Lab - Boot Methods (Instructor Version)

**Instructor Note**: Red font color or gray highlights indicate text that appears in the instructor copy only.

# Objectives

In this activity, you will investigate some of the available Windows installation boot methods and boot into another operating system using a bootable USB flash or optical media.

Part 1: Research Boot Methods

Part 2: Access BIOS / UEFI

Part 3: Use a bootable USB media

# Background / Scenario

The most common method to install an operating system on a new computer requires bootable media, such as DVD or USB. In this lab, you will investigate different ways to install windows: with and without bootable media.

To change the boot order on your system, you will need to access Unified Extensible Firmware Interface (UEFI) or the legacy Basic Input Output System (BIOS).

UEFI is the software that is designed to replace the legacy Basic Input Output System (BIOS). The UEFI comes with additional benefits, such as improved security, faster boot times, and large capacity hard drive support.

The Basic Input Output System (BIOS) is the low-level software that is located on one of the chips of the motherboard. The BIOS is responsible for essential functions, such as booting and keyboard control. The BIOS also configures the hard drive, CPU and memory and other related equipment.

# Required Resources

* Internet access
* A computer where the BIOS or UEFI is accessible
* A USB flash drive with a minimum of 8 GB

# Instructions

## Research Boot Methods

A few of the available boot methods are USB optical media, USB flash media, and Preboot Execution Environment (PXE) network and internet-based, hard drive partition. In this part, you will review the process to create a bootable USB and optical media, use a network boot, and boot from a hard drive partition.

Perform an internet search to answer the following questions.

#### Questions:

Bootable USB and optical Media

What is the process to create a bootable USB or optical media?

Type your answers here.

For Windows, you will need to download or purchase a copy of the Windows operating system from a authorized source, such as the Microsoft website. At the Microsoft website, tools and directions are provided to create a bootable media to install Windows on your current PC or a different PC. For the other operating systems, such as Ubuntu Linux, you can download the OS from the Ubuntu website and write the OS onto a USB or optical media and make sure it is set to be bootable.

PXE and Internet-Based Boot

PXE boot is a process where the device boots from its NIC.

#### Questions:

Where would you use PXE boot?

Type your answers here.

PXE boot is usually used in a data center infrastructure environment to deploy software.

What are the components required for a PXE boot?

Type your answers here.

On the client side, the PC must have a partition on a hard drive to store temporary files and a PXE-capable NIC that supports Wake-on-LAN mode connected to the same wired network. The PXE boot server requires DHCP services to provide clients with IP network configuration to join the network and PXE configurations or direct the client PC to a server with the necessary boot files.

What are the advantages and disadvantages of using PXE boot?

Type your answers here.

Answers will vary. For example, PXE boot can simplify the deployment process by automating the maintenance and installation of multiple systems over the network without inserting optical or flash media into each system. With PXE boot, the client system does not require an operating system on the hard disk. In the event of hardware or software failure, this allows the administrator to troubleshoot the issue and fix the problem. However, it takes technical knowledge to deploy a PXE server.

What is an Internet-Based Boot?

Type your answers here.

Internet-Based boot is similar to PXE boot. The installation server is located on the internet. The local DHCP server supplies the DNS name of installation server, similar to downloading updates and additional packages.

Hard Drive Partition

After the operating system has been successfully installed on a hard drive partition, the bootable hard drive partition should be configured as the default boot device.

#### Question:

Under what circumstances would you boot to another internal hard drive partition?

Type your answers here.

Answers may vary. You may want to boot the recovery partition to restore the operating system to factory defaults or troubleshoot issues. The system may have multiple operating systems installed on different partitions, such as Windows and Linux.

## Access BIOS / UEFI

BIOS / UEFI firmware allows you to change the advanced settings. Within the BIOS / UEFI firmware, you can change the boot order. There are two ways to access BIOS / UEFI: settings or boot keys. You should only access the BOS / UEFI when necessary.

**Note**: Be careful when accessing motherboard firmware. Incorrect firmware settings can prevent your computer from starting.

### Enter BIOS / UEFI using boot key options

You could use the boot key sequence to access the motherboard firmware settings if you have an older device that uses legacy BIOS or no access to Windows 10 computer.

* + - 1. Restart the computer if you have access to a computer.
      2. When the splash screen displays, press the key combination. Press the required key combination until you enter setup mode. The key combination usually consists of ESC, Delete or one of the Function keys, such as F12.

#### Question:

What is the key sequence you used to access the motherboard firmware?

Type your answers here.

Here are some computer brands and their respective keys to access the motherboard firmware:

Dell: F2 or F12.

HP: ESC or F10.

Acer: F2 or Delete.

ASUS: F2 or Delete.

Lenovo: F1 or F2.

MSI: Delete.

Toshiba: F2.

Samsung: F2.

Surface: Press and hold volume up button.

* + - 1. If the boot process finished too quickly, restart the device again and press the same key sequence again until you have successfully entered the firmware settings.

#### Question:

List the devices that are available to boot from:

Type your answers here.

Answers will vary. USB optical media, USB flash media, and Network (PXE) are some of the examples.

### Enter UEFI using Windows settings

If you have access to a Windows 10 or later computer, you may be able to access UEFI via Windows settings.

* + - 1. Click **Start** and navigate to **Settings**.
      2. Click **Update & Security**.
      3. Click **Recovery**.
      4. Under the **Advanced startup** heading, click **Restart now**.

**Note**: The following steps are shown as an example. Your menu items may be different.

* + - 1. Click **Use a device**.

#### Question:

List some of the devices that are available to boot from:

Type your answers here.

Answers will vary. USB optical and flash media, NVMe, network (PXE) and cloud boot, or hard drive are some of the examples.

* + - 1. Navigate back to **Choose an option** so you can click **Continue** to exit and return to Windows.

## Use a bootable USB media

In this example, you create a bootable USB media using the media creation tool from Microsoft.

### Create a bootable USB media.

**Note**: You will not be installing Windows on the PC in this activity.

* + - 1. Navigate to the Microsoft website to download a Windows 10 image using an internet search. Use keywords, such as **download Windows 10**.
      2. At the time of writing, under the **Create Windows 10 installation media**, click **Download Now** to download the Media Creation Tool.
      3. Open the Media Creation Tool.
      4. In the setup wizard, accept the license and click **Next**.
      5. Select **Create installation media (USB flash drive, DVD, or ISO file) for another PC**. Click **Next**.
      6. Select the correct language, architecture, and edition as needed. Click **Next**.
      7. Choose USB flash drive and insert a USB drive with at least 8GB capacity. Note that the drive will be erased. All the data currently on the drive will be erased. Click **Next**.
      8. Select the desired drive and click **Next** to start the download.
      9. Click **Finish** when the file is finished downloading.

#### Question:

What other media can you use to create a bootable media? Which boot device should be used to boot into this media?

Type your answers here.

A blank DVD can be used instead of a USB flash drive. An ISO image is downloaded and burned onto a DVD drive. The boot device should be set to boot into an internal or USB DVD drive.

### Boot using bootable USB media.

* + - 1. With the USB flash media still available on the PC, navigate back to Windows, click **Start** > **Settings** > **Update & Security** > **Advanced startup** > **Restart now**. In the Choose an option screen, select **Use a device**. Select **USB HDD** or the appropriate bootable device.

**Note**: If UEFI is not available or you are unable to select the desired boot device, restart Windows and enter the BIOS setting to change the boot order. Review your answers in the previous part of this activity for the key options to enter BIOS settings to change the boot order.

* + - 1. Now you should be in Windows 10 setup screen. This confirms that the PC has started up using the bootable USB drive. **DO NOT** click Next.
      2. Exit the Windows installation by closing the setup window. Click **Yes** to confirm to cancel Windows installation.
      3. During reboot, remove the USB drive and continue to boot to Windows.
      4. Restore the boot order as configured prior to this activity.

#### Question:

Now that you have a Windows image on a bootable media. What can you do with Windows image?

Type your answers here.

Answers will vary. You can use it to perform a clean installation or reinstall Windows 10.

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