

Integrating NEO® Tape Libraries with IBM® Spectrum Protect 8.1 (Linux)



Spectrum Protect 8.1 (formerly Tivoli Storage Manager) from IBM supports many Overland-Tandberg tape libraries including NEOs StorageLoader (1U), NEOs T24 (2U), NEOxl 40 (3U), and NEOxl 80 (6U).

This guide explains how to configure a NEOxl 80 to work with IBM Spectrum Protect 8.1 in a Red Hat Enterprise Linux (RHEL) environment. Upon successful completion of these procedures, the reader will have a general understanding on how to configure a NEO tape library using the Spectrum Protect console and how to create a backup and restore job to the NEO tape library. This process is the same for the other supported NEO tape libraries (NEO StorageLoader, NEOs T24, and NEOxl 40).



The guide also covers how to configure tape drive encryption.

Integrate NEOxl 80 with Spectrum Protect 8.1

The next few steps require a Linux command prompt to verify the NEO library and its tape drives.

1. Verify all devices are present by typing:

```
# cat /proc/scsi/scsi
```

```
[root@sd32127rh74 /]# cat /proc/scsi/scsi
Attached devices:
Host: scsi0 Channel: 02 Id: 00 Lun: 00
Vendor: SMC Model: SMC2208 Rev: 3.29
Type: Direct-Access ANSI SCSI revision: 05
Host: scsi11 Channel: 00 Id: 00 Lun: 00
Vendor: HL-DT-ST Model: DVDROM GP10NB20 Rev: 1.02
Type: CD-ROM ANSI SCSI revision: 00
Host: scsi9 Channel: 00 Id: 00 Lun: 00
Vendor: MSCC Model: Smart Adapter Rev: 1.60
Type: Enclosure ANSI SCSI revision: 05
Host: scsi9 Channel: 02 Id: 00 Lun: 00
Vendor: MSCC Model: 3154-8e Rev: 1.60
Type: RAID ANSI SCSI revision: 05
Host: scsi10 Channel: 00 Id: 00 Lun: 00
Vendor: IBM Model: ULTRIUM-HH8 Rev: KAH1
Type: Sequential-Access ANSI SCSI revision: 06
Host: scsi10 Channel: 00 Id: 01 Lun: 00
Vendor: IBM Model: ULTRIUM-HH8 Rev: KAH1
Type: Sequential-Access ANSI SCSI revision: 06
Host: scsi10 Channel: 00 Id: 01 Lun: 01
Vendor: BDT Model: MULTISTAK Rev: 2.80
Type: Medium Changer ANSI SCSI revision: 05
[root@sd32127rh74 /]#
```

In this example, a NEOxl 80 and two LTO-8 drives are shown.

2. Use the following commands to verify the IBM tape drives are recognized correctly along with their device files, making careful note of the device paths that will be used later to configure Spectrum Protect. Type these two lines:

```
# ls -la /dev/IBM*
```

```
# cat /proc/scsi/IBM*
```

```
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
[root@sd32127rh74 /]# ls -la /dev/IBM*
lrwxrwxrwx. 1 root root 240, 3069 Jan 8 10:17 /dev/IBMSpecial
lrwxrwxrwx. 1 root root 240, 3071 Jan 8 10:17 /dev/IBMtape
lrwxrwxrwx. 1 root root 240, 0 Jan 8 10:27 /dev/IBMtape0
lrwxrwxrwx. 1 root root 240, 1024 Jan 8 10:27 /dev/IBMtape0n
lrwxrwxrwx. 1 root root 240, 1 Jan 9 10:12 /dev/IBMtape1
lrwxrwxrwx. 1 root root 240, 1025 Jan 9 10:12 /dev/IBMtape1n
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
[root@sd32127rh74 /]# cat /proc/scsi/IBM*
lin_tape version: 3.0.48
lin_tape major number: 240
Attached Changer Devices:
Number model SN HBA SCSI FO
lin_tape version: 3.0.48
lin_tape major number: 240
Attached Tape Devices:
Number model SN HBA SCSI FO
0 ULTRIUM-HH8 11C2A700BF qla2xxx 10:0:0:0 NA
1 ULTRIUM-HH8 11C2A700B5 qla2xxx 10:0:1:0 NA
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
[root@sd32127rh74 /]#
```

The tape drive paths are shown as:

```
/dev/IBMtape0
```

```
/dev/IBMtape1 (if a second tape drive exists)
```

NOTE: If your output does not look similar to this example, you may need to download and install the IBM lin_tape driver for Linux. You can also check the Troubleshooting section for additional guidance for device discovery.

3. To configure the NEO device file using Spectrum Protect executable. Navigate to the `/opt/tivoli/tsm/devices/bin` directory do the following:

- a. Create a copy of `lb.conf.smp` in `lb.conf`.
- b. To configure the `lb.conf`, review the **output** from Step 1.

```
Host: scsio Channel: 00 Id: 01 Lun: 01
Vendor: BDT Model: MULTISTAR Rev: 2.80
Type: Medium Changer ANSI SCSI revision: 05
[root@sd32127rh74 /]#
```

c. Edit `lb.conf` (using the vi editor) and configure the following parameters:

- `HOST[0]=0`
- `CHANNEL[0]=0`
- `ID[0]=0`
- `LUN[0]=0` (or 1 for second tape drive)

```
HOST[0]=0
CHANNEL[0]=0
ID[0]=0
LUN[0]=1
#
[root@sd32127rh74 bin]#
```

d. Save `lb.conf` changes.

4. Use these commands to create the **library device file** based on the configuration file previously modified and make note of the device file that will be used later:

a. In the current directory, type:

```
./autoconf -a
```

```
[root@sd32127rh74 bin]# ./autoconf -a
*****
IBM Spectrum Protect
Autoconf Utility Program for Linux
*****
Licensed Materials - Property of IBM

(C) Copyright IBM Corporation 2016. All rights reserved.
U.S. Government Users Restricted Rights - Use, duplication or disclosure
restricted by GSA ADP Schedule Contract with IBM Corporation.

Medium Changer Devices:
-----
Index Minor Host CHN ID LUN Type Vendor_ID Device_Serial_Number Product_ID Rev.
000 006 010 000 001 001 008 BDT DE68101788_LL01 MULTISTAR 2.80

[root@sd32127rh74 bin]# ./tsmdlst
IBM Spectrum Protect
Device List Utility Program for Linux
Licensed Materials - Property of IBM
(C) Copyright IBM Corporation 2016. All rights reserved.
U.S. Government Users Restricted Rights - Use, duplication or disclosure
restricted by GSA ADP Schedule Contract with IBM Corporation.

No tape drive information. File /dev/tsm SCSI mtinfo does not exist.

Index Minor Host CHN ID LUN Type Vendor_ID Device_Serial_Number Product_ID Rev.
000 006 010 000 001 001 008 BDT DE68101788_LL01 MULTISTAR 2.80
[root@sd32127rh74 bin]#
```

b. Type the following command:

```
# ls -l /dev/tsm SCSI/*
```

```
[root@sd32127rh74 bin]# ls -l /dev/tsm SCSI/*
lrwxrwxrwx. 1 root root 6 Jan 9 10:31 /dev/tsm SCSI/lb0 -> /dev/sg6
-rw-r--r--. 1 root root 181 Jan 9 10:31 /dev/tsm SCSI/lbinf
[root@sd32127rh74 bin]#
```

Make careful note of the library device path which is displayed after the command. In this example, it is:

```
/dev/sg6
```

5. Use the Spectrum Protect Administration Console to configure the NEO library, Device Class, and Stage Pool:

a. Navigate to `/opt/tivoli/tsm/client/ba/bin` and type:

```
./dsmadm
```

b. Define the library by typing:

```
def libr <LibraryName> libt=scsi
```

c. Define the library's path by typing:

```
def path <TSMserverName> <LibraryName> srctype=server desttype=libr
device=<path>
```

```
IBM Spectrum Protect:SERVER1>
def libr neoxl80 libt=scsi
ANR2017I Administrator SERVER_CONSOLE issued command: DEFINE LIBRARY neoxl80 libt=scsi
ANR2017I Library NEOXL80 defined.
ANR1434W No files have been identified for automatically storing device configuration
information.
IBM Spectrum Protect:SERVER1>
def path server1 neoxl80 srctype=server desttype=library device=/dev/tmscsi/lb0
ANR2017I Administrator SERVER_CONSOLE issued command: DEFINE PATH server1 neoxl80 srctype=ser-
ver desttype=library device=/dev/tmscsi/lb0
ANR2017I Library NEOXL80 with serial number is updated with the newly discovered serial
number DE68101788_LL01.
ANR1720I A path from SERVER1 to NEOXL80 has been defined.
ANR1434W No files have been identified for automatically storing device configuration
information.
IBM Spectrum Protect:SERVER1>
```

d. Define the drives by typing for *each* drive:

```
def drive <LibraryName> <DriveName>
```

e. Define *each* drive's path by typing:

```
def path <TSMserverName> <DriveName> srctype=server desttype=drive
device=<path>
```

```
IBM Spectrum Protect:SERVER1>
def path server1 lto8d1 srctype=server desttype=drive device=/dev/IBMtape0 libr=neoxl80
ANR2017I Administrator SERVER_CONSOLE issued command: DEFINE PATH server1 lto8d1 srctype=serv-
er desttype=drive device=/dev/IBMtape0 libr=neoxl80
ANR2017I Drive LTO8D1 in library NEOXL80 with serial number is updated with the newly
discovered serial number 11C2A700B5.
ANR1720I A path from SERVER1 to NEOXL80 LTO8D1 has been defined.
ANR1434W No files have been identified for automatically storing device configuration
information.
IBM Spectrum Protect:SERVER1>
```

f. Define the device class by typing:

```
def devc <DevClassName> devtype=lto libr=<LibraryName> format=drive
```

g. Define the stage pool by typing:

```
def stgpool <StgPoolName> <DevClassName> maxscratch=3 dataformat=native
```

h. Update the stage pool to write directly to NEO as a target device for backup by typing the following:

```
update stgpool backuppool nextstgpool=<StgPoolName>
```

```
Protect: SERVER1>def devc neoxl_encr_class libr=neoxl80 devtype=lto driveencryption=on
ANR2203I Device class NEOXL_ENCR_CLASS defined.
Protect: SERVER1>def stgpool neoxlpool neoxl_encr_class maxscratch=100 dataformat=native
ANR2200I Storage pool NEOXLPOOL defined (device class NEOXL_ENCR_CLASS).
Protect: SERVER1>update stgpool backuppool nextstgpool=neoxlpool
ANR2202I Storage pool BACKUPPOOL updated.
```

6. Label and prepare the media by typing:

```
label libv <LibraryName> search=yes labelsource=barc overwrite=yes checkin=scr
```

```
Protect: SERVER1>label libv neoxl80 search=yes labelsource=barc overwrite=yes checkin=scr
ANS0003I Process number 2 started.

Protect: SERVER1>q proc

Process      Process Description      Process Status
-----
Number      -----
2           LABEL LIBVOLUME          ANR0805I Labeling volumes in library NEOXL80; 0
                               volume(s) labeled.
```

7. To start a backup and restore, use the Spectrum Protect **dsmc utility**. You'll need to:

a. Navigate to the following directory:

```
/opt/tivoli/tsm/client/ba/bin/dsmc
```

b. To run a backup job, type the following:

```
selective <directory to backup path> -subdir=yes
```

```
Protect> selective /home/appuser/ -subdir=yes
Selective Backup function invoked.

Directory--> 178 /home/appuser [Sent]
Directory--> 39 /home/appuser/mozilla [Sent]
Directory--> 42 /home/appuser/software [Sent]
Directory--> 58 /home/appuser/testdata [Sent]
Directory--> 58 /home/appuser/testdata2 [Sent]
Directory--> 58 /home/appuser/testdata3 [Sent]
Directory--> 58 /home/appuser/testdata4 [Sent]
Directory--> 58 /home/appuser/testdata5 [Sent]
Normal File--> 18 /home/appuser/.bash_logout [Sent]
Normal File--> 193 /home/appuser/.bash_profile [Sent]
Normal File--> 231 /home/appuser/.bashrc [Sent]
Directory--> 6 /home/appuser/.mozilla/extensions [Sent]
Directory--> 6 /home/appuser/.mozilla/plugins [Sent]
Directory--> 80 /home/appuser/software/driver [Sent]
Directory--> 44 /home/appuser/software/iso [Sent]
Directory--> 59 /home/appuser/software/tsm [Sent]
Directory-->
< 130.46 KB> | -1
```

The status of the library can be seen using the NEO RMI.

c. A detailed status of the active backup can be seen by typing the following:

```
q sess
```

```
Protect: SERVER1>q sess

Sess      Comm.   Sess   Wait   Bytes   Bytes   Sess   Platform   Client Name
Number    Method State   Time   Sent    Recvd   Type      -----
-----
1         SSL     Run     0 S     16.0 K   2.8 K   Admin     Linux      TSMTEST
           x86-64
2         SSL     IdleW   31 S     1.8 K   1.1 K   Node     Linux      SD32127RH74
           x86-64
3         SSL     MediaW  31 S     463     845     Node     Linux      SD32127RH74
           x86-64
```

d. To run a restore job, type the following:

```
restore <restore path> -subdir=yes
```

```
Protect>
Protect> restore /home/appuser/testdata/ -subdir=yes
Restore function invoked.

ANS1247I Waiting for files from the server...
** Interrupted **
ANS1114I Waiting for mount of offline media.
Restoring 58 /home/appuser/testdata [Done]
Restoring 117 /home/appuser/testdata/CentOS [Done]
Restoring 114 /home/appuser/testdata/Debian [Done]
Restoring 221 /home/appuser/testdata/RHEL [Done]
Restoring 49 /home/appuser/testdata/SUSE [Done]
Restoring 42 /home/appuser/testdata/CentOS/7.2 Feb2016 [Done]
Restoring 138 /home/appuser/testdata/CentOS/packages [Done]
Restoring 3,916,431,360 /home/appuser/testdata/CentOS/CentOS-6.8-x86_64-bin-DVD1.iso [Done]
Restoring 2,220,693,504 /home/appuser/testdata/CentOS/CentOS-6.8-x86_64-bin-DVD2.iso [Done]
```

Spectrum Protect 8.1 Encryption

IBM Spectrum Protect 8.1 supports tape drive encryption. Encryption is enabled during the NEO device class creation. Use the following procedure to enable encryption and verify the status of encryption to the NEO device class.

1. To enable encryption, define the device class by typing:

```
def devc <DevClassName> libr=<LibraryName> devtype=lto driveencryption=on
```

```
Protect: SERVER1 def devc neoxl40_encr_class libr=neoxl40 devtype=lto driveencryption=on
ANR2203I Device class NEOXL40_ENCR_CLASS defined.
```

2. To verify the status of the encryption, type:

```
q devc f=d
```

The status is given as Drive Encryption.

```
Device Class Name: NEOXL40_ENCR_CLASS
Device Access Strategy: Sequential
Storage Pool Count: 1
Device Type: LTO
Format: DRIVE
Est/Max Capacity (MB):
Mount Limit: DRIVES
Mount Wait (min): 60
Mount Retention (min): 60
Label Prefix: ADSM
Library: NEOXL40
Directory:
Server Name:
Retry Period:
Retry Interval:
Shared:
High-level Address:
Minimum Capacity:
WORM: No
Drive Encryption: On
Scaled Capacity:
more... (<ENTER> to continue, 'C' to cancel)
```

- Once the encrypted backup is complete, check the volume details to verify the value of Drive Encryption Key Manager is IBM Spectrum Protect. Use the command:

```
q vol f=d
```

```
Protect: SERVER1> q vol f=d
Volume Name: AG8643L8
Storage Pool Name: NEOXL40_ENCR_POOL
Device Class Name: NEOXL40_ENCR_CLASS
Estimated Capacity: 27.3 T
Scaled Capacity Applied:
Pct Util: 2.2
Volume Status: Filling
Access: Read/Write
Pct. Reclaimable Space: 0.0
Scratch Volume?: Yes
In Error State?: No
Number of Writable Sides: 1
Number of Times Mounted: 5
Write Pass Number: 1
Approx. Date Last Written: 01/07/2020 08:42:21
Approx. Date Last Read: 01/07/2020 08:49:24
Date Became Pending:
Number of Write Errors: 0
Number of Read Errors: 0
Volume Location:
Volume is MVS Lanfree Capable : No
Last Update by (administrator):
Last Update Date/Time: 01/02/2020 07:09:14
Begin Reclaim Period:
End Reclaim Period:
Drive Encryption Key Manager: IBM Spectrum Protect
Logical Block Protected: No
```