Module 1 – Operating Systems Linux

Session 1 – VMware Configuration

Presented by Tim Medin

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. In this module we discuss operating systems. But, before we get too far we need to setup our systems for our hands-on lab. We will be using VMware to virtualize our lab environment.

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About Tim

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SANS CYBER ACES ONLINE TUTORIALS
YOUR GATEWAY TO CYBERSECURITY SKILLS AND CAREERS

1. Introduction to Operating Systems
- 01. Linux
- 02. Windows

2. Networking

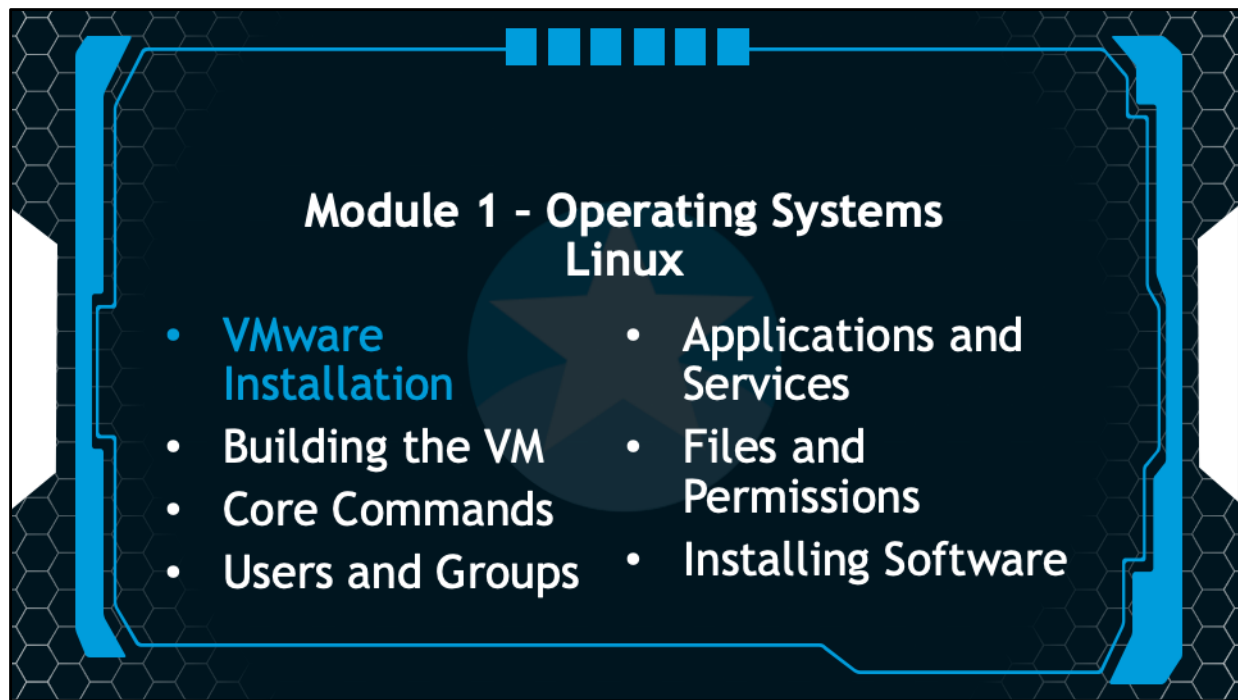**3. System Administration**
- 01. Bash
- 02. PowerShell
- 03. Python

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 begine our examination of Linux.

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/.

Module 1 – Operating Systems
Linux

- VMware Installation
- Building the VM
- Core Commands
- Users and Groups

- Applications and Services
- Files and Permissions
- Installing Software

Before we can use our virtual machine (VM), we need to install the virtualization technology to build the VM.

Setting Up a Lab

There will be hands-on exercises throughout this training

We use VMware as our virtualization platform to create Linux and Windows virtual machines for use with the hands-on exercises

- Windows or Linux – VMware Player (free!) from vmware.com/player
- MacOS – VMware Fusion available from vmware.com/fusion, not free but there is a 30 trial

You can use other virtualization software, such as VMware Workstation, VirtualBox, Qemu, or Parallels, but installation instructions for those tools is not included in this training

We will discuss the installation instructions for VMware software on Windows and OSX

Hands-on training is important. It will give you additional experience with the software that will reinforce the concepts covered in the training. You are highly encouraged to do the hands-on exercises as it will help you retain the information and better prepare you for using the software. You can simply read and listen to the training, but you will miss out on the additional experience that comes with the hands-on training.

Throughout this training we will be using various lab systems to practice the tools and techniques learned throughout the class. You will need to install VMware Player if you have Windows or Linux as your host operating system. This is a free product available at https://www.vmware.com/products/workstation-player.html. If you are using MacOS (Apple) you will need VMware Fusion. This product is not free, but there is a free demo period. You can download VMWare Fusion at https://www.vmware.com/products/fusion.html.

You can use other virtualization products, but they are not officially supported. If you choose to use one of these other products you will need to install it and configure it on your own. Also, if you are installing VMware Player on your host running Linux as the native operating system you will need to install the software on your own.

Why A Lab?

We need specially dedicated systems

We need a common base of installed software for our hand-on exercises

We need systems that we can modify and control without affecting your "host" operating system

- The "host" is your native Operating System
- The Virtual Machines are called "guests" or "VMs"

Next, we'll set up VMware Player/Fusion

We need to setup special lab systems so we can interact with the systems without affecting the host system. This gives us the ability to experiment with the virtual systems without fear of messing up the host operating system. We can try out new software or test configurations in the VM, and if things go very wrong the VM can be safely deleted and a new one built to replace it. The paid versions of VMware will allow you to take snapshots so you can test your changes and revert to a known good state if necessary without having to reinstall the VM.

There are some important terms we use in virtualization that we must know before going forward. The "host" is your native, base operating system. The virtual machines (VM's) are called guests, and are fully operational operating systems running within virtual hardware. We will setup two virtual machines for use with this training, a Windows and a Linux VM.

The guests can be created, modified, and deleted without affecting the underlying host operating system. This gives the opportunity to test software or operating systems without having to use additional hardware. We can also have many different guests ready to use.

Let's begin by installing VMware Player or Fusion on you Windows or MacOS respectively.

Other Virtualization Products or Host Operating Systems

We will be covering VMware products only
- Installation instructions for other host operating systems and other virtualization products are not included in this training
- Too many combinations and variances across the distributions and virtualization technologies to cover all the options here

Other prominent virtualization technologies include VirtualBox, Qemu, and Parallels

Note for Linux or BSD Host Operating Systems
- You will likely need to install additional software dependencies first
- You will need to find installation instructions and dependencies for your OS

If you have VMware Fusion, Player or Workstation already installed then you can skip ahead to the next session

VMware is not the only vendor in the virtualization space, but they are currently the market share leader. You can use other virtualization products for this training, such as VirtualBox, Qemu, Parallels or other products, but the installation instructions are not included in this training. If you need additional help installing any of these other products refer to the vendor's support or forums pages for help.

VMware Player is available for install on Linux and BSD systems. There are many different distributions of these operating systems and the installation instructions vary greatly for each one. As such, we cannot include the installation instructions for all possible configurations. You will need to install a virtualization platform before continuing to participate in the hands-on exercises.

Exercise
VMware Player/Fusion Installation

The following section will cover the installation of VMware Player on Windows
  ▪ If you are using MacOS skip ahead!

You can use another virtualization system, but you will need to install it on your own

Let's begin by installing VMware Player on Windows now

Before we can begin an interaction with the Windows system we will use for the labs, we will need to install the VMware virtualization software of our choice. We will cover VMware Player installation on Windows first. If you are using a Mac and you are going to install Fusion, skip ahead to the installation instructions for VMware Fusion.

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

Installing VMware Player

MacOS Users: Skip Ahead!

Browse to http://www.vmware.com/go/downloadplayer/

Download the software by clicking on "VMware Player for Windows"
- Native Linux users should select the appropriate download for their operating system install and hardware

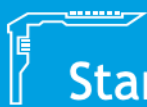Run the setup executable

The default install options are fine

To begin the installation of VMware Player browse to http://www.vmware.com/go/downloadplayer/. Select "VMware Player for Windows" to begin the download.

Once you have downloaded the software, run the installation executable. The default options are fine, but you may want to disable the option to join the VMWare Custer Experience Improvement Program, which sends usage statistics to VMware. When the install is complete you are ready to begin using the software!

Native Linux Users:

Follow the instructions above to get to the download page. Then select the proper install (32-bit or 64-bit) based on your native operating system and hardware. You will need to run the .bundle file to install VMware Player and you may need to install additional software before you can complete the installation process. If you need assistance installing the software on your system consult the online forum or use your search engine of choice to find installation instructions. Once you have completed the installation, the remaining steps on the following pages should be the same.

Note: VMware is independent of Cyber Aces and as such we cannot control the layout of the VMware.com site. The download locations and/or software versions may change at any time.
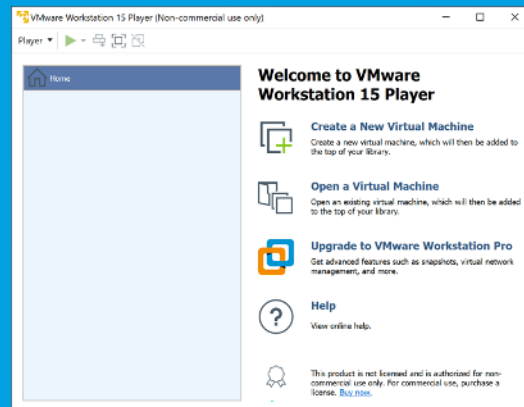
Start VMware Player to confirm the installation was successful. You may be prompted to upgrade or install VMware Workstation, you do NOT need to do this. VMware Workstation is a paid product offering additional capabilities (including snapshots). We do not need the additional features for this training. If VMware Player is started successfully then you have completed this session! You can now skip to the next session where we will install a guest operating system.

Installation on MacOS

The following steps are for installation on MacOS.

Installing VMware Fusion on MacOS

MacOS Users Only!

Browse to vmware.com/fusion

Select "Download Free Trial"
- Trial lasts 30 days
- If you would like to continue using Fusion after that time you will need to purchase it
- There is no long-term free product similar to VMware Player on Windows & Linux
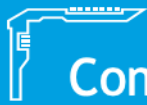
Download the software

Open the .dmg file to begin the installation

If you are using a Mac, the virtualization product we will be using is VMware Fusion. To download the installer, start by browsing to VMware.com/fusion. Click on the button that says "Download Free Trial". This free trial will work for 30 days. If you want to use the software beyond the 30 days you will need to upgrade to a paid version of the software. Unfortunately, there is no free product for the Mac as there is for Windows and Linux (Player).

Once the install .dmg file has downloaded, open the file and begin the installation.

Start VMware Fusion

Start the application

Click "Open" to continue

Enter your credentials to install the software using elevated permissions
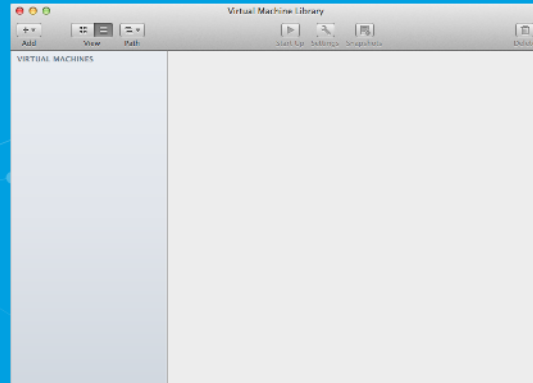
Chose an option to continue

During the installation process, you will be prompted to answer a few questions. First, MacOS might prompt to ask if it is OK to run an application you downloaded from the internet; you will need to click "Open" to continue the installation. You will then be prompted to enter your credentials as the installation process needs elevated permissions to complete the install. Next, choose if you want to "Help improve VMware Fusion" by sending anonymous usage data to VMware.

Completing VMware Fusion Installation

Installation is now complete!

After the install has completed, launch VMware Fusion. You should see a screen similar to this. If you see this screen, you have successfully installed VMware Fusion and can move on to the next session where we will install a guest operating system. If you have any trouble completing this install, refer to the online documentation and forum provided by VMware.

Exercise Complete!

You should have a fully operational copy of VMware Player or Fusion installed

As previously mentioned, other virtualization platforms will work, but instructions for their installation and use are not included in this training
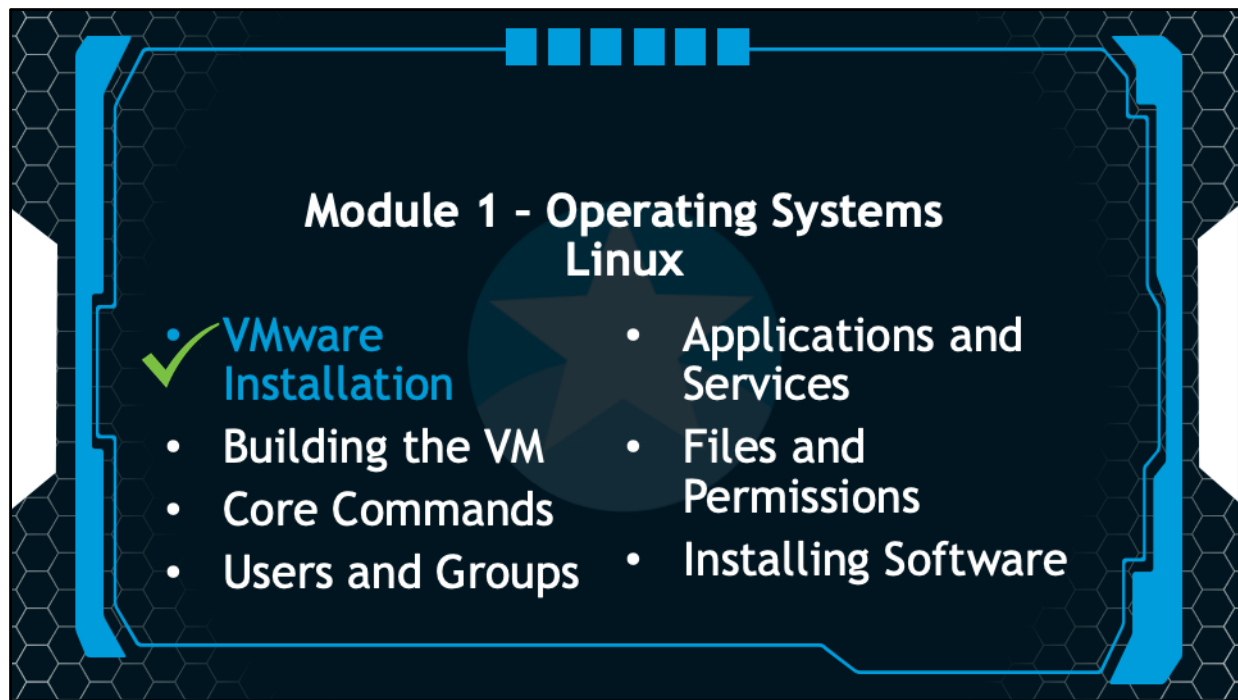
Congratulations, you can proceed to the next section!

You should now have a fully operational copy of VMware Player, VMware, Fusion, VMware Workstation, or other virtualization platform installed. Make sure you have completed this step before moving on to the next steps. You will need to have a virtualization product installed to create the Linux and Windows virtual machines.

Once you have completed this exercise, proceed to the next section.

Congratulations, you have completed the first session!

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In the next session we will build our Linux VM that will use throughout the rest of the tutorials.