

ActiveImage Protector 2018 Update for RDX Backup Operation Guide

3rd Edition – July 2, 2020

ActiveImageTM
PROTECTOR



Actiphy, Inc.
Tandberg Data Japan Inc.

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Introduction

This guide provides the description about the backup and recovery operating procedures, by using ActiImage Protector 2018 Update for RDX, saving the backup files to RDX QuikStor / QuikStation connected to Windows/Linux OS host and restoring the systems from the backup files.

◆What is ActiImage Protector 2018 Update for RDX?

ActiImage Protector 2018 Update for RDX is a backup tool supporting RDX, developed by ActiPhy, Inc., in cooperation with Tandberg Data Japan Inc. The combined use of ActiImage Protector with Tandberg Data's RDX enables you to provide an affordable disaster recovery solution in the event of a computer system failure, natural disaster, a fire accident, virus infection, etc.

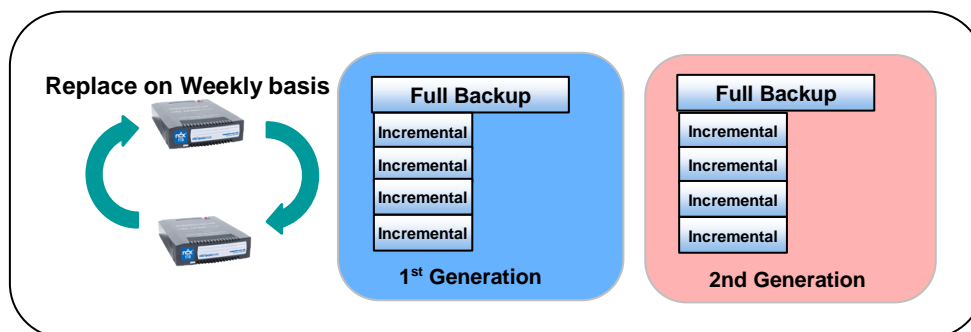
For example, a loss of backup data may cause a critical problem damaging a corporate's credibility and even existential threat, so the backup data must be placed into a secure location. However, transferring and saving large volume data at a remote site increases the impact of data transfer traffic over the network and incurs the extra cost related to the use of backup storage.

ActiImage Protector 2018 Update for RDX is featured with automated backups stored in RDX cartridge. The ejected cartridge should be saved in a safe place (sent to a remote site by using a delivery service and saved in a fire-resistant and water-proof vault.) Dealing with unforeseen situations, you can quickly restore the system from the backup file in RDX cartridge and reboot the system.

◆Post-backup Cartridge Eject feature

ActiImage Protector 2018 Update for RDX provides Post-backup Cartridge Eject feature designed to automatically eject RDX cartridge upon completion of a backup task or the last backup task executed on a specific day of a week, reducing the risk of backup data loss or computer virus infection by eliminating a mistake of not removing RDX cartridge.

You will find this feature convenient to use in scheduled backup operations, for example, where RDX cartridge is weekly replaced with a new one saving one full-backup and incremental backup files created for a week.



Operating procedures in Windows environment

This chapter provides the details of operating procedures how to connect RDX QuikStor / QuikStation to Windows host machine and configure the backup settings.

Installation of RDX Manager

Active Image Protector 2018 Update for Windows is incorporated with the features of RDX Manager, therefore, please make sure RDX Manager is installed.

Note) ActiveImage Protector 2018 Update for Windows supports RDX Manager Version 01.0.30 or later. If you use an earlier version, please update the RDX Manager.

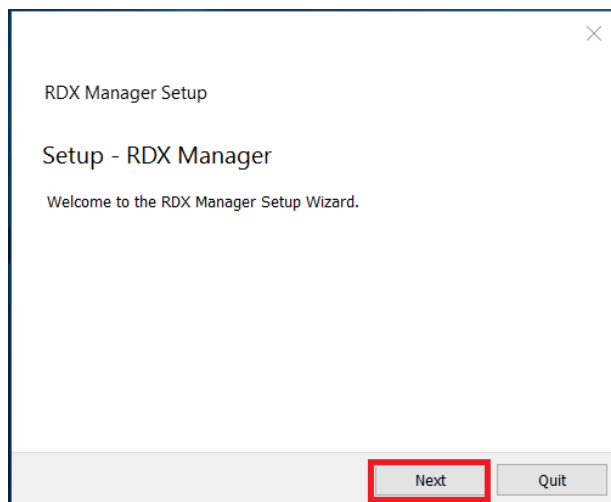
This chapter provides the installation procedures for RDX Manager.

Please visit the following Tandberg Data's Web site. Go to the "Product" page for RDX QuikStor, RDX QuikStation4 or RDX QuikStation8 and click "Download" to download RDX Manager for Windows.

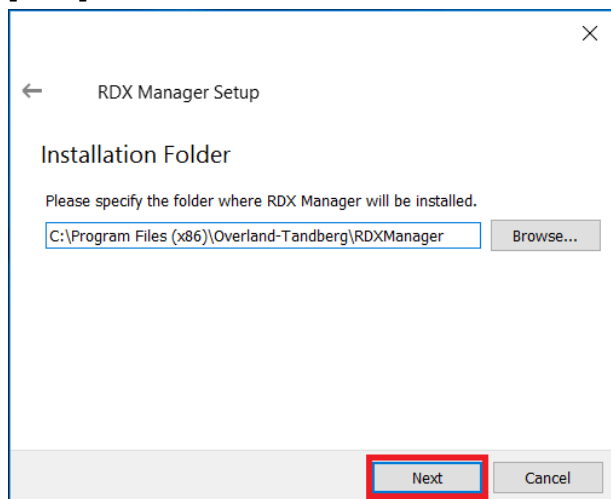
<https://www.tandbergdata.com/jp/index.cfm/products/removable-disk/rdx-quikstor/>

Unzip the downloaded zip file to run "RDXManagerinstall.exe". The wizard driven interface guides you through installation of RDX Manager.

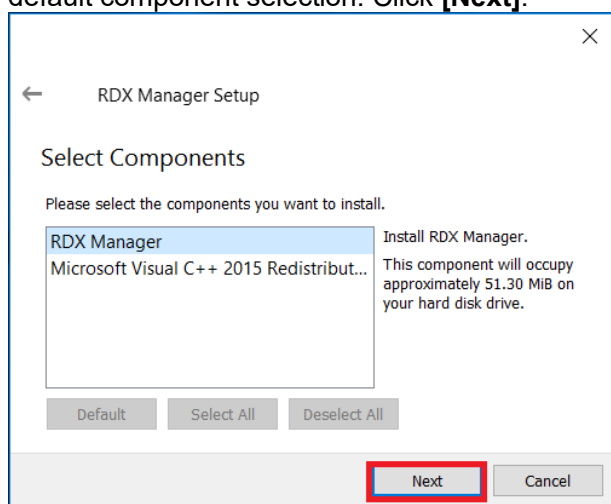
- 1) The launched installer displays the following dialog. Click **[Next]**.



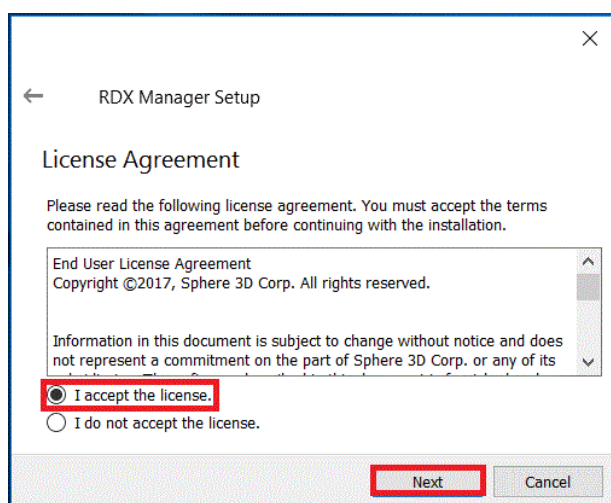
- 2) Please specify the folder to install the files in **[Installation Folder]** dialog and click **[Next]**.



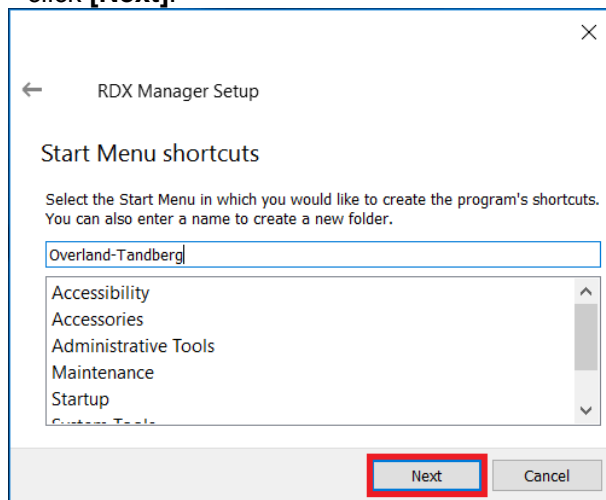
- 3) **[Select Components]** dialog is displayed as follows. You do not have to change the default component selection. Click **[Next]**.



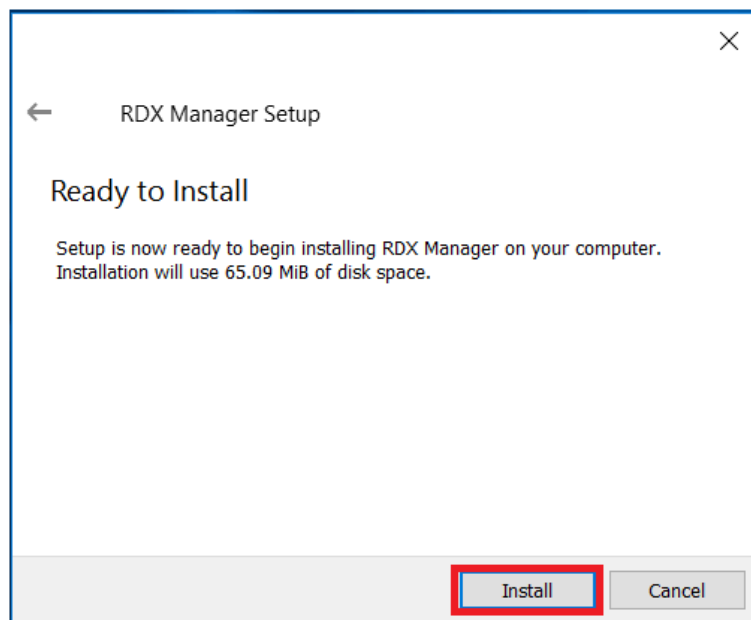
- 4) Please review the License Agreement and check the box next to **[I accept the license]** to continue the installation. Click **[Next]**.



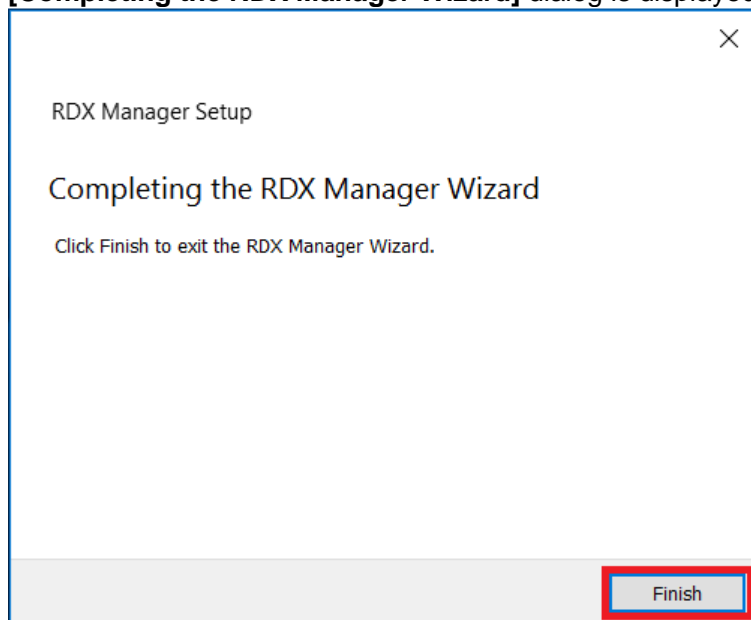
- 5) **[Start Menu Shortcuts]** dialog is displayed. If you do not need to make any change, click **[Next]**.



- 6) **[Ready to Install]** dialog is displayed. Click **[Install]**.



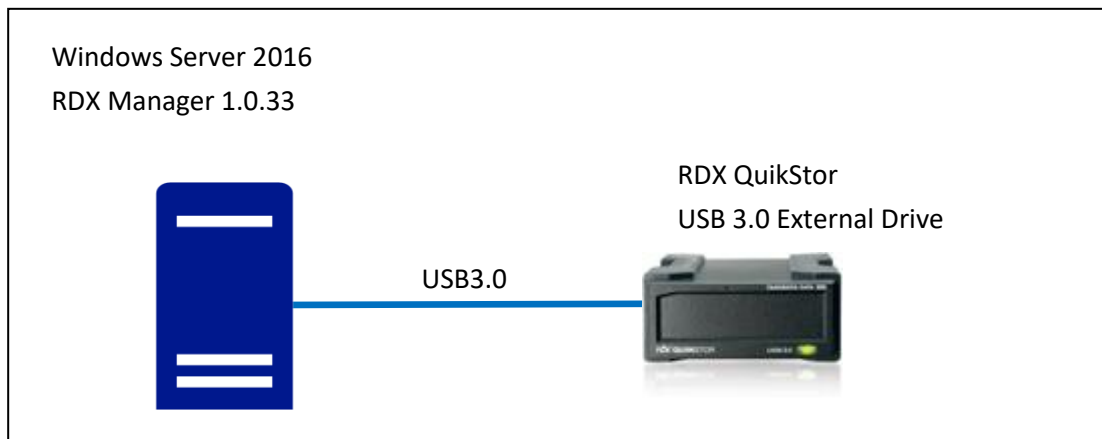
- 7) **[Completing the RDX Manager Wizard]** dialog is displayed. Click **[Finish]**.



Connection Check (QuikStor)

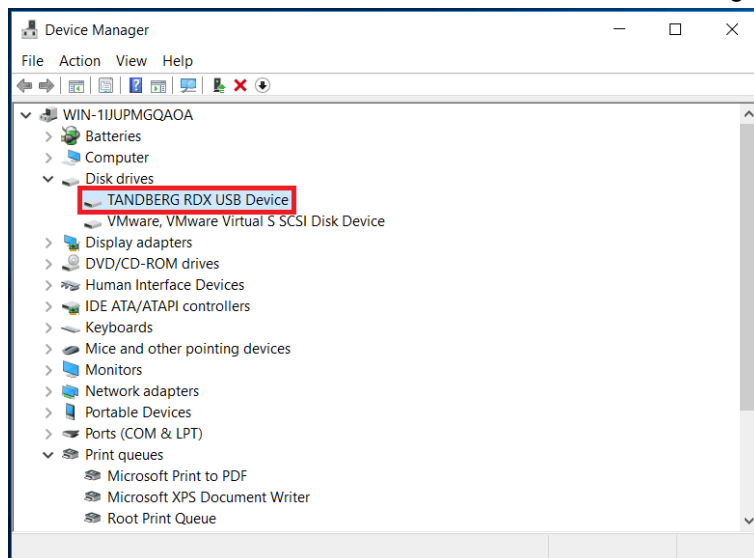
Check for detection of RDX drive from OS.

Example:

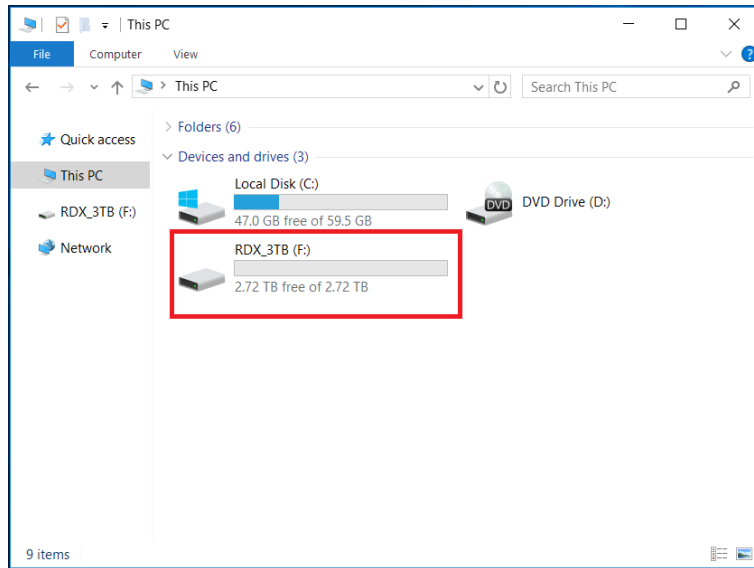


Detection of RDX drive

- 1) Please make sure that RDX drive is detected in Device Manager.



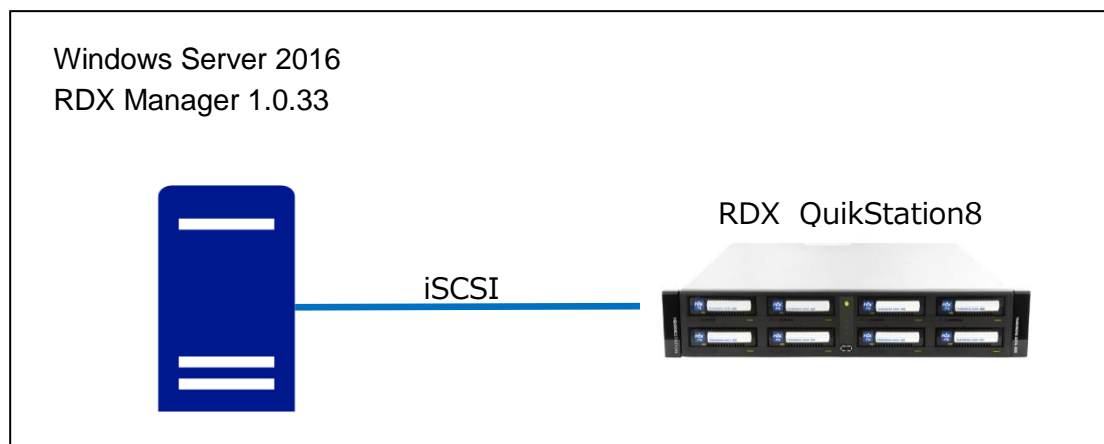
- 2) Insert the RDX cartridge in the drive and make sure that RDX drive/media is correctly recognized in Explorer.



Connection Check (QuikStation)

After setting up the device mode, connect RDX QuikStation4 or 8 to OS via iSCSI and make sure that RDX QuikStation4 or 8 is detected on OS, and perform partitioning / formatting.

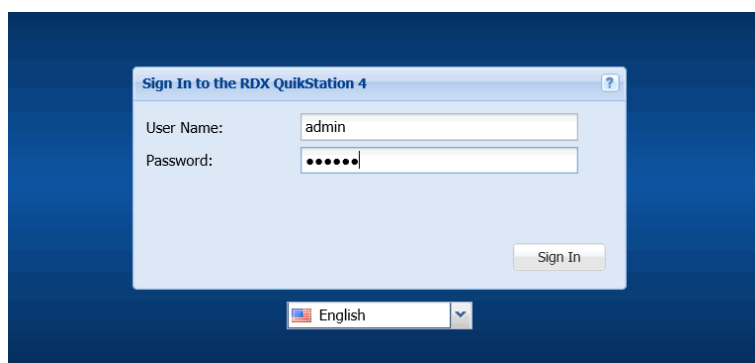
Example:



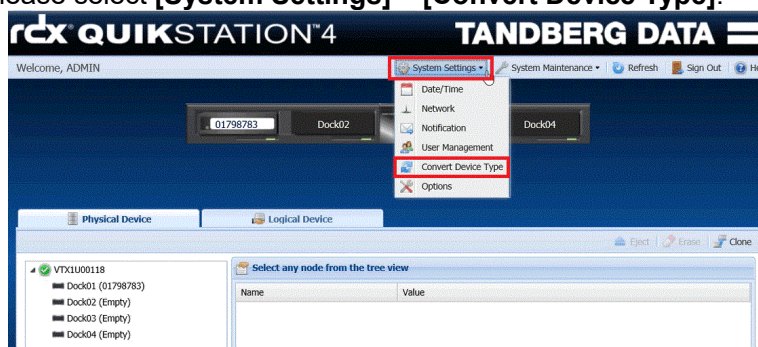
Set up RDX QuikStation mode

This manual provides the description on premises that the product is used for a disk target including RDX drive, disk autoloader, logical drive and protected volumes. For more detailed procedures how to set up the respective modes, please refer to the product manuals downloadable from Tandberg's Web site. The setting example is configured to eject the cartridge upon completion of a backup task. Before selecting Post-backup Cartridge Eject option, please configure the mode setting for the removable disk.

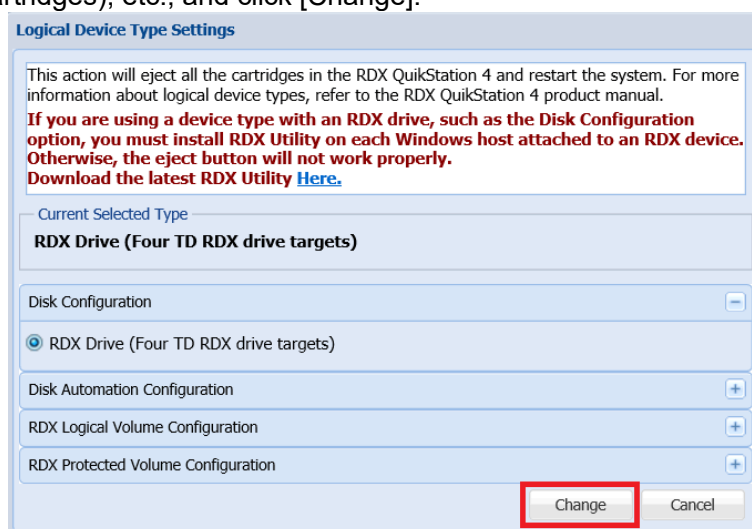
- 1) In **[Sign In to the RDX QuikStation4]** dialog, please log in.



- 2) Please select **[System Settings] – [Convert Device Type]**.



- 3) Select a logical device type from RDX drive (connecting to a single dock), disk automation drive (replacing automatically ejected cartridge), RDX logical volume (using combined multiple cartridges), RDX protected volume (configuring RAID with multiple cartridges), etc., and click **[Change]**.

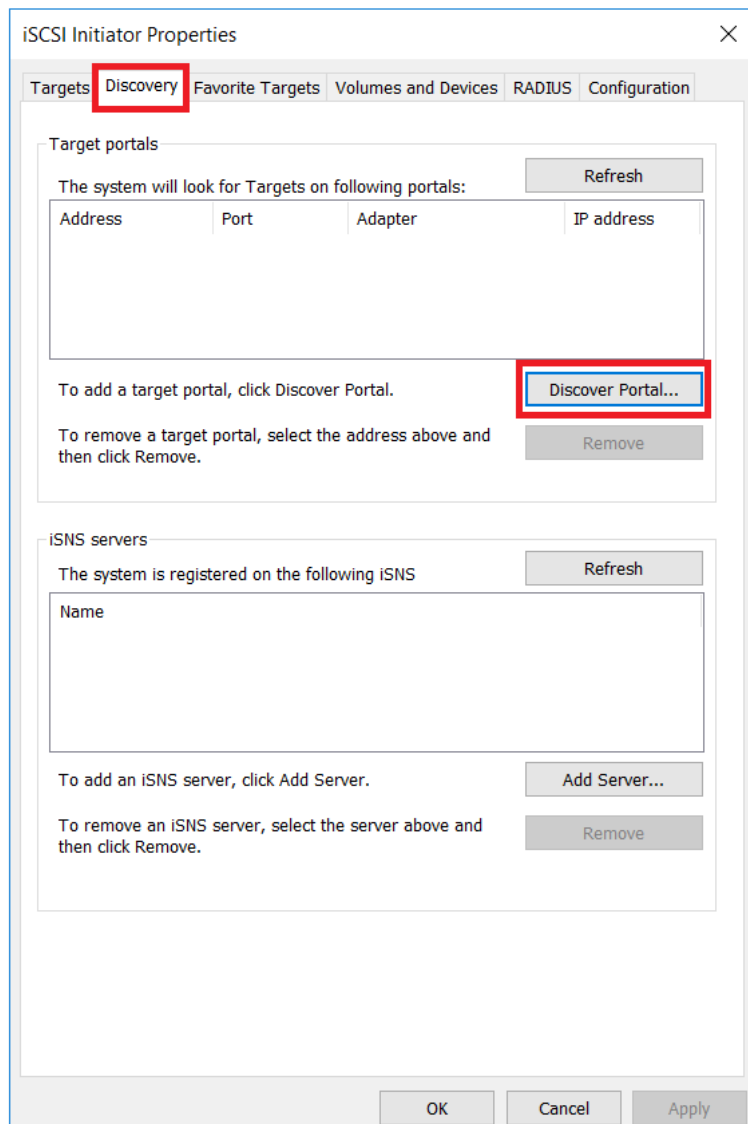


- 4) The device boots up and the mode is changed.

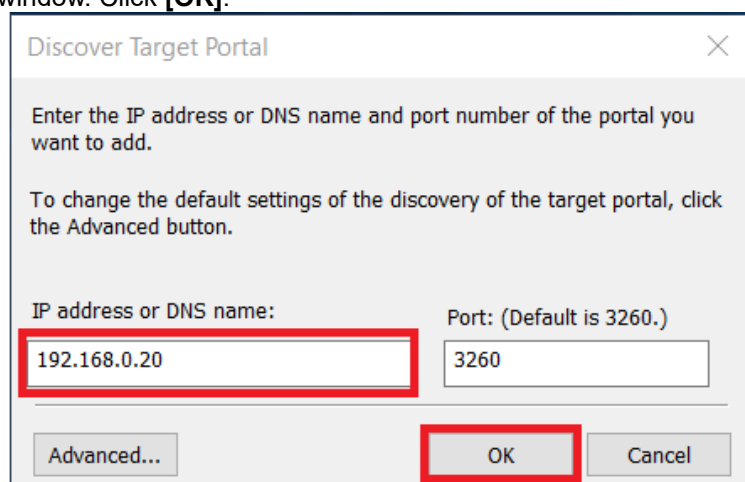
Connecting iSCSI target

Connect QuikStation logical device using iSCSI Initiator tool.

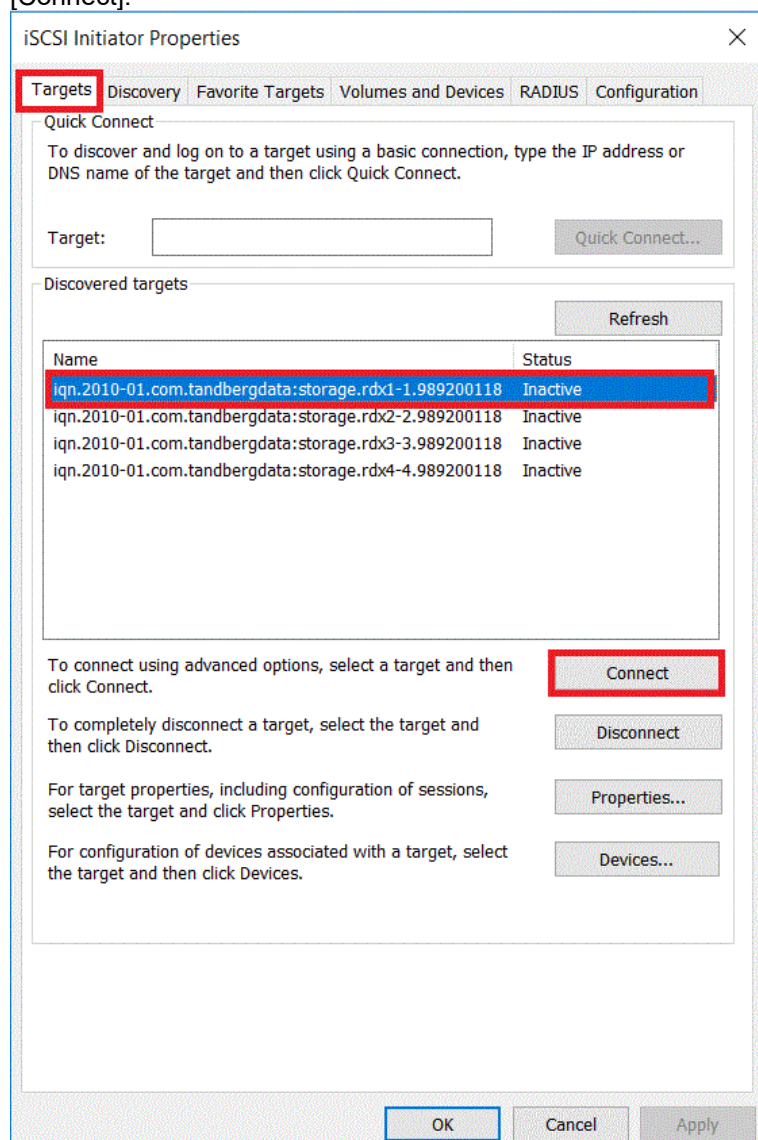
- 1) Select **[Management Tool] – [iSCSI Initiator]** to start iSCSI Initiator, and go to **[Discovery]** tab and click **[Discover Portal]**.



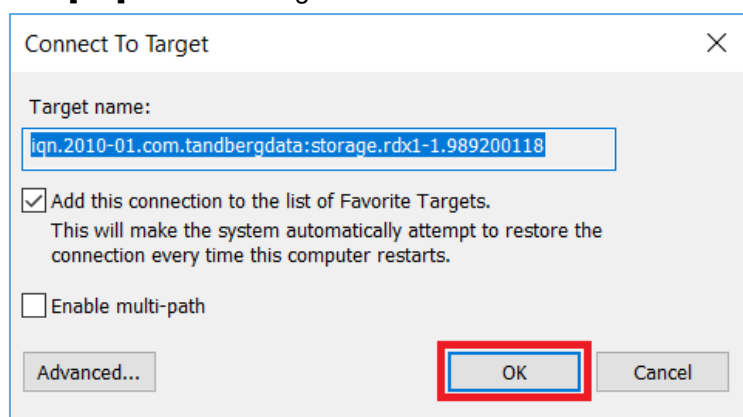
- 2) Enter IP address or DNS name of QuikStation for **[IP address or DNS name]** in the following window. Click **[OK]**.



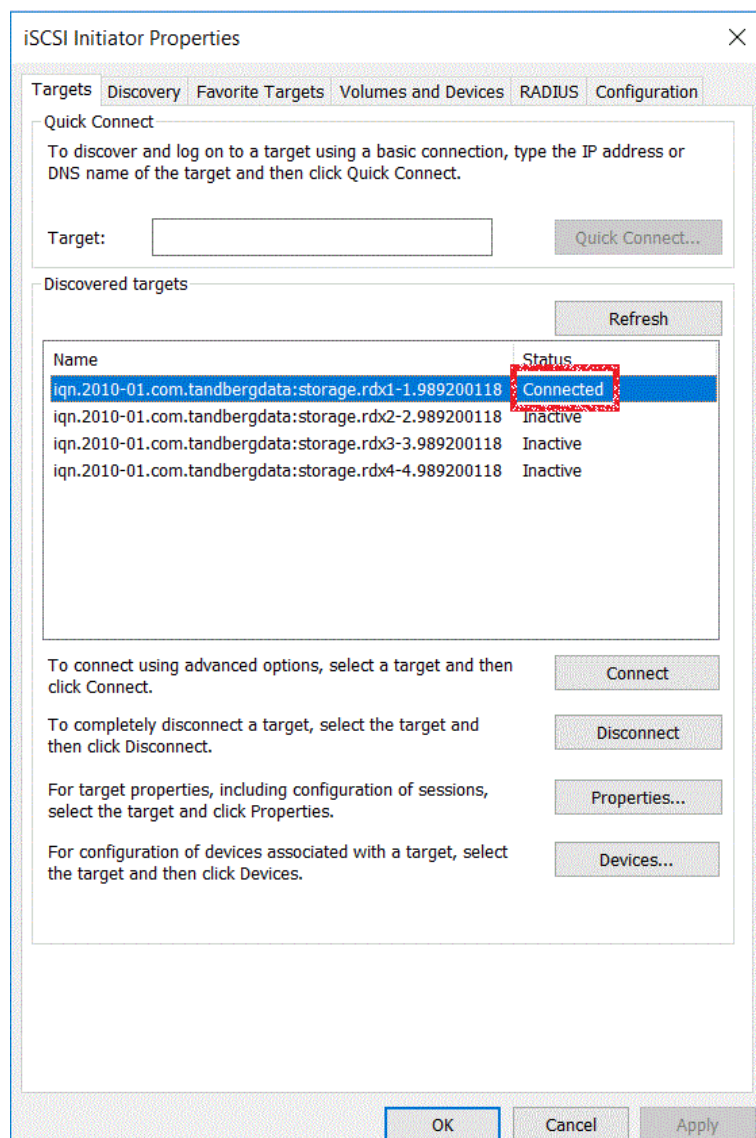
- 3) Go to [Targets] tab and select the target to connect from [Discovered targets] list. Click [Connect].



- 4) Click [OK] in the following window.



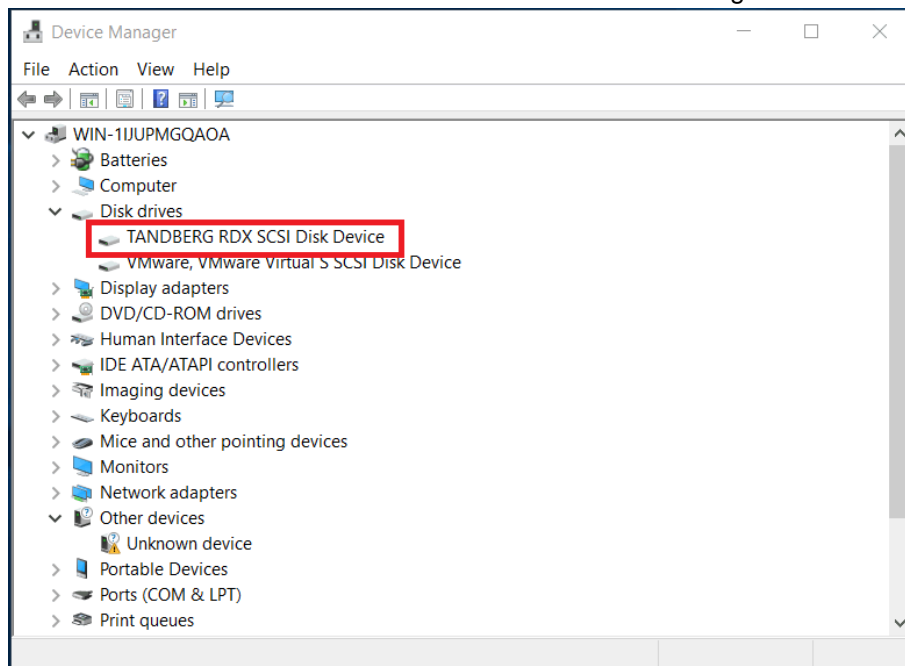
- 5) The **[Status]** is changed to “Connected”.



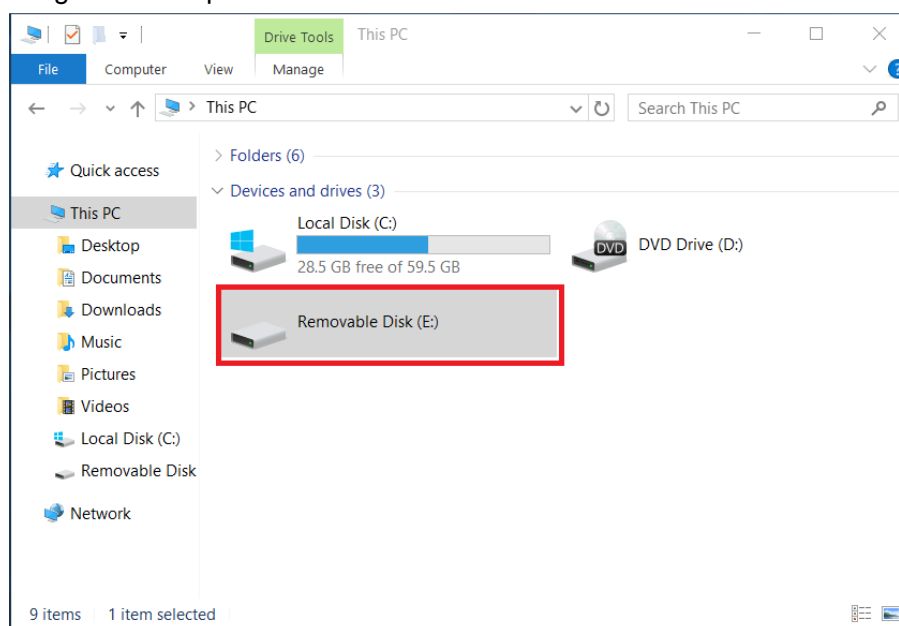
- 6) If you have any other targets to connect, repeat the same procedures and click **[OK]**.

Detection of RDX drive

- 1) Please make sure that RDX drive is detected in Device Manager.



- 2) Insert the RDX cartridge in the slot and make sure that RDX drive/media is correctly recognized in Explorer.



Partitioning

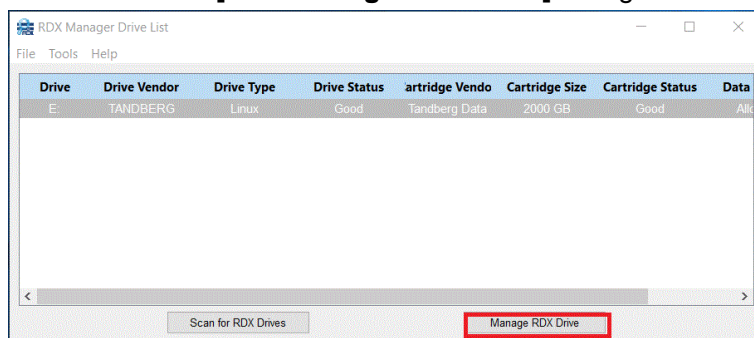
When using QuikStation logical volume mode or protected volume mode, the partition is recognized without formatting with a partition file system.

Please take the following operating procedures to create partitions (when using an NTFS formatted cartridge in x8 RDX drive mode, you do not need to take these procedures.)

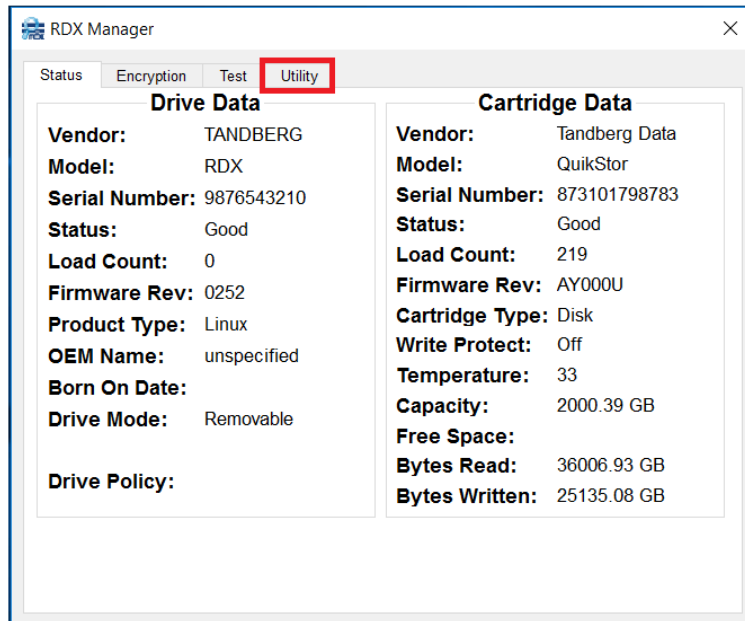
- 1) Start RDX Manager.



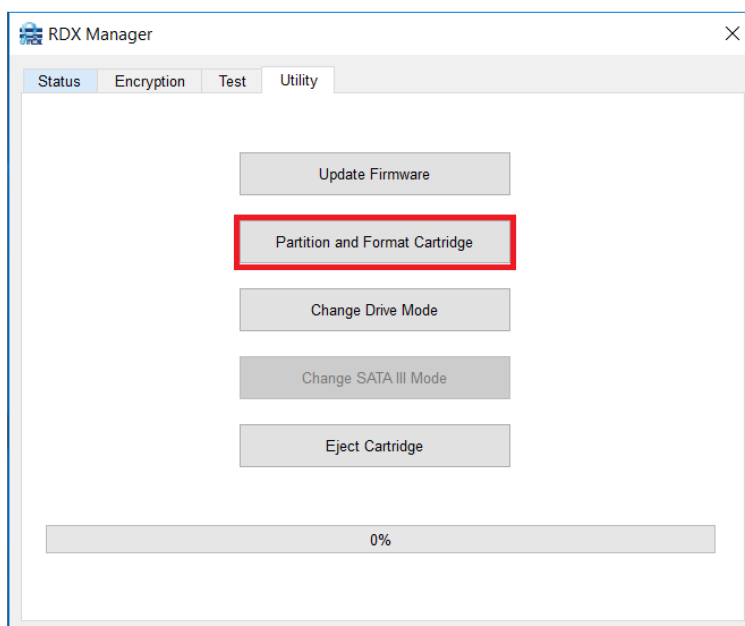
- 2) Select a drive in **[RDX Manager Drive List]** dialog and click **[Manage RDX Drive]**.



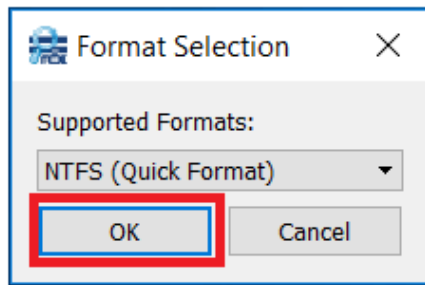
- 3) Click **[Utility]** tab in **[RDX Manager]** window.



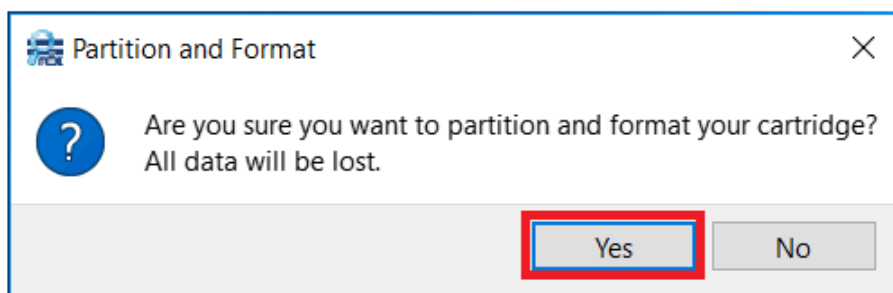
- 4) Click **[Partition and Format Cartridge]** in **[Utility]** tab.



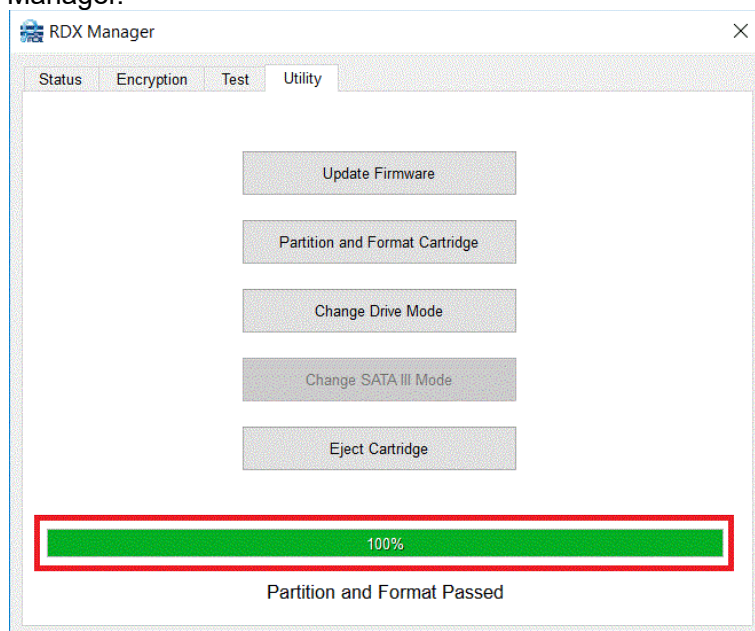
- 5) Please select “**NTFS**” (by default) or “**exFAT**” for the format type and click **[OK]** in **[Format Selection]** window.



- 6) The following message is displayed in **[Partition and Format]** dialog. Click **[Yes]** for confirmation.



- 7) Make sure that **[Partition and Format Passed]** indicates 100% and please end RDX Manager.



Installation of ActiveImage Protector

For the detailed operating procedures for installation of ActiveImage Protector, please access the online help and refer to “Installing ActiveImage Protector” at the following URL. Please also refer to “System Requirements”.

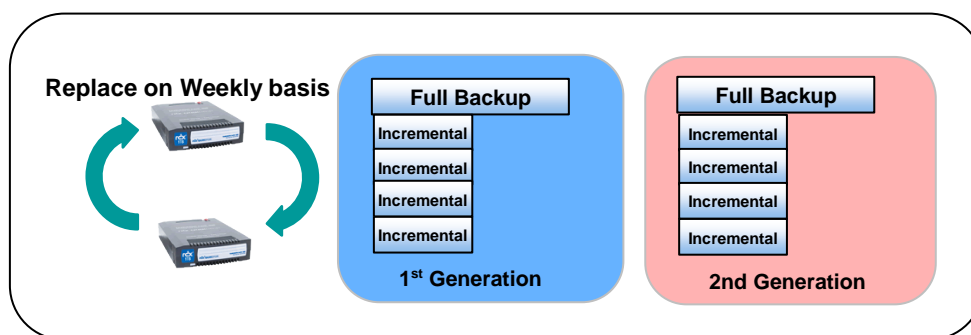
•ActiveImage Protector 2018 Update Server/Desktop Edition Online Help
<http://webhelp.netjapan.com/AIP/Windows/2018/en/help/index.html>

Backup Operation and Settings

The following are the examples of backup task settings configured for a standard backup operation.

Replace the cartridge with a new one on a weekly basis

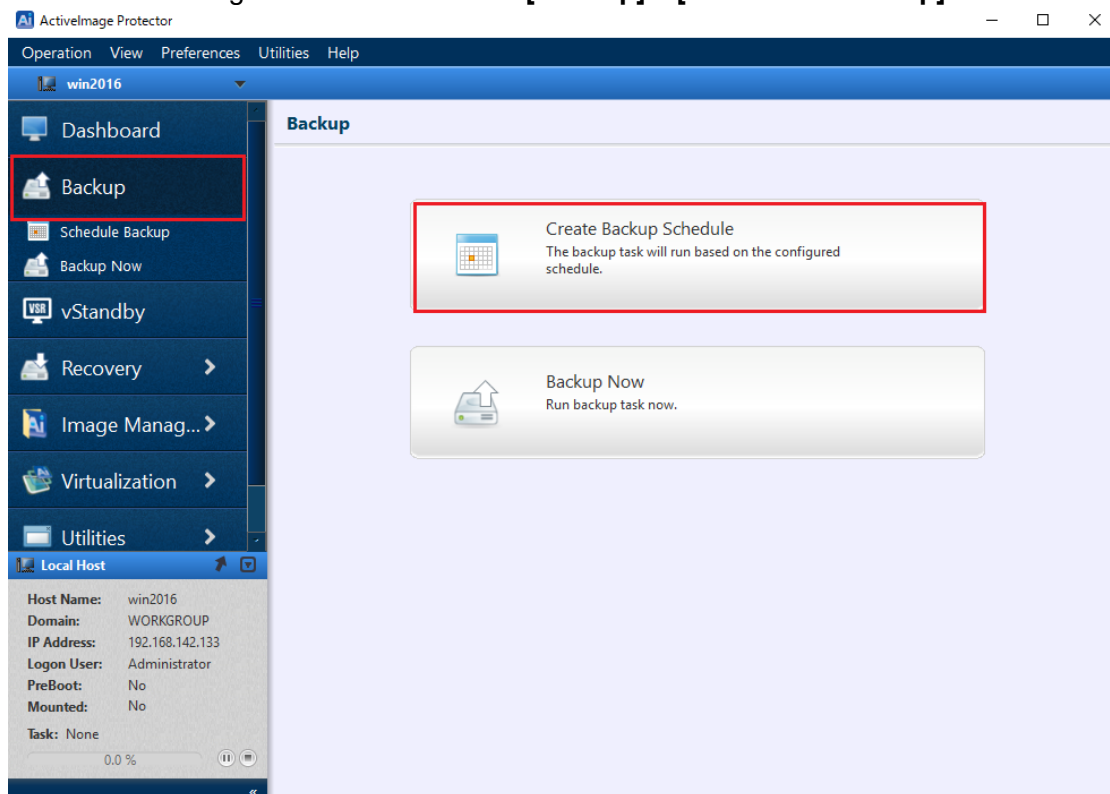
This backup operation scenario includes replacement of a cartridge on a weekly basis, while one full backup and incremental backups created for a week are saved in the removed cartridge. A full backup task is executed at the beginning of a week and recurring incremental backup tasks are executed for the rest of the week. Detecting if the backup task is the lastly scheduled for the week, the cartridge is automatically ejected eliminating a mistake of not removing RDX cartridge. Another operation scenario includes replacement of two cartridges on a weekly basis, enabling to restore the system back to the state of a day in a week before. The more increased number of the cartridges are used, the more image sets for the respective weeks can be saved in the respective cartridges (for example, 4 cartridges for 4 weeks).



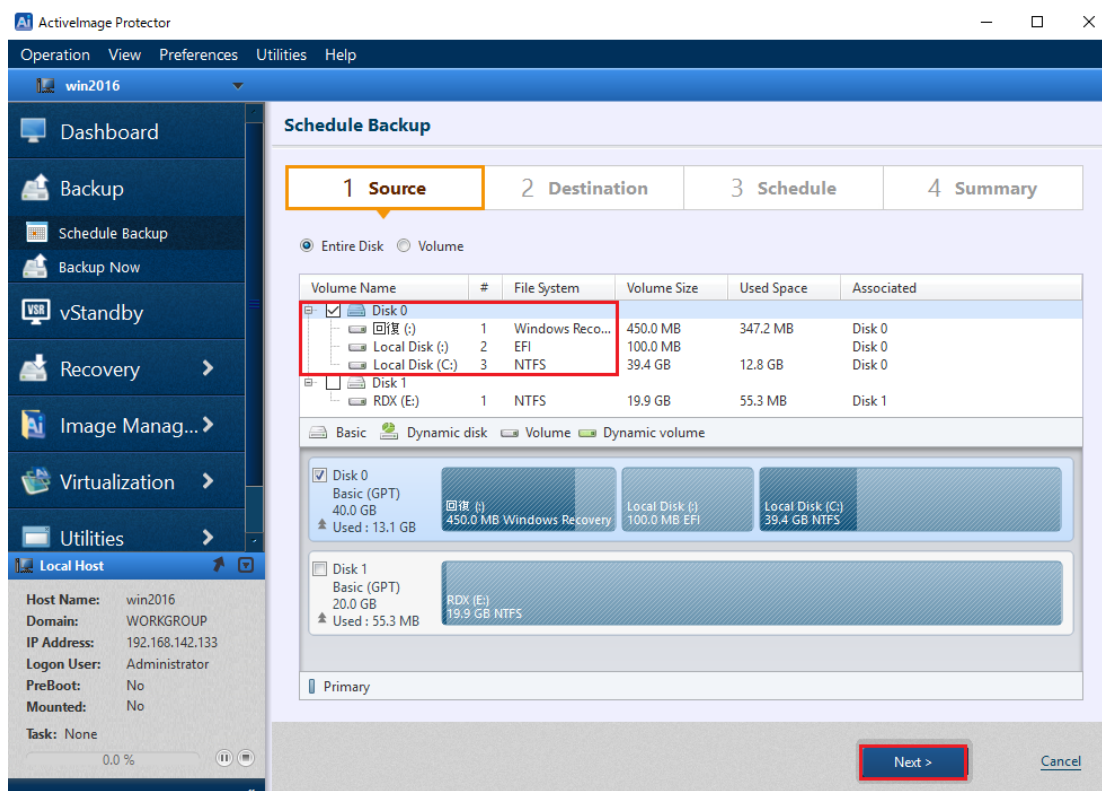
Example of Backup Schedule Setting

The following are the operating procedures of the backup operation executing a full backup and replacing the cartridge once a week.

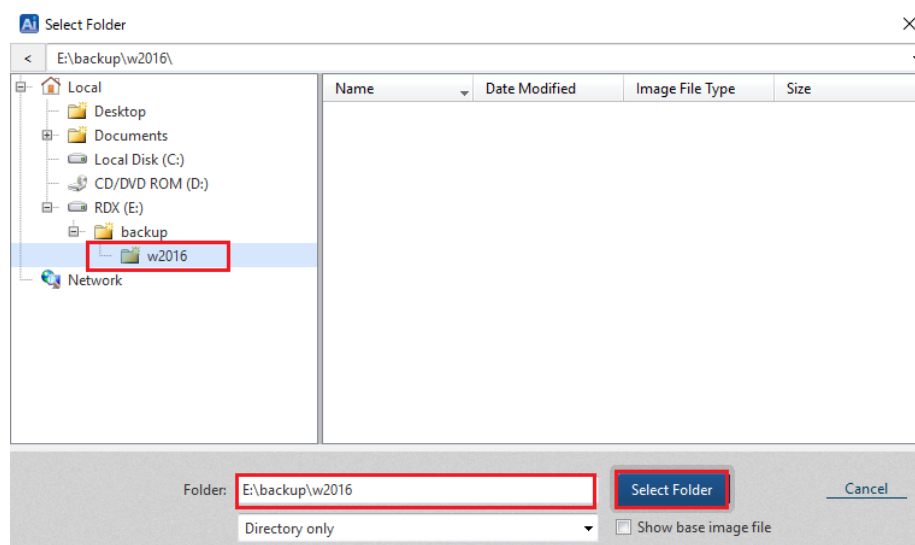
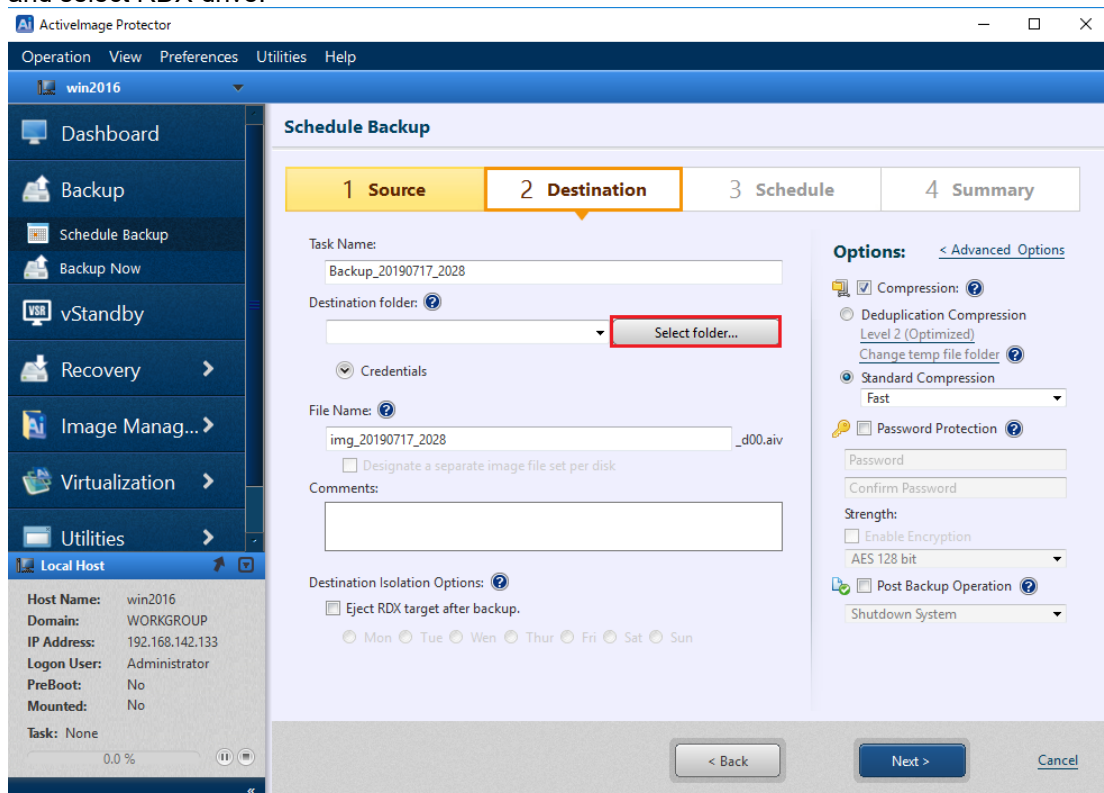
- 1) Launch ActiveImage Protector and select **[Backup] – [Scheduled Backup]**.



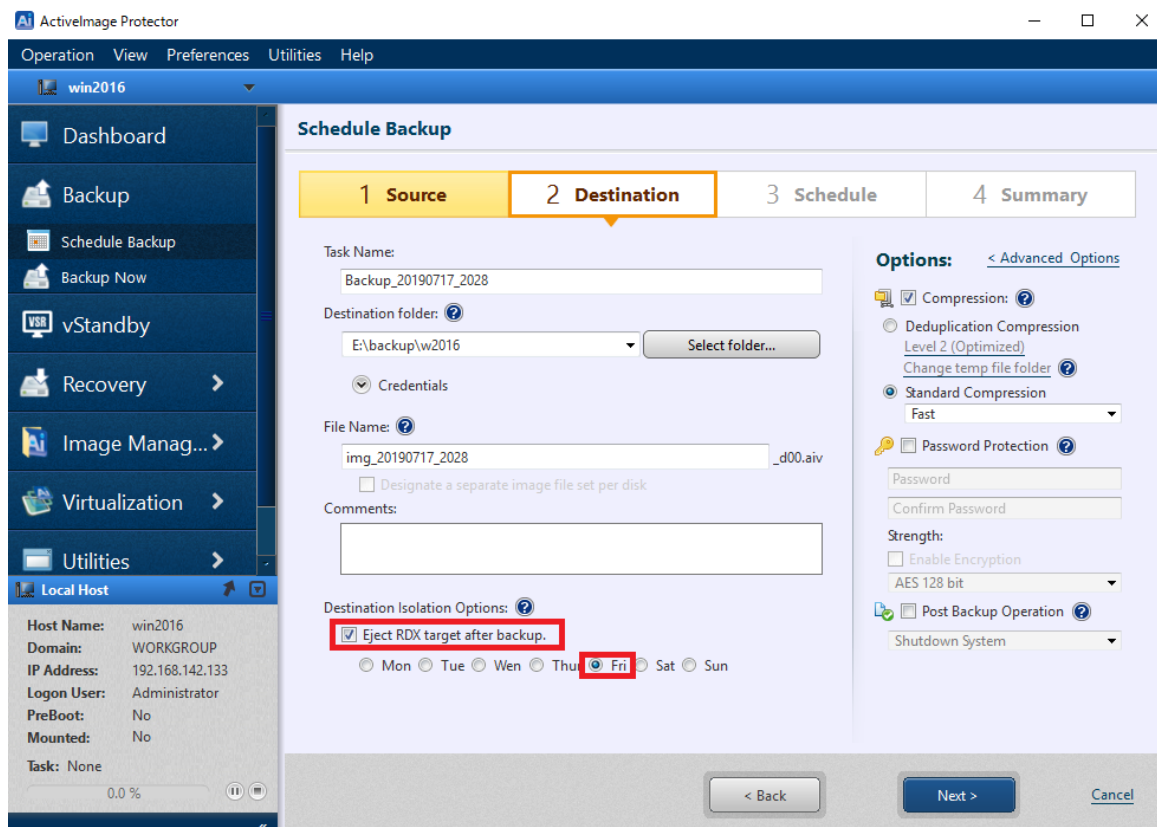
- 2) **[Source]** dialog is displayed. Select a source disk and click **[Next]** (the entire disk including C drive is selected in the following example.)



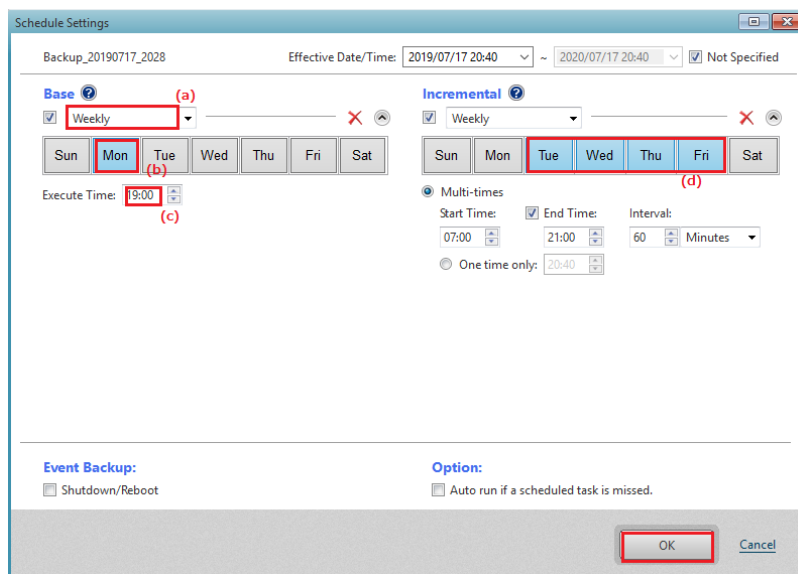
- 3) **[Destination]** dialog is displayed. Click **[Select folder]** to the right of **[Destination folder]** and select RDX drive.



- 4) After selecting [Destination], check the box for [Destination Isolation Option] - [Automatically eject removable RDX cartridge after backup] and select the day of a week to automatically eject the RDX cartridge ("Friday" is selected in the following example). Click [Next].



- 5) The following [Schedule Settings] dialog is displayed. Please configure the settings and click [OK].
 - a) Check in the box for **[Base]** and select **[Weekly]**.
 - b) Select a day of a week ("Monday" is selected in the example.)
 - c) Specify **[Start Time]** ("19:00" is selected in the example.)
 - d) Check in the box for **[Incremental]** and select **[Weekly]** ("Tuesday to Friday" are selected in the example.).
(The default settings remain unchanged for others.)



In the above example, a full backup task is executed at 19:00 on Monday every week, incremental backup tasks are executed on an hourly basis from 7:00 to 21:00 from Tuesday to Friday and the cartridge is automatically ejected upon completion of the lastly scheduled incremental backup task on Friday. The ejected cartridge is replaced with a new one on Monday during daytime.

- 6) The following **[Schedule]** dialog is displayed. Please configure the **[Options]** setting as follows and click **[Next]**.

ActiveImage Protector

Operation View Preferences Utilities Help

win2016

Dashboard Backup Schedule Backup Backup Now vStandby Recovery Image Manag... Virtualization Utilities

Local Host

Host Name: win2016
Domain: WORKGROUP
IP Address: 192.168.142.133
Logon User: Administrator
PreBoot: No
Mounted: No
Task: None
0.0 %

Schedule Backup

1 Source 2 Destination 3 Schedule 4 Summary

Effective From: 2019/07/17 20:40
Base (Full): Weekly: Mon., 19:00
Incremental: Weekly: Tue.-Fri., 07:00-21:00, Every 60 Minutes
[Edit Schedule](#)

Post-backup Process

☒ ImageCheck: [Unconfigured](#) ☐ ImageVerify: [Unconfigured](#) ☐ Consolidation: [Unconfigured](#)

Options:

☒ Enable Reconcile Image [?](#)
☒ Enable Retention Policy [Delete both full and incremental](#) [?](#)
 Number of image sets to retain:
 ☒ Delete the older image before new base backup.
☐ Send email [Task failed](#)

Execution Priority [?](#)
 Full (Base):
 Lowest Low Medium High
 Incremental:
 Lowest Low Medium High

< Back **Next >** [Cancel](#)

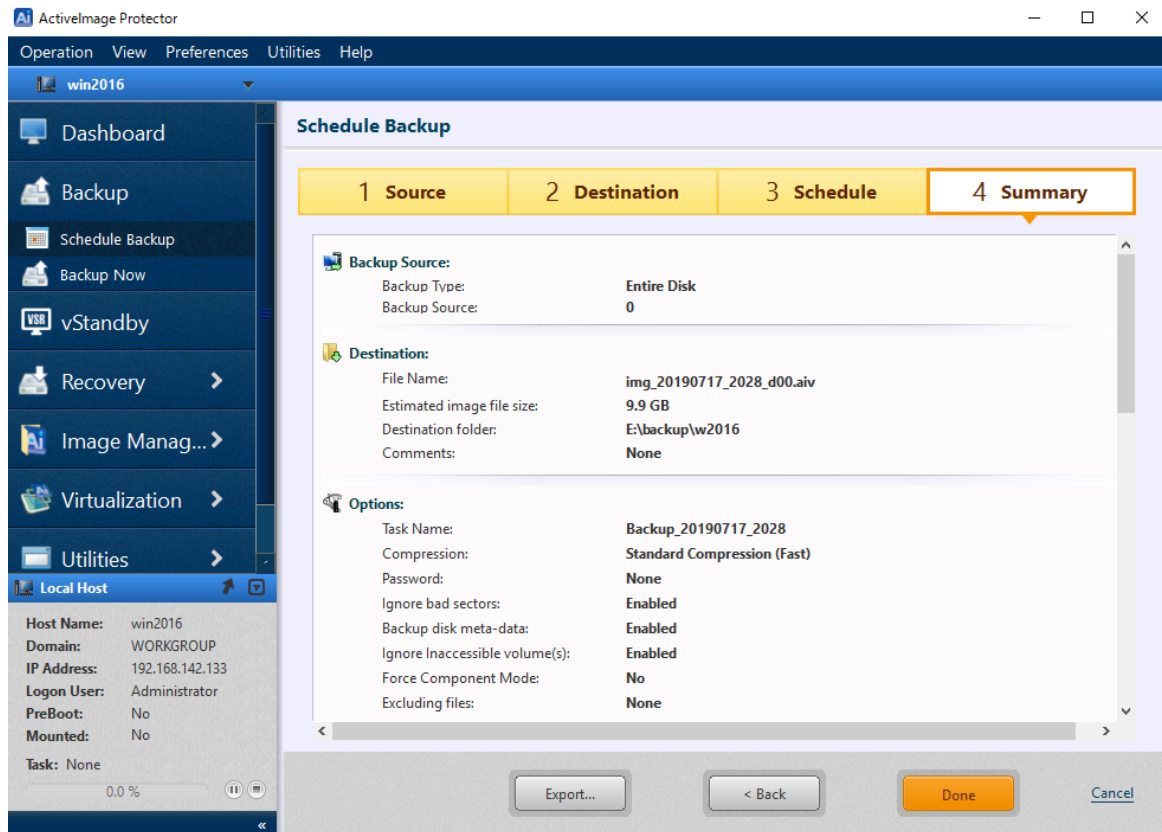
Options setting:

- Select **[Weekly]** for **[Base]** and check in the box for **[Enable Retention Policy]**
- Select **[Delete both full and incremental]** from the combo box (selected by default).
- Specify "1" for **[Number of image sets to retain]**.
- Check in the box for **[Delete the older image before new base backup]**.

Options:

☒ (a) Enable Reconcile Image [?](#) (b) ☒ Enable Retention Policy [Delete both full and incremental](#) [?](#)
 Number of image sets to retain:
 (c) ☒ (d) Delete the older image before new base backup
☐ Send email [Task failed](#)

- 7) The following **[Summary]** dialog is displayed. If you do not have to edit the settings please click **[Done]**.

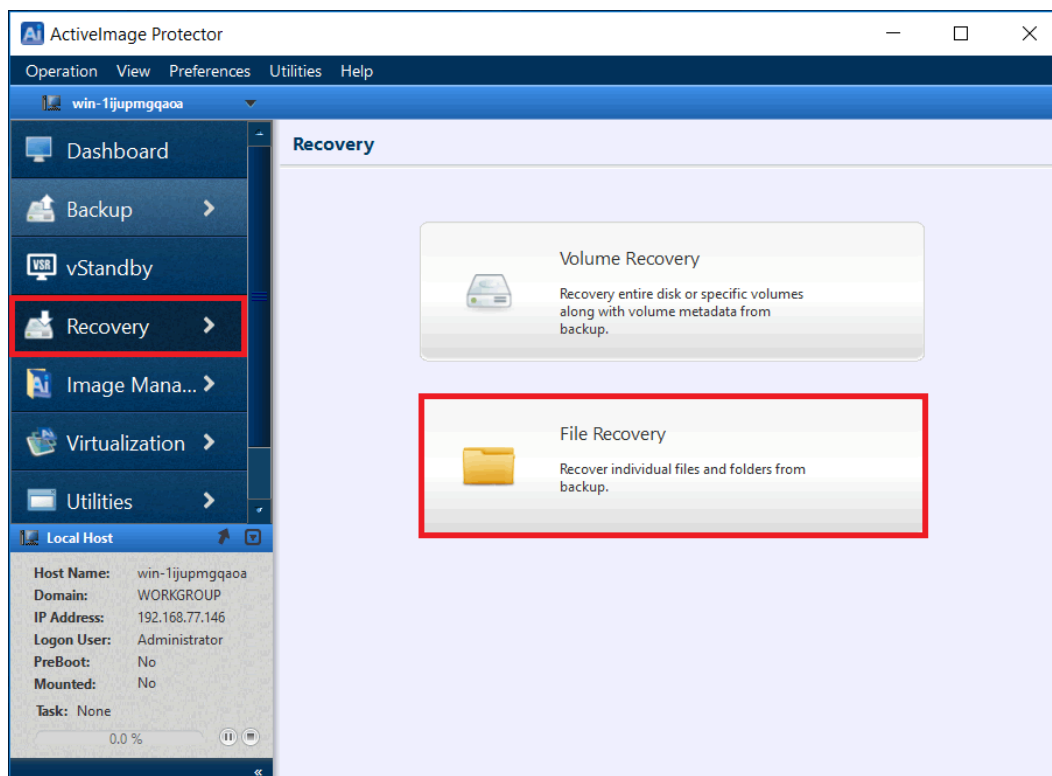


- 8) Upon completion of the backup tasks scheduled on every Friday, the cartridge is automatically ejected. Please replace the cartridge with a new one.

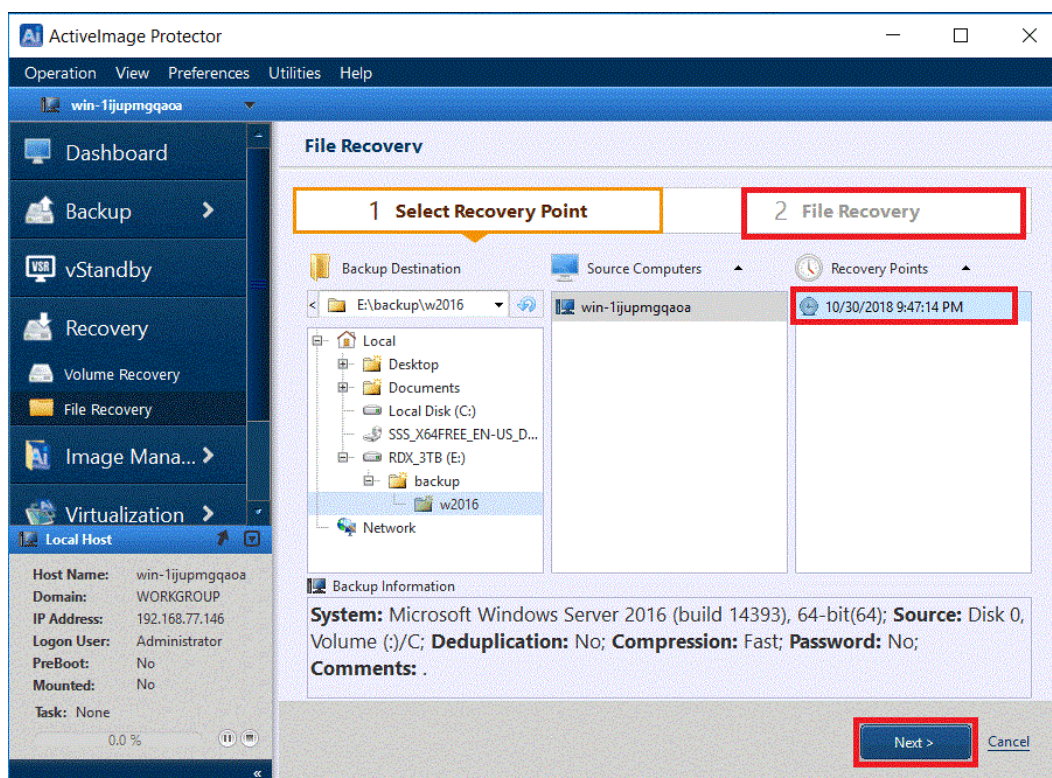
File Recovery

The following are the operating procedures to restore a specific file or folder from a backup image file

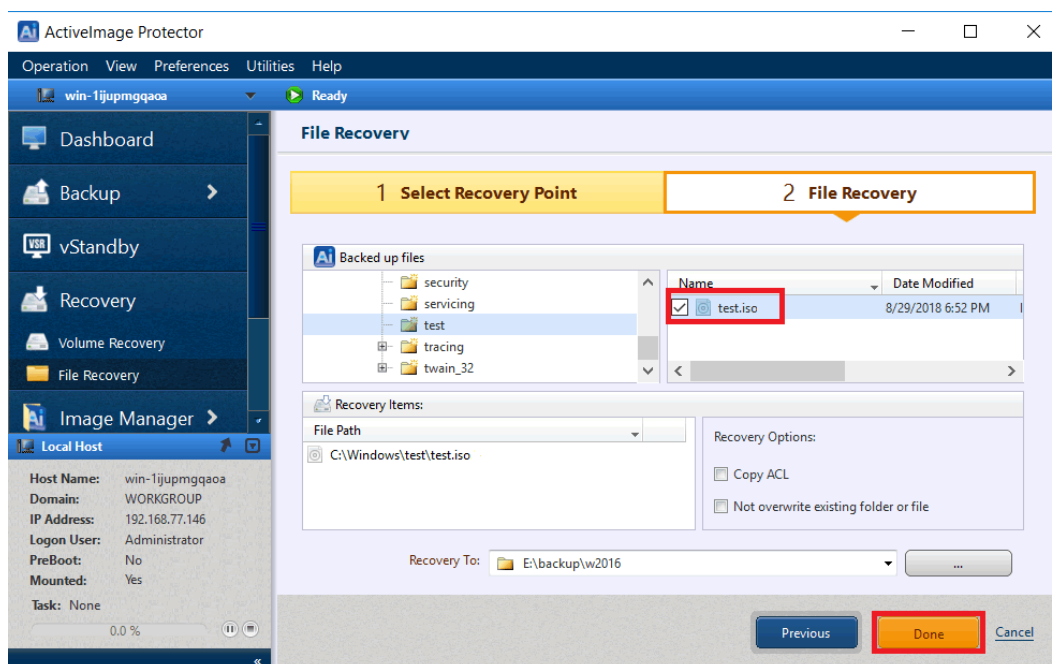
- 1) Please select **[Recovery]** and **[File Recovery]** in the dialog.



- 2) **[Select Recovery Point]** dialog is displayed. Please select a Recovery Point and click **[Next]**.



- 3) **[File Recovery]** dialog is displayed. Select a file to restore and click **[Done]**.



- 4) File Recovery task is executed.

Recovery

System recovery from a backup image in iSCSI target requires the use of CentOS-based bootable media.

*CentOS-based bootable media:

- If you purchased the media kit:

Please use ActiveImage Protector 2018 Update bootable media.

- If you downloaded the program from Actiphy's Web site:

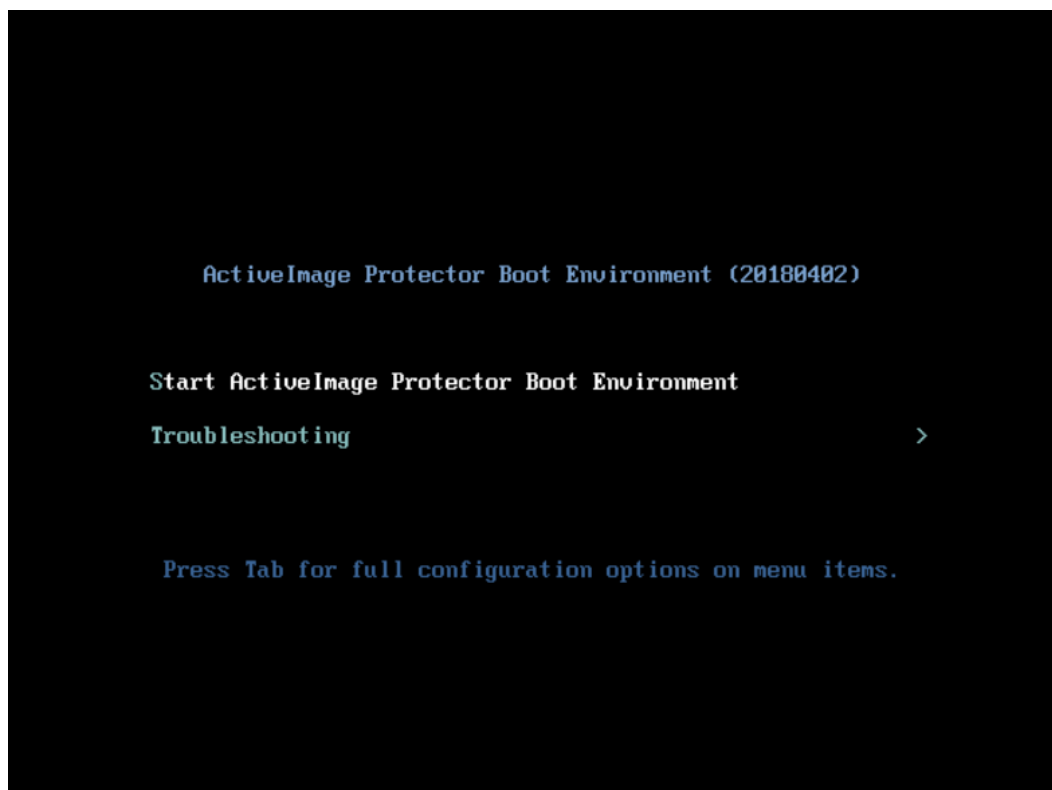
Locate AIPBE_CentOS.iso in ActiveImage Protector 2018 Update RDX for Server's ISO folder and write it in DVD-R.

The following chapter provides the description about the system recovery by using CentOS-based bootable media. As for the system recovery from a backup image in RDX USB drive using CentOS-based bootable media, please take the same operating procedures except for the part for iSCSI device.

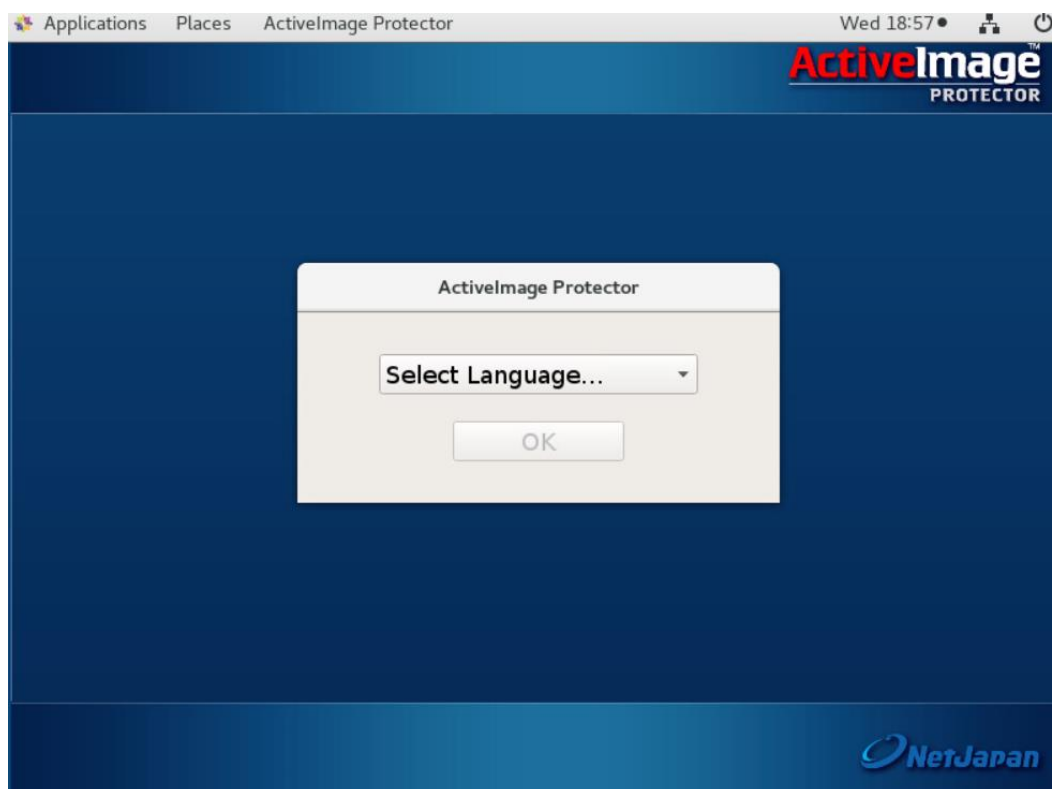
System recovery using a bootable media

The following are the operating procedures how to recover the computer system by using CentOS-based bootable media.

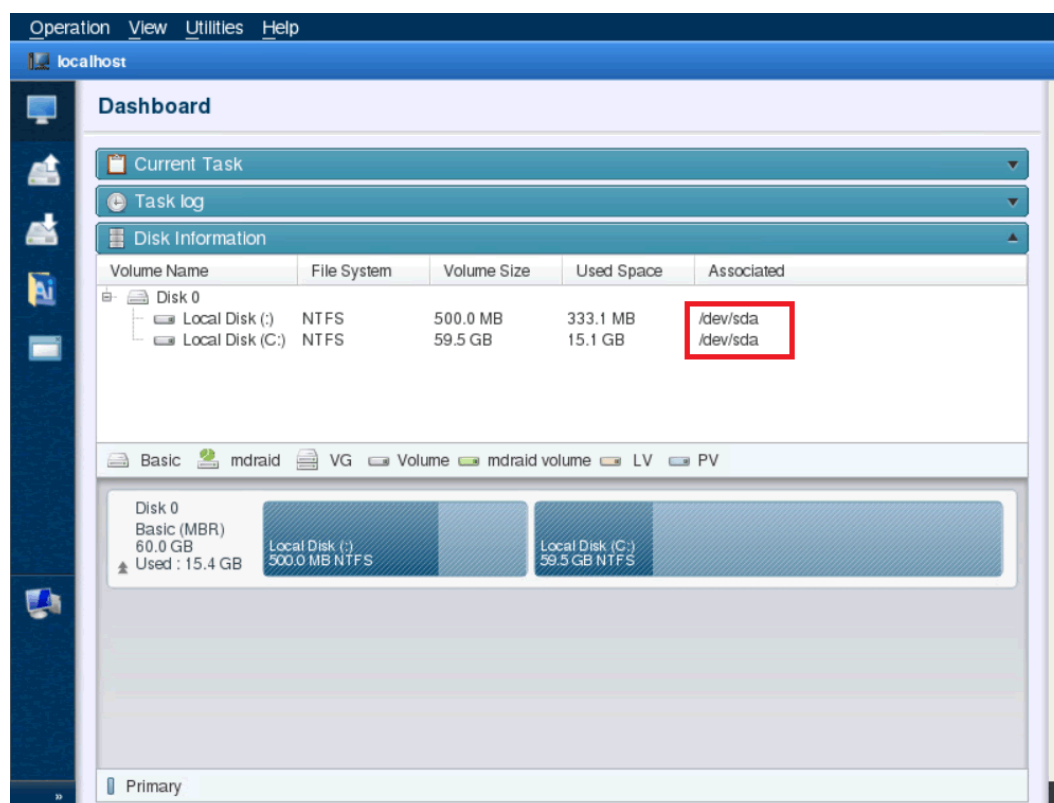
- 1) Boot up the computer system by using the CentOS-based bootable media. Select **[Start ActiveImage Protector Boot Environment]** and press Enter key.



- 2) Please select **[English]** in the following dialog and click **[OK]**.



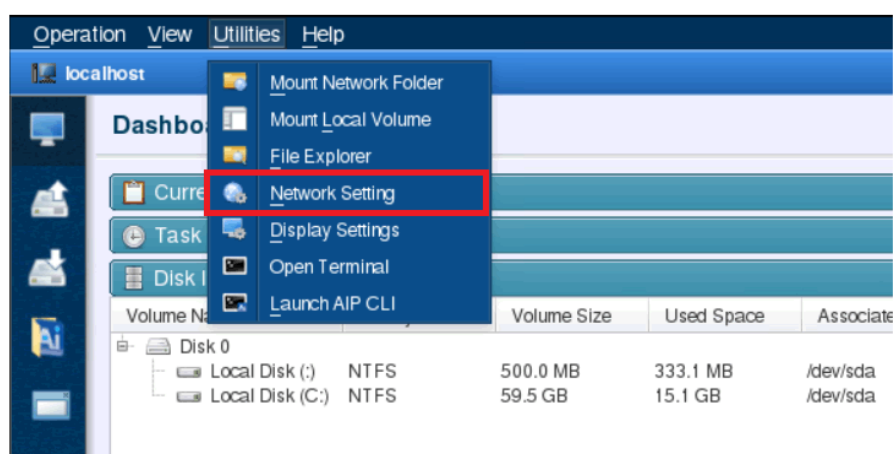
- 3) **[Dashboard]** dialog is displayed as follows.



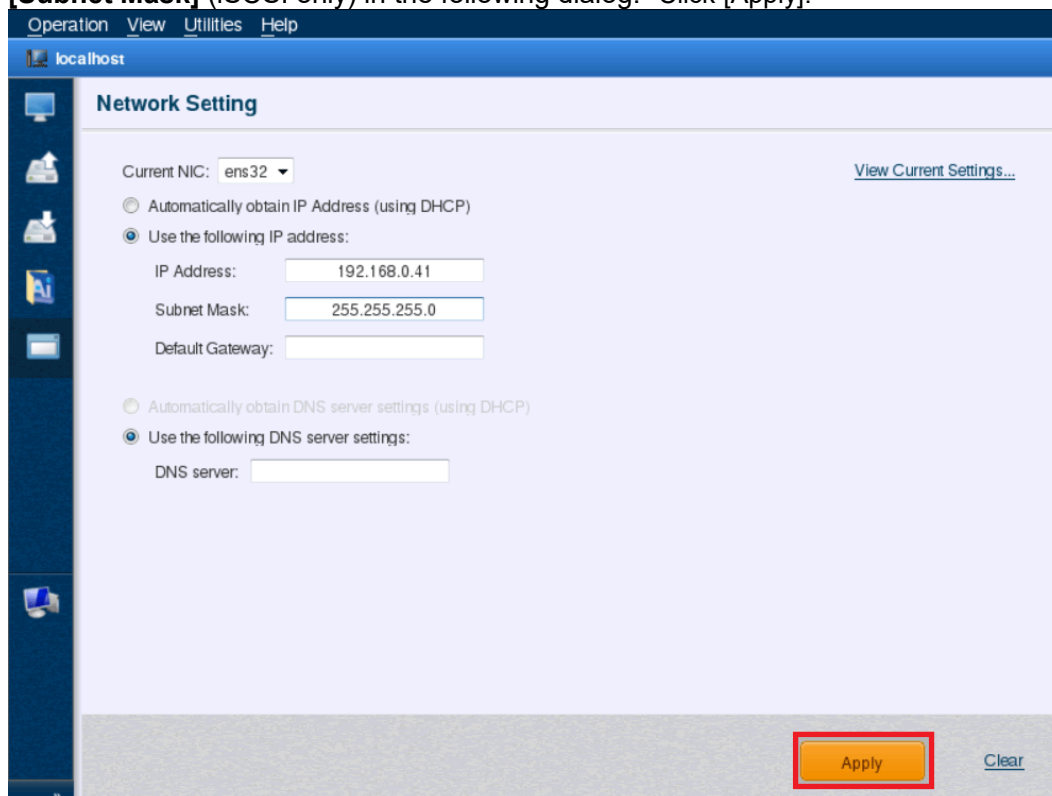
The disk including the system volume is recognized as “/dev/sda” on Linux system. This device name is important.

Note) The following network and iSCSI device connection settings are required for QuikStation4/8 only. You do not need to configure the network settings when DHCP automatically assigns IP address.

- 4) Select **[Utilities] – [Network Setting]** (iSCSI only, static IP environment only.)

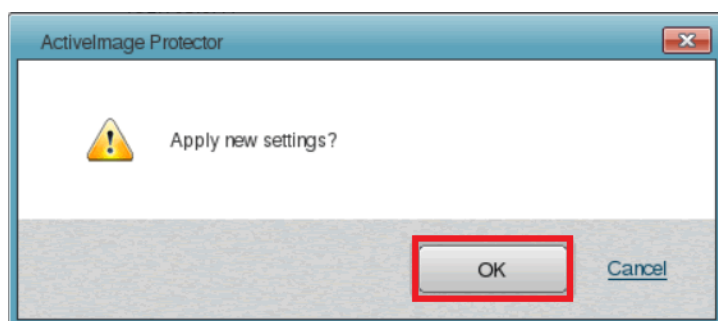


- 5) Specify NIC connected over the same network as QuikStation for **[Current NIC]**, IP address used for network connection for **[IP Address]** and the value for subnet mask for **[Subnet Mask]** (iSCSI only) in the following dialog. Click [Apply].

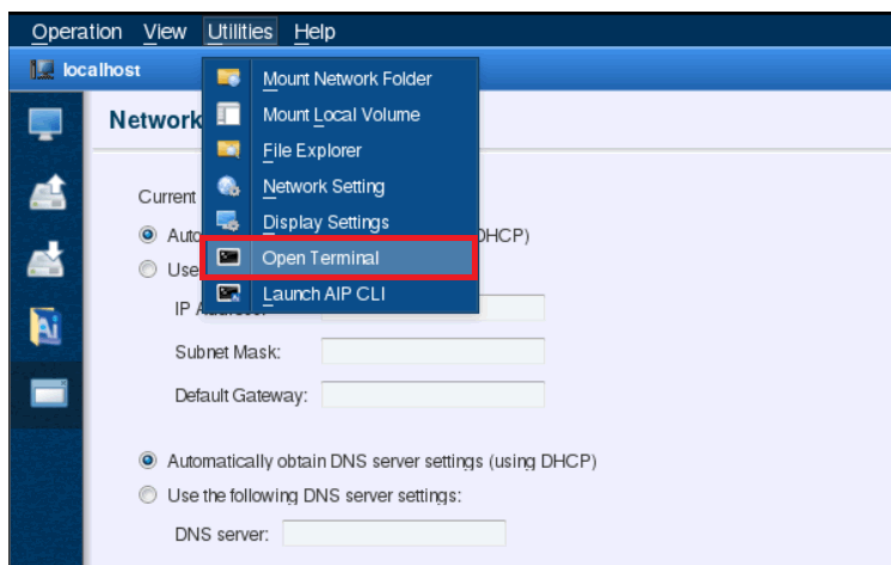


The above example shows that the private network of “192.168.0.41” is used.

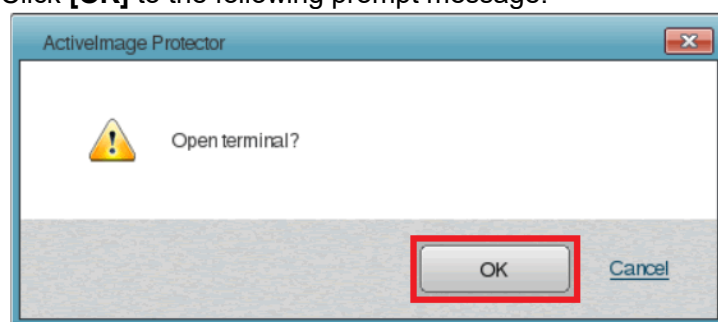
Click **[OK]** to the following prompt message.



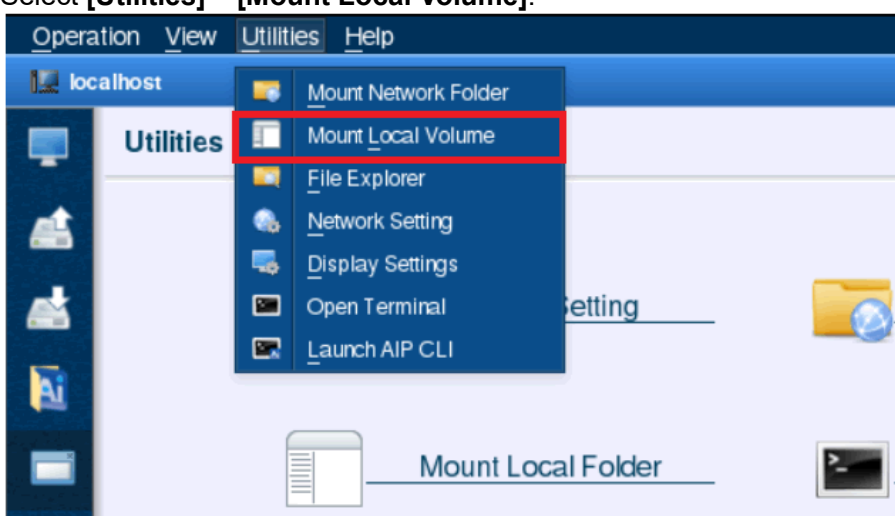
- 6) Select **[Utilities]** – **[Open Terminal]** (iSCSI only).



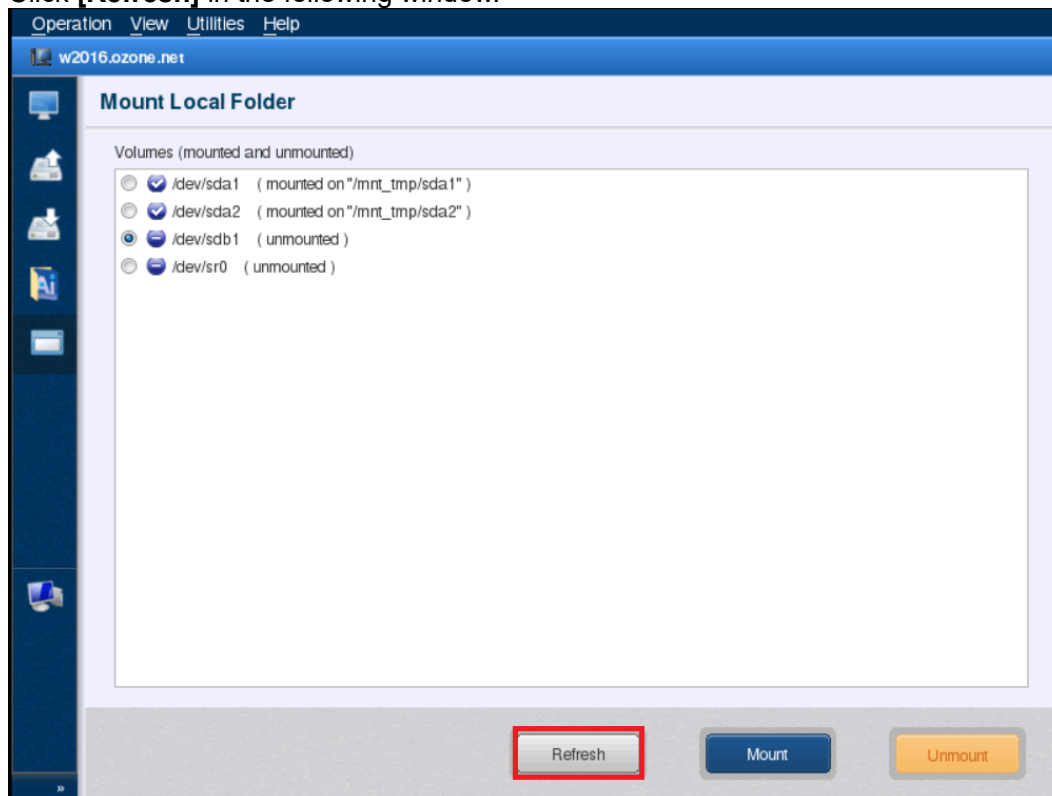
Click **[OK]** to the following prompt message.



- 7) Run “iscsiadm” command in the displayed terminal window.
- a) `iscsiadm -m discovery -t st -p IPAddr ->` Search for the target portal.
 - b) `iscsiadm -m node --login ->` Log in the target
 - c) Exit the terminal window.
- 8) Select **[Utilities]** – **[Mount Local Volume]**.



- 9) Click **[Refresh]** in the following window.

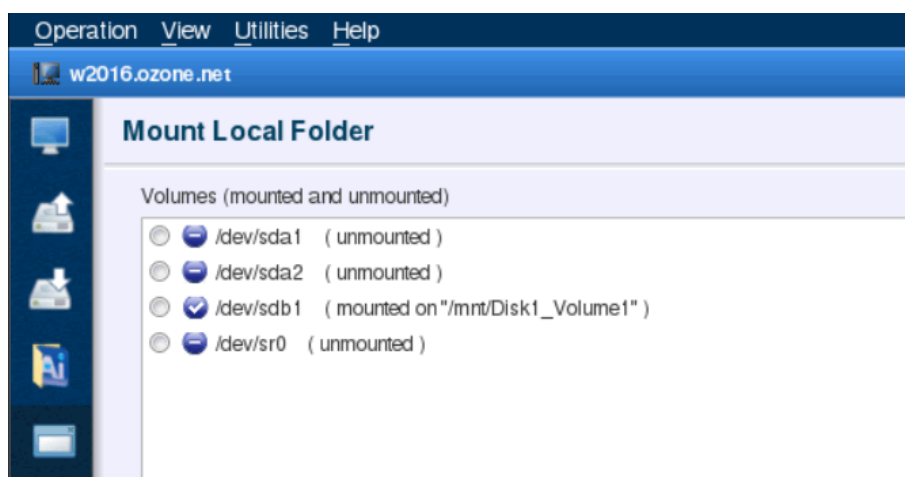


- ☒ represents mounted volumes
- ☐ represents unmounted volumes

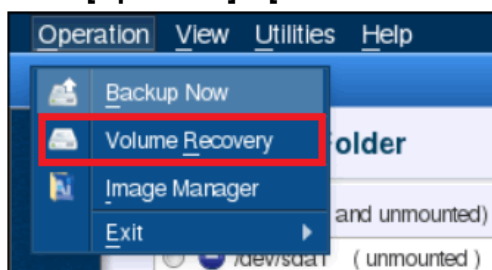
Every volume recognized when the system booted up are mounted, but the restore target volume (C drive, etc.) must be unmounted while the volume (RDX drive) on which the backup image files are located have to be mounted.

In the above example "/dev/sda" is the boot volume including C drive, while "/dev/sde1" is the volume including backup image files.

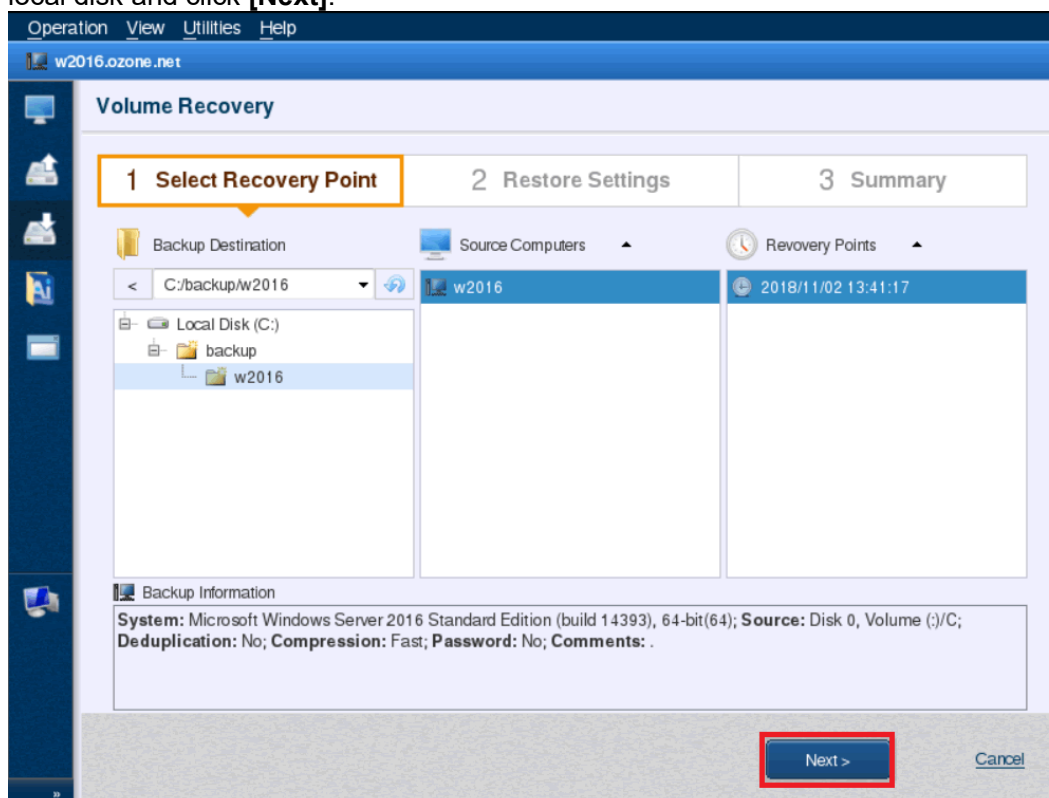
- 10) Only RDX drive is mounted and selected, while the other volumes are unmounted.



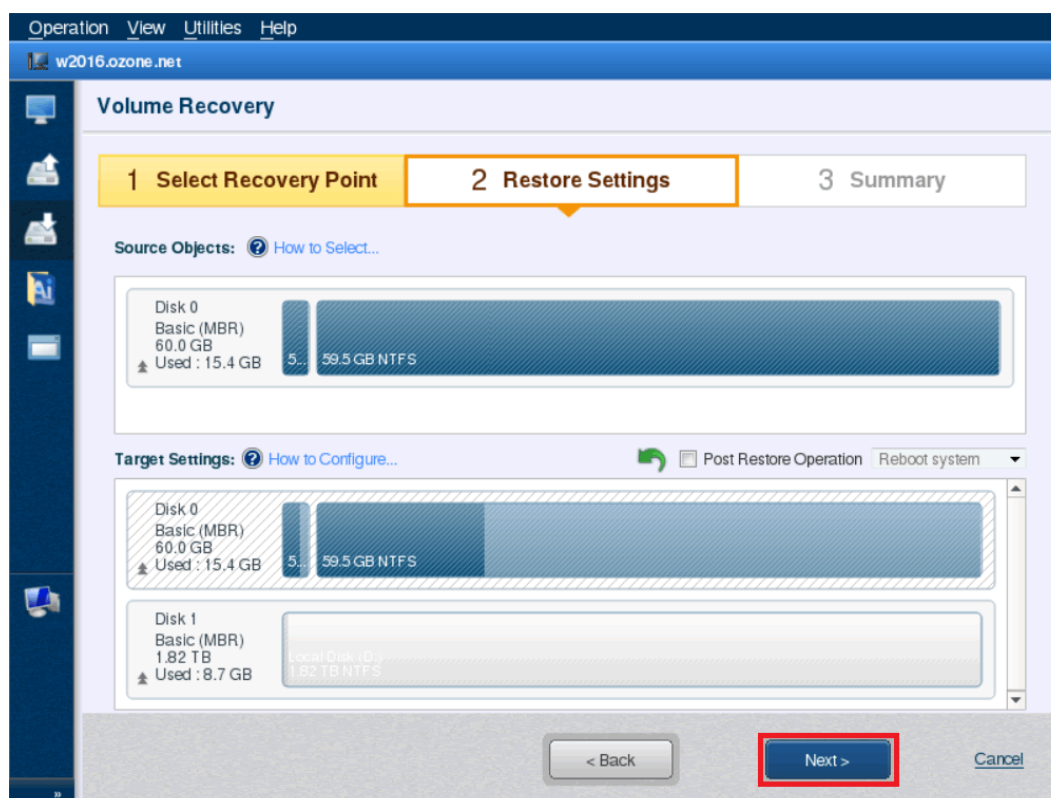
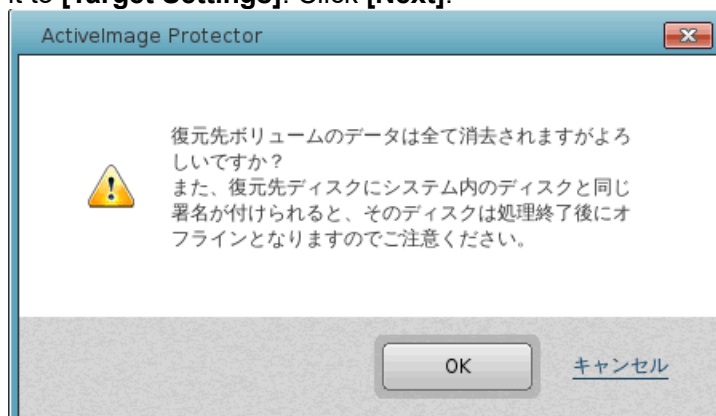
- 11) Select **[Operation] – [Volume Recovery]**.



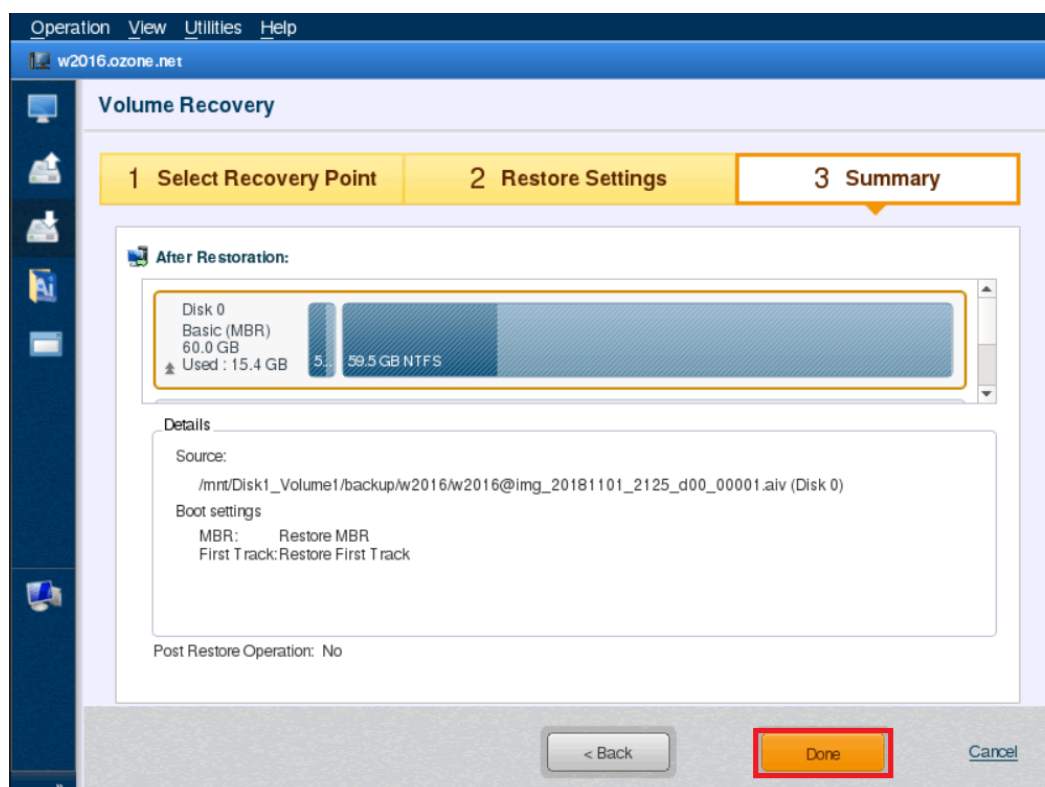
- 12) The following **[Select Recovery Point]** dialog is displayed. Select a recovery point in the local disk and click **[Next]**.



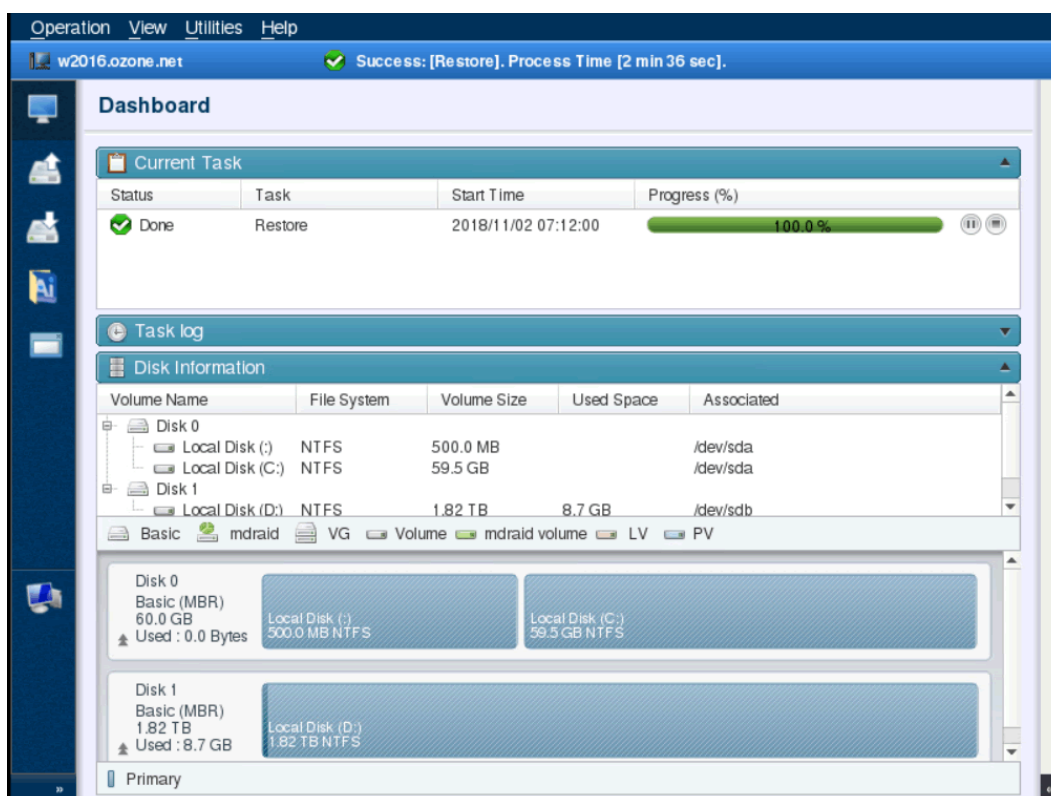
- 13) **[Restore Settings]** dialog is displayed and the disk layout of the selected image is shown in **[Source Objects:]**. Drag a disk or a volume from **[Source Objects:]** and drop it to **[Target Settings:]**. Click **[Next]**.



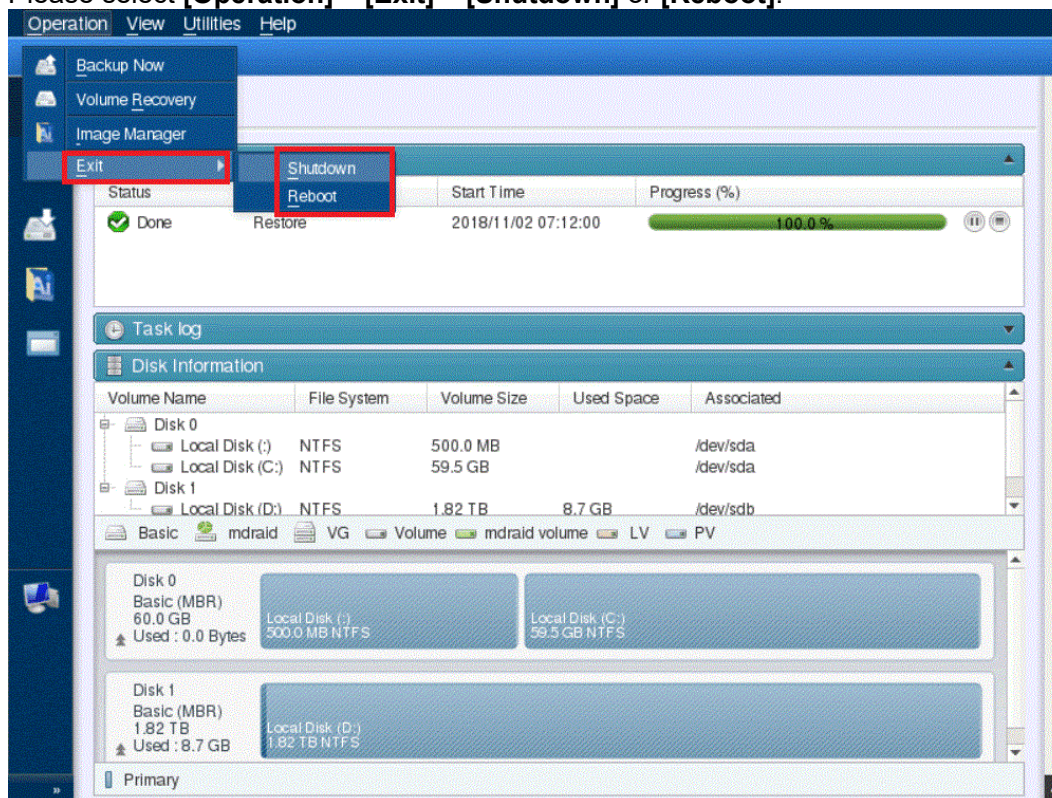
- 14) Please click **[Done]** in **[Summary]** dialog.



- 15) When recovery process starts, **[Dashboard]** window is displayed. Upon completion of the recovery process, please make sure that **[Status]** is **[Done]**.



- 16) Please select **[Operation] – [Exit] – [Shutdown]** or **[Reboot]**.

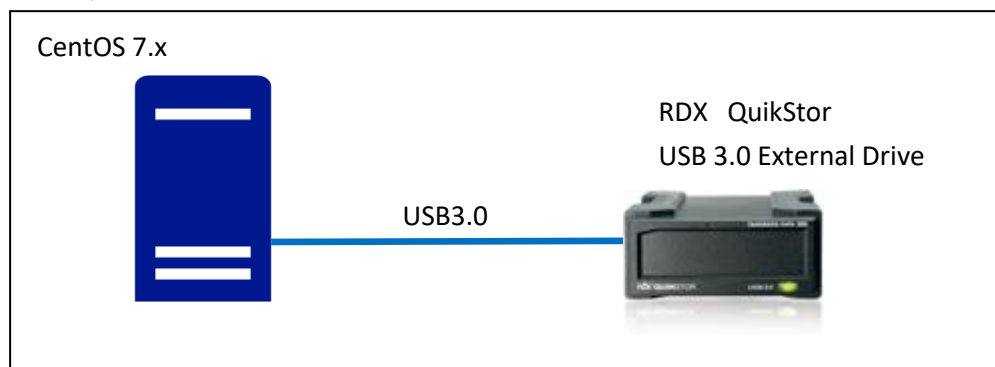


- 17) When the system normally reboots, recovery process has completed.

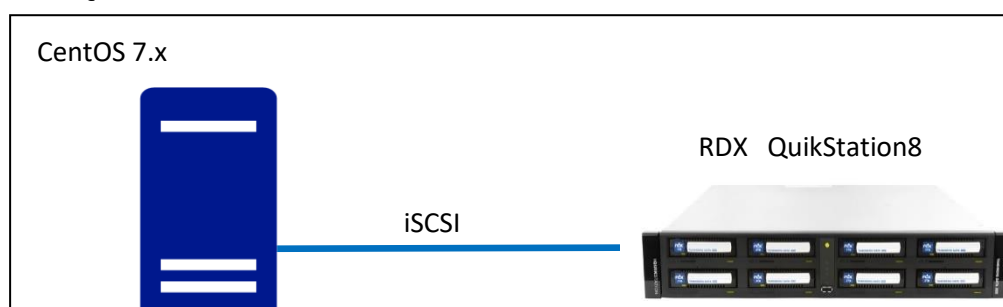
Operating Procedures in Linux Environment

This chapter provides the details of operating procedures how to connect RDX QuikStor by USB3 cable and RDX QuikStation via iSCSI to Linux CentOS7.x host and configure the backup setting.

RDX QuikStor



RDX QuikStation



Connection Check

Set up the device mode, connect RDX QuikStation8 to OS via iSCSI, make sure that RDX QuikStation8 is detected on OS and perform partitioning / formatting.

The use of RDX QuikStor does not need to set up the device mode or iSCSI connection. Please configure the settings for other items.

Setup RDX QuikStation mode (QuikStation only)

- 1) For more details about the respective device modes of RDX QuikStation, please refer to [Appendix 1\) Device Mode of RDX QuikStation4/8](#).
- 2) For more detailed operating procedures to set up the respective device modes of RDX QuikStation, please refer to [Set up RDX QuikStation mode](#).

Connecting iSCSI target (QuikStation only)

Install iSCSI Initiator tool to establish connection with QuikStation logical device.

Install iSCSI Initiator Tool

Run the following command to check for the package in iSCSI initiator tool. When there exists the package, the following is displayed.

```
# rpm -qa | grep iscsi-initiator
iscsi-initiator-utils-xxxxxxx
```

If the package does not exist, please install the package of iSCSI initiator tool.

```
# yum -y install iscsi-initiator-utils
```

Connecting iSCSI target

Run “iscsiadm” command to connect iSCSI target. The following example shows iSCSI target is connected to QuikStation8 in RDX mode at IP Address 192.168.0.10.

- 1) Use Discovery mode to search for the target.

```
# iscsiadm -m discovery -t sendtargets -p 192.168.0.10
192.168.0.10:3260,1 iqn.2010-01.com.tandbergdata:storage.rdx2-2.989300045
192.168.0.10:3260,1 iqn.2010-01.com.tandbergdata:storage.rdx1-1.989300045
```

- 2) Log in the target.

```
# iscsiadm -m node -T iqn.2010-01.com.tandbergdata:storage.rdx1-1.989300045 --login
Logging in to [iface: default, target: iqn.2010-01.com.tandbergdata:storage.rdx1-1.989300045, portal:
192.168.0.10,3260] (multiple)
Login to [iface: default, target: iqn.2010-01.com.tandbergdata:storage.rdx1-1.989300045, portal:
192.168.0.10,3260] successful.
```

Detection of RDX drive (QuikStor)

Connect RDX QuikStor to OS by using USB cable and make sure that RDX drive is normally recognized on OS.

Example:

```
# ls SCSI
[1:0:0:0] cd/dvd NECVMWar VMware IDE CDR10 1.00 /dev/sr0
[2:0:0:0] disk VMware Virtual disk 1.0 /dev/sda
[3:0:0:0] disk TANDBERG RDX 0227 /dev/sdb
```

Partition and Mount

Most of RDX cartridges are NTFS formatted and marketed. Before you use an RDX cartridge as the backup destination storage for backup images created by using AIP, the use of RDX cartridge formatted with ex4 on Linux provides improved performance. QuikStation logical volume / protected volume, after initialization, needs to be partitioned. The following example details the procedures how to delete the NTFS formatted partitions and create ext4 partitions again (if the partitions are formatted by using ntfs-3g package, the use of NTFS formatted partitions is allowed, however, it will cause a decline in performance.)

1) Start operating the partition

Please unmount the automatically mounted drive (the device path of the RDX cartridge is “/dev/sdc” in this example.)

```
# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
fd0 2:0 1 4K 0 disk
sda 8:0 0 50G 0 disk
├─sda1 8:1 0 1G 0 part /boot
├─sda2 8:2 0 46G 0 part /
└─sda3 8:3 0 3G 0 part [SWAP]
sdc 8:32 1 2.7T 0 disk
└─sdc1 8:33 1 2.7T 0 part /run/media/root/RDX_3TB
sr0 11:0 1 1024M 0 rom

# umount /dev/sdc1
```


2) Check the partition

Run “parted” command to create the partition again. Specify the RDS cartridge device for the argument to run the command. Run “print” command to check the partitions in the cartridge. You can identify that “/dev/sdc1” device is NTFS partition in this example.

```
# parted /dev/sdc
GNU Parted 3.1
Using /dev/sdc
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) print
Model: TANDBERG RDX (scsi)
Disk /dev/sdc: 3001GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name              Flags
1       1049kB  3001GB  3001GB  ntfs         Basic data partition
```

3) Delete a partition

Enter the number as specified for “Number” above to delete NTFS partition. Run “print” command to make sure that the partition is deleted.

```
(parted) rm 1
(parted) print
Model: TANDBERG RDX (scsi)
Disk /dev/sdc: 3001GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name  Flags
```

4) Create a partition again

Run “mkpart” command to create a new partition. One partition is created for the entire cartridge. Run “print” command to make sure that the partition is created.

```
(parted) mkpart
Partition name? []? RDX_3TB
File system type? [ext2]? ext4
Start? 0%
End? 100%
(parted) print
Model: TANDBERG RDX (scsi)
Disk /dev/sdc: 3001GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name      Flags
1       2032kB  3001GB  3001GB                RDX_3TB

(parted) quit
```


5) Format a partition

Run “mkfs” command to format the created partition (/dev/sdc1) with ext4.

```
# mkfs -t ext4 /dev/sdc1
mke2fs 1.42.9 (28-Dec-2013)
/dev/sdc1 alignment is offset by 512 bytes.
This may result in very poor performance, (re)-partitioning suggested.
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=496 blocks
183148544 inodes, 732564720 blocks
36628236 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2881486848
22357 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
    4096000, 7962624, 11239424, 20480000, 23887872, 71663616, 78675968,
    102400000, 214990848, 512000000, 550731776, 644972544

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

6) Check the formatted device

Run “Parted -l” command to make sure that the device is formatted with ext4.

```
# parted -l

Model: TANDBERG RDX (scsi)
Disk /dev/sdc: 3001GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name      Flags
  1      2032kB  3001GB  3001GB  ext4         RDX_3TB
```

7) Register RDX device in fstab

Note: When OS boots up, the device path may change depending on the system environment. In the environment as such, use udev to fix the path.

Please create a mount point for the destination storage in advance, register RDX device in fstab so that the RDX device will be automatically mounted when OS boots up. Please edit fstab by using Text Editor or running vi command.

- The option for iSCSI target should be **[_netdev]**.
- The option for USB target should be **[nofail]**.
- “/backup” is specified in the example. Please create a mount point in advance.

```
# mkdir /backup

# vi /etc/fstab
#
# /etc/fstab
# Created by anaconda on Thu Dec 14 12:59:10 2017
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=88ab5fe0-43ef-4ebe-a51a-3c0ded2945fe /          ext4    defaults    1 1
UUID=ff408246-729f-46c9-88cf-240f7f3d58ca /boot      ext4    defaults    1 2
UUID=3f4345e5-f65f-4c58-9f9f-d867c11a0264 swap       swap    defaults    0 0
/dev/sdc1  /backup    ext4    _netdev     0 0
```

8) Mount RDX device

Run “mount -a” to mount RDX device according to the settings configured in fstab. If the settings are correctly configured in fstab, RDX device is normally mounted.

```
# mount -a
# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
fd0   2:0    1   4K  0 disk
sda   8:0    0  50G  0 disk
├─sda1 8:1    0   1G  0 part /boot
├─sda2 8:2    0  46G  0 part /
└─sda3 8:3    0   3G  0 part [SWAP]
sdc   8:32   1  2.7T  0 disk
└─sdc1 8:33   1  2.7T  0 part /backup
sr0   11:0   1 1024M  0 rom
```

9) Auto-mount the replaced cartridge

--- RHEL7.x / CentOS7.x ---

The cartridge on GNOME desktop of RHEL7.x / CentOS7.x, when replaced with a new one, is automatically mounted. Depending on the system environment, the replaced cartridge may not be automatically mounted. Please check if the following packages are installed to see if the replaced cartridge is automatically mounted.

```
# rpm -qa | grep udisks2
libudisks2-2.7.3-6.el7.x86_64
udisks2-2.7.3-6.el7.x86_64
```

In general, udisks2 is installed on GNOME desktop. However, minimal setup requires installation of udisks2.

```
# yum -y install udisks2
```

If you do not install udisks2, run “cron” command to run mount command on a regular basis.

You can edit crontab in the same manner as you operate vi editor.

```
# crontab -u root -e

*/5 * * * * `mount -t ext4 /dev/sdc1 /backup`
```

Run “crontab -l” command to check the configured settings.

```
# crontab -l
*/5 * * * * `mount -t ext4 /dev/sdc1 /backup`
```

--- RHEL6.x / CentOS6.x ---

Even when udisks package is installed on RHEL6.x / CentOS6.x, the cartridge, after replaced with a new one, is not automatically mounted. Therefore, run “cron” command to run mount command on a regular basis.

You can edit crontab in the same manner as you operate vi editor..

```
# crontab -u root -e

*/5 * * * * `mount -t ext4 /dev/sdc1 /backup`
```

Run “crontab -l” command to check the configured settings.

```
# crontab -l
*/5 * * * * `mount -t ext4 /dev/sdc1 /backup`
```

Installation of ActiveImage Protector

For the detailed operating procedures for installing ActiveImage Protector, please refer to “Installing ActiveImage Protector” in online help at the following URL. Please also refer to “System Requirements”.

• ActiveImage Protector 2018 Linux Edition Online Help

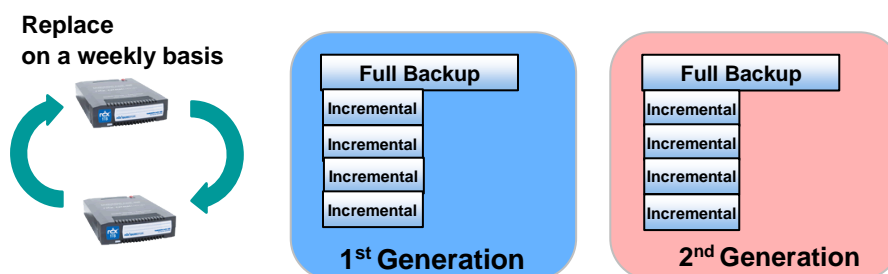
<http://webhelp.netjapan.com/AIP/Linux/2018/en/help/index.html>

Backup Operation and Settings

The following are the examples of backup task settings according to a standard backup operation scenario.

Replace the cartridge with a new one on a weekly basis

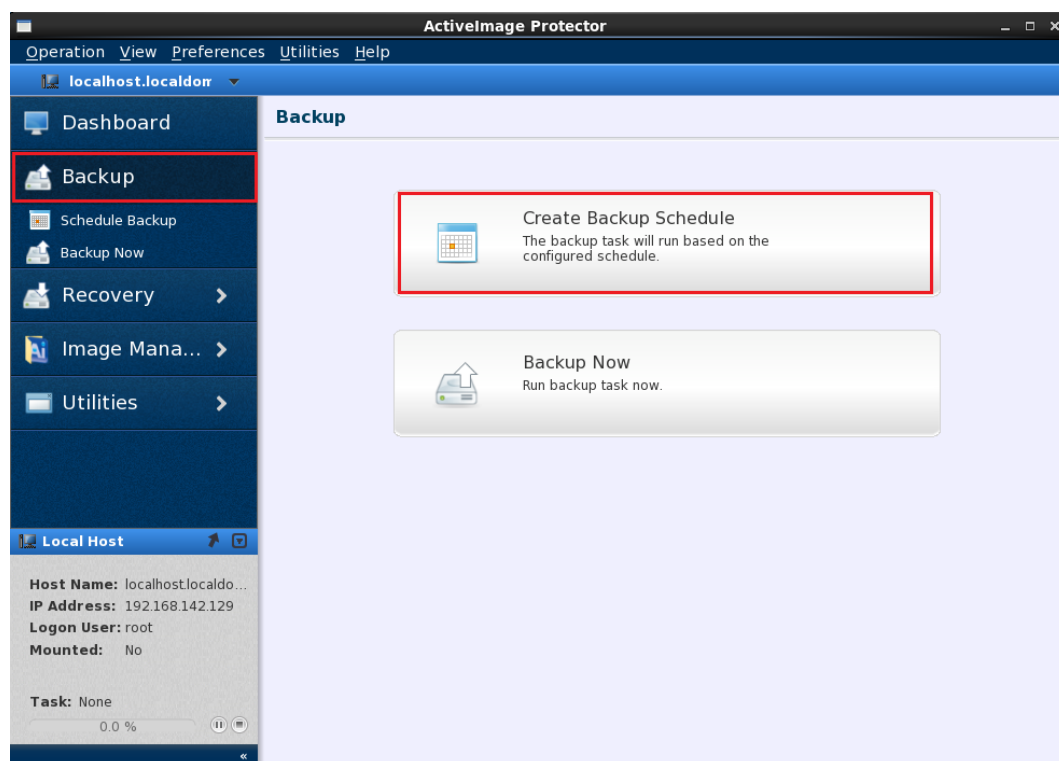
One full backup and incremental backups created in a week are saved in one cartridge and replaced with a new one on a weekly basis. In this operation scenario, a full backup task is executed at the beginning of a week and recurring incremental backup tasks for the remaining days of a week. Detecting if the backup task is the lastly scheduled for the week, the cartridge is automatically ejected eliminating a mistake of not removing RDX cartridge. Another operation scenario includes replacement of two cartridges on a weekly basis, enabling to restore the system back to the state of a day in a week before. The more increased number of the cartridges are used, the more image sets for the respective weeks can be saved in the respective cartridges (for example, 4 cartridges for 4 weeks).



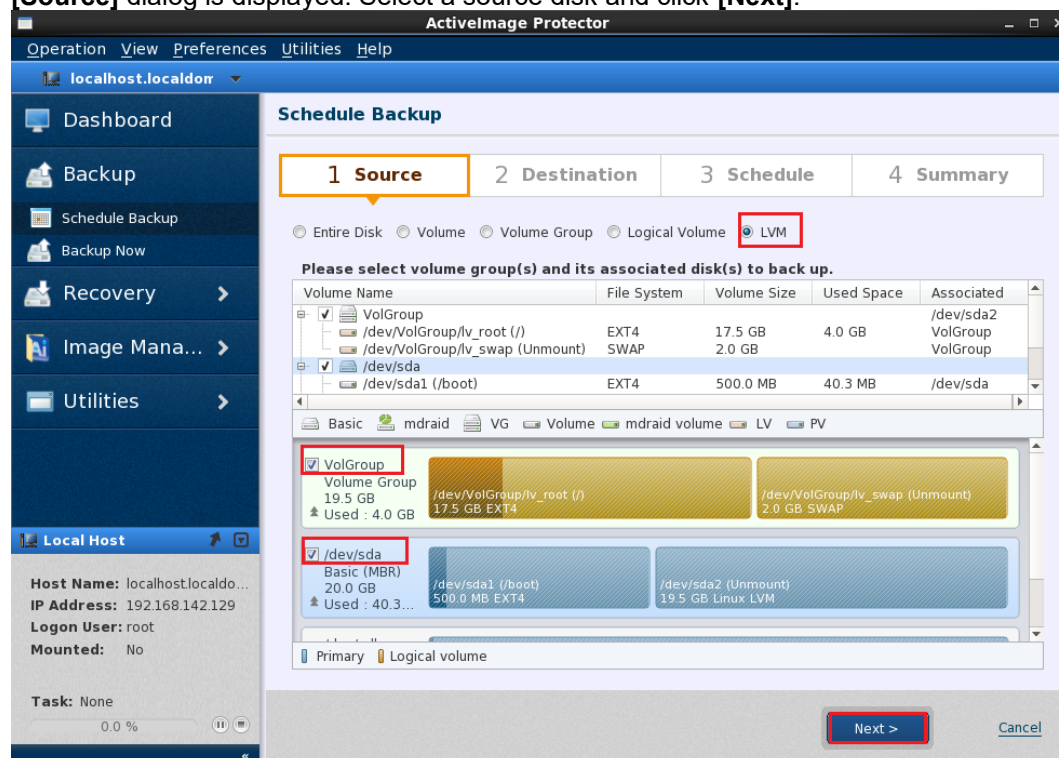
Configure Backup Schedule Settings

This chapter provides the details of how to configure the backup schedule settings to run a full backup and replace a cartridge with a new one on a weekly basis.

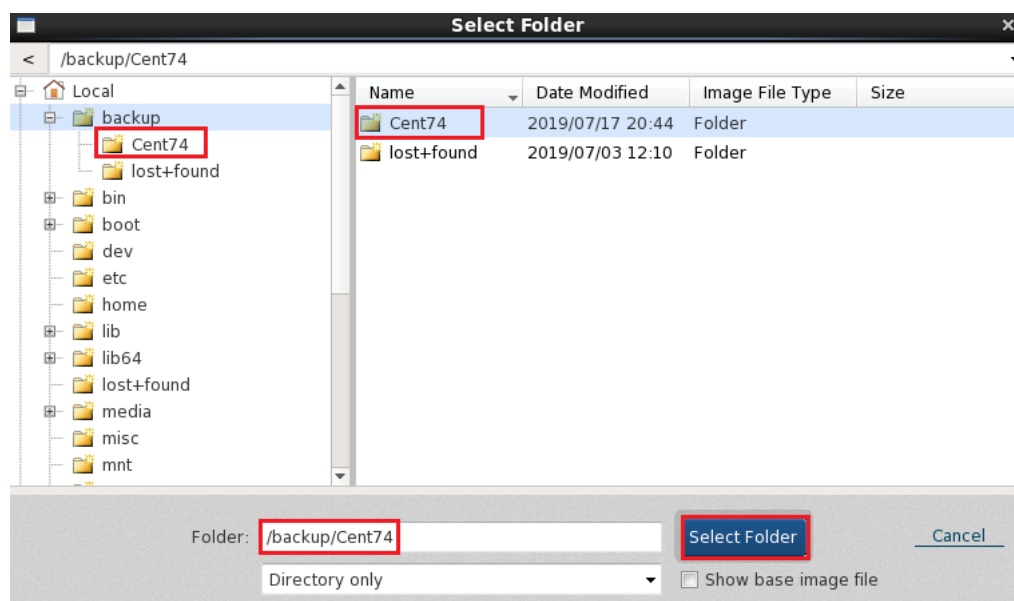
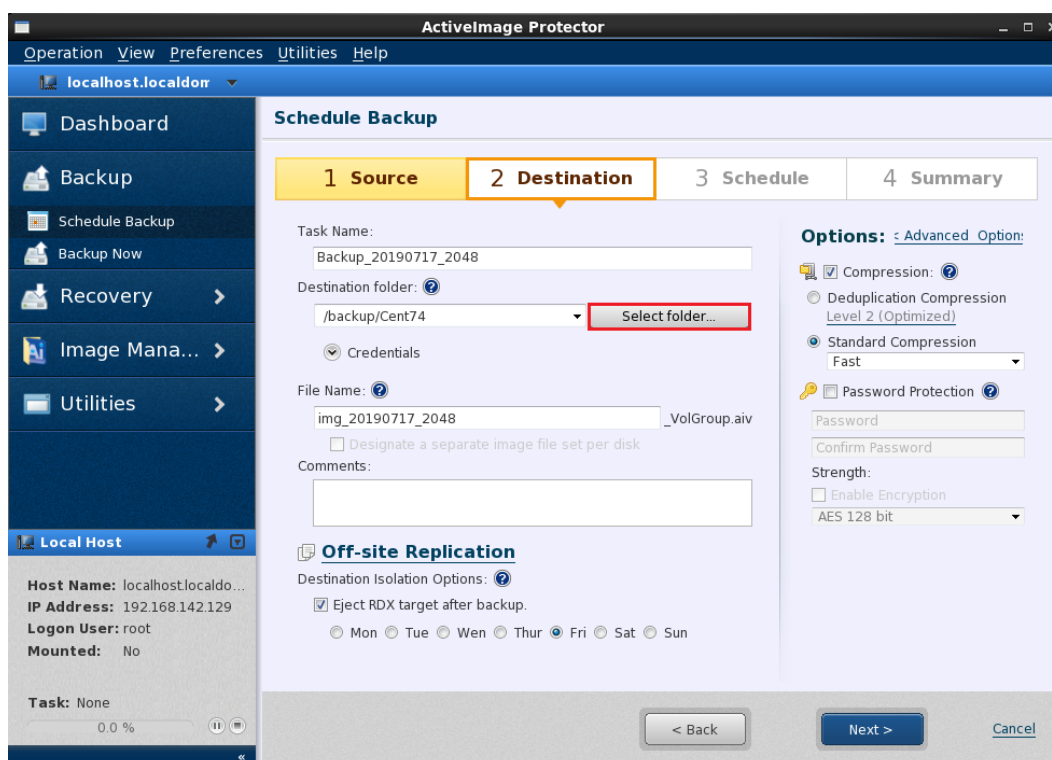
- 1) Launch ActiveImage Protector and select **[Backup] – [Schedule Backup]**.



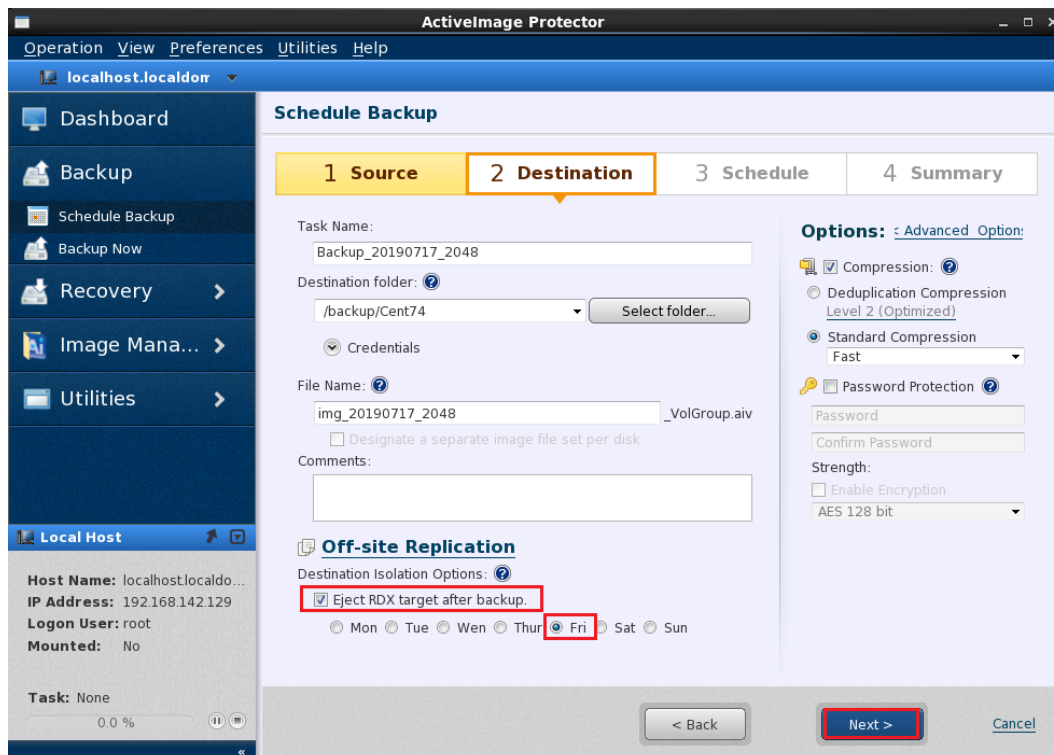
- 2) **[Source]** dialog is displayed. Select a source disk and click **[Next]**.



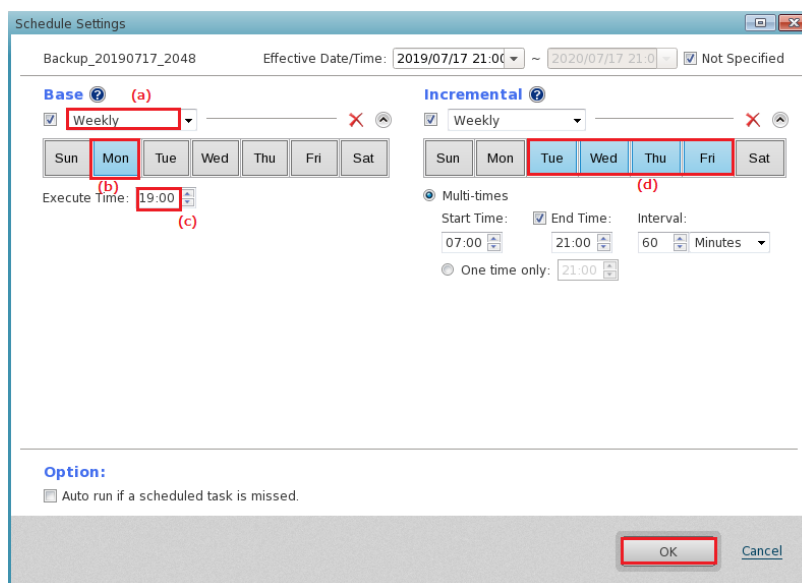
- 3) **[Destination]** dialog is displayed. Click **[Select folder]** to the right of **[Destination folder]** and select a mount point for RDX drive.



- 4) After selecting the destination folder, check the box for **[Eject RDX target after backup]** for **[Destination Isolation Option]**, select the day of a week (Friday is selected in this example) and click **[Next]**.



- 5) The following **[Schedule Settings]** dialog is displayed. Please configure the following settings and click **[OK]**.
- Check in the box for **[Base]** and select **[Weekly]**.
 - Select a day of a week to run a base backup task (Monday is selected in this example.)
 - Specify Execute Time ("19:00" is specified in this example.)
 - Select days of a week to run incremental backup tasks (Tuesday to Friday are selected in this example.)
- (The default values are selected for the other settings in this example.)



According to the settings configured above, a full backup task is executed at 19:00 on every Monday, incremental backup tasks every hour from 7:00 to 21:00 from Tuesday to Friday every week. Upon completion of the last incremental backup process on Friday, the cartridge is automatically ejected. The cartridge is replaced with a new one on Monday during daytime.

- 6) The following **[Schedule]** dialog is displayed. Please configure **[Option]** settings as follows and click **[Next]**.

The screenshot shows the 'ActiveImage Protector' application window with the 'Schedule Backup' dialog open. The 'Schedule' tab is active. The 'Options' section is highlighted with a red box. The 'Options' section includes:

- ☒ Enable Retention Policy
- Delete both full and incremental (selected in the dropdown)
- Number of image sets to retain: 1
- ☒ Delete the older image before new base backup.
- ☐ Send email Task failed (dropdown)

The 'Execution Priority' section shows 'Full (Base):' and 'Incremental:' both set to 'Lowest'. The 'Next >' button is highlighted with a red box.

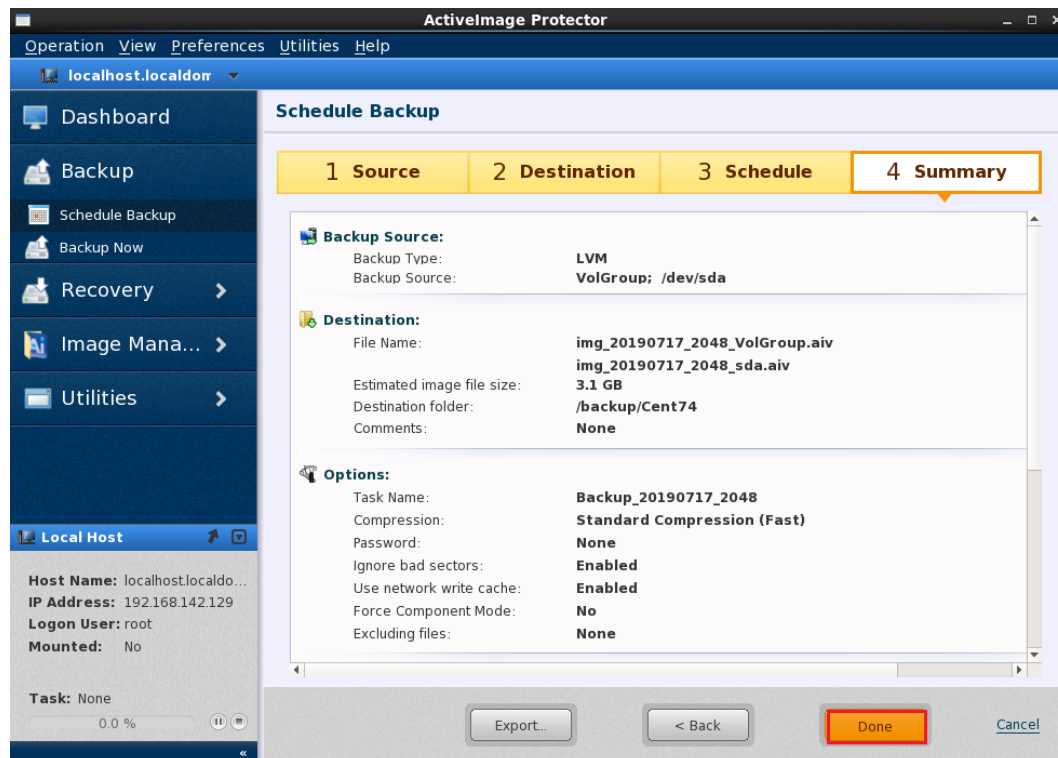
Options setting

- Check in the box for [Enable Retention Policy].
- Select [Delete both full and incremental] from the combo box (selected by default).
- Specify "1" for [Number of image sets to retain].
- Check in the box for [Delete the older image before new base backup].

The close-up shows the 'Options' section with the following settings highlighted by red boxes and labels:

- (a) ☒ Enable Retention Policy
- (b) Delete both full and incremental (selected in the dropdown)
- (c) 1 (Number of image sets to retain)
- (d) ☒ Delete the older image before new base backup.

- 7) The following **[Summary]** dialog is displayed. If you do not have to edit the settings please click **[Done]**.



Upon completion of the lastly scheduled backup task on Friday on a weekly basis, the cartridge is automatically ejected. Please replace the cartridge with a new one.

Recovery

System recovery from a backup image in iSCSI device requires the use of CentOS-based bootable media.

*CentOS-based bootable media:

- If you purchased the media kit:

Please use ActiveImage Protector 2018 Update bootable media.

- If you downloaded the program from Actiphy's Web site:

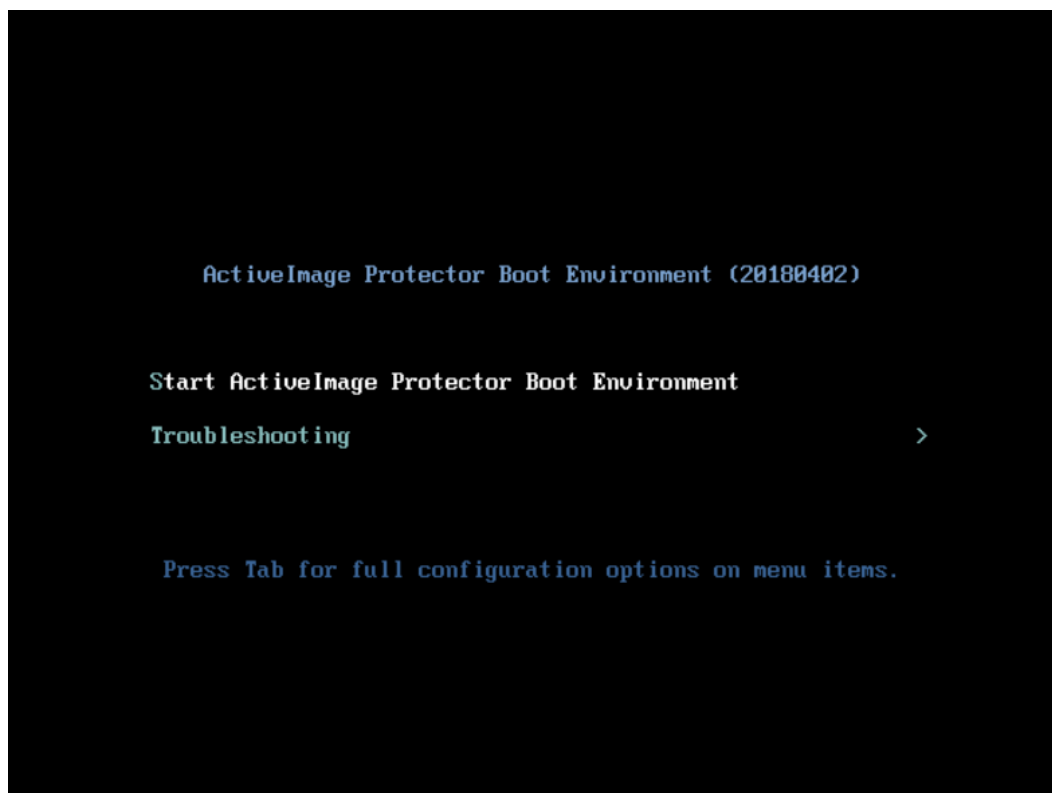
Locate AIPBE_CentOS.iso in ActiveImage Protector 2018 Update RDX for Linux's ISO folder and write it in DVD-R.

This chapter provides the description about the system recovery by using CentOS-based bootable media. As for the system recovery from a backup image in RDX USB drive using CentOS-based bootable media, please take the same operating procedures except for the part regarding iSCSI device.

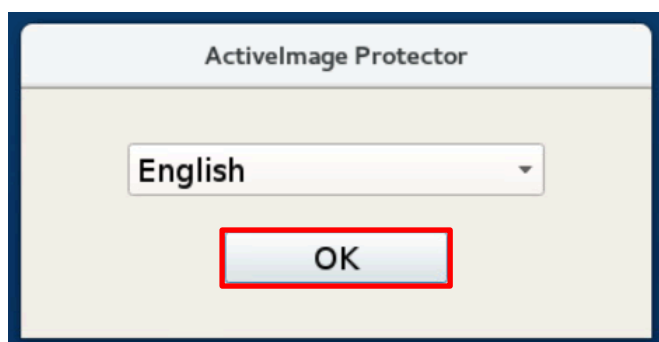
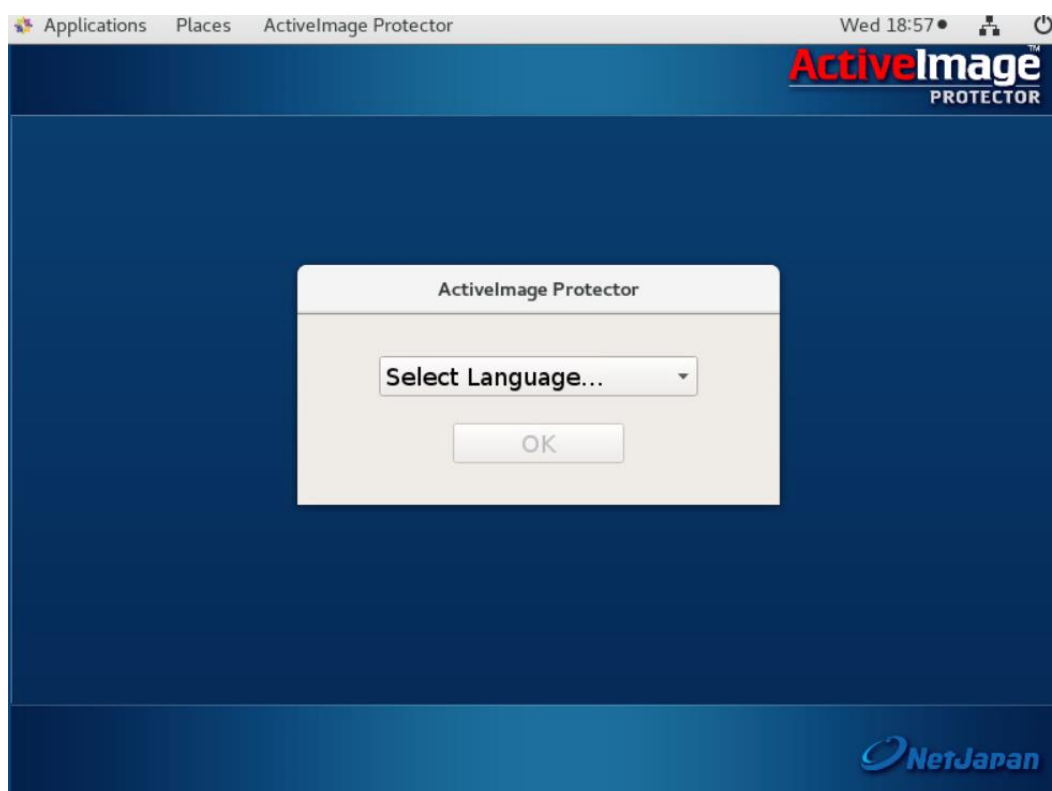
System recovery by using a bootable media

The following are the operating procedures how to recover the computer system by using CentOS-based bootable media.

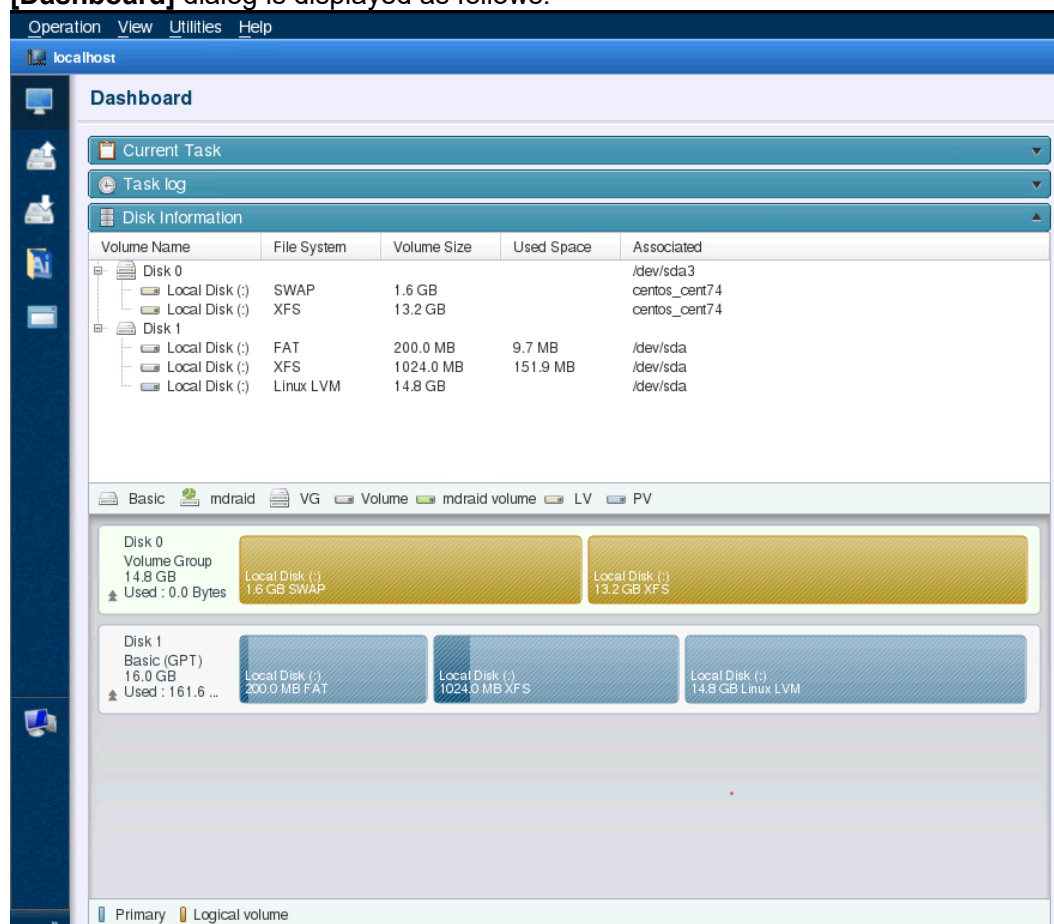
- 1) Boot up the computer system from the bootable media. Select **[Start ActiveImage Protector Boot Environment]** and press Enter key.



- 2) Please select **[English]** in the following dialog and click **[OK]**.

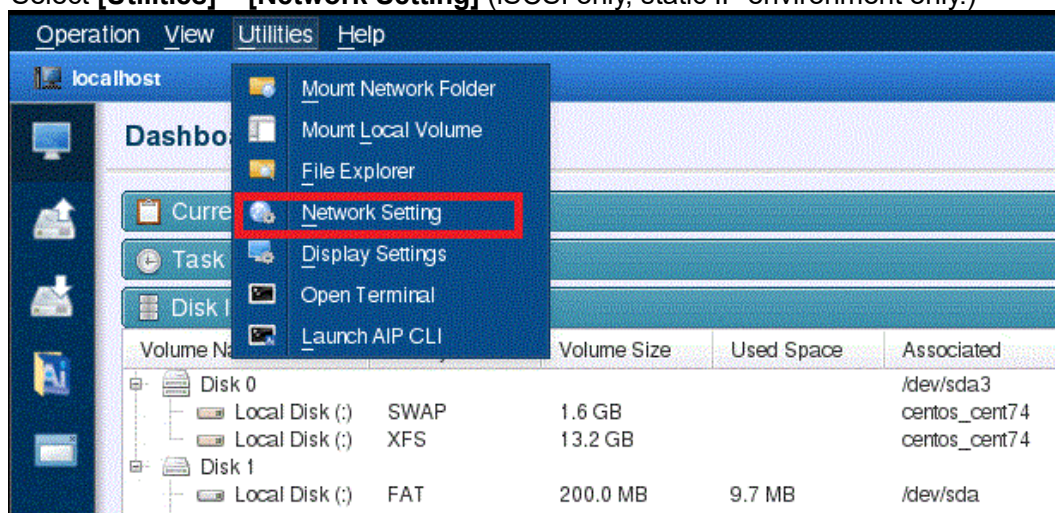


- 3) **[Dashboard]** dialog is displayed as follows.

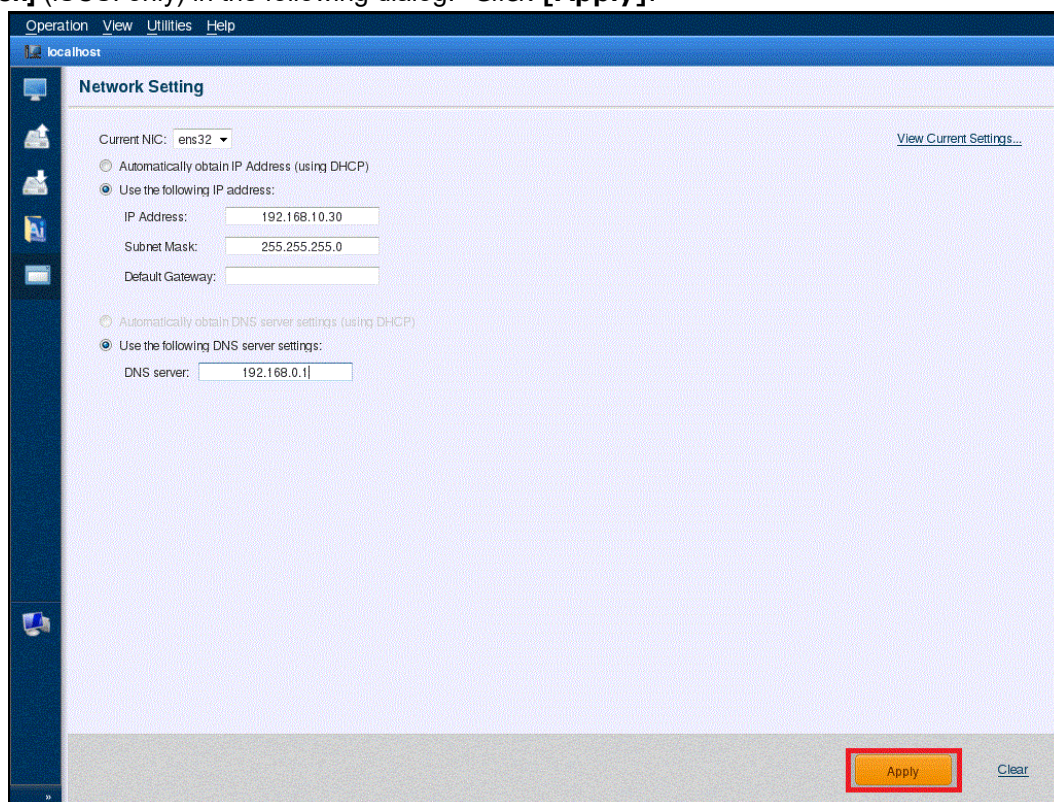


Note) The following network settings and the connection to iSCSI device are required for QuikStation4/8 of iSCSI device only. You do not need to configure the network settings when DHCP automatically assigns IP address.

- 4) Select **[Utilities]** – **[Network Setting]** (iSCSI only, static IP environment only.)

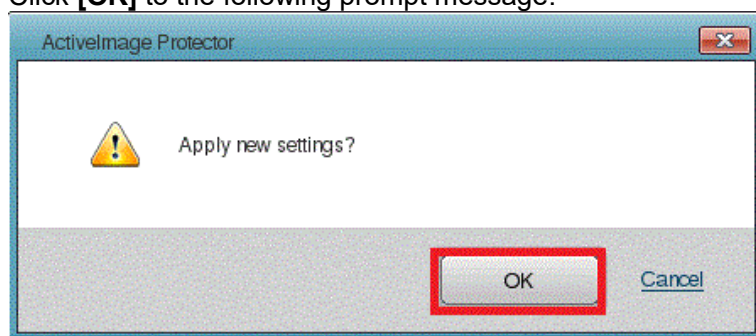


- 5) Specify NIC connected over the same network as QuikStation for **[Current NIC]**, IP address used for network connection for **[IP Address]** and the value for subnet mask for **[Subnet Mask]** (iSCSI only) in the following dialog. Click **[Apply]**.

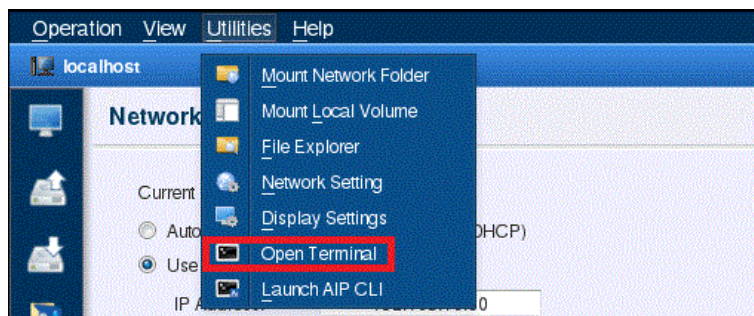


The above example shows that the private network of “192.168.1030/30” is used.

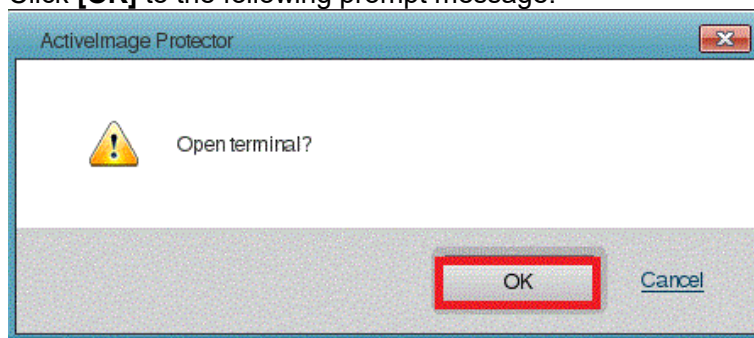
Click **[OK]** to the following prompt message.



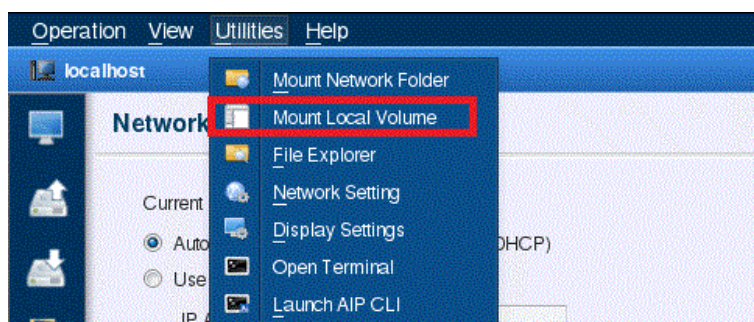
- 6) Select **[Utilities]** – **[Open Terminal]** (iSCSI only).



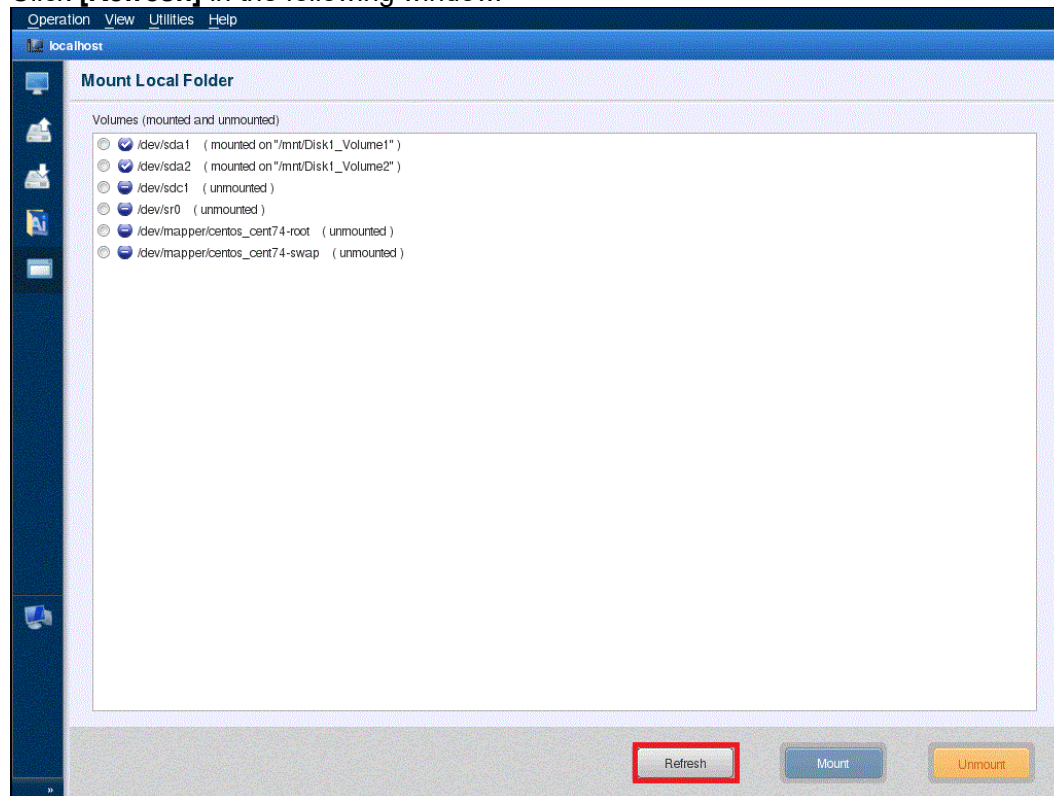
Click **[OK]** to the following prompt message.



- 7) Run “iscsiadm” command in the terminal window
- a) iscsiadm -m discovery -t st -p *IPaddr* -> Search for the target portal.
 - b) iscsiadm -m node --login -> Log in the target
 - c) Exit the terminal window.
- 8) Select **[Utilities]** – **[Mount Local Volume]**.



9) Click **[Refresh]** in the following window.



- ✓ represents mounted volume
- represents unmounted volume

Every volume recognized when the system boots up are mounted. However, the restore target volume (/ volume, etc.) must be unmounted while the volume (RDX drive) including the backup image files have to be mounted.

The above example shows that "/dev/sda" is the boot disk, while "/dev/sde1" is RDX drive including backup image files.

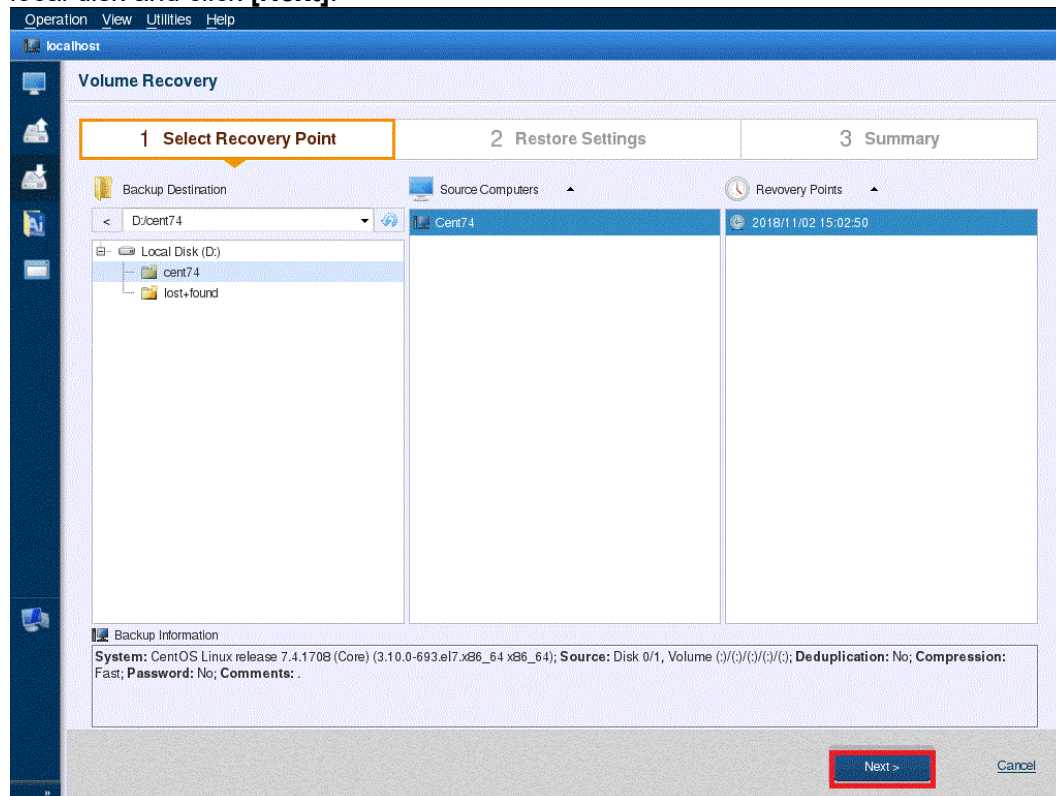
- 10) Mount or unmount the respective volumes, so that only RDX drive is selected.



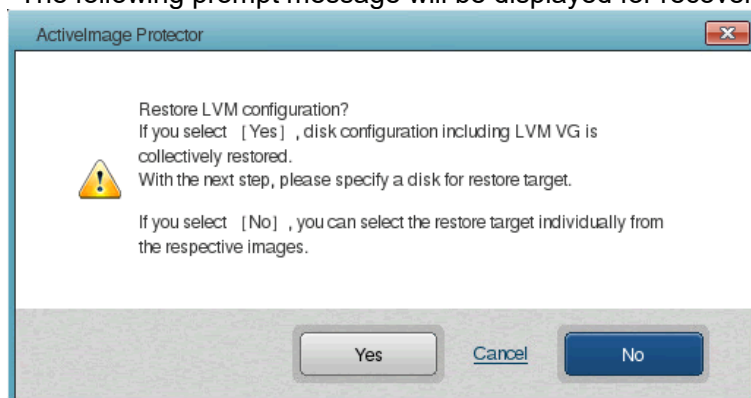
- 11) Select **[Operation] – [Volume Recovery]**.



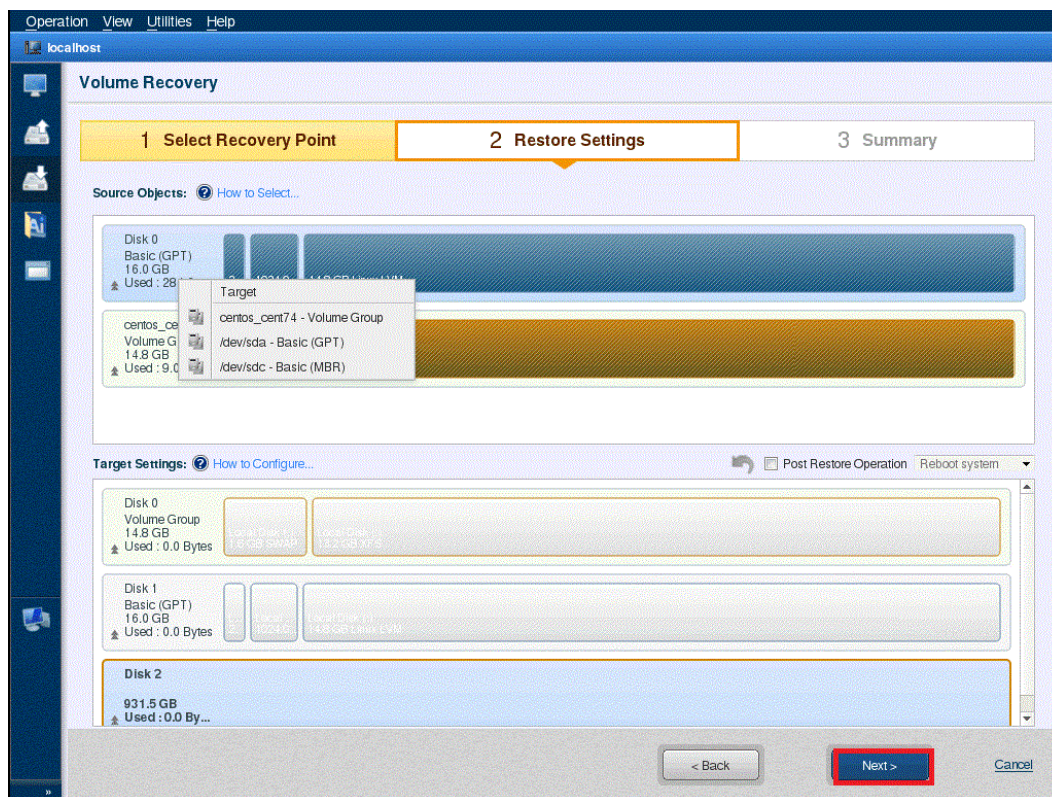
- 12) The following **[Select Recovery Point]** dialog is displayed. Select a recovery point in local disk and click **[Next]**.



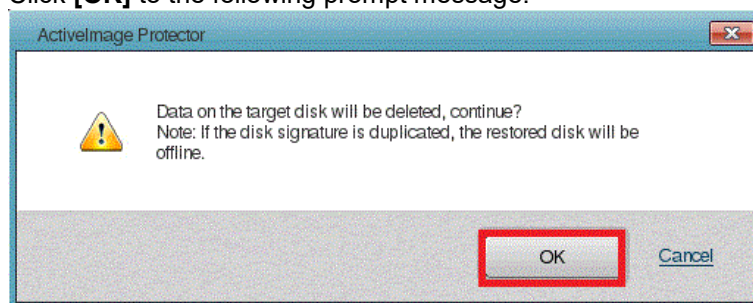
The following prompt message will be displayed for recovery of LVM configuration.



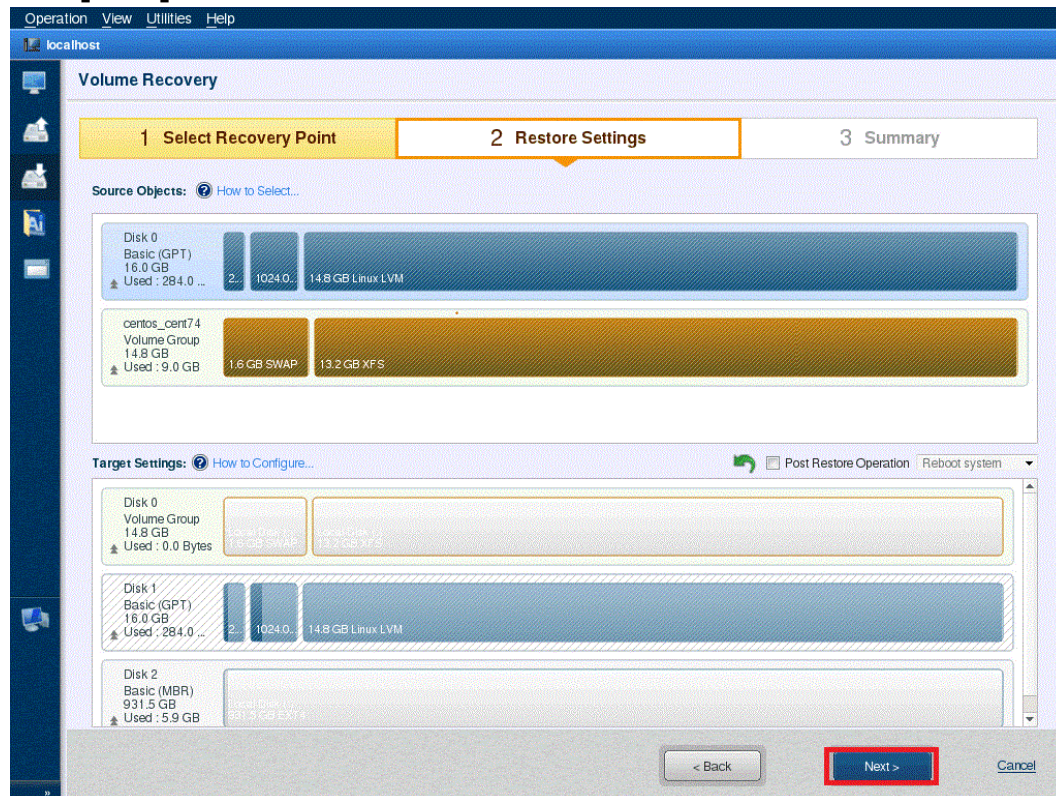
- 13) **[Restore Settings]** dialog is displayed and the selected disk is shown in **[Source Objects:]**. Drag an item (a disk or a volume) from **[Source Objects:]** and drop it to **[Target Settings]**. Click **[Next]**.



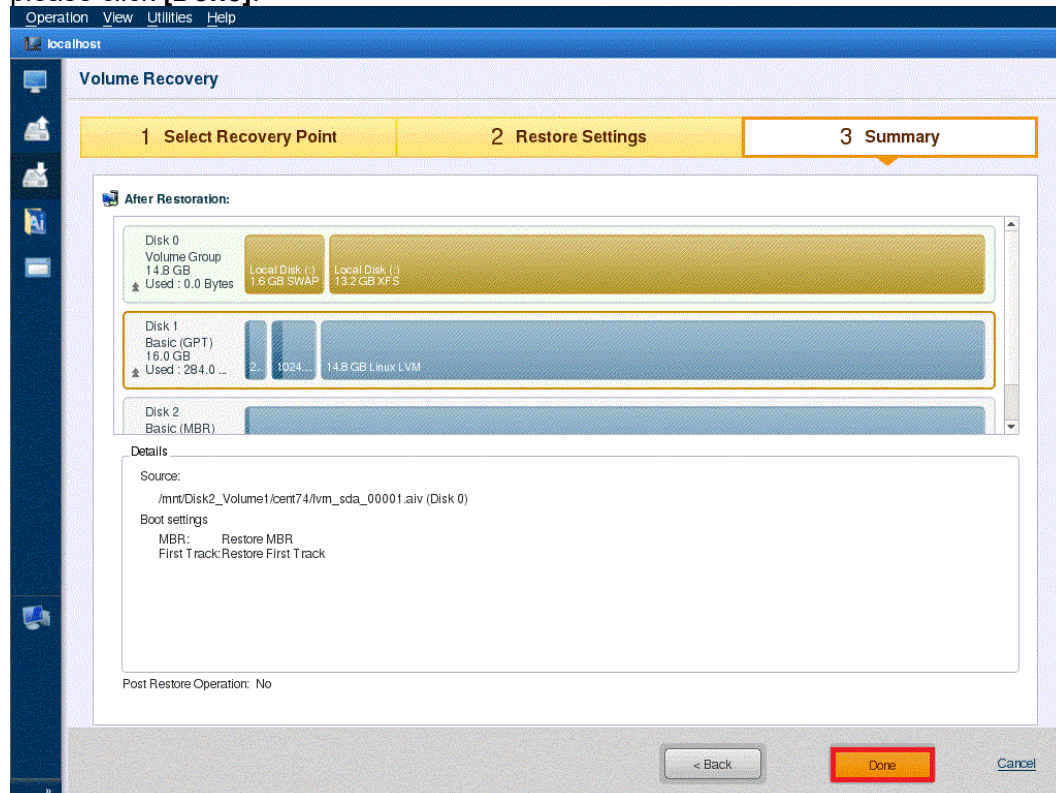
Click **[OK]** to the following prompt message.



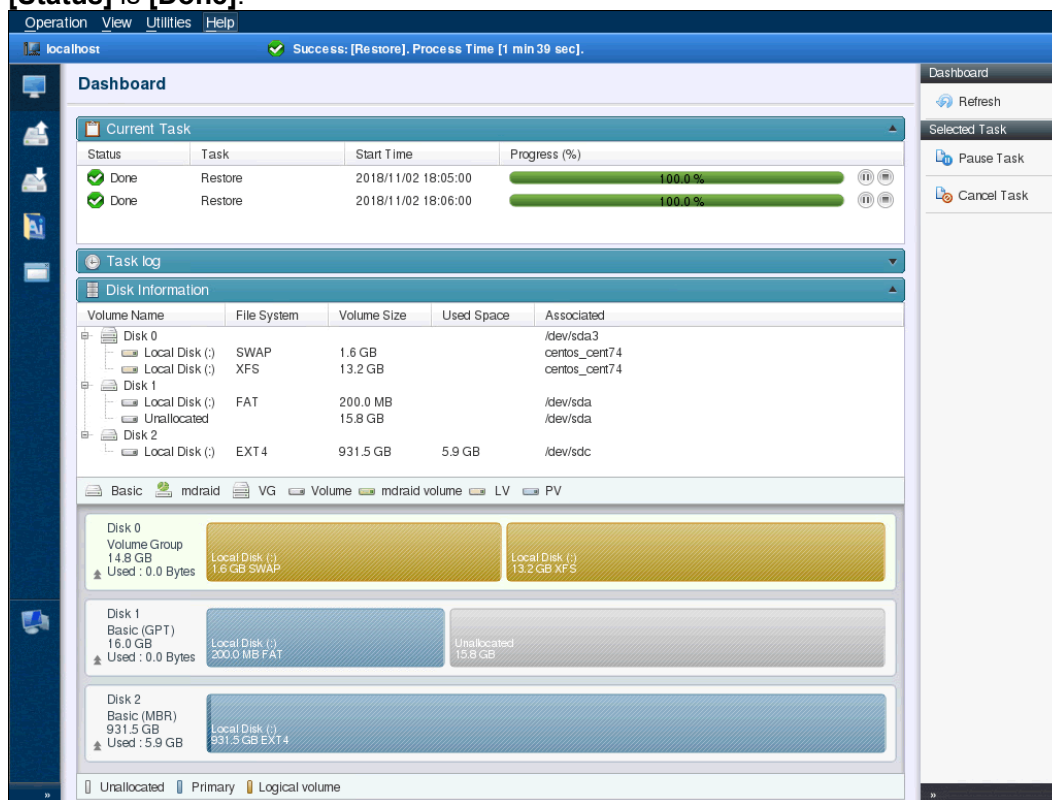
Click **[Next]**.



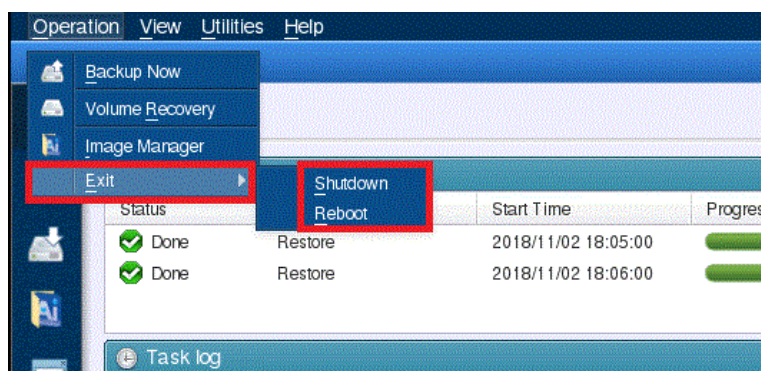
- 14) The following **[Summary]** dialog is displayed. If you do not have to edit the settings please click **[Done]**.



- 15) Upon start of the recovery process, [Dashboard] provides real-time monitoring of the status and progress of the recovery task. Upon completion, please make sure that **[Status]** is **[Done]**.



- 16) Select **[Operation]** - **[Exit]** - **[Shutdown]** or **[Reboot]** to finish.



- 17) When the restored system normally boots up, that is the end of recovery operation.

Appendix 1) Device Mode of RDX QuikStation4/8

The use of RDX QuikStation4/8 allows you to select a logical device mode such as RDX drive, logical volume, protected volume, disk auto loader, tape emulation, etc.

This manual provides the description on premises that the product is used in RDX drive, logical volume, protected volume, or disk auto loader in removable disk mode.

For the details of the respective logical device mode, please refer to “RDX QuikStation 4 and 8 Product Manual”.

Overview of the respective modes

RDX drive mode

Eight RDX drives are independently assigned to iSCSI targets.

Basically assume that a USB drive is replaced with iSCSI target that can be used in the same manner as RDX QuikStor.

Logical Volume Mode

Up to 4 cartridges are combined and recognized as a single cartridge in logical volume mode. You are allowed to add another cartridge in the logical volume. A simple combination of multiple cartridges should not cause a striping.

Replacement of the cartridge requires import operation with Firmware: 1.004.02 or earlier version.

Detected an issue that ejecting a cartridge from the host failed with Firmware: 1.003.05. Post-backup cartridge eject feature does not work in this mode. You need to upgrade the Firmware to the latest version.

Protected Volume Mode

Multiple cartridges configures protected volumes for RAID5 and RAID6, providing redundancy enhancement. The protected volumes are configured with 3 and 4 cartridges for RAID5 and 4 to 8 cartridges for RAID6 (QuikStation8 only).

Replacement of the cartridge requires import operation.

Using 1 to 4 drives and 5 to 8 drives, two logical volumes are created for QuikStation8 logical volume and RAID5 protected volume.



RAID6 protected volume as a whole configures one protected volume device.



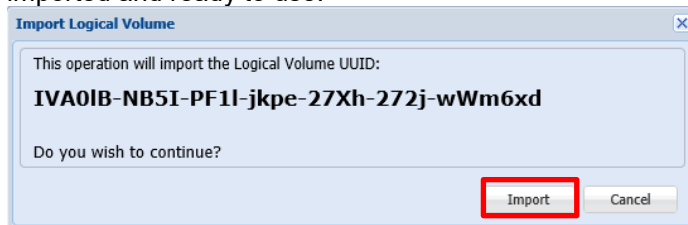
Import a Logical Volume/Protected Volume

Please take the following operating procedures to use the logical volume from which a cartridge is ejected or to import a logical volume created on another QuikStation unit.

- 1) Insert all cartridges belonging to the logical volume.
- 2) From **[Logical Device]** tab, select one of the available disks that has a UUID, and click **[Import]**.



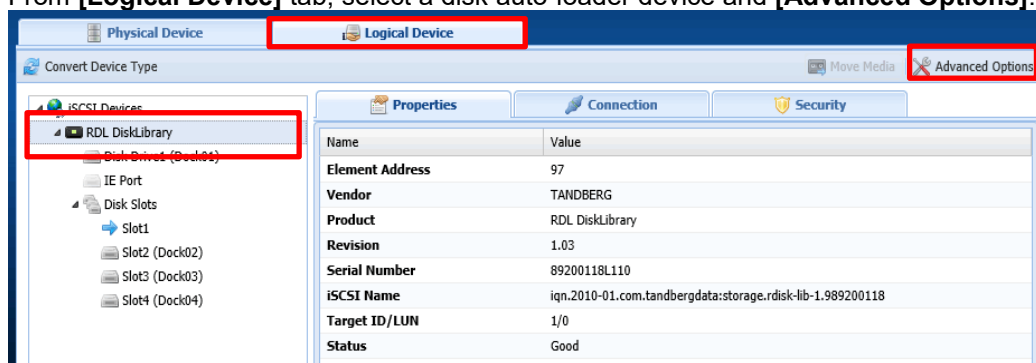
- 3) In **[Import Logical Volume]** dialog, click **[Import]**. The logical/protected volume will be imported and ready to use.



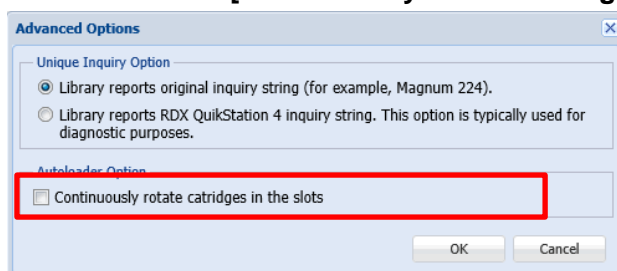
Disk Autoloader Media continuously rotate Cartridges without physical ejection

You can select an option for a physical or logical ejection.

- 1) From **[Logical Device]** tab, select a disk auto-loader device and **[Advanced Options]**.



- 2) Check in the box for **[Continuously rotate cartridges in the slots]**.



Appendix 2) How to write udev rule

Replacement of a cartridge does not change the device path, however, inserting/removing RDX USB memory while another USB memory is left in a USB port may change the device path.

If you often insert and remove USB memory, you need to write udev rule and fix the device path.

- 1) Write udev rule.

```
# touch /usr/lib/udev/rules.d/10-local.rules
# vi /usr/lib/udev/rules.d/10-local.rules

SUBSYSTEMS=="usb", ATTRS{idVendor}=="1a5a", ATTRS{product}=="RDX",
SYMLINK+="RDX_USB_HDD%n"

SUBSYSTEMS=="scsi", ATTRS{vendor}=="TANDBERG", ATTRS{model}=="RDX",
SYMLINK+="RDX_iSCSI_HDD%n"
```

Depending on the OS version, the udev rule may be written in a different location.

RHEL7.x / CentOS7.x :

/usr/lib/udev/rules.d/10-local.rules

RHEL6.x / CentOS6.x :

/etc/udev/rules.d/10-local.rules

Depending on the RDX type, the description to be included in the rule may differ.

*You can specify any name for SYMLINK, however, you need to add "%n" at the end of the name.

USB drive :

```
SUBSYSTEMS=="usb", ATTRS{idVendor}=="1a5a", ATTRS{product}=="RDX",
SYMLINK+="RDX_USB_HDD%n"
```

iSCSi target :

```
SUBSYSTEMS=="scsi", ATTRS{vendor}=="TANDBERG", ATTRS{model}=="RDX",
SYMLINK+="RDX_iSCSI_HDD%n"
```

- 2) Restart OS to apply the created udev rule.

Upon restart of OS, run [ls /dev | grep RDX] to make sure that the symbolic link is correctly specified.

```
# ls -la /dev | grep RDX
lrwxrwxrwx. 1 root root          3 10月  4 16:19 RDX_USB_HDD -> sdb
lrwxrwxrwx. 1 root root        11 10月  4 16:19 RDX_USB_HDD0 -> bsg/8:0:0:0
lrwxrwxrwx. 1 root root          4 10月  4 16:19 RDX_USB_HDD1 -> sdb1
lrwxrwxrwx. 1 root root          3 10月  4 16:19 RDX_USB_HDD2 -> sg2
lrwxrwxrwx. 1 root root        15 10月  4 16:19 RDX_USB_HDD3 -> bus/usb/002/008
```

- 3) Edit fstab according to the udev rule. For example, the following provides the example for USB/iSCSI target.

```
# mkdir /USB/backup
# mkdir /iSCSI/backup

# vi /etc/fstab
#
# /etc/fstab
# Created by anaconda on Thu Dec 14 12:59:10 2017
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=88ab5fe0-43ef-4ebe-a51a-3c0ded2945fe /                ext4    defaults    1 1
UUID=ff408246-729f-46c9-88cf-240f7f3d58ca /boot            ext4    defaults    1 2
UUID=3f4345e5-f65f-4c58-9f9f-d867c11a0264 swap             swap     defaults    0 0
/dev/RDX_USB_HDD1 /USB/backup      ext4    nofail      0 0
/dev/RDX_iSCSI_HDD1 /iSCSI/backup    ext4    _netdev     0 0
```

- 4) Run [mount -a] command to check the mount point.

```
# mount -a
# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
sda   8:0    0 111.8G 0 disk
├─sda1 8:1    0    2G 0 part [SWAP]
└─sda2 8:2    0 109.8G 0 part /
sdb   8:16   1   2.7T 0 disk
└─sdb1 8:17   1   2.7T 0 part /USB/backup
sr0   11:0   1  1024M 0 rom
```

- 5) Even when the device path is changed, the USB drive is mounted.

```
# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
sda   8:0    0 111.8G 0 disk
├─sda1 8:1    0    2G 0 part [SWAP]
└─sda2 8:2    0 109.8G 0 part /
sdb   8:16   1   3.8G 0 disk
└─sdb1 8:17   1   1.5G 0 part /run/media/root/DEPLOY_USB
sdc   8:32   1   2.7T 0 disk
└─sdc1 8:33   1   2.7T 0 part /USB/backup
sr0   11:0   1  1024M 0 rom

# ls -la /dev | grep RDX
lrwxrwxrwx. 1 root root          3 10月  4 16:40 RDX_USB_HDD -> sdc
lrwxrwxrwx. 1 root root          4 10月  4 16:39 RDX_USB_HDD0 -> bsg/11:0:0:0
lrwxrwxrwx. 1 root root          4 10月  4 16:40 RDX_USB_HDD1 -> sdc1
lrwxrwxrwx. 1 root root          3 10月  4 16:39 RDX_USB_HDD3 -> sg3
```

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