



Module 1 - Operating Systems Windows

Session 1 - Installing Windows

Presented by Tim Medin

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YOUR GATEWAY TO CYBERSECURITY SKILLS AND CAREERS

Welcome to Cyber Aces Online, Module 1! A firm understanding of operating systems is essential to being able to secure or attack one. This module dives in to Microsoft Windows Operating System.

SANS CYBER ACES ONLINE TUTORIALS

YOUR GATEWAY TO CYBERSECURITY SKILLS AND CAREERS

1. Introduction to Operating Systems

- 01. Linux
- 02. Windows

2. Networking

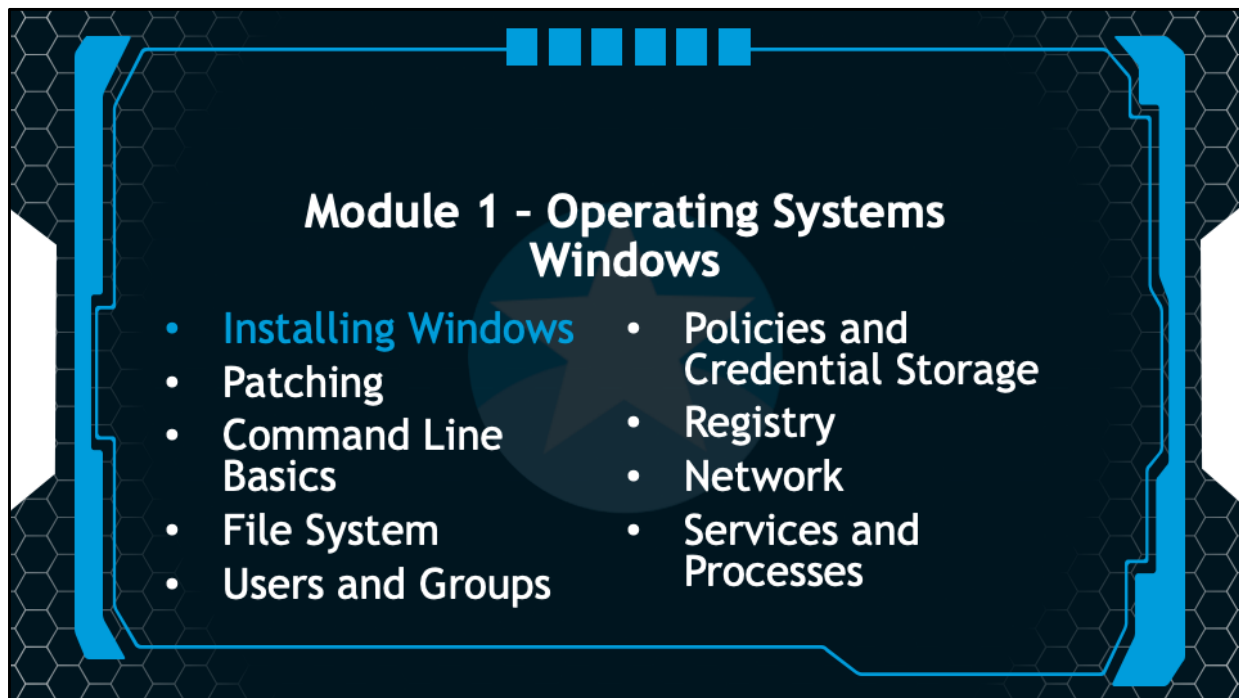
3. System Administration

- 01. Bash
- 02. PowerShell
- 03. Python

This training material was originally developed to help students, teachers, and mentors prepare for the Cyber Aces Online Competition. This module focuses on the basics of what an operating systems is as well as the two predominant OS's, Windows and Linux. This session is part of Module 1, Introduction to Operating Systems. This module is split into two sections, Linux and Windows. In this session, we will begin our examination of Windows.

The three modules of Cyber Aces Online are Operating Systems, Networking, and System Administration.

For more information about the Cyber Aces program, please visit the Cyber Aces website at <https://CyberAces.org/>.



This module focuses on the basics of what an operating systems is as well as the two predominant OS's, Windows and Linux. In this session we will provide a walkthrough of the installation a Windows VM using VMware Fusion (OS X/Mac) and VMware Player (Windows & Linux). These sessions include hands-on labs, but before we begin those labs we need to install the operating systems used in those labs. We will be using VMware to virtualize these operating systems. You can use other virtualization technologies if you like, but instruction for their setup and use are not included in this training.



Introduction to Windows®



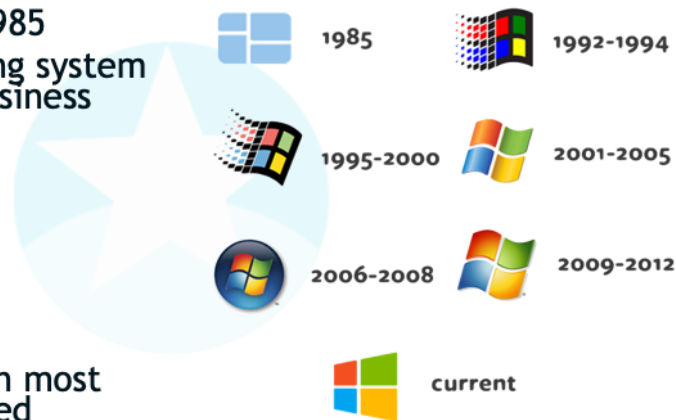
Initially released in 1985

The standard operating system
for both home and business
applications

Runs on:

- Servers
- Desktops
- Laptops
- Mobile Devices
- Embedded Devices

Installed by default on most
manufacturer-produced
computers



Windows refers to a series of operating systems developed by Microsoft Corporation. Since its initial release in 1985, Windows has become the de facto operating system for personal computers in both home and business applications. Windows operating systems also exist for servers, mobile devices, and embedded devices. Recent, well-known releases for personal computers include Windows 7, 8, and 8.1, and Windows 10. Chances are that you are already running Windows and are familiar with how to use it, as the operating system is installed by default on most manufacturer-produced computers.

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Microsoft Windows OS Family



Server
Workstation
IoT
Mobile (depracated)



The exercises will use Windows 10 Enterprise
Next, you will create a Windows 10 Enterprise Virtual Machine

The Windows line of operating systems takes many forms and is not confined to solely personal computers. For instance, the Windows Server branch is produced to provide services such as Web, Database, Email, File and Print services and more. The IoT edition is produced for low-cost, lightly powered devices and IoT (Internet of Things) scenarios. Each edition is designed to address the needs of and provide effective support for its respective target market; this may even take the form of an entirely new kernel being developed with special specifications.

Windows 10 is the currently-supported Workstation versions of the operating system. The "workstation" family of OSes has been further broken down to target business customers and classes of home consumers. Editions of Windows 10 include Home, Pro, Enterprise, and Education.

This course will focus on the use of Windows 10 Enterprise. Some of the security features and tools are not available on home versions of Windows. In a corporate enterprise, Windows Server and Active Directory introduce several additional security features that we will not discuss here such as Group Policies and Trust Models.



Exercise Building a Windows 10 VM



We will be creating a Virtual Machine (VM) using Microsoft Windows 10 Enterprise

- This is the same software used by the majority of enterprises
- This is an evaluation copy, and access to it will expire; at this time Microsoft gives you 90 days
- If it expires, build a new VM; you do NOT need to purchase a license for this training
- **NOTE:** Downloading Windows 10 ISO can take a long time, so make sure you have enough time to complete the download

Steps

- Download software - this step can take a long time!
- Create a new VM
- Install Windows 10 Enterprise
- Patch the guest operating system - this step can take a while!

We will have hands-on exercises throughout the training. The hands-on training is intended to compliment the topics learned throughout this training. You are highly encouraged to follow along so that you can get the most out of this training.

We will be using an evaluation version of Windows 10 Enterprise. This is the same software used by the vast majority of organizations. Since this is an evaluation version, it will expire after 90 days. It is fully functional for the 90 days, but at the end of that time you will no longer be able to use the VM. If you need to use the OS after that date, simply follow these directions again to build a new VM with a new 90 days.

NOTE: Microsoft Windows is owned and licensed by Microsoft, any changes to the availability of the ISO or changes to the licensing and or evaluation period is completely up to Microsoft and is out of control of Cyber Aces. We will keep you informed of any changes as promptly as possible.

There are four steps in this exercise. We will first download the software (.ISO file). This step can take a long time and will require a download of over 4GB. Make sure you set aside enough time to complete this download.

Next, we'll create the VM, then install Microsoft Windows 10 Enterprise. We will wrap up this exercise by patching the operating system. This step can also take a long time.



Downloading the Windows 10 Enterprise Evaluation



Licensing restrictions prevent Cyber Aces and SANS from directly providing the software; you will need to download it from Microsoft yourself

Microsoft offers some of their software for free evaluation

To begin the download browse to:

<https://www.microsoft.com/en-us/evalcenter/evaluate-windows-10-enterprise>

Select "ISO - Enterprise" and click "Continue"

Provide your contact information

Select 32 or 64 bit

Select your desired language

Then, click the "Download" button

Please select your evaluation file type:

☒ ISO - Enterprise

☐ ISO - LTSC

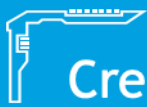
Continue

Due to licensing restrictions, Cyber Aces and SANS do not have permission to directly provide you with an existing and pre-built Windows VM. You will be creating the virtual machine yourselves by downloading and installing an evaluation copy of Windows 8.1 Professional inside of a virtual machine.

Begin by browsing to <https://www.microsoft.com/en-us/evalcenter/evaluate-windows-10-enterprise>. Select "ISO - Enterprise" from the menu near the top, and then click "Continue". Provide your contact information on the following screen and click "Continue". Select the 32 or 64 bit radio button, select your desired language from the dropdown menu, and click "Download".



The following steps are for installation on Windows. MacOS users, please skip ahead to the MacOS installation instructions.



Creating the VM



The setup instructions using VMware Player are significantly different from the instructions using VMware Fusion

OS X users using VMware Fusion should skip ahead to the page titled "Create the VM with Fusion"

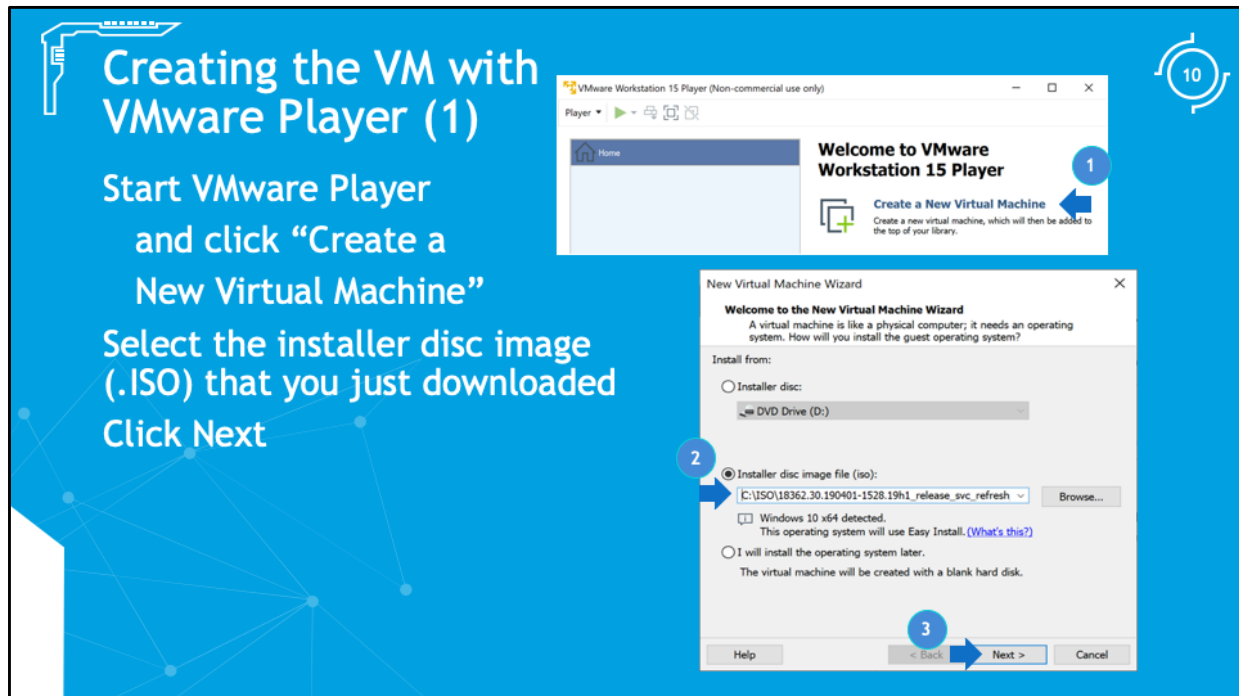
Windows and Linux users using VMware Player should continue to the next page

The instructions for creating a VM in VMware Player are significantly different from the instructions for creating a VM in VMware Fusion.

Attention Mac Users: The instructions for installation via VMware Fusion are very different from the instructions using VMware Player. Please skip ahead to the page title "Create the VM with Fusion"

If you are using VMware Player in Windows or Linux, continue to the next page.

If you are using another virtualization product beside VMware Player or VMware Fusion you will need to create the VM now. Instructions for creation of the VM using other products is not included in this training as there are simply too many variations.



Start VMware Player and click on the "Create a New Virtual Machine" button. This will allow us to configure the options for our new Windows 10 VM.

Select the "Installer disc image file (iso)" option, click the "Browse" button, and select the .ISO file that you just downloaded.

Creating the VM with VMware Player (2)

1. Select Windows 10 Enterprise from the dropdown menu
2. Enter the username "student" name and enter a password of your choice (twice)
3. Click Next
4. Click Yes

The screenshot shows the 'New Virtual Machine Wizard' in VMware Workstation 15 Player. The 'Easy Install Information' section is active. The 'Version of Windows to install' dropdown is set to 'Windows 10 Enterprise' (indicated by a blue circle 1). The 'Full name' field contains 'student' (indicated by a blue circle 2). The 'Password' and 'Confirm' fields are empty. The 'Next >' button is highlighted with a blue circle 3. A second dialog box titled 'VMware Workstation 15 Player' is shown on the right, asking 'You did not enter a Windows product key. Windows will install without one, but must be manually activated later. Would you like to continue?' with 'Yes' and 'No' buttons. The 'Yes' button is highlighted with a blue circle 4.

On the next configuration page, Select "Windows 10 Enterprise" from the dropdown. Enter your name in the "Full Name" field, and enter a password and confirmation password (if desired). Click Next.

Click Yes on the next screen to confirm you want to proceed without entering a license key.

Creating the VM with VMware Player (3)

Name the Virtual Machine
Select a save location
Click Next

On the "Specify Disk Capacity" screen, use Microsoft's recommended minimum of 20GB
Click Next

New Virtual Machine Wizard

Name the Virtual Machine
What name would you like to use for this virtual machine?

Virtual machine name:
Cyber Aces Windows 10

Location:
C:\Users\someuser\Desktop

< Back Next >

New Virtual Machine Wizard

Specify Disk Capacity
How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB): 20

Recommended size for Windows 10 x64: 60 GB

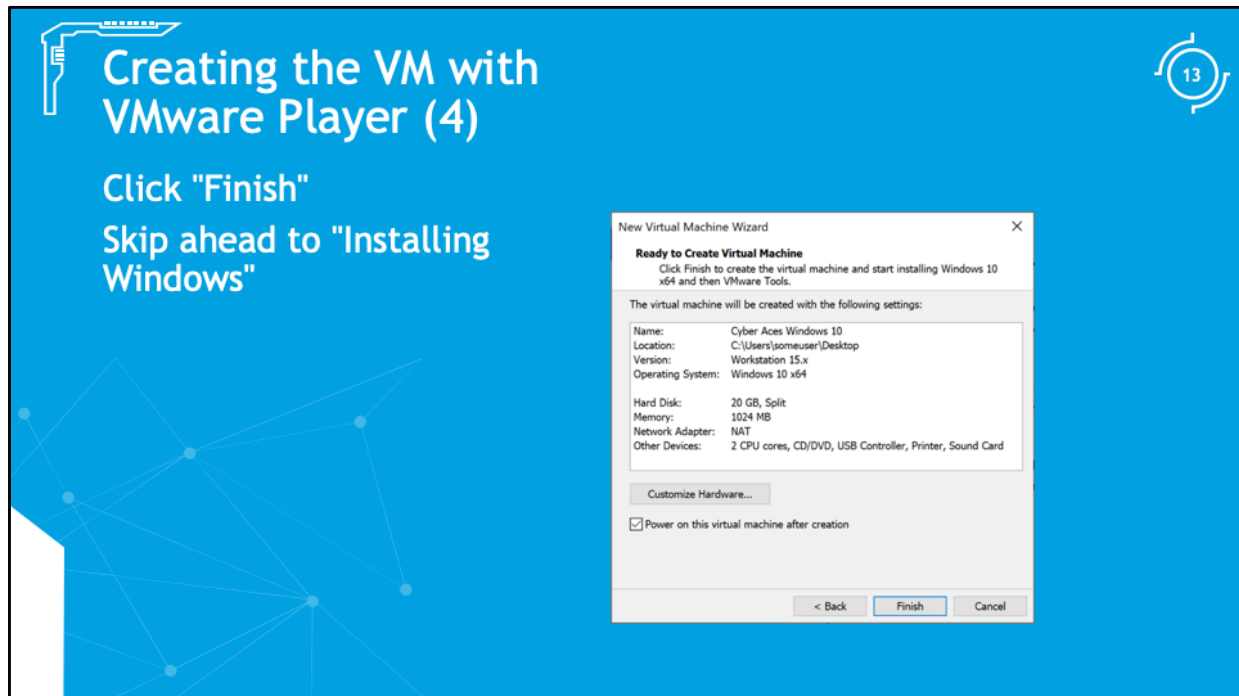
☐ Store virtual disk as a single file
☒ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help < Back Next >

On the next configuration page, select "Microsoft Windows" as the Guest operating system and "Windows 10" as the operating system Version. If you are using an older version of Player or Workstation, you may not have "Windows 10" as a version option. In this case, choose the newest client version of Windows available in the dropdown (Windows 7, Window 8). Click Next.

Name the Virtual Machine "Cyber Aces Windows 10" and choose a location that you will remember and be able to easily access. Click Next.



After you click "Finish" you have completed the creation of the VM. You can now begin installing Windows. Skip ahead to the the page titled "Installing Windows".



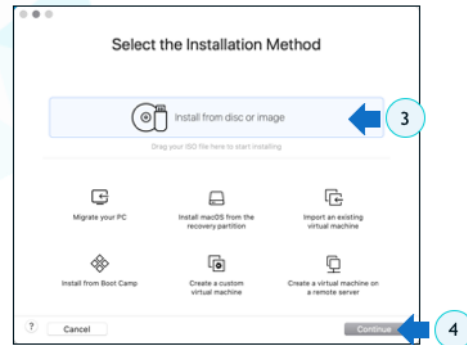
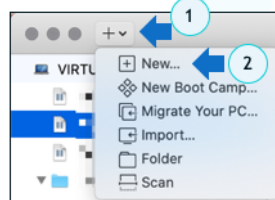
The following steps are for installation on MacOS.



Creating the VM with Fusion (1)



1. Click the +
2. Click "New..."
3. Click "Install from disc or image"
4. Click "Continue"



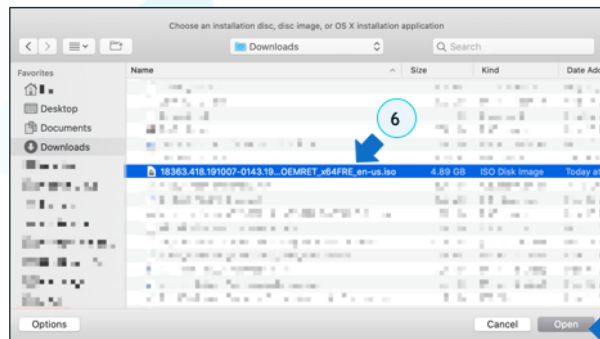
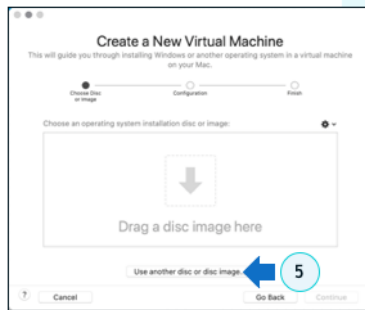
Follow these steps to create a new Virtual machine in Fusion on MacOS.

1. Click the +
2. Click "New..."
3. Click "Install from disc or image"
4. Click "Continue"



Creating the VM with Fusion (2)

5. Click "Use another disc or disc image..."
6. Select the .iso file you just downloaded
7. Click Open



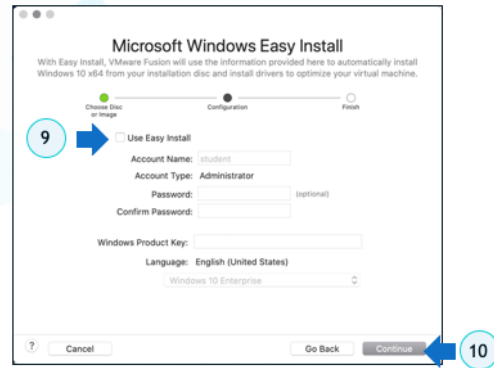
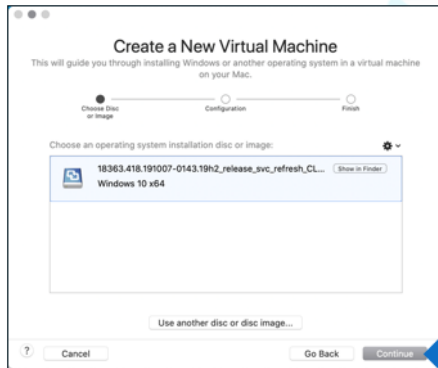
5. Click "Use another disc or disc image..."
6. Select the .iso file you just downloaded
7. Click Open



Creating the VM with Fusion (3)



8. Click "Continue"
9. Uncheck "Use Easy Install"
10. Click "Continue"



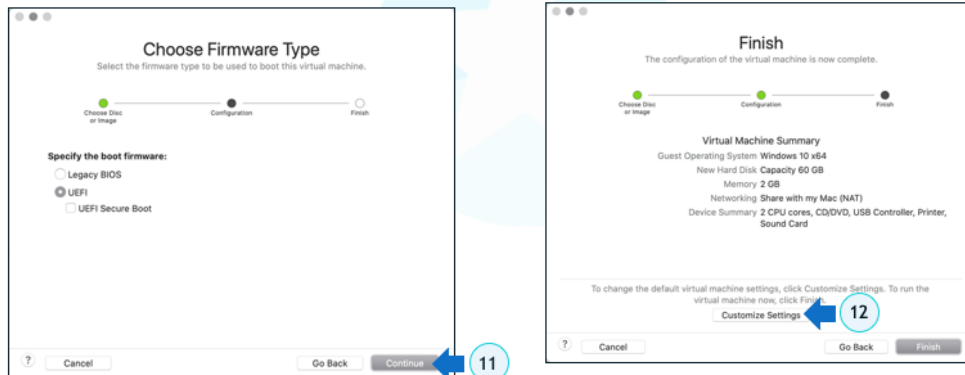
8. Click "Continue"
9. Uncheck "Use Easy Install"
10. Click "Continue"



Creating the VM with Fusion (4)



11. Click "Continue" (again)
12. Click "Customize Settings"



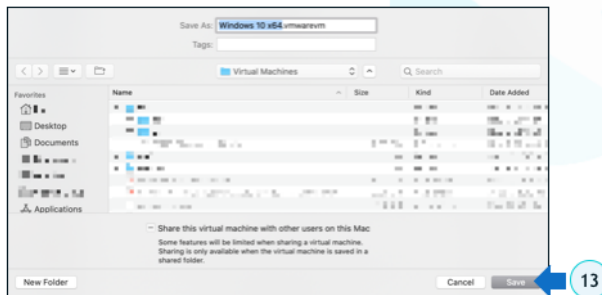
11. Click "Continue" (again)
12. Click "Customize Settings"



Creating the VM with Fusion (5)

13. Name the file (default name is fine) and click "Save"

14. Click "Hard Disk (SCSI)"



13. Name the file (default name is fine) and click "Save"

14. Click "Hard Disk (SCSI)"



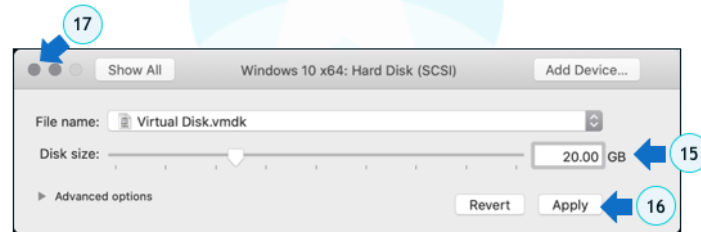
Creating the VM with Fusion (6)



15. Change the "Disk size" to "20.00" GB

16. Click "Apply"

17. Close the window



15. Change the "Disk size" to "20.00" GB

16. Click "Apply"

17. Close the window



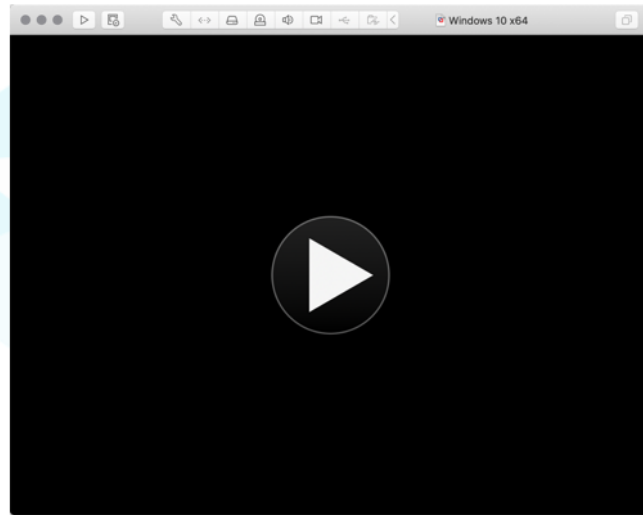
Creating the VM with Fusion (4)



You are all set to begin installing Windows

Click the play button in the middle or at the top left

Next, we'll install Windows in our VM



Now that our virtual machine is configured with the expected operating system and virtual hardware, we are ready to begin installing Windows. Click on the play button at the top labeled "Start Up" to boot the VM.

Next, we will move on to installing Windows on the virtual machine we just configured.

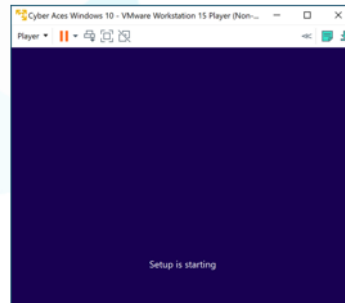
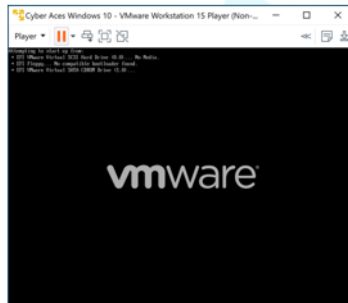


The following steps are for installation on MacOS.



Installing Windows

Windows will begin booting; wait for it to get to the installation prompts



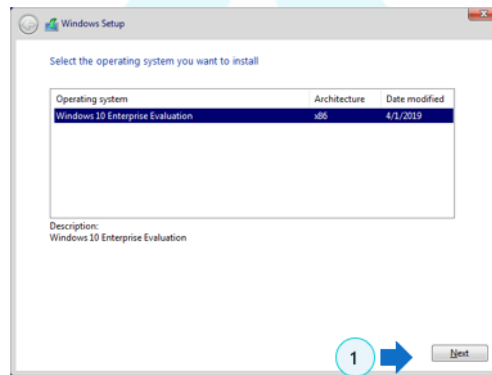
Hitting the play button powers on our virtual machine. Much like a physical machine, it begins going through a boot sequence beginning with our mounted ISO file as if it were a CD-ROM inserted into the computer.

If everything was configured correctly, Windows setup will begin.



Windows Installation (1)

Click "Next" to begin the installation

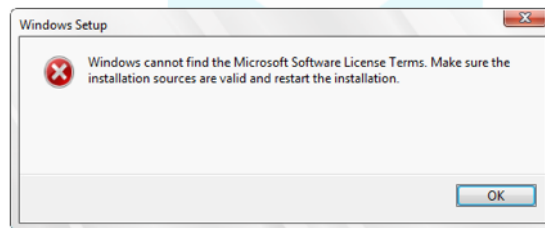


The installations of Windows 10 is very simple. The first prompt will ask you to confirm the version of the operating system being installed. Click "Next" to continue.



Windows Installation (2)

If you receive the following error, proceed to the next slide, otherwise to the slide titled "Windows Installation (6)"



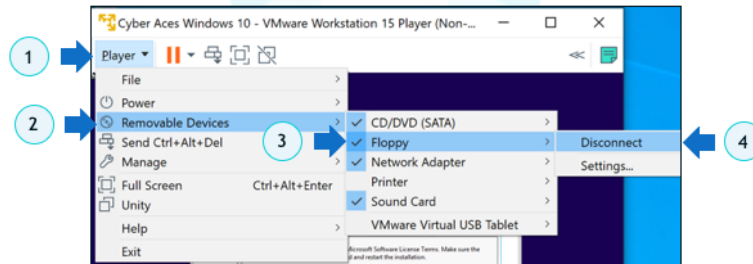
In some versions of VMWare, the installer may report a licensing error (shown above) if a virtual floppy drive device is configured. Proceed to the following slide if you receive this error. Otherwise, proceed to the slide titled "XXX" to continue the installation process.



Windows Installation (3)

Press "Ctrl" and "Alt" simultaneously to release your cursor

From the Player menu, select Removable Devices
> Floppy > Disconnect

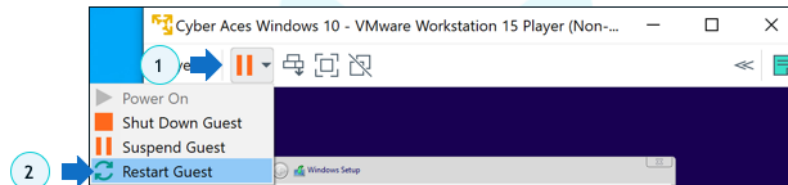


Press the "Ctrl" and "Alt" keys simultaneously to release your mouse cursor from the VM. Navigate to the Player menu and select Removable Devices > Floppy > Disconnect from the Player menu.



Windows Installation (4)

Restart the virtual machine by selecting Restart Guest from the control menu

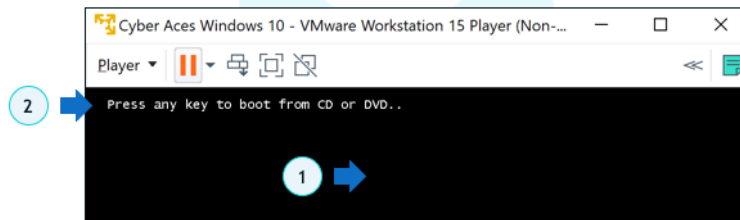


Press the "Ctrl" and "Alt" keys simultaneously to release your mouse cursor from the VM. Navigate to the Player menu and select Removable Devices > Floppy > Disconnect from the Player menu.



Windows Installation (5)

Click anywhere in the VM window
Press the space bar or Enter key to boot from the ISO when prompted

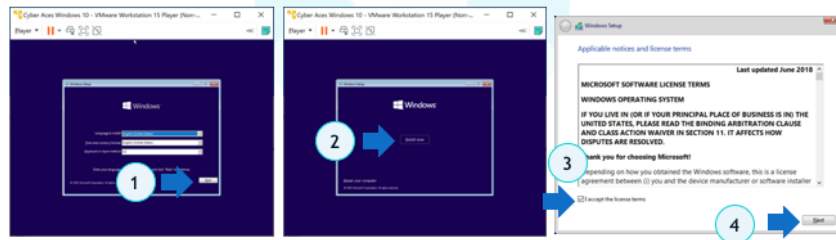


Press the "Ctrl" and "Alt" keys simultaneously to release your mouse cursor from the VM. Navigate to the Player menu and select Removable Devices > Floppy > Disconnect from the Player menu.



Windows Installation (6)

Use the default options at the first two prompts
Accept the EULA



The installations of Windows 10 is very simple. The first prompt will ask you the language, currency, and keyboard type, the default options are usually acceptable here.

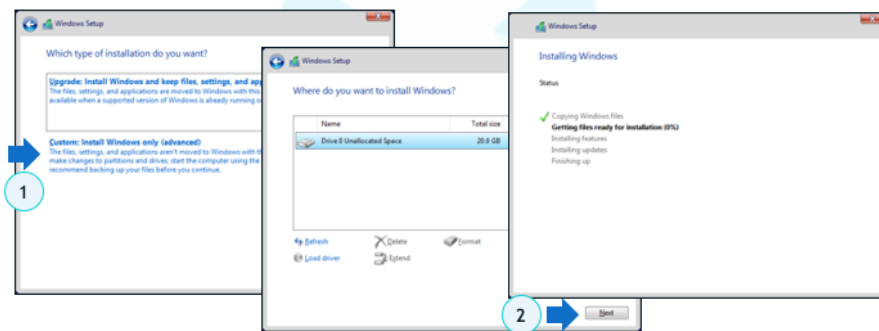
Next, you will be prompted to "Install Now", click the button to continue.

Before installation can proceed you need to agree to the End User License Agreement (EULA) offered by Microsoft. If you agree click the checkbox and click "Next".



Windows Installation (7)

Click “Custom: Install Windows only (advanced)”
Accept the installation location
Wait for the installation to complete



The next prompt will ask you what type of installation you want. The “Custom Install” is the option to select.

The installer will then prompt you asking where you want to install the operating system, there is only one option. Click “Next”.

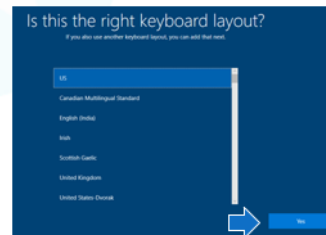
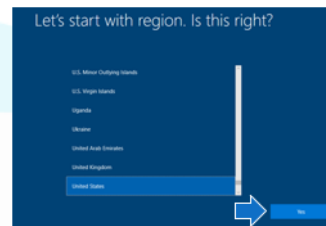
Windows will then begin the installation. Depending on the speed of your system this could take a while, but it usually doesn’t take too long.



Finalizing the Windows Installation

Select region

Select keyboard layout

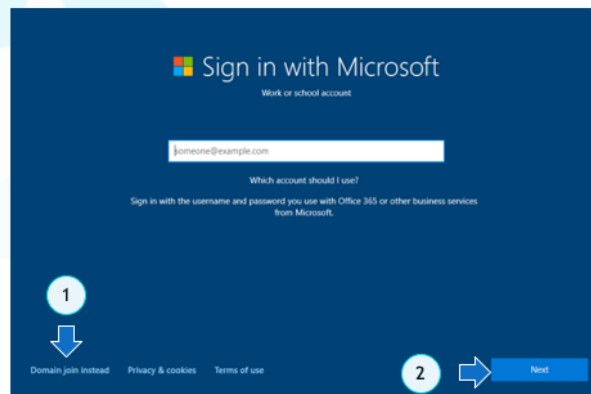


After the installation is complete you will need to finalize the installation by answering a few questions. You will first need to select the Region. After selecting the Region, select your desired keyboard layout.



Account Setup (1)

Select "Domain join instead"
Choose your username

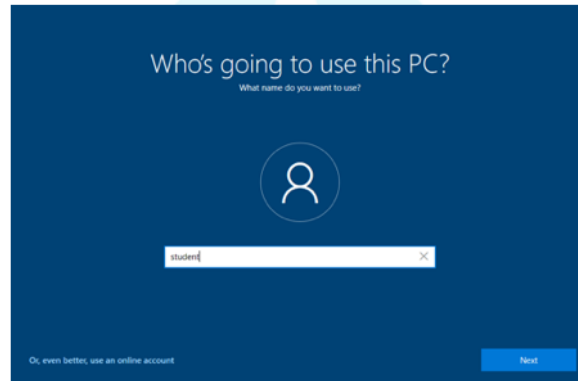


Microsoft will ask you to sign in with a Microsoft account. You do not have to do this. This training does not require that you use a Microsoft account, so click the "Domain join instead" option and click "Next". If you would like to use an existing account (or a new one) you can do this, but it is not required for the exercises.



Account Setup (2)

Use the username "student"



The installer will ask you for information about a new account that will be used to log in to the system. Create an account named "student" and click "Next".



Account Setup (3)



Pick a good password that you will remember

Select a good password that you will remember. If you forget this password Cyber Aces will not be able to help you retrieve it. If you need to, add a password hint that will help you remember this password. Click "Next". Re-enter your password on the next screen and click "Next" to continue.



Account Setup (4)



Select security questions and answers

Create security questions for this account

Just in case you forget your password, choose 3 security questions, and make sure your answers are unforgettable.

1 → What was your first pet's name?

2 → SecretAnswer

Or, even better, use an online account

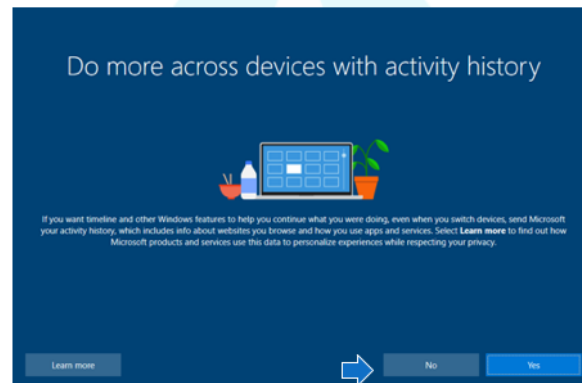
Next

Select a security question and provide the answer. Be careful to choose questions and answers only you can know. Anyone with access to your computer can use these questions and answers to reset your password and log into your computer. If you forget the answers to these questions, Cyber Aces will not be able to help you retrieve them. Click "Next" to proceed after answering each question.



Account Setup (5)

Select "No"

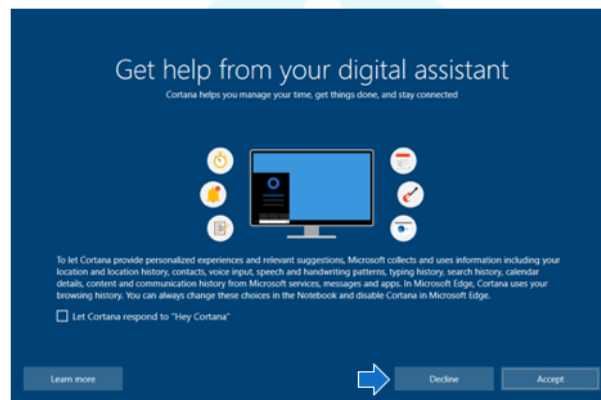


Select no on this slide to decline synchronization across devices. Click "Next" to proceed.



Account Setup (6)

Select "Decline"



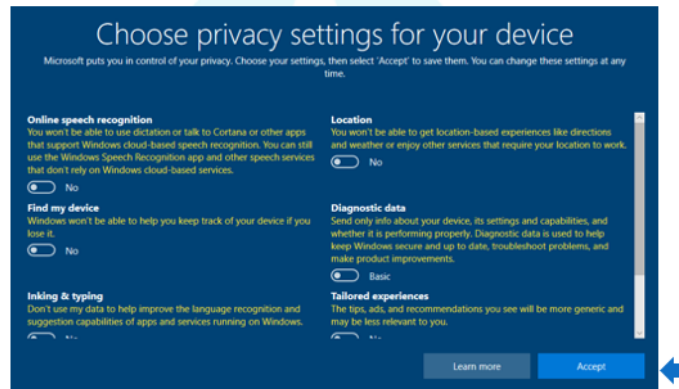
Select Decline on this slide to decline setting up the Windows 10 assistant, Cortana.



Account Setup (7)



Select privacy settings



By default, Microsoft enables settings with privacy implications. Set each option as follows:

Online speech recognition - Set to "No"

Location - Set to "No"

Find my device - Set to "No"

Diagnostic data - Set to "Basic"

Inking & typing - Set to "No"

Tailored Experiences - Set to "No"

Advertising ID - Set to "No"

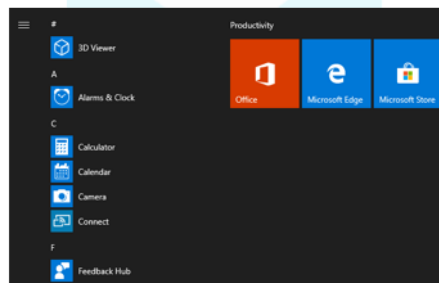
Click "Accept" to continue.



Exercise Complete!



Congratulations, you have installed Windows!
Keep this VM handy, we will use it throughout the remainder of the training



Congratulations, you have installed Windows 10 in your VM!
This VM will be used throughout the training, so keep it handy.

Module 1 - Operating Systems Windows



Installing Windows

- Patching
- Command Line Basics
- File System
- Users and Groups
- Policies and Credential Storage
- Registry
- Network
- Services and Processes

In the next session we will discuss updating and patching Windows.