



Recovering a Dell™ DL Backup and Recovery Appliance using Rapid Appliance Self Recovery (RASR)

Dell DL Series Technical Marketing Team
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Revisions

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Executive summary

The Dell DL Backup and Recovery Appliance (DL Appliance) is a turnkey backup and recovery appliance powered by award-winning AppAssure backup and recovery software. The DL Appliance protects both physical and virtual servers, nearly eliminates backup windows, recovers applications within minutes, and guarantees recoverability.

In addition to backup and recovery, the DL Appliance delivers disaster recovery and enterprise capabilities such as remote replication, encryption, compression, deduplication and support for standby virtual machines to be used for near instantaneous server recovery. The DL Appliance is turnkey, purpose-built, and designed to be deployed within minutes and is easy to manage.

The DL Appliance includes a unique feature called Rapid Appliance Self Recovery (RASR) that allows one to quickly and easily restore the appliance to its factory default image or its latest Windows backup. RASR is an industry-leading offering that allows customers to protect their physical appliance very easily without the need to purchase or deploy any additional hardware, software or SKU's. Currently, no other vendor in the industry offers this type of innate protection for their customers. This paper describes and outlines the different RASR options that can be used to recover the DL Appliance.

Note: The DL Appliance system build version and screenshots used for this paper may vary slightly, depending on the version of the DL Series system used.



1 What is RASR and why is it important?

Rapid Appliance Self Recovery (RASR) is used to quickly and easily recover a DL Appliance to an operating state. RASR offers two recovery options:

1. Recover the DL Appliance to a state very close to when the DL Appliance system failed. The DL Appliance operating system, configurations and settings are recovered.
2. Reset the DL Appliance to its original factory state – a state it was in as it left the factory..

All necessary software and logic to recover a DL appliance is provided by RASR. RASR is used to recover a DL Appliance operating system, configurations, and settings. It is not designed to recover the data within its repositories. Protecting the data within a DL Appliance is achieved by replication.

Because RASR is self-contained within the DL Appliance, it does not require the downloading of operating systems, plugins or AppAssure software. Recovery of a DL Appliance takes 30 minutes or less.

Most data protection solutions do an excellent job protecting and restoring physical and virtual machines but neglect the ability to protect itself, especially data protection appliances. This lack of design is unacceptable, as a non-functioning data protection solution immediately elevates anyone's risk to data loss. Every piece of data that has been created, modified, or deleted from the point of backup solution failure is exposed to potential loss. When data is required to be retrieved, a non-functioning data protection solution is no help. This is not a place where any IT administrator wants to be. Welcome to RASR. RASR is designed to self-protect and recover the DL appliance itself. In the event of a DL appliance corruption or failure, RASR significantly minimizes a computing environments risk to data loss by effortlessly and rapidly restoring the DL appliance so that it can continue to protect production assets again.



2 RASR Protection and Recovery Options

Two main steps are taken when recovering a DL appliance using RASR. The first step is to launch the DL appliance in to RASR followed by choosing a recovery method.

The DL Appliance can launch RASR from a number of media types or locations. These include:

1. USB Key
2. RASR Virtual Disk
3. Internal Dual SD Module (IDSDM)
4. Recovery Partition

No matter how RASR is launched, RASR offers the same recovery features and capabilities – quick and easy appliance recovery.

Depending on the DL appliance model, the following RASR launch options are available:

	USB	RASR Virtual Disk	IDSDM	Recovery Partition
DL1x00	✓			✓
DL4300	✓	✓	✓	✓
DL4000	✓	✓		✓

The DL appliance offers three recovery methods. These options are:

1. **System Recovery** –The DL appliance is restored to a point in time from an available Windows backup image residing on a DL appliance local disk
2. **Windows Recovery Wizard** –Launches the Microsoft® Windows Backup Utility to perform recovery operations not supported by a System Recovery or Factory Reset
3. **Factory Reset** – The DL appliance is restored to the original Dell factory image

Depending on the DL appliance model, the following recovery options are available:

	System Recovery	Windows Recovery Wizard	Factory Reset
DL1000		✓	✓
DL4300	✓	✓	✓
DL4000	✓	✓	✓

NOTE: All backup and recovery steps are performed from the DL Appliance.



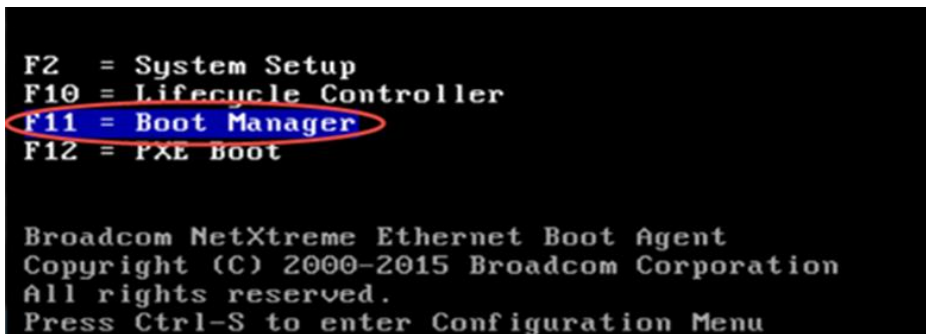
3 Launching RASR

RASR can be launched from four different media types or locations. No matter what RASR launch method is chosen, RASR recovers the DL Appliance to an operational state by restoring the appliance operating system, applications, configurations and settings.

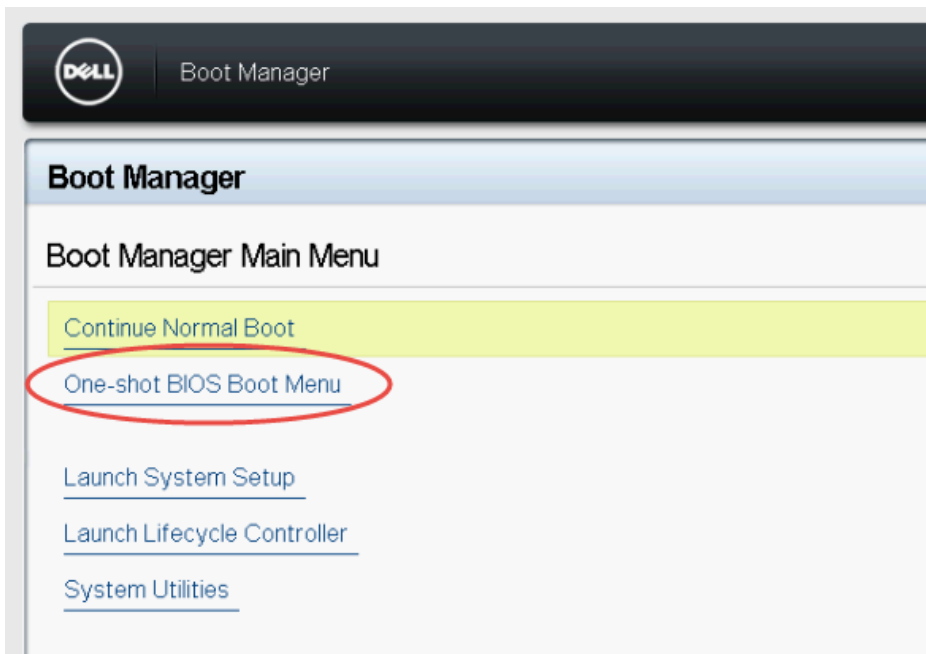
3.1 IDSDM

The Dell DL4300 appliance offers a unique option to launch the RASR process - IDSDM. A bootable Internal Dual SD Module (IDSDM) provides all logic to restore the DL4300 appliance in the event of critical operating system disk hardware or software failure. (Dell DL1x00 and DL4000 appliances do not offer an IDSDM option).

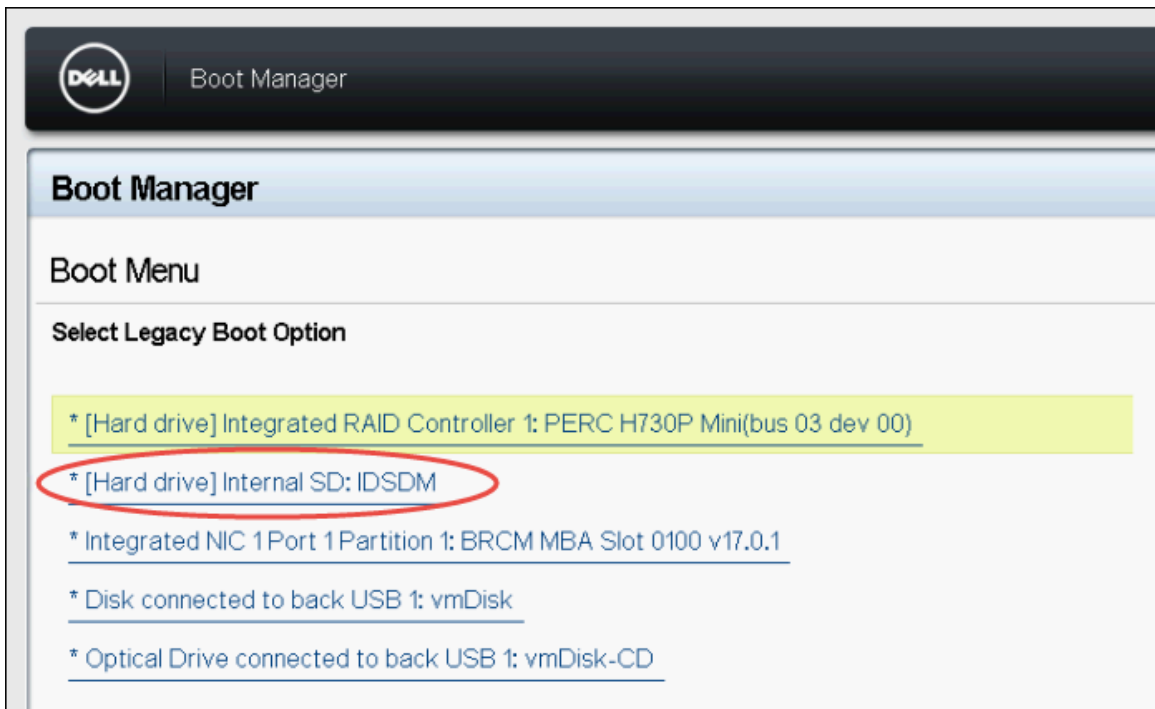
1. Restart the DL Appliance and select Boot Manager (F11)



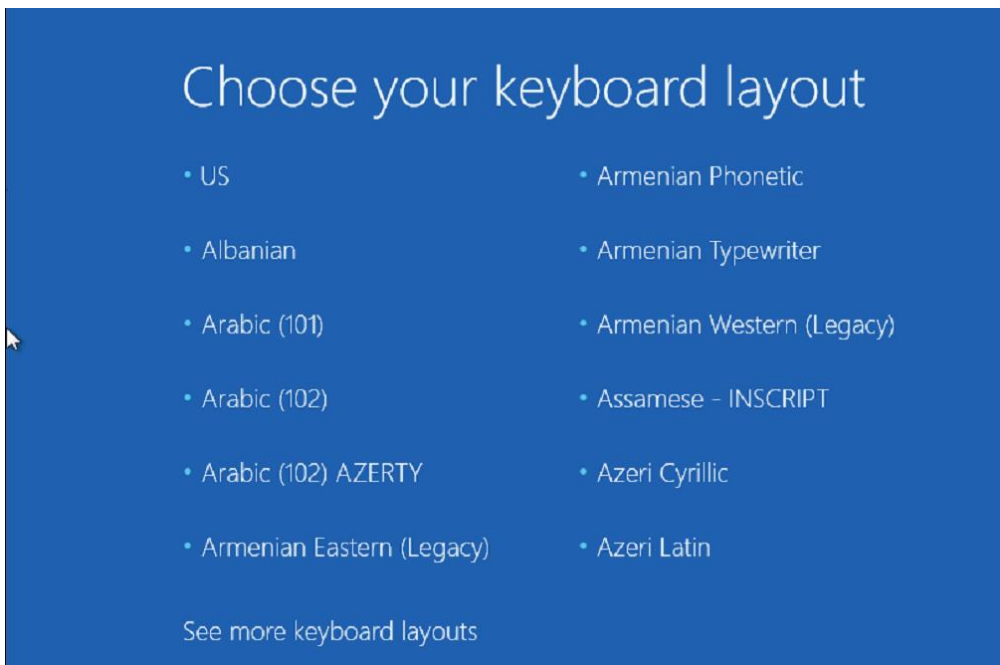
2. Within the **DL Appliance Boot Manager** utility, select **One-shot BIOS Boot Menu**.



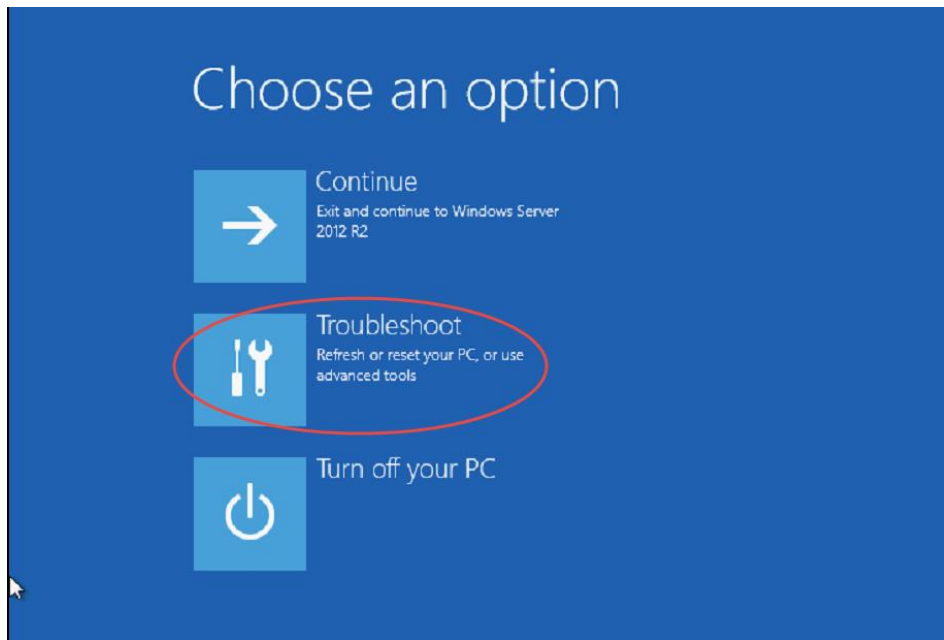
3. Select to launch RASR from the ISDSM option.



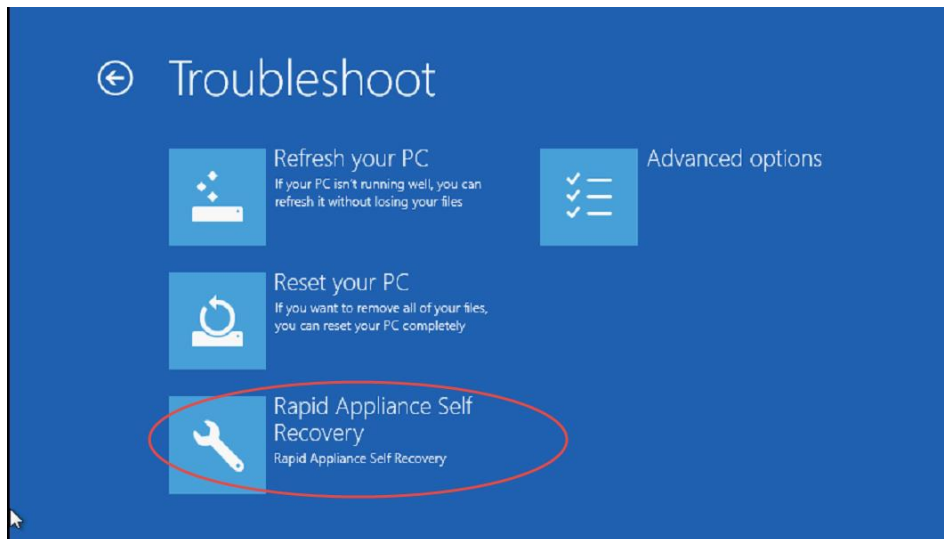
4. Select your keyboard layout.



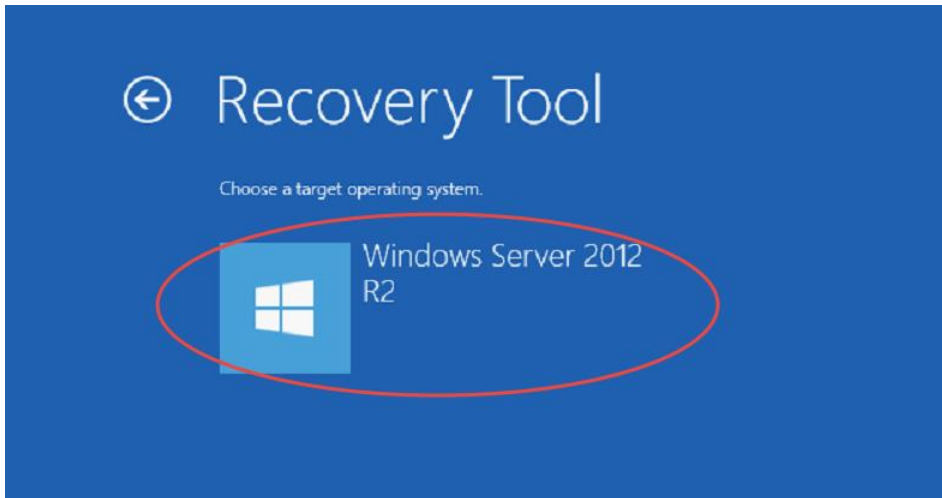
5. Click **Troubleshoot**.



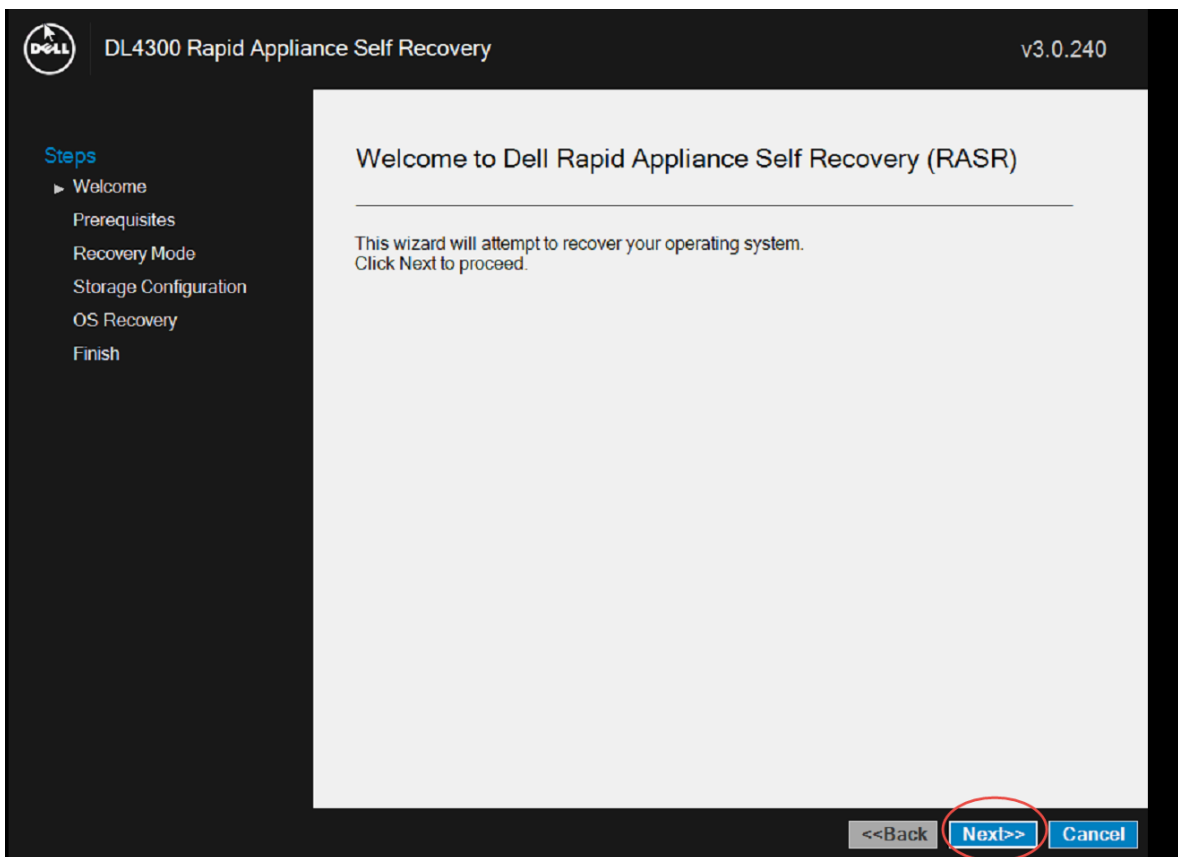
6. Click **Rapid Appliance Self Recovery (RASR)**.



7. Click **Windows Server 2012 R2**.



8. RASR is now launched.



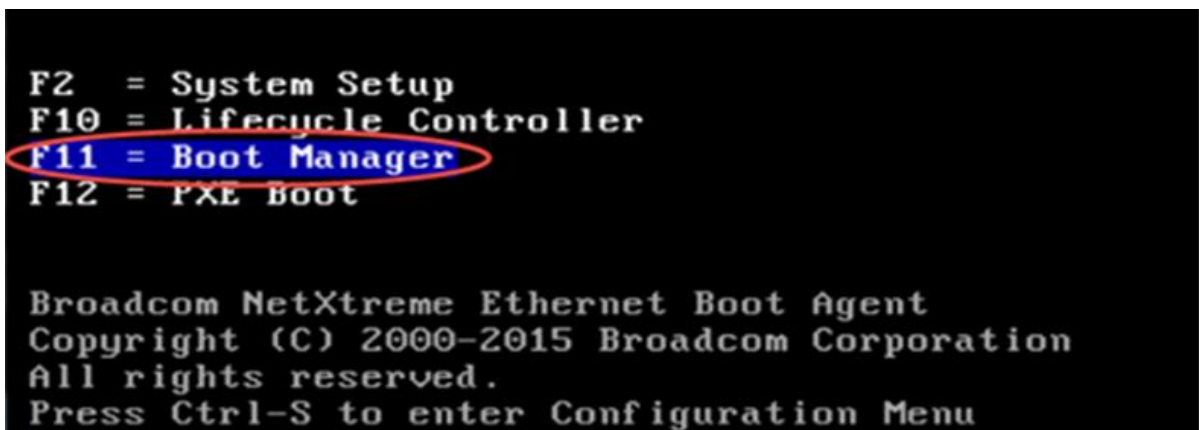
3.2 RASR USB Key

A RASR USB key is used to launch the RASR process. Like the IDSDM option to launch RASR, the RASR USB key provides all logic to restore the DL appliance in the event of OS and/or repository storage system issues.

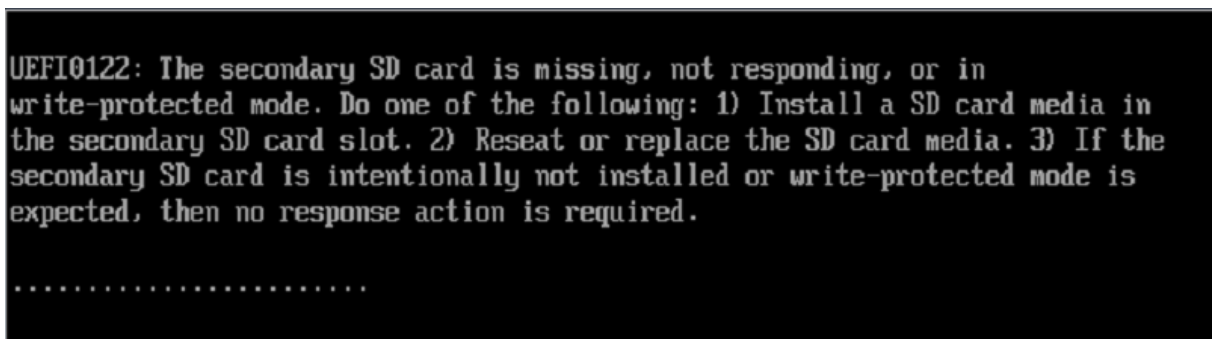
NOTE: Creation of a RASR USB key is described in Appendix-A.

NOTE: The DL1000 appliance consists of a mirrored pair of disk drives containing the operating system, appliance applications, and data. In the event of a critical disk failure, RASR can only be launched from a USB disk device. Thus, immediate creation of a RASR USB key is very important for the DL1000 appliance.

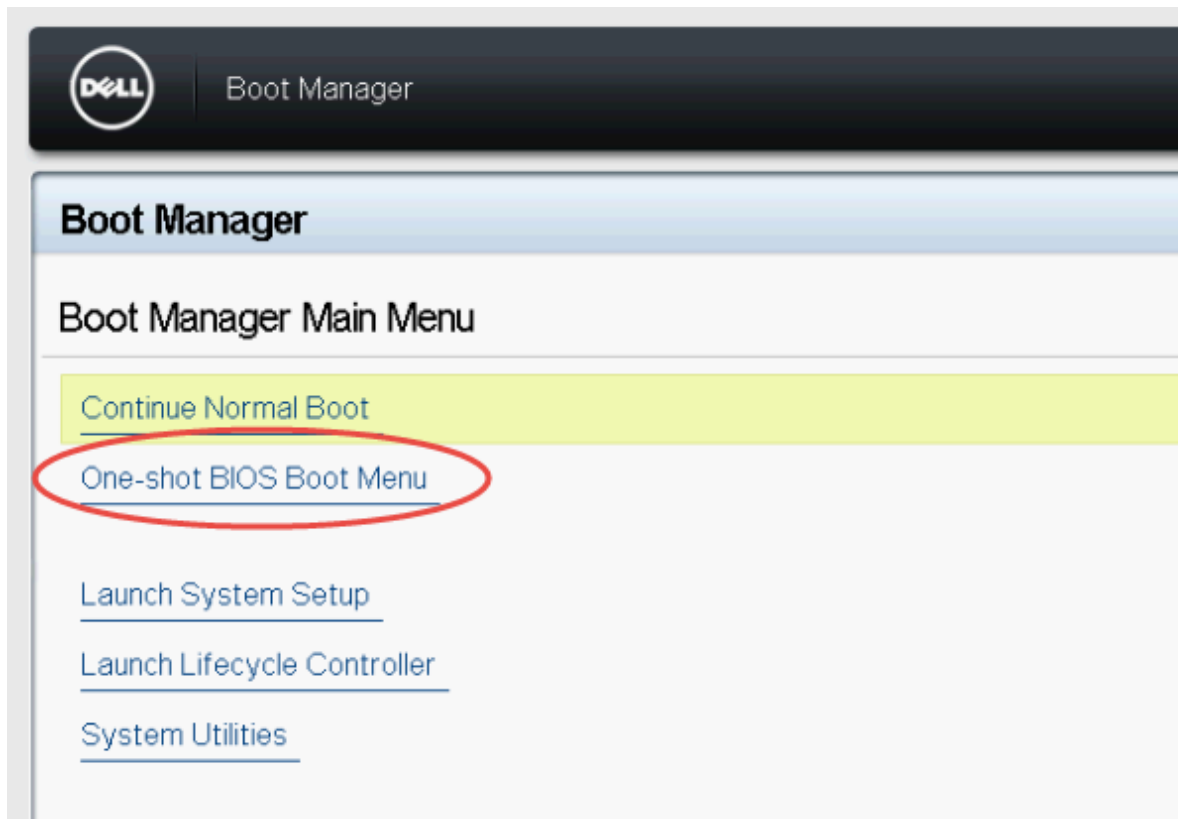
1. Boot the DL Appliance with the RASR USB key attached and select Boot Manager (F11).



2. The following message can be ignored during the RASR recovery of the DL Appliance.



3. Within the **DL Appliance Boot Manager** utility, select **One-shot BIOS Boot Menu**.



4. Select the attached USB drive within the Boot Manager Boot Menu



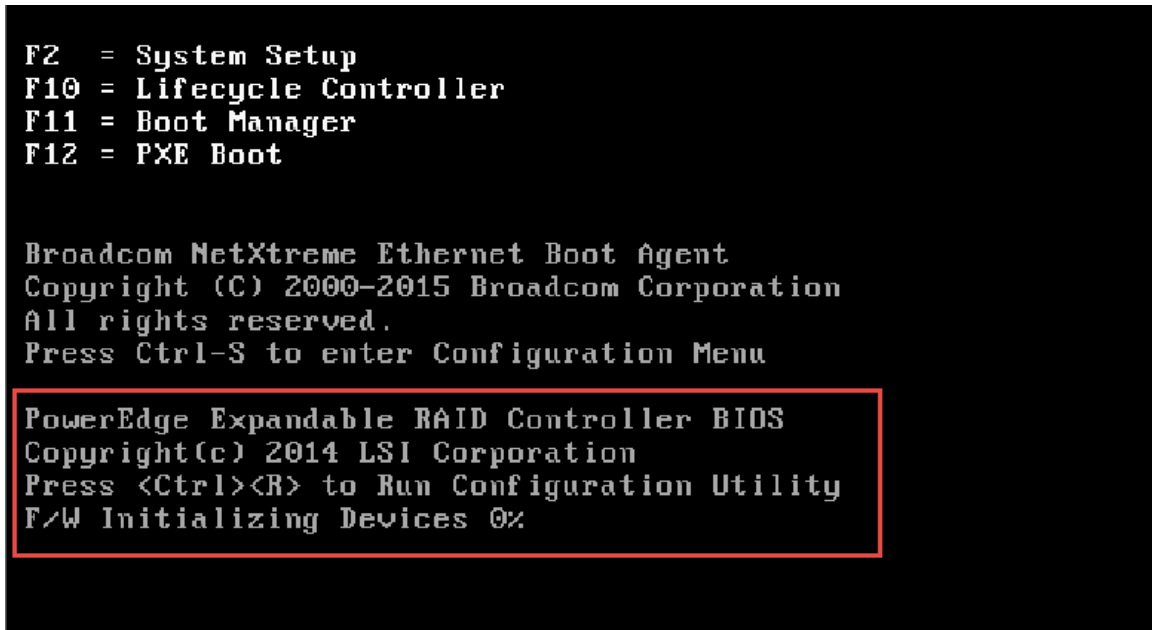
5. Continue with step #4 within section 3.1 IDSDM (page 8).



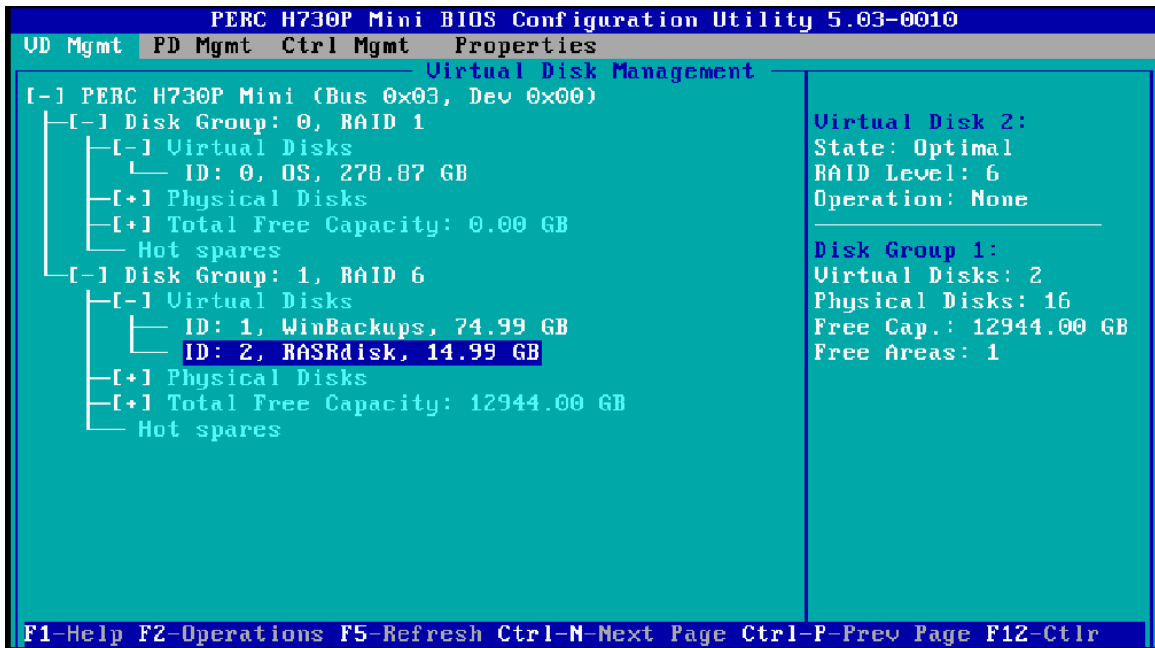
3.3 RASR Virtual Disk

The RASR virtual disk resides on the local DL Appliance non-OS disks and is used to launch RASR.

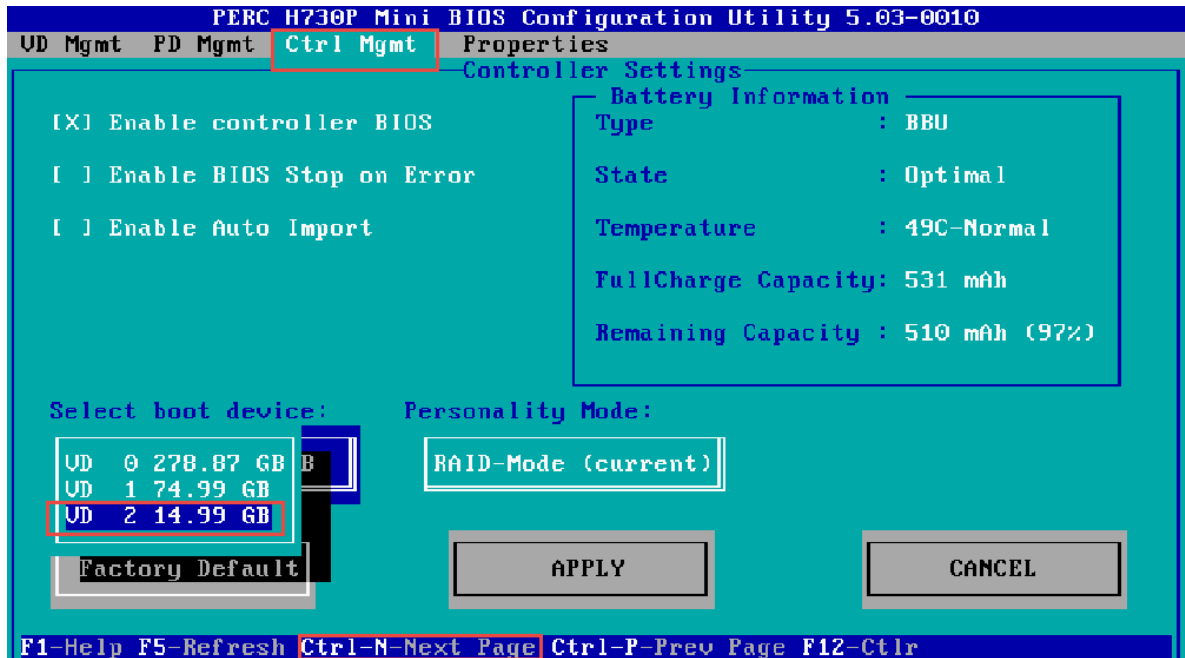
1. Boot the DL Appliance and enter the PowerEdge Expandable RAID Controller BIOS Utility by pressing Ctrl+R when its message is displayed.



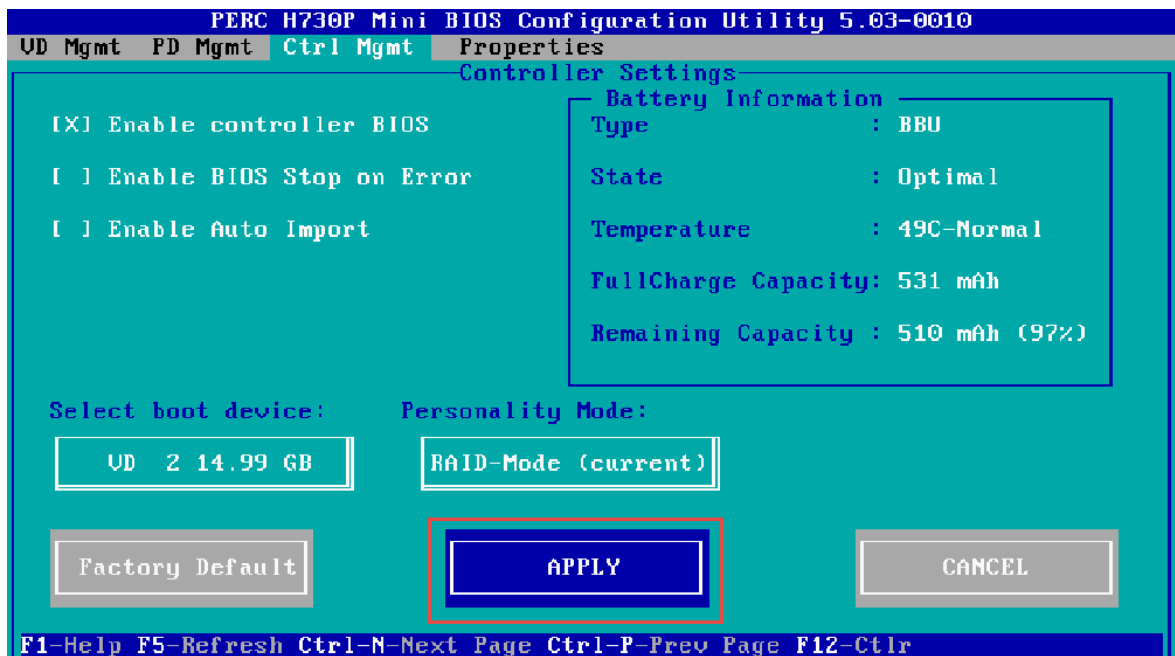
2. Select the RASR virtual disk within the PERC Configuration Utility. Note the virtual disk ID and capacity. In this example, the RASR virtual disk ID is 2 and its capacity is 14.99GB,



3. Press Ctrl+N to advance to the Ctrl Mgmt page within the PERC Configuration Utility. Select the RASR virtual disk as the boot device.



4. Using the keyboard TAB key, advance to **APPLY**. Press Return to apply this boot device change.



5. Press the keyboard Esc key several times until the PERC Configuration Utility exits then select the option to reboot the DL Appliance.

NOTE: RASR will automatically set the PERC boot device to the OS boot virtual disk if restoration is successful.

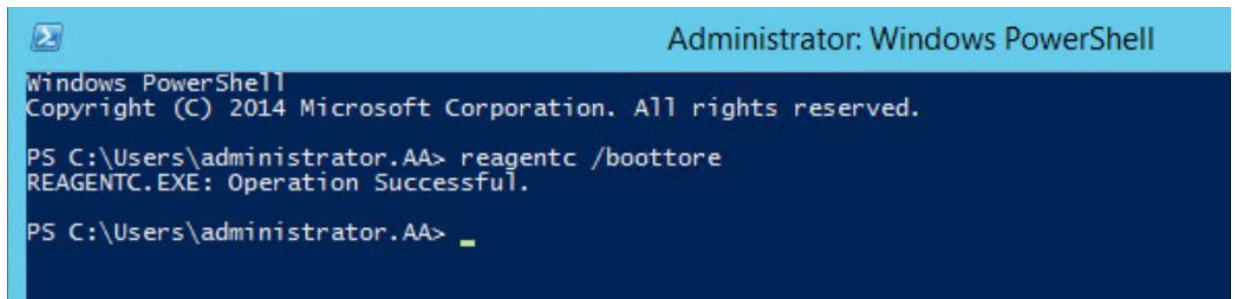
6. Continue with step #4 within section 3.1 IDSDM (page 8).

3.4 Recovery Partition

A bootable Recovery Partition is located on the DL Appliance operating system disks. If the appliance operating system physical disks supporting the Recovery Partition are healthy, the Recovery Partition can be used to launch RASR.

1. Open up the DL Appliance PowerShell or command window and type the command:

reagentc /bootore



```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) 2014 Microsoft Corporation. All rights reserved.

PS C:\Users\administrator.AA> reagentc /bootore
REAGENTC.EXE: Operation Successful.

PS C:\Users\administrator.AA> _
```

2. Reboot the DL Appliance.
3. Continue with step #4 within section 3.1 IDSDM (page 8).



4 RASR Recovery Options

Once RASR is launched, three RASR appliance recovery options are presented; System Recovery, Windows Recovery Wizard, and Factory Reset.

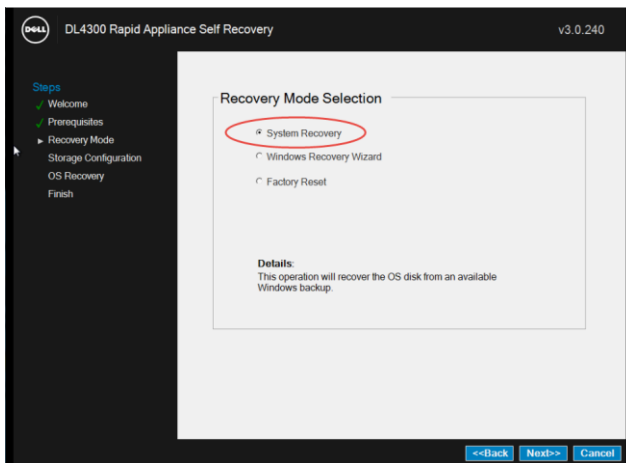
4.1 System Recovery

During the initial configuration of the DL4300 and DL1300 Appliance, a Windows Backup Virtual Disk can optionally be created that is designated to hold DL appliance Windows backup images. When choosing the RASR System Recovery option, Windows backups that are stored within the Windows Backup Virtual Disk are presented as options for recovery.

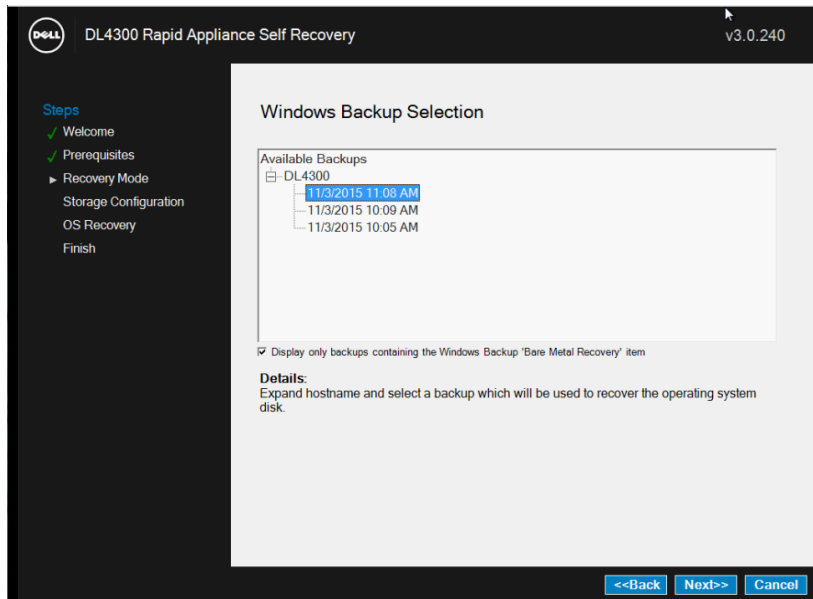
The System Recovery option offers DL appliance recovery advantages. Because a windows backup is used for recovery, the restoration process takes only one step to recover all DL functional software that might have been implemented or edited after initial configuration. Other functional software includes RUU, AppAssure, operating system, appliance updates, SQL if installed on the operating system drives, and all settings that were initially configured through the AppAssure Appliance Configuration Wizard (Network, SNMP, active directory, etc.).

NOTE: The DL1000 does not include an automatically created Windows Backup virtual disk. However, the System Recovery option can be used on any DL appliance provided Windows Backup has been configured to backup the Operating System and Recovery Volumes, System State and Bare Metal Recovery. The backup location must be a directly attached physical device which can include a USB disk drive.

1. Once RASR starts, select **System Recovery**.



2. Select the Windows backup that you wish to restore the DL Appliance to.



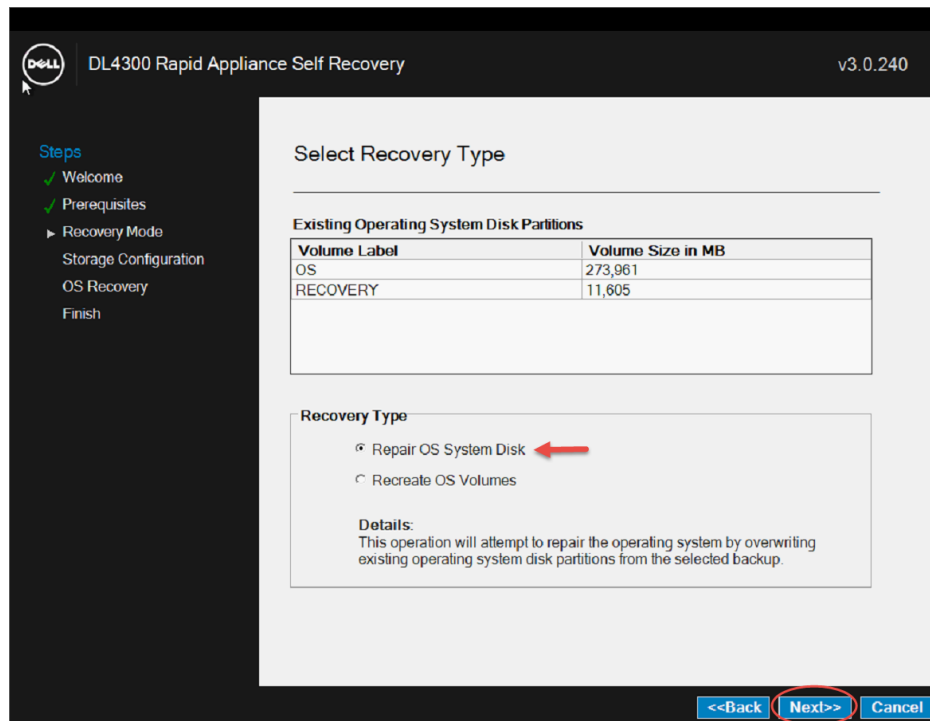
4.1.1 Recovery Type

Within the System Recovery option, there are two System Recovery options.

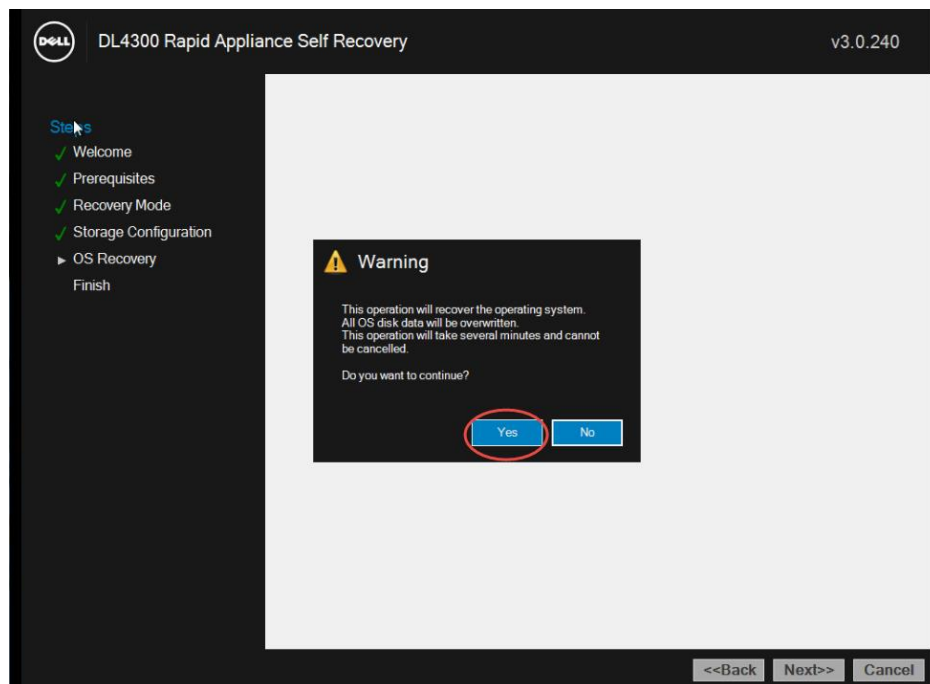
1. **Repair OS System Disk** – This option overwrites the current DL operating system and recovery partition with files contained in the backup image selected. This option is best suited when there are missing or corrupt files that cause the DL Appliance to malfunction. In order to use the Repair OS System Disk option, ensure the Display only backups containing the Windows Backup 'bare Metal Recovery' item is checked.

Repair OS System Disk will fail if the Windows backup image selected is from a different system or volumes other than the presently running OS and Recovery volumes. If the Repair OS System Disk fails to restore the system, restart RASR and try the Recreate OS Volumes option.

- i. Select **Repair OS System Disk** and click **Next**.



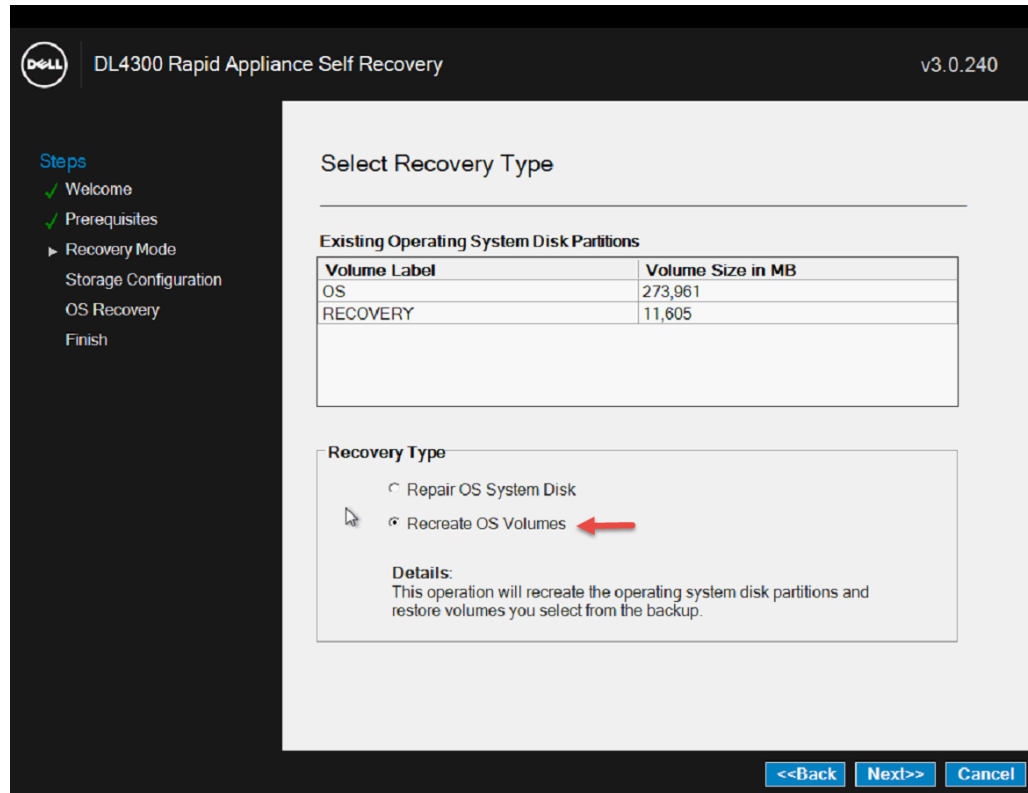
- ii. Click **Yes** to start the recovery process.



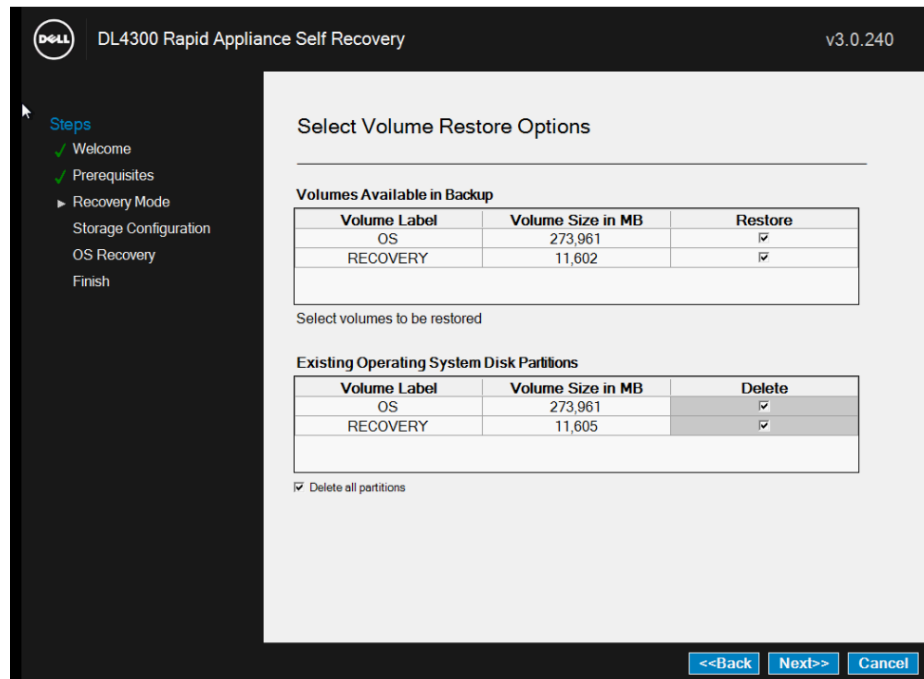
- iii. The DL Appliance Recovery process is finished.

2. **Recreate OS Volumes** – This option re-creates the DL OS virtual disk if necessary (as in the case of a replaced hard disk), and restores the DL operating system and recovery partitions with the content from the backup image selected. This option is best suited when storage hardware issues are encountered such as a failed OS volume. After replacing faulty hardware, launch RASR and select this option.

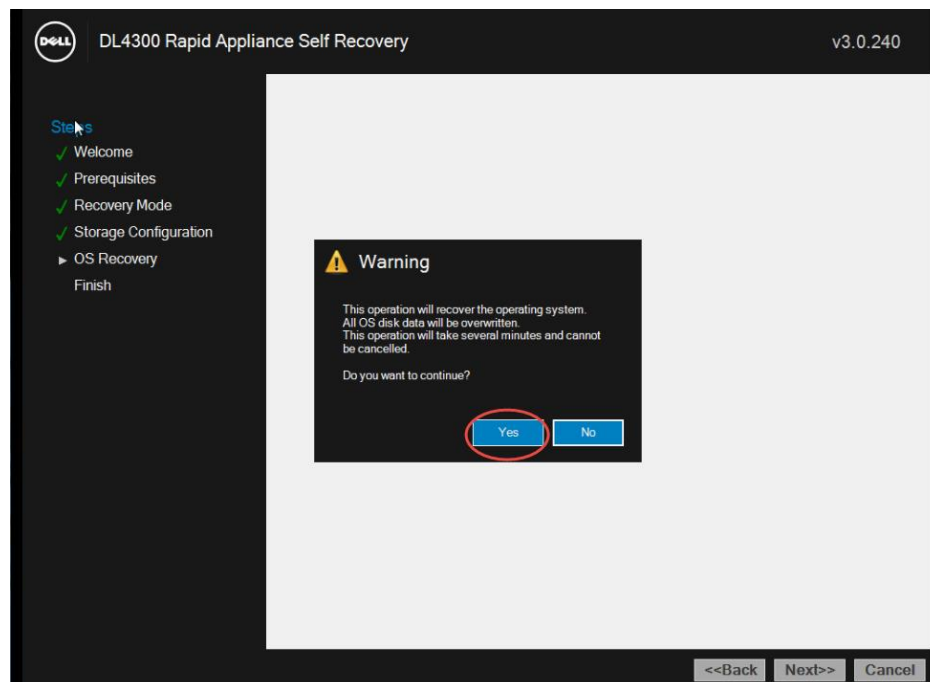
- i. Select **Recreate OS Volumes** recovery type and click **Next**.



- ii. Select the volumes to recover. You must first select to delete existing volumes if you plan to recover them.



- iii. Click **Yes** to start the recovery process.

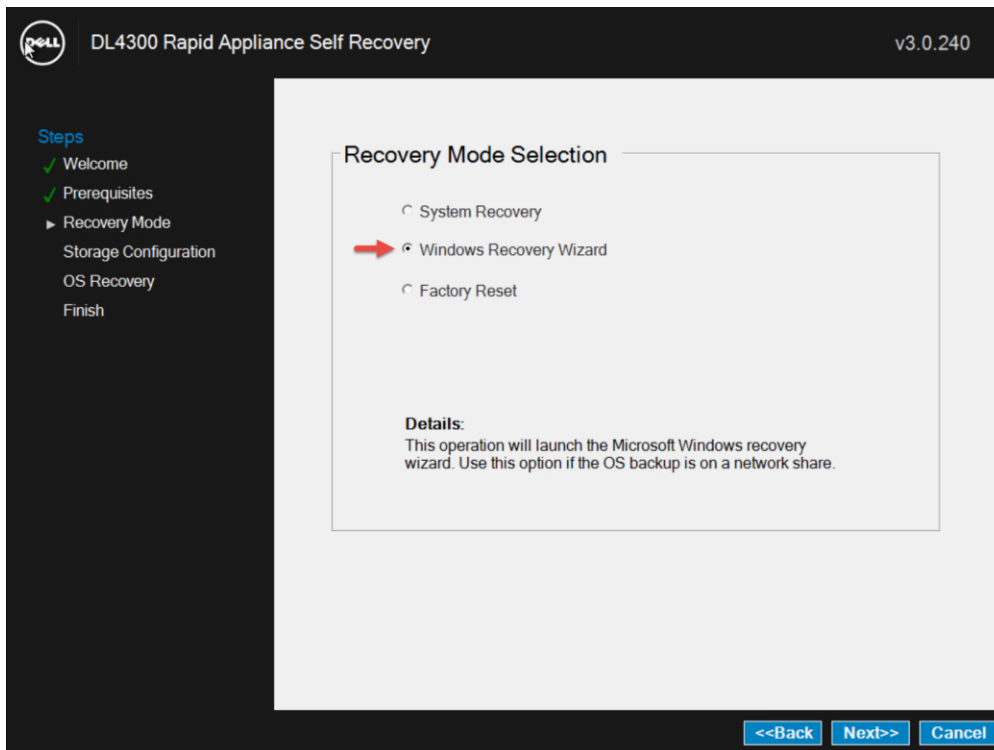


The DL Appliance recovery process is finished.

4.2 Windows Recovery Wizard

This RASR recovery option can be used to restore a DL Appliance from a Windows backup located within the appliance (Windows Backup virtual disk), a directly attached disk, or an externally attached disk such as a network share containing the backup image. The Windows Recovery Wizard uses Microsoft Windows Server Backup for recovery. For more information on using Windows Server Backup for DL appliance recoveries, please refer to Appendix C and the following documents: <https://technet.microsoft.com/en-us/library/cc770757.aspx> and <https://technet.microsoft.com/en-us/library/cc755163.aspx>.

NOTE: RASR for the DL1000 does not offer the System Recovery option. Instead, the Windows Recovery Wizard can be used to restore a DL appliance, configurations settings and any updates from a Windows backup stored on a shared network drive. Details for the RASR Windows Recovery Wizard can be found at Appendix C.



4.3 Factory Reset

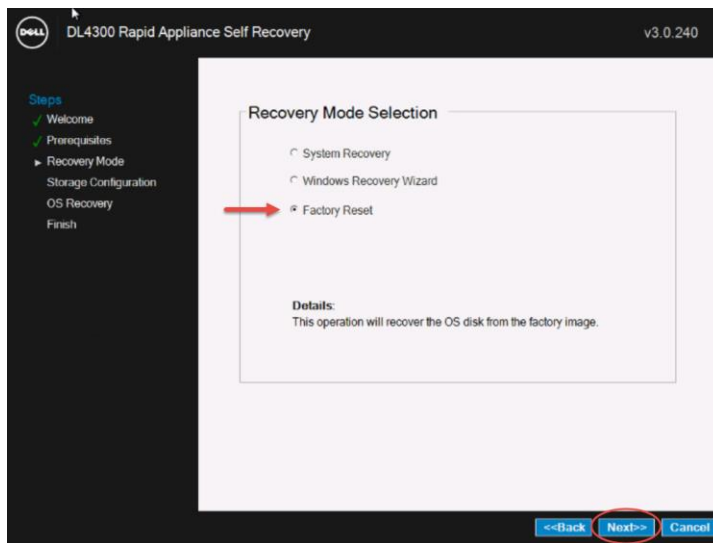
The Factory Reset recovery option restores the DL Appliance to its original factory state – the state it was in as it left the factory.

If failed operating system drives are replaced, the Factory Reset option detects that the operating system virtual disk does not exist and will prepare a new virtual disk to restore the factory default operating system to it.

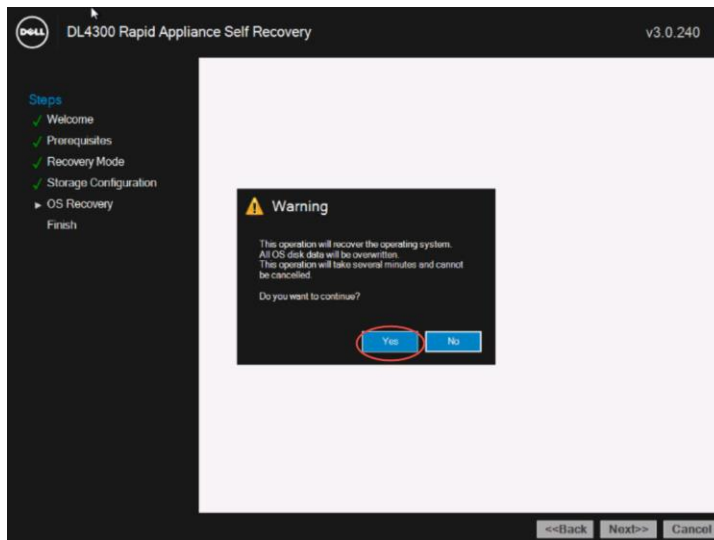
Because Factory Reset does not alter the non-operating system drives, restoration of the repository, appliance settings and configurations are possible as described in Section 5.

NOTE: The Factory Reset option does not restore any previously installed or configured items such as networking, SNMP and active directory settings. If Microsoft SQL Server is installed on the appliance operating system virtual disk, it will not be recovered as the Factory Reset option only restores the original Dell factory image.

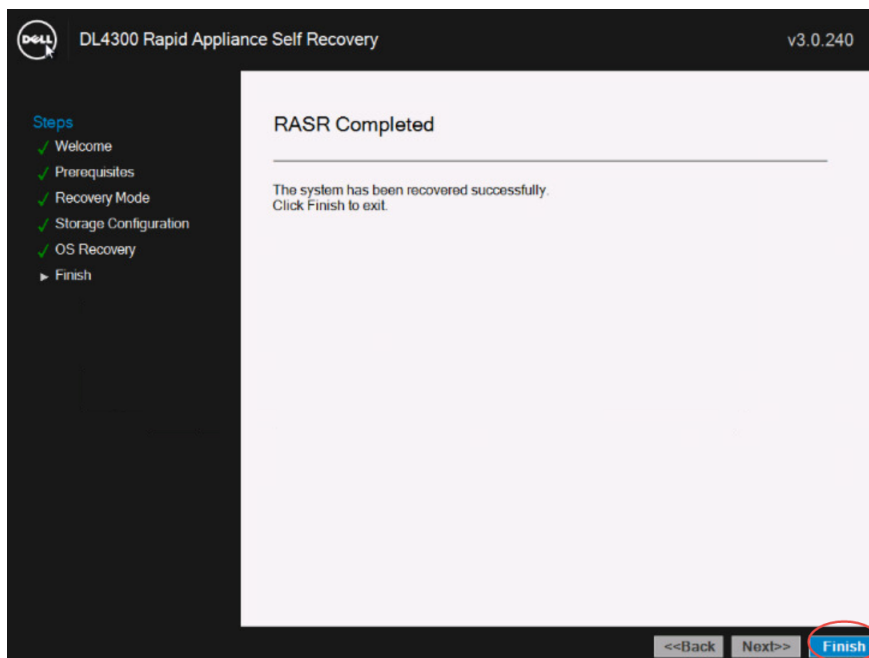
1. Once RASR starts, select **Factory Reset** and click **Next**.



2. Select **Yes** to begin the recovery process.



3. This completes the Factory Reset recovery process. Click **Finish** to reboot the DL Appliance.



4. After reboot, the **AppAssure Appliance Configuration Wizard** is automatically launched for initial appliance configuration. The **AppAssure Application Configuration Wizard** steps are outlined in [Appendix B](#).



NOTE: Ensure that you provide the same information in the **AppAssure Appliance Configuration Wizard** that was provided during the initial deployment of the DL appliance. Failure to provide the exact same information can result in the inability to recover the Appliance configuration settings and/or AppAssure repository data.

5. After completing the **AppAssure Application Configuration Wizard** steps, refer to [Recovering Repositories, Recovery Points and Settings](#) to recover the DL Appliance to a state very close to the time of failure.

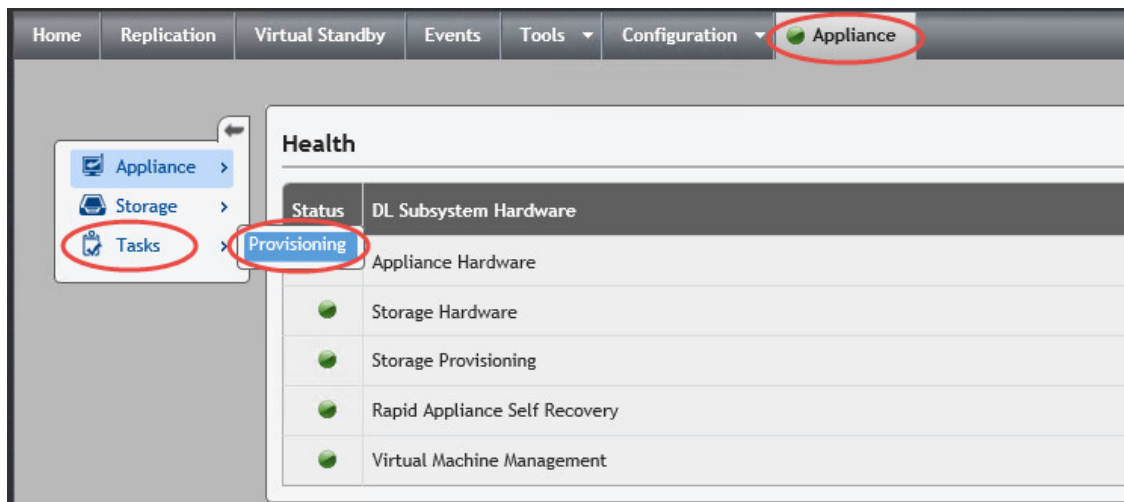


5 Recovering Repositories, Recovery Points and Settings

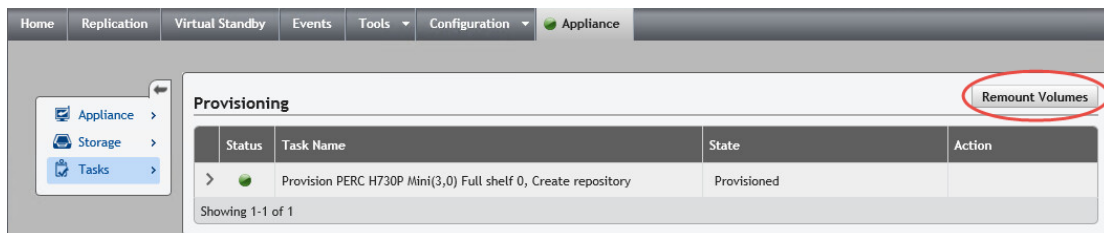
After DL Appliance recovery, the appliance recovery points and settings can optionally be restored.

NOTE: The DL1000 will automatically attempt to recover DL repositories and restore the AppAssure Core settings.

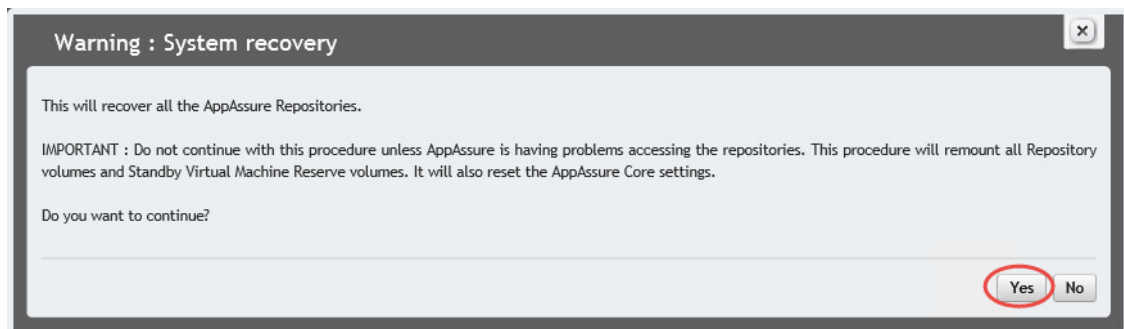
1. Select the **Appliance** tab. Then select **Tasks > Provisioning**.



2. Click **Remount Volumes**.



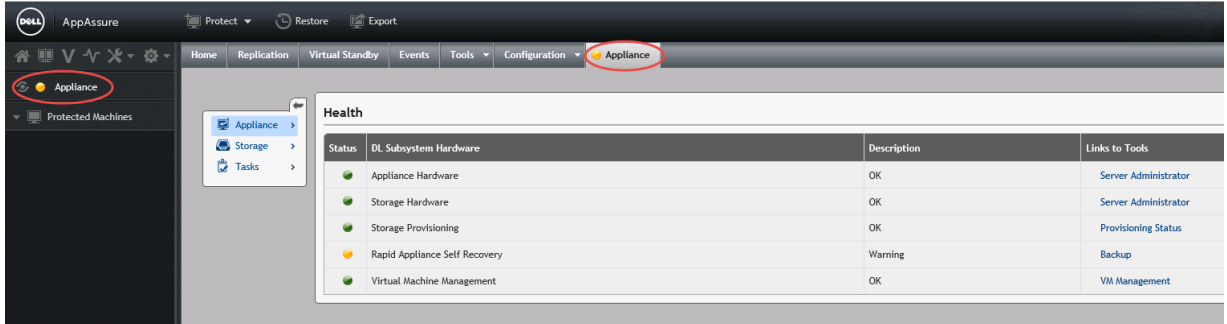
3. Click **Yes** to continue.



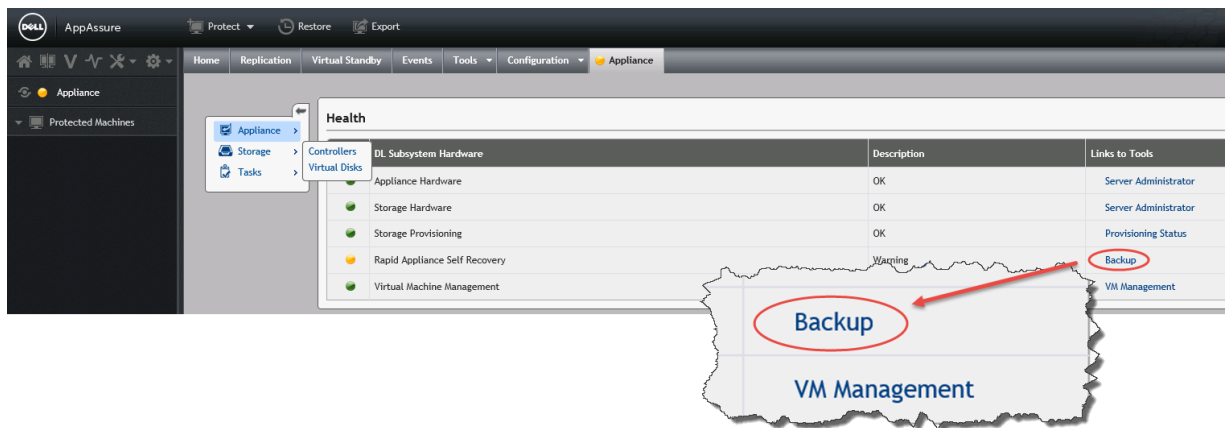
4. This completes the DL Appliance settings, configuration and repository restoration.

6 Appendix A: Creating an USB RASR Key

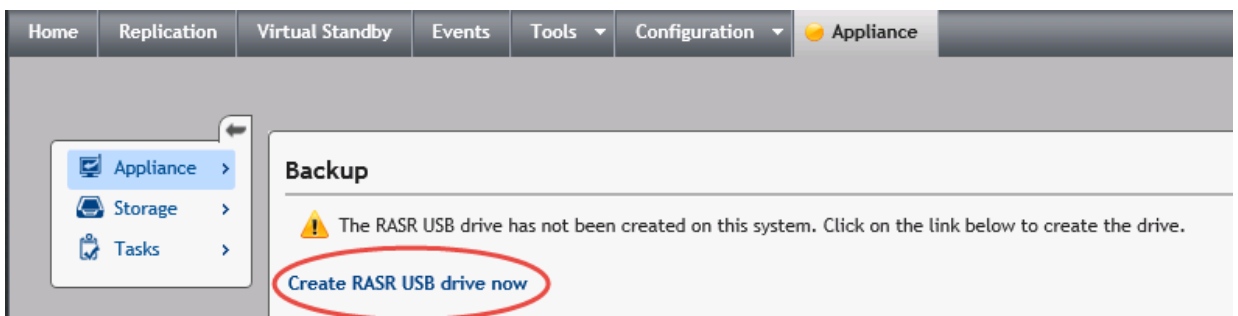
1. Insert a 16GB or larger USB key into the DL Appliance.
2. Navigate to the **Appliance** tab.



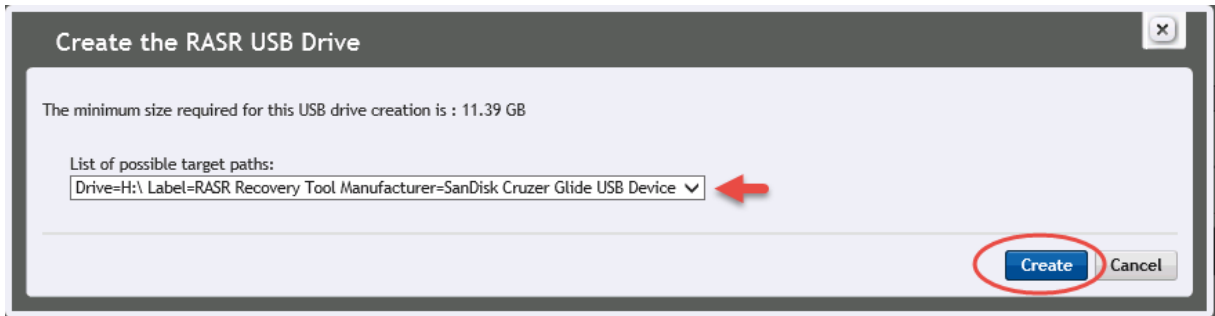
3. Click the **Backup** link.



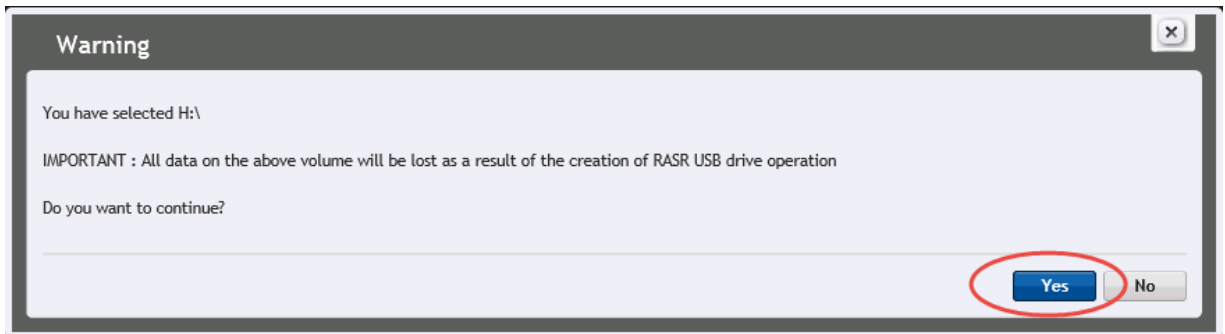
4. Click **Create USB RASR Key**.



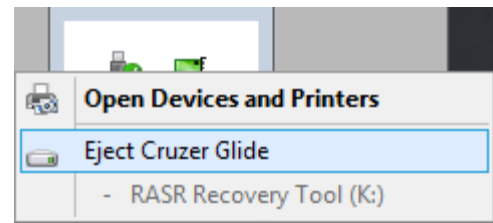
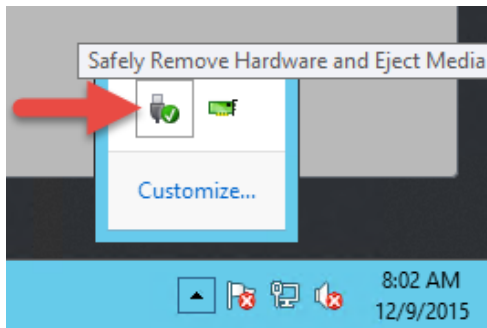
5. After a prerequisite check is performed, select the possible USB target path and click **Create**.



6. Click **Yes** to proceed.



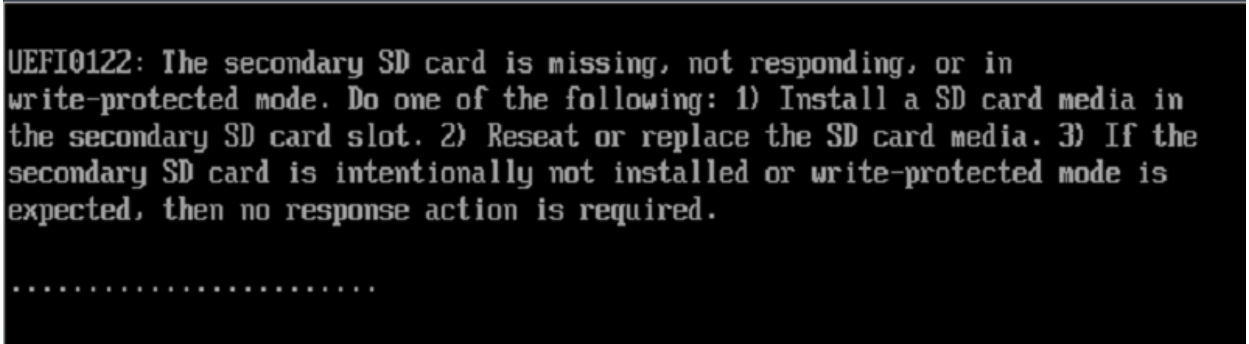
7. After the RASR USB key has been created, safely eject the RASR key.



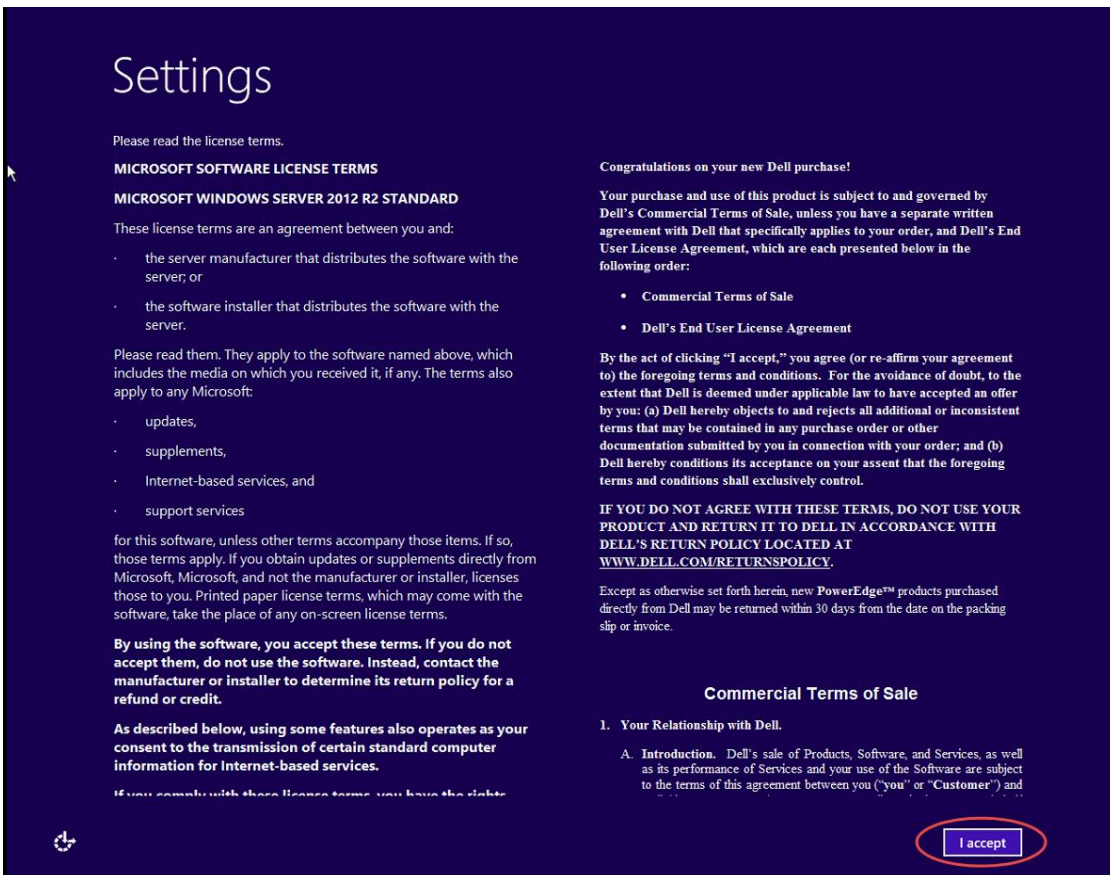
7 Appendix B: AppAssure Appliance Configuration Wizard

NOTE: The following is an example of the **AppAssure Application Configuration Wizard** for a DL4300. Depending on the DL model and/or build version, variances of these steps may vary.

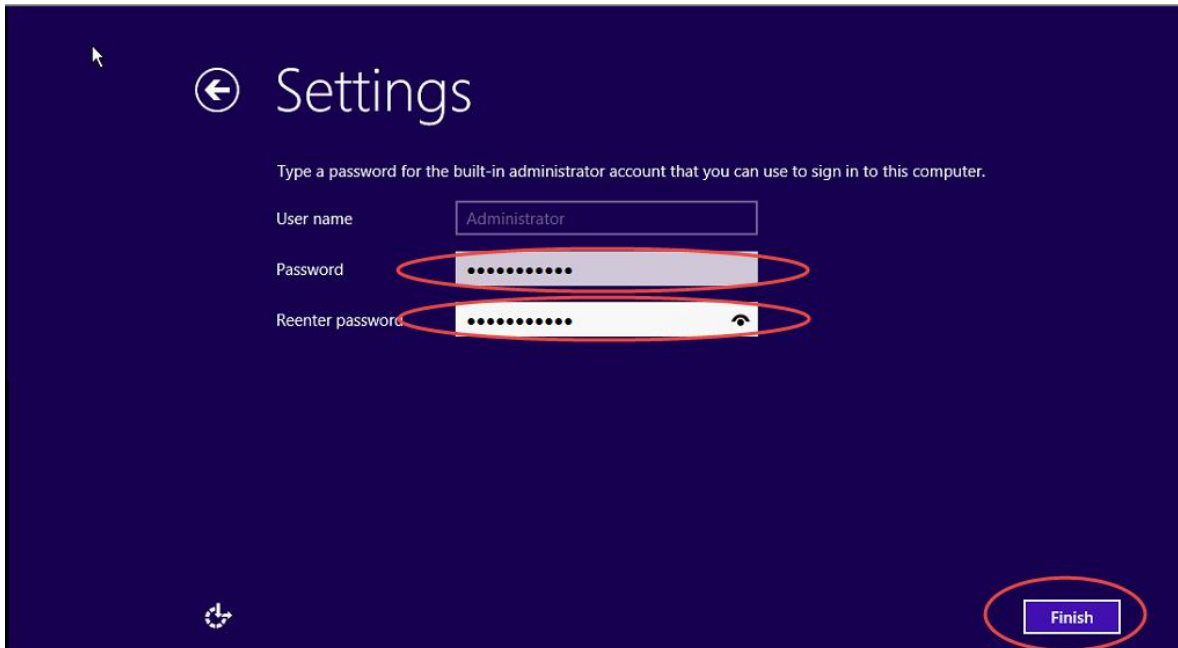
1. The following message can be ignored during the RASR recovery of the DL Appliance.



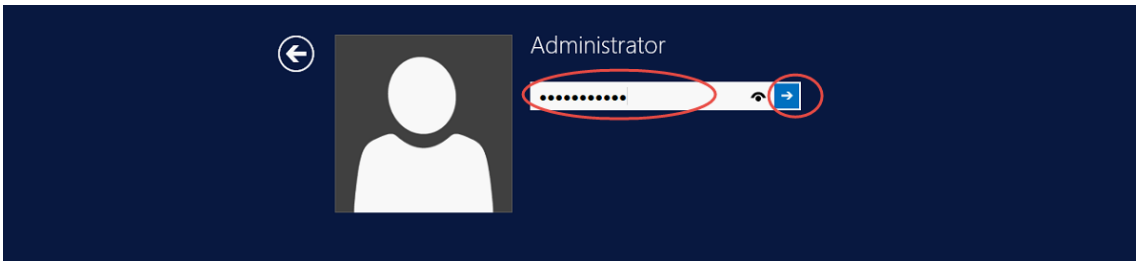
2. Accept the Microsoft software license terms.



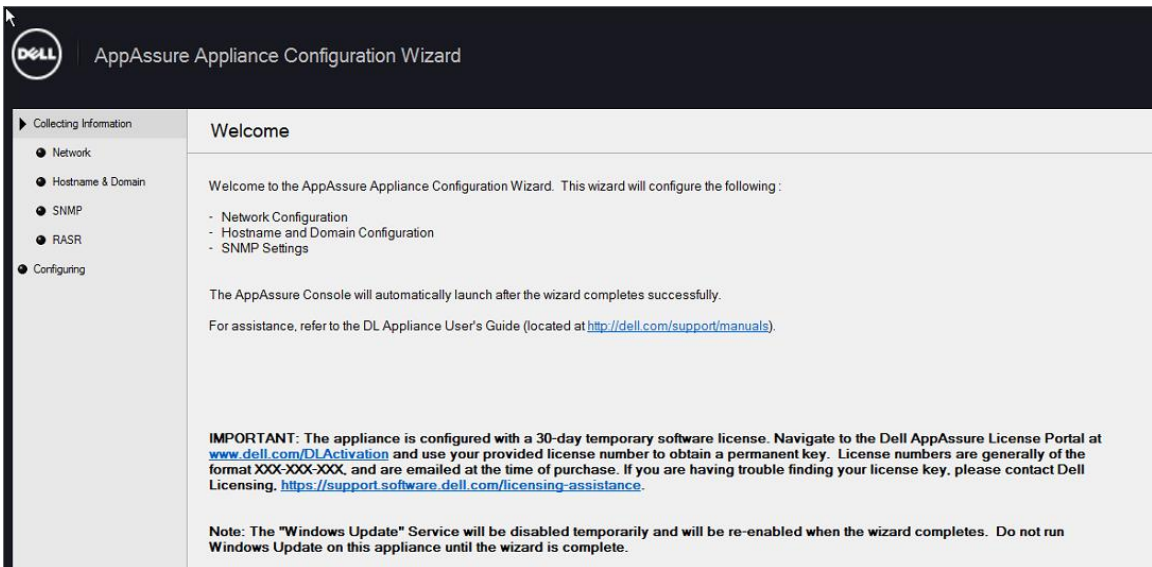
3. Log into the DL Appliance.
4. Define a local password for the DL Appliance and click **Finish**.



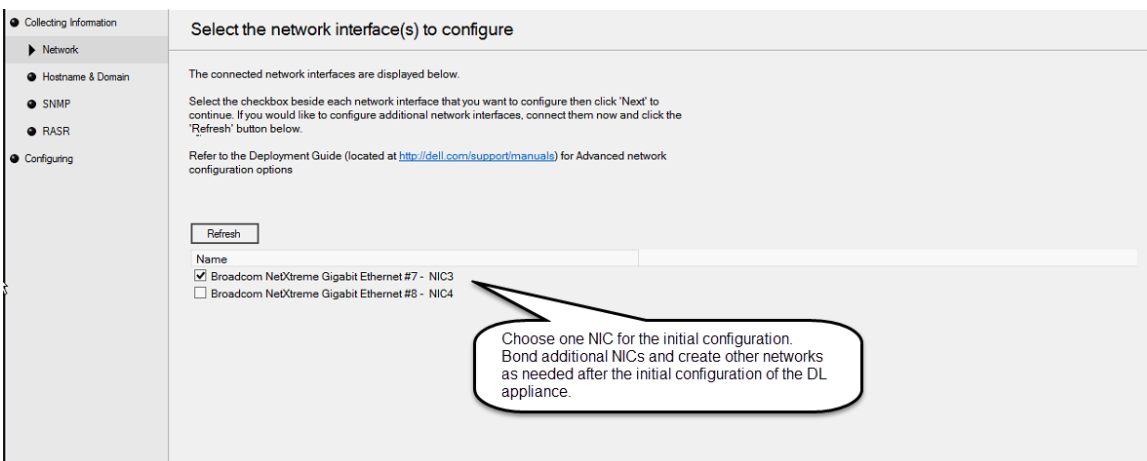
5. Log into the DL Appliance using the credentials applied in the previous step.



6. Examine the notes and messages on the **AppAssure Appliance Configuration Wizard** welcome screen.



7. Select one DL4300 NIC to begin the recovery of the DL4300 Appliance.



8. Enter network settings for the selected NIC in the previous step.

Collecting Information

- Network
- Hostname & Domain
- SNMP
- RASR
- Configuring

Configure selected network interface

Broadcom NetXtreme Gigabit Ethernet #7 - NIC3

Choose the internet protocol for this interface IPv4 IPv6

Obtain an IPv4 address automatically

Use the following IPv4 address:

IPv4 Address:

Subnet mask:

Default Gateway:

Obtain DNS server address automatically

Use the following DNS server address:

Preferred DNS server:

Alternate DNS server:

9. Configure the hostname and domain settings for the DL Appliance.

Collecting Information

- Network
- Hostname & Domain
- SNMP
- RASR
- Configuring

Configure hostname and domain settings

Enter a new hostname for this appliance.

If the hostname is to be changed, it is recommended that the hostname be changed prior to starting backups. To change the hostname at a later point, refer to the DL Appliance User's Guide (located at <http://dell.com/support/manuals>).

Current hostname:

New hostname:

Do you want this appliance to join a domain? Yes No

Domain name:

Domain user name:

Domain user password:



10. Configure SNMP Settings.

Configure SNMP settings

The SNMP service provides network management over the TCP/IP protocol. This pane will configure SNMP trap settings for the Server.

Configure SNMP on this appliance

SNMP master agent configuration:

Communities (separate using commas):

Accept SNMP packets from these hosts (separate using commas, leave blank to accept all):

Configure SNMP Alerts:

Community name:

Trap destinations:

Configured SNMP addresses:

Community Name	Trap Destination
<input type="text"/>	<input type="text"/>

11. Optionally create Virtual Disks.

DELL AppAssure Appliance Configuration Wizard

Create Windows and RASR virtual disk(s)

The RASR (Rapid Appliance Self Recovery) pre-requisite checks have completed successfully. Select the virtual disk(s) to create and click "Next" to proceed.

Create optional virtual disk(s):

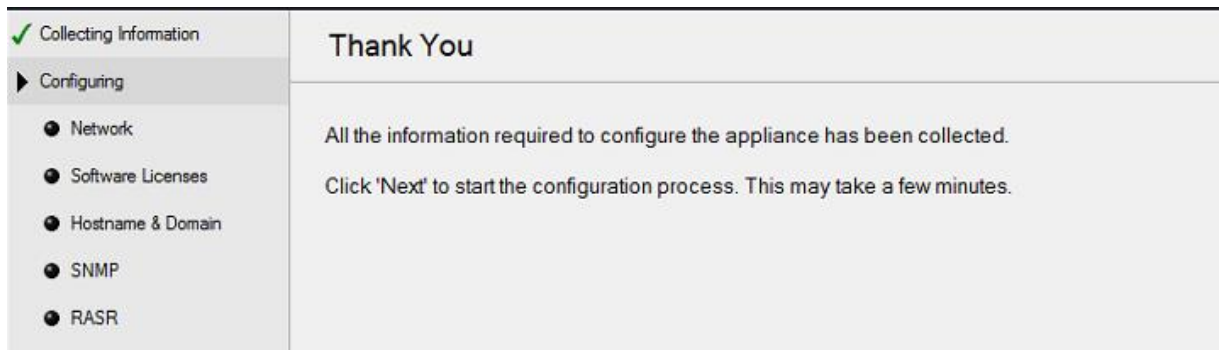
Windows Backup virtual disk

Bootable RASR virtual disk

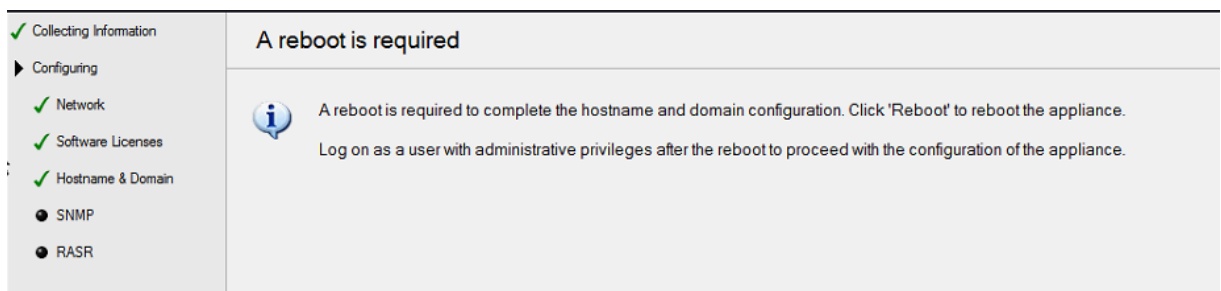
NOTE: If Windows Server Backup is planned to be used for scheduled DL Appliance protection, the Windows Backup Virtual disk option must be chosen here.

NOTE: If the Windows Backup virtual disk or bootable RASR virtual disks already exist or have previously been configured, the following message appears *"No Windows Backup virtual disk or bootable RASR virtual disk can be created at this time."*

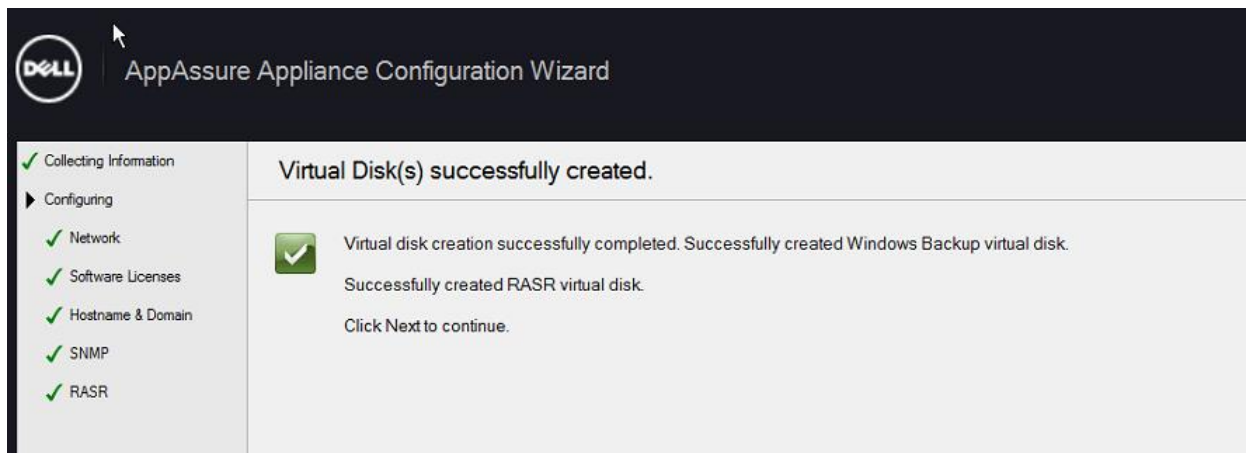
12. Apply the provided DL configurations by clicking **Next**.



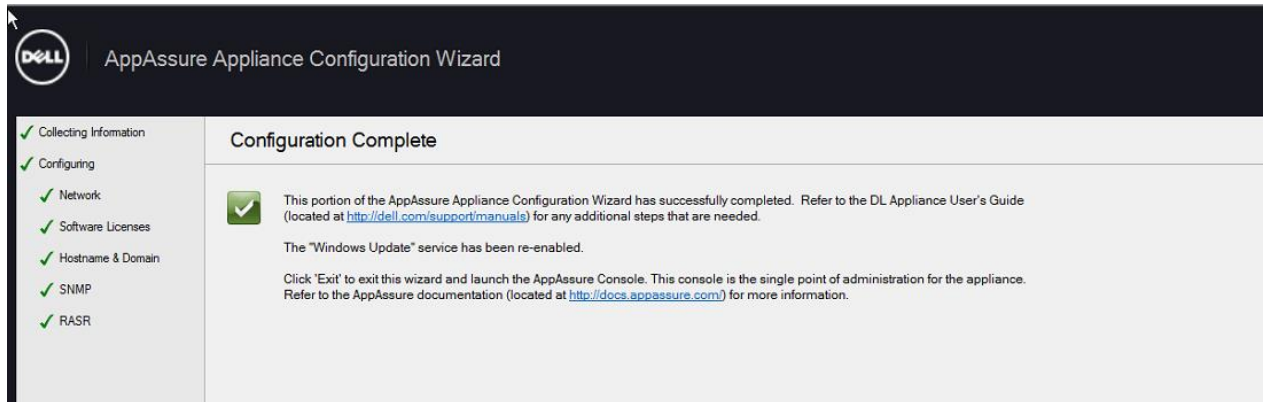
13. Reboot the DL Appliance.



14. After reboot, the AppAssure Appliance configuration wizard starts and optionally creates the Windows Backup and/or RASR Virtual disks. When creation is finished, the following message appears. Click **Next**.



15. The restoration of the DL Appliance operating system is complete. Configure the remaining DL appliance NICs as needed.



16. The restoration of the DL Appliance operating system is complete. Configure the remaining DL appliance NICs as needed.



8 Appendix C: Windows Recovery Wizard – Network Backup Configuration

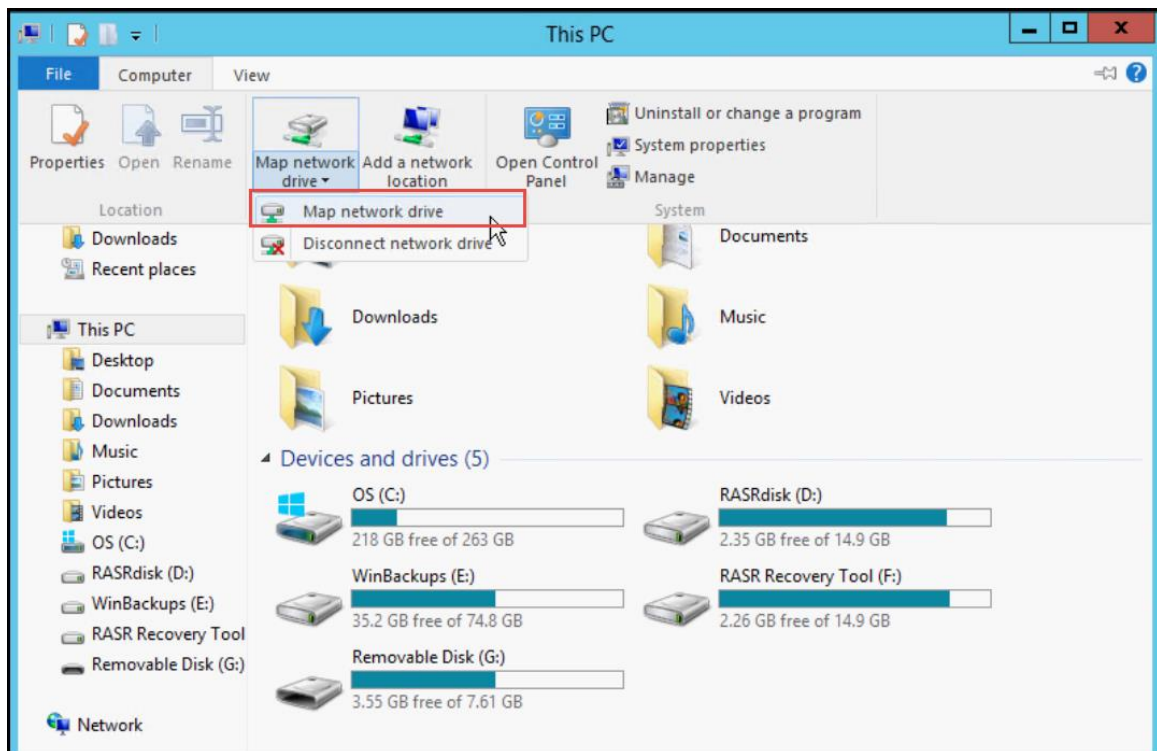
The RASR Windows Recovery Wizard recovery option offers a unique feature - to recover a DL appliance from a backup image that resides on a shared network drive.

8.1 Configure a Scheduled Shared Network Drive Backup Policy

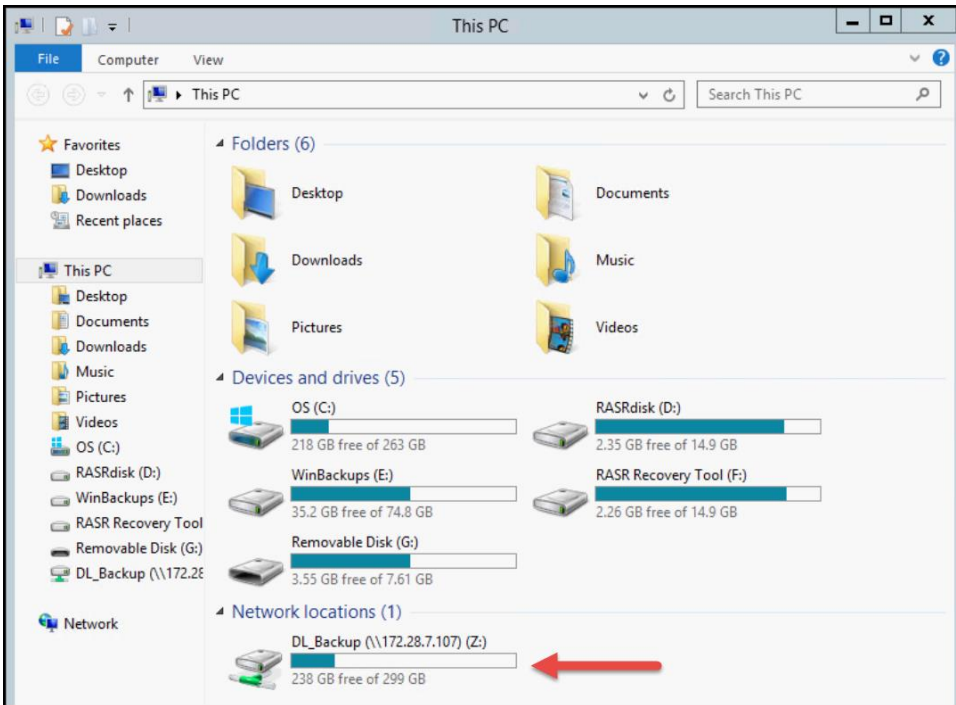
The DL appliance must create a recovery image on a network shared drive if it is to restore from it. To do so, Windows Server Backup is used.

NOTE: Windows Backup Server can preserve at most one backup on a network disk.

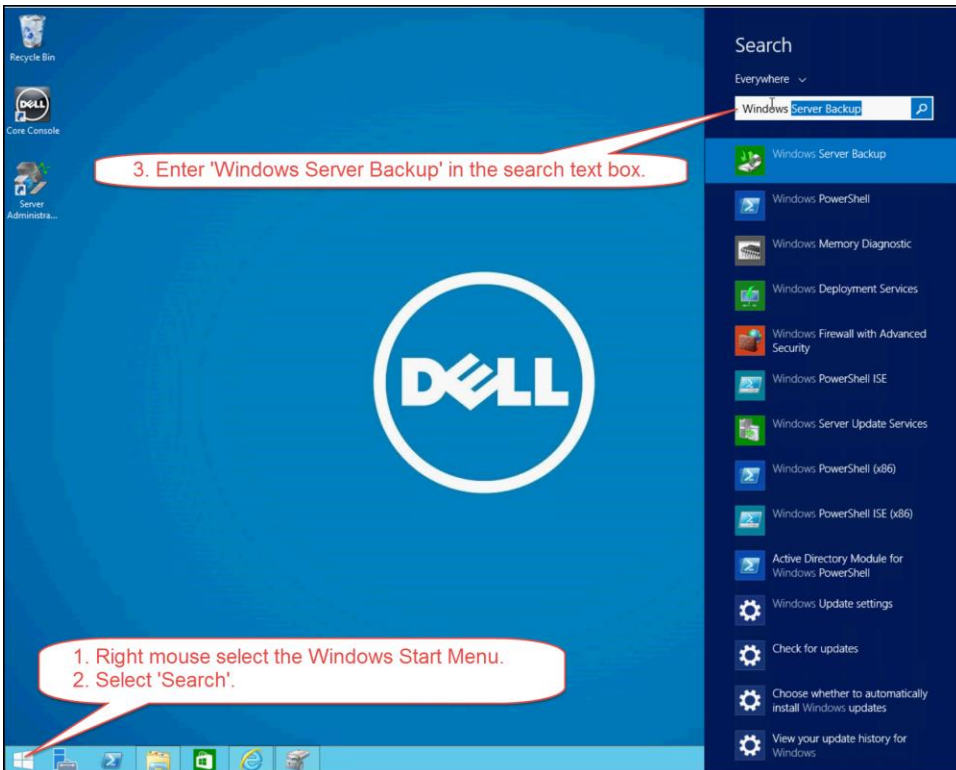
1. Map a network drive to be used as a backup target to the DL appliance.



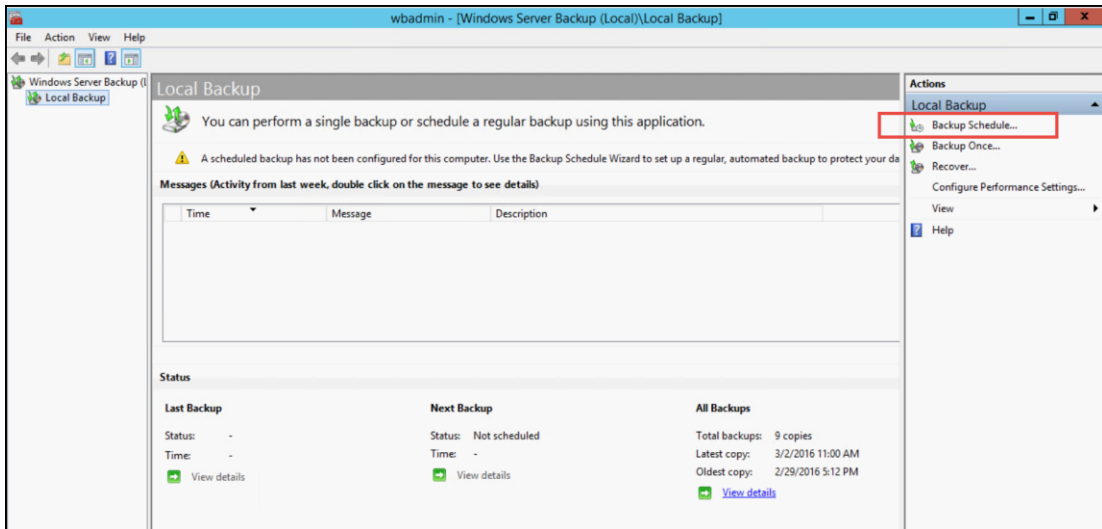
1b.



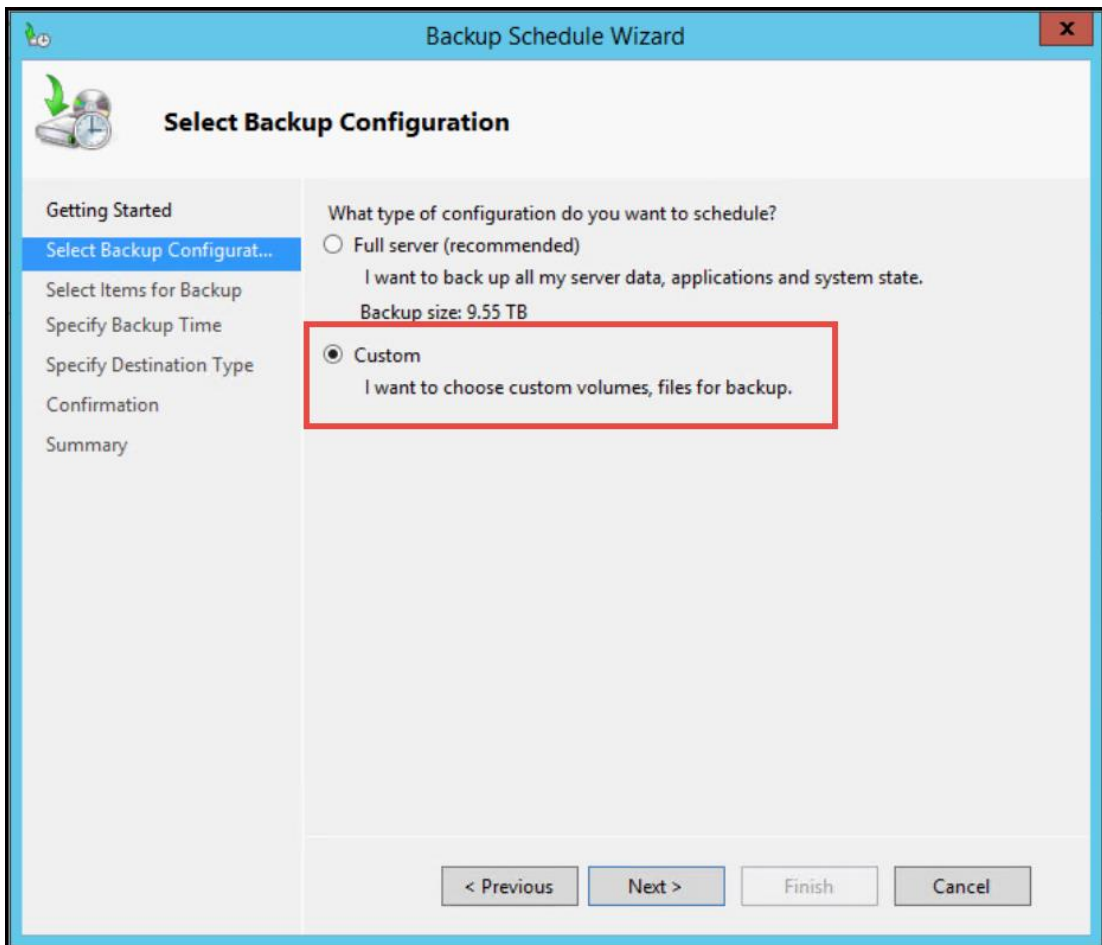
2. Launch the DL appliance Windows Backup Server application.



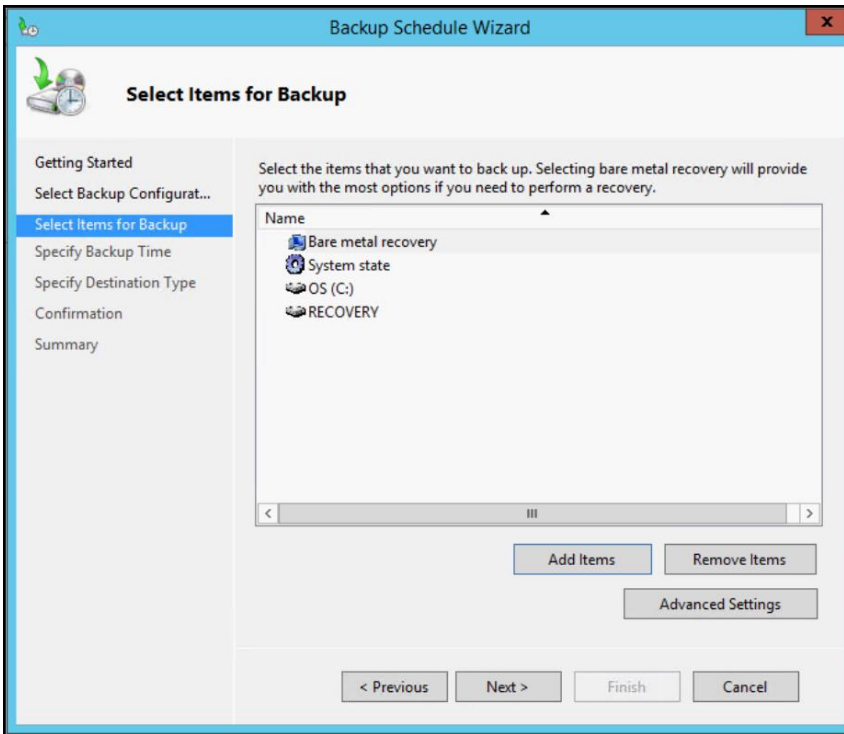
3. Launch the **Backup Schedule Wizard**.



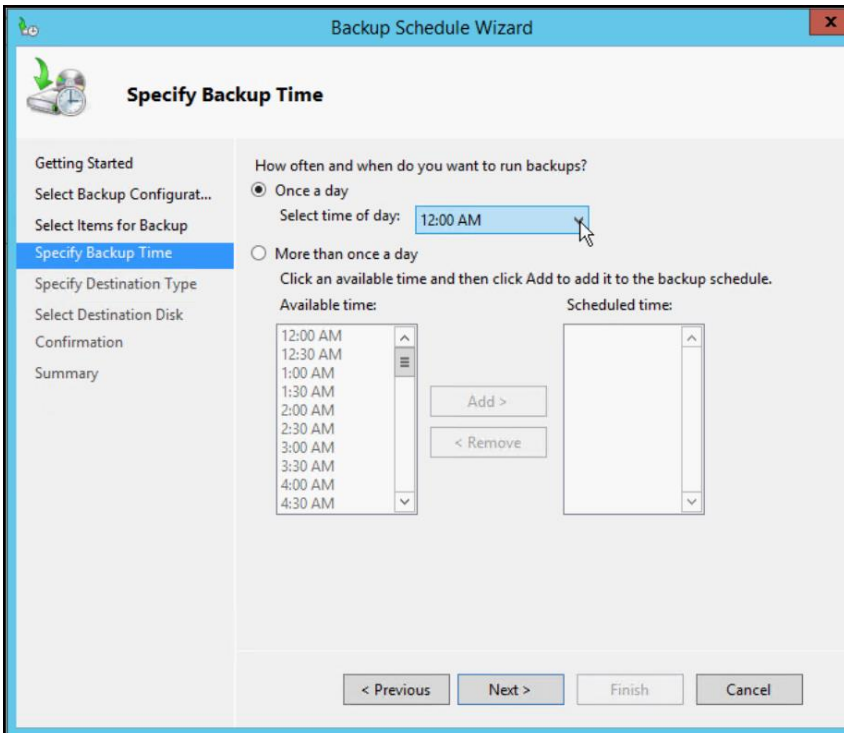
4. Select **Custom** to create a custom configuration.



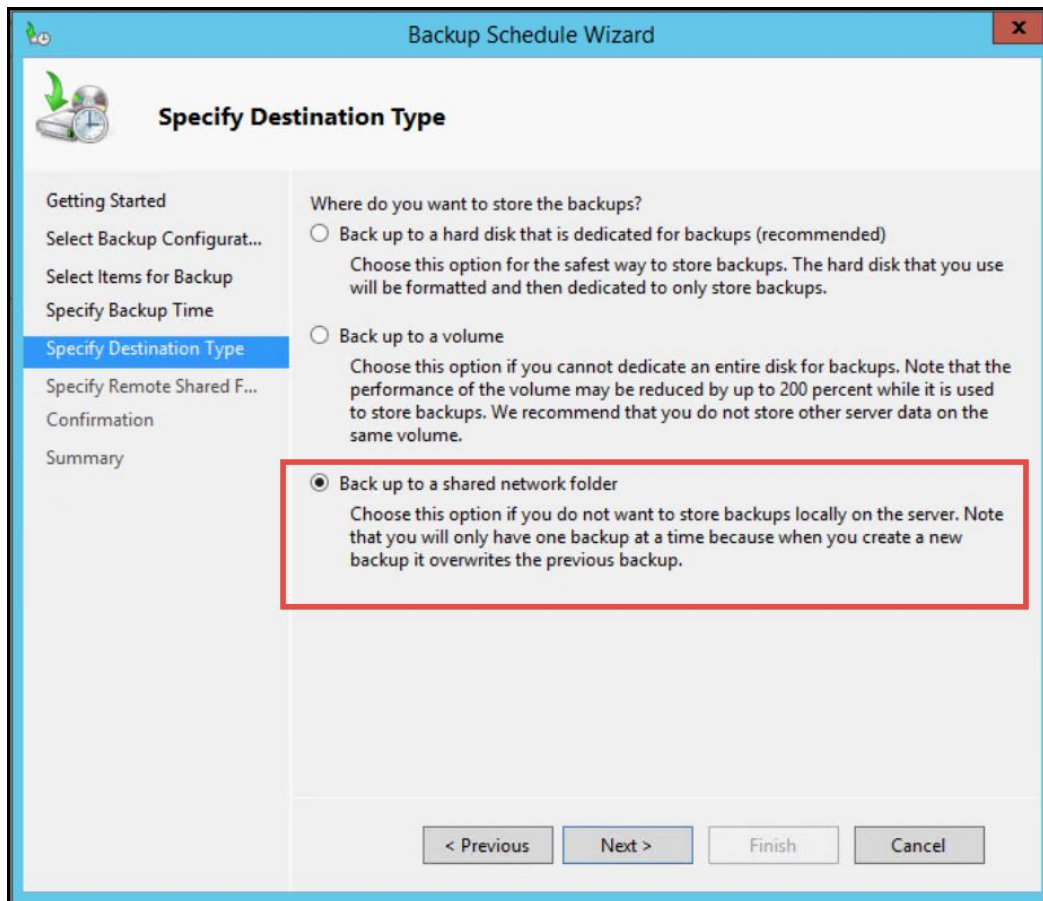
5. Add the following Items for backup. (Additionally add the item **Boot** if it exists).



6. Select a backup schedule that fits your needs.



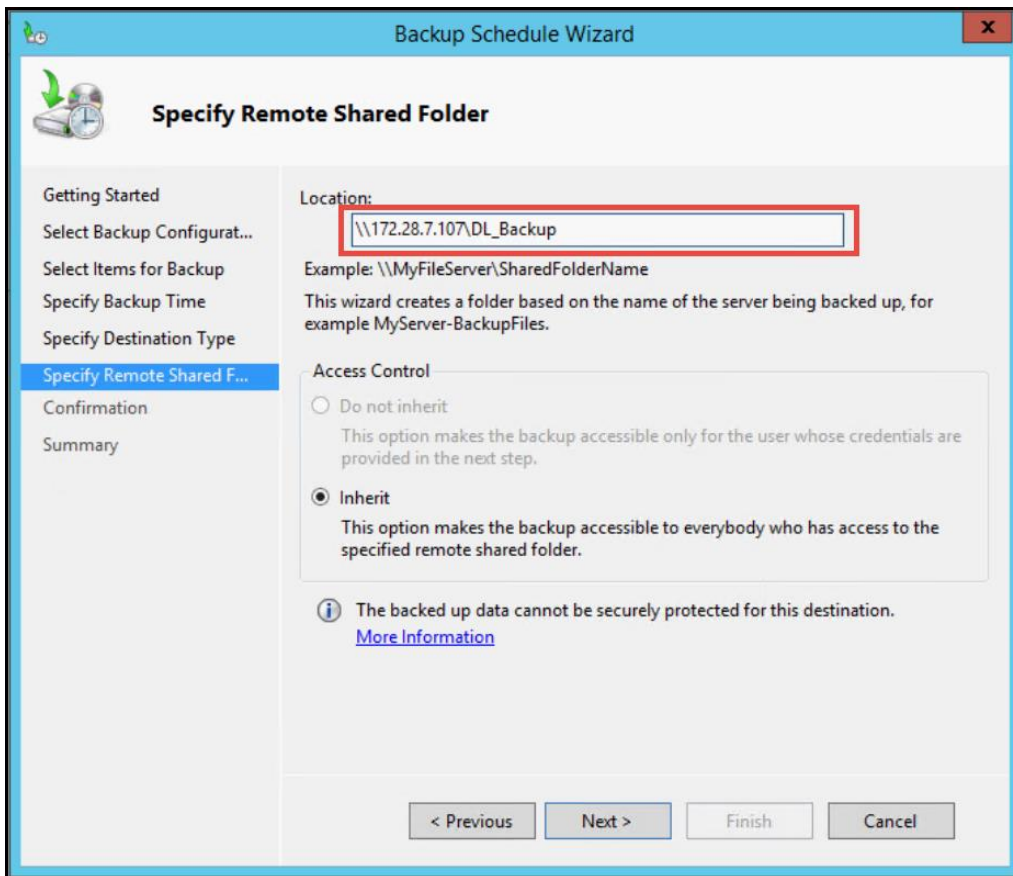
7. Select **Backup to a shared network folder**.



8. Accept the message describing that only one backup will exist when using a shared network folder.



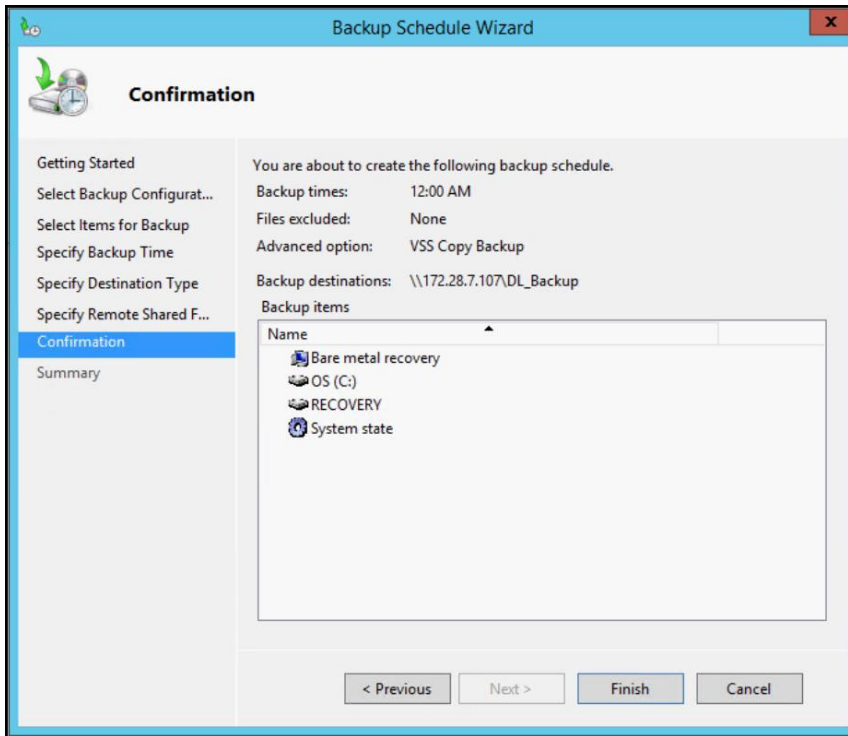
9. Enter the UNC name to the shared network folder to use as the backup target.



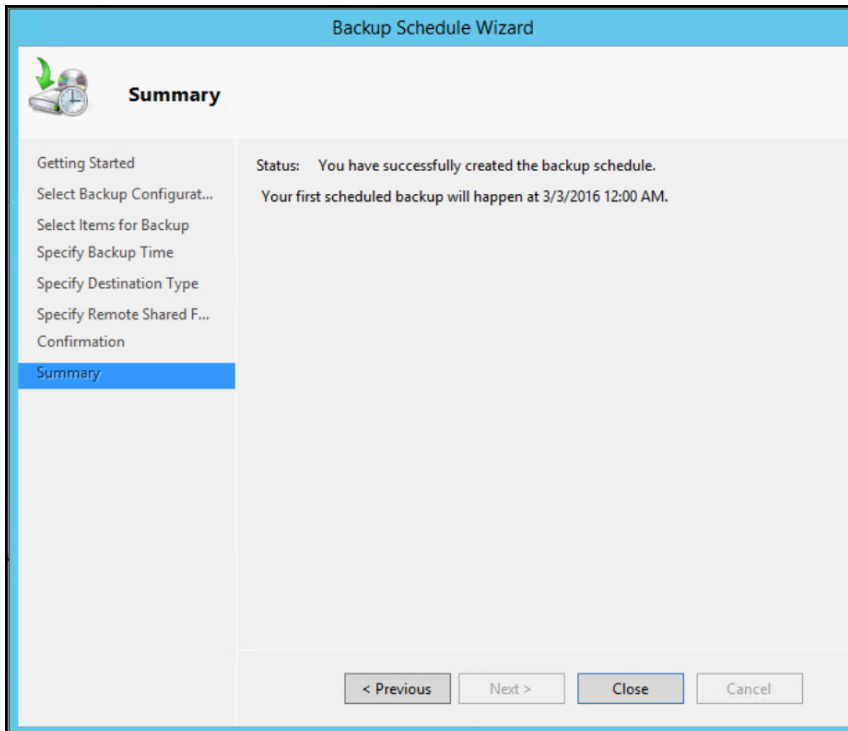
10. Enter credentials to be used to carry out the scheduled backup.



11. Confirm the backup policy settings and click **Finish**.

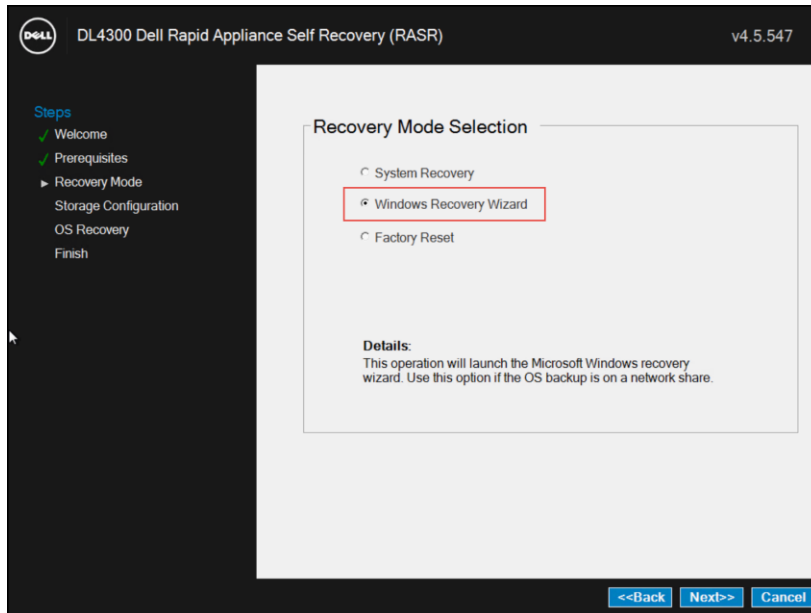


12. The configuration of Windows Backups stored on a network drive is complete.

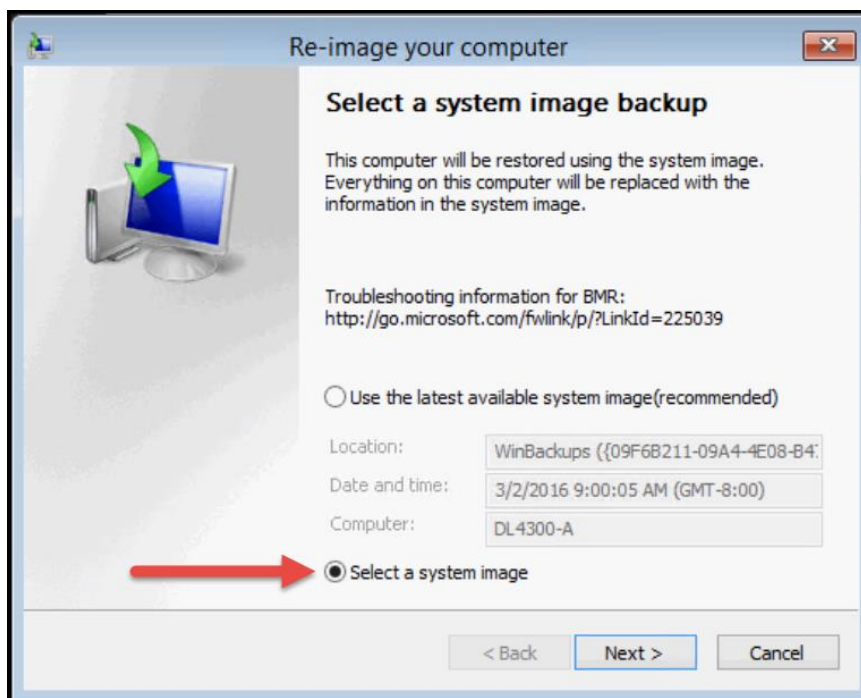


8.2 RASR Recovery using a Shared Network Drive Backup

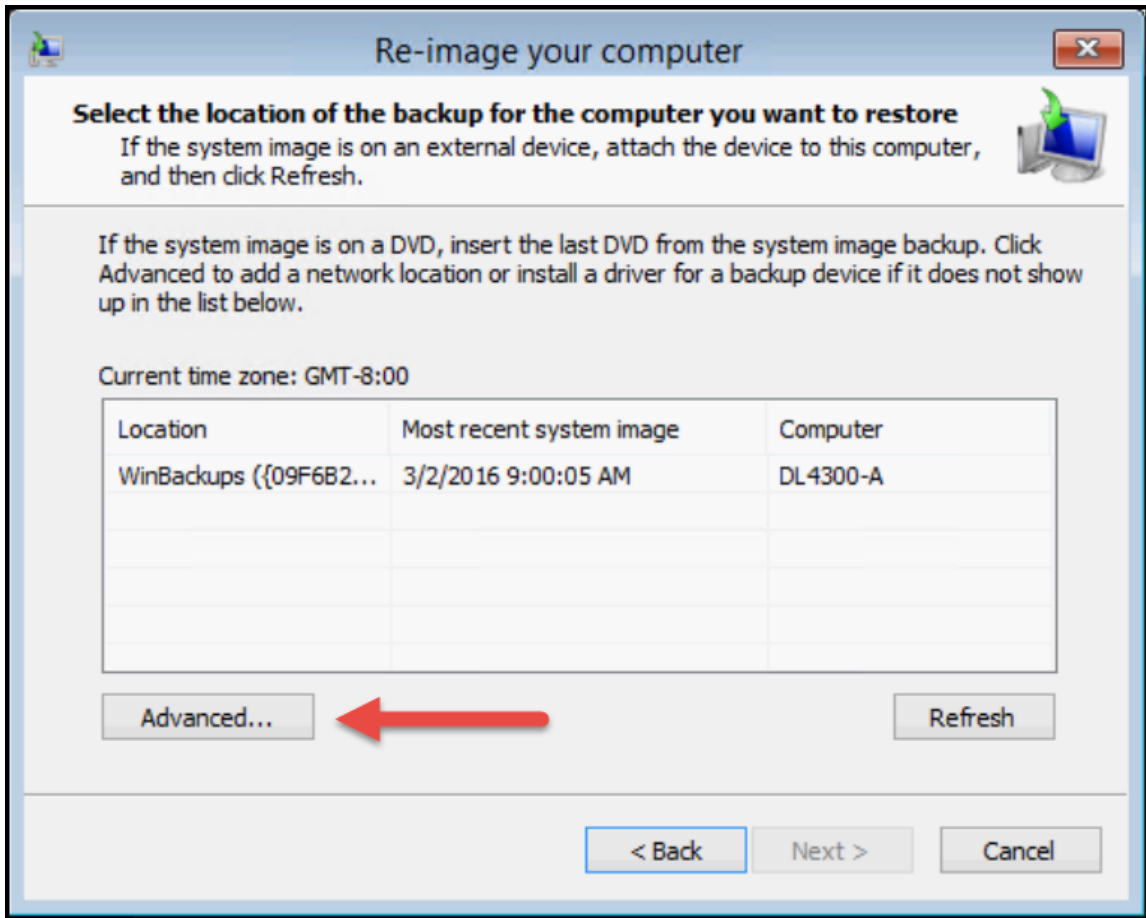
1. Launch RASR from any one of the supported methods supported by the DL appliance and select **Windows Recovery Wizard**. (See Section-3 Launching RASR)
2. Select **Windows Recovery Wizard**.



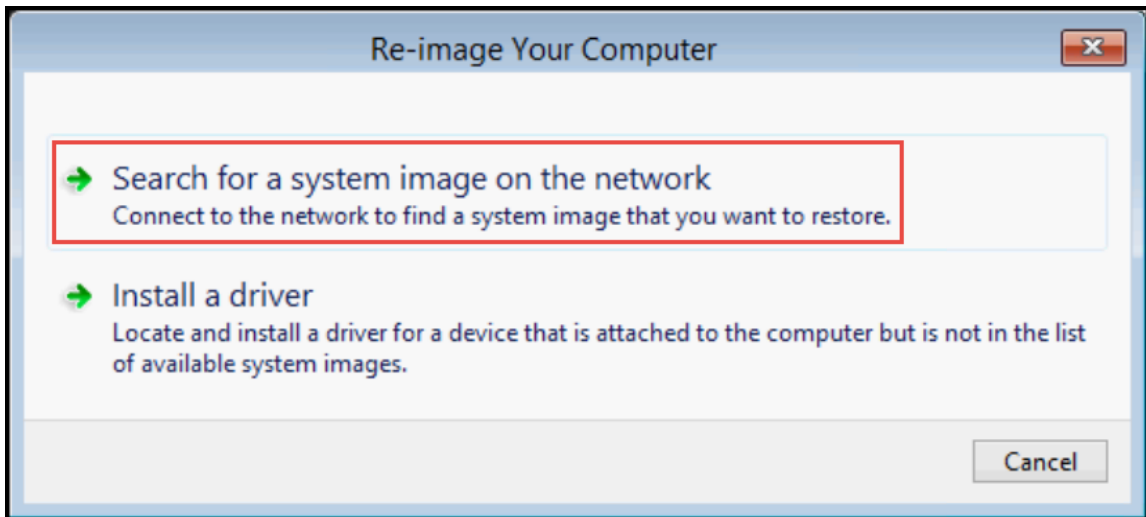
3. Select **Select a system image**.



4. Click **Advanced...**



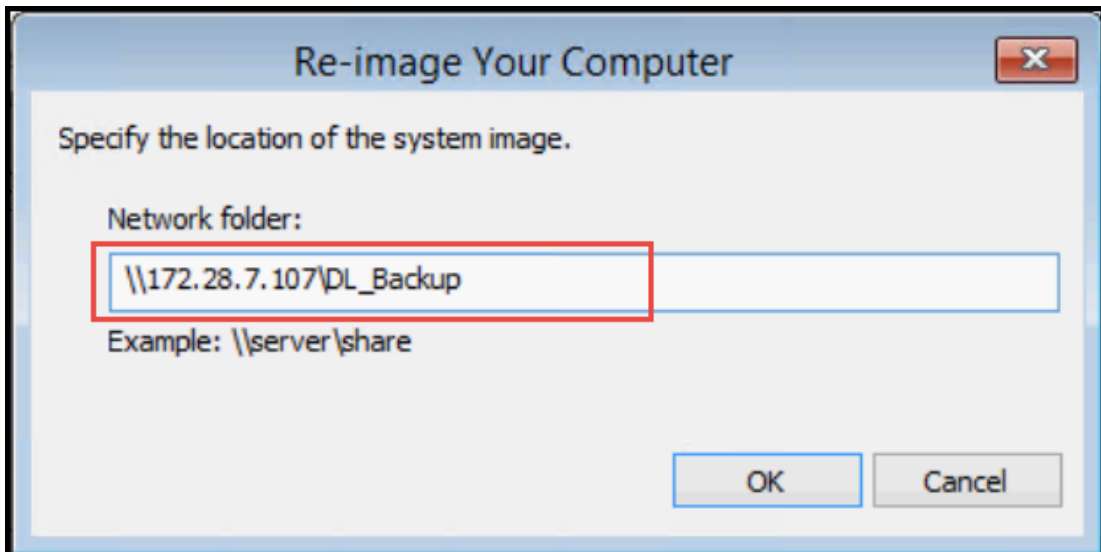
5. Click **Search for a system image on the network**.



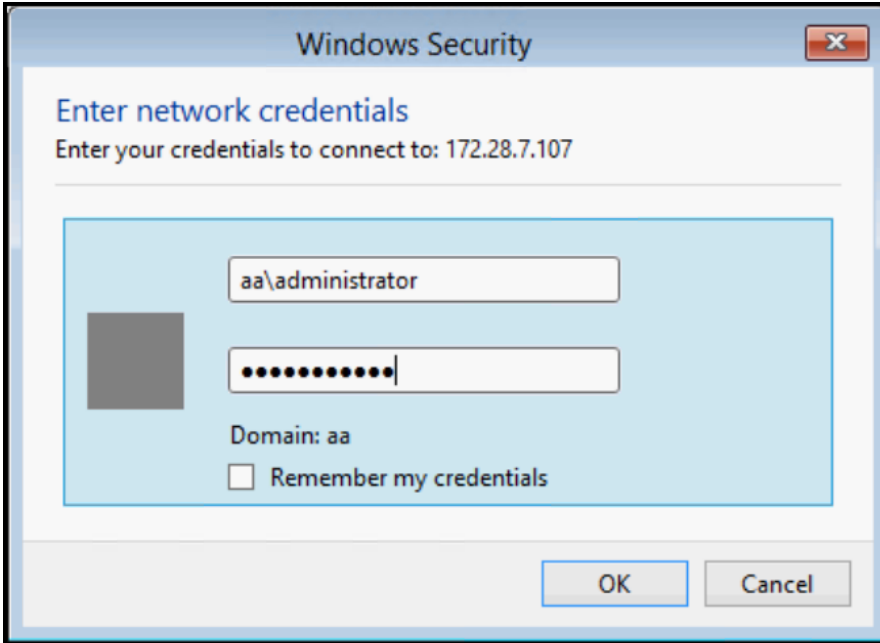
6. Click **Yes**.



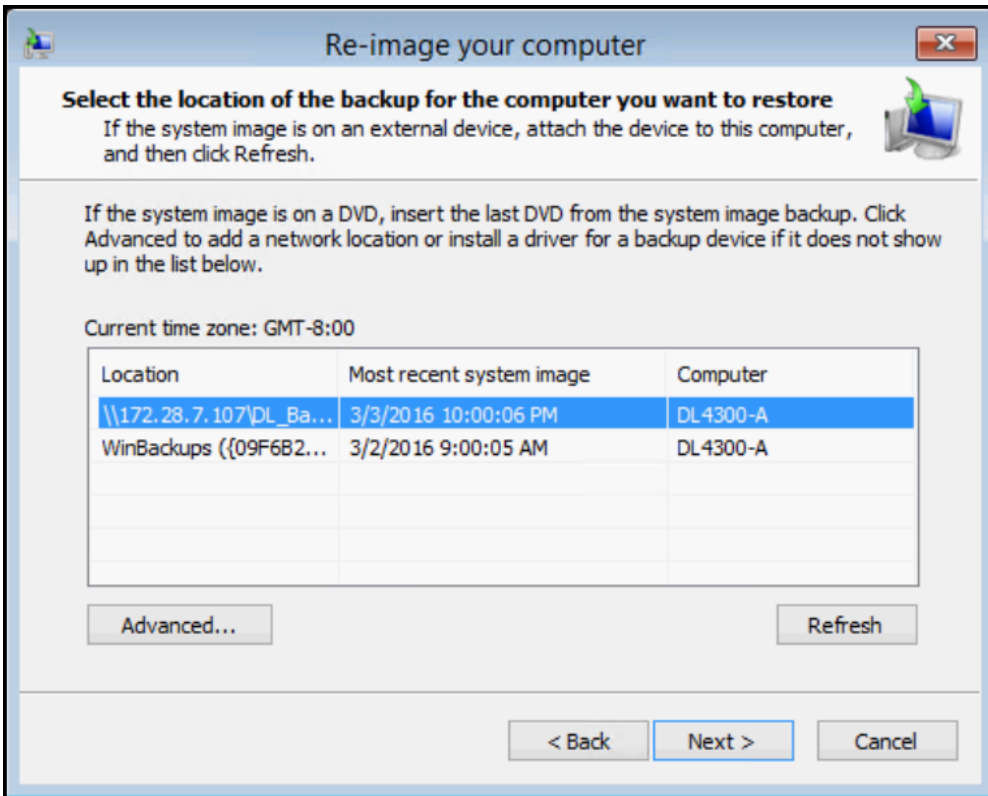
7. Enter the UNC name to the shared network folder that hosts the DL system image.



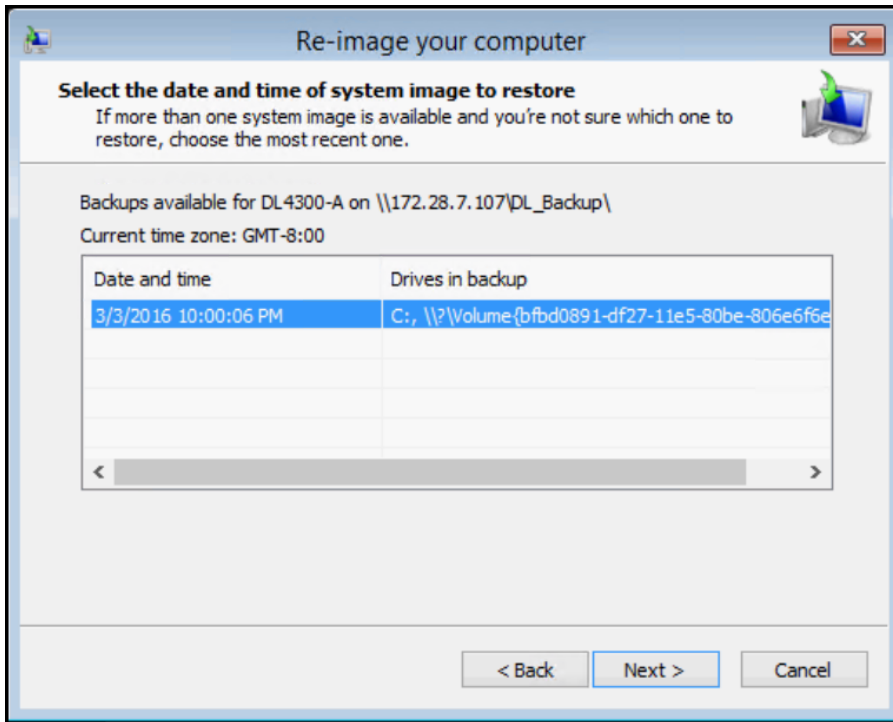
8. Enter network credentials.



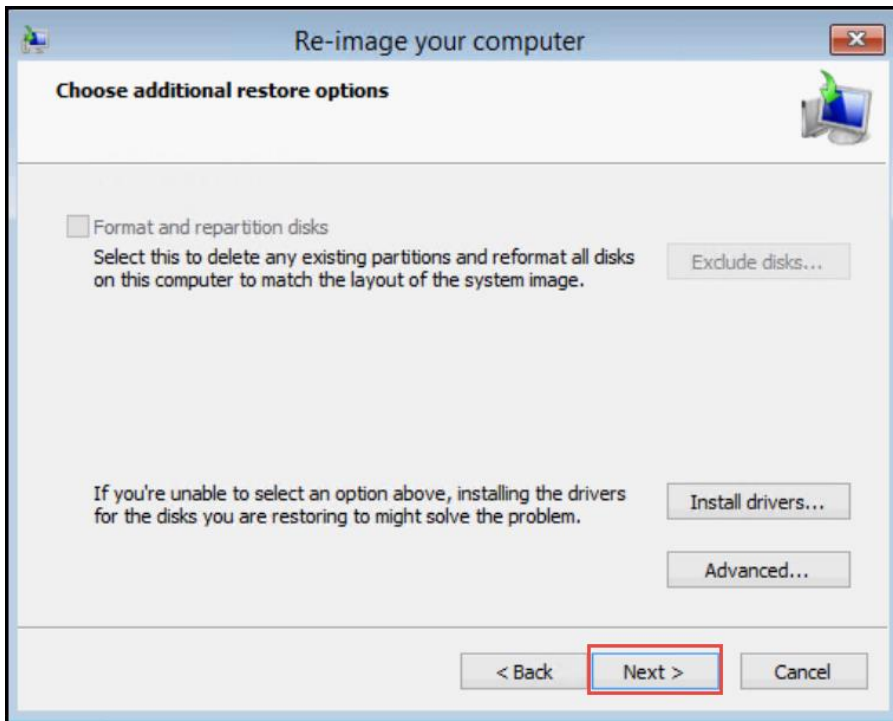
9. Highlight the newly added network location and click **Next**.



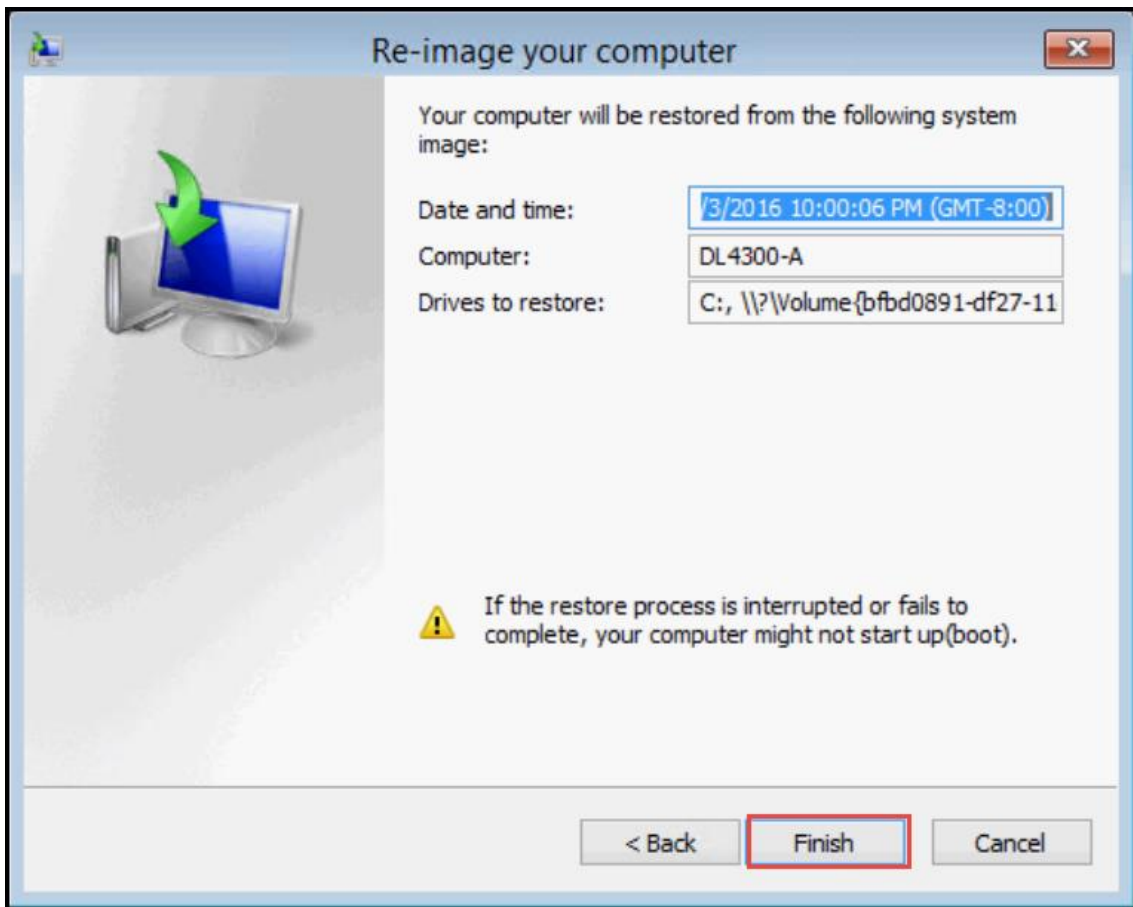
10. Highlight the system image that exists on the shared network drive. Click **Next**.



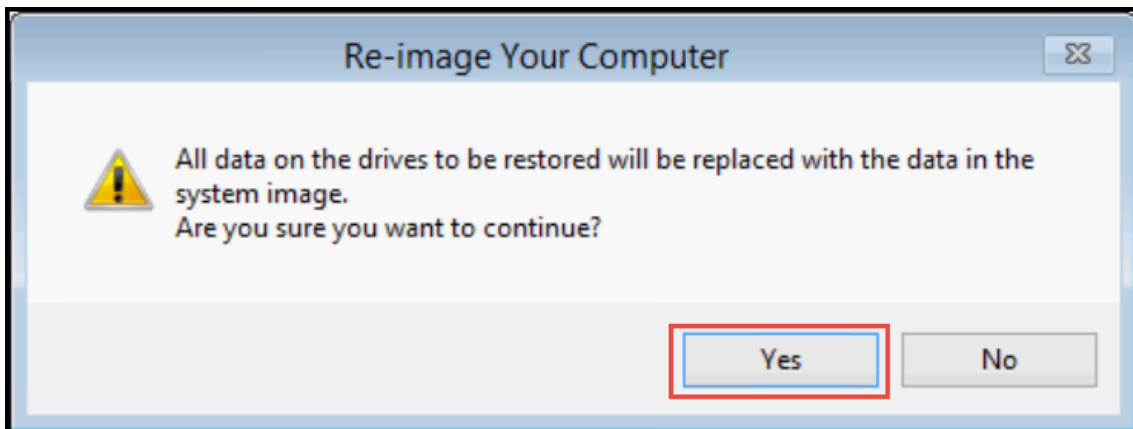
11. Click **Next**.



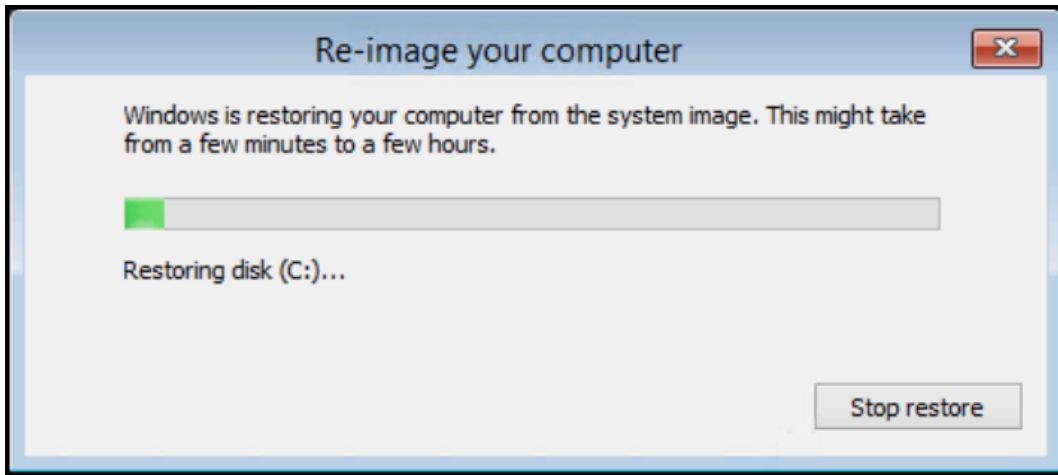
12. If the desired recovery image is correct, click **Finish**.



13. Click **Yes** to begin the DL recovery process.



14. The restoration process takes ~ XX minutes



15. Once restoration of the backup image is complete, the DL appliance will automatically restart. This completes the process for a RASR recovery using a shared network drive backup.

9 Appendix D Additional DL Appliance Resources

Component	Location
DL4300 Manuals and Documents	DL4300 Product Support
DL1000 Manuals and Documents	DL1000 Product Support
AppAssure Appliance Configuration Wizard Demonstration	YouTube Video Demonstration
DL4300 Specifications, Resources & Documents	DL4300 Appliance web page
DL1000 Specifications, Resources & Documents	DL1000 Appliance web page
AppAssure Specifications, Resources & Documents	AppAssure web page
AppAssure product Support	AppAssure Product Support

