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Module Code & Module Title

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Submitted to: Mr Prasant Adhikari

I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.

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Introduction:

Windows Server 2022 introduces advanced multi-layer security, hybrid capabilities with Azure, and a flexible application platform. As part of this release, we are bringing secured-core capabilities to help protect hardware, firmware, and Windows Server OS capabilities against advanced security threats. Secured-core server builds on technologies such as Windows Defender System Guard and Virtualization-based Security to minimize risk from firmware vulnerabilities and advanced malware. The new release also provides secured connectivity that introduces several new capabilities such as faster and more secure encrypted HTTPS connections, industry standard SMB AES 256 encryption and more.

Windows Server has grown since the start. For Windows NT administrators, system errors and a lack of controls were common problems. Windows 2000 was an important milestone with its better management and scalability, additional tools, and easy programming interfaces. However, it still had practical problems. With Windows Server 2003, Microsoft improved the platform by offering a more complex, scalable, and developed operating system. It laid the basis for later stable, feature-rich versions of Windows Server, making it an important basis for current computer design.

Secure connections are at the heart of today's interconnected systems. Transport Layer Security (TLS) 1.3 is the latest version of the internet's most deployed security protocol, which encrypts data to provide a secure communication channel between two endpoints. HTTPS and TLS 1.3 is now enabled by default on Windows Server 2022, protecting the data of clients connecting to the server. It eliminates obsolete cryptographic algorithms, enhances security over older versions, and aims to encrypt as much of the handshake as possible. Learn more about supported TLS versions and about supported cipher suites.

The demand for Windows Server 2022 is still high owing to its capabilities of supporting hybrid cloud. Enterprises that have high security and their critical infrastructure is located on premise, are in most cases looking for good quality servers that offer local

management and can also integrate with cloud services. Windows Server 2022 meets these expectations with further enhancement of its security protocols, wider support, and direct address for Azure and improved virtualization alternatives that can meet different business requirements as requested.

Some of the alternatives to Windows Server 2022 are operating systems that are server-based including Linux Operating systems (like Ubuntu Server, Red Hat Enterprise Linux) and also cloud-based services like what is offered by AWS or Google Cloud Server. Each one of these alternatives has its own strengths and for example lower cost, open source features or cloud services integration.

Pros of Windows Server 2022:

1. Improved performance:

   The new kernel and optimizations are designed to make Windows Server 2022 more efficient, allowing servers to use compute resources more efficiently and achieve higher performance.

2. Cloud integration:

   Integration with Azure and support for hybrid scenarios enable organizations to leverage resources in both on-premises data centers and the cloud.

3. Increased security:

   Secure Core Server and multi-factor authentication help protect servers from various threats and attacks, which is critical in an ever-changing cyber threat environment.

4. Convenient control:

   Windows Admin Center provides administrators with a convenient tool to centrally manage all aspects of their server infrastructure, saving time and simplifying processes.

5. Container optimization:

The introduction of new container capabilities and improvements to how they operate make Windows Server 2022 more attractive to modern applications and microservice architectures.

6. Improved data storage:

   New data migration tools and storage improvements make data management more efficient and flexible.

Cons Compared to Alternatives:

1. Resource requirements:

   New features and optimizations may increase resource consumption, which may require additional hardware to keep servers running efficiently.

2. Upgrade difficulty:

   Updating a server operating system can always be a challenging process, especially for large organizations with complex infrastructure.

3. Limitations of third party applications:

   Some third-party applications may not immediately adapt to the new version, which may cause problems at the beginning of the period of use.

4. Compatibility with legacy equipment:

   New capabilities may not fully match legacy equipment, requiring upgrades or upgrades.

5. The need for staff retraining:

   New features and interface changes may require time and resources to train administrators and staff.

Objective

The purpose of this lab is to guide us through setting up and configuring Windows Server 2022, focusing on preparing it for practical use in enterprise environments. We will start by installing the operating system and configuring essential components, such as network settings and security protocols, to ensure the server is secure and ready for integration. Another key part of this lab involves connecting the server with Azure to create a hybrid cloud setup, enabling the benefits of both on-premises and cloud infrastructure. Additionally, we will explore virtualization and container management features, which are essential for supporting modern applications and DevOps practices. By the end, we will have hands-on experience in setting up, securing, and optimizing Windows Server 2022, giving us the foundational skills needed to deploy and manage this technology in real-world scenarios.

Required Tools and Concepts

Hardware Requirements

- Processor: Intel Xeon 2.80 GHz processor (2 GHz 64-bit processor)
- Compatible with x64 instruction set
- RAM: 32 GB for Server with Desktop Experience installation option
- 256 GB SSD, 1 TB HDD
- An ethernet adapter capable of at least 1 gigabit per second throughput
- Compliant with the PCI Express architecture specification.
- GPU: NVIDIA GeForce GT 1030 (Graphics device and monitor capable of Super VGA (1024 x 768) or higher resolution)

- Network Interface: An Ethernet or Wi-Fi adapter for networking

Software Requirements:

- VirtualBox
- Windows Server 2022 ISO
- Networking Configuration Tools
- PowerShell

Key Concepts and Basic Knowledge:

- Virtualization Basics: Understanding of a virtualization technology, especially VirtualBox, to deploy virtual machines as self-contained units on a host computer.
- Windows Server Roles and Features: Experience with server roles like Active Directory, DNS, and DHCP, and features such as IIS and Hyper-V.
- Networking Fundamentals: Basic knowledge of IP addresses, subnets, and DNS, since these are essential when deploying network parameters aimed at establishing communication between server and client systems.
- Storage Solutions: Basic comprehension of storage types such as SAN and NAS, Raid levels, and file systems, for example, NTFS and ReFS, incorporated in Windows Server.
- Security Best Practices: Knowledge of security measures including firewall settings, role permissions and access, and update patches in order to secure the server environment.

Steps of Replicate:

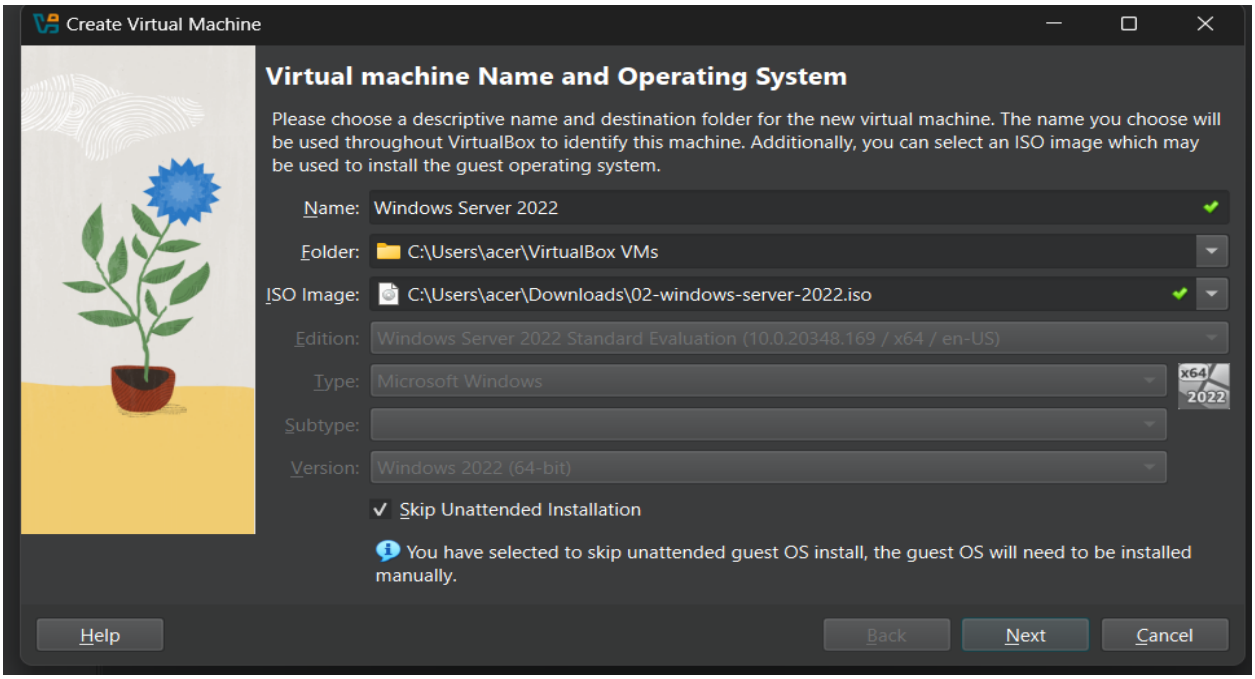

Figure 1: Selecting the ISO and location with name

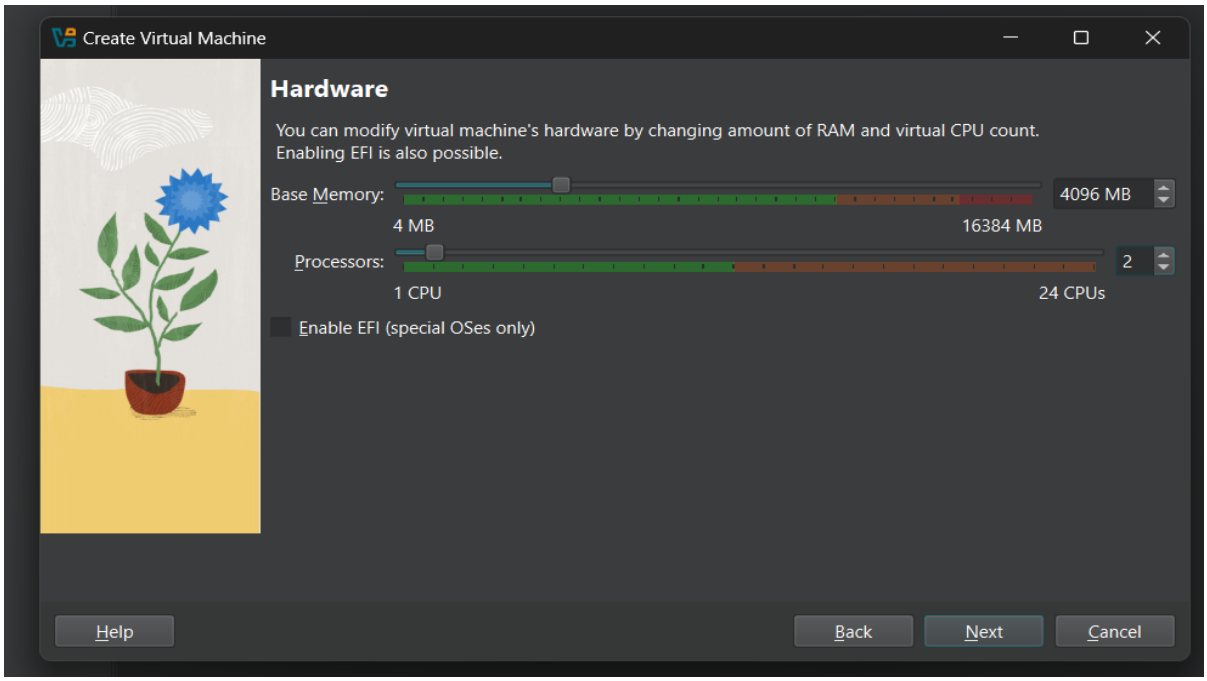

Figure 2: Putting the RAM and Processor

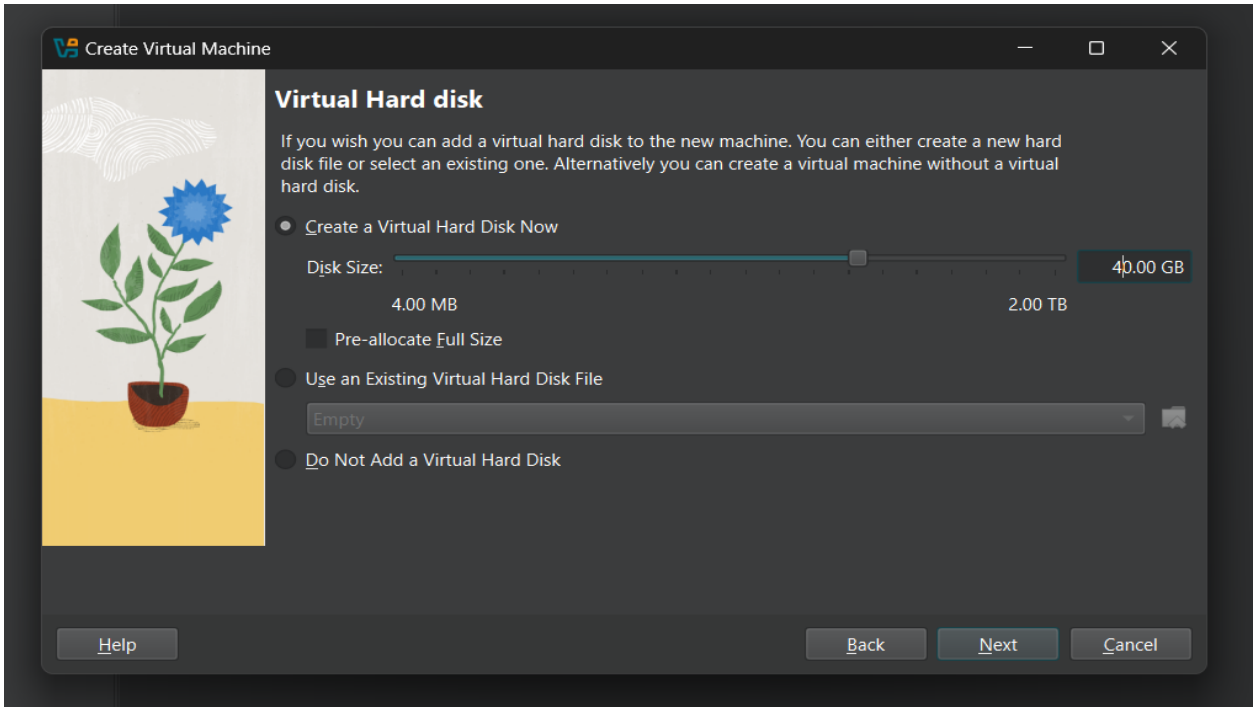

Figure 3 :Selecting ROM size

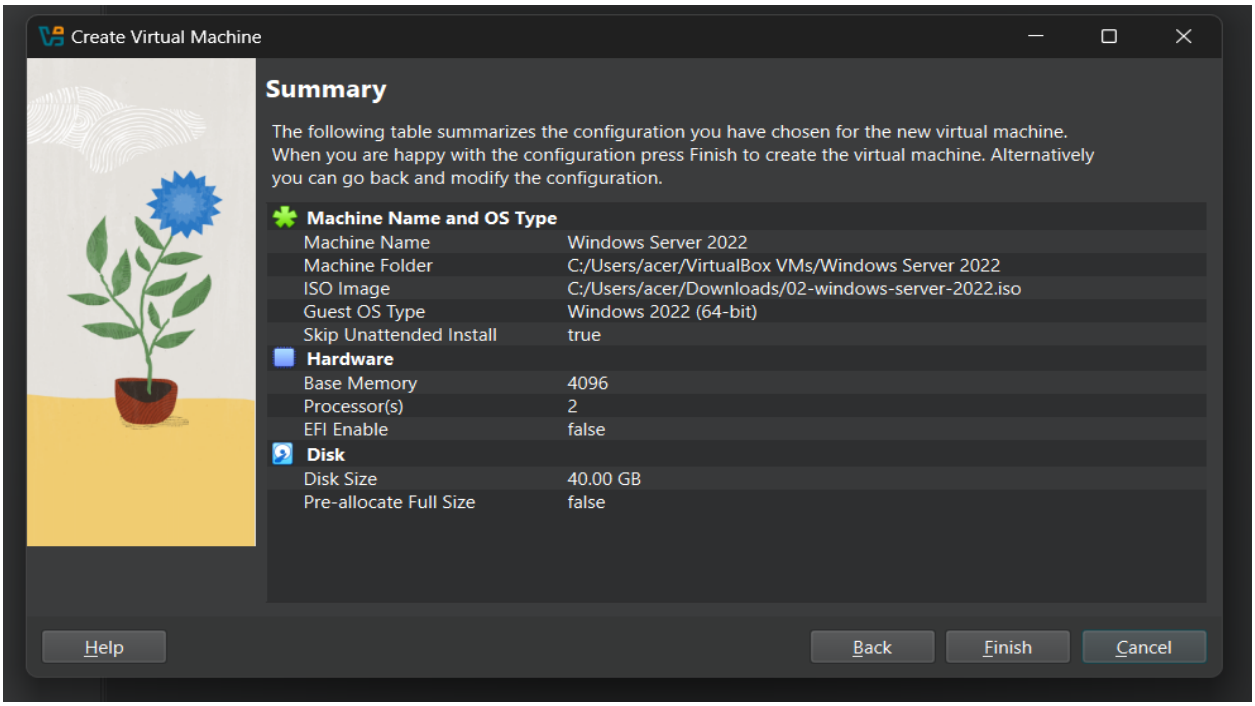

Figure 4 : : Summery and finalization of the machine

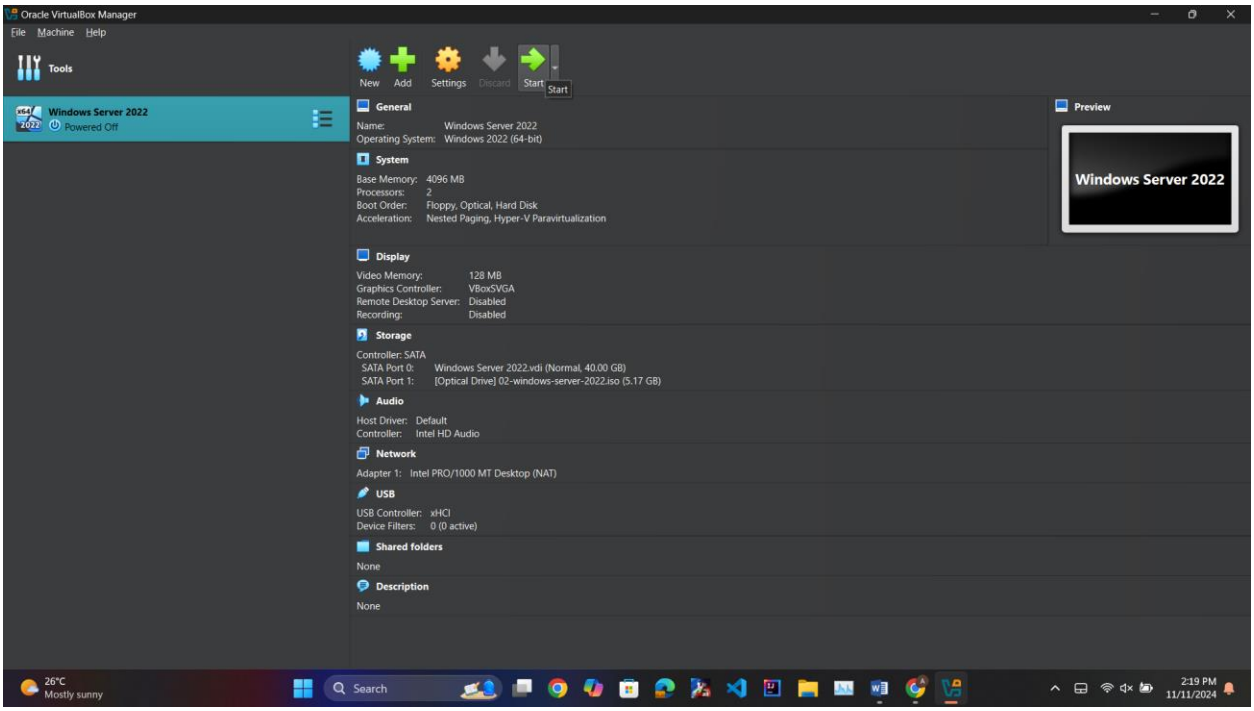

Figure 5: Starting the machine

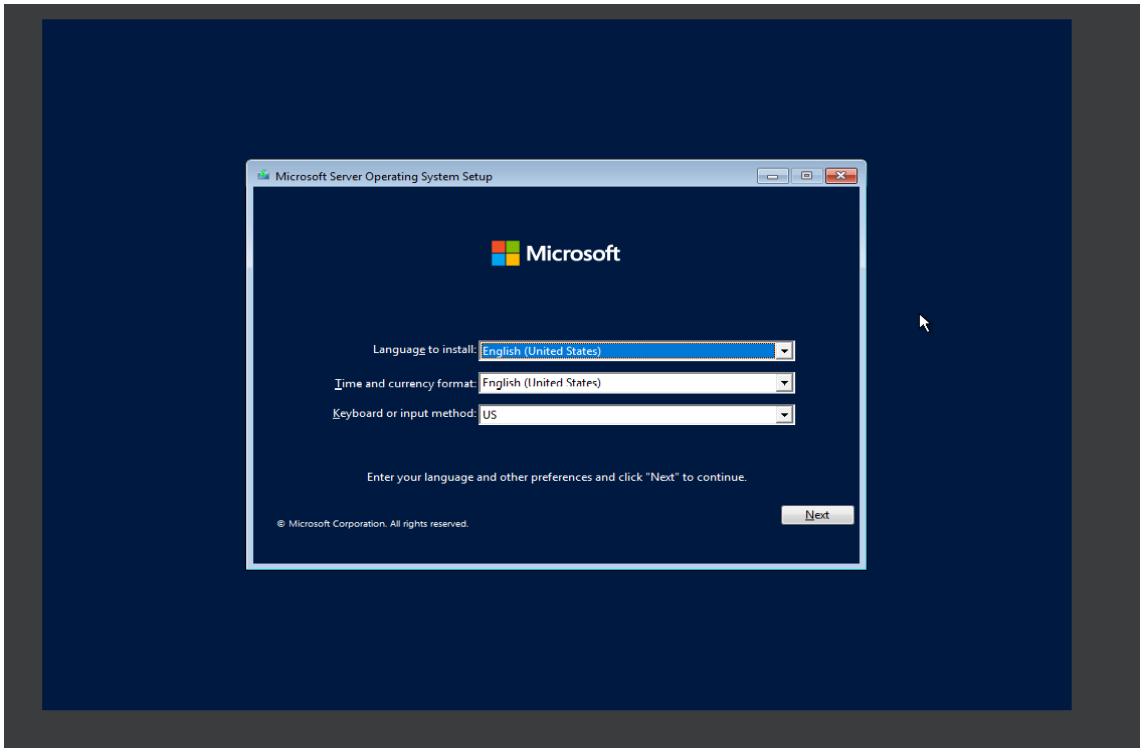

Figure 6:Selecting OS language

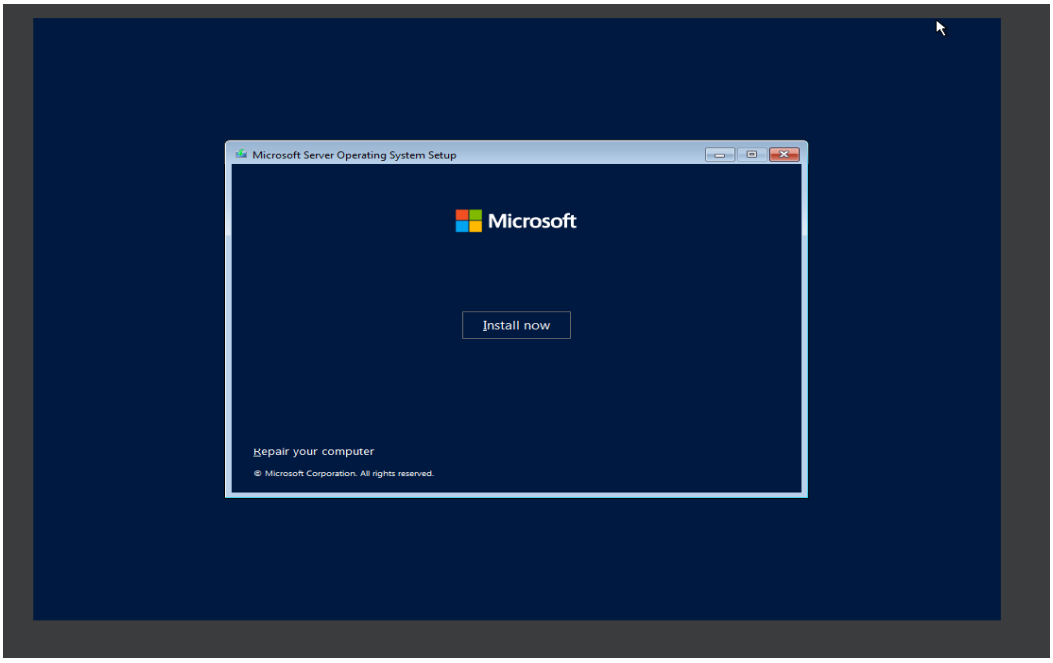

Figure 7 : Installing the OS in the machine

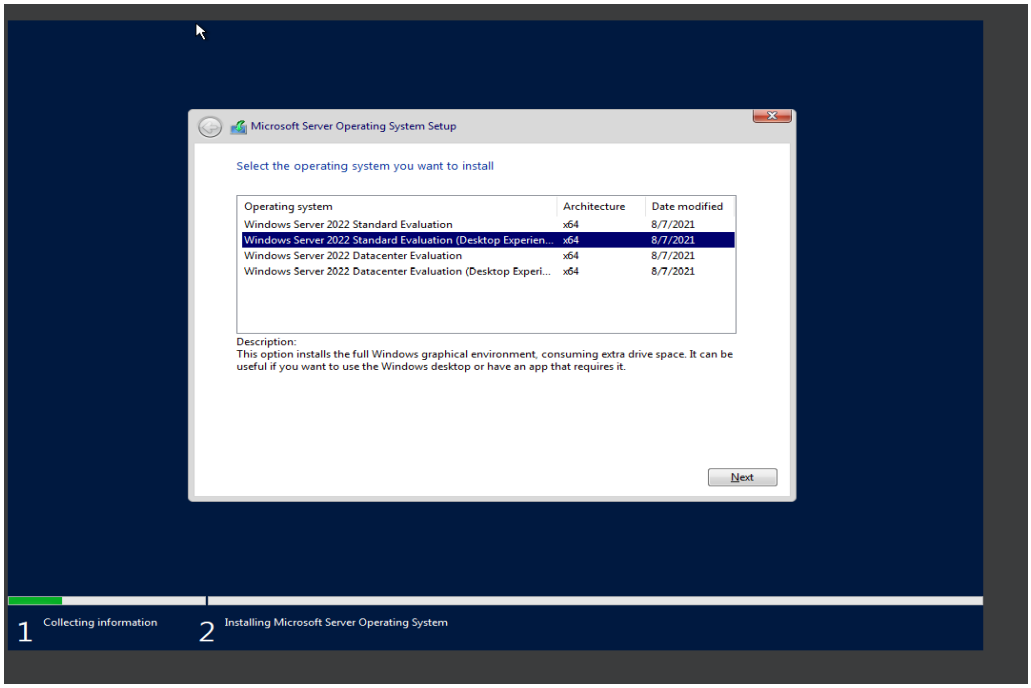

Figure 8: Selecting the Edition

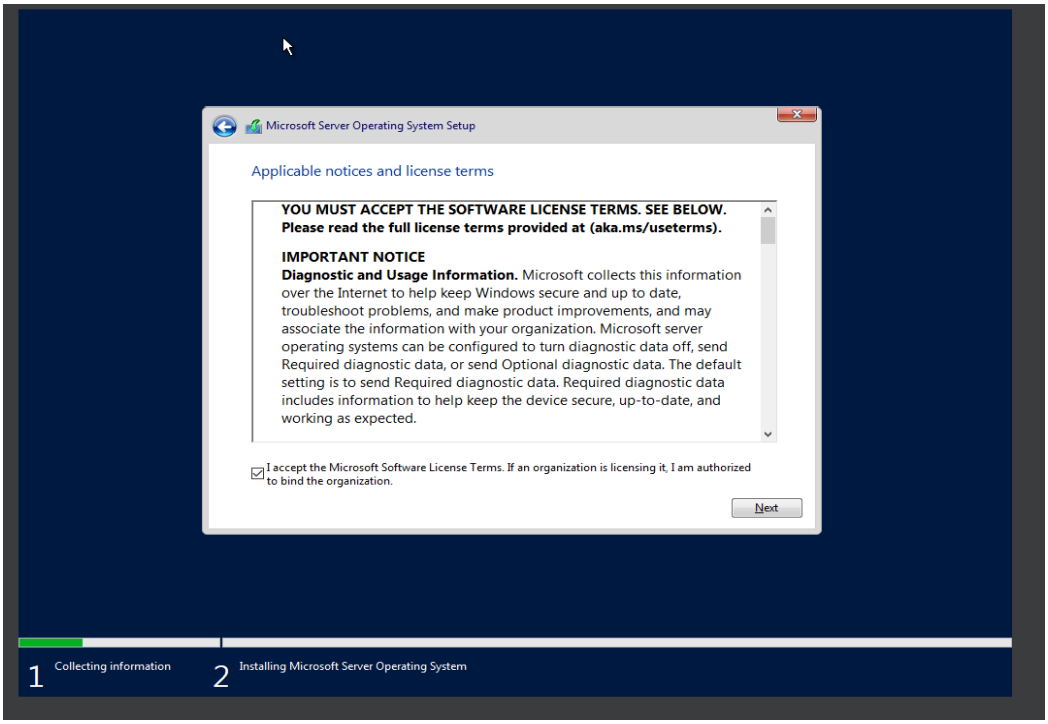

Figure 9 : Accepting the terms and conditions

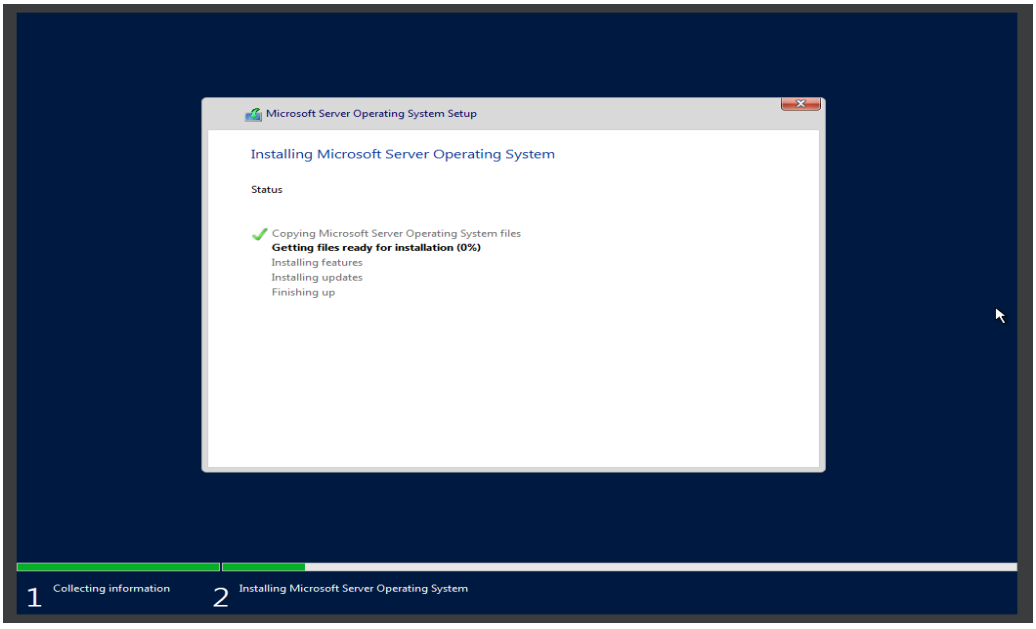

Figure 10 : Installing Process

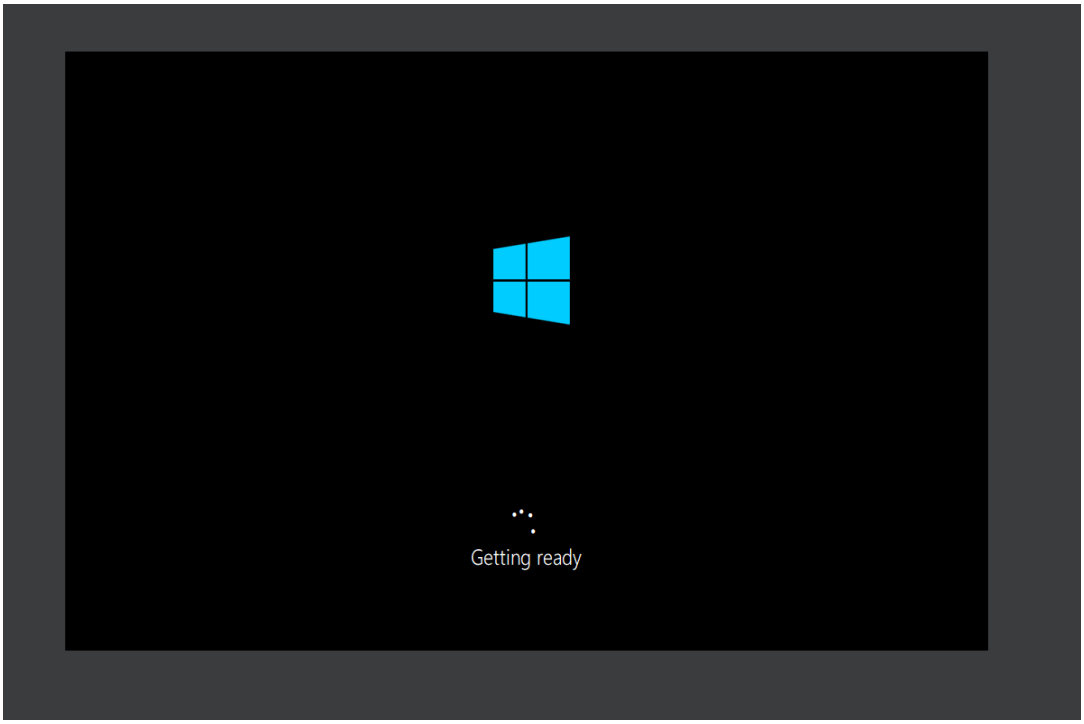

Figure 11 : Getting ready for open

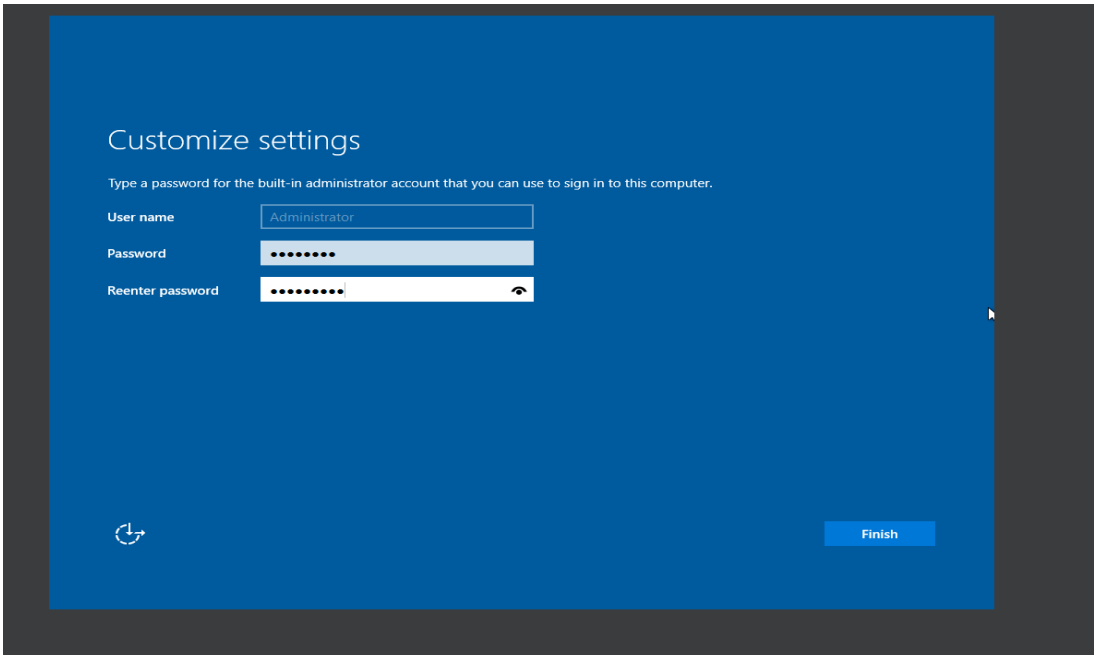

Figure 12: Inserting password

Figure 13: Inserting the Shortcut key

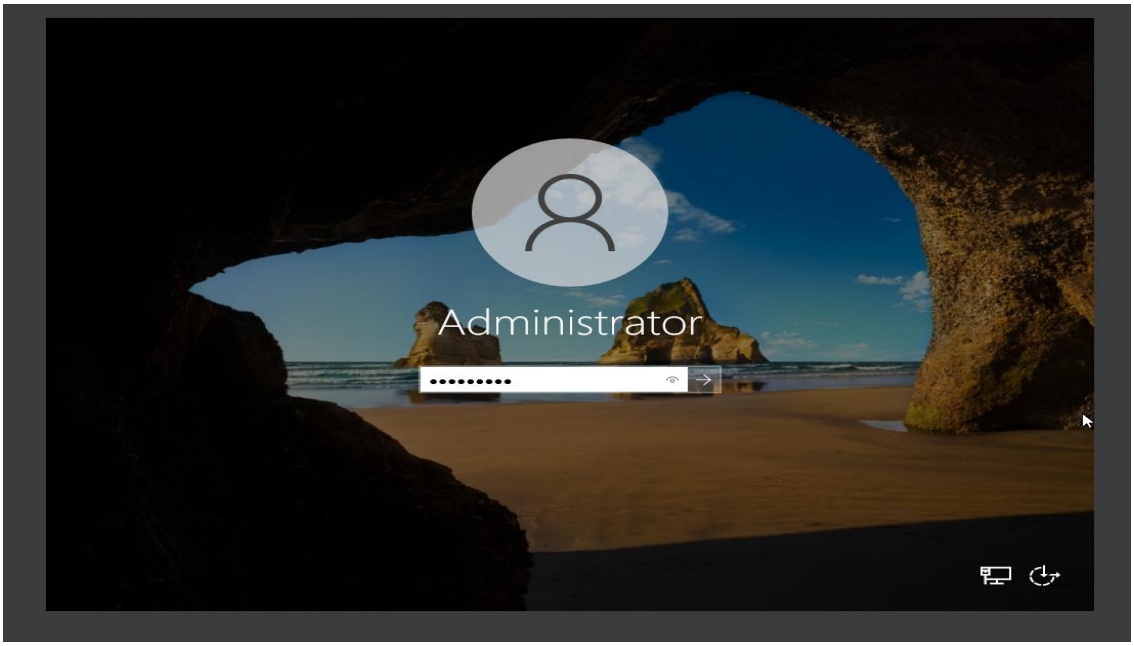

Figure 14: Logging in

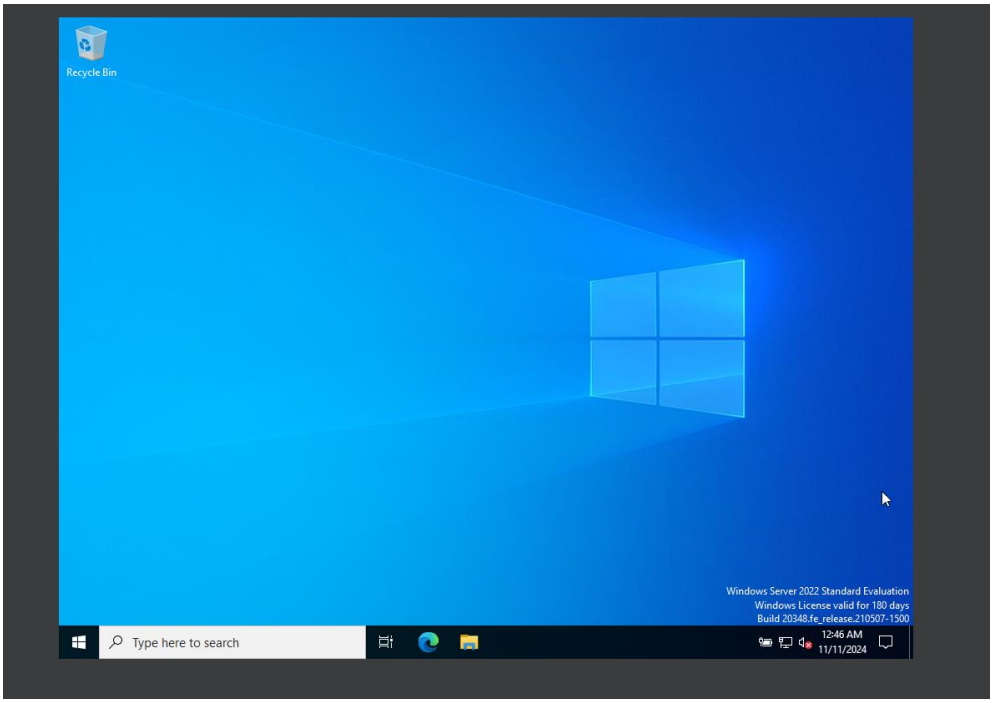

Figure 15: Windows home page opened

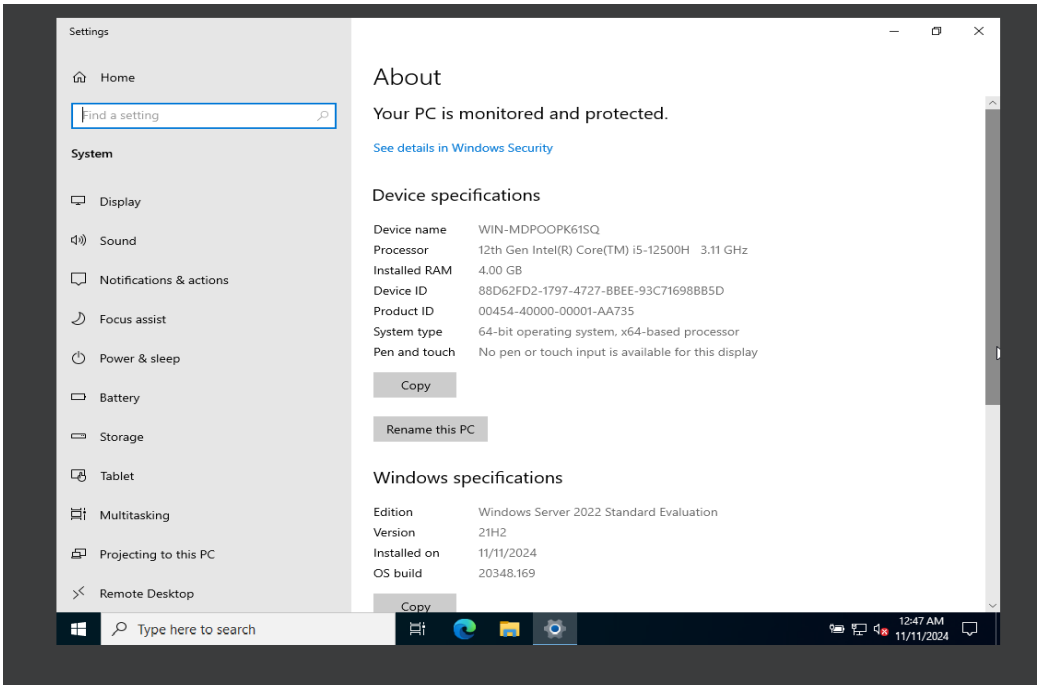

Figure 16: Checking the version and edition of the OS

Conclusion

In this lab, I learned how to set up virtual environments using VirtualBox, which allowed me to install and run different operating systems on a single computer. I also explored Windows Server 2022, looking into its background, why it’s still essential today, and how it supports modern technology. We covered partition formats like MBR and GPT, understanding the differences and why GPT is generally preferred for newer setups. The lab introduced foundational concepts in networking, cloud computing, and virtualization, which helped me understand the purpose of virtualization before getting hands-on with it.

One of the main things I learned was the concept of virtualization creates a simulated, or virtual, computing environment as opposed to a physical environment. Virtualization often includes computer-generated versions of hardware, operating systems, storage devices, and more. This allows organizations to partition a single physical computer or server into several virtual machines. Each virtual machine can then interact independently and run different operating systems or applications while sharing the resources of a single host machine. I used VirtualBox to set up Windows Server 2022 and explored the "Server Core" version, a streamlined installation without a graphical interface that saves system resources and is better for managing partitions. The lab also covered basic networking topics, such as IP addresses, routers, DNS, subnets, and protocols like TCP/IP and HTTP. These networking essentials were important for setting up the server correctly. I learned how to go through the Windows installation process, from choosing language and region settings to partitioning disks, and I practiced using command-line tools like PowerShell to simplify tasks and manage the server. We also looked at the hardware requirements for running servers and the costs involved in supporting many users. This included the importance of security, data backups, licensing, and choosing the right type of server for specific needs.

Overall, this lab gave me hands-on experience with Windows Server 2022, covering everything from installation to setup. It gave me a solid foundation in virtual machine configuration and helped me understand the benefits of GPT for modern setups. This experience showed me how essential servers are for powering modern technology and how they make it possible to run multiple applications securely and reliably.

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