INTEGRATION BRIEF

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: DVDRAM 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*
crw-------. 1 root root 240, 3069 Jan  8 10:17 /dev/IBMSpecial
crw-r--r--. 1 root root 240, 3071 Jan  8 10:17 /dev/IBMtape
crw-rw-rw-. 1 root root 240,    0 Jan  8 10:27 /dev/IBMtape0
crw-rw-rw-. 1 root root 240, 1024 Jan  8 10:27 /dev/IBMtape0n
crw-rw-rw-. 1 root root 240,    1 Jan  9 10:12 /dev/IBMtape1
crw-rw-rw-. 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: scsi10 Channel: 00 Id: 01 Lun: 01
  Vendor: BDT      Model: MULTISTAK        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]=10
CHANNEL[0]=0
ID[0]=0
LUN[0]=1
#
[root@sd32127rh74 bin]#
```

   d. Save lb.conf **changes**.

4. Use the 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      MULTISTAK        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/tsmscsi/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      MULTISTAK        2.80
[root@sd32127rh74 bin]#
```

   b. Type the following command:

```
# ls -l /dev/tsmscsi/*
```

```
[root@sd32127rh74 bin]# ls -l /dev/tsmscsi/*
lrwxrwxrwx. 1 root root   8 Jan  9 10:31 /dev/tsmscsi/lb0 -> /dev/sg6
-rw-r--r--. 1 root root 181 Jan  9 10:31 /dev/tsmscsi/lbinfo
[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:

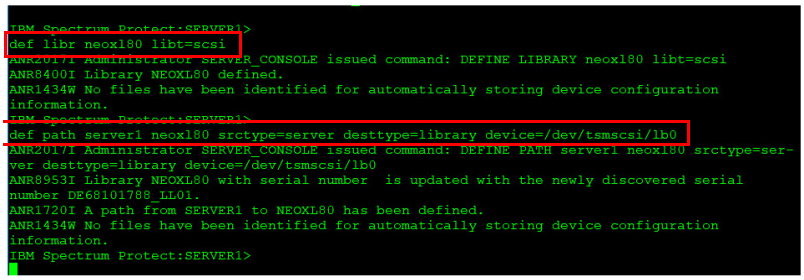
      `./dsmadmc`

   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>`

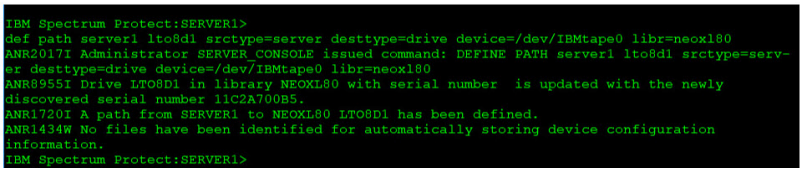


   d. Define the drives by typing for *each* drive:

      `def drive <LibraryName> <DriveName>`

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

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



   f. Define the device class by typing:

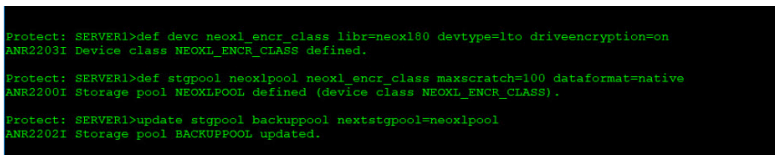
      `def devc <DevClassName> devtype=lto libr=<LibraryName> format=drive`

   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>`



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
ANS8003I Process number 2 started.

Protect: SERVER1>q proc

Process      Process Description      Process Status
  Number
--------   --------------------     -------------------------------------------------
       2     LABEL LIBVOLUME          ANR8805I 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]
<  130.46 KB> [  -]
```

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.

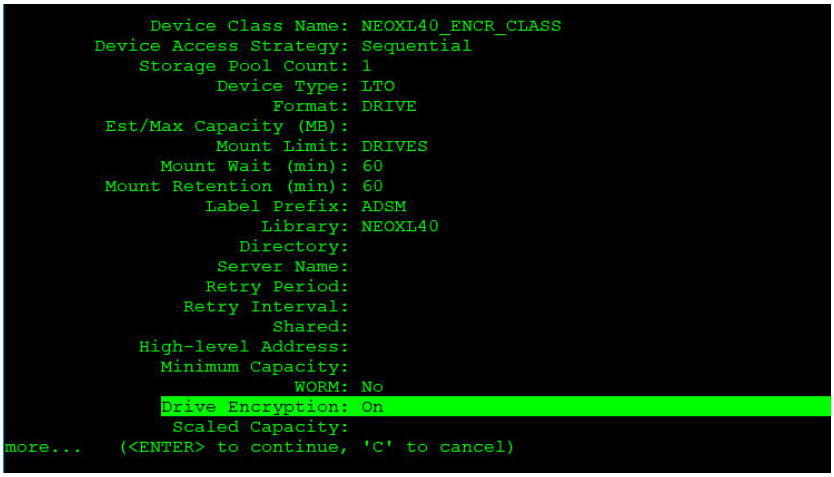
1. To enable encryption, define the device class by typing:

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

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

   `q devc f=d`

   The status is given as **Drive Encryption**.



3. 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
```