

Linux Library Controller Installation and Use

The Linux Library Controller is designed to be installed on the VTL server. This can eliminate the need for a separate Windows system to communicate with a virtual library to get information about the library and to execute tape movement commands. Version one mimics the current Windows controller in that it allows ONE client to communicate with ONE virtual library. NOTE: the ONLY supported configuration is a single virtual library assigned as a resource to an iSCSI client on a VTL.

Installation

The installation of the Linux Library Controller uses a self-extracting script. This may be named “Install-DSICTL.bsx” or it may have the version included in the name, Install-DSICTL-6-0-01.bsx for example. To perform the installation move the Install-DSICTL.bsx file to the VTL server. This can be placed in whatever directory you choose. For this example we use /tmp. You will need to make sure the file is executable. You must also be logged on to the server as the super user, root. When the file has been placed on the VTL server and you are logged in as root, issue: `cd /tmp` If you have placed the file in a different directory issue the cd command for that directory. You can then issue the command to ensure the file is readable and executable the super user root by issuing: `chmod 500 Install-DSICTL.bsx`.

The actual installation takes place when you run this file by entering its name:

```
./Install-DSICTL.bsx
```

Or

```
./Install-DSICTL-6-0-01.bsx
```

depending on the name of the file.

You should then see output similar to that in figure 1.

The DSICTL program consists of the binary file and several scripts. These are all placed under the /usr/local/DSI directory. If the directory doesn't exist, the install script will create it. The files installed by the Linux Library Controller are:

/usr/local/DSI/bin/LLC The binary file that is the library controller program.

/usr/local/DSI/scripts/DSICTL A script to start and stop the LLC.

/usr/local/DSI/scripts/DSICTL-Monitor A script that is started when the LLC is started. It is also stopped when the DSICTL script stops the controller. It runs in background mode and periodically checks that the LLC is running. If it detects if LLC has stopped, it starts it again.

/usr/local/scripts/PortUse A script used internally by the LLC to report what programs are using ports 3260, 5600, and 5604. These ports are used by the DSI software.

The DSICTL script is linked to /etc/init.d and appropriate /etc/rc.d subdirectories so that the controller is started or stopped when the VTL server is stopped, started, or rebooted. It is also linked to /usr/sbin so that the user will only have to enter **DSICTL start** or **DSICTL stop** to control the LLC.

```
[root@LLC-DEV tmp]# ./Install-DSICTL.bsx

DSI self extracting script to install the Linux Library Controller

./DSICTL-Install
./LLC-files.tar

Running the Installation script of the Linux Library Controller (LLC) .

Removing any rc.d links to old DSICTL scripts.
Unlinked DSICTL from /usr/sbin
    Make sure the current version is stopped.
Previous DSICTL level files are now unlinked and/or moved.

    Copying files to /usr/local/DSI.
./bin/LLC
./scripts/DSICTL
./scripts/DSICTL-Monitor
./scripts/PortUse

Now link the START/STOP script to proper /etc/rc.d directory.
ln: creating symbolic link `/etc/rc.d/rc0.d/K00DSICTL': File exists
ln: creating symbolic link `/etc/rc.d/rc6.d/K00DSICTL': File exists
ln: creating symbolic link `/etc/rc.d/rc5.d/S99DSICTL': File exists
ln: creating symbolic link `/etc/rc.d/rc3.d/S99DSICTL': File exists

To start the DSI Linux Library Controller software issue the following command.

    DSICTL start

Linux Library Controller installation complete.
```

Output of installation script. (figure 1.)

The Linux Library Controller creates and uses several directories under /usr/local/DSI. These are:

```
drwxr-xr-x 2 root root 4096 Jul 21 18:52 bin
drwxr-xr-x 2 root root 4096 Jul 26 17:11 config
drwxr-xr-x 2 root root 4096 Jul 26 17:11 logs
drwxr-xr-x 2 root root 4096 Jul 20 09:41 scripts
drwxr-xr-x 2 root root 4096 Jul 21 17:12 tmp
drwxr-xr-x 2 root root 4096 Jul 28 02:44 traces
```

Output of ls -l command in /usr/local/DSI (figure 2.)

/usr/local/DSI/bin The binary file LLC resides here. If you install a new version of LLC the install script copies the current **LLC** file to **old-LLC-<date/time>**. This can be used if it is necessary to fall back to the previous version.

/usr/local/DSI/scripts This contains the scripts mentioned above.

/usr/local/DSI/tmp This is used for several files created and used by the LLC

/usr/local/DSI/logs Log files are kept here.

/usr/local/DSI/traces Trace files are written here.

/usr/local/DSI/config Currently used for a PID file but may be used for other items in the future.

NOTE: the log and trace files are managed by the software. Currently these are limited to 50 files of each type, with a maximum size of about 10 MB each.

The Linux Library Controller using Fibre Channel connection to a library.

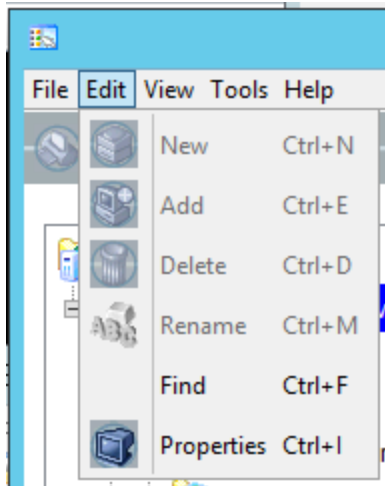
Starting with the LLC release 6.02.000 the library controller can be installed on a standalone server. Initially this is a DELL R330 system. This installation continues the restriction from the Windows Library Controller of having **ONLY** one library attached to the library controller. It also maintains the limit of only allowing one MCP client to use the system. It does **NOT** use iSCSI to attach to a library. The library will need to be attached via a fibre channel. The installation and configuration of the library is beyond the scope of this document. If a library is attached via fibre channel the following discussion of iSCSI does not apply.

Setting up the iSCSI initiator and iSCSI client

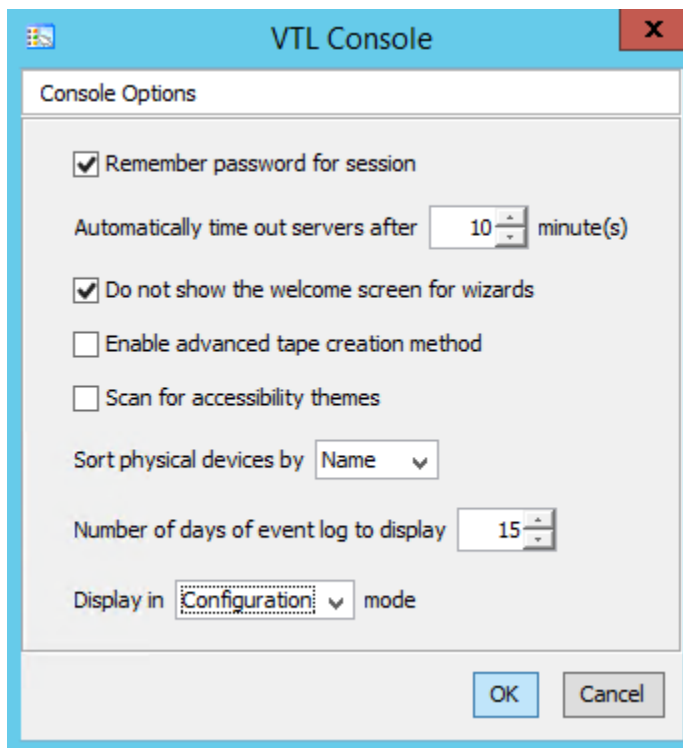
The Linux Library Controller uses the iSCSI protocol to communicate with the virtual library. This requires an iSCSI client be set up on the VTL.

Using the VTL Console GUI access the VTL server. Open the “+ Clients” by clicking on the plus sign.

Note: You can only see the +Clients option if you have enabled Configuration mode in the VTL Console properties. Select the VTL server and at the top of the Console select Edit – Properties.



At the bottom of the screen that popped up note the “Display in XXXXXX mode” where XXXXXX can be Standard or Configuration. Select Configuration.

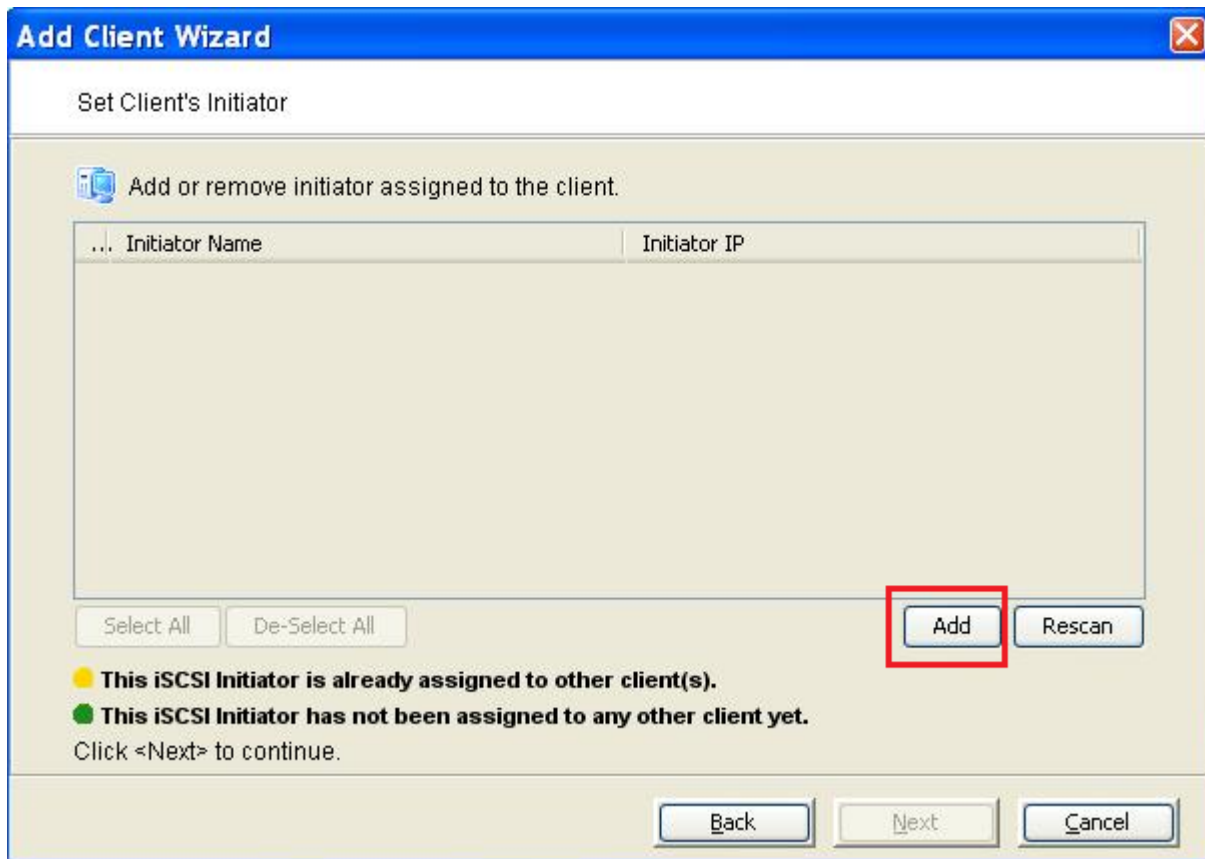


And then OK.

Then select the “iSCSI Clients” and right click on it and select “Add”



This will start the “Add Client Wizard”.



Click on the “Add” button. This will display a window that will need the client name. It is suggested that you use something that will easily identify this client and the library it will be controlling.



Add Client Wizard

Enter the Client Name

Enter the machine name of the client.

Client Name: LLC-R430Qual

Click <Next> to continue.

Back Next Cancel

Click “Next” and it will display the window that will allow you to select the initiator.

If no iSCSI initiators have been defined that access the VTL no Client Initiators will be displayed.

An iscsiadm command must be issued via a Linux terminal window on the VTL server to have the correct initiator be visible. This requires the IP address of the server be known. So this has to be done after the server is installed at the customer’s site as the IP address has to be supplied by the customer. The following command queries the given IP address/port combination for defined iscsi targets. It also identifies the sending system as an iscsi initiator. As root issue the command:

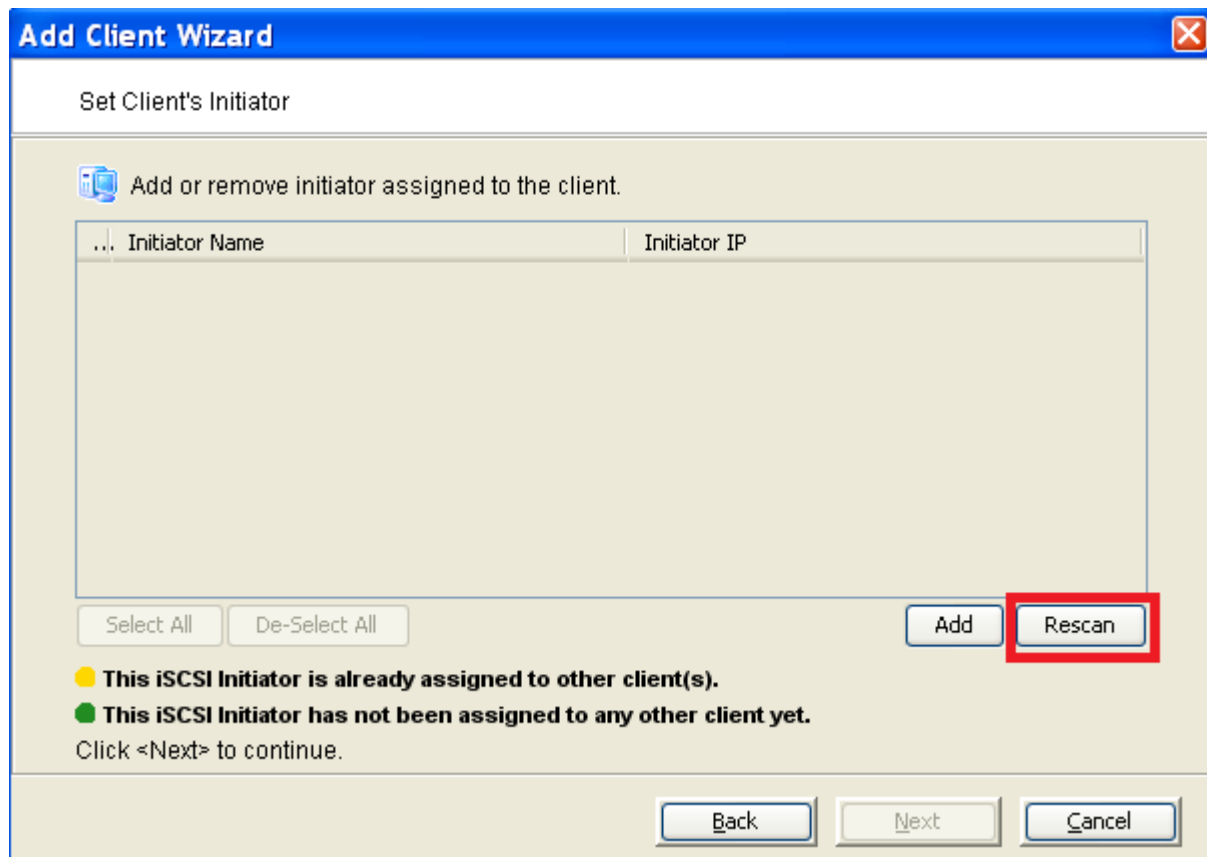
```
iscsiadm -m discovery --op update --type sendtargets --portal <primary VTL IP addr>:3260
```

The response to this command when no targets have been defined should be:

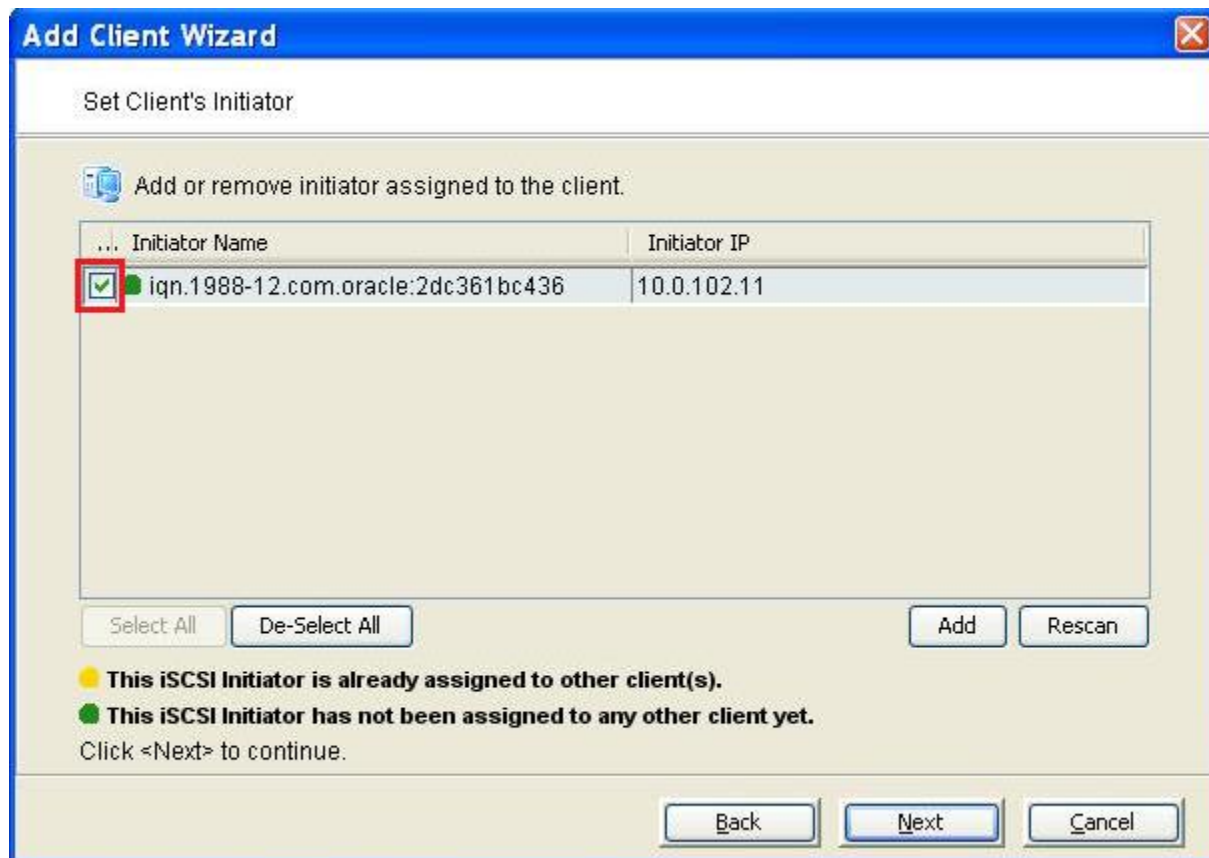
```
iscsiadm: No portals found
```

Of course <primary VTL IP addr> is replaced by the IP address of the VTL server. If a fail over pair of servers is being installed this command will also have to be run on the stand-by server. Again the IP address of the PRIMARY server will need to be used on the standby server as well. To be clear the command on BOTH servers should use the same IP address. This should be the IP address that the

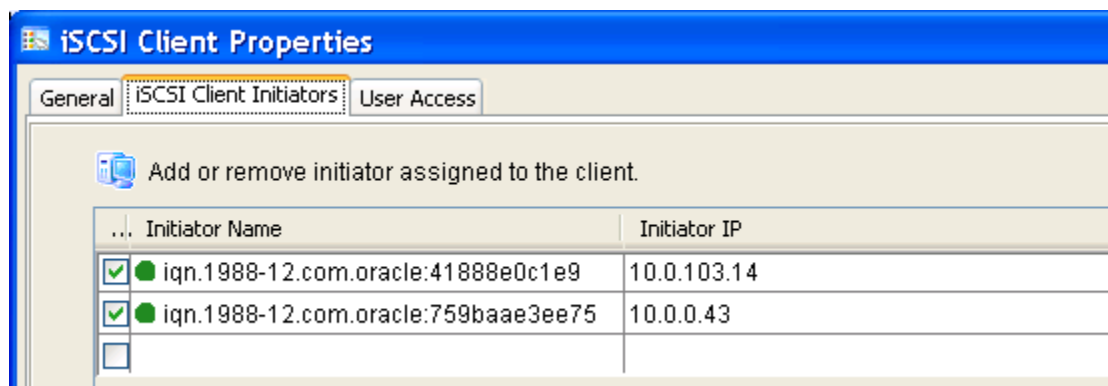
standby server takes over in the case of a fail over. The above command will cause the server itself to show up as an initiator during the client definition. After issuing the `iscsiadm` command you may have to select the “Rescan” button to refresh the initiator display.



Select the Initiator by clicking on the box to the left of the name. NOTE: There should be a green dot in front of the name.



If a fail over pair is being installed select BOTH the primary and standby servers as initiators when defining the iSCSI client. After issuing the `iscsiadm` command on both servers you should see a similar display on the VTL console GUI for the iSCSI Client Initiators:



Select both of the servers of the fail over pair. This allows the VTL software that is acting as the primary server to recognize the secondary server as an iSCSI initiator.

Select the Next button.

This will display the iSCSI User Access window. Select the "Allow unauthenticated access" button. Since the only user on the server accessing the library will be root.

Add Client Wizard [X]

Set iSCSI User Access

Set authentication for the Client

☒ **Allow unauthenticated access**

☐ Select or add users who can authenticate for the Client

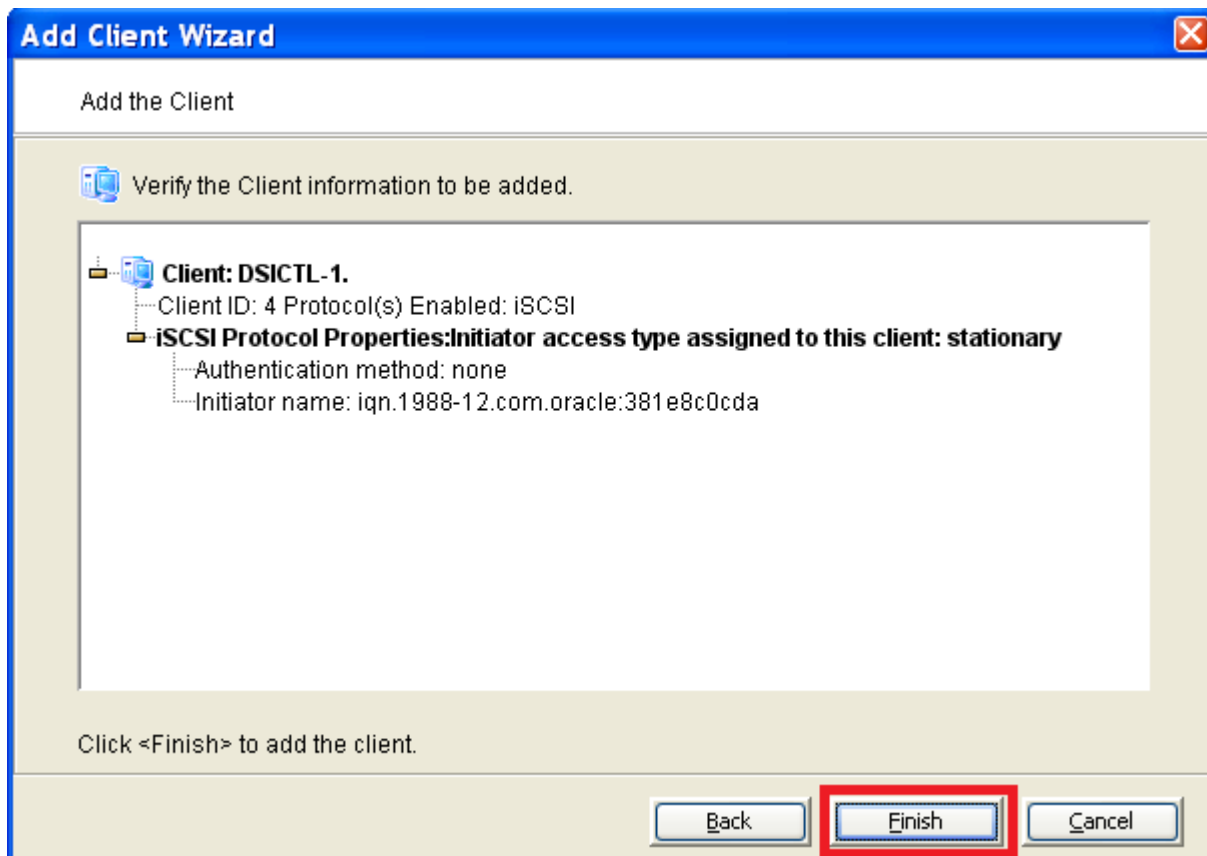
... Username

Select All De-Select All Add Delete Reset Password Rescan

Click <Next> to continue.

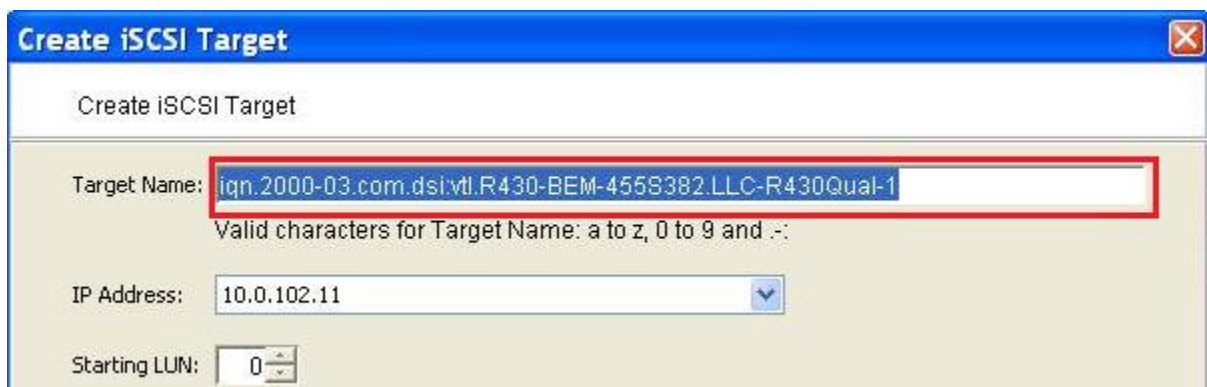
Back Next Cancel

Select the "Next" button and a window displaying the information entered will be displayed.

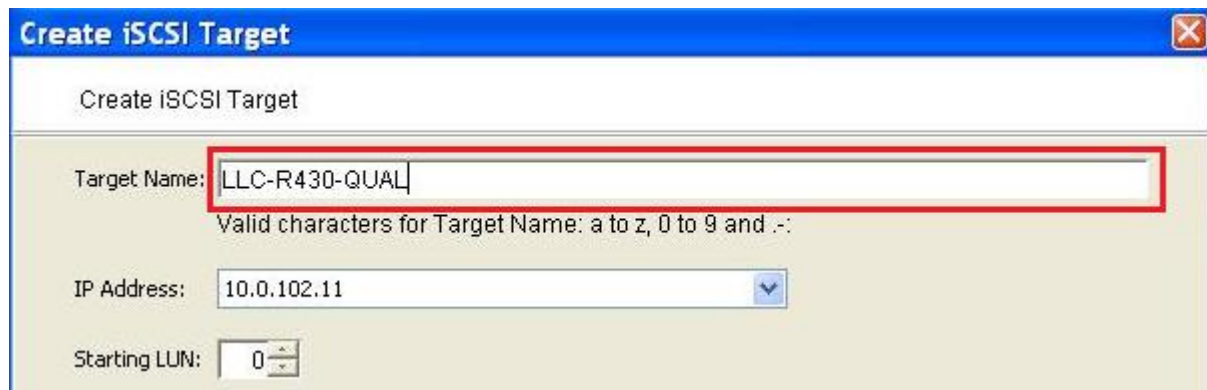


When this is correct select the “Finish” button, or if you need to change an item select “Back” and make corrections.

Now that a client has been created it needs to have a target created. The client that has been created will now be displayed under the iSCSI entry on the VTL Console GUI. Right click on the client and select “Create Target”. This will display a window with the default target name of the server’s iqn name.



You can use this but it is suggested that a more readable name be used. Possibly something that refers to the library to be used by this client. It will have to be unique on the server.



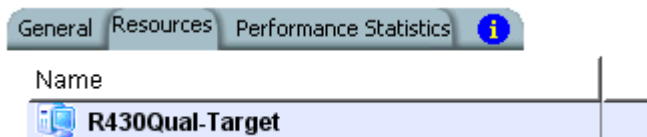
The image shows a 'Create iSCSI Target' dialog box. It has a blue title bar with the text 'Create iSCSI Target' and a close button. The main area is white and contains the following fields:

- Target Name:** A text box containing 'LLC-R430-QUAL'. This field is highlighted with a red rectangle. Below it, a note reads: 'Valid characters for Target Name: a to z, 0 to 9 and .-:'.
- IP Address:** A dropdown menu showing '10.0.102.11'.
- Starting LUN:** A numeric input field showing '0'.

Click the “Next” button and a review screen will be displayed. If the information is correct, click “Finish”. If you want to change the target name, click “Back” and make the changes.

Now that a client and a target have been created a library will have to be assigned to the target.

On the VTL Console GUI select the client you have just created and in the right pane click on the “Resources” tab.



This will display the available devices.

Assign iSCSI Resource to Target

Select virtual drives for LUNs in the target

Select the Resources to be assigned to the Client.

Target Name: R430Qual-Target

Click the button at the rightmost column to view the device grouping information for the tape library with tape drives.

☐ **Allow tape drive(s) in the tape library to be assigned individually.**

...	Name	Type	...
<input type="checkbox"/>	R430QUALTEST	Virtual Library	

Select All De-Select All

● The Logical Resource is already assigned to other clients / iSCSI targets.
● The Logical Resource has not assigned to other clients / iSCSI targets yet.

Click <Next> to continue.

Back Next Cancel

Select the library by clicking the box to the left of the library name. THEN select the “Allow tape drive(s) in the tape library to be assigned individually.” check box. The tape drives in the library will then be displayed. DO NOT CHECK THE BOXES FOR THE DRIVES! The tape drives should be assigned to a Fibre Channel client for the data path to the MCP client. The drives should NOT be assigned to the Library Controller.

Assign iSCSI Resource to Target

Select virtual drives for LUNs in the target

Select the Resources to be assigned to the Client.

Target Name: R430Qual-Target

Click the button at the rightmost column to view the device grouping information for the tape library with tape drives.

☒ **Allow tape drive(s) in the tape library to be assigned individually.**

...	Name	Type	...
<input checked="" type="checkbox"/>	R430QUALTEST	Virtual Library	▶
<input type="checkbox"/>	HP-Ultrium 5-SCSI-00005	Virtual Drive	▶
<input type="checkbox"/>	HP-Ultrium 5-SCSI-00006	Virtual Drive	▶

Select All De-Select All

● The Logical Resource is already assigned to other clients / iSCSI targets.
● The Logical Resource has not assigned to other clients / iSCSI targets yet.

Click <Next> to continue.

Back Next Cancel

Click the "Next" button and the Assign LUN to Target window will be displayed.

Assign iSCSI Resource to Target

Assign LUN to Target

Target Name: R430Qual-Target

Starting LUN: 0

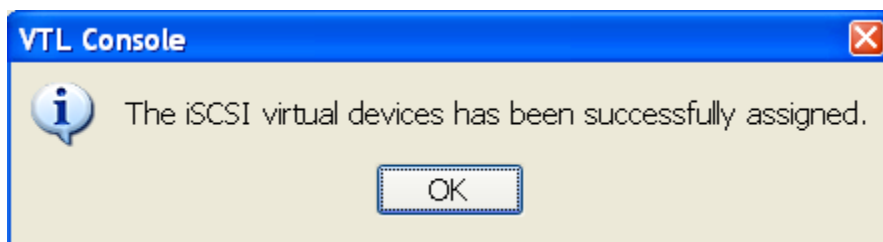
Name	Type	LUN
R430QUALTEST	Virtual Library	0

● The Logical Resource has one invalid LUN or conflict LUN number.
● The Logical Resource has one valid LUN number.

Click <Next> to continue.

The default LUN selection is fine. Click "Next".

A screen that displays the Assign LUN screen information is displayed for review. If it is correct click "Finish" and you will see the success window. Click "OK" to finish assigning devices to the iSCSI target.



After completing the client and target configuration again enter the command:

```
iscsiadm -m discovery --op update --type sendtargets --portal <primary VTL IP addr>:3260
```

The response should now be the <ip address>:3260,0 <target name>

For example after target R430Qual-Target has been created on a server at IP 10.0.102.11 the command:

```
iscsiadm -m discovery --op update --type sendtargets --portal 10.0.102.11:3260
```

Returns: 10.0.102.11:3260,0 R430Qual-Target

Now that an iSCSI client and target have been defined the Linux Library Controller can be used.

Refer to the Tape Manager / Library Manager documentation for information regarding the proper method to configure that software to connect to the LLC.

Starting and stopping the Linux Library Controller.

To start the library controller enter: **DSICTL start**

To see if the library controller is running issue: **DSICTL status**

To terminate the library controller enter: **DSICTL stop**

```
[root@DSI400-BEM-455S382 DSI]# DSICTL status
The LLC does not appear to be running.
[root@DSI400-BEM-455S382 DSI]# DSICTL start
[root@DSI400-BEM-455S382 DSI]# DSICTL status
DSICTL Version 6.000.01d is running with PID = 142615.
[root@DSI400-BEM-455S382 DSI]# DSICTL stop
[root@DSI400-BEM-455S382 DSI]# DSICTL status
The LLC does not appear to be running.
[root@DSI400-BEM-455S382 DSI]#
```

Sample output of status, start, and stop commands. (figure 3.)

When the Library Controller is started it creates a PID file. If the command to start the controller (**DSICTL start**) is issued while the LLC program is already running it will fail to start a second copy because it checks for the existence of the this PID file.

Trouble shooting the Linux Library Controller

Since the Linux Library Controller runs in background mode there isn't any outward sign that it is running. If it is suspected that the controller is not functioning you should:

Issue the **DSICTL status** command. If the LLC has been started or stopped in a normal manner this will report if it is NOT running or if it is running it will report the process id number (PID).

If the status command reports that the program is running you can verify this by issuing:

ps -e | grep LLC which could show something similar to:

```
# ps -e | grep LLC
```

```
142615 pts/1 00:00:00 LLC
```

This shows the PID (142615 above) which SHOULD match the output of the DSICTL status command. If it doesn't or it doesn't report anything it indicates there may be problem. Stop the controller with the DSICTL stop command. Then check the output of the DSICTL status command. It should report that LLC is not running. You may also want to verify this with the `ps -e | grep LLC` command to make sure it is not running. If the DSICTL status command STILL reports the program is running you but the `ps` command doesn't, you can remove the PID file manually. Issue `rm /usr/local/DSI/config/PID`

This will ask for confirmation:

```
# rm /usr/local/DSI/config/PID
```

```
rm: remove regular file `/usr/local/DSI/config/PID'?
```

Respond with **yes** or just a **y** to remove the file.

DSICTL status should now indicate that the controller is not running. The `ps -e | grep LLC` should also NOT report anything.

Now start the controller **DSICTL start**

Check for port usage.

There has been an issue that another program is using port 5600 that the controller uses to communicate with the client. When the LLC starts it creates a file showing the ports that it and the DSI VTL AGENT use. It also shows port 3260 which is used by the iSCSI software. Look at `/usr/local/DSI/tmp/UsedPorts` to see that the ports are is use by the DSI software.

Issue `cat /usr/local/DSI/tmp/UsedPorts` you should see something similar to

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State	PID/Program name
tcp	0	0	0.0.0.0:3260	0.0.0.0:*	LISTEN	12802/fsiscsid
tcp	0	0	0.0.0.0:5600	0.0.0.0:*	LISTEN	142766/LLC
tcp	0	0	0.0.0.0:5604	0.0.0.0:*	LISTEN	38897/VTL-Agent
tcp	0	0	10.0.102.11:3260	10.0.102.11:40238	ESTABLISHED	-
tcp	0	0	10.0.102.11:5604	10.0.0.31:63135	ESTABLISHED	38897/VTL-Agent

END PortUse

NOTE: If you have the LLC using a library with a fibre channel connection you should only see the entry for the LLC on port 5600.