

# Recovery Media Creation Guide



Based on

**Active Backup for Business 2.4.0**



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Got a problem and unable to find the solution in our official documentation? Search hundreds of answers by users and support staff in [Synology Community](#) or reach [Synology Support](#) through the web form, email or telephone.



# 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 to the device you intend to restore, as well as run the same Windows version and drivers. Manual recovery media creation is available for 32-bit systems, as well as devices that do not meet the conditions for creating automatic recovery media.

For Linux devices, instructions on how to create recovery media will also be 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 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 if the device intended to create the recovery media is running a 64-bit version of Windows and has the same language and region settings, as well as the same Windows versions and drivers as the device intended to be restored. If the device intended to be restored does not meet these conditions, refer to [Method 2: Manually Create Recovery Media](#) for more details.

Visit the [Synology Download Center](#) to download this tool and use it to create recovery media if all of the default settings do not need to be changed and no further customization is necessary. **Synology Active Backup for Business Recovery Wizard** does not need to be additionally installed as it is embedded in the **Synology Active Backup for Business Recovery Media Creator**. The following sections will guide you through how to use this tool.

## System Requirements and Supported Media Types

### System Requirements

- Windows 7 (all editions)
- Windows 10 (all editions)
- 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 **Synology Active Backup for Business Recovery Media Creator** and select **USB media**.



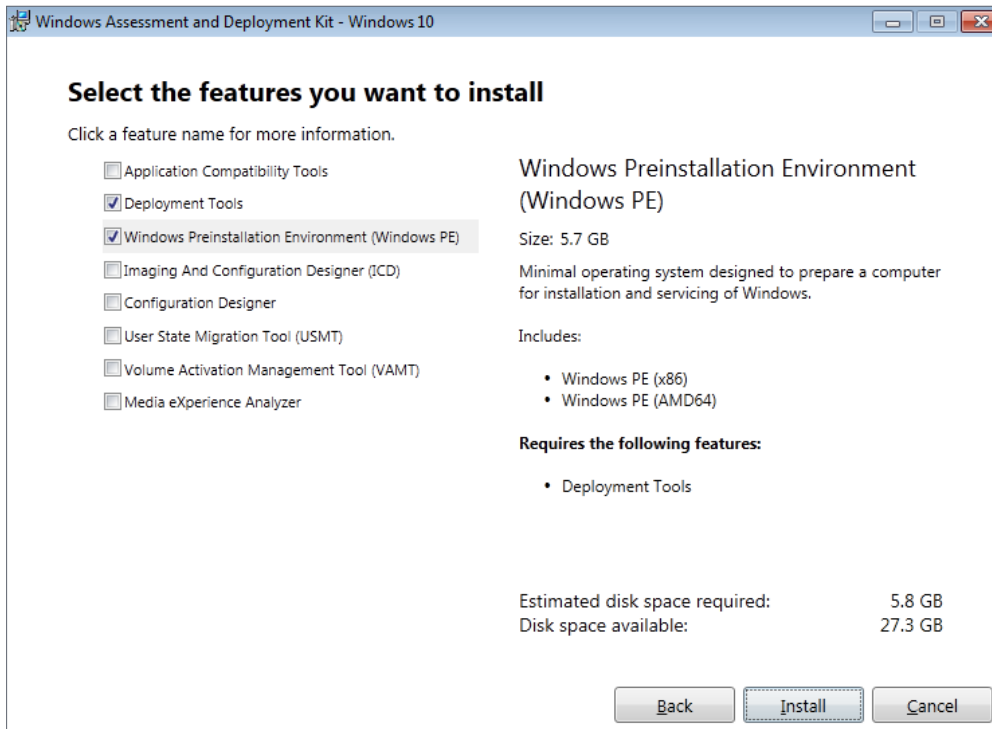
## Windows ADK Installation

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 image on the next page). Installing Windows ADK may take a few minutes. If you want to download the **Windows ADK** in advance, we recommend downloading version **1803**.

### 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, please refer to Microsoft's article, [Create bootable WinPE media](#).
- Internet connection must be available when downloading and installing Windows ADK. If you cannot use the online ADK installer, refer to Microsoft's article, [Install the Windows ADK offline](#).
- WinPE for Windows 10 (version 1803) is suggested for the download and installation through the Windows ADK. To check its compatibility with your device, you can refer to Microsoft's article, [What's New in Windows PE](#).



## Select the Target USB Drive

All of the detected USB drives will be listed in the drop-down menu on Synology Active Backup for Business Recovery Media Creator. Please select a target USB drive and then click **Create** to start the automated recovery media process. This action cannot be undone once the creation process of USB media has started.

## 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 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 the BIOS mode. This hotkey may vary according to different vendors.
4. Navigate to the **Boot** tab and prioritize the order of **Removable Devices** (for USB).
5. Exit the setup process and you will be directed to [Synology Active Backup for Business Recovery Wizard](#), which will start the recovery process automatically.

**Note:**

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

## Create ISO Recovery Media

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. Afterward, launch **Synology Active Backup for Business Recovery Media Creator** and select **ISO media**.



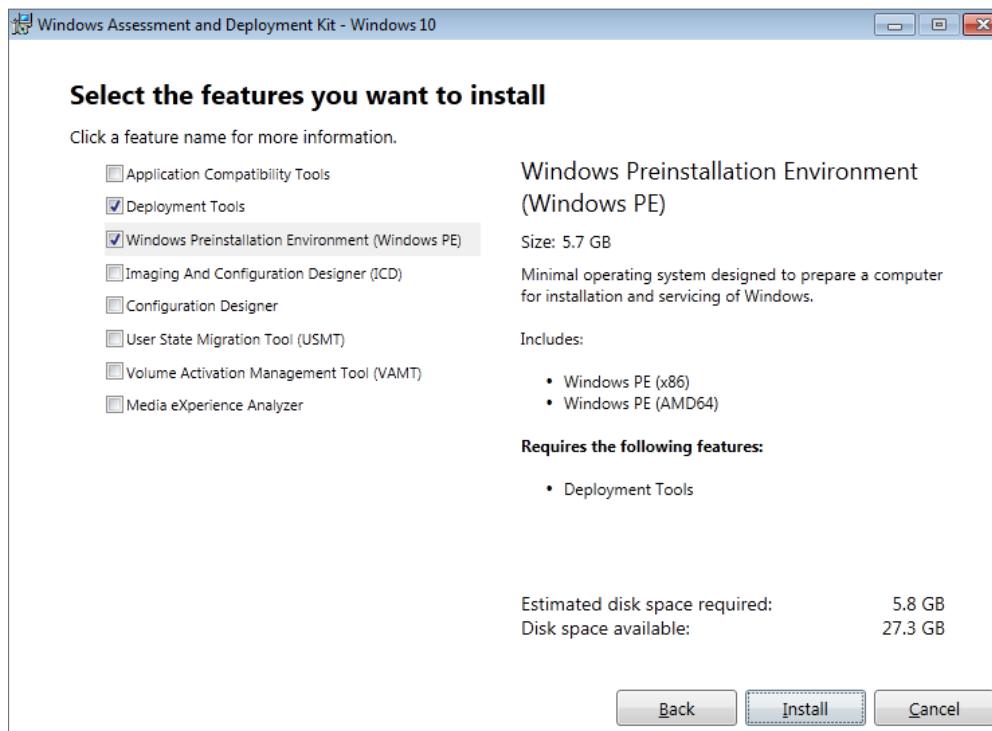
## Windows ADK Installation

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 the **Windows ADK** in advance, we recommend downloading version **1803**.


### 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, please refer to Microsoft's article, [Create bootable WinPE media](#).
- Internet connection must be available when downloading and installing Windows ADK. If you cannot use the online ADK installer, refer to Microsoft's article [Install the Windows ADK offline](#).
- WinPE for Windows 10 (version 1803) is suggested for the download and installation through the Windows ADK. To check its compatibility with your device, you can refer to Microsoft's article [What's New in Windows PE](#).





## Specify the ISO Image Path

To create ISO media, please define the directory for storing the recovery media once it is ready in ISO format. Click  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 the BIOS mode. This hotkey may vary according to different vendors.
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 [Synology Active Backup for Business Recovery Wizard](#), which will start the recovery process automatically.

**Note:**

**Synology Active Backup for Business Recovery Wizard** does not need to be additionally installed as it is embedded in **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. The cancellation process may take some time because of the time needed to unmount the mounted files and delete the unfinished pack. If the creation process fails at a certain stage, 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, please open the extracted folder named **Synology Restore Media Creator** and fetch the log titled **restore-media.log**. Send the log to Synology Technical Support for further assistance.

# Method 2: Manually Create Recovery Media

## Summary

Manual recovery media creation is the alternative method in the case that the device intended to create the 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 intended to restore. The following sections guide you through how to create recovery media manually.

## System Requirements and Limitations

### Prerequisite Environment

To manually create recovery media, a Windows 7 or above building environment with Internet connection is required. 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 **Synology Active Backup for Business Recovery Wizard**, which allows you to restore your device to the pre-installation environment.

To obtain the Windows PE, please download and install the **Windows Assessment and Deployment Kit (Windows ADK)** from Microsoft Windows. Please refer to the section [Download and Install the Windows ADK](#) for more information.

**Notes:**

- Recovery media based on WinPE 3.0 or above enables dynamic loading of the necessary device drivers. We recommend you to 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, please refer to Microsoft's article [What's New in Windows PE](#) for more information.
- Recovery media can be built either for x86 or x64 architecture. 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 the partition style when setting up Windows, please refer to the article by Microsoft, [Windows Setup: Installing using the MBR or GPT partition style](#).
- Internet connection must be available when downloading and installing Windows ADK. If you cannot use the online ADK installer with GUI, please refer to the Microsoft' article, [Install the Windows ADK offline](#), for more information.

## Administrative Permissions

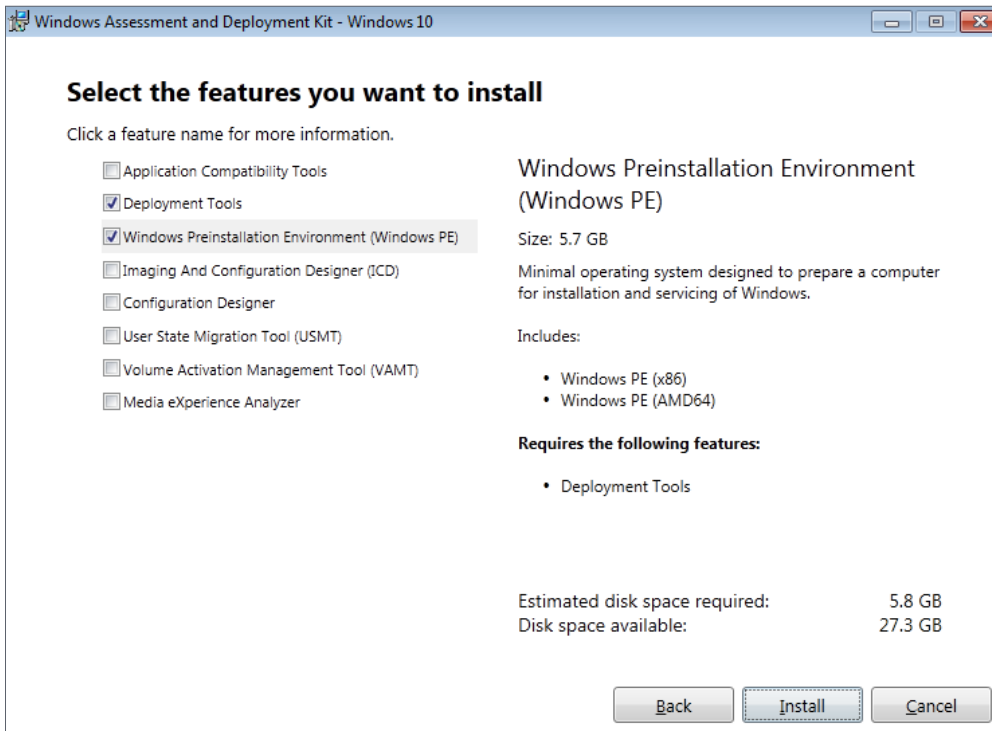
The entire process of creating recovery media requires users with local administrative permissions to use the command-line interface (CLI). Right-click on the CLI icon and choose **Run as administrator** to begin.

## 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](#)

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

**Notes:**

- Starting with Windows 10 (version 1809), **Windows Preinstallation Environment (Windows PE)** is released separately from the Windows ADK. To create recovery media, both the Windows ADK and WinPE packs need to be downloaded and installed. For more information, please refer to Microsoft's article, [Create bootable WinPE media](#).
- An Internet connection must be available when downloading and installing the Windows ADK. If you cannot use the online ADK installer, refer to Microsoft's article [Install the Windows ADK offline](#).
- WinPE for Windows 10 (version 1803) is the recommended version to be downloaded and installed through the Windows ADK. To check its compatibility with your device, you can refer to Microsoft's article, [What's New in Windows PE](#).

**Copy Required Boot Files to WinPE**

1. Right-click the CLI icon and select **Run as administrator** to begin.
2. Change the file directory by the command in this step. 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
```

## Method 2: Manually Create Recovery Media

- Copy WinPE to this designated path. Here, we use the path `C:\winpe` for example, displayed below:

```
copyype.cmd amd64 C:\winpe
```

Please note that `amd64` will build the media required for the 64-bit WinPE. `amd64` is used as the example here because it is the mainstream hardware architecture. If you want to create recovery media for a 32-bit device, the `amd64` in the example command should be changed to `x86`.

- 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](#) for details.

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

### Note:

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 Synology Active Backup for Business Recovery Wizard. The command for mounting **boot.wim** is shown below:

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

### Note:

If certain hardware require a specific driver that is not supported by WinPE, the driver needs to be copied or included in the media during the creation process. Refer to [Copy Drivers](#) and [Install Drivers](#) for more information.

## Download Synology Active Backup for Business Recovery Wizard

The latest version of **Synology Active Backup for Business Recovery Wizard** can be downloaded from the [Download Center](#). Please download the 64-bit zip file if you had entered `amd64`, and download 32-bit zip file if you had entered `x86`.

We recommend that you 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, and may affect the backup time of the recovery media version shown in **Synology Active Backup for Business Recovery Wizard**. You can change the time zone within the quotation marks according to your needs. Please check the time zone names on the list from Microsoft, [Default Time Zones](#).

### //Set the time zone to your local time zone

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

## Configure "winpehl.ini"

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

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

```
[LaunchApps]
%systemroot%\System32\wpeinit.exe
%systemdrive%\ActiveBackup\ui\recovery.exe
```

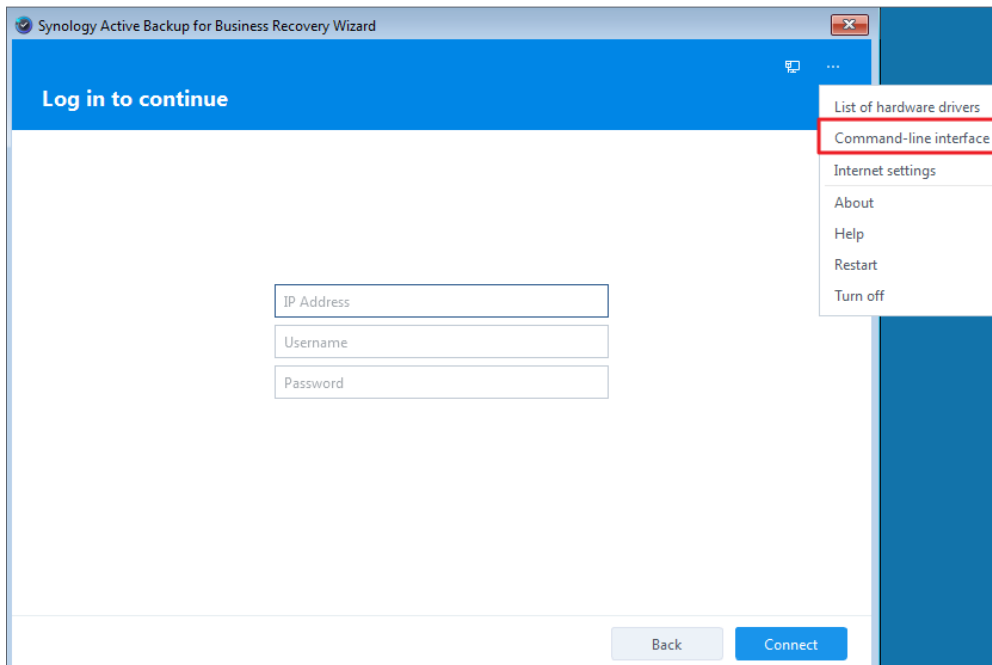
### Note:

If resolution and language configurations are required, please refer to the [Configure Resolution](#) and [Configure Language Settings](#) sections for more information.

## Set up 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:**
  - a. Copy **PE Network.exe** to the Recovery Wizard during manual recovery media creation.
  - b. Open the **Command-line interface** in the **Recovery Wizard** and execute `PENetwork.exe`.
  - c. Select the wireless connection interface and the connection point, then enter its credentials.

Once you have successfully connected to the 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 VM or burn the ISO image to CD/DVD or flash drive with a third-party tool for future recovery. Enter the command below 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 PC supports 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 Microsoft's article, [Boot in UEFI or legacy BIOS mode](#), for more information.
3. Enter the following commands in sequence according to your partition table type. Please note that the commands in bold should be changed according to your needs.

#### GPT

Step Description	Command
1. Launch the disk partition tool	diskpart
2. List all the disks on the device	list disk
3. Select which disk needs to be cleaned in the next step	select disk <b>2</b>
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 primary
7. Select the first partition	select partition 1
8. Format the USB's file system to FAT32 and name the USB	format quick fs=fat32 label="WinPE"
9. Assign the drive letter for the USB	assign letter=" <b>S</b> "
10. Specify that the partition is required by the device, and prevent assigning drive letter automatically on another device	gpt attributes=0x8000000000000001
11. Exit	exit



## MBR

Step Description	Command
1. Launch the disk partition tool	diskpart
2. List all the disks on the device	list disk
3. Select which disk needs to be cleaned in the next step	select disk <b>2</b>
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="WinPE"
10. Assign the drive letter for the USB	assign letter=" <b>S</b> "
11. Exit	exit

### Note:

The command in bold should be changed according to your needs. For example, "select disk **2**" should be changed to the corresponding disk number for your media.

- Enter the command below to copy the customized WinPE file to the USB drive. Please note that the underlined command should be changed according to your requirement. For example, the S in the sample command could be changed to your assigned letter.

```
xcopy.exe c:\winpe\media /E /F S:\
```

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

Preboot eXecution Environment (PXE) supports booting WinPE loaded from PXE server via Internet connection. You need to configure a DHCP, PXE, and TFTP server to set your Synology NAS as a PXE server. This section guides you through configuring DHCP, PXE, and TFTP 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 tick the **Enable SMB service** checkbox.
- 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
```

## Method 2: Manually Create Recovery Media

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

```
// 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} ramdiskdevice boot
bcdedit /store c:\BCD /set {ramdiskoptions} ramdiskpath \Boot\boot.
sdi
bcdedit /store c:\BCD /create /d "winpe boot image" /application
osloader

// 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" when done.

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

11. Sign in to your **DSM**, go to **Control Panel > File Services**, and tick **Enable TFTP service**. Select the PXE shared folder as the **TFTP root folder**.

12. Enable **DHCP server** from **Control Panel > DHCP Server > Network Interface**.

13. Enable **PXE** from **Control Panel > DHCP Server > PXE** and configure the boot loader. Select `bootx64.efi` and click **OK**.

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.

## 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 Internet connection. You need to configure a DHCP, PXE, and TFTP server to set your Synology NAS as a PXE server. This section guides you through configuring DHCP, PXE, and TFTP on your Synology NAS.

### UEFI

1. 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 tick the **Enable SMB service** checkbox.
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\*.ttf y:\EFI\Microsoft\Boot\Fonts
```

## Method 2: Manually Create Recovery Media

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

```
// 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} ramdiskdevice boot
bcdedit /store c:\BCD /set {ramdiskoptions} ramdiskpath \Boot\boot.
sdi
bcdedit /store c:\BCD /create /d "winpe boot image" /application
osloader

// 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
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 '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.efi
```

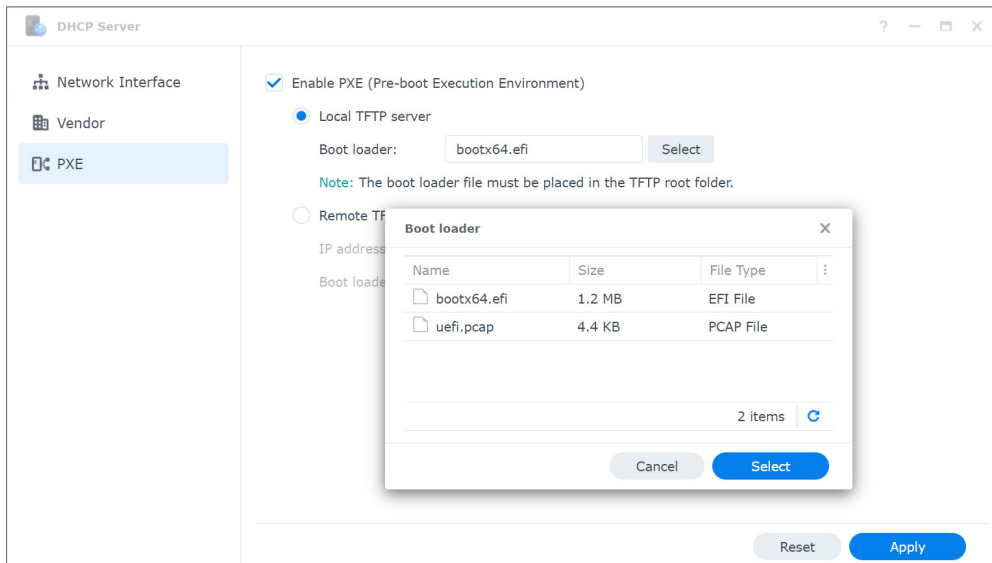
9. Unmount "boot.wim" when done.

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

10. Sign in to your **DSM**, go to **Control Panel > File Services > Advanced > TFTP**, and tick the **Enable TFTP service** checkbox. 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

1. 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 tick the **Enable SMB service** checkbox.
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
```

## Method 2: Manually Create Recovery Media

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 commands below.

```
// 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} ramdiskdevice boot
bcdedit /store c:\BCD /set {ramdiskoptions} ramdiskpath \Boot\boot.sdi
bcdedit /store c:\BCD /create /d "winpe boot image" /application
osloader

// 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" when done.

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

11. Sign in to your **DSM**, go to **Control Panel > File Services > Advanced > TFTP**, and tick the **Enable TFTP service** checkbox. 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 intended for restoration, press **F2** to enter the BIOS mode once your device has been rebooted. Please note that this hotkey may vary according to different vendors. Afterwards, navigate to the **Boot** tab, and prioritize the order of **CD-ROM Drive** and **Removable Devices** according to 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 start the recovery process automatically.



# 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.

Synology Active Backup for Business recovery media for Linux is implemented by using ISO images, which can also be burned to your 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)**.

For instructions on how to create a bootable USB recovery drive for your Linux device with ISO burning software, Legacy BIOS, and for UEFI, you can refer to [this tutorial](#).

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 via the following methods.

### 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:

- If WinRE exists in the system: `Windows RE status: Enabled`
- If WinRE does not exist in the system: `Windows RE status: Disabled`

If WinRE doesn't exist in the system, then you need to [get WinRE from the OS installation disc](#).

3. Stop running WinRE:

```
reagentc /disable
```

4. Generate the WinRE image at specific location:

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

### From a Windows installation disc

To get WinRE from a Windows installation disc, refer to [Customize Windows RE](#) for instructions.

## Copy Drivers

If your hardware requires a specific driver that is not supported by WinPE, the driver should be copied to and included into the recovery media when creating the media. Once the image is mounted during the restoration, the driver can be installed onto the device by clicking **Synology Active Backup for Business Recovery Wizard > Load Drivers** after opening WinPE. Because 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. You can refer to the article [Add and Remove Drivers to an offline Windows Image](#) 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 800x600. If you want to have higher resolution during restoration, the graphics card's driver is required. Without this, the resolution you have configured would be available only according to the extent supported by the WinPE.

To change the resolution, please add the file named "unattend.xml" under the directory `C:\winpe\mount\` with 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</HorizontalResolution>
<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 a language other than **English**.

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

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

Access the **WinPE\_OCs** file through the following path:

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

To configure the language settings, please follow the formats for relevant commands shown below:

```
// Install the Language packs for Traditional Chinese
Dism.exe /Image:"C:\winpe\mount" /Add-Package /PackagePath:"C:\winpe\
WinPE_OCs\zh-tw\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 guide you through adding root certificate to an WinPE image.

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

```
c:\path\to\mount
```

6. 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
```

## Create Recovery Media for a Linux Device

7. Copy the root certificate key.

```
reg copy HKEY_LOCAL_MACHINE\Software\Microsoft\SystemCertificates\
AuthRoot\Certificates HKEY_LOCAL_MACHINE\OFFLINE\Microsoft\
SystemCertificates\AuthRoot\Certificates /s /f

reg copy HKEY_LOCAL_MACHINE\Software\Microsoft\SystemCertificates\CA\
Certificates HKEY_LOCAL_MACHINE\OFFLINE\Microsoft\SystemCertificates\CA\
Certificates /s /f

reg copy HKEY_LOCAL_MACHINE\Software\Microsoft\SystemCertificates\ROOT\
Certificates HKEY_LOCAL_MACHINE\OFFLINE\Microsoft\SystemCertificates\
ROOT\Certificates /s /f
```

8. Remove the registry that you have loaded.

```
reg unload HKLM\OFFLINE
```

9. Now, the root certificate has been added to the WinPE image.



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