

Recovery Media Creation Guide

Based on Active Backup for Business 2.5.0



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Introduction

About Recovery Media Creation

Synology's all-in-one backup solution, **Active Backup for Business**, supports the backing up of physical devices including Windows PCs and Windows or Linux servers. If you would like to restore an entire device, recovery media can be created by using this solution.

For Windows devices, there are two methods that can be used to do this, depending on your device settings. For **automatic recovery media creation**, the device you use to create the media must have identical language and region settings, and run the same Windows version and drivers as the device you want to restore. **Manual recovery media creation** is available for 32-bit systems and other devices that do not meet the criteria for creating automatic recovery media.

For Linux devices, instructions on how to create recovery media are also provided in this guide.

The following chapters provide a step-by-step guide on how to create recovery media for your device.

Method 1: Automatically Create Recovery Media

Summary

Synology's **Active Backup for Business Recovery Media Creator** is a desktop tool that can be used with **Active Backup for Business**. This tool is designed for administrators to create recovery media for bare-metal or volume-level restores.

Administrators can use this tool as long as the device you use to create the recovery media is running a 64-bit version of Windows, has the same language and region settings, and has the same Windows versions and drivers as the device that you want to restore. If the device you want to restore does not meet these conditions, see Method 2: Manually Create Recovery Media.

If the default settings don't need to be changed and no further customization is necessary, visit the Synology Download Center to download the Synology Active Backup for Business Recovery Media Creator and use it to create recovery media.

The Synology Active Backup for Business Recovery Wizard does not need to be additionally installed, since it is embedded in the Synology Active Backup for Business Recovery Media Creator. The following sections will show you how to use this tool.

System requirements and supported media types

System requirements

- Windows 11 (all editions)
- · Windows 10 (all editions)
- Windows 7 (all editions)
- Windows Server 2022
- Windows Server 2019
- Windows Server 2016
- Windows Server 2012 R2
- Windows Server 2012
- Windows Server 2008 R2 SP1

Supported media types

A USB drive:

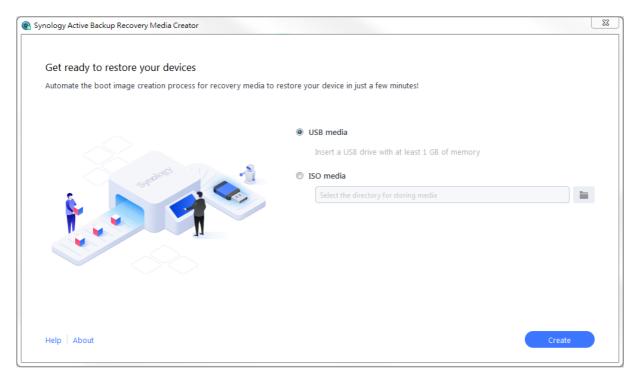
- · Required capacity: 1 GB
- Required local system volume storage capacity for temporary files: 2.5 GB
- Supported recovery model: UEFI 64-bit

An ISO image:

- · Required capacity: 1 GB
- Required local system volume storage capacity for temporary files: 2.5 GB
- Supported recovery model: Legacy/UEFI 64-bit

Create USB recovery media

- 1. Insert a USB drive with at least 1 GB capacity.
- 2. Launch the Synology Active Backup for Business Recovery Media Creator and select USB media.

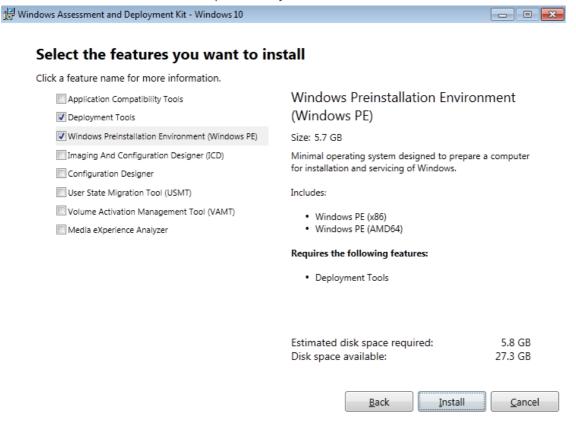


Windows ADK installation

A pop-up notification will appear if no **Windows Assessment and Deployment Kit (Windows ADK)** is detected. Click **Download** and the wizard will guide you through the Windows ADK installation process.

Deployment Tools and **Windows Preinstallation Environment (Windows PE)** must be installed to build recovery media (see the following image). Installing Windows ADK may take a few minutes. If

you want to download Windows ADK in advance, we recommend downloading version **1803** (download version 1803). If you use WinRE to create recovery media, download the corresponding version of Windows ADK. This depends on your OS version.



Notes:

- Starting with Windows 10 (version 1809), Windows Preinstallation Environment
 (Windows PE) is released separately from Windows ADK. To create recovery media,
 both the Windows ADK and WinPE packs need to be downloaded and installed. For
 more information, refer to Create bootable WinPE media by Microsoft.
- If you create recovery media manually by replacing WinPE with WinRE, you need to download a WinRE-compatible version of Windows ADK.
- You must be connected to the Internet when downloading and installing Windows
 ADK. If you cannot use the online ADK installer, refer to Install the Windows ADK offline
 by Microsoft.
- WinPE for Windows 10 (version 1803) is suggested for the download and installation through the Windows ADK. To check its compatibility with your device, refer to What's New in Windows PE by Microsoft.

Select the target USB drive

All of the detected USB drives will be listed on the drop-down menu in the Active Backup for Business Recovery Media Creator. Select a target USB drive and then click **Create** to start the

automated recovery media process. Once the USB media creation process has begun, it cannot be undone.

Time zone and language

The Synology Active Backup for Business Recovery Media Creator automatically detects and applies the local time zone and language to the created recovery media. The default settings will be applied if the local time zone and language cannot be detected. The default time zone is **Pacific Standard Time (PST)**, and the default language is **English**. Time zone settings may affect the backup time of the recovery media version shown in the Synology Active Backup for Business Recovery Wizard.

Boot recovery media

- 1. After recovery media has been created, a message will appear on the progress bar at the bottom of the tool.
- 2. Click **Finish** to open the directory for storing the ISO image. You can either mount the image onto the virtual machine intended for restoration, or burn the image onto a disk by using a third-party tool and insert the disk into the device that you want to restore.
- 3. Reboot the device and press **F2** to enter BIOS mode. This hotkey may vary by vendor.
- 4. Navigate to the **Boot** tab and prioritize the order of **Removable Devices** (for USBs).
- 5. Exit the setup process and you will be directed to the Synology Active Backup for Business Recovery Wizard, which will start the recovery process automatically.

Notes:

 The Synology Active Backup for Business Recovery Wizard does not need to be additionally installed since it is embedded in Synology Active Backup for Business Recovery Media Creator.

Create ISO recovery media

A system volume of at least 2.5 GB is required for creating recovery media in ISO format because creating an ISO image itself will occupy 1 GB, and the temporary files will occupy the remaining 1.5 GB.

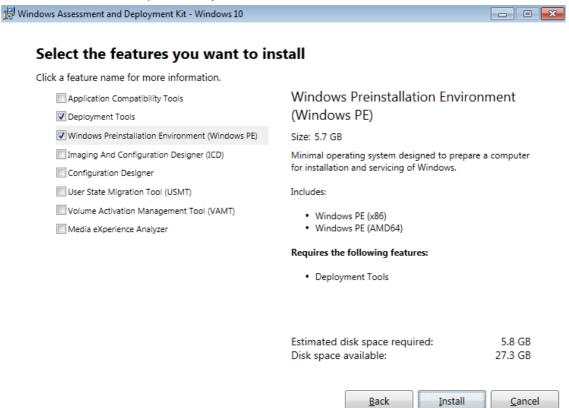
Launch Synology Active Backup for Business Recovery Media Creator and select ISO media.



Windows ADK installation

A pop-up notification will appear if no **Windows Assessment and Deployment Kit (Windows ADK)** is detected. Click **Download** and the wizard will guide you through the Windows ADK installation process.

Deployment Tools and Windows Preinstallation Environment (Windows PE) must be installed to build recovery media. Installing Windows ADK may take a few minutes. If you want to download Windows ADK in advance, we recommend downloading version 1803 (download version 1803). If you use WinRE to create recovery media, make sure to download the corresponding version of



Notes:

- Starting with Windows 10 (version 1809), Windows Preinstallation Environment (Windows PE) is released separately from Windows ADK. To create recovery media, both the Windows ADK and WinPE packs need to be downloaded and installed. For more information, refer to Create bootable WinPE media by Microsoft.
- If you create recovery media manually by replacing WinPE with WinRE, you need to download a WinRE-compatible version of Windows ADK.
- You must have an Internet connection when downloading and installing Windows ADK.
 If you cannot use the online ADK installer, refer to Install the Windows ADK offline by Microsoft.
- WinPE for Windows 10 (version 1803) is suggested for the download and installation through Windows ADK. To check its compatibility with your device, refer to What's New in Windows PE by Microsoft.

Specify the ISO image path

To create ISO media, define the directory for storing the recovery media once it is ready in ISO format. Click the folder icon to browse and select the target directory.

Time zone and language

Synology Active Backup for Business Recovery Media Creator automatically detects and applies the local time zone and language to the created recovery media. The default settings will be applied if the local time zone and language cannot be detected. The default time zone is Pacific Standard Time (PST), and the default language is English. Time zone settings may affect the backup time of the recovery media version shown in Synology Active Backup for Business Recovery Wizard.

Boot recovery media

- 1. After recovery media has been created, a message will appear on the progress bar at the bottom of the tool.
- 2. Click **Finish** to open the directory for storing the ISO image. You can either mount the image onto the virtual machine intended for restoration, or burn the image onto a disk by using a third-party tool and insert the disk into the device that you want to restore.
- 3. Reboot the device and press **F2** to enter BIOS mode. This hotkey may vary by vendor.
- 4. Navigate to the **Boot** tab and prioritize the order of **CD-ROM Drive**.
- 5. Exit the setup process and you will be directed to the Synology Active Backup for Business Recovery Wizard, which will start the recovery process automatically.

Notes:

 The Synology Active Backup for Business Recovery Wizard does not need to be additionally installed since it is embedded in the Synology Active Backup for Business Recovery Media Creator.

Cancel recovery media or troubleshoot failure

To cancel a recovery media creation that is in progress, close the application interface. Due to the time required to delete the unfinished pack and unmount the mounted files, the cancellation procedure may take some time.

If the creation process fails at any point, the **Synology Active Backup for Business Recovery Media Creator** will automatically finish the current stage, and then unmount and delete **boot.wim**.
Recovery media created in USB format cannot be rolled back once the creation process has begun.

If recovery media creation fails during the creation process, open the extracted folder named **Synology Restore Media Creator** and fetch the log titled **restore-media.log**. Then, send the log to **Synology Technical Support** for further assistance.

Method 2: Manually Create Recovery Media

Summary

If the device you use to create recovery media is running a 32-bit version of Windows, has different language and region settings, or has different Windows versions and drivers than the device that you want to restore, you should use manual recovery media creation. The following sections guide you through how to manually create recovery media.

System requirements and limitations

Prerequisite environment

To manually create recovery media, you must meet the following requirements:

- You must have a Windows 7 or above building environment with an Internet connection.
- The RAM on the target device must be larger than 512 MB.
- Before customizing the recovery media, a CD/DVD rewritable drive or a flash drive must be attached to the device.

PE-based recovery media

PE-based recovery media contains **Windows Pre-installation Environment (WinPE)**, which is a small Windows operating system for installing, deploying, and repairing the Windows operating system of desktops and servers that have crashed or are unbootable.

The recovery media also contains the **Synology Active Backup for Business Recovery Wizard**, which allows you to restore your device to the pre-installation environment.

To get Windows PE, download and install the **Windows Assessment and Deployment Kit** (Windows ADK) from Microsoft Windows. Refer to the Download and install the Windows ADK section for more information.

Notes:

- Recovery media based on WinPE 3.0 or above enables dynamic loading of the
 necessary device drivers. We recommend that you use WinPE for Windows 10, which
 supports better hardware compatibility and requires less effort when copying and
 installing drivers. For more information on the compatibility of each WinPE version,
 refer to What's New in Windows PE by Microsoft.
- Recovery media can be built for either x86 or x64 architectures. An x86-supported recovery media is required for an x86 architecture device.
- The 32-bit version of Windows PE can boot 32-bit Unified Extensible Firmware
 Interface (UEFI), BIOS PCs, and 64-bit BIOS PCs. The 64-bit version of Windows PE
 can boot 64-bit Unified Extensible Firmware Interface (UEFI), BIOS PCs, and 64-bit
 BIOS PCs. For more information on partition styles for setting up Windows, refer to
 Windows Setup: Installing using the MBR or GPT partition style by Microsoft.
- You must have an Internet connection when downloading and installing Windows ADK.
 If you cannot use the online ADK installer with GUI, refer to Install the Windows ADK offline by Microsoft.

Administrative permissions

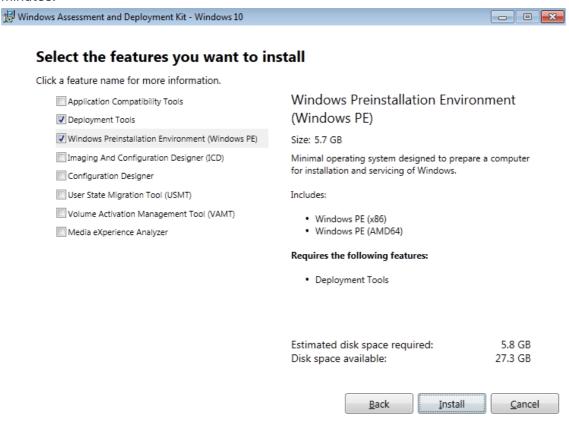
The entire process of creating recovery media requires users with local administrative permissions to use the command-line interface (CLI). Right-click on the CLI icon and choose **Run** as administrator to begin.

Create recovery media with the Windows ADK

Download and install the Windows ADK

When creating recovery media, we recommend downloading and installing Windows ADK version 1803 (download version 1803). If you use WinRE to create recovery media, download the corresponding version of Windows ADK. This depends on your OS version.

Deployment Tools and **Windows Preinstallation Environment (Windows PE)** are also required for building recovery media (see the following image). Installing **Windows ADK** may take a few



Notes:

- Starting with Windows 10 (version 1809), Windows Preinstallation Environment (Windows PE) is released separately from Windows ADK. To create recovery media, both the Windows ADK and WinPE packs need to be downloaded and installed. For more information, refer to Create bootable WinPE media by Microsoft.
- If you create recovery media manually by replacing WinPE with WinRE, you need to download a WinRE-compatible version of Windows ADK.
- You must have an Internet connection when downloading and installing Windows ADK.
 If you cannot use the online ADK installer, refer to Install the Windows ADK offline by Microsoft.
- We recommend downloading and installing WinPE for Windows 10 (version 1803)
 through the Windows ADK. To check its compatibility with your device, refer to What's
 New in Windows PE by Microsoft.

Copy required boot files to WinPE

- 1. Right-click the CLI icon and select Run as administrator to begin.
- 2. Change the file directory via the following command. For example, if the path of the installed Windows ADK is C:\Program Files (x86)\Windows Kits\10, the command will be:

cd "C:\Program Files (x86)\Windows Kits\10\Assessment and Deployment Kit\Deployment Tools"

3. Enter the following command to run the .bat file that will read all the environment variables required for creating recovery media:

DandISetEnv.bat

4. Copy WinPE to the designated path. Here, we use the path C:\winpe for example:

copype.cmd amd64 C:\winpe

Note:

amd64 builds the media required for 64-bit WinPE. amd64 is used for example here because it is a mainstream hardware architecture. If you want to create recovery media for 32-bit WinPE, the "amd64" in the example command should be changed to "x86".

5. If you are restoring a device **without** an Ethernet port, use this step. Otherwise, you can skip this step and continue to Mount and configure "boot.wim".

To support a WiFi connection, replace **WinPE** with **WinRE**. The following example uses WinRE from the Windows Recovery Tool. Refer to Get WinRE in the **Appendix** for details:

xcopy /h c:\Windows\System32\Recovery\Winre.wim C:\winpe\media\sources\
boot.wim

Notes:

To configure the drivers required for certain Wi-Fi modules through PE Network, the
PE Network and drivers (PE Network.exe) need to be copied and installed to recovery
media during the recovery media creation process.

Mount and configure "boot.wim"

The file **boot.wim** works as the operating system for WinPE. It needs to be mounted before copying the necessary configurations and the Synology Active Backup for Business Recovery Wizard. The command for mounting **boot.wim** is as follows:

Dism.exe /Mount-Wim /WimFile:"C:\winpe\media\sources\boot.wim" /index:1 / MountDir:"C:\winpe\mount"

Notes:

If your hardware requires a specific driver that is not supported by WinPE, then the
driver has to be copied or included in the media during the creation process. Refer to
Copy drivers and Install drivers in the Appendix for more information.

Download the Active Backup for Business Recovery Wizard

The latest version of the **Synology Active Backup for Business Recovery Wizard** can be downloaded from the Download Center. When copying the required boot files to WinPE, if you entered "amd64", download the 64-bit zip file, and if you entered "x86", download the 32-bit zip file.

We recommend you to create a separate folder on your hard disk and name it **ActiveBackup**, so the path would be: **C:\winpe\mount\ActiveBackup**. Afterwards, extract the recovery wizard to this directory.

Set the time zone

Time zone settings can be configured at this stage, which may affect the backup time of the recovery media version shown in the **Synology Active Backup for Business Recovery Wizard**. You can change the time zone within the quotation marks according to your needs. Refer to the time zone names on the **Default Time Zones** list by Microsoft:

//Set the time zone to your local time zone

Dism.exe /Image: "C:\winpe\mount" /Set-TimeZone: "Taipei Standard Time"

Configure "winpeshl.ini"

After WinPE has been initiated, the executable file, **winpeshl.exe**, will run automatically. **winpeshl.exe** will read the **winpeshl.ini** file. The purpose of this file is to initialize the network environment once your device has entered the WinPE environment and the Active Backup Recovery Wizard has been launched.

You can create this file by copying the following content and pasting it onto your notepad. Save the file as "winpeshl.ini" and move it to the directory C:\winpe\mount\Windows\system32:

[LaunchApps]

%systemroot%\System32\wpeinit.exe

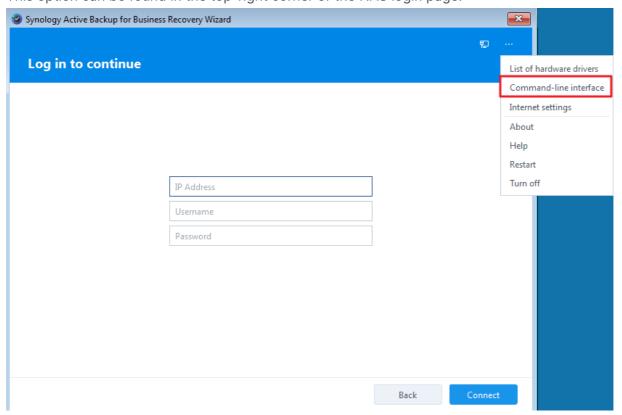
%systemdrive%\ActiveBackup\ui\recovery.exe

Notes:

• If resolution and language configurations are required, refer to Configure resolution and Configure language settings in the **Appendix** for more information.

Set up a WiFi connection (for WinRE only)

This option is only possible if you replaced WinPE with WinRE in the previous steps. After starting up the Recovery Wizard, you can set up the WiFi connection via the **Command-line interface**. This option can be found in the top-right corner of the NAS login page.



Set up the WiFi connection via either of the following:

- Netsh WLAN commands
- PE Network:
 - 1. Copy **PE Network.exe** to the **Recovery Wizard** during manual recovery media creation.
 - 2. Open the Command-line interface in the Recovery Wizard and execute PENetwork.exe.
 - 3. Select the wireless connection interface and the connection point, then enter its credentials.

Once you have successfully connected to WiFi, you can continue with the recovery process.

Unmount "boot.wim"

Every adjustment made to **boot.wim** needs to be committed to become effective. If all of the configurations are ready and expected to be effective, the parameter **/COMMIT** is required:

Dism.exe /Unmount-Wim /MountDir: "C:\winpe\mount" /COMMIT

Pack recovery media

Pack recovery media into an ISO image

Turning the media into an ISO image allows you to restore it directly on a VM or burn the ISO image to CD/DVD or flash drive with a third-party tool for future recoveries. Enter the following command to pack your customized media into an ISO image:

MakeWinPEMedia /ISO C:\winpe C:\winpe\custom pe amd64.iso

Pack recovery media into a USB drive

- 1. Insert your USB Drive into your PC.
- 2. Identify whether the partition table pertains to MBR or GPT: UEFI-based PCs support both UEFI (GPT) and legacy (MBR) BIOS modes. For Legacy BIOS mode, Windows PE needs to be booted in the MBR mode in order to correctly install Windows. Refer to Boot in UEFI or legacy BIOS mode by Microsoft for more information.
- 3. Enter the following commands in sequence according to your partition table type:

Note:

The underlined parts of the commands should be changed according to your needs. For example, the " $\underline{2}$ " in "select disk $\underline{2}$ " should be changed to the corresponding disk number for your media.

GPT

Step Description	Command
1. Launch the disk partition tool.	diskpart
2. List all disks on the device.	list disk
3. Select which disk needs to be cleaned in the next step.	select disk <u>2</u>
4. Clean all the data from the previously selected disk.	clean
5. Convert the partition table to GPT.	convert gpt

6. Create the primary partition.	create partition pri mary
7. Select the first partition.	select partition 1
8. Format the USB's file system to FAT32 and name the USB.	format quick fs=fat 32 label="WinPE"
9. Assign the drive letter for the USB.	assign letter=" <u>S</u> "
10. Specify that the partition is required by the device, and prevent automatic drive letter assignment on another device.	gpt attributes=0x80 0000000000000000000000000000000000
11. Exit.	exit

MBR

Step Description	Command
1. Launch the disk partition tool.	diskpart
2. List all disks on the device.	list disk
3. Select which disk needs to be cleaned in the next step.	select disk <u>2</u>
4. Clean all the data from the previously selected disk.	clean
5. Convert the partition table to MBR.	convert mbr
6. Create the primary partition.	create partition primary
7. Select the first partition.	select partition 1
8. Activate the partition to be formatted	active
9. Format the USB's file system to NTFS and name the USB.	format quick fs=ntfs label="Win PE"
10. Assign the drive letter for the USB.	assign letter=" <u>S</u> "
11. Exit.	exit

4. Enter the following command to copy the customized WinPE file to the USB drive. Note that the underlined part of the command should be changed according to your requirements:

xcopy.exe c:\winpe\media /E /F <u>S:\</u>

Preboot eXecution Environment (PXE) on Synology NAS for DSM 6.2 (MBR only)

Preboot eXecution Environment (PXE) supports booting WinPE loaded from PXE server over an Internet connection. You need to configure a DHCP, a PXE, and a TFTP server to set your Synology NAS as a PXE server. This section guides you through configuring DHCP, PXE, and TFTP servers on your Synology NAS.

- Create a shared folder named "PXE" on your NAS. Then, go to DSM > Control Panel > File
 Services > SMB/AFP/NFS and select Enable SMB service.
- 2. Go to **My Network Places** on your computer, enter the shared folder PXE, and create a Boot folder under it:

```
net use y: \\Your-Remote-NAS\PXE
y:
md Boot
```

3. Mount and customize boot.wim:

4. Copy the PXE boot file to the newly created Boot folder:

```
copy C:\winpe\mount\windows\Boot\pxe\*.* y:\Boot
```

5. Copy **boot.sdi** to the same Boot folder:

```
copy C:\winpe\media\Boot\boot.sdi y:\Boot
```

6. Copy the bootable WinPE image to the same Boot folder:

```
copy C:\winpe\media\sources\boot.wim y:\Boot
```

7. Copy the TrueType font to the Boot folder (optional):

```
md y:\Boot\Fonts
copy C:\winpe\media\Boot\Fonts\*.* y:\Boot\Fonts
```

8. Create a BCD file as an administrator by using the command line interface (CLI) and entering the following commands:

```
// Use bcdedit.exe to create space for BCD:
bcdedit /createstore c:\BCD
// Configure the RAMDISK:
bcdedit /store c:\BCD /create {ramdiskoptions} /d "Ramdisk options"
bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdidevice boot
bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdipath \Boot\boot.sdi
```

```
bcdedit /store c:\BCD /create /d "winpe boot image" /applicationosloader
// The last command will return a GUID, for example:
// The entry {a4f89c62-2142-11e6-80b6-00155da04110} was successfully created.
// Copy the returned GUID to use it in the next command. Substitute
'GUID1' with the copied GUID in the commands below:
// Create a new boot record for the Windows PE image:
bcdedit /store c:\BCD /set {GUID1} device ramdisk=[boot]\Boot\boot.wim,
{ramdiskoptions}
bcdedit /store c:\BCD /set {GUID1} path \windows\system32\winload.exe
bcdedit /store c:\BCD /set {GUID1} osdevice ramdisk=[boot]\Boot\boot.wim,
{ramdiskoptions}
bcdedit /store c:\BCD /set {GUID1} systemroot \windows
bcdedit /store c:\BCD /set {GUID1} detecthal Yes
bcdedit /store c:\BCD /set {GUID1} winpe Yes
// Configure BOOTMGR, substituting 'GUID 1' with the copied GUID:
bcdedit /store c:\BCD /create {bootmgr} /d "boot manager"
bcdedit /store c:\BCD /set {bootmgr} timeout 30
bcdedit /store c:\BCD -displayorder {GUID1} -addlast
// Copy this BCD file to the shared folder "Boot"
copy c:\BCD y:\Boot\BCD
```

9. Copy bootmgr.exe and pxeboot.n12 to y::

```
copy y:\Boot\bootmgr.exe y:\bootmgr.exe
copy y:\Boot\pxeboot.n12 y:\pxeboot.n12
```

10. Unmount **boot.wim**:

Dism.exe /Unmount-Wim /MountDir:"C:\winpe\mount" /COMMIT

- 11. Sign in to DSM, go to **Control Panel** > **File Services**, and tick **Enable TFTP service**.
- 12. Select the PXE shared folder as the **TFTP root folder**.
- 13. Enable **DHCP server** from **Control Panel** > **DHCP Server** > **Network Interface**.
- 14. Enable PXE from Control Panel > DHCP Server > PXE and configure the boot loader. Select bootx64.efi and click OK.
- 15. When you are restoring the device, enter the **BIOS Setup Utility** to change the BIOS boot sequence. Prioritize **Network** in the boot order. By doing this, you will be able to enter WinPE via PXE.

Preboot eXecution Environment (PXE) on Synology NAS for DSM 7.0 (UEFI and MBR)

Preboot eXecution Environment (PXE) supports booting WinPE loaded from PXE server via an Internet connection. You need to configure a DHCP, a PXE, and a TFTP server to set your Synology NAS as a PXE server. This section guides you through configuring DHCP, PXE, and TFTP servers on your Synology NAS.

UEFI

- Create a shared folder named "PXE" on your NAS and then download SMB Service from the Package Center. Go to DSM > Control Panel > File Services > SMB and select Enable SMB service.
- 2. Go to **My Network Places** on your computer, enter the shared folder PXE, and create a Boot folder under it:

```
net use y: \\Your-Remote-NAS\PXE
y:
md Boot
```

3. Mount and customize boot.wim:

Dism.exe /Mount-Wim /WimFile:"C:\winpe\media\sources\boot.wim" /index:1 / MountDir:"C:\winpe\mount"

4. Copy **boot.sdi** to the same Boot folder:

```
copy C:\winpe\media\Boot\boot.sdi y:\Boot
```

5. Copy the bootable WinPE image to the same Boot folder:

```
copy C:\winpe\media\sources\boot.wim y:\Boot
```

6. Copy the TrueType font to the Boot folder (optional):

```
md EFI\Microsoft\Boot\Fonts
copy C:\winpe\media\Boot\Fonts\*.* y:\EFI\Microsoft\Boot\Fonts
```

7. Create a BCD file as an administrator by using the command line interface (CLI) and entering the following commands:

// Create storage for BCD with bcdedit.exe: bcdedit /createstore c:\BCD // Configure the RAMDISK: bcdedit /store c:\BCD /create {ramdiskoptions} /d "Ramdisk options" bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdidevice boot bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdipath \Boot\boot.sdi bcdedit /store c:\BCD /create /d "winpe boot image" /applicationosloader // The last command will return a GUID, for example: // The entry {a4f89c62-2142-11e6-80b6-00155da04110} was successfully created.

// Copy the returned GUID to use it in the next command. Substitute 'GUID1' with the copied GUID in the commands below:

// Create a new boot record for the Windows PE image:

bcdedit /store c:\BCD /set {GUID1} device ramdisk=[boot]\Boot\boot.wim,
{ramdiskoptions}

bcdedit /store c:\BCD /set {GUID1} path \windows\system32\winload.efi

{ramdiskoptions}

bcdedit /store c:\BCD /set {GUID1} systemroot \windows

bcdedit /store c:\BCD /set {GUID1} detecthal Yes

bcdedit /store c:\BCD /set {GUID1} winpe Yes

// Configure BOOTMGR, substituting 'GUID1' with the copied GUID:

bcdedit /store c:\BCD /create {bootmgr} /d "boot manager"

bcdedit /store c:\BCD /set {bootmgr} timeout 30

bcdedit /store c:\BCD -displayorder {GUID1} -addlast

// Copy the BCD file to the Boot shared folder

copy c:\BCD y:\Boot\BCD

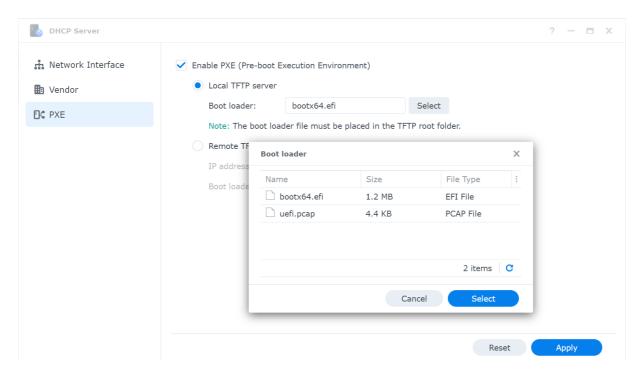
8. Copy bootx64.efi to y::

copy c:\winpe\media\EFI\Boot\bootx64.efi y:\bootx64.ef

9. Unmount **boot.wim**:

Dism.exe /Unmount-Wim /MountDir: "C:\winpe\mount" /COMMIT

- 10. Sign in to DSM, go to **Control Panel** > **File Services** > **Advanced** > **TFTP**, and select **Enable TFTP service**. Select the PXE shared folder as the **TFTP root folder**.
- 11. Install **DHCP Server** from the **Package Center**. Go to **DHCP Server** > **Network Interface** to enable the DHCP server.
- 12. Open **DHCP Server** and go to the **PXE** page. Choose **Local TFTP server** and select **bootx64.efi** as the **boot loader**.



13. When you are restoring the device, enter the **BIOS Setup Utility** to change the BIOS boot sequence. Prioritize **Network** in the boot order. By doing this, you will be able to enter WinPE via PXE.

MBR

- Create a shared folder named "PXE" on your NAS and then download SMB Service from the Package Center. Go to DSM > Control Panel > File Services > SMB and select Enable SMB service.
- 2. Go to **My Network Places** on your computer, enter the shared folder PXE, and create a Boot folder under it:

```
net use y: \\Your-Remote-NAS\PXE
y:
md Boot
```

3. Mount and customize boot.wim:

Dism.exe /Mount-Wim /WimFile:"C:\winpe\media\sources\boot.wim" /index:1 / MountDir:"C:\winpe\mount"

4. Copy the PXE boot file to the newly created Boot folder:

copy C:\winpe\mount\windows\Boot\pxe*.* y:\Boot

5. Copy **boot.sdi** to the same Boot folder:

copy C:\winpe\media\Boot\boot.sdi y:\Boot

6. Copy the bootable WinPE image to the same Boot folder:

copy C:\winpe\media\sources\boot.wim y:\Boot

7. Copy the TrueType font to the Boot folder (optional):

```
md y:\Boot\Fonts
copy C:\winpe\media\Boot\Fonts\*.* y:\Boot\Fonts
```

8. Create a BCD file as an administrator by using the command line interface (CLI) and entering the following commands:

```
// Use bcdedit.exe to create space for BCD:
bcdedit /createstore c:\BCD
// Configure the RAMDISK:
bcdedit /store c:\BCD /create {ramdiskoptions} /d "Ramdisk options"
bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdidevice boot
bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdipath \Boot\boot.sdi
bcdedit /store c:\BCD /create /d "winpe boot image" /applicationosloader
// The last command will return a GUID, for example:
// The entry {a4f89c62-2142-11e6-80b6-00155da04110} was successfully created.
// Copy the returned GUID to use it in the next command. Substitute
'GUID1' with the copied GUID in the commands below:
// Create a new boot record for the Windows PE image:
bcdedit /store c:\BCD /set {GUID1} device ramdisk=[boot]\Boot\boot.wim,
{ramdiskoptions}
bcdedit /store c:\BCD /set {GUID1} path \windows\system32\winload.exe
bcdedit /store c:\BCD /set {GUID1} osdevice ramdisk=[boot]\Boot\boot.wim,
{ramdiskoptions}
bcdedit /store c:\BCD /set {GUID1} systemroot \windows
bcdedit /store c:\BCD /set {GUID1} detecthal Yes
bcdedit /store c:\BCD /set {GUID1} winpe Yes
// Configure the BOOTMGR, substituting 'GUID 1' with the copied GUID:
bcdedit /store c:\BCD /create {bootmgr} /d "boot manager"
bcdedit /store c:\BCD /set {bootmgr} timeout 30
bcdedit /store c:\BCD -displayorder {GUID1} -addlast
// Copy this BCD file to the shared folder "Boot"
copy c:\BCD y:\Boot\BCD
```

9. Copy bootmgr.exe and pxeboot.n12 to "y:":

```
copy y:\Boot\bootmgr.exe y:\bootmgr.exe
copy y:\Boot\pxeboot.n12 y:\pxeboot.n12
```

10. Unmount boot.wim:

Dism.exe /Unmount-Wim /MountDir: "C:\winpe\mount" /COMMIT

- 11. Sign in to DSM, go to **Control Panel** > **File Services** > **Advanced** > **TFTP**, and select **Enable TFTP service**. Select the PXE shared folder as the **TFTP root folder**.
- 12. Install a DHCP Server from the **Package Center**. To enable the DHCP server, go to **DHCP**Server > Network Interface.
- 13. Open **DHCP Server** and go to the **PXE** page. Choose **Local TFTP server** and select **bootx64.efi** as the **boot loader**.
- 14. When you are restoring the device, enter the **BIOS Setup Utility** to change the BIOS boot sequence. Prioritize **Network** in the boot order. By doing this, you will be able to enter WinPE via PXE.

Boot recovery media (ISO image or USB drive)

After you have mounted the ISO image or attached the USB drive to the device you want to restore, press **F2** to enter BIOS mode once your device has been rebooted. This hotkey may vary by vendor.

Afterwards, navigate to the **Boot** tab and prioritize the order of **CD-ROM Drive** and **Removable Devices** depending where the recovery media is located.

Exit the setup process and you will be directed to **Synology Active Backup for Business Recovery Wizard**, which will automatically start the recovery process.

Create recovery media for a Linux device

Summary

If you have created a backup using the **Active Backup for Business Agent** on a Linux device, **Active Backup for Business Recovery Media** can guide you through restoring the backup data from your Synology NAS to your Linux device.

Active Backup for Business recovery media for Linux is implemented via ISO images, which can also be burned to a USB. To create recovery media for Linux, go to the Download Center and download Synology Active Backup for Business Recovery Media for Linux (Synology-Recovery-Media.iso).

Refer to how to create a bootable USB recovery drive for your Linux device for instructions for ISO burning software, Legacy BIOS, and UEFI.

Since the recovery wizard is already embedded in the Active Backup for Business Recovery Media for Linux (Synology-Recovery-Media.iso), it will start up automatically when booting up your Linux device using recovery media.

Appendix

Get WinRE

You can obtain WinRE from the Windows Recovery Tool or from a Windows installation disc.

From the Windows Recovery Tool

1. Enter the following command to check if your Windows Recovery Tool has WinRE:

reagentc /info

- 2. The system will respond with one of the following:
 - o If WinRE exists in the system: Windows RE status: Enabled
 - If WinRE does not exist in the system: Windows RE status: Disabled
 If WinRE does not exist in the system, then you need to get WinRE from the Windows installation disc.
- 3. Stop running WinRE:

reagentc /disable

4. Generate the WinRE image at a specific location:

c:\Windows\System32\Recovery\Winre.wim

From a Windows installation disk

To get WinRE from a Windows installation disk, refer to Customize Windows RE by Microsoft.

Copy drivers

If your hardware requires a specific driver that is not supported by WinPE, the driver should be copied to and included in the recovery media during creation. Once the image is mounted during the restoration, the driver can be installed onto the device via the **Synology Active Backup for Business Recovery Wizard > Load Drivers** after opening WinPE.

Since the WinPE version suggested in this Guide contains a broader hardware compatibility, this step is optional.

Install drivers

You can directly install the drivers into the WinPE operating system. If you do this, the specific drivers that you need will be ready in the operating system without manually loading them upon booting the recovery media.

Refer to Add and Remove Drivers to an offline Windows Image by Microsoft for more detailed commands regarding this installation:

// When installing a specific driver, you can add parameter /ForceUnsigned to allow unsigned drivers.

Dism.exe /Image: "C:\winpe\mount" /Add-Driver /Driver: "path-to-driver/driver-name.inf" // When installing all the drivers in the folder, you can add parameter /ForceUnsigned to allow unsigned drivers.

Dism.exe /Image: "C:\winpe\mount" /Add-Driver /Driver: "path-to-driver" /Recurse

Configure resolution

The default resolution of WinPE is 800×600. If you want to have higher resolution during restoration, the graphics card's driver is required. Without this, the resolution you configure can only be used to the extent that WinPE supports.

To change the resolution, add the file named **unattend.xml** under the directory **C:\ winpe\mount** via the following command:

```
<?xml version="1.0" encoding="utf-8"?>
<unattend xmlns="urn:schemas-microsoft-com:unattend">
<settings pass="windowsPE">
<component name="Microsoft-Windows-Setup">
processorArchitecture="amd64"
publicKeyToken= "31bf3855ad364e35" language="neutral"
versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi= "http://www.w3.org/2001/XMLSchema-instance">
<Display>
<ColorDepth>32</ColorDepth>
<HorizontalResolution>1024
<VerticalResolution>768</VerticalResolution>
<RefreshRate>60</RefreshRate>
<.Display>
<EnableNetwork>true</EnableNetwork>
<EnableFirewall>true</EnableFirewall>
</component>
</settings>
</unattend>
```

Configure language settings

WinPE for Windows 10 does not support downloading SDK for any language other than English.

If you want to use other languages for the user interface, you must install those languages' packs and fonts. You will also be required to configure the display language and the system local language.

If your architecture is **amd64**, configure the language settings through the **WinPE_OCs** file. We recommend you first copy this file to **C:\winpe** for a smoother process and to avoid accidental space errors.

Access the WinPE_OCs file via the following path:

C:\Program Files (x86)\Windows Kits\10\Assessment and Deployment Kit\Windows Preinstallation Environment\amd64\WinPE OCs

To configure language settings, follow the formats of the relevant commands:

// Install the Language packs for Traditional Chinese

Dism.exe /Image:"C:\winpe\mount" /Add-Package /PackagePath:"C:\winpe\WinPE_OCs\zhtw\lp.cab"

// Install the font

Dism.exe /Image: "C:\winpe\mount" /Add-

Package/PackagePath: "C:\winpe\WinPE_OCs\WinPE-FontSupport-ZH-TW.cab"

// Set the UI language to be Traditional Chinese

Dism.exe /Image: "C:\winpe\mount" /Set-UILang:zh-tw

// Set the regional language to be Traditional Chinese

Dism.exe /Image: "C:\winpe\mount" /Set-UserLocale:zh-tw

Add certificate to WinPE image

This section will show you how to add a root certificate to an WinPE image.

1. Mount the WinPE image to a temporary location on your computer with DISM. For example:

c:\path\to\mount

2. Import the offline registry hive to a temporary hive in your host registry:

reg load HKLM\OFFLINE c:\path\to\mount\Windows\System32\config\Software

3. Copy the root certificate key:

reg copy

 $\label{thm:local_machine} HKEY_LOCAL_MACHINE\Software\Microsoft\System\Certificates\AuthRoot\Certificates\ /Supplies\LOCAL_MACHINE\DESCRIPTION ACHINE\DESCRIPTION A$

/f

 $\label{local_machine} reg \ copy \ HKEY_LOCAL_MACHINE\Software\Microsoft\System\Certificates\CA\Certificates \\ HKEY_LOCAL_MACHINE\Microsoft\System\Certificates\CA\Certificates\/s\/f \\ reg \ copy \\$

 $\label{thm:local_machine} HKEY_LOCAL_MACHINE\Software\Microsoft\System\Certificates\ROOT\Certificates\ /s\ /f\ ACHINE\ACHINE\Microsoft\System\Certificates\ROOT\Certificates\ /s\ /f\ ACHINE\$

4. Remove the loaded registry:

reg unload HKLM\OFFLINE

5. The root certificate should now be added to the WinPE image.