and click **Next**.

Quest DR6300  
dr6300-45 ocarina.local

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 07:17:16  
USIPacific-New

### TSM/Containers

**+ Add Container**

Robot Model: **STK L700**  
Tape Size: **800GB** (Max Num of Tapes is 2000)  
VTL Access Protocol: **iSCSI**  
IGN, FQDN or IP Address: **10.250.235.68** ✓  
Marker Type: **TSM**

Previous **Next** Refresh Cancel

Container	Marker Type	Access Protocol	Connection Status	Replication	Actions
My_Container_Backup	TSM	NFS,CIFS	Available, Available	Not Configured	

1 item(s) found.

- 4 Review the summary and then click **Save** to add the container.

Quest DR6300  
dr6300-45 ocarina.local

GlobalView  
Dashboard  
Containers  
Replications  
System Configuration  
Support

10/28/2017 07:18:44  
USIPacific-New

### TSM/Containers

**+ Add Container**

**Storage Access Protocol**  
Access Protocol: **Virtual Tape Library (VTL)**  
Container Name: **TSM-iscsi**

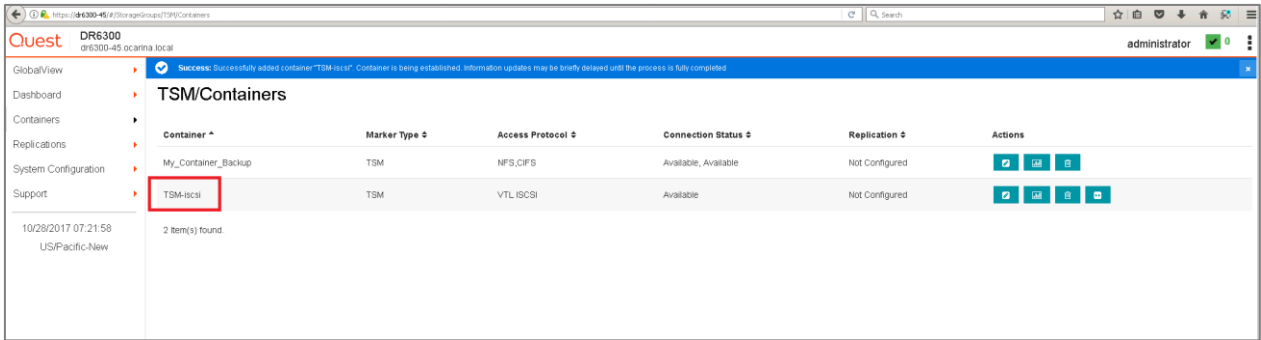
**Configure Virtual Tape Library**  
Robot Model: **STK L700**  
Tape Size: **800GB**  
VTL Access Protocol: **iSCSI**  
IGN, FQDN or IP Address: **10.250.235.68**  
Marker Type: **TSM**

Previous **Save** Refresh Cancel

Container	Marker Type	Access Protocol	Connection Status	Replication	Actions
My_Container_Backup	TSM	NFS,CIFS	Available, Available	Not Configured	

1 item(s) found.

5 Confirm that the container is successfully added on the Containers page.

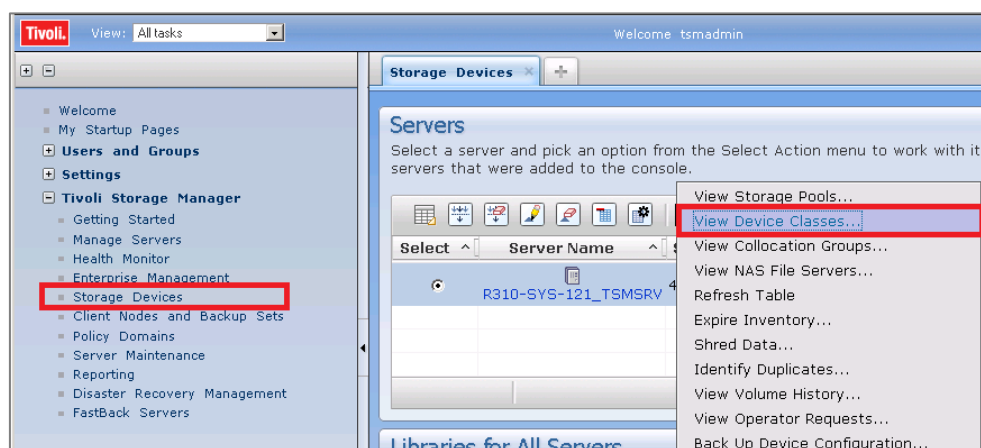


# Configuring TSM for CIFS and NFS targets

## Configuring the device class for CIFS and NFS protocols

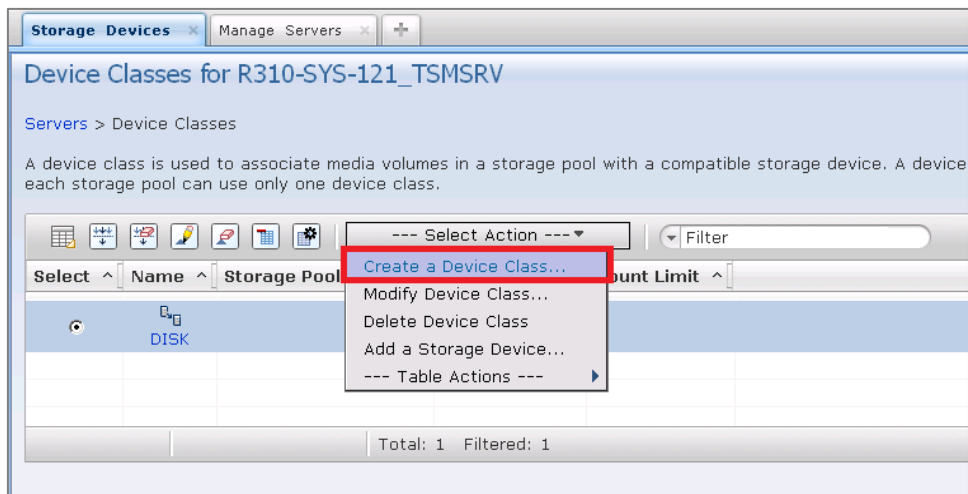
These instructions walk you through a basic configuration for connecting a DR Series system appliance with the Windows version of Tivoli Storage Manager (v7.1.4).

- 1 Open the IBM Tivoli Storage Manager Administration Center.
- 2 Click **Storage Devices > View Storage Classes**.

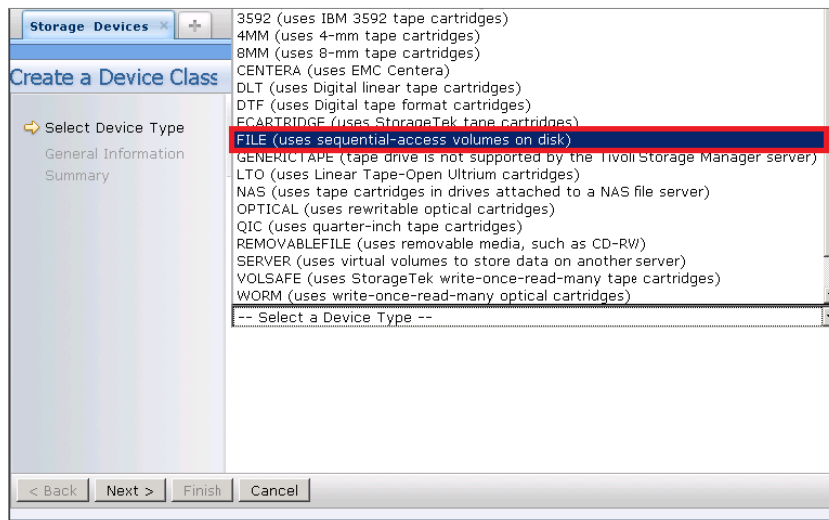




3 Click **Create a Device Class**.

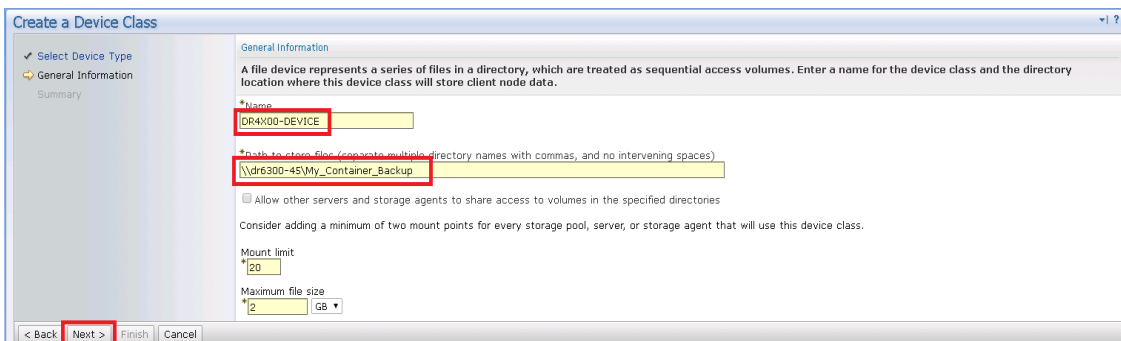


4 Select the **FILE** device type and click **Next**. (This device type is optimized for writing to disk-based storage.)



5 Enter the appropriate information under General Information and click **Next**.

6 For a CIFS Container Path:



7 For an NFS container path:

The screenshot shows the 'Create a Device Class' dialog box with the 'General Information' tab selected. The 'Name' field contains 'DR4X00-DEVICE'. The 'Path to store files (supports multiple directory names with commas, and no intervening spaces)' field contains '/mnt/My\_Container\_Backup'. The 'Mount limit' is set to '20' and the 'Maximum file size' is set to '2 GB'. The 'Next >' button is highlighted with a red box.

- **Name:** Enter a descriptive name for the device class.
- **Path:** Add the UNC path to the DR container for CIFS and the mount point of DR Series appliance export for NFS.
- **Mount Limit:** Set the connection limit. Please consult the DR Series Interoperability Guide for your systems maximum 32 concurrent CIFS connections. The optimal number of connections is five.
- **Maximum File Size:** Set the maximum. The DR Series system supports very large files such as 1TB. The recommended file sizes for TSM are between 1GB and 50GB to allow for fast space reclamation and replication of files to remote sites.

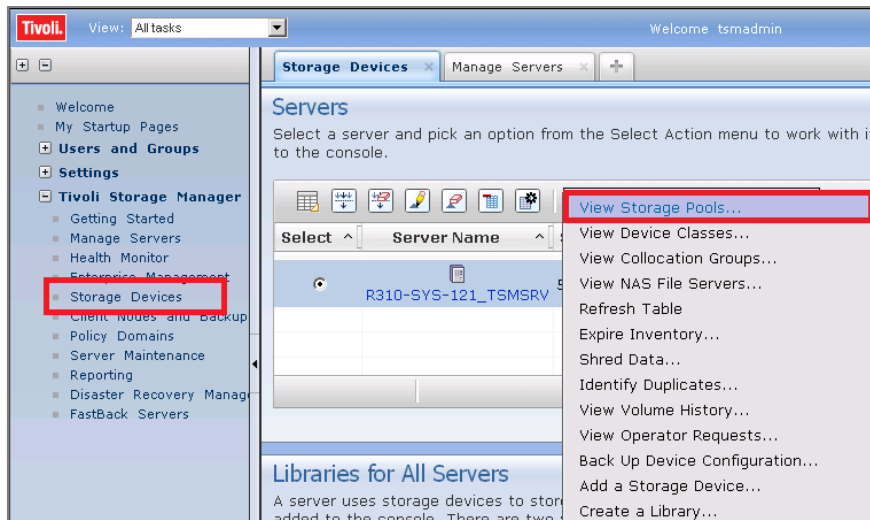
**NOTE:** The service account for Tivoli Storage Manager needs to have the correct permission to the DR Series system CIFS share for this step to complete successfully. Before providing the information, see Appendix A for information about setting up the TSM service account correctly.

8 Click **Finish**.

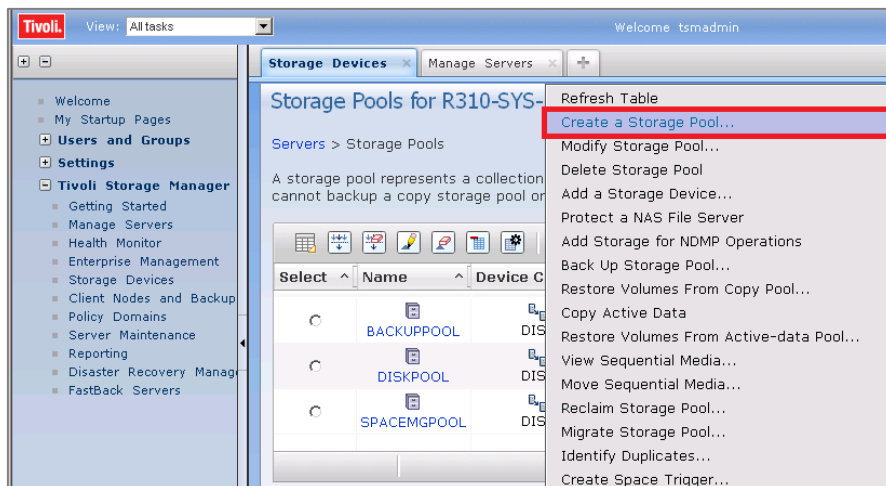
The screenshot shows the 'Create a Device Class' dialog box with the 'Summary' tab selected. The message reads: 'These storage objects have been successfully defined. Device class DR4X00-Device has been created.' The 'Finish' button is highlighted with a red box.

# Configuring a storage pool for the CIFS and NFS protocols

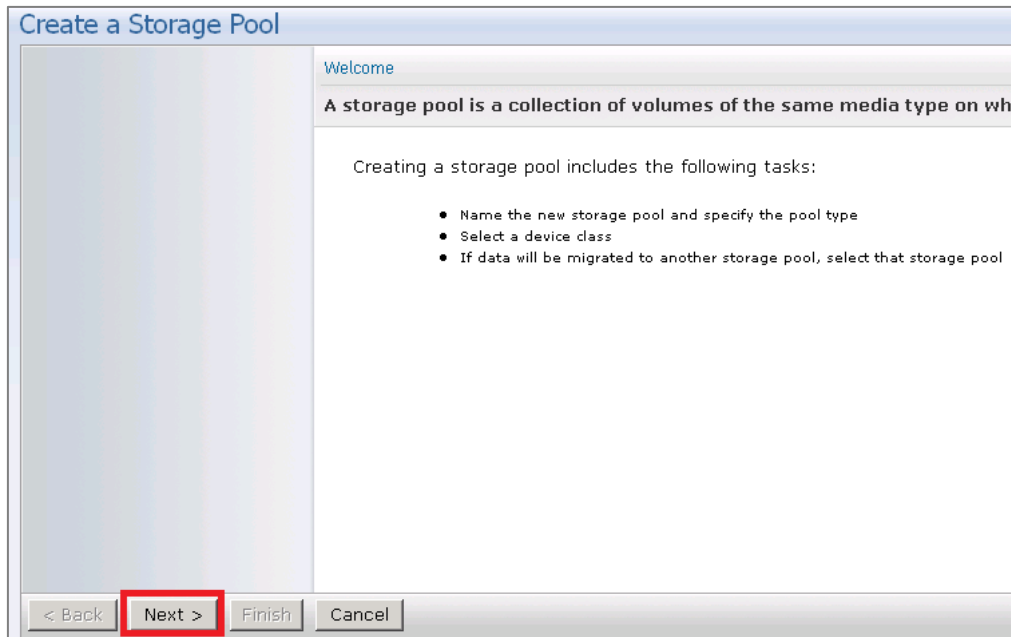
- 1 Click **Storage Devices > View Storage Pools**.



- 2 Click **Create Storage Pools**.



- 3 Click **Next**.



The screenshot shows the 'Create a Storage Pool' window with a 'Welcome' tab. It explains that a storage pool is a collection of volumes of the same media type. It lists three tasks for creating a storage pool: naming the pool and specifying the type, selecting a device class, and selecting a storage pool for migration if applicable. The 'Next >' button is highlighted with a red box.

**Create a Storage Pool**

Welcome

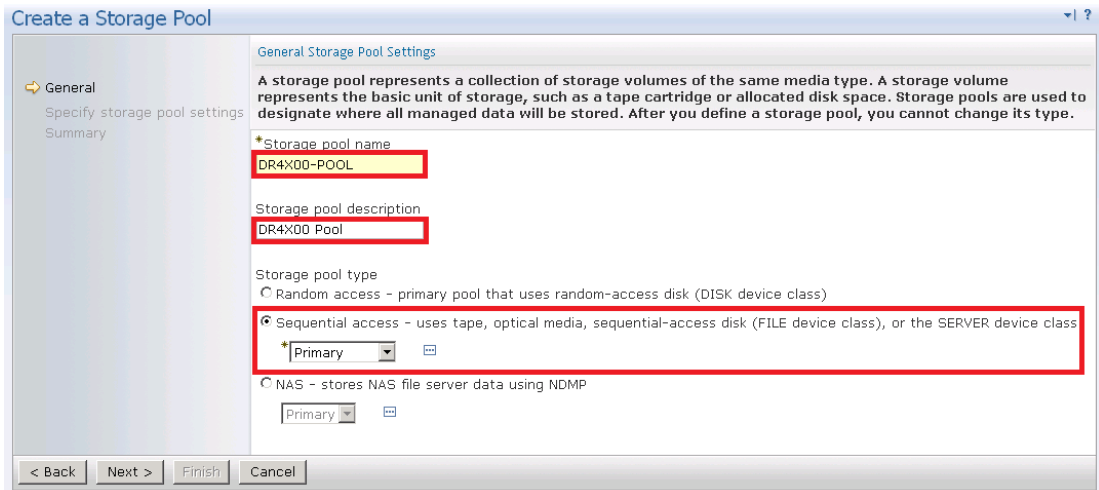
A storage pool is a collection of volumes of the same media type on which data is stored.

Creating a storage pool includes the following tasks:

- Name the new storage pool and specify the pool type
- Select a device class
- If data will be migrated to another storage pool, select that storage pool

< Back **Next >** Finish Cancel

- 4 Enter the information for the General Storage Pool Settings and then click **Next**.



The screenshot shows the 'Create a Storage Pool' window with the 'General Storage Pool Settings' tab selected. It provides instructions on what a storage pool represents. The 'Storage pool name' is set to 'DR4X00-POOL', the 'Storage pool description' is 'DR4X00 Pool', and the 'Storage pool type' is 'Sequential access'. The 'Primary' dropdown menu is highlighted with a red box. The 'Next >' button is also highlighted with a red box.

**Create a Storage Pool**

General Storage Pool Settings

A storage pool represents a collection of storage volumes of the same media type. A storage volume represents the basic unit of storage, such as a tape cartridge or allocated disk space. Storage pools are used to designate where all managed data will be stored. After you define a storage pool, you cannot change its type.

\*Storage pool name  
DR4X00-POOL

Storage pool description  
DR4X00 Pool

Storage pool type  
☐ Random access - primary pool that uses random-access disk (DISK device class)  
☒ Sequential access - uses tape, optical media, sequential-access disk (FILE device class), or the SERVER device class

\*Primary

☐ NAS - stores NAS file server data using NDMP  
Primary

< Back **Next >** Finish Cancel

- **Storage Pool Name:** Enter a descriptive name for the DR Series system pool.
- **Storage Pool Description:** Enter a description for the DR Series system pool.
- **Storage Pool Type:** Select **Sequential Access** as the DR Series system is integrated as a FILE type device.

- 5 Enter the required information for the device class, and click **Next**.

The screenshot shows the 'Create a Storage Pool' wizard with the 'Specify storage pool settings' step selected. The 'General' tab is active. The 'Device class name' dropdown is set to 'DR4X00-DEVICE'. The 'Maximum number of scratch volumes' is set to '150'. The 'Next storage pool' dropdown is set to '-- None --'. The 'Back', 'Next >', 'Finish', and 'Cancel' buttons are at the bottom.

**Create a Storage Pool**

Select a Device Class

A device class represents a set of similar storage devices. A device class is used to associate storage pool volumes with a compatible storage device.

\*Device class name  
DR4X00-DEVICE

Scratch volumes are used to dynamically satisfy mount requests. Consider entering the number of physical volumes available for this storage pool.

\*Maximum number of scratch volumes  
150

You can select another primary storage pool to use as a Next pool. The Next pool is used to store data migrated from the storage pool being created. During client node operations, the Next pool can also be used to store data if this storage pool runs out of space, or to store files that exceed its maximum size.

Next storage pool  
-- None --

< Back Next > Finish Cancel

- **Device Class Name:** Select the name of the DR Series system device class (created previously).
- **Maximum Number of Scratch Volumes:** Set the number of scratch volumes in the system. (Setting the value between 100 to 200 scratch volumes is recommended.)

- 6 For Identifying Duplicates, accept the default selections, and click **Next**.

The screenshot shows the 'Create a Storage Pool' wizard with the 'Identify Duplicates' step selected. The 'General' tab is active. The 'Identify the duplicate data in this storage pool' checkbox is unchecked. The 'Number of processes to identify duplicates' is set to '1'. The 'Back', 'Next >', 'Finish', and 'Cancel' buttons are at the bottom.

**Create a Storage Pool**

Identify Duplicates

The server can identify duplicate data within a FILE storage pool. This data is then removed during reclamation processing. Eliminating duplicate data increases the amount of available disk space. However, identifying duplicate data increases the server workload, and data that has been deduplicated can take longer to restore.

☐ Identify the duplicate data in this storage pool.

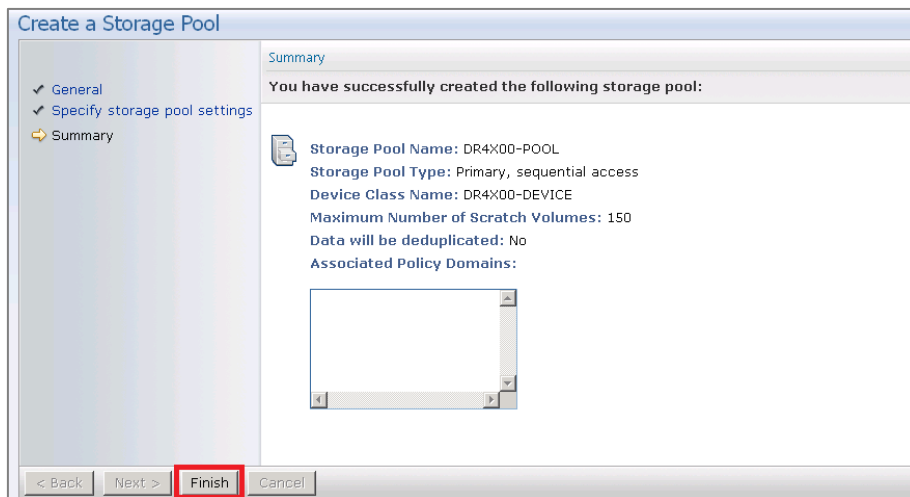
The number of processes to identify duplicates. When calculating this number, consider the workload on the server and the amount of data requiring deduplication.

1

< Back Next > Finish Cancel

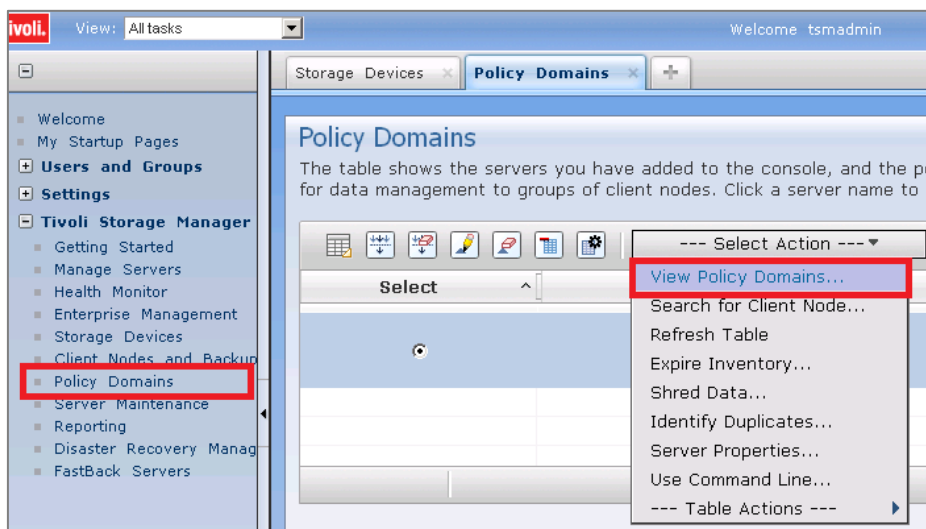
- Keep the **Identify the duplicate data in the storage pool** check box clear as the DR Series system uses inline deduplication and already identifies and removes duplicate data.

- 7 Review the settings and click **Finish**.

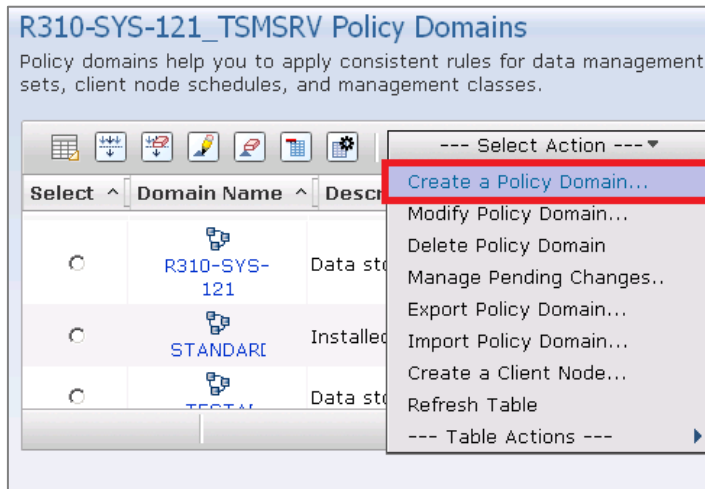


## Creating a policy domain for the job

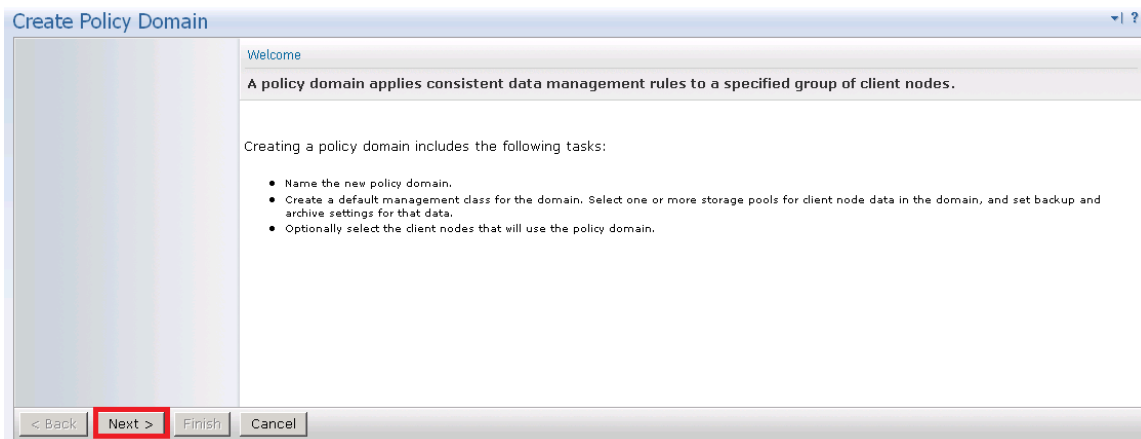
- 1 Click **Policy Domain > View Policy Domain**.



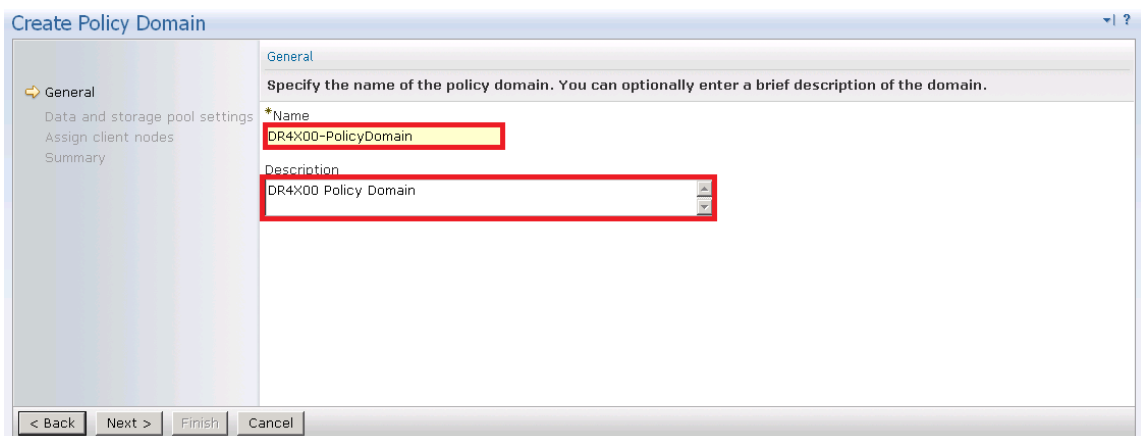
- 2 Click **Create a Policy Domain**.



- 3 Click **Next**.



- 4 Enter the required information, and then click **Next**.



- **Name:** Enter a descriptive name for the DR Series system policy domain.
- **Description:** Enter a description for the DR Series policy domain.

- 5 Enter the required information for data and storage pool settings, and then click Next.

The screenshot shows the 'Create Policy Domain' wizard with the 'Data and storage pool settings' step selected. The left sidebar shows 'General', 'Data and storage pool settings', 'Assign client nodes', and 'Summary'. The main content area has a title bar 'Data and storage pool settings' and a description: 'The default management class is used for all client node data that are not bound to a different management class. Select the default management class storage pools, specify backup and archive settings, and specify if active-data pools can be used.' Below this is a note: 'Select a storage pool for at least one of these data types. If you do not select storage pools for both data types, backup or archive operations can fail.' There are two sections: 'Specify default management class settings for backup data:' which is checked, and 'Specify default management class settings for archive data:' which is unchecked. The backup section has a dropdown for 'Storage pool for backup data' set to 'DR4X00-POOL', a text box for 'Number of file versions to keep' set to '2', and a text box for 'Number of days to keep inactive versions' set to '30'. The archive section has a dropdown for 'Storage pool for archive data' set to 'DR4X00-POOL'.

- **Specify default management class:** Select the DR Series system pool that was set up previously.
- **Number of file versions to Keep:** Specify how many versions of a file to keep.
- **Number of days to keep inactive versions:** Specify how many days to retain data after it falls out of policy.

**i** | **NOTE:** File versions and inactive versions are set based on company policies.

- 6 Select to assign the policy domain to clients, and click **Next**.

The screenshot shows the 'Create Policy Domain' wizard with the 'Assign Client Nodes Now?' step selected. The left sidebar shows 'General', 'Data and storage pool settings', 'Assign client nodes', and 'Summary'. The main content area has a title bar 'Assign Client Nodes Now?' and a description: 'The server manages the data and operations for a client node by using the rules of the policy domain. You can select the client nodes to assign to the new policy domain now or at another time. A client node can be assigned to only one policy domain.' Below this is a question: 'Do you want to assign client nodes to this policy domain now?' with two radio buttons: 'Yes' (selected) and 'No'. At the bottom of the wizard are four buttons: '< Back', 'Next >', 'Finish', and 'Cancel'.



- 7 Select to display the set of clients to move to the DR Series system, and click **Next**.

The screenshot shows the 'Create Policy Domain' window with the 'Assign Client Nodes' tab selected. The left sidebar shows 'General', 'Data and storage pool settings', 'Assign client nodes', and 'Summary'. The main area has the heading 'Assign Client Nodes' and 'Create the list of client nodes to select from.' Below this are two radio buttons: 'View all client nodes.' (selected) and 'View client nodes that match your conditions:'. The second option has a 'Name' text box next to it. At the bottom are buttons for '< Back', 'Next >', 'Finish', and 'Cancel'.

**NOTE:** Choose to limit if you have a lot of client computers.

- 8 Select the check box next to the clients you want to back up to the DR Series system, and click **Next**.

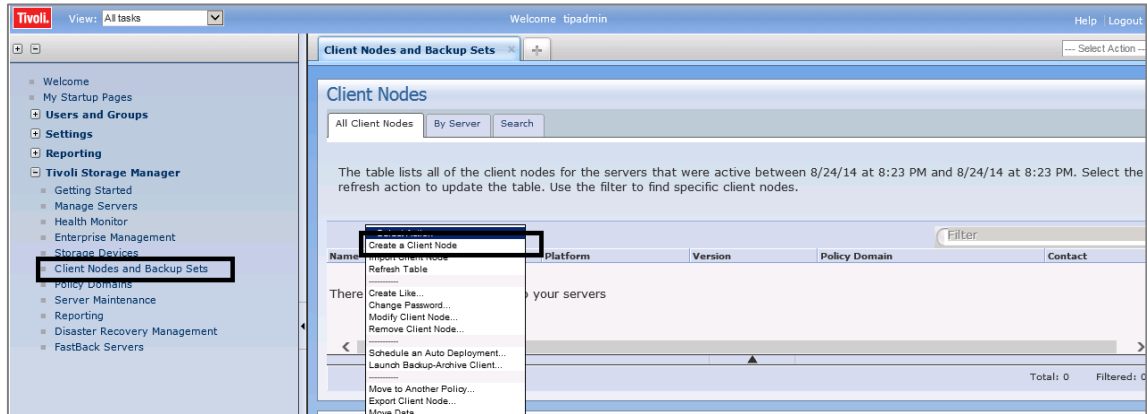
The screenshot shows the 'Create Policy Domain' window with the 'Assign Client Nodes' tab selected. The left sidebar shows 'General', 'Data and storage pool settings', 'Assign client nodes', and 'Summary'. The main area has the heading 'Assign Client Nodes' and 'Select client nodes to assign to the policy domain. A client node belongs to only one policy domain.' Below this is a table with columns: 'Select', 'Name', 'Current Policy Domain', 'Type', 'Platform', and 'Description'. Two rows are visible: 'R310-SYS-121 STANDARD Client -' and 'R310-SYS-33 STANDARD Client -'. Both rows have their 'Select' checkboxes checked. At the bottom are buttons for '< Back', 'Next >', 'Finish', and 'Cancel'.

- 9 Click **Finish**.

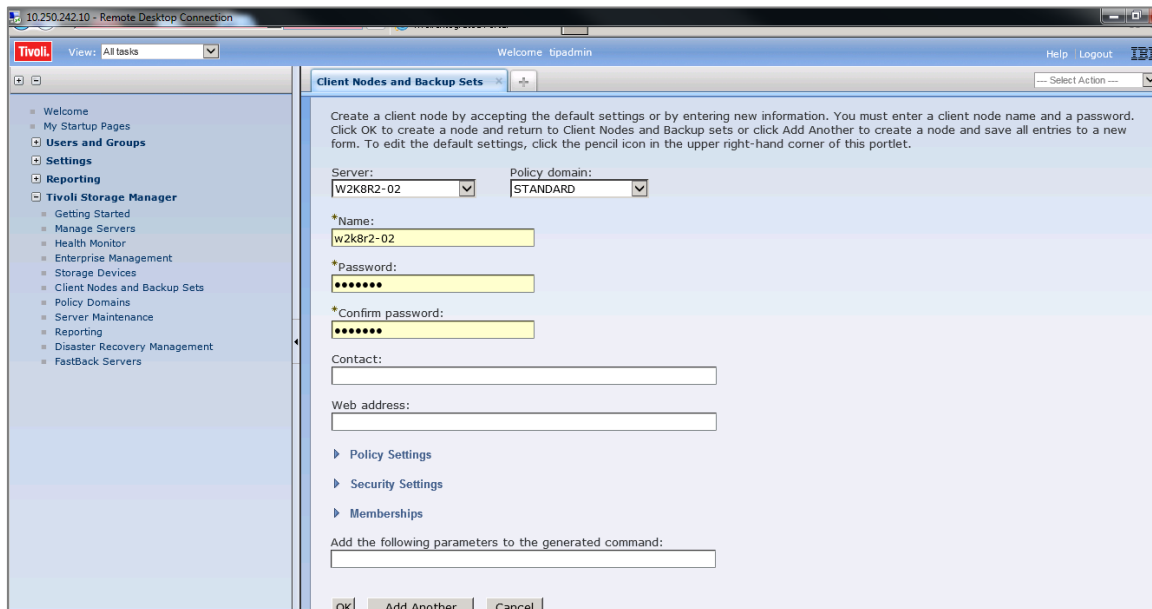
The screenshot shows the 'Create Policy Domain' window with the 'Summary' tab selected. The left sidebar shows 'General', 'Data and storage pool settings', 'Assign client nodes', and 'Summary'. The main area has the heading 'Summary' and a paragraph: 'You have successfully created a policy domain named DR4X00-POLICYDOMAIN with the default management class STANDARD. You can assign additional client nodes to the policy domain later. You can update the policy settings for additional options for handling backup and archive files later. You can also create additional policies for the policy domain by defining schedules, option sets, and additional management classes.' Below this are several fields: 'Policy domain name' (DR4X00-PolicyDomain), 'Description', 'Default management class name' (STANDARD), 'Storage pool for backup data' (DR4X00-POOL), 'Backup versions' (2), 'Backup retention period' (30 days), and 'Storage pool for archive data' (Not defined). At the bottom is a list box for 'Client nodes' containing 'R310-SYS-121' and 'R310-SYS-33'. At the bottom are buttons for '< Back', 'Next >', 'Finish', and 'Cancel'.

# Creating client nodes and backup sets

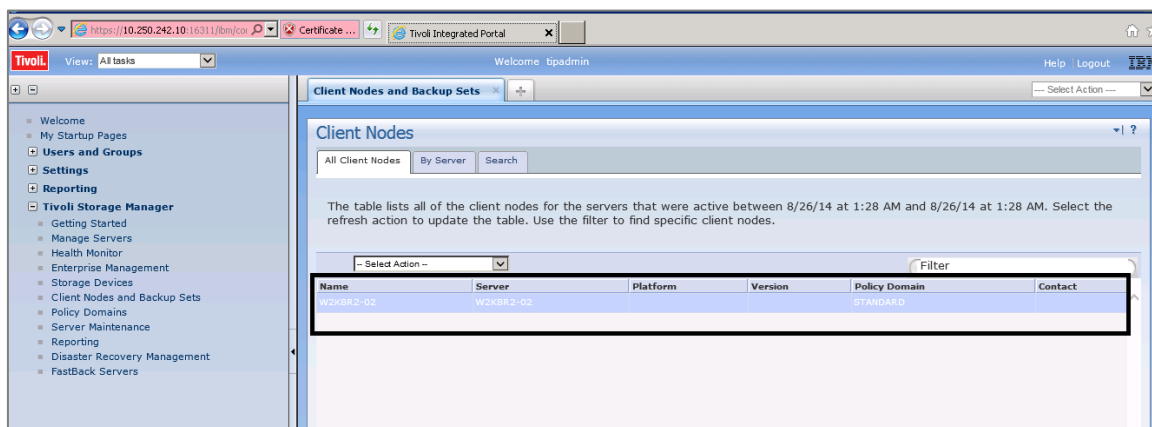
- 1 Open the client nodes and backup sets from Tivoli Storage Manager to register the client machine.



- 2 Provide the client name, policy name, and password to connect.



- 3 Confirm that the client node is successfully registered.

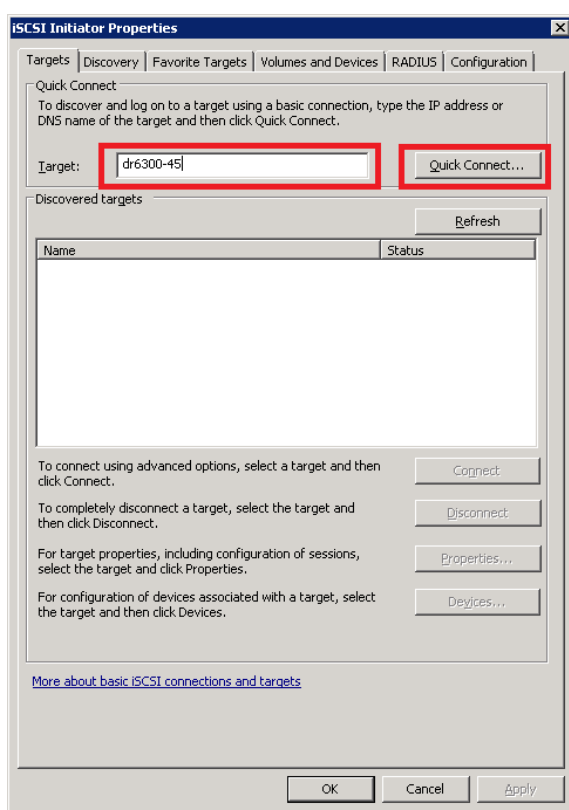


# Configuring iSCSI target container(s) for TSM

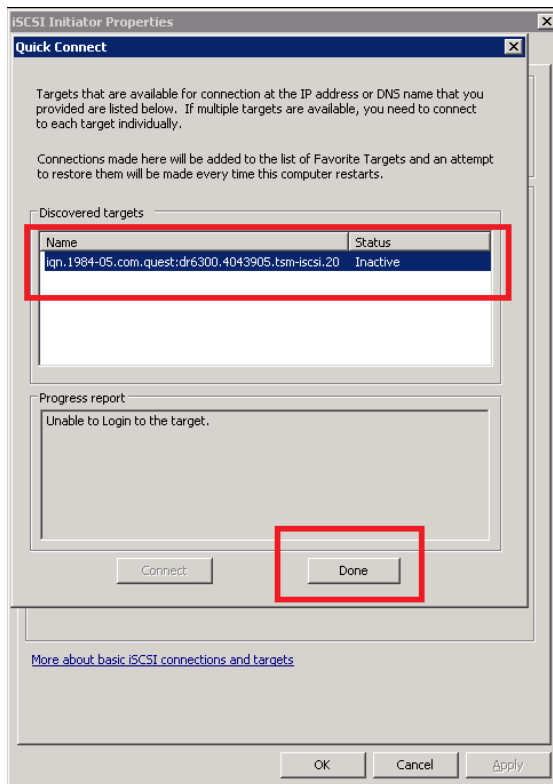
## Configuring the iSCSI initiator

### Configuring the iSCSI initiator for Windows (TSM Server)

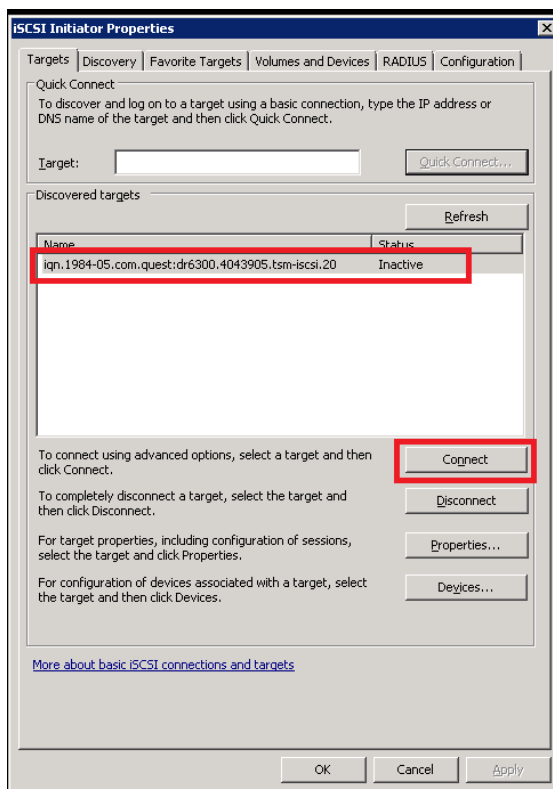
- 1 In the Windows TSM Server, open your iscsi initiator software, enter the DR Series system IP/Hostname as the target, and click **Quick connect**.



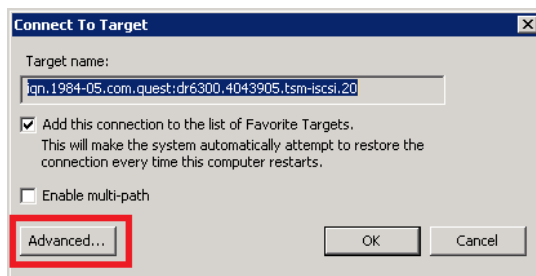
- 2 Quick connect will discover the targets. Click **Done**.



- 3 Select the required targets and click **Connect**



4 Click **Advanced**.

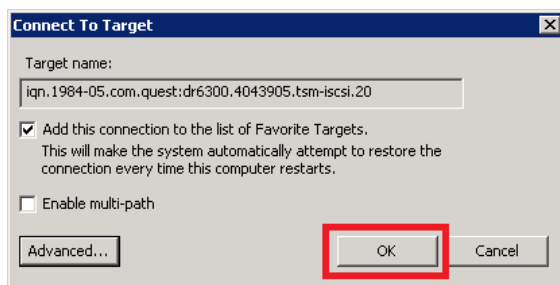
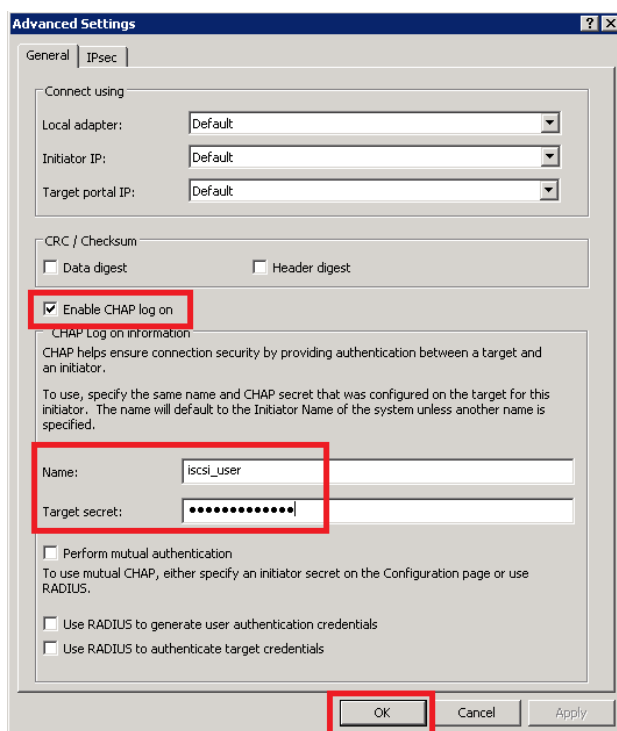


5 Click **Enable CHAP log on**, provide the name: `iscsi_user`, with the password: `St0r@geliscsi`, and click **OK**.

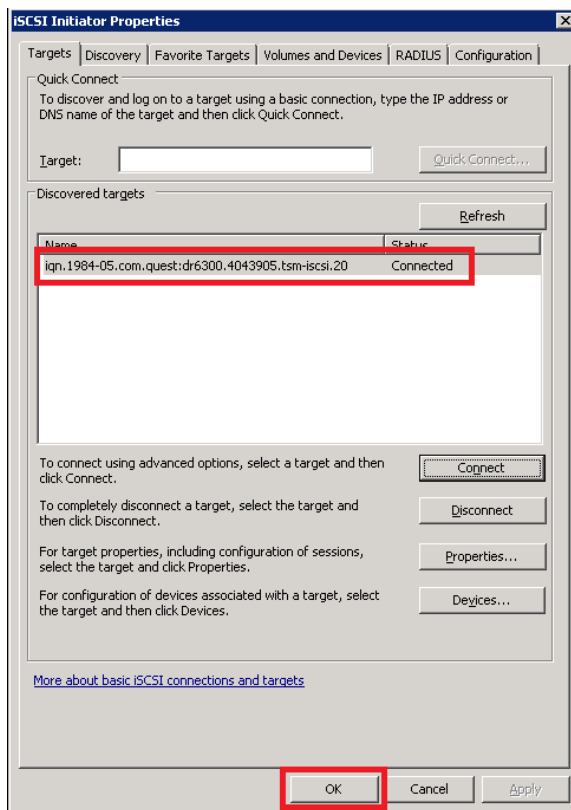


**NOTE:** The iSCSI user name can be found by entering the following command on the DR system:

```
# iscsi --show --user
```



- 6 Check the Status as connected and click **OK**.



## Configuring the iSCSI Initiator for Linux (TSM Server)

Before you begin this procedure, ensure that the iSCSI initiator is installed (iscsi-initiator-utils). For example:

```
#yum install iscsi-initiator-utils; /etc/init.d/iscsi start
```

To configure the iSCSI target for Linux, follow these steps.

- 1 Add the CHAP Authentication details for the DR Series system on the Linux Initiator as follows:

- a Edit `/etc/iscsi/iscsid.conf` and un-comment the following line:

```
node.session.auth.authmethod = CHAP
```

- b Modify the following lines:

```
# To set a CHAP username and password for initiator
# authentication by the target(s), uncomment the
following lines:
node.session.auth.username = iscsi_user
```

```
node.session.auth.password = St0r@ge!iscsi
```

- 2 Set the Discovery Target Node(s) by using this command:

```
#iscsiadm -m discovery -t st -p <FQDN of DR>
```

For example:

```
#iscsiadm -m discovery -t st -p 10.8.230.108
```

- 3 Enable login to the DR Series system iSCSI VTL target(s) by using the following command:

```
#iscsiadm -m node --portal <FQDN of DR:PORT> --login
```

For example:

```
#iscsiadm -m node --portal "10.8.230.108:3260" --login
```

- 4 Display the open session(s) with DR VTL(s) by using the following command:

```
#iscsiadm -m session
```

For example:

```
#iscsiadm -m session = tcp: [8] 10.8.230.108:3260,1  
iqn.1984-05.com.quest:dr6300.3071067.interoprhel52n1.30
```

- 5 Review dmesg or /var/log/messages for details about the tape devices created upon adding the DR Series system iSCSI VTL.
- 6 Run "cat /proc/scsi/scsi" command to see the LUN and HOST details.

## Configuring the DR Series system VTL for the Windows and Linux TSM server

**For Windows:** To see the Tape Library device IDs, use command "tsmdlst," for example:

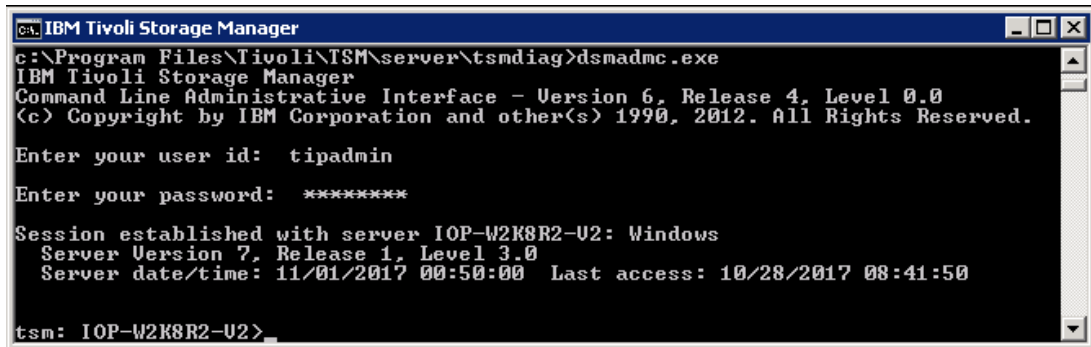
```
cd "C:\Program Files\Tivoli\TSM\server\tsmdiag"  
  
tsmdlst.exe
```

**For Linux:** For discovering the tape devices and associated IDs, see Appendix C of this document.

# Windows configuration

All commands should be executed on the TSM Server Prompt.

- 1 Open a CMD prompt and cd to "C:\Program Files\Tivoli\TSM\server\tsmdia" and run "dsmadm.exe" and enter the username/password for the TSM server.



```
c:\Program Files\Tivoli\TSM\server\tsmdia>dsmadm.exe
IBM Tivoli Storage Manager
Command Line Administrative Interface - Version 6, Release 4, Level 0.0
(c) Copyright by IBM Corporation and other(s) 1990, 2012. All Rights Reserved.

Enter your user id: tipadmin
Enter your password: *****

Session established with server IOP-W2K8R2-U2: Windows
Server Version 7, Release 1, Level 3.0
Server date/time: 11/01/2017 00:50:00 Last access: 10/28/2017 08:41:50

tsm: IOP-W2K8R2-U2>
```

- 3 Define Library -

```
# define library TSM-iscsi libtype=scsi shared=yes autolabel=yes
(TSM-iscsi is user defined name for the library)
```

- 4 Define Library path -

```
# define path WIN-8B1A4SA50SR TSM-iscsi srct=server autodetect=yes
destt=library

device=lb0.1.0.3
```

where WIN-8B1A4SA50SR = TSM server hostname, and Device = Device ID for medium changer listed by "tsmdlst" command.

- 5 Define Drive -

```
# define drive TSM-iscsi drive01 online=yes
```

Where TSM-iscsi = Library name defined in earlier command, Drive01 = User defined drive name

- 6 Define Drive Path -

```
# define path WIN-8B1A4SA50SR drive01 srct=server destt=drive
library=TSM-iscsi device=mt0.2.0.3 online=yes
```

- 7 Audit the Library -

```
# audit library TSM-iscsi checklabel=barcode
```

- 8 Checkin the Library Volumes -

```
# checkin libvolume TSM-iscsi search=yes checklabel=barcode
status=scratch
```



# Linux Configuration

All commands should be executed at the TSM Server Prompt.

- 1 You can get the TSM Server prompt by using the following commands:

```
[root@dma-rhel7-v1 bin]# ./dsmadm  
Enter your user id:  tipadmin  
Enter your password:  
Session established with server DMA-RHEL7-V1: Linux/x86_64  
Server Version 7, Release 1, Level 3.0  
Server date/time: 11/23/2017 02:38:33 Last access: 11/23/2017  
02:37:32  
tsm: DMA-RHEL7-V1>
```

- 2 Define Library:

```
# define library TSM-iscsi libtype=scsi shared=yes autolabel=yes
```

- 3 Define Library path –

```
# define path RHEL-TSM-SERVER TSM-iscsi srct=server autodetect=yes  
destt=library  
device=/dev/tmscsi/lb0
```

- 4 Define Drive -

```
# define drive TSM-iscsi drive01 online=yes (define all drives 0-  
9, drive01 is defined by user)
```

- 5 Define Drive Path –

```
# define path RHEL-TSM-SERVER drive01 srct=server destt=drive  
library=TSM-iscsi device=/dev/IBMtape0 online=yes
```

- 6 Audit the Library -

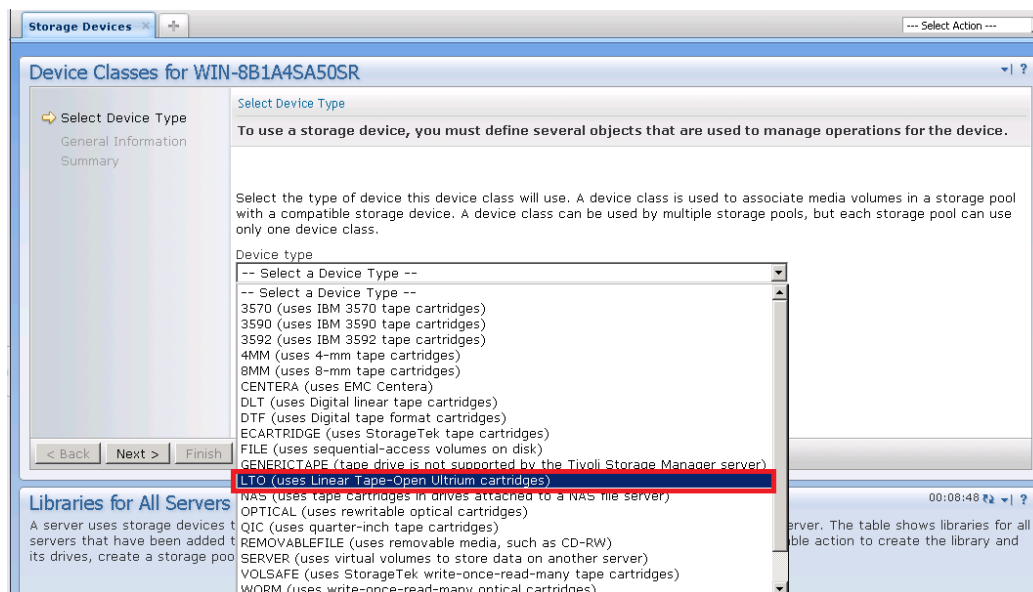
```
Audit library TSM-iscsi checklabel=barcode
```

- 7 Checkin the Library Volumes –

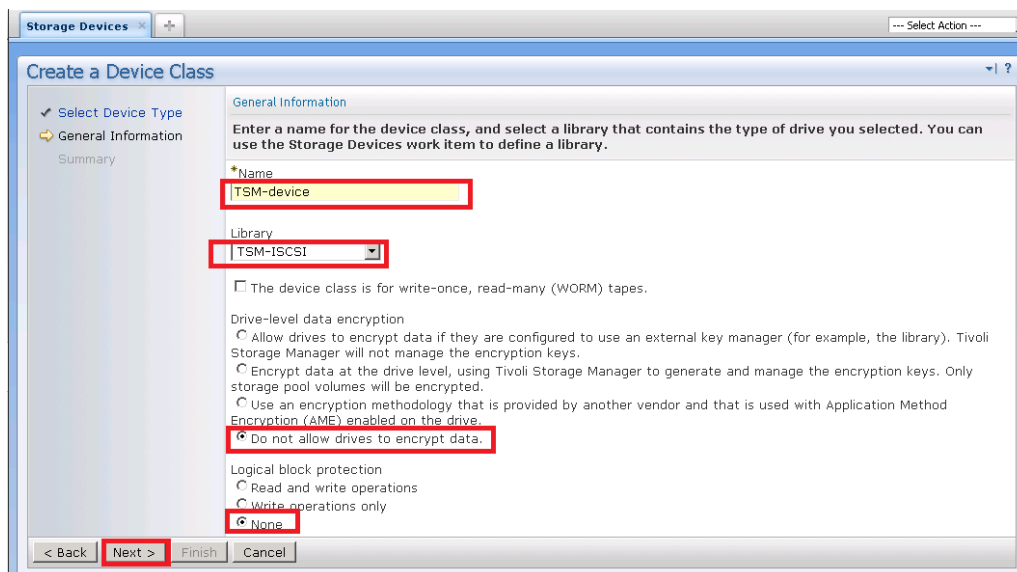
```
# checkin libvolume TSM-iscsi search=yes checklabel=barcode  
status=scratch
```

# Configuring the device class for iSCSI VTL

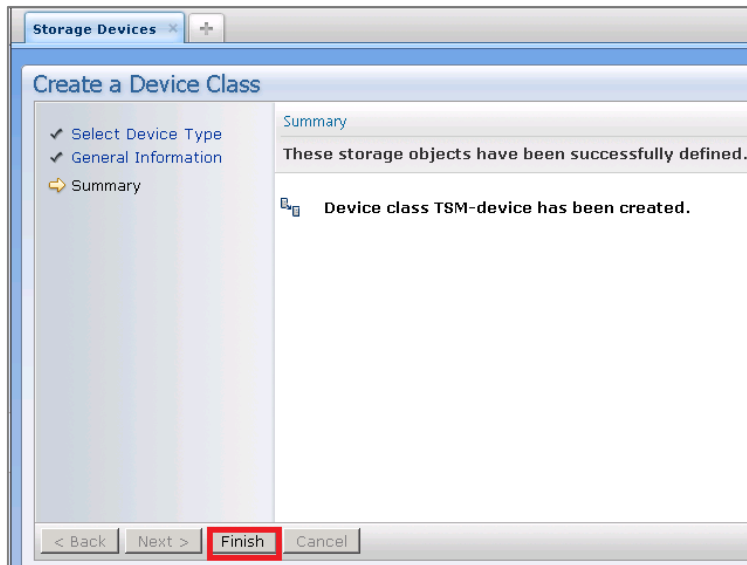
- 1 Follow Steps 1, 2, and 3 as described in the preceding Device Class creation section.
- 2 Select the Device Type as **LTO** for iSCSI VTL.



- 3 In the General Information section, provide the name and select the configured library.
- 4 In the Drive-level data encryption section, select the **Do not allow drives to encrypt data** option.
- 5 For Logical Block Protection, click **None**.

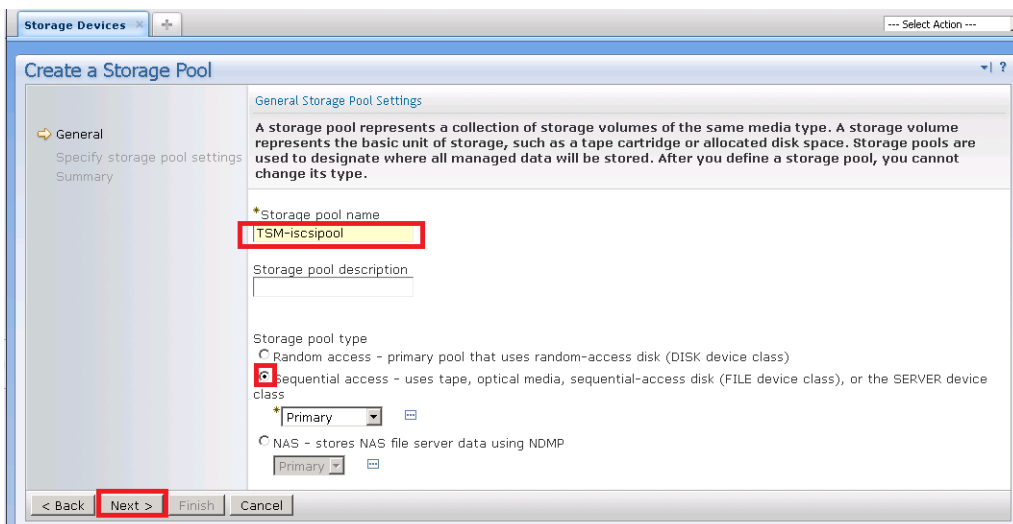


- 6 Click **Next** and then click **Finish**.



## Configuring the storage pool for iSCSI VTL

- 1 Follow the steps 1, 2 and 3 from the preceding Storage Pool creation section of this document.
- 2 In the General storage pool settings section, provide the pool name and type.
- 3 Click **Next**.



- 4 Provide the necessary Device class name and maximum number of Scratch volumes, and click **Next**.

**Create a Storage Pool**

Select a Device Class

A device class represents a set of similar storage devices. A device class is used to associate storage pool volumes with a compatible storage device.

\*Device class name  
TSM-DEVICE

Scratch volumes are used to dynamically satisfy mount requests. Consider entering the number of physical volumes available for this storage pool.

\*Maximum number of scratch volumes  
100

You can select another primary storage pool to use as a Next pool. The Next pool is used to store data migrated from the storage pool being created. During client node operations, the Next pool can also be used to store data if this storage pool runs out of space, or to store files that exceed its maximum size.

Next storage pool  
-- None --

< Back **Next >** Finish Cancel

- 5 Click **Finish**.

**Create a Storage Pool**

Summary

You have successfully created the following storage pool:

Storage Pool Name: TSM-ISCSPool  
Storage Pool Type: Primary, sequential access  
Device Class Name: TSM-DEVICE  
Maximum Number of Scratch Volumes: 100  
Associated Policy Domains:

< Back Next > **Finish** Cancel

## Adding volumes to the library

- 1 After creating the storage pool, click **Storage Devices** in the left pane.
- 2 Select the library configured earlier.

**Libraries for All Servers**

A server uses storage devices to store data for client nodes. Libraries and drives represent storage devices to the server. The table shows libraries for all servers that have been added to the console. There are two ways to add a library. Use the Add a Storage Device table action to create the library and its drives, create a storage pool, and add media. Use Create a Library to create only the library and its drives.

Select	Library Name	Status	Library Manager	Library Clients	Scratch Volumes	Private Volumes	Device Classes
<input type="radio"/>	ISILIB	Good	WIN-8B1A4SA50SR	-	-	-	ISICLASS, LTO-CLASS
<input type="radio"/>	MINE	Good	WIN-8B1A4SA50SR	-	10	-	MINE_DEVICE
<input type="radio"/>	ONE	Good	WIN-8B1A4SA50SR	-	-	10	NAS_CLASS_1, ONE
<input type="radio"/>	TSM-ISCSCI	Good	WIN-8B1A4SA50SR	-	-	-	TSM-DEVICE

Total: 4 Filtered: 4

- 3 Clear the column selection (which was default earlier), disable the target reset option when the server is restarted, and click **OK**.

The screenshot shows the 'Libraries for All Servers' dialog box with the 'General' tab selected. The 'Name' field is 'TSM-ISCSI' and the 'Library type' is 'SCSI'. The 'World wide name' field is empty. The 'Serial number' section has 'Automatically detect the serial number when the library's path is defined.' selected. The 'Automatically label volumes' section has 'No' selected. The 'Last Updated By' field is 'TIPADMIN' and the 'Last Updated On' field is 'Feb 9, 2016 12:13:28 AM'. The 'Share this library' checkbox is checked. The 'Perform a target reset when the server is restarted or when a library client or storage agent reconnects to the server' checkbox is unchecked. The 'OK', 'Apply', and 'Cancel' buttons are at the bottom.

- 4 In the volumes section, click **Add Volumes** and click **OK**.

The screenshot shows the 'Libraries for All Servers' dialog box with the 'Volumes' tab selected. The 'Add Volumes...' button is highlighted in the 'Select Action' dropdown menu. The table below the dropdown is empty. The 'Page 1 of 1', '1', 'Go', 'Rows 0', and 'Total: 0 Filtered: 0' information is at the bottom.

- 5 Enable the option, **All of the volumes are labeled**, and click **Next**.

**TSM-SCSI Properties (WIN-8B1A4SA50SR)**

Check in volumes  
Advanced Options  
Summary

**Add Volume**

A volume represents a single unit of storage media. All volumes must be internally labeled by Tivoli Storage Manager, including those with external bar code labels. Volumes must then be checked into a library before they can be used.

Insert the volumes you want to use into the library or its entry-exit ports.

☐ Not all of the volumes are labeled. Label them now.

☒ All of the volumes are labeled. Just check them in.

< Back **Next >** Finish Cancel

- 6 Enable the option, **Search for all eligible volumes in the library's regular slots**, and click **Next**.

**TSM-SCSI Properties (WIN-8B1A4SA50SR)**

Check in volumes  
Advanced Options  
Summary

**Volume Search Options**

Select whether to search for volumes that are not currently checked in. For a single volume, the server will issue a mount request. Use the View Operator Requests table action in the Libraries table to reply to the mount request.

☐ Search for all eligible volumes in the library's entry-exit ports

☒ Search for all eligible volumes in the library's regular slots

☐ Request only this volume

Volume name

< Back **Next >** Finish Cancel

- 7 On the Check in Volumes page, in the section Discover Eligible Volumes, select the option, **Read bar codes and check in all eligible volumes**.
- 8 Select the **Scratch** option and click **Next**.

**TSM-SCSI Properties (WIN-8B1A4SA50SR)**

00:09:36

Check in volumes  
Advanced Options  
Summary

**Check In Volumes**

The server will search the library to discover volumes that are not currently checked in. Volumes currently defined to the server cannot be checked in as scratch volumes. The check-in process will fail if a drive is not available.

Use the following procedure to discover eligible volumes

☒ Read bar codes and check in all eligible volumes.

☐ Read bar codes, but search only these volumes (separate volume names with commas)

☐ Read bar codes, but search only the volumes found in the following file

☐ Read bar codes, but search only volumes within this range of names

Starting volume name

Ending volume name

☐ Mount volumes and read their labels (required for WORM tapes, except 3592). Check in all eligible volumes.

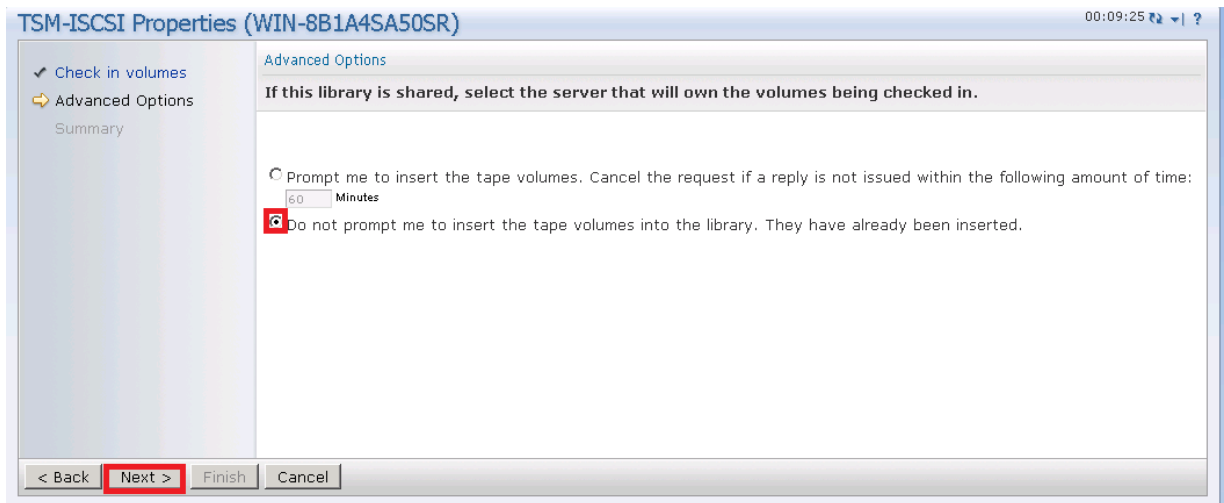
Give volumes the following status when checking them in

☒ Scratch - can be used to satisfy any request to mount a scratch volume

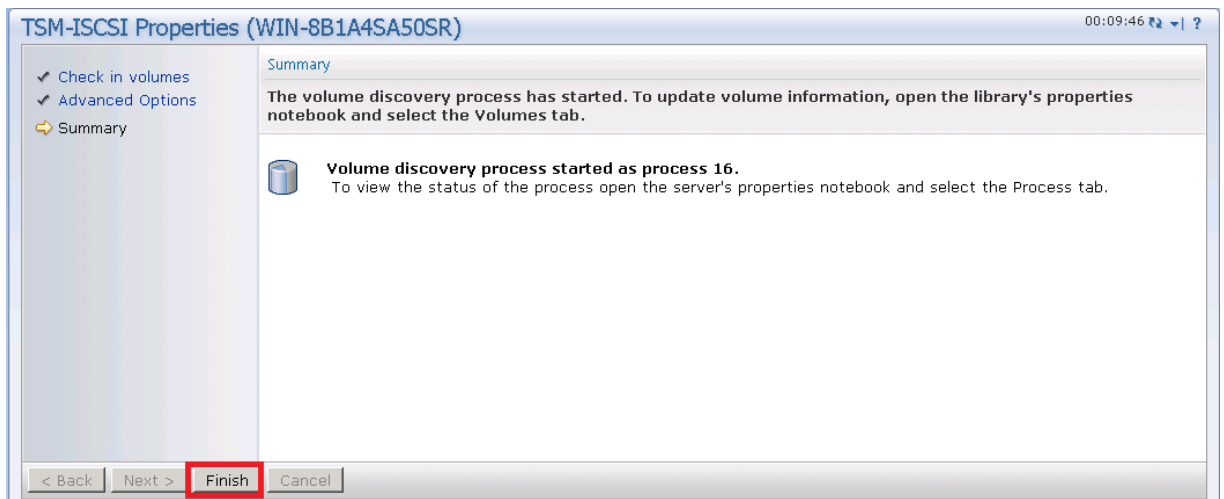
☐ Private - can only be used to satisfy a request to mount the volume by name

< Back **Next >** Finish Cancel

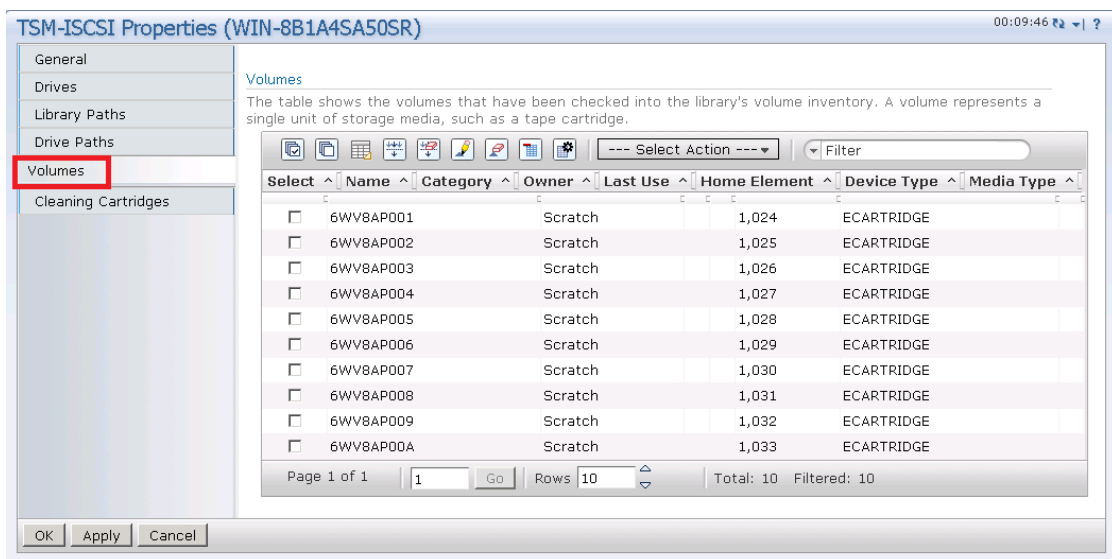
- 9 For Advanced Options, select the option, **Do not prompt me to insert the tape volumes into the library**, and click **Next**.



- 10 Click **Finish**.



- 11 Check that all the volumes are created.



# Adding volumes to the storage pool

- 1 Go to the **STORAGE POOL** section, which was created earlier for the iSCSI target, and click **Volumes**.

The screenshot shows the 'Storage Pools for WIN-8B1A4SA50SR' window with the 'General' tab selected. The left sidebar contains a list of tabs: General, Migration, Media management, Volumes, Statistics, Advanced Options, and Simultaneous Write. The 'Volumes' tab is highlighted with a red rectangle. The main area displays the 'General' configuration for the storage pool. It includes a description: 'A storage pool represents a collection of storage volumes of the same media type. A storage volume represents the basic unit of storage, such as a tape cartridge or allocated disk space. Storage pools are used to designate where all managed data will be stored.' Below this are fields for 'Storage pool name' (TSM-ISCSIPOOL), 'Storage pool description', 'Storage pool type' (Primary, sequential access), 'Next storage pool' (a dropdown menu showing '-- None --'), and 'Device class name' (TSM-DEVICE). At the bottom are 'OK', 'Apply', and 'Cancel' buttons.

- 2 In the Volumes section, click on **Add Volume**.

The screenshot shows the 'Storage Pools for WIN-8B1A4SA50SR' window with the 'Volumes' tab selected. The left sidebar shows the 'Volumes' tab highlighted with a red rectangle. The main area displays the 'Storage Pool Volumes' section. It includes a table with columns: Select, Volume Name, Estimated Size, Status, and Access. The table is currently empty. Above the table is a toolbar with a 'Select Action' dropdown menu, a 'Filter' field, and a 'Page 1 of 1' indicator. The 'Add Volume...' option in the 'Select Action' dropdown menu is highlighted with a red rectangle. Other options in the dropdown include 'Modify Volume...', 'Delete Volume', 'Restore Volume From Copy Pool...', 'Restore Volume From Active-data Pool...', 'Audit Volume...', 'Move Data...', 'View Contents...', 'Refresh Table', and '--- Table Actions ---'. At the bottom are 'OK', 'Apply', and 'Cancel' buttons.

- 3 Provide the details of the volumes one by one in the volumes name field.

**i** | **NOTE:** Provide exactly the same volume name as present in the LIBRARY into volume name for the storage pool.



**Add Storage Pool Volume**

Add Storage Pool Volume

\*Volume name

You can enter a description of the volume's location

☐ Make this volume read-only

OK Cancel **Add Another**

---

**Libraries for All Servers**

General  
 Drives  
 Library Paths  
 Drive Paths  
**Volumes**  
 Cleaning Cartridges

Volumes

The table shows the volumes that have been checked into the library's volume inventory. A volume represents a single unit of storage media, such as a tape cartridge.

Select	Name	Category	Owner	Last Use	Home Element	Device Type	Media Type
<input type="checkbox"/>	6WV8AP001	Scratch			1,024	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP002	Scratch			1,025	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP003	Scratch			1,026	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP004	Scratch			1,027	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP005	Scratch			1,028	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP006	Scratch			1,029	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP007	Scratch			1,030	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP008	Scratch			1,031	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP009	Scratch			1,032	ECARTRIDGE	
<input type="checkbox"/>	6WV8AP00A	Scratch			1,033	ECARTRIDGE	

- 4 Verify that all of the storage pool volumes are configured.

**Add Storage Pool Volume**

General  
 Migration  
 Media management  
**Volumes**  
 Statistics  
 Advanced Options  
 Simultaneous Write

Storage Pool Volumes

The table shows volumes that have been added to this storage pool.

Select	Volume Name	Estimated Capacity	Percentage Utilized	Status	Access
<input type="radio"/>	6WV8AP001	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP002	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP003	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP004	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP005	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP006	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP007	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP008	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP009	0 KB	0	Empty	Read/Write
<input type="radio"/>	6WV8AP00A	0 KB	0	Empty	Read/Write

Page 1 of 1 1 Go Rows 10 Total: 10 Filtered: 10

OK Apply Cancel

## Creating the policy domain for iSCSI VTL

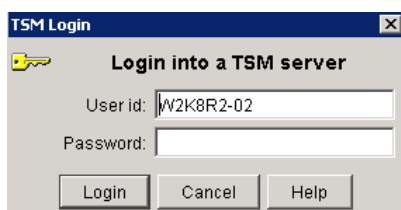
Follow the steps as described in the preceding Policy Domain creation section of this document.

## Creating the client node for iSCSI VTL

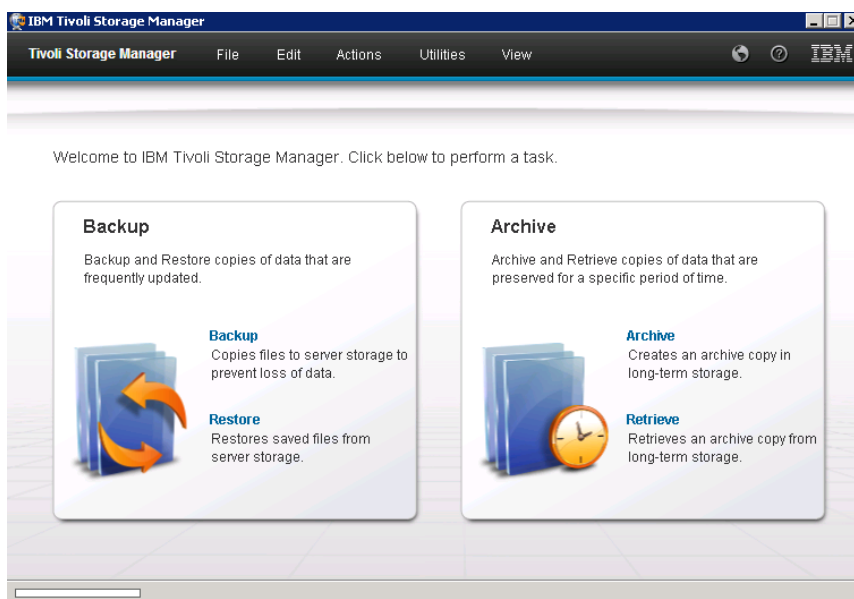
Follow the steps as described in the preceding Client Node creation section of this document.

## Using the backup and archive GUI

- 1 On a client machine, open the Backup-Archive GUI, provide the user ID and password details that were described previously.



When you have logged on, the Backup button is enabled. The Backup and restore manager is ready to perform.



When you have successfully completed the steps above, you have configured the DR Series system for Tivoli Storage Manager. The next time the client is scheduled to back up it will back up to the DR Series system(s). See Appendix B of this document for additional best practices.

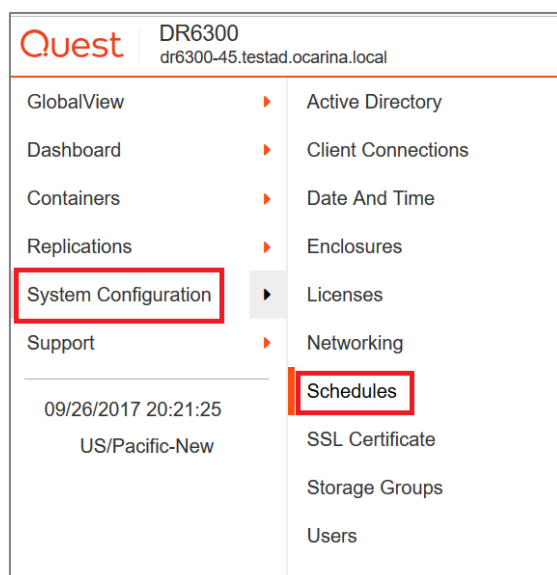
# Setting up the DR Series system cleaner

Performing scheduled disk space reclamation operations are recommended as a method for recovering disk space from system containers in which files were deleted as a result of deduplication.

The system cleaner runs during idle time. If your workflow does not have a sufficient amount of idle time on a daily basis, then you should consider scheduling the cleaner to force it to run during a scheduled time.

If necessary, you can perform the procedure shown in the following example screenshot to force the cleaner to run. After all of the backup jobs are set up, the DR Series system cleaner can be scheduled. The DR Series system cleaner should run at least 40 hours per week when backups are not taking place, and generally after a backup job has completed. Follow these steps to add a cleaner event on the DR Series system.

- 1 On DR series GUI select **System Configuration** then click **Schedules**



- 2 On the **Action Menu** in the upper right corner of the page, select **Add Cleaner Event**.

The screenshot shows the Quest DR6300 Schedules page. The top right corner displays the user 'administrator' with a green checkmark and a dropdown menu. The dropdown menu is open, and the 'Add Cleaner Event' option is highlighted with a red box. Other options in the menu include 'Add Replication Event', 'Add Multiple Replications', 'Add Multiple Cleaners', 'Run Cleaner Now', and 'Log Out'. The main area of the page shows a calendar grid for the week of September 26, 2017, with a green bar indicating a cleaner event on Friday at 7:30.

- 3 Enter the day, start time, and end time for the cleaner event, and then click **Save**.

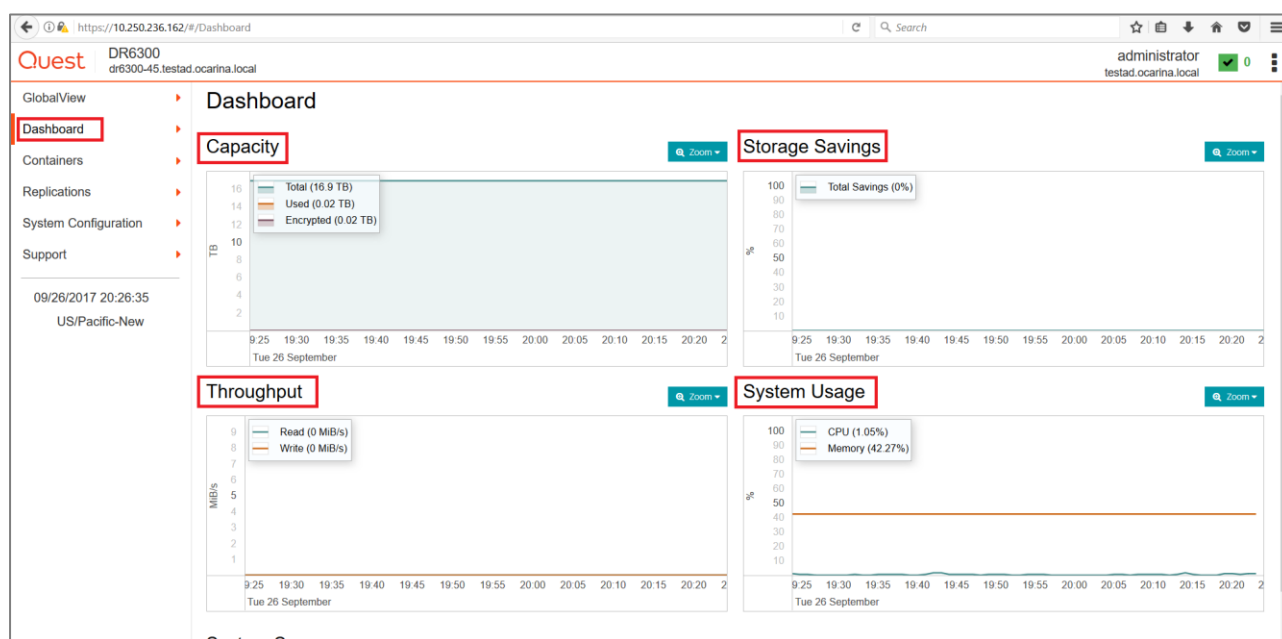
The screenshot shows the Quest DR6300 Schedules page with the 'New' event form open. The form has a red border and contains the following fields: 'Set event from start day' with 'Monday' selected, 'at: 14 : 00', 'to end day' with 'Thursday' selected, and 'at: 14 : 30'. Below the form are 'Save' and 'Cancel' buttons. The 'Save' button is highlighted with a red box. The main area of the page shows a calendar grid for the week of September 26, 2017, with a green bar indicating a cleaner event on Friday at 7:30.

# Monitoring deduplication, compression, and performance

After backup jobs have completed, the DR Series tracks capacity, storage savings and throughput on the DR Series system GUI dashboard. This information is valuable in understanding the benefits of the DR Series system.



**NOTE:** Deduplication ratios increase over time; it is not uncommon to see a 2-4x reduction (25-50% total savings) on the initial backup. As additional full backup jobs complete, the ratios will increase. Backup jobs with a 12-week retention will average a 15x ratio in most cases.



## A - Configuring CIFS authentication

This appendix describes the steps for sync-ing CIFS authentication between the Tivoli Storage Manager service account and the DR Series system.

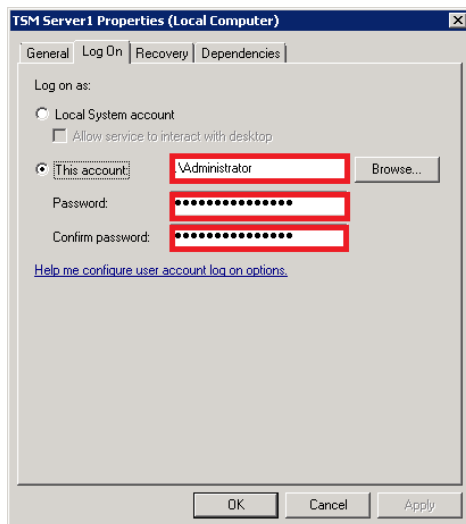
There are two methods for allowing the Tivoli Storage Manager service account to authenticate to a DR Series system.

- Integrate the Tivoli Storage Manager Media Server and DR Series system with Active Directory.
  - Ensure the AD user has appropriate ACLs to the DR4X00 Container
  - Set the TSM Server service to run with <Domain\User>
- Sync local usernames and passwords between the DR Series system and the Tivoli Storage Manager media server. To set the password for the local CIFS administrator on the DR Series system, log on to the DR Series system using SSH.
  - Logon with the credentials: administrator/St0r@ge!
  - Run the following command: `authenticate --set --user administrator`

```
administrator@dr6300-45 > authenticate --set --user administrator
Enter new password for CIFS user administrator:
Re-enter new password for CIFS user administrator:
Changed administrator's password.
administrator@dr6300-45 >
administrator@dr6300-45 >
```

When an authentication method has been selected, set the Tivoli Storage Manager service account to use that account.

- 1 Launch the Microsoft Services Snap-in. (Start > Run > Services.msc > Enter).
- 2 Locate the TSM Server Service (Right-click > Properties > Logon tab.)



**Note:** If you are using local sync'd accounts instead of an Active Directory account, make sure that there is a "." in front of the user name.

- 3 Click OK.
- 4 Right-click the TSM Service process, and click Stop/Start to restart the process.

## B - Best practices/considerations

### Deduplication and compression

The DR Series system has inline deduplication and Compression built-in and does not require any additional deduplication/compression to be done ahead of data being written to the DR Series system. The system will remove any redundancies in the data before the data is stored on disk and then compress the data blocks.

Enabling deduplication/compression before the data stream is sent to the DR Series system will cause the data to be obfuscated, not allowing the system to achieve optimal savings. It is highly recommended that deduplication/compression is not done before the data stream is sent to the DR Series system.

### Encryption

The DR Series system supports encryption-at-rest; hence there is no need to enable encryption for the data management application.

Enabling encryption before the data stream is sent to the DR Series system will cause the data to be obfuscated, not allowing the DR series devices to achieve optimal savings. It is highly recommended that encryption is not

done before the data stream is sent to the DR Series system. It supports encryption on the wire for transferring data to remote sites using replication.

## Space reclamation

For optimal performance, DR Series system and Tivoli Storage Manager backup and space reclamations jobs should be scheduled to happen at different times.

# C - Configuring the tape library devices on Linux

After installing the required device drivers for medium changer and drive, we need to configure tape Library with TSM Server. There is need to figure out the device IDs for respective devices so that Library can be defined in TSM.

In Windows server, there is a command utility “tsmdlst” which lists all the devices along with their IDs. The same can be done in Linux TSM server with “Autoconf” utility located at ‘/opt/tivoli/tsm/devices/bin’. If “Autoconf” utility is not working, need to define library manually in the TSM server as follows.

Please see the following link for more details:

[http://publib.boulder.ibm.com/tividd/td/ITSM/ITSM23-4692-02/en\\_US/HTML/anrlqs52254.htm](http://publib.boulder.ibm.com/tividd/td/ITSM/ITSM23-4692-02/en_US/HTML/anrlqs52254.htm)

To configure the Tivoli Storage Manager device drivers for selected tape drives and libraries, do the following:

1. Verify that the device is connected to your system, and is powered on and active.
2. Ensure that the Tivoli Storage Manager device driver package (TIVsm-tsmcsi-x.x.x-x) is installed for your corresponding architecture.

Get the required driver software from IBM fix central site - <https://www-945.ibm.com/support/fixcentral/>

3. Copy the two sample configuration files that are located in the installation directory from mt.conf.smp and lb.conf.smp to mt.conf and lb.conf, respectively:

**For drives:**

```
> cp /opt/tivoli/tsm/devices/bin/mt.conf.smp  
/opt/tivoli/tsm/devices/bin/mt.conf
```



**For libraries:**

```
> cp /opt/tivoli/tsm/devices/bin/lb.conf.smp  
/opt/tivoli/tsm/devices/bin/lb.conf
```

4. Edit the mt.conf and lb.conf. Add one stanza (as shown in the example at the top of the file) for each SCSI target ID and LUN combination for which you want the device driver to probe for supported tape drives, and for each autochanger device in the system that you want the server to use.
5. To load the device driver, run the tsm SCSI script from the device driver installation directory.

```
> cd /opt/tivoli/tsm/devices/bin ./tsmscsi
```

Then all the devices will be listed in following location –

TSM drives     /dev/tsmscsi/mt#

IBM drives     /dev/IBMtape#

TSM Library    /dev/tsmscsi/lb#

Change the permissions of the devices to avoid IO error during Library configuration –

```
chmod 777 /dev/tsmscsi/*  
chown tsminst1:tsmsrvrs /dev/tsmscsi/*  
chmod 777 /dev/IBM*  
chown tsminst1:tsmsrvrs /dev/IBM*
```

Note: tsminst1 and tsmsrvrs are the user and group resp. created for TSM installation.