## LESSON: Windows Server & Enterprise Creation

**Before you Begin**

This is the second module in the Microsoft Security Administration course. Please note that you are not required to demonstrate the process of installing a Windows Server operating system. However, you may choose to do so. If you choose to demonstrate the installation of Windows Server, you should set aside approximately 15 minutes for that activity. Just as in the first module, the students are simply observing your demonstration. For this lesson and upcoming lessons, instructors are required to ensure the following activities are completed:

* Review the “Lesson Opener” and “Real World Scenario” with the learners prior to starting the module.
* Throughout the module, you will find “Consider the Real World Scenario” slides. Review the questions found on these slides, tie the concepts back to the scenario discussed at the start of the lesson as well as content you are presenting, and encourage the learners to share their thoughts.
* Ensure learners are given opportunities for breaks throughout the lesson. The pacing guide below provides recommended breaks. However, there are additional breaks added in the slide deck, please use them if needed.
* For each lesson, you will find a “Pulse Check” slide which is the opportunity for instructors to open a poll to gather feedback from the learners. Leave the poll open for about 1 minute and after you close the poll, share the results with the learners. Encourage the learners to share their thoughts. This information will help the instructors as well as the learners better understand where they are with regards to the lesson.
* Labs are to be demonstrated live for each module. The demonstration of labs is the top priority for the lead instructor. While demonstrating each lab, encourage students to participate and explore.
* At the end of each lesson, it is important to take a few minutes to review the key concepts for the lesson, provide guidance on what the learners can do to prepare for the next lesson, and wrap up with Q&A.

### Summary

In this lesson, learners will explore Microsoft Windows Server, its crucial role in network infrastructure, and the installation process. They will understand the importance of servers as data storage and access points for users, and the ability to configure a single server for multiple roles. Learners will learn to select the appropriate Windows Server version and choose secure passwords for enhanced administrator account security. They will discover the similarities between Windows Server 2016 and Windows 10 Client installation, and the significance of Active Directory Domain Services (AD DS) for managing domain objects. By promoting a server to a Domain Controller (DC), learners will grasp the advantages of centralized security management for the domain and its systems.

### Objectives

* Define what a server does given a set of server types.
* Differentiate between various server types.
* Explain how servers can be used to support business operations in a Windows Server environment.
* Install a Windows Server OS.
* Identify the appropriate Windows Server version and license terms.
* Create and manage an administrator password.
* Explain how to configure basic settings in a Windows Server OS.
* Explain how to promote Active Directory to a domain controller (DC) for effective management of a Windows Server.
* Describe and select the appropriate steps involved in the process of configuring a Windows Server.

### Lesson Activities and Teaching Strategies

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| Estimated Time | Lesson Portion | Directions |
| 5 min | **Lesson Opener:**  Windows Server & Enterprise Creation | * Introduce learners to the importance of Windows Server and the creation of an enterprise system called Active Directory Services. |
| 5 min | **Real World Scenario:**  Windows Server & Enterprise Creation | * Review the real world scenario challenge and inform learners that you will be constantly coming back to this scenario throughout the lesson to discover how to solve and apply concepts to this real situation. |
| 40 min | **Cyber Uncovered:**  Introduction to Servers | * Provide an overview of the history and purpose of Microsoft Windows Servers, highlighting their release in July 1993 and the importance of compatibility between client and server versions. * Explain the concept of Windows Server providing services to hosts and clients through roles and policies, emphasizing their role in network operations. * Detail the significance of popular Windows Server versions that students may come across in the field and that these operations systems have a life-cycle and associated security concerns with maintaining unsupported versions. * Discuss the importance of running supported versions of Windows Server on a network. * Introduce noteworthy features like the "headless" Nano Server with a smaller footprint, the ReFS high-performance file system, AD FS v4 support for OpenID token ID, Hyper-V Hot-Add virtual hardware, VM Shielding, and VM multi-tenancy. * Define the fundamental differences between client and server operating systems, focusing on the role of clients in requesting data and servers in responding to those requests. * Explore how clients make requests to servers for services, illustrating examples like DHCP server requests and web server requests. * Explain the client and server model, highlighting the roles of both parties in the communication process using relatable examples such as internet browsing. * Present various types of common servers, including the Radius Server, Database Server, File Server, Web Server, Email Server, DHCP Server, and DNS Server, describing their functions and importance within a network. * Discuss the ideal scenario of having separate servers for each service, while acknowledging the possibility of combining services on a single server for efficient resource utilization. * Detail the functions of web servers in delivering website content and mail servers in handling email communication, illustrating the communication process between clients and these servers. * Address the need for servers in managing large volumes of data and serving multiple users simultaneously, emphasizing the advantages of server OS stability, security, efficiency, and processing power. * Contrast the organizational structures of domains and workgroups, highlighting central management and user access in domains and self-management in workgroups. * Define domain controllers (DCs) and their role in controlling resource access and client authentication within a domain. * Explain the concept of Active Directory (AD) forests, domain trust relationships, and the common schema shared across domains in a single forest. * Be prepared to discuss the implication of the real world scenario presented at the beginning of class on network types and devices. There are specific prompts that you should ask learners to reflect on to apply this concept to the real world scenario. |
| 5 min | **Break** | * Share a timer on the screen so there is clarity as to when class will resume. Ensure cameras and microphones are disabled during the break. |
| 45 min | **Cyber Uncovered:**  Server Installation | * **Note:** Because learners will not be performing the Windows installation (same as with the previous module), it is essential that the instructor explains thoroughly the installation steps. It is recommended to demonstrate the process by going through the steps using your local virtual machine. The installation process will require approximately 15 min of time. * Start by discussing the importance of selecting the appropriate server version based on the server's main job. * Emphasize the benefits of using the same OS on all network servers for uniformity and troubleshooting. * Highlight the availability of other useful tools in the installation area. * Describe the options available during installation, such as "Install now" for a new installation and "Repair your computer" to fix a corrupted installation. * Explain the installation process and guide learners through the necessary steps. * Discuss the available server versions and their characteristics. * Focus on Windows Server 2016 Standard Evaluation (Desktop Experience) as the version for the first server. * Compare the graphical user interface (GUI) version (Desktop Experience) with the command-line interface (CLI) version (Nano/Core), highlighting the differences in navigation and features. Do not confuse Core with Nano. Nano cannot be installed using the ISO but is a special installation of Windows Server typically deployed via PowerShell and Containers and used for very specific server roles. Core on the other hand can be installed using the ISO and not selecting the Desktop Experience option. * Explain the importance of reviewing and understanding the end user license agreement (EULA). * Encourage learners to read through the terms as a best practice. * Guide learners through the custom installation process. * Explain the difference between upgrading an existing OS and performing a custom install. * Recommend selecting "Custom: Install Windows Only (advanced)" for a new installation. * Describe the final steps of the installation process. * Inform learners that a secure password needs to be set for the administrator account. * Provide an example password (e.g., Pa$$w0rd) for lab purposes. * Be prepared to discuss the implication of the real world scenario presented at the beginning of class on network types and devices. There are specific prompts that you should ask learners to reflect on to apply this concept to the real world scenario. |
| 5 min | **Pulse Check** | * After the poll is concluded, review the results with the learners. Encourage those in the red zone to attend office hours and/or to reach out to the instructors for assistance. |
| 5 min | **Break** | * Share a timer on the screen so there is clarity as to when class will resume. Ensure cameras and microphones are disabled during the break. |
| 40 min | **Cyber Uncovered:**  Server Configuration | * Begin by explaining the importance of creating an Active Directory Domain after the server installation. * Highlight the role of Active Directory Domain Services (AD DS) in providing authentication, directory services, security policies, and other services within the Windows Domain. * Mention that not every server gets the AD DS role installed. * Introduce the Server Manager tool as a central location for managing roles and features. * Emphasize the need to set a static IP address and change the server name before configuring Active Directory. * If you have set up a local VM for demonstration earlier in the lesson, you can also decide if you wish to demonstrate the following activities listed below. Some of these activities will not be performed in the lab such as name change, IP address configuration, etc. * Demonstrate how to access Server Manager and make the necessary network and server name changes. * Demonstrate how to access the Server Manager dashboard and navigate to the Add Roles and Features option. * Explain the importance of configuring the IP address and server name for effective network communication and identification. * Emphasize the role of Server Manager in managing server settings. * Guide the students on how to assign a server with a static IP address and other IP configuration information such as the Preferred DNS server. * Demonstrate how to change the server name by clicking on the blue link next to "Computer Name" in Server Manager. * Explain the significance of changing the server name for identification purposes. * Guide students to make necessary changes to the server name in the provided field. * Describe the appearance of a pop-up window stating, "You must restart your computer to apply these changes." * Explain the two methods used to access Add Roles and Features: Through the blue text or the Manage option. * Guide learners through the steps of the Add Roles and Features Wizard, including installation type, server selection, and selection of the Active Directory Domain Services role. * Discuss the purpose of each page in the Add Roles and Features Wizard, such as Before You Begin and Installation Type. * Instruct learners on the proper selections for server roles and features, specifically checking the Active Directory Domain Services box. * Guide learners through the installation confirmation and automatic restart settings. * In Server Manager, guide learners to select the “Promote this server to a domain controller” option in the notification flag. * Explain the deployment configuration options and the importance of selecting "Add a new forest" for the first domain controller. * Instruct learners to set the DSRM administrator password and proceed through the DNS options and additional options. * Instruct learners to review the path configurations and summary of selected options. * Describe the additional domain controller options with learners. * Demonstrate how to install AD DS and emphasize the need to wait for the server to reboot. * After logging back in, demonstrate how the domain name appears before the username to indicate successful domain creation. * Show learners how to verify the domain creation in Server Manager. * Be prepared to discuss the implication of the real world scenario presented at the beginning of class on network types and devices. There are specific prompts that you should ask learners to reflect on to apply this concept to the real world scenario. |
| 45 min | **Lab:**  Windows Server Configuration | * Remind learners to use this lab to practice and apply the concepts they have learned throughout the day. * Learners will receive direct feedback on their lab to properly assess their knowledge and determine where they might need additional assistance. * Take an opportunity after the lab tasks are completed to review the tools and structure of the Active Directory environment that was just created during the lab session. |
| 5 min | **Discussion Board** | * Allocate a few minutes on the Review Discussion Board Slides * Review requirements * Review how the assignment impacts students’ final grades. |
| 10 min | **Lesson Closure** | * For this lesson, spend just a few minutes reminding the learners what the key ”take-aways'' were from the lesson and what they should do to prepare for the next module. You may want to focus on the objective of centralizing services on the network to ensure better management and security. Review some of the more common activities a security professional may be performing if managing an Active Directory environment. * You will be able to use the data collected in the pulse check to help with the lesson closure. Remind those learners that reported being in the “red zone” to take advantage of office-hours. * Recommend that the learners ensure they submit all of the assignments on-time to ensure the appropriate credit is provided to them. * Recommend that the students read-ahead and come prepared for the next lesson. * Q&A |
|  | **Additional Time Filler (if needed)** | * Kahoot * Discuss interview prep and questioning * Use breakout rooms for additional lab practice * Continue Real World Scenario Conversation |