



Certified Network Defender v3

LAB SETUP GUIDE

EC-Council Official Curricula

Table of Contents

<i>Classroom Setup Instructions: CND</i>	5
<i>Classroom Requirements</i>	5
<i>Hardware</i>	6
<i>Software</i>	6
<i>Setup Document Overview</i>	7
<i>Training Room Environment</i>	7
<i>Instructor's Computer</i>	8
<i>Student Workstations</i>	11
<i>Room Environment</i>	14
<i>Classroom Configuration</i>	15
<i>Computer Names</i>	17
<i>Instructor Acceptance</i>	17
<i>Firewall Settings</i>	18
<i>Blackboard</i>	18
<i>Setup Checklist</i>	19
<i>Instructor Acceptance</i>	20
<i>Assistance</i>	20
<i>Detailed Configuration Tasks (CT)</i>	21
<i>CT#1: Download CND-Tools</i>	21
<i>CT#2: Install VMware Workstation Pro on the Host Machine</i>	21
<i>CT#3: Configure the Virtual Network in VMware Virtual Network Editor</i>	25
<i>CT#4: Creating Virtual Machines</i>	29
CT#4.1: Creating Virtual Machine for Web Server	29
CT#4.2: Creating Virtual Machine for AD Domain Controller.....	33
CT#4.3: Creating Virtual Machine for Finance Dept	37
CT#4.4: Creating Virtual Machine for Admin Machine-1	41
CT#4.5: Creating Virtual Machine for Operation Dept.....	46

CT#4.6: Creating Virtual Machine for Admin Machine-2	51
CT#4.7: Creating Virtual Machine for OSSIM Server	56
CT#4.8: Creating Virtual Machine for Android Device	61
CT#4.9: Creating Virtual Machine for PfSense External Firewall	66
CT#4.10: Creating Virtual Machine for Smoothwall Internal Firewall	72
CT#4.11: Creating Virtual Machine for Attacker Machine	79
<i>CT#5: Configuring PfSense as External Firewall.....</i>	<i>87</i>
CT#5.1: Installing PfSense as External Firewall.....	87
<i>CT#6: Configuring Smoothwall as Internal Firewall.....</i>	<i>97</i>
CT#6.1: Installing Smoothwall as Internal Firewall	97
<i>CT#7: Configuring Windows 11 Enterprise Guest OS as Admin Machine-1.....</i>	<i>113</i>
CT#7.1: Installing Windows 11 Pro OS as Admin Machine-1	113
CT#7.2: Change the Computer Name	131
CT#7.3: Setting up IP address for Admin Machine-1.....	135
CT#7.4: Installing Adobe Acrobat Reader	145
CT#7.5: Installing WinRAR	146
CT#7.6: Installing Web Browsers.....	146
CT#7.7: Installing Notepad++	146
CT#7.8: Installing JDK	147
CT#7.9: Installing ZAP Tool.....	152
CT#7.10: Installing Nessus Vulnerability Scanning Tool.....	154
CT#7.11: Turn off Windows Firewall.....	160
CT#7.12: Configure pfSense Firewall	163
CT#7.13: Configuring Host File in Admin Machine-1	174
CT#7.14: Allowing running Cain&Abel on Admin Machine-1	175
<i>CT#8: Configuring Windows Server 2022 Guest OS as Web Server</i>	<i>177</i>
CT#8.1: Installing Windows Server 2022 as Web Server	177
CT#8.2: Changing the Computer Name	182
CT#8.3: Turn Off Windows Firewall.....	185
CT#8.4: Setting up IP address for Web Server	189

CT#8.5: Mapping CND-Tools Folder from Host Machine to Windows Server 2022 VM	195
CT#8.6: Installing Adobe Acrobat Reader	196
CT#8.7: Installing WinRAR	197
CT#8.8: Configuring Windows Explorer.....	197
CT#8.9: Installing Web Browsers.....	197
CT#8.10: Installing Notepad++	197
CT#8.11: Adding IIS (Internet Information Services) roles in Server Manager	198
CT#8.12: Configure the LuxuryTreats Website	217
CT#8.13: Configuring Host File in Windows Server 2022	225
CT#8.14: Setting up FTP Site.....	225
CT#8.15: Change User Account Settings to disable notification on System Changes	232
CT#8.16: Sharing Shared Docs folder in C Drive	237
<i>CT#9: Configuring Windows Server 2022 Guest OS as AD Domain Controller.....</i>	241
CT#9.1: Installing Windows Server 2022 as AD Domain Controller.....	241
CT#9.2: Changing the Computer Name	246
CT#9.3: Turn Off Windows Firewall.....	248
CT#9.4: Enabling Remote Desktop Connection.....	252
CT#9.5: Setting up IP address for AD Domain Controller	254
CT#9.6: Adding DHCP Role to Domain Controller.....	258
CT#9.7: Install Active Directory on AD Domain Controller VM.....	266
CT#9.8: Map CND-Tools Folder from Admin Machine-1 VM	277
CT#9.9: Installing Adobe Acrobat Reader	279
CT#9.10: Installing WinRAR.....	279
CT#9.11: Installing Web Browsers	280
CT#9.12: Installing Notepad++	280
CT#9.13: Create and Configure OU in AD.....	280
CT#9.14: Create and Configure User Account in AD	286
CT#9.15: Installing WampServer.....	290
<i>CT#10: Conguring Windows 11 Enterprise Guest OS as Finance Dept.....</i>	306
CT#10.1: Installing Windows 11 Enterprise Guest OS as Finance Dept	306

CT#10.2: Changing the Computer Name.....	323
CT#10.3: Setting up IP address for Finance Dept	326
CT#10.4: Installing Adobe Acrobat Reader	332
CT#10.5: Installing WinRAR.....	332
CT#10.6: Installing Web Browsers	333
CT#10.7: Installing Notepad++.....	333
CT#10.8: Enabling Remote Desktop Connection	333
<i>CT#11: Configuring Ubuntu Linux Guest OS as Operation Dept</i>	<i>333</i>
CT#11.1: Installing Ubuntu Linux as Operation Dept	333
CT#11.2: Add User to Operation Dept	339
<i>CT#12: Configuring Security Onion Guest OS as Admin Machine-2</i>	<i>342</i>
CT#12.1: Installing Security Onion as Admin Machine-2	342
CT#12.2: Configuring Security Onion as Admin Machine-2.....	350
<i>CT#13: Configuring OSSIM Server Guest OS as OSSIM Server.....</i>	<i>351</i>
CT#13.1: Installing OSSIM Server.....	351
CT#13.2: Configuring OSSIM Server Web Interface	359
<i>CT#14: Configuring Ubuntu Linux Guest OS as Attacker Machine.....</i>	<i>362</i>
CT#14.1: Installing Ubuntu Linux as Attacker Machine	362
CT#14.2: Setting up IP address for Attacker Machine	367
CT#14.3: Configuring Hosts file	369
CT#14.4: Creating files in Attacker Machine.....	369
<i>CT#15: Set Time Zone</i>	<i>370</i>
CT#15.1: Set Time Zone of VMs	371
<i>CT#16: Disable Real-time Protection.....</i>	<i>371</i>
<i>CT#17: Install and Configure Android Device VM.....</i>	<i>375</i>
CT#17.1: Install Android	375
CT#17.2: Configure IP Addresses for Android	384

Classroom Setup Instructions: CND

This document contains setup instructions for the EC-Council Certified Network Defender (CND) course. The course requires a standard modular classroom seating configuration, one computer for each student, one computer for the instructor, a dedicated switch, dedicated firewall, and Internet connection. This class teaches network security techniques.

Before beginning the class, install and configure all computers using the information and instructions that follow.

The information contained in this document is subject to change without notice. Unless otherwise noted, the names of companies, products, people and data used in this document are fictional. Their use is not intended in any way to represent any real company, person, product or event. Users of this document are responsible for compliance with all applicable copyright laws. No part of this document may be reproduced or transmitted by any means, electronic or mechanical, for any purpose, without the express written consent of the International Council of Electronic-Commerce Consultants, herein after referred to as the EC-Council. If, however, your only means of access is electronic, permission is hereby granted to print one copy.

The EC-Council may have patents, patent applications, trademarks, copyrights or other intellectual property rights covering the material in this document. Except as expressly provided in any written license agreement from the EC-Council, providing this document does not give you any license to those patents, trademarks, copyrights or other intellectual property.

EC-Council Certified Network Defender and CND are either registered trademarks or trademarks of the EC-Council in the USA and/or other countries. Other product and company names mentioned herein may be the trademarks of their respective owners.

Classroom Requirements

This section describes classroom equipment required for the EC-Council Certified Network Defender course.

Classroom Equipment

The following equipment is required for the general classroom setup:

- Climate control system adjustable within the classroom
- Lighting controls, adjustable within the classroom
- Whiteboard, 3 feet X 6 feet (1m X 2m) or larger
- Markers, whiteboard, assorted colors
- Eraser, whiteboard cleaner liquid
- Easel with flipchart or butcher paper pad, 24 inches X 36 inches
- Felt tip pens, blue and black required, other colors optional, chisel tip (not fine-point)
- Screen, projection, 6 feet diagonal measurement (non-reflective whiteboard surface may be substituted)
- Instructor station:
 - Desk, chair, and ergonomic keyboard

- Power outlet
- Network jack
- Projector, LCD, capable of 740 X 1280 pixels minimum w/ all connecting cables
- Student station (per student)
 - Chair, ergonomic keyboard
 - Workstation, minimum horizontal workspace 9 square feet (3 feet X 3 feet)
 - Power outlet, one per student station
 - Network jack, one per student station

Hardware

Hardware requirements for instructor, student and victim computers are identical:

- Intel Core i5 or equivalent CPU with minimum CPU speed of 3.2 GHz
- Minimum 8 GB RAM (16 GB is recommended)
- Hard disk, 500 GB or larger, 7200 RPM or faster
- DVD drive (DVD R/W drive preferred)
- 1 Network adapters (minimum of a 10/100 NIC, but a 10/100/1000 is preferred), full duplex (disable any additional network adapters installed)
- Monitor (minimum requirement is 17-inch LCD)
- Mouse or compatible pointing device, and sound card with amplified speakers
- Internet access

The following additional hardware is also required:

- An unmanaged switch, with sufficient ports to allow connection of all instructor and student workstations plus at least 5 additional, unused ports for connection of additional equipment or for use as “spares.”

Software

All computers in the class require the following software:

- Windows Server 2022 R2 or later* (64-bit Standard Edition with GUI), fully patched
- Microsoft Windows 11 Pro (64-bit) ISO/DVD
- Ubuntu Linux (downloadable at <https://ubuntu.com/download/desktop>)
- AlienVault OSSIM ISO (downloadable at http://downloads.alienvault.com/c/download?version=current_ossim_iso)
- Security Onion ISO (downloadable at <https://securityonionsolutions.com/software>)
- Android ISO (downloadable at <https://sourceforge.net/projects/android-x86/files>)
- pfSense ISO (downloadable at <https://www.pfsense.org/download/>)
- Smoothwall Express ISO (downloadable at <https://smoothwall.org/download.html>)
- CND Tools downloadable from Aspen portal.

Setup Document Overview

This document provides background information for technical staff responsible for setting up a training room facility for the CND course. This guide describes the requirements for the network equipment and computer stations that are installed and configured by the facilities personnel for the training courses.

Training Room Environment

The training room environment consists primarily of the following equipment:

- Instructor's Computer
- Student Workstation

Equipment	Number (Class of 12 Students)	Operating System	Minimum System Requirements
Instructor's Computer	1	Any Windows/Linux OS	Intel Core i5 or equivalent PC with 200 GB free disk space (with two logical partitions C: and D:), minimum of 8 GB RAM, 1 NIC (disable or unplug extras), 17-inch monitor, and compatible mouse
Student Workstations	12	Any Windows/Linux OS	Intel Core i5 or equivalent PC with 200 GB free disk space (with two logical partitions C: and D:), minimum of 8 GB RAM, 1 NIC (disable or unplug extras), 17-inch monitor, and compatible mouse

Instructor's Computer

The instructor's computer must:

- Be installed with **Windows 10** or later with the latest service packs and full patches applied
- Have Microsoft Office/Open Office or PowerPoint, Word, and Excel Viewers installed
- Be running IP protocol
- Have all CND Essential Tools downloaded from Aspen to the hard drive in E:\CND-Tools folder for easy access (See [CT#1](#) in Configuration Task section)
- Install VMware Workstation on Host Machine (See Configuration Task [CT#2](#))
- Configuring Internal Network for Hyper-V (See Configuration Task [CT#3](#))
- Create required guest operating systems on VMWare (See Configuration Task [CT#4](#))
 - Create Windows Server 2022 Virtual Machine as Web Server (See Configuration Task [CT#4.1](#))
 - Create Windows Server 2022 Virtual Machine as AD Domain Controller (See Configuration Task [CT#4.2](#))
 - Create Windows 11 Virtual Machine as Finance Dept (See Configuration Task [CT#4.3](#))
 - Create Windows 11 Virtual Machine as Admin Machine-1 (See Configuration Task [CT#4.4](#))
 - Create Ubuntu Virtual Machine as Operation Dept (See Configuration Task [CT#4.5](#))
 - Create Security Onion Virtual Machine as Admin Machine-2 (See Configuration Task [CT#4.6](#))
 - Create OSSIM Server Virtual Machine as OSSIM Sever (See Configuration Task [CT#4.7](#))
 - Create Android Virtual Machine as Android Device(See Configuration Task [CT#4.8](#))
 - Create PfSense Virtual Machine as PfSense External firewall (See Configuration Task [CT#4.9](#))
 - Create Smoothwall Virtual Machine as Internal firewall (See Configuration Task [CT#4.10](#))
 - Create Ubuntu Virtual Machine as Attacker Machine (See Configuration Task [CT#4.11](#))
- Configuring PfSense Guest OS as External Firewall (See Configuration Task [CT#5](#))
 - Installing PfSense as External Firewall (See Configuration Task [CT#5.1](#))
- Configuring Smoothwall Guest OS as Internal Firewall (See Configuration Task [CT#6](#))
 - Installing Smoothwall as Internal Firewall (See Configuration Task [CT#6.1](#))
- Configuring Windows 11 Guest OS as Admin Machine-1 (See Configuration Task [CT#7](#))
 - Installing Windows 11 Pro OS as Admin Machine-1 (See Configuration Task [CT#7.1](#))
 - Changing the Computer Name (See Configuration Task [CT#7.2](#))

- Setting up IP address for Admin Machine-1 (See Configuration Task [CT#7.3](#))
- Installing Adobe Acrobat Reader (See Configuration Task [CT#7.4](#))
- Installing WinRAR (See Configuration Task [CT#7.5](#))
- Installing Web Browsers (See Configuration Task [CT#7.6](#))
- Installing Notepad++ (See Configuration Task [CT#7.7](#))
- Installing JDK (See Configuration Task [CT#7.8](#))
- Installing ZAP Tool (See Configuration Task [CT#7.9](#))
- Installing Nessus Vulnerability Scanning Tool (See Configuration Task [CT#7.10](#))
- Turn off Windows Firewall (See Configuration Task [CT#7.11](#))
- Configuring pfSense Firewall (See Configuration Task [CT#7.12](#))
- Configuring Host File in Admin Machine-1 (See Configuration Task [CT#7.13](#))
- Configuring Windows Server 2022 Guest OS as Web Server (See Configuration Task [CT#8](#))
 - Installing Windows Sever 2022 as Web Server (See Configuration Task [CT#8.1](#))
 - Changing the Computer Name (See Configuration Task [CT#8.2](#))
 - Turn Off Windows Firewall (See Configuration Task [CT#8.3](#))
 - Setting up IP address for Web Server (See Configuration Task [CT#8.4](#))
 - Mapping CND-Tools Folder from Host Machine to Windows Server 2022 VM (See Configuration Task [CT#8.5](#))
 - Installing Adobe Acrobat Reader (See Configuration Task [CT#8.6](#))
 - Installing WinRAR (See Configuration Task [CT#8.7](#))
 - Configuring Windows Explorer (See Configuration Task [CT#8.8](#))
 - Installing Web Browsers (See Configuration Task [CT#8.9](#))
 - Installing Notepad++ (See Configuration Task [CT#8.10](#))
 - Adding IIS (Internet Information Services) roles in Server Manager (See Configuration Task [CT#8.11](#))
 - Configure the LuxuryTreats Website (See Configuration Task [CT#8.12](#))
 - Configuring Host File in Windows Server 2022 (See Configuration Task [CT#8.13](#))
 - Setting up FTP Site (See Configuration Task [CT#8.14](#))
 - Change User Account Settings to disable notification on System Changes (See Configuration Task [CT#8.15](#))
 - Adding New User (See Configuration Task [CT#8.16](#))
 - Sharing Shared Docs folder in C Drive [CT#8.17](#))
- Configuring Windows Server 2022 Guest OS as AD Domain Controller (See Configuration Task [CT#9](#))

- Installing Windows Server 2022 as AD Domain Controller (See Configuration Task [CT#9.1](#))
- Changing the Computer Name (See Configuration Task [CT#9.2](#))
- Turn Off Windows Firewall (See Configuration Task [CT#9.3](#))
- Enabling Remote Desktop Connection (See Configuration Task [CT#9.4](#))
- Setting up IP address for AD Domain Controller (See Configuration Task [CT#9.5](#))
- Adding DHCP Role to Domain Controller (See Configuration Task [CT#9.6](#))
- Install Active Directory on AD Domain Controller VM (See Configuration Task [CT#9.7](#))
- Map CND-Tools Folder from Admin Machine-1 VM (See Configuration Task [CT#9.8](#))
- Installing Adobe Acrobat Reader (See Configuration Task [CT#9.9](#))
- Installing WinRAR (See Configuration Task [CT#9.10](#))
- Installing Web Browsers (See Configuration Task [CT#9.11](#))
- Installing Notepad++ (See Configuration Task [CT#9.12](#))
- Create and Configure OU in AD (See Configuration Task [CT#9.13](#))
- Create and Configure User Account in AD (See Configuration Task [CT#9.14](#))
- Installing WampServer (See Configuration Task [CT#9.15](#))
- Configuring Windows 11 Guest OS as Finance Dept (See Configuration Task [CT#10](#))
 - Installing Windows 11 Enterprise Guest OS as Finance Dept (See Configuration Task [CT#10.1](#))
 - Changing the Computer Name (See Configuration Task [CT#10.2](#))
 - Setting up IP address for Finance Dept (See Configuration Task [CT#10.3](#))
 - Installing Adobe Acrobat Reader (See Configuration Task [CT#10.4](#))
 - Installing WinRAR (See Configuration Task [CT#10.5](#))
 - Installing Web Browsers (See Configuration Task [CT#10.6](#))
 - Installing Notepad++ (See Configuration Task [CT#10.7](#))
- Configuring Ubuntu Linux Guest OS as Operation Dept (See Configuration Task [CT#11](#))
 - Installing Ubuntu Linux as Operation Dept (See Configuration Task [CT#11.1](#))
 - Add User to Operation Dept (See Configuration Task [CT#11.2](#))
- Configuring Security Onion Guest OS as Admin machine-2 (See Configuration Task [CT#12](#))
 - Installing Security Onion as Admin Machine-2 (See Configuration Task [CT#12.1](#))
 - Configuring Security Onion (See Configuration Task [CT#12.2](#))
- Configuring OSSIM Server Guest OS as OSSIM Server (See Configuration Task [CT#13](#))

- Installing OSSIM Server(See Configuration Task [CT#13.1](#))
- Configuring OSSIM Server Web Interface (See Configuration Task [CT#13.2](#))
- Configuring Ubuntu Linux Guest OS as Attacker Machine (See Configuration Task [CT#14](#))
 - Installing Ubuntu Linux as Attacker Machine(See Configuration Task [CT#14.1](#))
 - Setting up IP address for Attacker Machine (See Configuration Task [CT#14.2](#))
 - Configuring Hosts file (See Configuration Task [CT#14.3](#))
 - Creating files in Attacker VM (See Configuration Task [CT#14.4](#))
 -
- Setting Time Zone (See Configuration Task [CT#15](#))
 - Set Time Zone of VMs (See Configuration Task [CT#15.1](#))
- Setting Time Zone (See Configuration Task [CT#16](#))
- Install and Configure Android Device VM (See Configuration Task [CT#17](#))
 - Install Android (See Configuration Task [CT#17.1](#))
 - Configure IP addresses for Android (See Configuration Task [CT#17.2](#))
- Have all the VMs configured as per the Configuration Tasks (see Configuration Task section for details)
- Have an LCD Projector connected to the instructor's machine
- The use of Ghost images is recommended to reduce setup time if computer failure occurs

Student Workstations

Student workstations must:

- Be installed with **Windows 10** or later with the latest service packs and full patches applied
- Have Microsoft Office/Open Office or PowerPoint, Word, and Excel Viewers installed
- Be running IP protocol
- Have all CND Essential Tools downloaded from Aspen to the hard drive in E:\CND-Tools folder for easy access (See [CT#1](#) in Configuration Task section)
- Install VMware Workstation on Host Machine (See Configuration Task [CT#2](#))
- Configuring Internal Network for Hyper-V (See Configuration Task [CT#3](#))
- Create required guest operating systems on VMWare (See Configuration Task [CT#4](#))
 - Create Windows Server 2022 Virtual Machine as Web Server (See Configuration Task [CT#4.1](#))
 - Create Windows Server 2022 Virtual Machine as AD Domain Controller (See Configuration Task [CT#4.2](#))
 - Create Windows 11 Virtual Machine as Finance Dept (See Configuration Task [CT#4.3](#))

- Create Windows 11 Virtual Machine as Admin Machine-1 (See Configuration Task [CT#4.4](#))
- Create Ubuntu Virtual Machine as Operation Dept (See Configuration Task [CT#4.5](#))
- Create Security Onion Virtual Machine as Admin Machine-2 (See Configuration Task [CT#4.6](#))
- Create OSSIM Server Virtual Machine as OSSIM Sever (See Configuration Task [CT#4.7](#))
- Create Android Virtual Machine as Android Device(See Configuration Task [CT#4.8](#))
- Create PfSense Virtual Machine as PfSense External firewall (See Configuration Task [CT#4.9](#))
- Create Smoothwall Virtual Machine as Internal firewall (See Configuration Task [CT#4.10](#))
- Create Ubuntu Virtual Machine as Attacker Machine (See Configuration Task [CT#4.11](#))
- Configuring PfSense Guest OS as External Firewall (See Configuration Task [CT#5](#))
 - Installing PfSense as External Firewall (See Configuration Task [CT#5.1](#))
- Configuring Smoothwall Guest OS as Internal Firewall (See Configuration Task [CT#6](#))
 - Installing Smoothwall as Internal Firewall (See Configuration Task [CT#6.1](#))
- Configuring Windows 11 Guest OS as Admin Machine-1 (See Configuration Task [CT#7](#))
 - Installing Windows 11 Pro OS as Admin Machine-1 (See Configuration Task [CT#7.1](#))
 - Changing the Computer Name (See Configuration Task [CT#7.2](#))
 - Setting up IP address for Admin Machine-1 (See Configuration Task [CT#7.3](#))
 - Installing Adobe Acrobat Reader (See Configuration Task [CT#7.4](#))
 - Installing WinRAR (See Configuration Task [CT#7.5](#))
 - Installing Web Browsers (See Configuration Task [CT#7.6](#))
 - Installing Notepad++ (See Configuration Task [CT#7.7](#))
 - Installing JDK (See Configuration Task [CT#7.8](#))
 - Installing ZAP Tool (See Configuration Task [CT#7.9](#))
 - Installing Nessus Vulnerability Scanning Tool (See Configuration Task [CT#7.10](#))
 - Turn off Windows Firewall (See Configuration Task [CT#7.11](#))
 - Configuring pfSense Firewall (See Configuration Task [CT#7.12](#))
 - Configuring Host File in Admin Machine-1 (See Configuration Task [CT#7.13](#))
- Configuring Windows Server 2022 Guest OS as Web Server (See Configuration Task [CT#8](#))
 - Installing Windows Sever 2022 as Web Server (See Configuration Task [CT#8.1](#))
 - Changing the Computer Name (See Configuration Task [CT#8.2](#))

- Turn Off Windows Firewall (See Configuration Task [CT#8.3](#))
- Setting up IP address for Web Server (See Configuration Task [CT#8.4](#))
- Mapping CND-Tools Folder from Host Machine to Windows Server 2022 VM (See Configuration Task [CT#8.5](#))
- Installing Adobe Acrobat Reader (See Configuration Task [CT#8.6](#))
- Installing WinRAR (See Configuration Task [CT#8.7](#))
- Configuring Windows Explorer (See Configuration Task [CT#8.8](#))
- Installing Web Browsers (See Configuration Task [CT#8.9](#))
- Installing Notepad++ (See Configuration Task [CT#8.10](#))
- Adding IIS (Internet Information Services) roles in Server Manager (See Configuration Task [CT#8.11](#))
- Configure the LuxuryTreats Website (See Configuration Task [CT#8.12](#))
- Configuring Host File in Windows Server 2022 (See Configuration Task [CT#8.13](#))
- Setting up FTP Site (See Configuration Task [CT#8.14](#))
- Change User Account Settings to disable notification on System Changes (See Configuration Task [CT#8.15](#))
- Adding New User (See Configuration Task [CT#8.16](#))
- Sharing Shared Docs folder in C Drive [CT#8.17](#))
- Configuring Windows Server 2022 Guest OS as AD Domain Controller (See Configuration Task [CT#9](#))
 - Installing Windows Server 2022 as AD Domain Controller (See Configuration Task [CT#9.1](#))
 - Changing the Computer Name (See Configuration Task [CT#9.2](#))
 - Turn Off Windows Firewall (See Configuration Task [CT#9.3](#))
 - Enabling Remote Desktop Connection (See Configuration Task [CT#9.4](#))
 - Setting up IP address for AD Domain Controller (See Configuration Task [CT#9.5](#))
 - Adding DHCP Role to Domain Controller (See Configuration Task [CT#9.6](#))
 - Install Active Directory on AD Domain Controller VM (See Configuration Task [CT#9.7](#))
 - Map CND-Tools Folder from Admin Machine-1 VM (See Configuration Task [CT#9.8](#))
 - Installing Adobe Acrobat Reader (See Configuration Task [CT#9.9](#))
 - Installing WinRAR (See Configuration Task [CT#9.10](#))
 - Installing Web Browsers (See Configuration Task [CT#9.11](#))
 - Installing Notepad++ (See Configuration Task [CT#9.12](#))
 - Create and Configure OU in AD (See Configuration Task [CT#9.13](#))

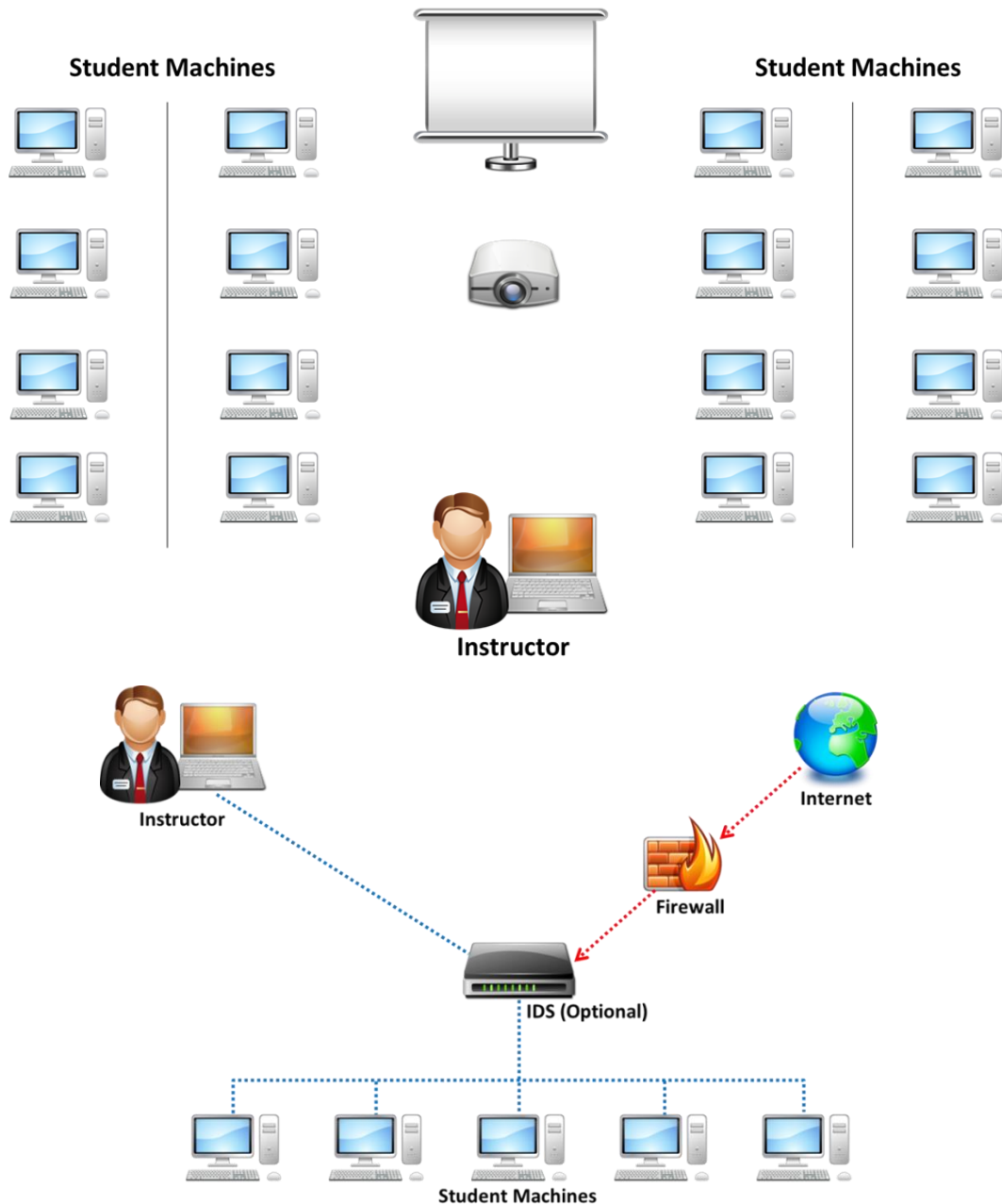
- Create and Configure User Account in AD (See Configuration Task [CT#9.14](#))
- Installing WampServer (See Configuration Task [CT#9.15](#))
- Configuring Windows 11 Guest OS as Finance Dept (See Configuration Task [CT#10](#))
 - Installing Windows 11 Enterprise Guest OS as Finance Dept (See Configuration Task [CT#10.1](#))
 - Changing the Computer Name (See Configuration Task [CT#10.2](#))
 - Setting up IP address for Finance Dept (See Configuration Task [CT#10.3](#))
 - Installing Adobe Acrobat Reader (See Configuration Task [CT#10.4](#))
 - Installing WinRAR (See Configuration Task [CT#10.5](#))
 - Installing Web Browsers (See Configuration Task [CT#10.6](#))
 - Installing Notepad++ (See Configuration Task [CT#10.7](#))
- Configuring Ubuntu Linux Guest OS as Operation Dept (See Configuration Task [CT#11](#))
 - Installing Ubuntu Linux as Operation Dept (See Configuration Task [CT#11.1](#))
- Configuring Security Onion Guest OS as Admin machine-2 (See Configuration Task [CT#12](#))
 - Installing Security Onion as Admin Machine-2 (See Configuration Task [CT#12.1](#))
 - Configuring Security Onion (See Configuration Task [CT#12.2](#))
- Configuring OSSIM Server Guest OS as OSSIM Server(See Configuration Task [CT#13](#))
 - Installing OSSIM Server(See Configuration Task [CT#13.1](#))
 - Configuring OSSIM Server Web Interface (See Configuration Task [CT#13.2](#))
- Configuring Ubuntu Linux Guest OS as Attacker Machine (See Configuration Task [CT#14](#))
 - Installing Ubuntu Linux as Attacker Machine(See Configuration Task [CT#14.1](#))
 - Setting up IP address for Attacker Machine (See Configuration Task [CT#14.2](#))
- Have all the VMs configured as per the Configuration Tasks (see Configuration Task section for details)
- The use of Ghost images is recommended to reduce setup time if computer failure occurs

Room Environment

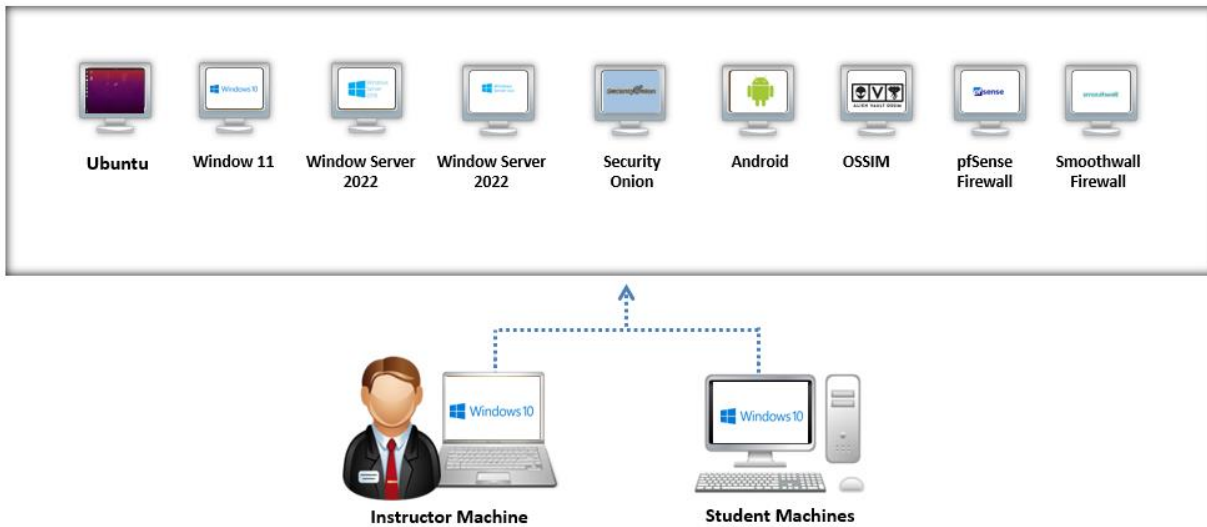
- The room must contain a whiteboard measuring a minimum of 1 yard by 2-3 yards in length (1 meter by 2-3 meters)
- The room should contain an easel and large tablet (optional)
- The room must be equipped with legible black and blue felt tip pens

Classroom Configuration

The configuration of this classroom is modular. Computers can be added or removed by either row or column, depending on the needs of the particular class. The following is a sample room setup that provides optimal support. This setup allows for ease of access to "*troubleshooting*" by the instructor, and allows students to break into functional small and larger teams.



Set up the machines based on the classroom setup diagram. The lab exercises for the students are instructor led and they are based on the network security tools in the trainer slides.



Computer Names

Assign computer names to student machines like CNDSTUDENT1, CNDSTUDENT2, CNDSTUDENT3, and so on. Instructor machine should be named as INSTRUCTOR.

Instructor Acceptance

Before the training class is scheduled to begin, the instructor will visit the training facility to inspect and accept the setup. The technical contact (System Administrator) for the facility must be available to answer questions and correct any setup issues. Both the instructor and the facility technical contact will ensure completion of the following checklists before the training setup is deemed acceptable.

Firewall Settings

Do not block any ports while accessing the Internet through the firewall. You should be able to ping servers on the Internet.

Blackboard

- Write the following on the blackboard top left corner
 - Instructor name: <Name of the instructor>
 - The username/password to logon to the student machine
- At the center of the board write the following letters in bold

Welcome to CNDv3 Class!

Instructor Name: **Jack Smith**

The Username / Password to logon to the student machine

administrator / qwerty@123

Welcome to CND Class!

Setup Checklist

The arrangement of items in the setup checklists is designed to allow the process to be completed in the most efficient manner possible and validate that the setup has been done correctly. Before beginning the setup checklist, log off any connected users.

Tick Here	List
<input type="checkbox"/>	Open Network. Verify that all classroom computers are visible in Network
<input type="checkbox"/>	Verify that the CND tools are on the computer in CND-Tools folder in the E:\ drive
<input type="checkbox"/>	Verify that Internet access is available
<input type="checkbox"/>	Visit https://www.eccouncil.org to check the Internet access
<input type="checkbox"/>	Verify each computer has 200 GB or more free disk space
<input type="checkbox"/>	Verify Microsoft PowerPoint, Word, and Excel viewer are installed (or Microsoft office/Open Office is installed)
<input type="checkbox"/>	Verify if you can successfully boot Windows Server 2012, Windows 10, Windows Server 2008, Ubuntu, OSSIM, and NST virtual machines
<input type="checkbox"/>	Verify that all the VMs are configured as per the configuration tasks
<input type="checkbox"/>	Verify that the Instructor computer can image through the overhead projector
<input type="checkbox"/>	Placement of LCD (overhead) projector is appropriate
<input type="checkbox"/>	Cable wiring organized and labeled
<input type="checkbox"/>	Student workstations and chair placement is satisfactory
<input type="checkbox"/>	Whiteboard and dry erase markers and erasers are available
<input type="checkbox"/>	Instructor station is properly organized and oriented
<input type="checkbox"/>	Computers are labeled with client number
<input type="checkbox"/>	EC-Council courseware (Official EC-Council CND Box) is available for students
<input type="checkbox"/>	Write down the facility's technical contact person's mobile phone number. Contact him in case of network problem

Instructor Acceptance

The technical contact (System Administrator) for the facility must be available to answer questions and correct any setup issues.

The Instructor will inspect both the classroom and the items covered in the setup checklist(s) to ensure that the classroom and setup meet EC Council standards. Any deficiencies discovered by the Instructor must be corrected before the scheduled start time for the class.

Assistance

If you have problems or require assistance in setting up the Lab for your CND class, please e-mail partnersupport@eccouncil.org

Detailed Configuration Tasks (CT)

CT#1: Download CND Tools

1. Create a folder in the Drive E: named CND-Tools
2. Login to your Aspen account → click eBooks icon under the Learning Resources section → select CND Courseware from the Select Courseware drop-down list in the Download Courseware section → scroll down to the Tools section
3. Click the module names and download all the Essential Tools files to the E:\CND-Tools folder
4. Right-click the .zip files in the E:\CND-Tools folder and select Extract Here option

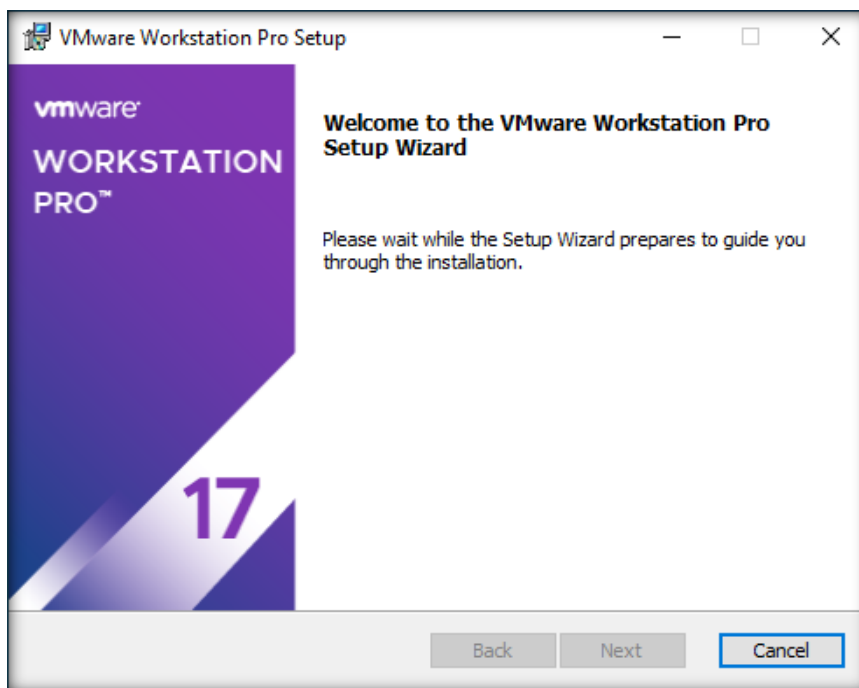
CT#2: Install VMware Workstation Pro on the Host Machine

1. Download the latest version of **VMware Workstation Pro** from the VMware official website (<https://www.vmware.com/in/products/workstation-pro/workstation-pro-evaluation.html>).
2. Double click on the .exe setup file to begin the installation.
3. The **User Account Control** pop-up window appears. Click **Yes**.

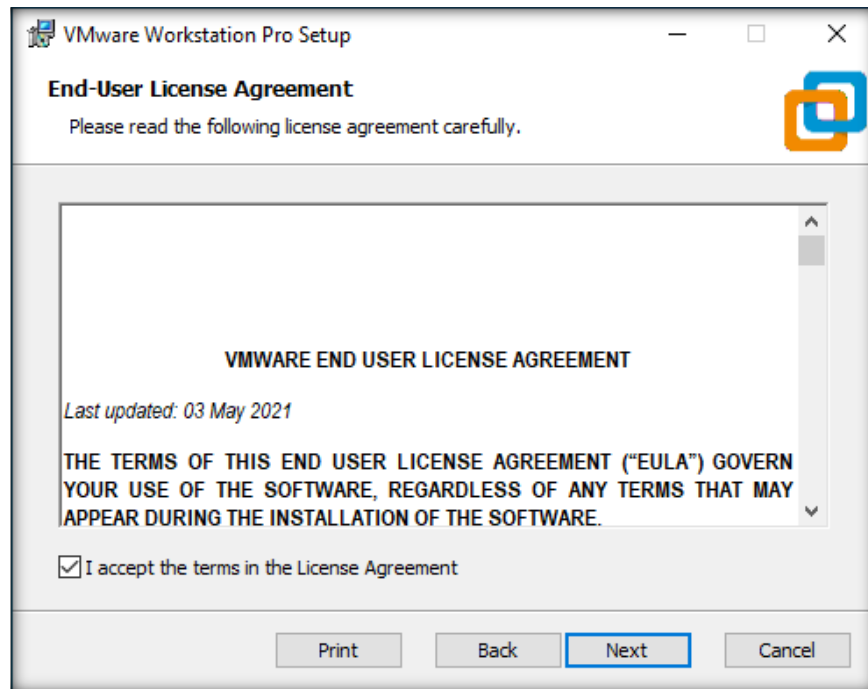
Note: If a **VMware Product Installation** notification appears, click **Yes** to restart the system.

Note: After the system reboots, double-click the downloaded .exe file.

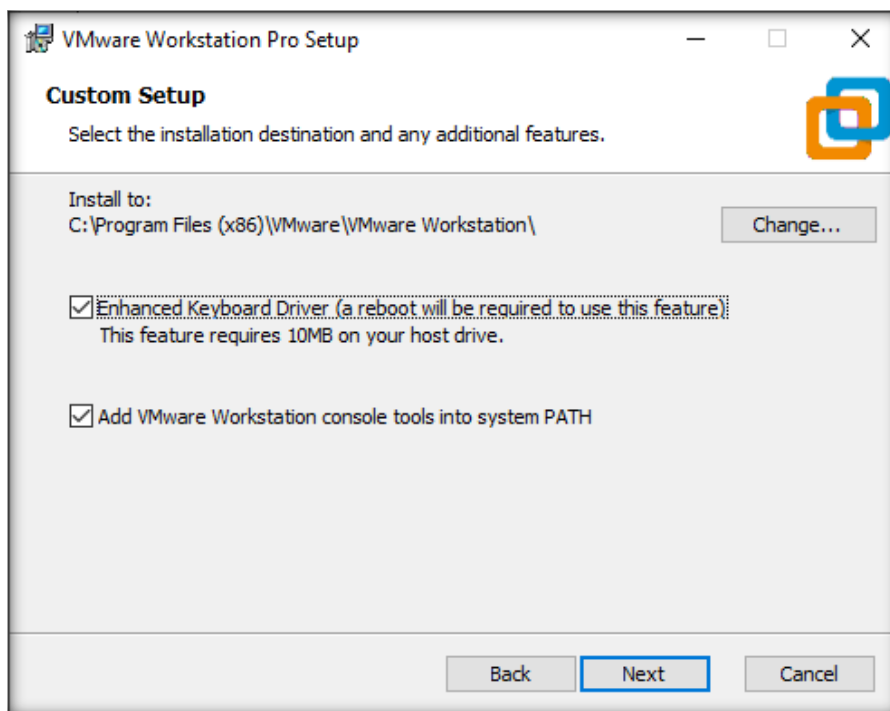
4. VMware Workstation Pro initializes; in the installation wizard, click **Next**.



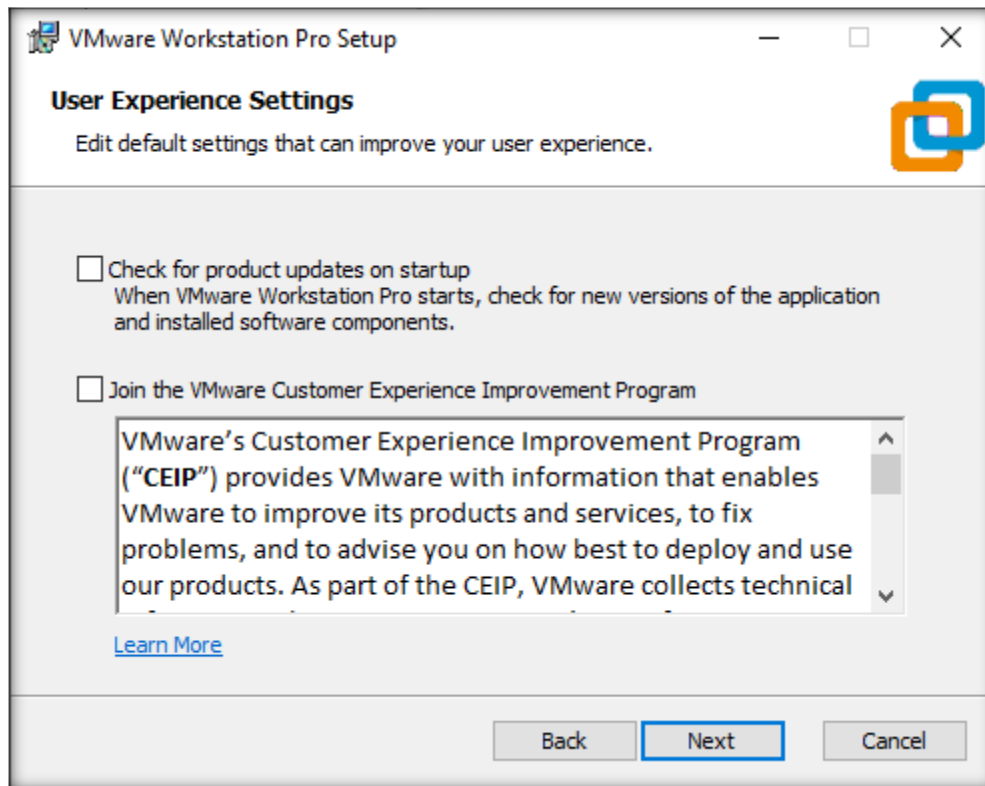
5. Accept the user agreement and click **Next**.



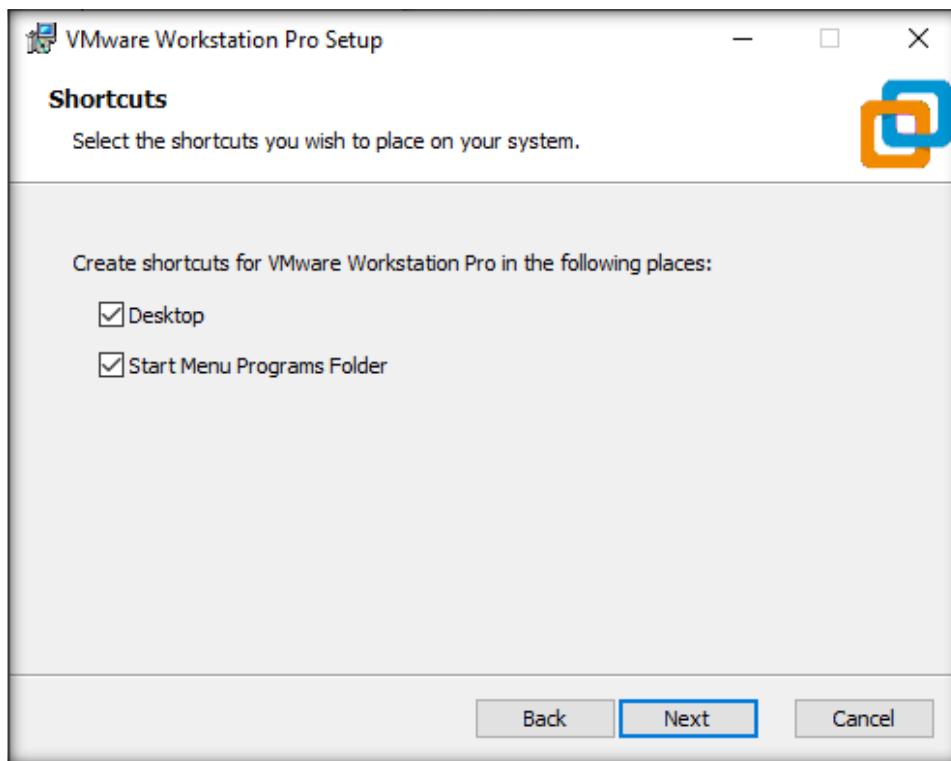
6. In the **Custom Setup** wizard, check the **Enhanced Keyboard Driver** option and click **Next**.



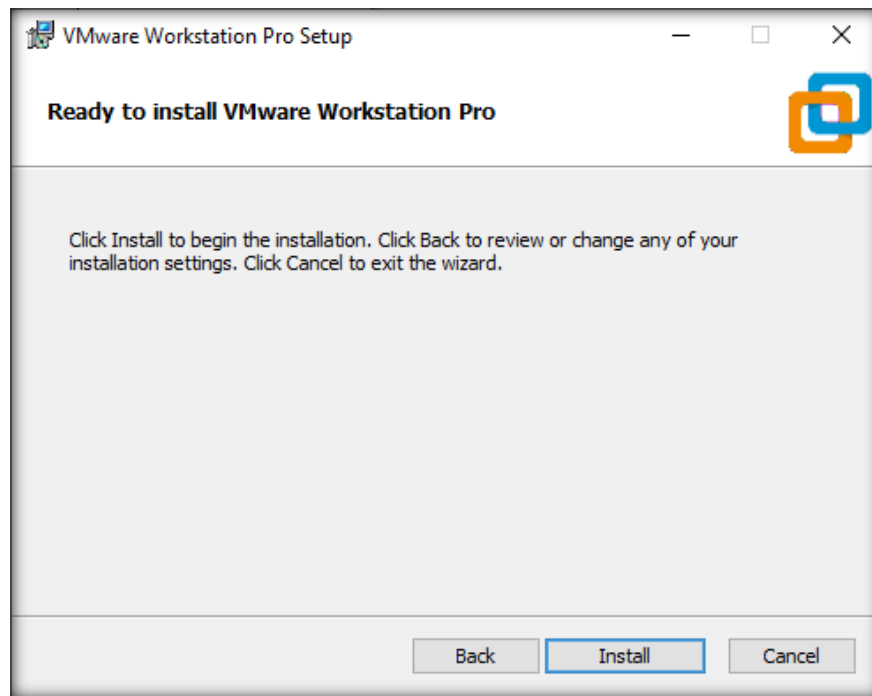
7. In the User Experience Settings window, keep the default settings, and click Next.



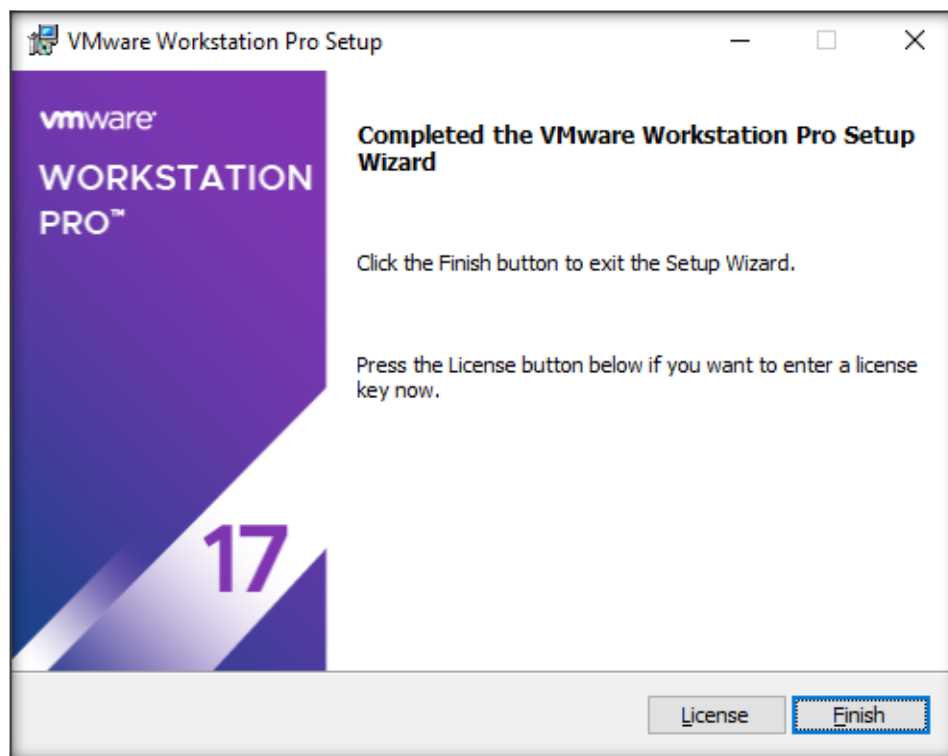
8. In the Shortcuts windows, keep the default settings and click **Next**.



- Click **Install** to begin VMware Workstation Pro installation in the Ready to install the VMware Workstation Pro window.



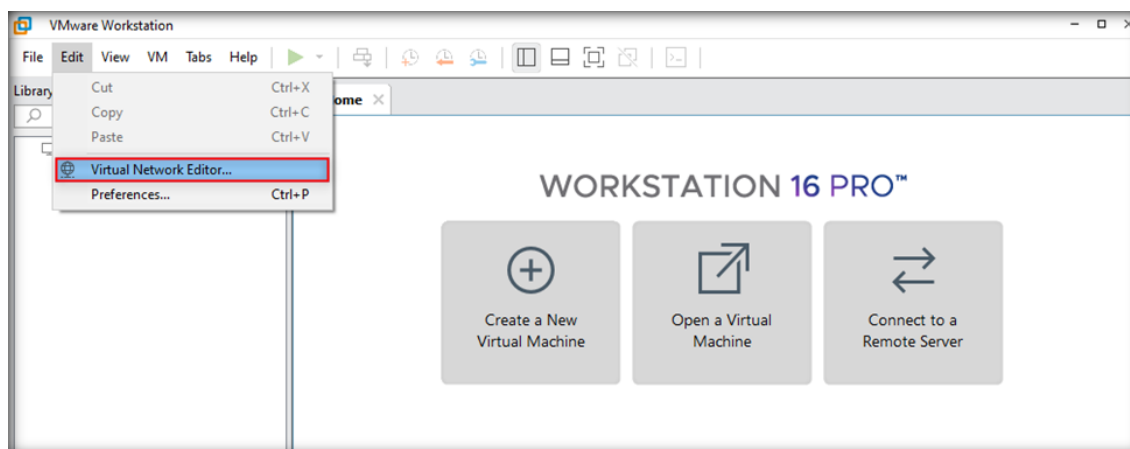
- On completion of the installation, click **Finish**.



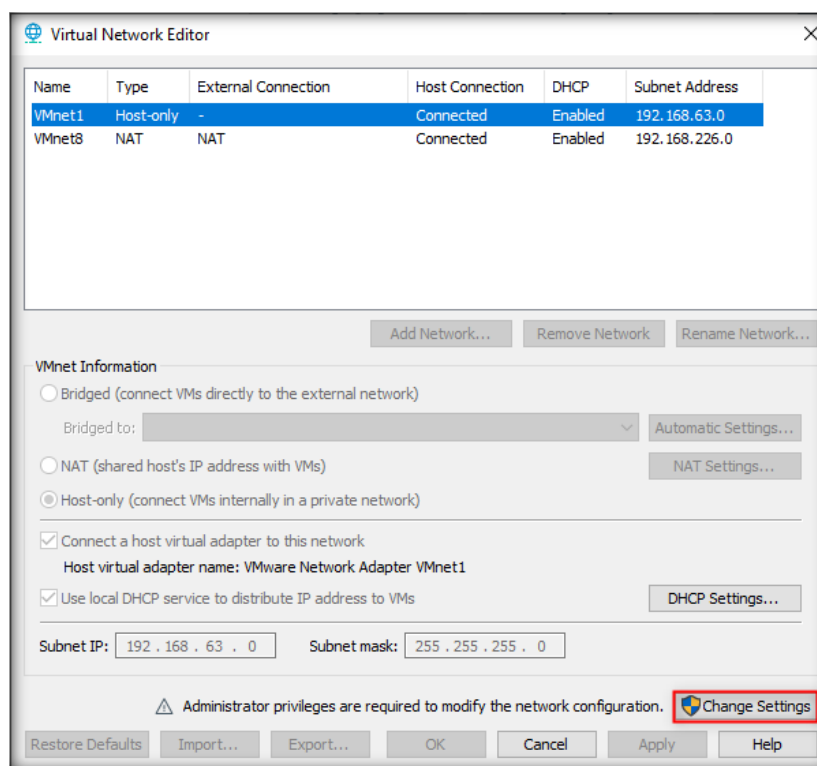
- You will be prompted to restart the system, click **Yes**.

CT#3: Configure the Virtual Network in VMware Virtual Network Editor

1. Launch **VMware Workstation Pro**.
2. Navigate to **Edit** and click **Virtual Network Editor...** as shown in the screenshot.

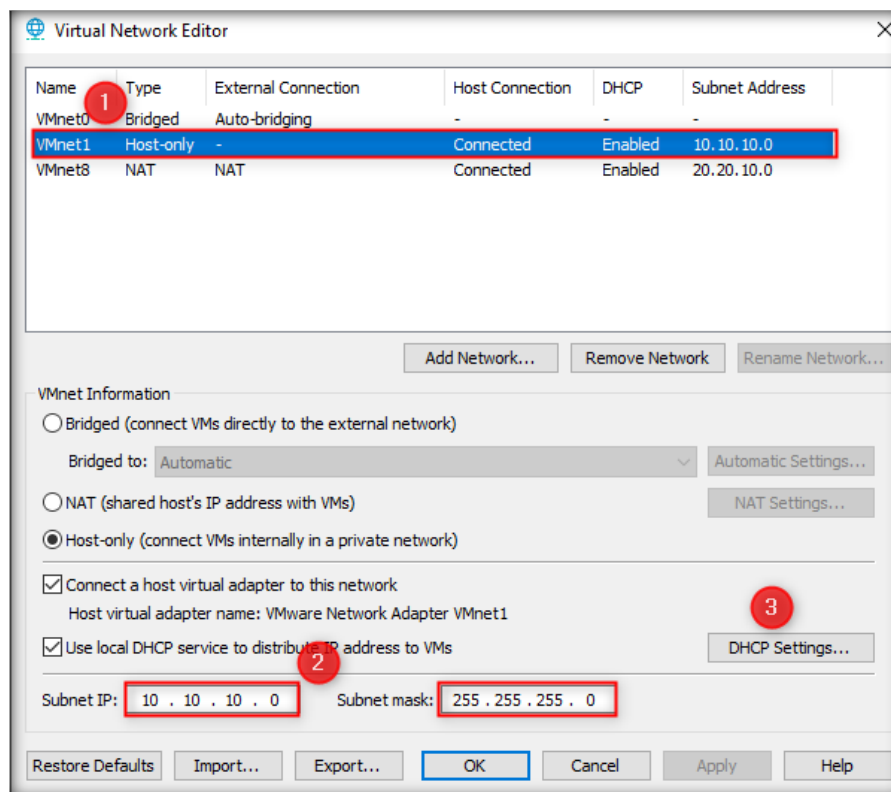


3. The **Virtual Network Editor** window appears; choose the **VMnet8 NAT** network and click **Change Settings** from the lower-right section of the window.

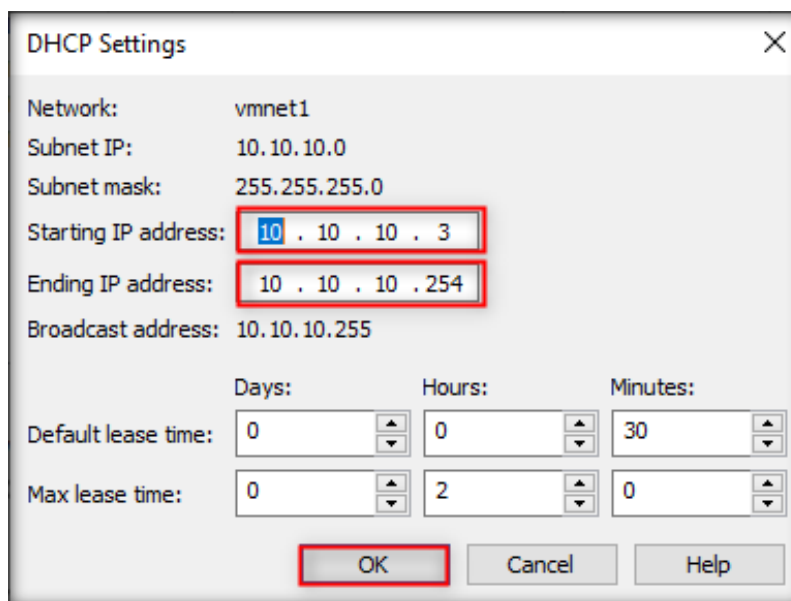


4. If a **User Account Control** pop-up appears, click **Yes**.

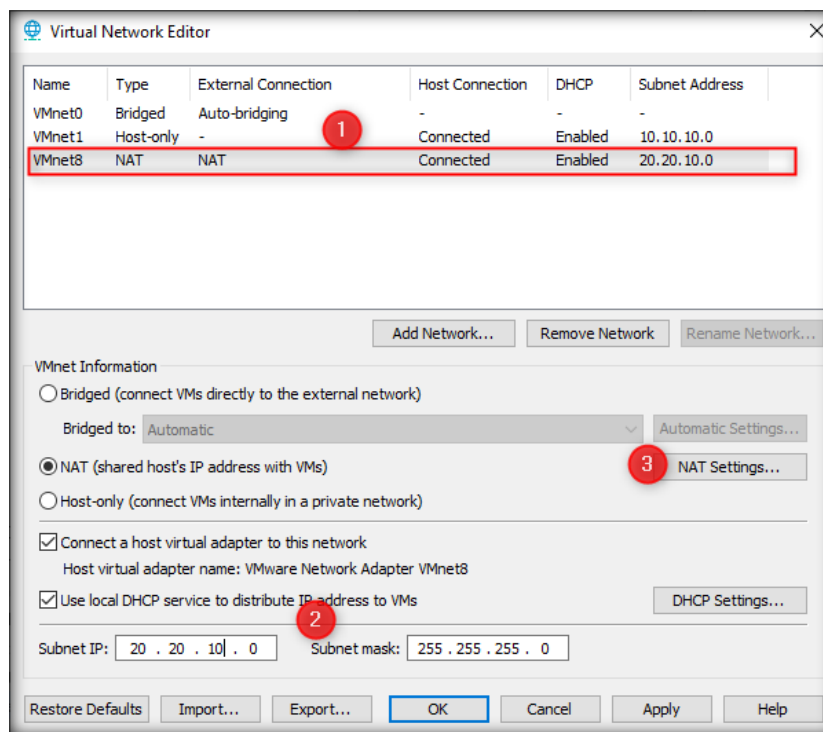
5. In the **Virtual Network Editor** window, select **VMnet1**, define **Subnet IP** as **10.10.10.0**, and **Subnet mask** as **255.255.255.0**, and click **DHCP Settings...**



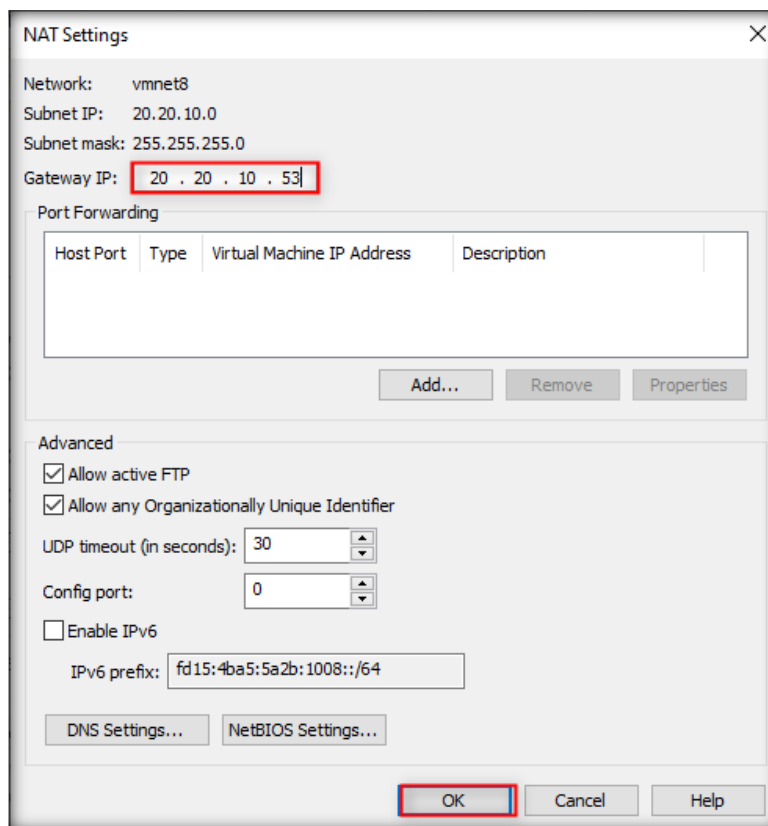
6. In the **DHCP Settings** window, define the **Starting IP address** as **10.10.10.3** and the **Ending IP address** as **10.10.10.254**, and click **OK**.



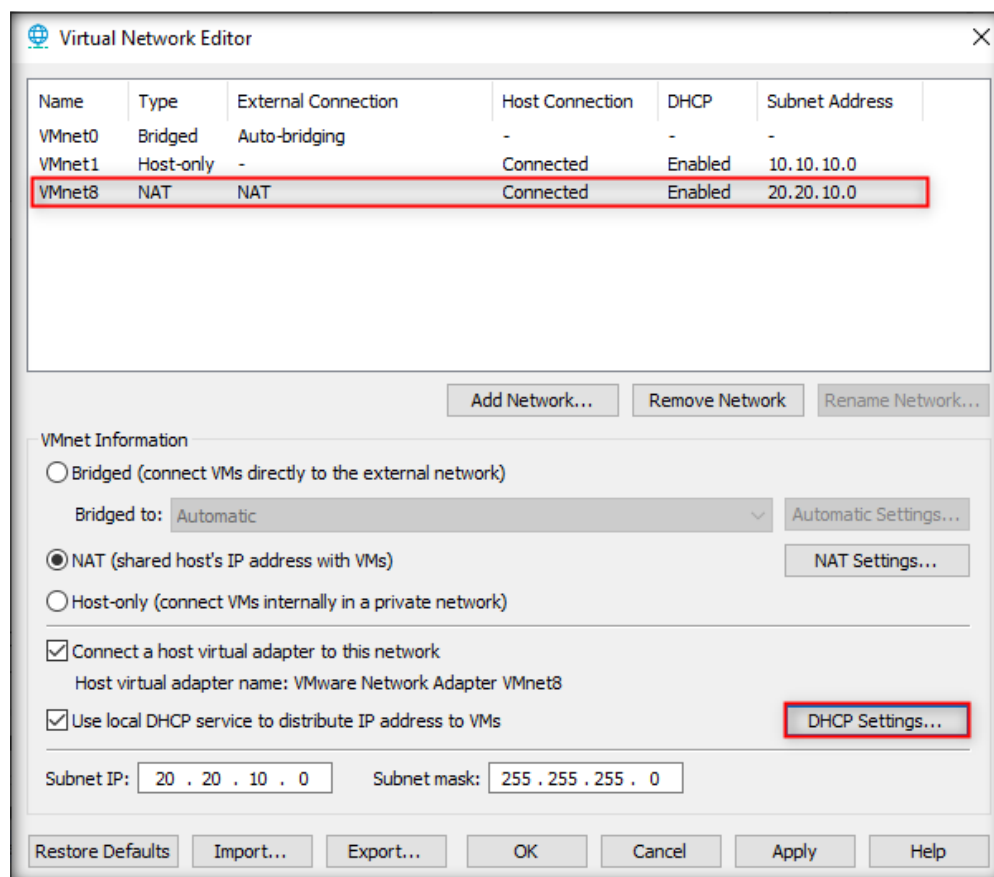
7. Select **VMnet8**, define **Subnet IP** as **20.20.10.0** and **Subnet mask** as **255.255.255.0**, and click **NAT Settings...**



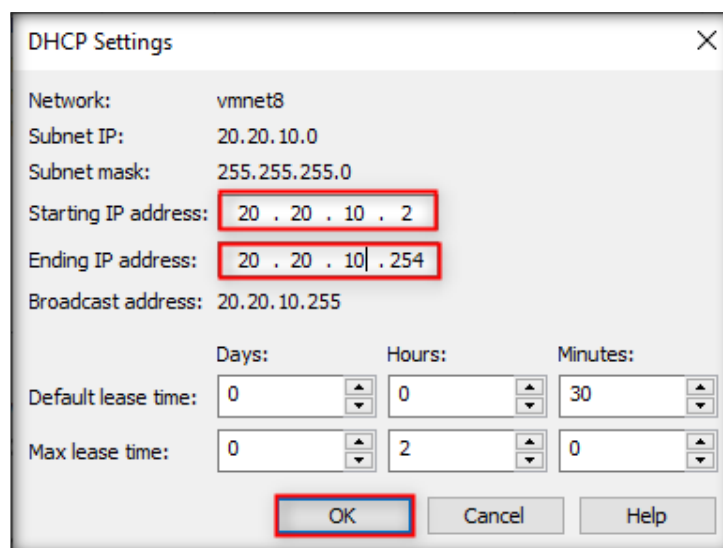
8. The **NAT Settings** window appears; enter the **Gateway IP** as **10.10.10.2** and click **OK**.



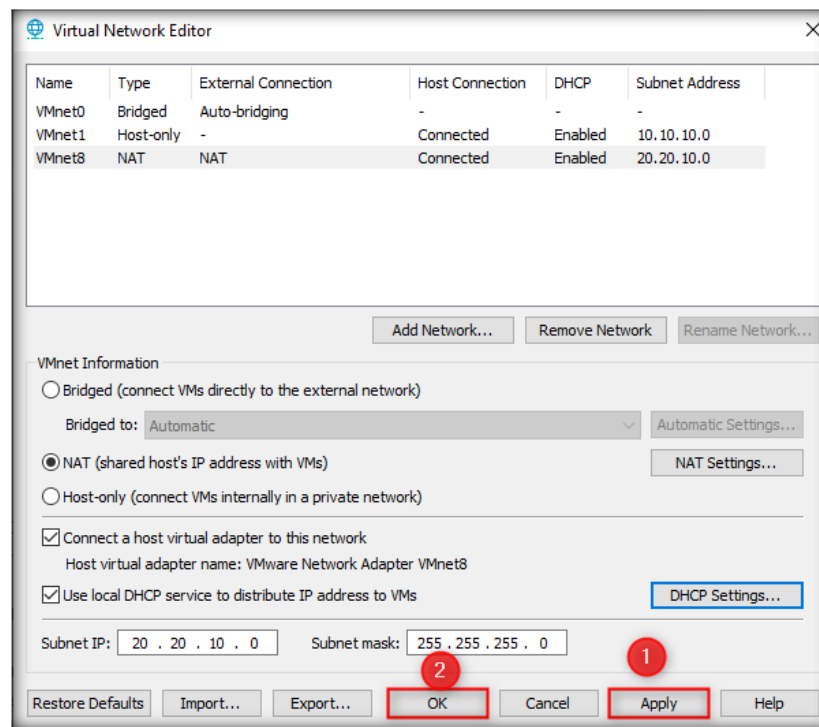
9. Now we keep **VMnet8** selected and click **DHCP Settings...**



10. In the **DHCP Settings** window, define the **Starting IP address** as 20.20.10.2 and the **Ending IP address** as 20.20.10.254, and click **OK**.



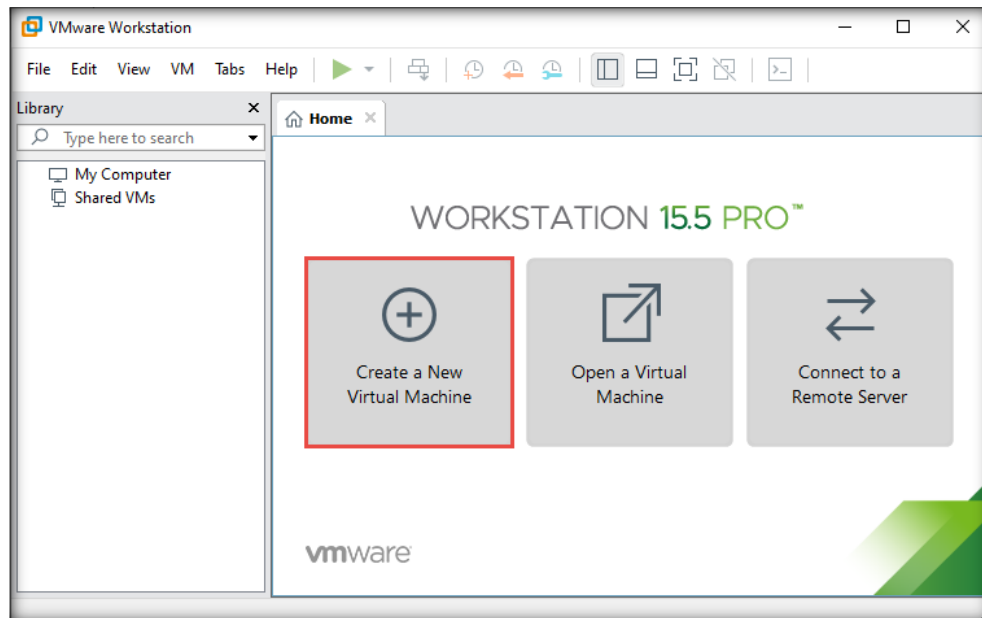
11. Click **Apply** and **OK** in the **Virtual Network Editor** window to complete the configuration.



CT#4: Creating Virtual Machines

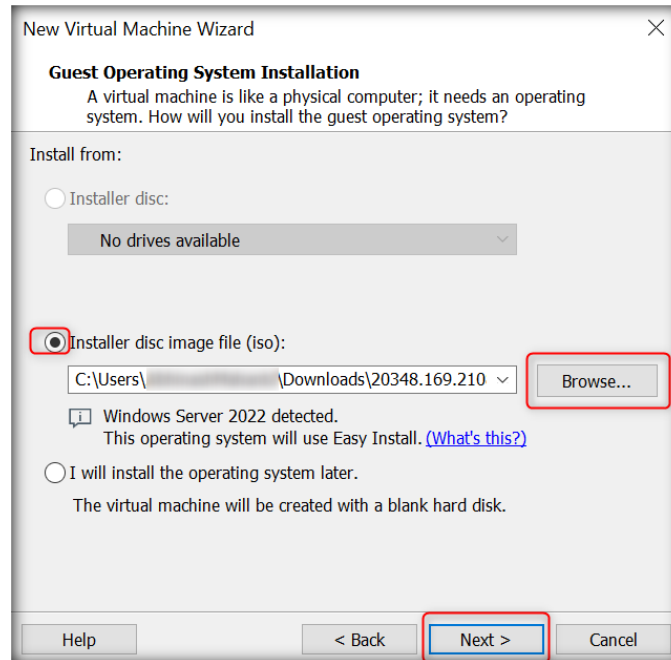
CT#4.1: Creating Virtual Machine for Web Server

1. In the VMware Workstation window, click Create a New Virtual Machine.

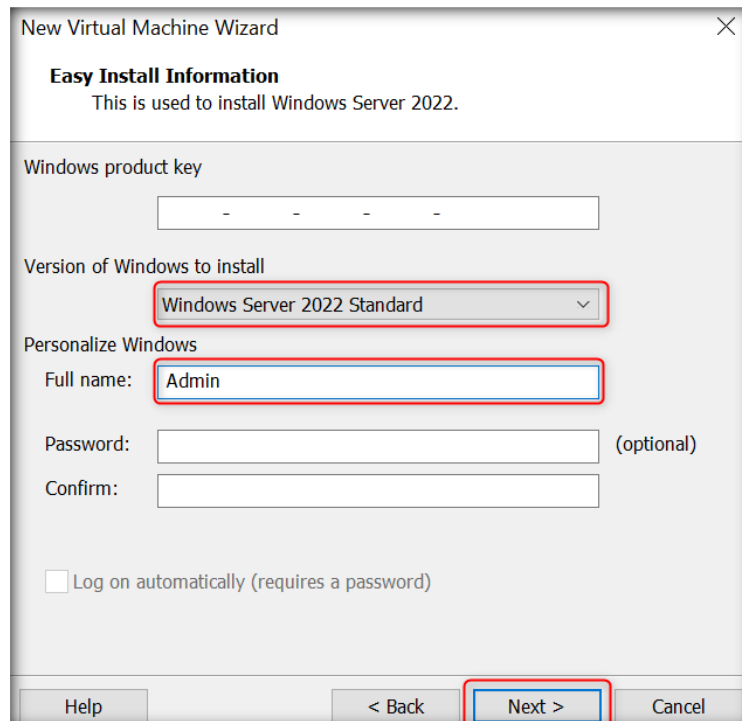


2. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.

- Click **Installer disc image file (iso)** radio button and click on **Browse**. Select the iso file and click on **Next >**.



- Select Windows Server 2022 Standard and type Full name as Admin. Click on Next.



- A popup appears for windows product key. Click yes.

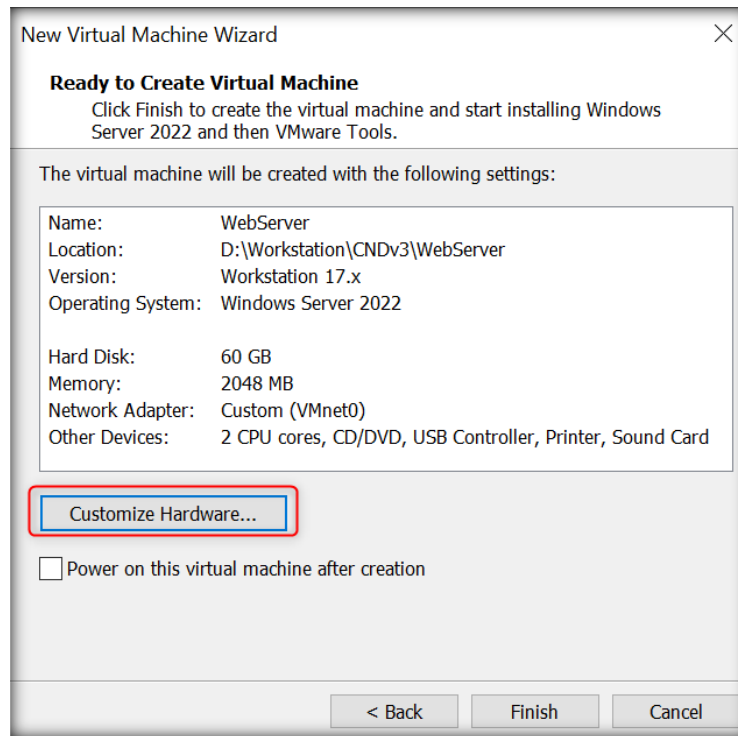
6. Assign the name of the virtual machine as **WebServer**. You can choose different location to store the VM's or set it to default location. Click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Name the Virtual Machine'. Below the title is the question 'What name would you like to use for this virtual machine?'. There are two input fields: 'Virtual machine name:' with the text 'WebServer' and 'Location:' with the text 'D:\Workstation\CNDv3\WebServer'. A 'Browse...' button is next to the location field. Below the fields is the text 'The default location can be changed at Edit > Preferences.' At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red box.

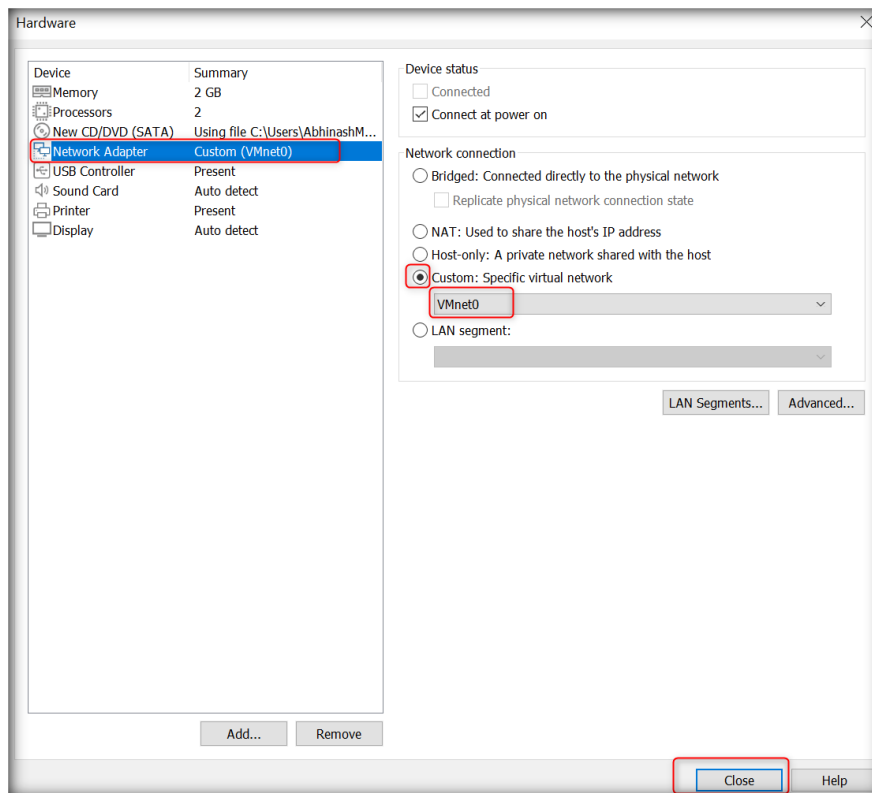
7. Specify Disk Capacity section appears, allocate **60 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Specify Disk Capacity'. Below the title is the question 'How large do you want this disk to be?'. There is a text box for 'Maximum disk size (GB):' with the value '60.0' and a spin button. Below this is the text 'Recommended size for Windows Server 2022: 60 GB'. There are two radio buttons: 'Store virtual disk as a single file' (selected) and 'Split virtual disk into multiple files'. Below the second radio button is the text 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a blue box.

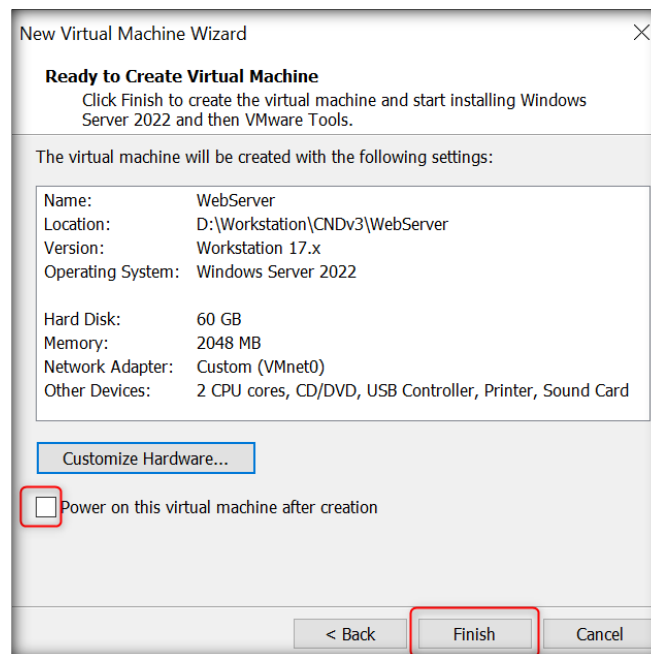
8. Click Customize Hardware.



9. Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet0 (Bridged). Click on **Close**.



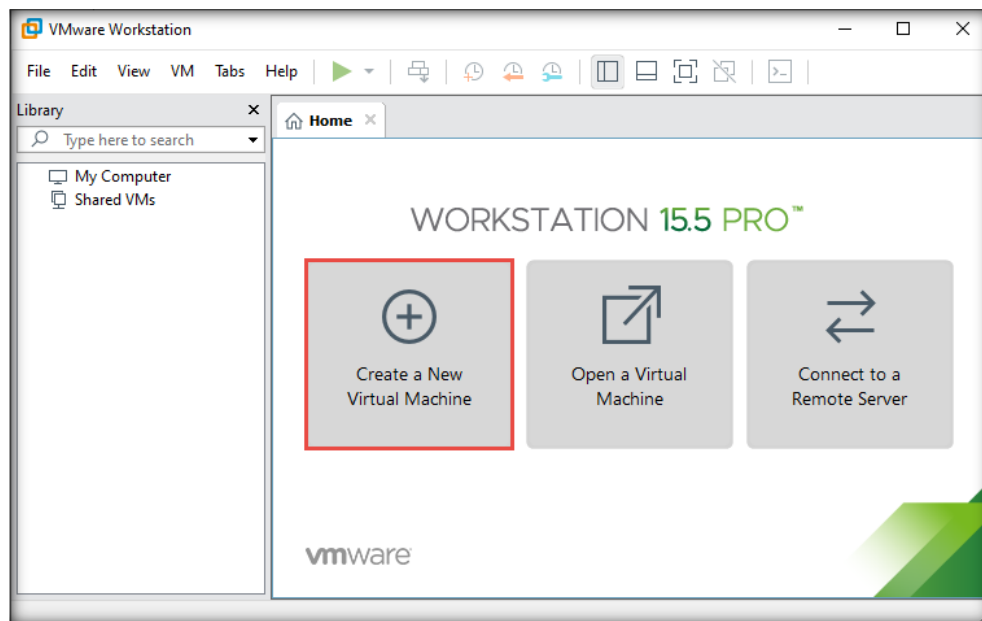
10. Uncheck Power on this virtual machine after creation checkbox and click on Finish.



11. VMware workstation creates **WebServer** virtual machine profile.

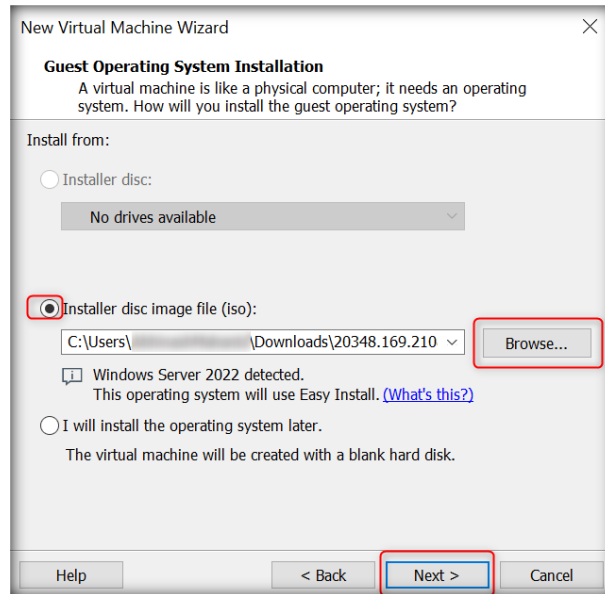
CT#4.2: Creating Virtual Machine for AD Domain Controller

1. In the VMware Workstation window, click Create a New Virtual Machine.

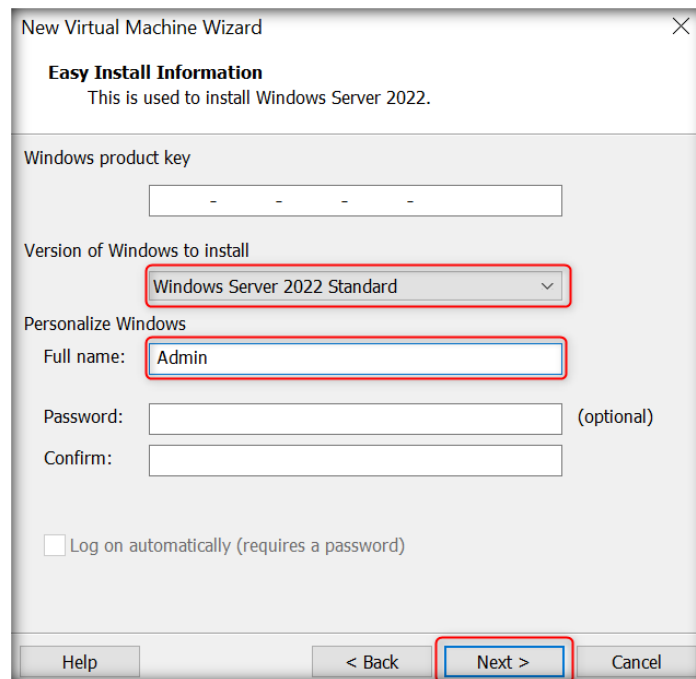


2. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.

- Click **Installer disc image file (iso)** radio button and click on **Browse**. Select the iso file and click on **Next >**.



- Select Windows Server 2022 Standard and type Full name as Admin. Click on Next.



- A popup appears for windows product key. Click yes.

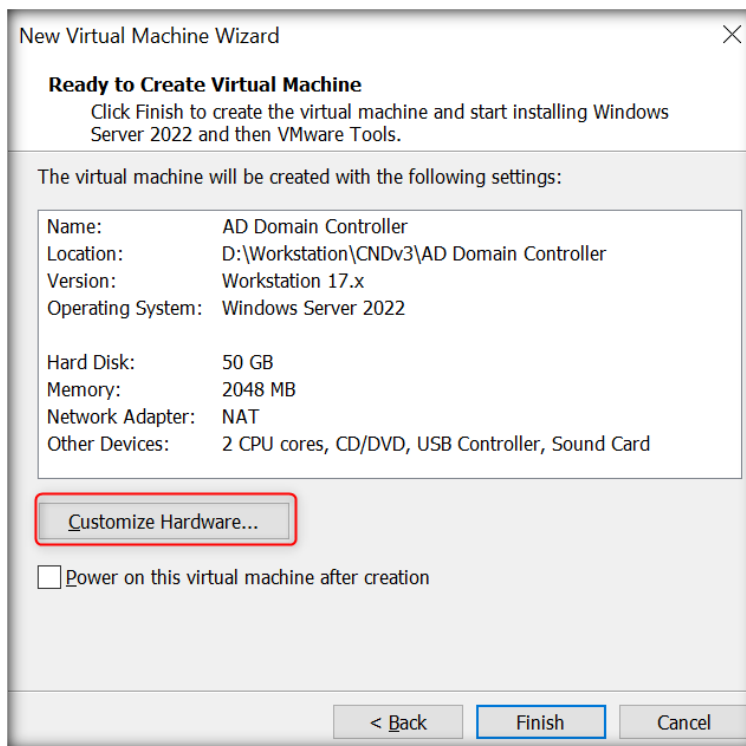
6. Assign the name of the virtual machine as **AD Domain Controller**. You can choose different location to store the VM's or set it to default location. Click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Name the Virtual Machine'. Below the title is the question 'What name would you like to use for this virtual machine?'. There are two input fields: 'Virtual machine name:' with the text 'AD Domain Controller' and 'Location:' with the text 'D:\Workstation\CNDv3\AD Domain Controller'. A 'Browse...' button is next to the location field. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red box.

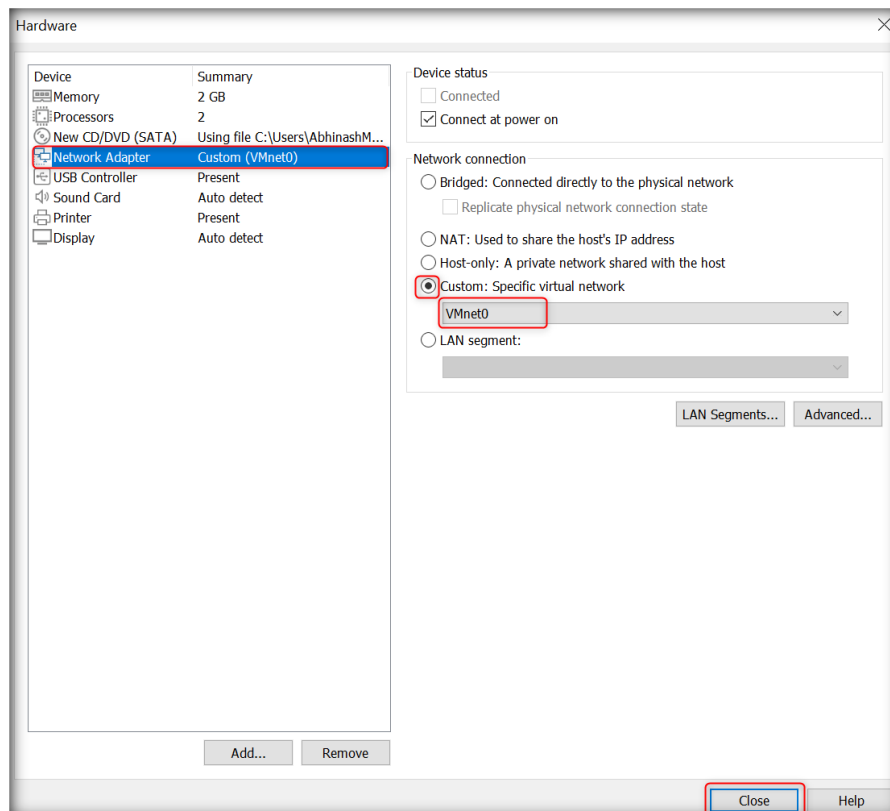
7. Specify Disk Capacity section appears, allocate **50 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Specify Disk Capacity'. Below the title is the question 'How large do you want this disk to be?'. There is a text box for 'Maximum disk size (GB):' with the value '50' and a spin button. Below this is the text 'Recommended size for Windows Server 2022: 60 GB'. There are two radio buttons: 'Store virtual disk as a single file' (selected) and 'Split virtual disk into multiple files'. Below the second radio button is the text 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red box.

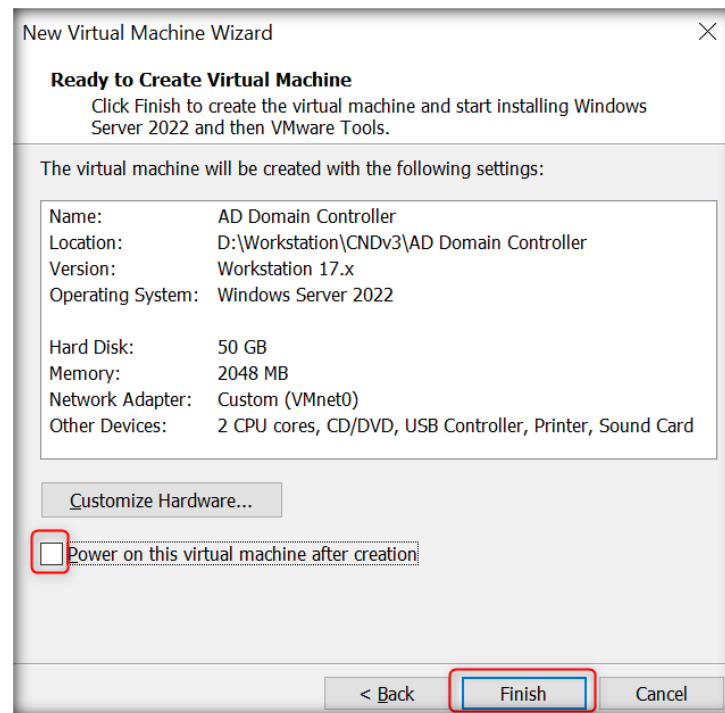
8. Click on Customize Hardware.



9. Click on Network Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet0 (Bridged). Click on **Close**.



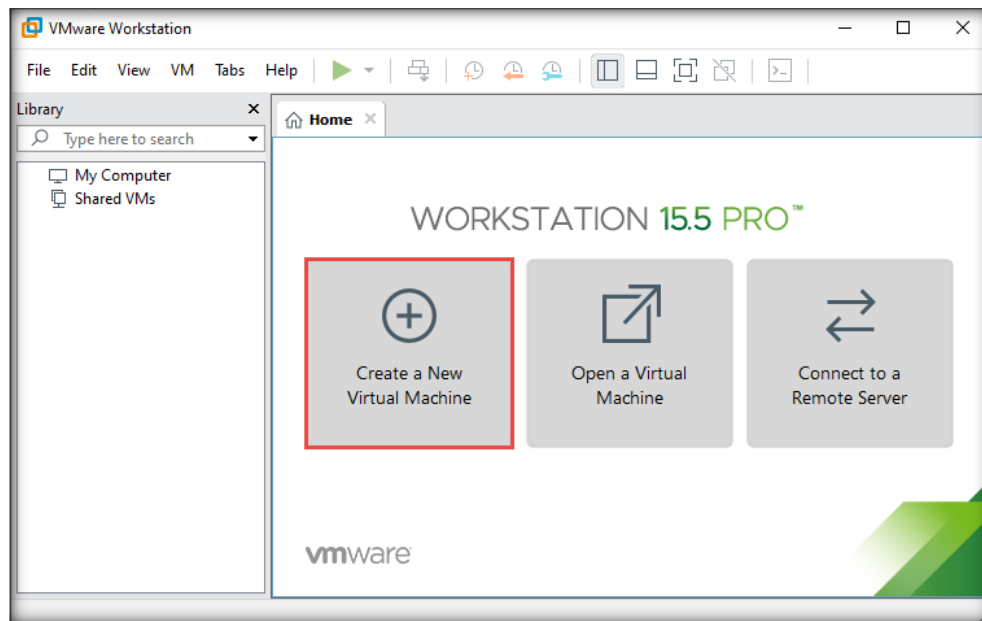
10. Ensure to uncheck the **Power on this virtual machine after creation** checkbox and click **Finish**.



11. Hyper-V Manager creates **AD Domain Controller** virtual machine profile.

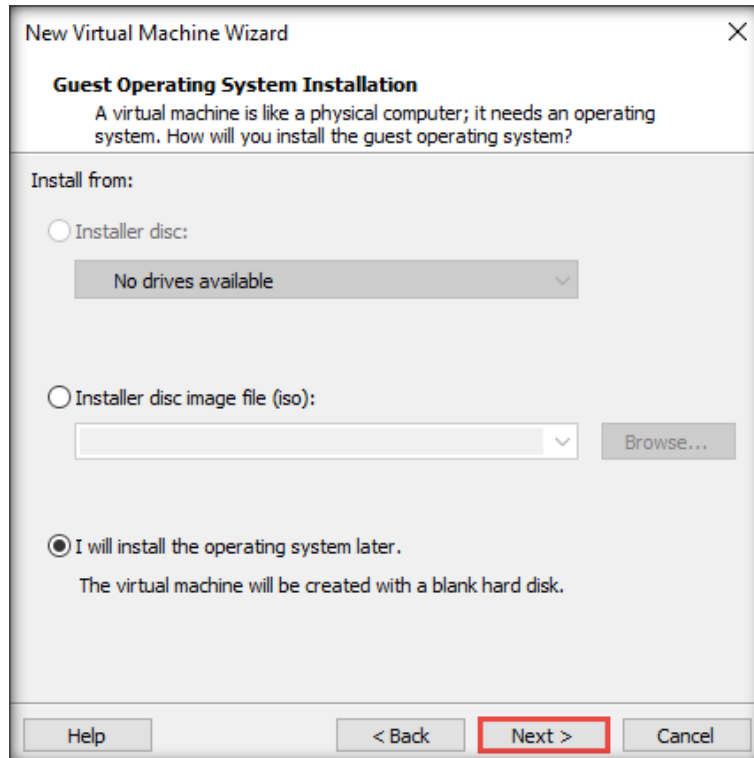
CT#4.3: Creating Virtual Machine for Finance Dept

1. In the **VMware Workstation** window, click **Create a New Virtual Machine**.

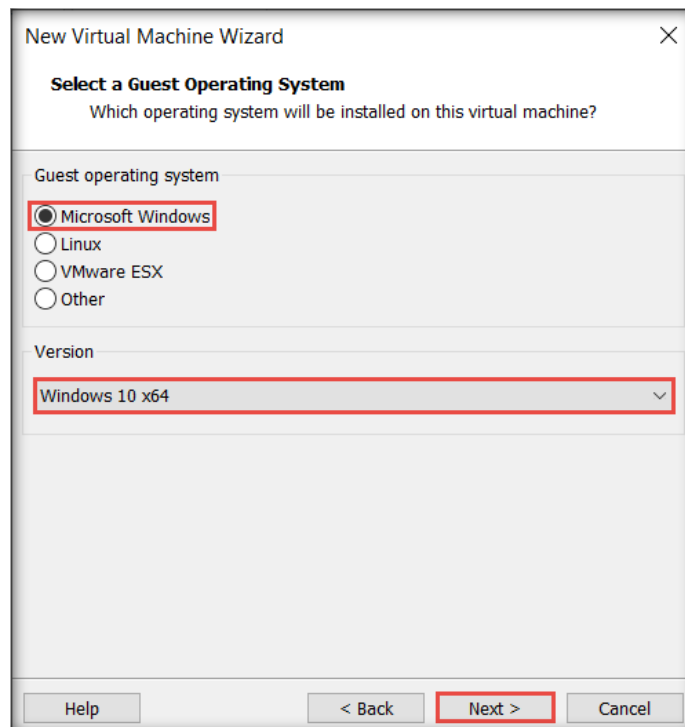


2. In the **New Virtual Machine Wizard** window, leave the settings to default (**Typical**) and click **Next**.

3. In the **Guest Operating System Installation** wizard, choose the **I will install the operating system later** radio button (if you have an ISO of **Windows 11**) and click **Next**.



4. In the **Select a Guest Operating System** wizard, ensure that the **Microsoft Windows** radio button is selected in the **Guest operating system** section and that **Windows 10 x64** is selected under **Version**. Click **Next**.



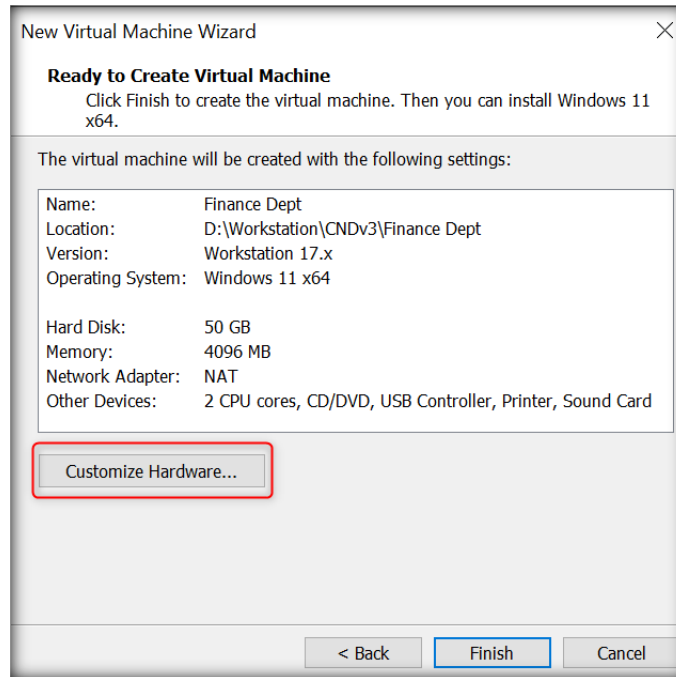
- The **Name the Virtual Machine** wizard appears; type **Windows 11** in the **Virtual machine name** field and click the **Browse** button to store the virtual hard disk. Choose your desired location to store the hard disk and then click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Name the Virtual Machine' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Name the Virtual Machine' with the subtitle 'What name would you like to use for this virtual machine?'. There are two input fields: 'Virtual machine name:' containing 'Finance Dept' and 'Location:' containing 'D:\Workstation\CNDv3\Finance Dept'. A 'Browse...' button is next to the location field. Below the location field, it says 'The default location can be changed at Edit > Preferences.' At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'. Red boxes highlight the 'Virtual machine name' field, the 'Browse...' button, and the 'Next >' button.

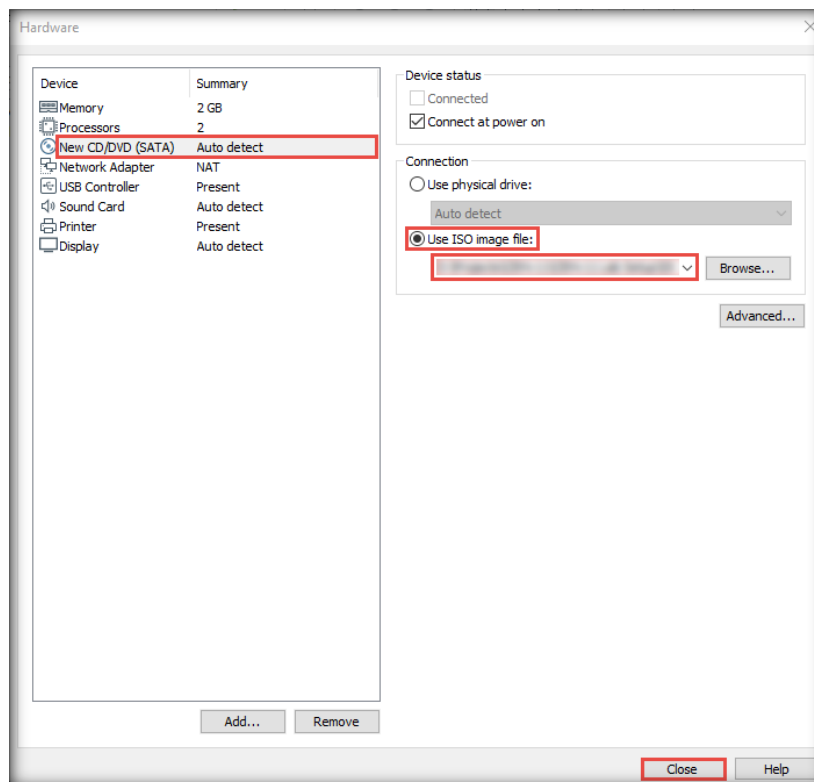
- The **Specify Disk Capacity** wizard appears. Leave the **Maximum disk size (GB)** to default (i.e., **80 GB**, recommended), select the **Store virtual disk as a single file** radio button, and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Specify Disk Capacity' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Specify Disk Capacity' with the subtitle 'How large do you want this disk to be?'. Below the heading, there is a paragraph: '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.' There is a 'Maximum disk size (GB):' label followed by a spinner box set to '80.0'. Below that, it says 'Recommended size for Windows 10 x64: 60 GB'. There are two radio buttons: 'Store virtual disk as a single file' (which is selected) and 'Split virtual disk into multiple files'. Below the radio buttons, there is a paragraph: 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. Red boxes highlight the 'Maximum disk size (GB)' spinner, the 'Store virtual disk as a single file' radio button, and the 'Next >' button.

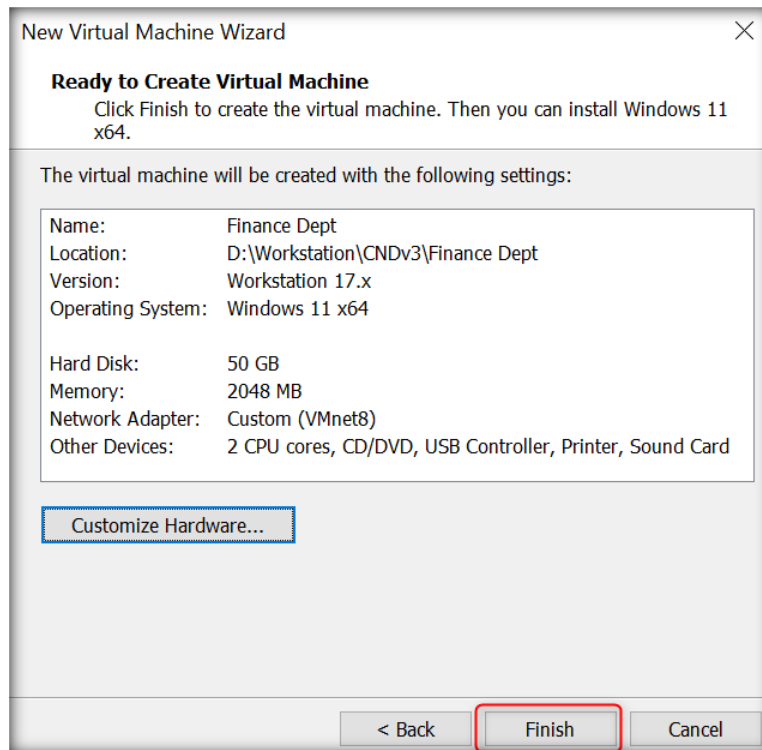
7. The **Ready to Create Virtual Machine** wizard appears; confirm the settings and click the **Customize Hardware...** button.



8. The **Hardware** window appears; click the **New CD/DVD (SATA)** option from the left-hand pane. In the right-hand pane, select the **Use ISO image file** radio button and then click the **Browse...** button to provide the ISO path of Windows 11 ISO file. Click **Close**.



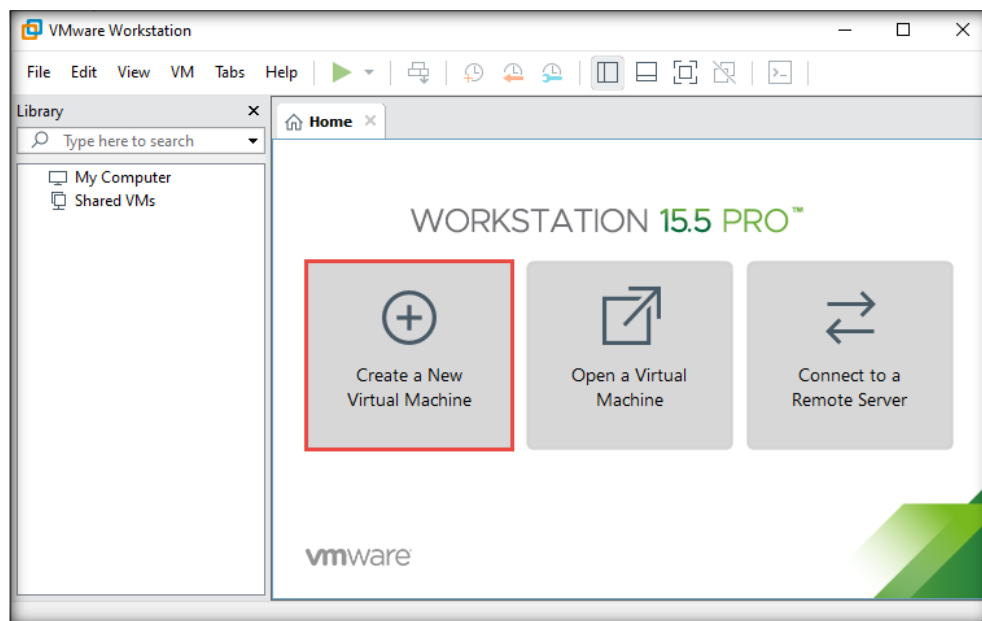
9. In the **Ready to Create Virtual Machine** wizard, click **Finish**.



10. VMware workstation creates **Finance Dept** virtual machine profile.

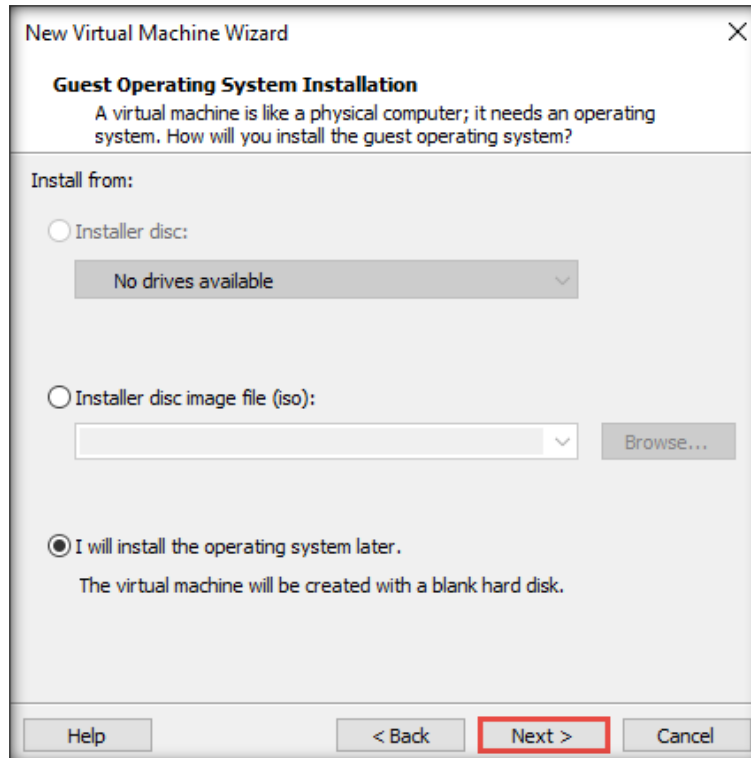
CT#4.4: Creating Virtual Machine for Admin Machine-1

1. In the **VMware Workstation** window, click **Create a New Virtual Machine**.

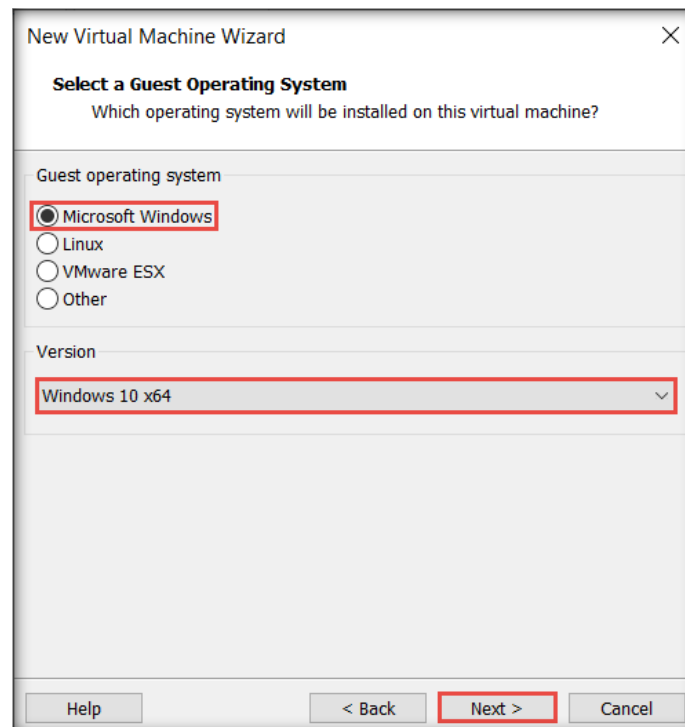


2. In the **New Virtual Machine Wizard** window, leave the settings to default (**Typical**) and click **Next**.

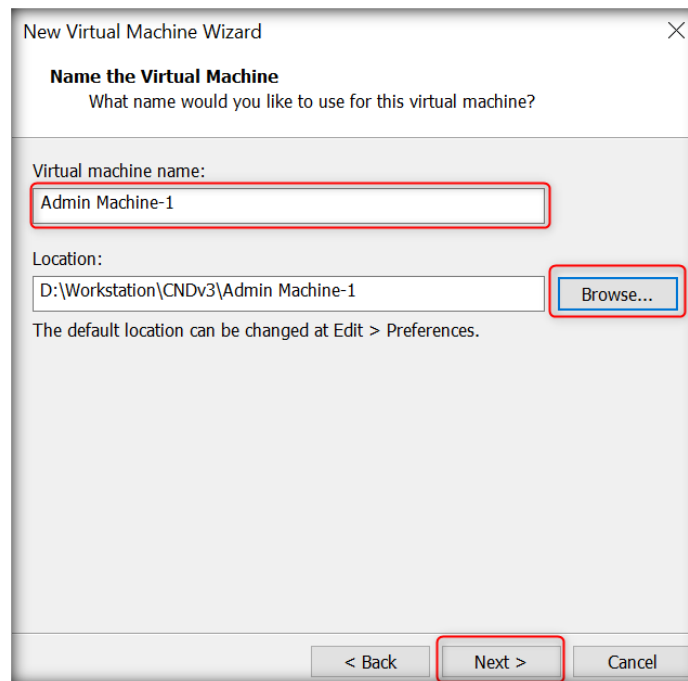
3. In the **Guest Operating System Installation** wizard, choose the **I will install the operating system later** radio button (if you have an ISO of **Windows 11**) and click **Next**.



4. In the **Select a Guest Operating System** wizard, ensure that the **Microsoft Windows** radio button is selected in the **Guest operating system** section and that **Windows 10 x64** is selected under **Version**. Click **Next**.

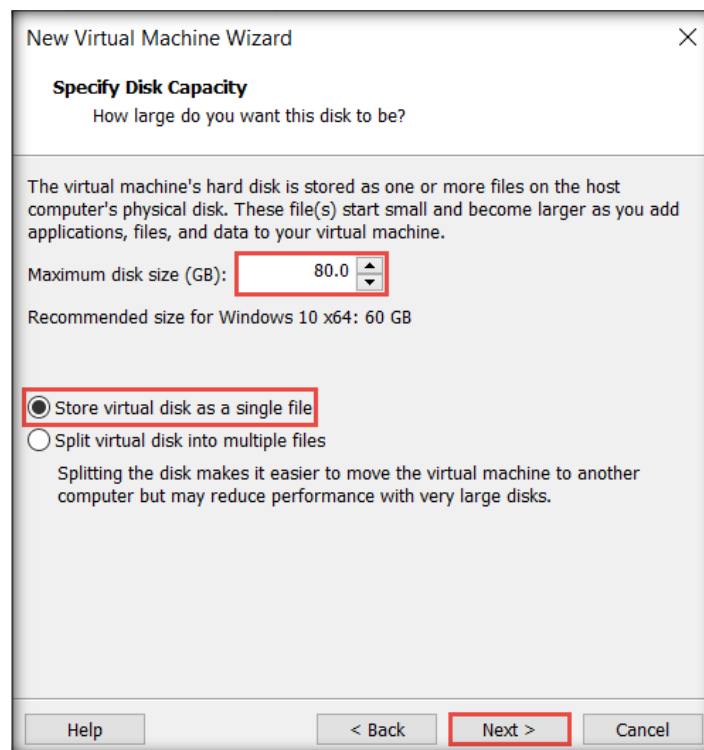


- The **Name the Virtual Machine** wizard appears; type **Windows 11** in the **Virtual machine name** field and click the **Browse** button to store the virtual hard disk. Choose your desired location to store the hard disk and then click **Next**.



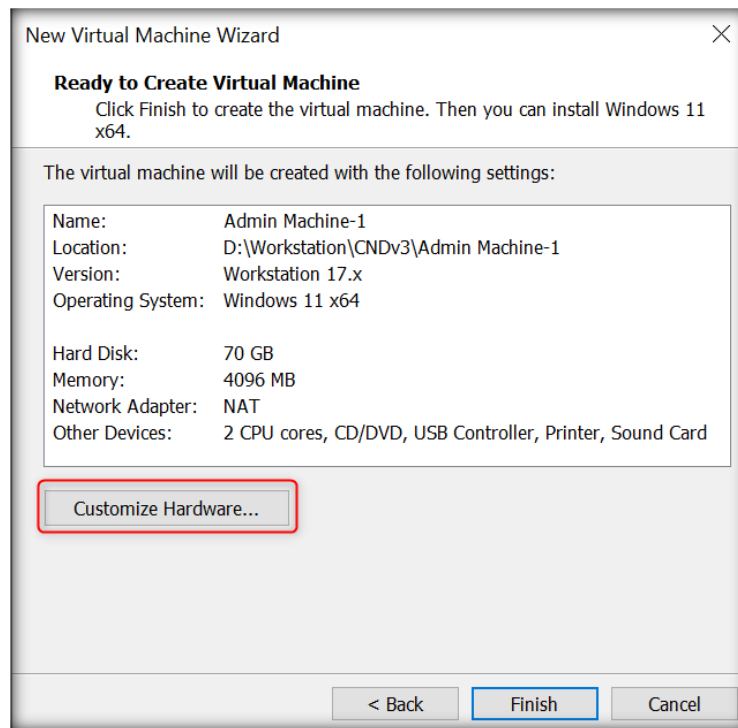
The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Name the Virtual Machine' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Name the Virtual Machine' with the subtitle 'What name would you like to use for this virtual machine?'. There are two input fields: 'Virtual machine name:' containing 'Admin Machine-1' and 'Location:' containing 'D:\Workstation\CNDv3\Admin Machine-1'. A 'Browse...' button is next to the location field. Below the location field, it says 'The default location can be changed at Edit > Preferences.' At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'. Red boxes highlight the 'Virtual machine name' field, the 'Browse...' button, and the 'Next >' button.

- The **Specify Disk Capacity** wizard appears. Leave the **Maximum disk size (GB)** to default (i.e., **80 GB**, recommended), select the **Store virtual disk as a single file** radio button, and click **Next**.

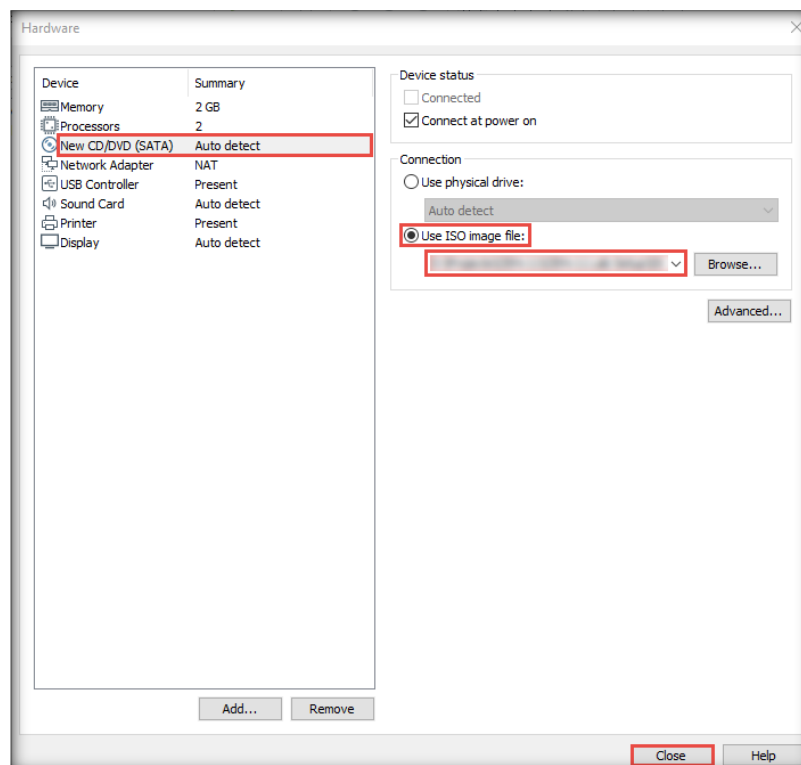


The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Specify Disk Capacity' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Specify Disk Capacity' with the subtitle 'How large do you want this disk to be?'. Below this, there is explanatory text: '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.' There is a 'Maximum disk size (GB):' field with a spinner set to '80.0'. Below that, it says 'Recommended size for Windows 10 x64: 60 GB'. There are two radio buttons: 'Store virtual disk as a single file' (which is selected) and 'Split virtual disk into multiple files'. Below the radio buttons, there is explanatory text: 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. Red boxes highlight the 'Maximum disk size (GB)' field, the 'Store virtual disk as a single file' radio button, and the 'Next >' button.

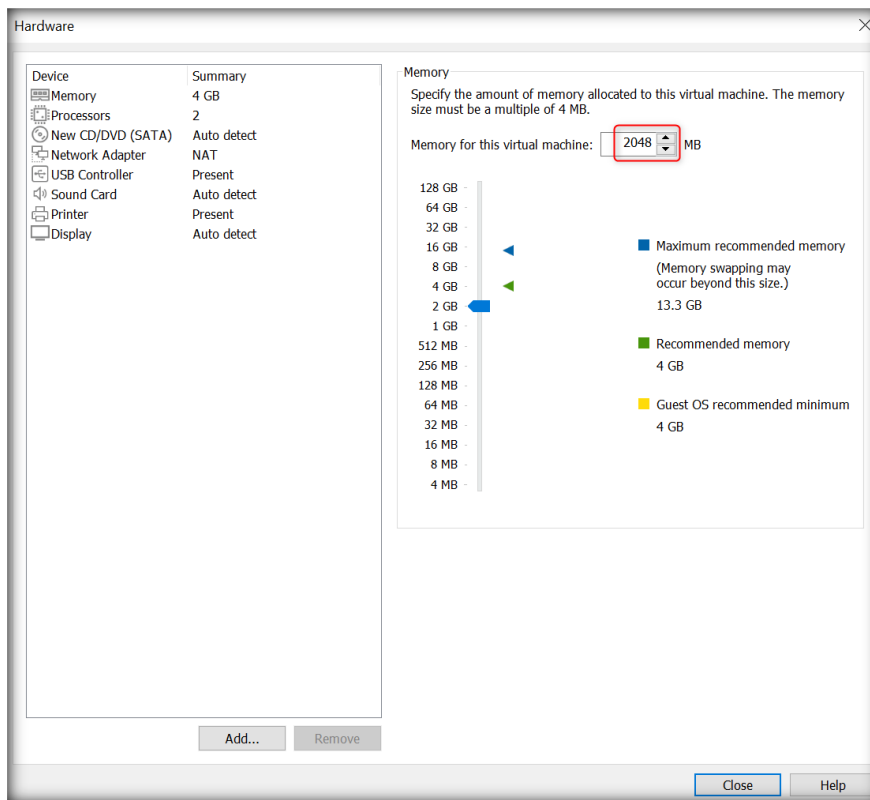
7. The **Ready to Create Virtual Machine** wizard appears; confirm the settings and click the **Customize Hardware...** button.



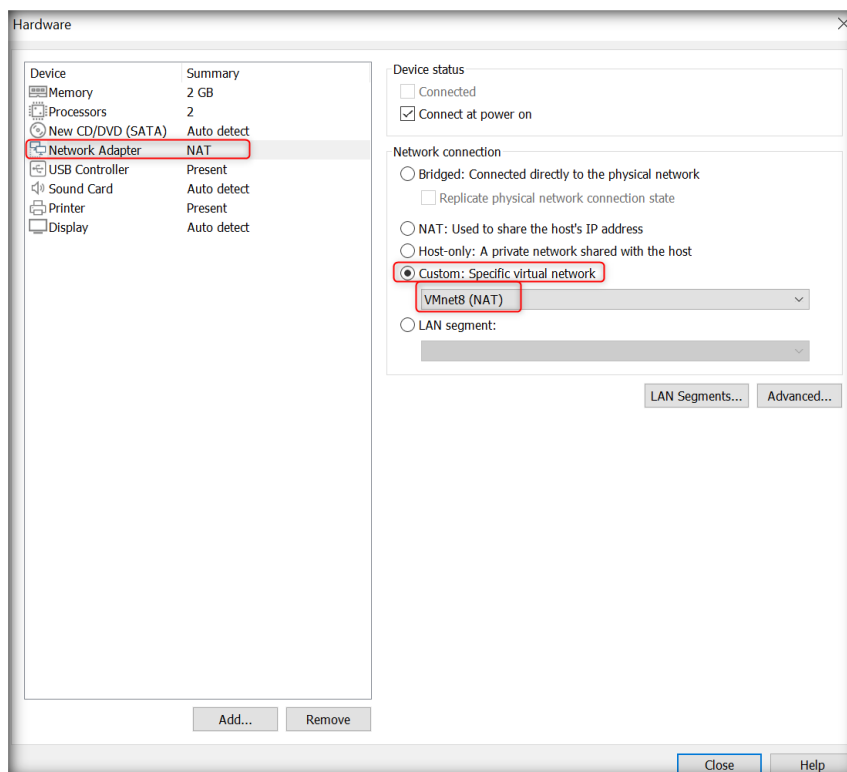
8. The **Hardware** window appears; click the **New CD/DVD (SATA)** option from the left-hand pane. In the right-hand pane, select the **Use ISO image file** radio button and then click the **Browse...** button to provide the ISO path of Windows 11 ISO file. Click **Close**.



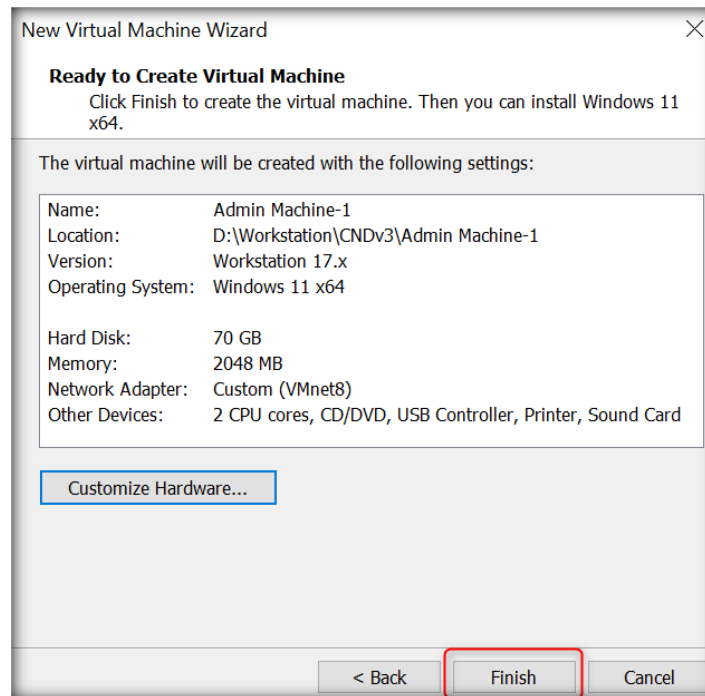
9. Assign the amount of **Memory for this Virtual Machine** to allocate to this virtual machine in MB (here, **2048**).



10. Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet8.



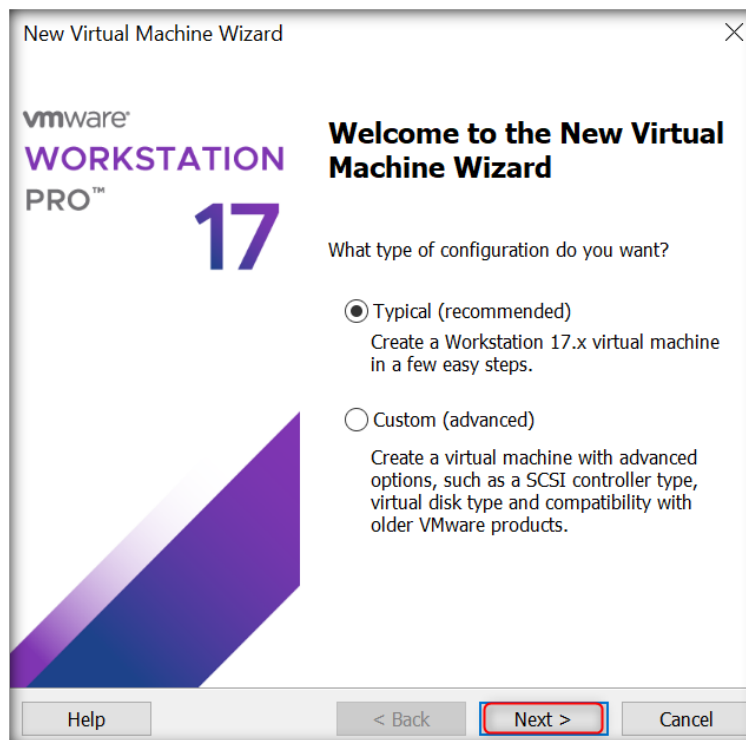
11. In the **Ready to Create Virtual Machine** wizard, click **Finish**.



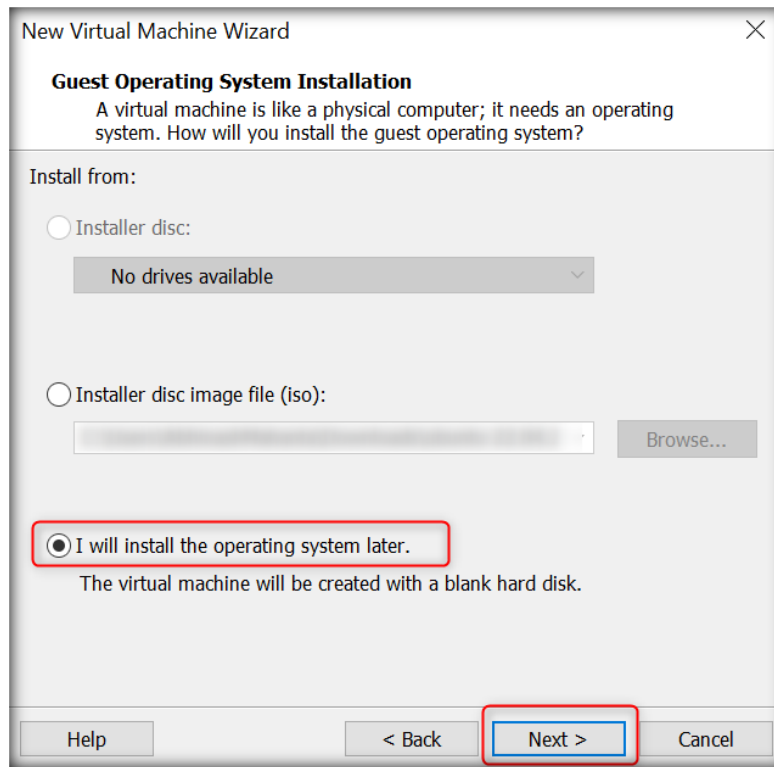
12. VMware workstation creates **Admin Machine-1** virtual machine profile.

CT#4.5: Creating Virtual Machine for Operation Dept

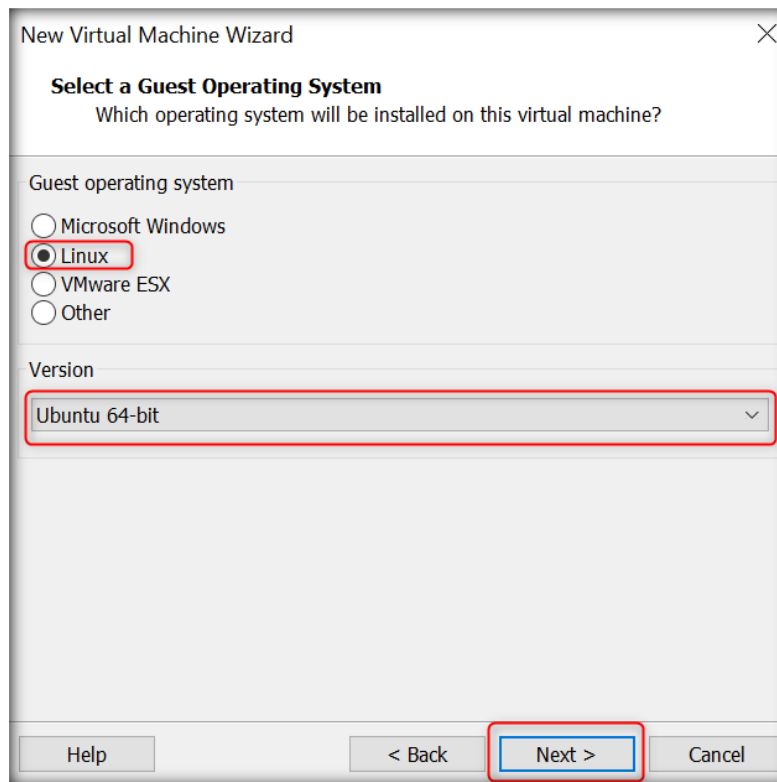
1. Launch VMware Workstation. If already launched, skip to step two.
2. **New Virtual Machine Wizard** window appears, click **Next >** button.



3. Click **I will install the operating system later** radio button and click on **Next >**.



4. Select Linux and choose Ubuntu 64-bit as Version. Click on Next.



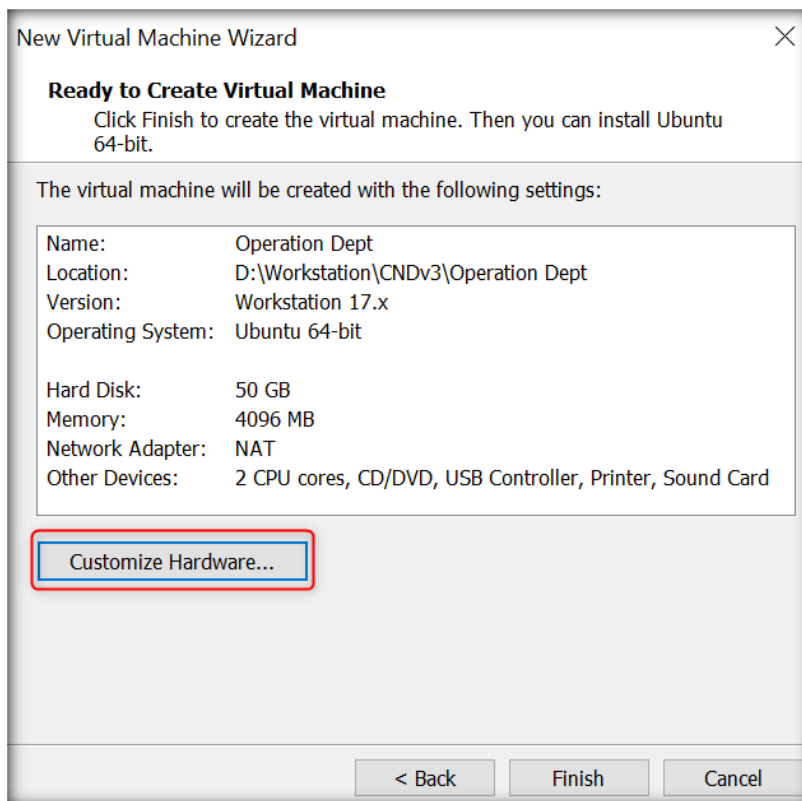
5. Assign the name of the virtual machine as **Operation Dept**. You can choose different location to store the VM's or set it to default location. Click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Name the Virtual Machine'. Below the title is the question 'What name would you like to use for this virtual machine?'. There are two input fields: 'Virtual machine name:' with the text 'Operation Dept' and 'Location:' with the text 'D:\Workstation\CNDv3\Operation Dept'. A 'Browse...' button is next to the location field. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'. Red boxes highlight the 'Operation Dept' text, the 'Browse...' button, and the 'Next >' button.

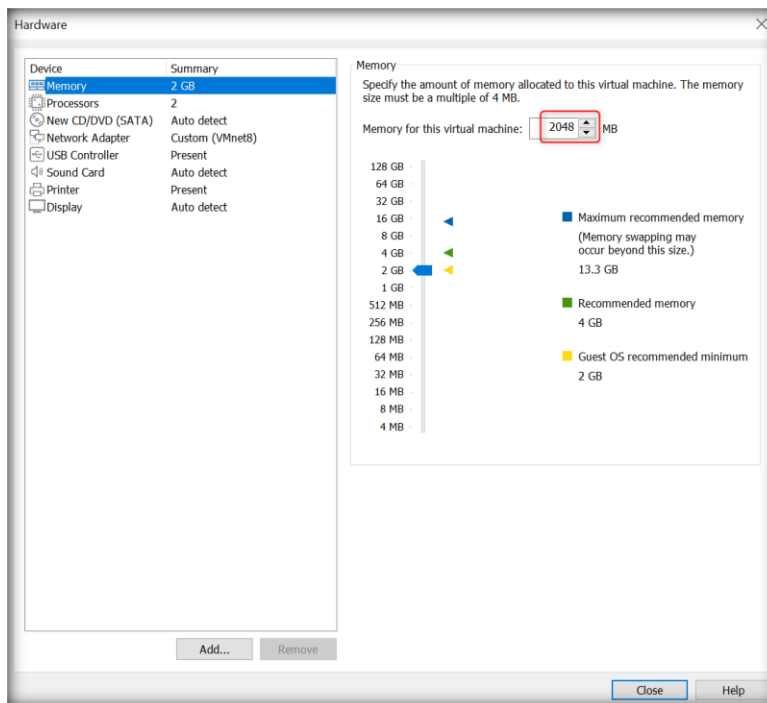
6. Specify Disk Capacity section appears, allocate **50 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Specify Disk Capacity'. Below the title is the question 'How large do you want this disk to be?'. There is a text box for 'Maximum disk size (GB):' with the value '50'. Below this is the text 'Recommended size for Ubuntu 64-bit: 20 GB'. There are two radio buttons: 'Store virtual disk as a single file' (selected) and 'Split virtual disk into multiple files'. Below the radio buttons is the text 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. Red boxes highlight the '50' in the disk size field, the 'Store virtual disk as a single file' radio button, and the 'Next >' button.

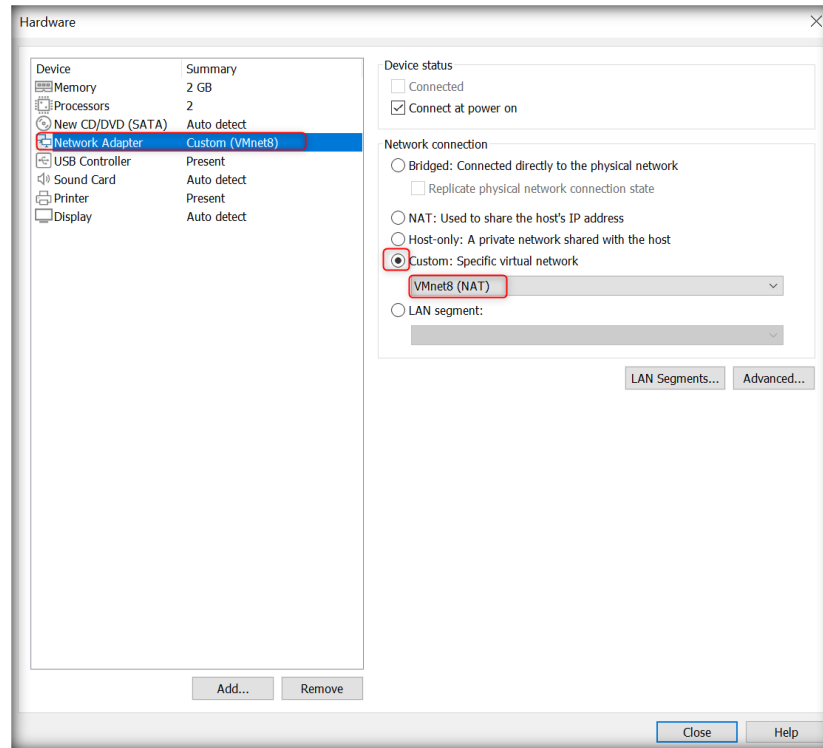
- Click Customize Hardware.



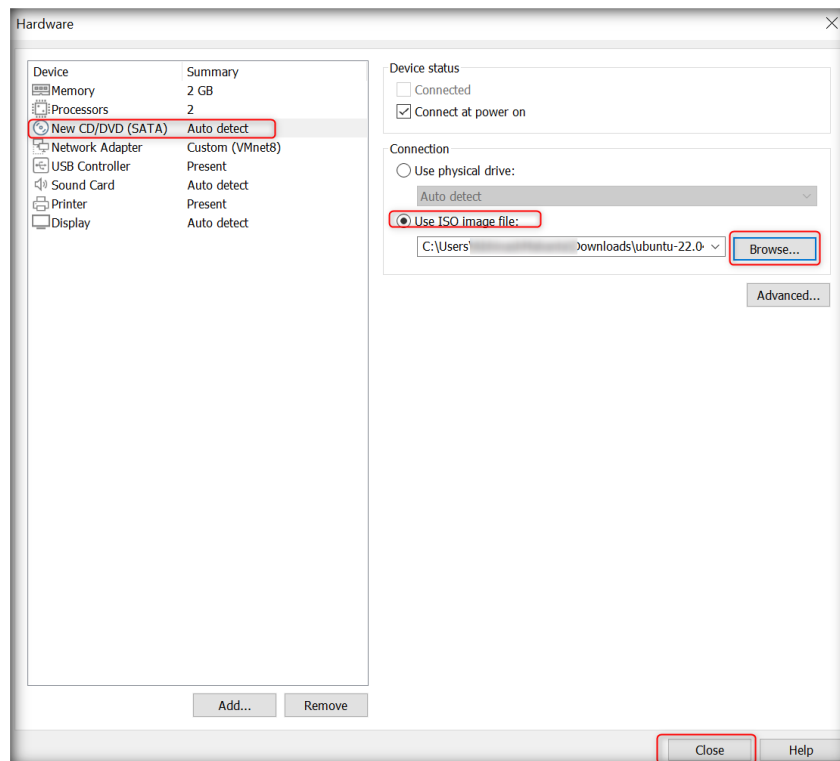
- Assign the amount of **Memory for this Virtual Machine** to allocate to this virtual machine in MB (here, **2048**).



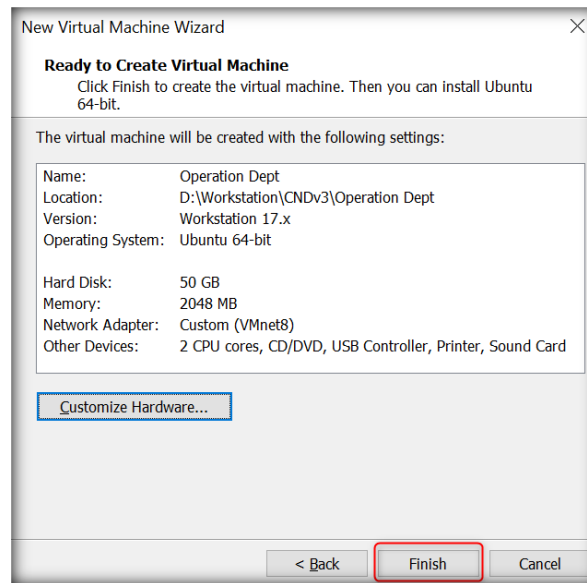
9. Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet8. Click on **Close**.



10. Select New CD/DVD (SATA) and select Use ISO image file radio button. Click on browse and select the iso file for Ubuntu. Click on Close.



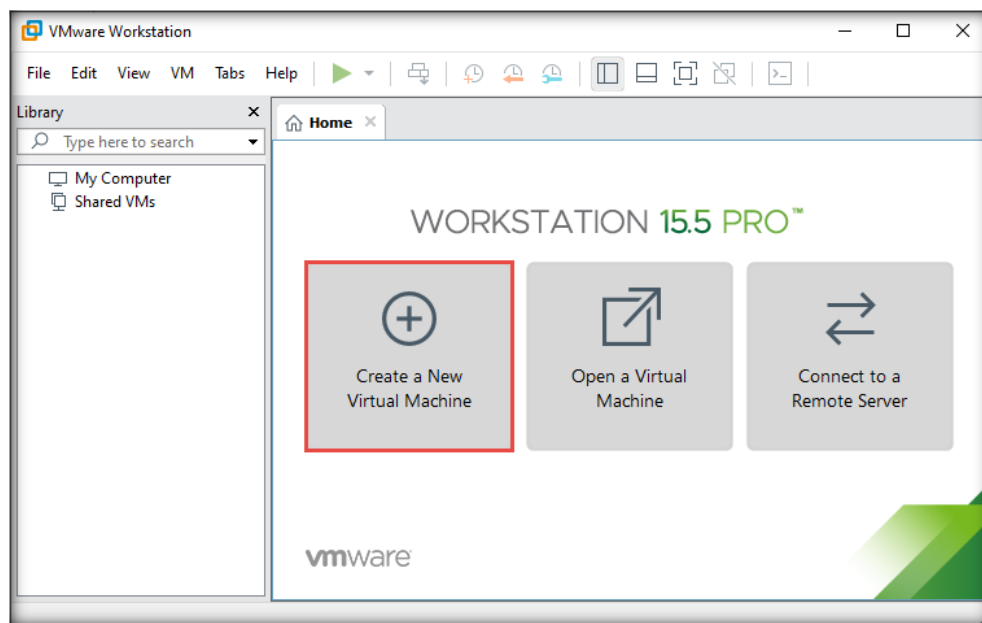
11. Click on Finish.



12. VMware workstation creates **Operation Dept** virtual machine profile.

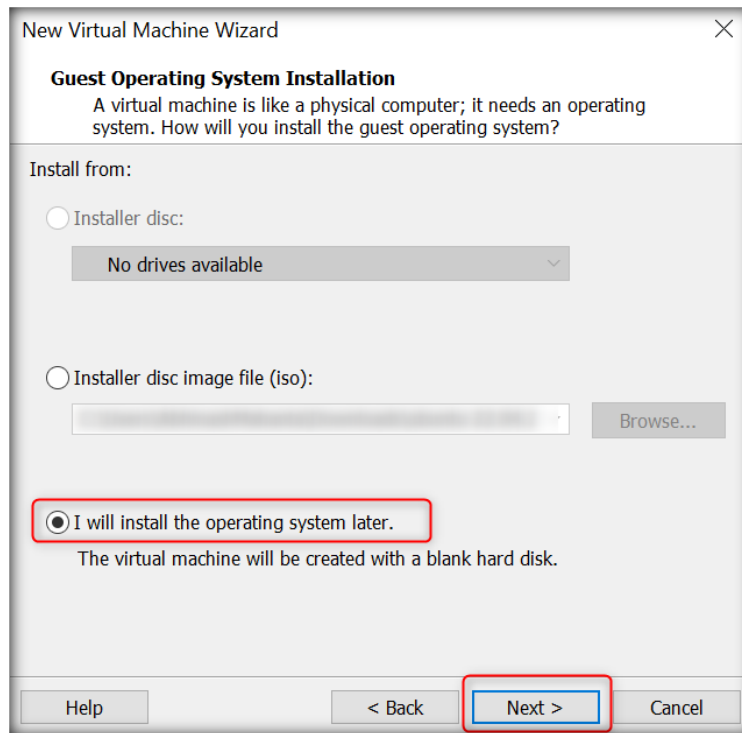
CT#4.6: Creating Virtual Machine for Admin Machine-2

1. In the VMware Workstation window, click Create a New Virtual Machine.

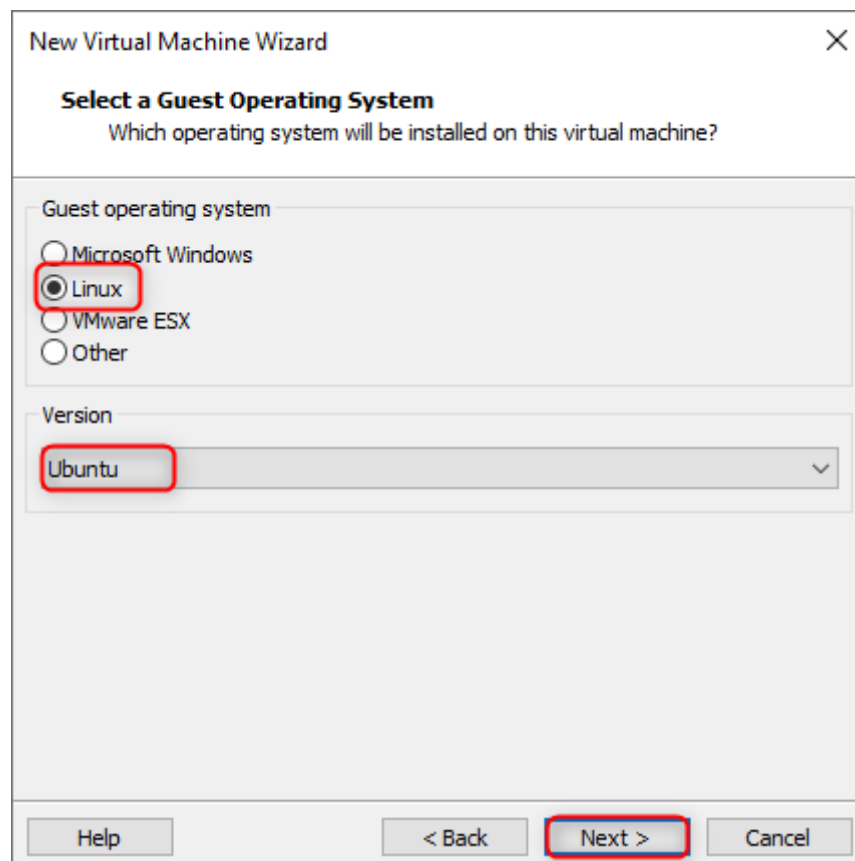


2. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.

- Click **I will install the operating system later** radio button and click on **Next >**.



- Select **Linux** and choose **Ubuntu** as Version. Click on **Next**.



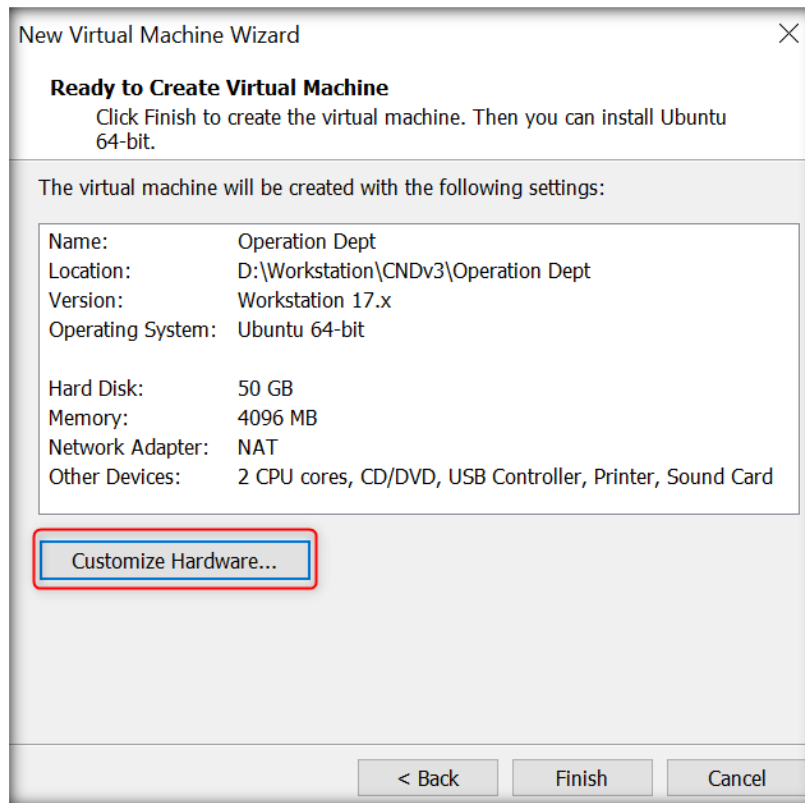
- Assign the name of the virtual machine **Admin Machine-2**. You can choose a different location to store the VM's or set it to default location. Click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Name the Virtual Machine'. Below the title is the question 'What name would you like to use for this virtual machine?'. There are two input fields: 'Virtual machine name:' containing 'Admin Machine-2' and 'Location:' containing 'D:\Work\Virtual Machines\Admin Machine-2'. A 'Browse...' button is next to the location field. Below these fields is the text 'The default location can be changed at Edit > Preferences.' At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red box.

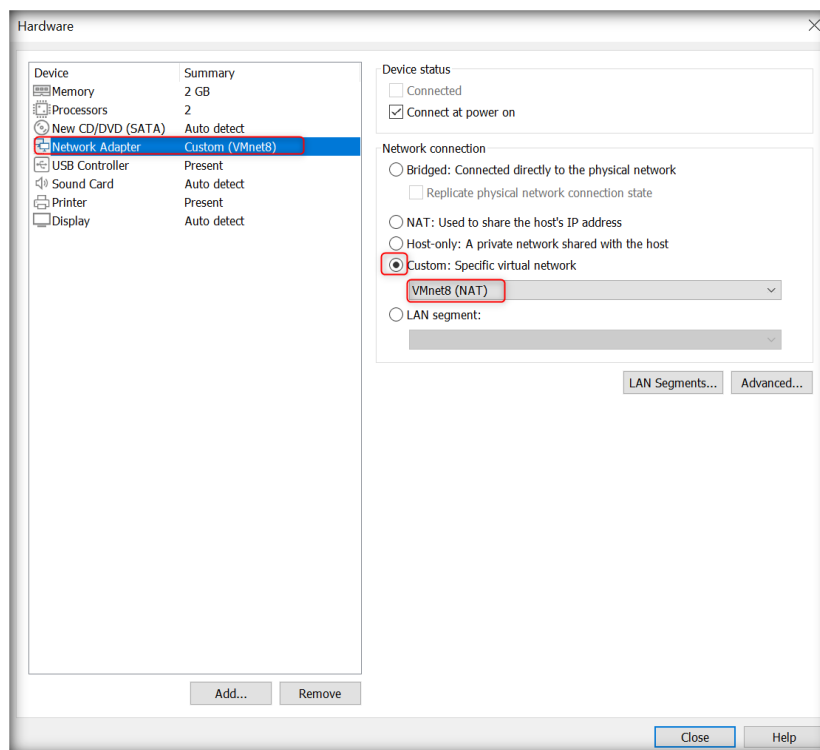
- Specify Disk Capacity section appears, allocate **50 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Specify Disk Capacity'. Below the title is the question 'How large do you want this disk to be?'. There is a text box for 'Maximum disk size (GB):' with the value '50' entered. Below this is the text 'Recommended size for Ubuntu 64-bit: 20 GB'. There are two radio buttons: 'Store virtual disk as a single file' (selected) and 'Split virtual disk into multiple files'. Below the radio buttons is the text 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red box.

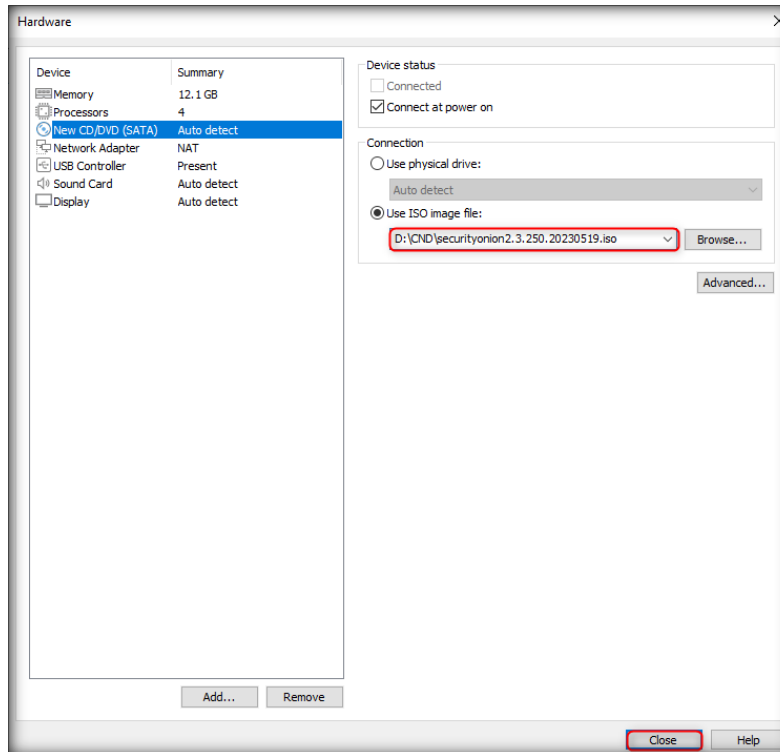
- Click Customize Hardware.



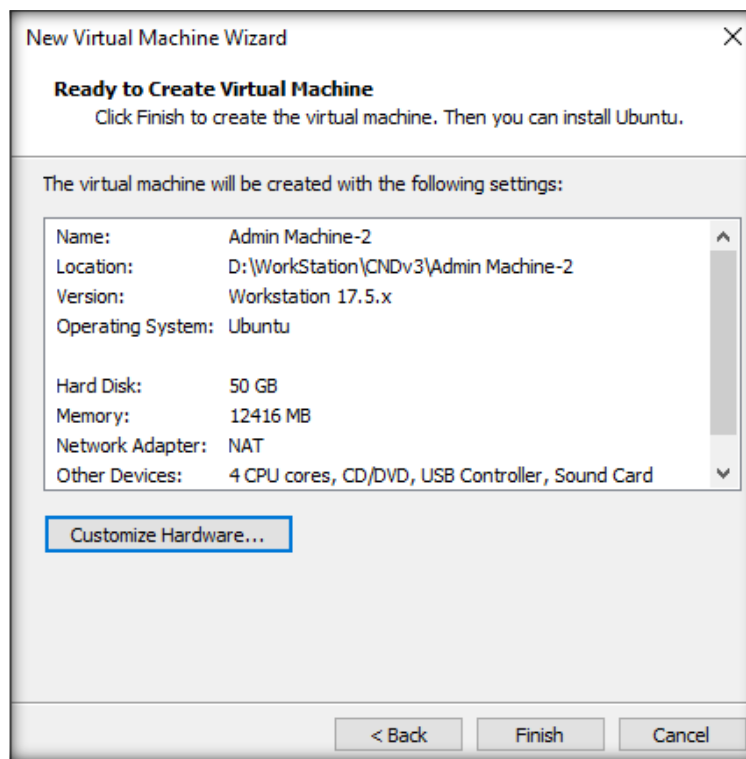
- Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet8..



9. Select **New CD/DVD (SATA)** and select Use ISO image file radio button. Click on browse and select the iso file for Security Onion. Click on **Close**.



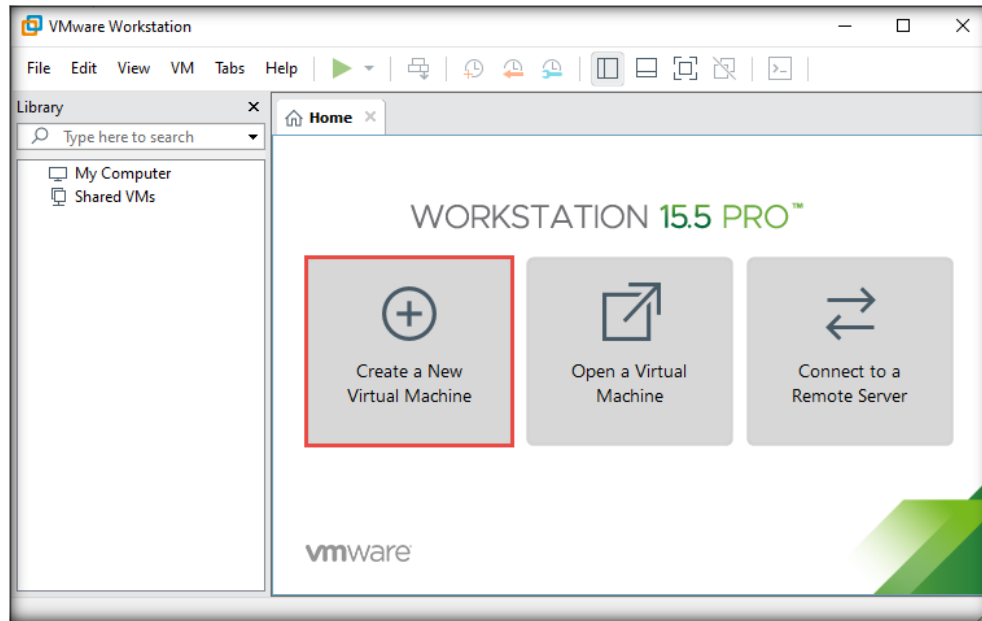
10. Click on Finish.



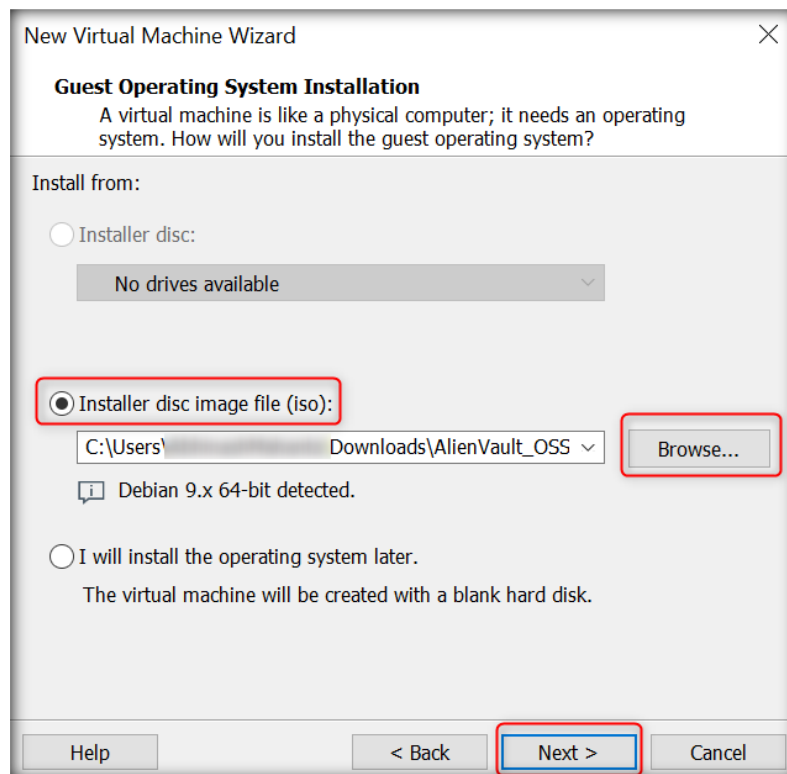
11. VMware workstation creates **Admin Machine-2** virtual machine profile.

CT#4.7: Creating Virtual Machine for OSSIM Server

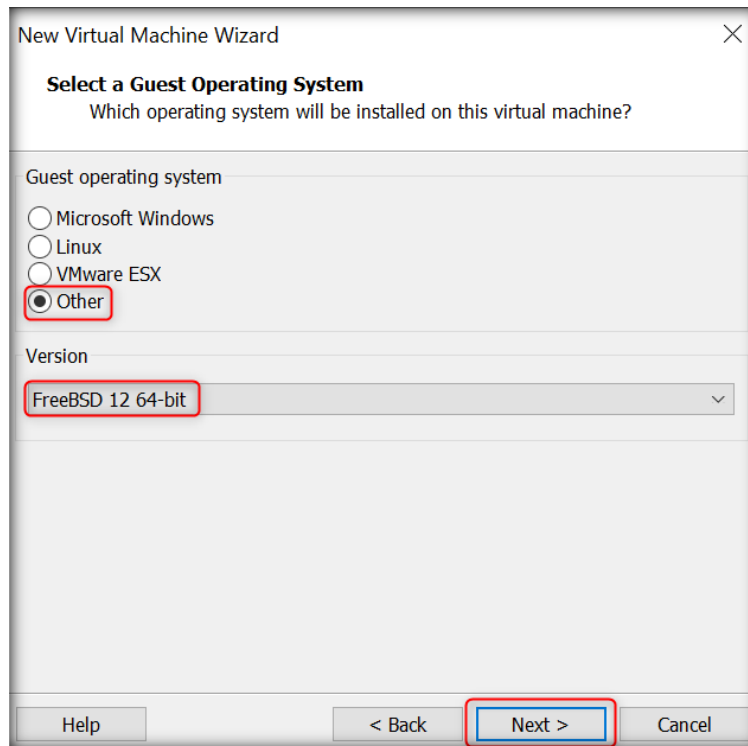
1. In the VMware Workstation window, click Create a New Virtual Machine.



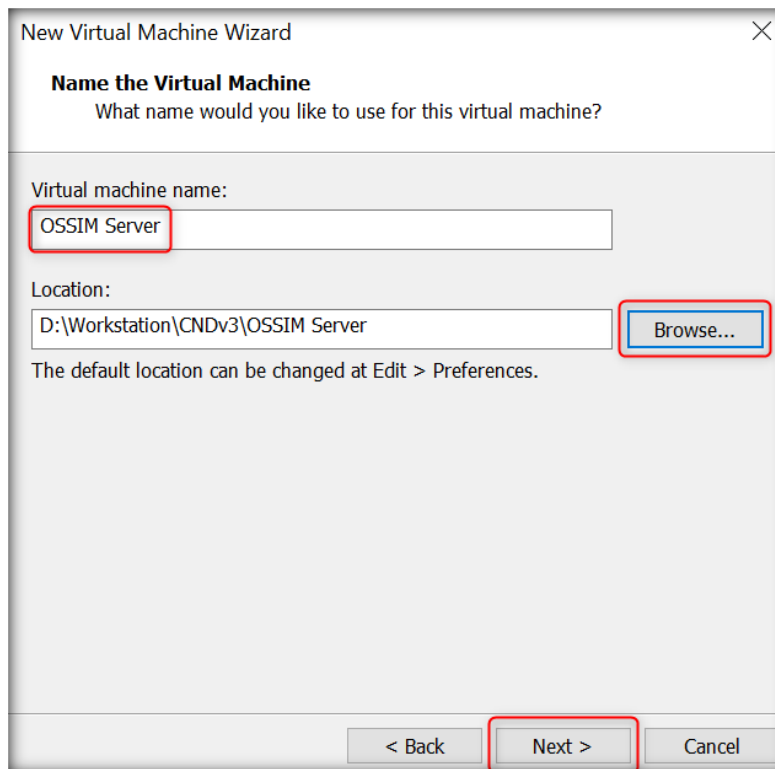
2. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.
3. Click **Installer disc image file (iso)** radio button and click on **Browse**. Select the iso file and click on **Next >**.



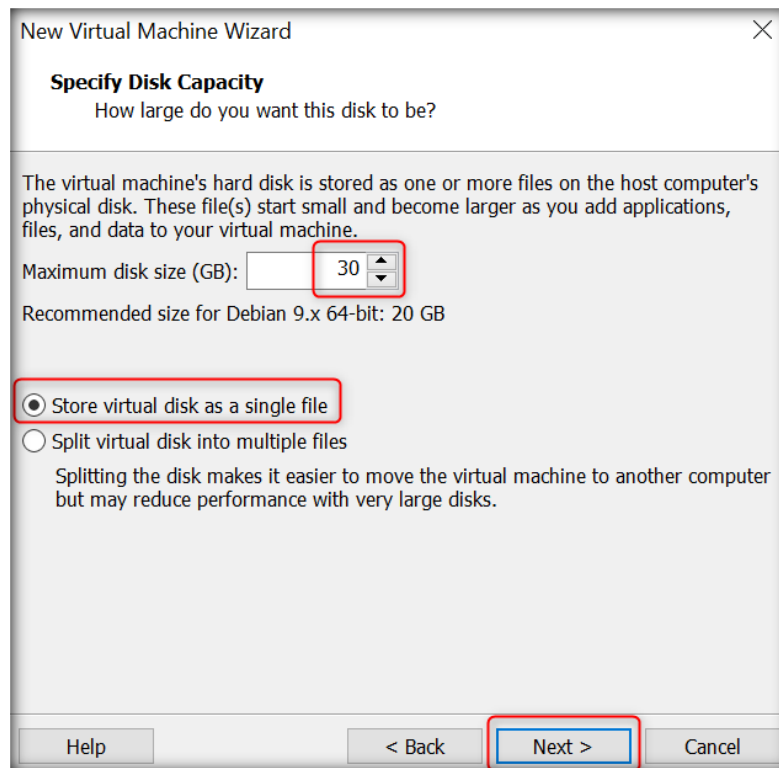
4. Select Other and choose FreeBSD 12 64-bit as Version. Click on Next.



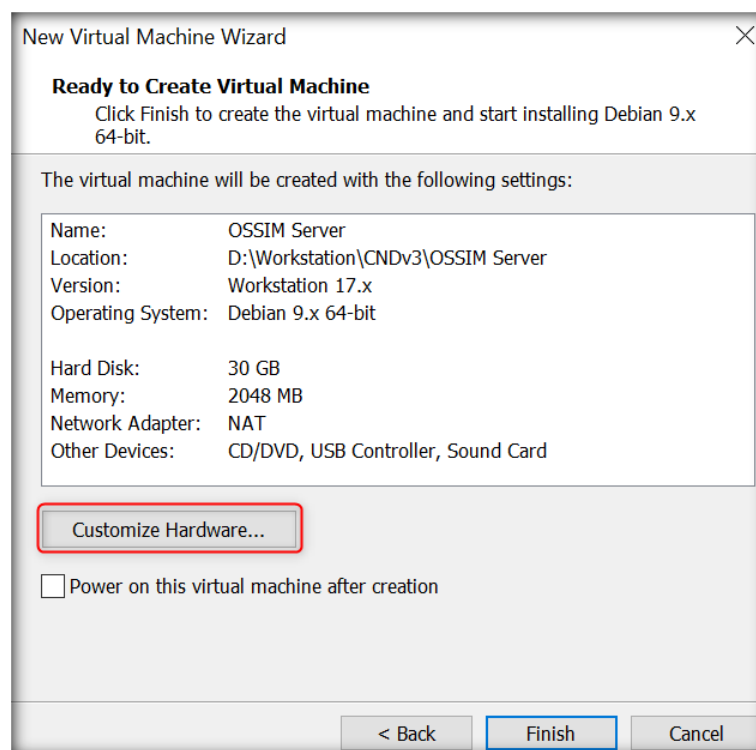
5. Assign the name of the virtual machine as **OSSIM Server**. You can choose different location to store the VM's or set it to default location. Click **Next**.



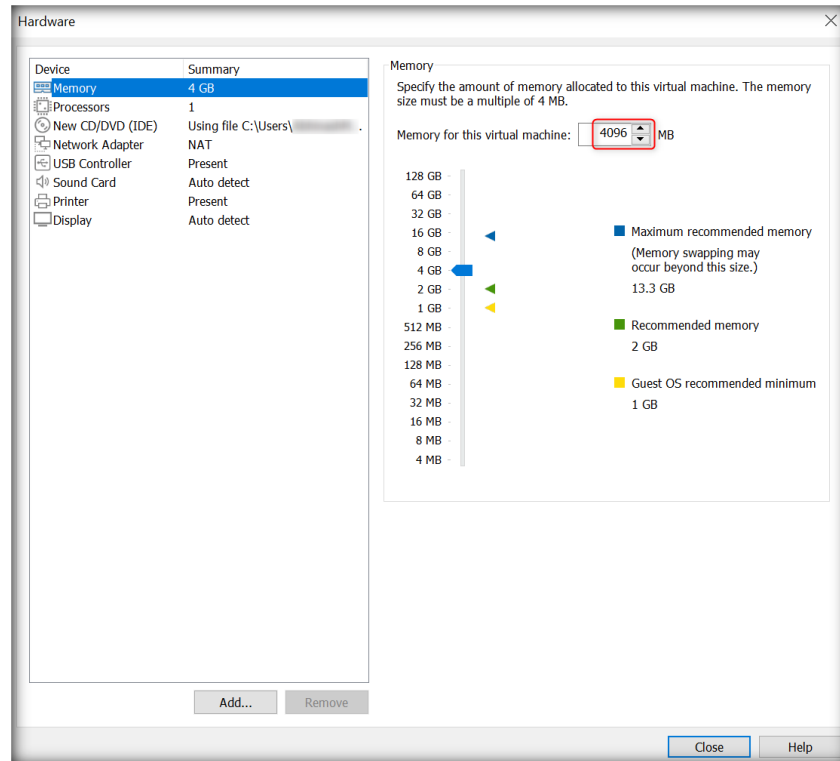
- Specify Disk Capacity section appears, allocate **20 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.



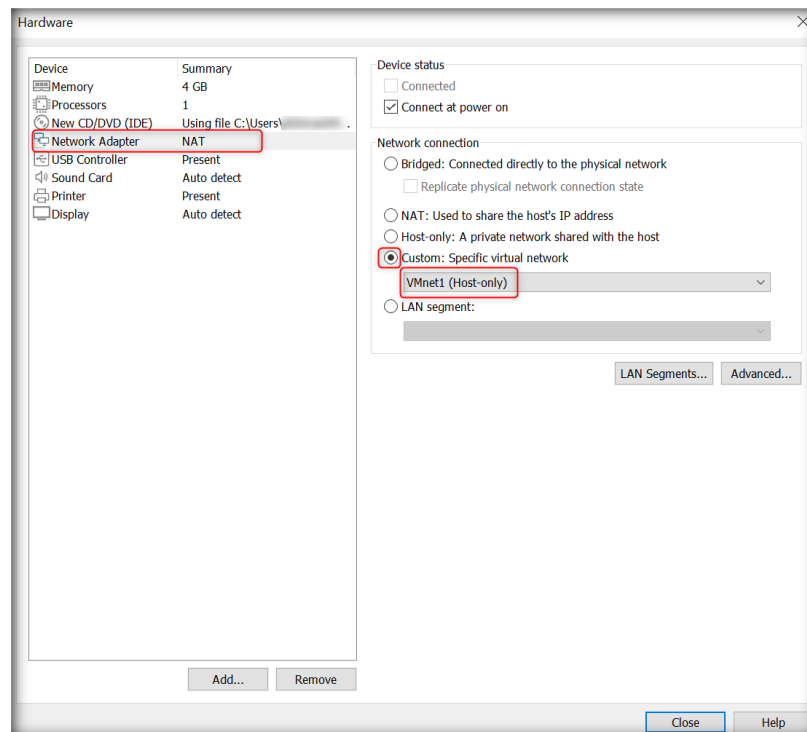
- Click Customize Hardware.



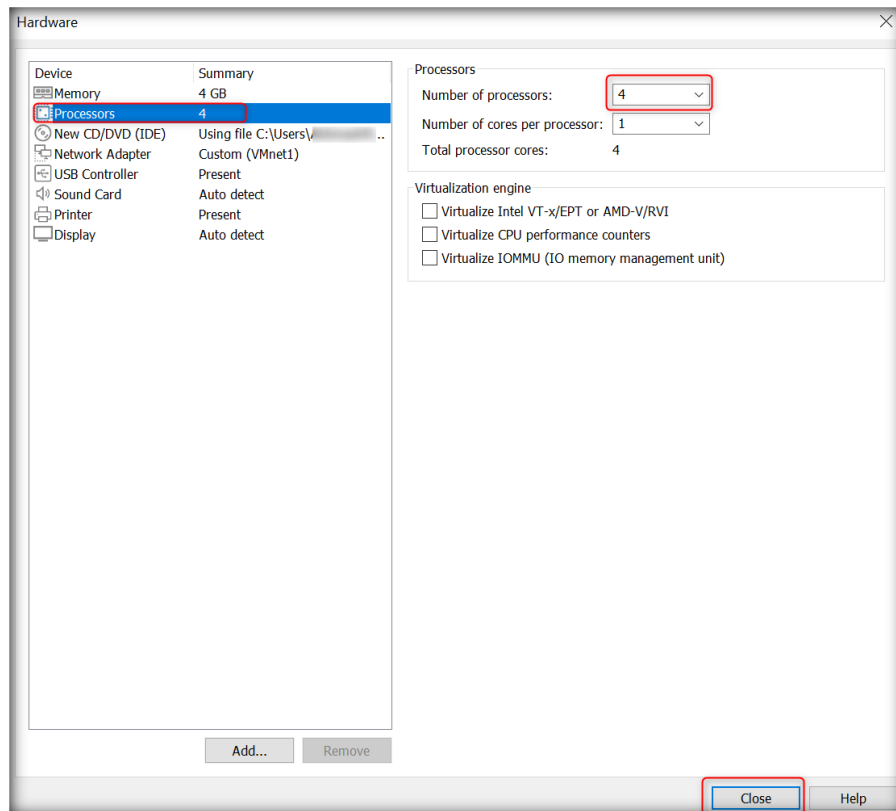
8. Assign the amount of **Memory for this Virtual Machine** to allocate to this virtual machine in MB (here, **4096**).



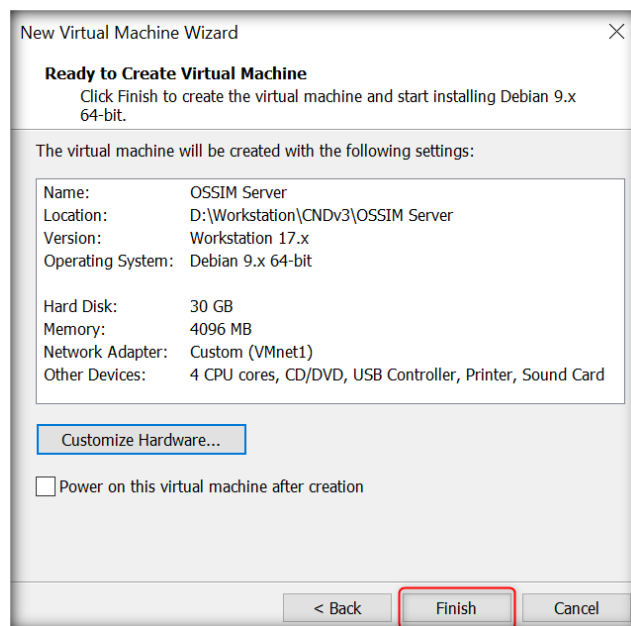
9. Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet1. Click on **Close**.



10. Select **Processors** and select 4 in number of processors. Click on Close.



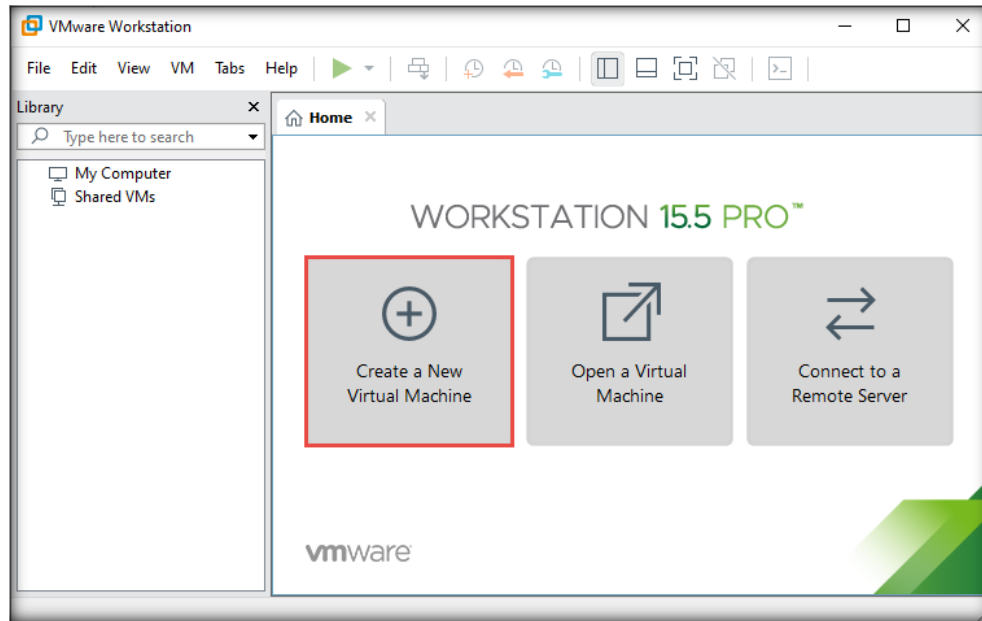
11. Click on Finish.



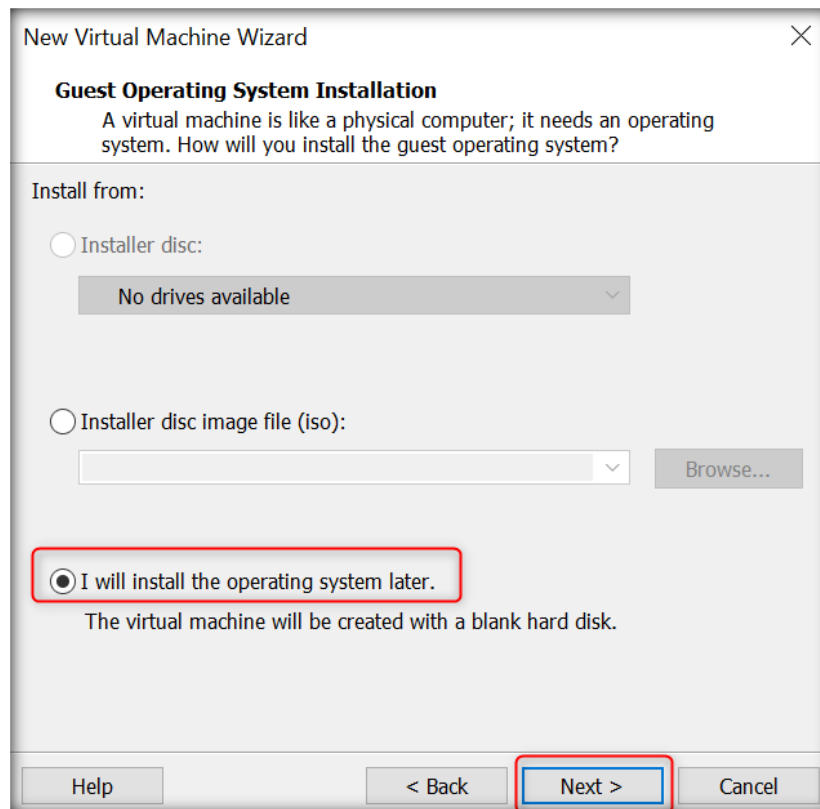
12. VMware workstation creates **Android** virtual machine profile.

CT#4.8: Creating Virtual Machine for Android Device

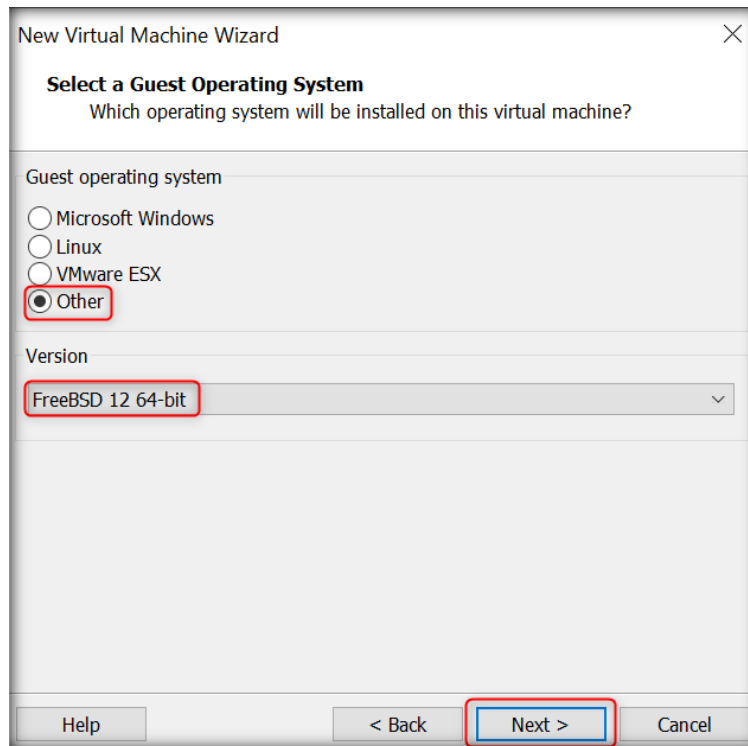
1. In the VMware Workstation window, click Create a New Virtual Machine.



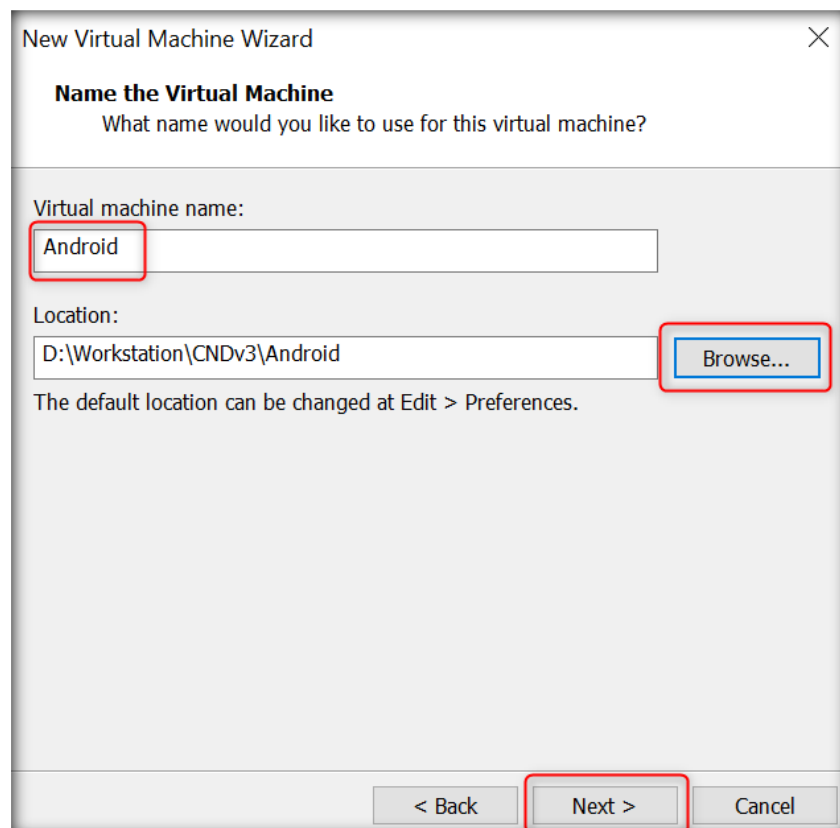
2. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.
3. Click **I will install the operating system later** radio button and click on **Next >**.



4. Select Other and choose FreeBSD 12 64-bit as Version. Click on Next.



5. Assign the name of the virtual machine as **Android**. You can choose different location to store the VM's or set it to default location. Click **Next**.



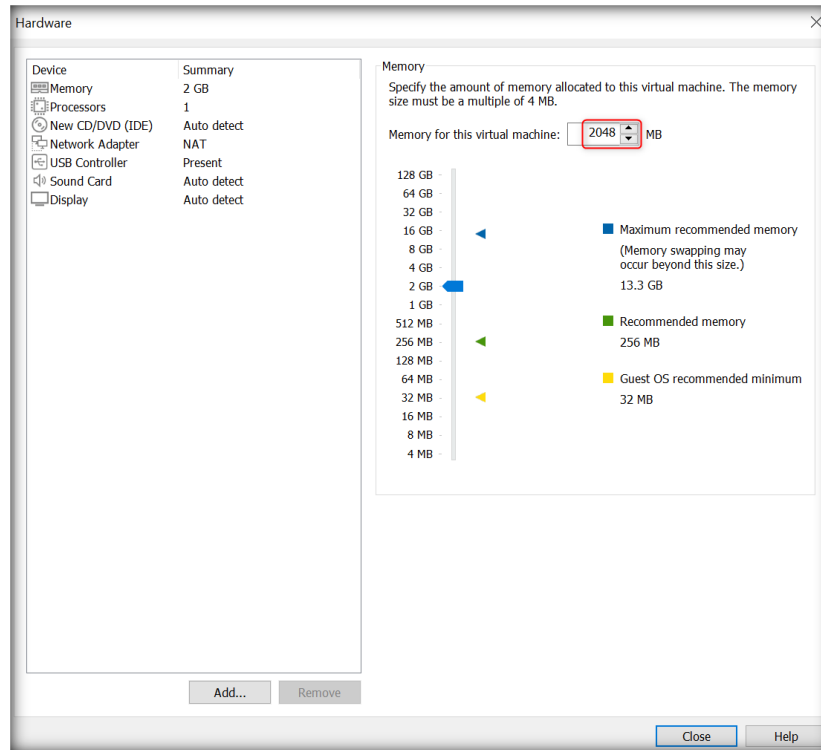
- Specify Disk Capacity section appears, allocate **20 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box, specifically the 'Specify Disk Capacity' step. The title bar reads 'New Virtual Machine Wizard'. Below the title bar, the section is titled 'Specify Disk Capacity' with the subtitle 'How large do you want this disk to be?'. A text box explains: '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.' Below this, there is a 'Maximum disk size (GB):' label followed by a text box containing '20' and a spinner control. Below that, it says 'Recommended size for FreeBSD 12 64-bit: 20 GB'. There are two radio buttons: 'Store virtual disk as a single file' (which is selected and highlighted with a red box) and 'Split virtual disk into multiple files'. Below the second radio button, a note states: 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom, there are four buttons: 'Help', '< Back', 'Next >' (highlighted with a red box), and 'Cancel'.

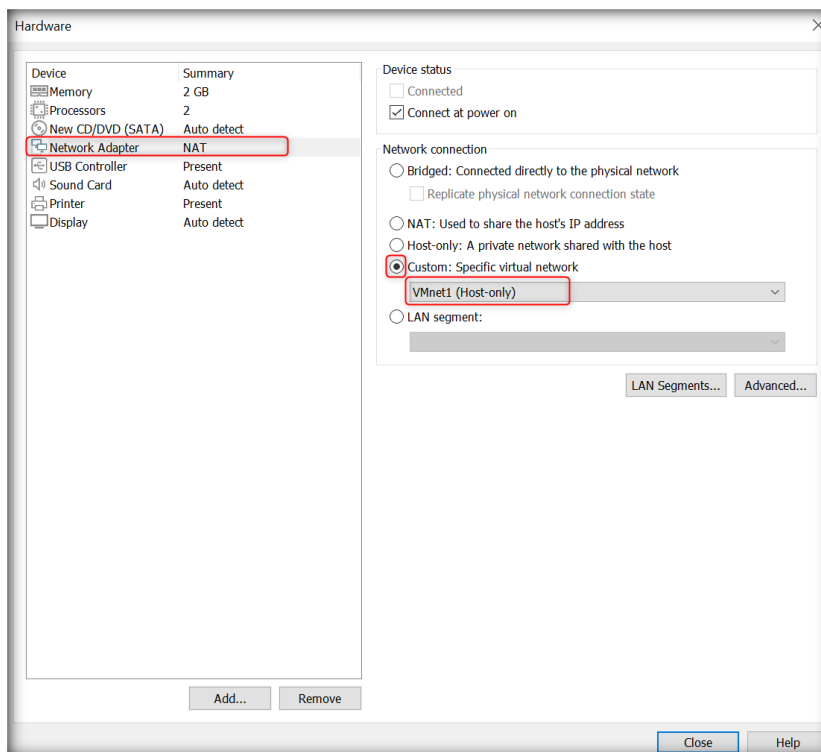
- Click Customize Hardware.

The screenshot shows the 'New Virtual Machine Wizard' dialog box, specifically the 'Ready to Create Virtual Machine' step. The title bar reads 'New Virtual Machine Wizard'. Below the title bar, the section is titled 'Ready to Create Virtual Machine' with the subtitle 'Click Finish to create the virtual machine. Then you can install FreeBSD 12 64-bit.' A text box states: 'The virtual machine will be created with the following settings:'. Below this, there is a list of settings: Name: Android, Location: D:\Workstation\CNDv3\Android, Version: Workstation 17.x, Operating System: FreeBSD 12 64-bit, Hard Disk: 20 GB, Memory: 256 MB, Network Adapter: NAT, and Other Devices: CD/DVD, Printer, Sound Card. Below the list, there is a 'Customize Hardware...' button highlighted with a red box. At the bottom, there are three buttons: '< Back', 'Finish' (highlighted with a blue box), and 'Cancel'.

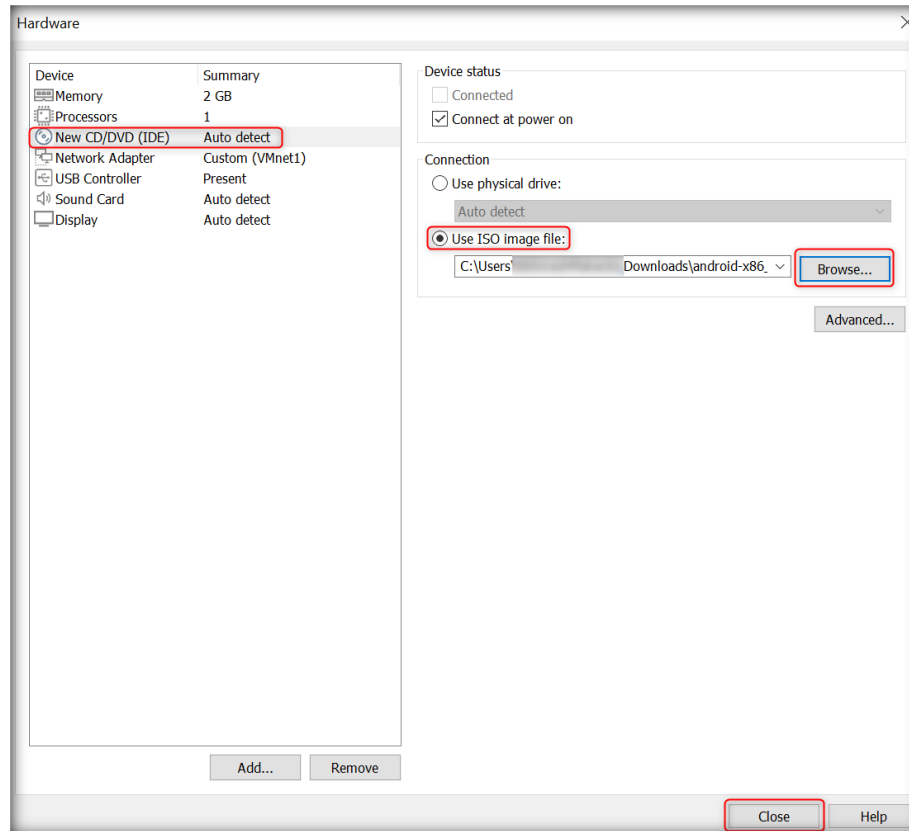
8. Assign the amount of **Memory for this Virtual Machine** to allocate to this virtual machine in MB (here, **2048**).



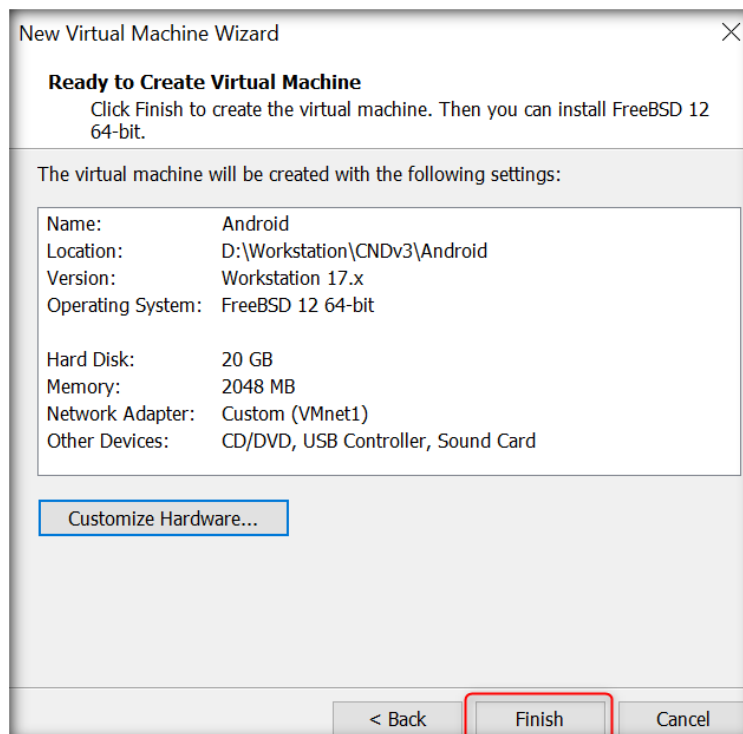
9. Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet1. Click on **Close**.



10. Select New CD/DVD (SATA) and select Use ISO image file radio button. Click on browse and select the iso file of Android. Click on Close.



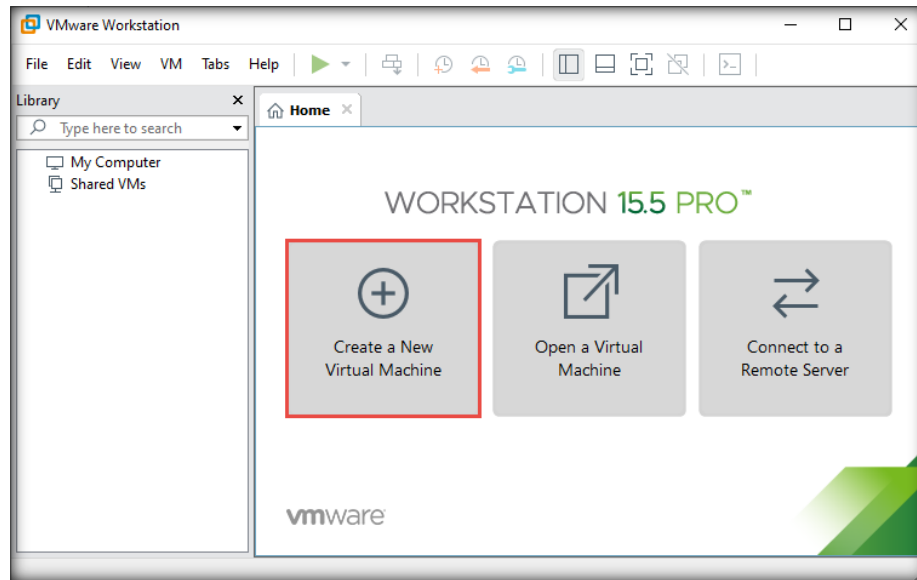
11. Click on Finish.



12. VMware workstation creates **Android** virtual machine profile.

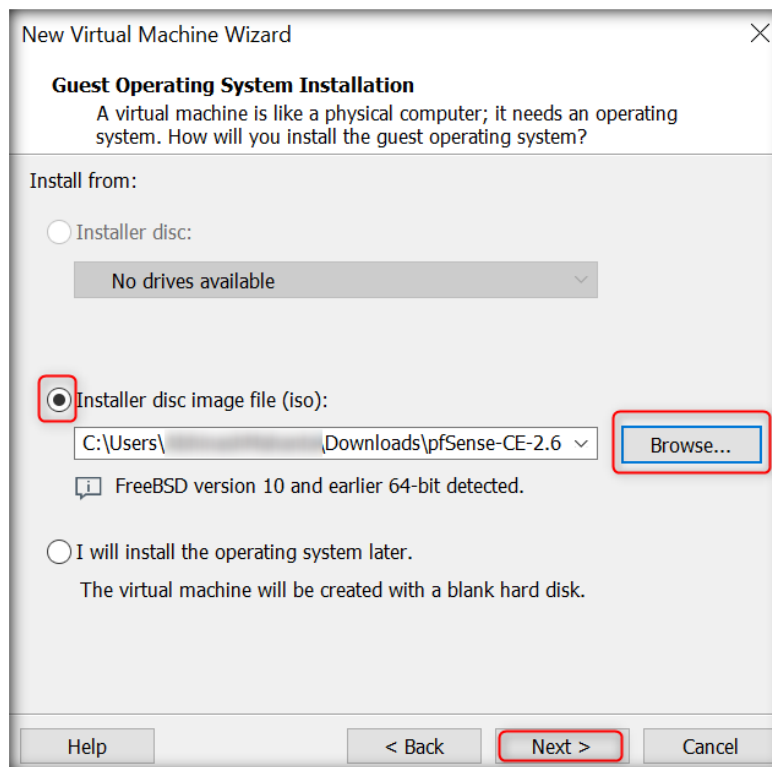
CT#4.9: Creating Virtual Machine for PfSense External Firewall

13. In the VMware Workstation window, click Create a New Virtual Machine.



14. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.

15. Click **Installer disc image file (iso)** radio button and click on **Browse**. Select the iso file and click on **Next >**.



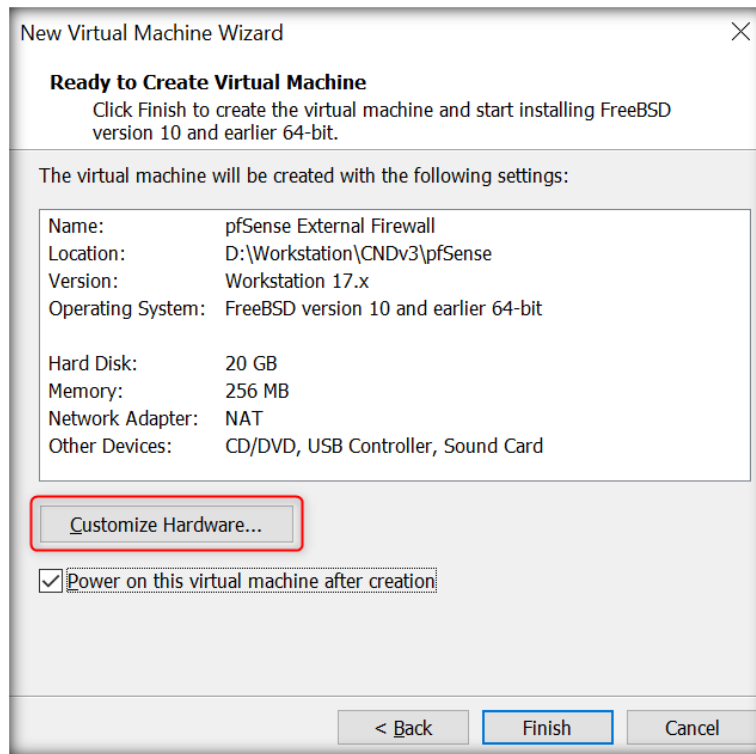
16. Assign the name of the virtual machine as **pfSense External Firewall**. You can choose different location to store the VM's or set it to default location. Click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Name the Virtual Machine'. Below the title is the question 'What name would you like to use for this virtual machine?'. There are two input fields: 'Virtual machine name:' with the text 'pfSense External Firewall' and 'Location:' with the text 'D:\Workstation\CNDv3\pfSense'. A 'Browse...' button is next to the location field. At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'. Red boxes highlight the name field, the location field, the 'Browse...' button, and the 'Next >' button.

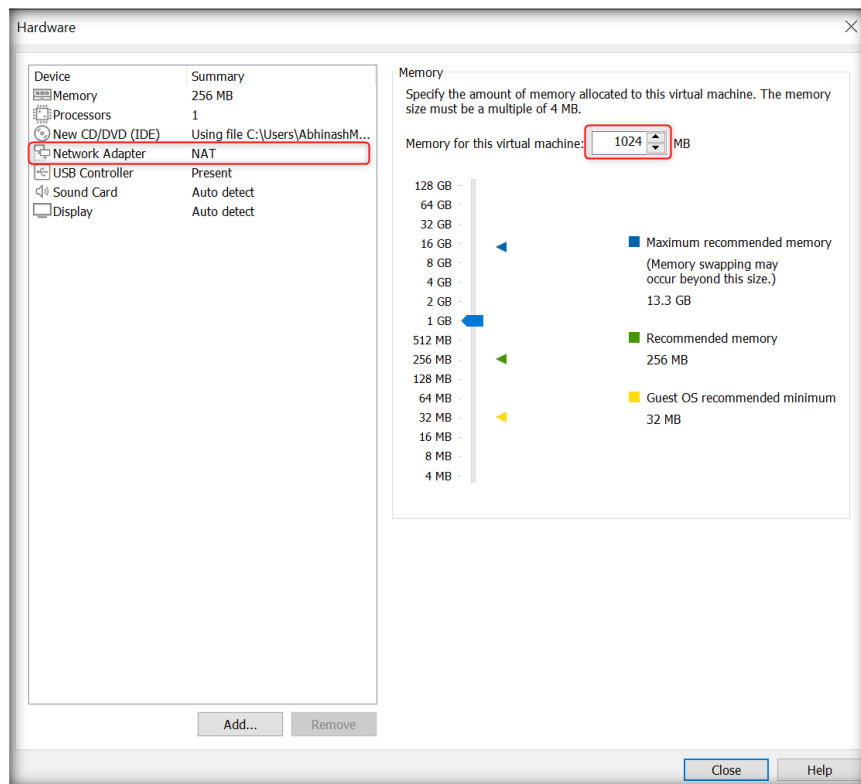
17. Connect Specify Disk Capacity section appears, allocate **20 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Specify Disk Capacity'. Below the title is the question 'How large do you want this disk to be?'. There is a text box for 'Maximum disk size (GB)' with the value '20.0'. Below it is the text 'Recommended size for FreeBSD version 10 and earlier 64-bit: 20 GB'. There are two radio buttons: 'Store virtual disk as a single file' (selected) and 'Split virtual disk into multiple files'. Below the radio buttons is the text 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. Red boxes highlight the 'Maximum disk size (GB)' field, the 'Store virtual disk as a single file' radio button, and the 'Next >' button.

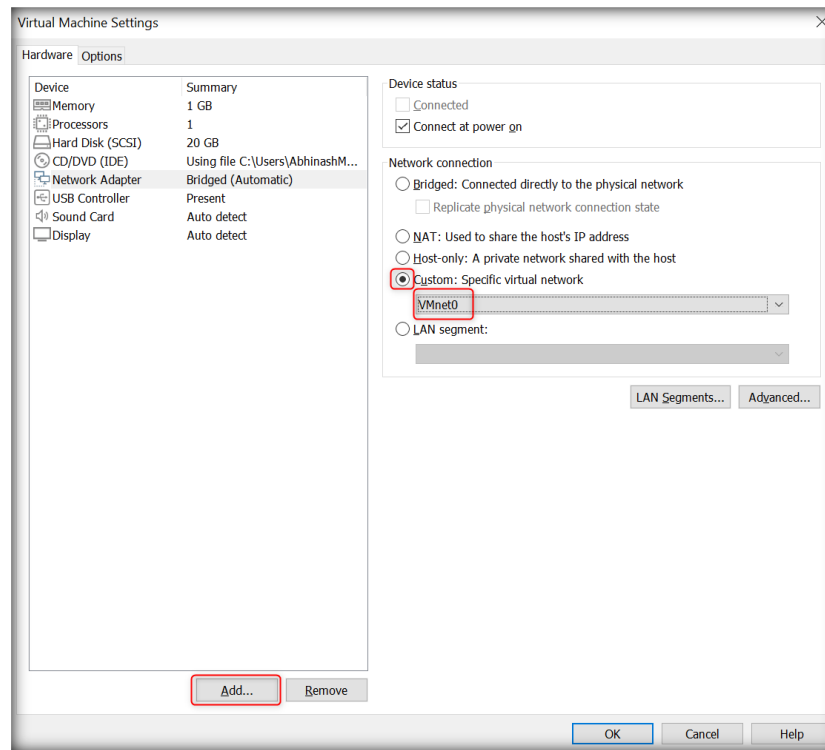
18. Click on Customize hardware.



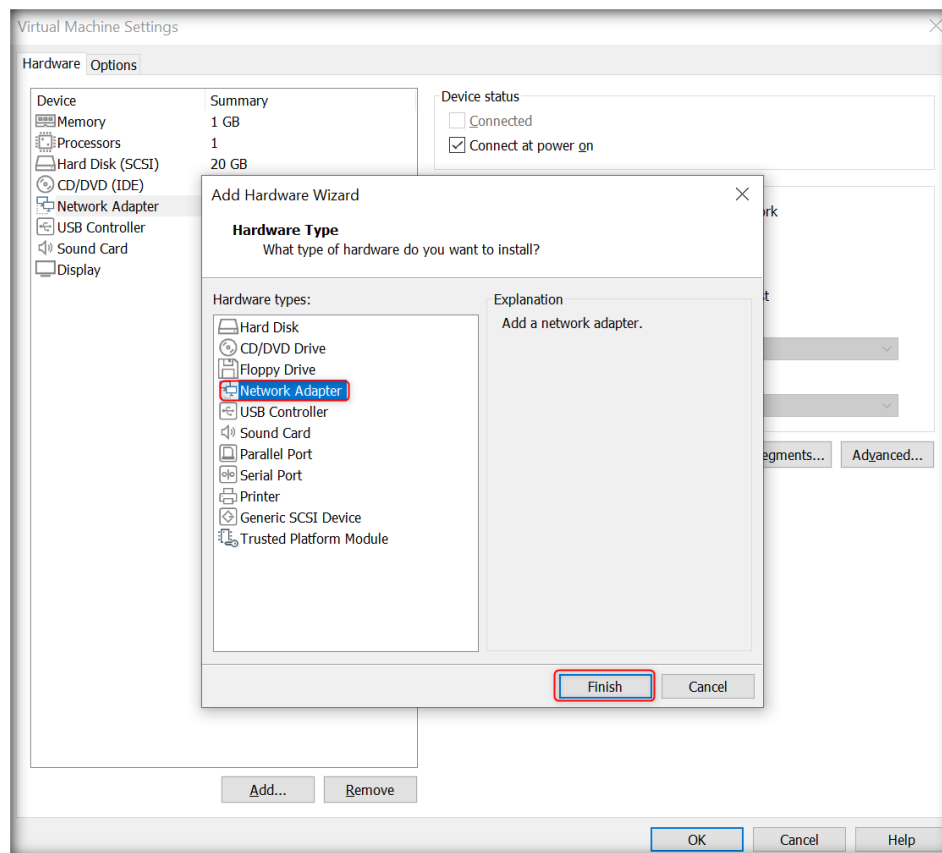
19. Assign the amount of **Memory for this Virtual Machine** to allocate to this virtual machine in MB (here, **1024**). Click on Network Adapter.



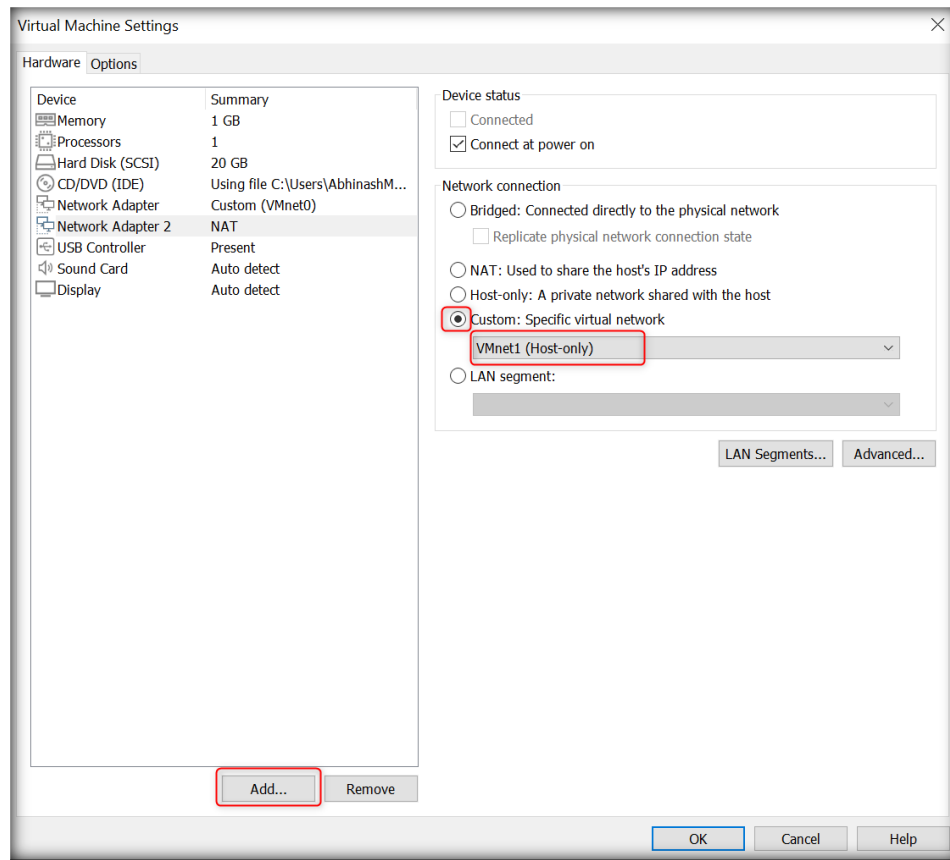
20. Select **Custom: Specific Virtual Network** and select VMnet0 (Bridged). Click on **Add**.



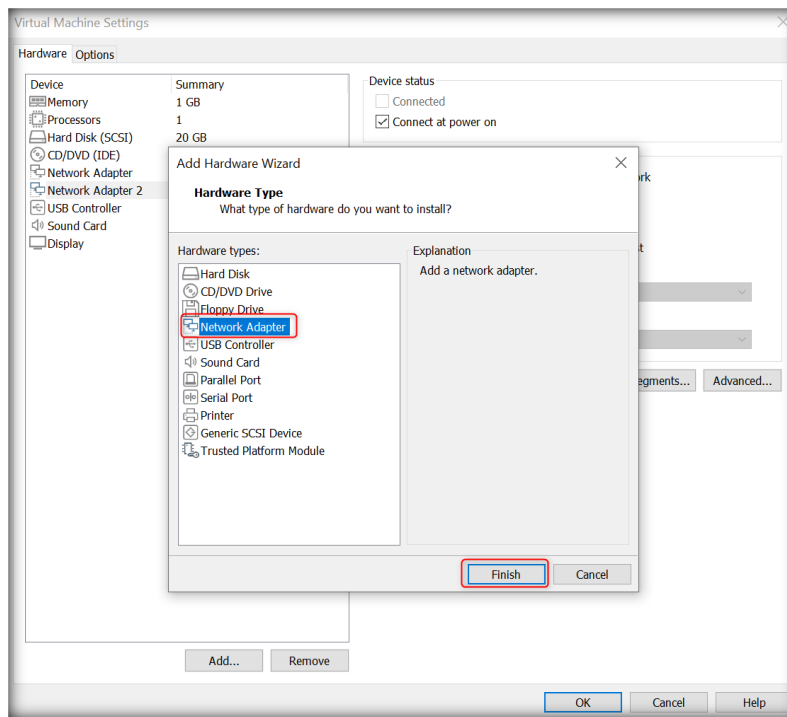
21. Select **Network Adapter** and click **Finish**.



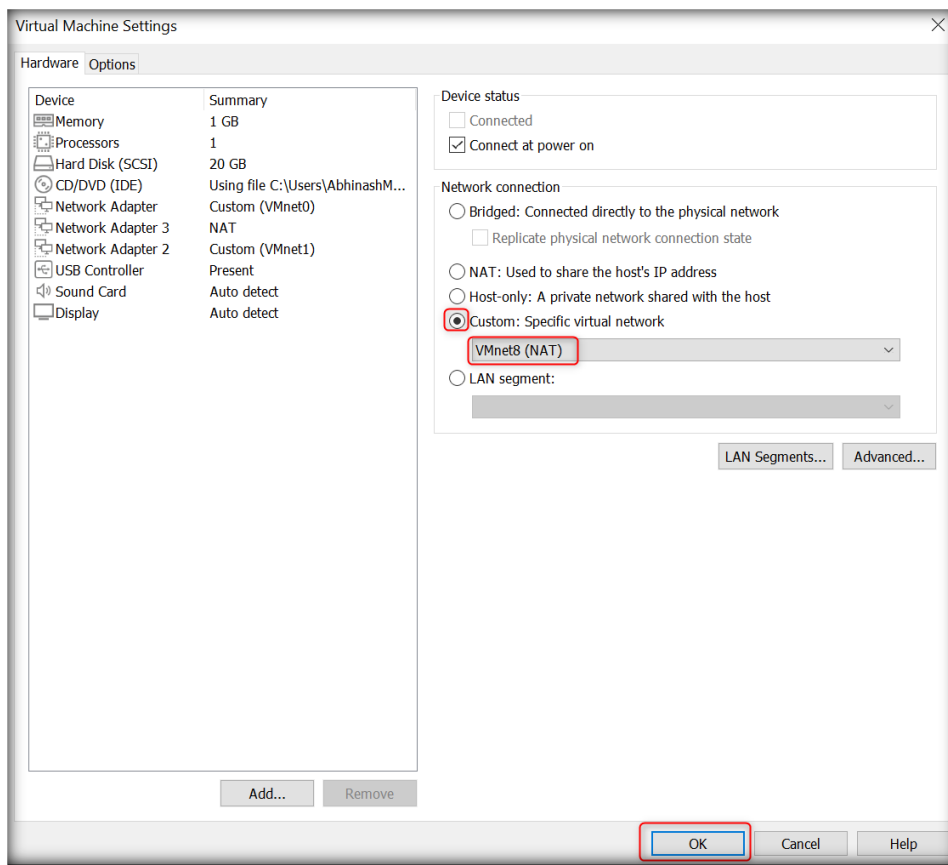
22. Select Custom: Specific Virtual Network and select VMnet1 (Host Only). Click on **Add**.



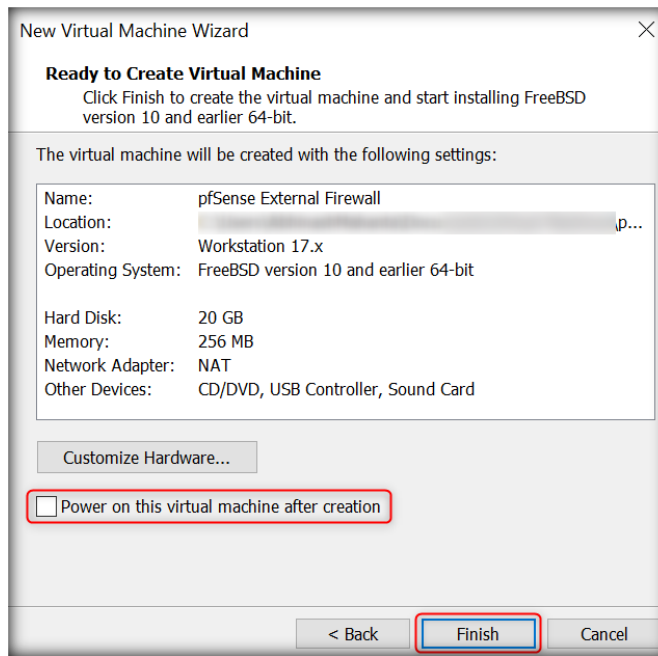
23. Select Network Adapter and click **Finish**.



24. Select **Custom: Specific Virtual Network** and select VMnet8 (NAT). Click **OK**.

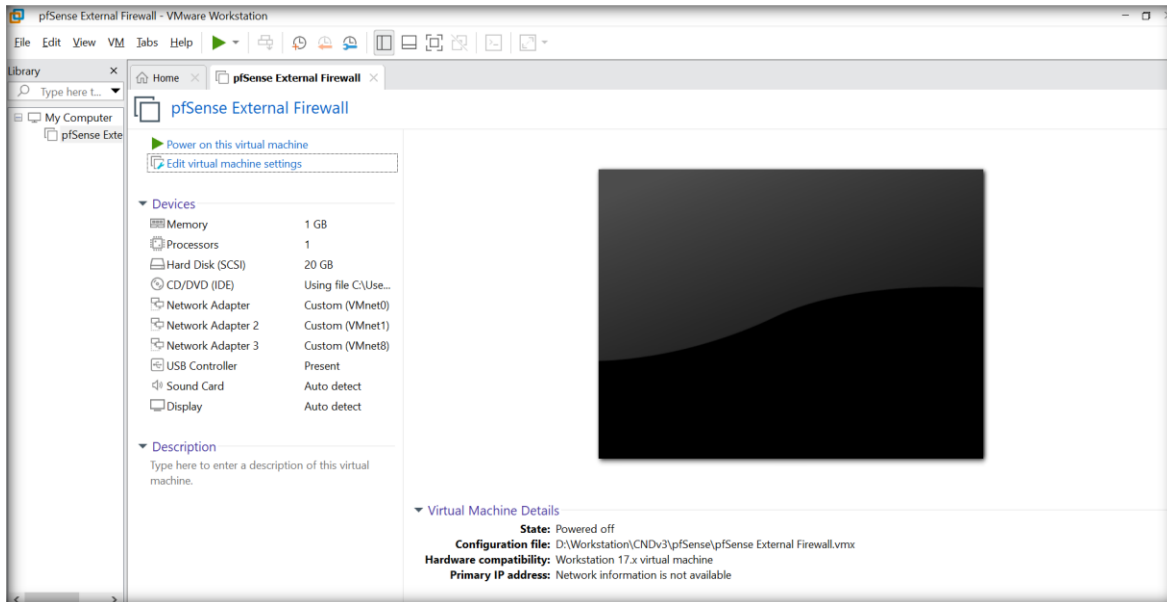


25. Unselect **Power on this virtual machine after creation** checkbox and click on **Finish**.



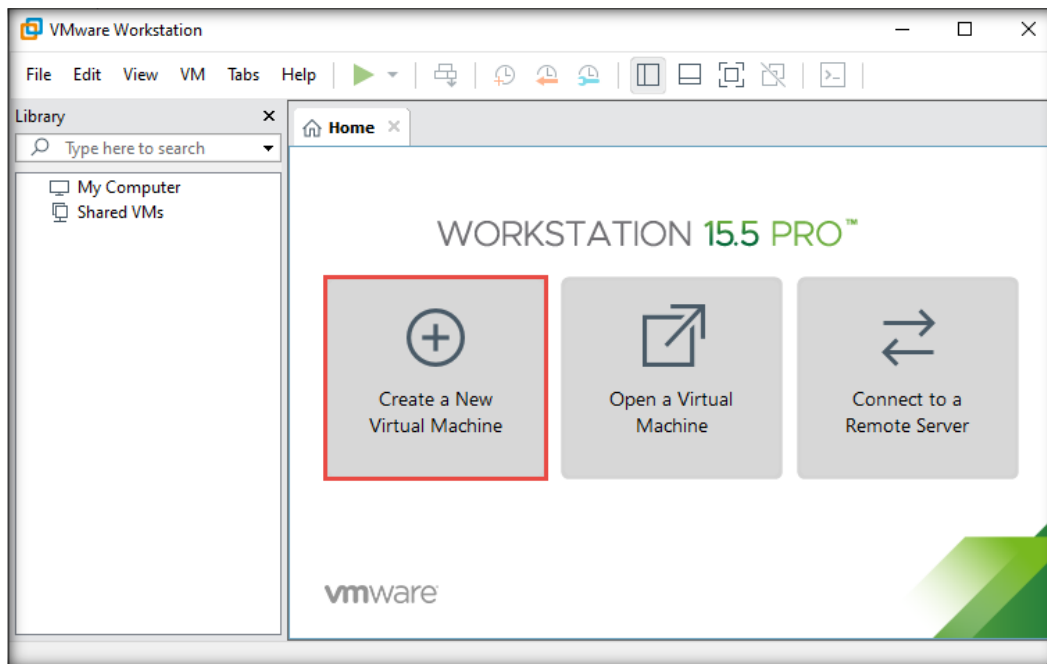
26. VMware workstation creates **pfSense External Firewall** virtual machine profile.

27. In **VMware Workstation** main window, you see a new virtual machine named **pfSense External Firewall**.



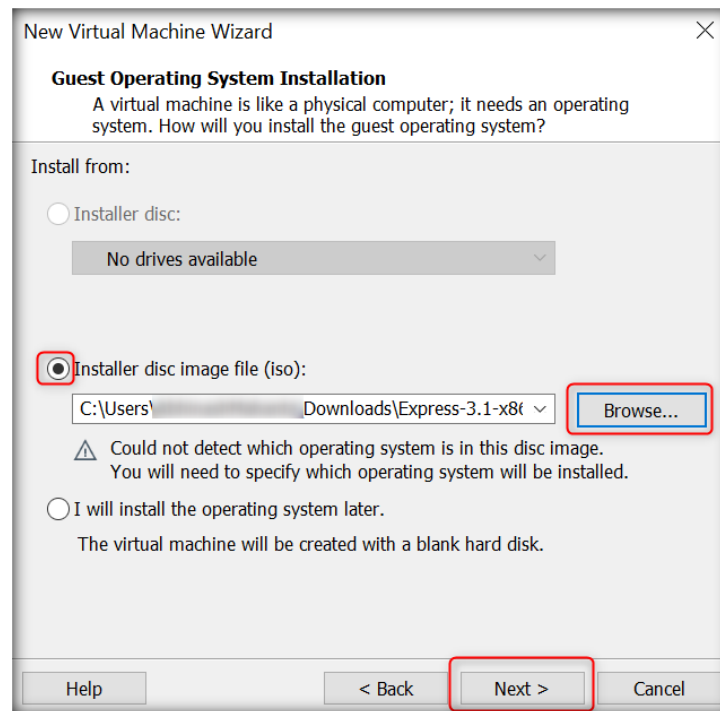
CT#4.10: Creating Virtual Machine for Smoothwall Internal Firewall

1. In the VMware Workstation window, click Create a New Virtual Machine.

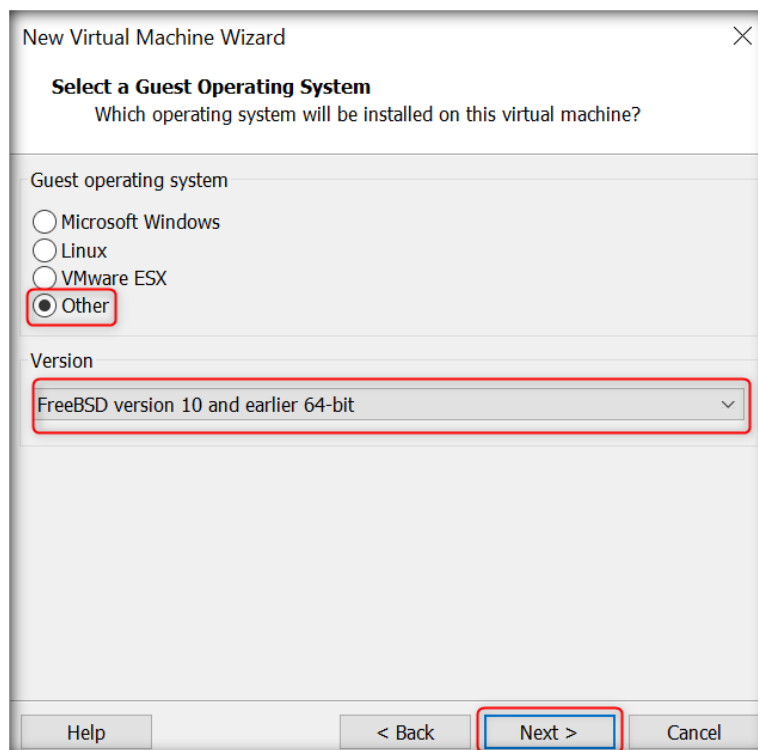


2. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.

- Click **Installer disc image file (iso)** radio button and click on **Browse**. Select the iso file and click on **Next >**.



- Select a Guest Operating System section appears. Select **Other** radio button and choose **FreeBSD version 10 and earlier 64-bit** as shown in the screenshot. Click on **Next**.



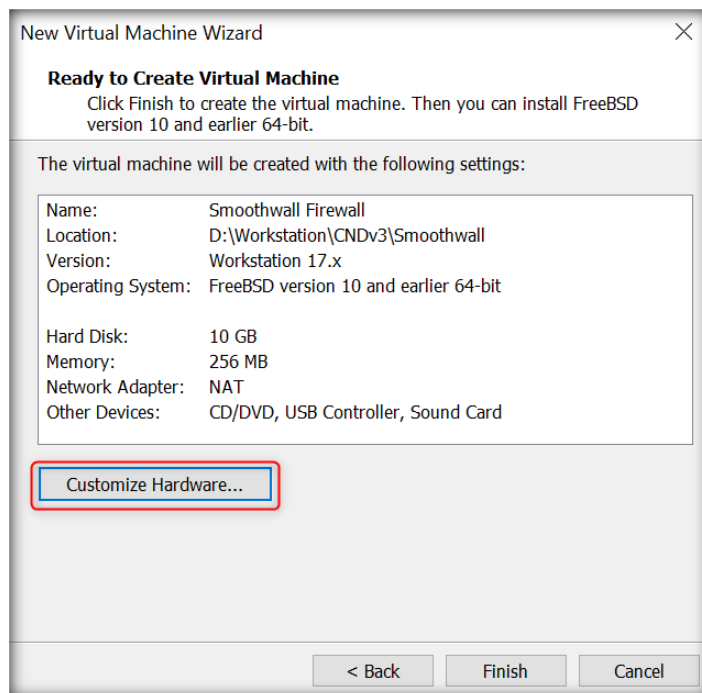
- Assign the name of the virtual machine as **Smoothwall Firewall**. Click on Browse to choose different location to store the VM's or set it to default location. Click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Name the Virtual Machine'. The subtitle is 'What name would you like to use for this virtual machine?'. There is a text input field for 'Virtual machine name:' containing 'Smoothwall Firewall'. Below it is a 'Location:' section with a text input field containing 'D:\Workstation\CNDv3\Smoothwall' and a 'Browse...' button. A note states 'The default location can be changed at Edit > Preferences.' At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'. Red boxes highlight the 'Virtual machine name' field, the 'Browse...' button, and the 'Next >' button.

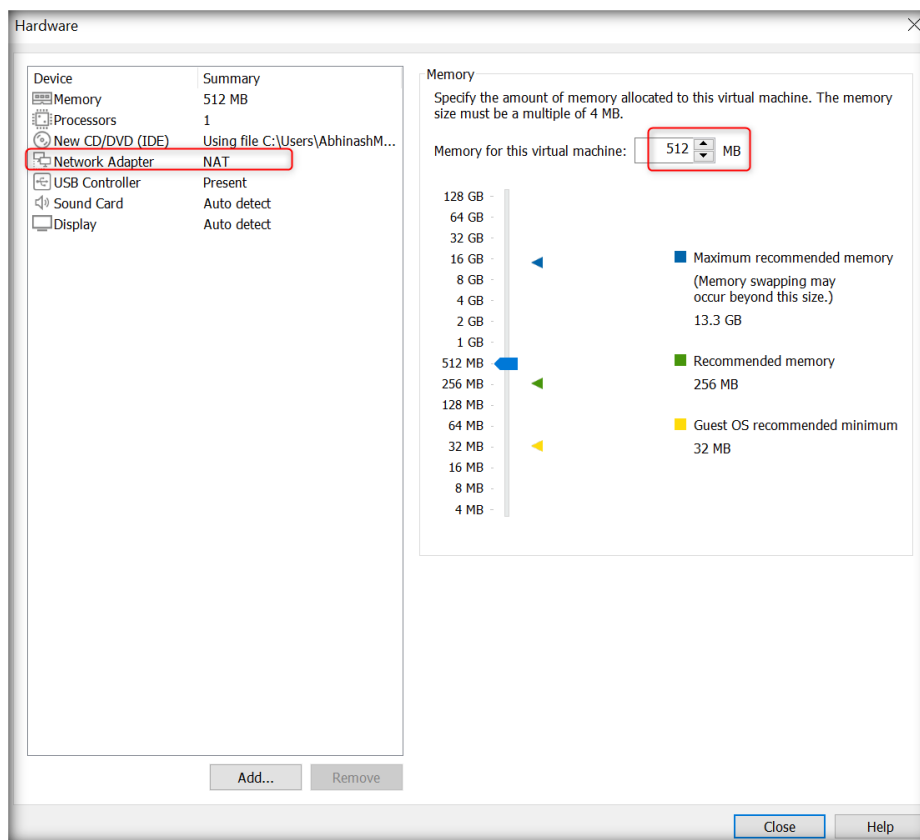
- Connect Specify Disk Capacity section appears, allocate **10 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' dialog box with the title 'Specify Disk Capacity'. The subtitle is 'How large do you want this disk to be?'. A paragraph explains that the virtual machine's hard disk is stored as one or more files on the host computer's physical disk. Below this is a 'Maximum disk size (GB):' section with a spin box set to '10'. A note states 'Recommended size for FreeBSD version 10 and earlier 64-bit: 20 GB'. There are two radio buttons: 'Store virtual disk as a single file' (which is selected) and 'Split virtual disk into multiple files'. A note explains that splitting the disk makes it easier to move the virtual machine but may reduce performance. At the bottom are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. Red boxes highlight the '10' in the spin box, the 'Store virtual disk as a single file' radio button, and the 'Next >' button.

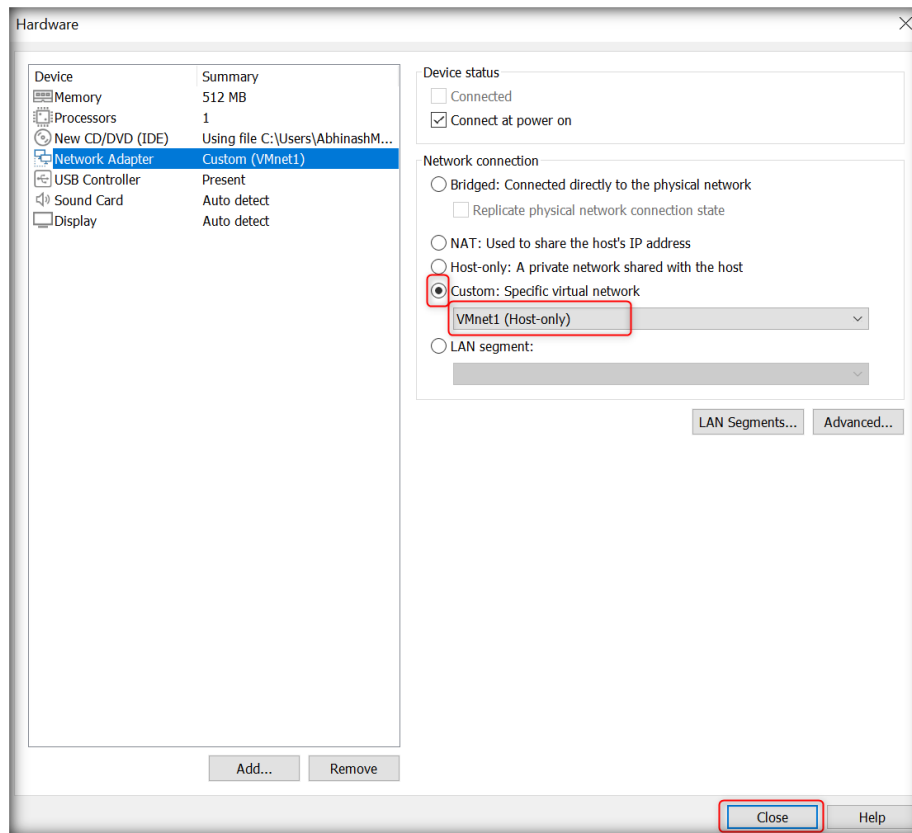
7. Click on Customize Hardware.



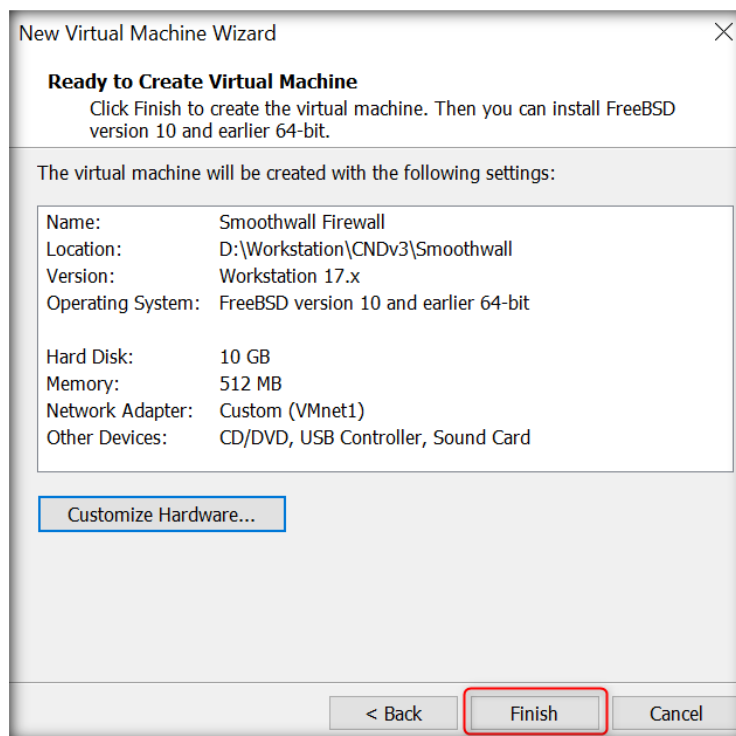
8. Assign the amount of **Memory for this Virtual Machine** to allocate to this virtual machine in MB (here, **512**). Click on Network Adapter.



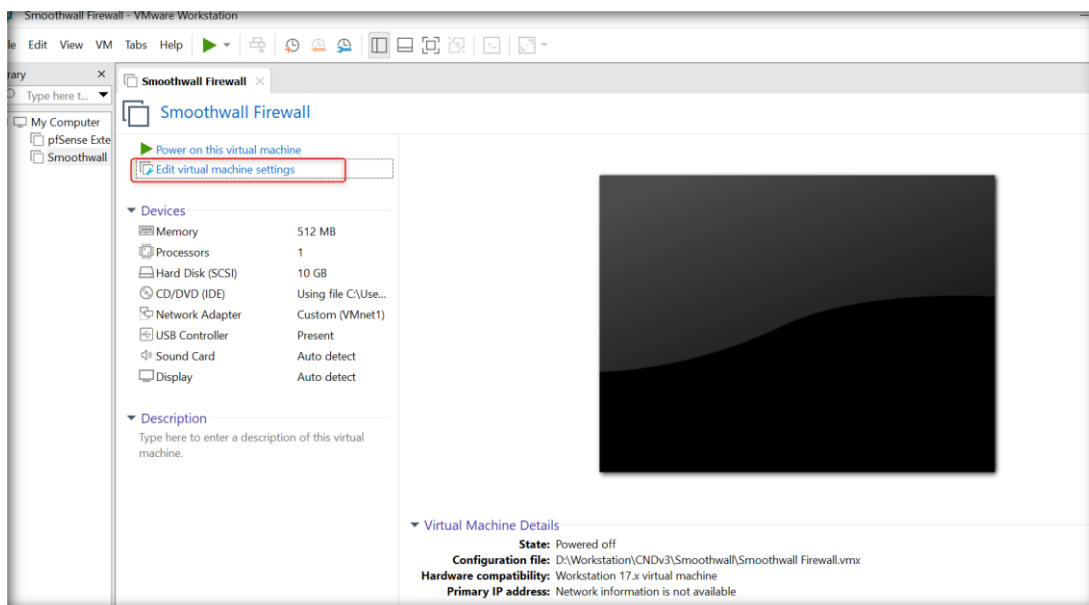
9. Select **Custom: Specific Virtual Network** and select VMnet1 (Host Only). Click on close.



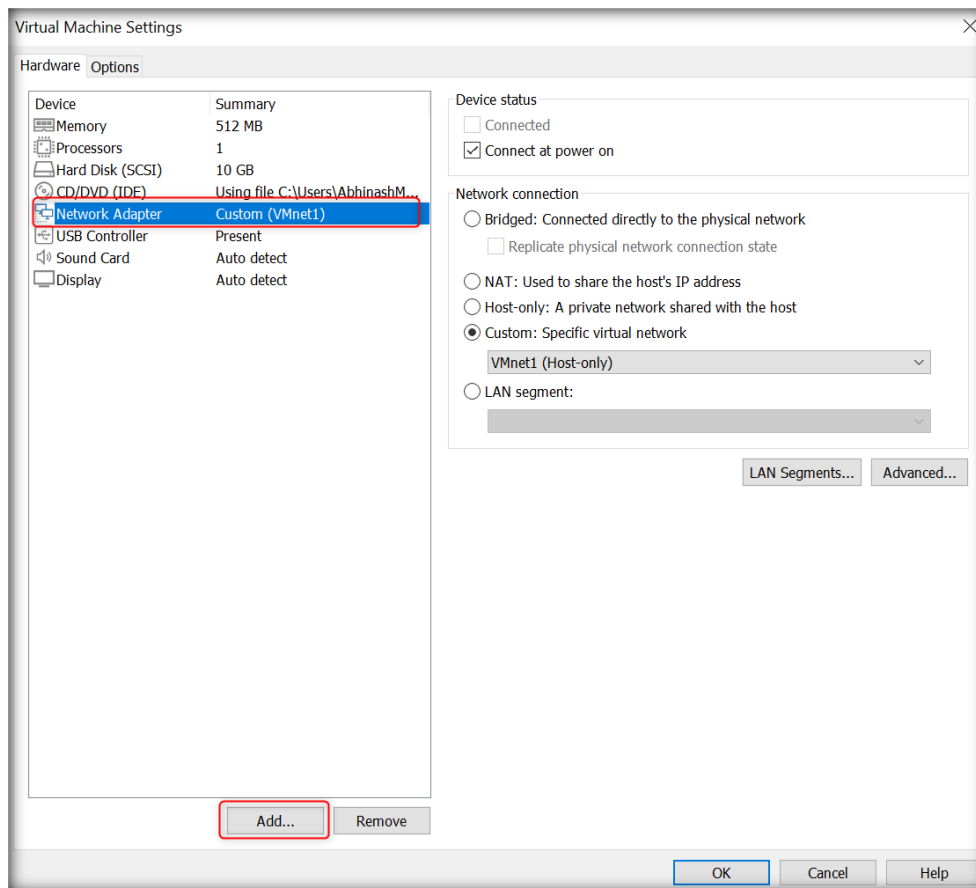
10. Click finish.



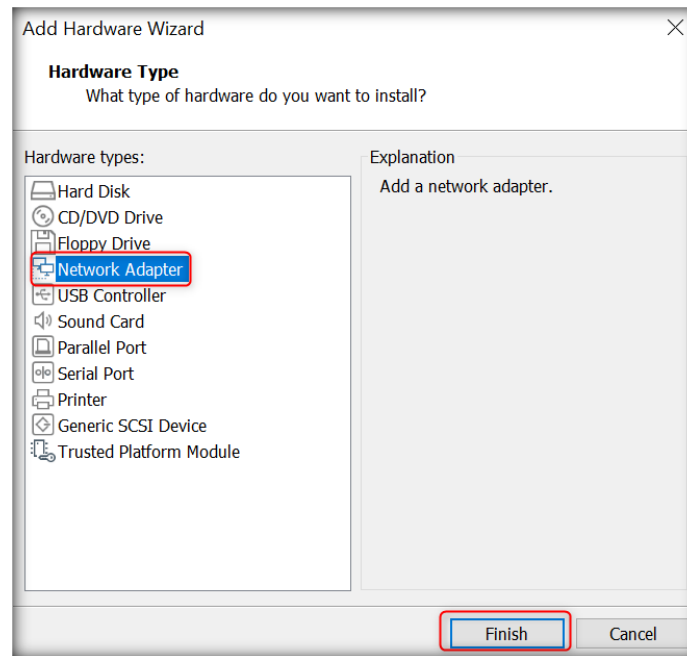
11. VMware Workstation creates **Smoothwall Internal Firewall** virtual machine profile.
12. In **VMware Workstation** main window, you see a new virtual machine named **Smoothwall Firewall**. Click on Edit virtual machine settings.



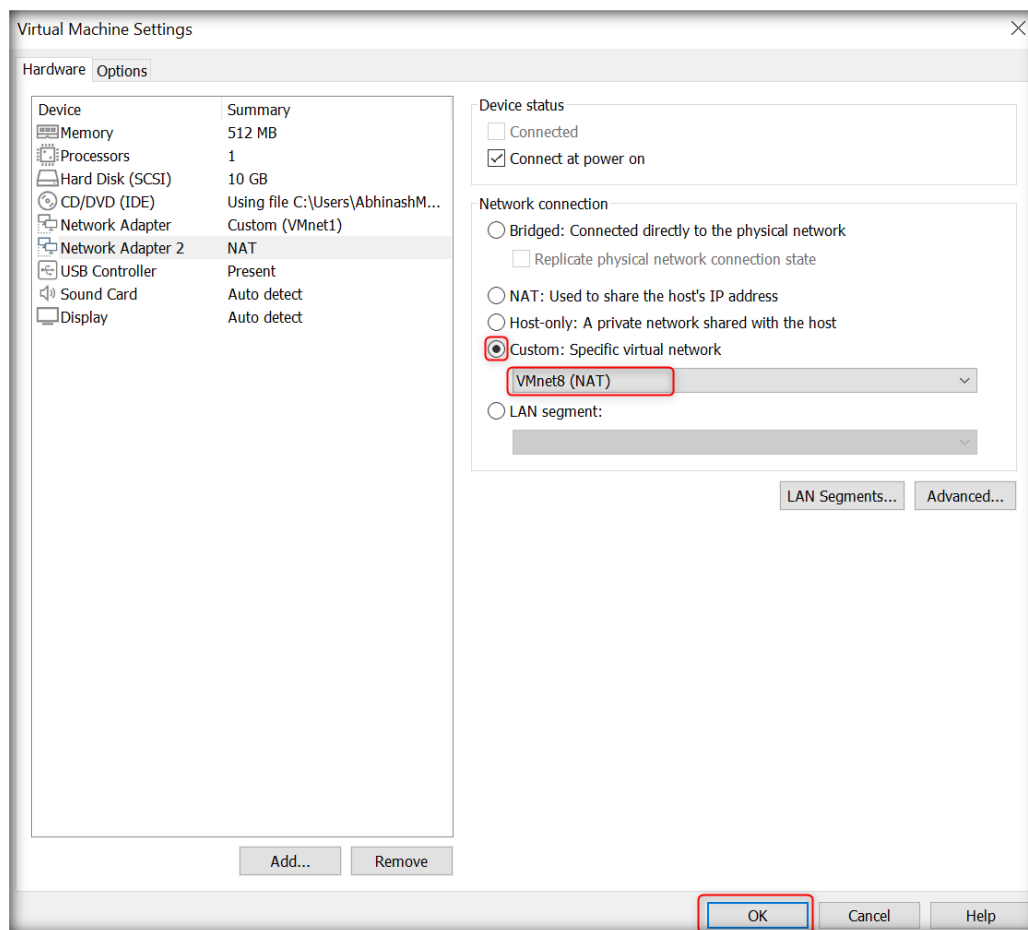
13. Select Network Adapter and click on Add.



14. Select Network Adapter and click on Finish.

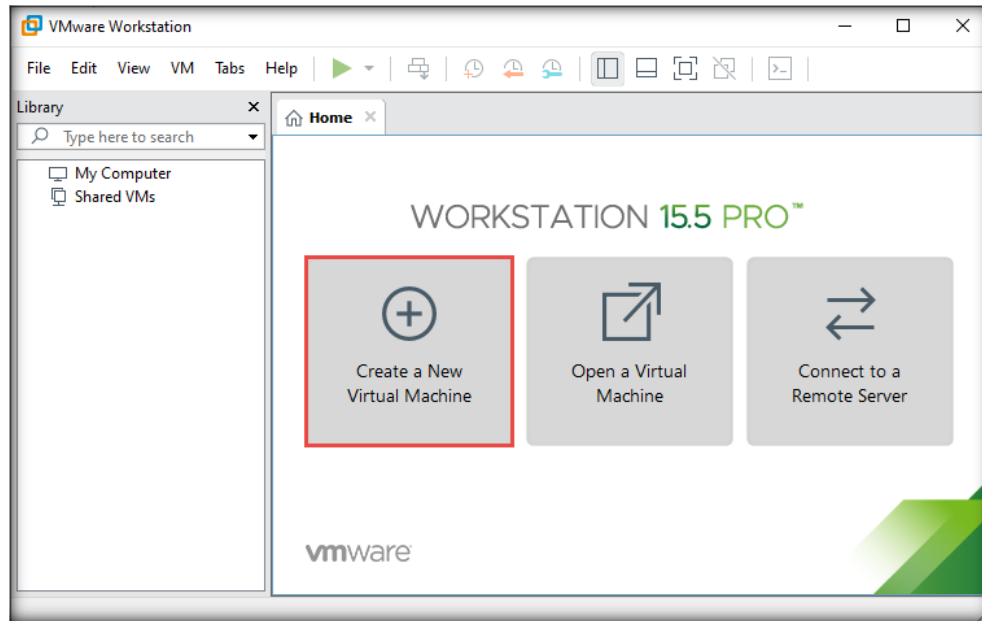


15. Select **Custom: Specific Virtual Network** and select VMnet1 (Host Only). Click on OK.

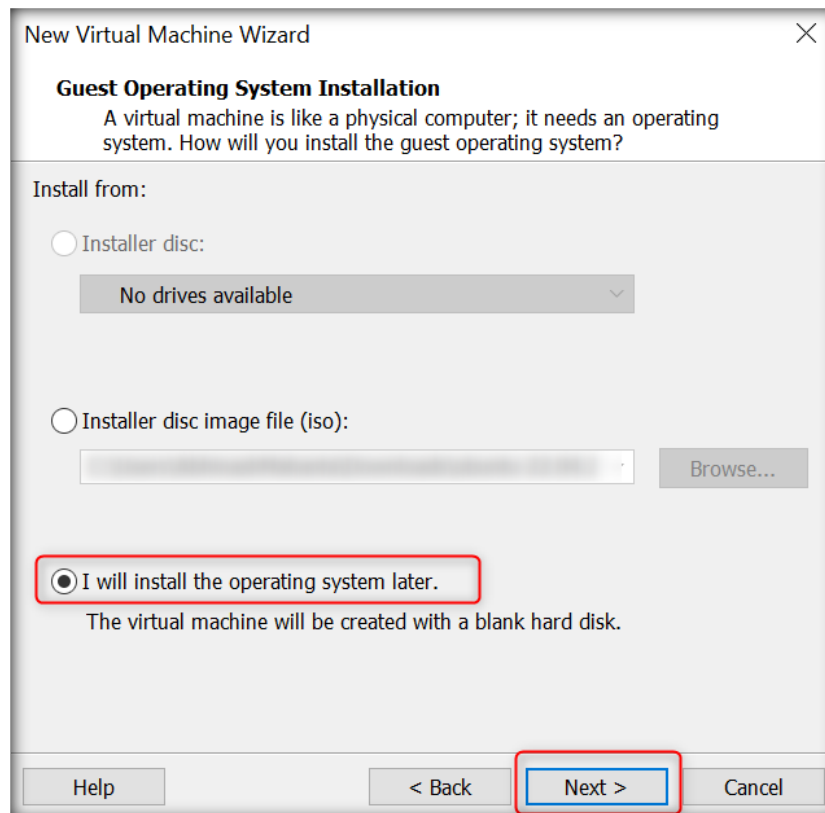


CT#4.11: Creating Virtual Machine for Attacker Machine

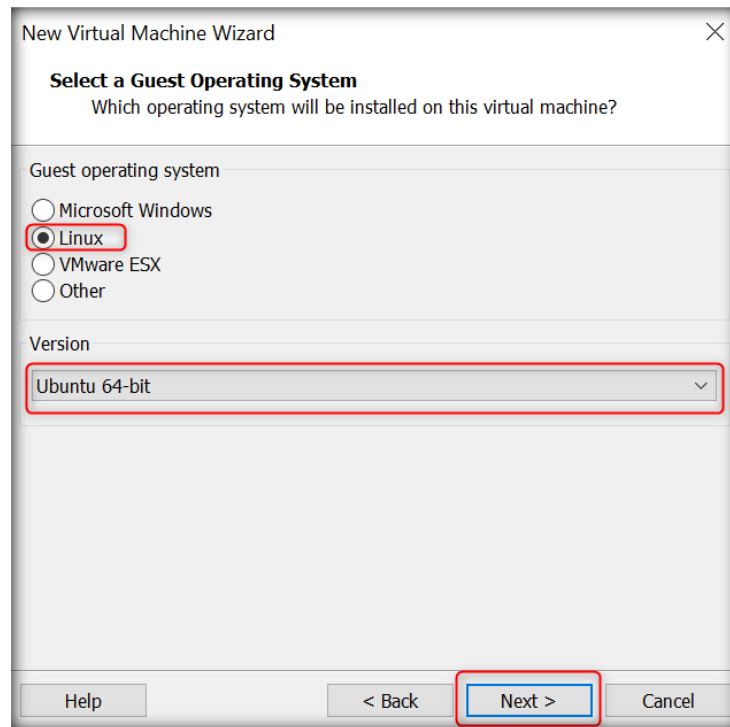
1. In the VMware Workstation window, click Create a New Virtual Machine.



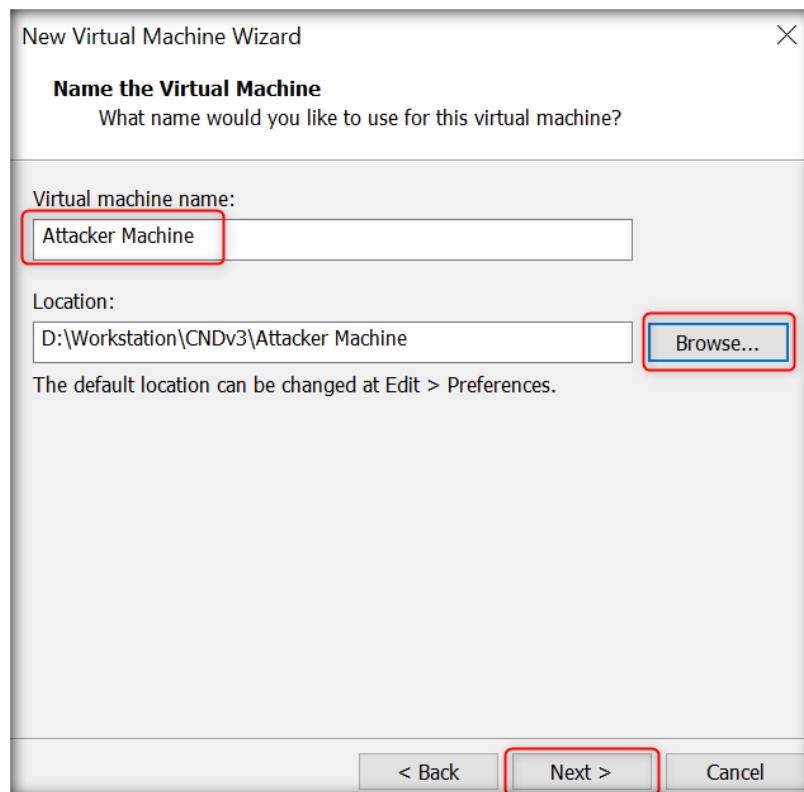
2. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.
3. Click **I will install the operating system later** radio button and click on **Next >**.



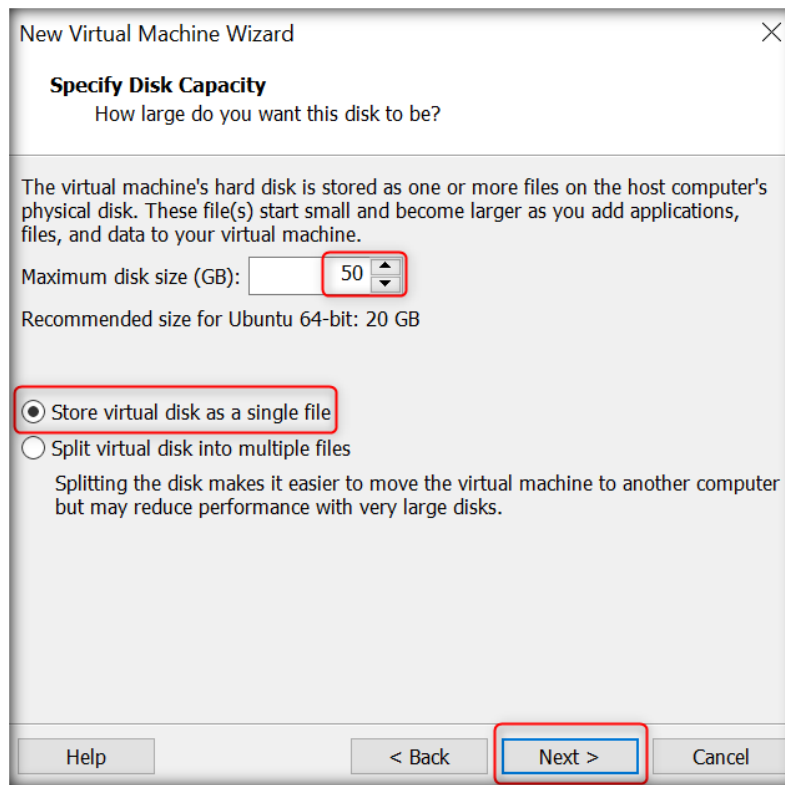
4. Select Linux and choose Ubuntu 64-bit as Version. Click on Next.



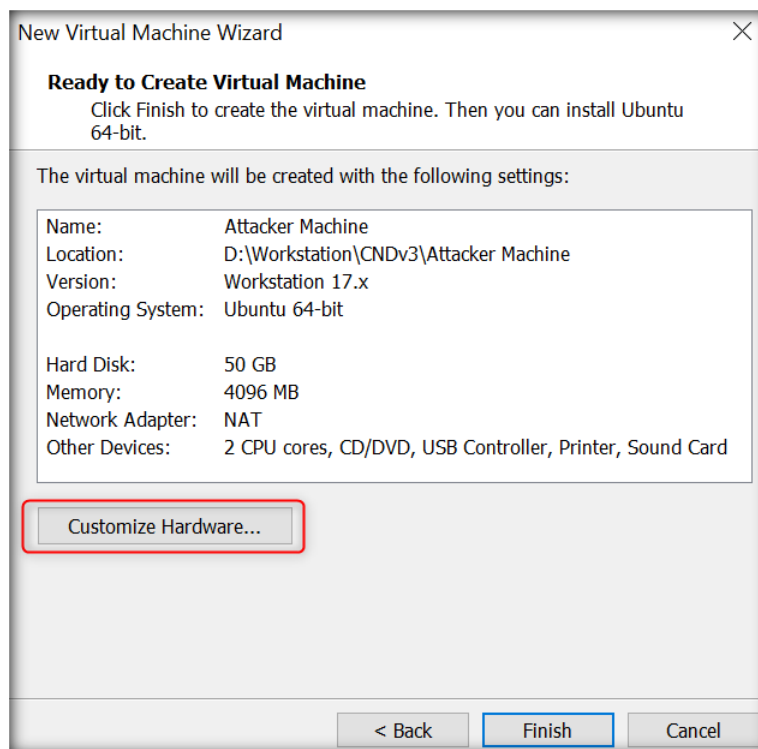
5. Assign the name of the virtual machine as **Attacker Machine**. You can choose different location to store the VM's or set it to default location. Click **Next**.



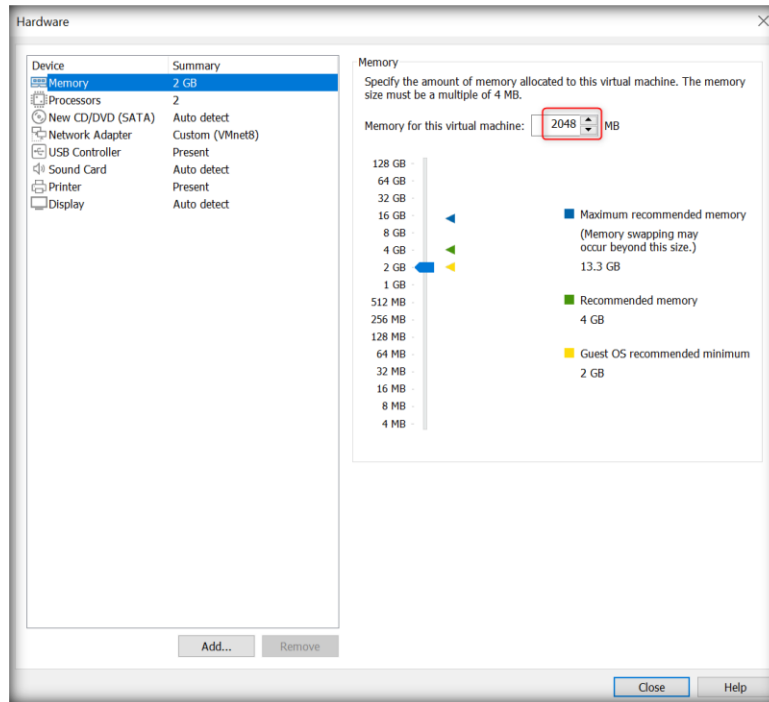
- Specify Disk Capacity section appears, allocate **50 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.



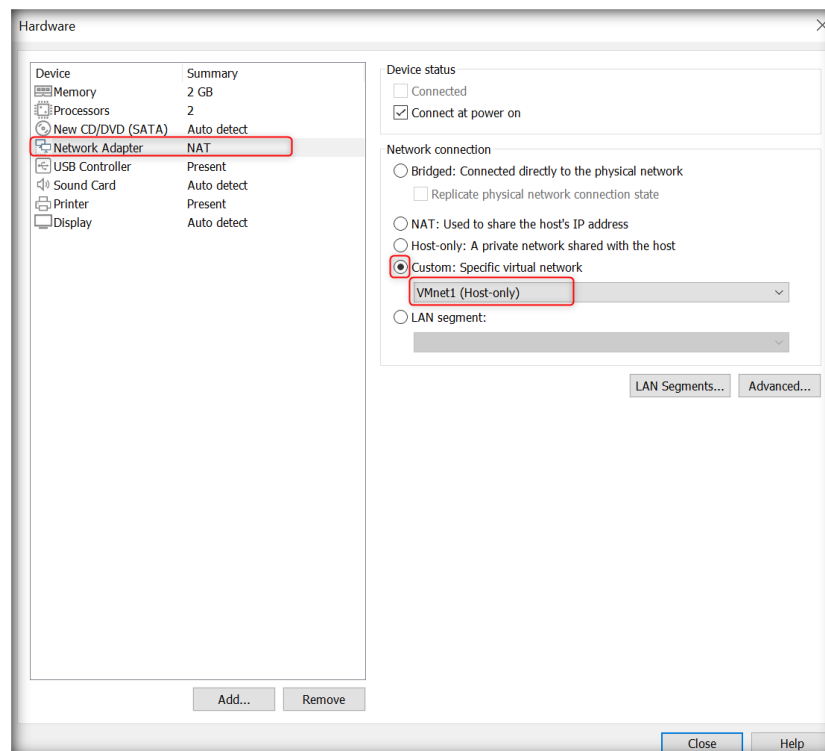
- Click Customize Hardware.



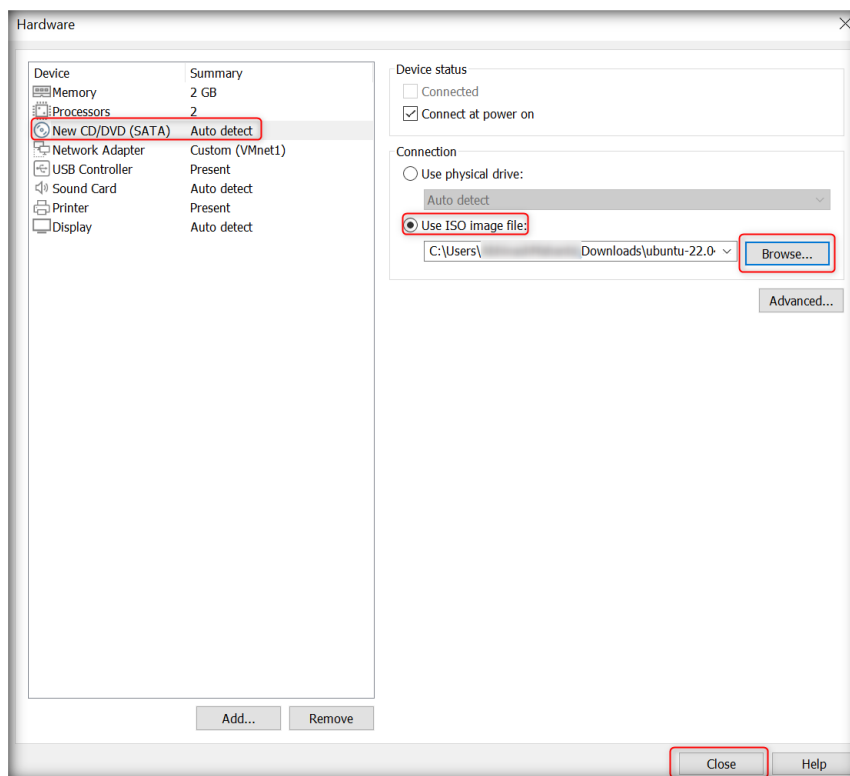
8. Assign the amount of **Memory for this Virtual Machine** to allocate to this virtual machine in MB (here, **2048**).



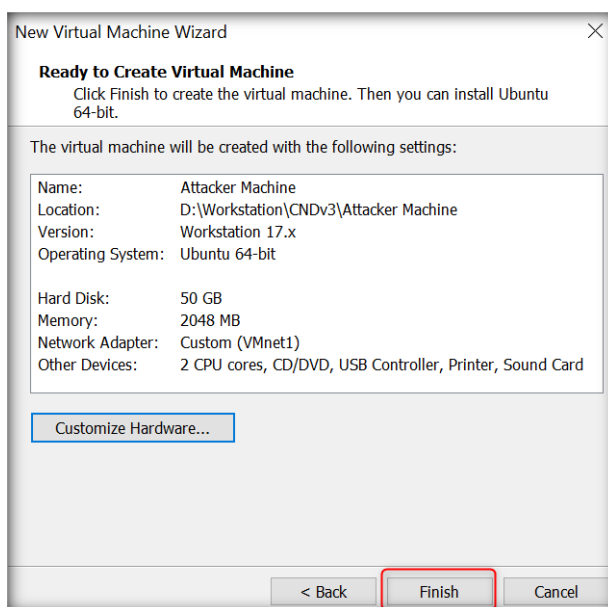
9. Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet1. Click on **Close**.



10. Select New CD/DVD (SATA) and select Use ISO image file radio button. Click on browse and select the iso file for Ubuntu. Click on Close.



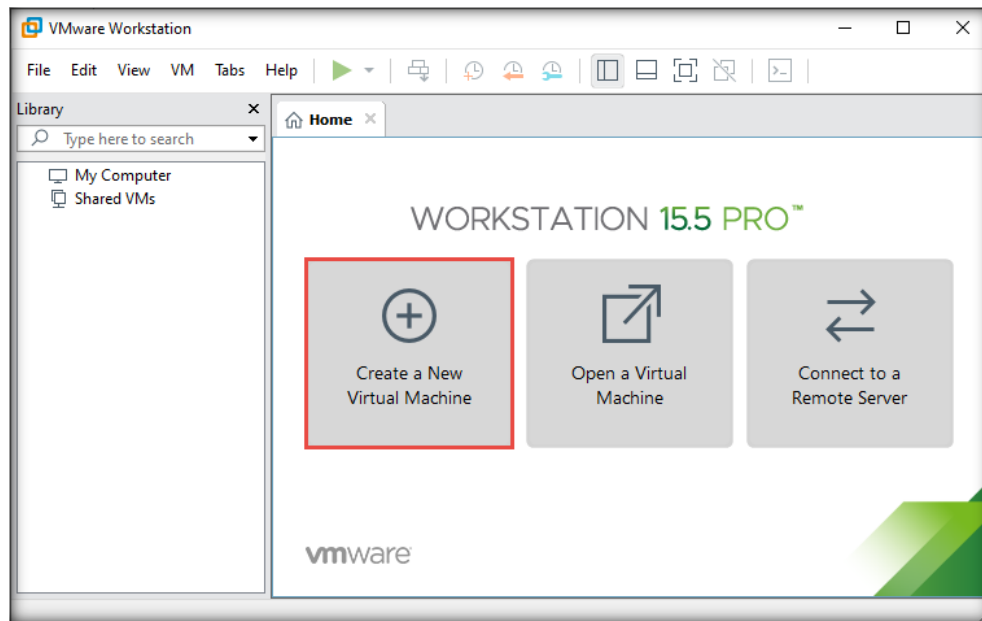
11. Click on Finish.



12. VMware workstation creates **Attacker Machine** virtual machine profile.

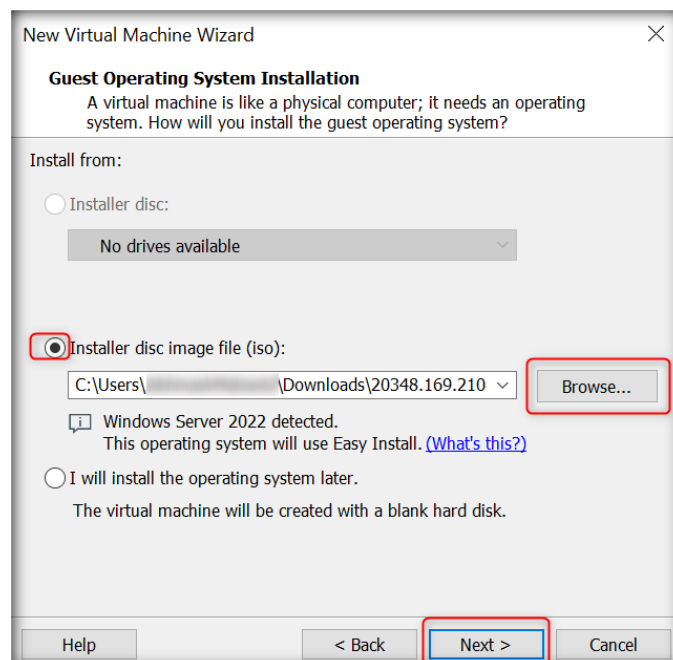
CT#4.1: Creating Virtual Machine for Backup Server

12. In the VMware Workstation window, click Create a New Virtual Machine.



13. In the New Virtual Machine Wizard window, leave the settings to default (Typical) and click Next.

1. Click **Installer disc image file (iso)** radio button and click on **Browse**. Select the iso file and click on **Next >**.



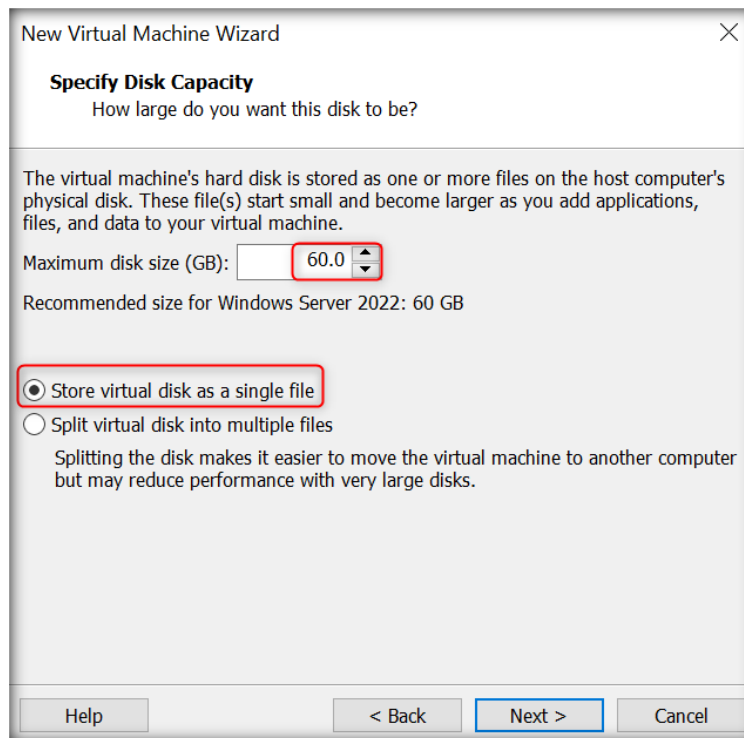
2. Select Windows Server 2022 Standard and type Full name as Admin. Click on Next.

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Easy Install Information' step. The window title is 'New Virtual Machine Wizard'. Below the title bar, it says 'Easy Install Information' and 'This is used to install Windows Server 2022.' The 'Windows product key' field is empty. The 'Version of Windows to install' dropdown menu is set to 'Windows Server 2022 Standard'. Under 'Personalize Windows', the 'Full name:' field is set to 'Admin'. The 'Password:' and 'Confirm:' fields are empty. There is an unchecked checkbox for 'Log on automatically (requires a password)'. At the bottom, there are buttons for 'Help', '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red box.

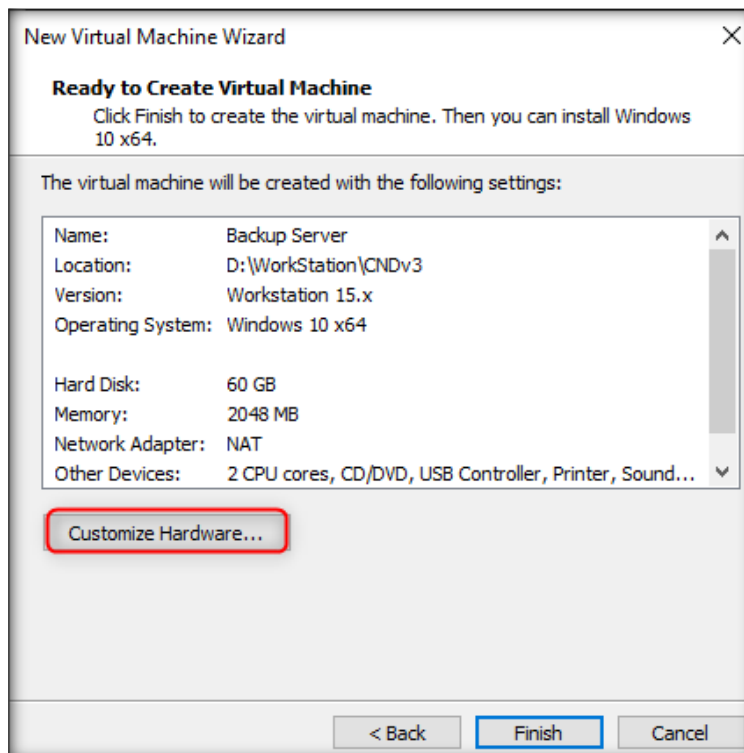
3. A popup appears for windows product key. Click yes.
4. Assign the name of the virtual machine as **WebServer**. You can choose different location to store the VM's or set it to default location. Click **Next**.

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Name the Virtual Machine' step. The window title is 'New Virtual Machine Wizard'. Below the title bar, it says 'Name the Virtual Machine' and 'What name would you like to use for this virtual machine?'. The 'Virtual machine name:' field is set to 'Backup Server'. The 'Location:' field is set to 'D:\WorkStation\CNDv3'. There is a 'Browse...' button next to the location field. Below the location field, it says 'The default location can be changed at Edit > Preferences.' At the bottom, there are buttons for '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a blue box.

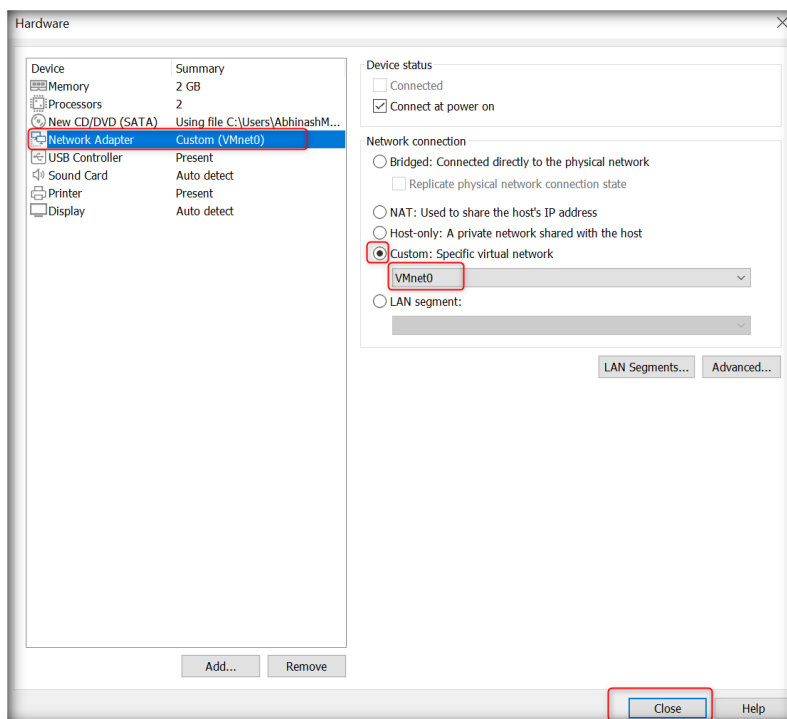
5. Specify Disk Capacity section appears, allocate **60 GB** space for hard disk. Then, select the Store virtual disk as a single file radio button and click **Next**.



6. Click Customize Hardware.



- Click on Network Adapter. Select **Custom: Specific Virtual Network** and select VMnet0 (Bridged). Click on **Close**.

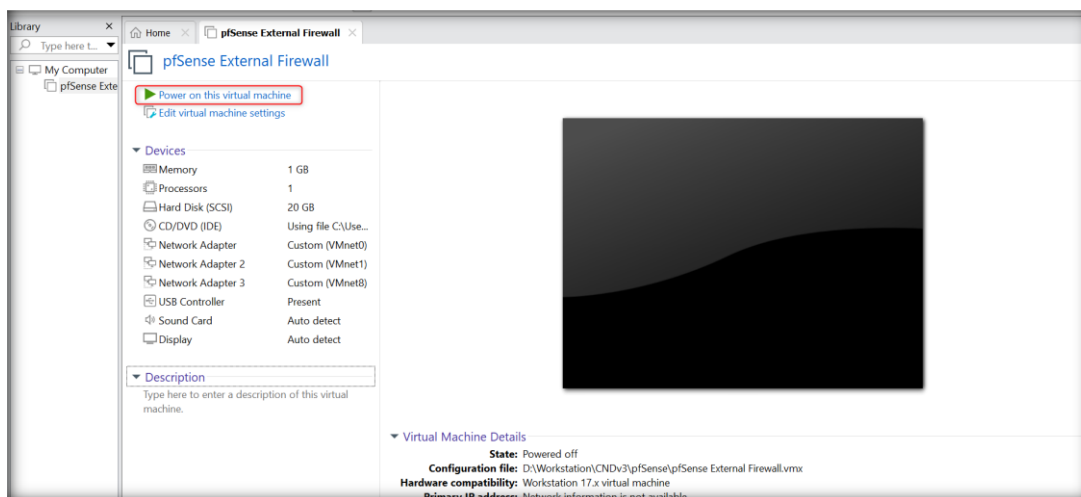


- Uncheck Power on this virtual machine after creation checkbox and click on Finish.
- VMware workstation creates **Backup Server** virtual machine profile.

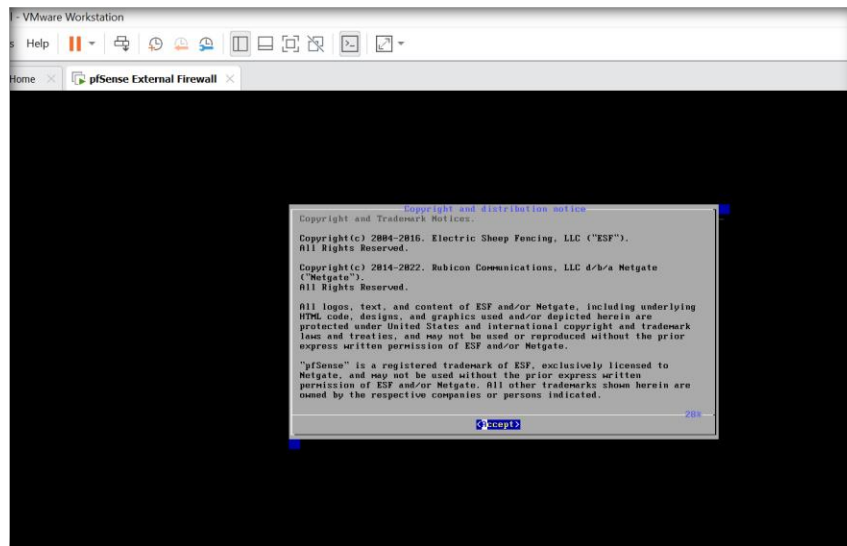
CT#5: Configuring PfSense as External Firewall

CT#5.1: Installing PfSense as External Firewall

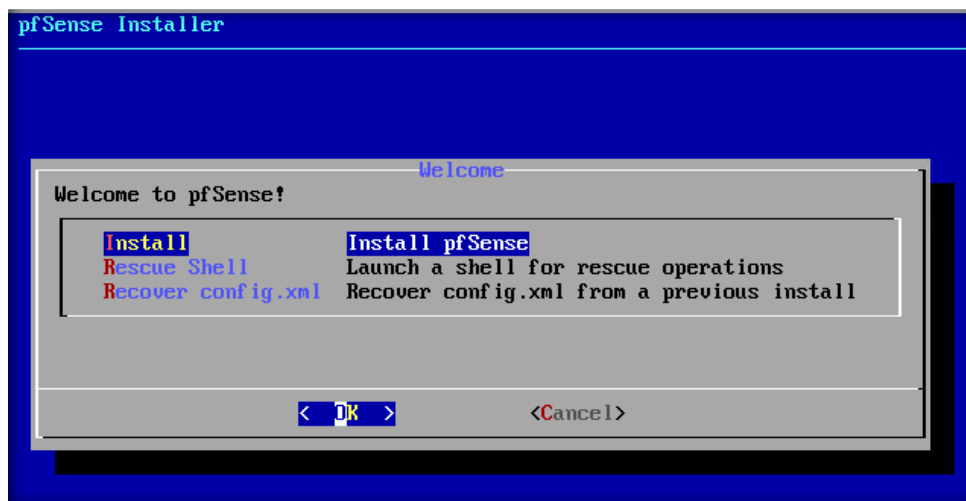
- In **VMware Workstation** main window, you see a new virtual machine named **pfSense External Firewall**. Click **Power on this virtual machine**.



2. pfSense Installer will start, press **Enter** to Accept copyrights and distribution notice.



3. pfSense Welcome screen appears, Press **Enter** to Install pfSense.



4. Hit the **Enter** to Continue with default keymap.



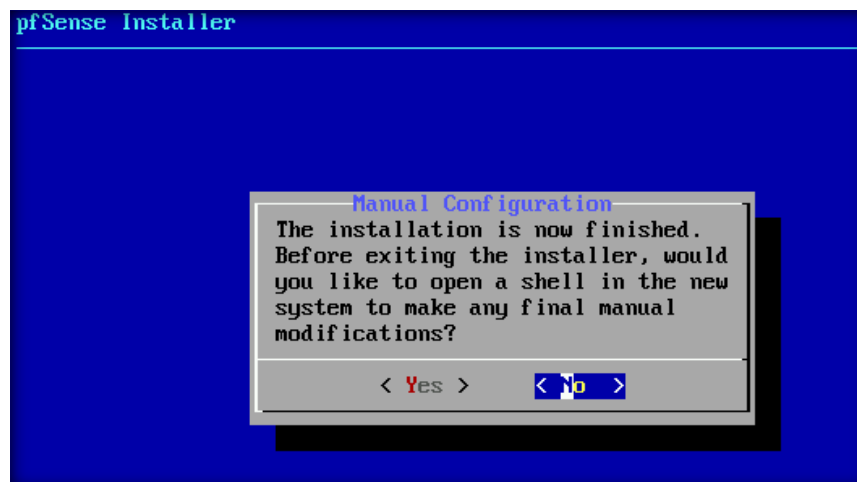
5. Press the **Down Arrow** and **Enter** for disk partition as selected Guided Disk Setup using BIOS boot method.



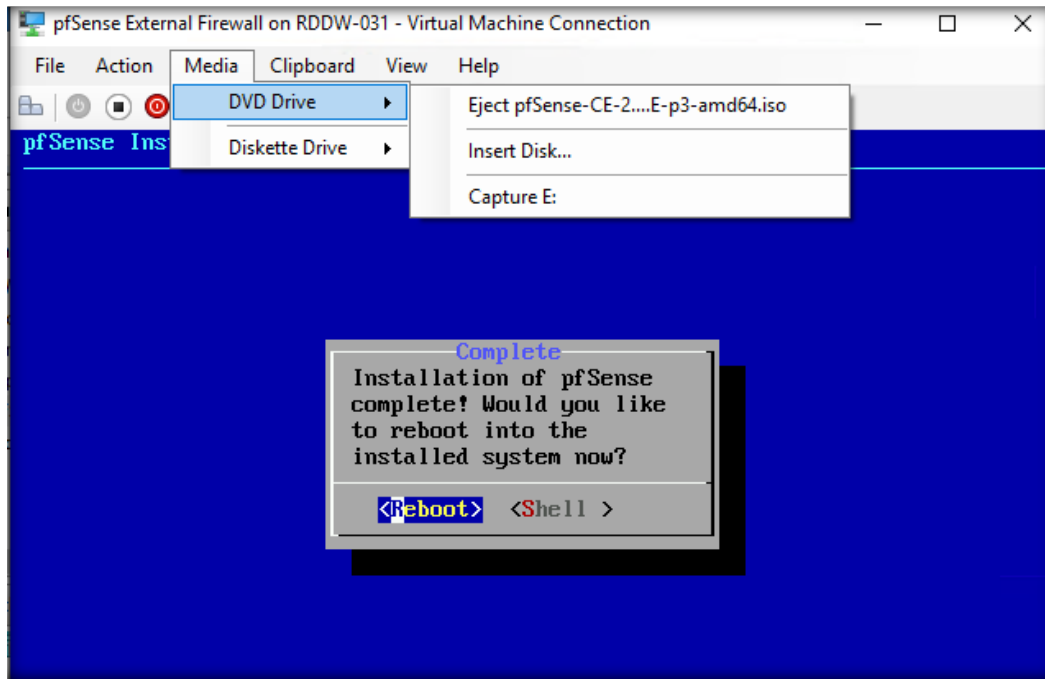
6. Wait for few seconds for installing distribution.



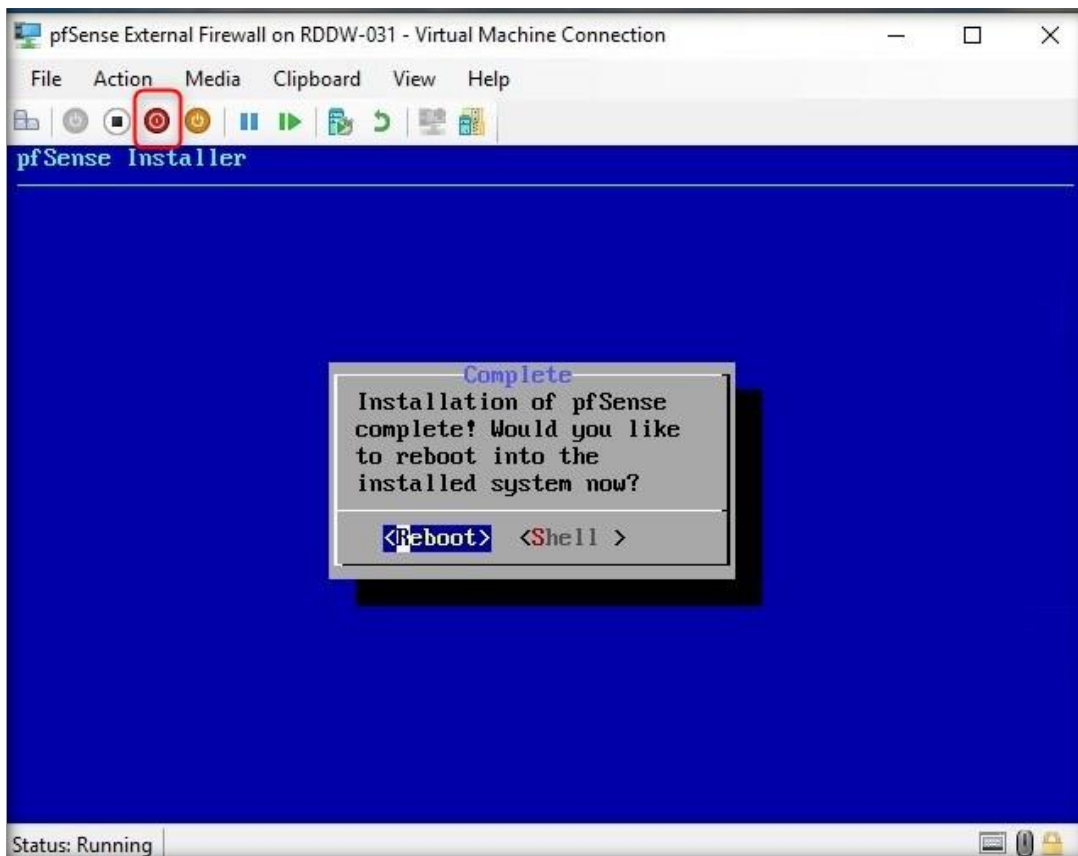
7. Installation will finish, Hit Enter for default selection **No**.



8. Navigate to **Media** menu of virtual machine select **DVD Drive**→**Eject pfSense-CE-2....**
To remove disk media



9. Click on red button of virtual machine to shut down pfSense system.



1. pfSense firewall booting will start, It will prompt for VLAN setup type **n** and press **Enter**.

```
Structured Extended Features3=0xbc000000<IBPB,STIBP,ARCH_CAP,SSBD>
XSAVE Features=0xf<XSAVEOPT,XSAVEC,XINUSE,XSAVES>
IA32_ARCH_CAPS=0x4
Hypervisor: Origin = "Microsoft Hv"
Done.
..... done.
Initializing..... done.
Starting device manager (devd)...done.
Loading configuration.....done.
Updating configuration.....done.
Warning: Configuration references interfaces that do not exist: em0 em1

Network interface mismatch -- Running interface assignment option.

Valid interfaces are:

hn0      00:15:5d:00:e0:10 (down) Hyper-V Network Interface
hn1      00:15:5d:00:e0:11 (down) Hyper-V Network Interface
hn2      00:15:5d:00:e0:12 (down) Hyper-V Network Interface

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y/n]? n
Status: Running
```

2. To setup interface it will prompt for valid input interfaces as shown in above list.
3. Type **hn0** for WAN Interface and press **Enter**.

```
Starting device manager (devd)...done.
Loading configuration.....done.
Updating configuration.....done.
Warning: Configuration references interfaces that do not exist: em0 em1

Network interface mismatch -- Running interface assignment option.

Valid interfaces are:

hn0      00:15:5d:00:e0:10 (down) Hyper-V Network Interface
hn1      00:15:5d:00:e0:11 (down) Hyper-V Network Interface
hn2      00:15:5d:00:e0:12 (down) Hyper-V Network Interface

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y/n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(hn0 hn1 hn2 or a): hn0
Status: Running
```


4. Type **hn1** for LAN Interface name and press **Enter**.

```
Network interface mismatch -- Running interface assignment option.

Valid interfaces are:

hn0      00:15:5d:00:e0:10 (down) Hyper-V Network Interface
hn1      00:15:5d:00:e0:11 (down) Hyper-V Network Interface
hn2      00:15:5d:00:e0:12 (down) Hyper-V Network Interface

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y|n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(hn0 hn1 hn2 or a): hn0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(hn1 hn2 a or nothing if finished): hn1

Status: Running
```

5. Type **hn2** for **Optional 1** Interface and press **Enter**.

```
Valid interfaces are:

hn0      00:15:5d:00:e0:10 (down) Hyper-V Network Interface
hn1      00:15:5d:00:e0:11 (down) Hyper-V Network Interface
hn2      00:15:5d:00:e0:12 (down) Hyper-V Network Interface

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y|n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(hn0 hn1 hn2 or a): hn0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(hn1 hn2 a or nothing if finished): hn1

Enter the Optional 1 interface name or 'a' for auto-detection
(hn2 a or nothing if finished): hn2

Status: Running
```

6. Finally, all Interfaces will be displays, type **y** to proceed and press **Enter**.

```
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y|n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(hn0 hn1 hn2 or a): hn0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(hn1 hn2 a or nothing if finished): hn1

Enter the Optional 1 interface name or 'a' for auto-detection
(hn2 a or nothing if finished): hn2

The interfaces will be assigned as follows:

WAN -> hn0
LAN -> hn1
OPT1 -> hn2

Do you want to proceed [y|n]? y

Status: Running
```

7. Welcome screen appears with list of options, type **2** for setting interfaces IP address and hit **Enter**.

```
Starting CRON... done.
pfSense 2.4.4-RELEASE (Patch 3) amd64 Wed May 15 18:53:44 EDT 2019
Bootup complete

FreeBSD/amd64 (pfSense.localdomain) (ttyv0)

Hyper-V Virtual Machine - Netgate Device ID: 26edde81246e014cd3fb

*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> hn0      -> v4/DHCP4: 172.16.1.109/23
LAN (lan)      -> hn1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> hn2      ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults    13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                15) Restore recent configuration
7) Ping host                  16) Restart PHP-FPM
8) Shell

Enter an option: 2

Status: Running
```

8. It will prompt for number interfaces configuration, type **2** and press **Enter**.

```
*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> hn0      -> v4/DHCP4: 172.16.1.109/23
LAN (lan)      -> hn1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> hn2      ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults  13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (hn0 - dhcp, dhcp6)
2 - LAN (hn1 - static)
3 - OPT1 (hn2)

Enter the number of the interface you wish to configure: 2
Status: Running
```

9. Type **10.10.10.1** IPv4 address for LAN and press **Enter**.

```
LAN (lan)      -> hn1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> hn2      ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults  13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (hn0 - dhcp, dhcp6)
2 - LAN (hn1 - static)
3 - OPT1 (hn2)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address. Press <ENTER> for none:
> 10.10.10.1
Status: Running
```

10. Enter Subnet bit count as **24** and hit **Enter**.

```
Available interfaces:

1 - WAN (hm0 - dhcp, dhcp6)
2 - LAN (hm1 - static)
3 - OPT1 (hm2)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address. Press <ENTER> for none:
> 10.10.10.1

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0     = 8

Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24
```

Status: Running

11. System will prompt for to enter IPv4 upstream gateway address hit **Enter** for none.
12. Hit **Enter** for setting LAN IPv6 as **none**.
13. System will ask to enable DHCP server on LAN type **n** for none and hit Enter.

```
1 - WAN (hm0 - dhcp, dhcp6)
2 - LAN (hm1 - static)
3 - OPT1 (hm2)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address. Press <ENTER> for none:
> 10.10.10.1

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0     = 8

Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24

For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
```

Status: Running

14. Type **n** to not revert http as webconfigurator protocol and press **Enter**.

```
3 - OPT1 (hm2)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address. Press <ENTER> for none:
> 10.10.10.1

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0   = 16
     255.0.0.0     = 8

Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24

For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
Disabling IPv4 DHCPD...Disabling IPv6 DHCPD...
Do you want to revert to HTTP as the webConfigurator protocol? (y/n) n

Status: Running
```

15. System will display the URL of pfSense webconfigurator, hit **Enter** to continue.

```
Enter the new LAN IPv4 subnet bit count (1 to 31):
> 24

For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
Disabling IPv4 DHCPD...Disabling IPv6 DHCPD...
Do you want to revert to HTTP as the webConfigurator protocol? (y/n) n

Please wait while the changes are saved to LAN...
Reloading filter...
Reloading routing configuration...
DHCPD...

The IPv4 LAN address has been set to 10.10.10.1/24
You can now access the webConfigurator by opening the following URL in your web
browser:
https://10.10.10.1/

Press <ENTER> to continue.

Status: Running
```

16. pfSense welcome screen appears with list of options as shown in following screenshot.

```
The IPv4 LAN address has been set to 10.10.10.1/24
You can now access the webConfigurator by opening the following URL in your web
browser:

      https://10.10.10.1/

Press <ENTER> to continue.
Hyper-V Virtual Machine - Netgate Device ID: 003cdb125c601139f620

*** Welcome to pfSense 2.4.4-RELEASE-p3 (amd64) on pfSense ***

WAN (wan)      -> hn0      -> v4/DHCP4: 172.16.0.84/23
LAN (lan)      -> hn1      -> v4: 10.10.10.1/24
OPT1 (opt1)    -> hn2      ->

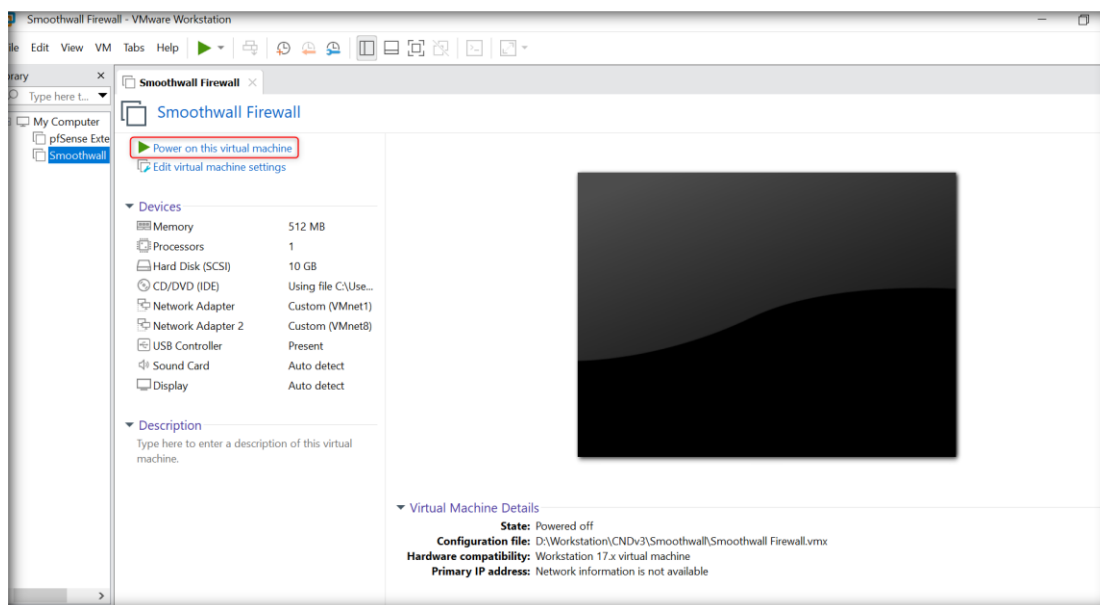
0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults  13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: █
```

CT#6: Configuring Smoothwall as Internal Firewall

CT#6.1: Installing Smoothwall as Internal Firewall

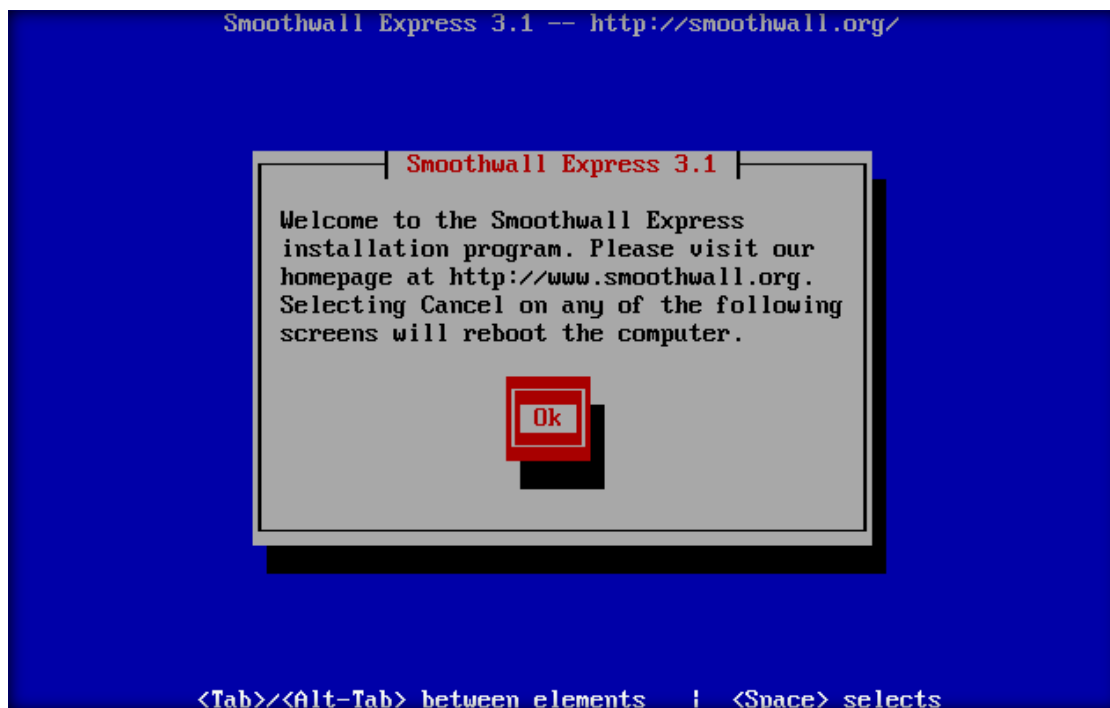
1. In **VMware Workstation** main window, you see a new virtual machine named **Smoothwall Firewall**. Click **Power** on this virtual machine.



2. The **Boot Options** window will appear, select **Install Smoothwall Express** option and press **Enter**.



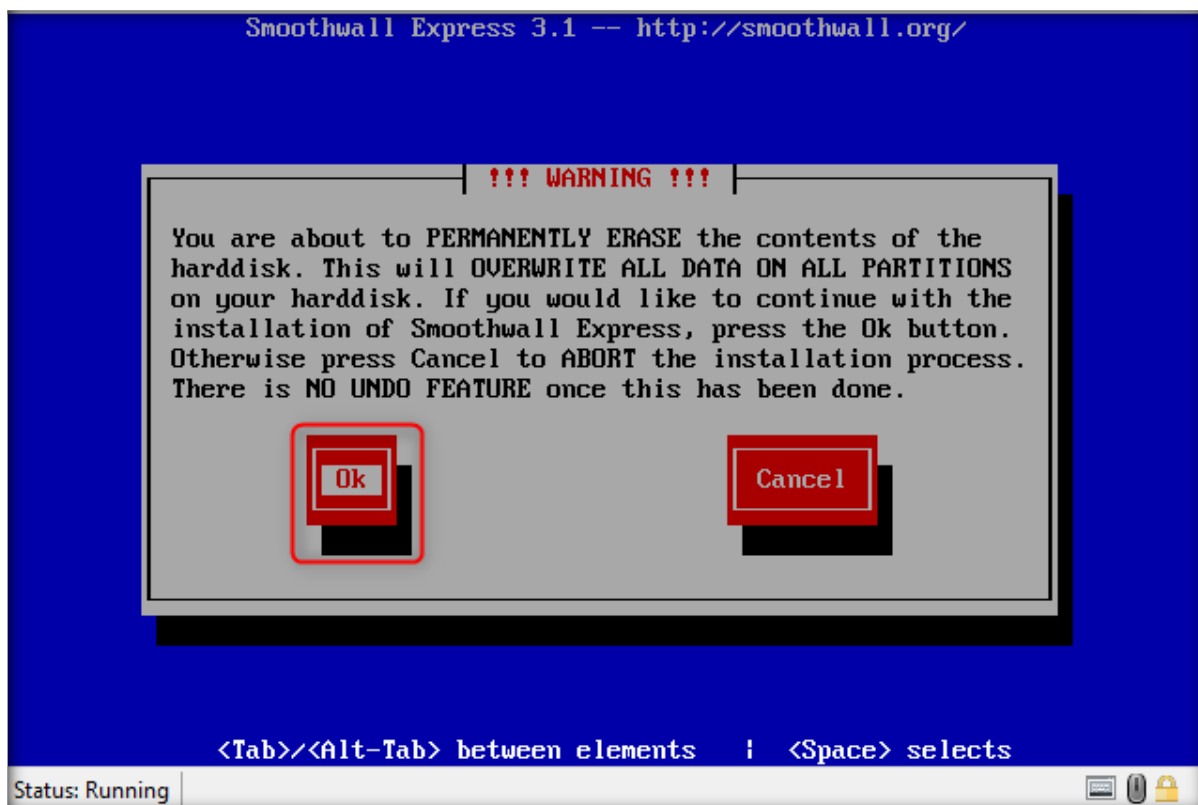
3. Accept the welcome to installation message and click **Ok** (Press **Enter**).



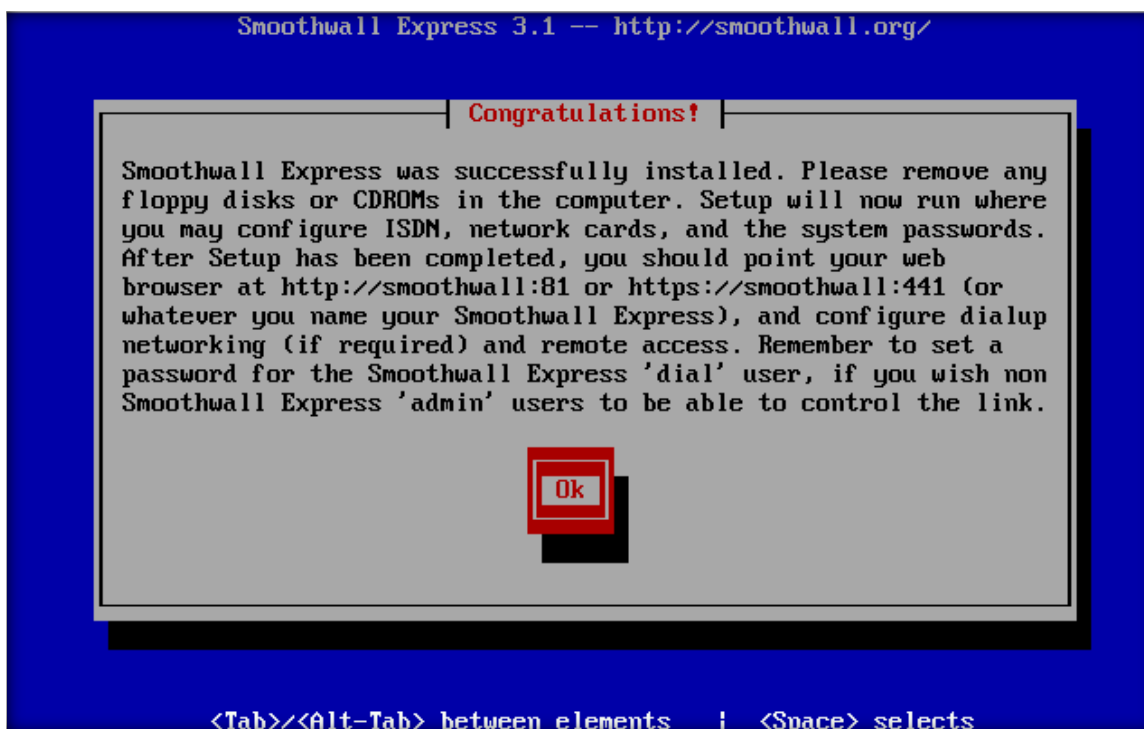
4. Then click on **Ok** (Press **Enter**) to acknowledge the Smoothwall hard disk.



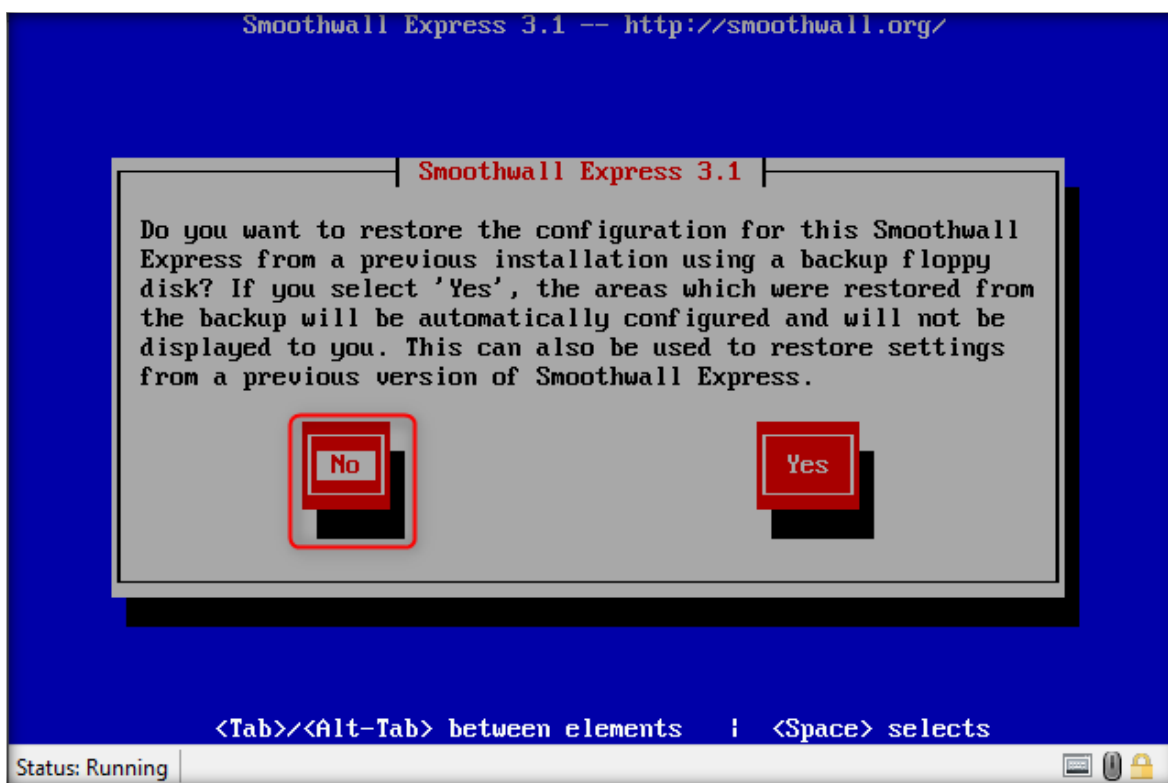
5. On the Warning window, click Ok (Press Enter) to start the installation and accept that you might permanently erase things.



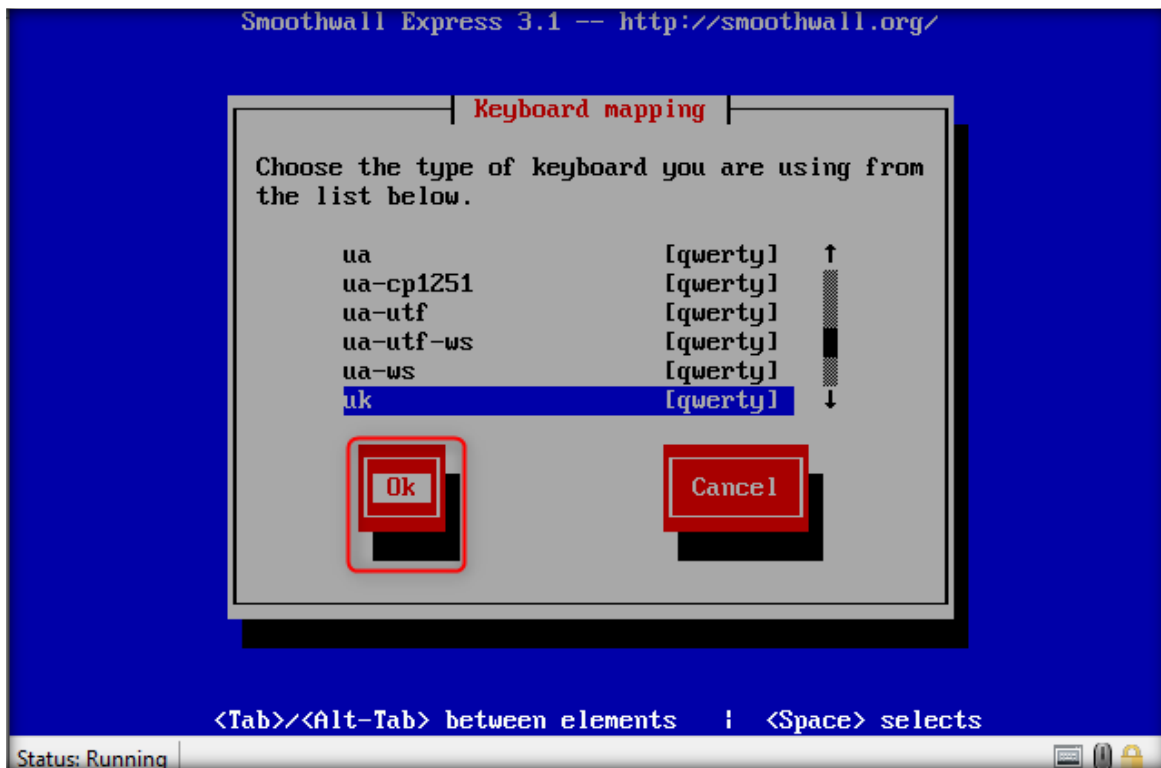
6. After the installation is complete, on the **Configurations!** window, click **Ok** (Press **Enter**).



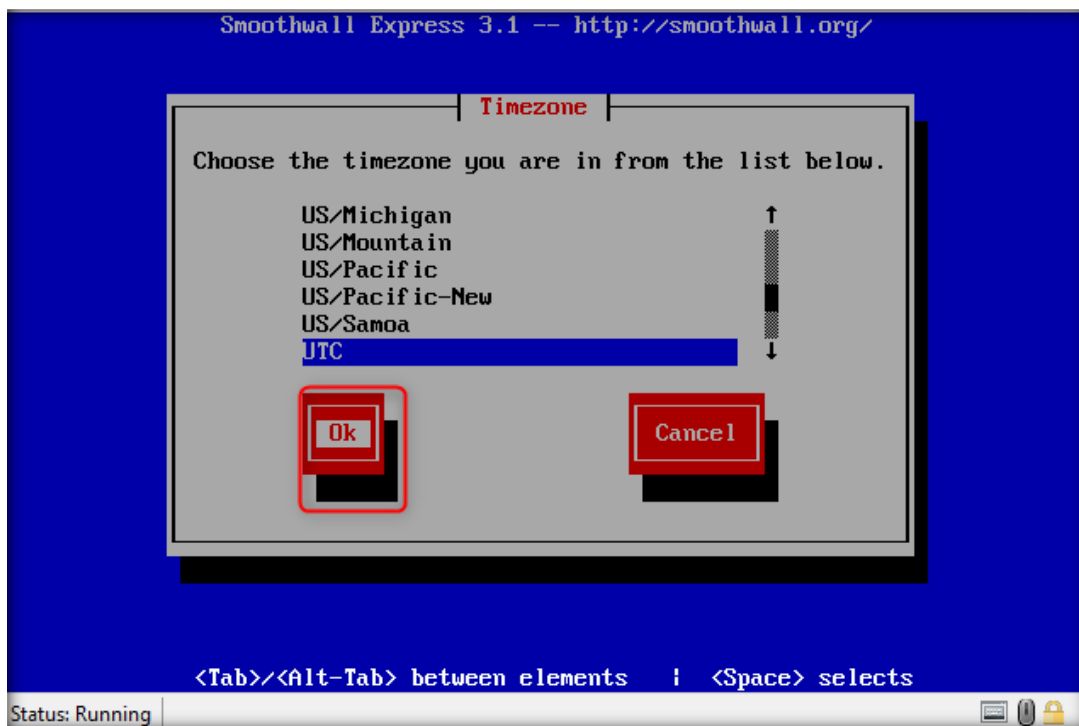
7. Accept the default of **No** for restoring configuration and press **Enter**.



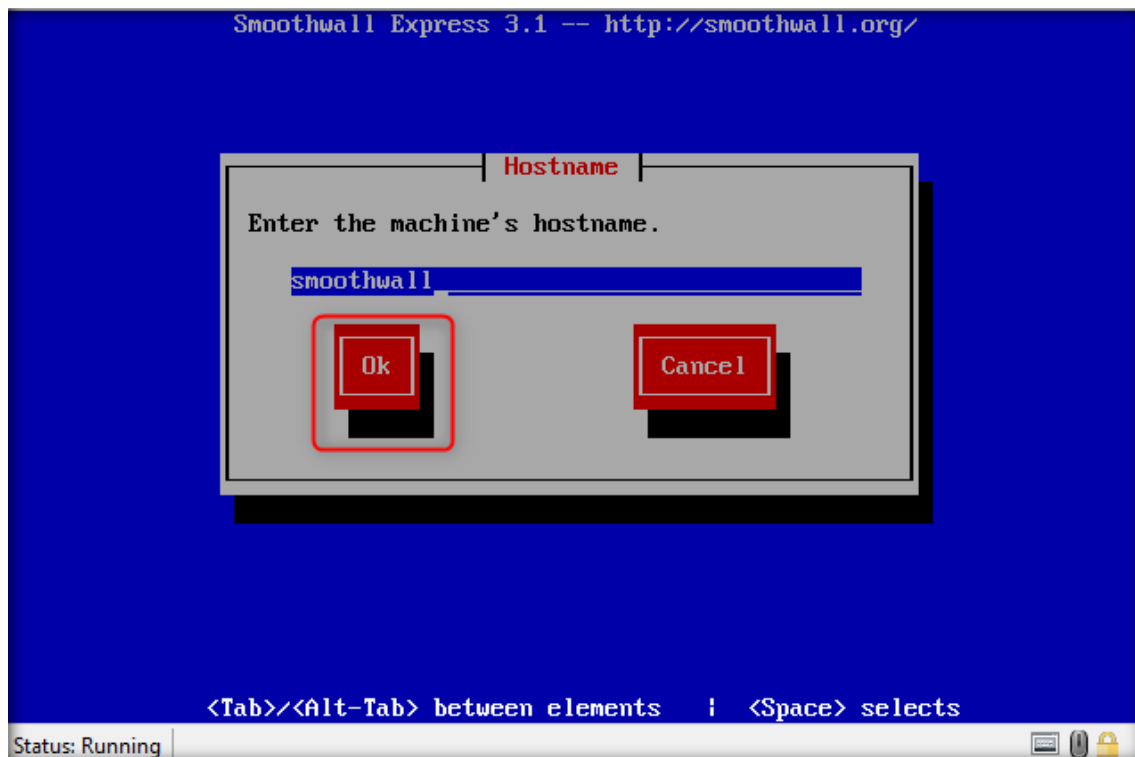
8. On the **Keyboard mapping** window, select the type of keyboard required from the list, select **Ok** and press **Enter**.



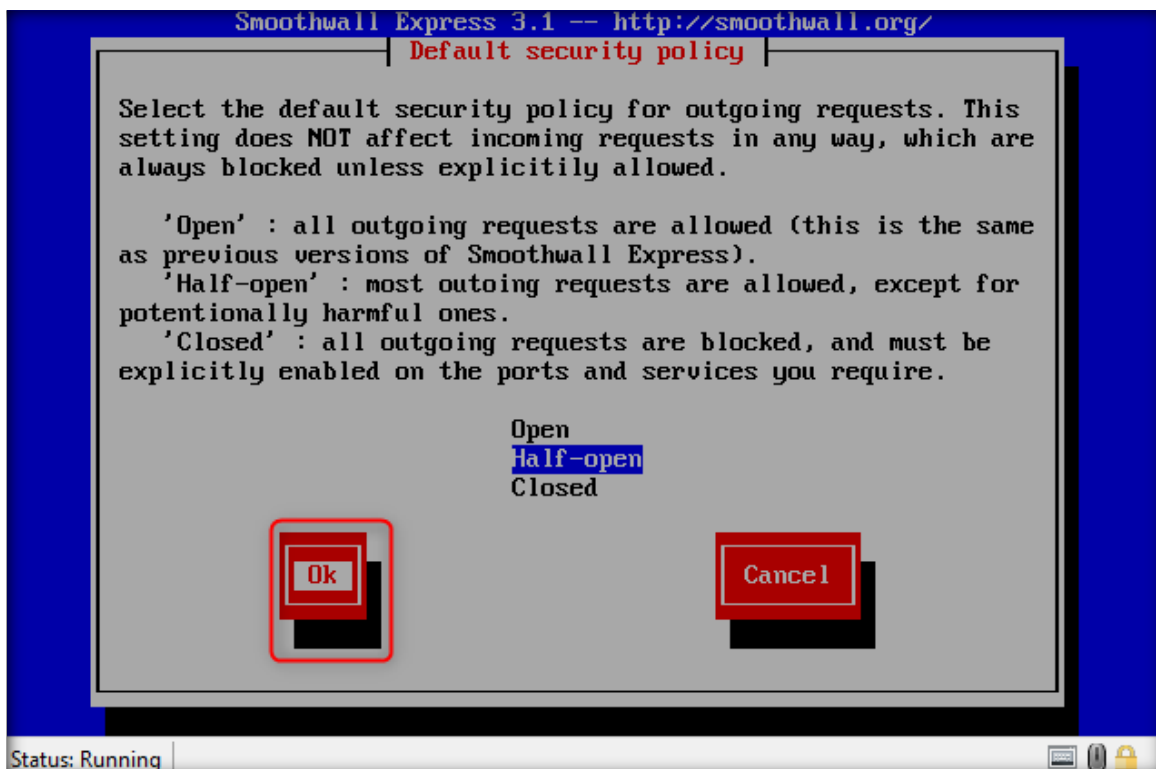
9. In the **Timezone** window, select the proper time zone from the list, select **Ok** and press **Enter**.



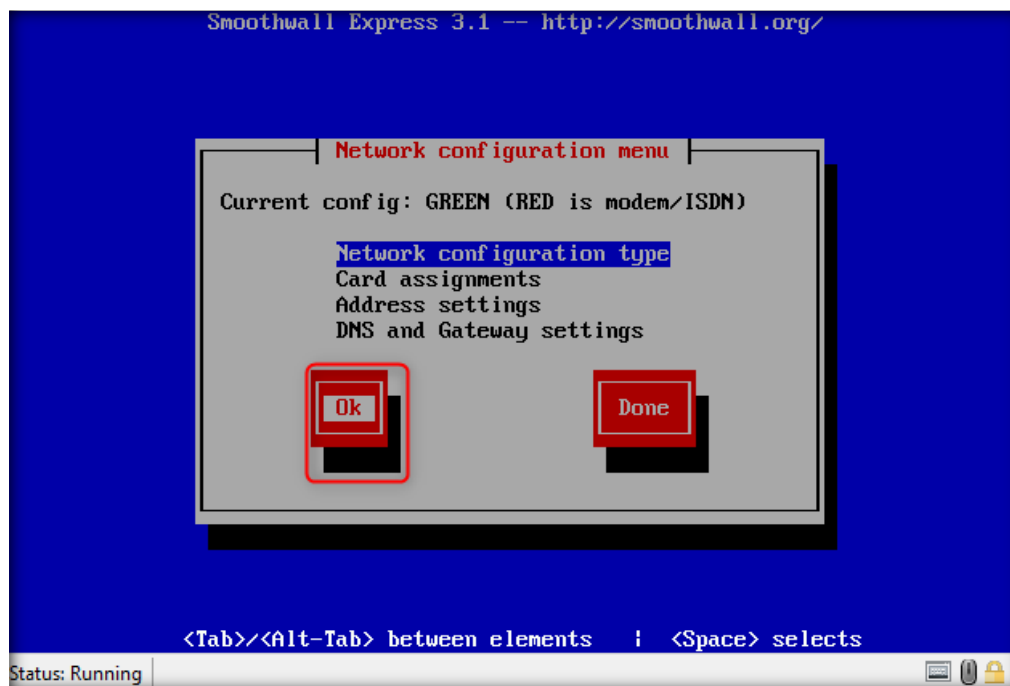
10. On the **Hostname** window, enter a name if you like for the machine, or accept the default **smoothwall**, select **Ok** and press **Enter**.



11. We want a relatively secure Firewall, but not a closed firewall, so accept the default of Half-open and press Enter.



12. On the **Network configuration menu** window, select the **Network configuration type** and press **Enter**.

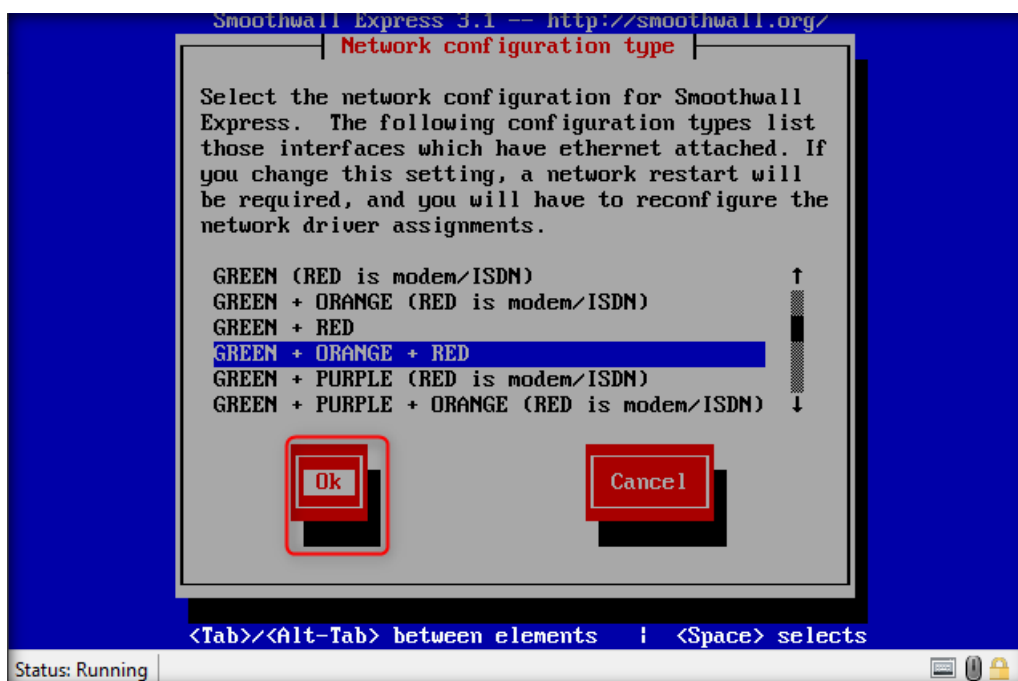


13. On the **Network configuration type** windows:

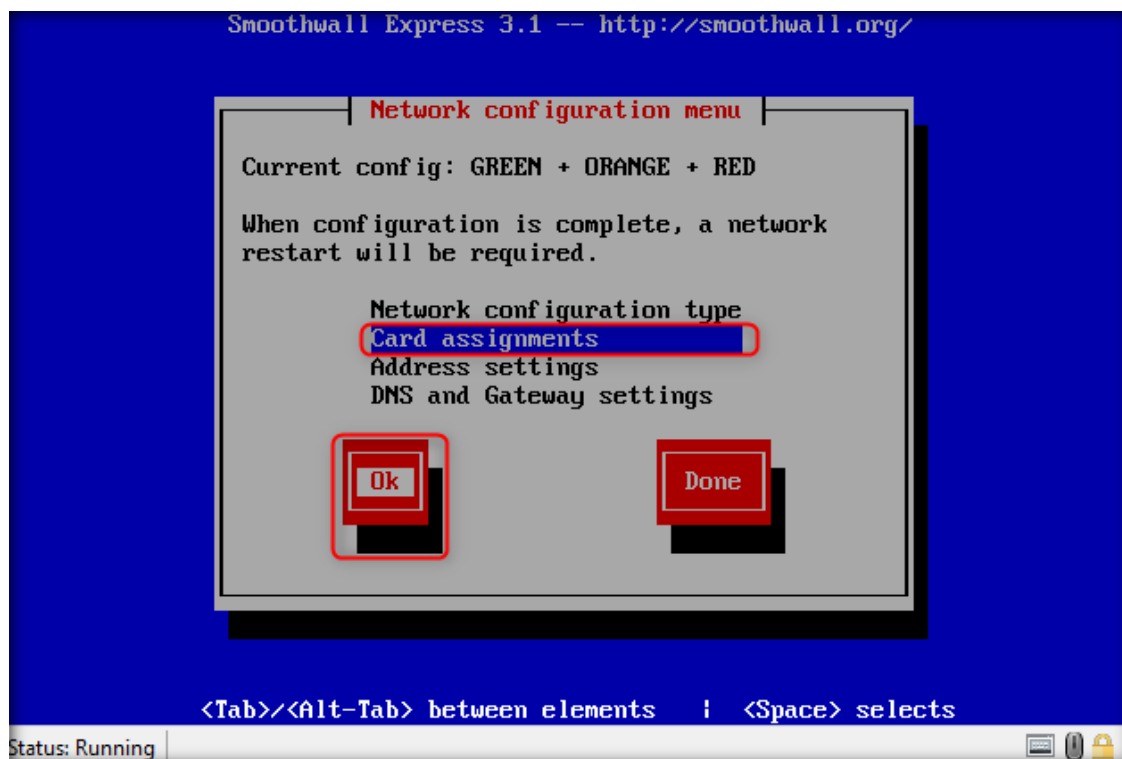
- Select **GREEN + ORANGE + RED** option from the list
- Select **Ok** and press **Enter**

This gives us 3 interfaces for the machine

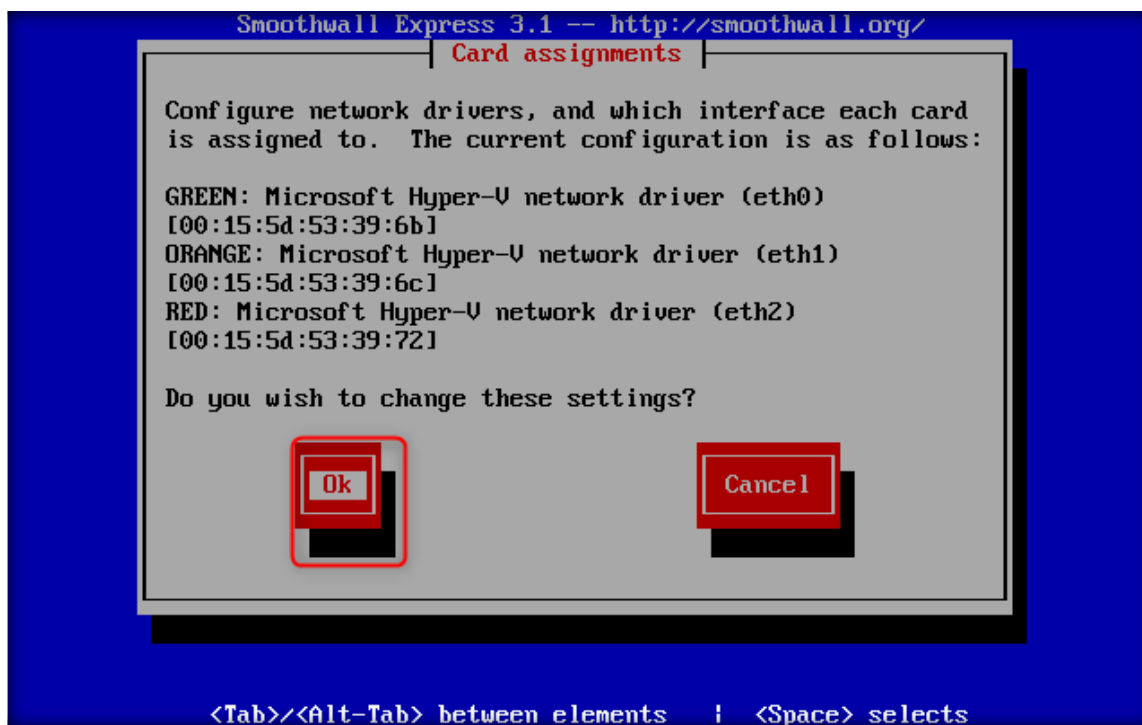
Note: Use **<Arrow>** and **<Tab>** keys to select the proper options.



14. After you have selected the interface types, you will be back to the main configuration window, and you need to arrow down and select **Card assignments** and press **Enter**.

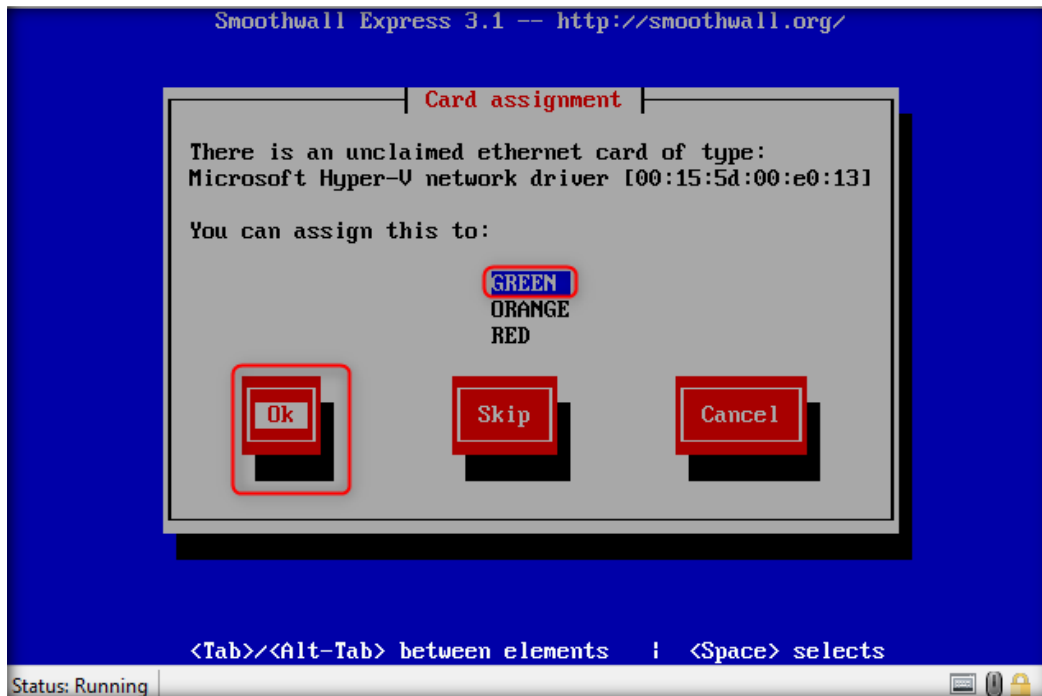


15. You will be prompted for probing for cards. In the **Card assignments** window, select **Ok** and press **Enter** to change the settings.



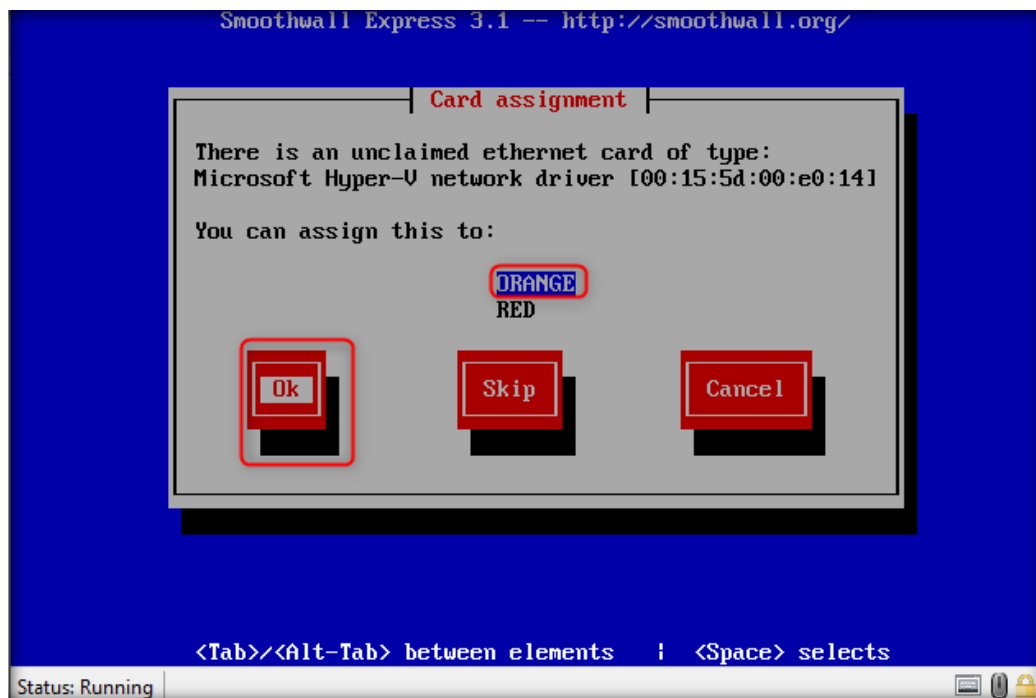
16. Assign this card to the **Green** interface.

- Select **Green** option from the list
- Select **Ok** and press **Enter**



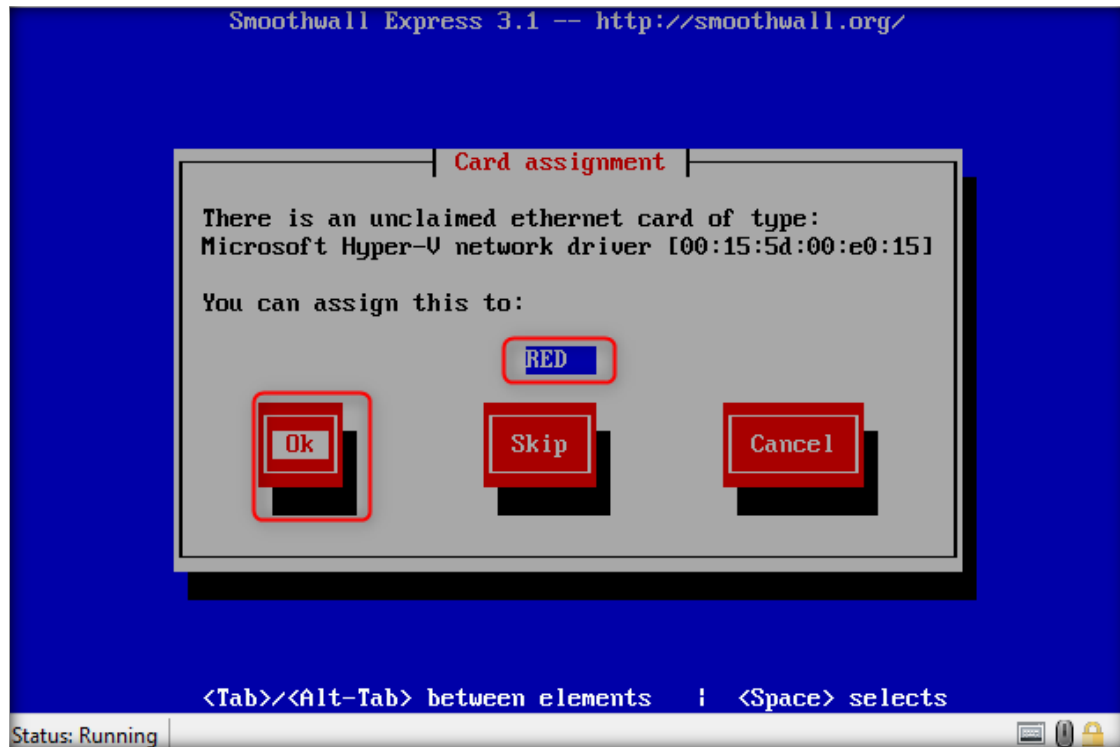
17. Assign this card to the **ORANGE** interface.

- Select **ORANGE** option from the list
- Select **Ok** and press **Enter**

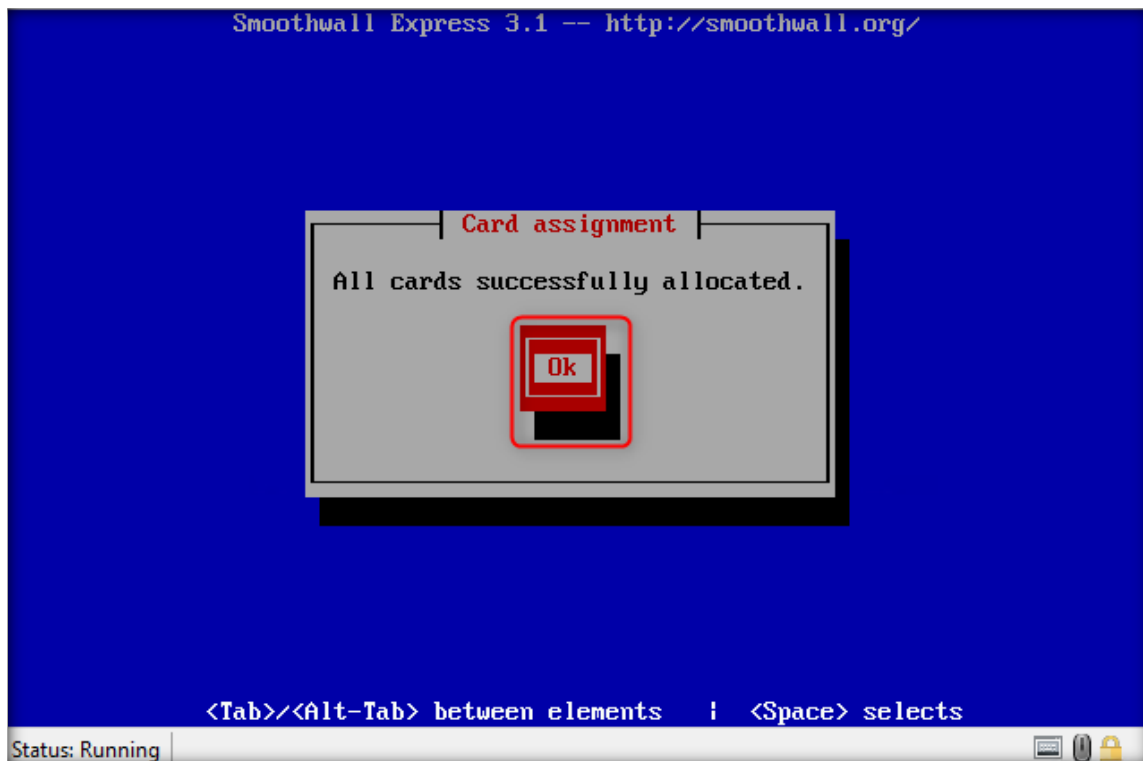


18. Assign this card to the **RED** interface.

- Select **RED** option from the list
- Select **Ok** and press **Enter**



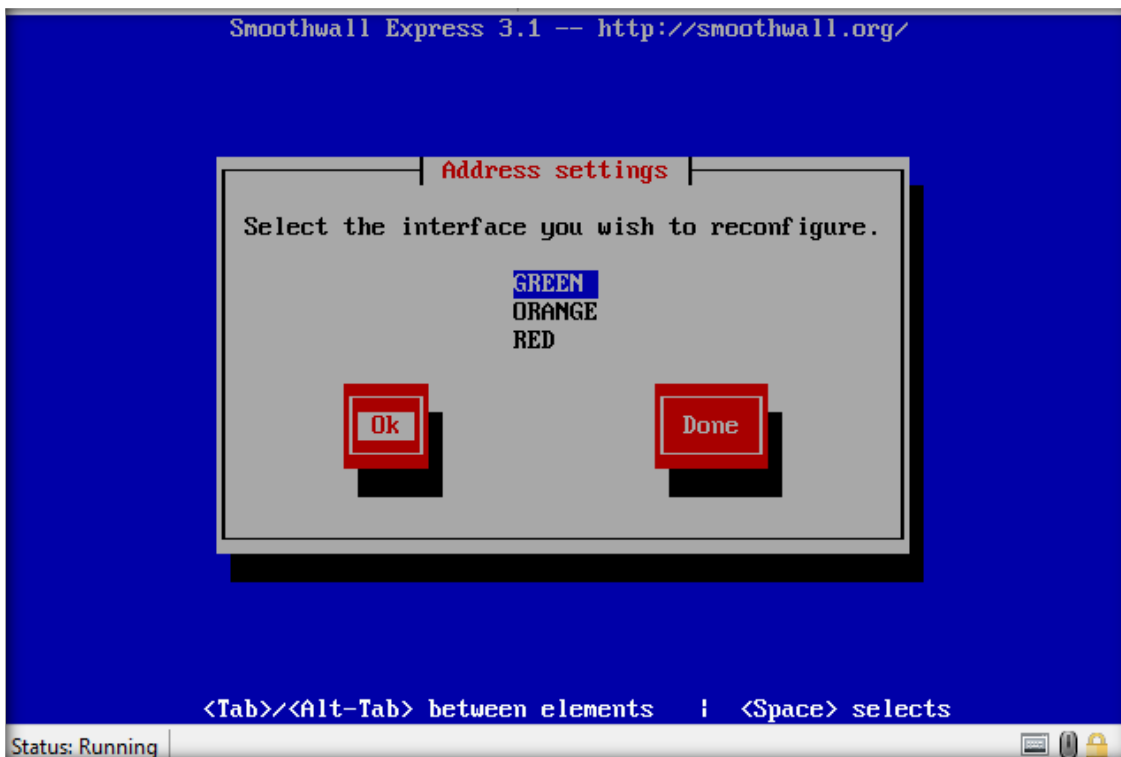
19. Finally, card assignment will be allocated you will see message, press **Enter**.



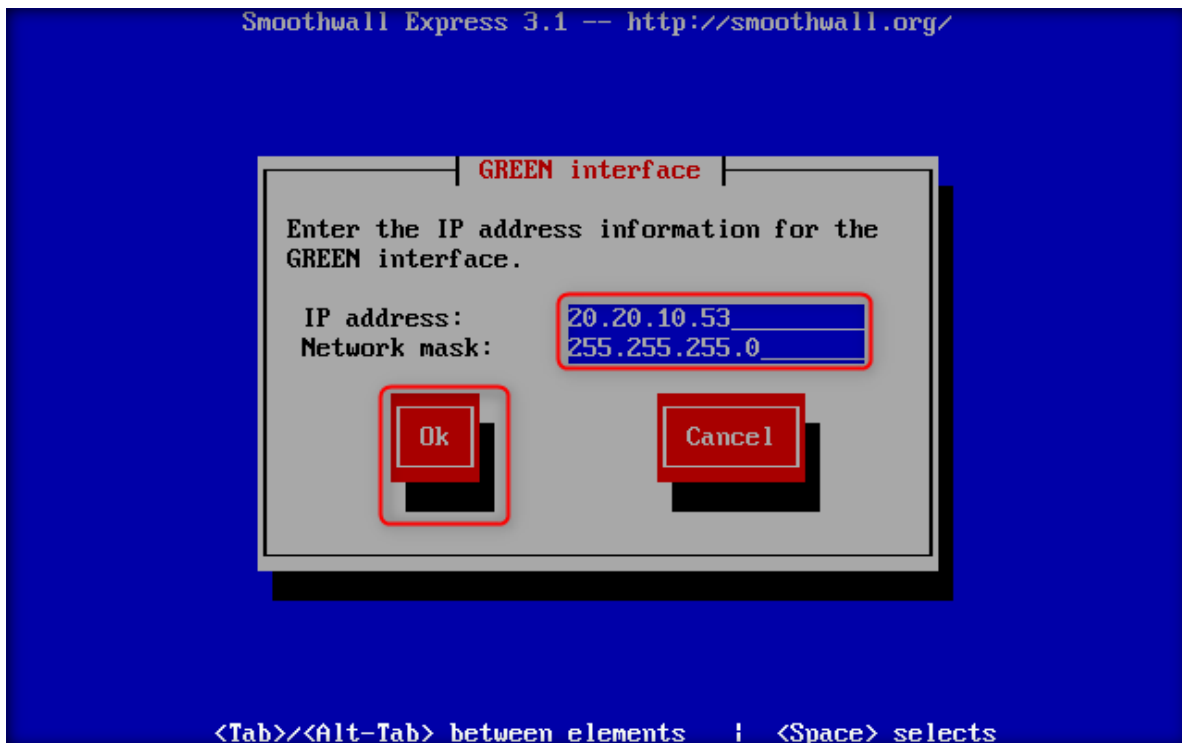
20. You will be back to the main configuration window, and you need to arrow down and select **Address settings** and press **Enter**.



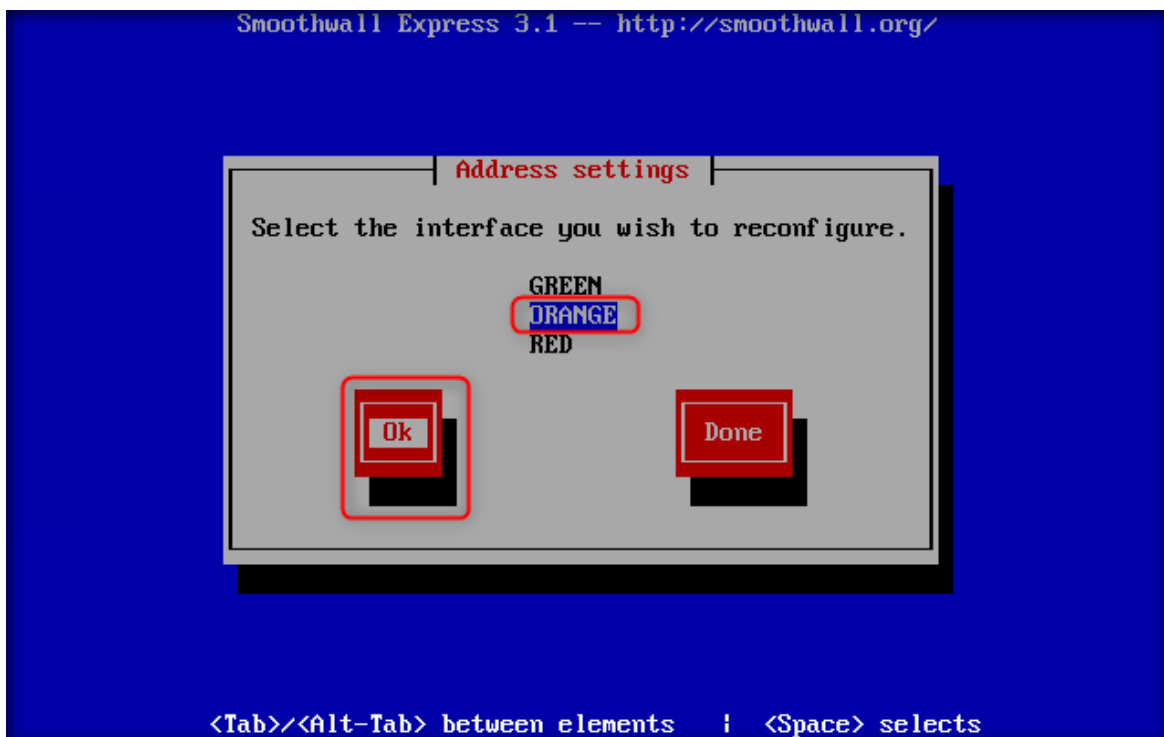
21. Address settings will prompt, select **GREEN** Interface and press **Enter**.



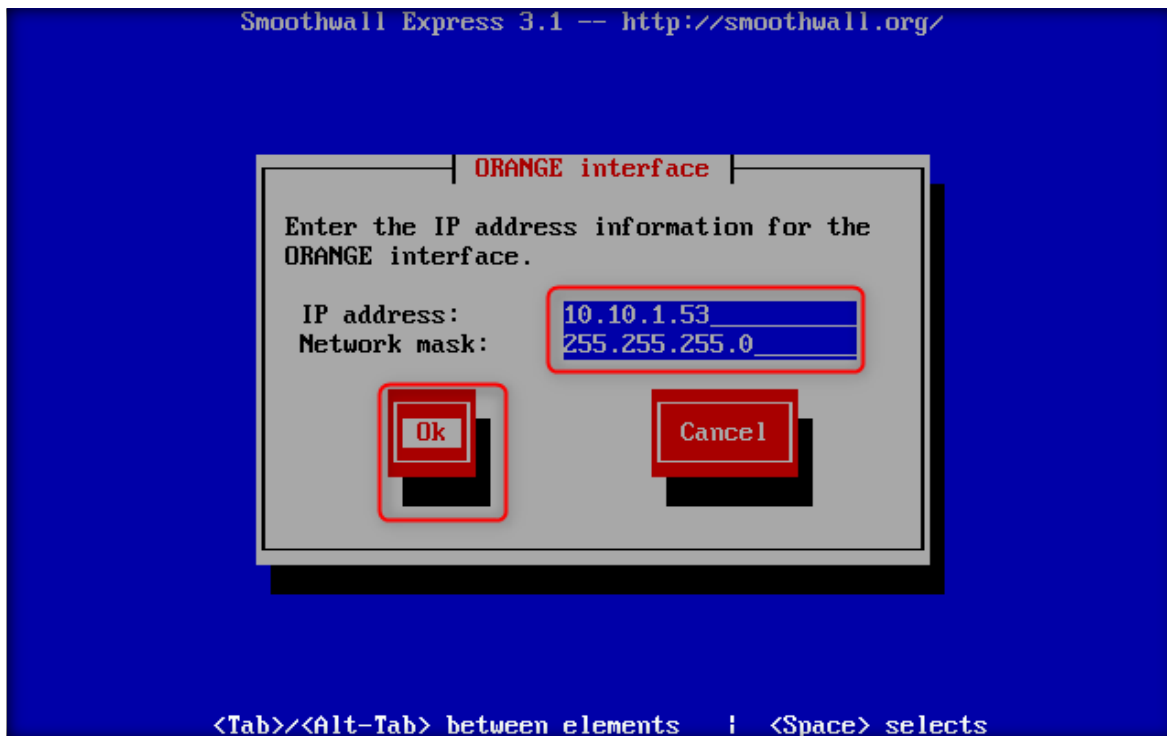
22. Type the IP address as **20.20.10.53** and Network mask as **255.255.255.0**, select **Ok** and press **Enter**.



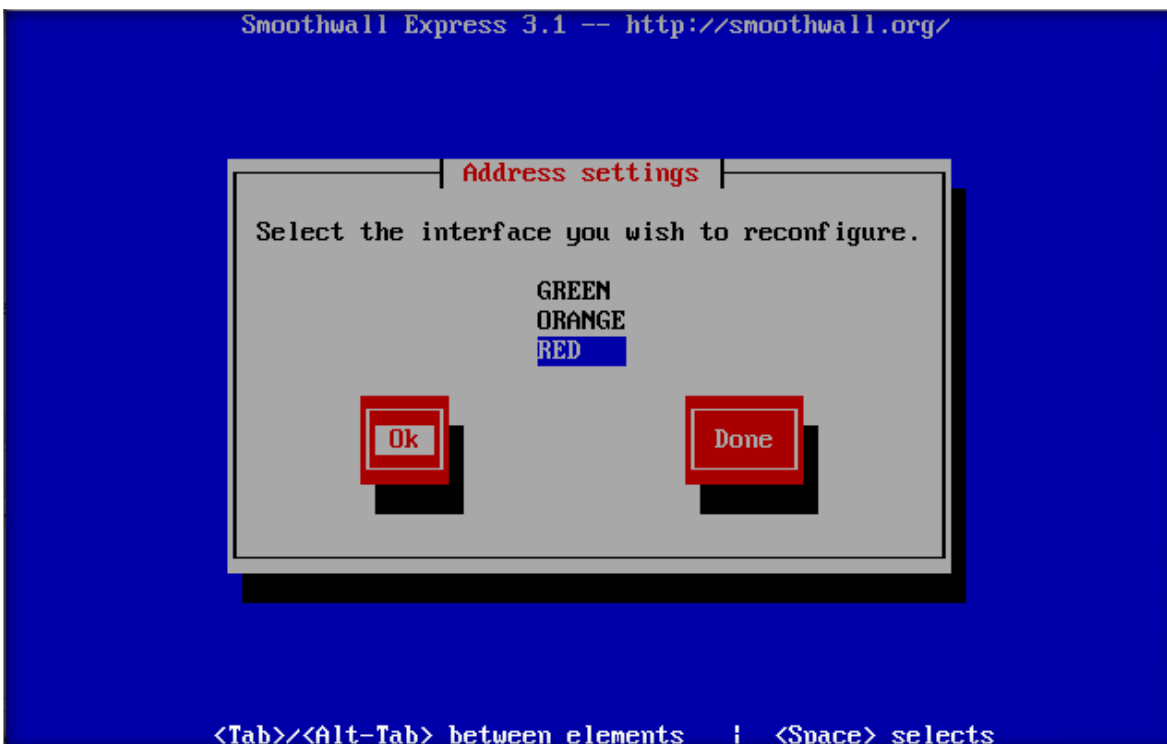
23. You will be back on **Address setting** prompt, select **ORANGE** Interface and press **Enter**.



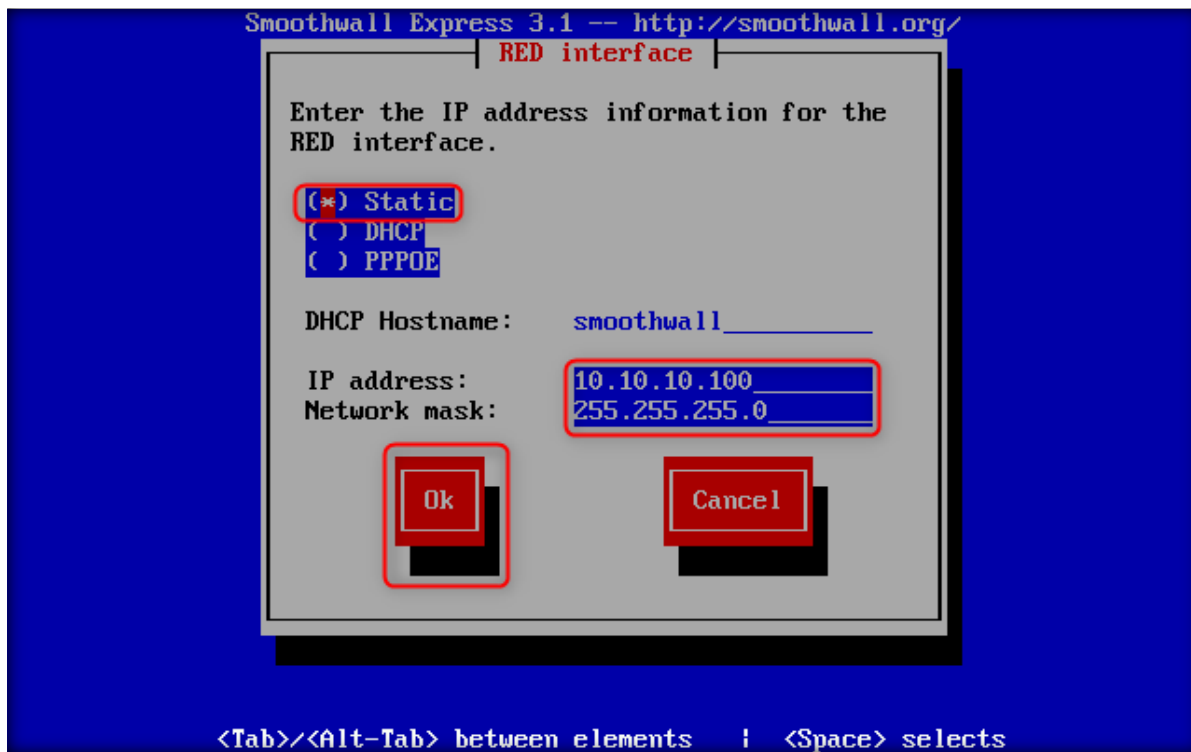
24. Type the IP address as **10.10.1.53** and Network mask as **255.255.255.0**, select **Ok** and press **Enter**.



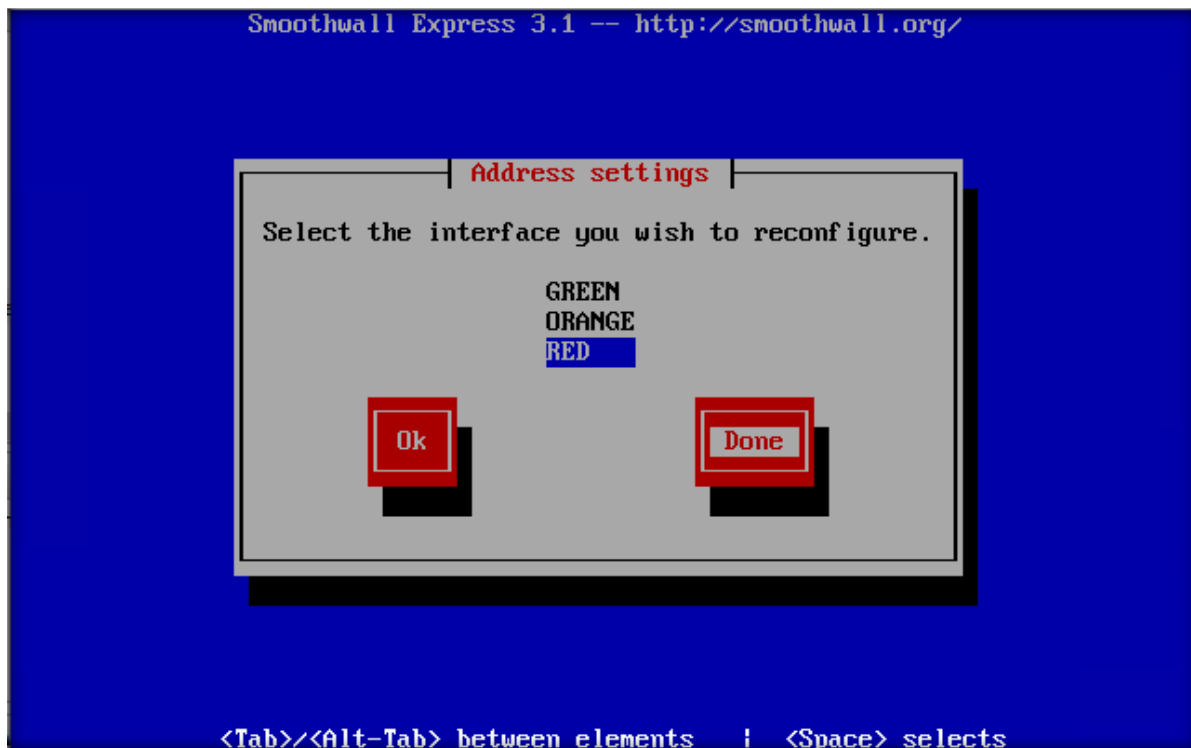
25. You will be back on **Address setting** prompt, select **RED** Interface and press **Enter**.



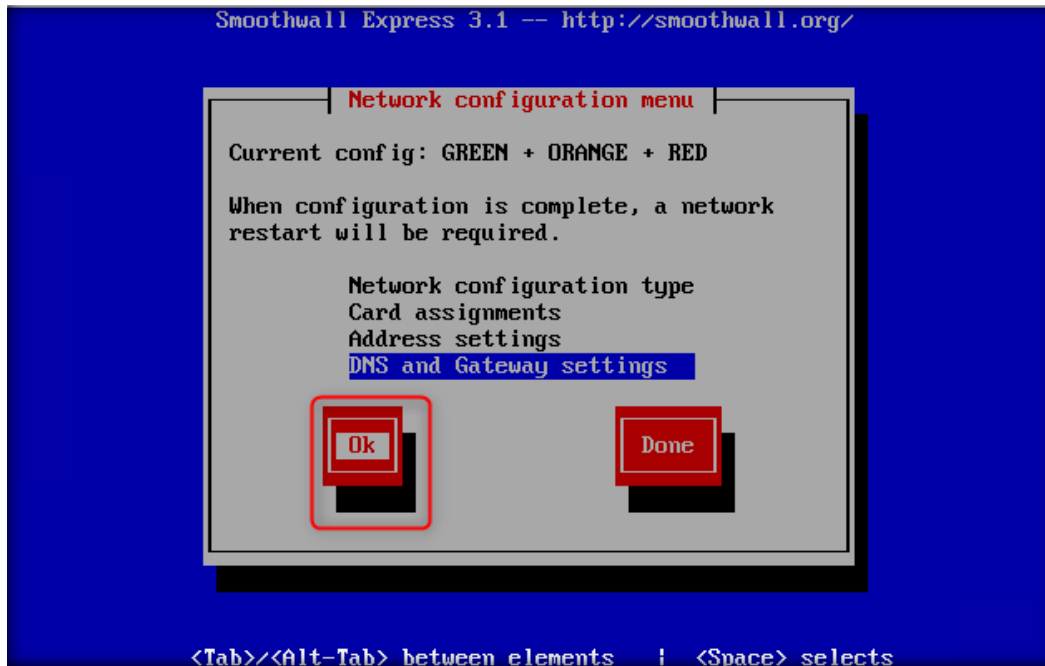
26. To continue IP address setting configuration for **RED** Interface use space bar button, select IP address option as **Static**, press tab and set IP address for RED Interface is **10.10.10.100** and Network mask as **255.255.255.0**, press **Enter**.



27. Navigate to **Done** option using tab button and press **Enter**.



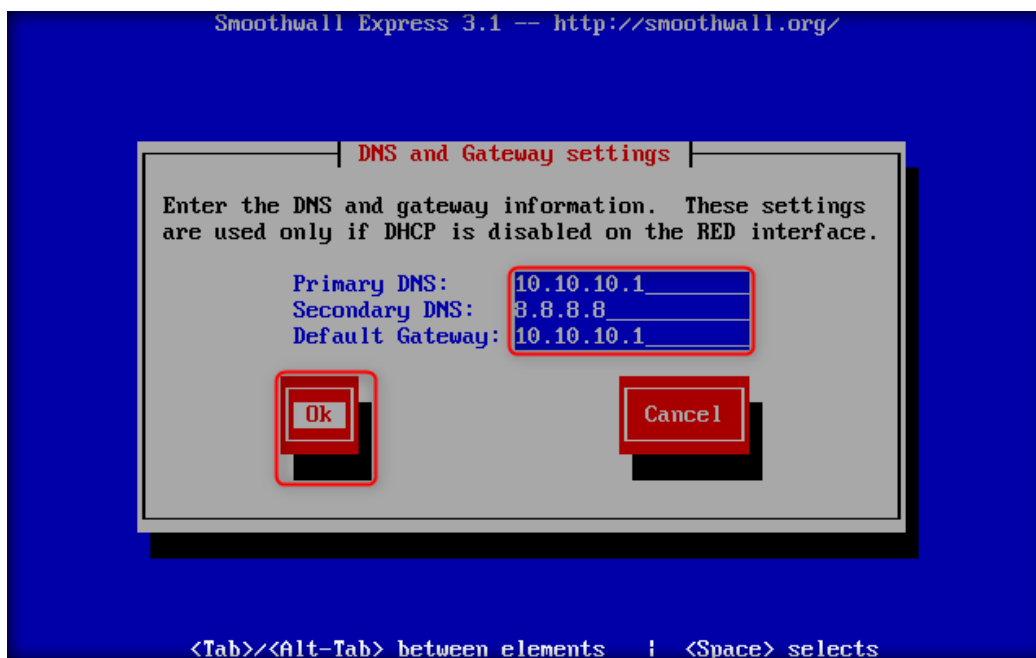
28. You will be back to the Network configuration menu, select **DNS and gateway settings** option press tab to **Ok** and press **Enter**.



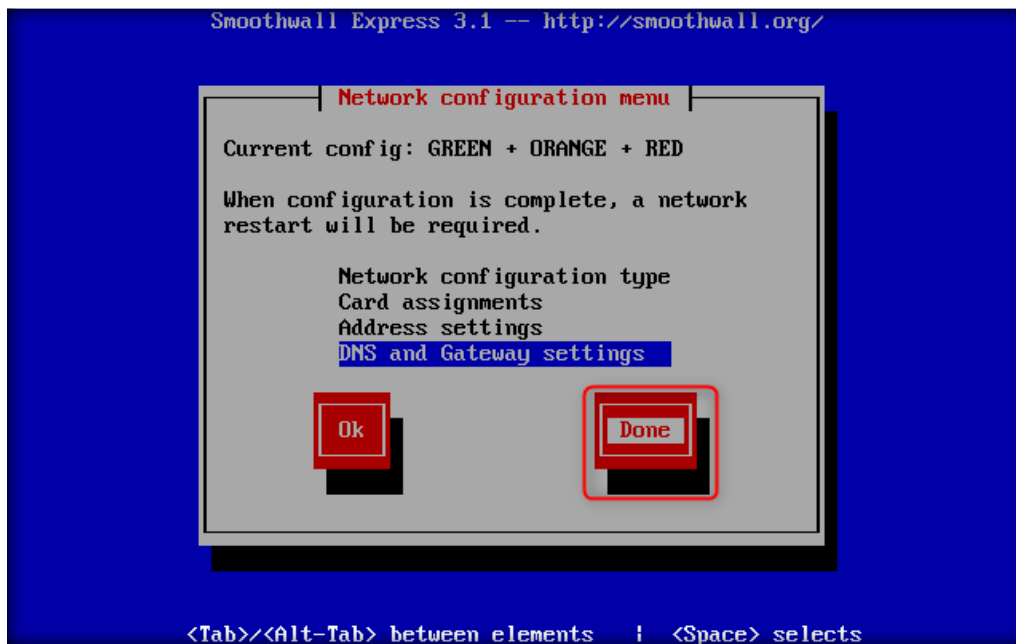
29. In DNS and Gateway setting window set following configuration

- Primary DNS: 10.10.10.1
- Secondary DNS: 8.8.8.8
- Default Gateway: 10.10.10.1

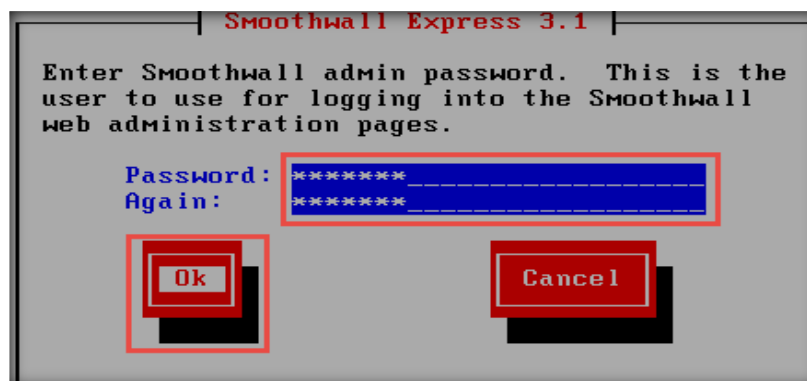
Press tab and press **Enter**.



30. You will be back to the Network configuration menu, select **Done** option using tab and press **Enter**.

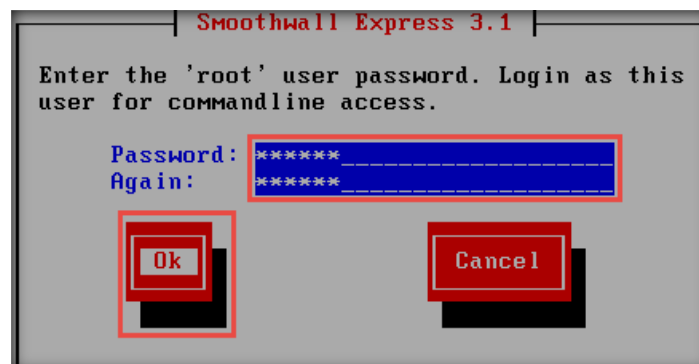


31. On the next window, select **Finished** and press **Enter**.
32. Enter a password for the remote admin of **admin**



Note: Make sure that the **<Caps Lock>** is not **ON**.

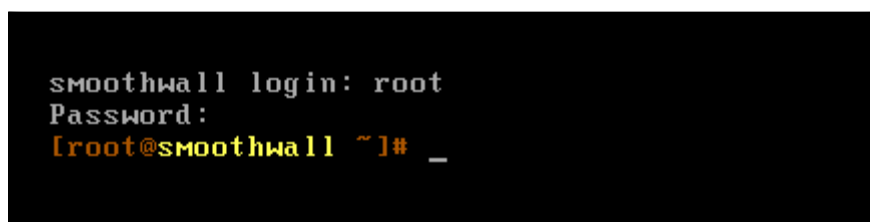
33. Enter the password **root** for the root user.



34. On the Completion window, press **Ok** to reboot the Smoothwall machine.



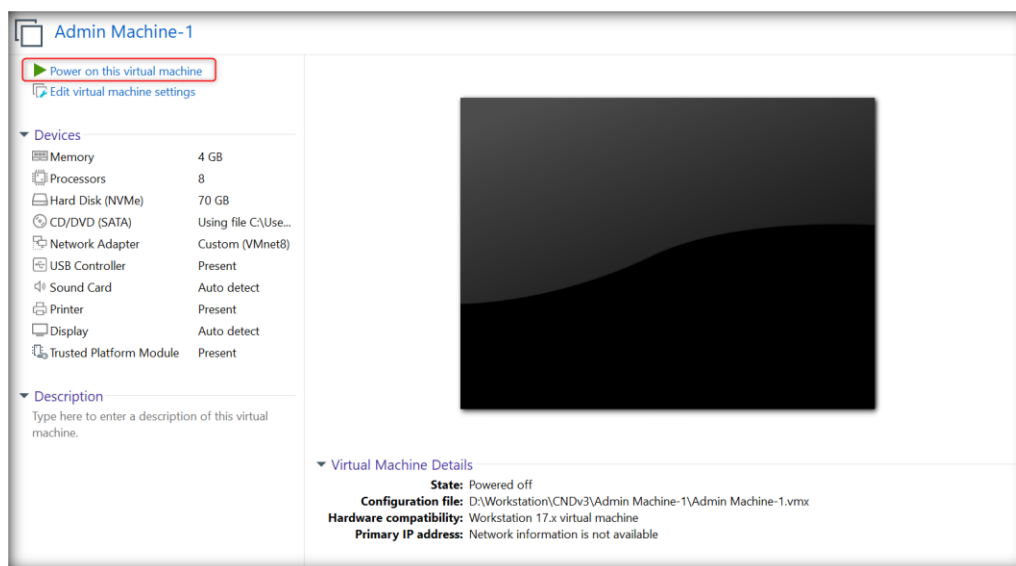
35. Smoothwall machine will reboot. Login with user as **root** and password as **toor**.



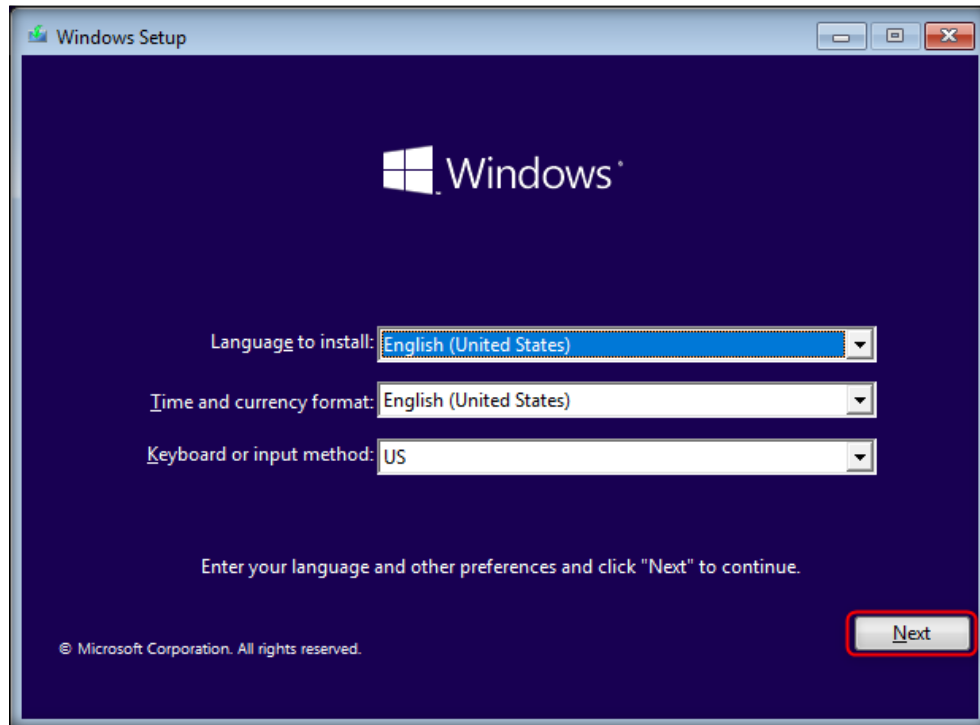
CT#7: Configuring Windows 11 Enterprise Guest OS as Admin Machine-1

CT#7.1: Installing Windows 11 Pro OS as Admin Machine-1

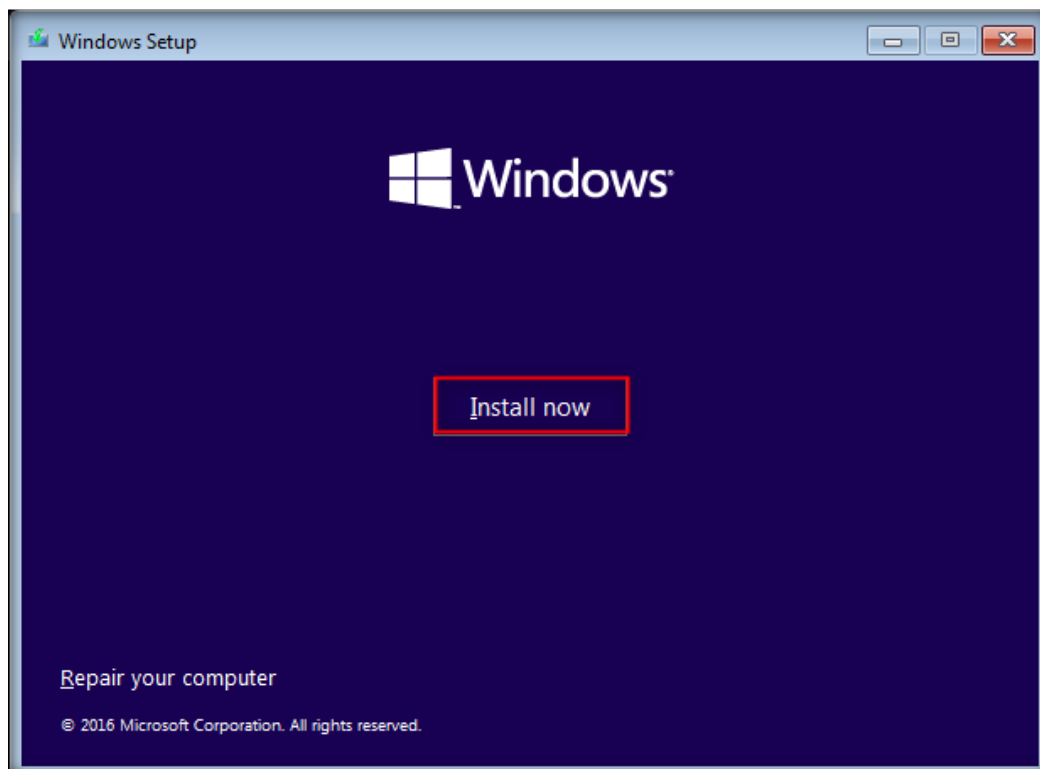
1. Click on **Admin Machine-1** virtual machine in VMWare Workstation and click **Power on this virtual machine**.



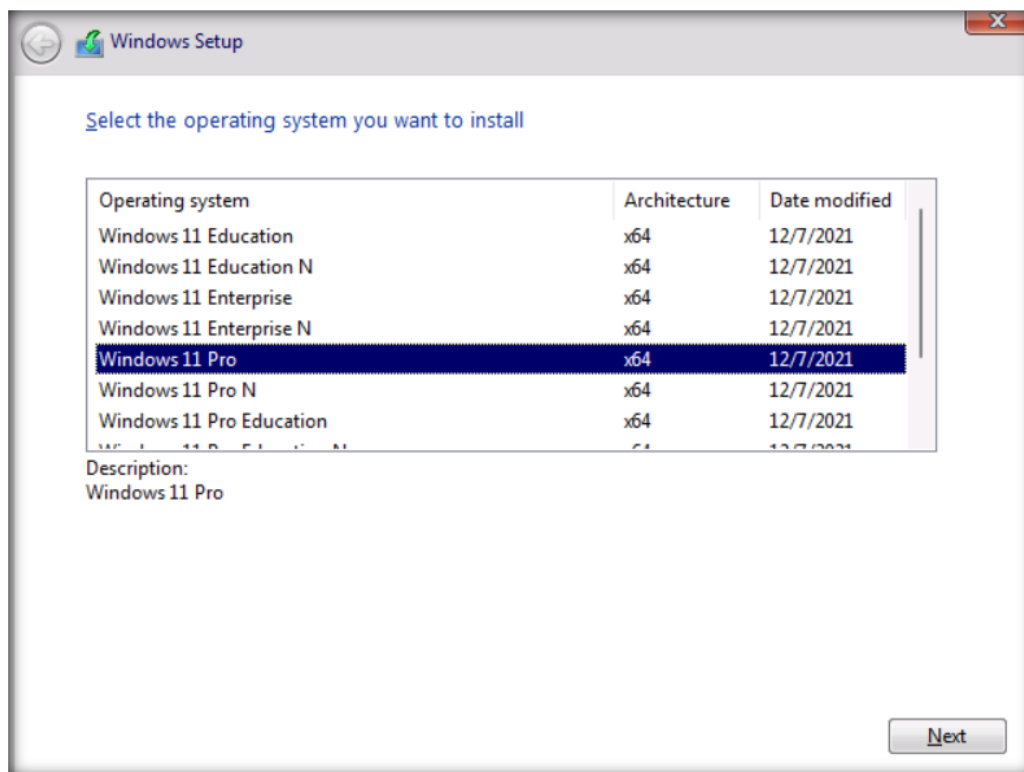
- The virtual machine is initialized and the **Windows Setup** window appears. In the first window of the setup, keep the default settings and click on **Next**.



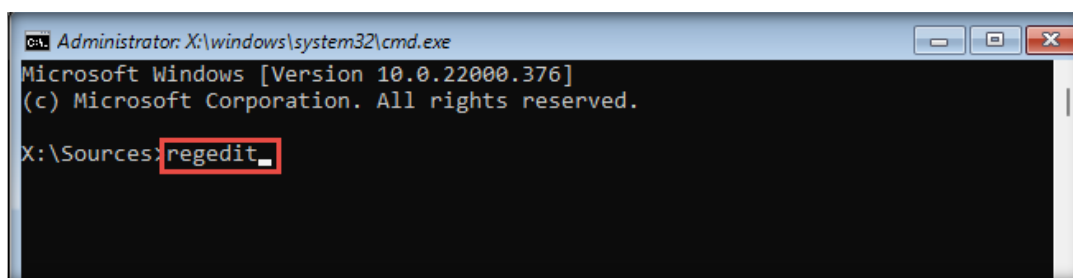
- In the next window, click on **Install now** to begin installation.



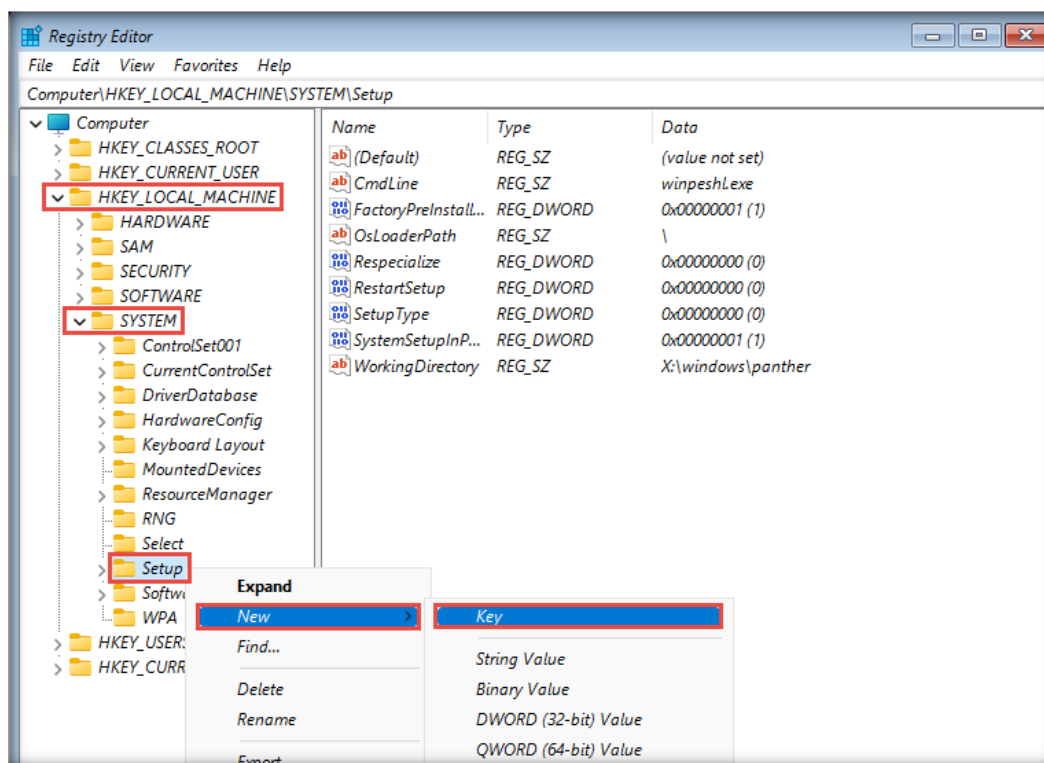
14. In the **Select the operating system you want to install** wizard, select **Windows 11 Pro** and click **Next**.



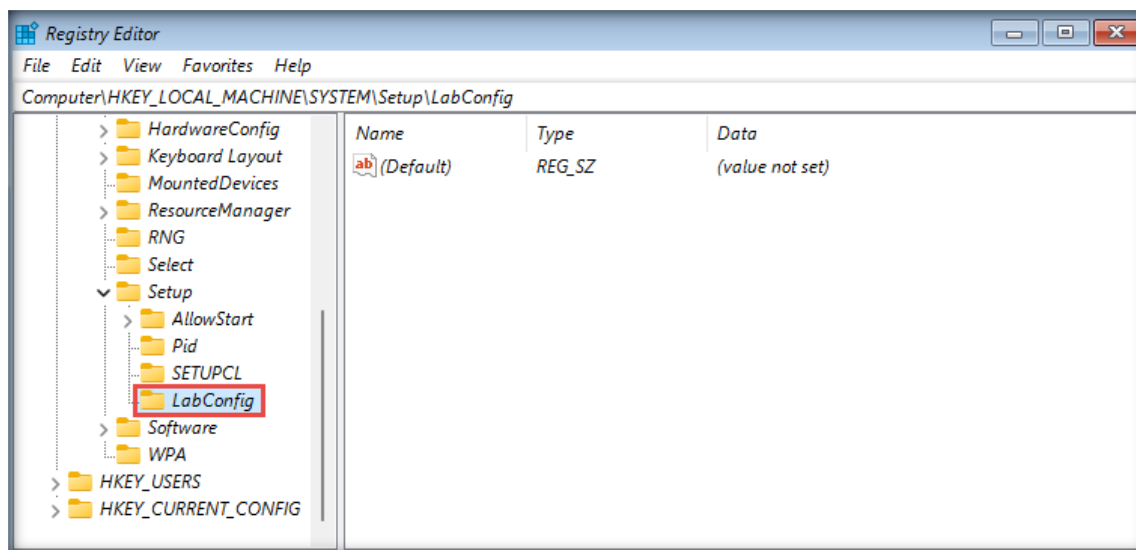
15. If **This PC can't run Windows 11** error appears, follow the below steps:
- Press **Shift+F10** and a **Command Prompt** window appears.
 - In the **Command Prompt** window, type **regedit** and press **Enter**.



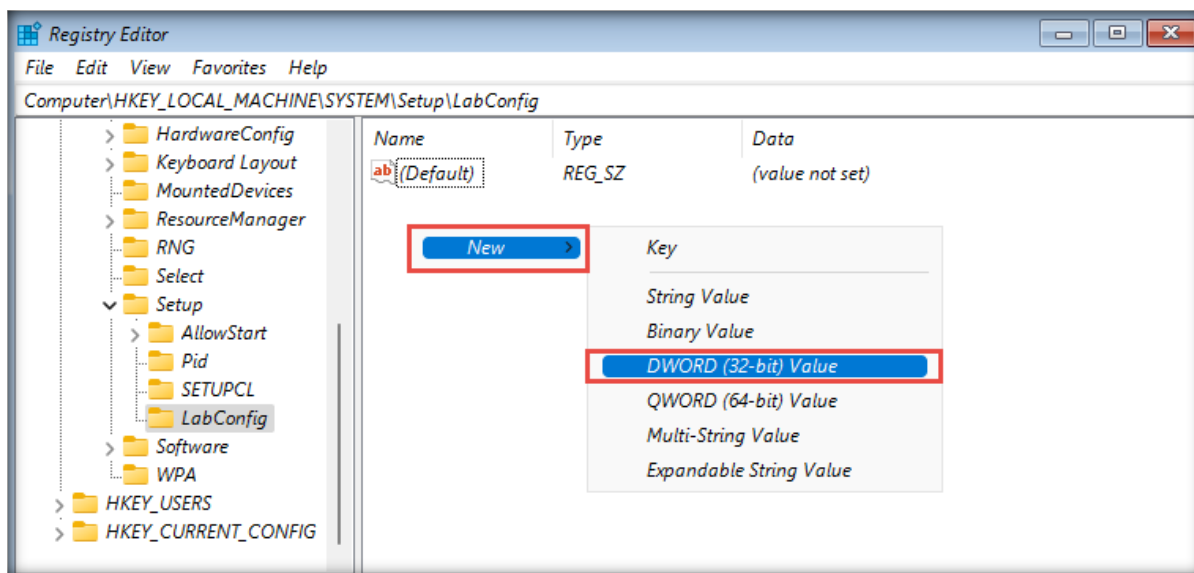
16. The **Registry Editor** window appears, from the left-pane navigate to **HKEY_LOCAL_MACHINE** → **SYSTEM**. Right-click **Setup** node and navigate to **New** → **Key**.



17. A new key has been created, rename it as **LabConfig** and press **Enter**.



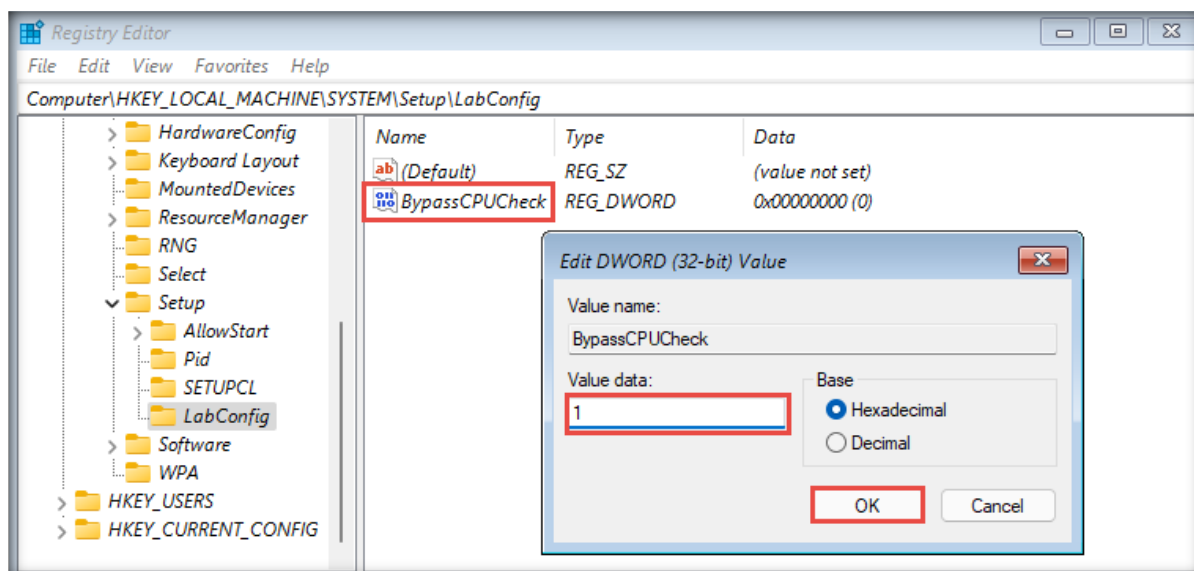
18. Right-click anywhere in the right pane and navigate to **New → DWORD (32-bit) Value**.



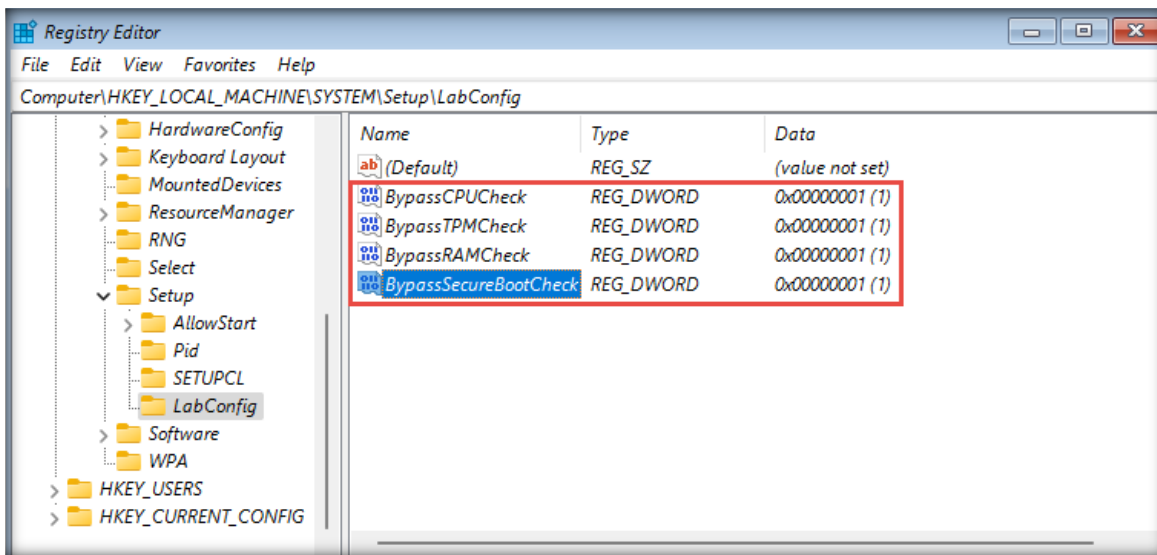
19. Rename the value as **BypassCPUCheck** and press **Enter**.

20. Now, right-click **BypassCPUCheck** value and select **Modify...** option.

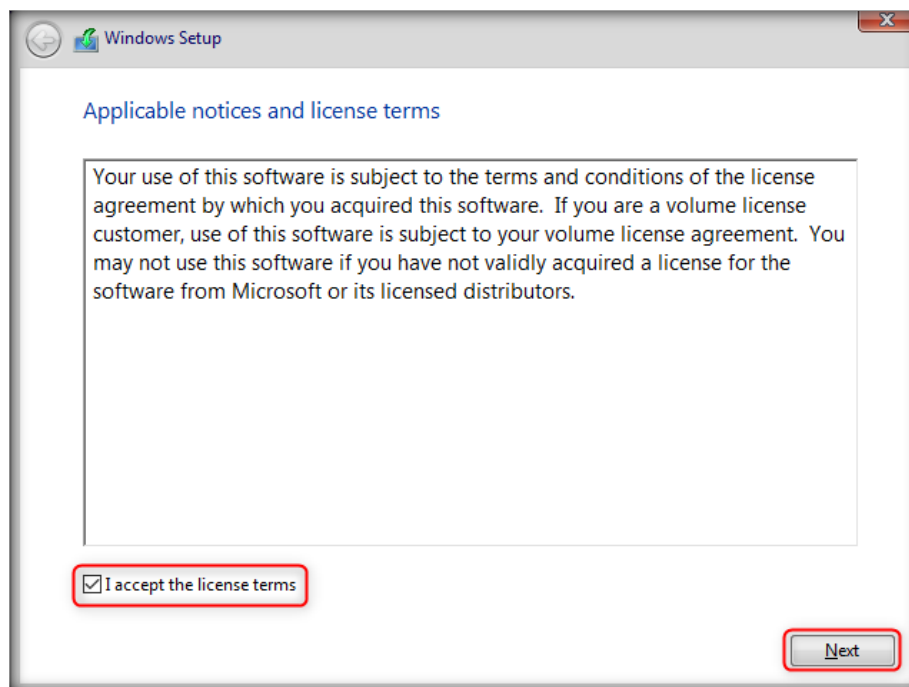
21. **Edit DWORD (32-bit Value)** pop-up appears, change the **Value data** to **1** and click **OK**.



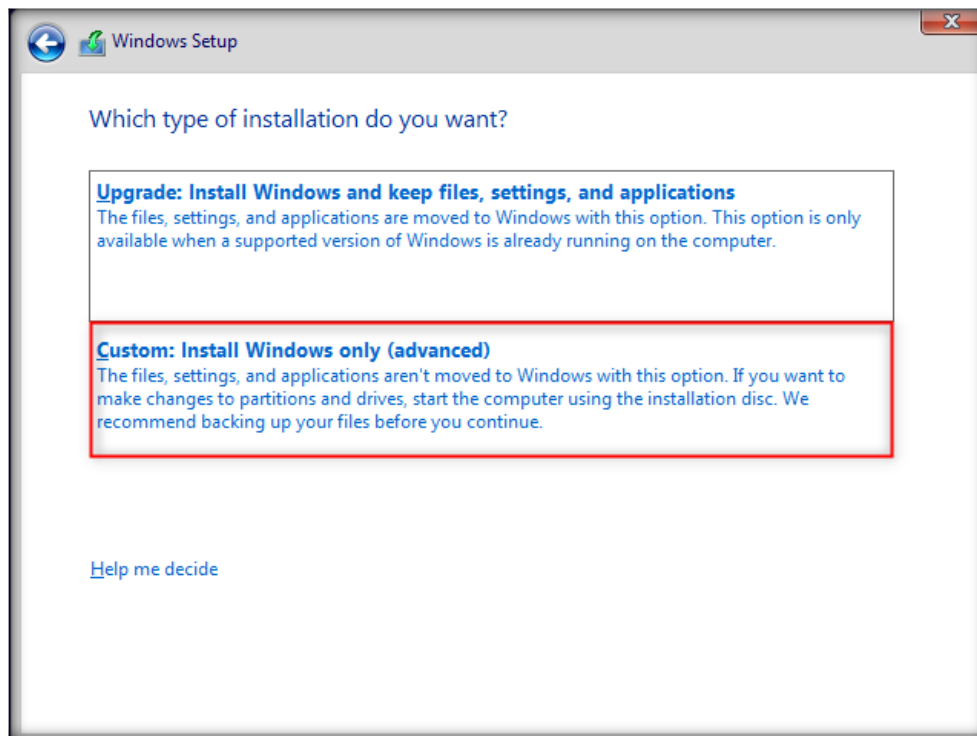
22. Similarly, create **BypassTPMCheck**, **BypassRAMCheck**, and **BypassSecureBootCheck** values (for each value, set **Value data=1**).



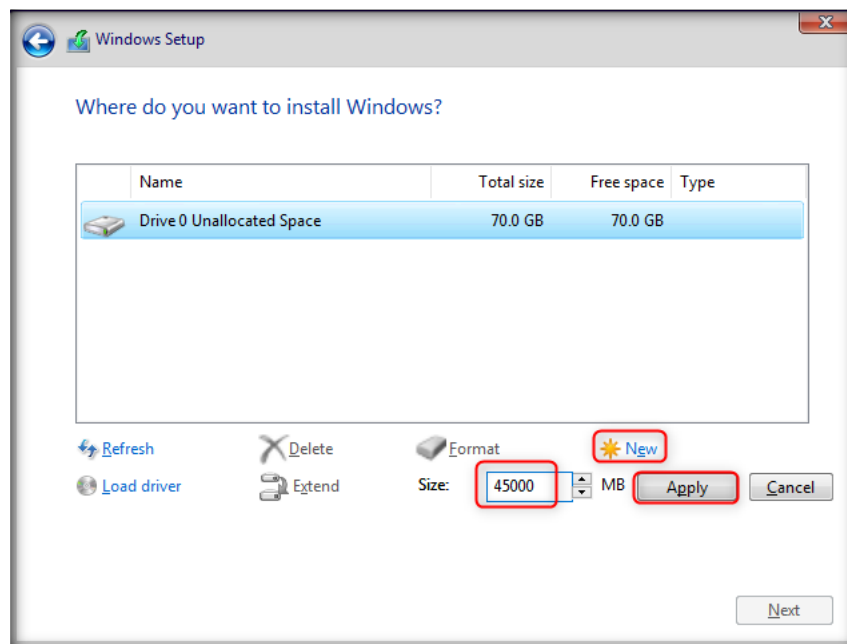
23. Now, close all the windows (Registry Editor, Command Prompt and Error window).
24. In **Windows Setup** window, click **Yes**.
25. Click **Install Now** button.
26. The **Select the operating system you want to install** wizard appears again; select **Windows 11 Pro** and click **Next**.
27. **Applicable notices and license terms** wizard appears, accept the license terms by clicking on **I accept...** checkbox and click **Next**.



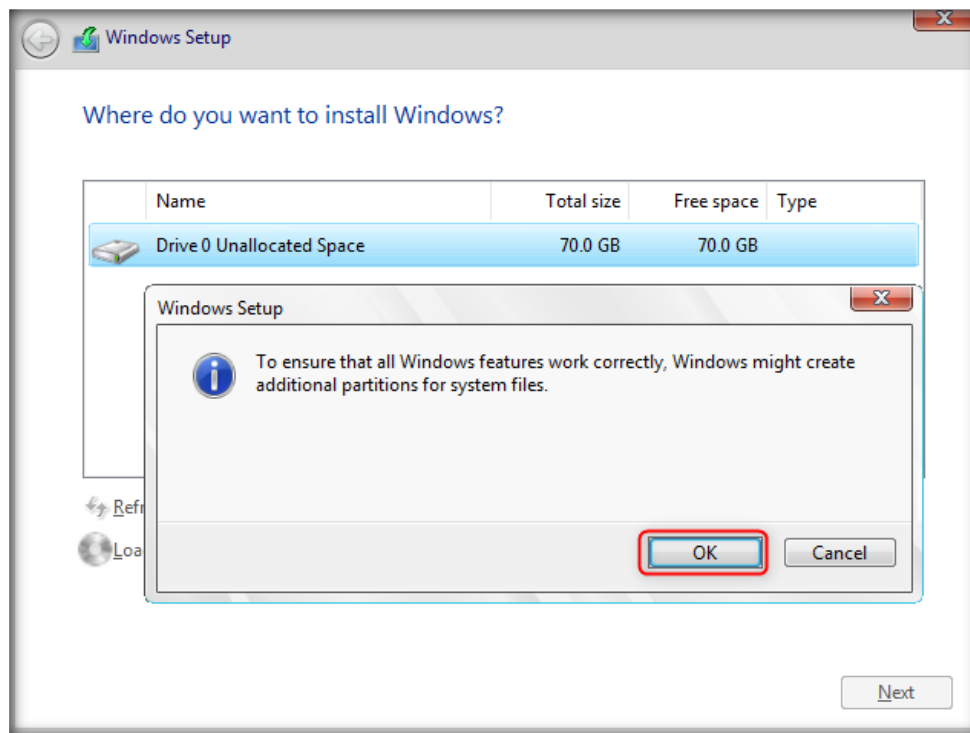
28. Under the **Which type of installation do you want?** wizard, click on **Custom: Install Windows only (advanced)**.



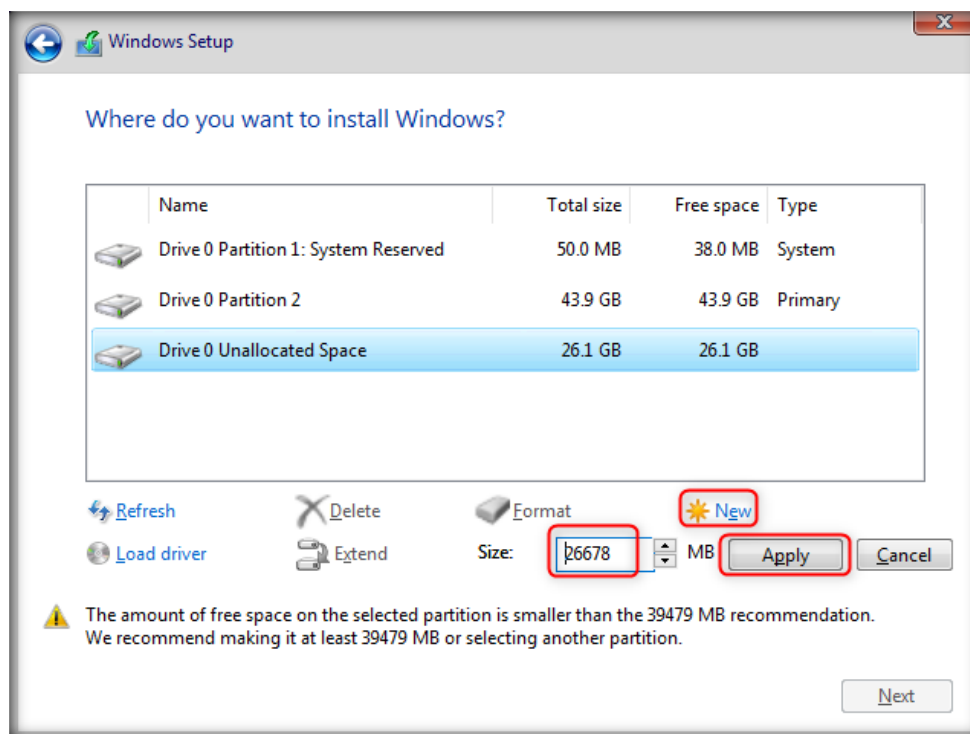
29. Then a **Where do you want to install Windows?** wizard appears; click on **New** to create a partition. Select **45000 MB** in the **Size** field and click on **Apply**.



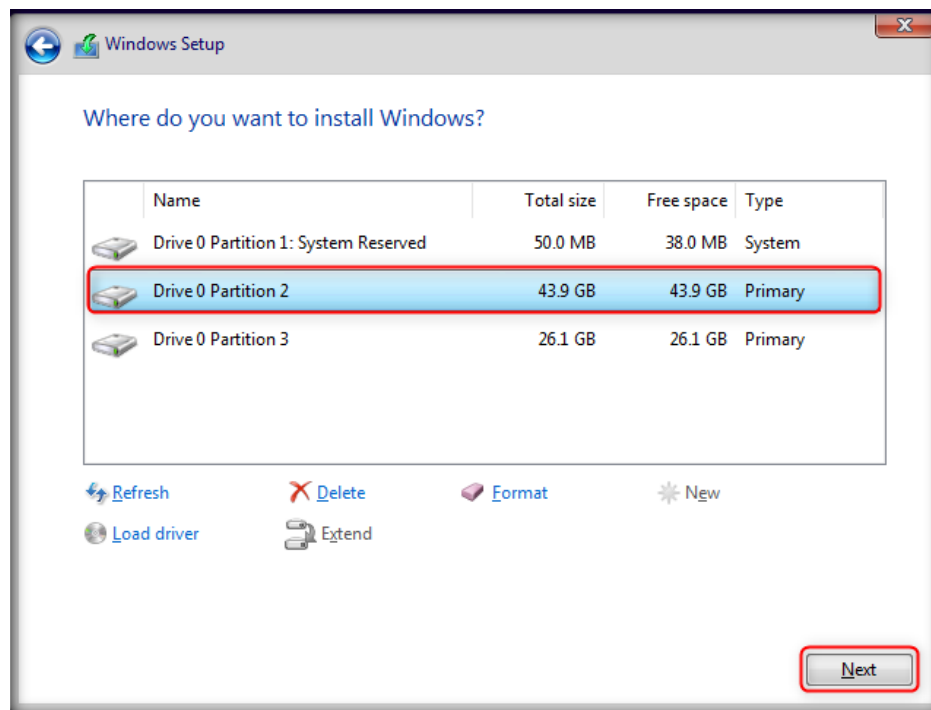
30. Click OK.



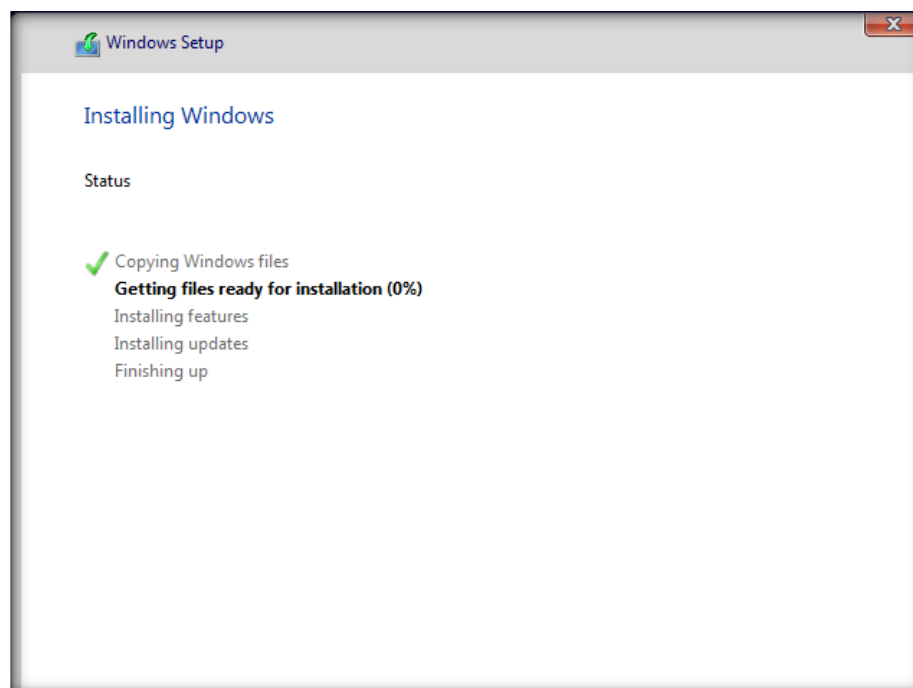
31. Select the **Unallocated Space** partition and click on **New**; then, leave the size to default and click on **Apply**.



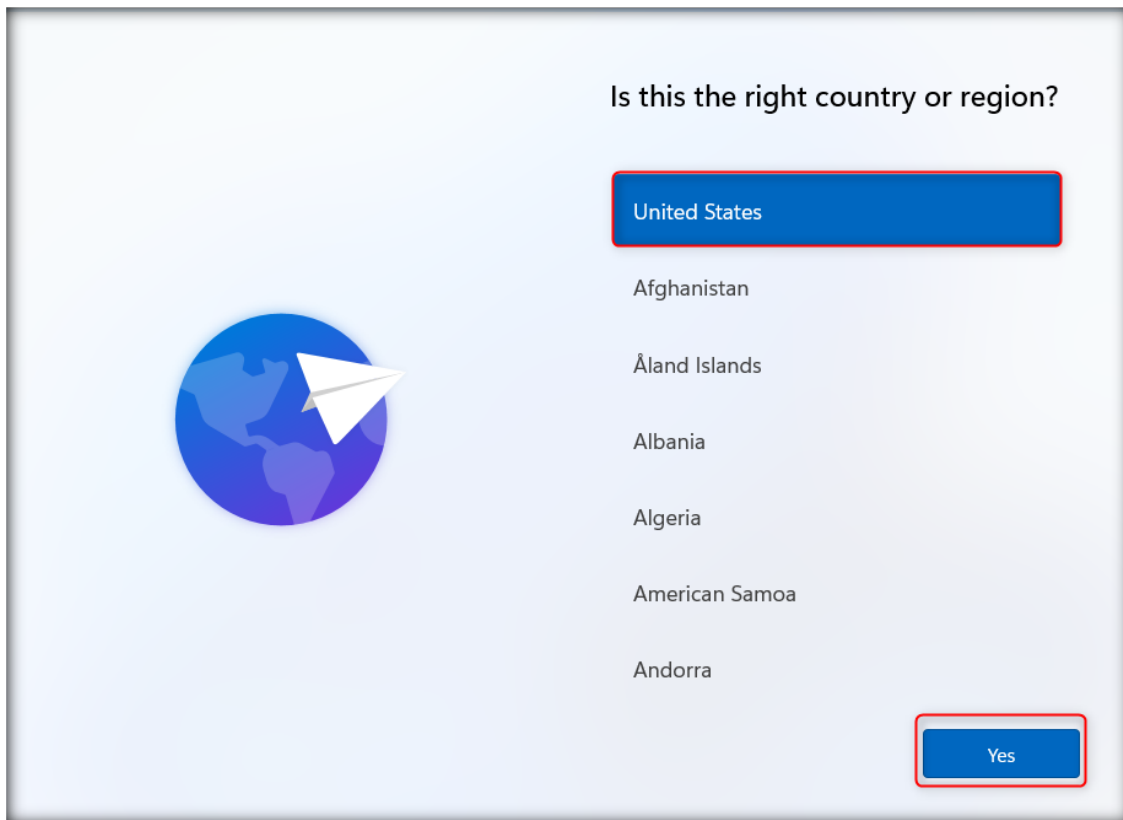
32. After the partitions are created, select **Partition 2** to install Windows 11 and click on **Next**.



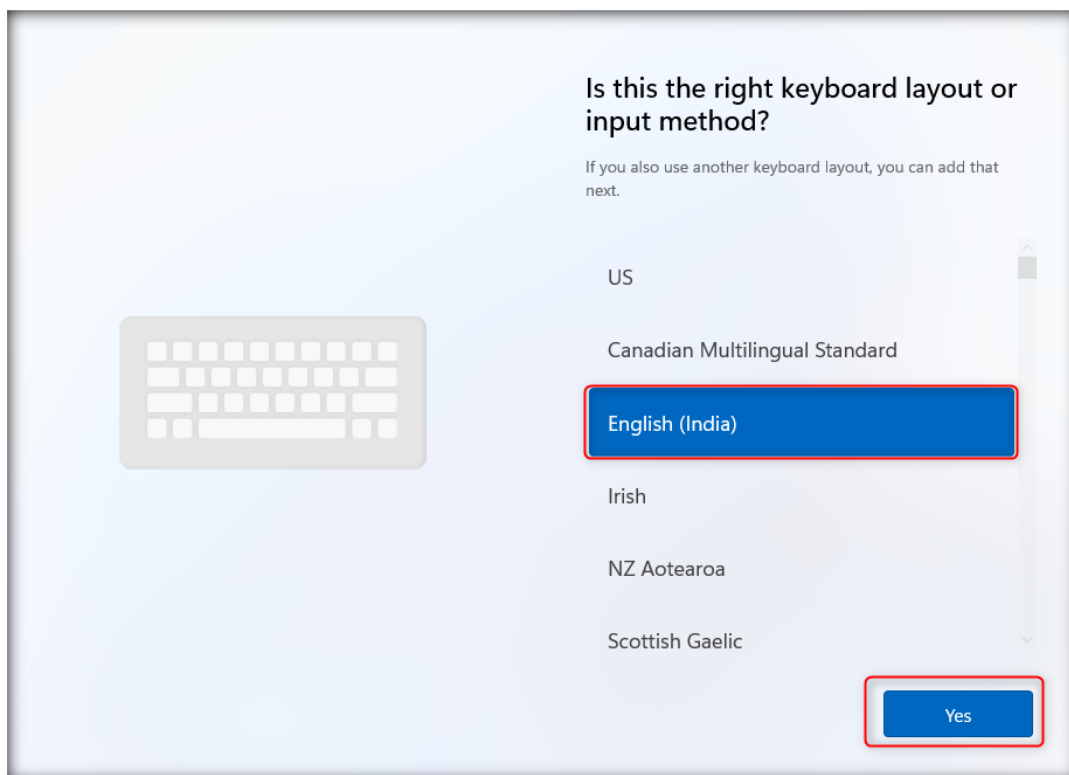
33. The **Installing Windows** screen appears; wait until installation is complete.



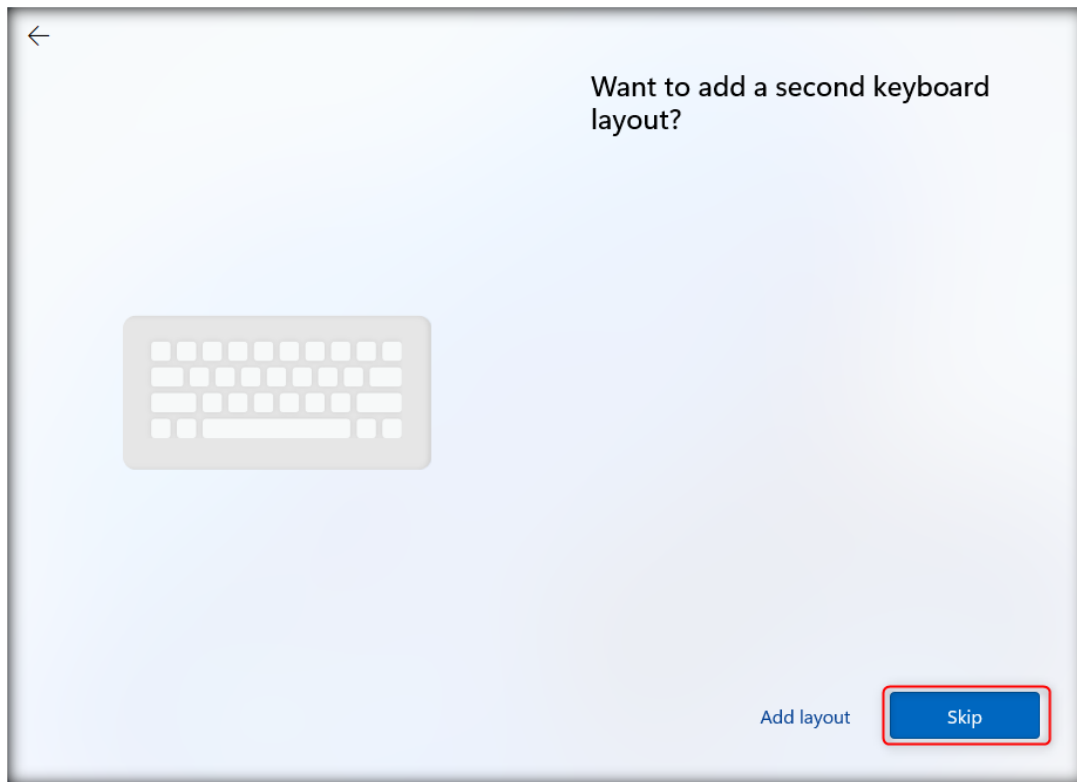
34. Use Default location and click yes.



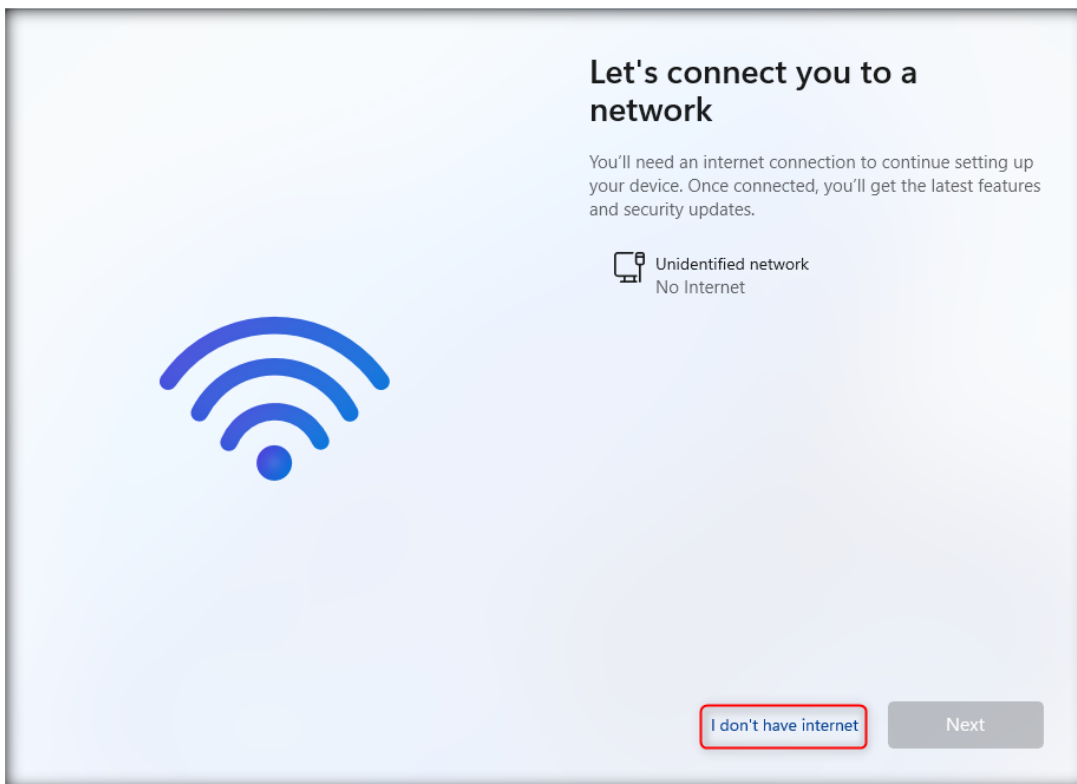
35. Select **English (India)** as **Keyboard layout** and click on **Yes**.



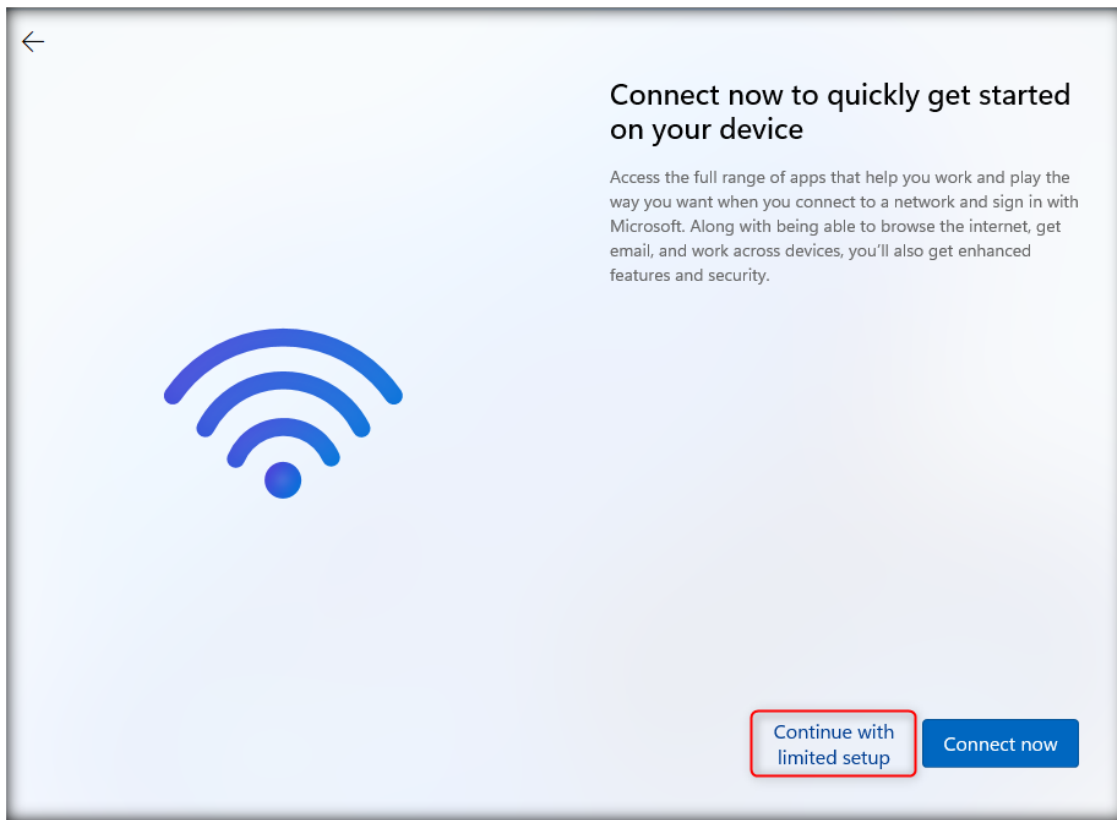
36. Click **Skip**.



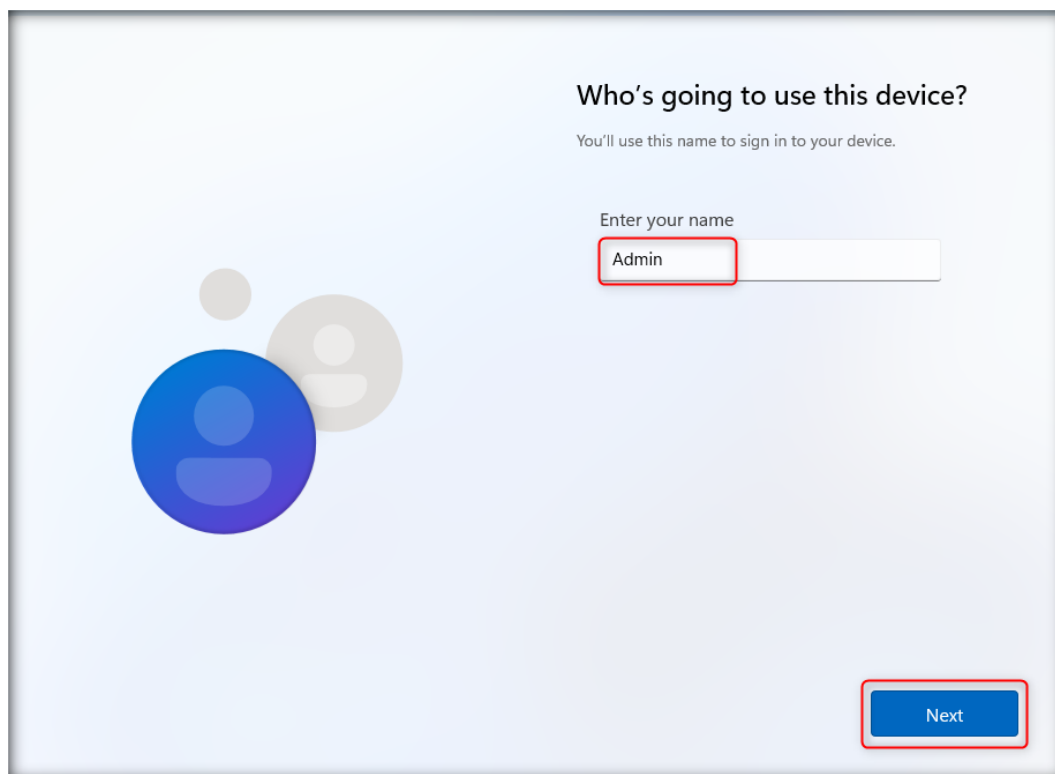
37. Click on **I don't have internet**.



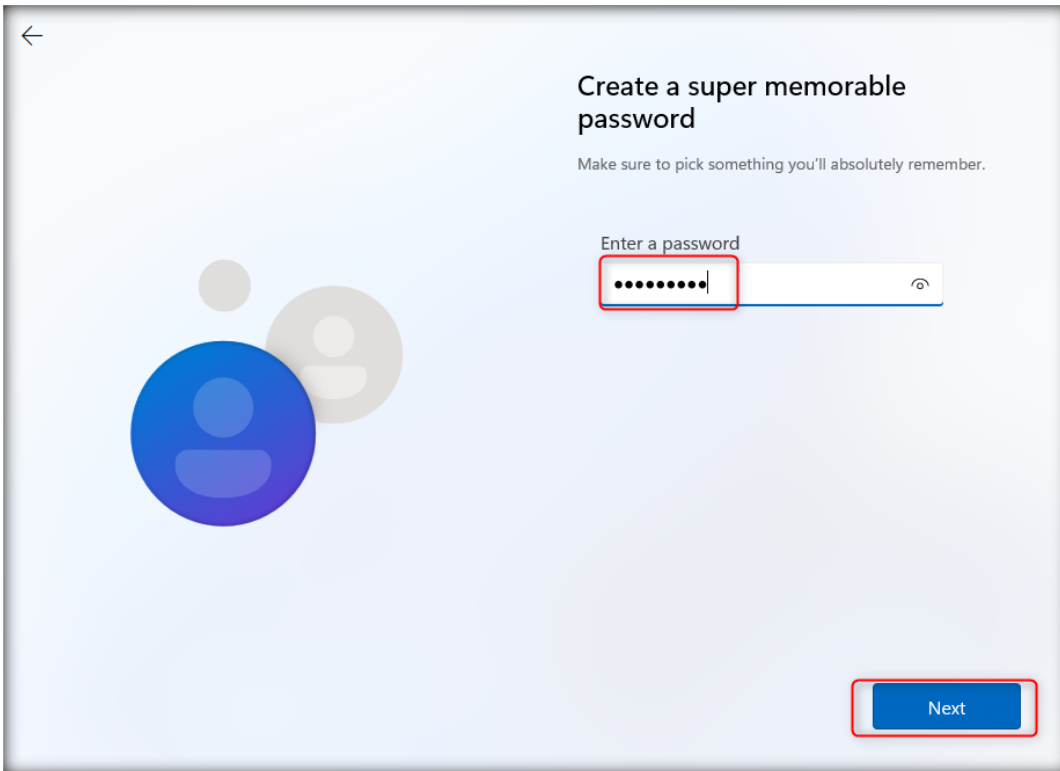
38. Click **Continue with limited setup**.



39. Type **Admin** and click on **Next**.



40. Type **admin@123** as password and click on **Next**.



←

Create a super memorable password

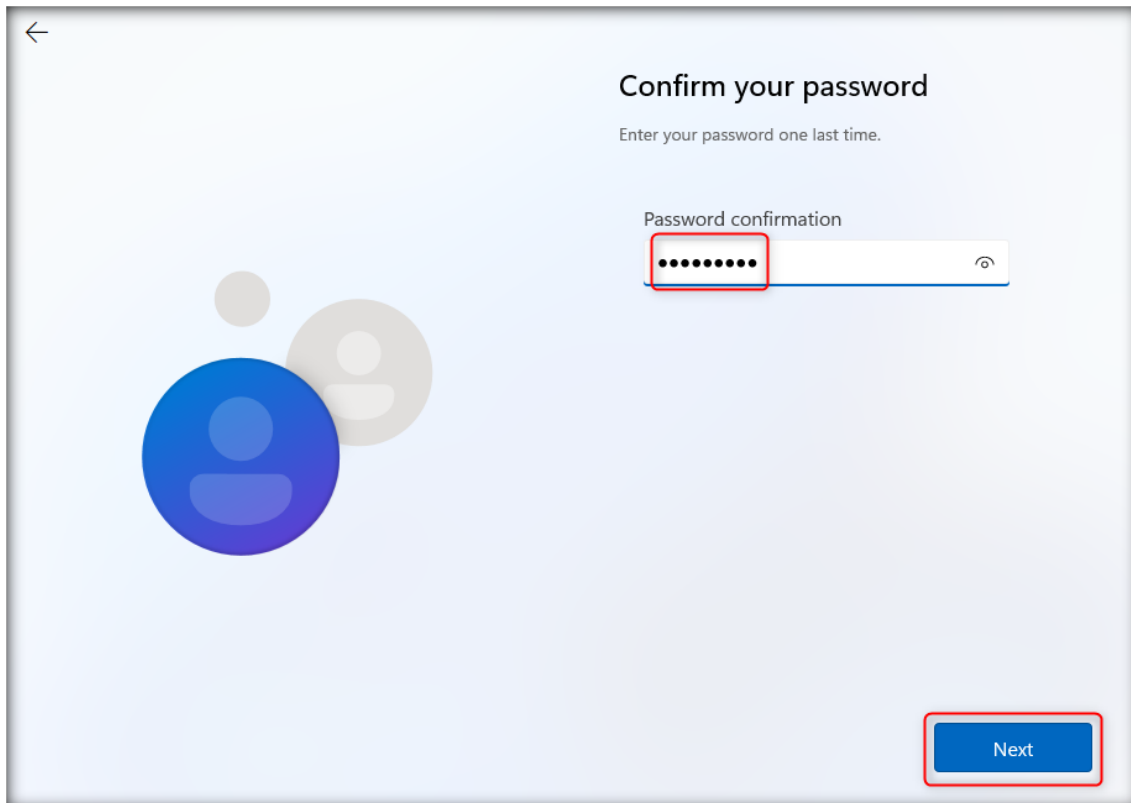
Make sure to pick something you'll absolutely remember.

Enter a password

.....

Next

41. Type **admin@123** to confirm the password and click on **Next**.



←

Confirm your password

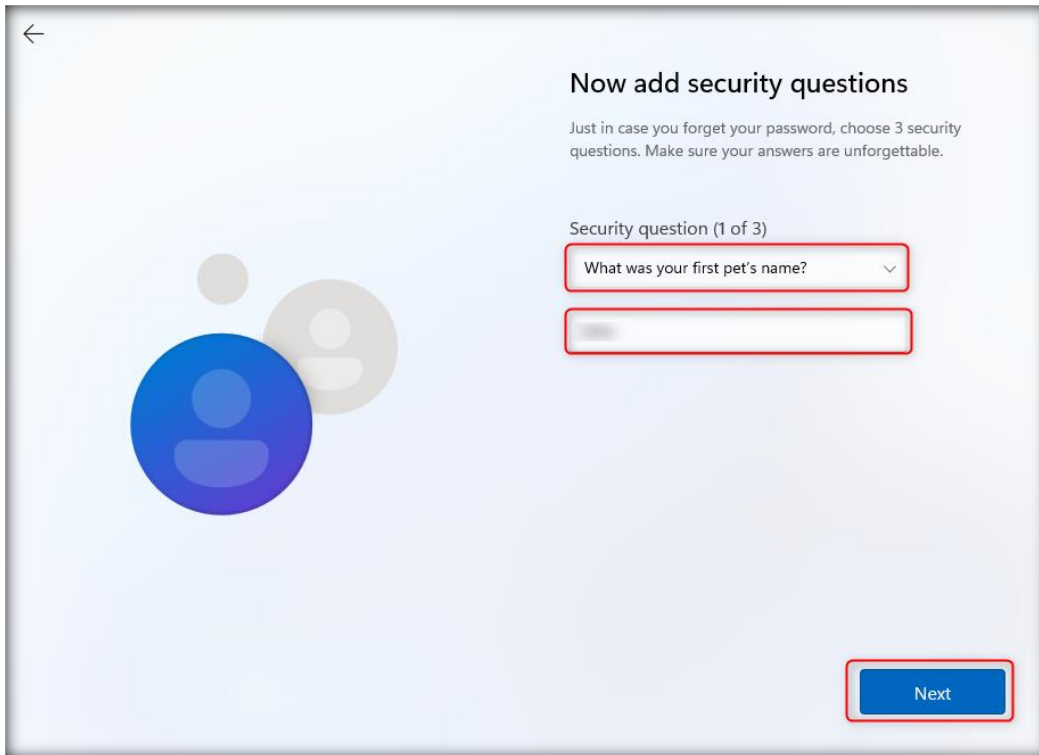
Enter your password one last time.

Password confirmation

.....

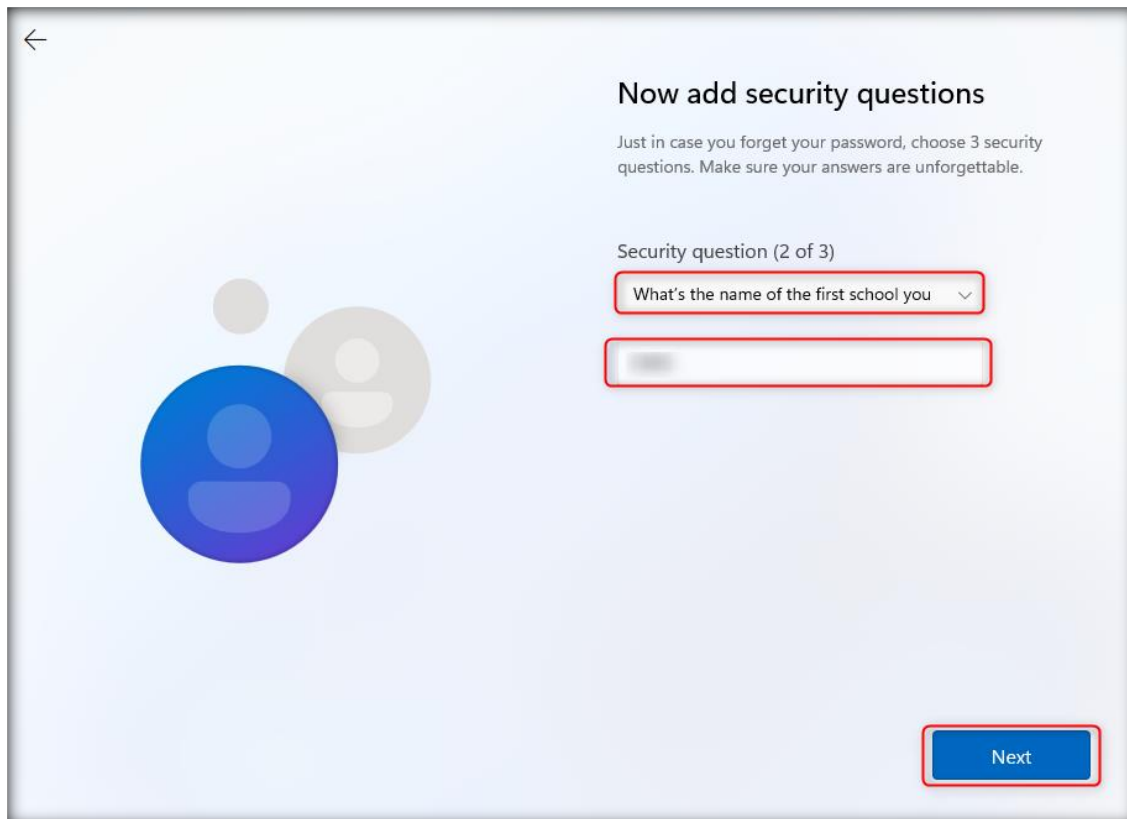
Next

42. Select one security question and type the answer. Click on **Next**.



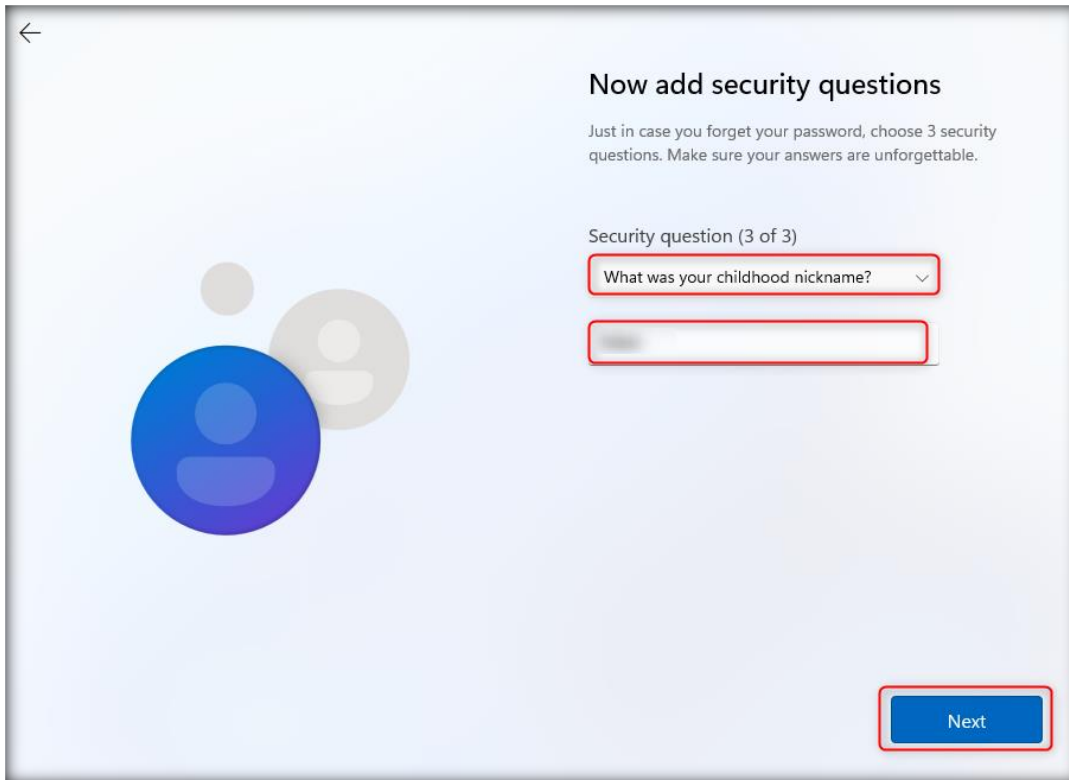
The screenshot shows a user interface for adding security questions. On the left is a large blue circular profile picture placeholder with a smaller grey one behind it. The main heading is "Now add security questions" with a subtext: "Just in case you forget your password, choose 3 security questions. Make sure your answers are unforgettable." Below this, it says "Security question (1 of 3)". There is a dropdown menu with the text "What was your first pet's name?" and a small downward arrow. Below the dropdown is a text input field. At the bottom right is a blue button labeled "Next".

43. Select another security question and type the answer. Click on **Next**.



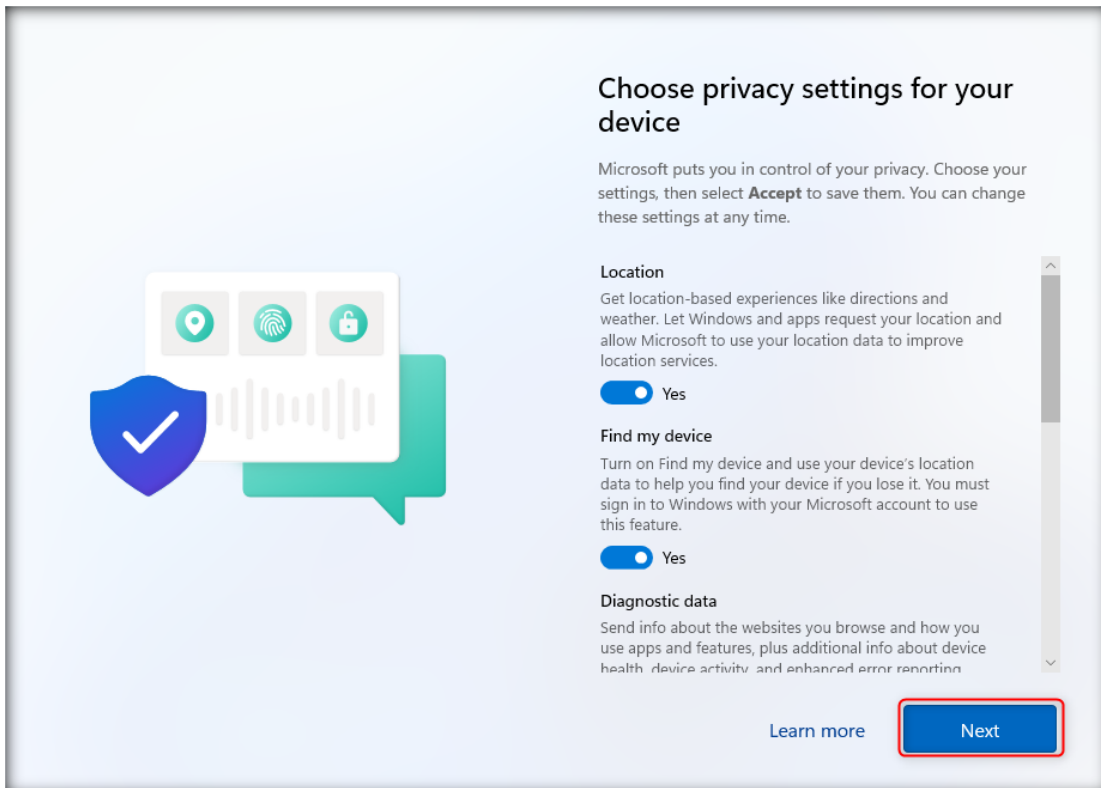
The screenshot shows the same user interface as the previous one, but for the second question. The heading is "Now add security questions" with the same subtext. It says "Security question (2 of 3)". The dropdown menu now displays "What's the name of the first school you" with a small downward arrow. Below the dropdown is a text input field. At the bottom right is a blue button labeled "Next".

44. Select the last security question and type the answer. Click on **Next**.



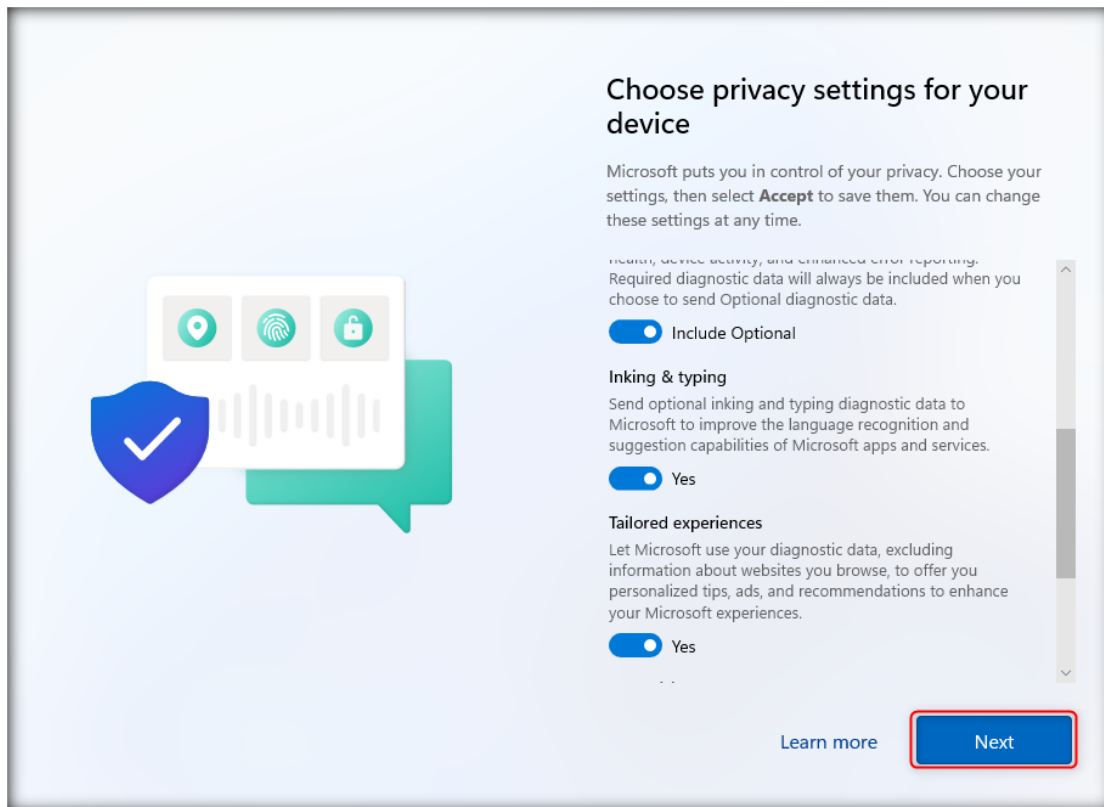
The screenshot shows the 'Now add security questions' screen in Windows. On the left is a large blue circular profile picture placeholder. To its right, the text 'Now add security questions' is followed by a subtext: 'Just in case you forget your password, choose 3 security questions. Make sure your answers are unforgettable.' Below this, 'Security question (3 of 3)' is displayed above a dropdown menu showing 'What was your childhood nickname?'. A text input field for the answer is positioned below the dropdown. At the bottom right, a blue 'Next' button is highlighted with a red rectangle.

45. Click on **Next**.

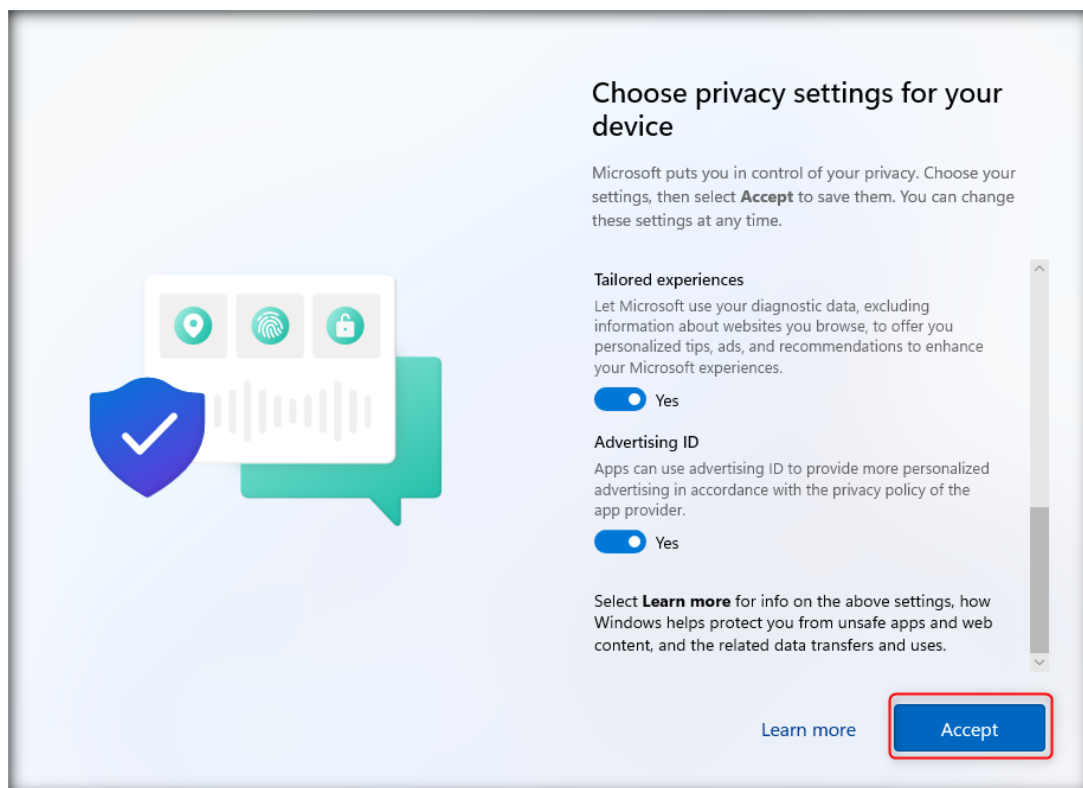


The screenshot shows the 'Choose privacy settings for your device' screen. On the left is an illustration of a shield with a checkmark and a document with icons for location, fingerprint, and a lock. The main content area has the title 'Choose privacy settings for your device' and a paragraph: 'Microsoft puts you in control of your privacy. Choose your settings, then select **Accept** to save them. You can change these settings at any time.' Below this are three sections: 'Location' with a 'Yes' toggle, 'Find my device' with a 'Yes' toggle, and 'Diagnostic data' with a 'Yes' toggle. At the bottom right, a 'Learn more' link and a blue 'Next' button (highlighted with a red rectangle) are visible.

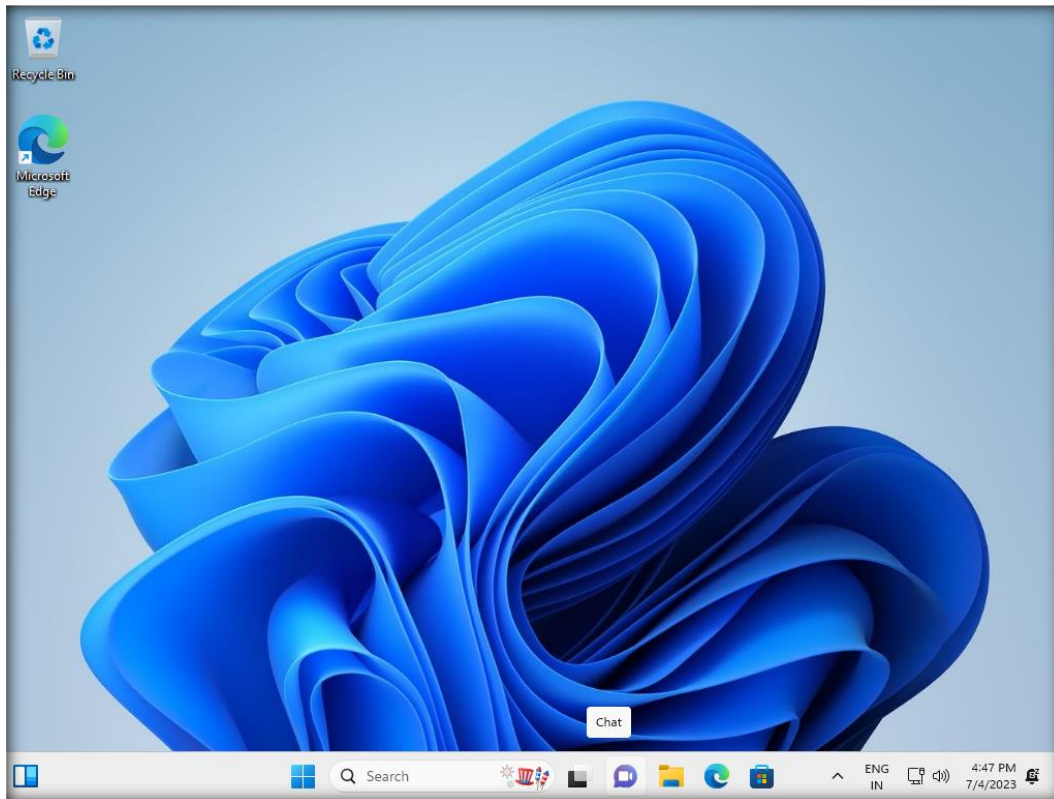
46. Click on **Next**.



47. Click on **Accept**.

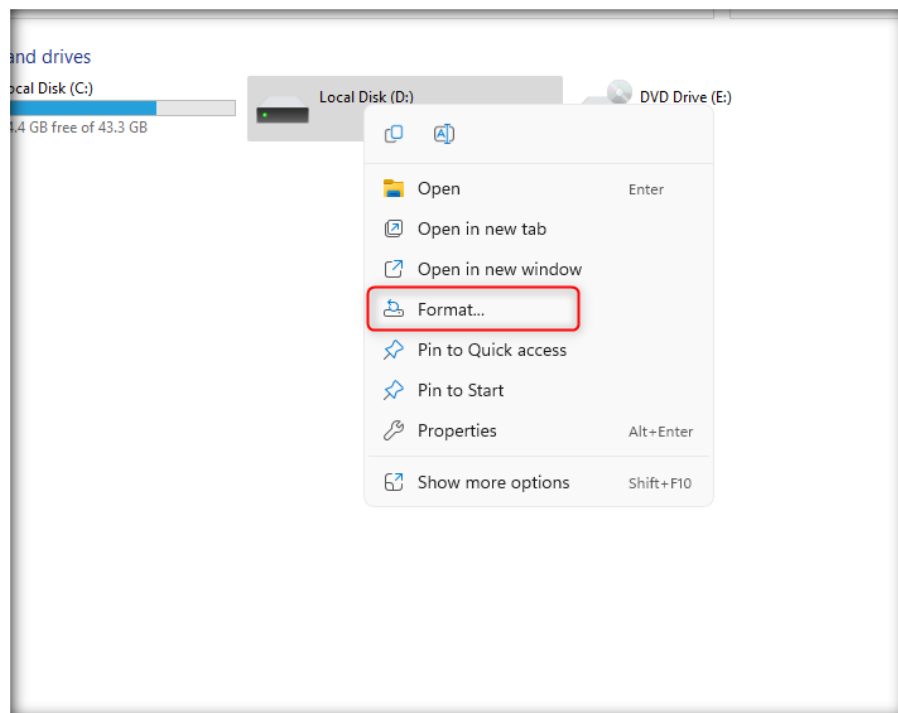


48. Now, the Windows 11 machine is ready, as shown in the screenshot below.

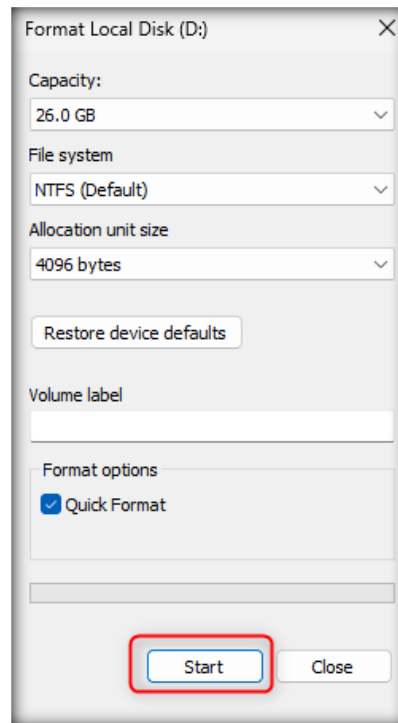


49. Open File Explorer window and click This PC in the left pane, then right-click on Local Disk (D:) and click Format from the context menu.

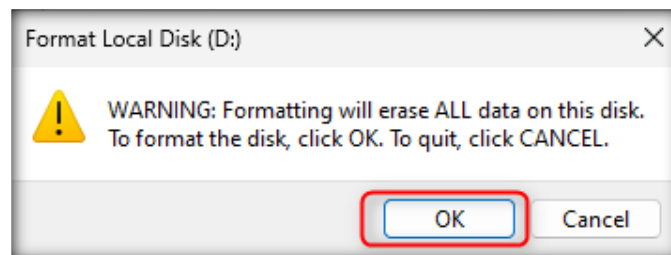
Note: Drive letter may vary in your lab environment.



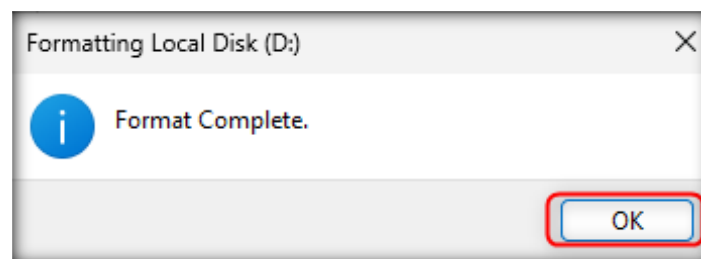
50. Format Local Disk (D:) window appears, leave the settings to default and click Start.



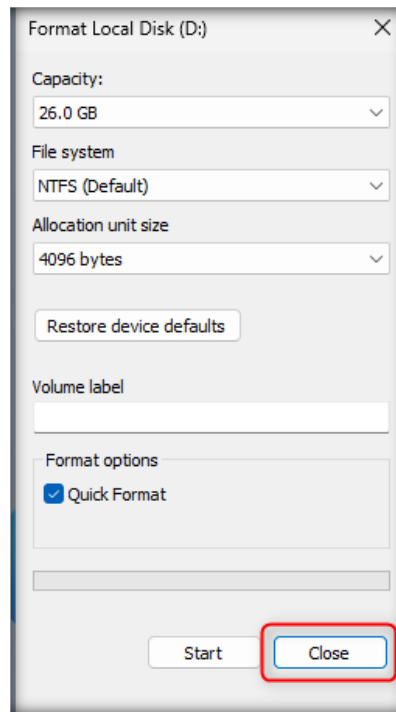
51. Warning pop-up appears click OK



52. In Format Complete message box click OK.

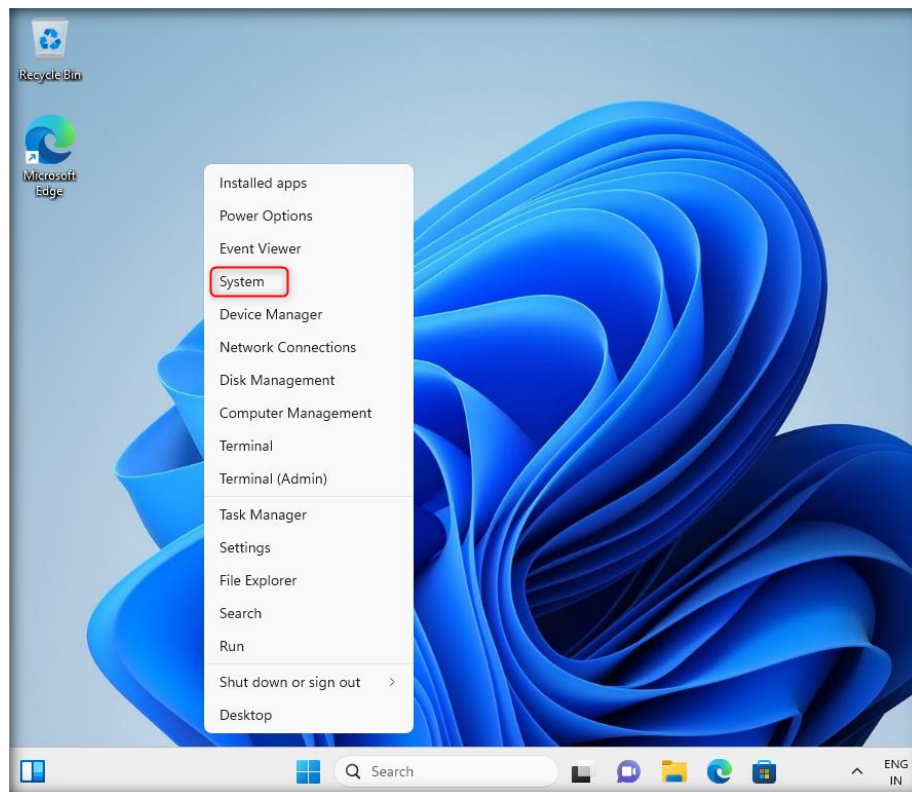


53. Once the formatting of Local Disk (D:) is completed click Close.

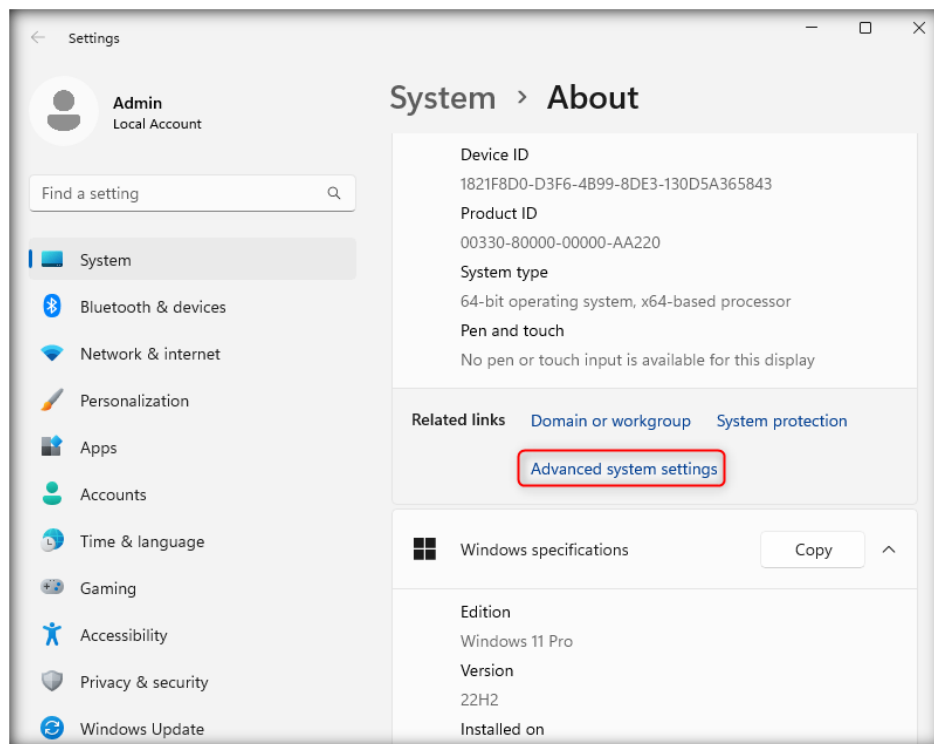


CT#7.2: Change the Computer Name

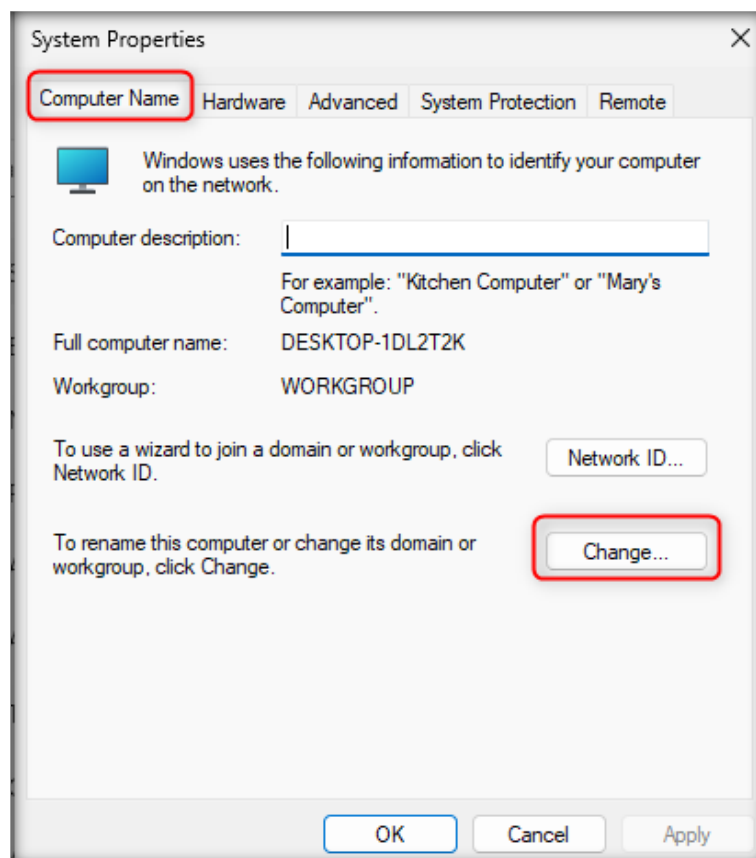
1. Right-click Start icon and click on System.



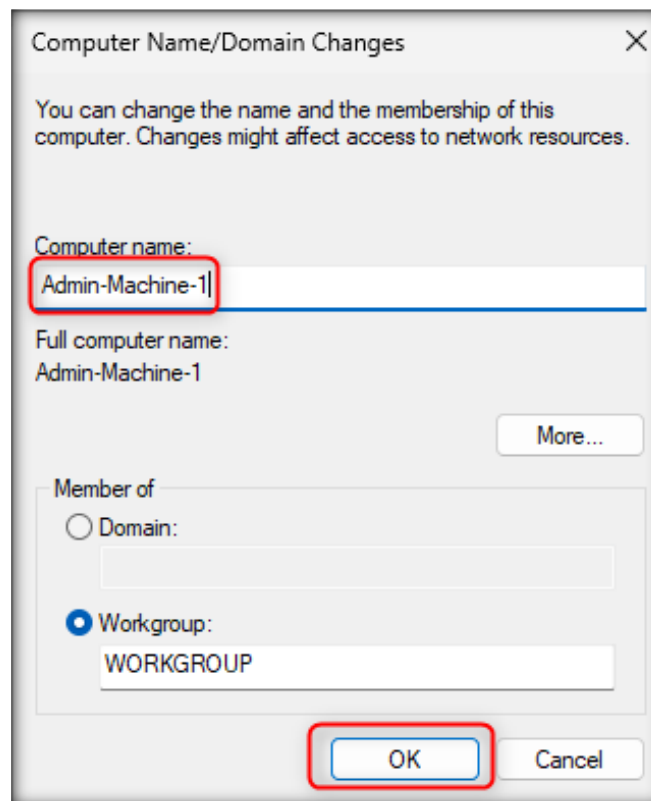
2. In the System properties window, click Advanced system settings.



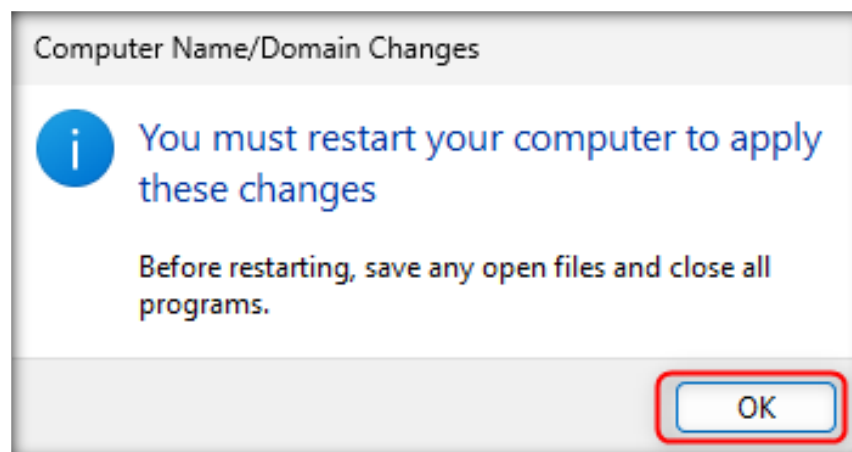
3. In the Computer Name tab of the System Properties window, click Change.



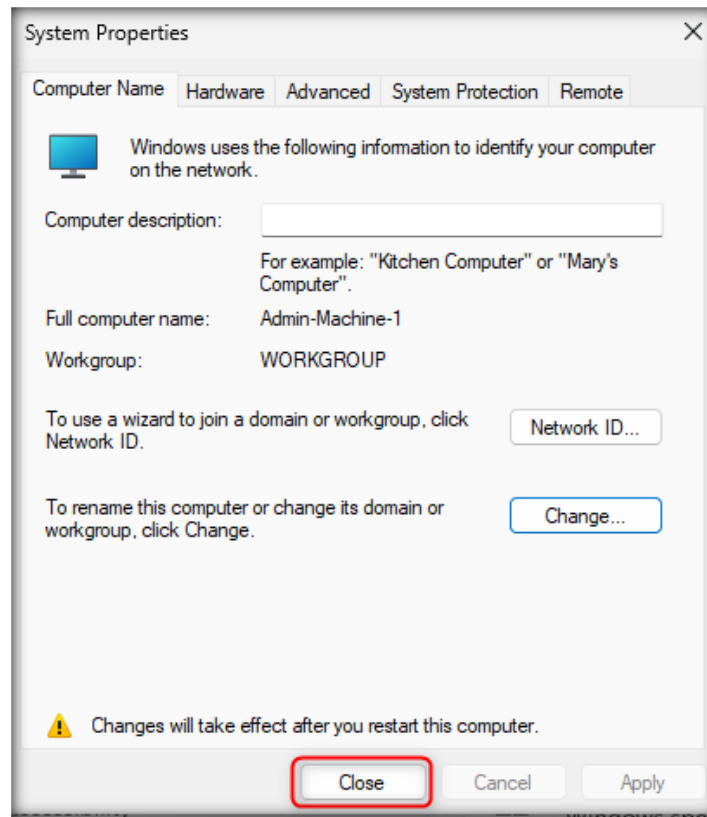
4. In the Computer Name field enter Admin-machine-1 and click OK.



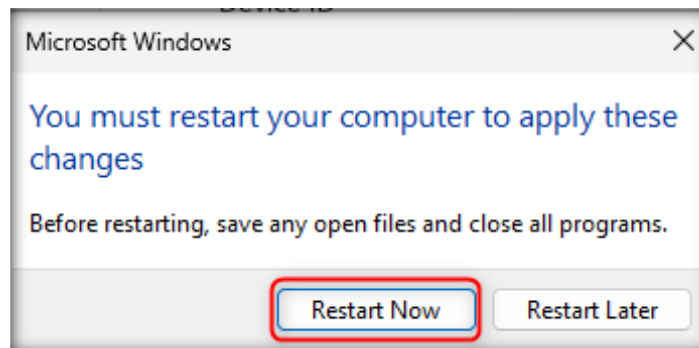
5. When prompted to restart the system, click OK.



6. You will be returned back to System Properties window, click **Close**.

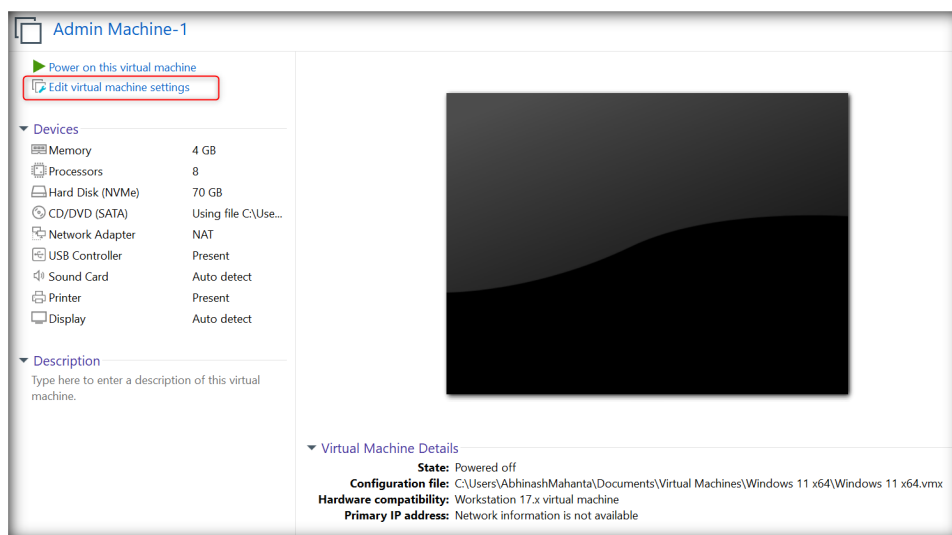


7. You will be prompted to restart the system, click **Restart Now**.

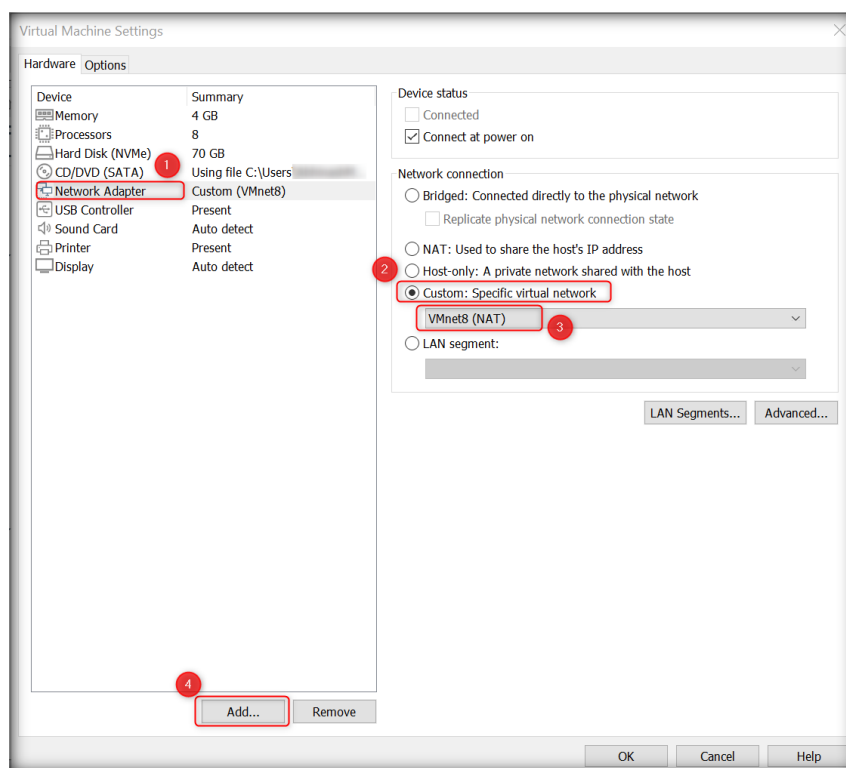


CT#7.3: Setting up IP address for Admin Machine-1

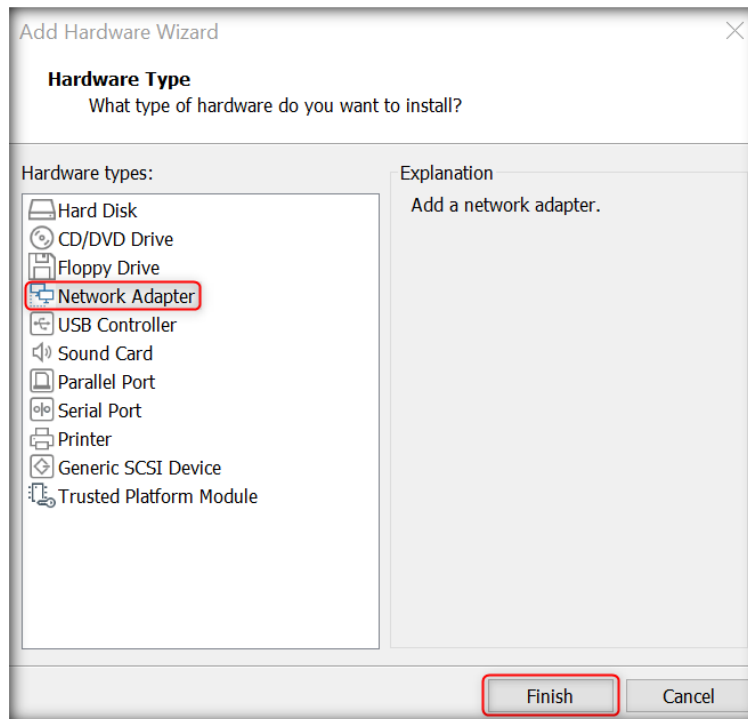
1. Launch VMWare Workstation.
2. Click on **Admin Machine-1** virtual machine profile and click **Edit virtual machine settings**.



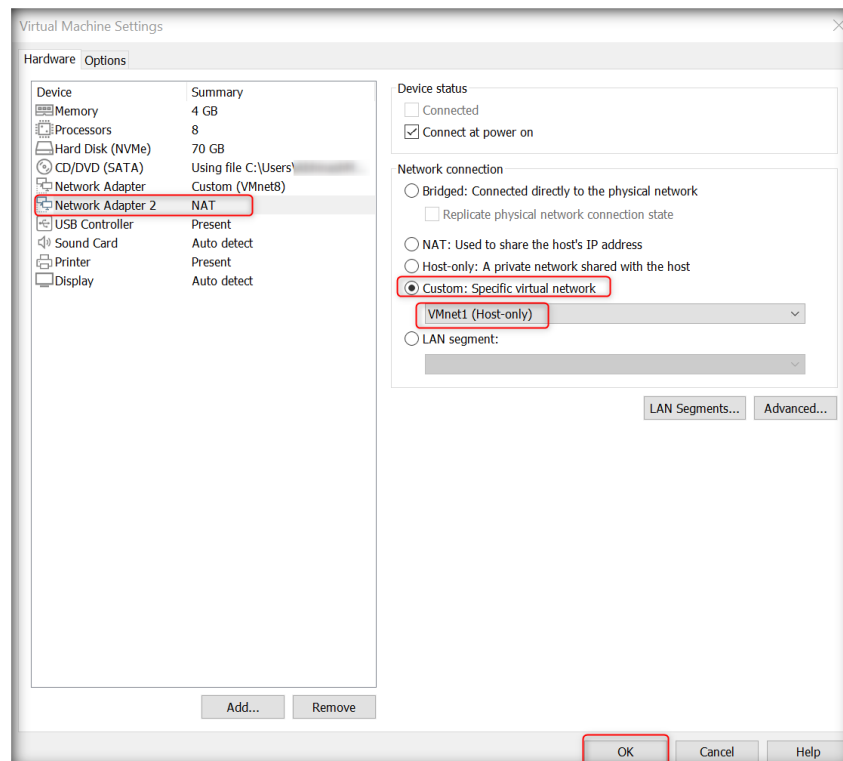
3. **Settings for Admin Machine-1** window opens, click **Network Adapter** in left side pane, click **Custom: Specific virtual network** radio button and select **VMnet8** from dropdown, click **Add....**



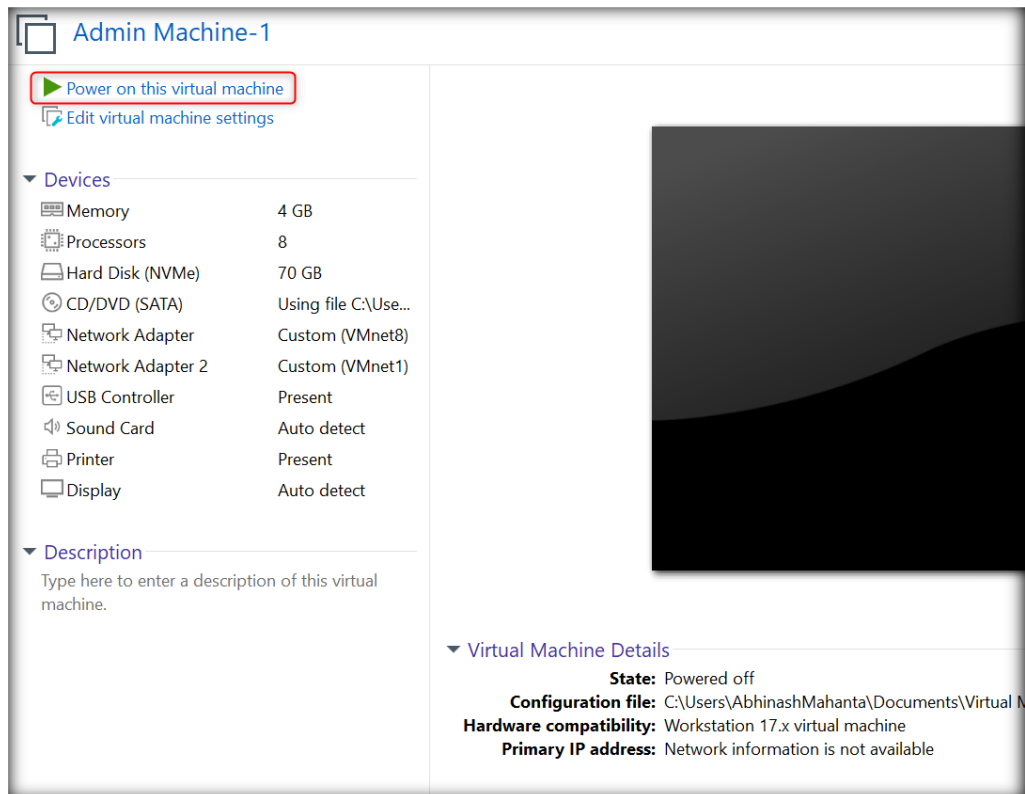
- The PrivateVS switch for internet purpose which is connected to PfSense External Firewall, now we need one more switch that is **InternalVS** for Lan connection.
- Select **Network Adapter** in left side pane and click **Finish** button.



- The new **Network Adapter** will be added, select newly added Network adaptor, click **Custom: Specific virtual network** radio button and select **VMnet1**. Then, click **OK**.



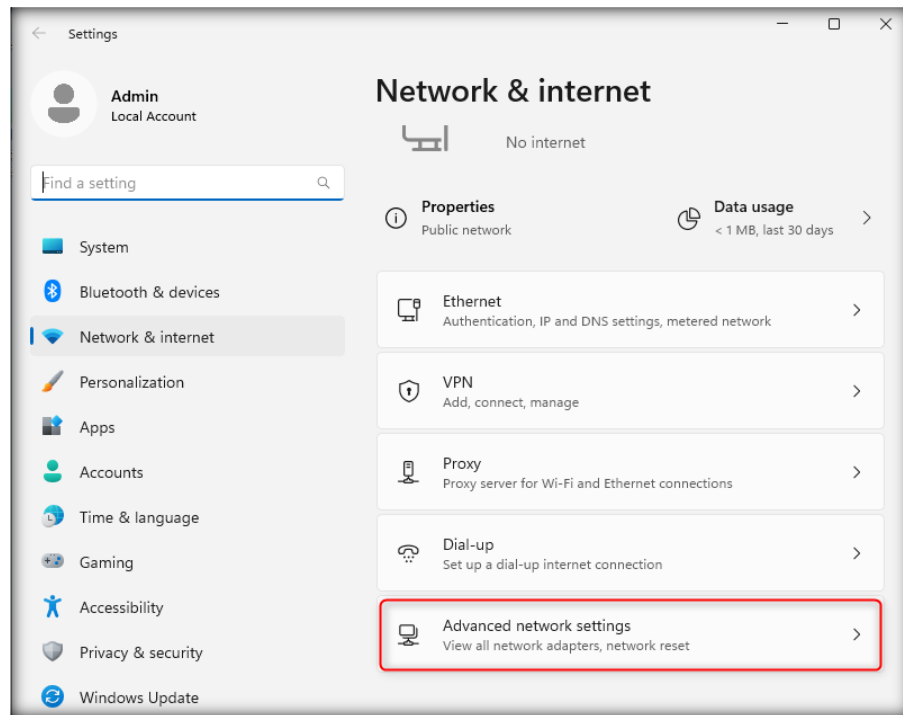
7. In VMware Workstation, click **Power on this virtual machine**.



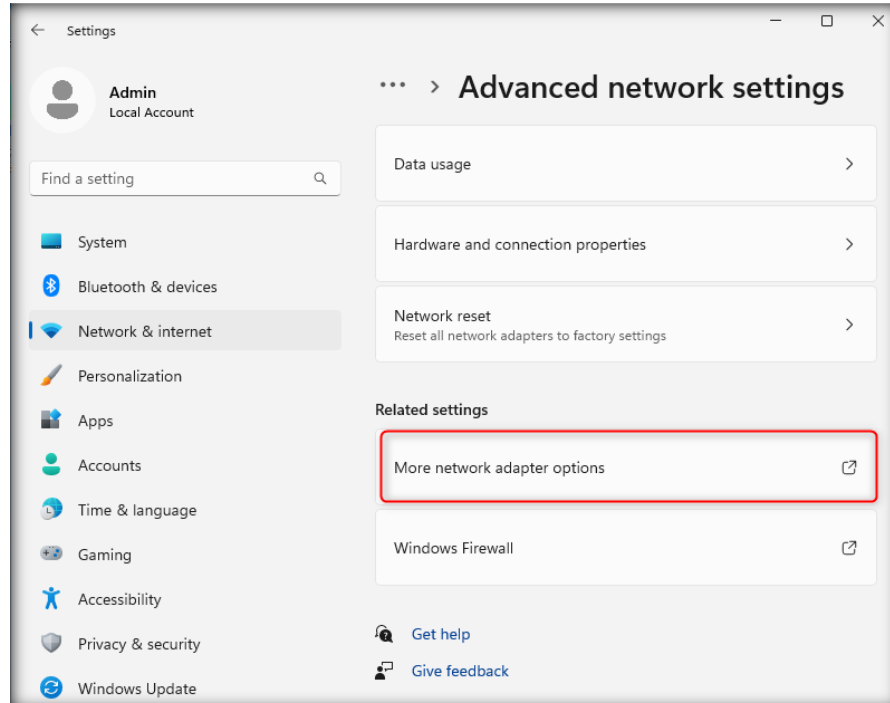
8. Login as Admin. after successful sign in, right-click on **Network** icon (lower right corner of the desktop) and click **Network and Internet Settings** from the context menu.



9. The **Settings** window opens, scroll down and click on **Change adaptor options**.

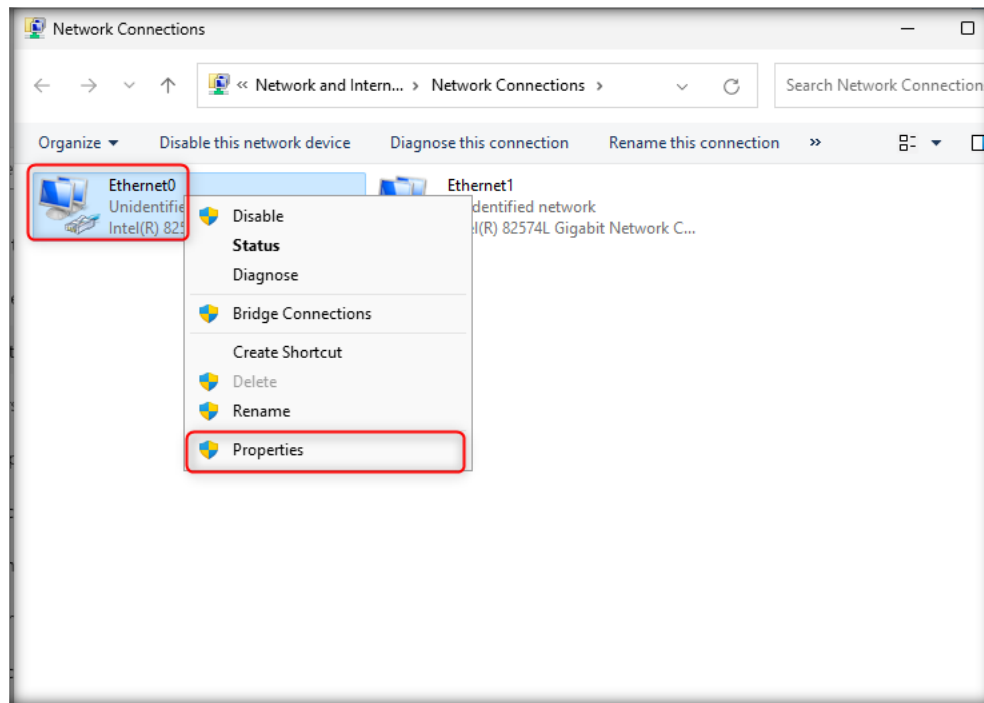


10. The **Advanced network settings** page appears; scroll down and click on **More network adapter options**.

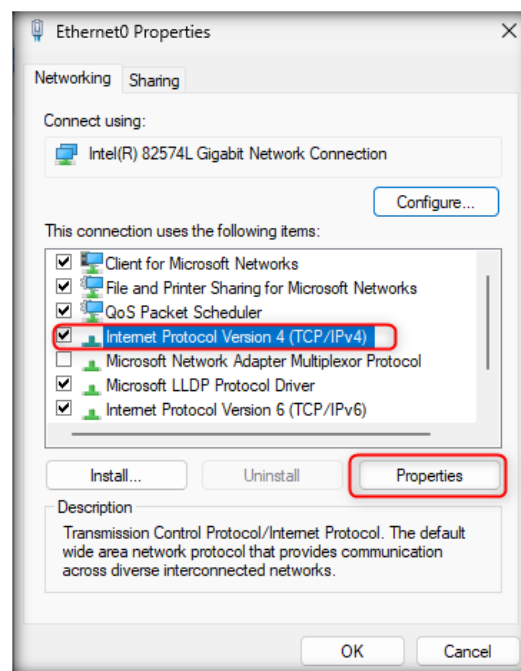


11. Network Connections window opens, we have added two hardware virtual switch, so there are two adaptors will visible here, choose first one (here Ethernet 0 in your case switch number is different) right-click on **Ethernet 0** switch, select **Properties** from the context menu.

Note: The Name of Unidentified network may vary.



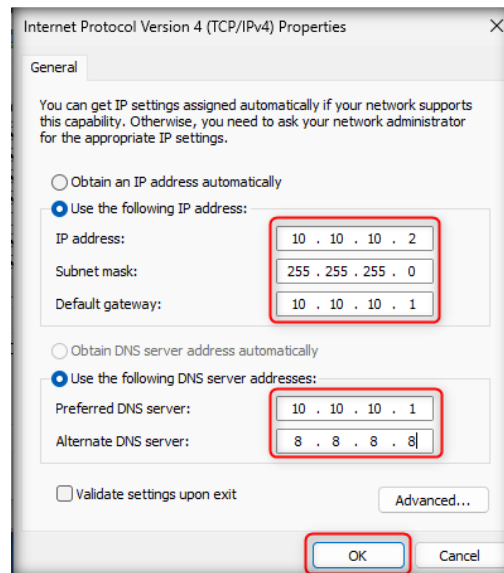
12. Ethernet adapter Properties window appears; and select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.



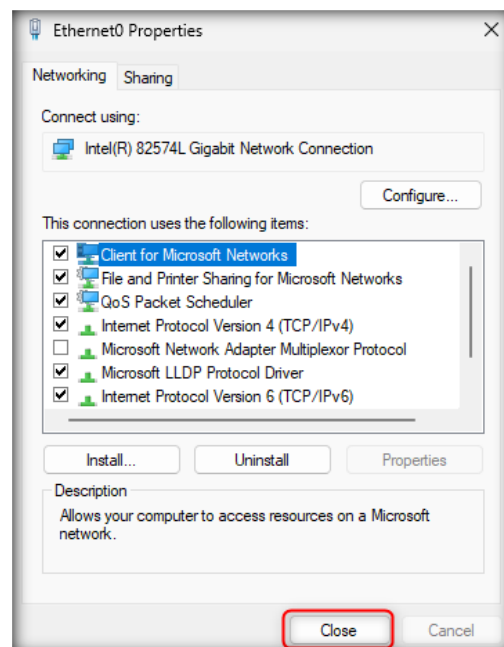
13. Select **Use the following IP address** and **Use the following DNS server addresses** radio buttons, and type the following values as shown in the screenshot and click **OK**.

- IP address: **10.10.10.2**
- Subnet mask: **255.255.255.0**
- Default gateway: **10.10.10.1**
- Preferred DNS server: **10.10.10.1**
- Alternate DNS server: **8.8.8.8**

Note: Once you click on **OK** button if Networks section appears on the right side of the desktop screen, and then click **Yes**.

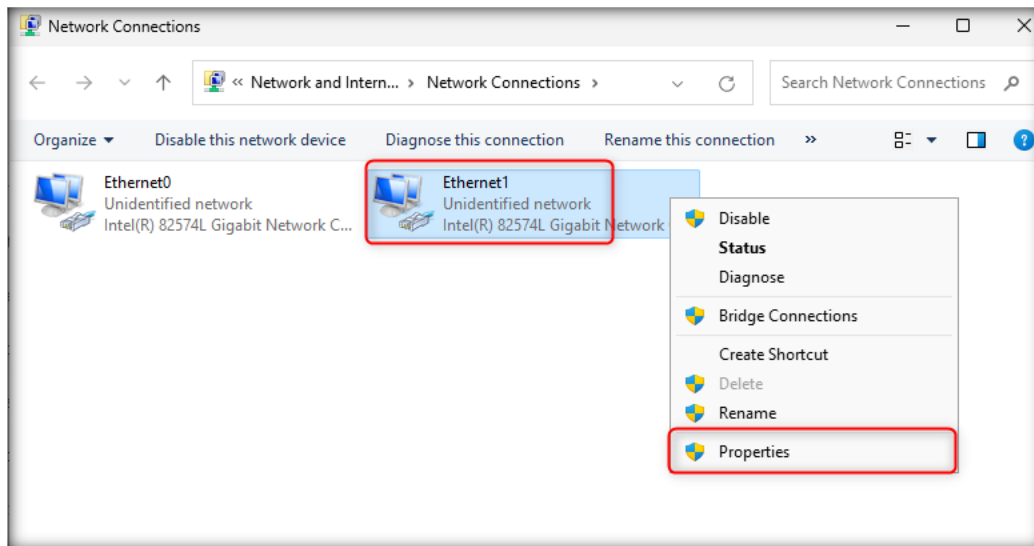


14. Click **Close** to close the Ethernet Properties window.

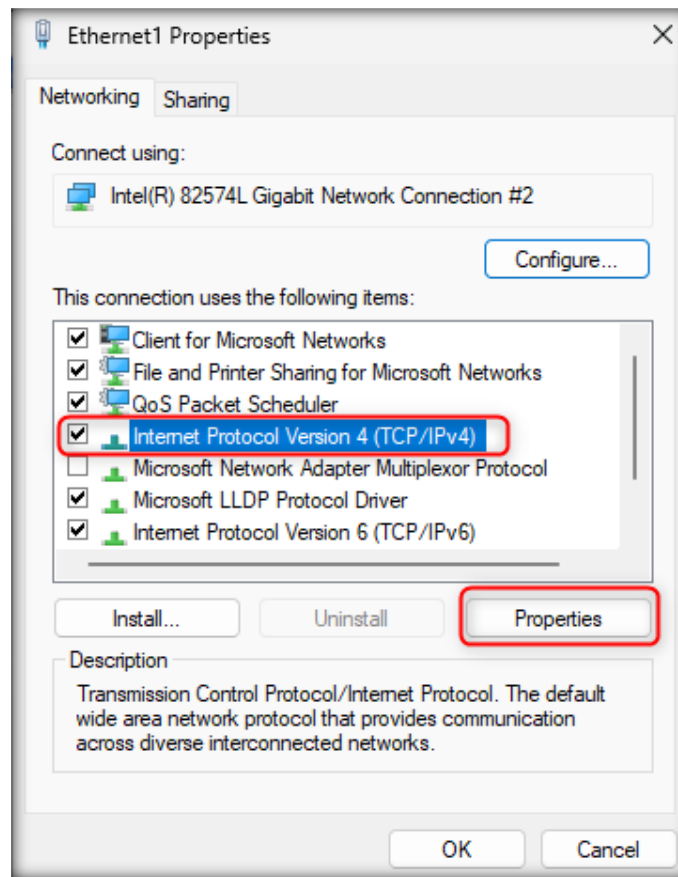


15. Choose the second one (here Ethernet 1 in your case switch number is different) right-click on **Ethernet 1** switch, select **Properties** from the context menu.

Note: The Name of Unidentified network may vary.



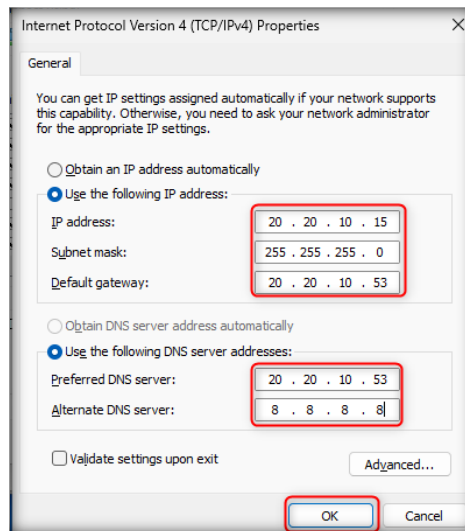
16. Ethernet adapter Properties window appears; and select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.



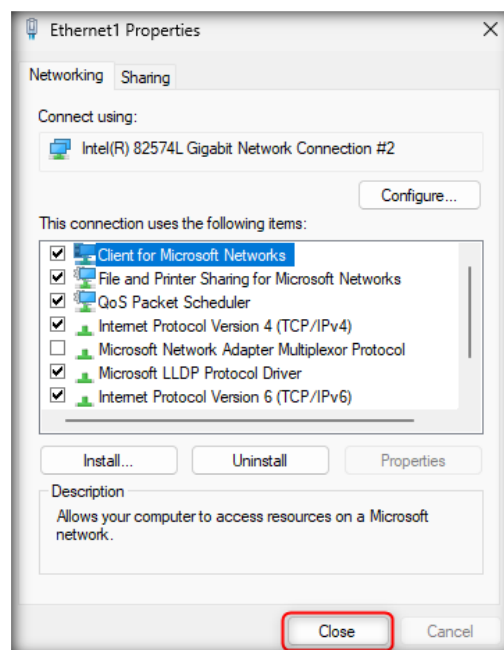
17. Select **Use the following IP address** and **Use the following DNS server addresses** radio buttons, and type the following values as shown in the screenshot and click **OK**.

- IP address: **20.20.10.15**
- Subnet mask: **255.255.255.0**
- Default gateway: **20.20.10.53**
- Preferred DNS server: **10.10.10.1**
- Alternate DNS server: **8.8.8.8**

Note: Once you click on **OK** button if Networks section appears on the right side of the desktop screen, and then click **Yes**.

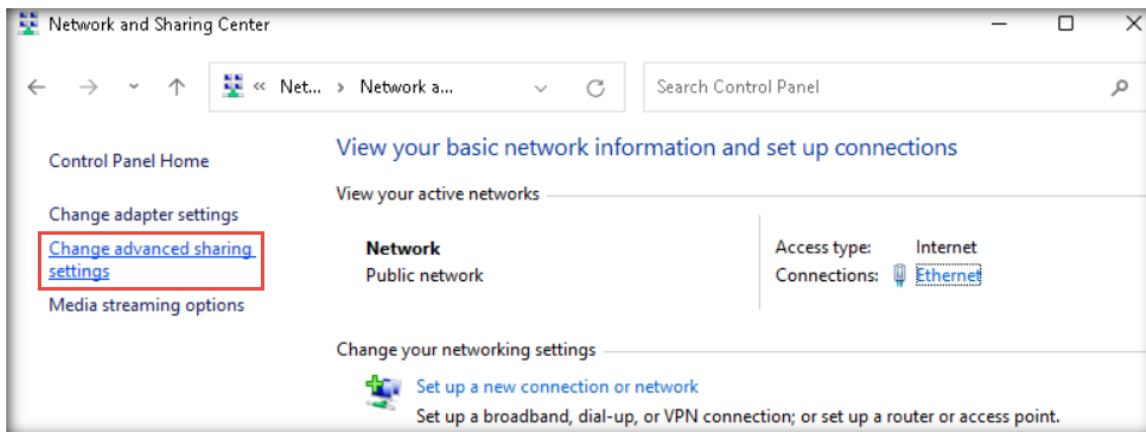


18. Click **Close** to close the Ethernet Properties window.

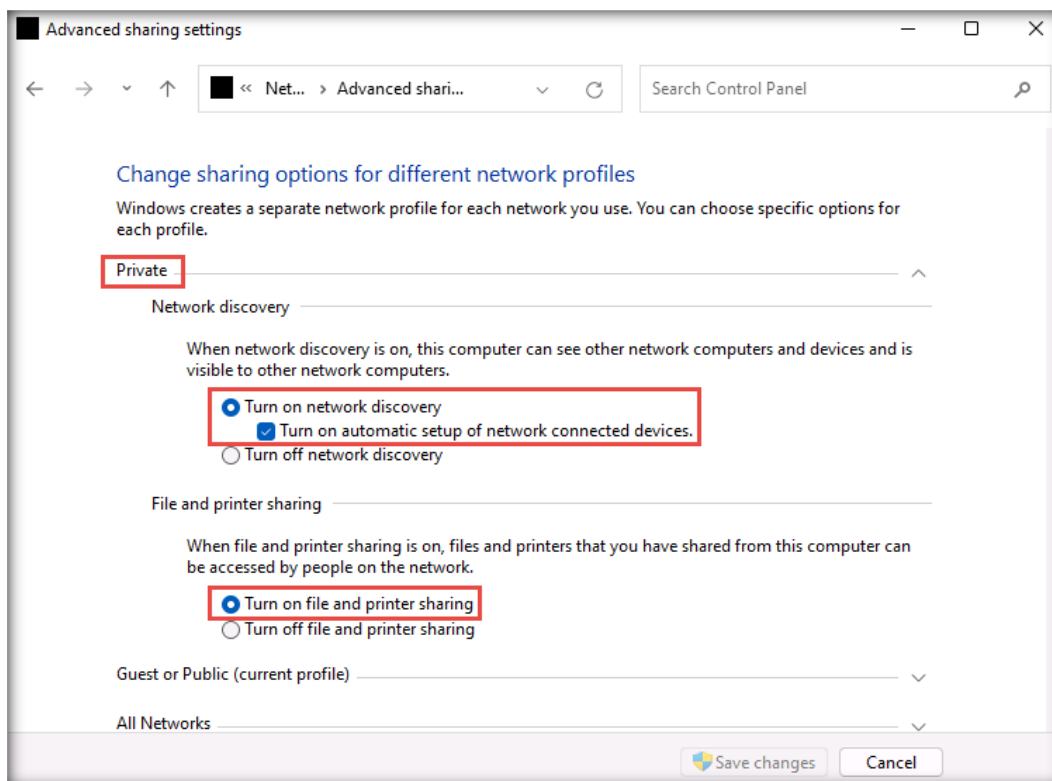


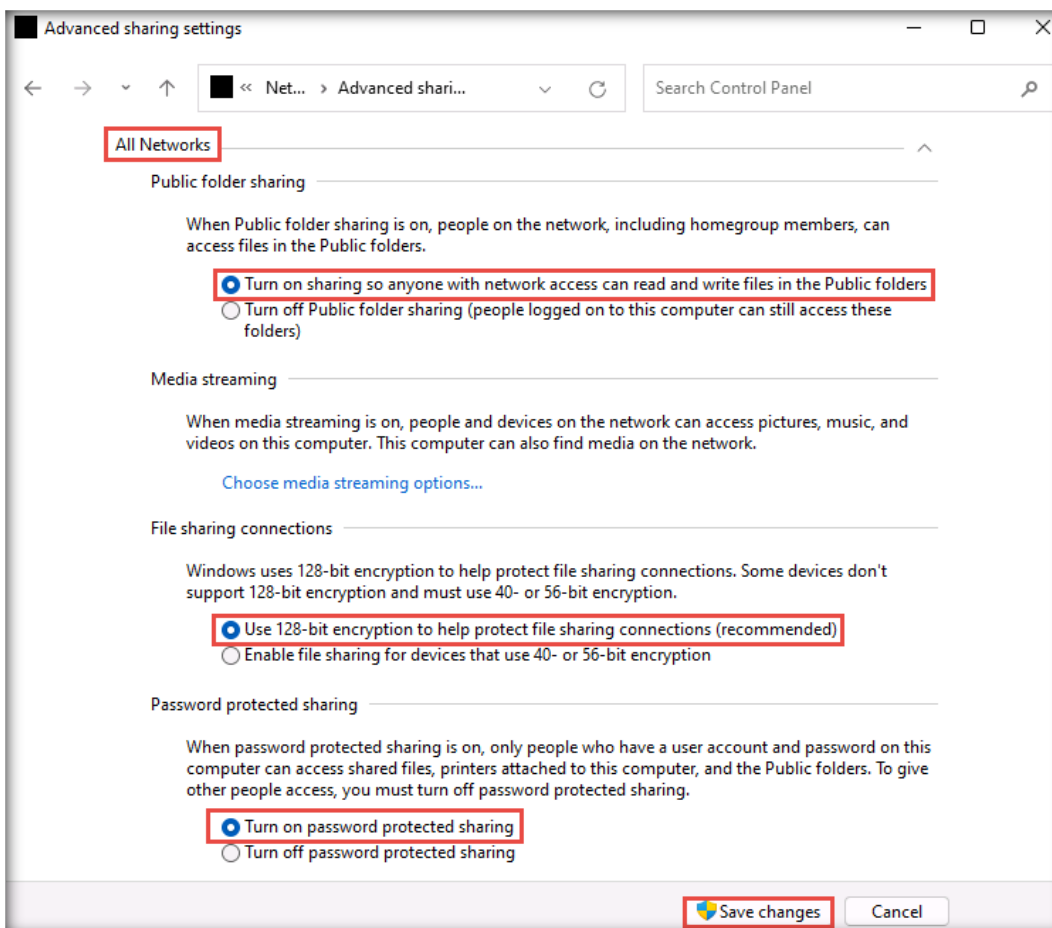
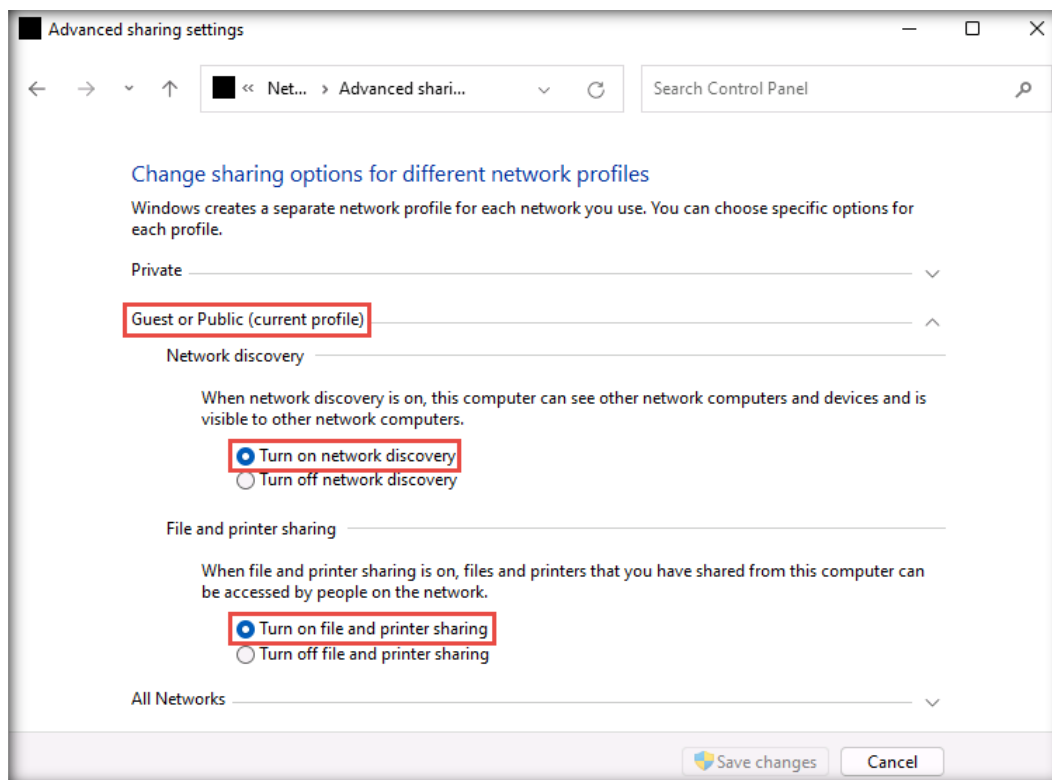
Download CND Tools Folder in Admin Machine-1

1. Copy the **CND Tools** folder from ASPEN in the E: Drive of Admin Machine-1.
2. Open **Network and Sharing Center** by navigating to **Control Panel** → **Network and Internet** → **Network and Sharing Center**.
3. In the **Network and Sharing Center** window, click the **Change advanced sharing settings** link in the left pane.

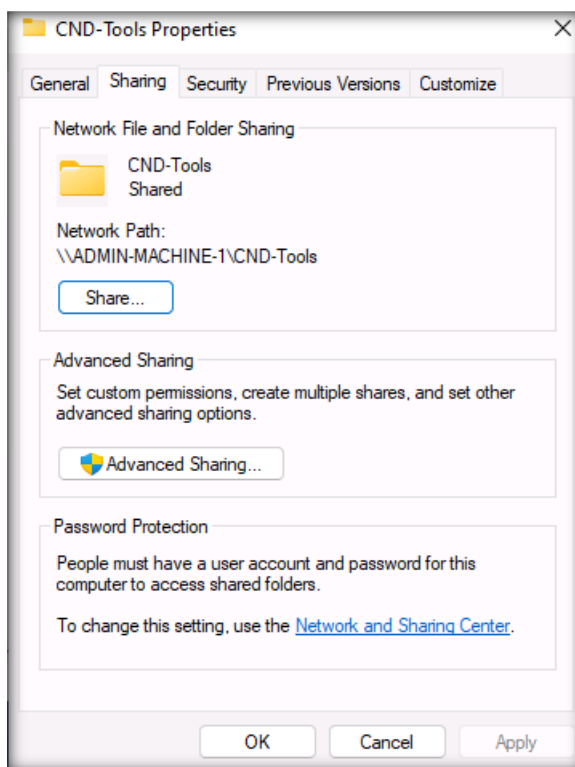


4. In the **Advanced sharing settings** window, turn on network discovery as well as file and printer sharing under **Private (current profile)**, **Guest or Public**, and **All Networks**, as shown in the screenshots below, and click **Save changes**.





5. Close the **Network and Sharing Center** window.
6. Now, open a **File Explorer** window, navigate to the **E:** drive, right-click on the **CND Tools** folder, and navigate to **Show more options** → **Properties** from the context menu.
7. Select the **Sharing** tab from the **Properties** window to modify and display the current shared folder settings.
8. Click the **Share...** button to access the **File Sharing** options.
9. In the **File Sharing** wizard, select **Everyone** from the drop-down list and click **Add**.
10. For the newly added users (**Everyone**), click the **Read** drop-down menu and click **Read/Write**.
11. Click **Share** to begin sharing with the added users.
12. Click **Done** on the confirmation page of the **File Sharing** wizard.



13. Close the **CND Tools Properties** window.
14. Close all open windows.

CT#7.4: Installing Adobe Acrobat Reader

1. Navigate to E:\CND-Tools\Lab Prerequisites\Adobe Reader folder
2. Alternatively, you may download the latest version of Adobe Reader Adobe website
3. Double-click **.EXE** file to begin the installation
4. Follow wizard-driven installation steps and complete the install by choosing default options throughout the installation process

CT#7.5: Installing WinRAR

1. Navigate to E:\CND-Tools\Lab Prerequisites\WinRAR folder.
2. Alternatively, you can also download the latest version of WinRAR from Vendor.
3. Double click on .exe to begin the installation.
4. WinRAR setup window appears.
5. In the WinRAR 6.22 setup window, click Install.
6. Complete the install by choosing defaults throughout the installation process.
7. After completing the installation, the installation location of WinRAR files window opens automatically.
8. Close the window.

CT#7.6: Installing Web Browsers

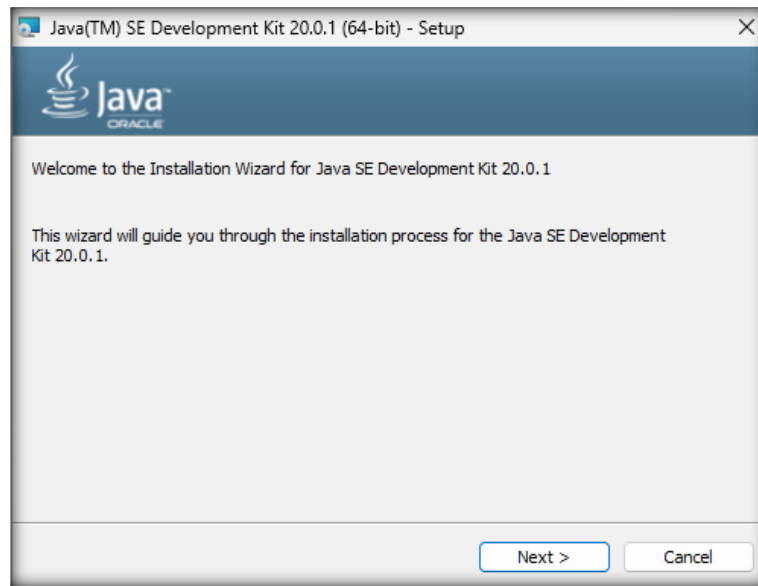
1. Navigate to E:\CND-Tools\Lab Prerequisites in guest operating systems.
2. Open Web Browsers folder
3. Follow wizard-driven installation steps and install Firefox and Chrome web browsers.
4. You can also download latest version of web browsers from respective vendors.

CT#7.7: Installing Notepad++

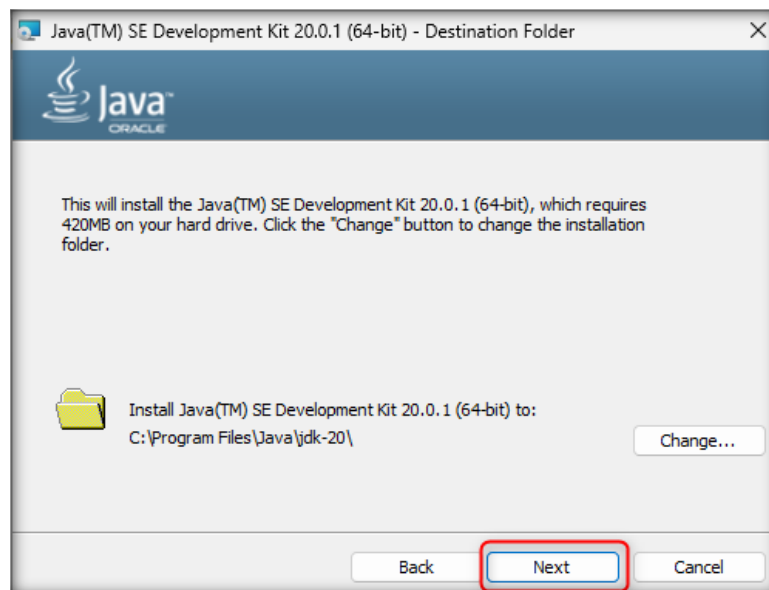
1. Navigate to **E:\CND-Tools\Lab Prerequisites** in guest operating systems.
2. Open Notepad++ folder and double-click .exe file.
3. Follow the wizard-driven installation steps, to install Notepad++.
4. You can also download latest version of Notepad++ from its vendor site.

CT#7.8: Installing JDK

1. Navigate the E:\CND-Tools\Lab Prerequisites\Java Double-click on jdk-20_windows-x64_bin.exe.
2. If User Account Control popup appears, click Yes.
3. JDK Setup window appears, click **Next**.



4. Click **Next**.

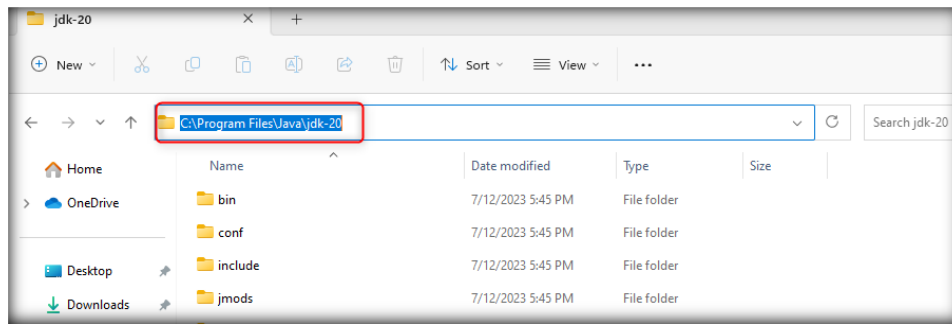


Note: If a user access control popup appears; click yes.

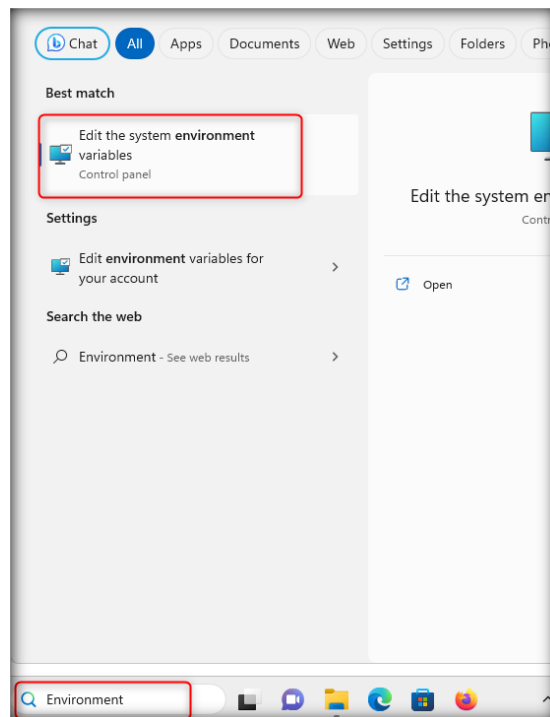
5. Java SDK installed successfully, click **Close**.



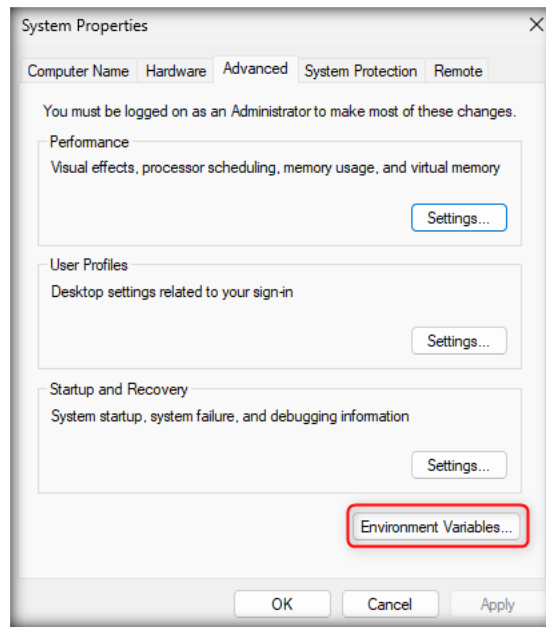
6. Navigate to C:\Program Files\Java\jdk-20 and copy the path.



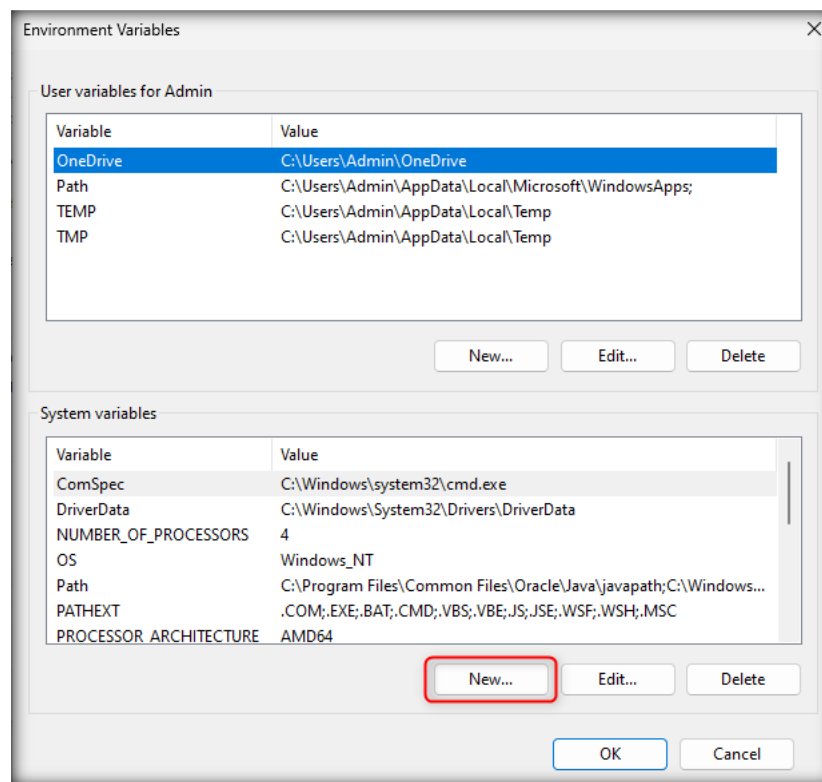
7. In the search box, type Environment variable and click on **Edit the system environment variables**.



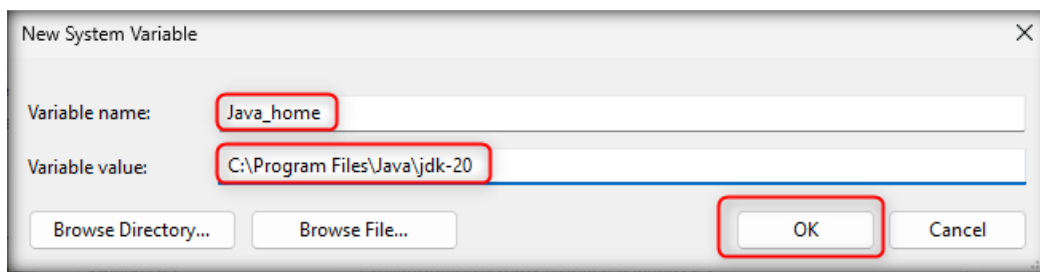
8. The system properties window appears; click on Environment variables...



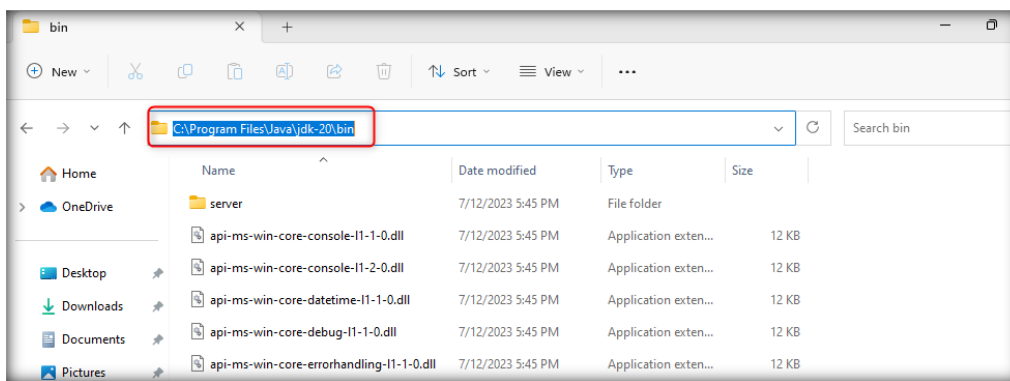
9. Click on New



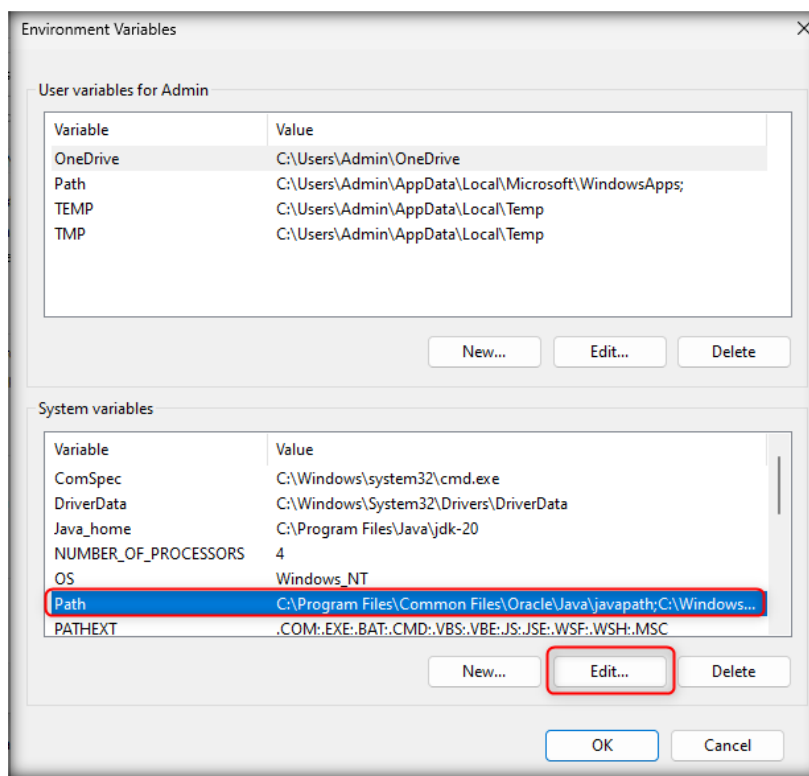
10. In the **New System Variable** window enter **Variable name** as Java_home and Variable value as C:\ProgramFiles\Java\jdk-20.



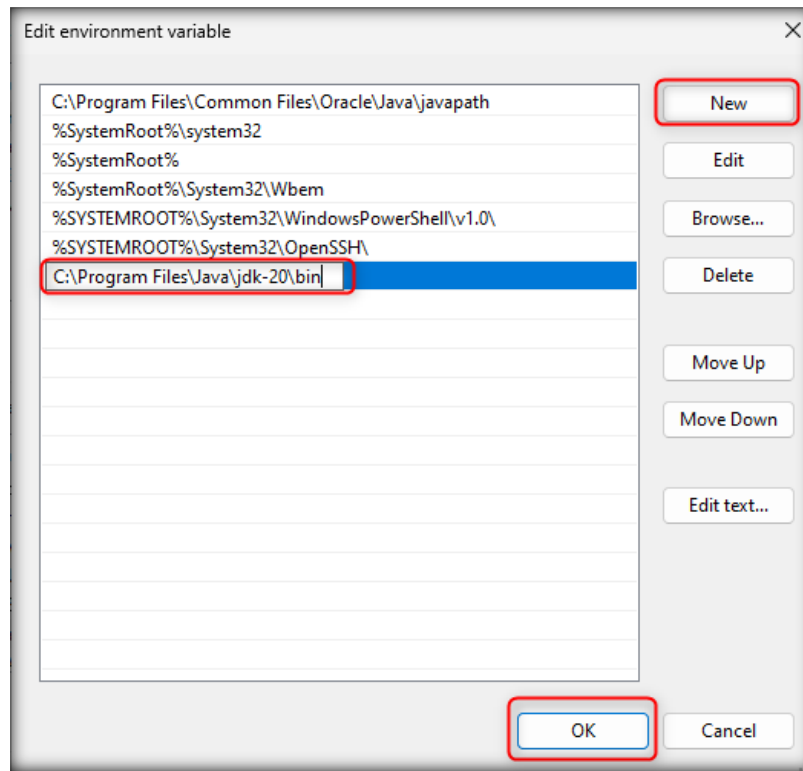
11. In Windows explorer navigate to C:\Program Files\jdk-20\bin and copy the path in the clipboard.



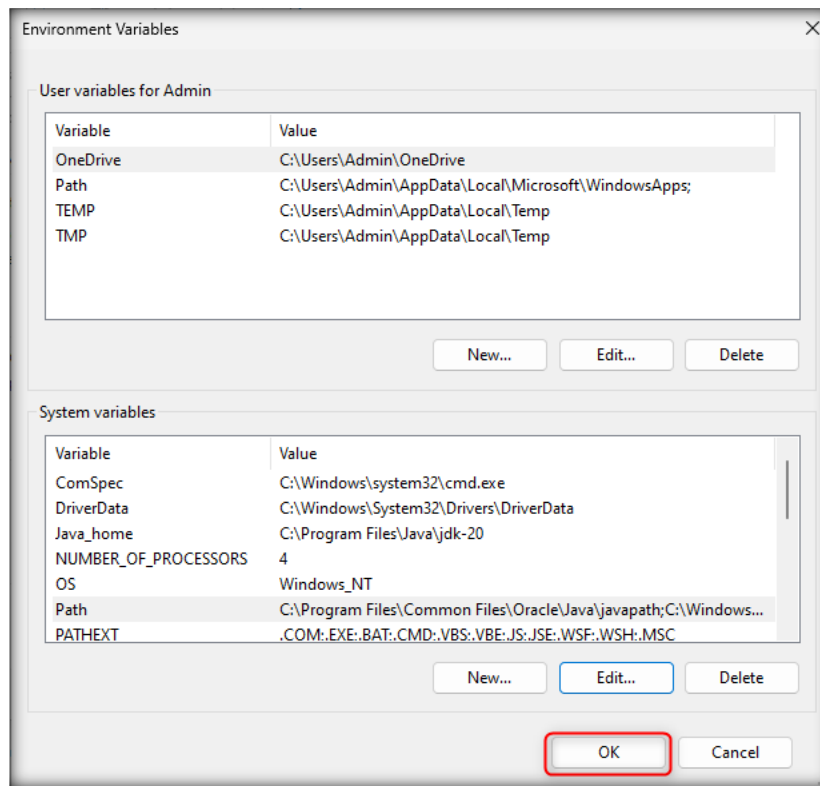
12. In the **Environment Variables** window select path and click **Edit**



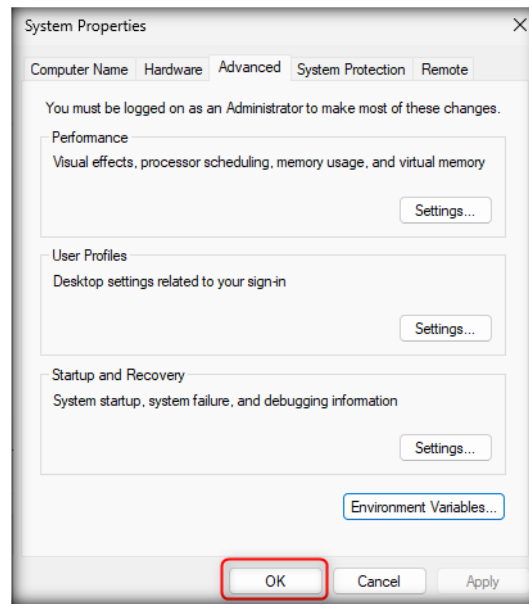
13. Click **New** and add the copied path in the window and click **OK**



14. Click OK.



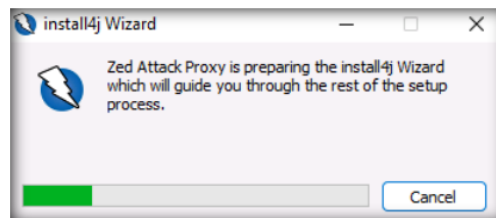
15. Click OK



CT#7.9: Installing ZAP Tool

1. Navigate to E:\CND-Tools\Lab Prerequisites\ZAP and double click on **ZAP_2_14_0_windows.exe**. The install wizard opens.

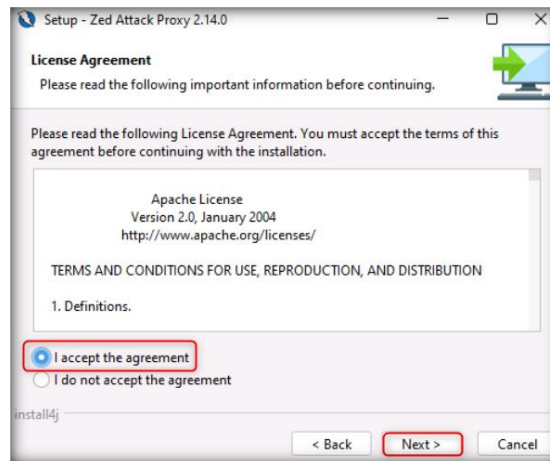
Note: If User Access Control pops up, click **Yes**.



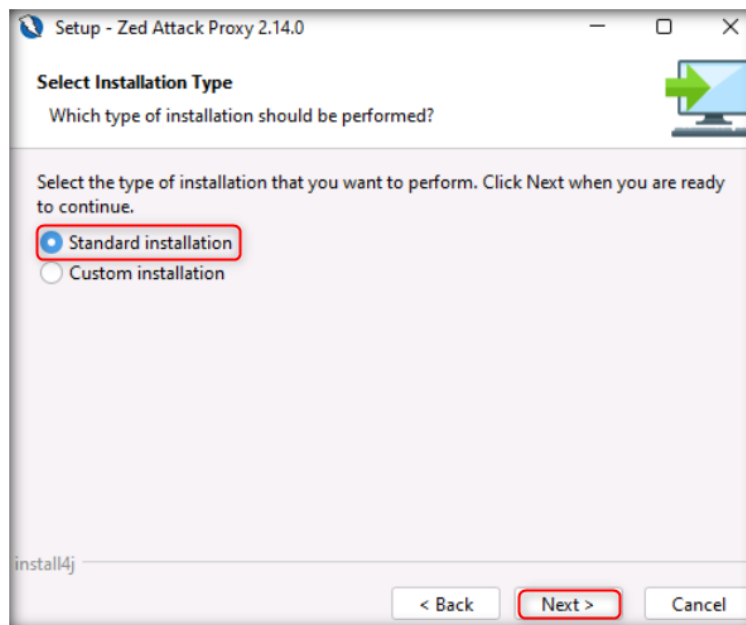
2. The automatically starts ZAP tool installation, The ZAP tool installation wizard opens, click **Next** to continue.



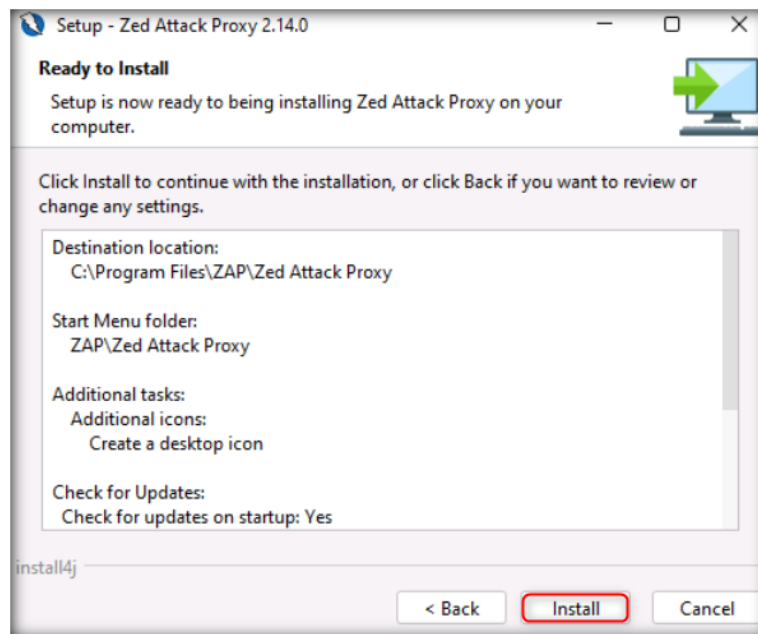
3. Accept the agreement and click **Next**.



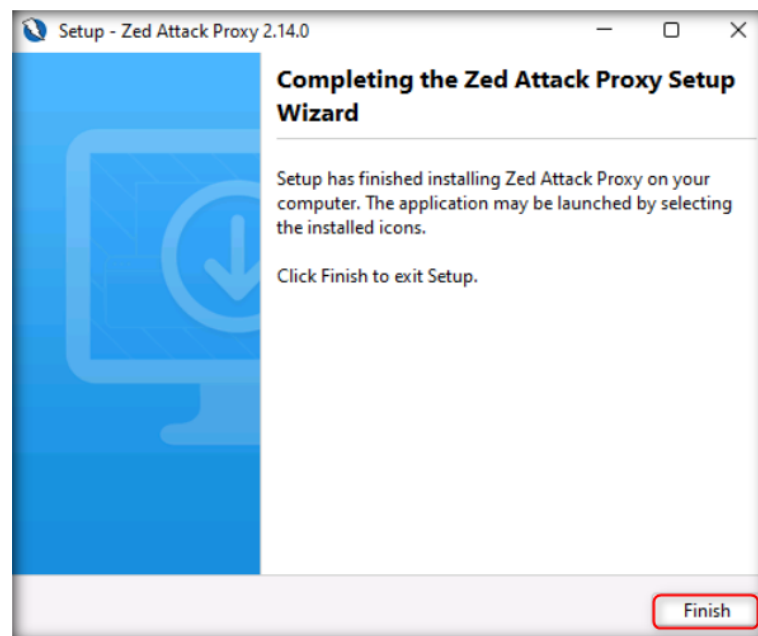
4. Select **Standard installation** radio button and click **Next**.



5. Click **Install** on Ready to install setup wizard.



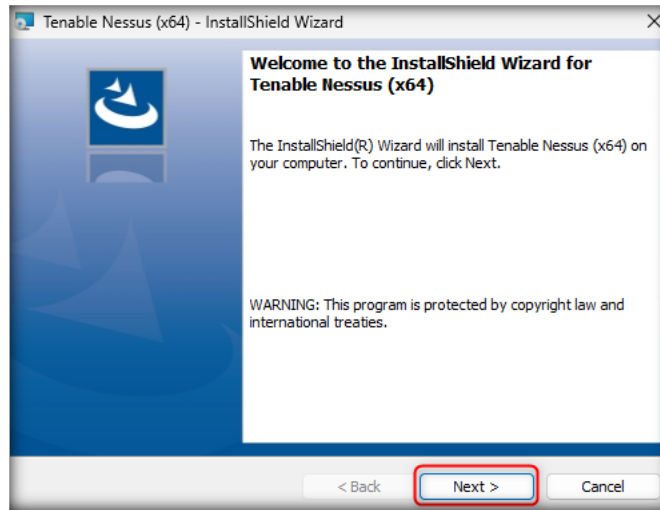
6. After successful installation, click **Finish** to complete the installation.



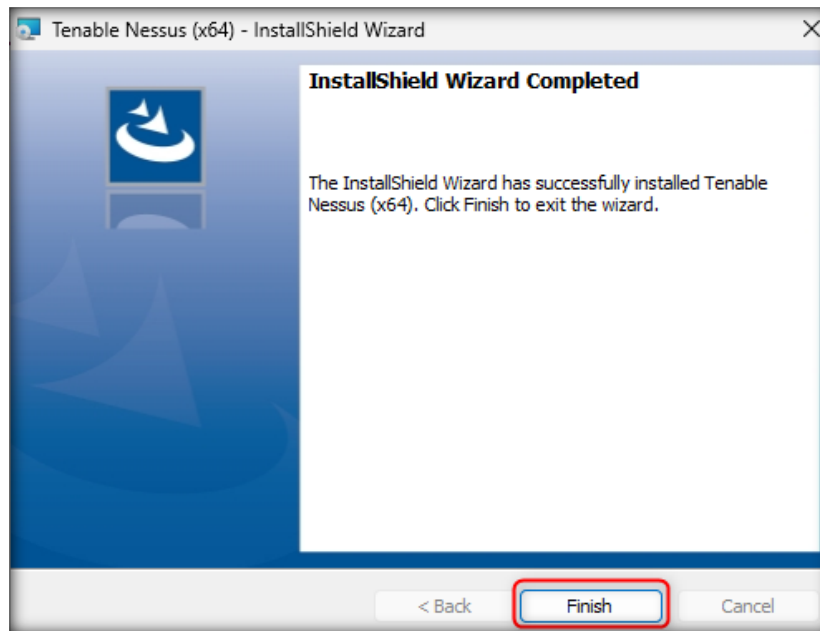
CT#7.10: Installing Nessus Vulnerability Scanning Tool

1. Navigate the **E:\CND-Tools\Lab Prerequisites\Nessus** Double-click on **Nessus-10.5.3-x64.msi**.

2. Follow the installation wizard to complete the installation.

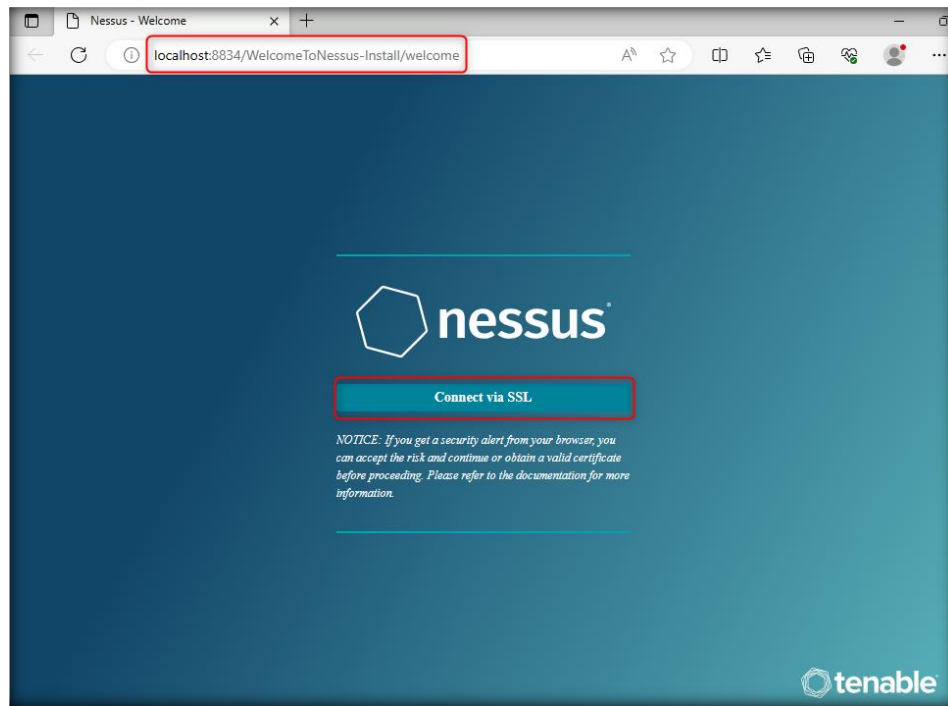


3. Click on Finish to complete the installation wizard.

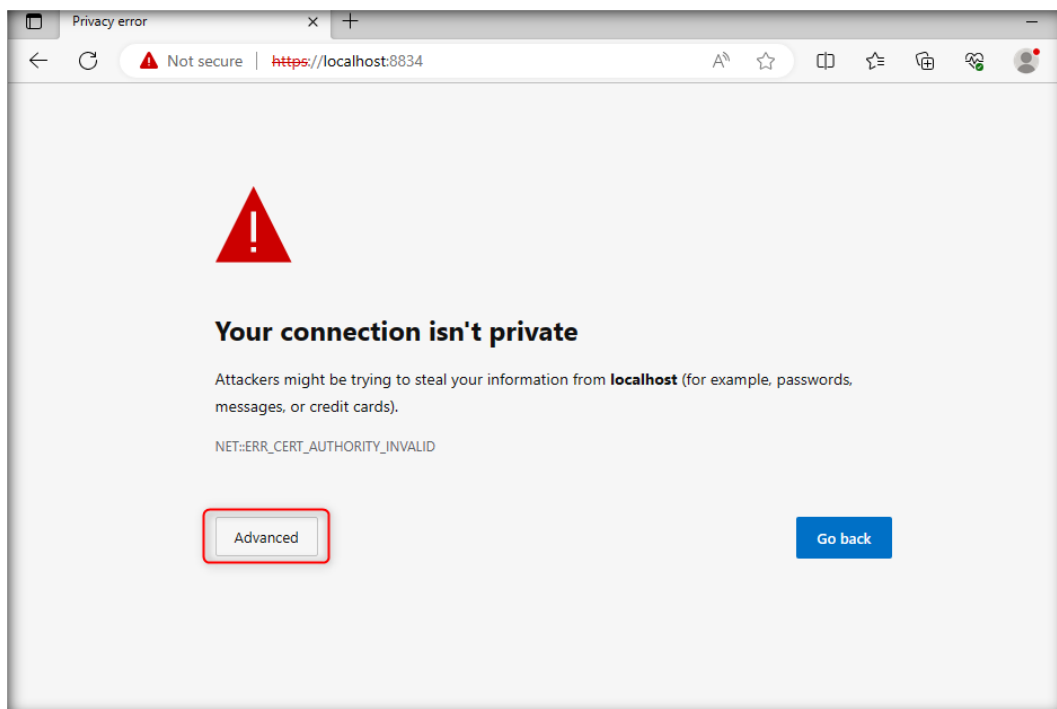


4. The Nessus will launch default browser navigating to <http://localhost:8834/WelcomeToNessus-Install/welcome> link.

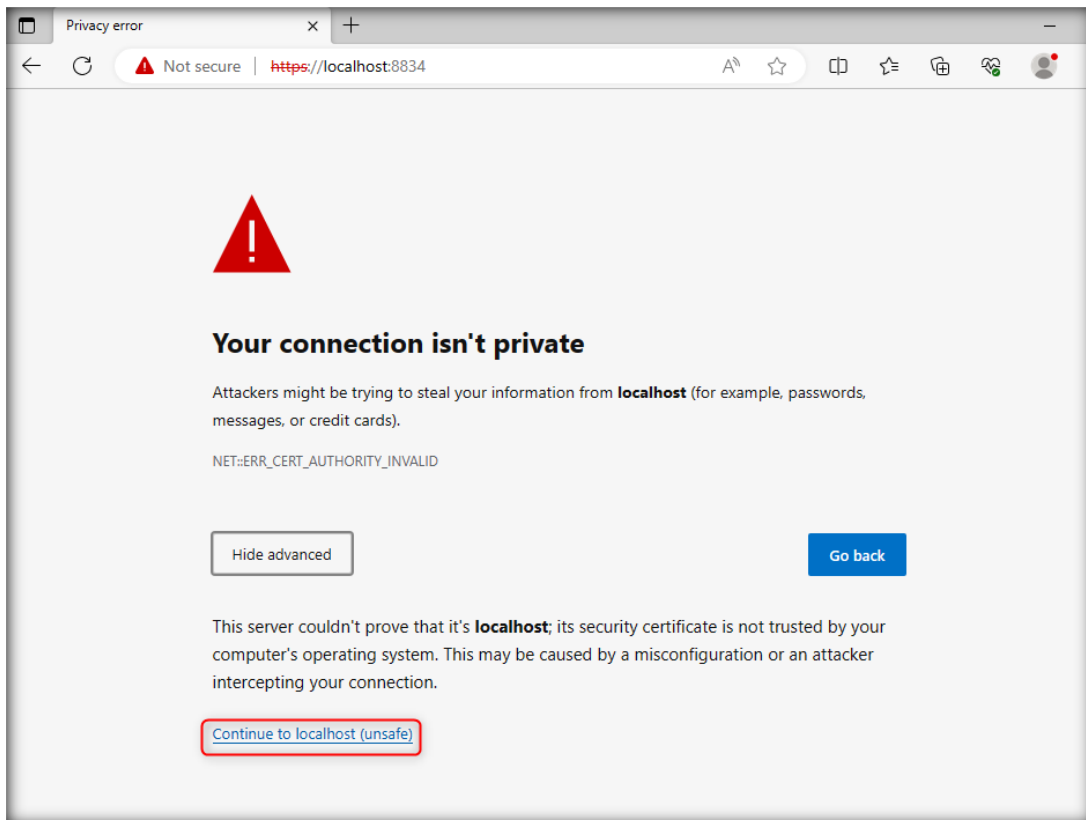
- Click **Connect via SSL** button to continue setup.



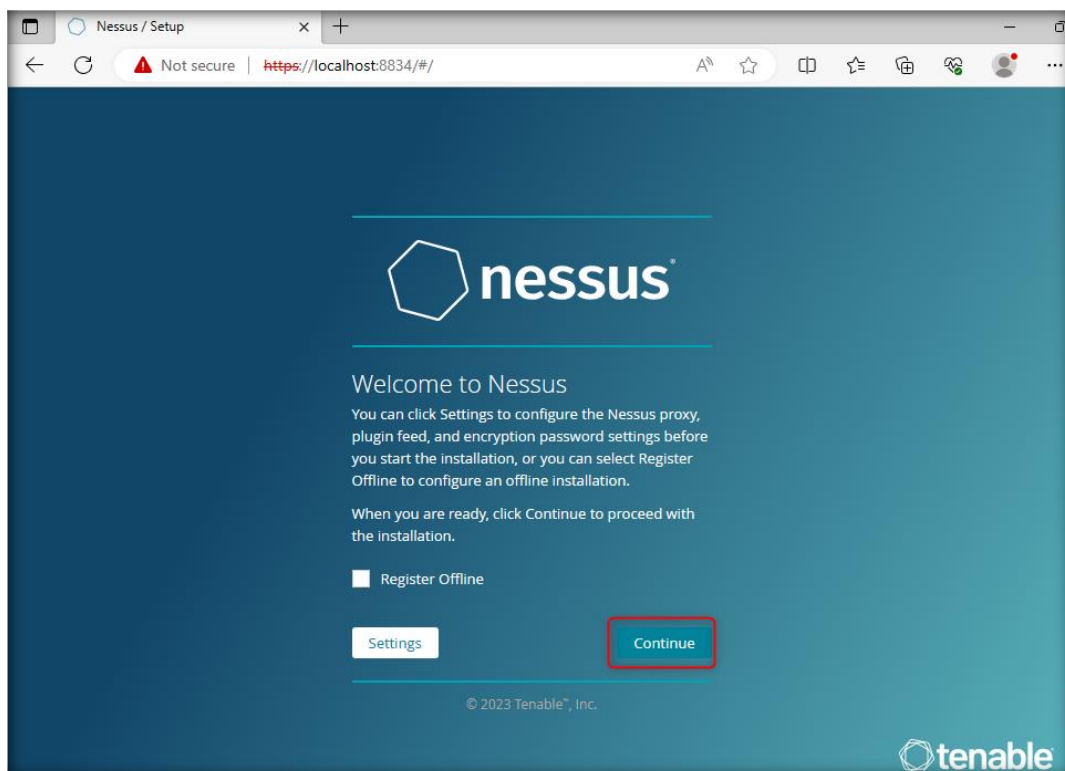
- The browser shows the security warning, click Advance button in the browser.



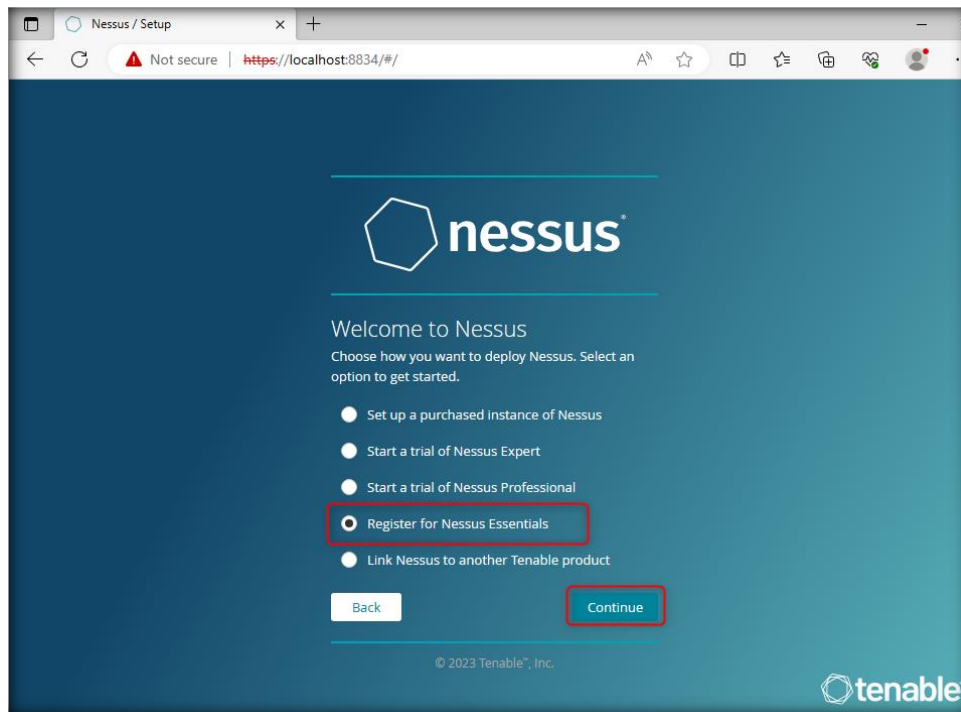
7. Click **Continue to localhost(unsafe)** button to continue the setup.



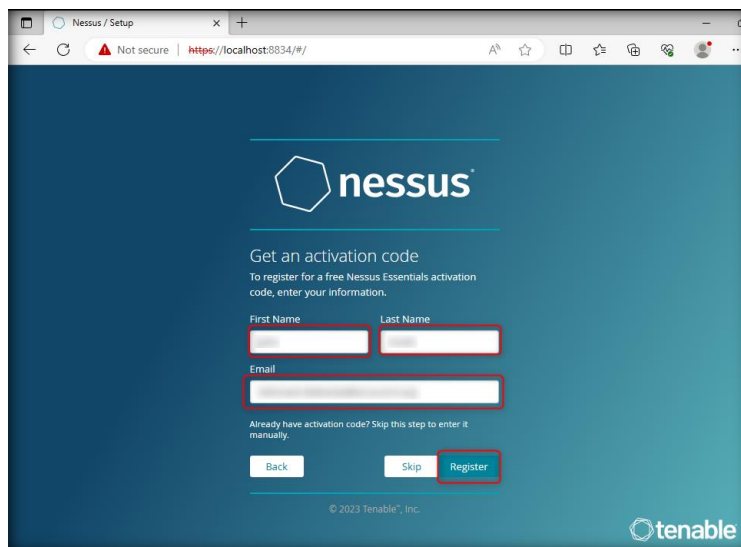
8. The Nessus welcome page opens, Click **Continue**.



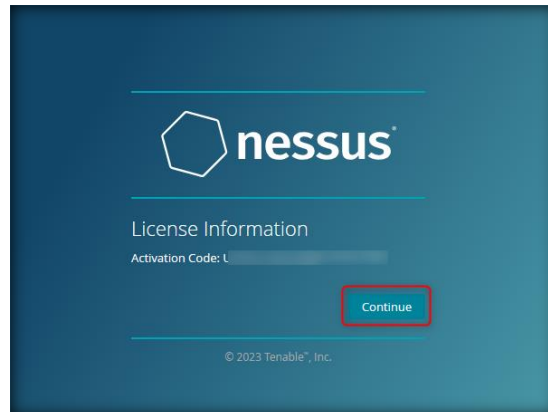
9. Select **Register for Nessus Essential** radio button and click **Continue**.



10. The Nessus required activation code, fill the following details and enter valid email address, you will get the activation code on entered email id, click Email



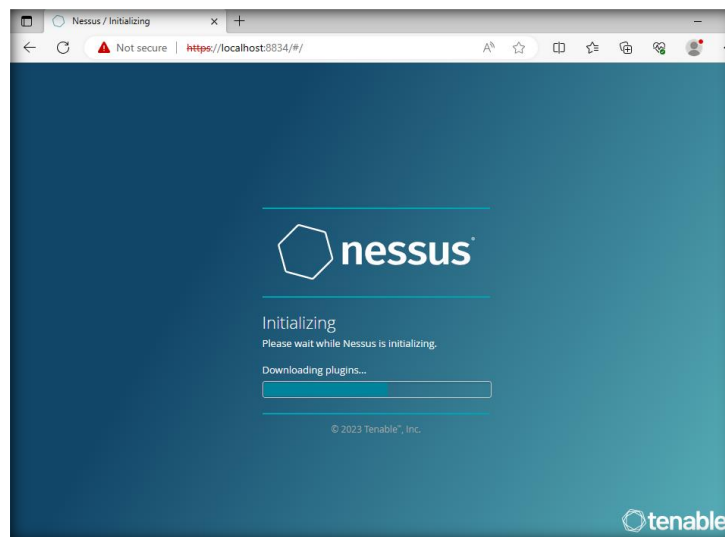
11. Copy the activation code, switch to the Nessus installation tab of the browser. And paste into the Activation Code* field, click **Continue**.



12. On the next page type username as **admin** and password as **admin@123**, click **Submit**.



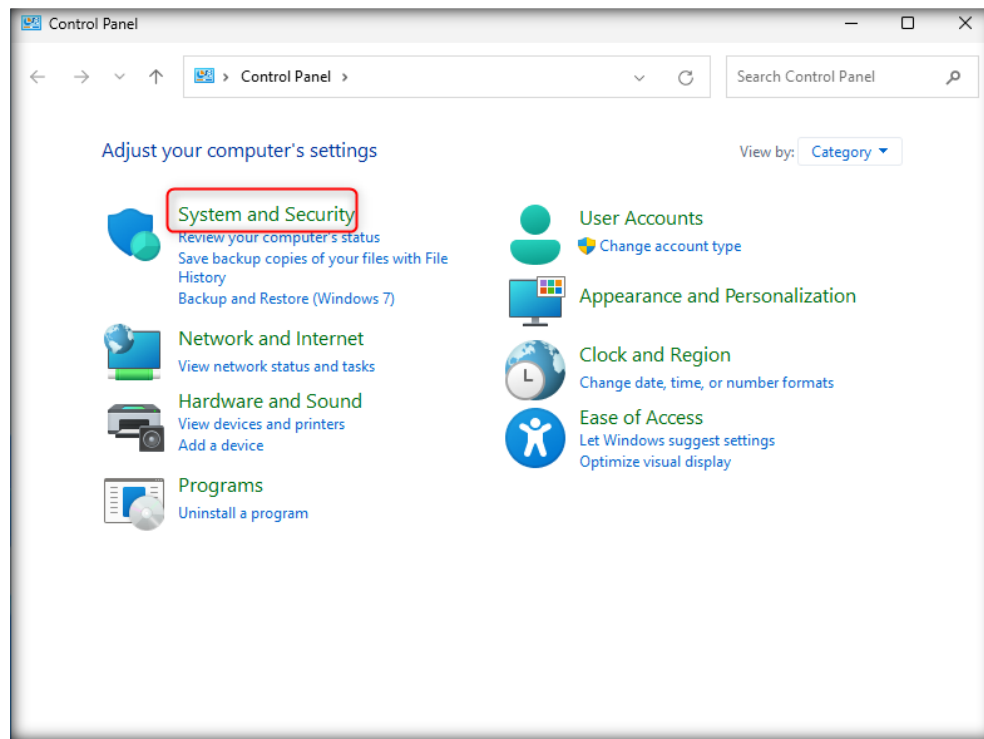
13. Wait for few minutes to complete the downloading.



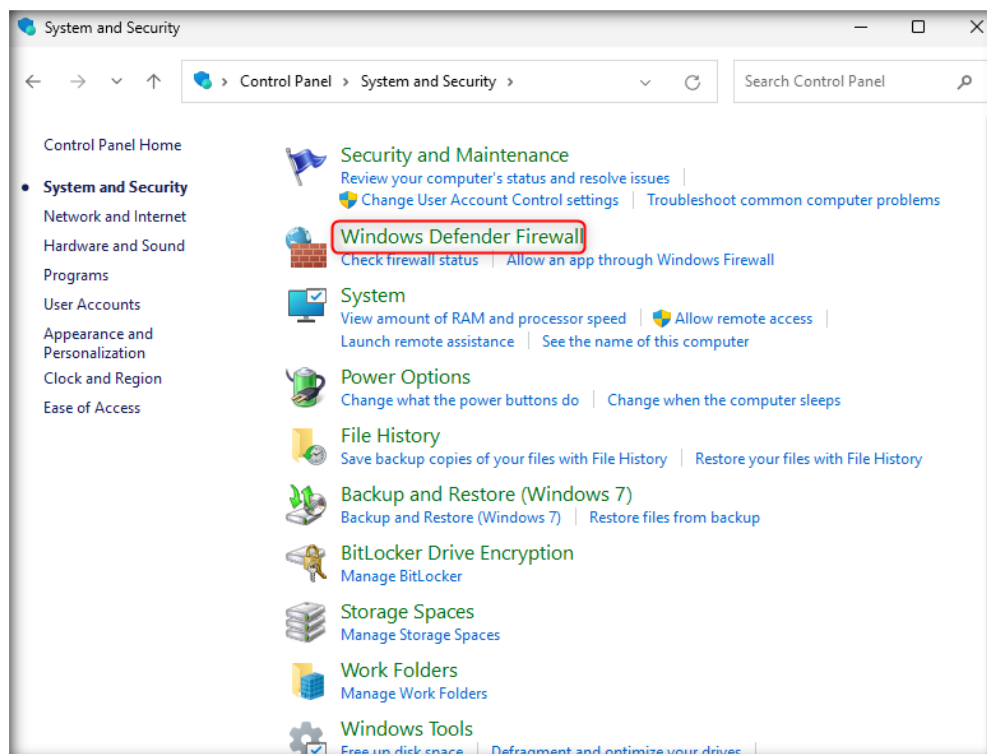
Note: The downloading may take time. You need to wait for a more the 20 minutes.

CT#7.11: Turn off Windows Firewall

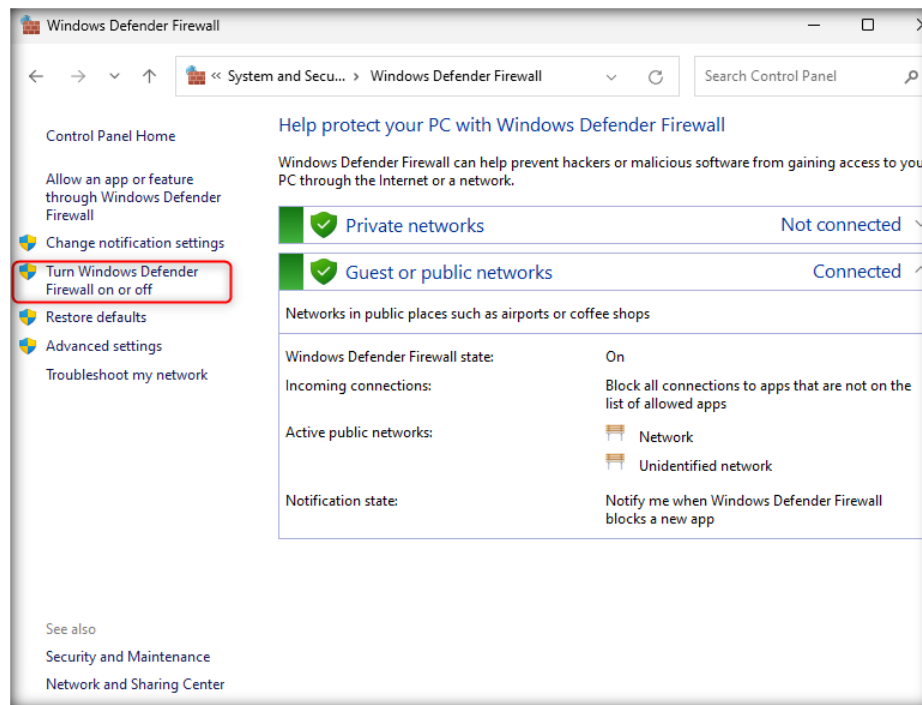
1. Turn on the machine and log in with your credentials.
2. Open **Control Panel** and select **System and Security**.



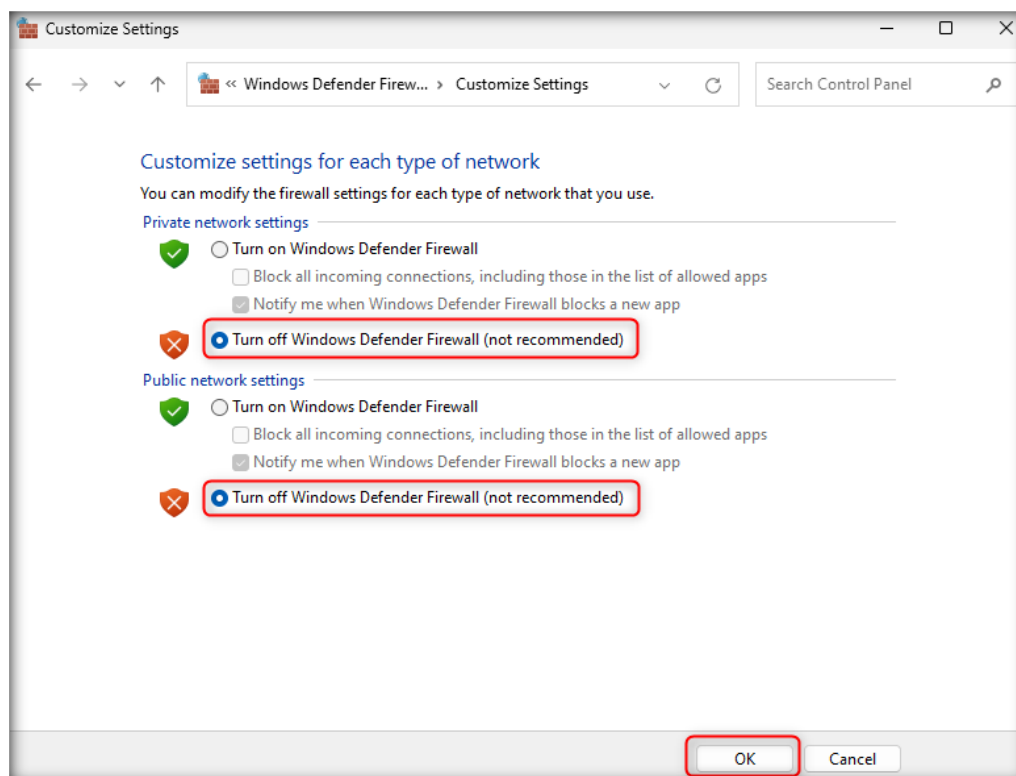
3. Click **Windows Firewall** in the **System and Security** window.



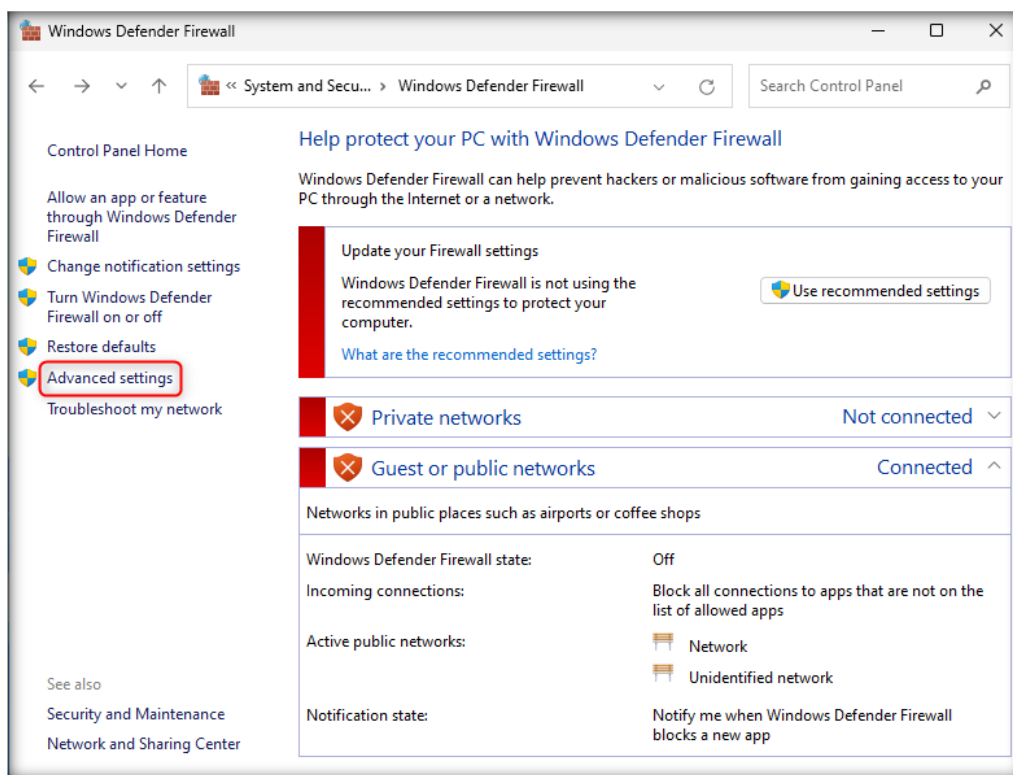
4. In the **Windows Firewall** window, click **Turn Windows Firewall on or off** in the left pane of the window.



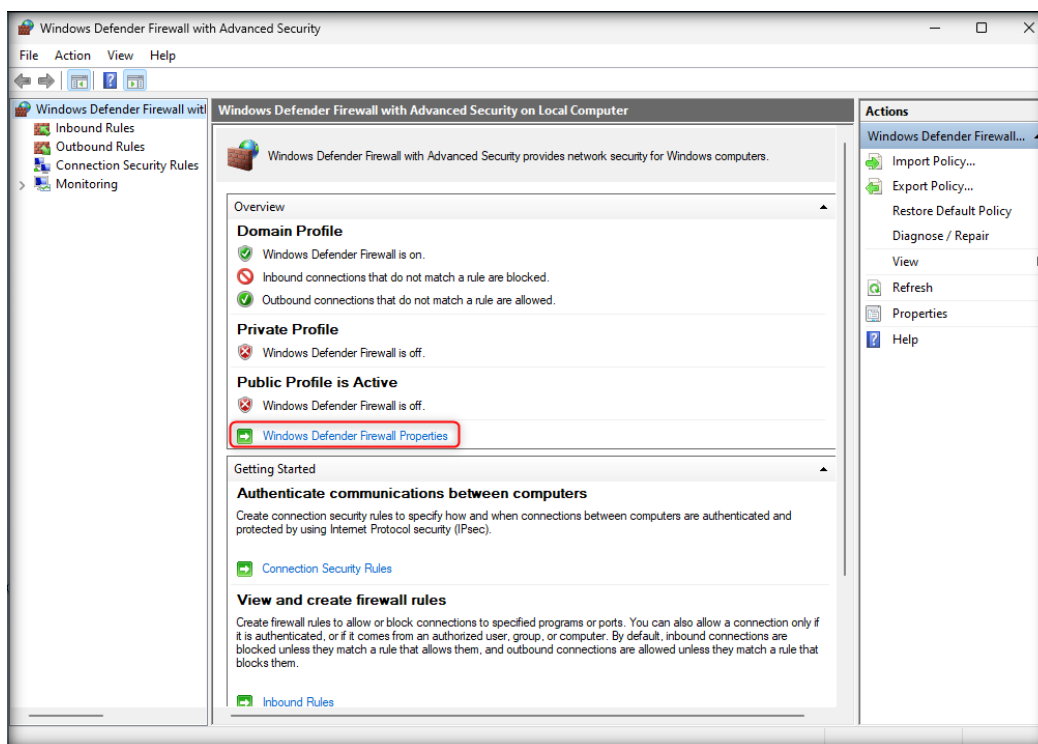
5. . In the **Customize Settings** window, select the **Turn off Windows Firewall (not recommended)** radio button for all Domain, Private and Public network settings and click **OK**.



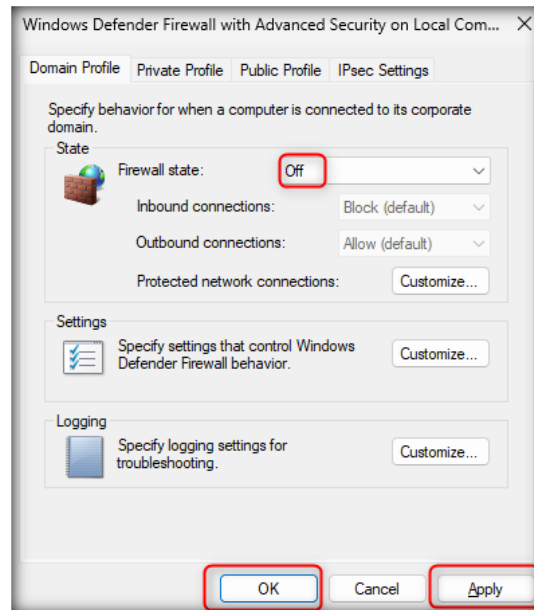
6. In the **Windows Defender Firewall** window, click **Advanced settings** in the left pane.



7. Once **Windows Defender Firewall with Advanced Security** appears, click **Windows Defender Firewall Properties** in the **Overview** section.



- When the **Windows Defender Firewall with Advanced Security on Local Computer Properties** window appears, in the **Domain Profile** tab, choose **Off** from the **Firewall state** drop-down list. Then, navigate to the **Private Profile** and **Public Profile** tabs and ensure that the **Firewall state** is **Off**. Click **Apply**, and then click **OK**.



- Close all windows.
- Turn **OFF** Admin Machine-1

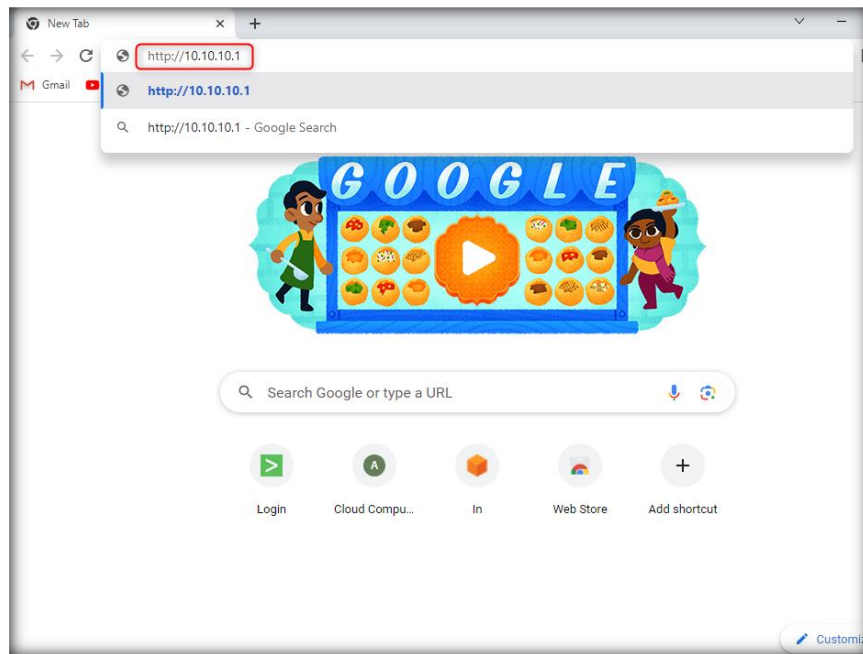
CT#7.12: Configure pfSense Firewall

Note: Make sure the pfSense Firewall VM is running.

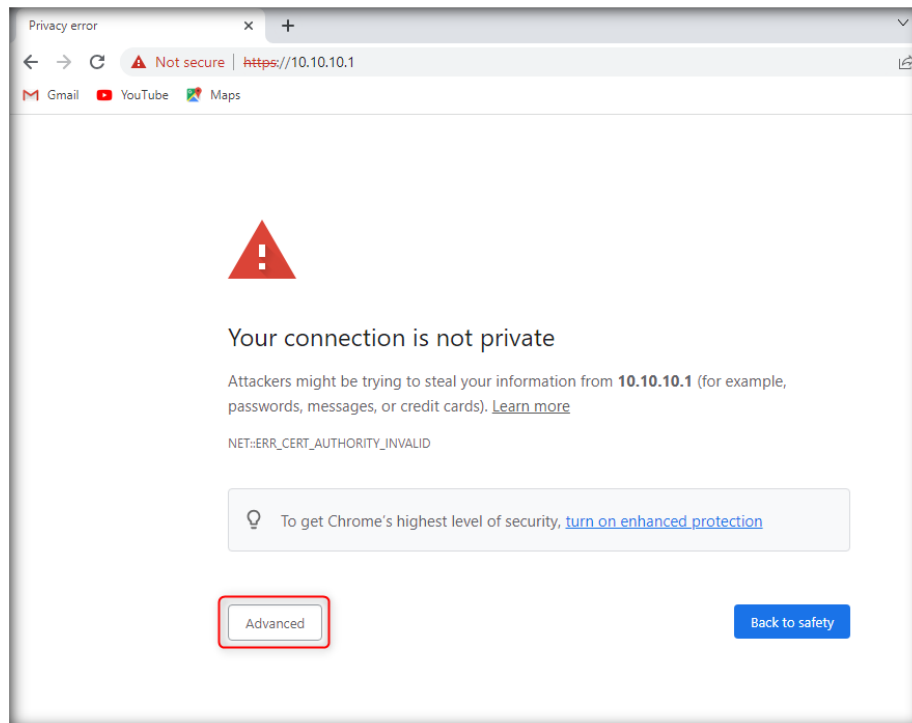
- To open the browser, double-click on the Google Chrome icon on the desktop.

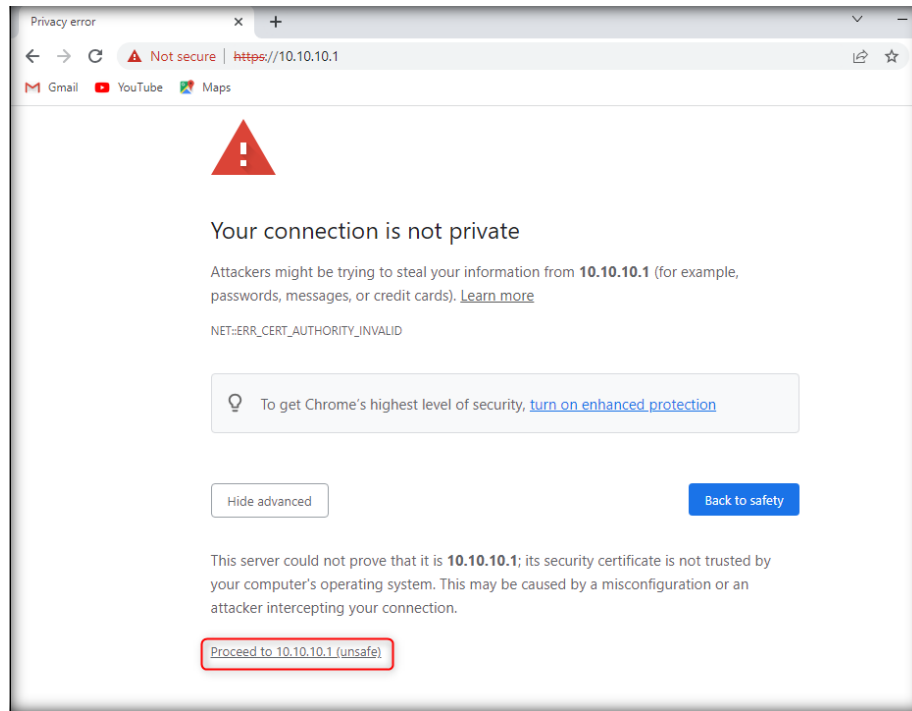


2. Browse pfSense web interface type **http://10.10.10.1** in the address bar and press **Enter**.

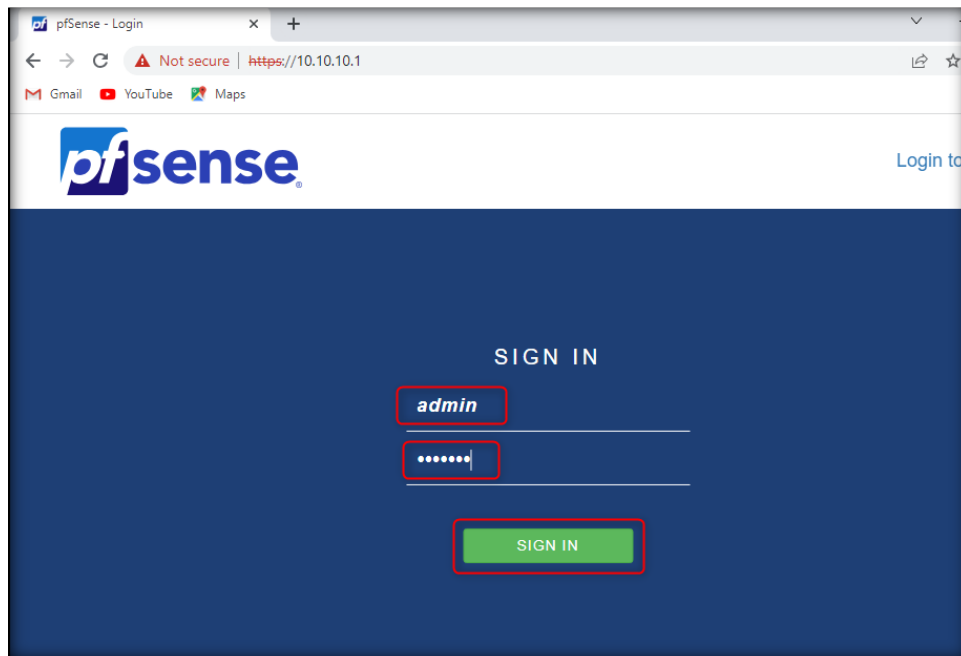


3. A Privacy error page appears; click **Advanced** button and select **Proceed to 10.10.10.1(unsafe)** to continue.

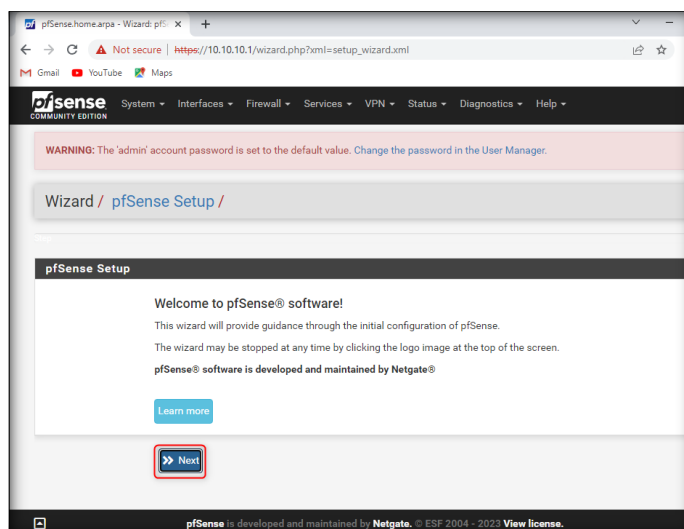




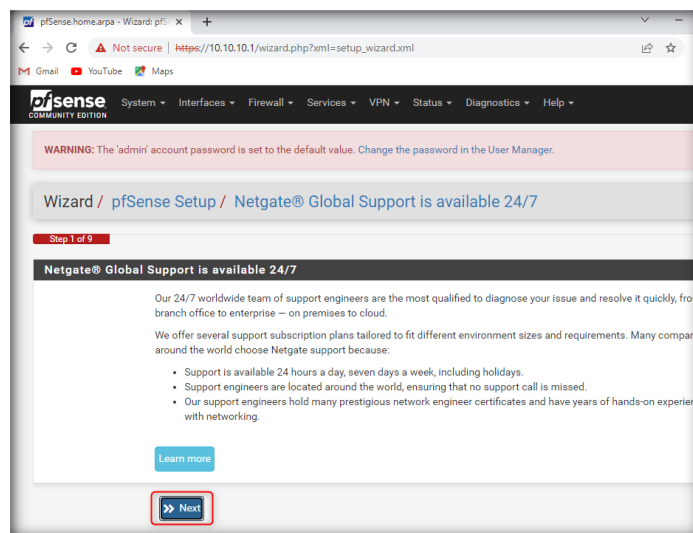
- The pfSense login page will appear; type username **admin** and password **pfSense**, and then click **SIGN IN** button.



5. To continue, Click **>Next** on the welcome page.



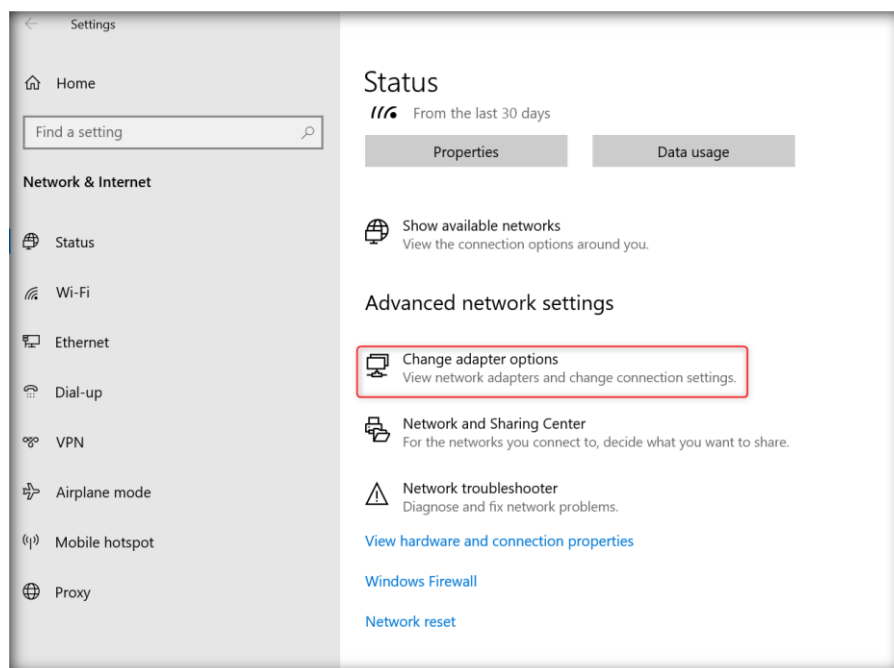
6. The Netgate Global Support page will appear; click **>Next**.



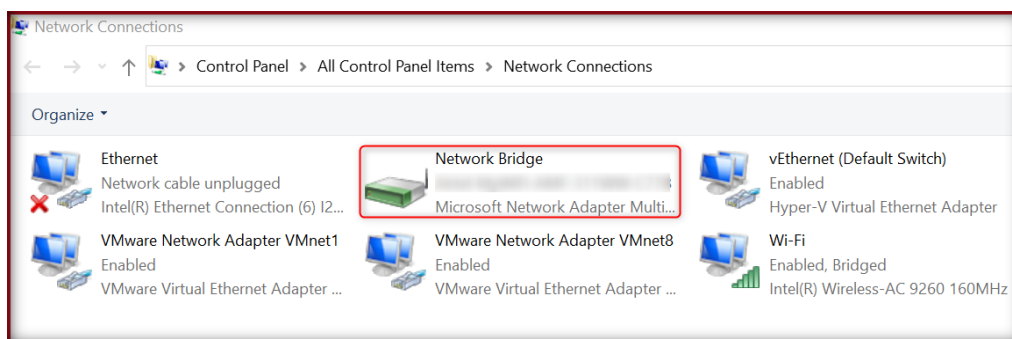
7. To contact the browser for the first time, it is important to configure the **primary DNS** server for pfSense. For the virtual environment, the default gateway address of the host machine will be the primary DNS server for pfSense. To know the host default gateway address of the host machine, switch to **host machine**.
8. Right-click on the Network icon on the taskbar and select **Open Network and Internet setting**.



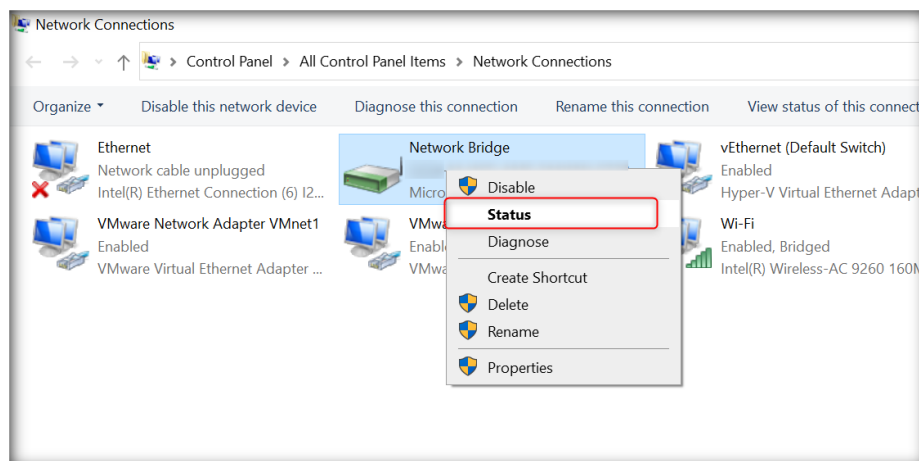
9. The Setting page will appear; click on **Change adapter options** under network settings.



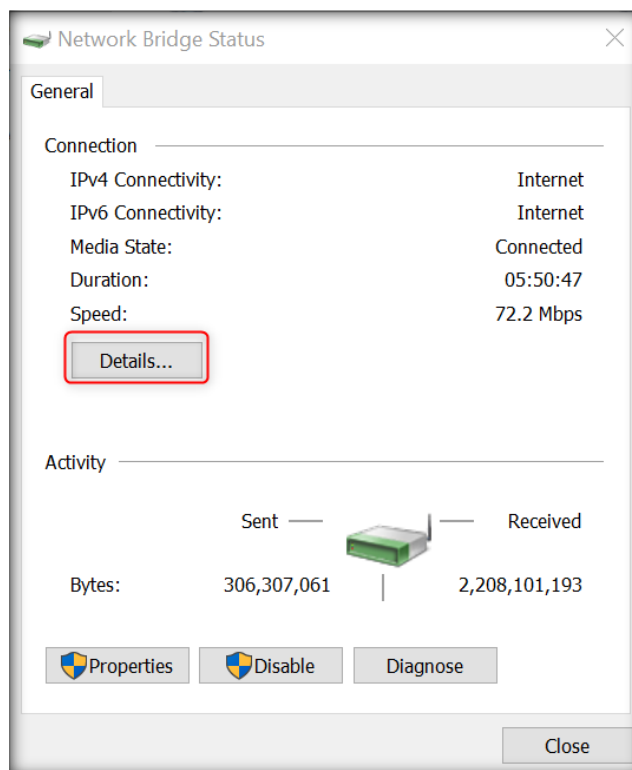
10. The Network Connections window will appear, which shows the number of adapters created. Right-click on **Network Bridge (Vnet0)** to view the default gateway address of the host machine.



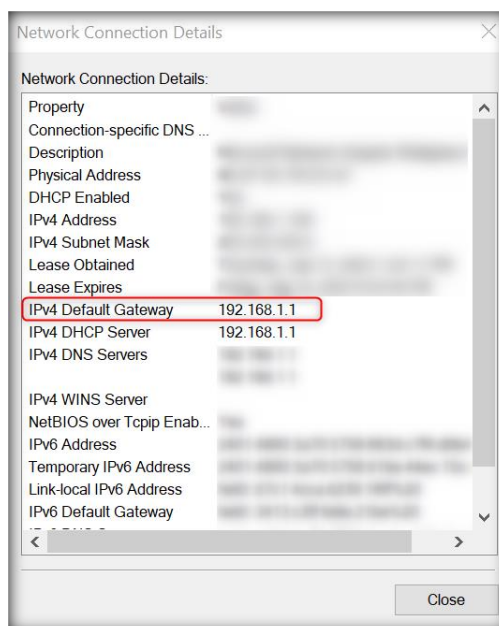
11. A pop-up list will appear; select the **Status** option.



12. The **Network Bridge (Vnet0)** adapter status window will appear; click on Details... button.



13. The Network Connection Details window will appear; you will find the default gateway address of the host machine here, as shown in the screenshot below.



14. Click Close all open Network connection windows and the Setting window.
15. Switch to **Admin Machine-1 VM**.

16. Scroll down the page and type **host DNS address** in the **Primary DNS Server** text box and **8.8.8.8** in the Secondary DNS Server text box (Note: here, the host machine default gateway address is **192.168.1.1**; in your case, it may differ. Please check your host machine default gateway address.); then, click **>Next**.

The screenshot shows the 'General Information' screen of the pfSense wizard. The browser address bar shows 'https://10.10.10.1/wizard.php?xml=setup_wizard.xml'. The form contains the following fields and values:

- Hostname:** pfSense (EXAMPLE: myserver)
- Domain:** home.arpa (EXAMPLE: mydomain.com)
- Primary DNS Server:** 192.168.1.1
- Secondary DNS Server:** 8.8.8.8
- Override DNS:** ☒ (Allow DNS servers to be overridden by DHCP/PPP on WAN)

A blue button labeled '> Next' is at the bottom.

17. Under Time Server Information, set the **Timezone** and click **>Next**.

The screenshot shows the 'Time Server Information' screen of the pfSense wizard. The browser address bar shows 'https://10.10.10.1/wizard.php?xml=setup_wizard.xml'. The page includes a warning about the default admin password and a breadcrumb trail: 'Wizard / pfSense Setup / Time Server Information'. A progress bar indicates 'Step 3 of 9'. The form contains the following fields and values:

- Time server hostname:** 2.pfsense.pool.ntp.org (Enter the hostname (FQDN) of the time server.)
- Timezone:** Asia/Kolkata

A blue button labeled '> Next' is at the bottom.

18. To continue the pfSense setup, scroll down and click **>Next**.

The screenshot shows the pfSense setup wizard at the URL `https://10.10.10.1/wizard.php?xml=setup_wizard.xml`. The page is titled "pfSense.home.arpa - Wizard: pfSense". It contains several sections:

- PPTP Dial on demand**: Includes a checkbox for "Enable Dial-On-Demand mode" and a description: "This option causes the interface to operate in dial-on-demand mode, allowing a virtual full time connection. The interface is configured, but the actual connection of the link is delayed until qualifying outgoing traffic is detected."
- PPTP Idle timeout**: Includes a text input field and a description: "If no qualifying outgoing packets are transmitted for the specified number of seconds, the connection is brought down. An idle timeout of zero disables this feature."
- RFC1918 Networks**: Includes a checkbox for "Block RFC1918 Private Networks" (checked) and a description: "When set, this option blocks traffic from IP addresses that are reserved for private networks as per RFC 1918 (10.0.0.0/8, 172.16.0.0/12, 192.168.0.0/16) as well as loopback addresses (127.0.0.0/8). This option should generally be left turned on, unless your WAN network lies in such a private address space, too."
- Block bogus networks**: Includes a checkbox for "Block bogus networks" (checked) and a description: "When set, this option blocks traffic from IP addresses that are reserved (but not RFC 1918) or not yet assigned by IANA. Bogons are prefixes that should never appear in the Internet routing table, and obviously should not appear as the source address in any packets received."

A red box highlights the "Next" button at the bottom of the page. The footer indicates "pfSense is developed and maintained by Netgate. © ESF 2004 - 2023 View license."

19. The Configure LAN Interface section will appear; the **LAN IP Address** and **Subnet Mask** are already during pfSense installation. Thus, click **>Next**.

The screenshot shows the pfSense setup wizard at the URL `https://10.10.10.1/wizard.php?xml=setup_wizard.xml`. The page is titled "pfSense.home.arpa - Wizard: pfSense". It contains several sections:

- WARNING**: "The 'admin' account password is set to the default value. Change the password in the User Manager."
- Wizard / pfSense Setup / Configure LAN Interface**: A breadcrumb trail.
- Step 5 of 9**: A progress bar.
- Configure LAN Interface**: A section with the following content:
 - On this screen the Local Area Network information will be configured.
 - LAN IP Address**: A text input field containing "10.10.10.1". Below it, a note says "Type dhcp if this interface uses DHCP to obtain its IP address."
 - Subnet Mask**: A dropdown menu showing "24".

A red box highlights the "Next" button at the bottom of the page. The footer indicates "pfSense is developed and maintained by Netgate. © ESF 2004 - 2023 View license."

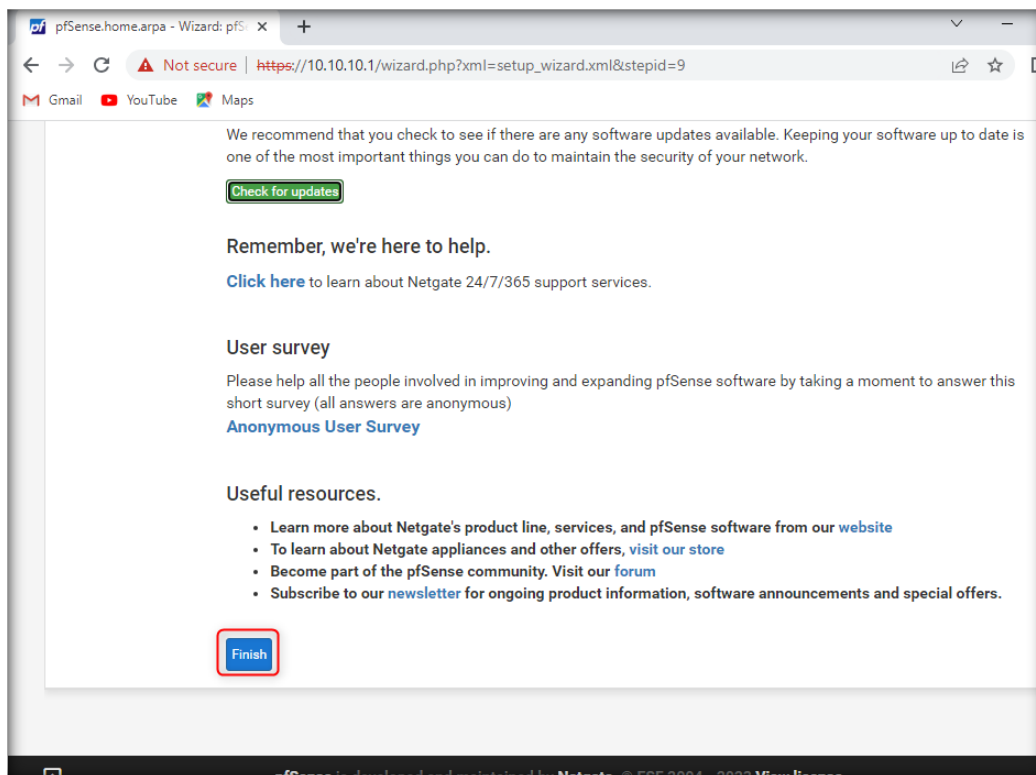
20. The **Set Admin WebGUI Password** page appears; enter the Admin Password as **admin@123** to change the default password of pfSense and click **>Next**.

The screenshot shows the pfSense Setup Wizard at Step 6 of 9, titled "Set Admin WebGUI Password". The page has a dark header with the pfSense logo and navigation links. A warning message states: "WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager." The breadcrumb trail is "Wizard / pfSense Setup / Set Admin WebGUI Password". Below a progress bar, the title "Set Admin WebGUI Password" is displayed. A sub-header explains: "On this screen the admin password will be set, which is used to access the WebGUI and also SSH services". There are two password input fields: "Admin Password" and "Admin Password AGAIN", both containing masked characters. A blue button labeled ">> Next" is at the bottom, highlighted with a red box.

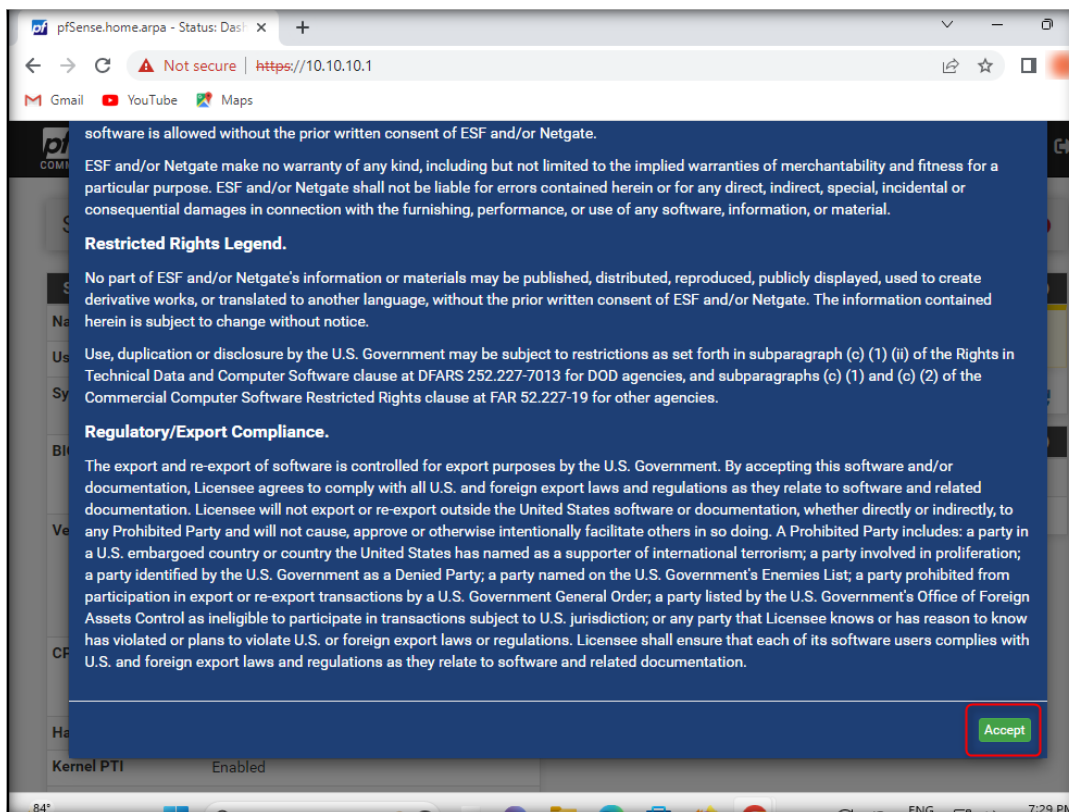
21. The Reload configuration page appears; click **>Reload**.

The screenshot shows the pfSense Setup Wizard at Step 7 of 9, titled "Reload configuration". The page has the same dark header and navigation links. The breadcrumb trail is "Wizard / pfSense Setup / Reload configuration". Below a progress bar, the title "Reload configuration" is displayed. A sub-header explains: "Click 'Reload' to reload pfSense with new changes." A blue button labeled ">> Reload" is at the bottom, highlighted with a red box.

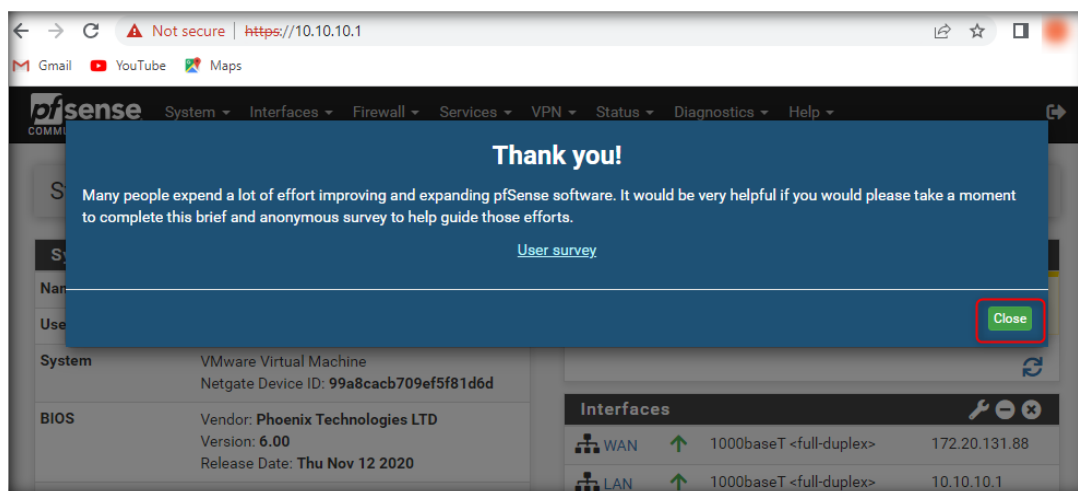
22. After reloading wizard is completed, click **>Finish** to complete the pfSense setup.



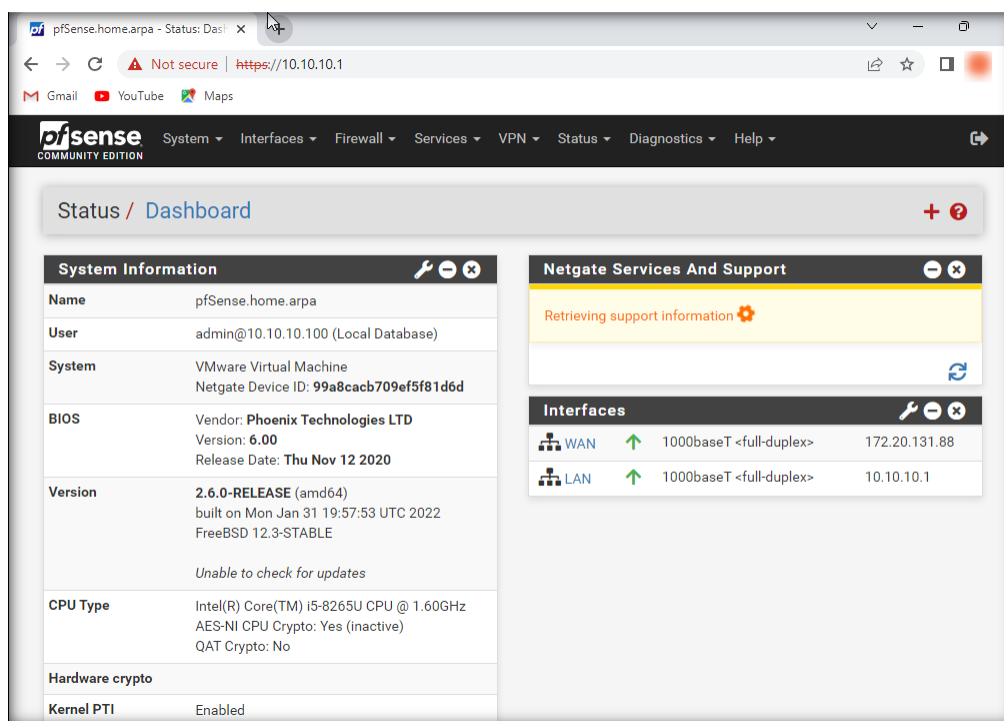
23. A copyrights pop-up will appear; click **Accept**.



24. Click **Close** to complete the pfSense Configuration.



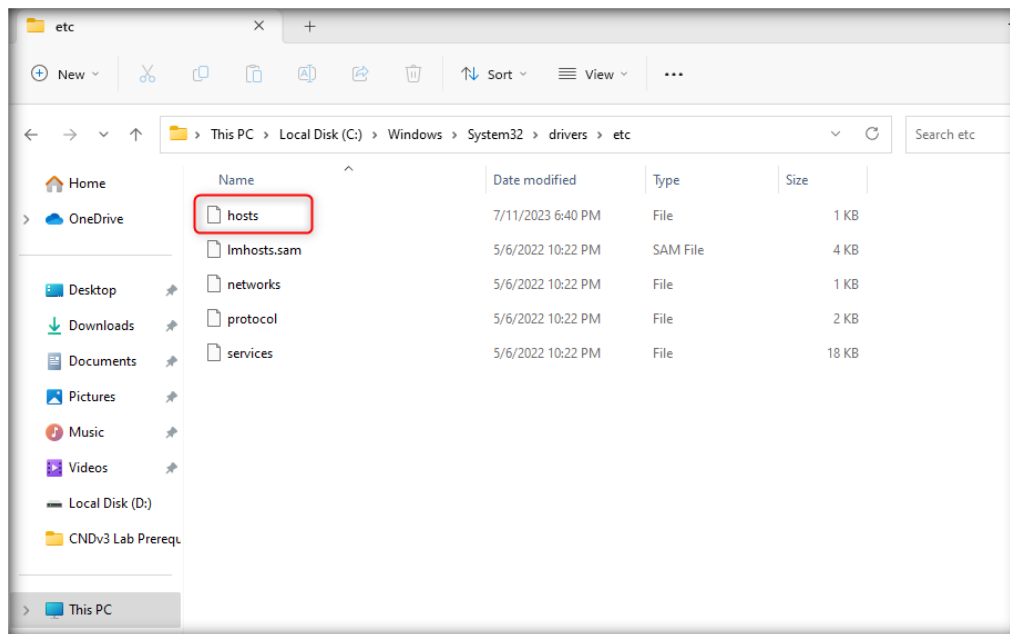
25. Finally, once the configuration is complete, you can start accessing the pfSense dashboard.



26. Close the browser and shut down **Admin Machine-1**.

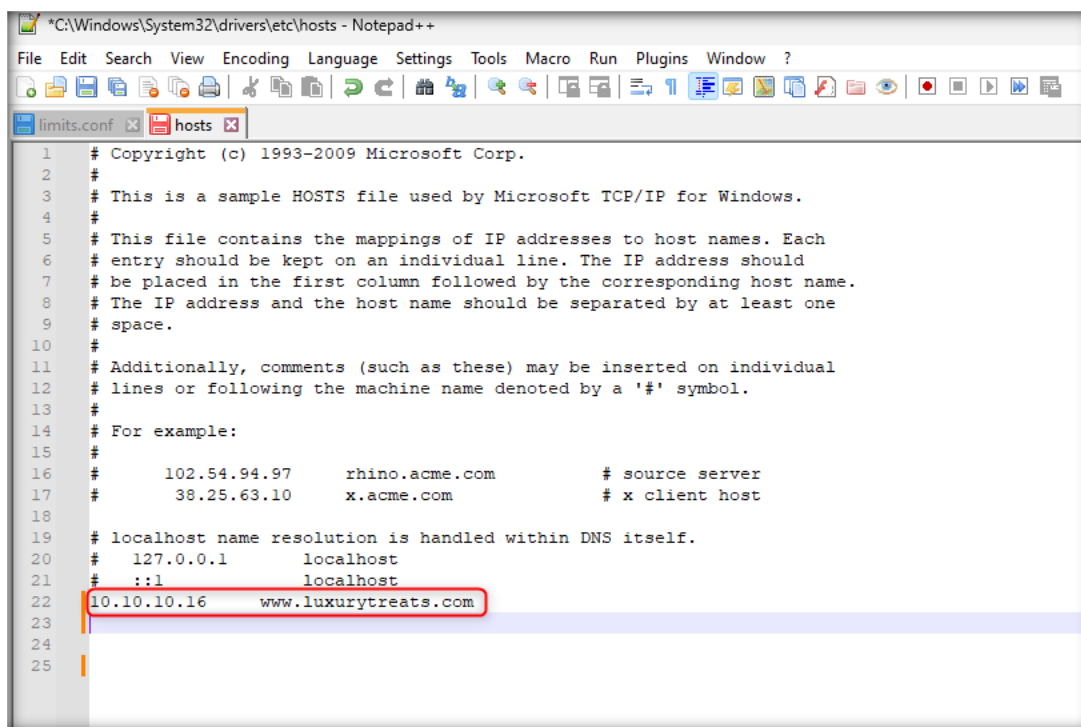
CT#7.13: Configuring Host File in Admin Machine-1

1. We will configure luxurytreats.com website in Web Server VM, to access website we need to configure Host file in Admin Machine-1, navigate to **C:\Windows\System32\drivers\etc** and right click on hosts file and click **Edit with Notepad++** from context menu.



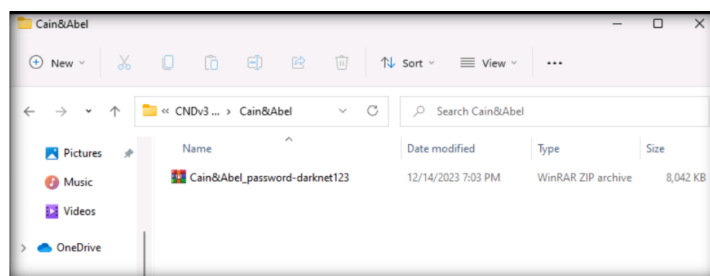
2. Hosts file opens in Notepad++ type <IP Address of the Web Server 10.10.10.16> **www.luxurytreats.com** and click **Save** button and **close** the Notepad++ window.

Note: The Save failed popup window appears, Click Yes to continue.

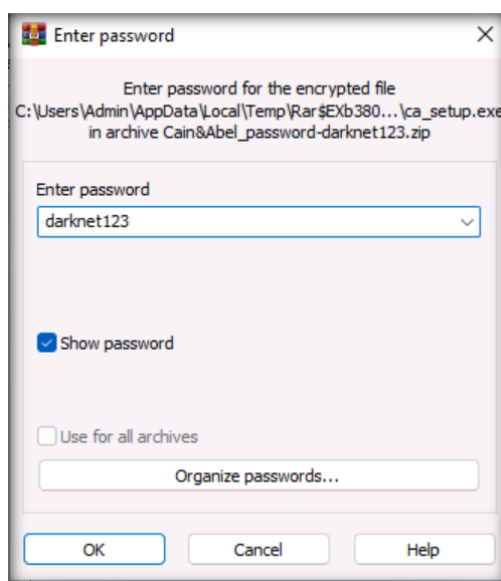


CT#7.14: Allowing running Cain&Abel on Admin Machine-1

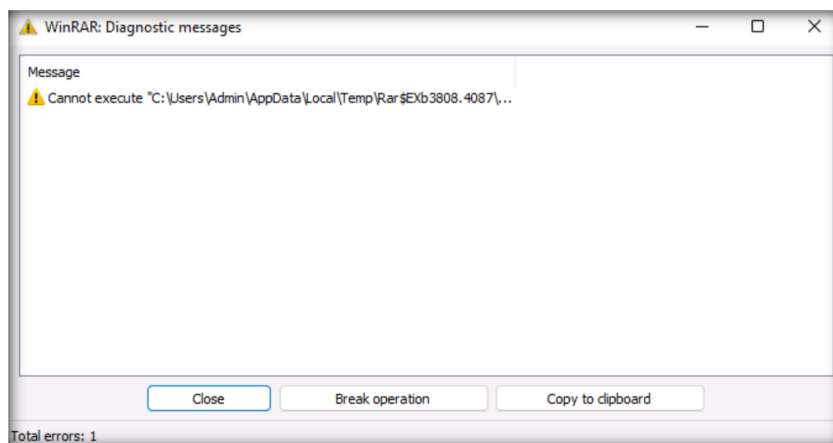
1. Open File Explorer and navigate to **E:\\CND-Tools\\CNDv3 Module 14 Network Traffic Monitoring and Analysis\\Cain&Abel** folder.



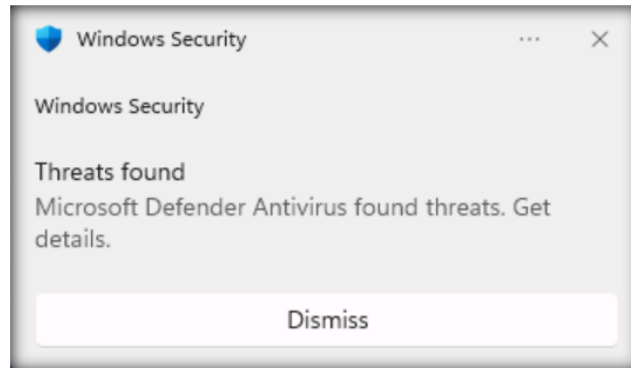
2. Double click on **Cain&Abel_password-darknet123** WinRAR ZIP archive file and then double click on ca_setup.exe. Type **darknet123** when prompted for password



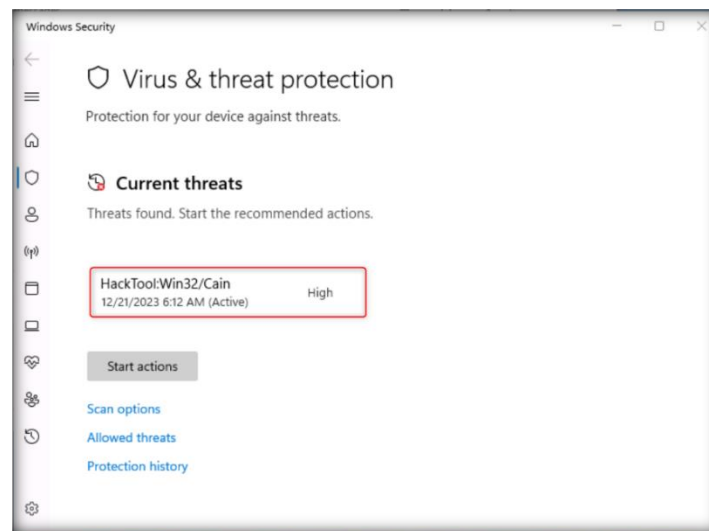
3. A WinRAR: Diagnostic messages window appears, close it



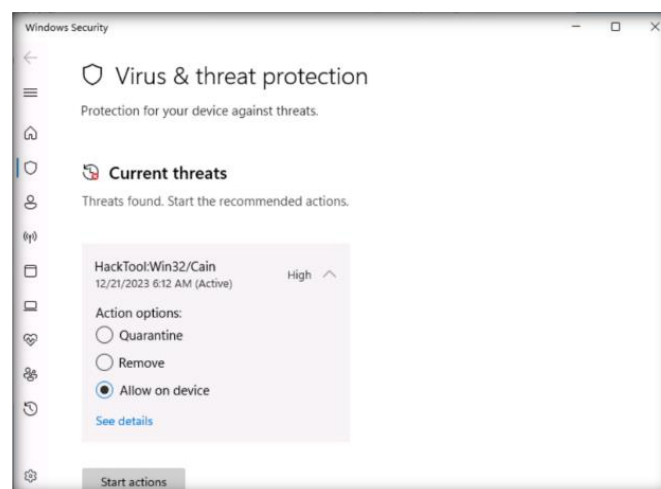
4. A Windows Security popup notification appears on bottom right corner of the screen, click on it.



5. Click on HackTool:Win32/Cain threat



6. A drop down box appears where we have to choose **Allow on device** option and then click on **Start actions**



7. A **User Account Control** popup appears, click on **Yes**



8. Navigate to **E:\\CND-Tools\\CNDv3 Module 02 Administrative Network Security\\Spyagent** and follow the above-mentioned steps after selecting spyagent14.Zip to allow the spyagent exe also in Admin Machine -1.

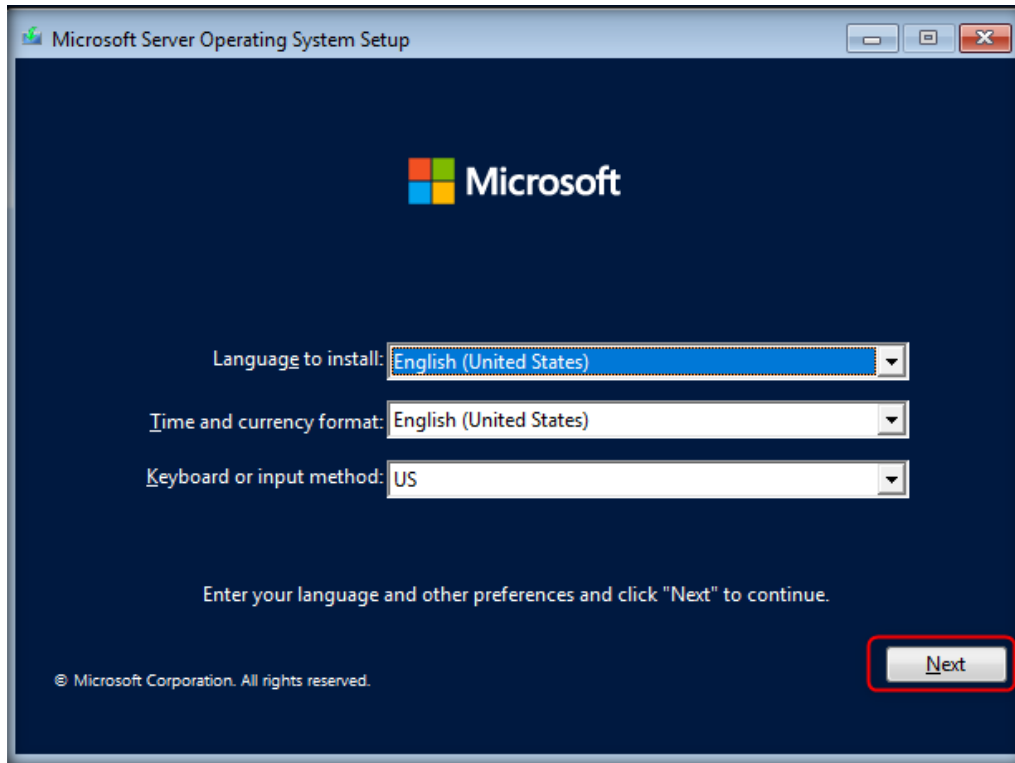
CT#8: Configuring Windows Sever 2022 Guest OS as Web Server

CT#8.1: Installing Windows Sever 2022 as Web Server

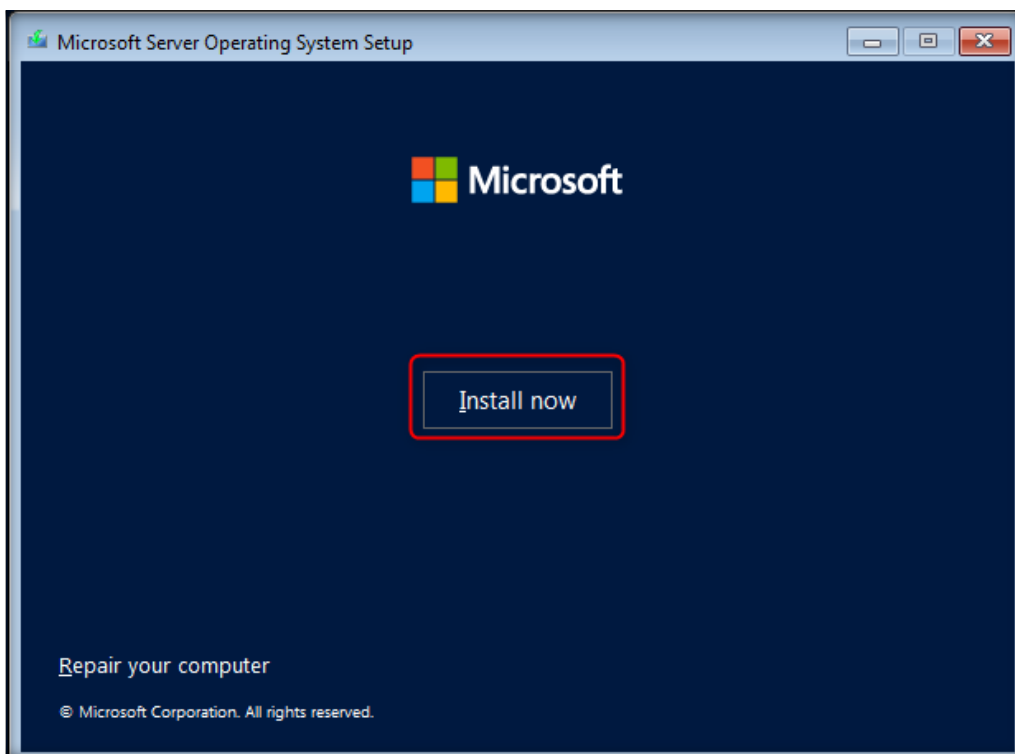
1. Launch VMware Workstation.
2. In **VMware Workstation** main window, you see a new virtual machine named **Web Server**. Click on the newly created virtual machine and click Power on this virtual machine from the context menu.



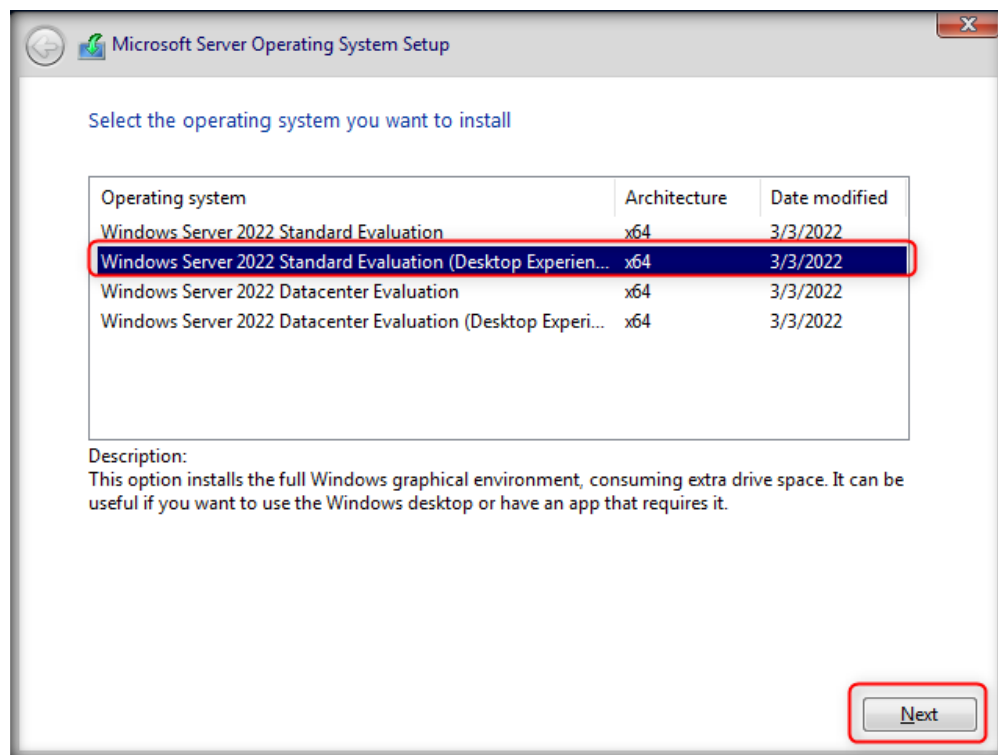
- When WebServer virtual machine is turned on, **Windows Setup** window will appear. Select the required details and click **Next**.



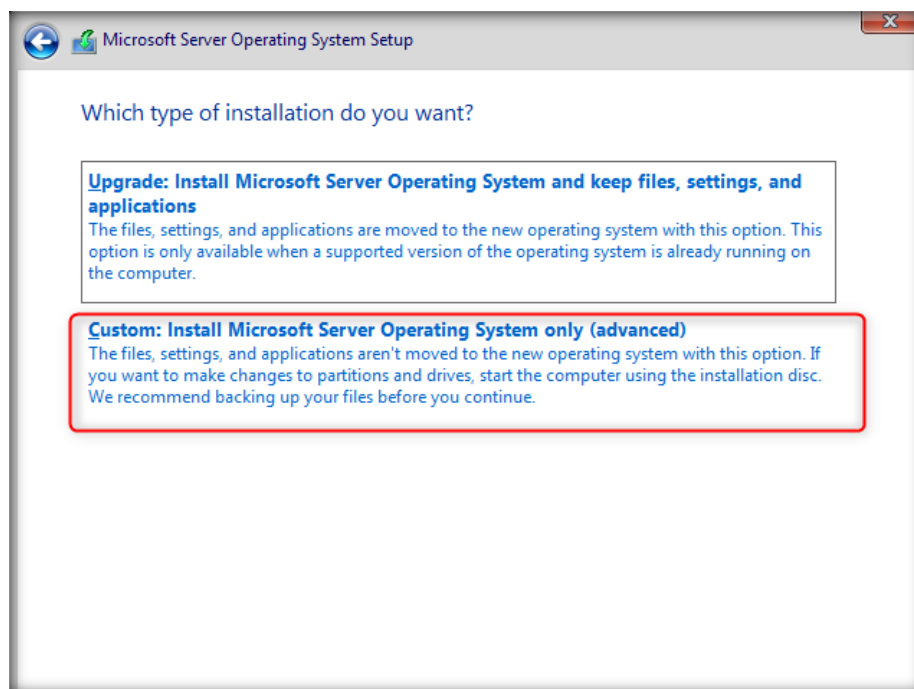
- Click **Install Now**.



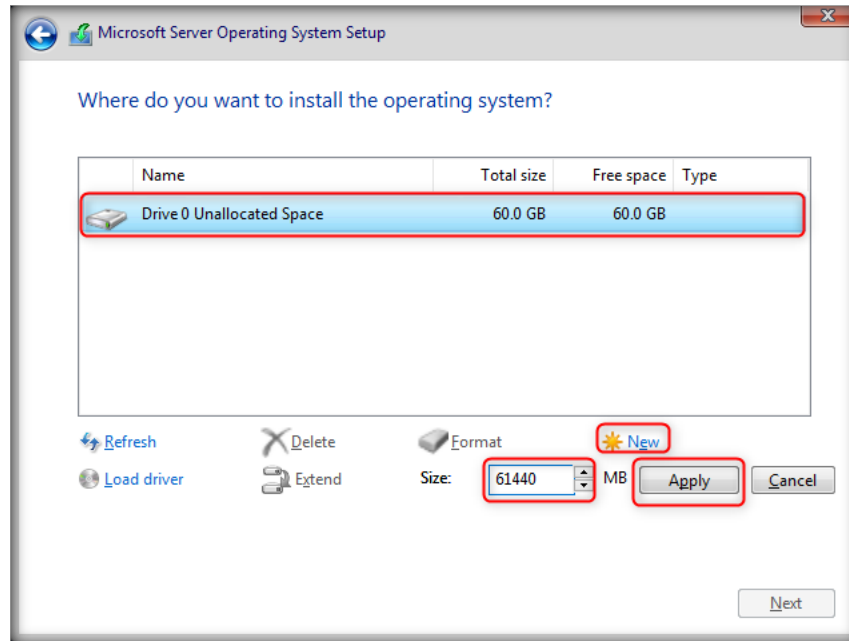
- While installing, Windows Setup appears; choose Windows Server 2022 Standard Evaluation (Desktop Experience) and click **Next**.



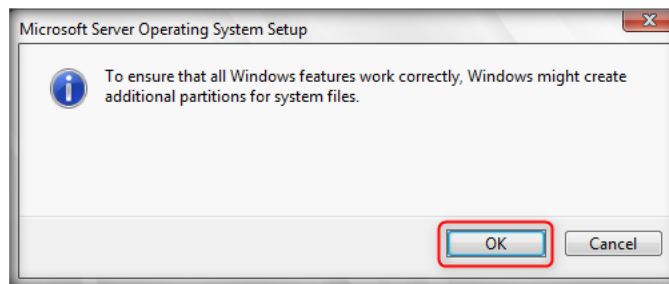
- The License terms wizard appears; check I accept the license terms and click **Next**.
- Click **Custom: Install Windows only (advanced)** to proceed with the installation.



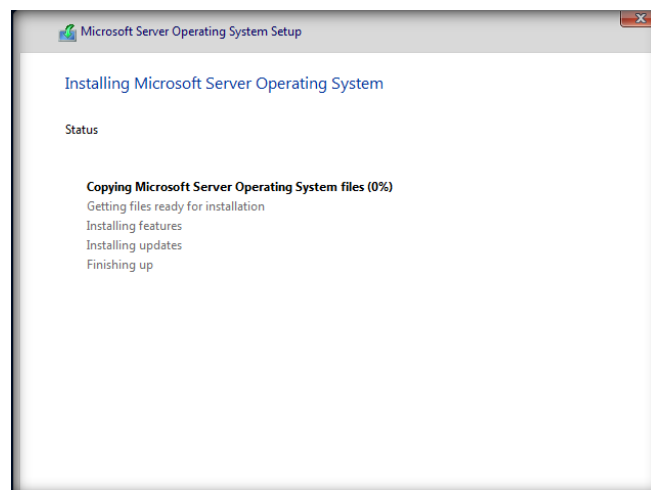
8. The Where do you want to install Windows? wizard appears; click **New** to create a partition. Set the Size to **61440 MB** and click **Apply**.



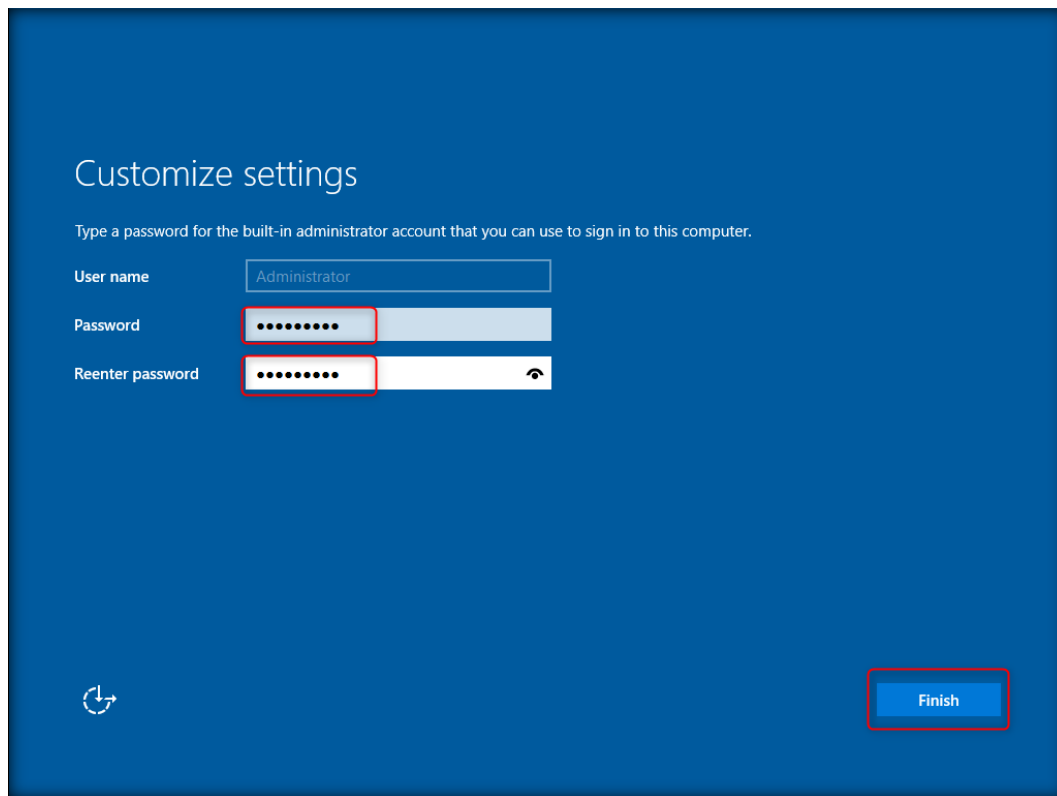
9. Click Ok in the Microsoft Server Operating System Setup dialog box



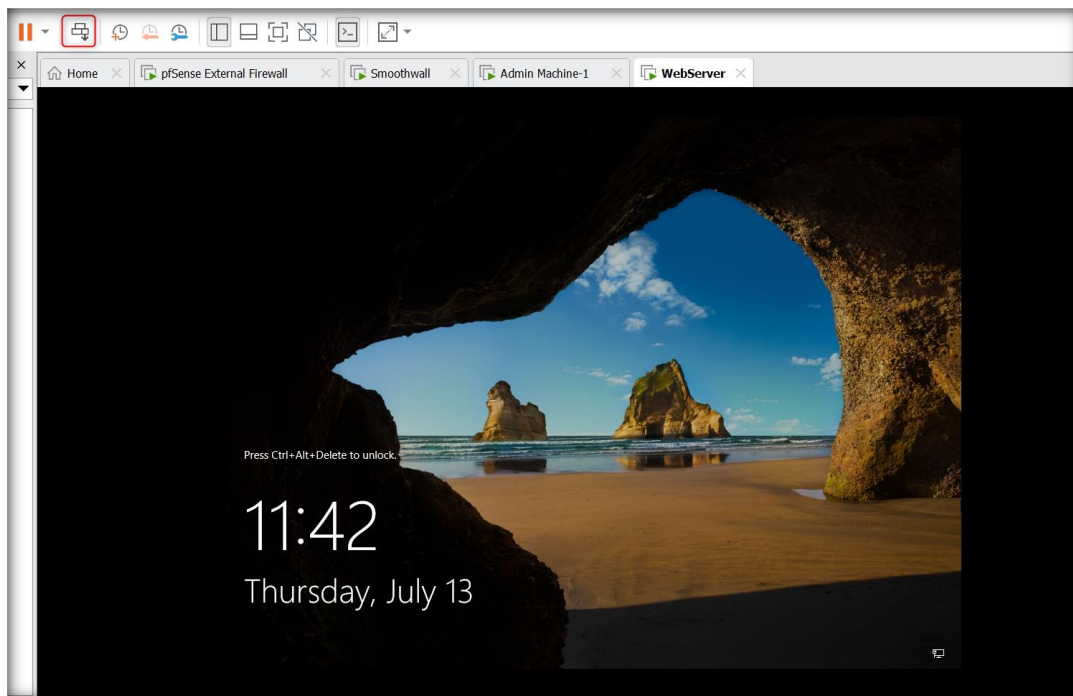
10. The Installing Windows screen appears; wait until installation is complete.



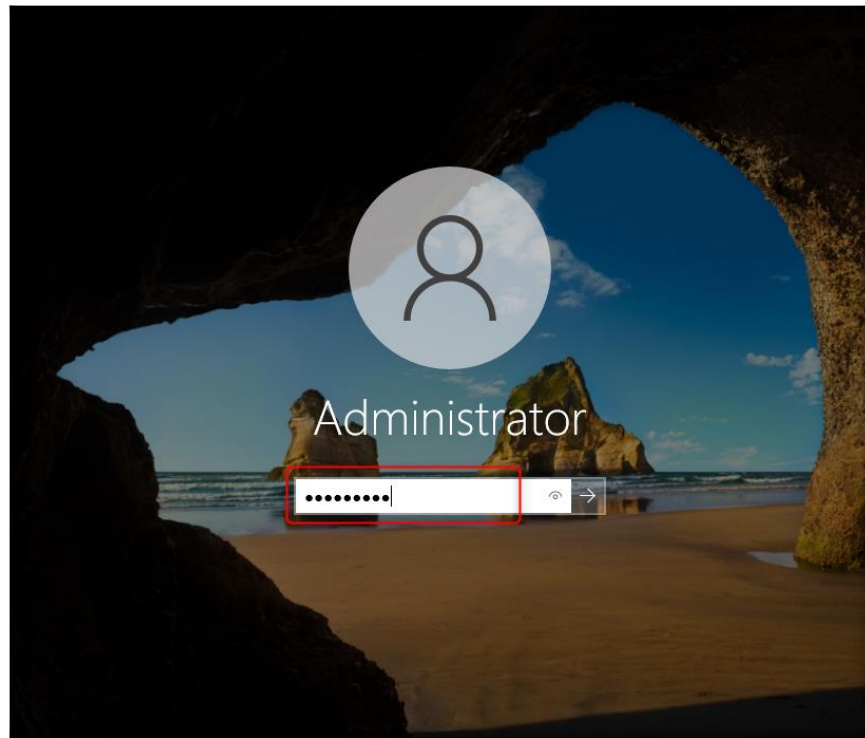
11. On installation, the **Customize settings** window appears where the username is set by default as **Administrator**. Enter the password as **admin@123** in Password and Re-enter password fields and click **Finish**.



12. Click **Ctrl+Alt+Delete** icon on the menu to login.



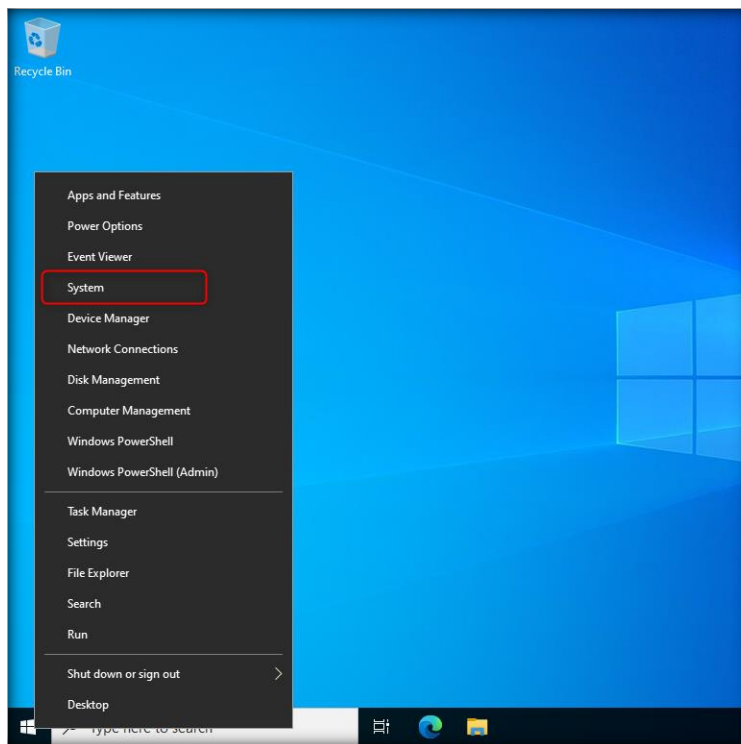
13. Login screen appears. Type the password (**admin@123**) and press **Enter**.



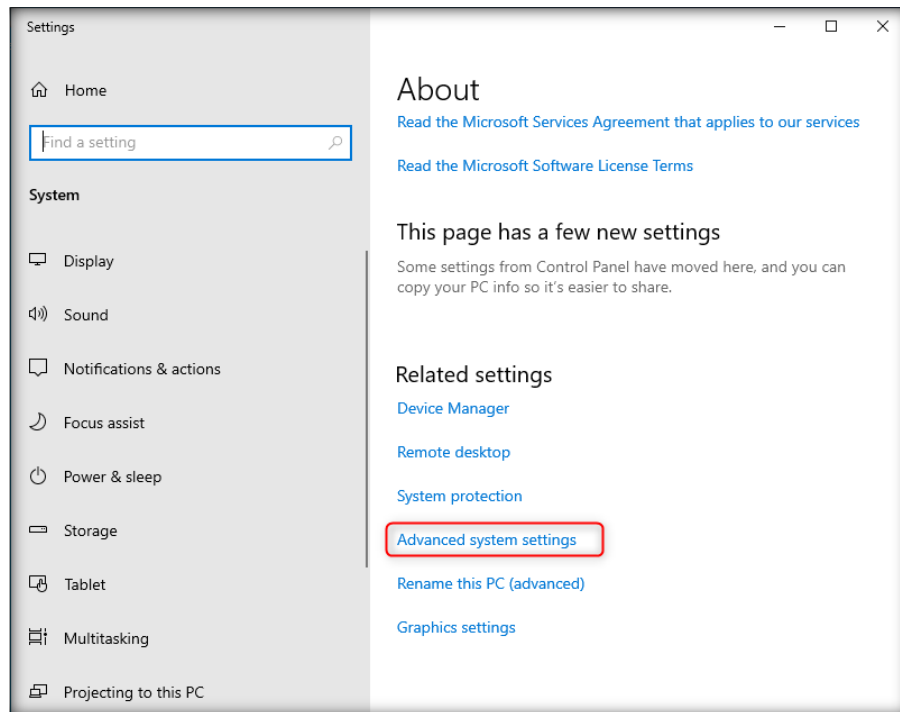
NOTE: Similarly install Windows server 2022 in Backup Server VM

CT#8.2: Changing the Computer Name

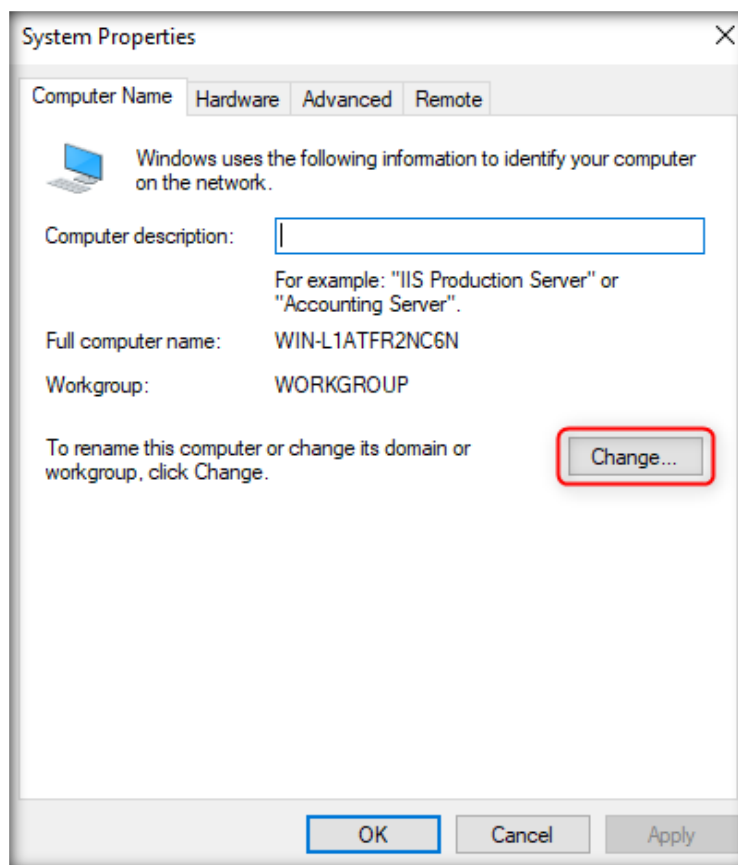
1. Close the Server Manager window that opens. Right-click **Start** icon and click on **System**.



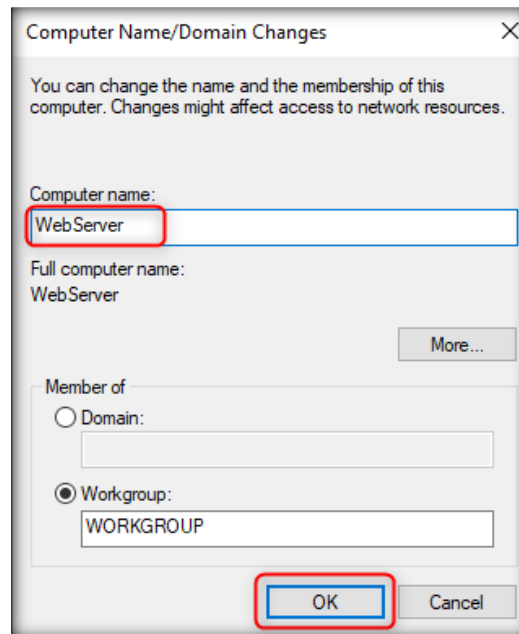
2. In the **Settings** window, scroll down and click **Advanced system settings**.



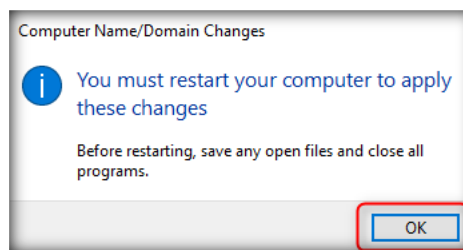
3. In the Computer Name tab of the System Properties window, click **Change**.



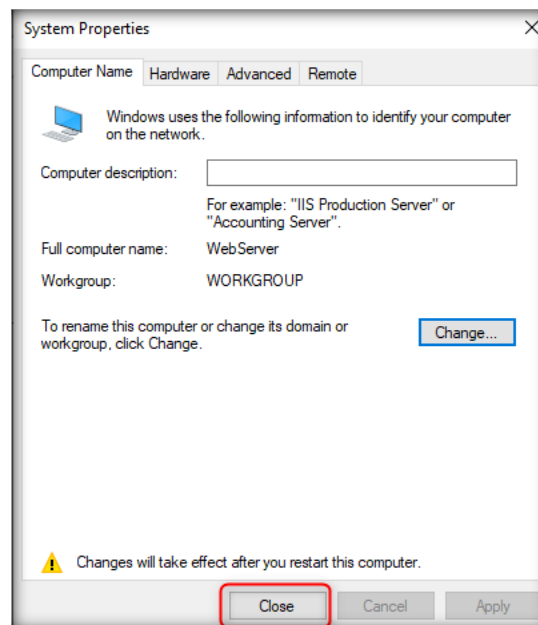
4. In the Computer Name field enter **WebServer** and click **OK**.



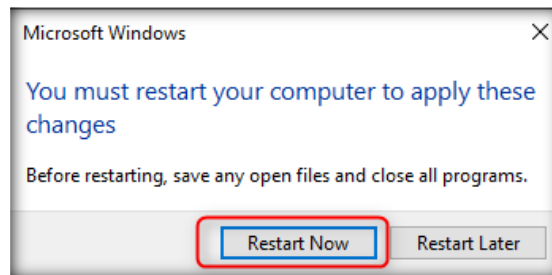
5. When prompted to restart the system, click **OK**.



6. You will be returned back to System Properties window, click **Close**



7. You will be prompted to restart the system, click **Restart Now**.

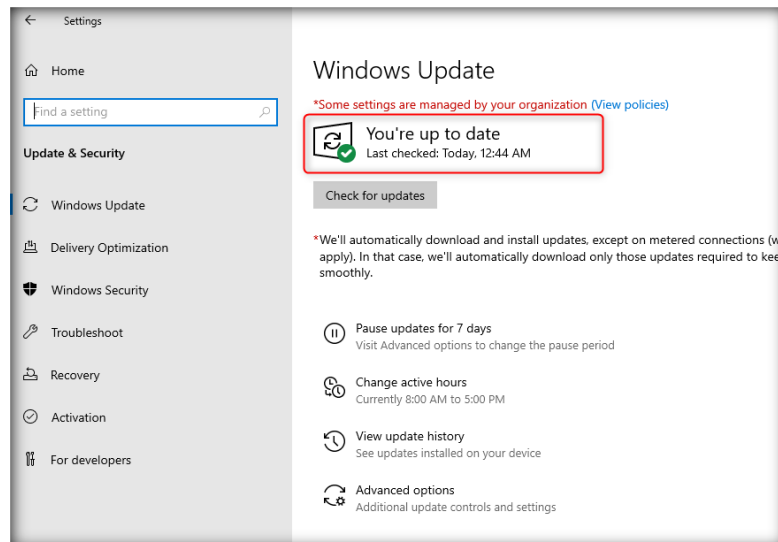


NOTE: Similarly Change the name of Backup Server VM as Backup Server.

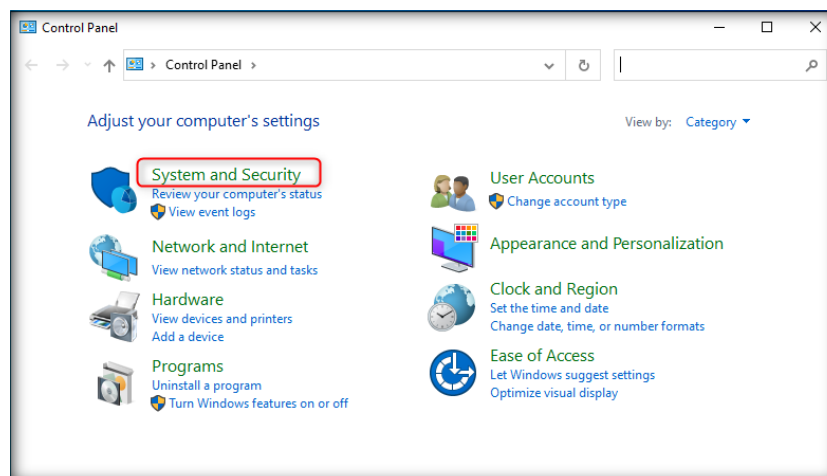
CT#8.3: Turn Off Windows Firewall

1. Turn on WebServer VM.
2. Now, check for the system updates and if found any, update the virtual machine to the latest.

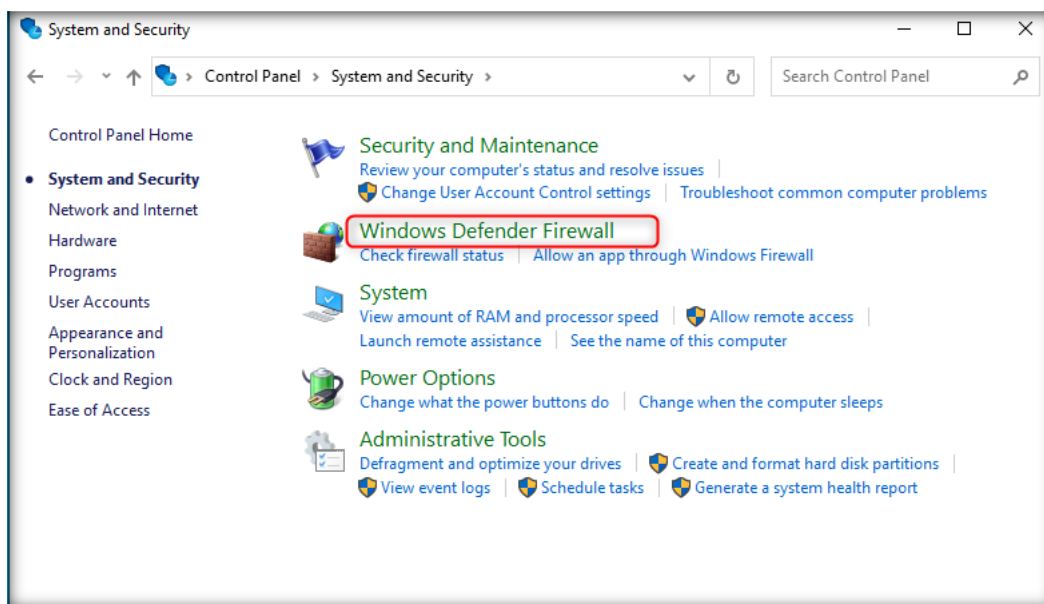
Note: Installing the updates might take some time.



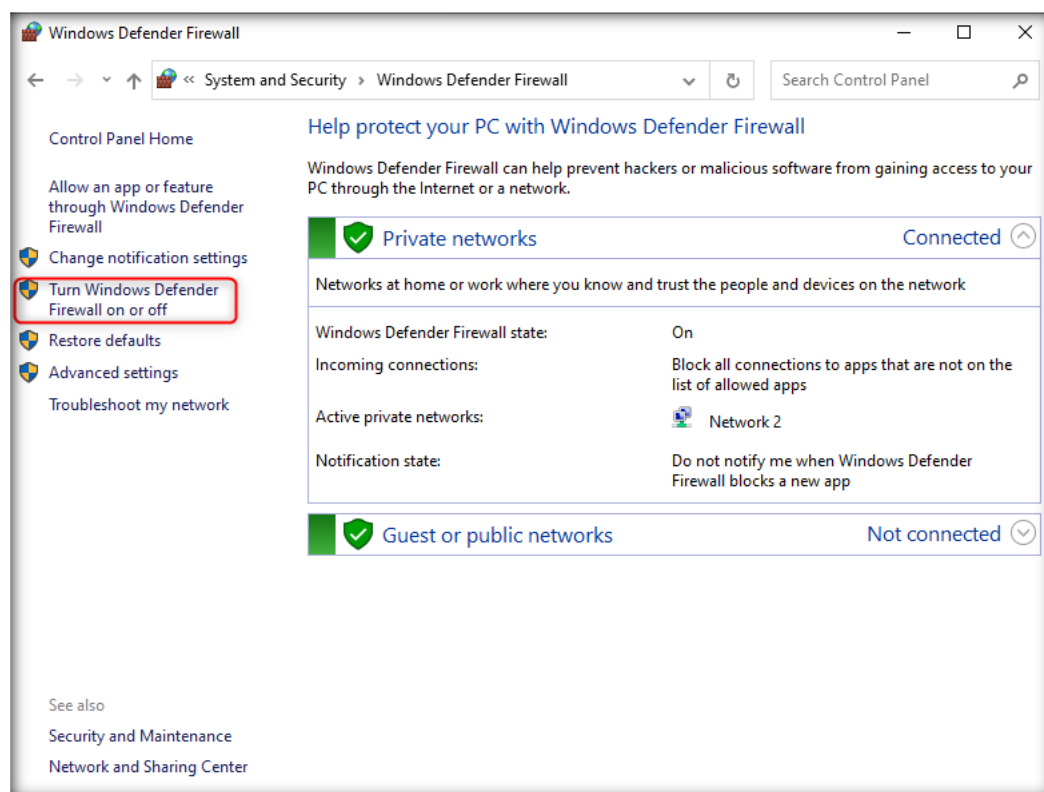
1. Open **Control Panel** select **System and Security**.



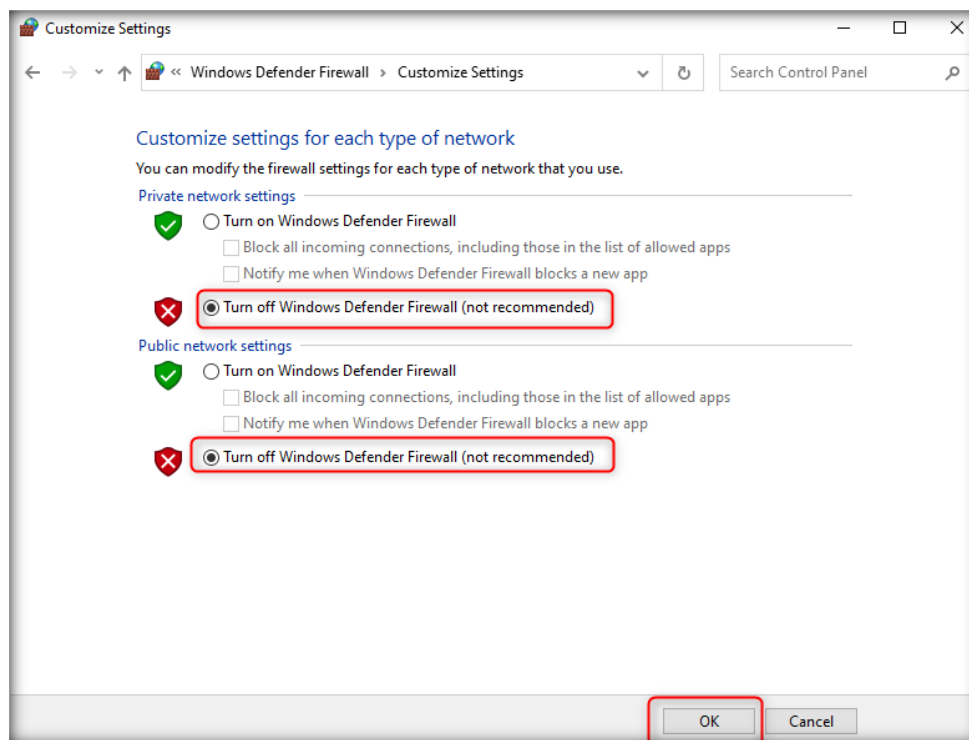
3. Click the **Windows Defender Firewall** in the **System and Security** window.



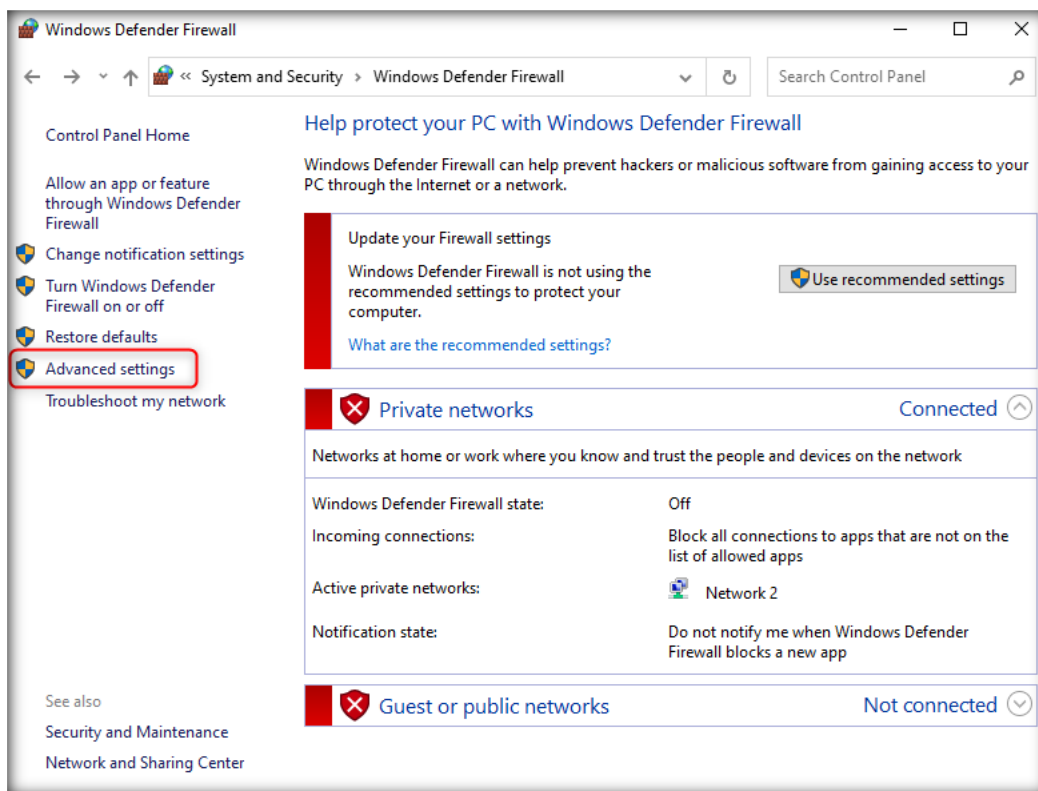
4. In the **Windows Firewall** window, click **Turn Windows Defender Firewall on or off** link in the left-pane of the window.



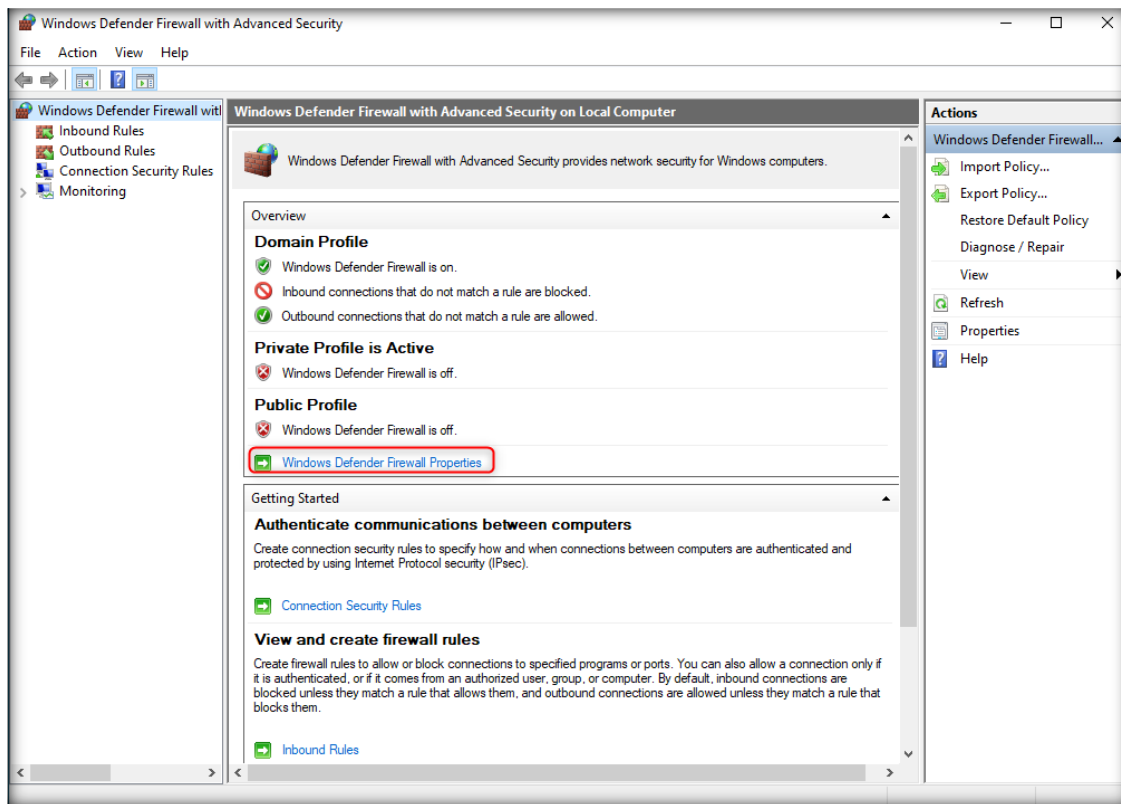
5. In the **Customize Settings** window, select **Turn off Windows Defender Firewall (not recommended)** radio button for all Domain, Private and Public network settings and click **OK**.



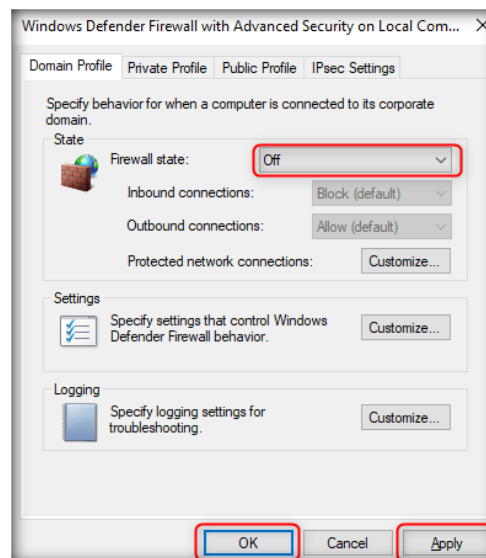
6. Again, in the **Windows Firewall** window, click **Advanced settings** link in the left-pane.



- Once the **Windows Firewall with Advanced Security** appears on the screen, click **Windows Firewall Properties** link in the **Overview** section.



- When the **Windows Firewall with Advanced Security on Local Computer Properties** window appears, in the **Domain Profile** tab, choose **Off** from the **Firewall state** drop-down list. Then navigate to **Private Profile** and **Public Profile** tabs and ensure that the **Firewall state** is **Off**. Click **Apply** and then click **OK**.

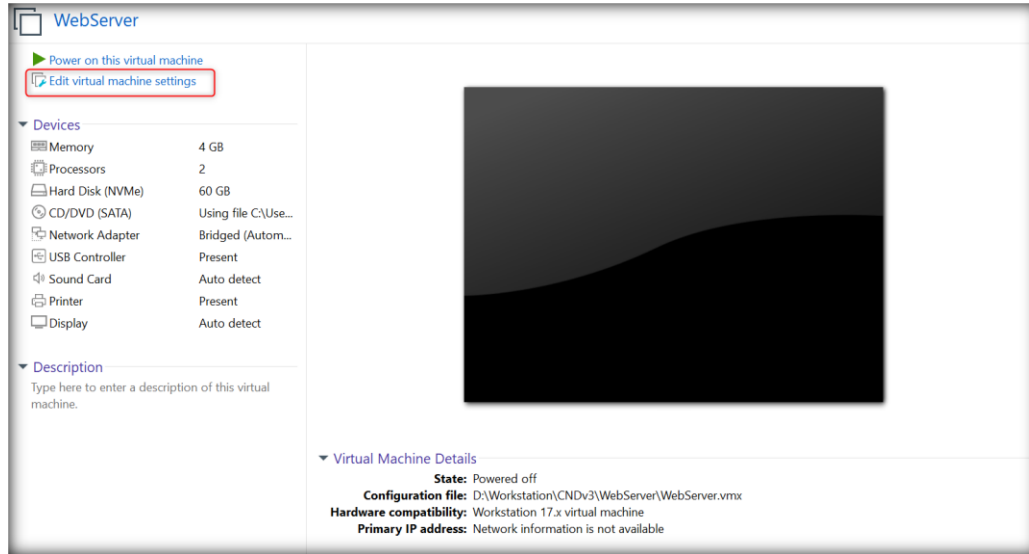


- Close all the windows.

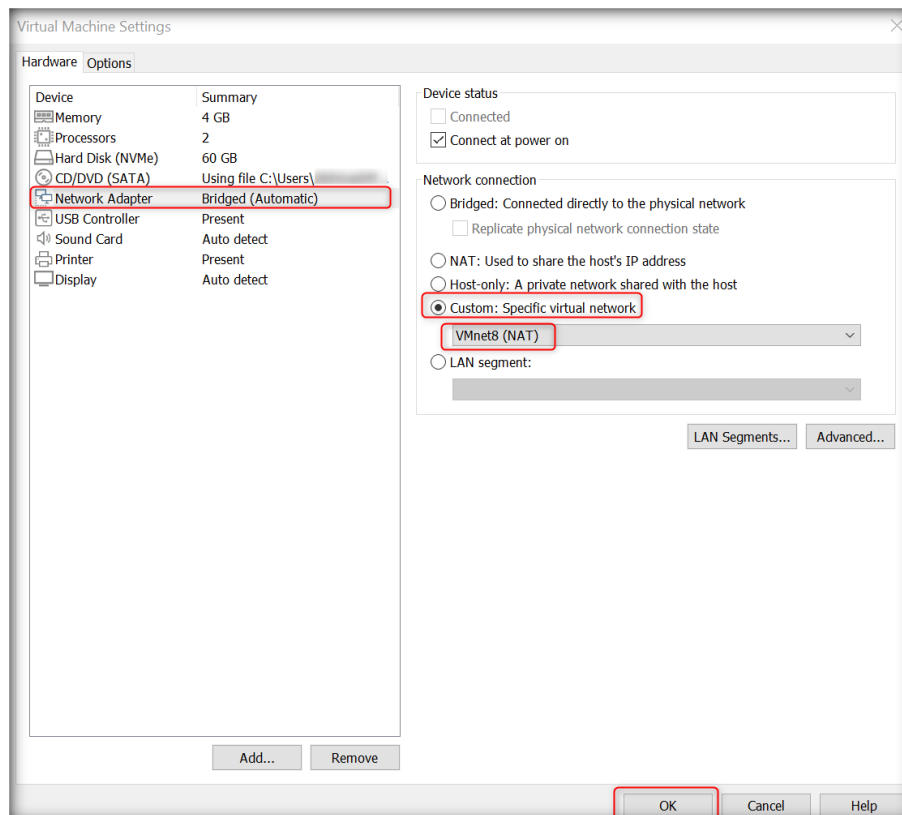
NOTE: Turnoff firewall in Backup server

CT#8.4: Setting up IP address for Web Server

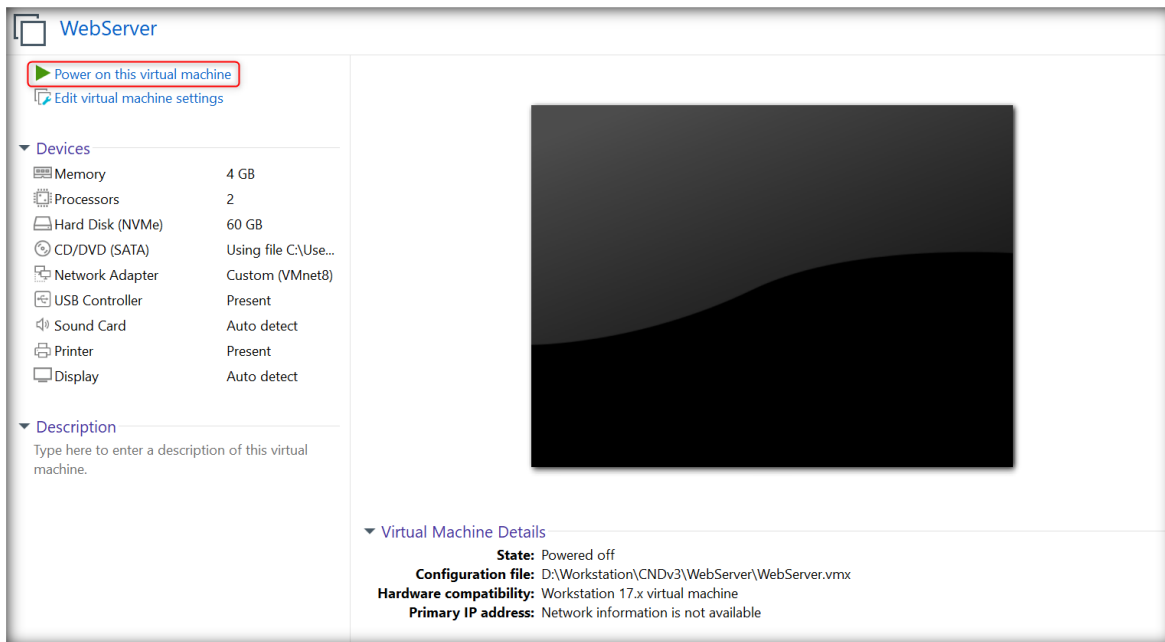
1. Launch VMware Workstation.
2. In **VMware Workstation** main window, you see a new virtual machine named **Web Server**. Click Edit virtual machine settings from the context menu.



3. **Settings for Admin Machine-1** window opens, click **Network Adapter** in left side pane, click **Custom: Specific virtual network** radio button and select **VMnet8** from dropdown, click **OK**.



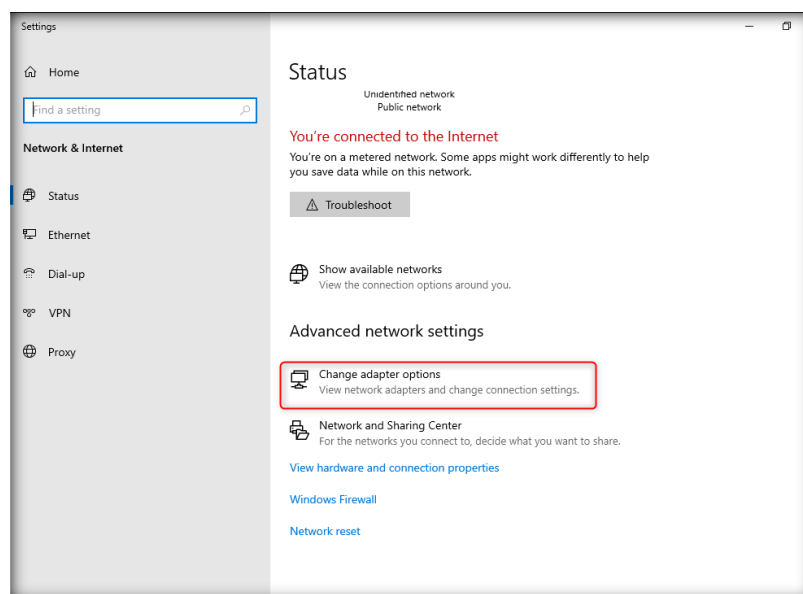
4. In VMware Workstation, Click on **Power on this virtual machine**.



5. Login as Administrator. Wait for few seconds, the server manager window opens, close the **Server Manager** window that opens after successful sign in, right-click on **Network** icon (lower right corner of the desktop) and click **Open Network & Internet settings** from the context menu.

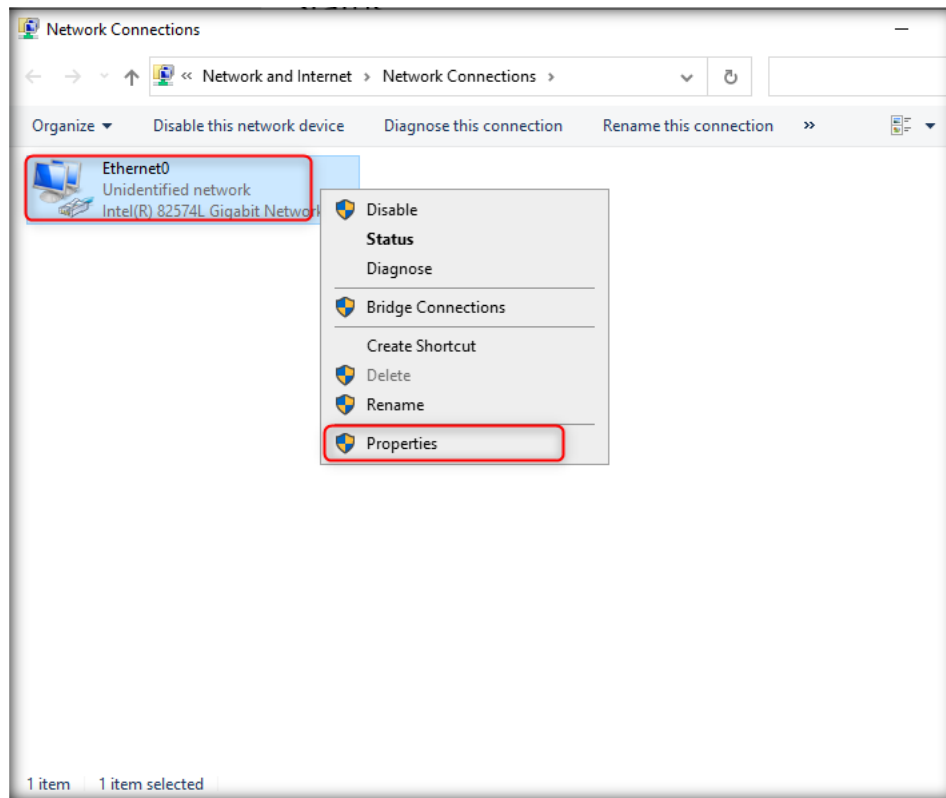


6. Network & Internet window appear, scroll down and click on **Change adapter settings**.

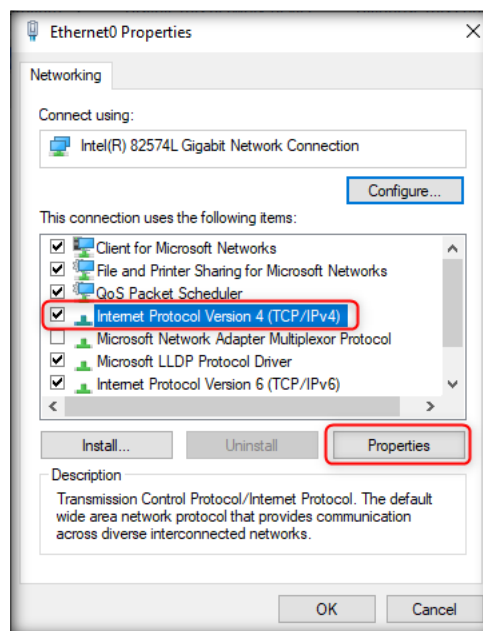


7. In the Network Connections window, right-click on Unidentified network (**Ethernet**) adapter and click **Properties** from the context menu.

Note: The Name of Unidentified network may vary.



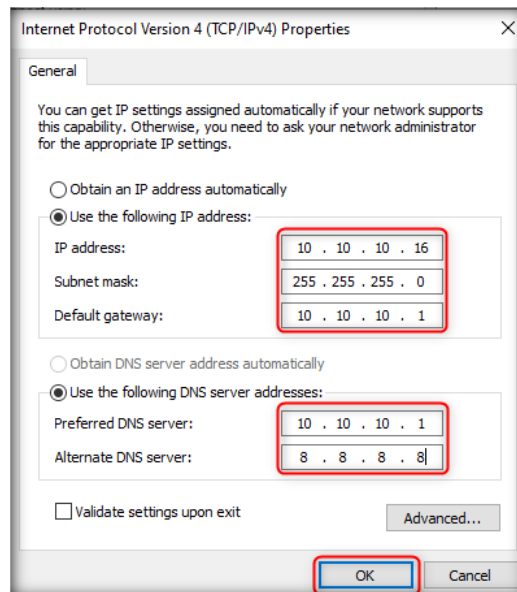
8. Ethernet adapter Properties window appears; and select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.



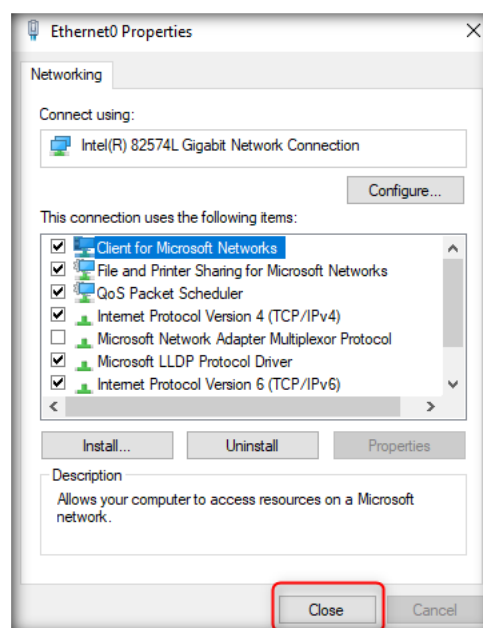
9. Select **Use the following IP address** and **Use the following DNS server addresses** radio buttons, and type the following values as shown in the screenshot and click **OK**.

- IP address: **10.10.10.16**
- Subnet mask: **255.255.255.0**
- Default gateway: **10.10.10.1**
- Preferred DNS server: **10.10.10.1**
- Alternate DNS server: **8.8.8.8**

Note: Once you click on **OK** button if Networks section appears on the right side of the desktop screen, and then click **Yes**.

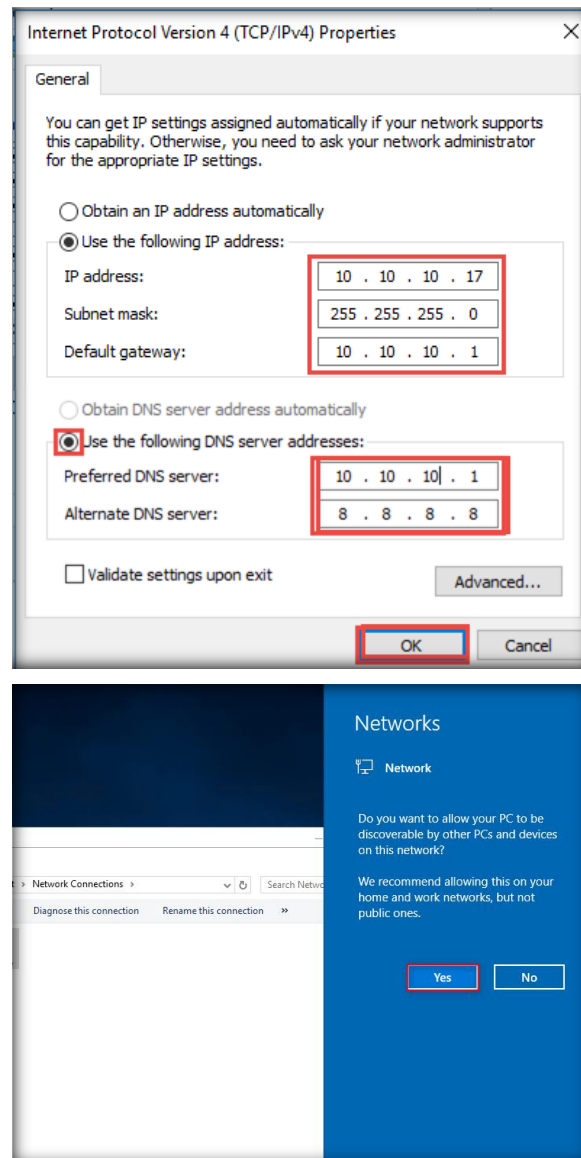


10. Click **Close** to close the Ethernet Properties window.

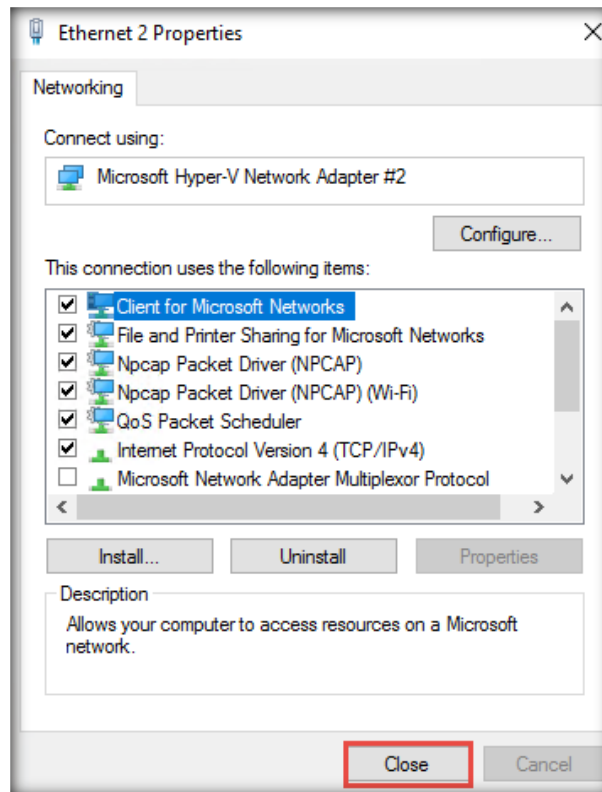


11. Now, check whether Windows Server 2022 is installed and working properly.
12. Set the IP address of backup server As follows
13. Select **Use the following IP address** and **Use the following DNS server addresses** radio buttons, and type the following values as shown in the screenshot and click **OK**.
 - IP address: **10.10.10.17**
 - Subnet mask: **255.255.255.0**
 - Default gateway: **10.10.10.1**
 - Preferred DNS server: **10.10.10.1**
 - Alternate DNS server: **8.8.8.8**

Note: Once you click on **OK** button if Networks section appears on the right side of the desktop screen, and then click **Yes**.



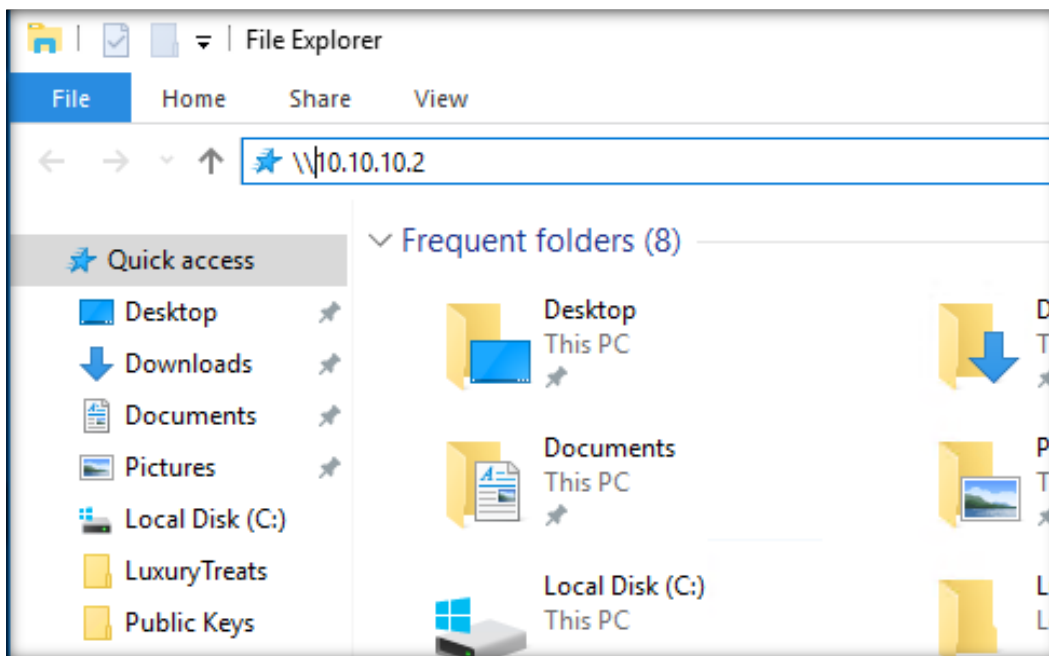
14. Click **Close** to close the Ethernet Properties window.



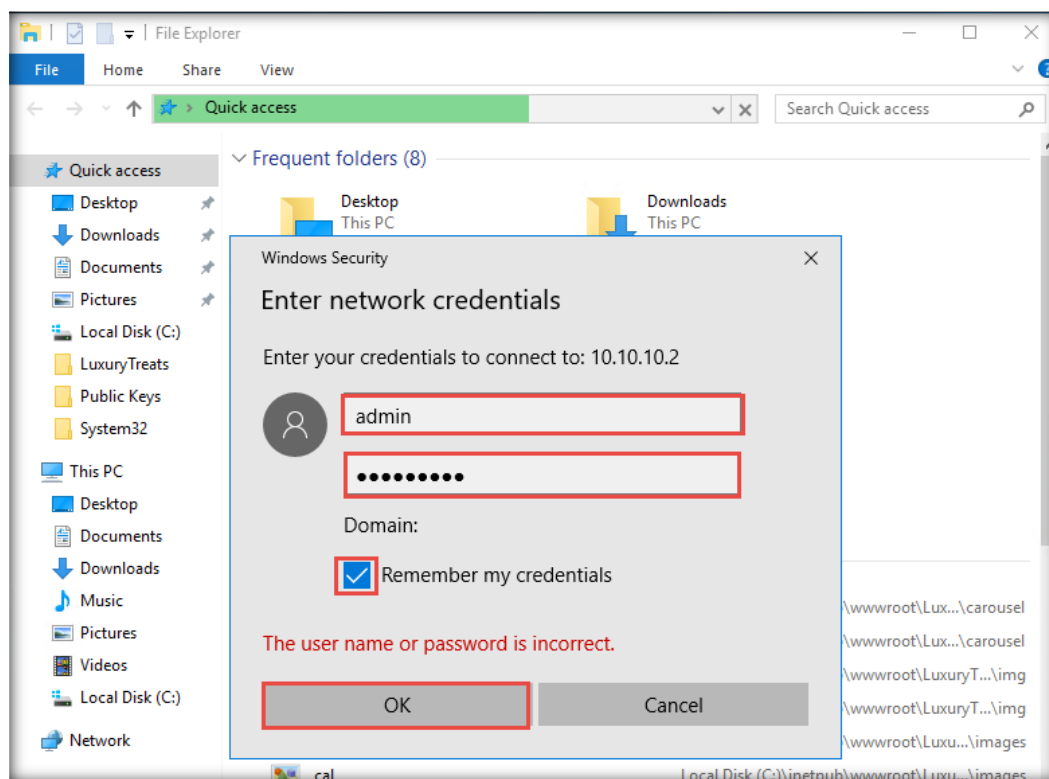
15. Now, check whether the network connection is set properly.

CT#8.5: Mapping CND-Tools Folder from Admin Machine to Windows Server 2022 VM

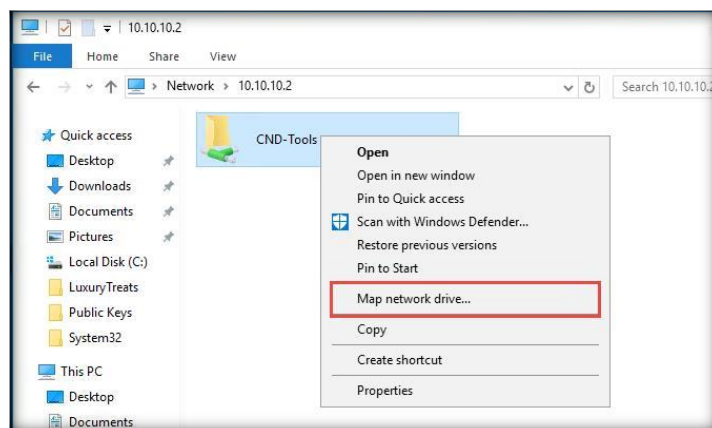
1. Open File Explorer, and type [\\10.10.10.2] in the address bar and press **Enter**.



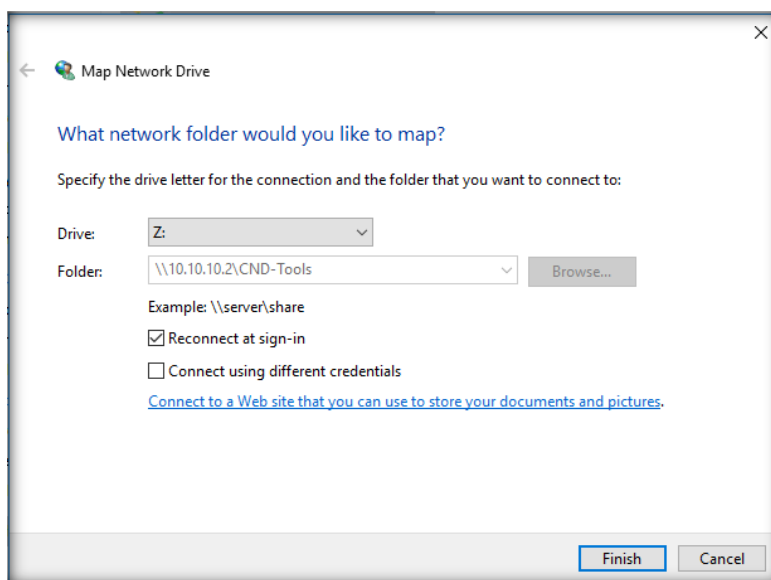
2. Windows Security pop-up will appear, type Admin Machine-1 credentials (username: **Admin**, Password: **admin@123**), check the **Remember my credentials** check box and click **OK**.



3. The **CND-Tools** shared appears folder and right-click on the CND-Tools Folder and select **Map network drive...** option.



4. **Map Network Drive** window opens, Select Drive as **Z:** check **Reconnect at sign-in**, click **Finish**.



We have mapped the **CND-Tools** folder from Admin Machine-1, this folder contains tools for lab execution

5. Follow the steps to share CND-Tools directory in Admin VM in backup server

CT#8.6: Installing Adobe Acrobat Reader

1. Navigate to Z:\CND-Tools\ Lab Prerequisites\Adobe Reader folder
2. Alternatively, you may download the latest version of Adobe Reader Adobe website
3. Double-click .exe to begin the installation
4. Follow wizard-driven installation steps and complete the install by choosing default options throughout the installation process
5. Similary install Adobe Acrobat Reader in Backup Server

CT#8.7: Installing WinRAR

1. Navigate to Z:\CND-Tools\Lab Prerequisites\WinRAR folder
2. Alternatively, you can also download the latest version of WinRAR from Vendor
9. Double click on .exe to begin the installation
10. WinRAR setup window appears
11. In the WinRAR 5.10 setup window, click Install
12. Complete the install by choosing defaults throughout the installation process
13. After completing the installation, the installation location of WinRAR files window opens automatically
14. Close the window
15. Similarly install WinRAR in Backup Server

CT#8.8: Configuring Windows Explorer

1. In the Advanced Settings section of explorer, under Hidden files and folders, select Show hidden files, folders, and drives radio button, uncheck Hide extensions for known file types and Hide protected operating system files (Recommended) options, click Apply and then click OK.

CT#8.9: Installing Web Browsers

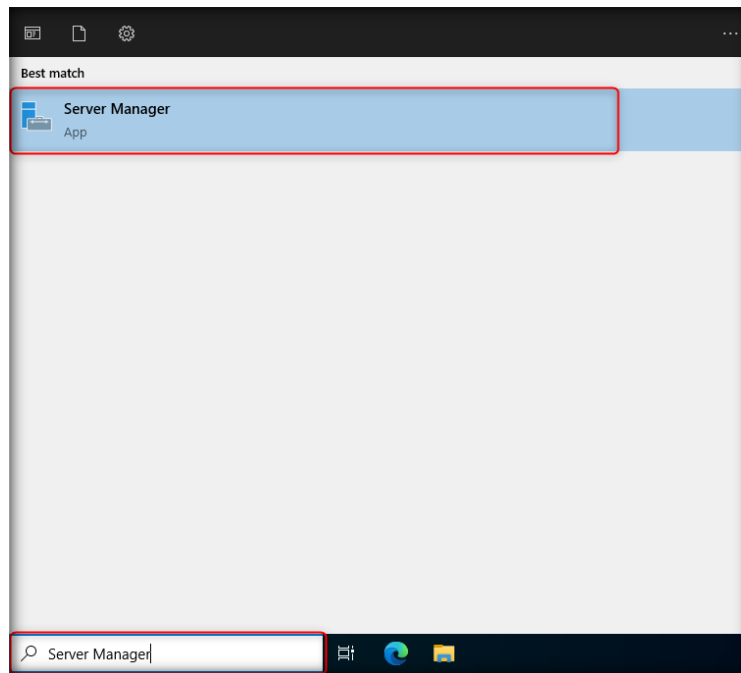
1. Navigate to Z:\CND-Tools\Lab Prerequisites in guest operating systems
2. Open Web Browsers folder
3. Follow wizard-driven installation steps and install Firefox and Chrome web browsers
4. You can also download latest version of web browsers from respective vendors
5. Similarly install Web Browsers in Backup Server

CT#8.10: Installing Notepad++

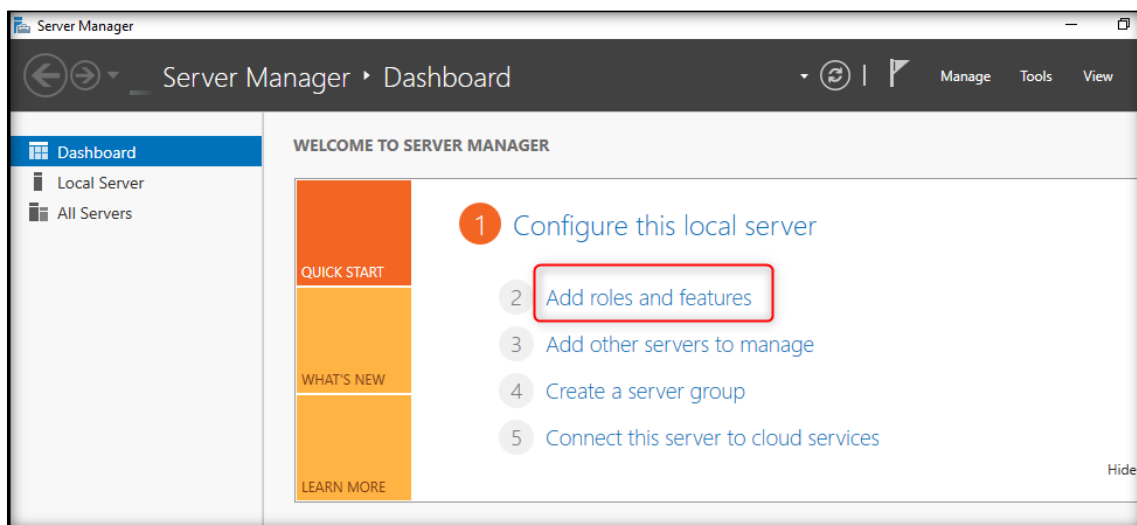
1. Navigate to Z:\CND-Tools\Lab Prerequisites in guest operating systems
2. Open Notepad++ folder and double-click .exe
3. Follow the wizard-driven installation steps, to install Notepad++
4. You can also download latest version of Notepad++ from its vendor site
5. Similarly install Notepad++ in Backup Server

CT#8.11: Adding IIS (Internet Information Services) roles in Server Manager

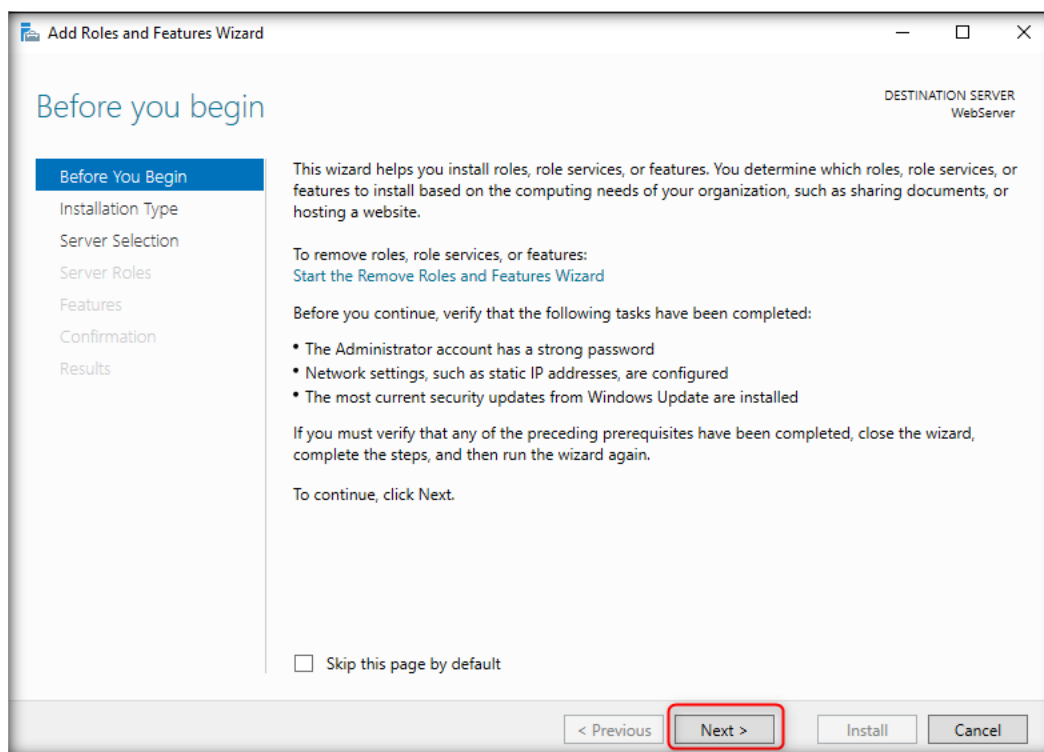
1. To open Server Manager, type **Server Manager** and click **Server Manager** icon.



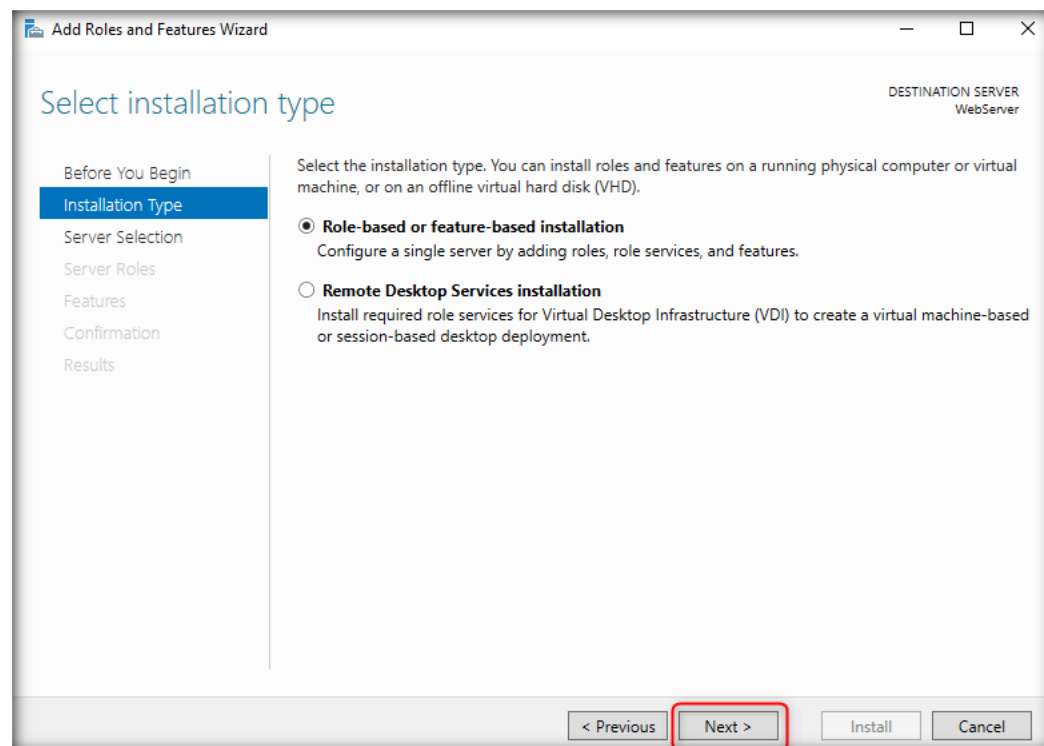
2. In Server Manager **Dashboard**, click **Add Roles and Features**.



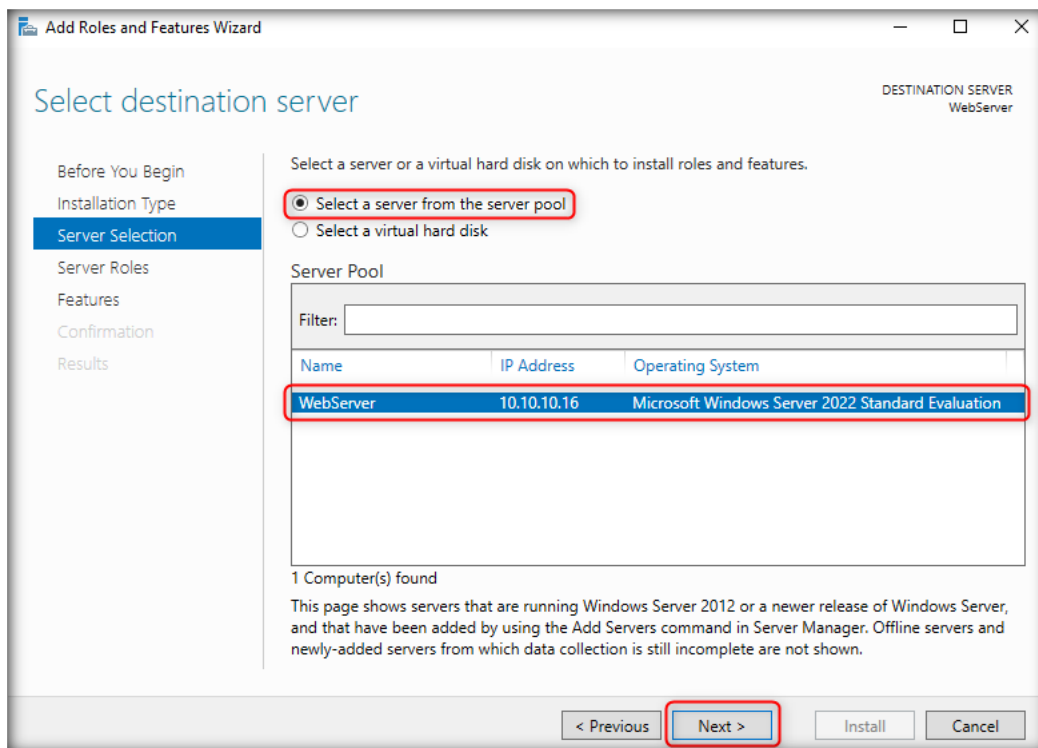
3. **Add Roles and Features Wizard** appears, click **Next**.



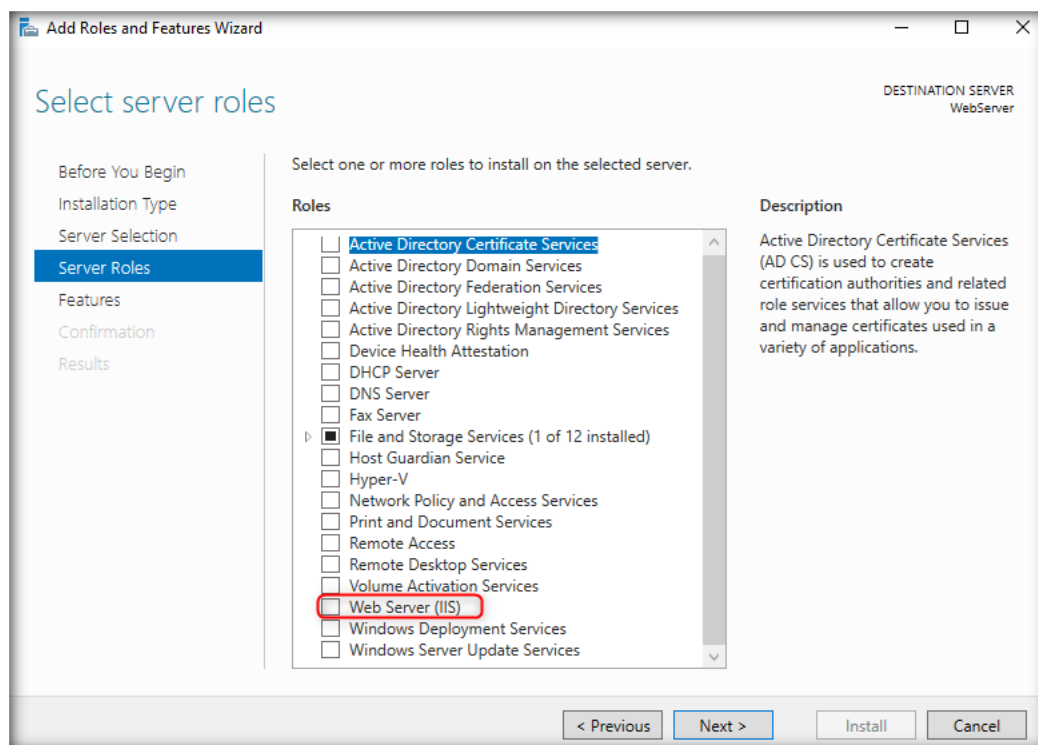
4. In **Installation Type** section of the wizard, select **Role-based or feature-based installation** radio button and click **Next**.



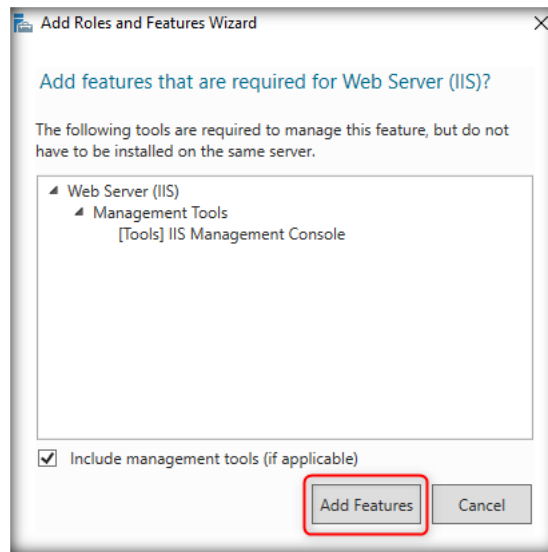
5. In **Server Selection** section, leave the selections to default and click **Next**.



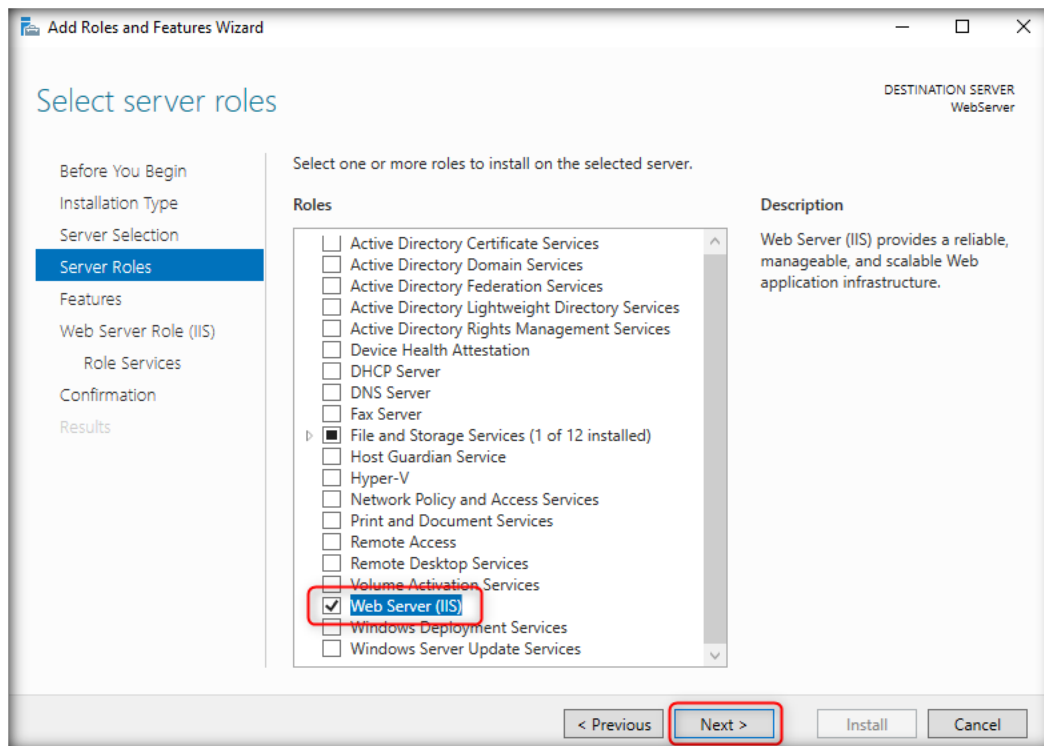
6. **Server Roles** section appears, click the check box of **Web Server (IIS)** role.



7. **Add Roles and Features Wizard** window appears, click **Add Features**.

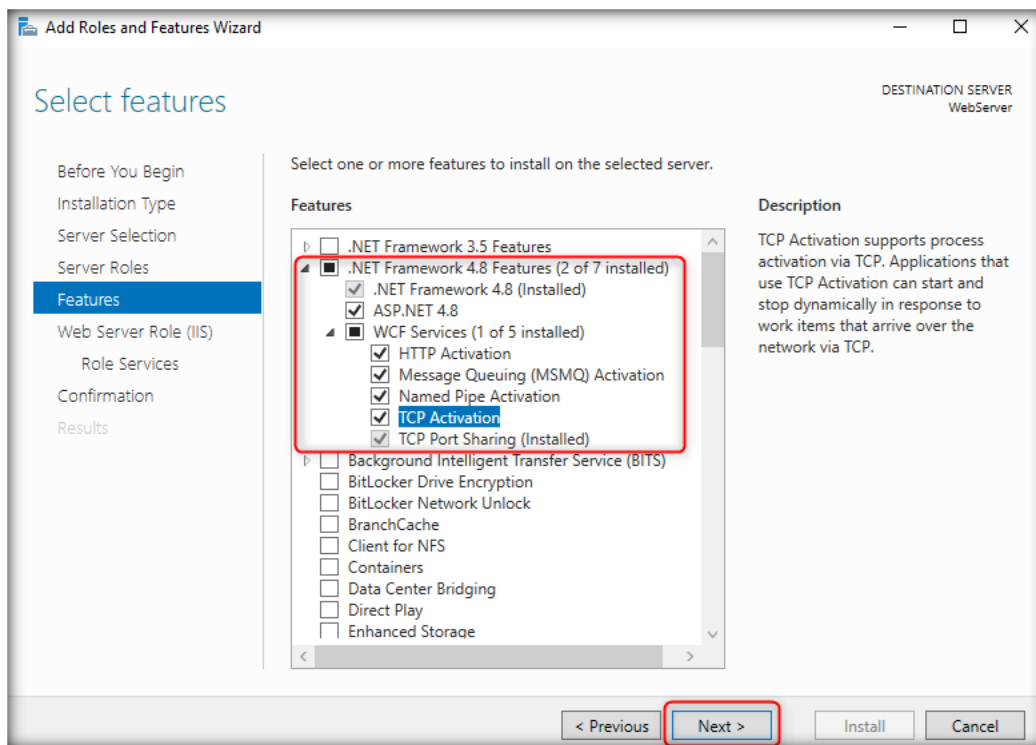


8. In the **Server Roles** section, you will observe the **Web Server (IIS)** option is checked. Click **Next**.

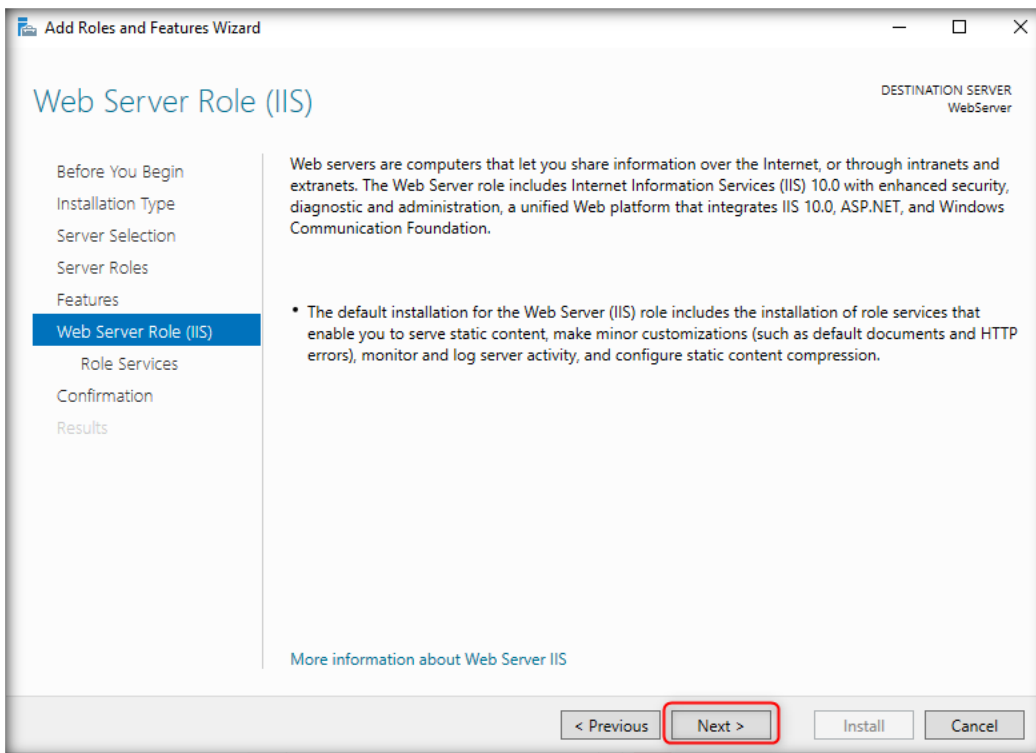


9. **Features** section appears, select the checkboxes under **.NET Framework 4.6** Features.

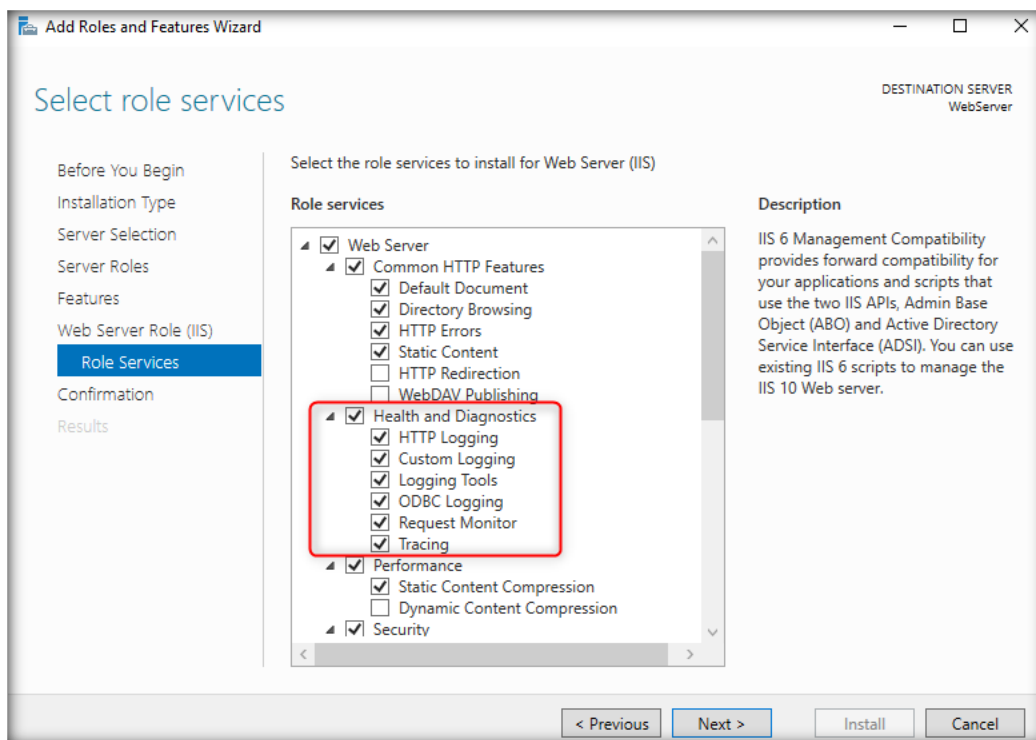
Note: Click **Add Features** button if you get a prompt for the features to be added, while selecting any features. Click **Next**.



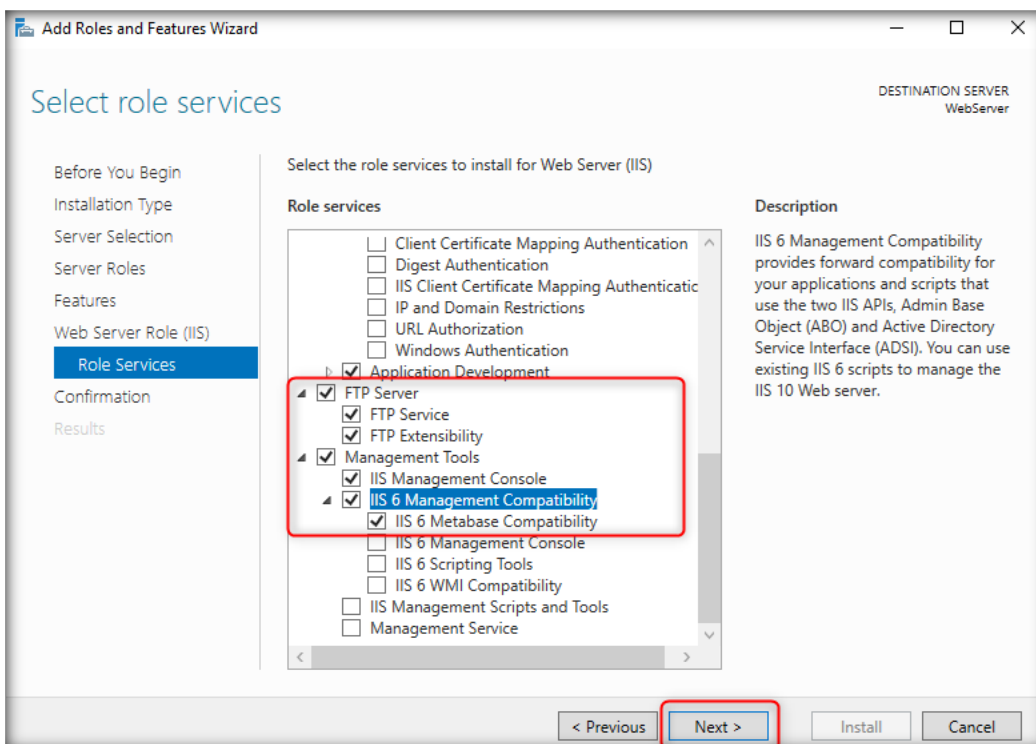
10. **Web Server Role (IIS)** section appears in the wizard, click **Next**.



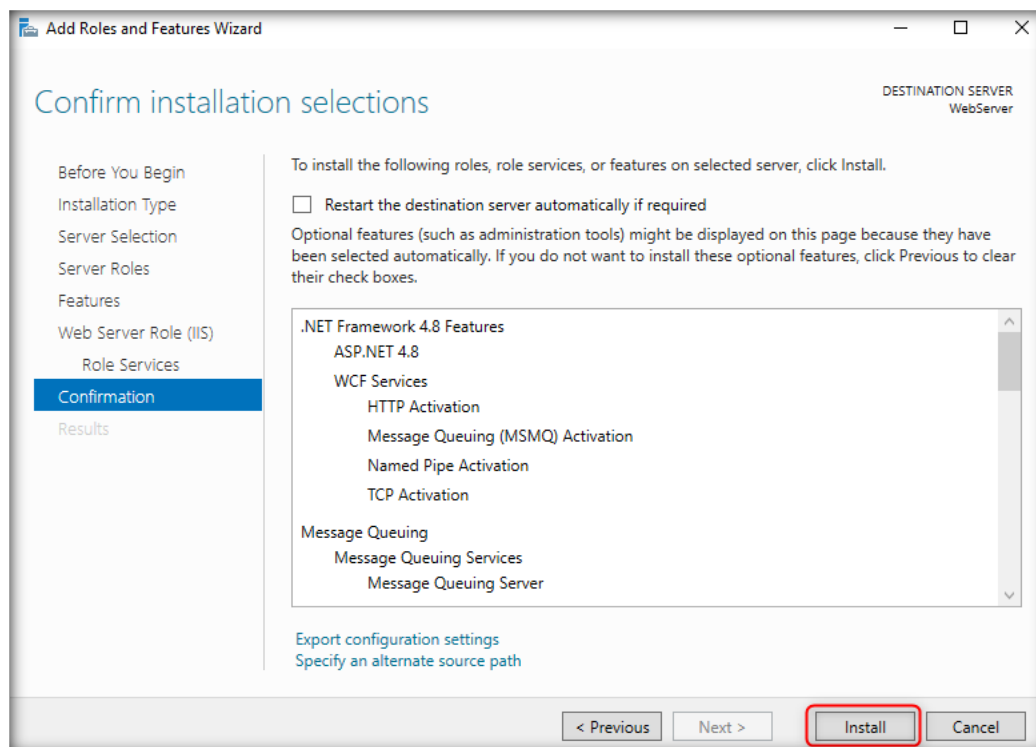
11. **Selected Role Services** section appears in the wizard. Check all features under **Health and Diagnostics**.



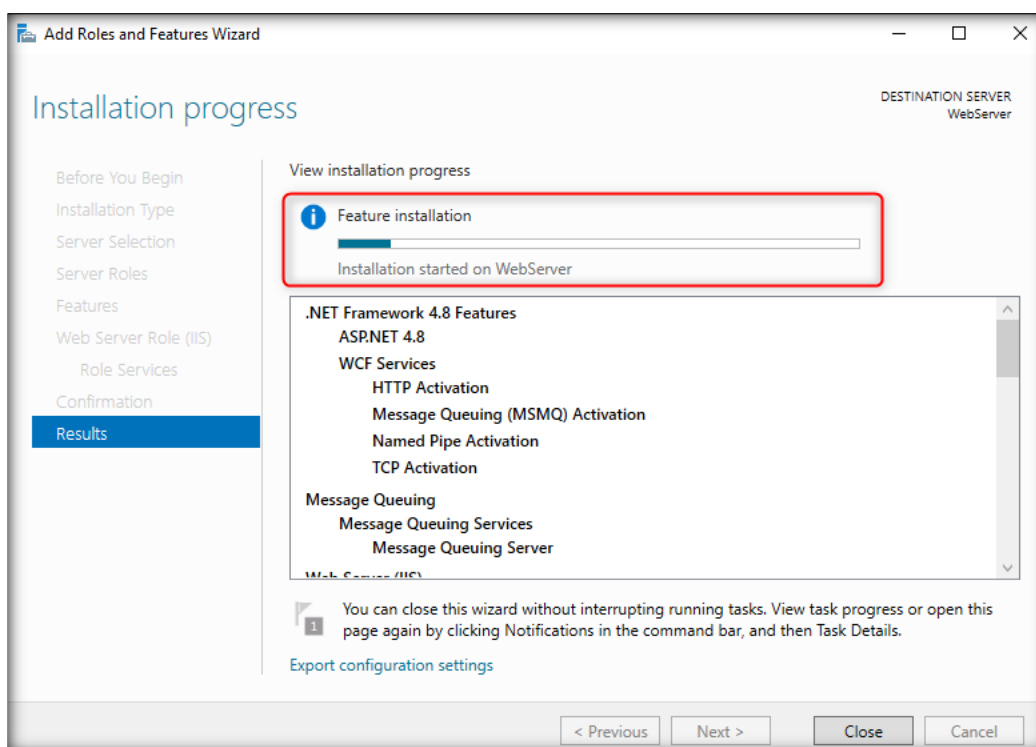
12. Scroll down and Check **FTP Server**→ **FTP Service**, **Management Tools**→ **IIS Management Console**, **IIS 6 Metabase Compatibility** → **IIS 6 Metabase Compatibility**. Click **Next**.



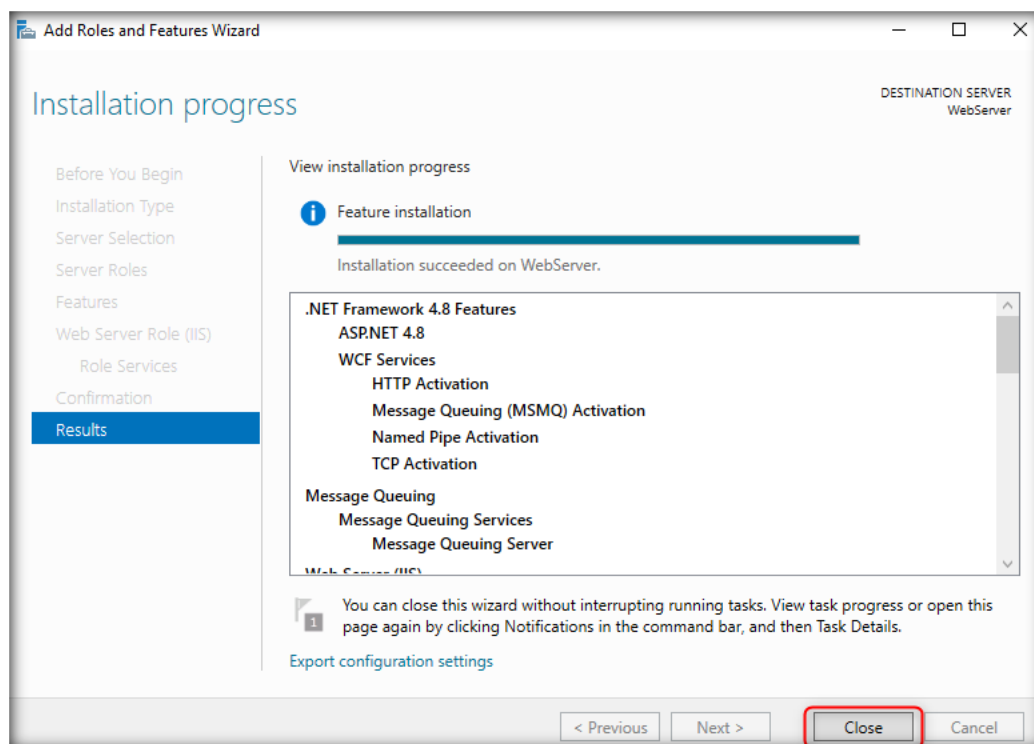
13. In Confirm installation section wizard, click **Install** (Ignore the warning under the Custom installation selections wizard).



14. **Add Roles and Features Wizard** will show the installation progress of the features. It will take a while to **complete** the installation of selected roles.

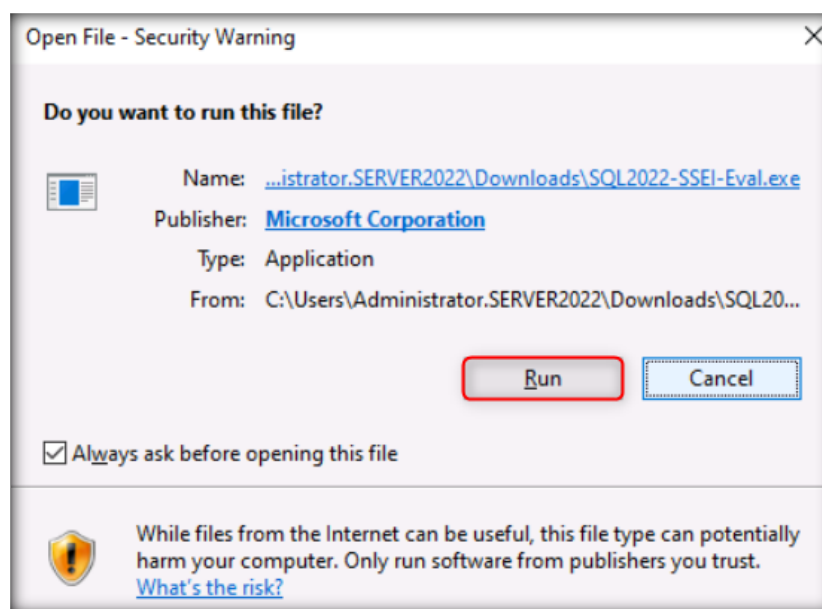


15. After the completion of installation, click **Close** button and restart the machine.

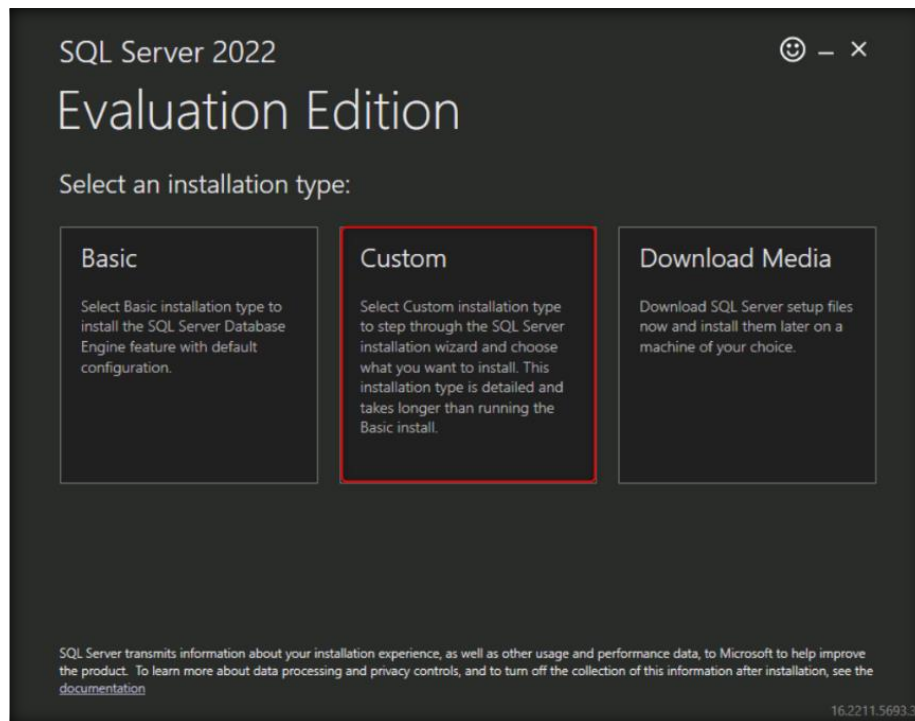


CT#6.12: Installing Microsoft SQL Server 2022 Evaluation edition

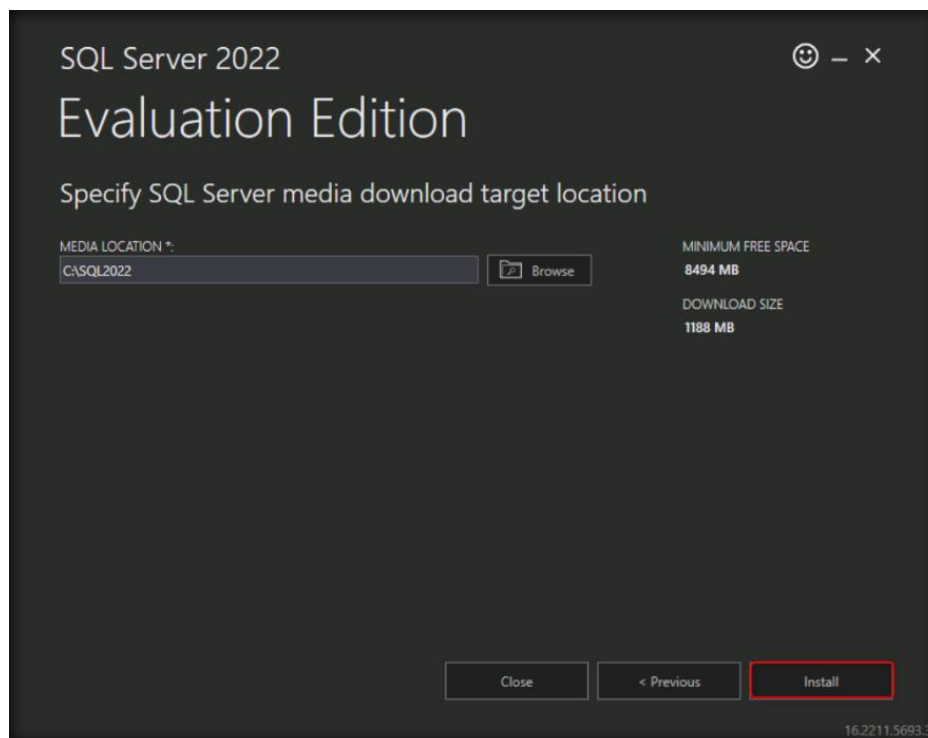
1. Navigate to **Z:\CND-Tools\Lab Prerequisites\SQL Server 2022** and double-click **SQLServer2022-SSEI-Eval.exe**.
2. If Open File -Security warning pop-up appears, click **Run**.



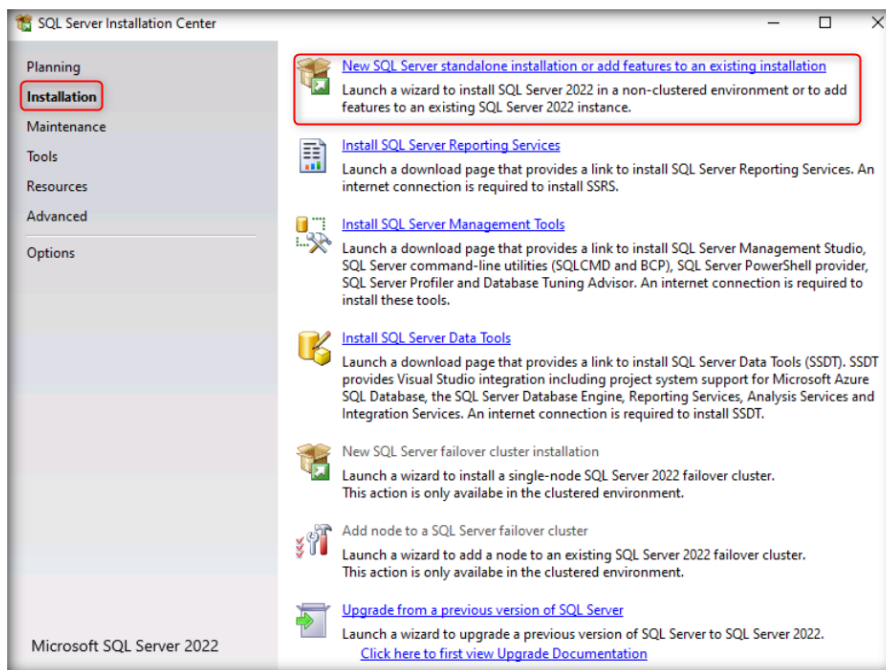
3. SQL Server 2022 window appears click **Custom**.



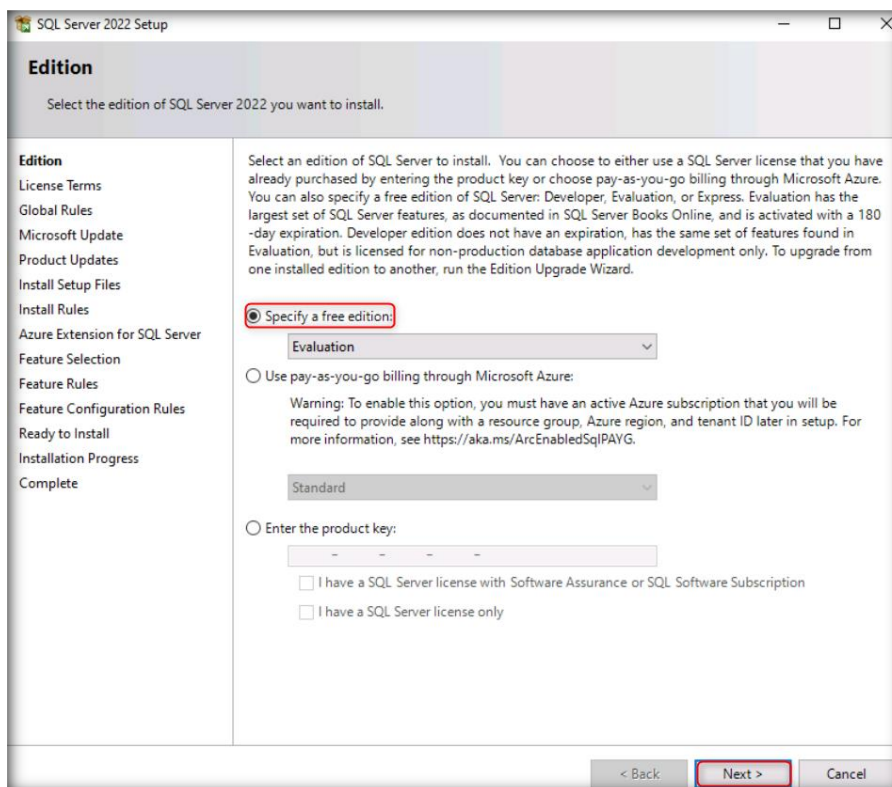
4. Specify SQL Server media download target location section appears, click **Install**.



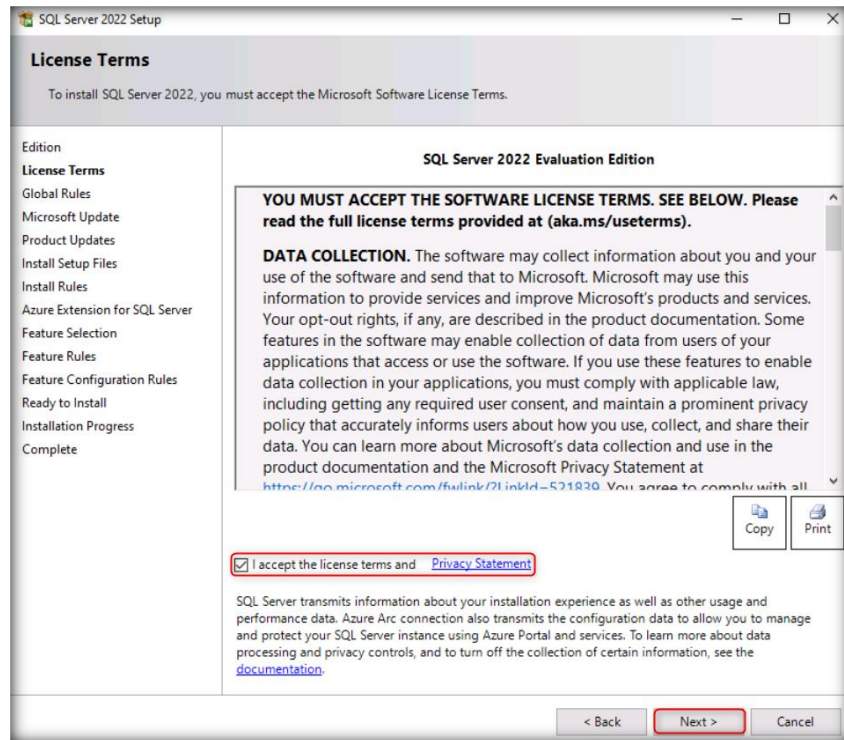
5. After installing, **SQL Server Installation Center** window appears. Select **Installation** tab from left pane and click **New SQL Server stand-alone installation or add features to an existing installation** link and wait for some time.



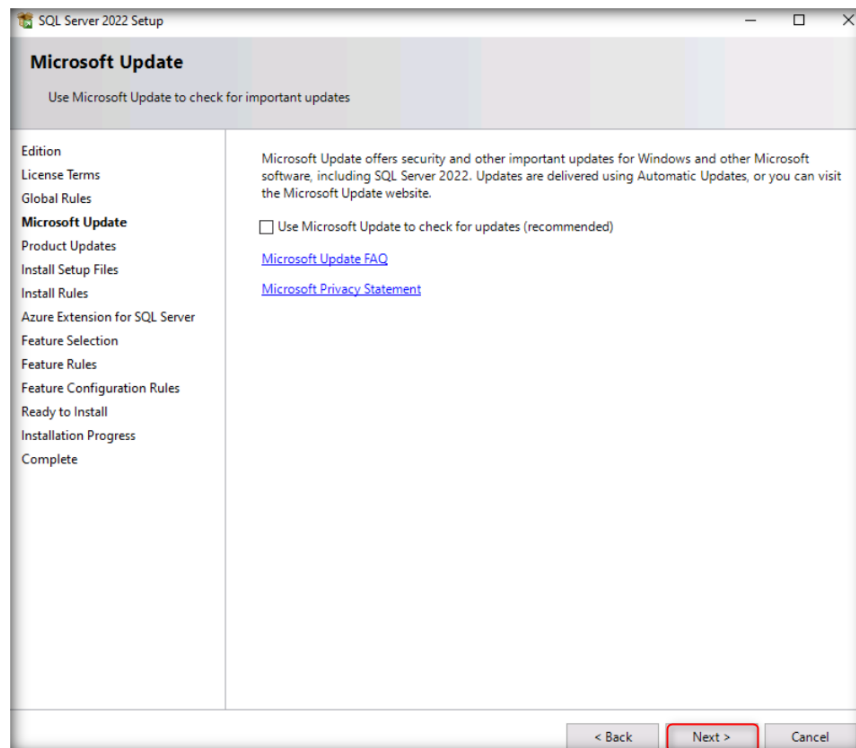
6. **Edition** window appears, Select **Specify a free edition** radio button and click on **Next**.



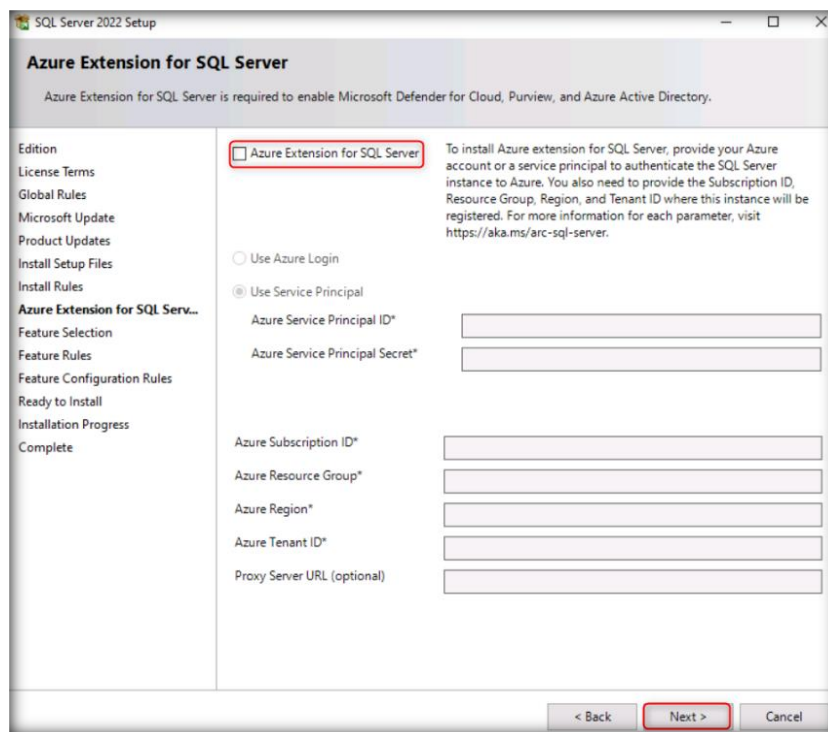
7. Read the Software License Terms in the **License Terms** section, check the option **I accept the license terms** and click **Next**



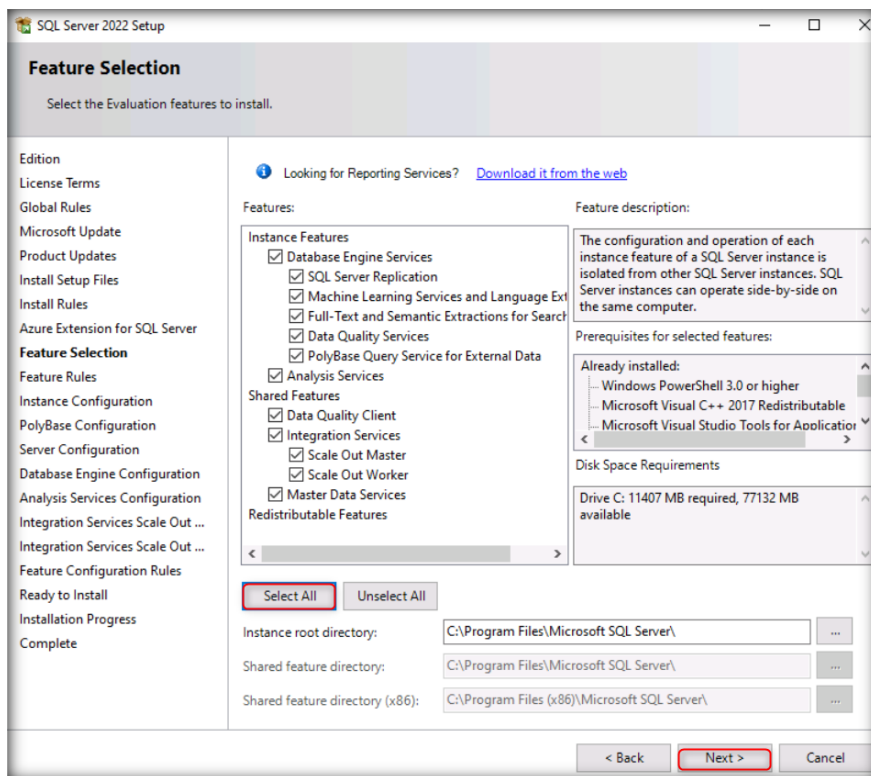
8. SQL Server 2022 Setup **Microsoft Update** section appears, click **Next**.



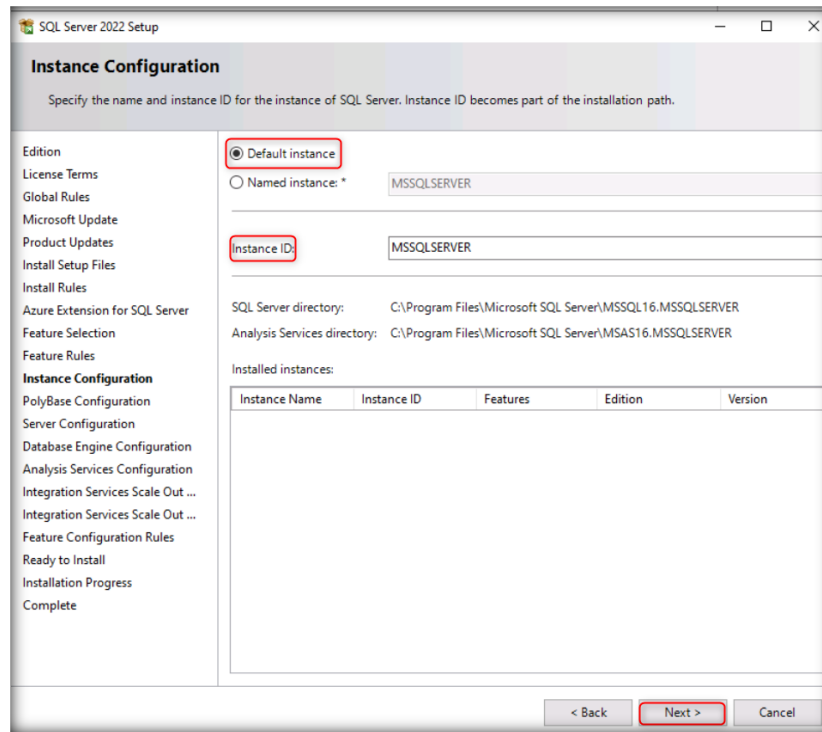
9. Azure Extension for SQL Server window appears. Uncheck the **Azure Extension for SQL Server** box and click on **Next**.



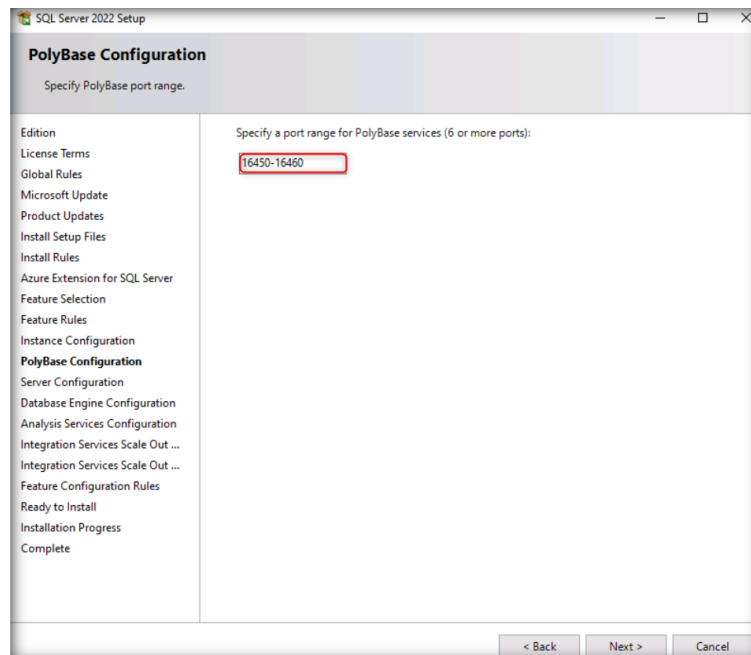
10. Feature Selection window appears. Click on **select all** and click on **Next**.



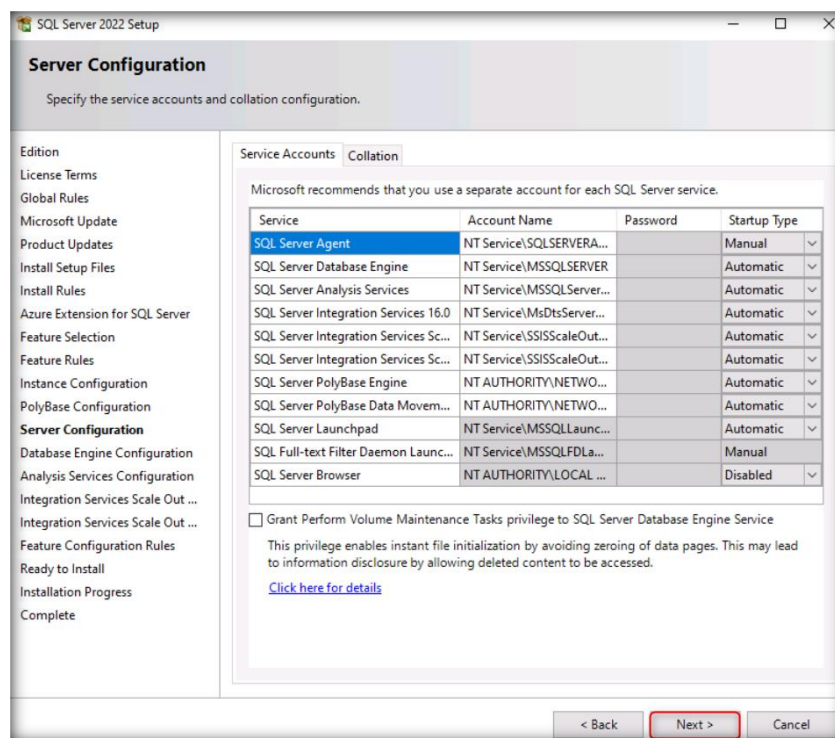
11. Instance Configuration window appears. Select **Default instance** radio button that gives Instance ID as MSSQLSERVER and click on **Next**.



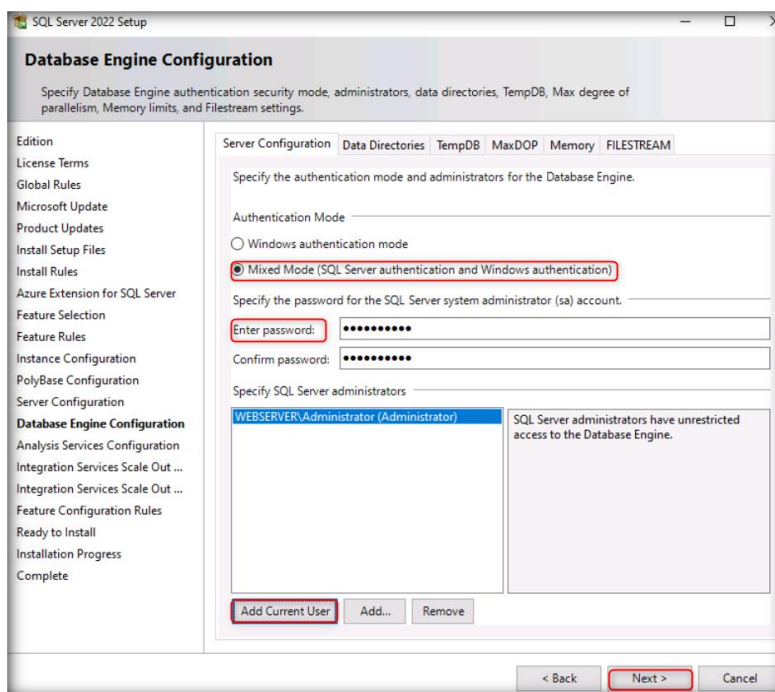
12. **PolyBase Configuration** window appears. Retain the default port range and click on **Next**.



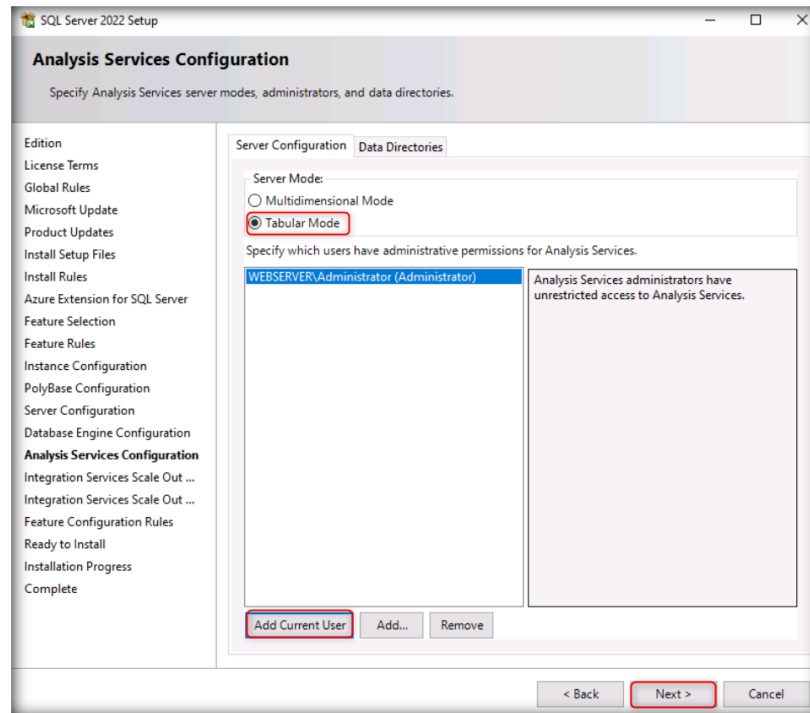
13. **Server configuration** window appears. Click on **Next**.



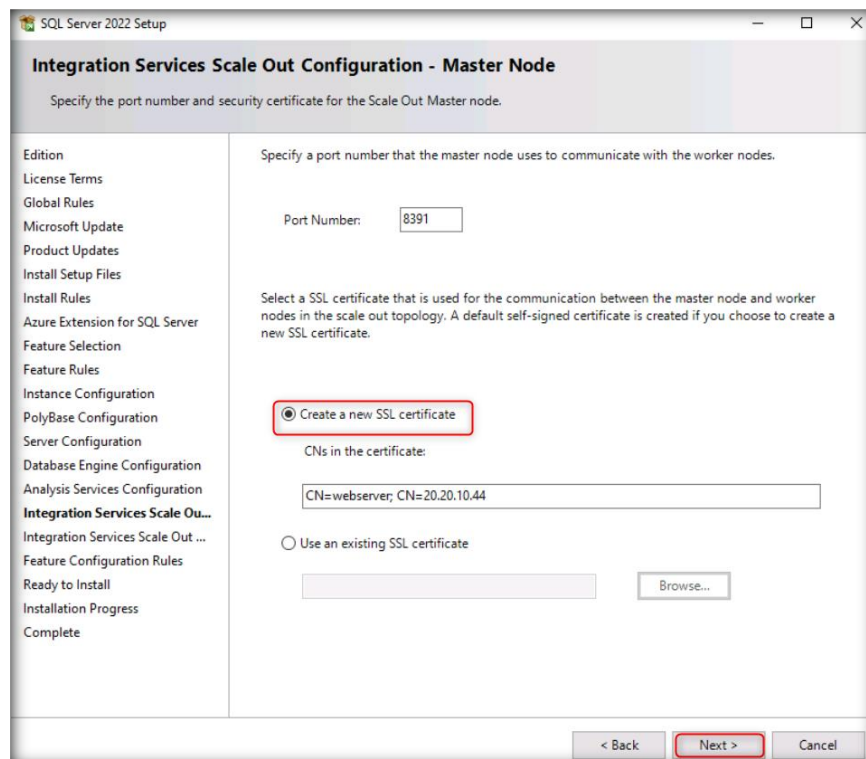
14. **Database Engine Configuration** window appears, select **Mixed Mode(SQL Server authentication and Windows authentication)** radio button and enter the password as **qwerty@123**. Click on **Add Current User**. You can see **WEBSERVER\Administrator (Administrator)** under Specify SQL Server administrators. Click on **Next**.



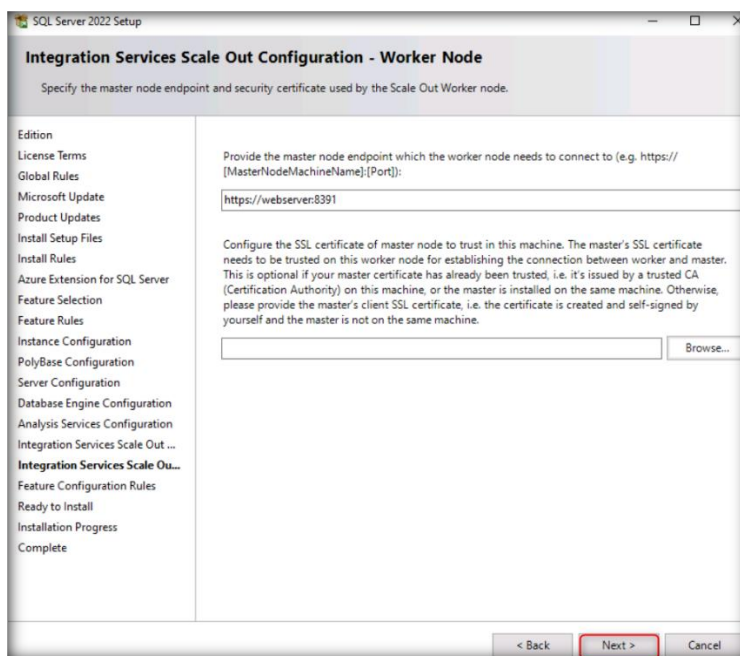
15. **Analysis Services Configuration** window appears. Select **Tabular Mode** radio button and Click on **Add Current User** as shown in the screenshot below and Click on **Next**.



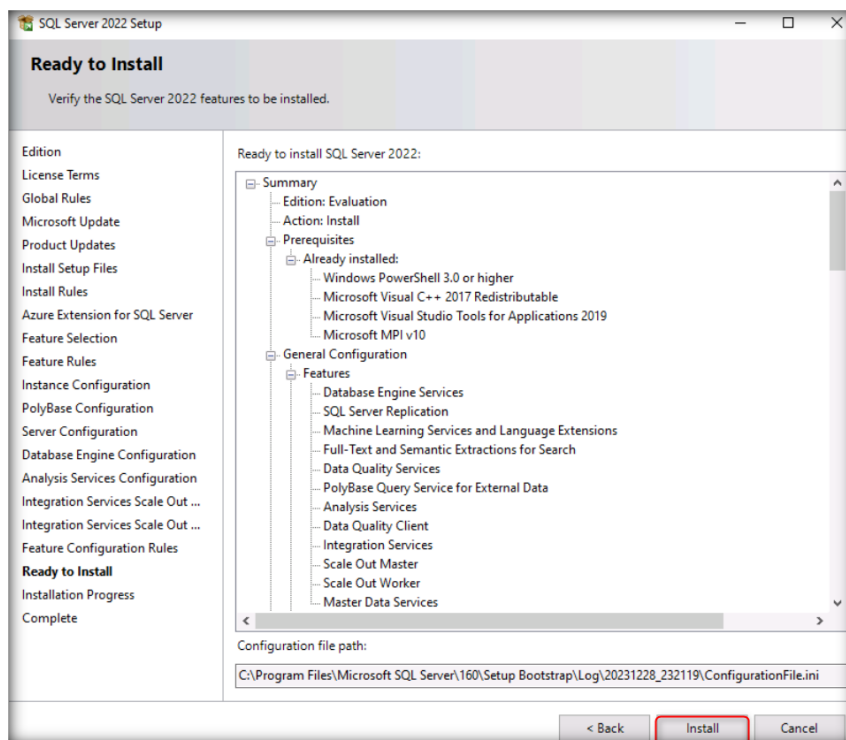
16. **Integration Services Scale Out Configuration- Master Node** window appears, Select **Create a new SSL certificate** radio button, and click on **Next**.



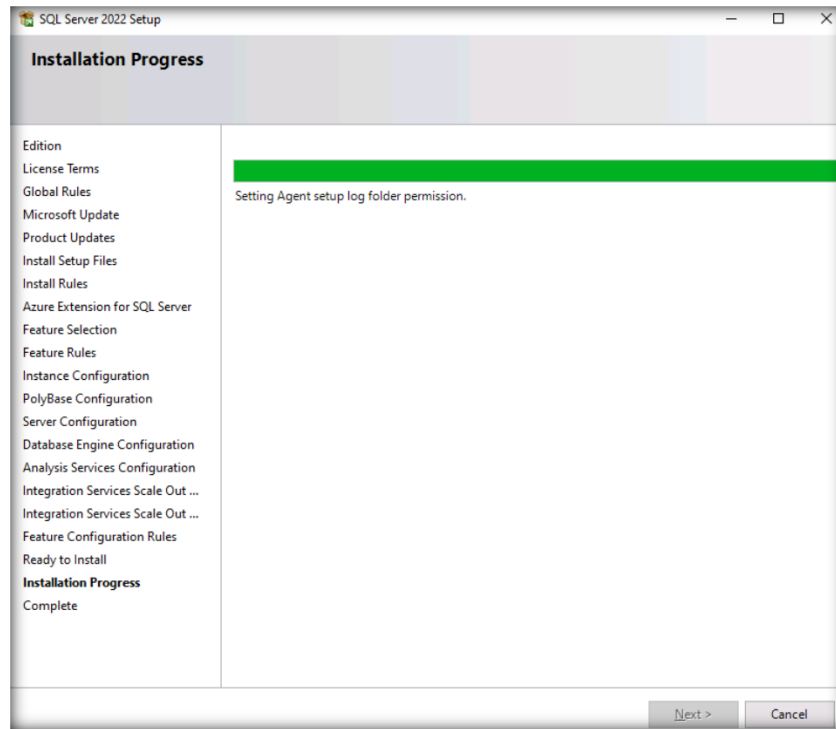
17. **Integration Services Scale Out Configuration- Work Node** window appears, Click on **Next**.



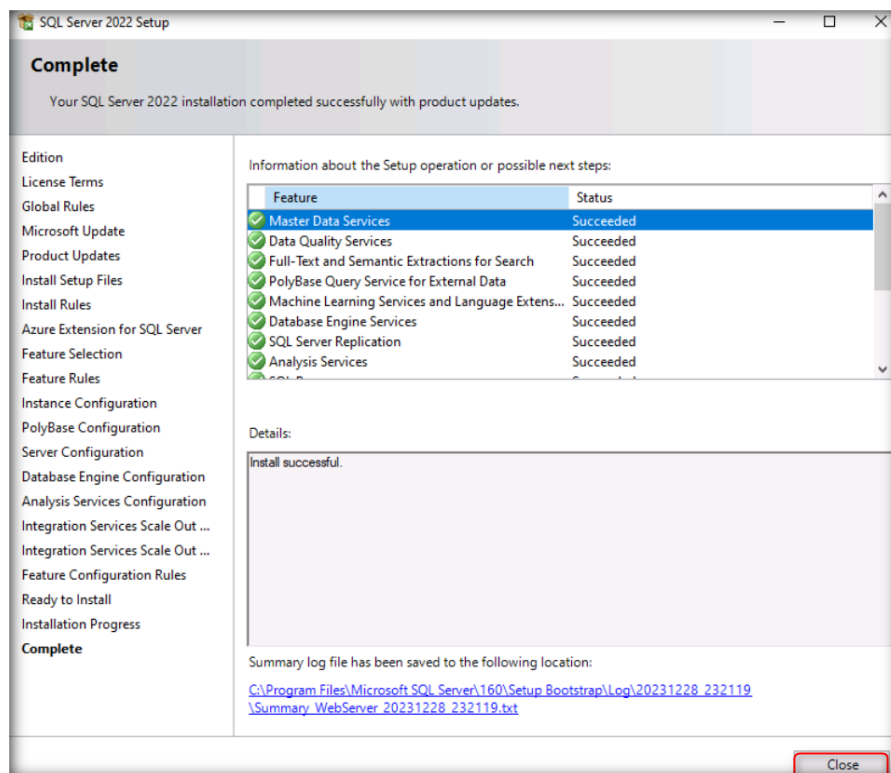
18. **Ready to Install** window appears. Click on **Install**.



19. Wait till it gets installed.



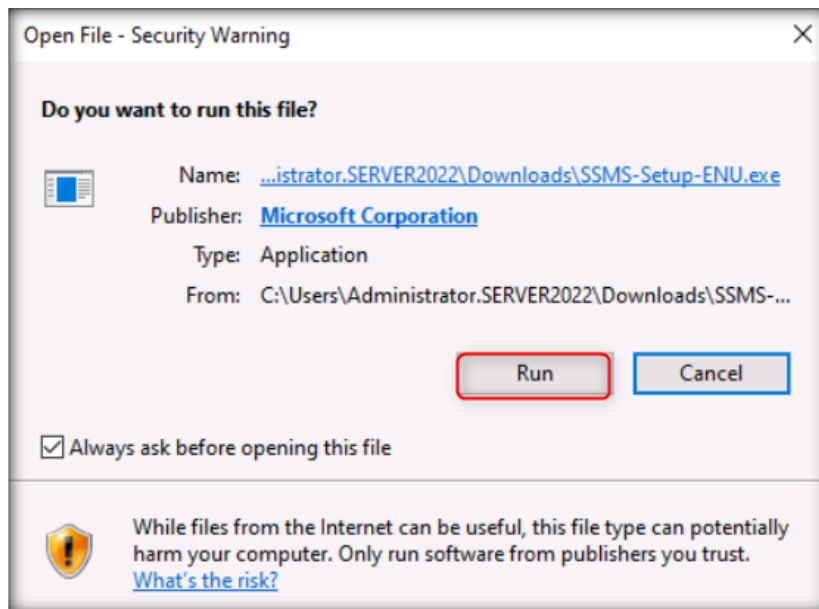
20. After the installation, click on **Close**.



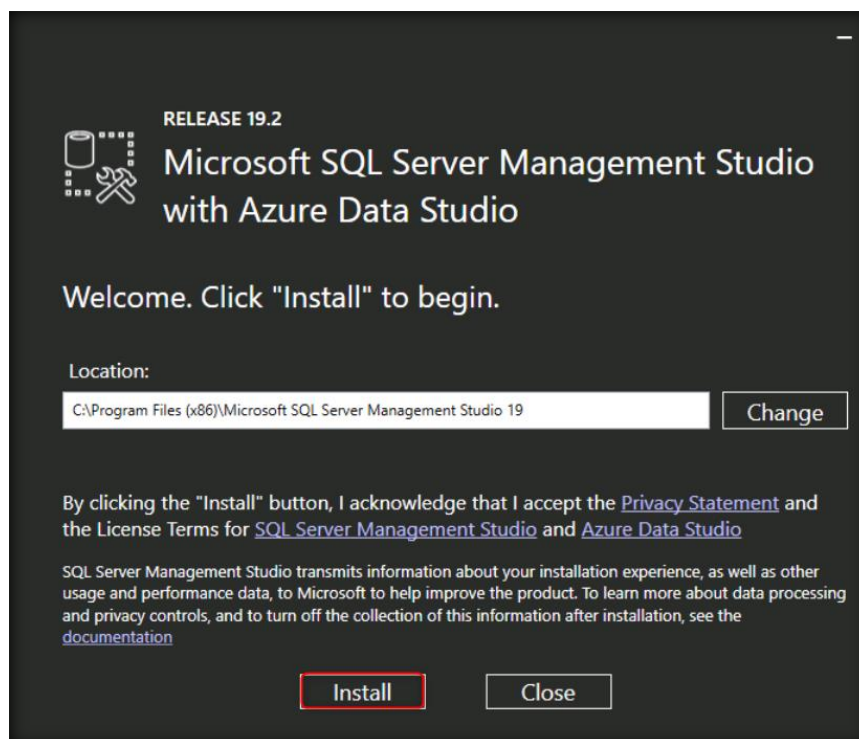
CT#6.13: Installation of Microsoft SQL Server Management Studio

1. Navigate the **Z:\CND-Tools\Lab Prerequisites\SQL Server Management Studio** Double-click on **SSMS-Setup-ENU.exe**.

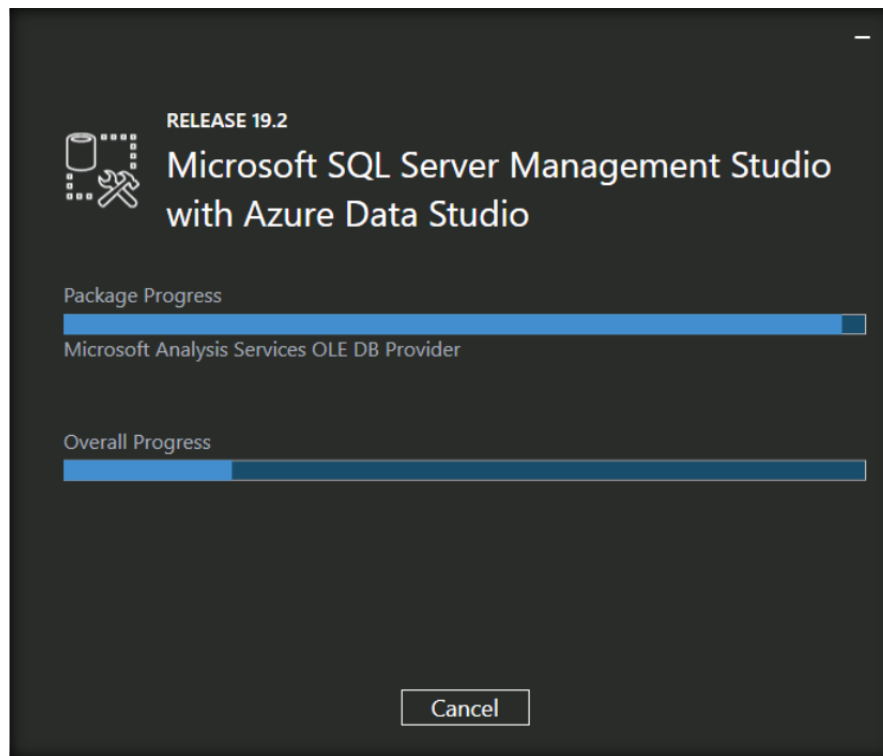
Click **Run** if a security warning pop-up appears.



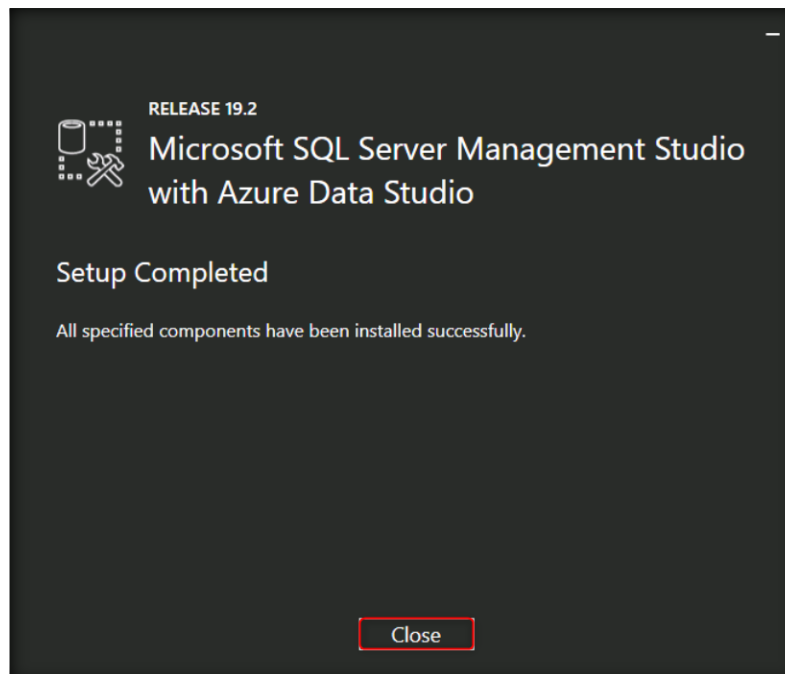
2. Microsoft SQL Server Management Studio welcome screen appears, click **Install** to begin the setup.



3. Microsoft SQL Server Management Studio begins the setup. Wait for the setup to finish.

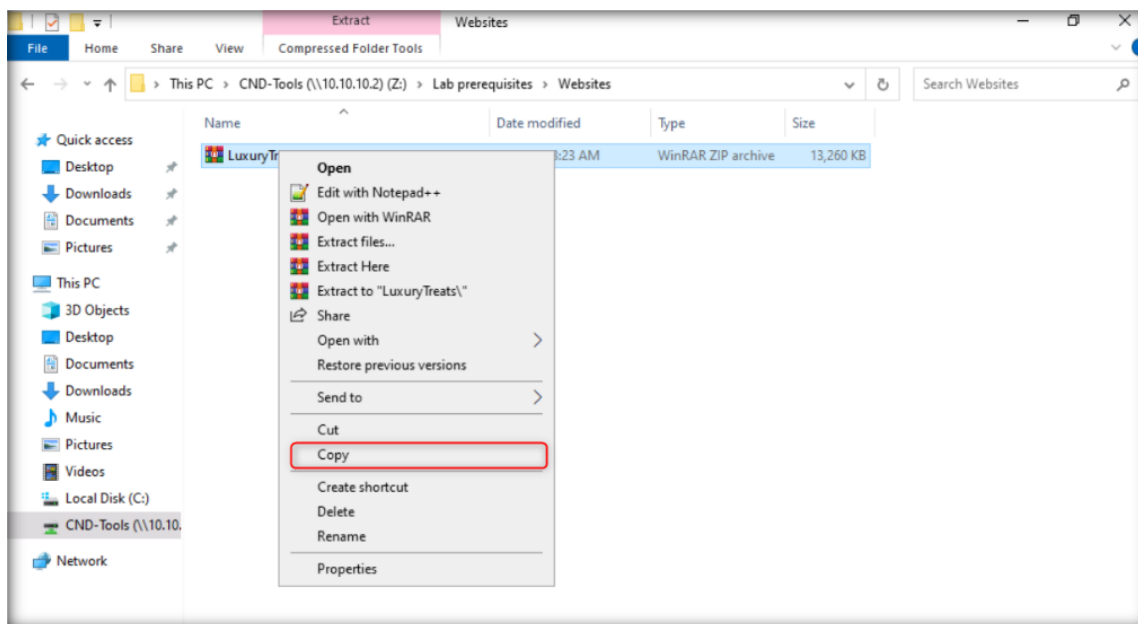


4. Microsoft SQL Server Management Studio Setup Completed screen appears, click **Close** to finish.

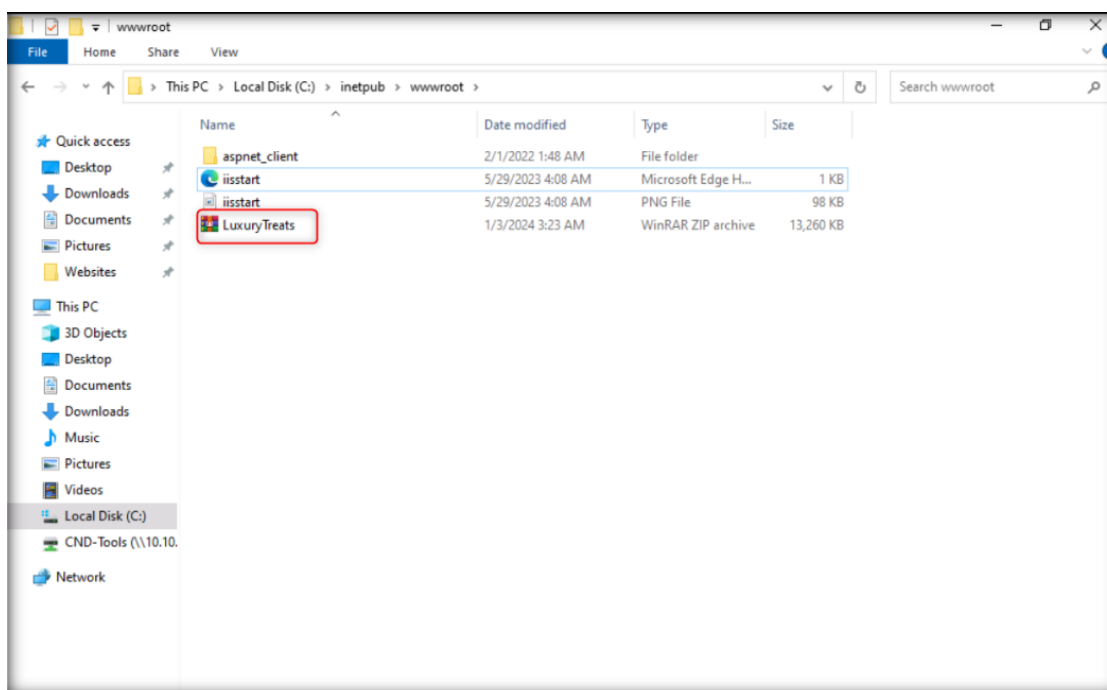


CT#8.12: Configure the LuxuryTreats Website

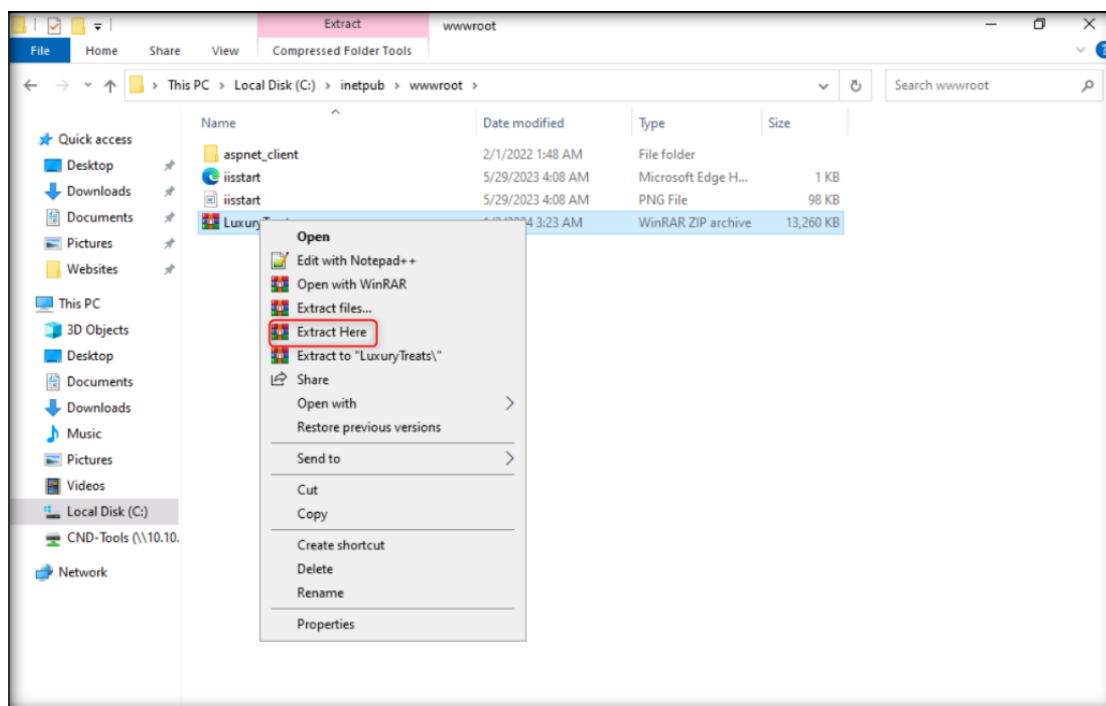
1. Navigate to **Z:\CND-Tools\Lab Prerequisites\Websites**.
2. Right-click the **LuxuryTreats.zip** file select copy from the context menu to copy the file.



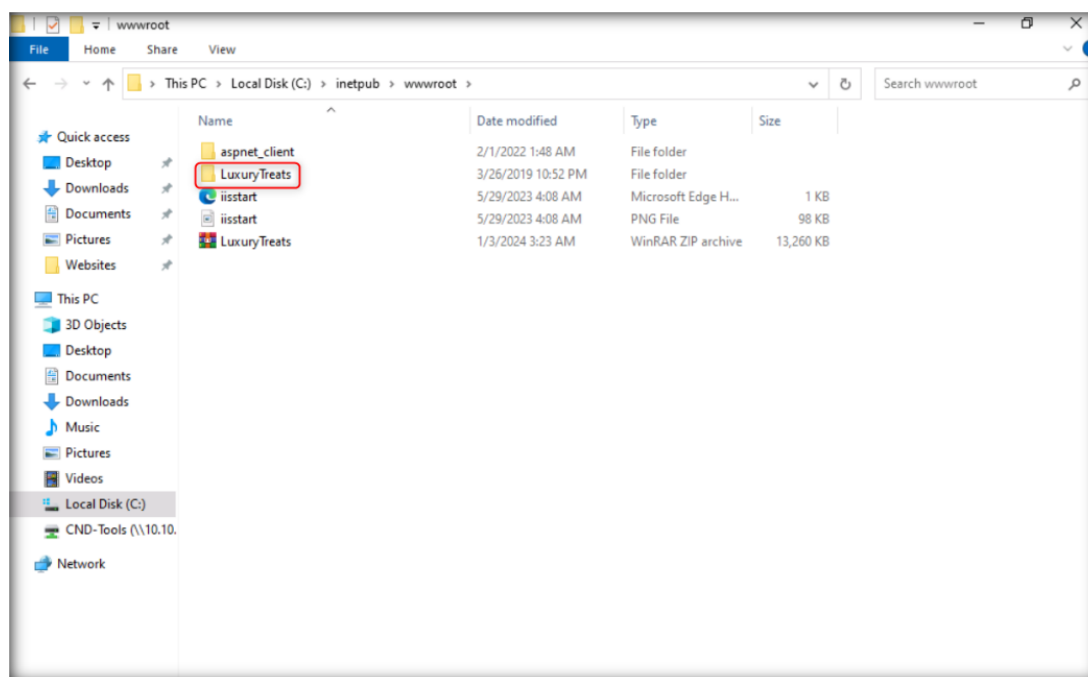
3. Navigate to **C:\inetpub\wwwroot** folder and past the copied LuxuryTreats.zip file.



4. Right-click the **LuxuryTreats.zip** file and click **Extract All** option from the context menu.



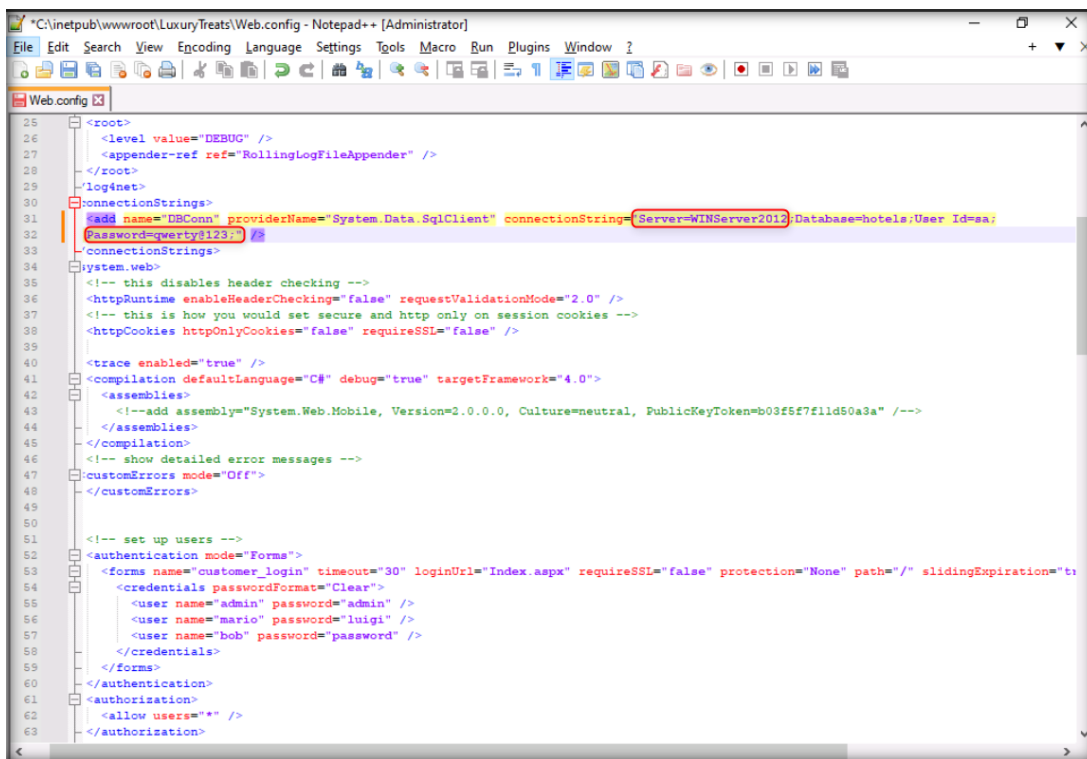
5. Change the Destination folder to **C:/inetpub/wwwroot/** and click **Extract**.
6. **LuxuryTreats.zip** file will be extracted, and you will see a **LuxuryTreats** folder created in **C:/inetpub/wwwroot**. **Delete** the **LuxuryTreats.zip** file. After extracting the **LuxuryTreats** folder delete the **LuxuryTreats.zip** file.



7. Open **LuxuryTreats** folder from **C:\inetpub\wwwroot** and open **Web.config** file in notepad++ or in notepad.

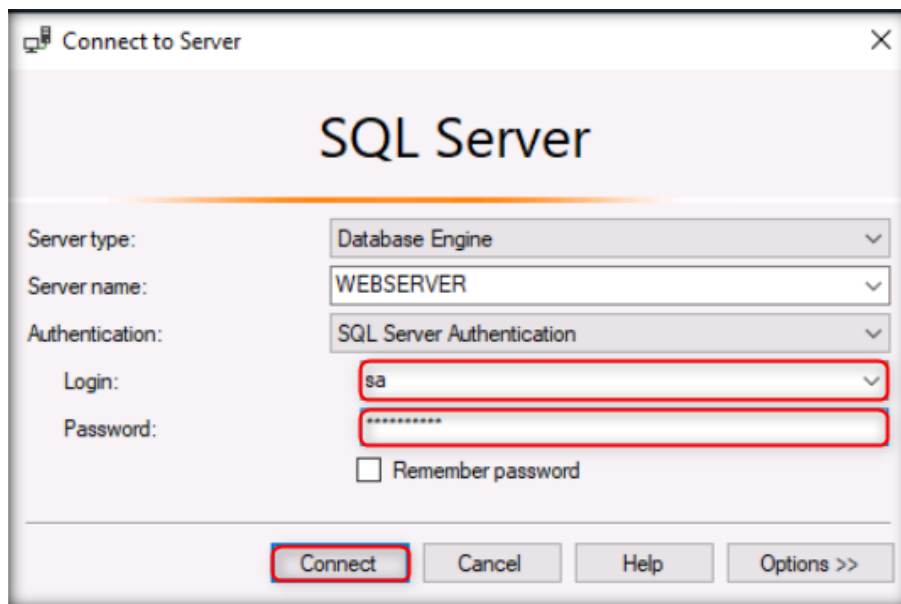
8. Scroll down to **connectionStrings** tag, Replace Server with your machine's name in the **connectionString** property of DBConn connection string as shown in the screenshot.

Note: If you have changed the password of sa user while installing SQL Server, change the password in the connection string to given password for SQL Server **sa** user while installing SQL Server.

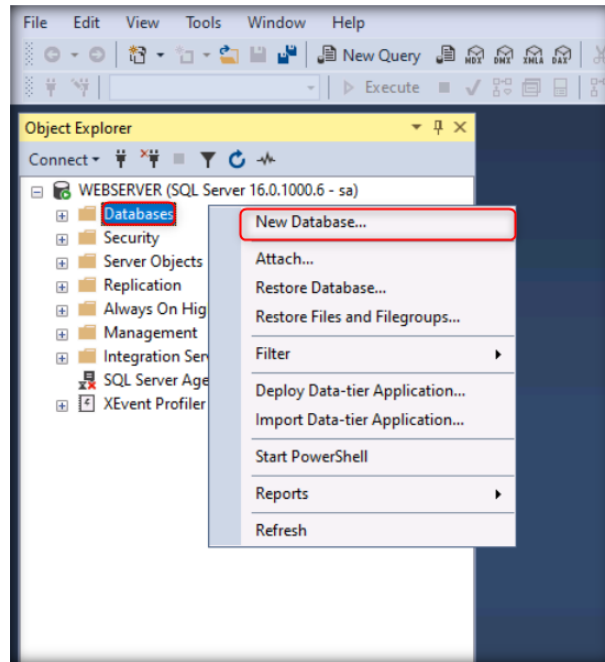


```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <appSettings>
    <add key="ConnectionString" value="Server=WINServer2012;Database=hotels;User Id=sa;Password=erty123;" />
  </appSettings>
  <connectionStrings>
    <add name="DBConn" providerName="System.Data.SqlClient" connectionString="Server=WINServer2012;Database=hotels;User Id=sa;Password=erty123;" />
  </connectionStrings>
  <system.web>
    <!-- this disables header checking -->
    <httpRuntime enableHeaderChecking="false" requestValidationMode="2.0" />
    <!-- this is how you would set secure and http only on session cookies -->
    <httpCookies httpOnlyCookies="false" requireSSL="false" />
    <trace enabled="true" />
    <compilation defaultLanguage="C#" debug="true" targetFramework="4.0" />
    <assemblies>
      <!--add assembly="System.Web.Mobile, Version=2.0.0.0, Culture=neutral, PublicKeyToken=b03f5f7f1fd50a3a" /-->
    </assemblies>
    </compilation>
    <!-- show detailed error messages -->
    <customErrors mode="Off" />
  </system.web>
  <!-- set up users -->
  <authentication mode="Forms">
    <forms name="customer_login" timeout="30" loginUrl="Index.aspx" requireSSL="false" protection="None" path="/" slidingExpiration="true" />
    <credentials passwordFormat="Clear">
      <user name="admin" password="admin" />
      <user name="mario" password="luigi" />
      <user name="bob" password="password" />
    </credentials>
  </forms>
  </authentication>
  <authorization>
    <allow users="*" />
  </authorization>
</configuration>
```

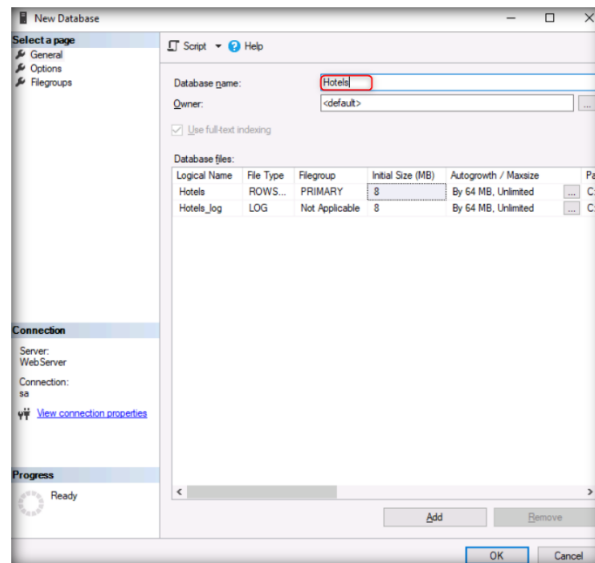
9. **Save** the file and **close** it.
10. Now, **launch** SQL Server 2022 Management Studio and click **Connect**.



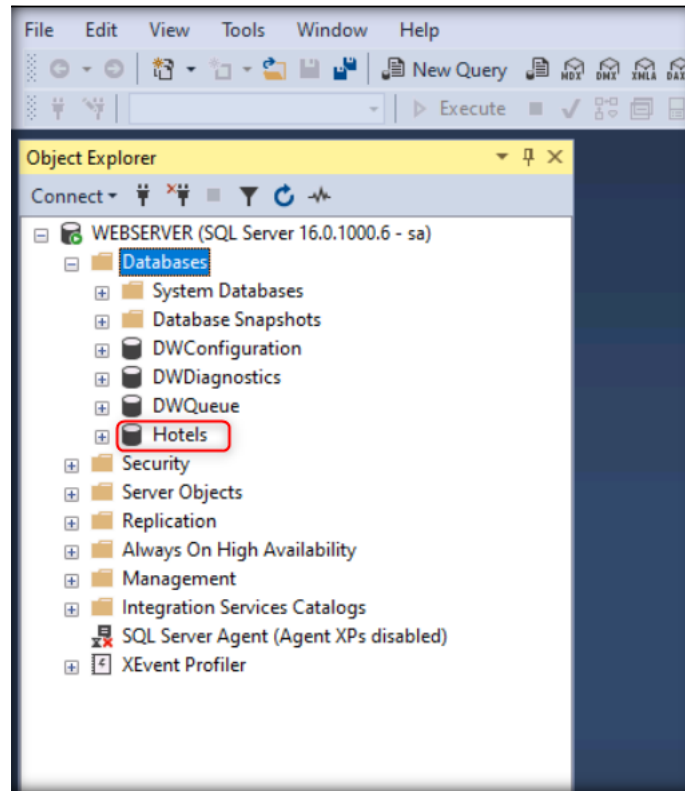
11. Microsoft SQL Server Management Studio window, right-click on **Databases** and select **New Database**.



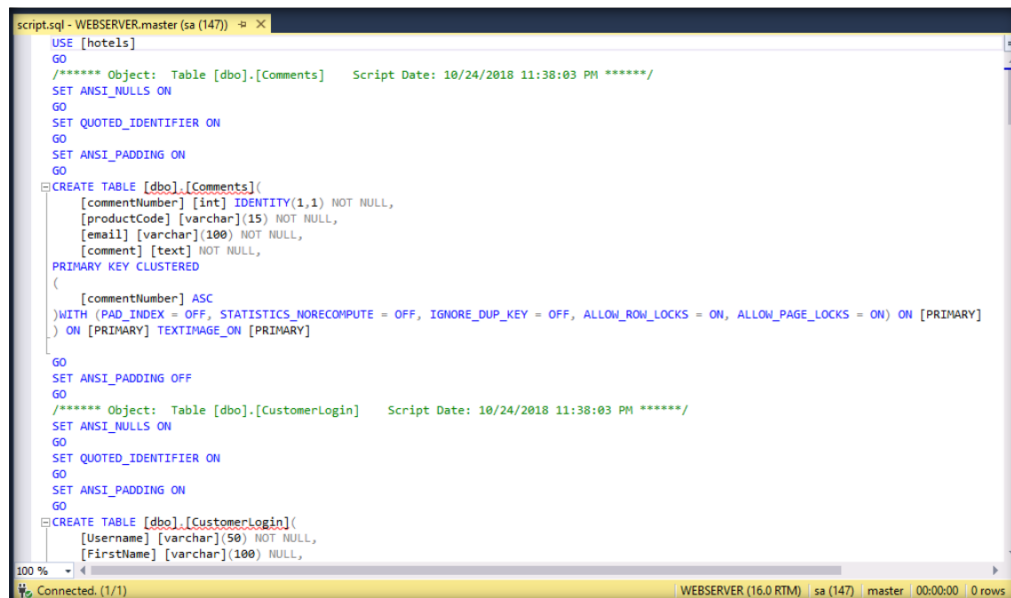
12. **New Database** window appears, specify **Database name** as **Hotels** and click **OK**.



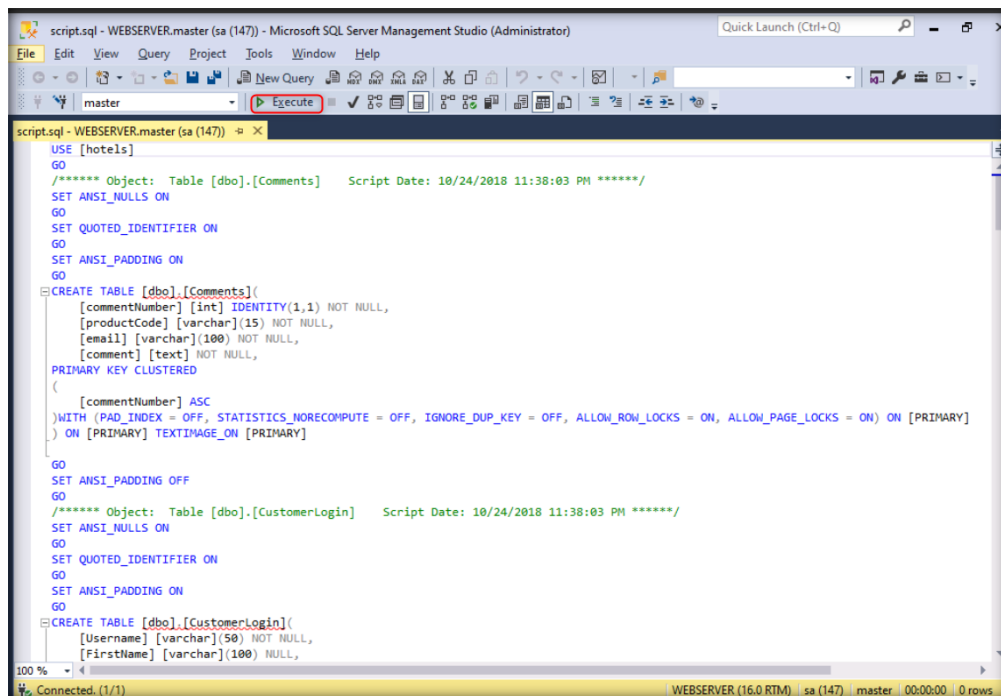
13. Now expand the **Databases** node. You will observe that Hotels database appears under the **Object Explorer** section, which implies that Hotels database has been **successfully** created.



14. Navigate to **Z:\Lab Prerequisites\Website\DBScript**.
15. Double-click **Script.sql** file, it will open in **SQL Server Management Studio** Editor. If you are not connected to the database server, a 'Connect to Server' window appears. Give the username and password and connect to the database server.

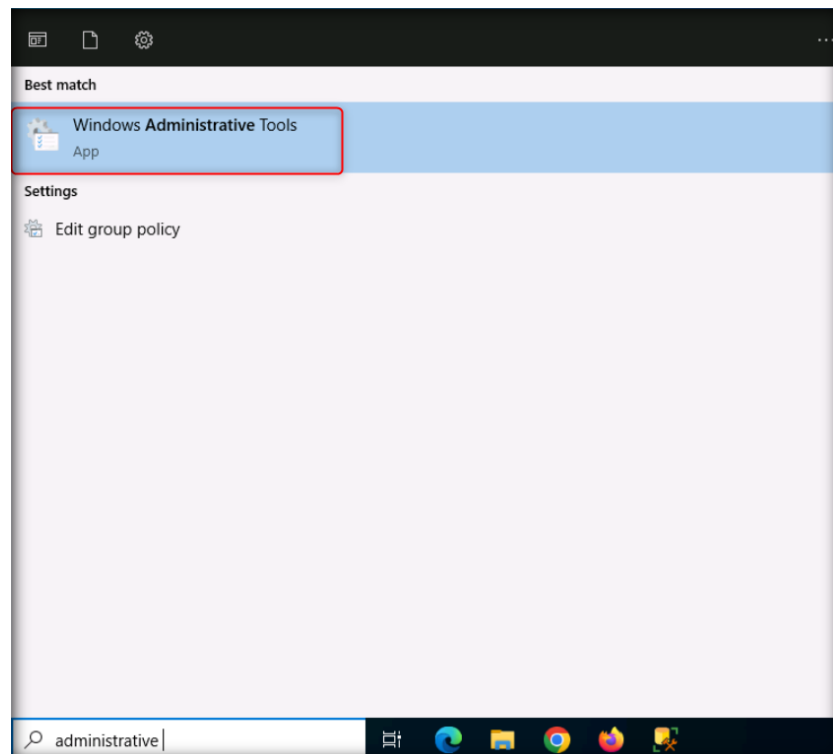


16. Now click  **Execute** on the task bar.

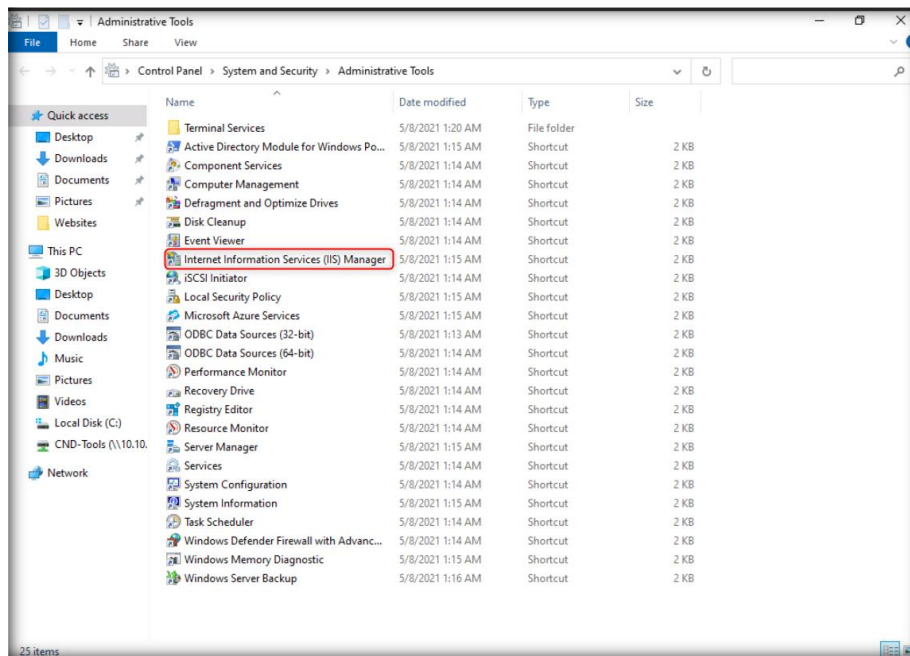


17. This process will create **necessary** tables in the **Hotels** database.

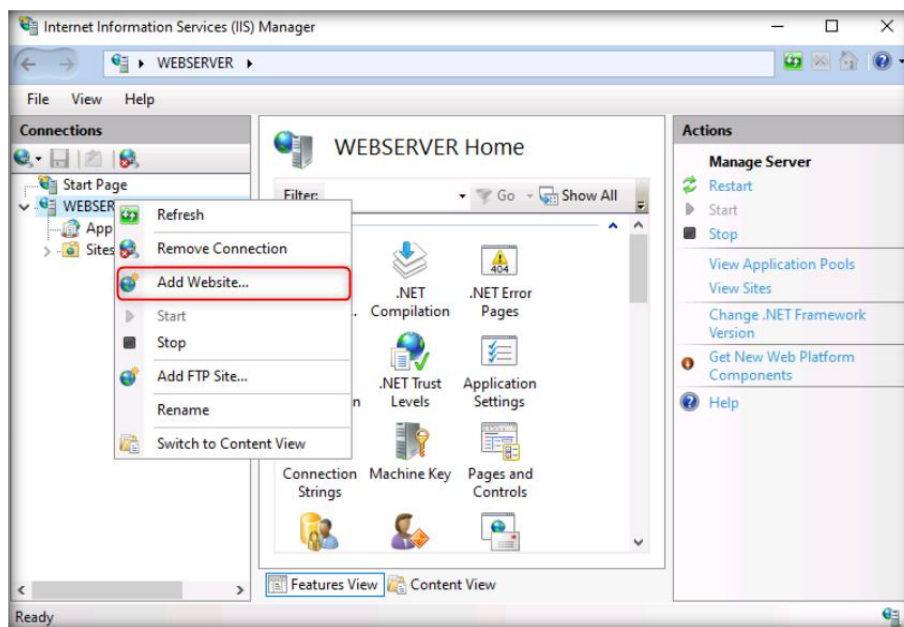
18. Now click **Start** menu button, click **Administrative Tools**.



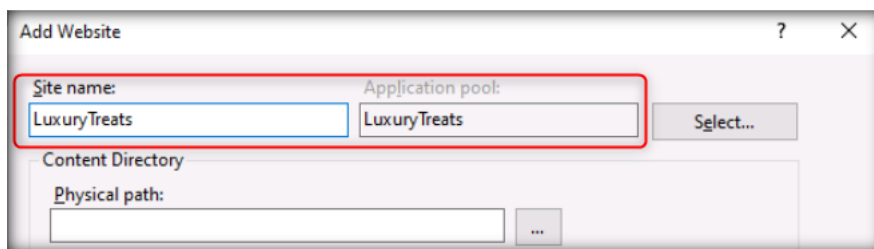
19. Double-click on **Internet Information Services (IIS) Manager**.



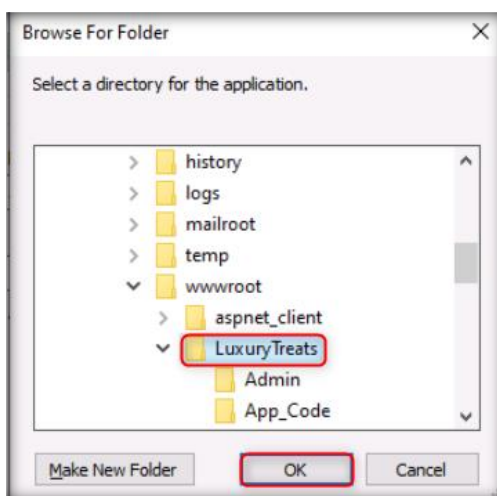
20. Internet Information Services (IIS) Manager main window appears, now in Connections pane of the IIS Manager, right-click the **Machine Name** and click **Add Website** from context menu.



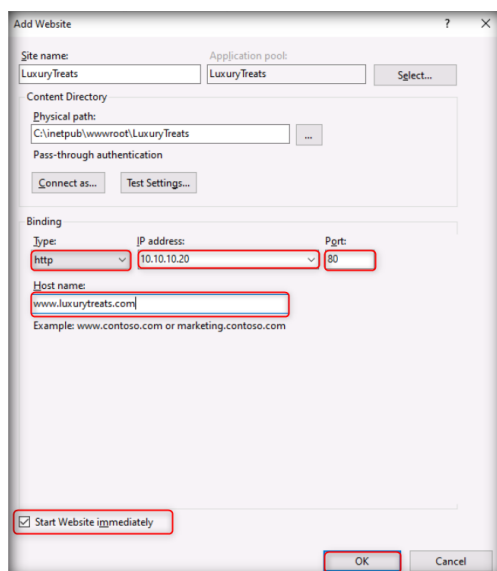
21. Add Website wizard appears, type the **Site** name in **Site name:** field and click on **Browse** button near **Physical path:** section. Here we are installing LuxuryTreats site, so we have provided **LuxuryTreats** in the Site name: field.



22. **Browse** for Folder pop-up appears, navigate to C:\inetpub\wwwroot and choose **LuxuryTreats** folder and click **OK**.

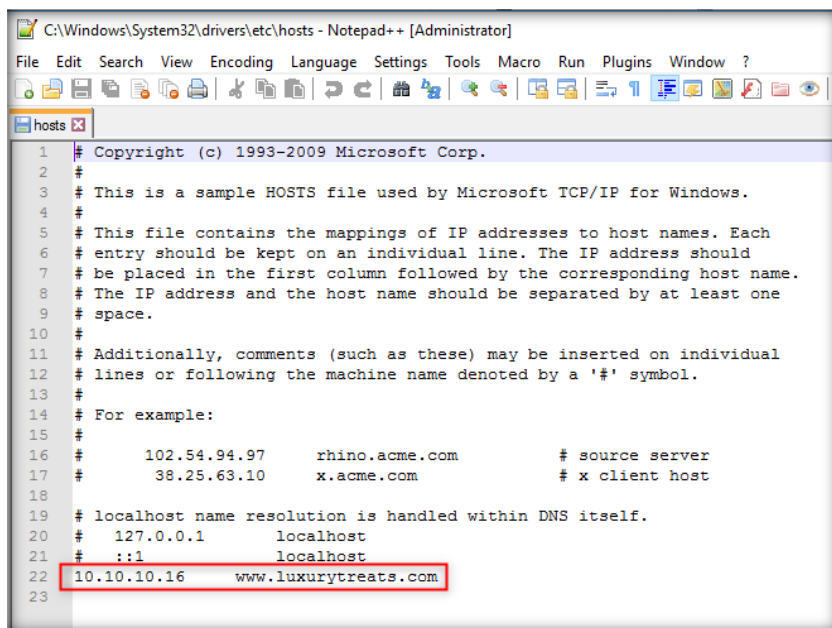


23. Now in Binding section choose **http** in Type: field. Choose the **Host machine IP address** (Internal adaptor - 10.10.10.12) from IP address: field, and choose **80** in Port: field.
24. Type www.luxurytreats.com in Hostname: field, make sure that **Start Website immediately** is checked and click **OK**.



CT#8.13: Configuring Host File in Windows Server 2022

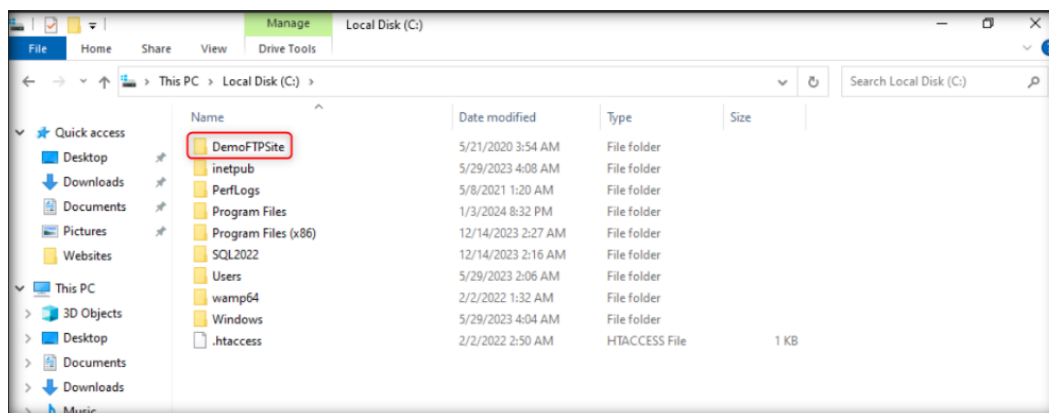
1. In Windows Server 2022 navigate to **C:\Windows\System32\drivers\etc** and right click on **hosts** file and click **Edit with Notepad++** from context menu.
2. Hosts file opens in Notepad++ type <IP Address of the Web Server> www.luxurytreats.com and click **Save** button and close the Notepad++ window.



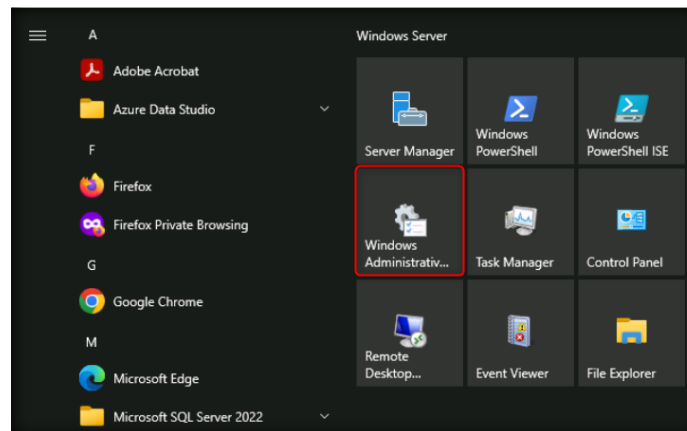
```
1 # Copyright (c) 1993-2009 Microsoft Corp.
2 #
3 # This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
4 #
5 # This file contains the mappings of IP addresses to host names. Each
6 # entry should be kept on an individual line. The IP address should
7 # be placed in the first column followed by the corresponding host name.
8 # The IP address and the host name should be separated by at least one
9 # space.
10 #
11 # Additionally, comments (such as these) may be inserted on individual
12 # lines or following the machine name denoted by a '#' symbol.
13 #
14 # For example:
15 #
16 #       102.54.94.97       rhino.acme.com           # source server
17 #       38.25.63.10       x.acme.com               # x client host
18 #
19 # localhost name resolution is handled within DNS itself.
20 #   127.0.0.1       localhost
21 #   ::1             localhost
22 # 10.10.10.16       www.luxurytreats.com
23
```

CT#8.14: Setting up FTP Site

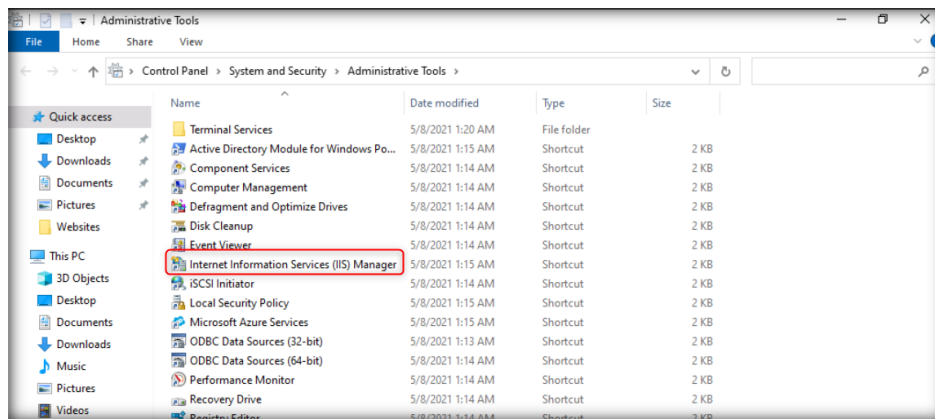
1. Navigate to **Z:\Lab Prerequisites\Website** and copy the **DemoFTPSite** into C: drive.



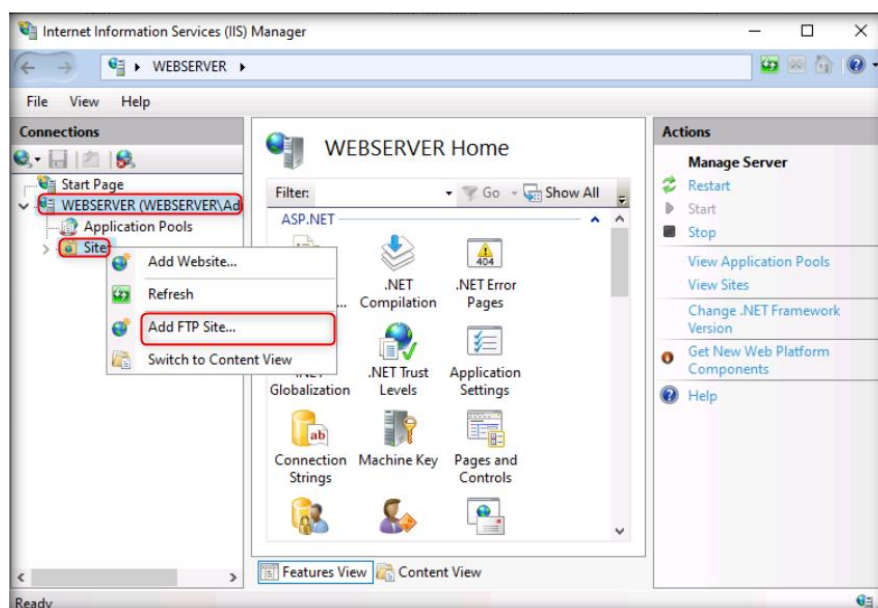
- Click on **Windows Start** button → **Administrative Tools**.



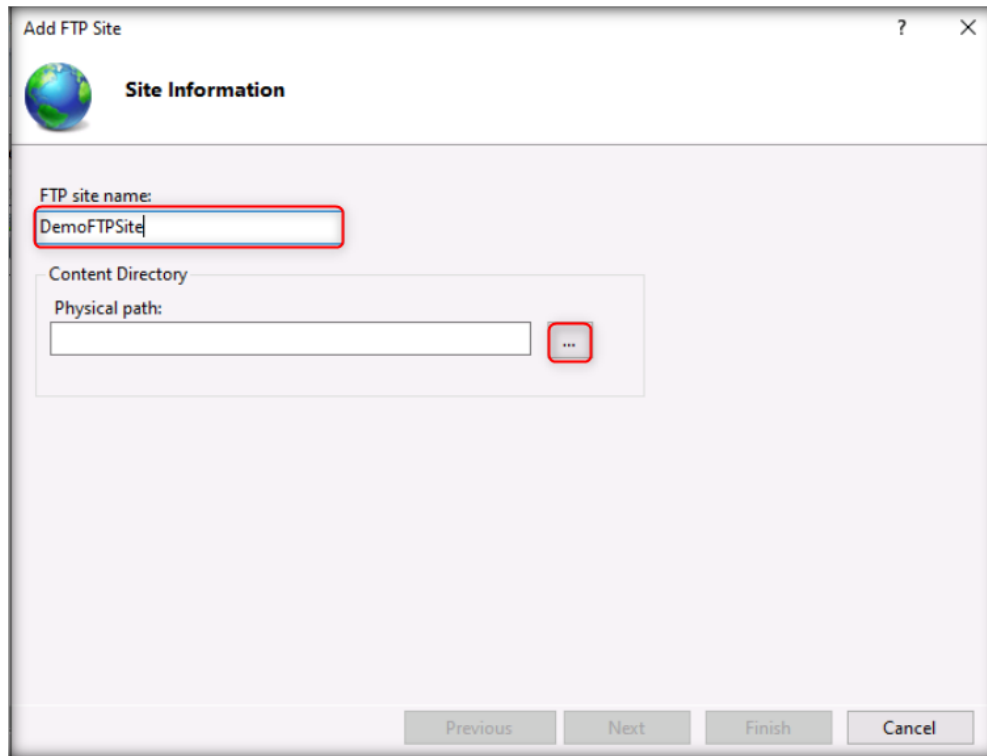
- Double-Click on **Internet Information Services (IIS) Manager**.



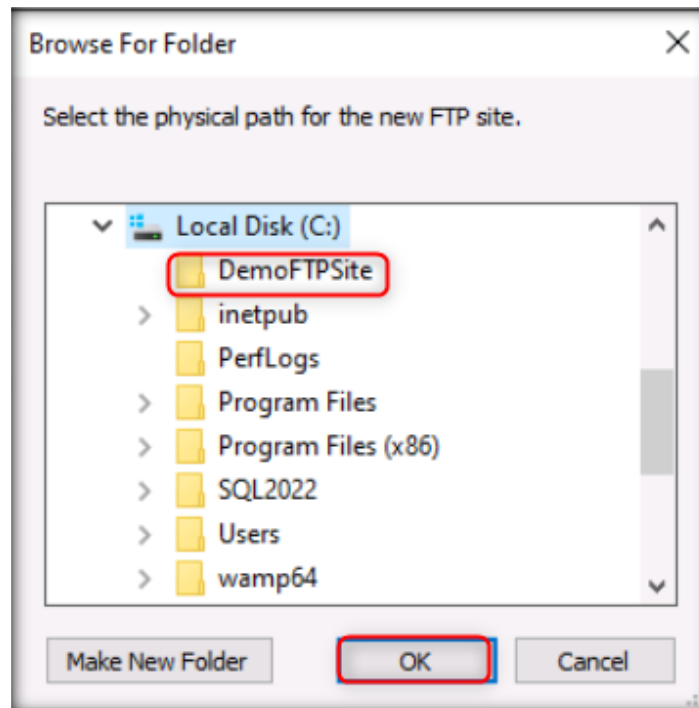
- In the IIS Manager window expands **WINSERVER (WEBSERVER\Administrator)**. Right-click on **Sites** and click on **Add FTP Site** from the context menu.



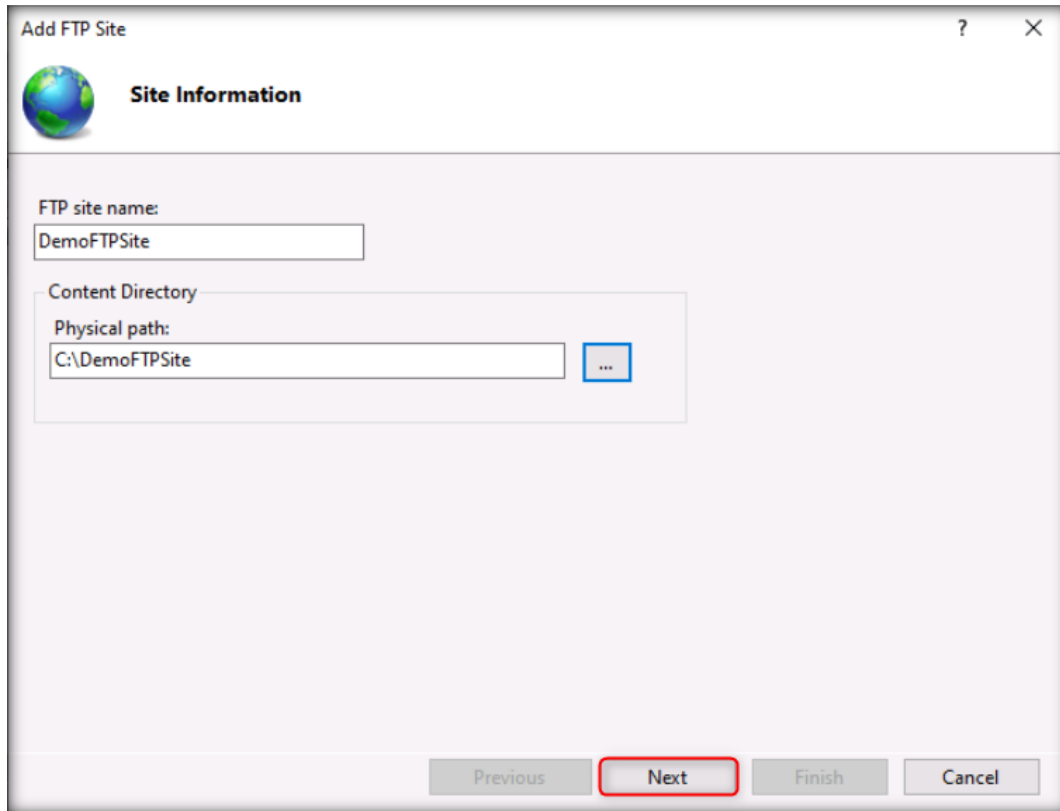
5. Give FTP site name as **DemoFTPSite**. Click ... ellipse button.



6. **Browse for folder** dialog box appears, navigate to **C:\DemoFTPSite** and click **OK**.



7. The physical path will be set to C:\DemoFTPSite. Click **Next**.

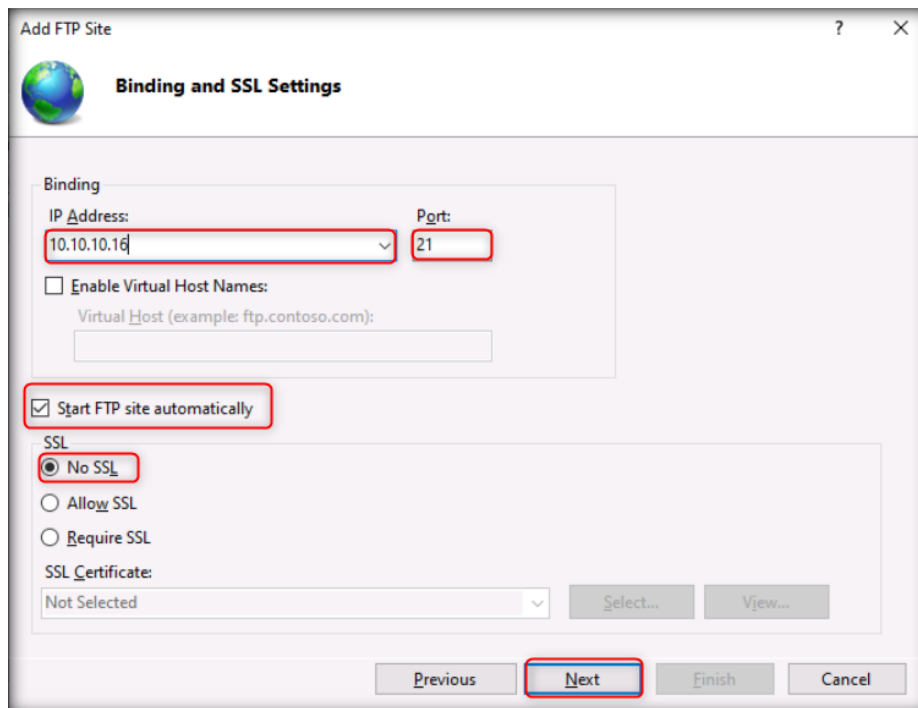


The 'Add FTP Site' dialog box, 'Site Information' tab, is shown. It contains the following fields:

- FTP site name:** DemoFTPSite
- Content Directory:**
 - Physical path:** C:\DemoFTPSite

At the bottom, there are four buttons: 'Previous', 'Next' (highlighted with a red box), 'Finish', and 'Cancel'.

8. Select IP Address **10.10.10.16** from the IP Address dropdown Port: **21** and check **Start FTP site automatically**. Select **No SSL** as **SSL** option and click **Next**.

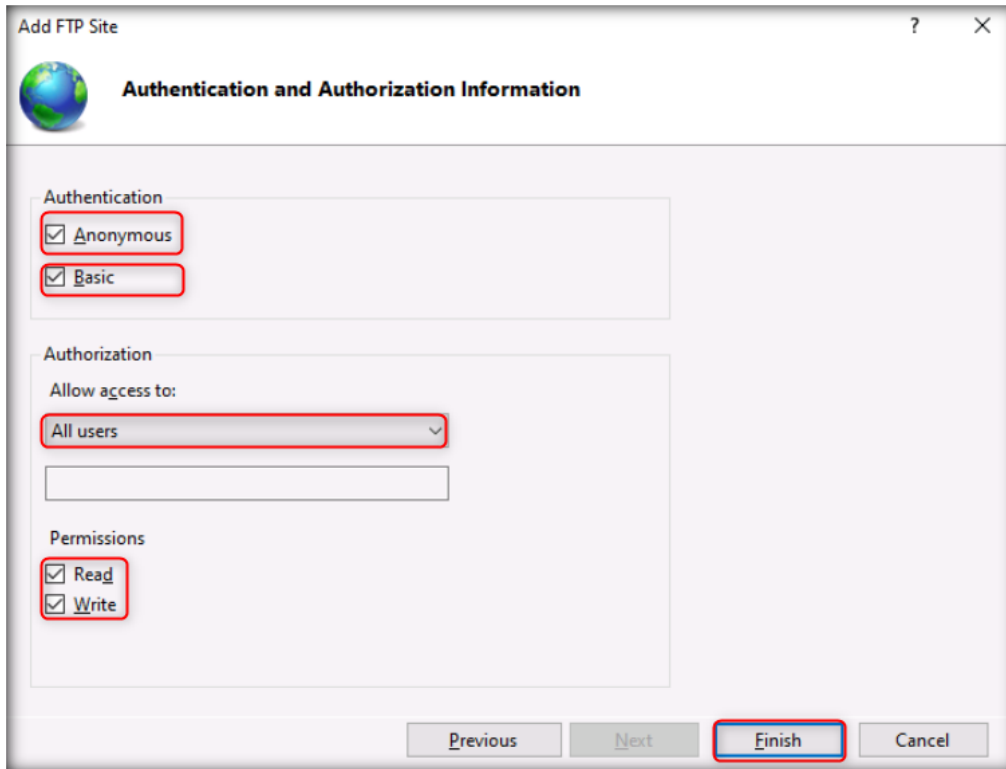


The 'Add FTP Site' dialog box, 'Binding and SSL Settings' tab, is shown. It contains the following settings:

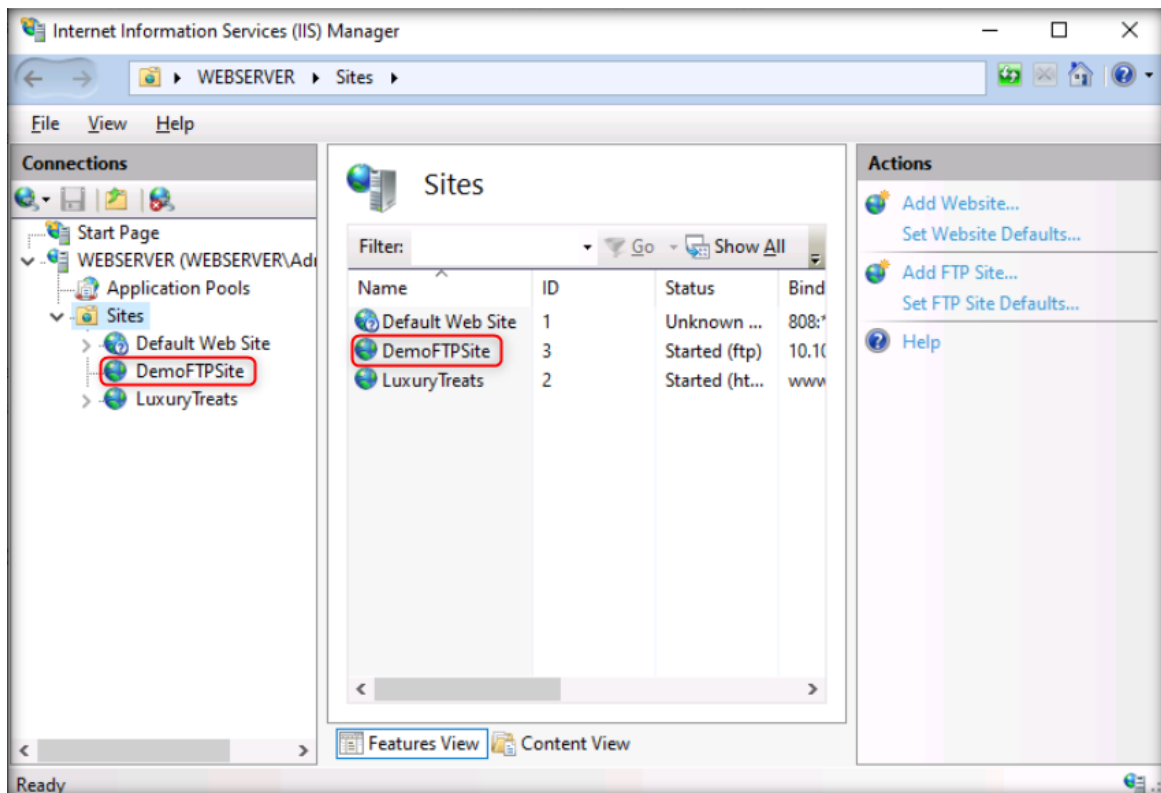
- Binding:**
 - IP Address:** 10.10.10.16 (dropdown menu)
 - Port:** 21
 - ☐ **Enable Virtual Host Names:**
Virtual Host (example: ftp.contoso.com):
- ☒ **Start FTP site automatically** (checkbox highlighted with a red box)
- SSL:**
 - ☒ **No SSL** (radio button highlighted with a red box)
 - ☐ Allow SSL
 - ☐ Require SSL
 - SSL Certificate:** Not Selected (dropdown menu)

At the bottom, there are four buttons: 'Previous', 'Next' (highlighted with a red box), 'Finish', and 'Cancel'.

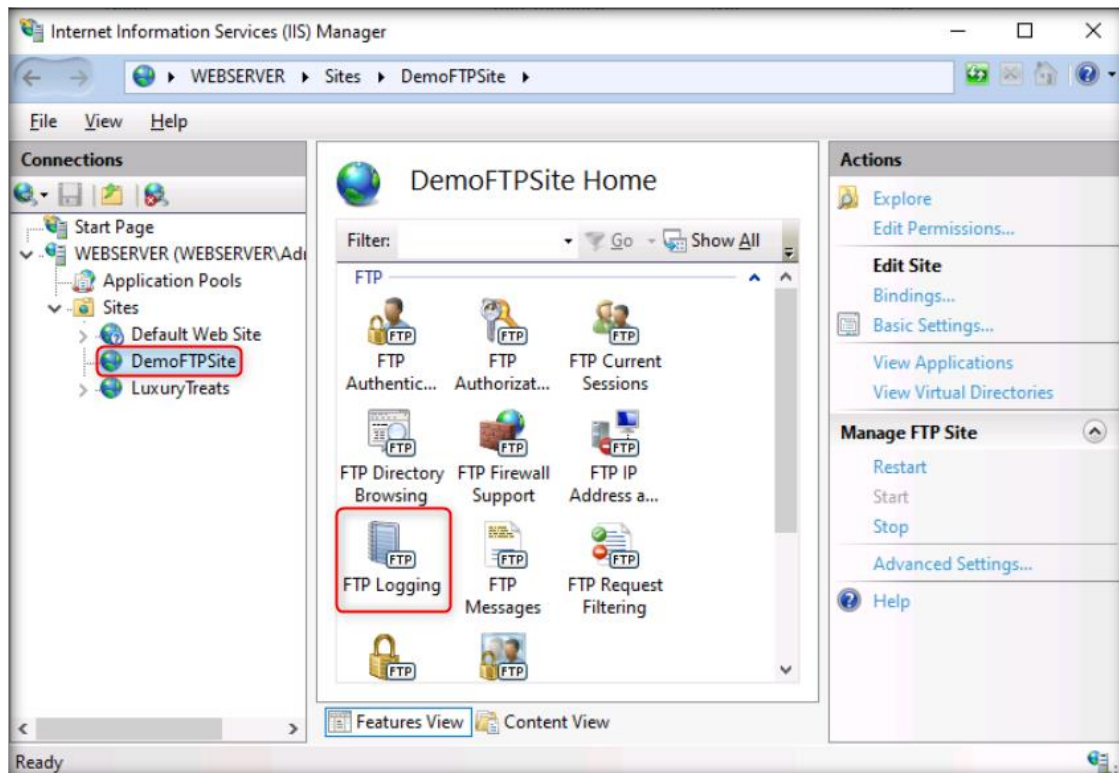
9. Check **Anonymous** and **Basic** for Authentication. Select **Allow access to: All users** as Authorization and check Permissions: **Read and Write**. Click **Finish**.



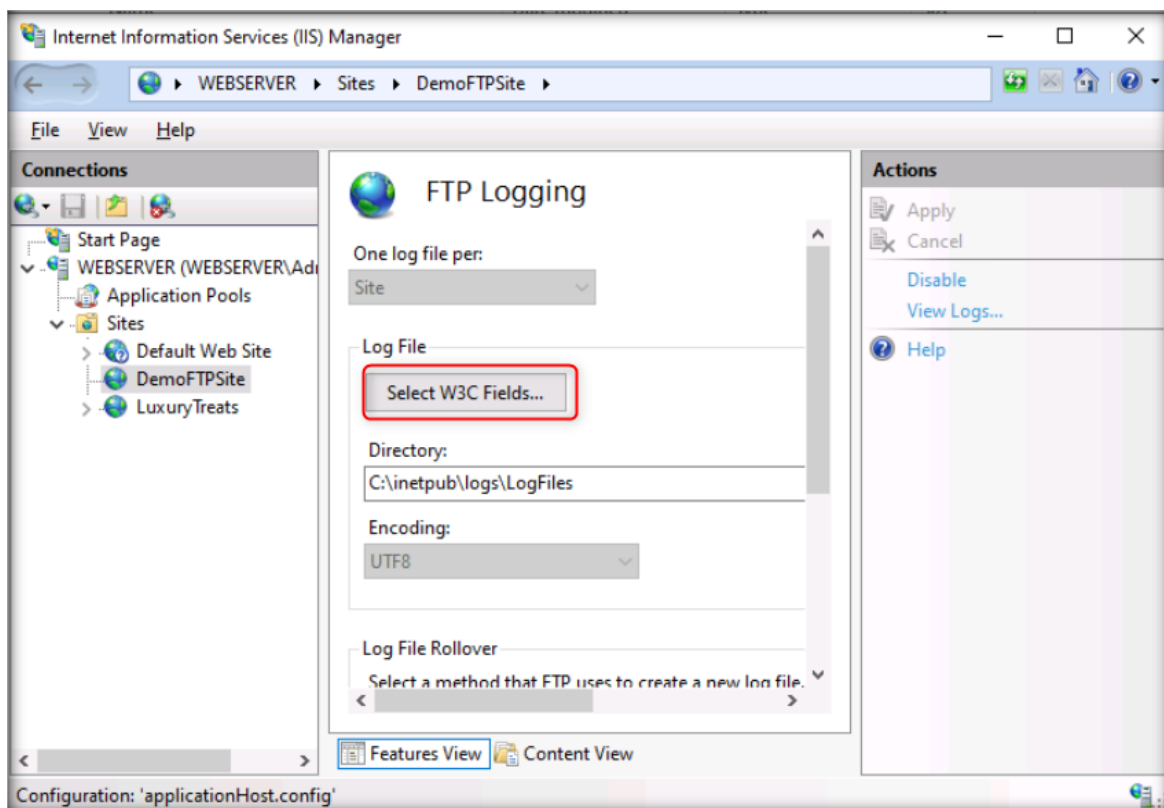
10. You will see that **DemoFTPSite** will be successfully created in IIS Manager.



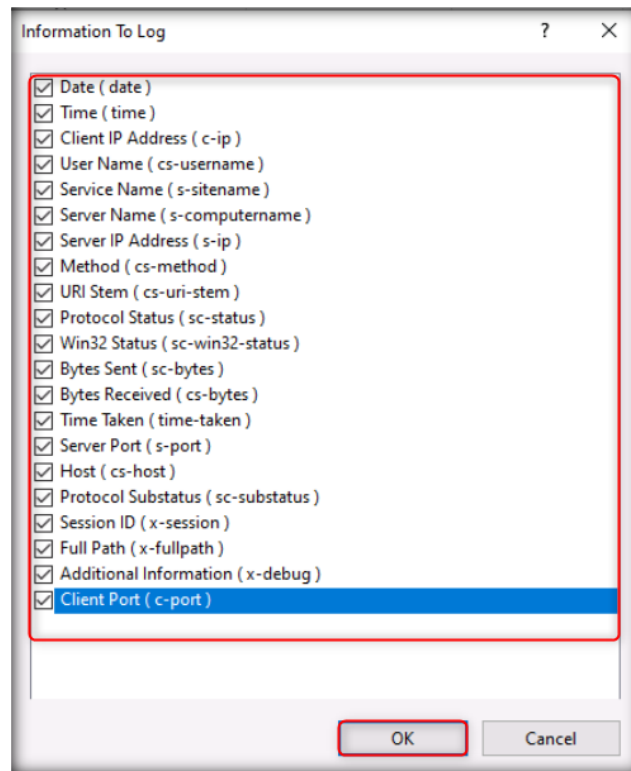
11. Click on **DemoFTPSite** and double-click on **FTP Logging** as shown in following screenshot.



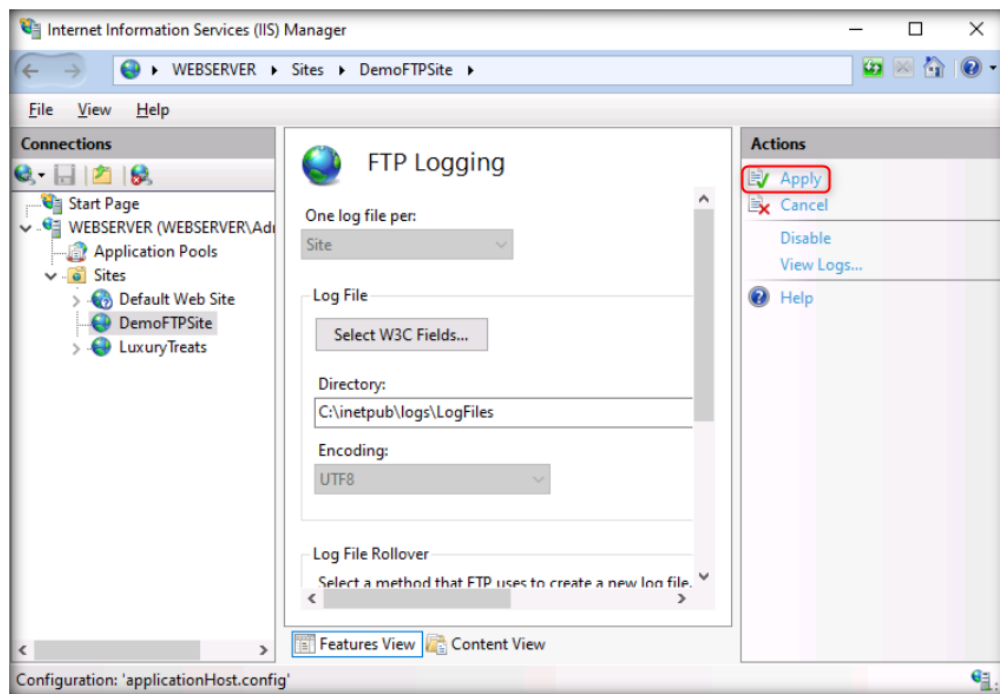
12. Click on **Select W3C Fields...** button.



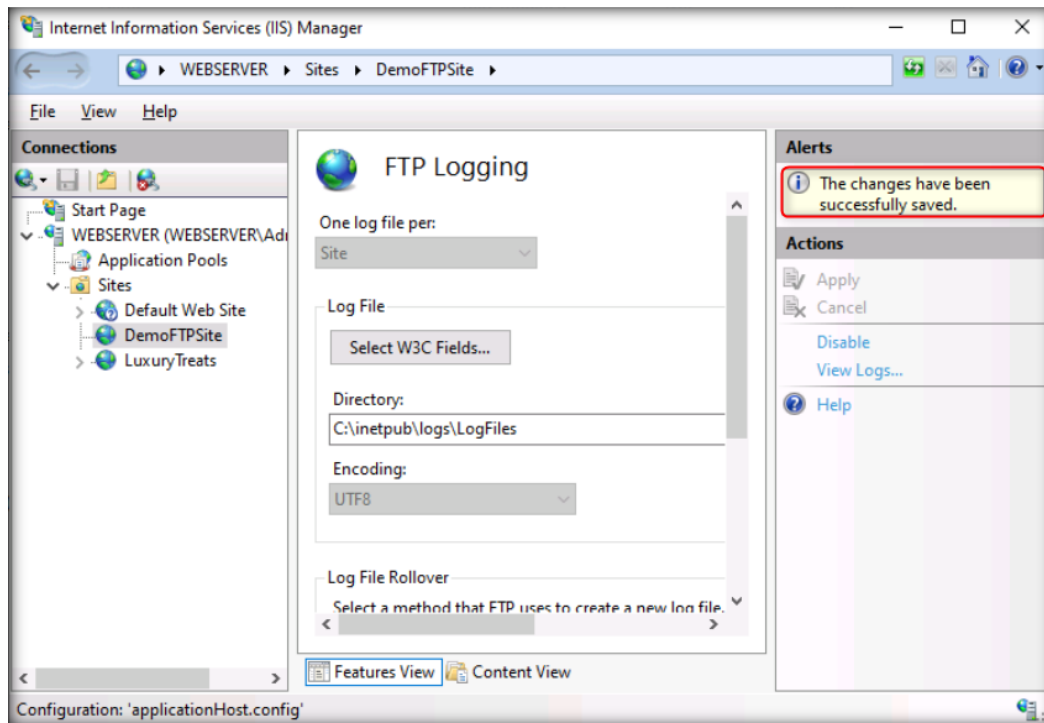
13. Tick All check boxes available in **Information to Log** window and click OK.



14. Click **Apply** in right side **Action** pane.



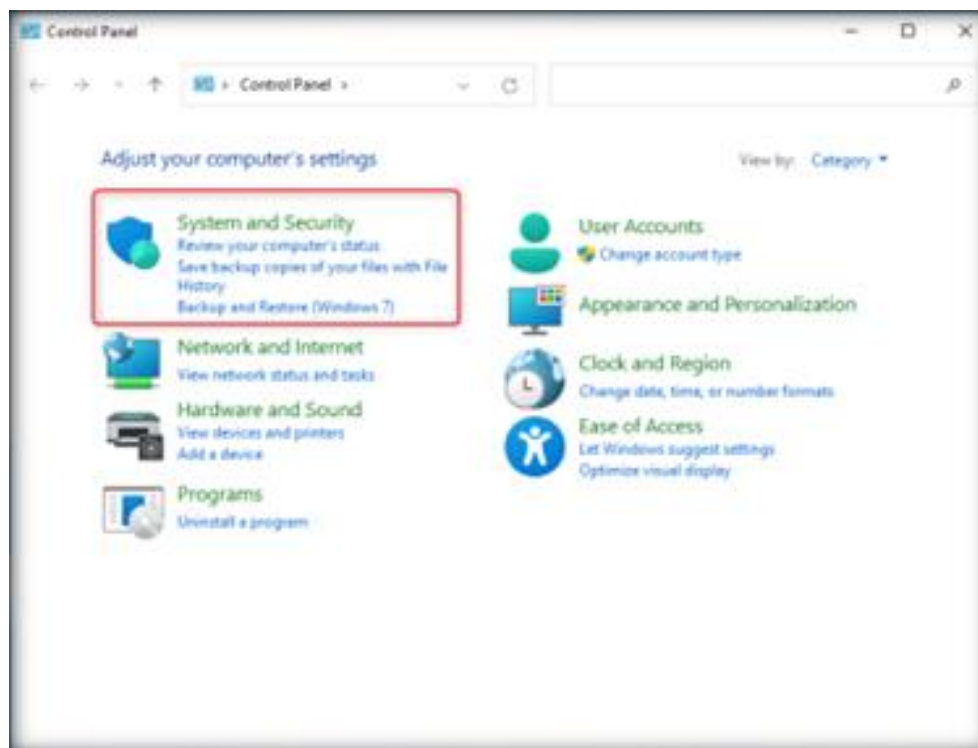
15. You will see Alerts **The changes have been successfully saved.**



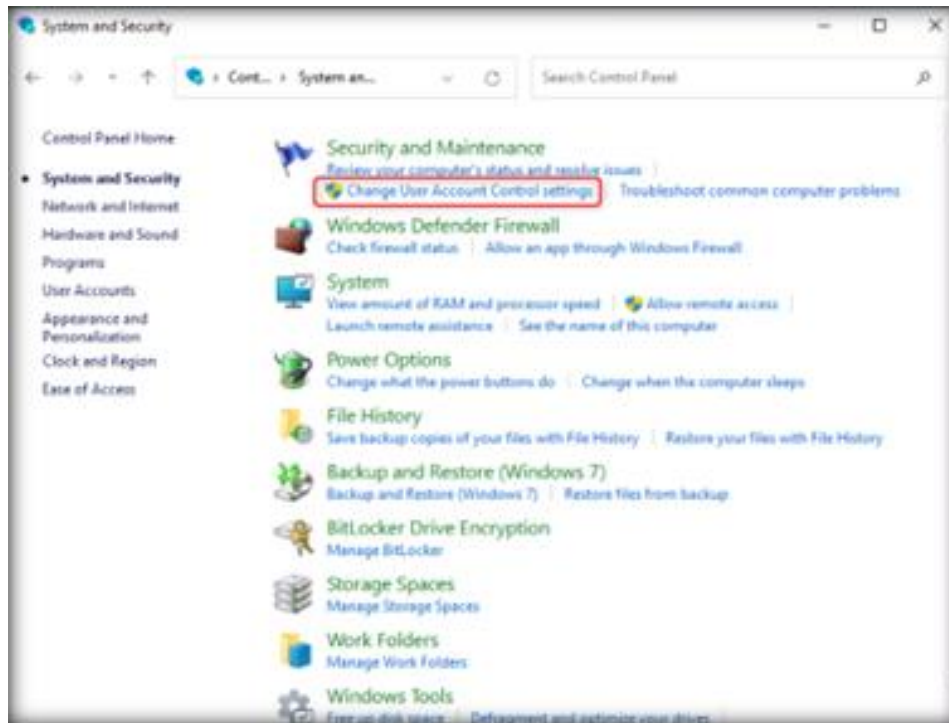
16. Close all open windows.

CT#8.15: Change User Account Settings to disable notification on System Changes

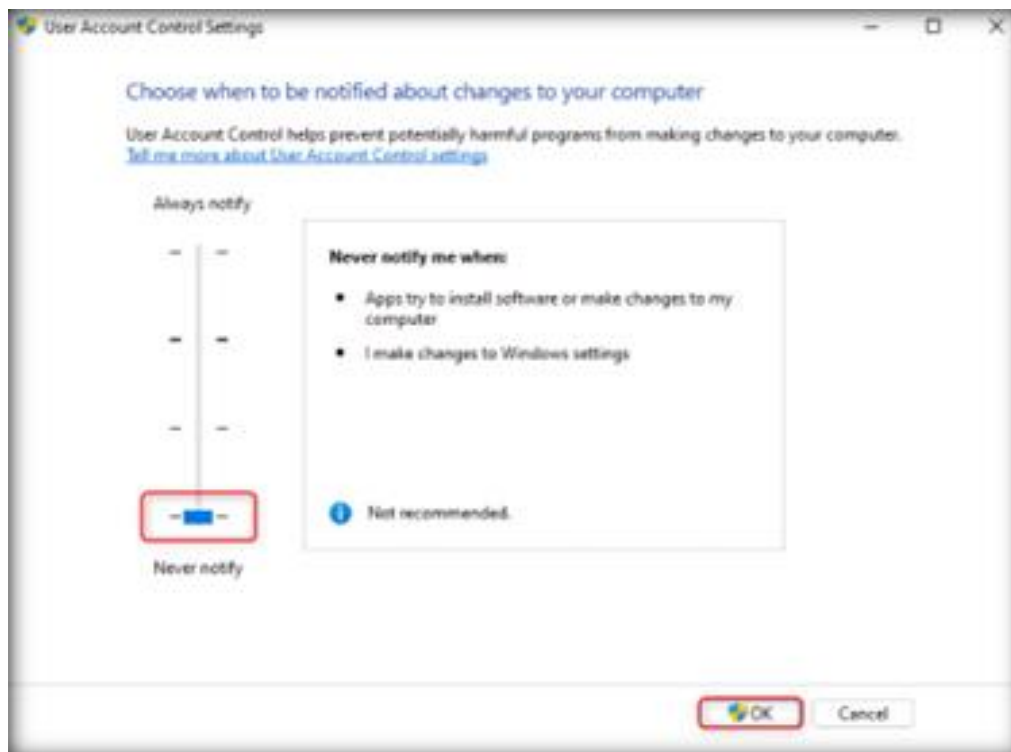
1. Open **Control Panel**, click on **System and Security**.



- Click on **Change User Account Control** setting link.

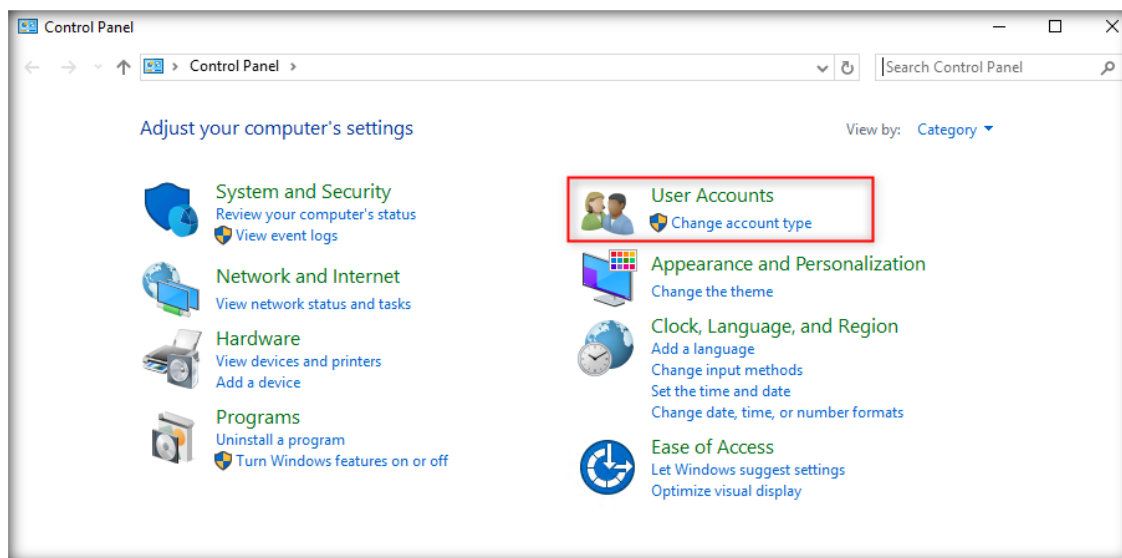


- Drag the scroll bar down **Always notify** to **Never notify** and click **OK**.

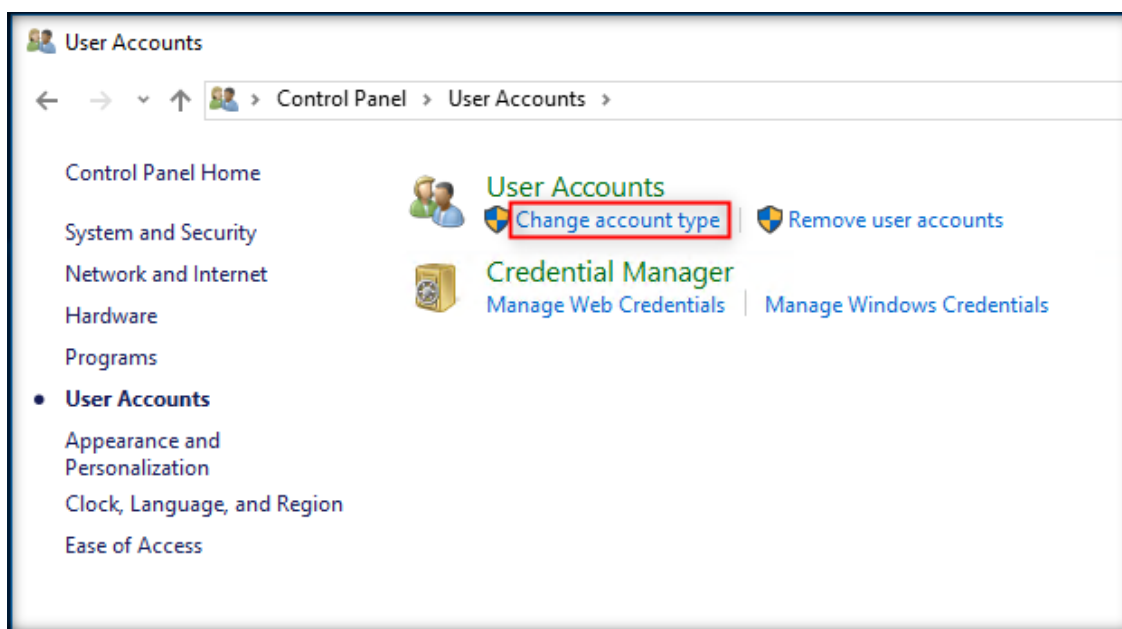


CT#8.16: Adding New User

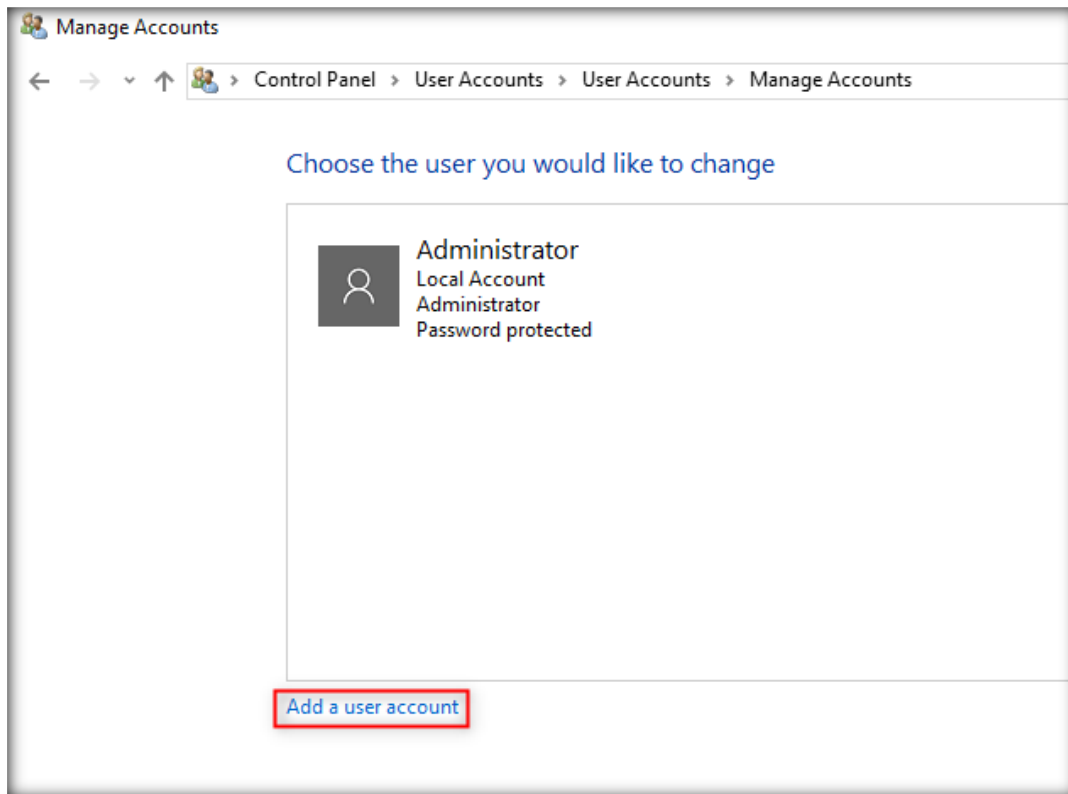
1. Right-click on **Web Server** virtual machine profile in Hyper-V Manager and click **Connect..** and login with username **Administrator** and password as **admin@123**. If already connect, skip step 2 to continue.
2. Open control panel and select User Accounts.



3. Select **Change account type** link as shown in following screenshot.

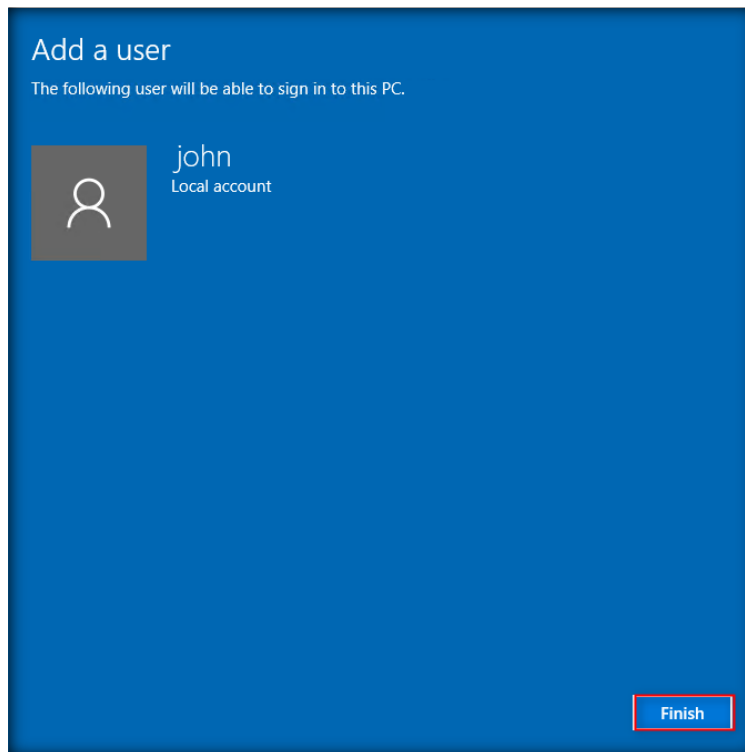


4. **Manage Account** window opens, click **Add a user accounts**.

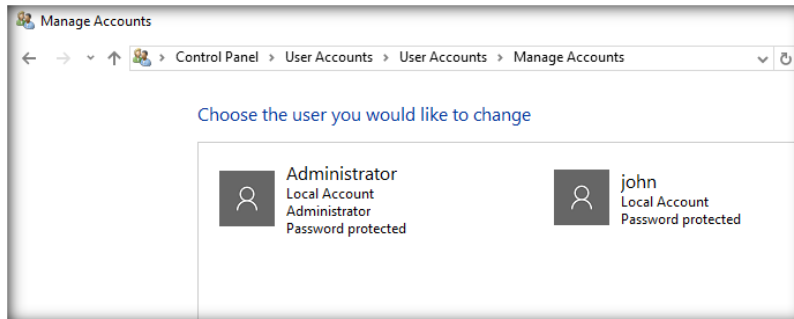


5. User details window opens, fill user details such as username as John, password as user@123 and confirm password, password hin, click **Next**.

- Click Finish to complete the document.

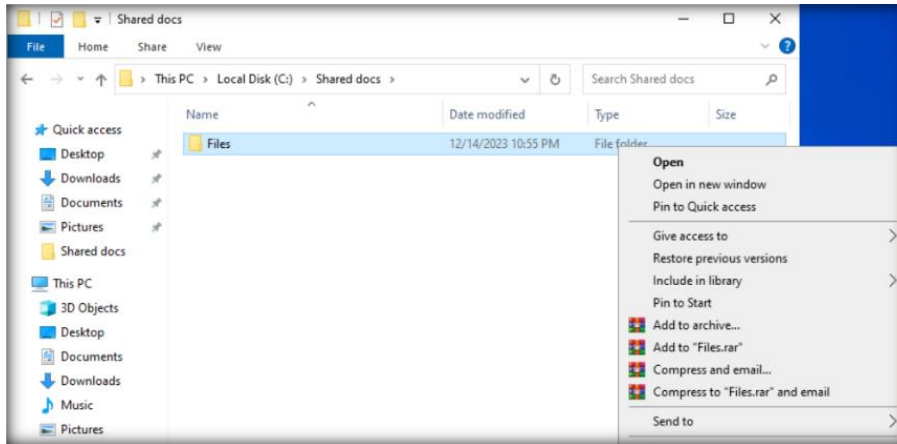


- You can see the user added successfully.

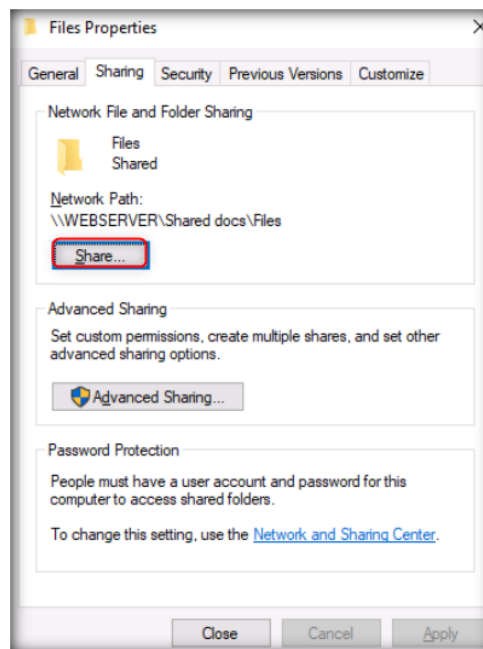


CT#8.16: Sharing Shared Docs folder in C Drive

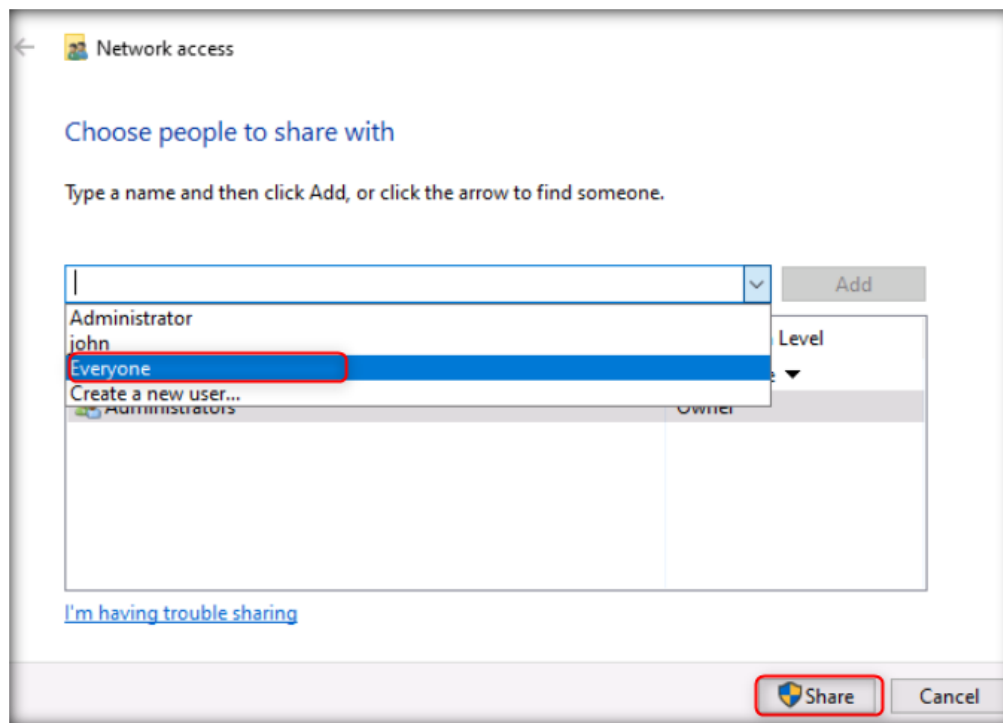
1. Navigate to **Z: CND-Tools** copy the **Shared Docs** folder from the **Lab Prerequisites** folder and copy it in **C:** Drive, double click on **Shared docs** and right click on **Files** and select **properties**.



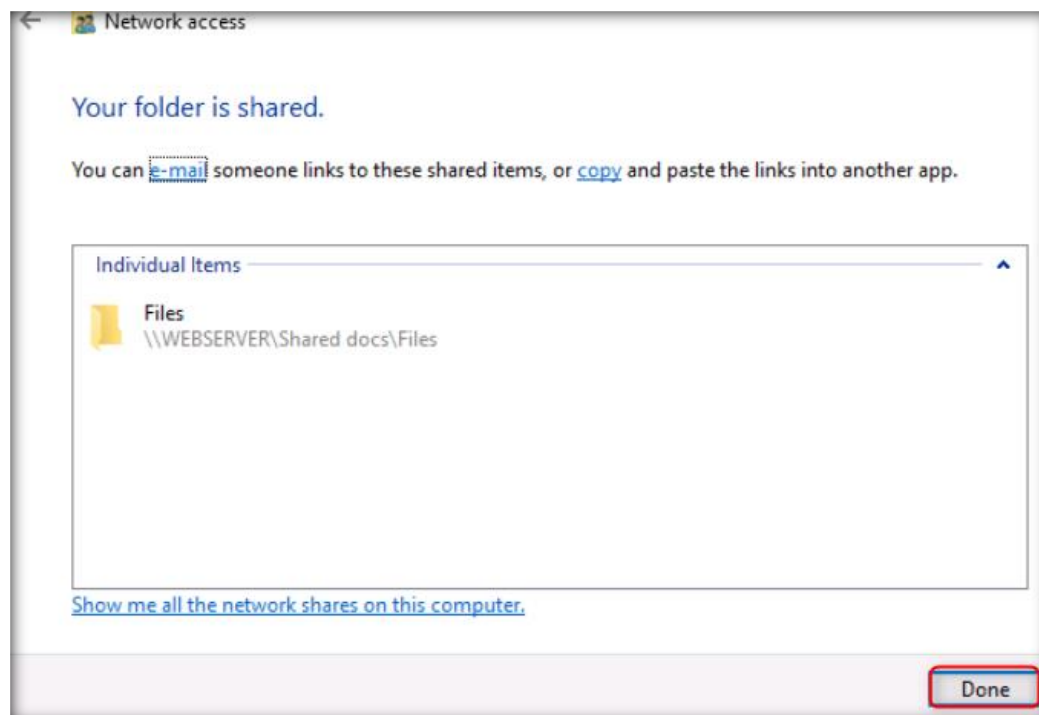
2. Go to **sharing** tab and click on **share**.



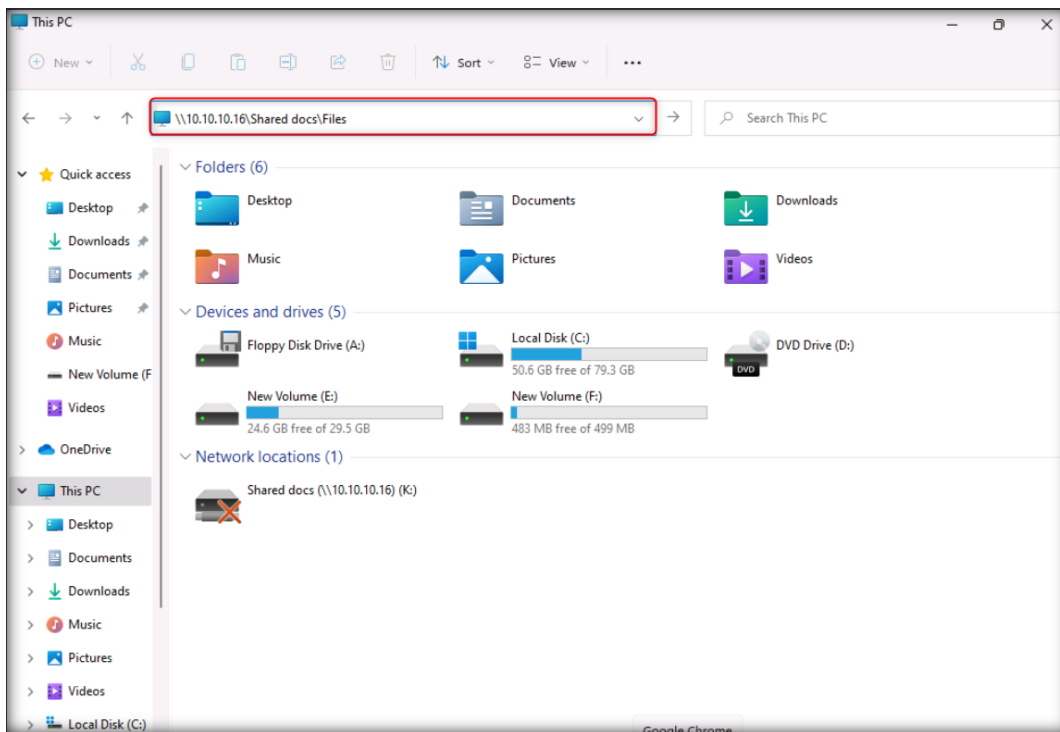
- Now click on **Drop-down arrow** and Select **Everyone**. Click on **share**.



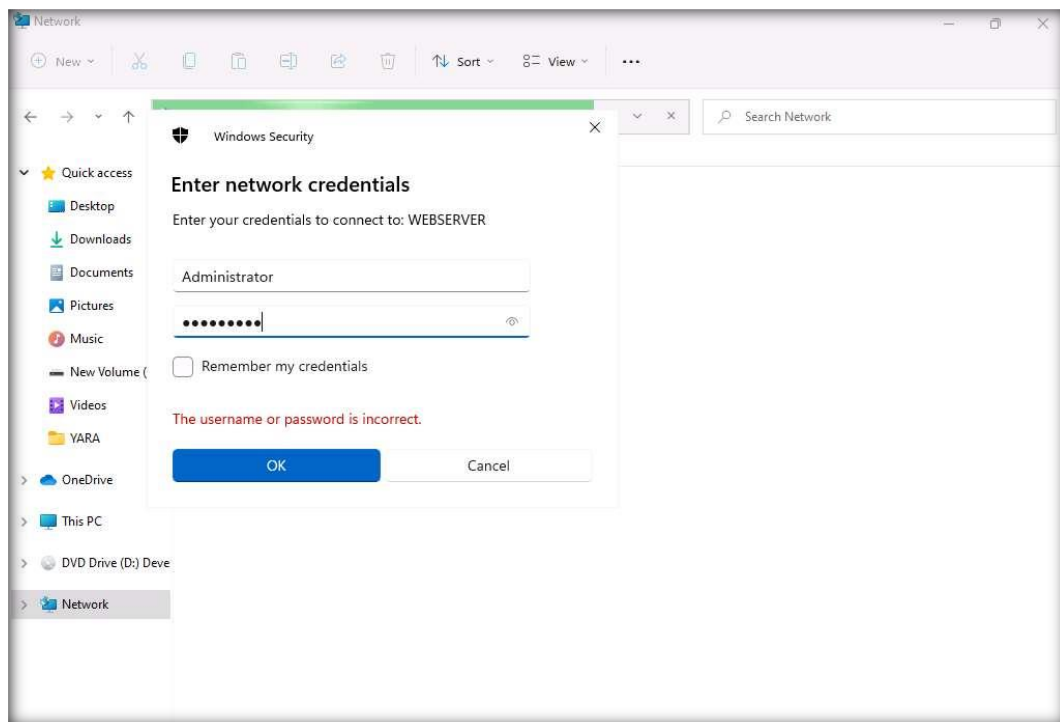
- Click on **Done**.



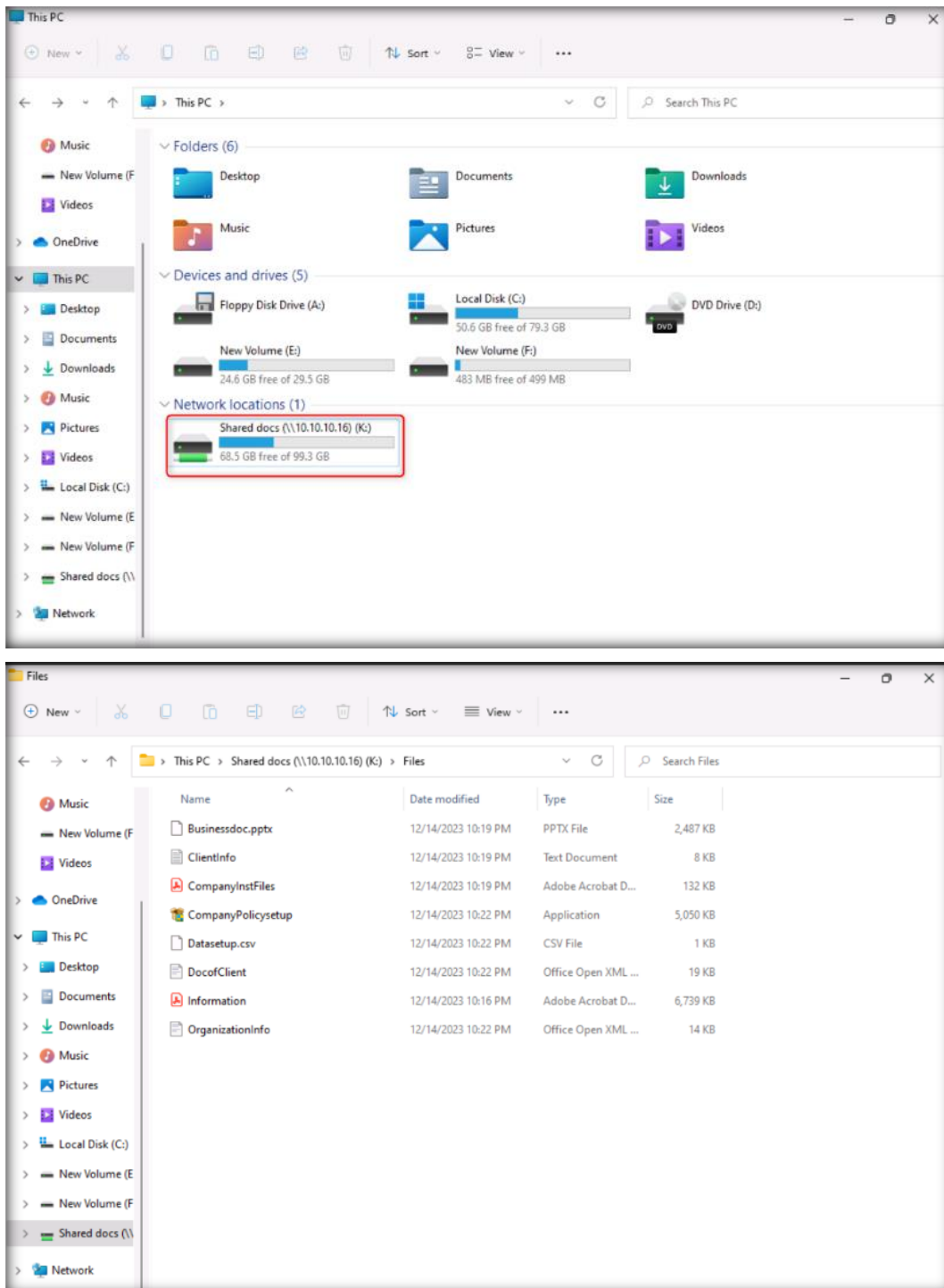
- Switch back to Admin Machine-1. To access the shared docs from webserver, **Navigate to File explorer and type \\10.10.10.16\Shared docs\Files** in the address bar and press **Enter**.



- Enter network credentials window appears. Type **Administrator** as username and **admin@123** as password. Click **OK**.



- Now, you can see **Shared docs folder** connected. Double click on it, and open Files folder. You can see all the files accessed from Webserver VM.



NOTE: Perform CT 8.11 – CT8.15 On Backup Server VM

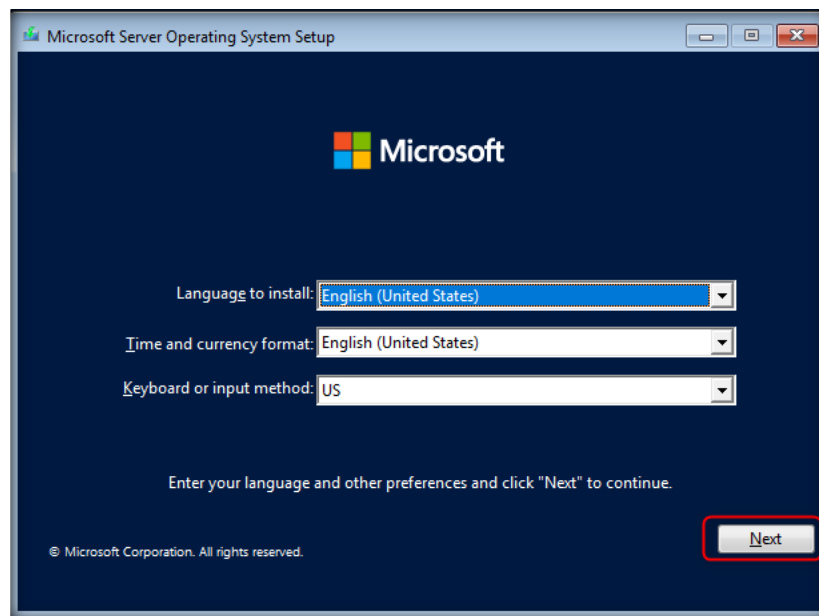
CT#9: Configuring Windows Server 2022 Guest OS as AD Domain Controller

CT#9.1: Installing Windows Server 2022 as AD Domain Controller

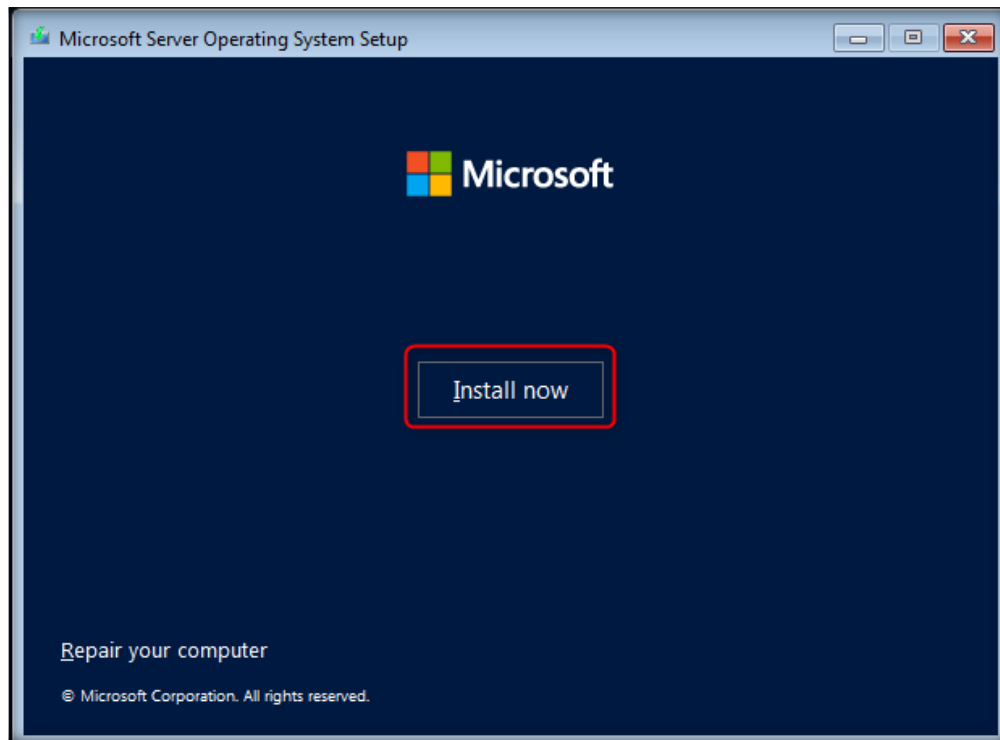
- Click on **Power on this virtual machine** virtual machine profile in VMware Workstation.



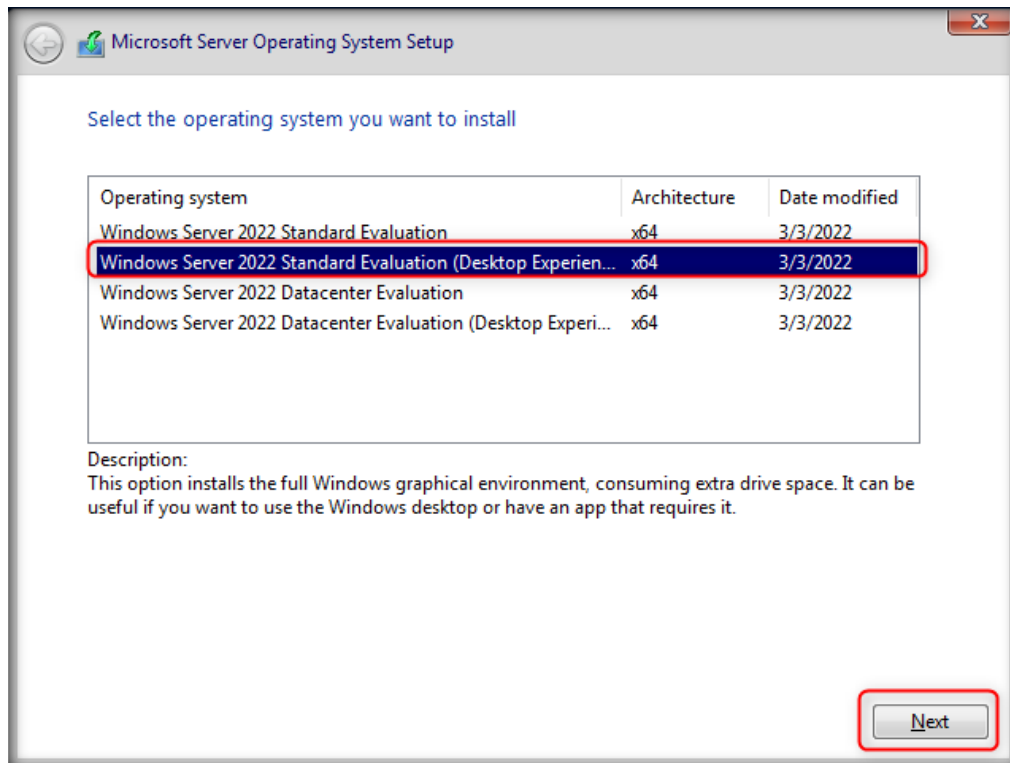
- When WebServer virtual machine is turned on, **Windows Setup** window will appear. Select the required details and click **Next**.



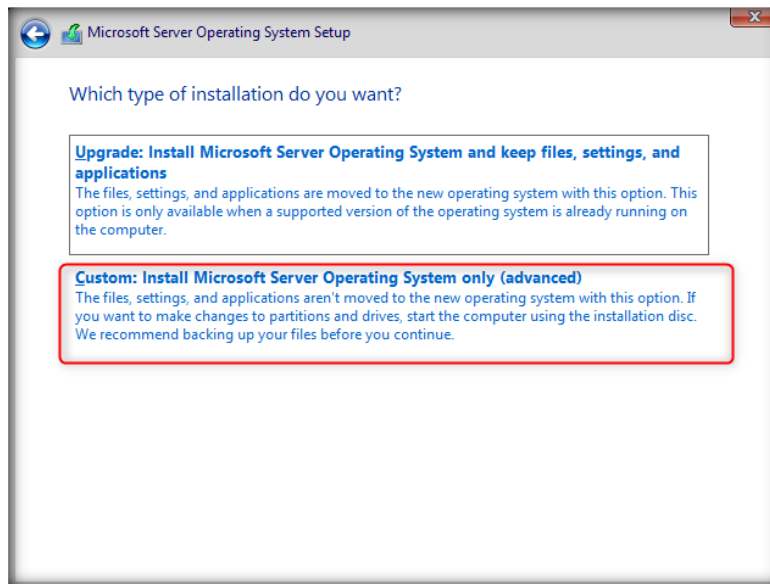
10. Click **Install Now**.



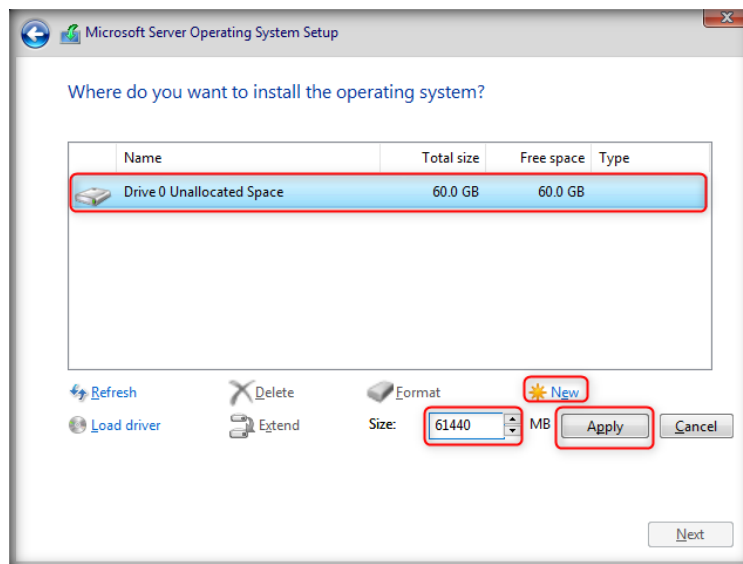
11. While installing, Windows Setup appears; choose Windows Server 2022 Standard Evaluation (Desktop Experience) and click **Next**.



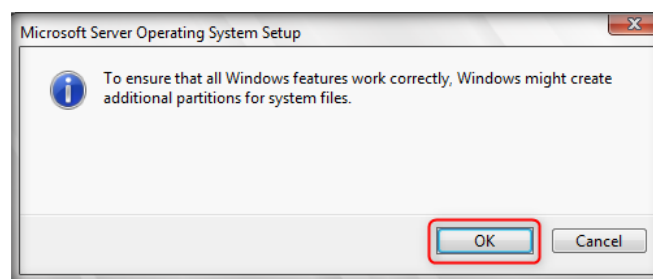
12. The License terms wizard appears; check I accept the license terms and click **Next**.
13. Click **Custom: Install Windows only (advanced)** to proceed with the installation.



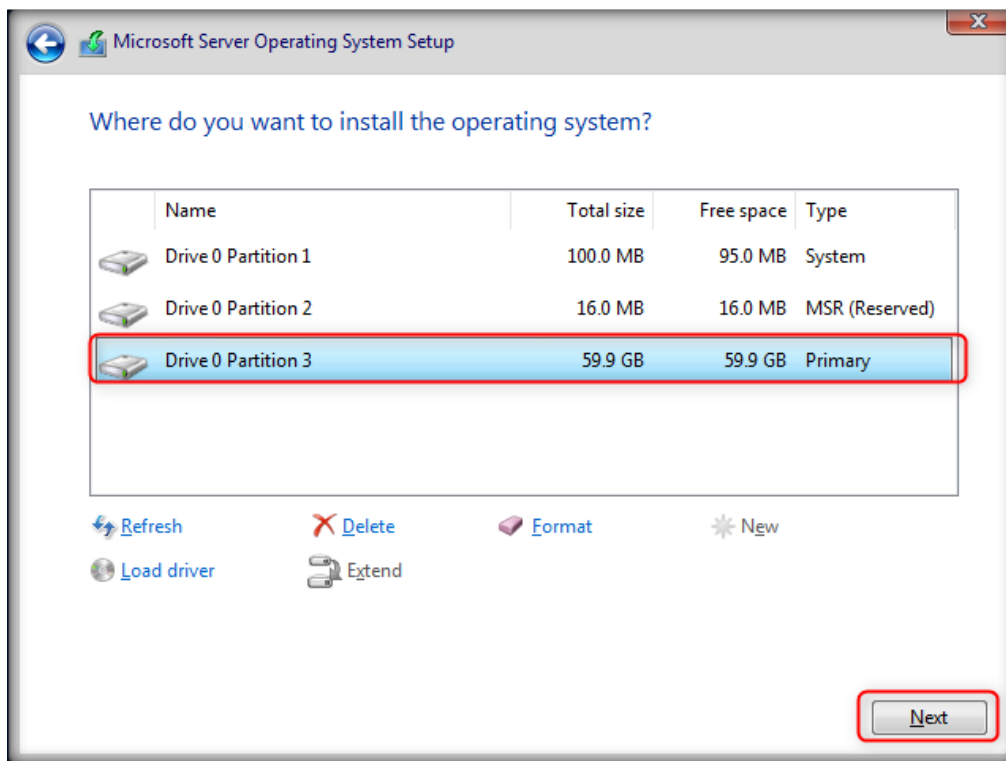
14. The Where do you want to install Windows? wizard appears; click **New** to create a partition. Set the Size to **61440 MB** and click **Apply**.



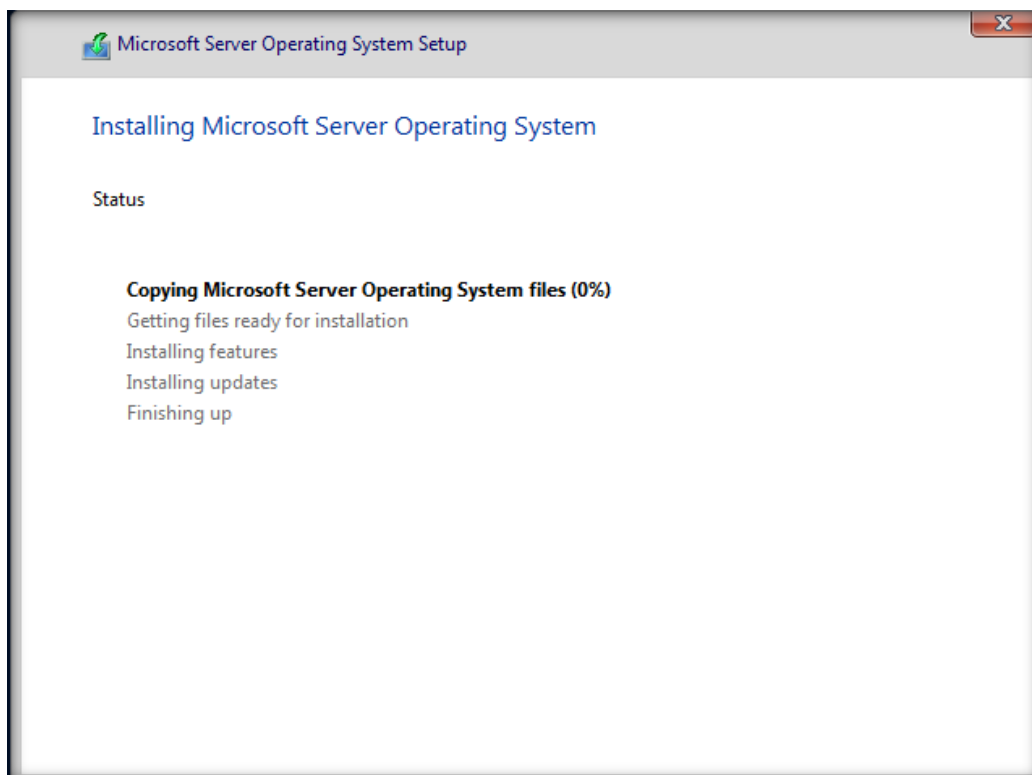
1. In the Microsoft Server Operating System Setup dialog box Click **OK**



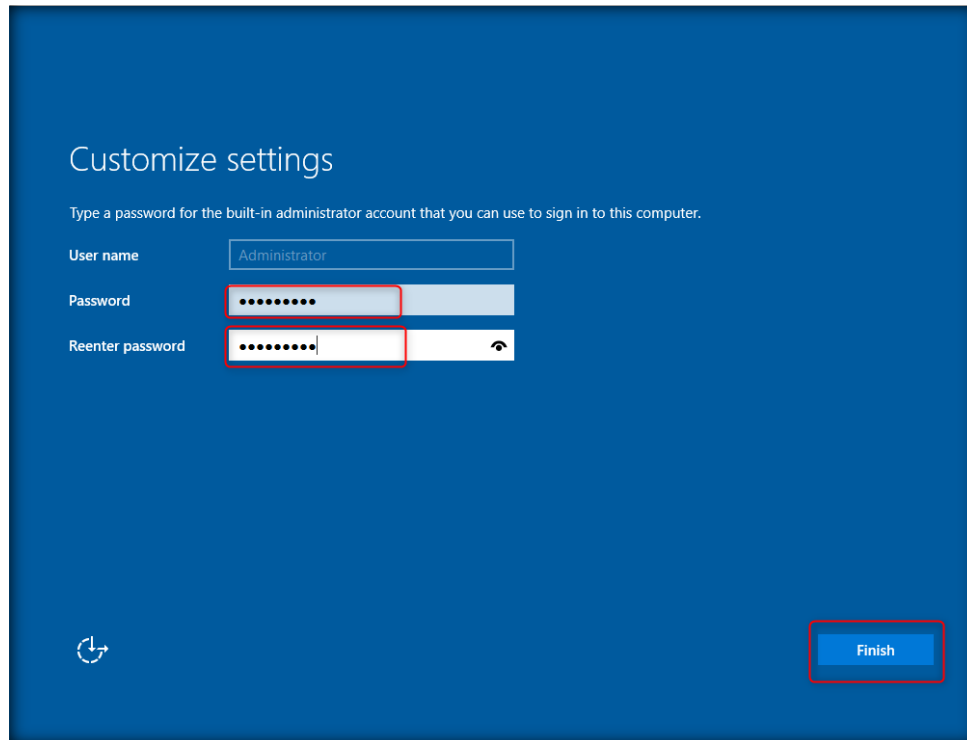
15. Select the Unallocated Space partition, click **Next**.



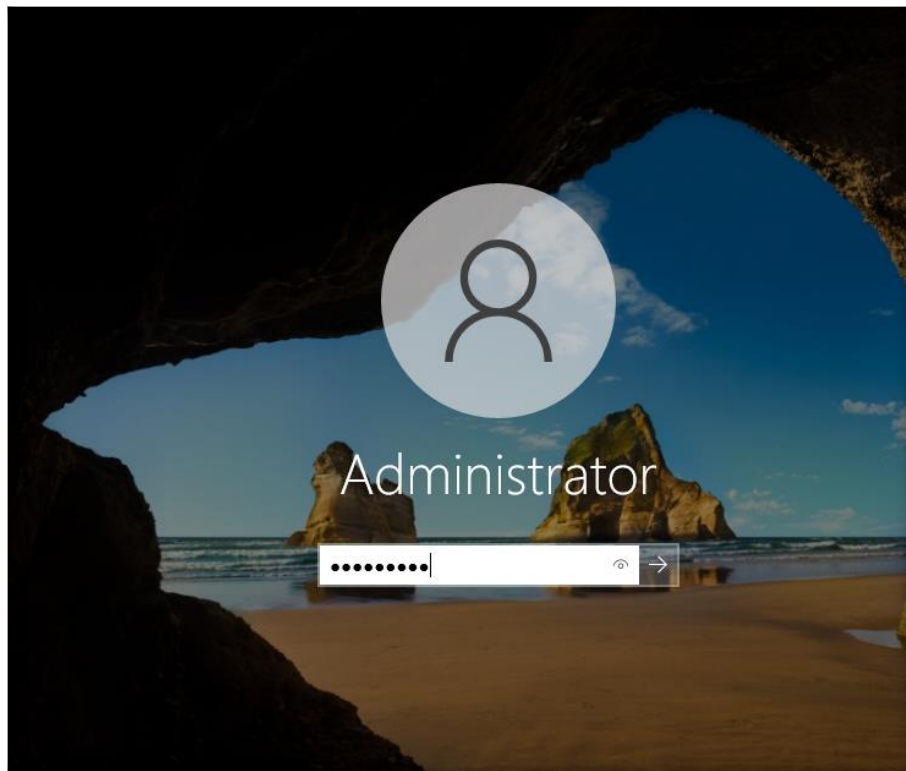
16. The Installing Windows screen appears; wait until installation is complete.



17. After successful installation customize setting window appears, type password **admin@123** for Administrator and type confirm password, click **Finish**

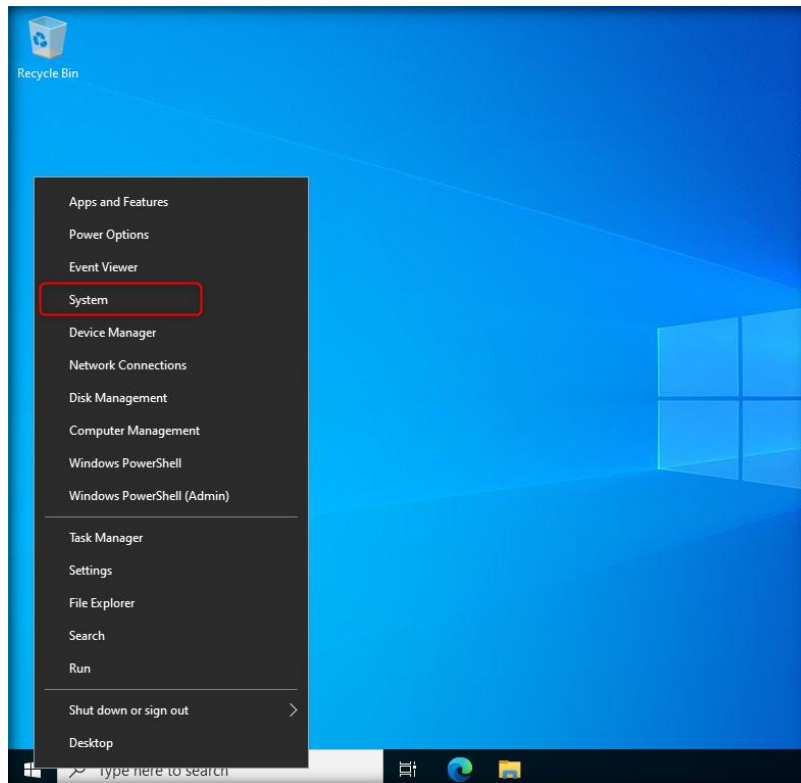


18. After completing the installation, the virtual machine automatically will restart.

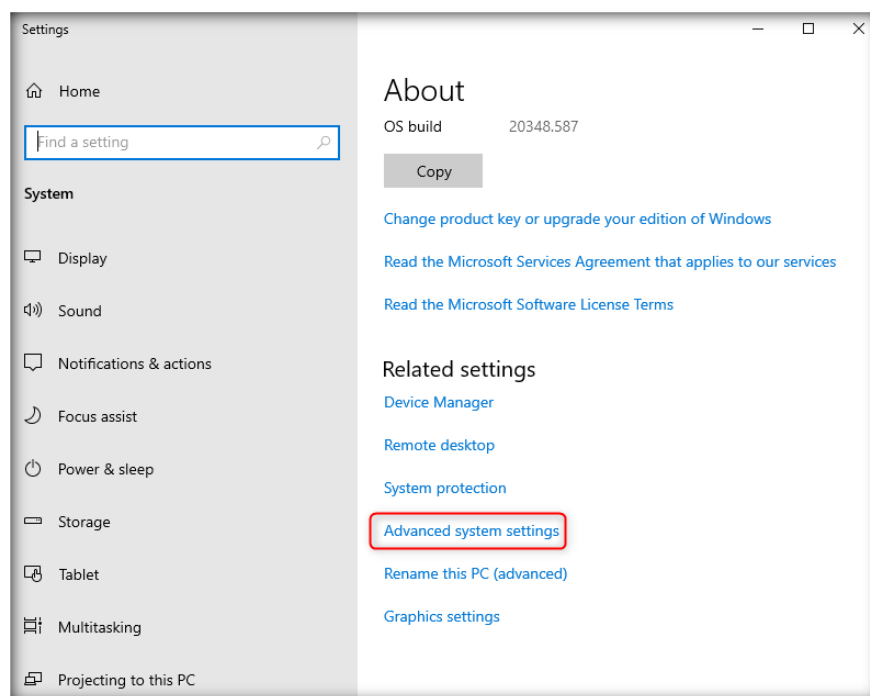


CT#9.2: Changing the Computer Name

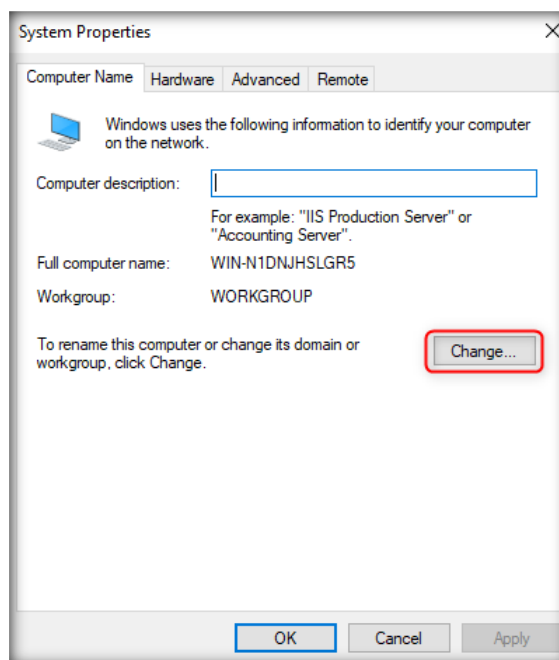
1. Login as Administrator.
2. Launch Server Manager and right-click on **Windows Start** Icon and select **System**.



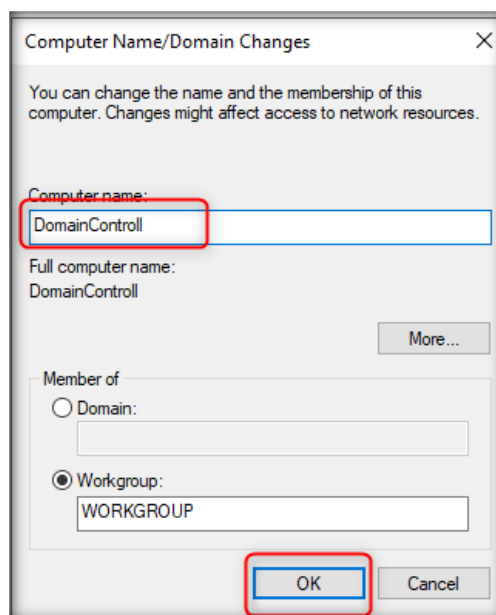
3. **Settings** window will open, scroll down and click on **Advanced system settings**.



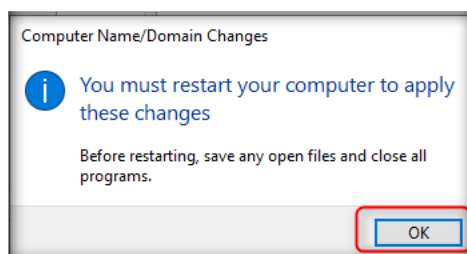
4. In the Computer Name tab of the System Properties window, click **Change**.



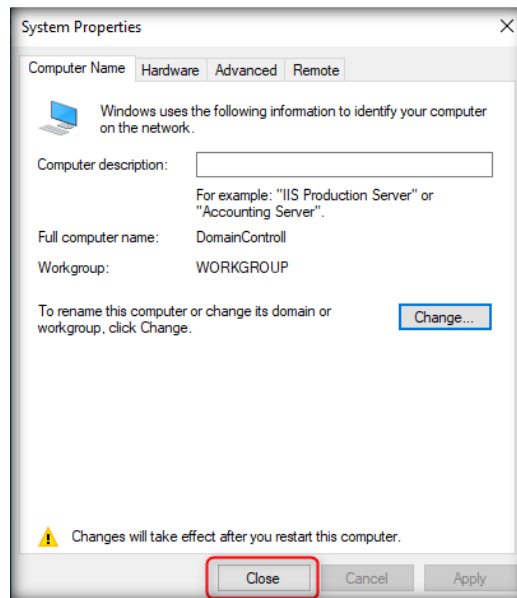
5. In the Computer Name field enter **DomainControll** and click **OK**.



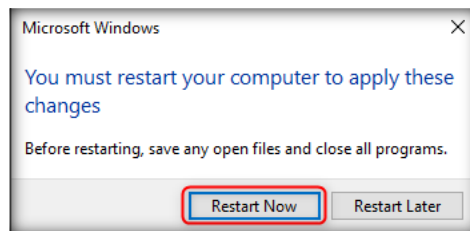
1. When prompted to restart the system, click **OK**.



6. You will be returned back to System Properties window, click **Close**.



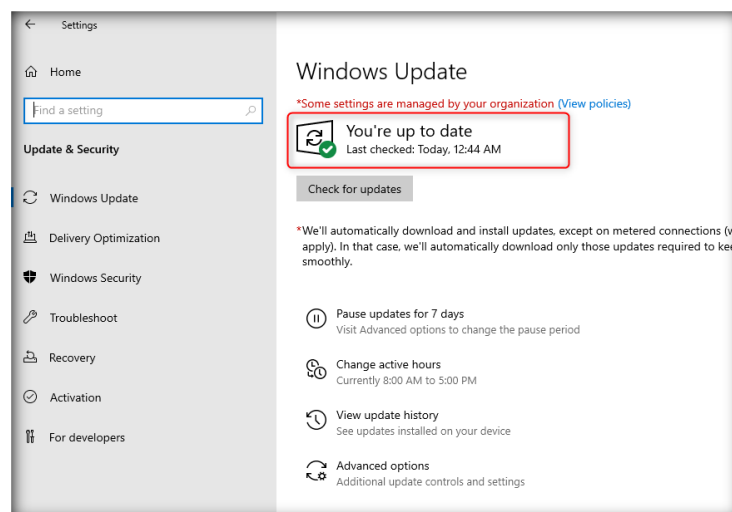
7. You will be prompted to restart the system, click **Restart Now**.



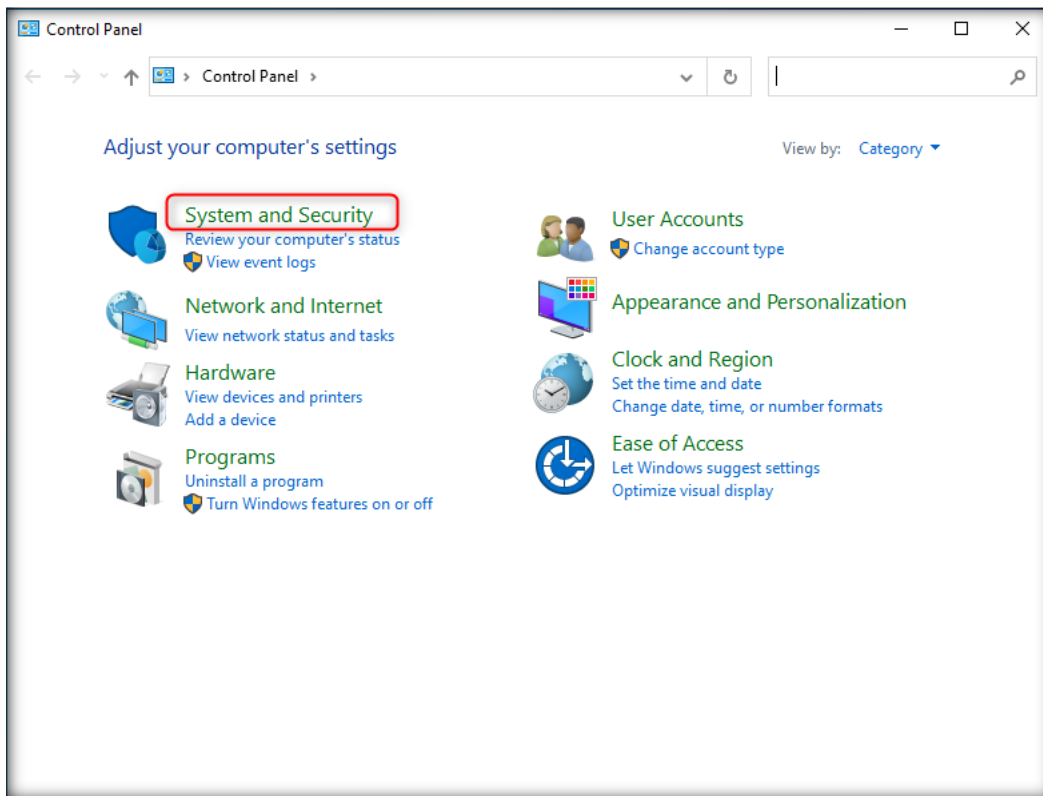
CT#9.3: Turn Off Windows Firewall

1. Turn on WebServer VM.
2. Now, check for the system updates and if found any, update the virtual machine to the latest.

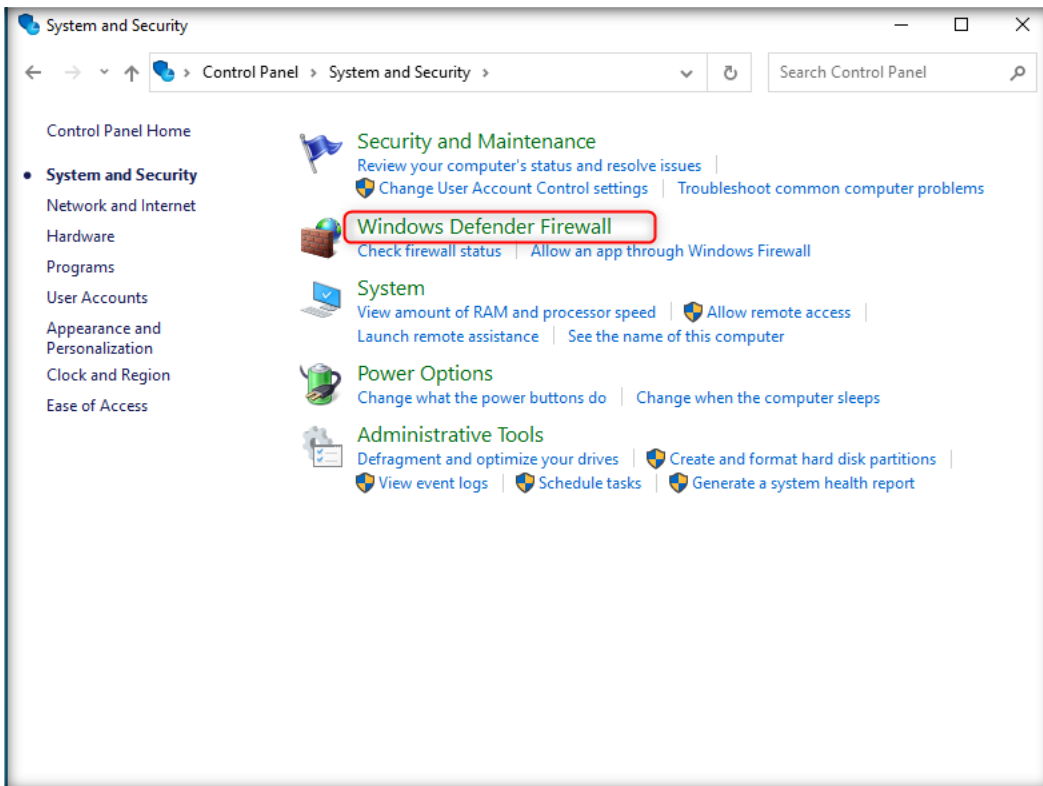
Note: Installing the updates might take some time.



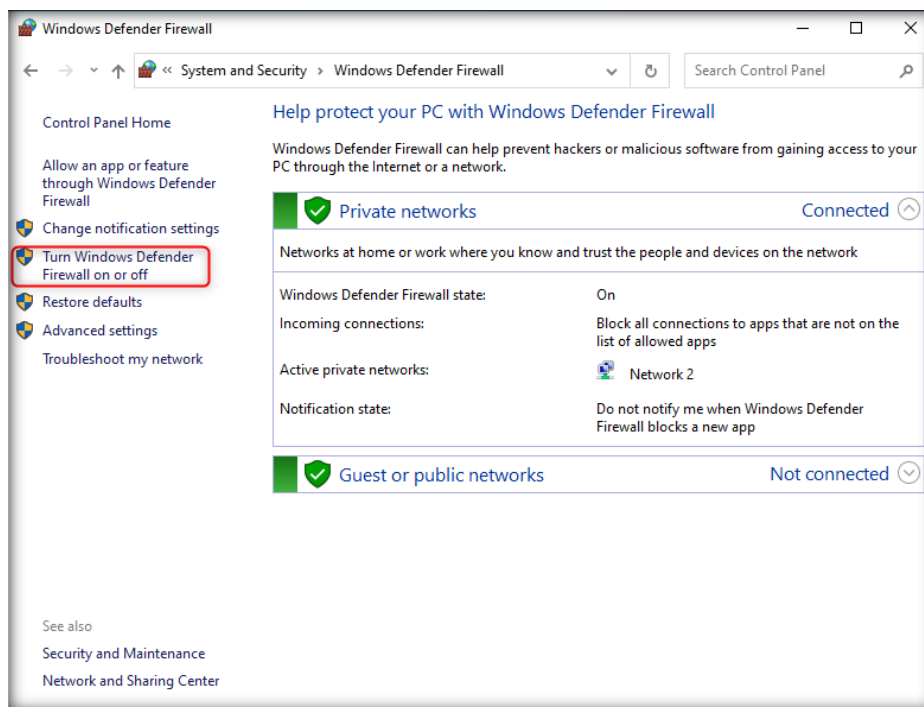
3. Open **Control Panel** select **System and Security**.



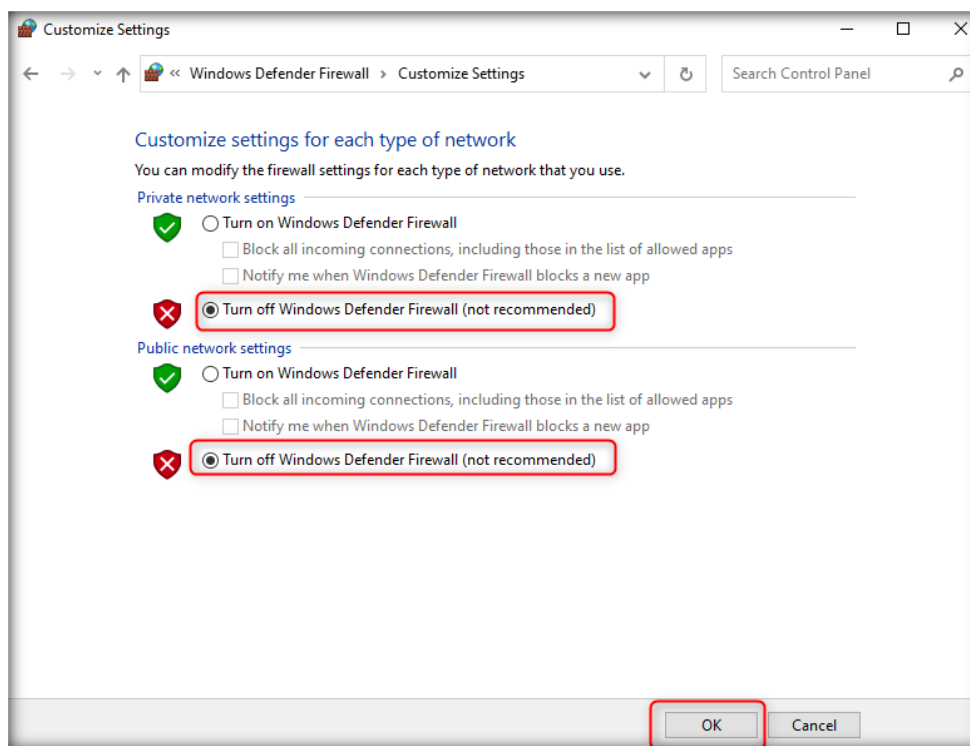
4. Click the **Windows Defender Firewall** in the **System and Security** window.



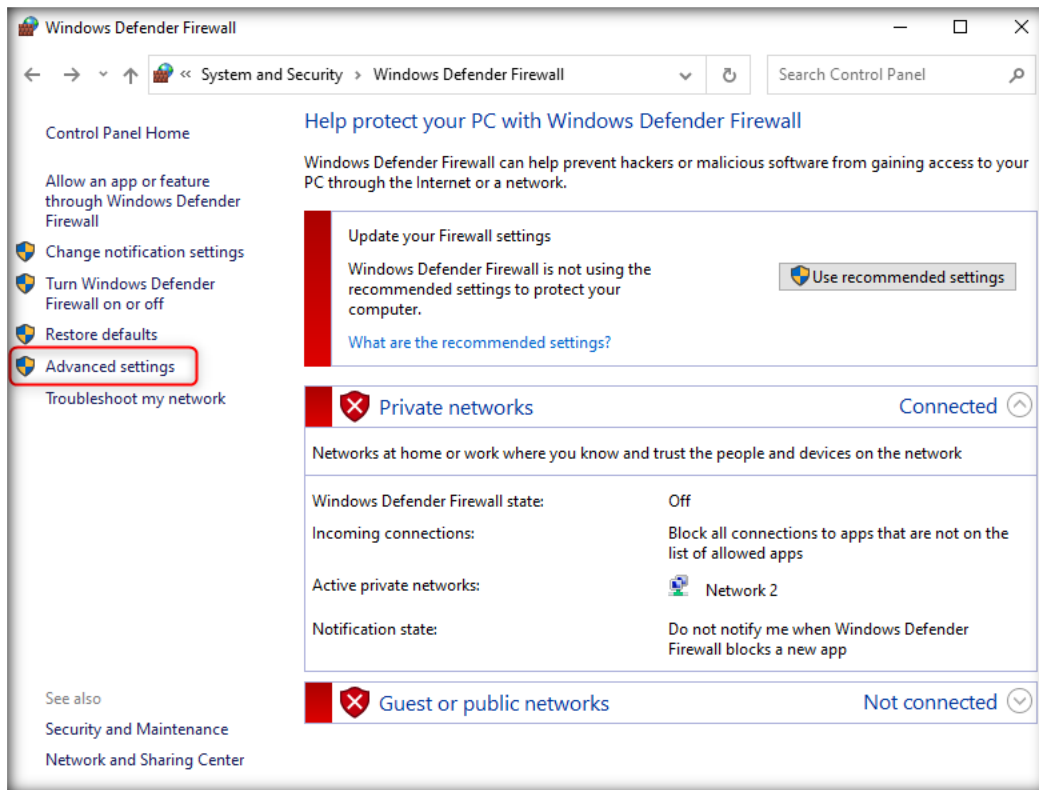
5. In the **Windows Firewall** window, click **Turn Windows Firewall on or off** link in the left-pane of the window.



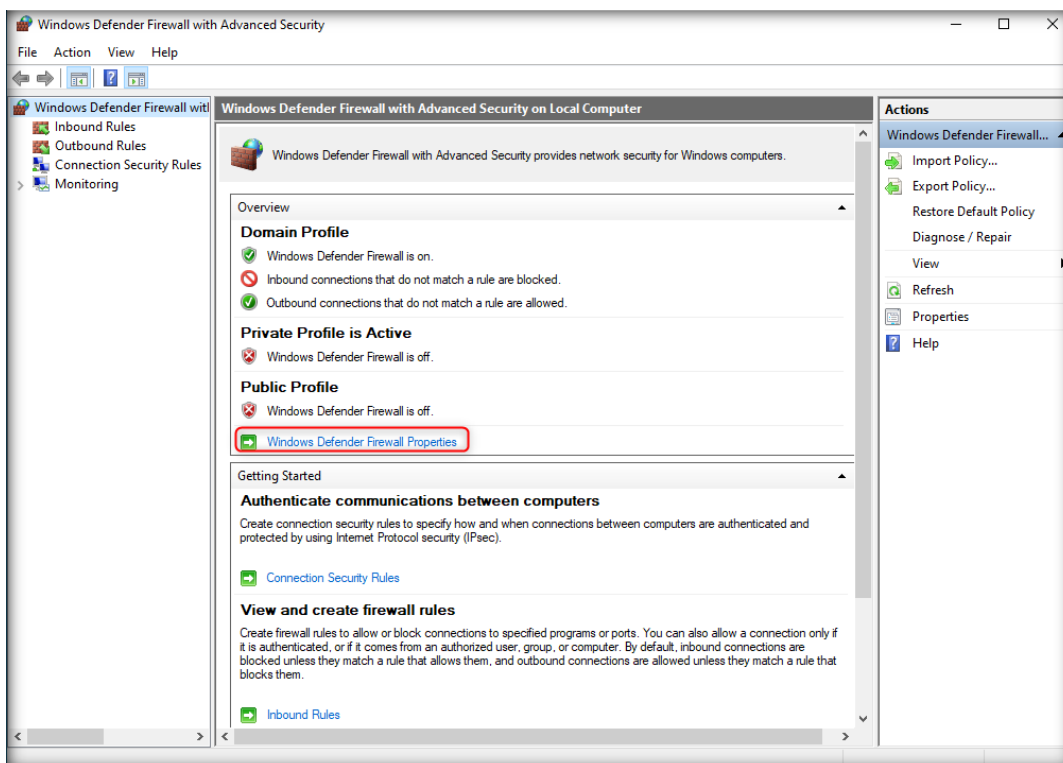
6. In the **Customize Settings** window, select **Turn off Windows Defender Firewall (not recommended)** radio button for all Domain, Private and Public network settings and click **OK**.



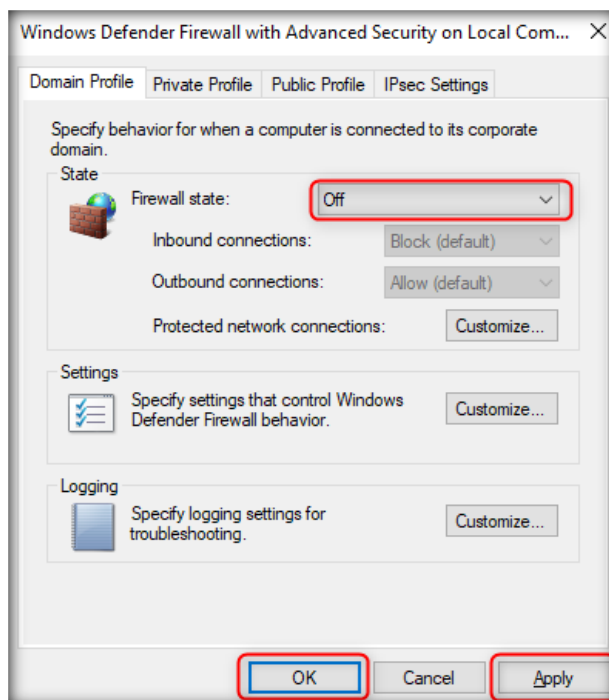
7. Again, in the **Windows Firewall** window, click **Advanced settings** link in the left-pane.



8. Once the **Windows Firewall with Advanced Security** appears on the screen, click **Windows Firewall Properties** link in the **Overview** section.



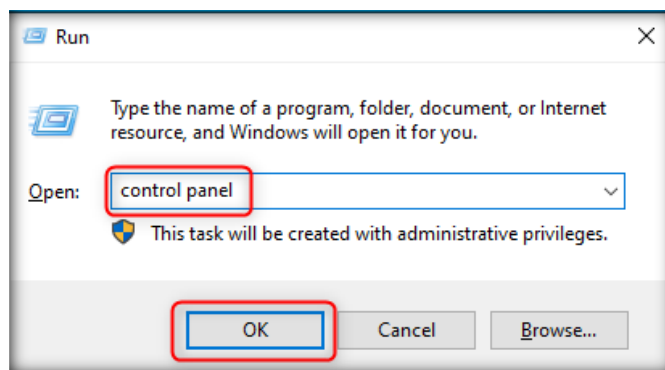
- When the **Windows Firewall with Advanced Security on Local Computer Properties** window appears, in the **Domain Profile** tab, choose **Off** from the **Firewall state** drop-down list. Then navigate to **Private Profile** and **Public Profile** tabs and ensure that the **Firewall state** is **Off**. Click **Apply** and then click **OK**.



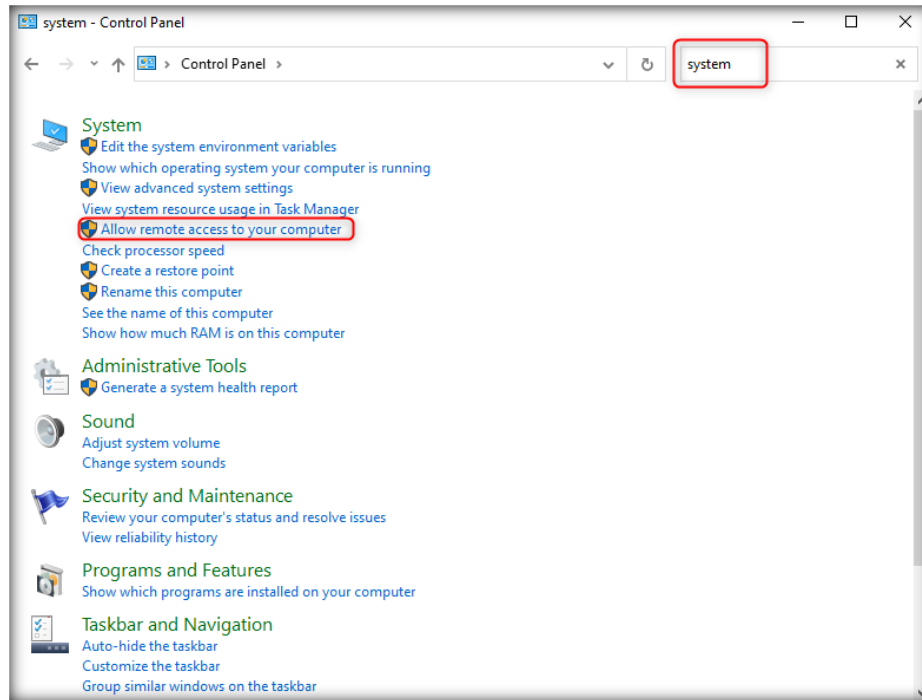
- Close all the windows.

CT#9.4: Enabling Remote Desktop Connection

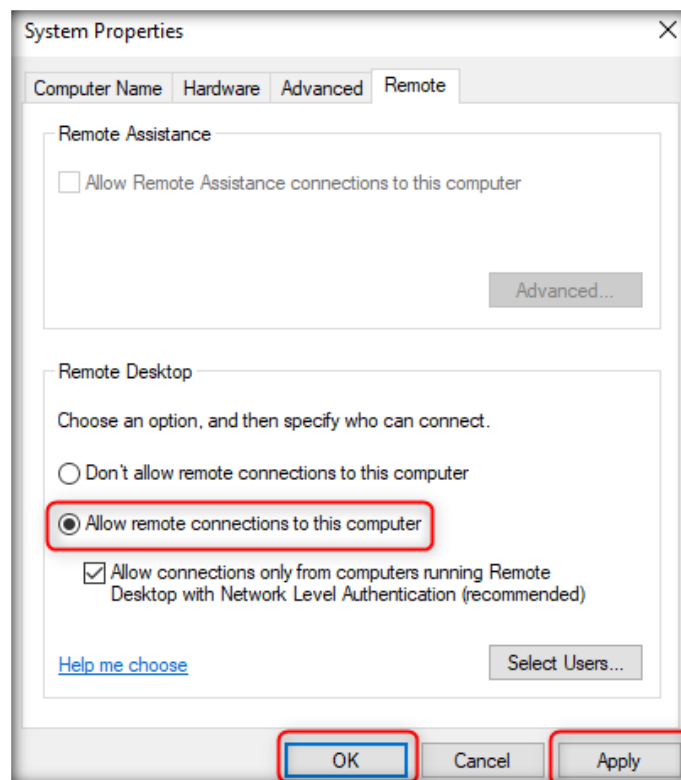
- Press Windows + R keys and type control panel in Run command to open control panel and click OK



- Control Panel appears on the screen, type **system** in search field, the System options will be listed out, click **Allow remote access to your computer** option under **System** section.

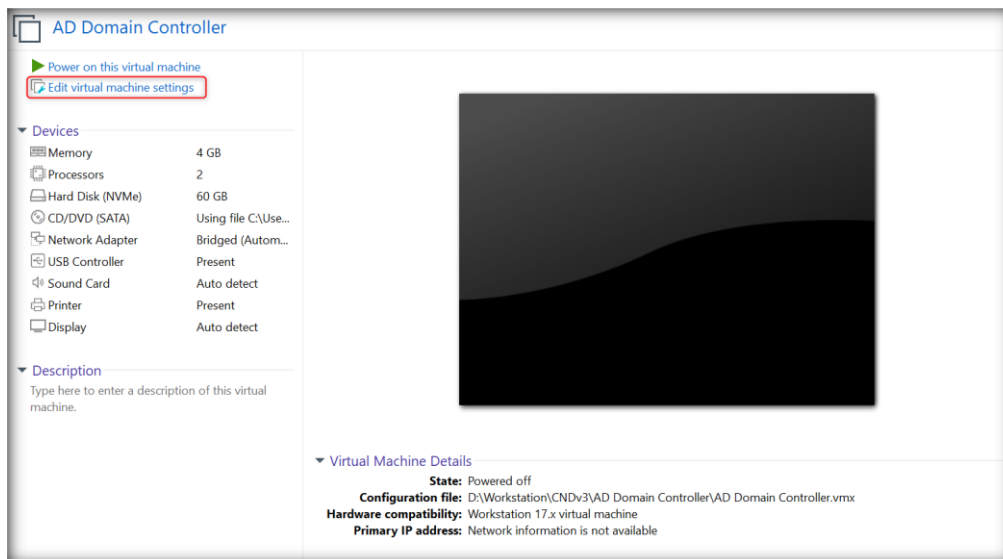


- System properties dialog-box appears, click Allow Remote Connection to this computer radio button, click **Apply** and **OK**.

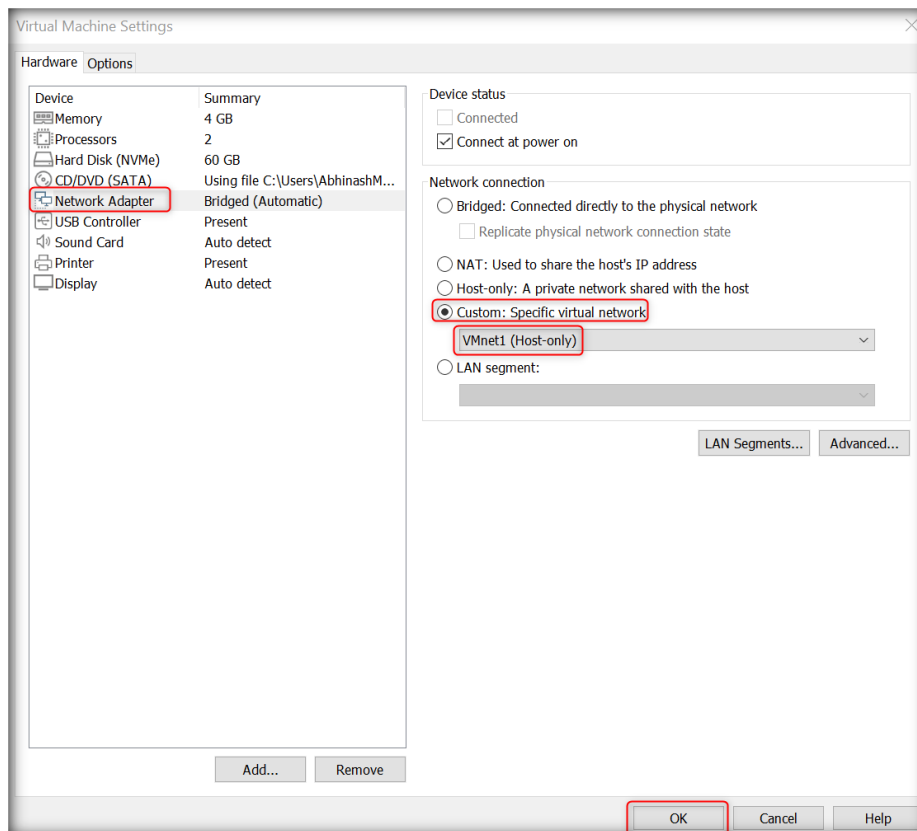


CT#9.5: Setting up IP address for AD Domain Controller

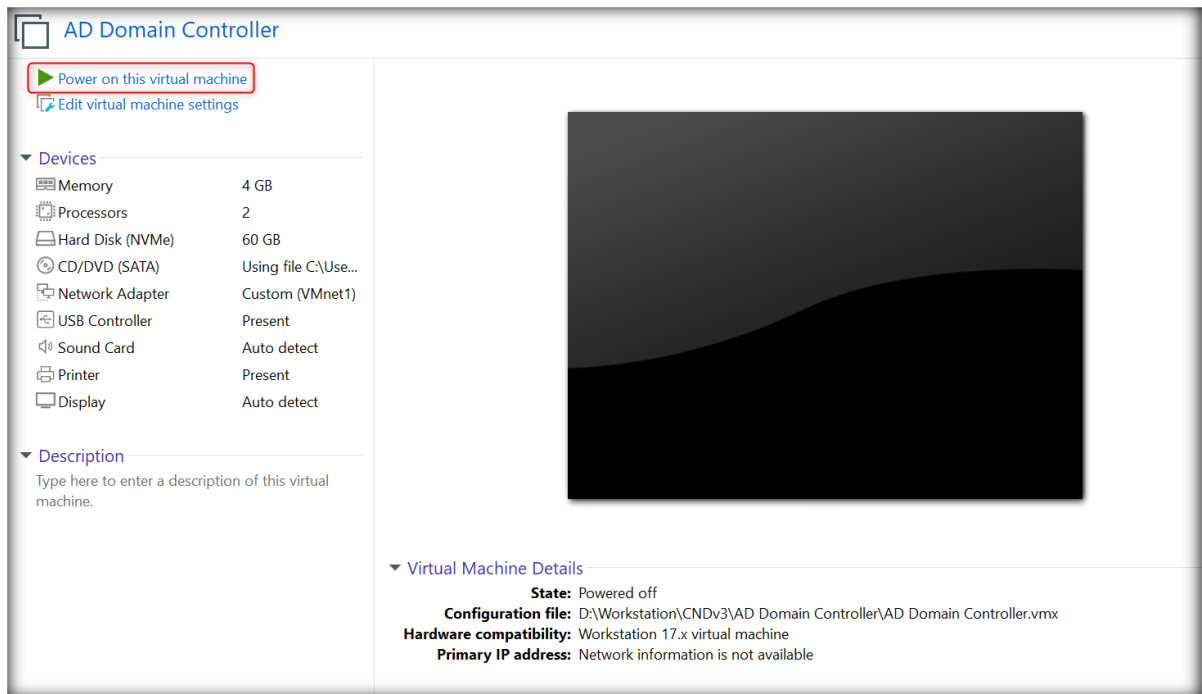
1. Launch VMWare Workstation.
2. Click on **AD Domain Controller** virtual machine profile and click **Edit virtual machine settings**.



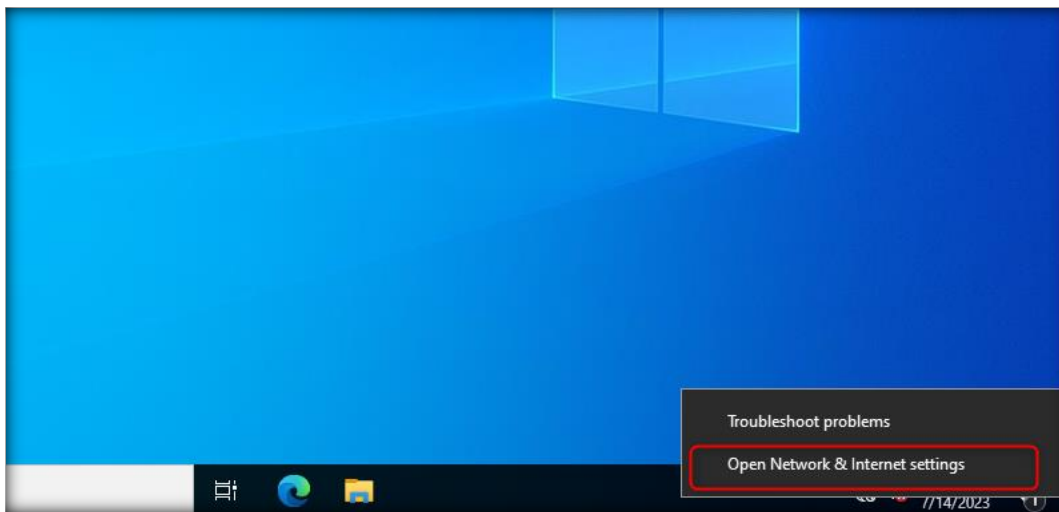
3. **Settings for AD Domain Controller** window opens, click **Network Adapter** in left side pane, click **Custom: Specific virtual network** radio button and select **VMnet1** from dropdown, click **OK**.



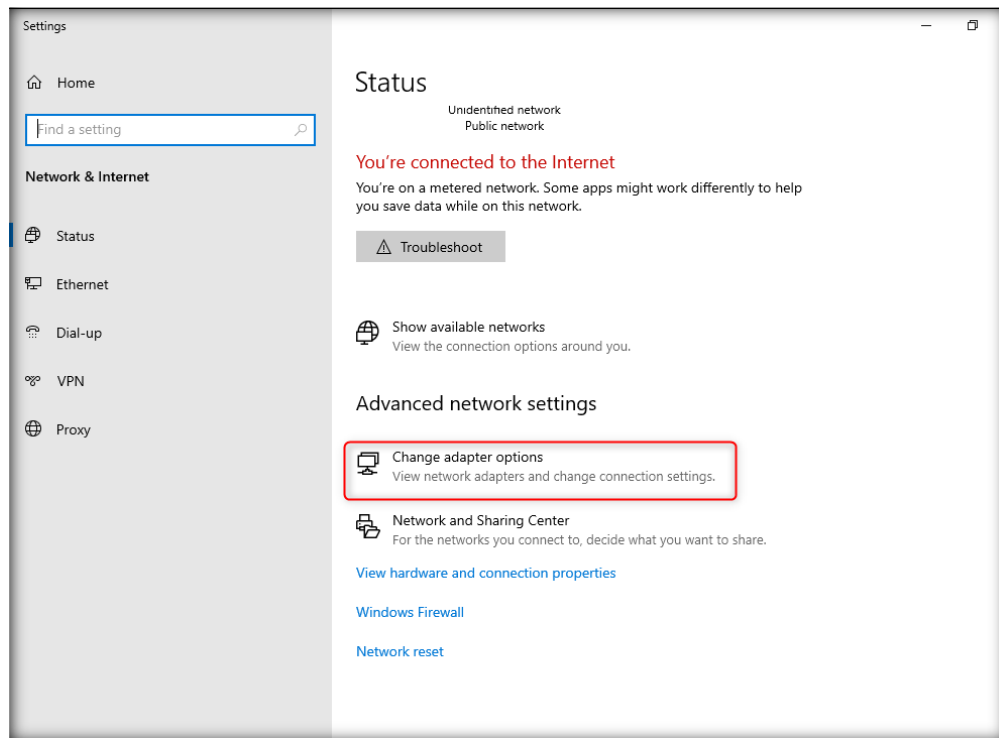
4. In VMware Workstation, click **Power on this virtual machine**.



5. Login as Administrator. Wait for few seconds, the server manager window opens, close the **Server Manager** window that opens after successful sign in, right-click on **Network** icon (lower right corner of the desktop) and click **Open Network & Internet settings** from the context menu.

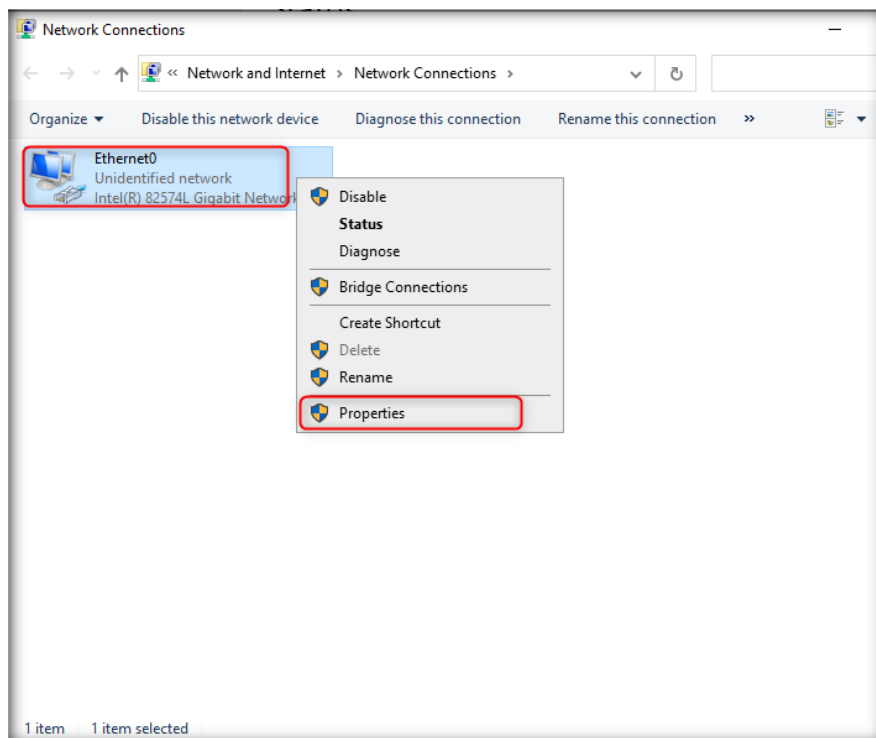


6. Network & Internet window appear, scroll down and click on **Change adapter settings**.

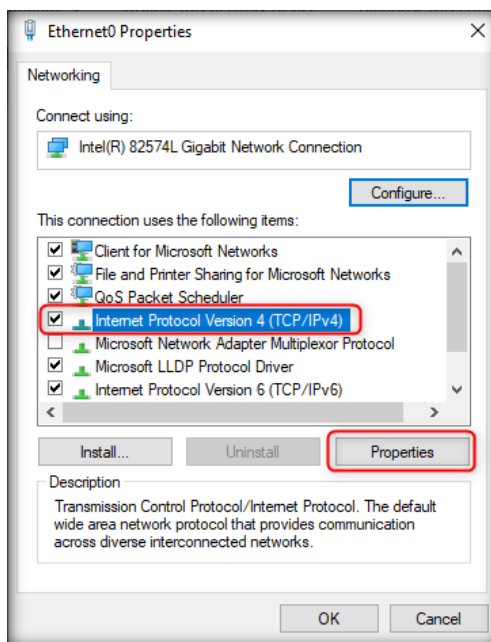


7. In the Network Connections window, right-click on Unidentified network (**Ethernet**) adapter and click **Properties** from the context menu.

Note: The Name of Unidentified network may vary.



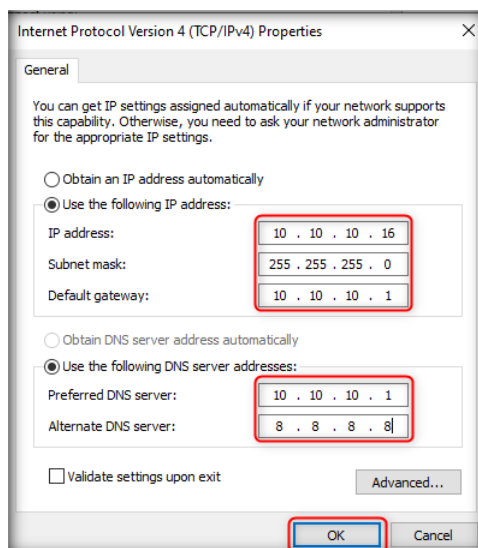
8. Ethernet adapter Properties window appears; and select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.



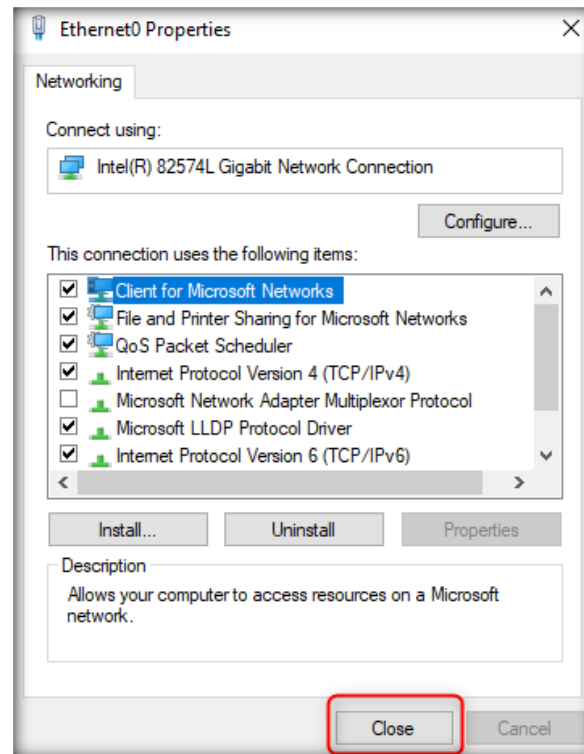
9. Select **Use the following IP address** and **Use the following DNS server addresses** radio buttons, and type the following values as shown in the screenshot and click **OK**.

- IP address: **20.20.10.19**
- Subnet mask: **255.255.255.0**
- Default gateway: **20.20.10.53**
- Preferred DNS server: **20.20.10.53**
- Alternate DNS server: **8.8.8.8**

Note: Once you click on **OK** button if Networks section appears on the right side of the desktop screen, and then click **Yes**.



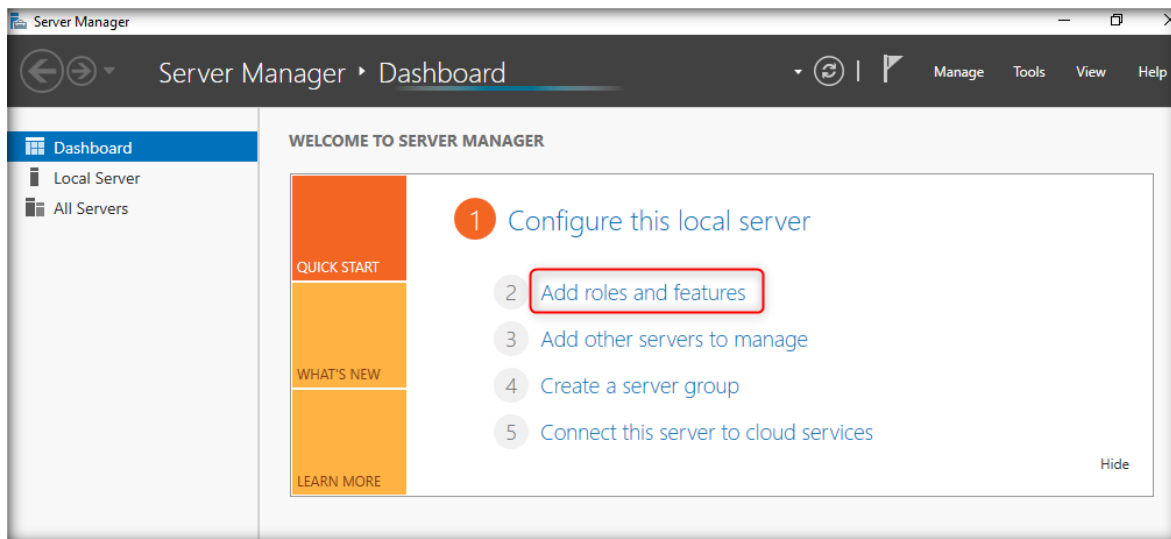
10. Click **Close** to close the Ethernet Properties window.



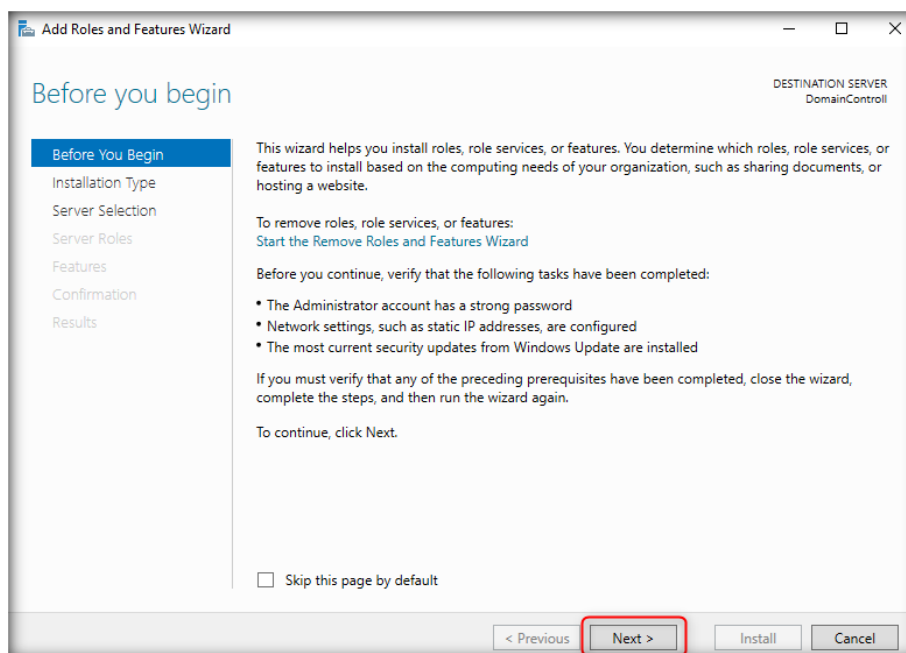
11. Now, check whether Windows Server 2022 is installed and working properly.

CT#9.6: Adding DHCP Role to Domain Controller

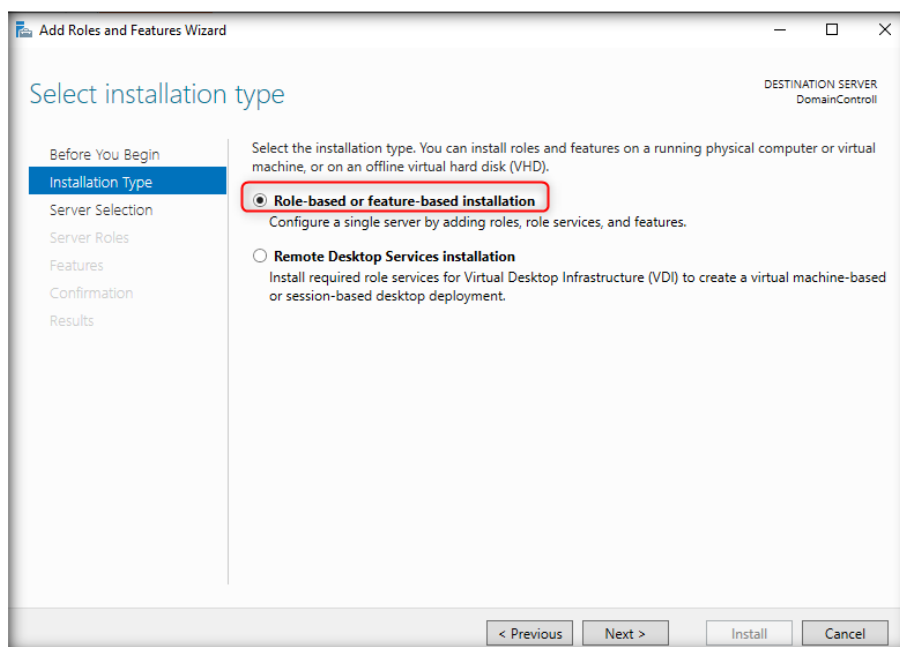
1. Launch Server Manager.-→ Click Add roles and features



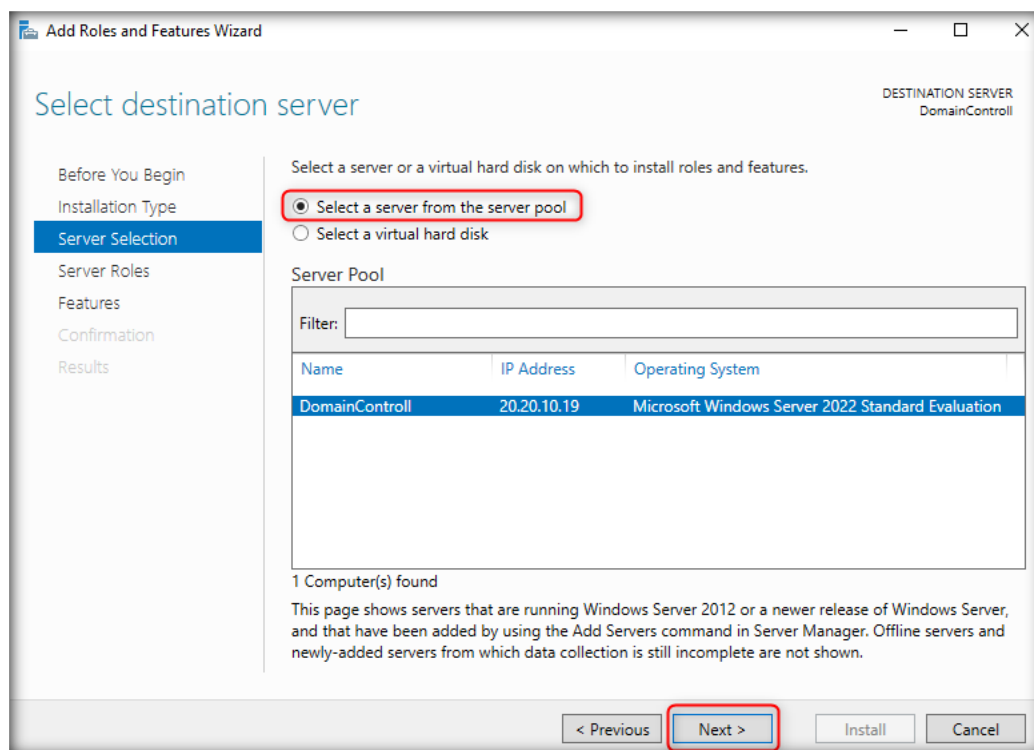
2. Click **Next** to begin.



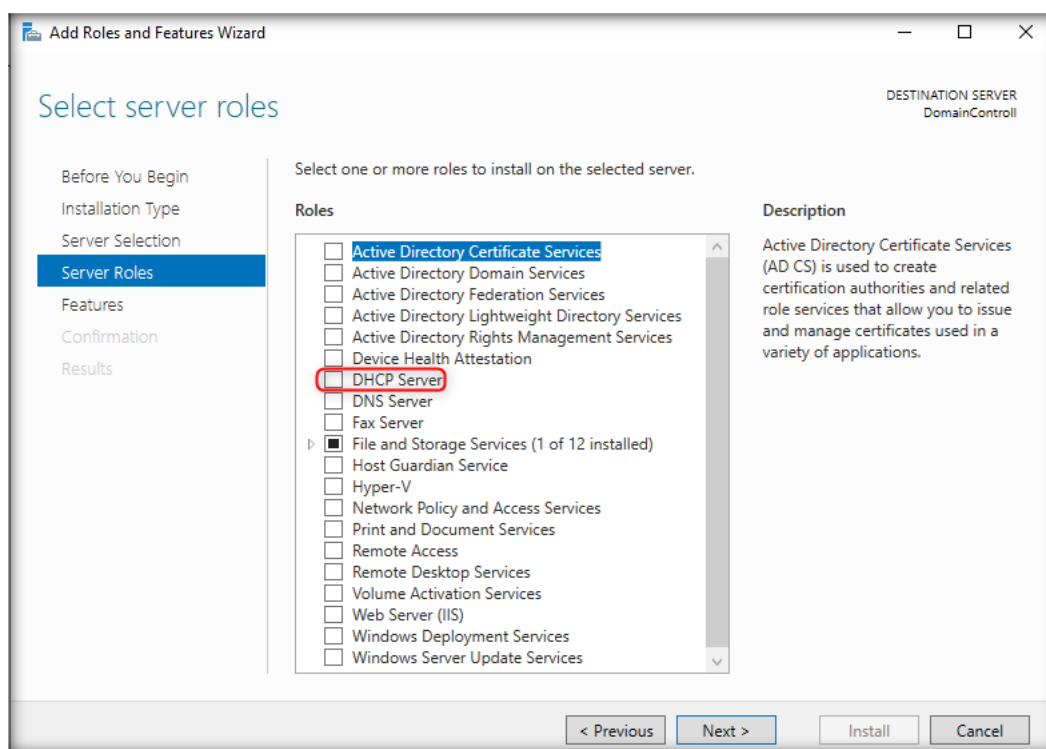
3. Select **Role-based or feature-based installation** and click **Next**.



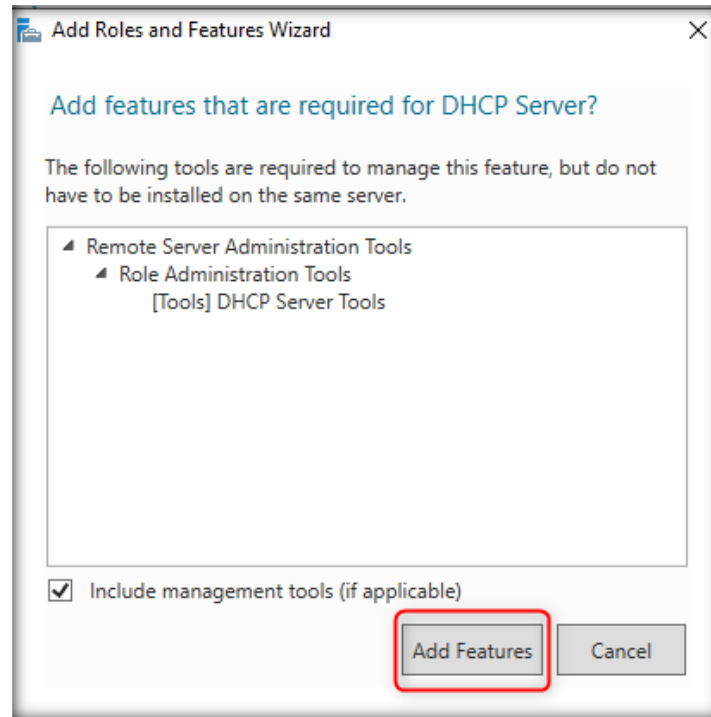
4. The Default DomainController is selected, click Next to continue.



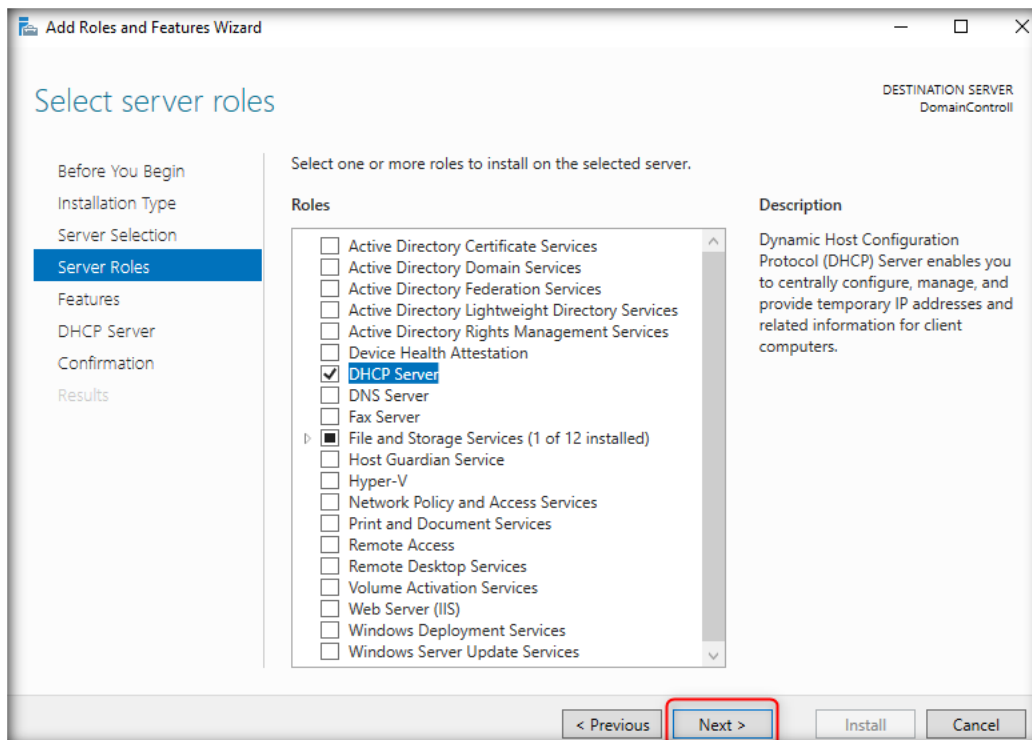
5. The list of roles displays, select DHCP from the list.



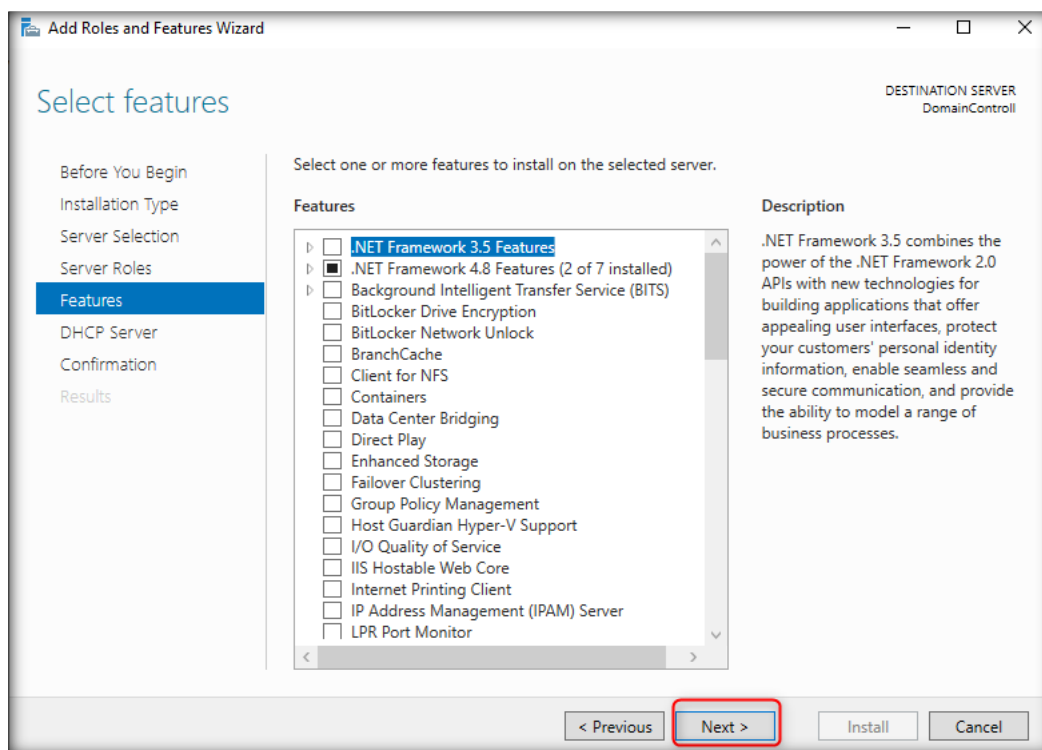
6. Add Roles and Features Wizard appears, click **Add Features**.



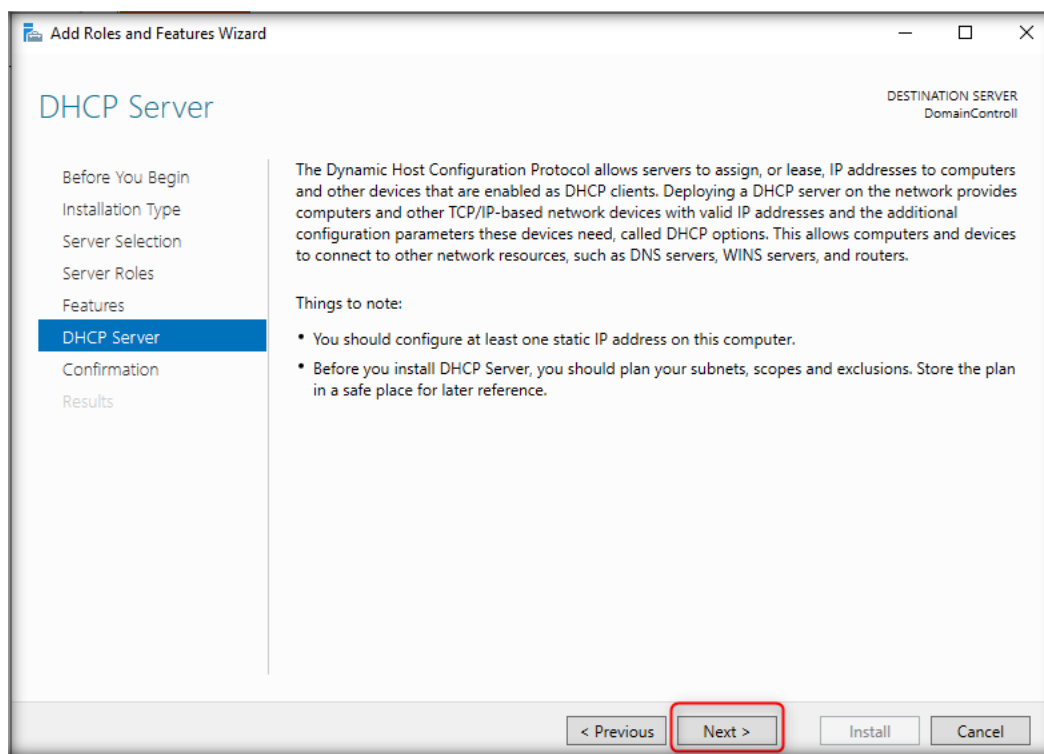
7. Click **Next** to continue.



8. Click **Next** in Feature section.

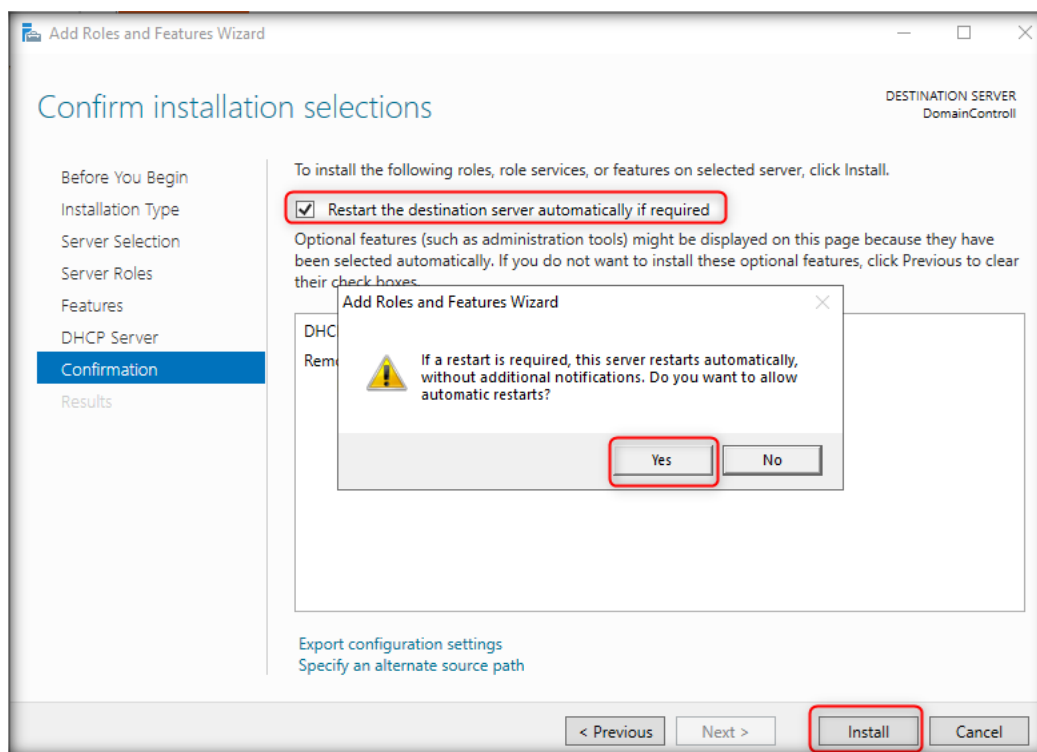


9. Under DHCP Server Section some note appears, click Next.

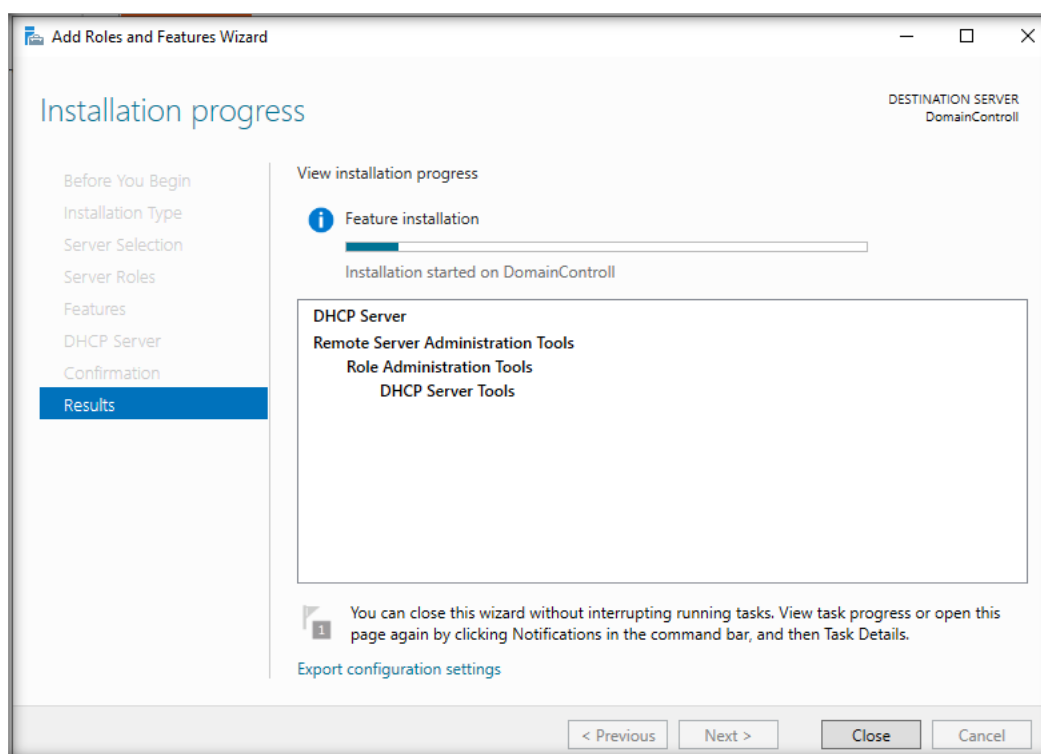


10. Now to confirm installation, select **Restart the destination server automatically if required.**

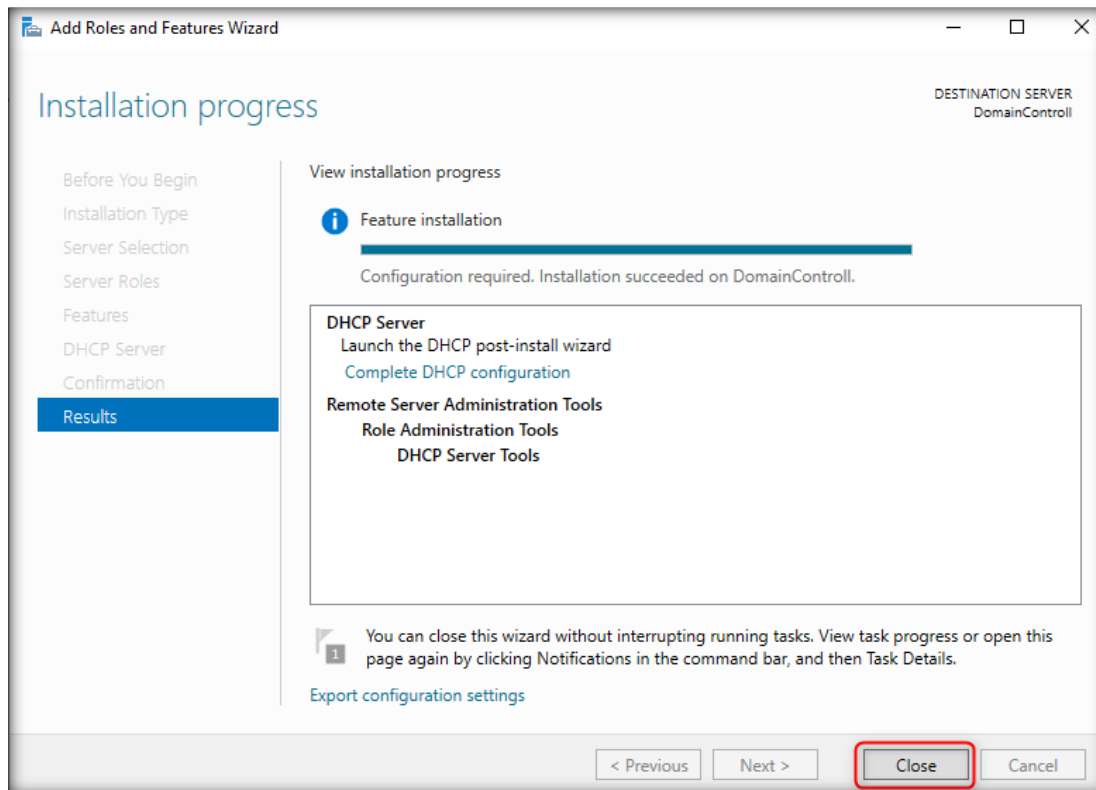
11. The alert popup appears, click **Yes** and click **Install** to continue.



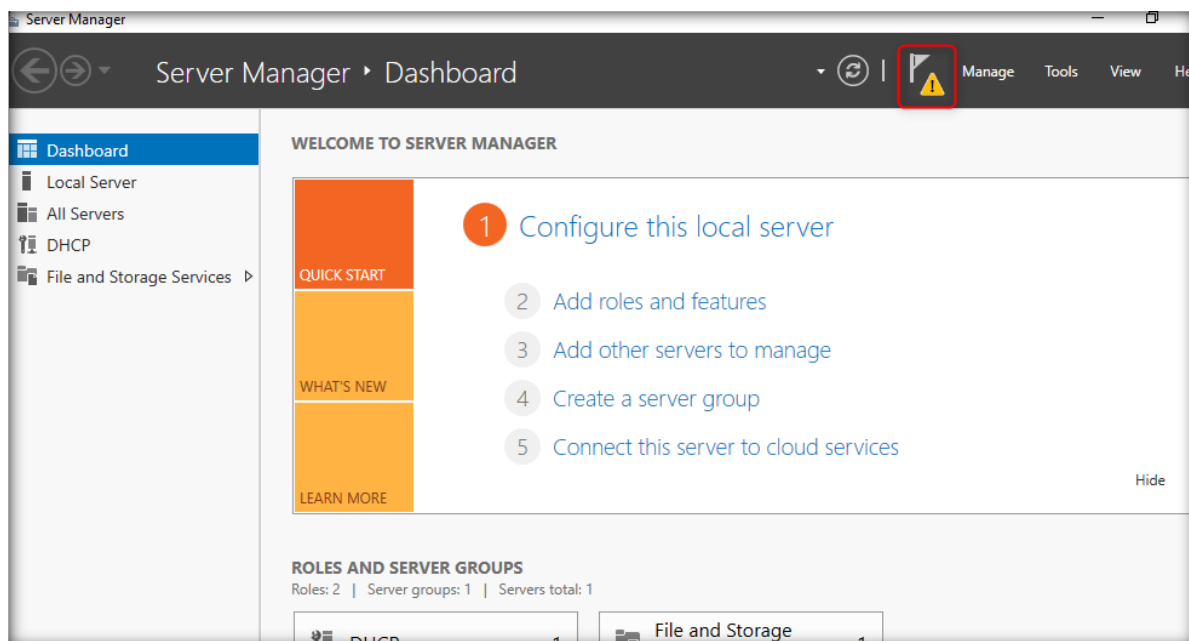
12. Wait for few minutes to install DHCP role.



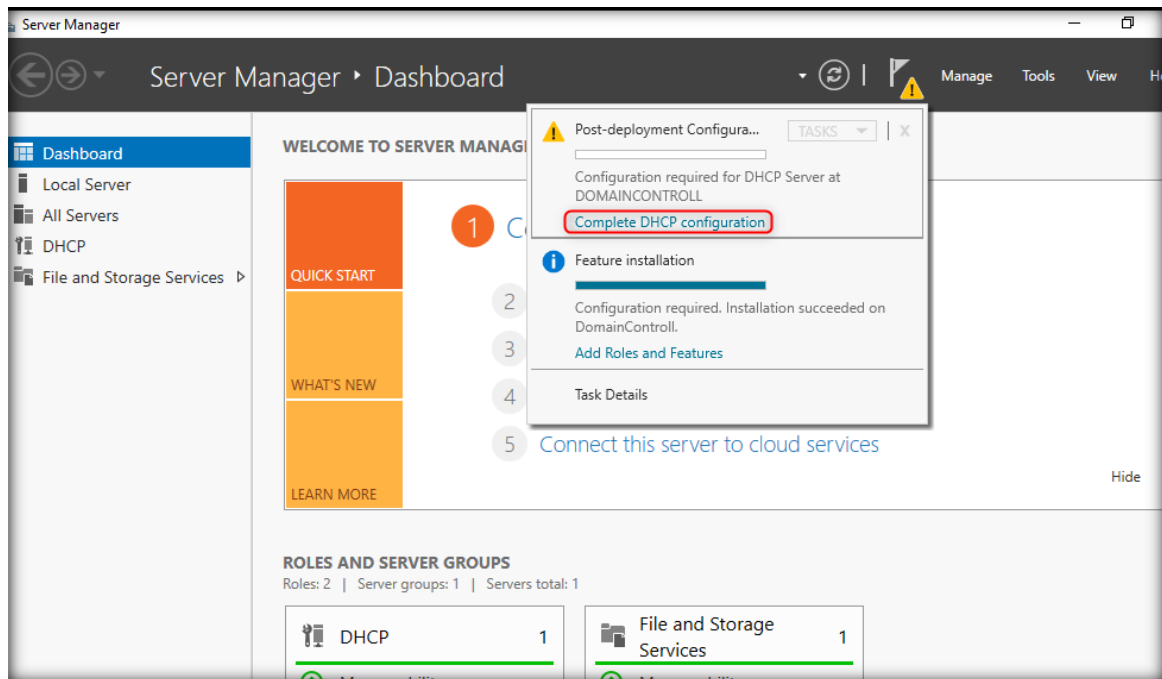
13. After Successful installation click Close.



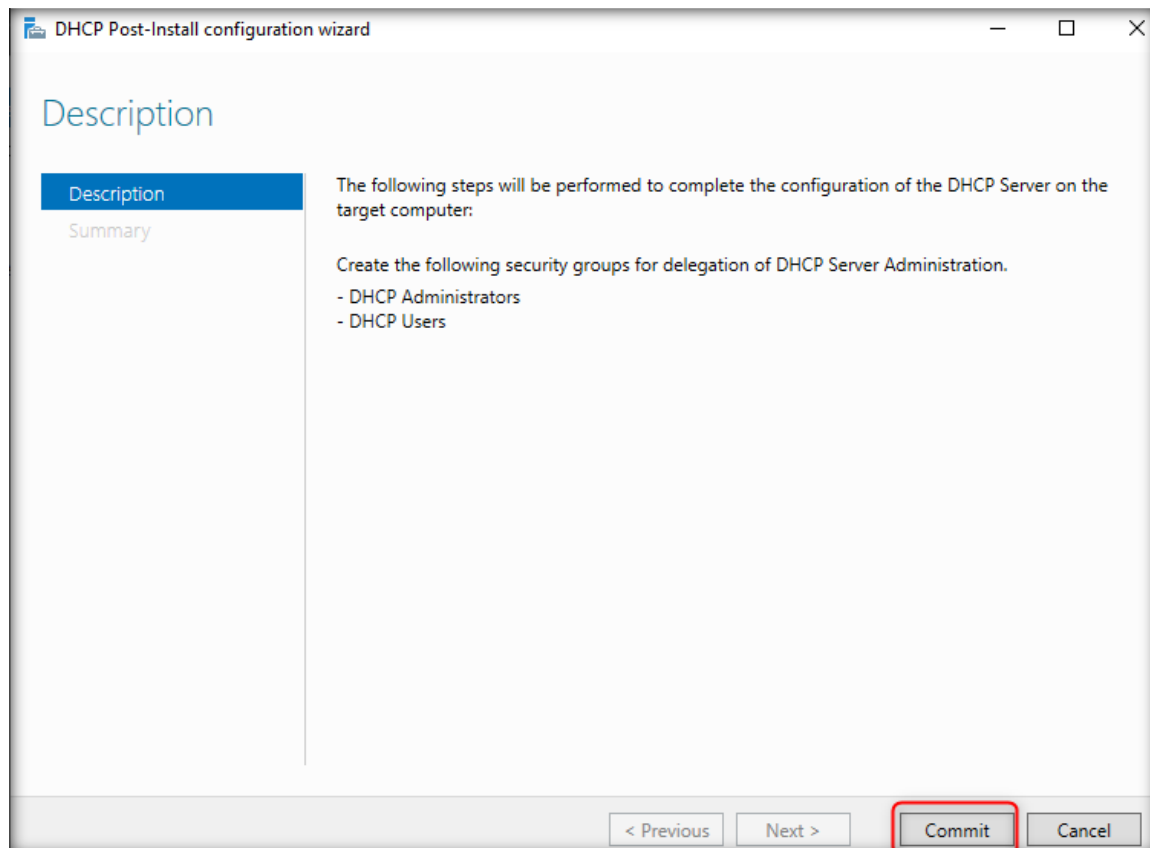
14. Now to complete the installation navigate to Server Manager and click on alert notification as shown in following screenshot.



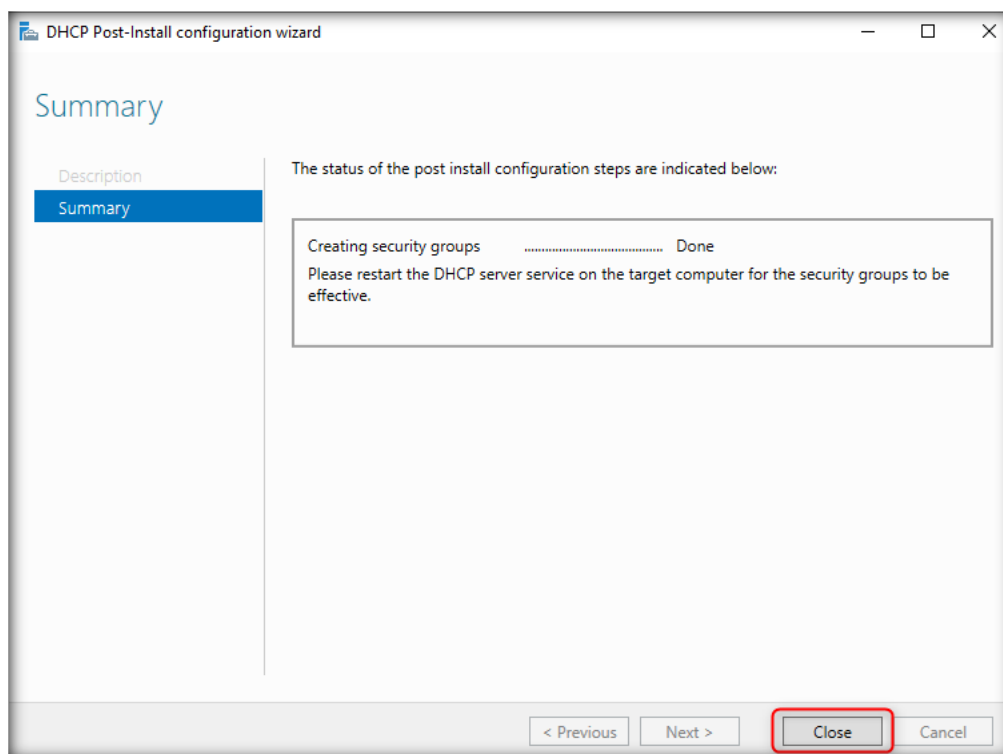
15. Click on complete DHCP Configuration.



16. Click Commit to complete the installation.

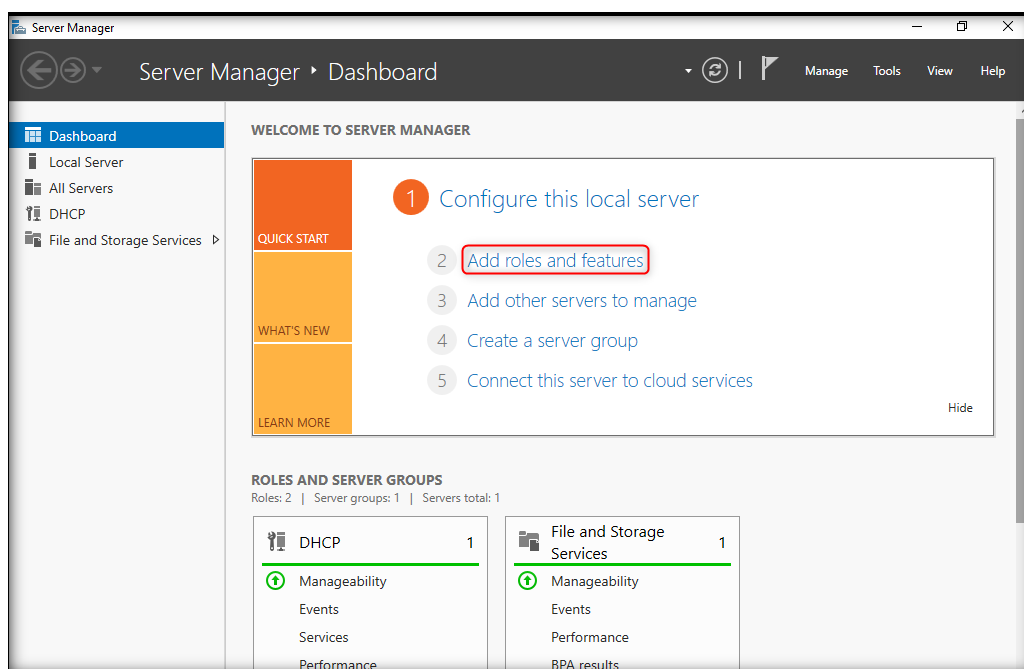


17. The summary page appears, click **Close**.

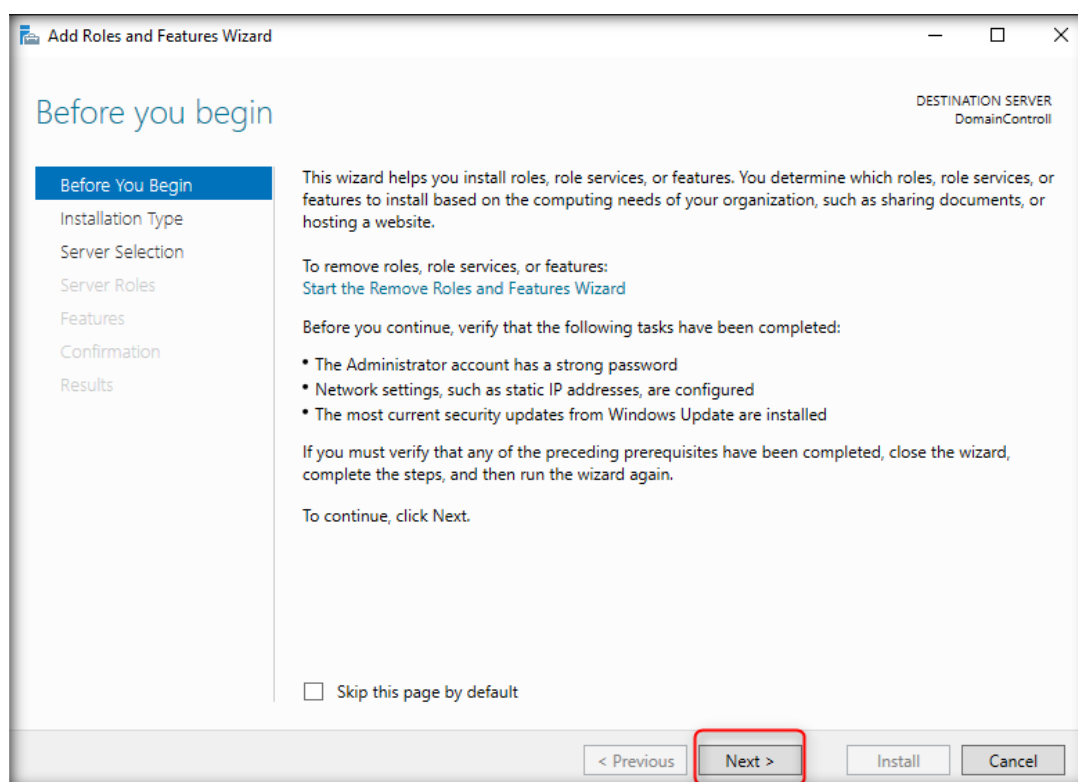


CT#9.7: Install Active Directory on AD Domain Controller VM

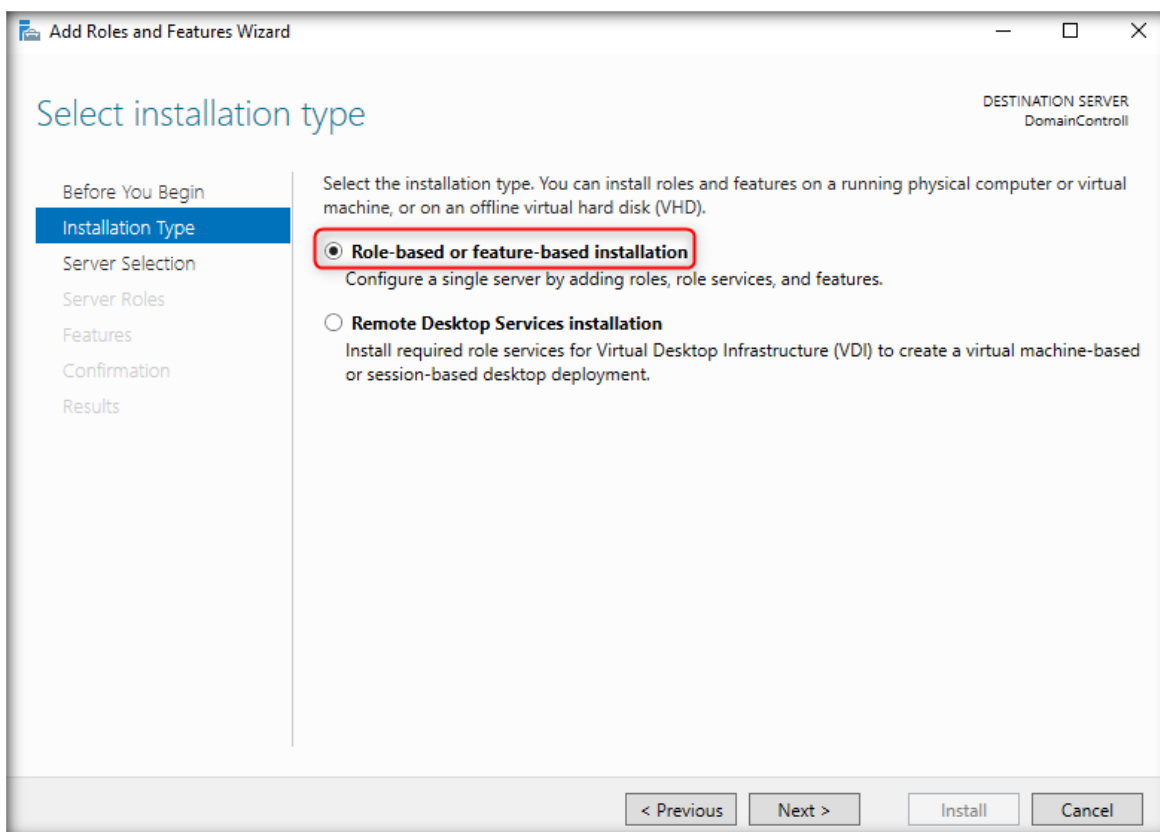
1. To install the AD in the Windows Server 2022 VM, launch the Server Manager, click **Roles** in the left pane, and **Add Roles** under the Roles Summary section.



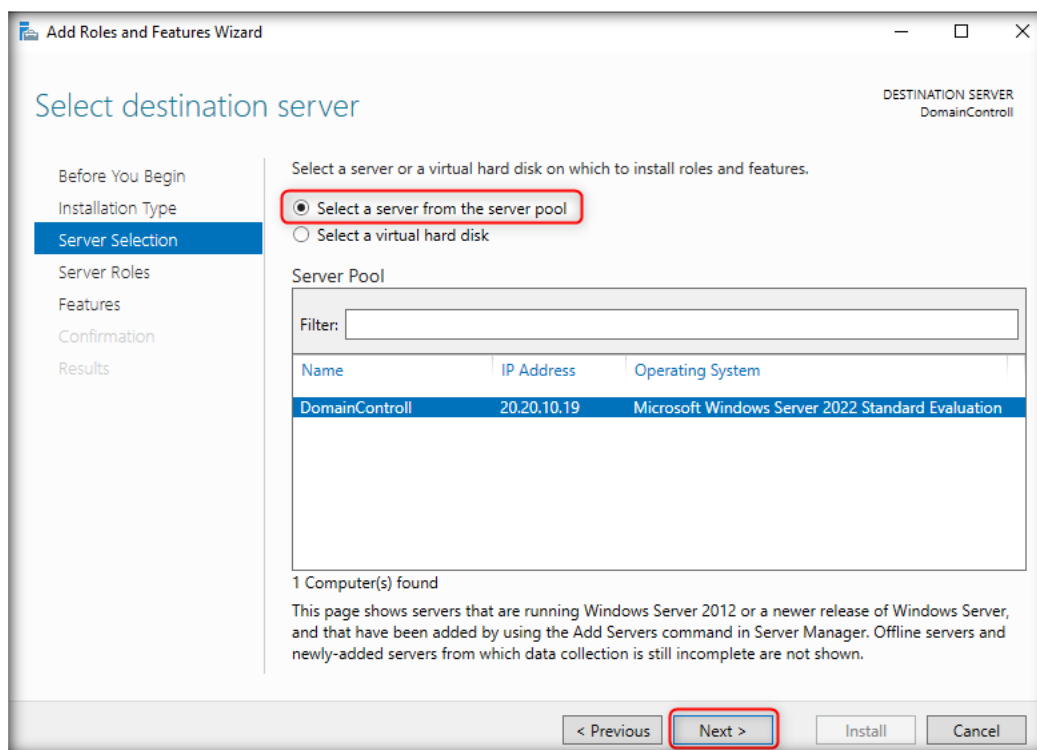
2. Once the Before You Begin wizard opens, click **Next** to continue.



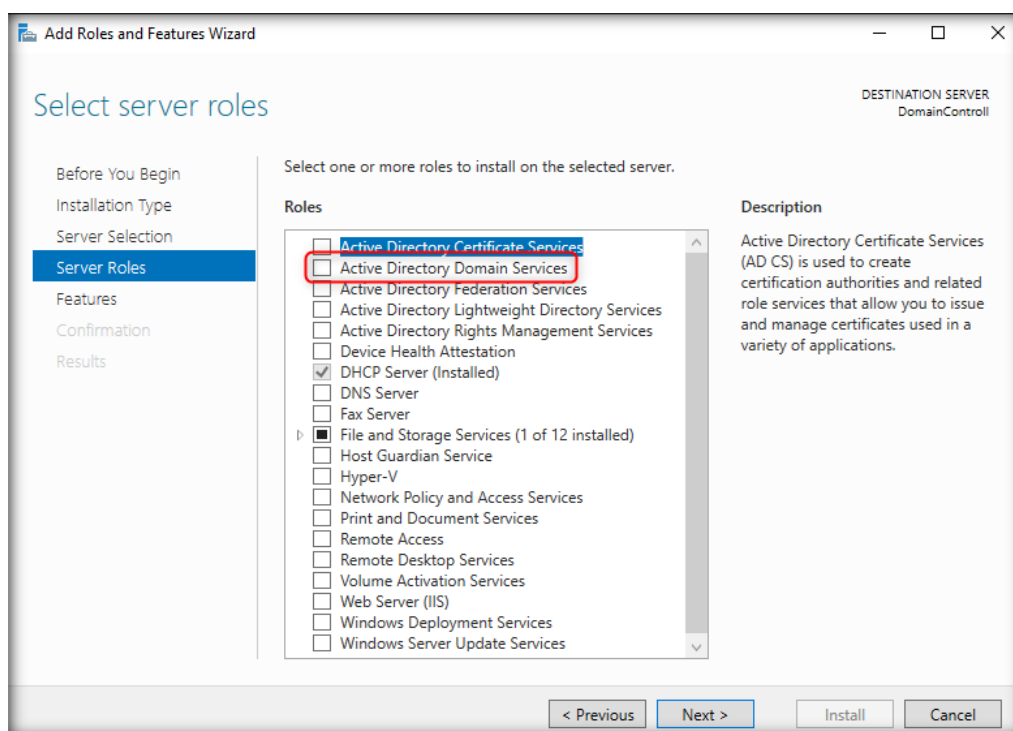
3. Select **Role-based or Feature-based installation** and click **Next**.



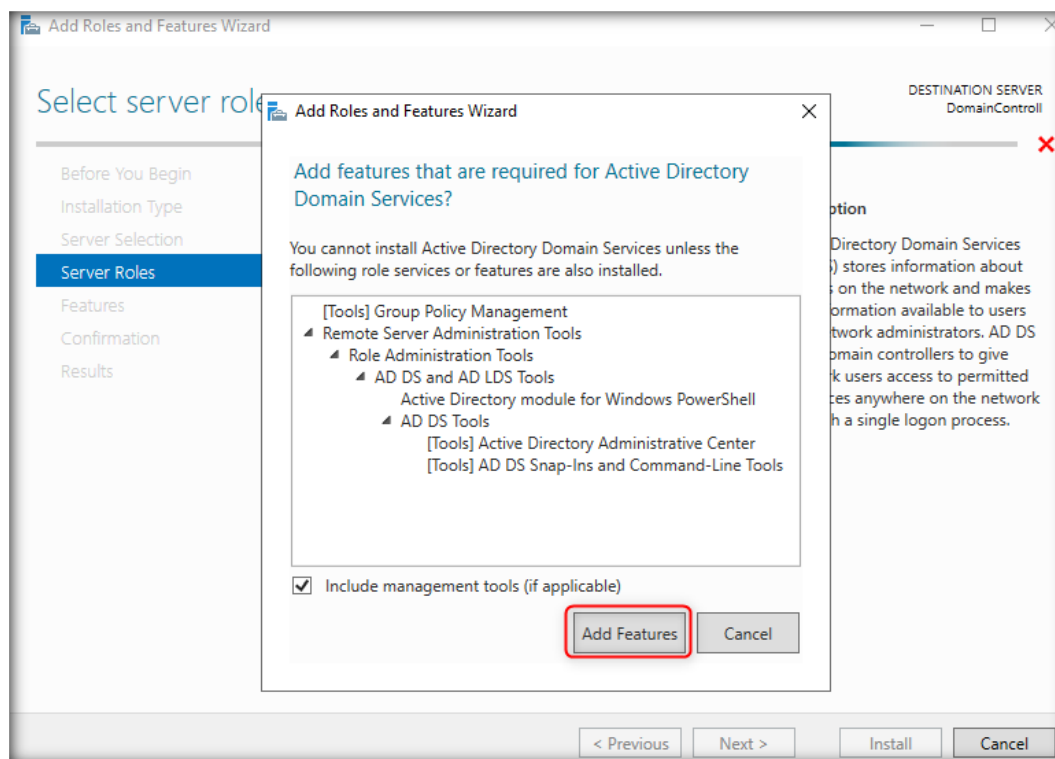
4. Choose **Select a server from the server pool** and click **Next**.



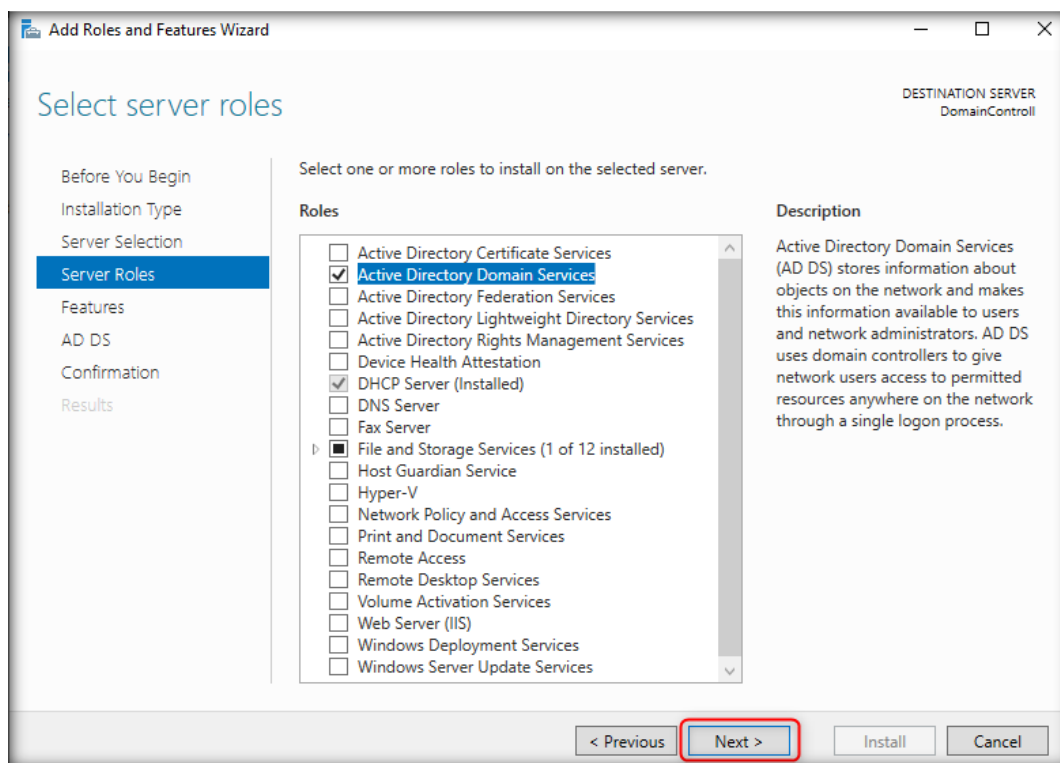
5. Check **Active Directory Domain Services** in the Roles section in the Server Roles wizard.



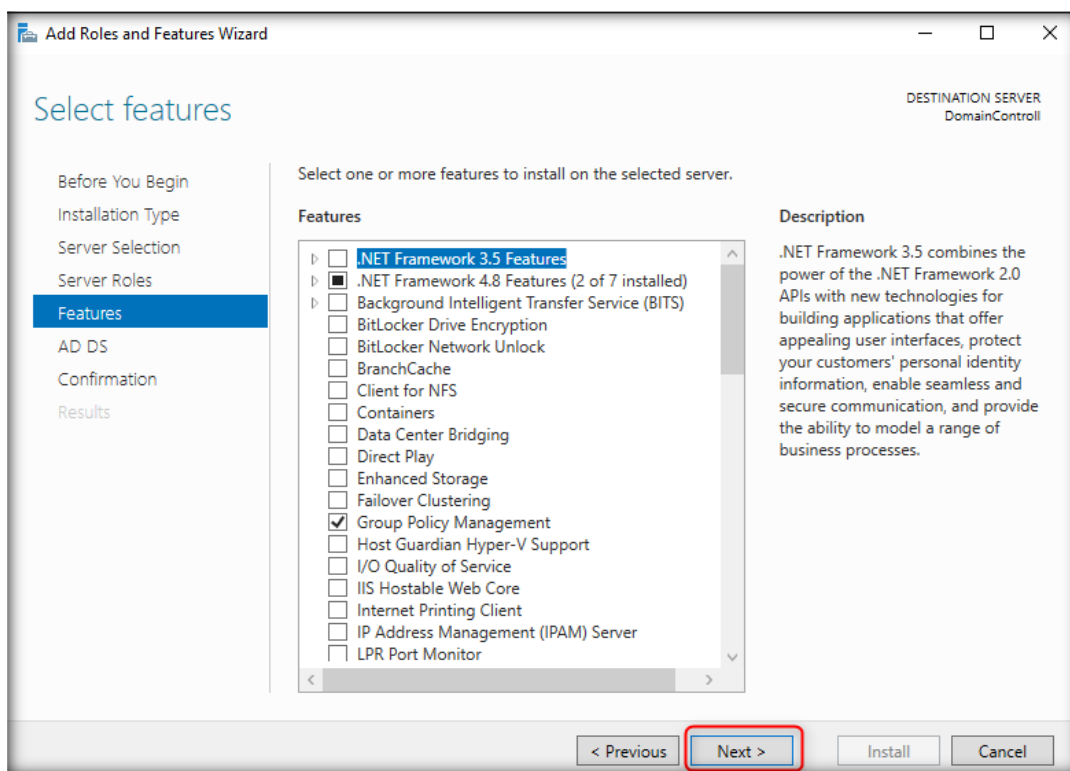
6. In the Add Roles and Features Wizard, choose **Add Features** button and click **Next**.



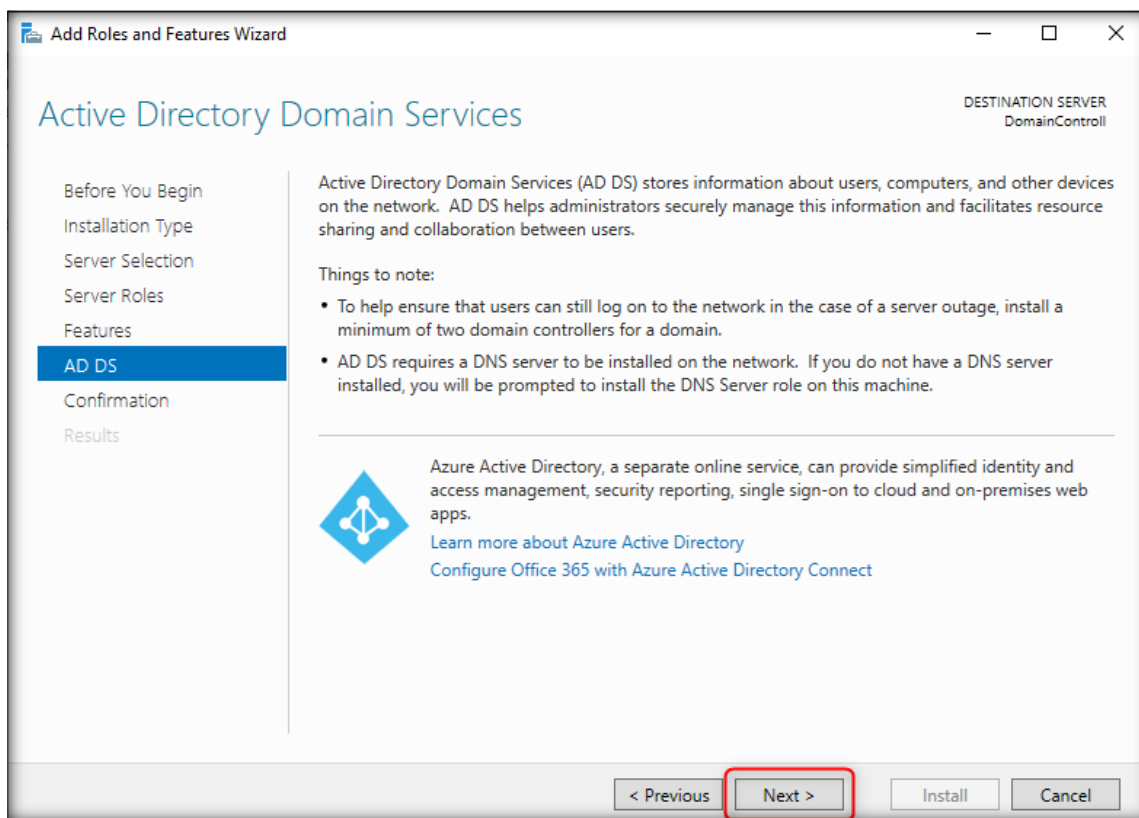
7. Click **Next**.



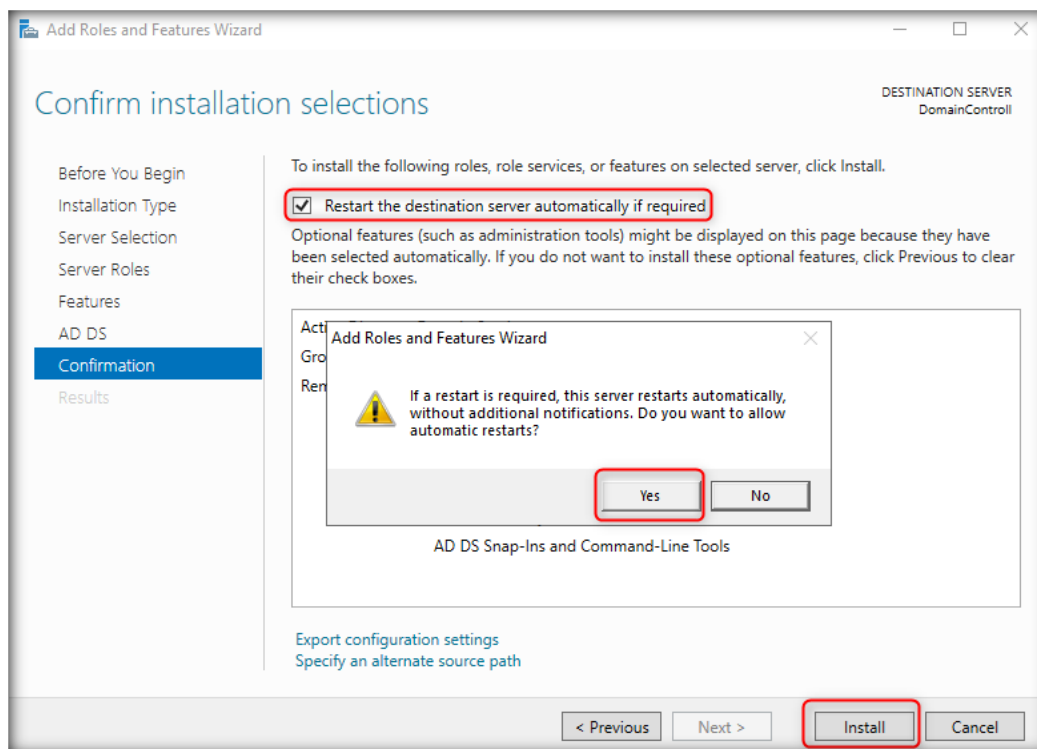
8. The Active Directory Domain Services wizard appears; click **Next** to continue.



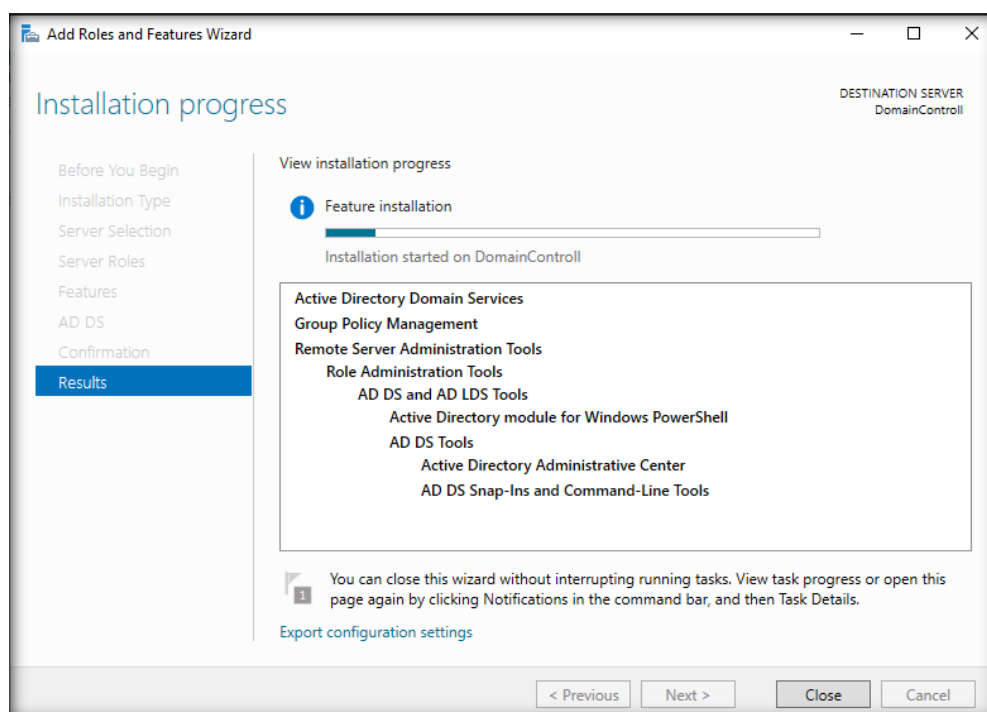
9. The Active Directory Domain Services wizard appears; click **Next** to continue.



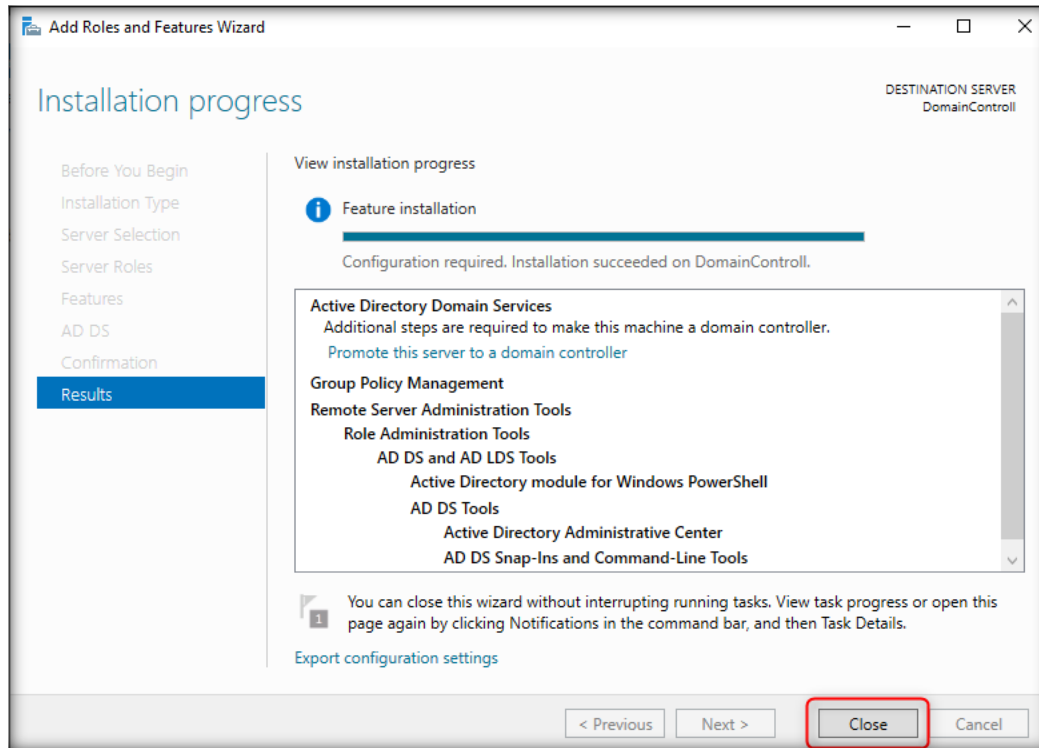
10. In the Confirm Installation Selections Wizard, check **Restart the destination server automatically if required**. Then, a confirmation prompt will appear. Click **Yes** and **Install** to continue.



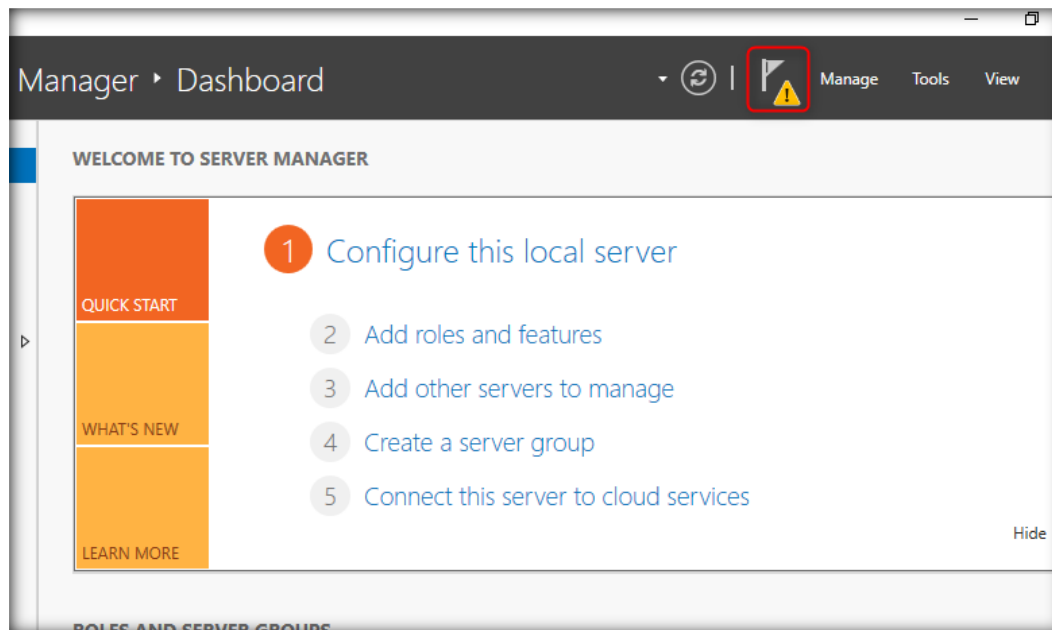
11. The **Installation progress** wizard shows the installation process of the Roles, as shown in the screenshot below.



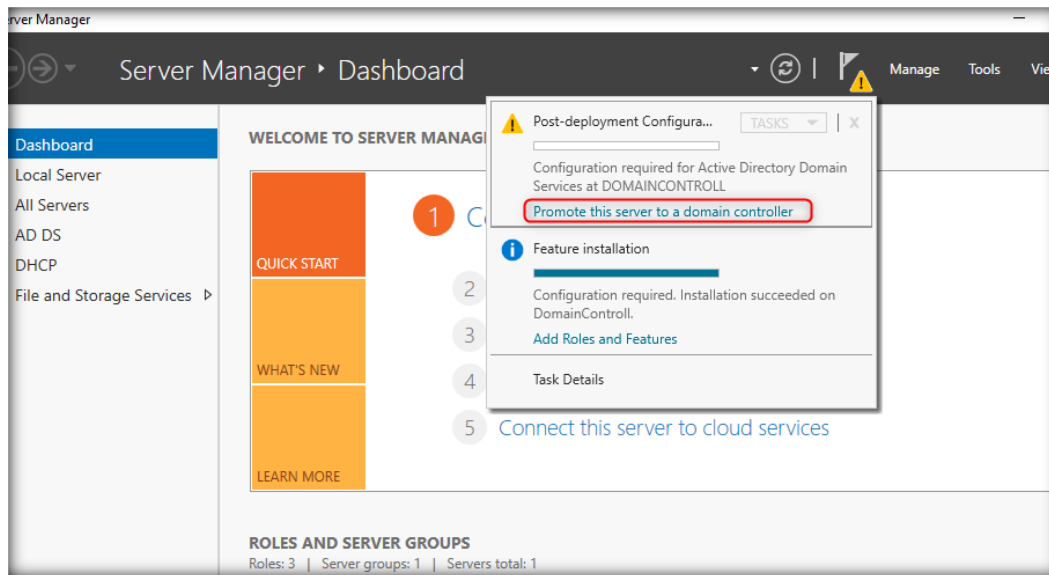
12. In Installation progress wizard, a **Configuration required. Installation succeeded on DomainControll.** message will appear; click **Close**.



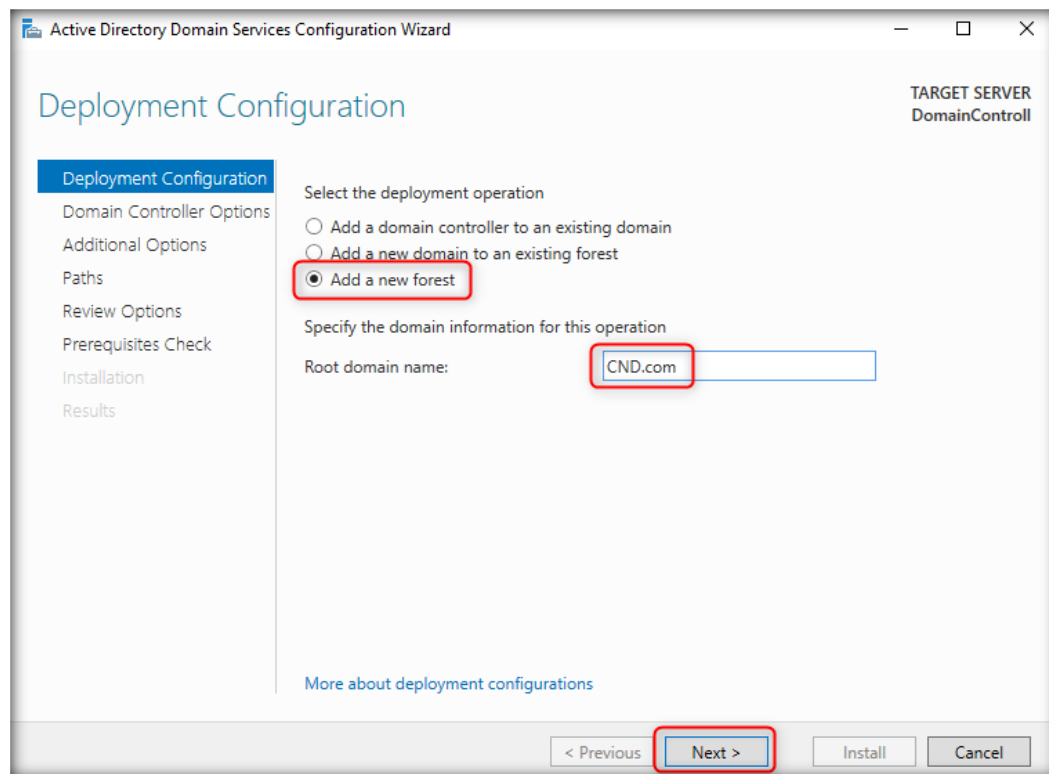
13. Click on Alert Flag, as shown in the screenshot below.



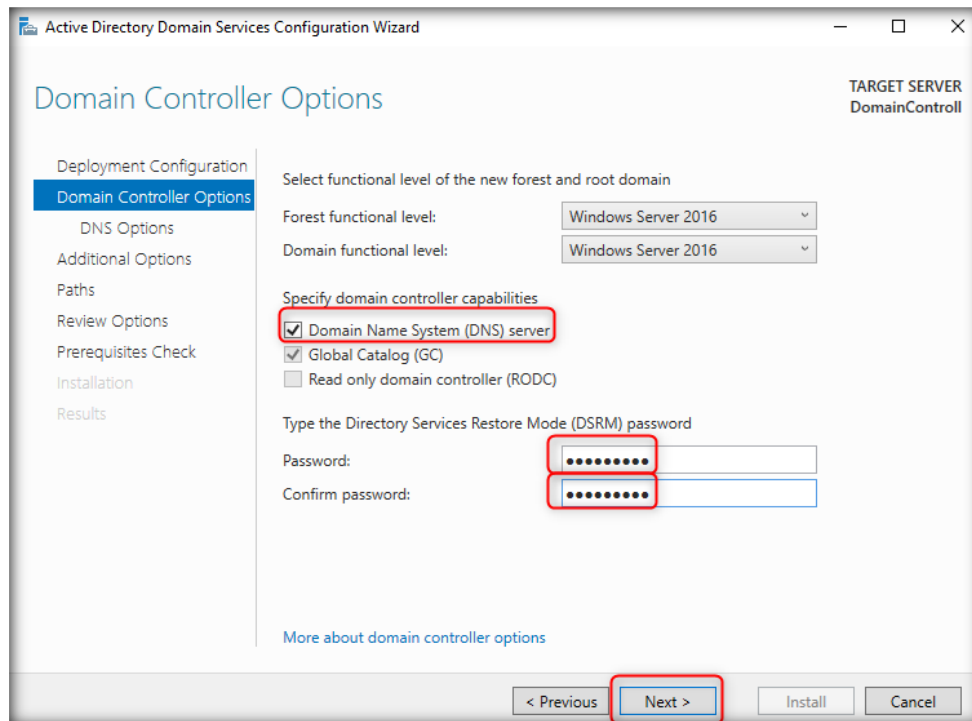
14. Select **Promote this server to a domain controller**.



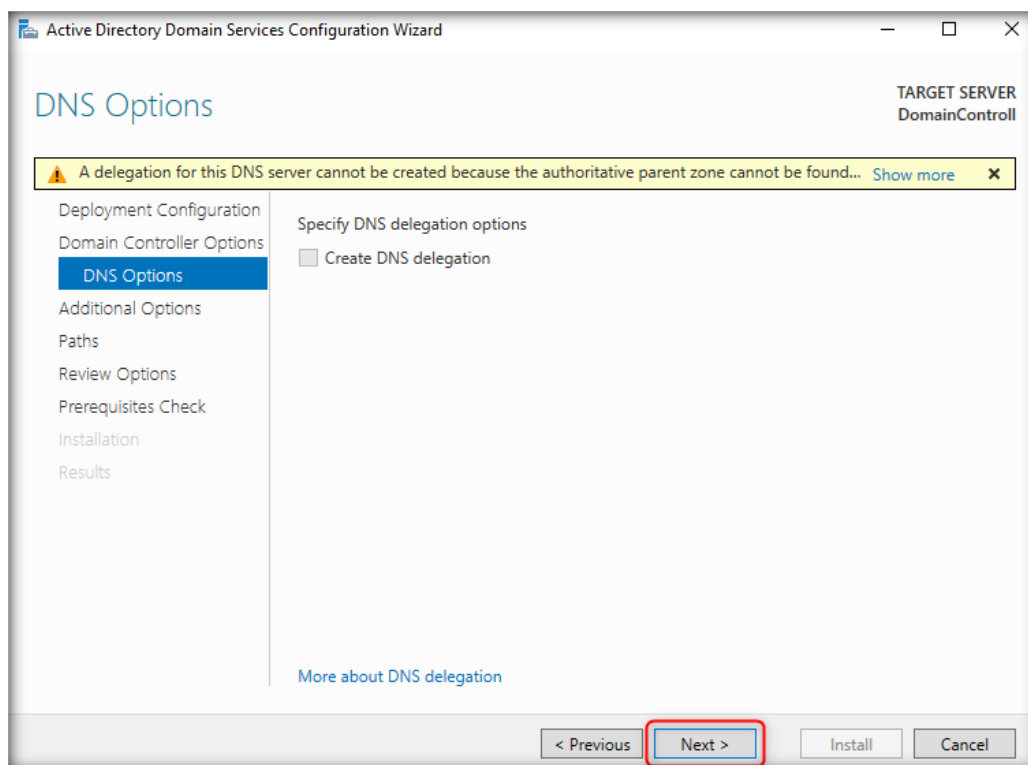
15. The **Active Directory Domain Services Configuration Wizard** opens; select **Add a new forest** and specify the root domain name as **CND.com**, and then click **Next**.



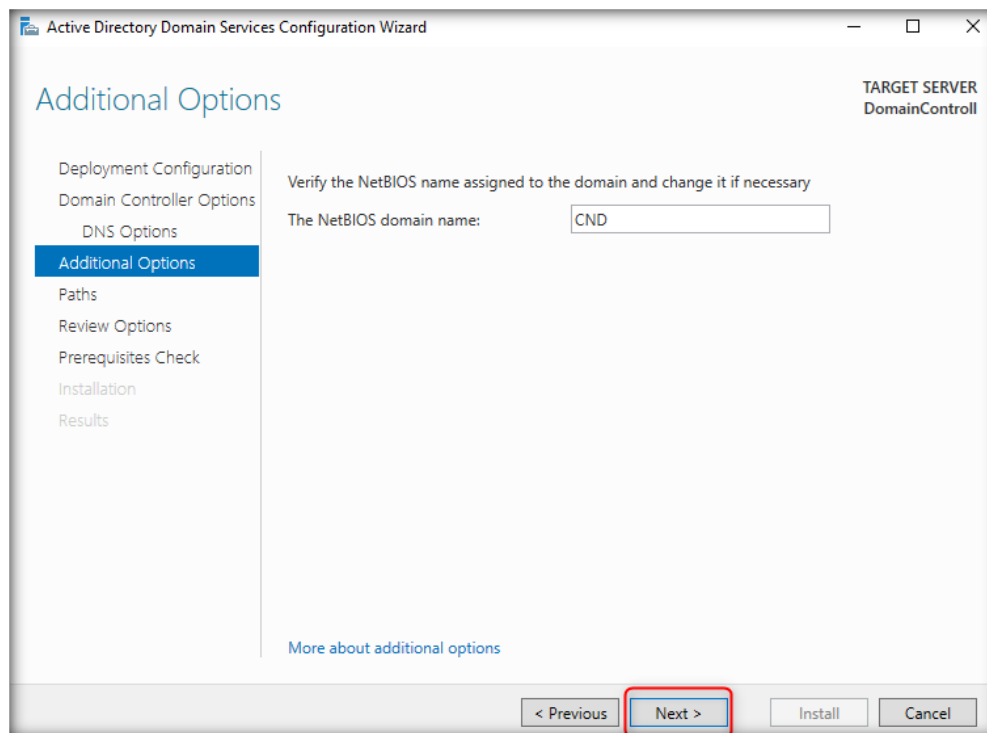
16. The Domain Controller option section appears; check **DNS server**, type password as admin@123, and click **Next**.



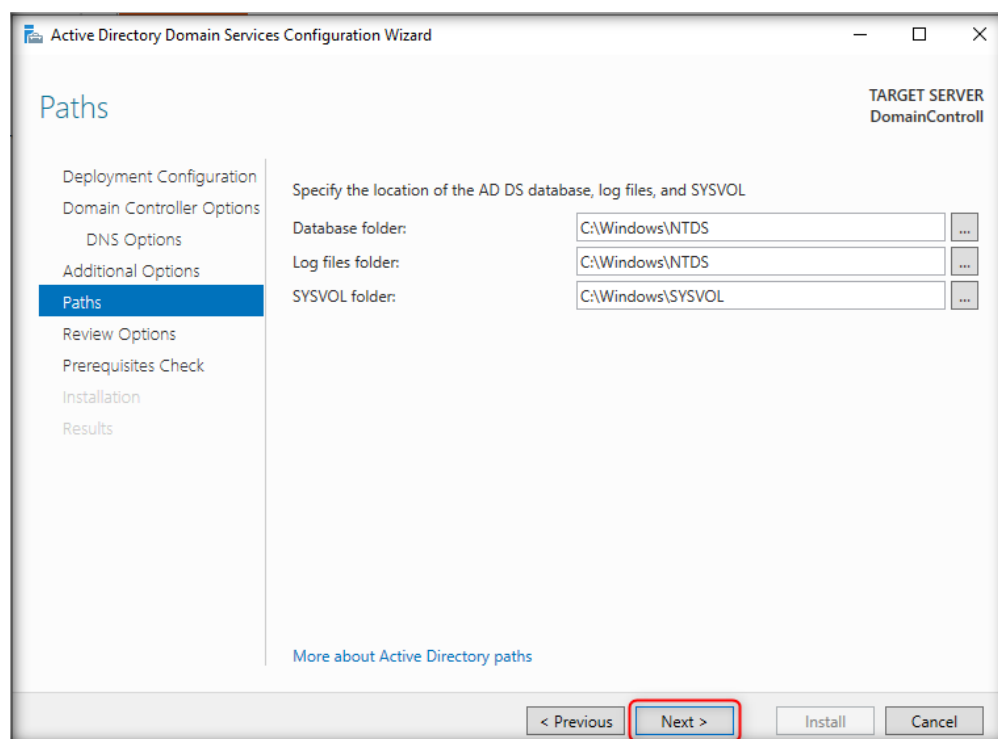
17. In the DNS Option, a parent zone cannot be found error is seen; ignore the error and click **Next**.



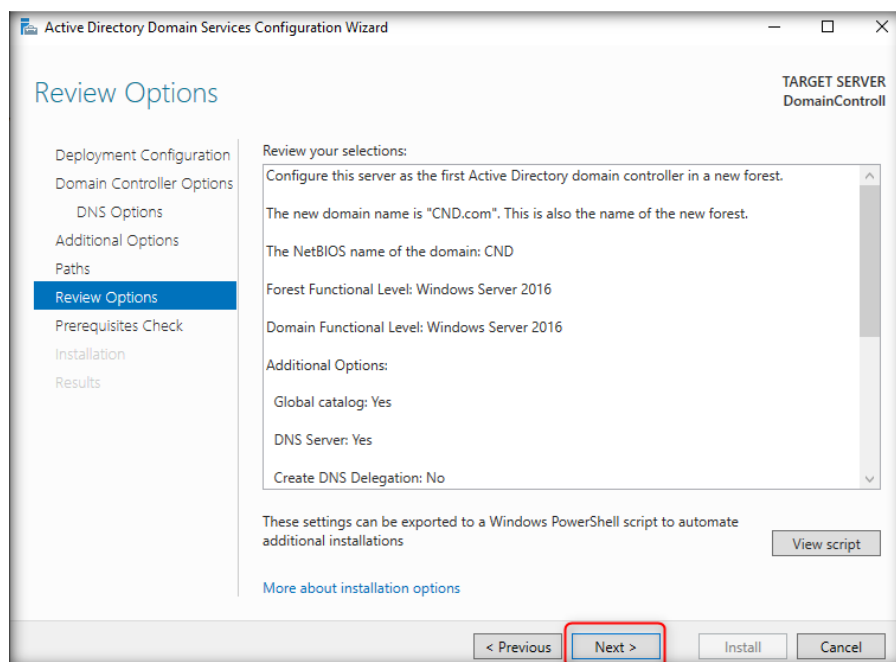
18. Retain the Net BIOS domain name; click **Next** to continue.



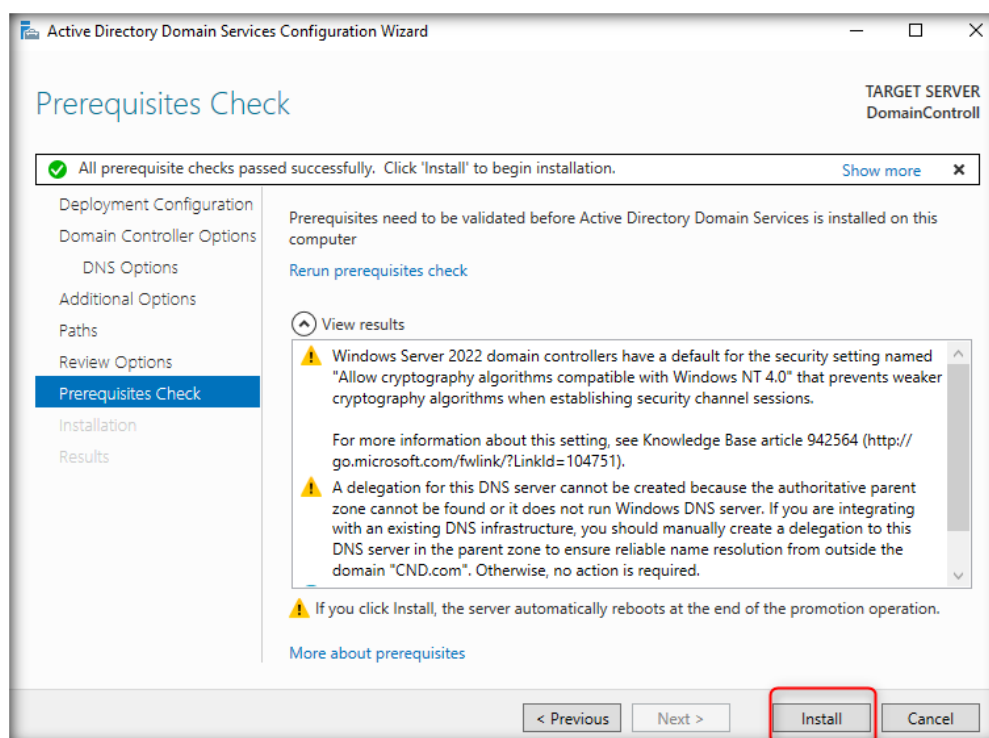
19. Retain the default path of the AD services, database, and logs, and then click **Next**.



20. In the Review section, the configuration settings of the AD services are available; click **Next** to continue.



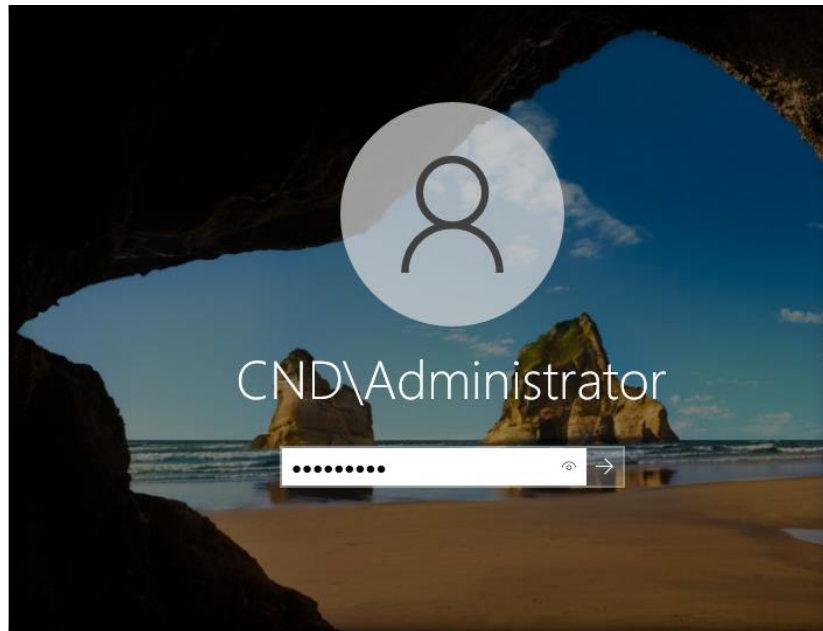
21. Under Prerequisites Check, click **Install** to continue.



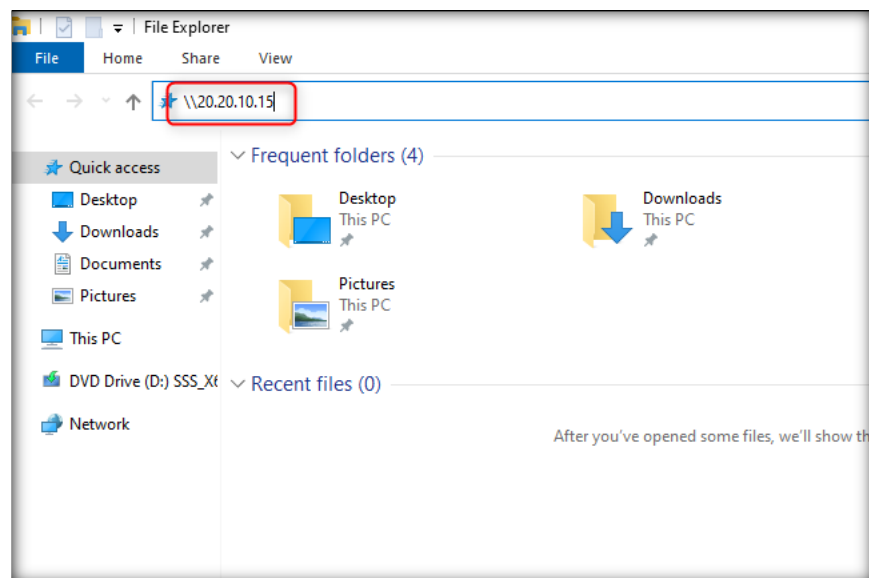
22. Wait for a few minutes for the system to restart; then, log in with username **CND\Administrator** and password **admin@123**.

CT#9.8: Map CND-Tools Folder from Admin Machine-1 VM

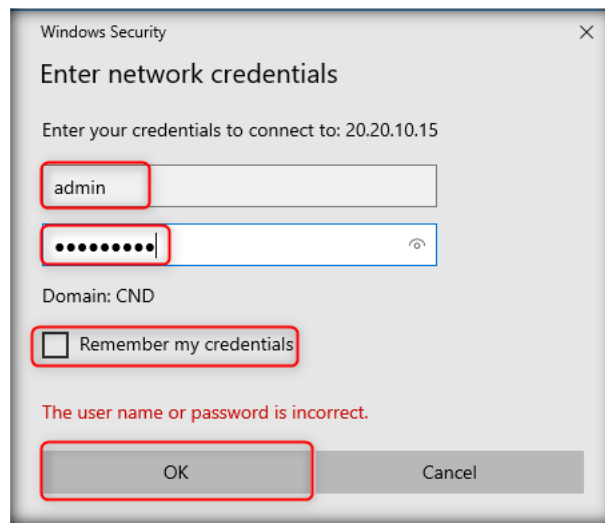
1. Before Mapping CND-Tools Folder, make sure that **pfSense Firewall VM**, **Smoothwall Firewall VM** and **Admin Machine-1 VM** is running.
2. Launch the **AD Domain Controller VM** Login with username as **CND\Administrator** and password as **admin@123**.



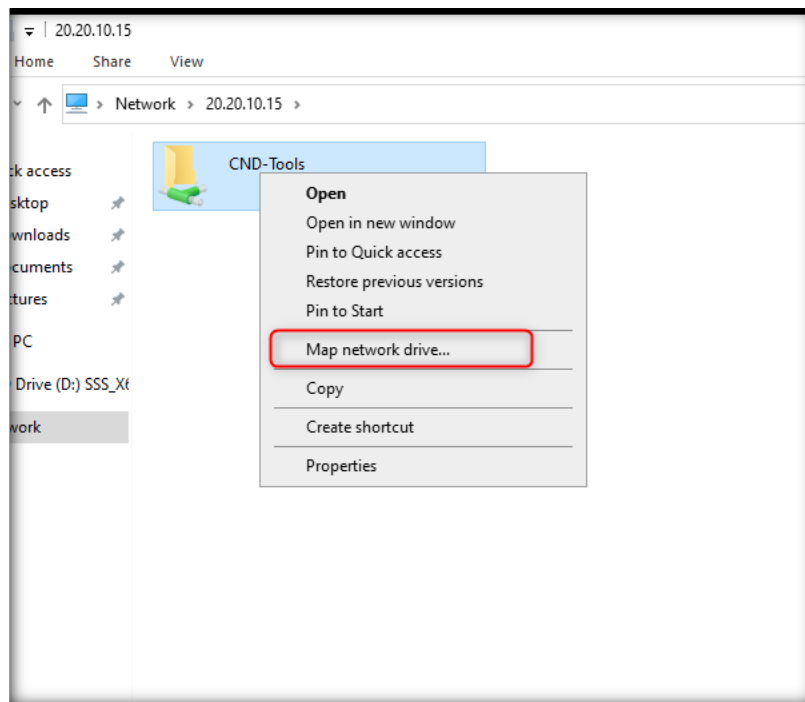
3. Open File Explorer, and type **[20.20.10.15]** in the address bar and press **Enter**.



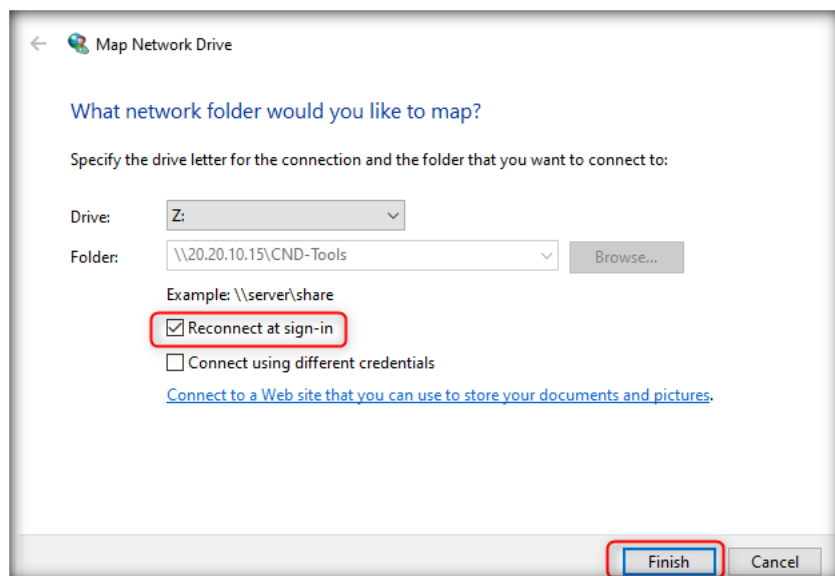
- Windows Security pop-up will appear, type Admin Machine-1 credentials (username: **Admin**, Password: **admin@123**), check the **Remember my credentials** check box and click **OK**.



- The **CND-Tools** shared appears folder and right-click on the CND-Tools Folder and select **Map network drive...** option.



6. **Map Network Drive** window opens, Select Drive as **Z:** check Reconnect at sign-in, click **Finish**.



7. We have mapped the **CND-Tools** folder from Admin Machine-1, this folder contains tools for lab

execution

CT#9.9: Installing Adobe Acrobat Reader

1. Navigate to Z:\CND-Tools\Lab Prerequisites\Adobe Reader folder.
2. Alternatively, you may download the latest version of Adobe Reader Adobe website.
3. Double-click **.exe** to begin the installation.
4. Follow wizard-driven installation steps and complete the installation by choosing default options throughout the installation process.

CT#9.10: Installing WinRAR

1. Navigate to Z:\CND-Tools\Lab Prerequisites\WinRAR folder
2. Alternatively, you can also download the latest version of WinRAR from Vendor
3. Double click on .exe to begin the installation
4. WinRAR setup window appears
5. In the WinRAR 5.10 setup window, click Install
6. Complete the install by choosing defaults throughout the installation process
7. After completing the installation, the installation location of WinRAR files window opens automatically
8. Close the window

CT#9.11: Installing Web Browsers

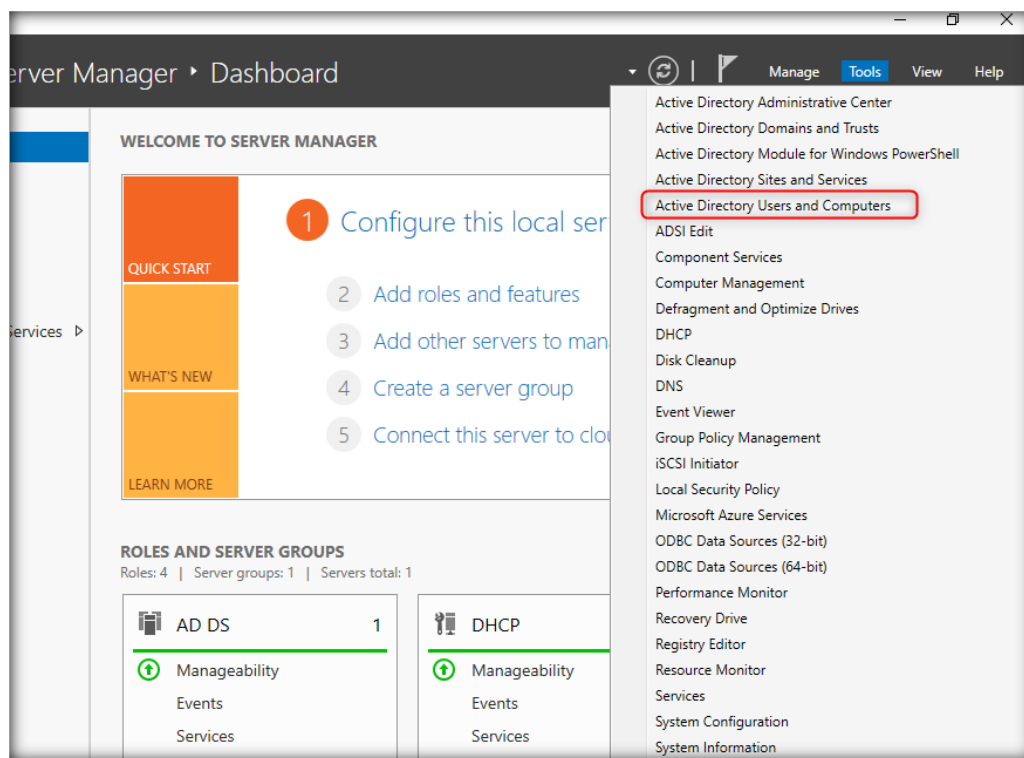
1. Navigate to Z:\CND-Tools\Lab Prerequisites in guest operating systems
2. Open Web Browsers folder
3. Follow wizard-driven installation steps and install Firefox and Chrome web browsers
4. You can also download latest version of web browsers from respective vendors

CT#9.12: Installing Notepad++

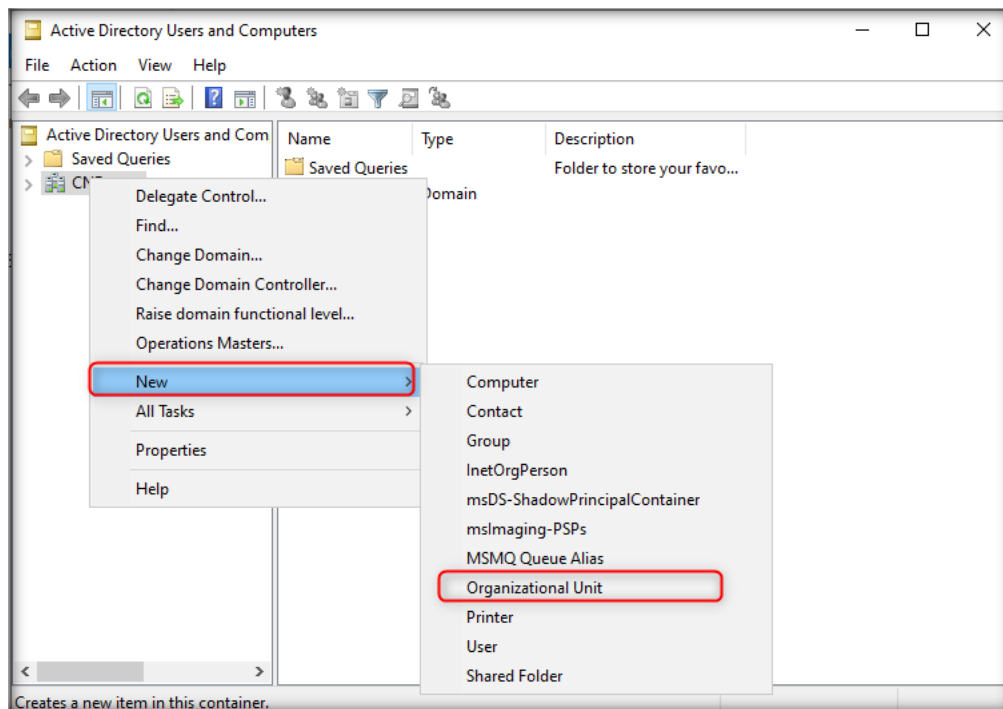
1. Navigate to Z:\CND-Tools\Lab Prerequisites in guest operating systems
2. Open Notepad++ folder and double-click .exe file
3. Follow the wizard-driven installation steps, to install Notepad++
4. You can also download latest version of Notepad++ from its vendor site

CT#9.13: Create and Configure OU in AD

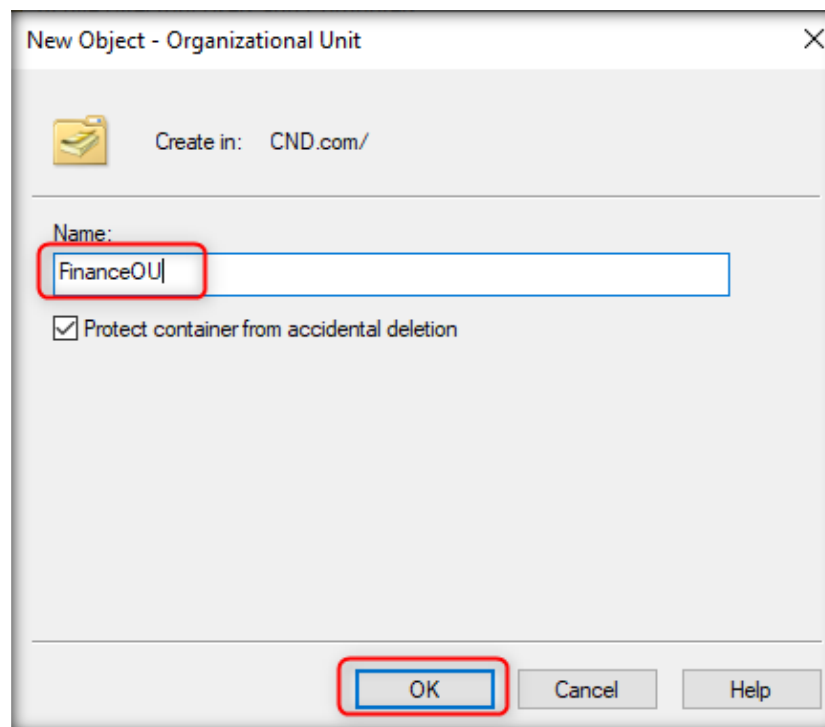
1. The Server Manager Window opens.
2. Navigate to **Tools** → **Active Directory Users and Computers**.



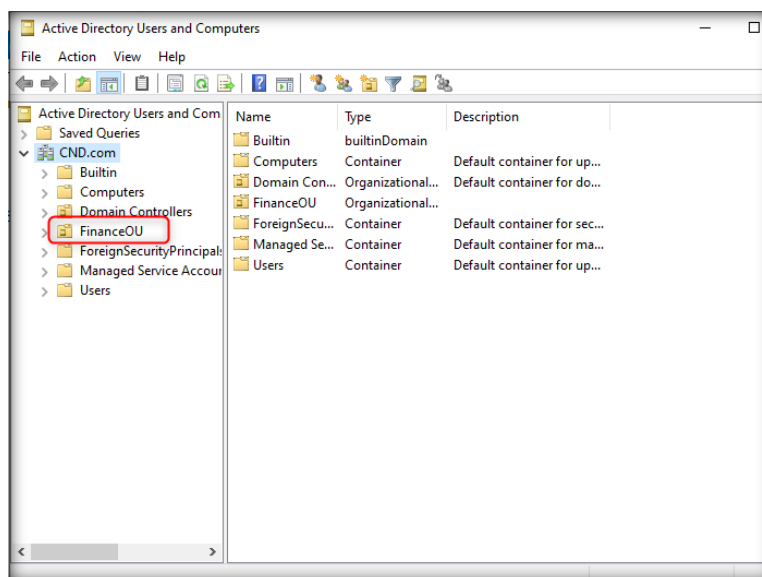
3. The Active Directory Users and Computers window opens; right-click on CND.com and select **New→Organizational Unit**.



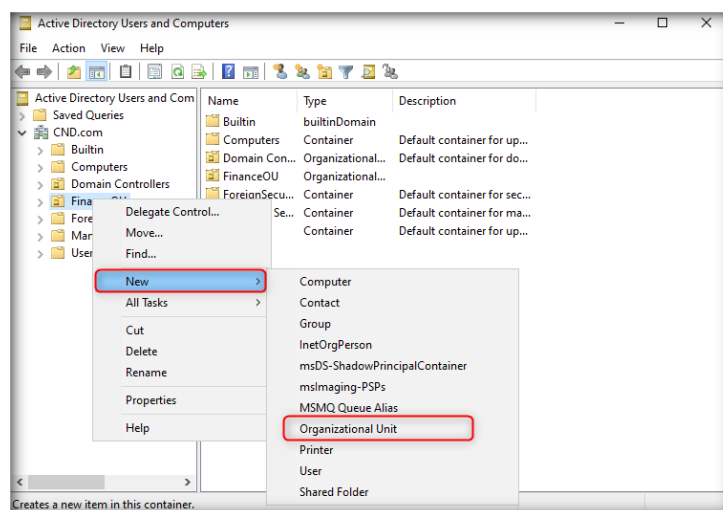
4. In the New Object - Organizational Unit window, type **FinanceOU** in the Name field and click **OK**.



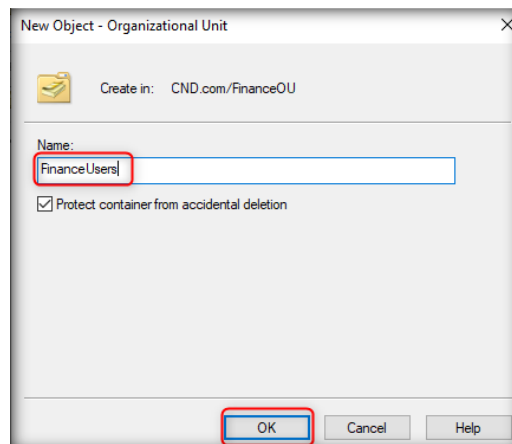
5. The FinanceOU is now created.



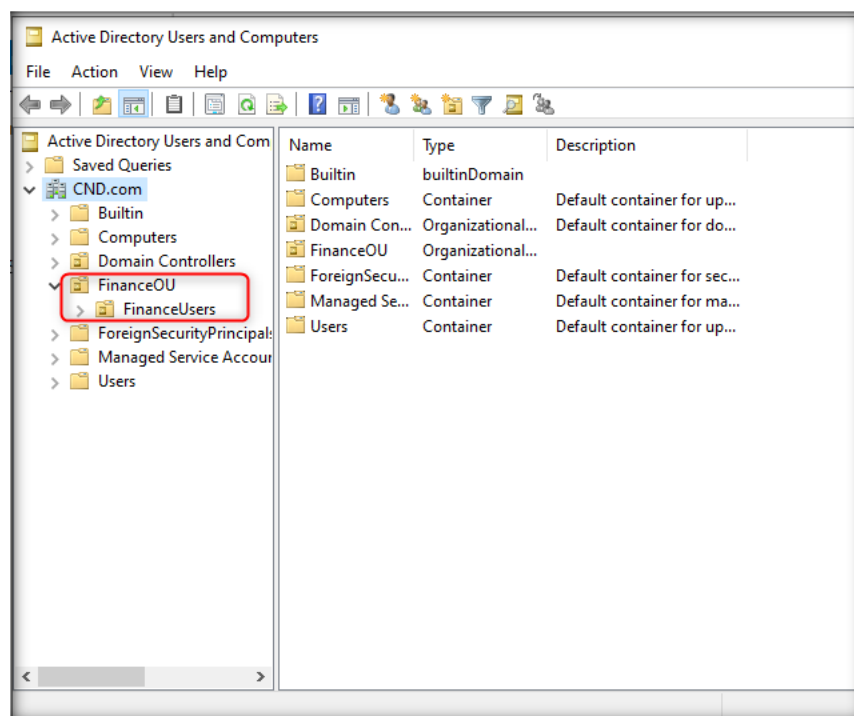
6. To create a sub-OU, right-click on **FinanceOU** and select **New→Organizational Unit**.



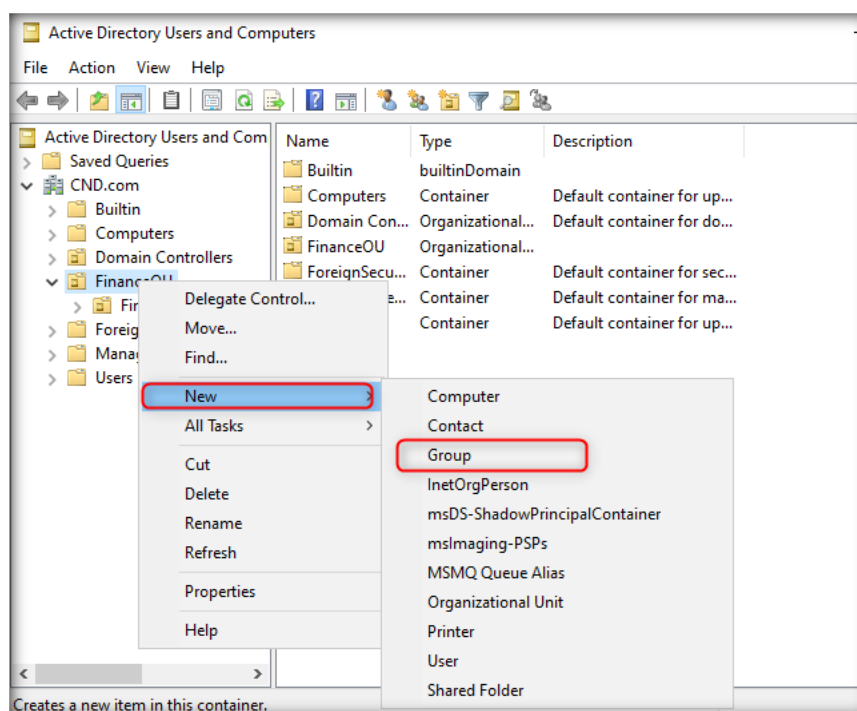
7. The New Object - Organizational Unit window opens; type **FinanceUsers** and click **OK**.



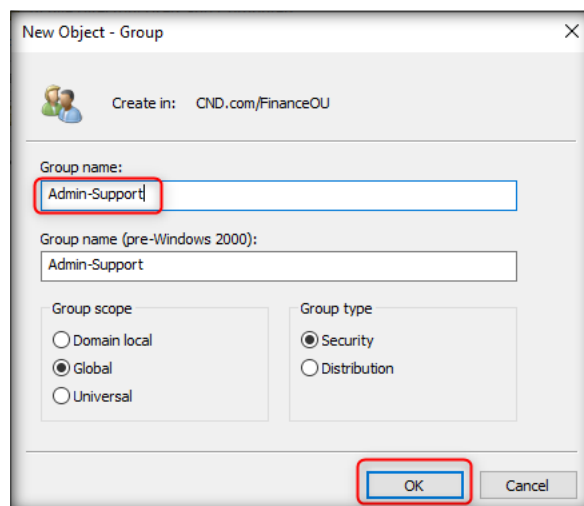
8. You have now created **FinanceOU**→**FinanceUsers** under CND.com



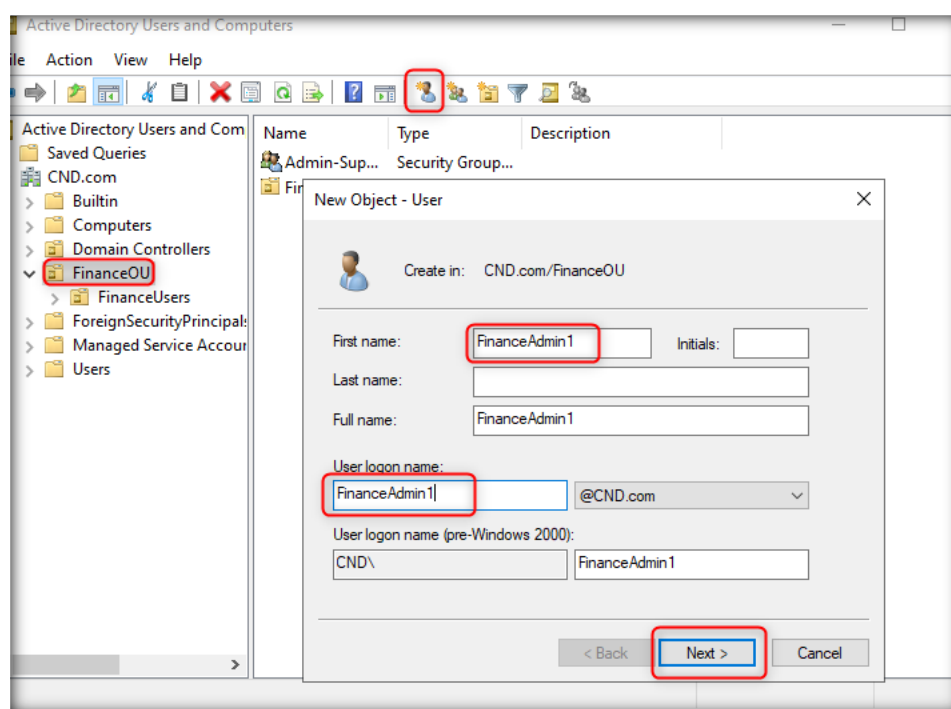
9. Right-click on FinanceOU and select **New** → **Group**.



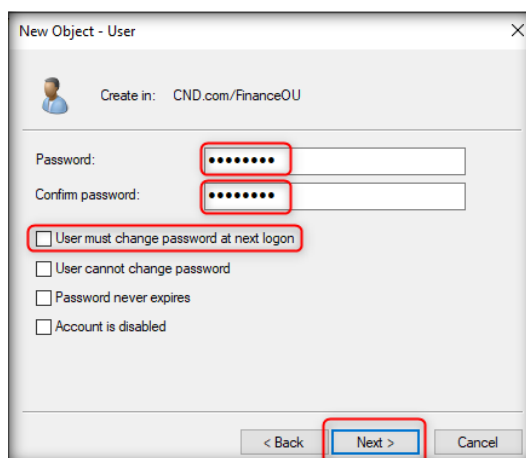
10. The **New Object - Group** window opens; type Group name as **Admin-Support** and click **OK**.



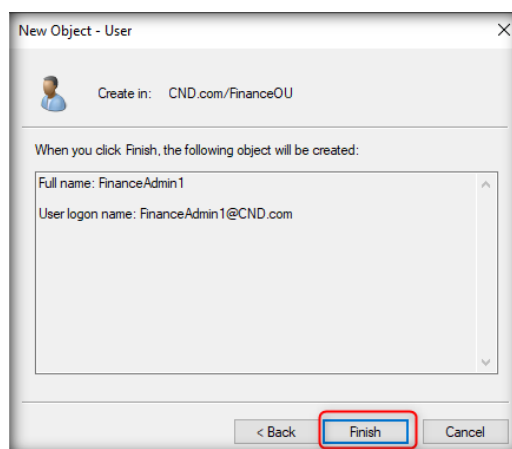
11. Create a user who will be a member of the Admin-Support group under FinanceOU.
12. Click the New user icon; the New Object - User window opens. Type the first name as **FinanceAdmin1** and user logon name as **FinanceAdmin1**; then, click **Next**.



13. Type and confirm your password user@123; uncheck all boxes and click **Next**.

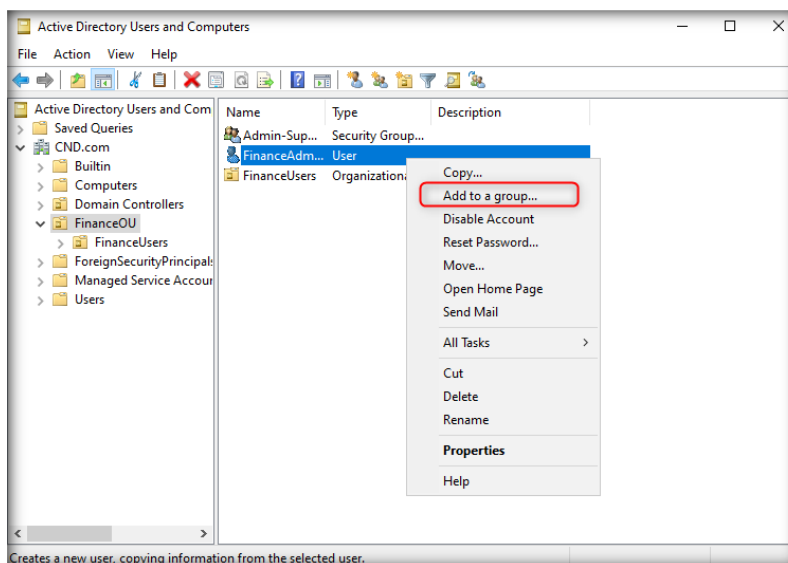


14. Click **Finish**.

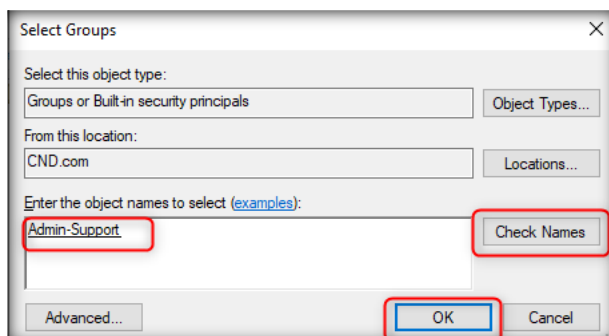


15. Once user **FinanceAdmin1** has been created, add this user to the Admin-Support group.

16. Right-click **FinanceAdmin1** and select **Add to a group...**



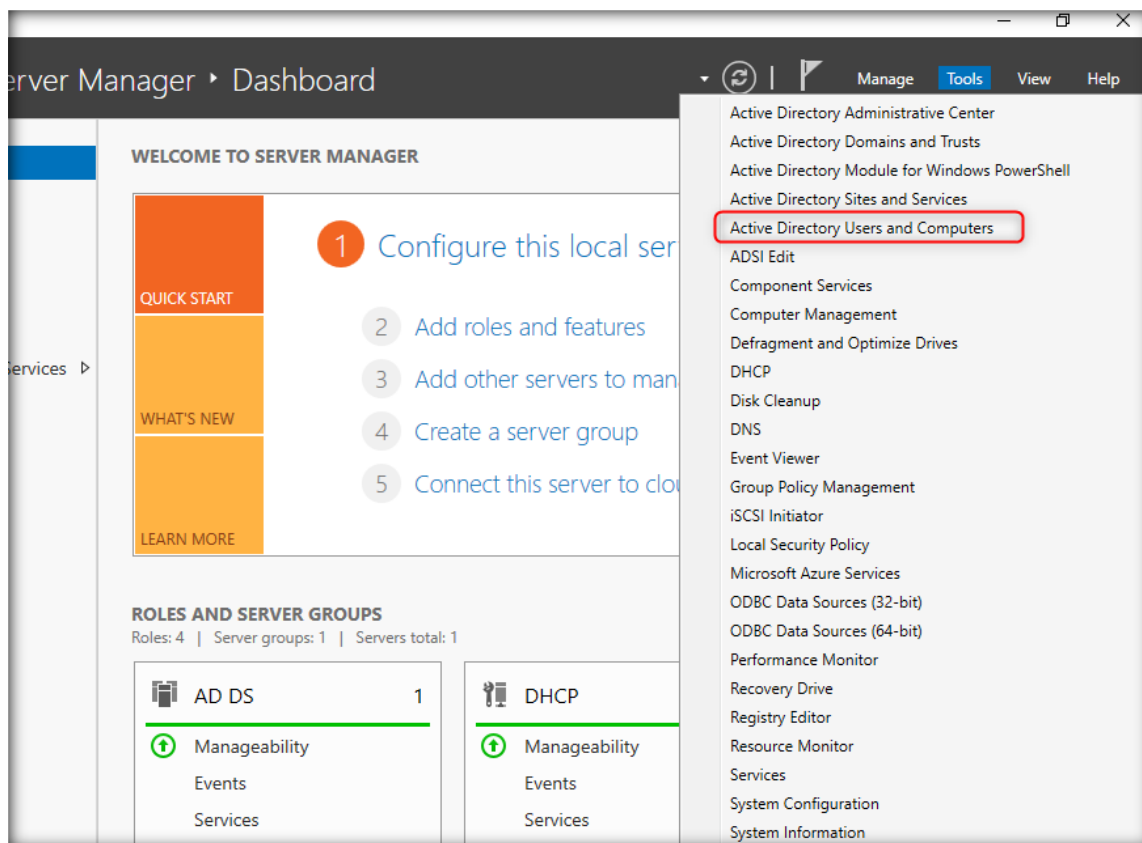
17. The Select Groups window opens; type the object name as **Admin-Support** and click Check Names. Once the **Admin-Support** group is selected, click **OK**. After you receive a message indicating you have successfully added the user to the group operation, click **OK**.



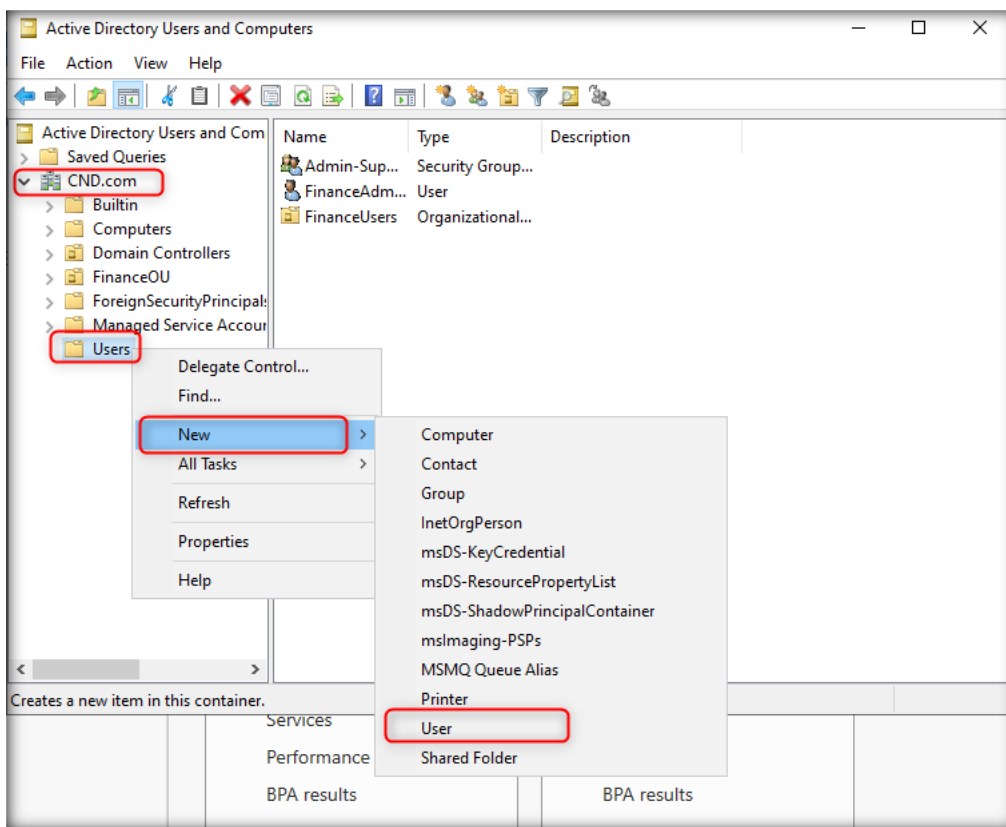
18. FinanceAdmin1 is now a member of the group Admin-Support.

CT#9.14: Create and Configure User Account in AD

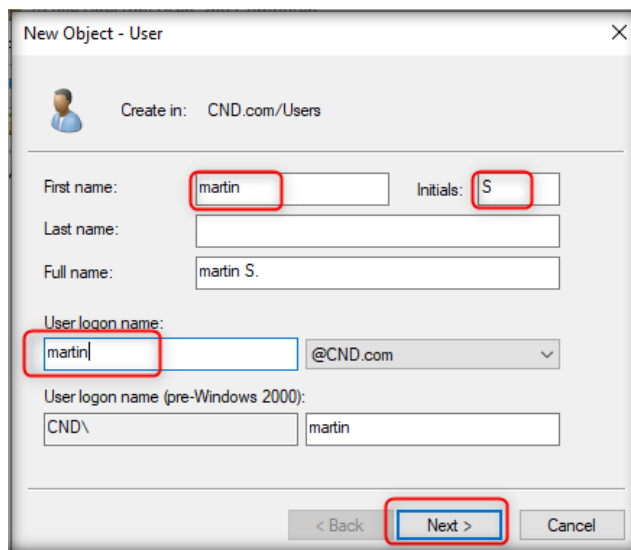
1. Open the Server Manager.
2. Navigate to **Tools** → **Active Directory Users and Computers**.



3. In the Active Directory Users and Computers window, expand the **CND.com** node and right-click **Users**. Click **New**, and then **User** from the context menu, as shown in the screenshot below.

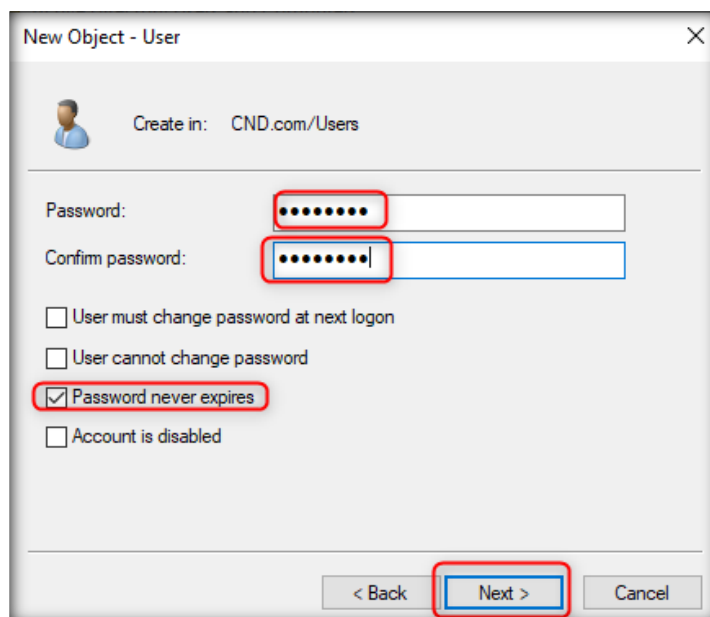


4. The **New Object - User** dialog box appears; fill in the required fields.
5. Type **Martin** in First name, initials of your choice, type **martin** in **User logon name**, and then click **Next**.



6. Type and confirm your password **user@123**, and uncheck User must change password at next logon and check Password never expires option. Then, click **Next**

Note: If a “You specified that the password should never expire” pop-up appears, click **OK**. This is for a lab demonstration purpose for CND, as a network administrator user should change their domain password according to the organization’s network policies.



New Object - User

Create in: CND.com/Users

Password: [dots]

Confirm password: [dots]

☐ User must change password at next logon

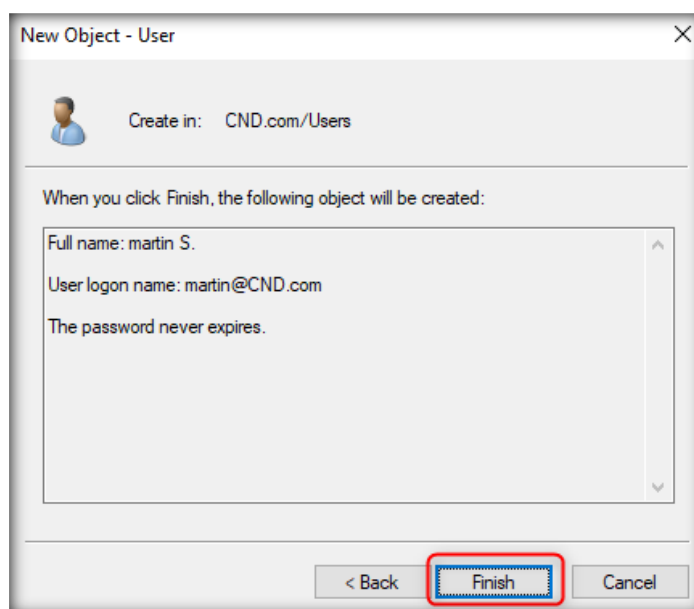
☐ User cannot change password

☒ Password never expires

☐ Account is disabled

< Back Next > Cancel

7. Once **User** is successfully created, click **Finish**.



New Object - User

Create in: CND.com/Users

When you click Finish, the following object will be created:

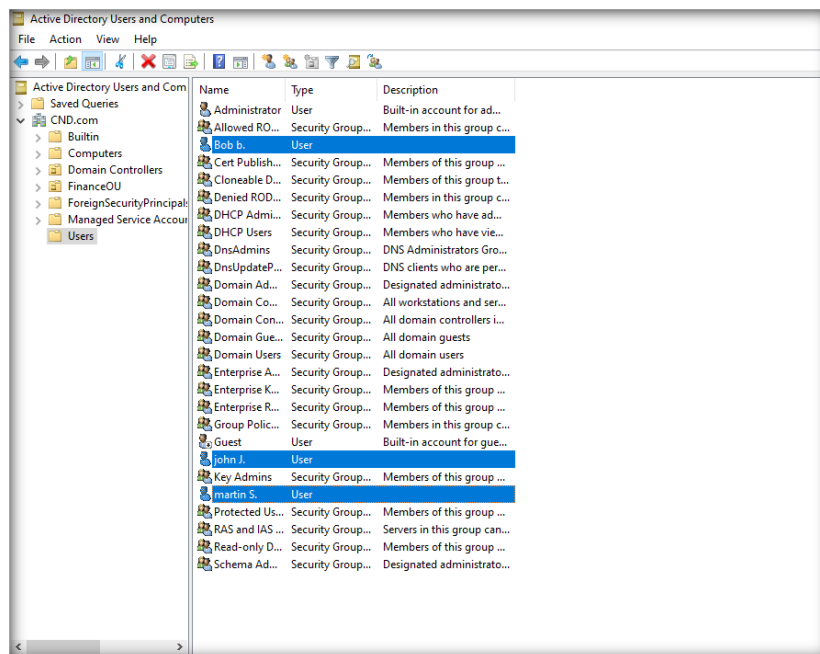
Full name: martin S.

User logon name: martin@CND.com

The password never expires.

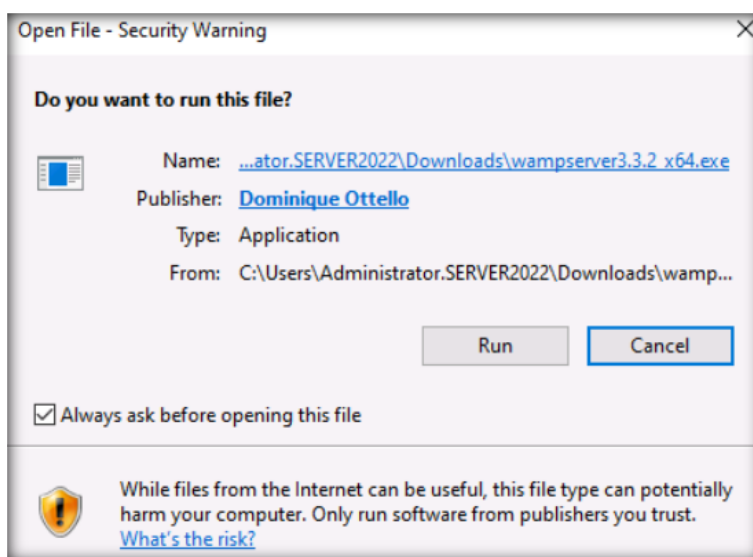
< Back Finish Cancel

8. Once **User** is successfully created, click **Finish**. Similarly, you can create **Bob b.** and **John j.** users in Active Directory Domain Services.

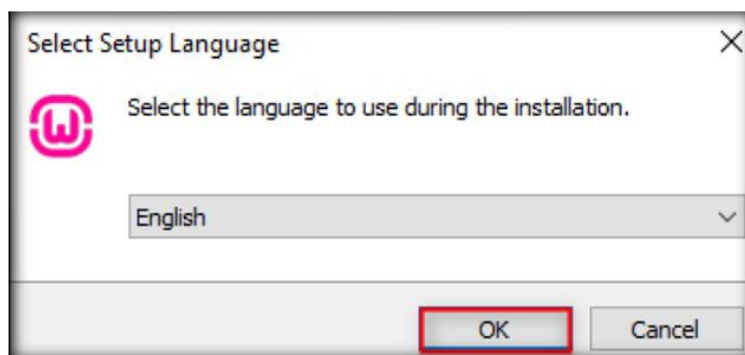


CT#9.15: Installing WampServer

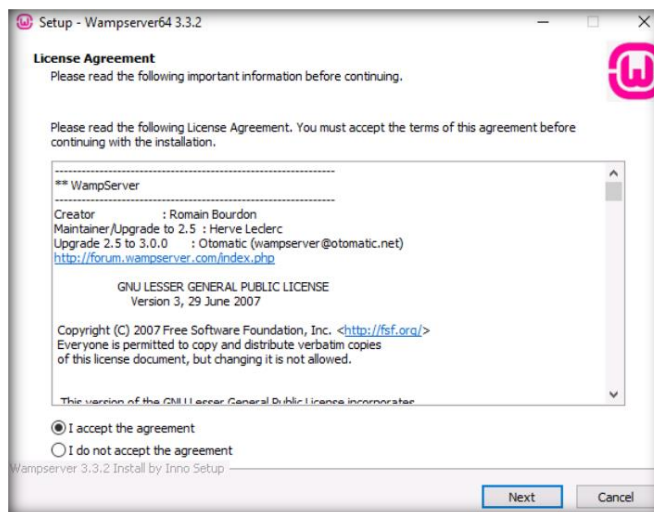
1. To install WampServer without any errors, install all required prerequisites.
2. Navigate to Z:\CND-Tools\Lab Prerequisites\WAMP Server and Copy the WAMP Server folder in C: Drive of AD Domain Controller VM.
3. Navigate to C:\ WAMP Server and extract all_vcrist_2022_x64.exe file.
4. The extracted folder contains the list of prerequisite VC++ files; select each file and install.
5. Similarly, navigate to C:\WAMP Server\ all_vcrist_2022_x86.exe, double-click each vcrist_* file, and follow the wizard-driven steps to install Microsoft Visual C++ Redistribute packages.
6. Navigate Z:\CNDv3 Lab Prerequisites\WAMP Server and double-click wampserver3.3.2_x64.exe
7. In the Select Setup Language pop-up, choose English as the default language and click **OK**.
1.Click Run



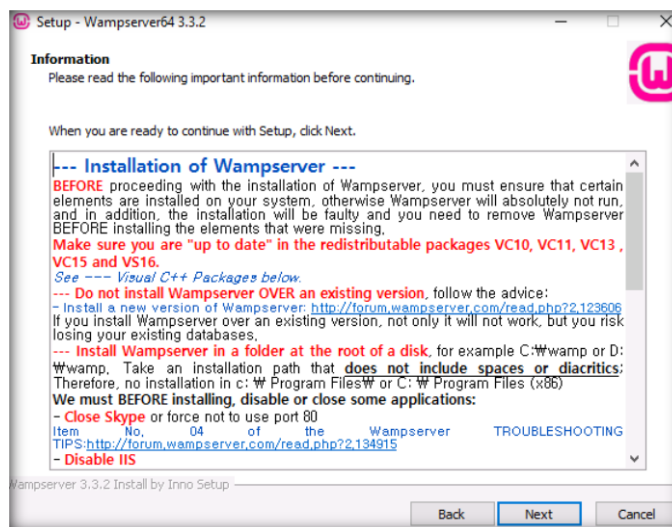
8. Select English language when **Select Setup Language** window appears.



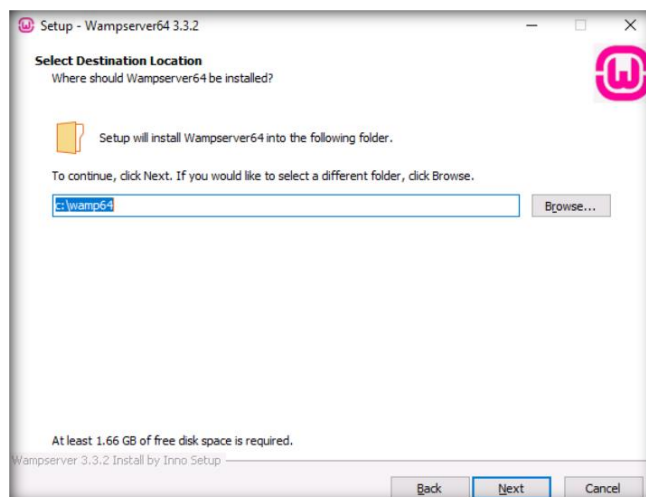
9. Select the **I accept the agreement** Radio button and click **Next**.



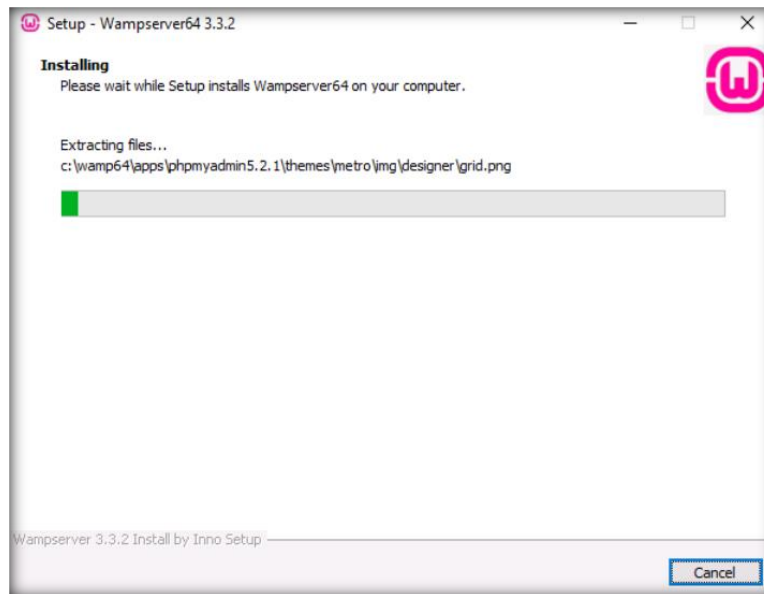
10. Click **Next**.



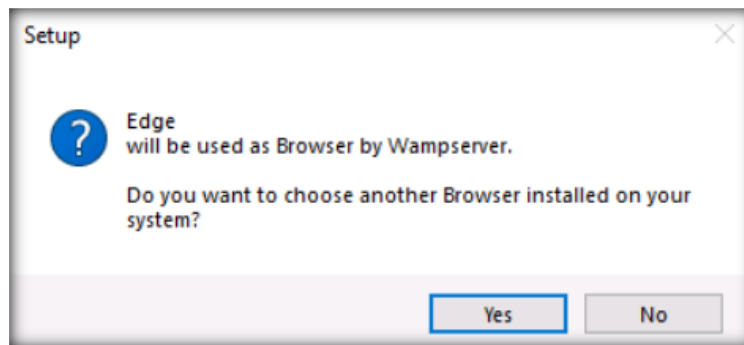
11. Select path and click **NEXT**.



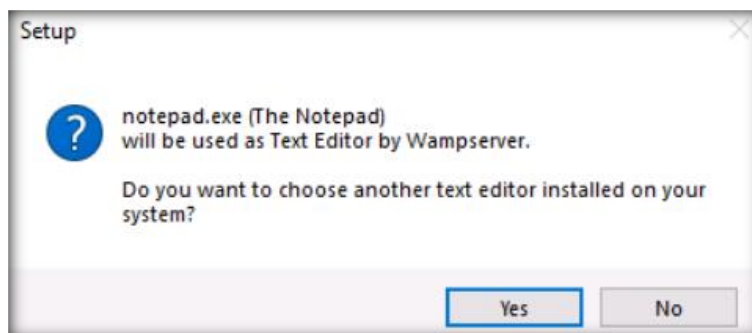
12. Wait until it is installed.



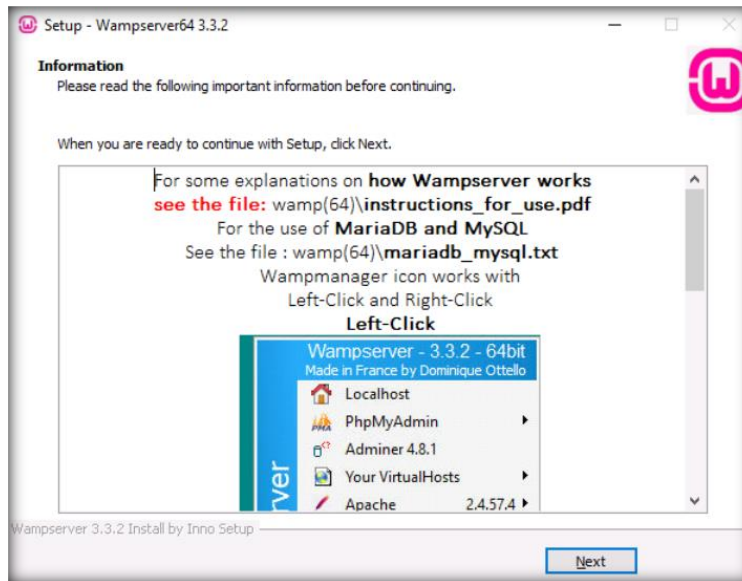
13. If you want to choose a browser different from your default browser, Click **Yes**.



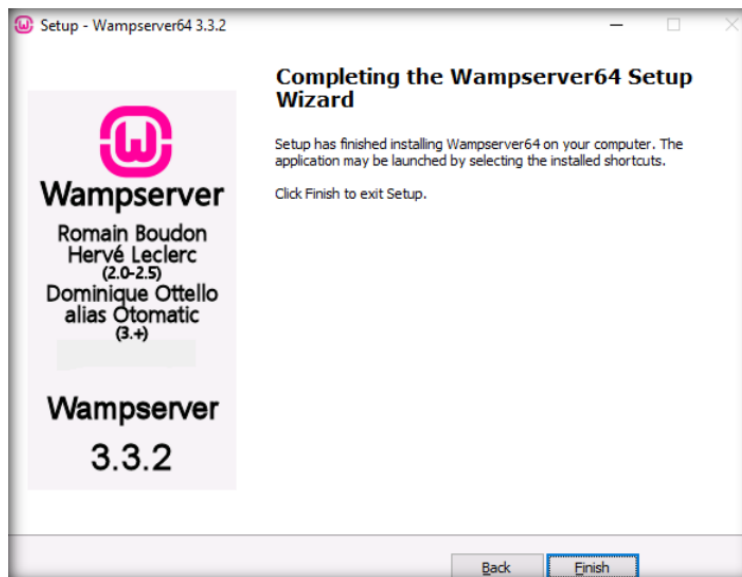
14. Say **No** to choose a different editor and wait until it Wamp server set up is completely installed.



15. Click **Next** when the Information window appears.



16. Click on **Finish** after successful setup installation.

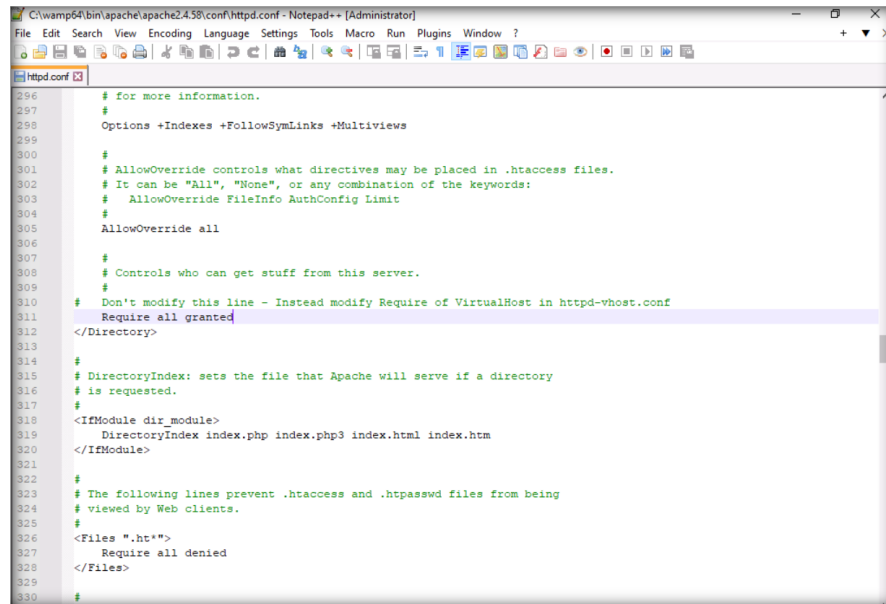


17. WampServer icon appears in the notification area. Wait till the icon turns from **red** colour to **green** colour.



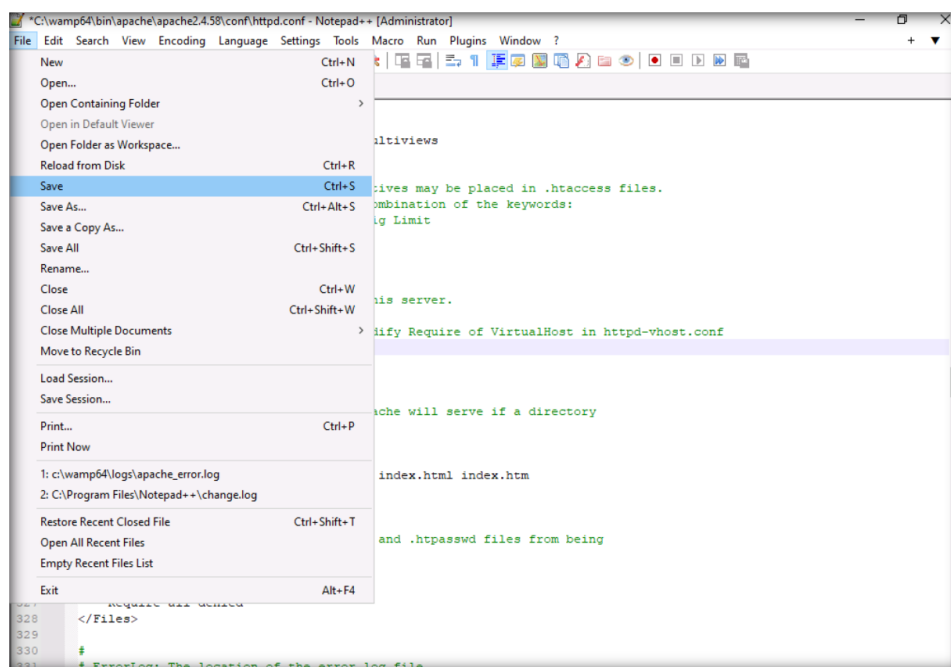
18. Once the icon turns green, navigate to the location C:\Wamp64\bin\apache\apache2.4.58\conf, open httpd.conf file with Notepad++ i.e., right-click on httpd.conf file and select Edit with Notepad++.

Scroll down to line no. 311 and change the script from Require local to Require all granted.



```
296 # for more information.
297 #
298 Options +Indexes +FollowSymLinks +Multiviews
299
300 #
301 # AllowOverride controls what directives may be placed in .htaccess files.
302 # It can be "All", "None", or any combination of the keywords:
303 #   AllowOverride FileInfo AuthConfig Limit
304 #
305 AllowOverride all
306
307 #
308 # Controls who can get stuff from this server.
309 #
310 # Don't modify this line - Instead modify Require of VirtualHost in httpd-vhost.conf
311 Require all granted
312 </Directory>
313
314 #
315 # DirectoryIndex: sets the file that Apache will serve if a directory
316 # is requested.
317 #
318 <IfModule dir_module>
319     DirectoryIndex index.php index.php3 index.html index.htm
320 </IfModule>
321
322 #
323 # The following lines prevent .htaccess and .htpasswd files from being
324 # viewed by Web clients.
325 #
326 <Files ".ht*">
327     Require all denied
328 </Files>
329
330 #
```

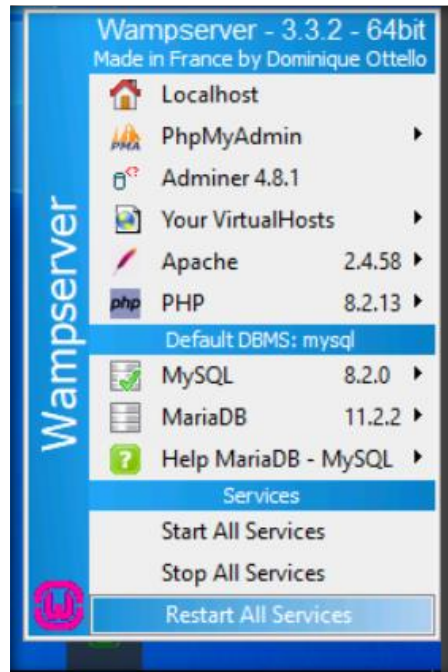
19. Click File from the menu bar and then click Save



```
*C:\wamp64\bin\apache\apache2.4.58\conf\httpd.conf - Notepad++ [Administrator]
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
New Ctrl+N
Open... Ctrl+O
Open Containing Folder
Open in Default Viewer
Open Folder as Workspace...
Reload from Disk Ctrl+R
Save Ctrl+S
Save As... Ctrl+Alt+S
Save a Copy As...
Save All Ctrl+Shift+S
Rename...
Close Ctrl+W
Close All Ctrl+Shift+W
Close Multiple Documents
Move to Recycle Bin
Load Session...
Save Session...
Print... Ctrl+P
Print Now
1: c:\wamp64\logs\apache_error.log
2: C:\Program Files\Notepad++\change.log
Restore Recent Closed File Ctrl+Shift+T
Open All Recent Files
Empty Recent Files List
Exit Alt+F4

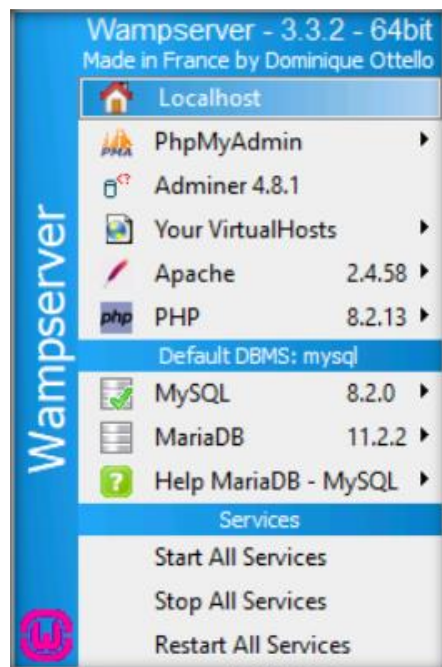
328 </Files>
329
330 #
331 # ErrorLog: The location of the error log file
```

20. Close the file and all the other folders that were open. Click Wamp server icon from the system tray, and then click Restart All Services and wait until the icon turns green.



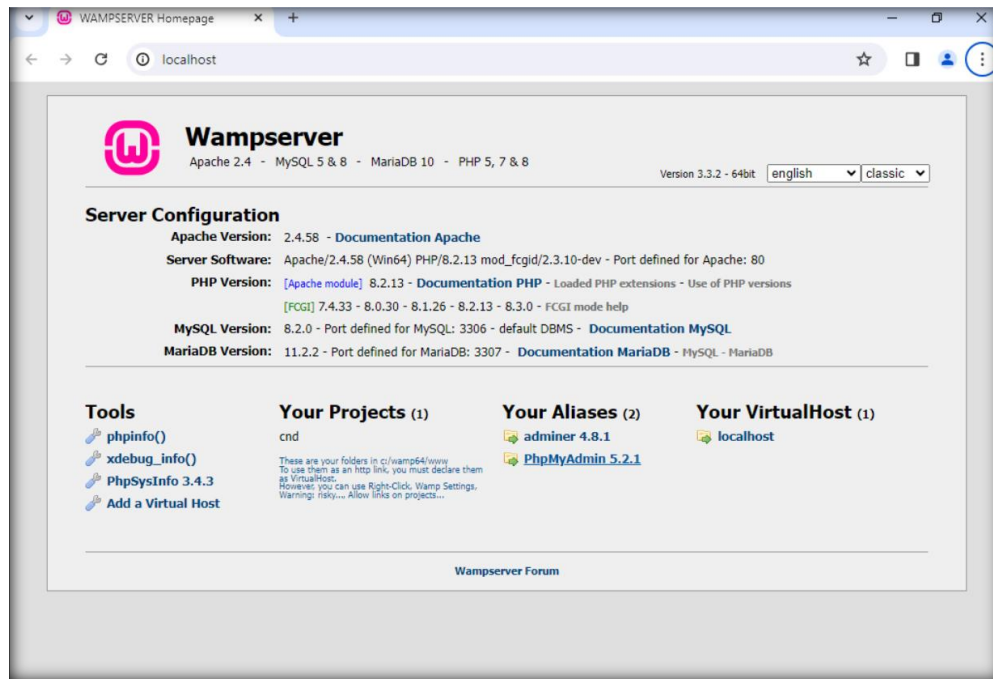
Installing and Configuring WordPress Website

1. Click on Wamp server icon from the system tray and select **Local Host**

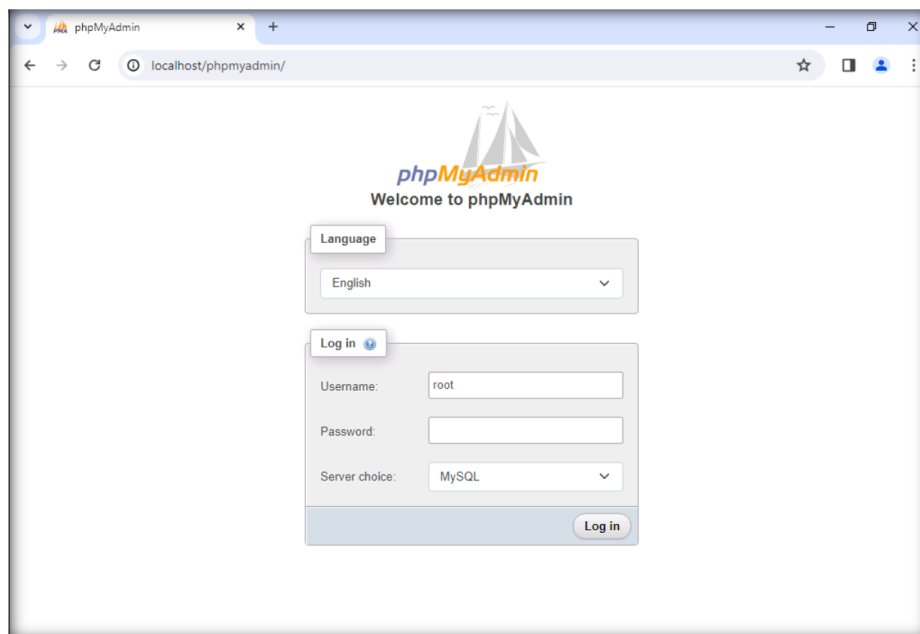


2. As soon as you click the icon, the **WAMPSERVER** home page appears in the default browser. Click phpmyadmin5.2.1 under **Your Aliases**

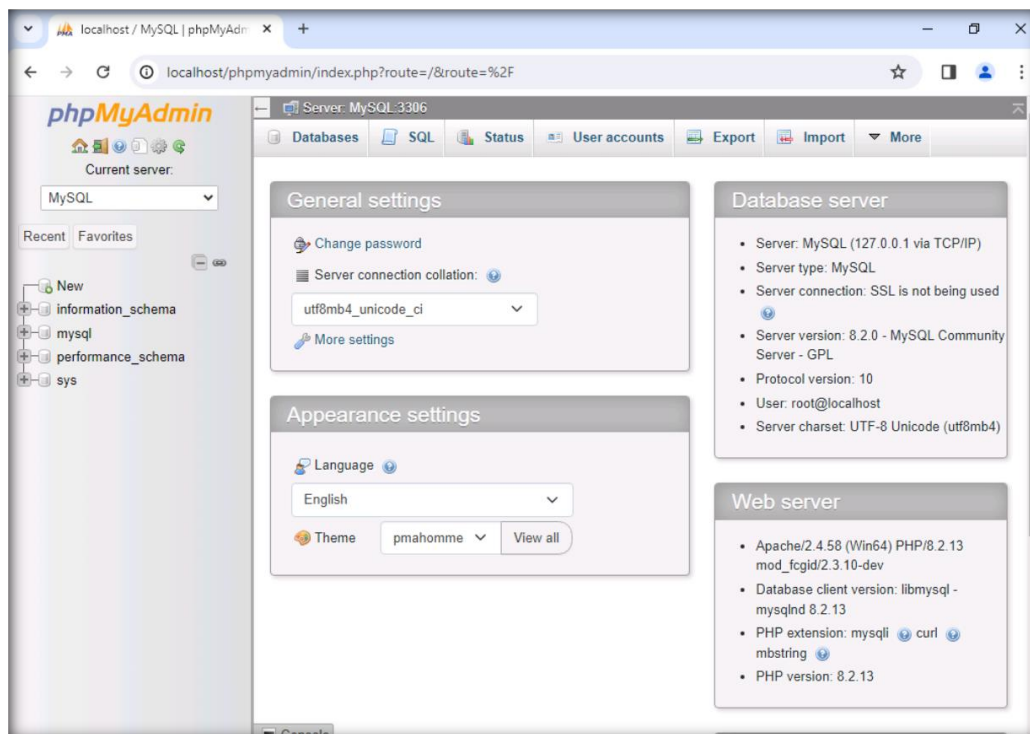
NOTE: Screenshots differs with different browsers



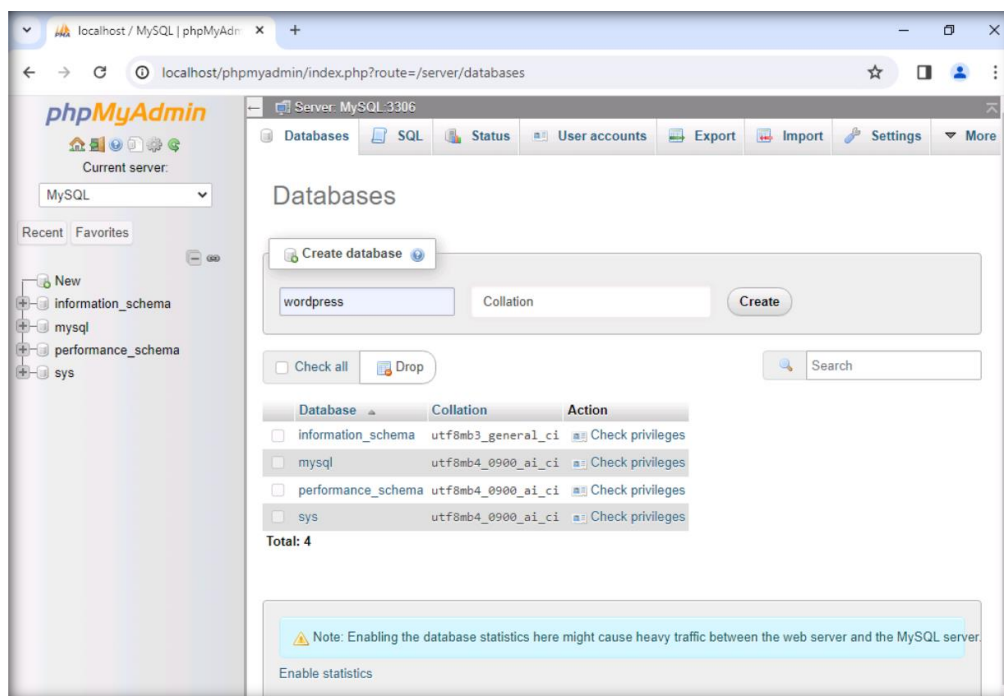
3. **PHPMyAdmin** Home page appears. Give username as root (no password is required) and click on Log in.



4. Select **Databases** tab.

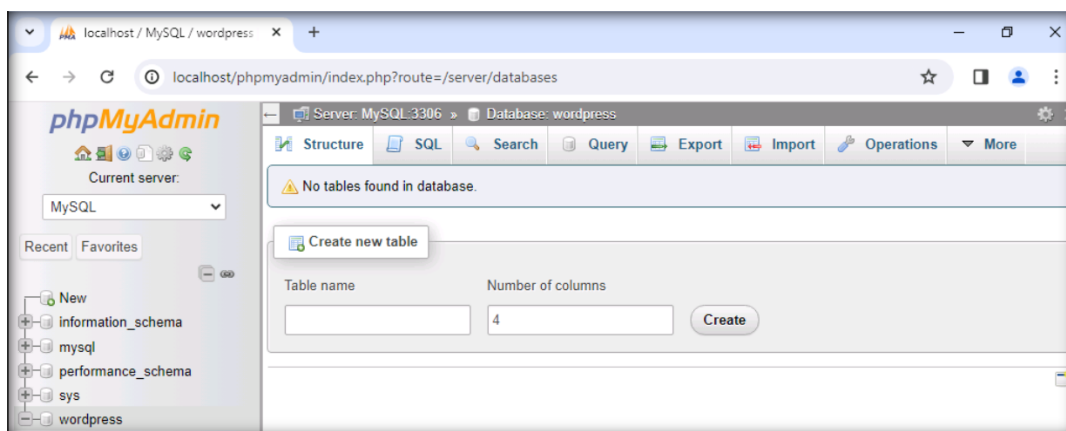


5. Databases webpage appears, type wordpress in the Create database text field, leave the drop-down list set to default as Collation and click Create to create a database named wordpress.

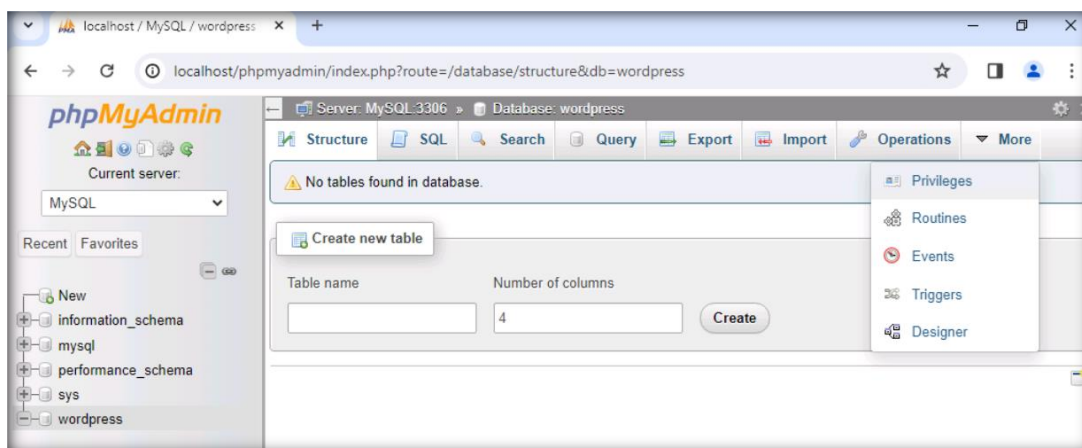


6. On successful creation of the database, a pop-up appears stating that the database is created.

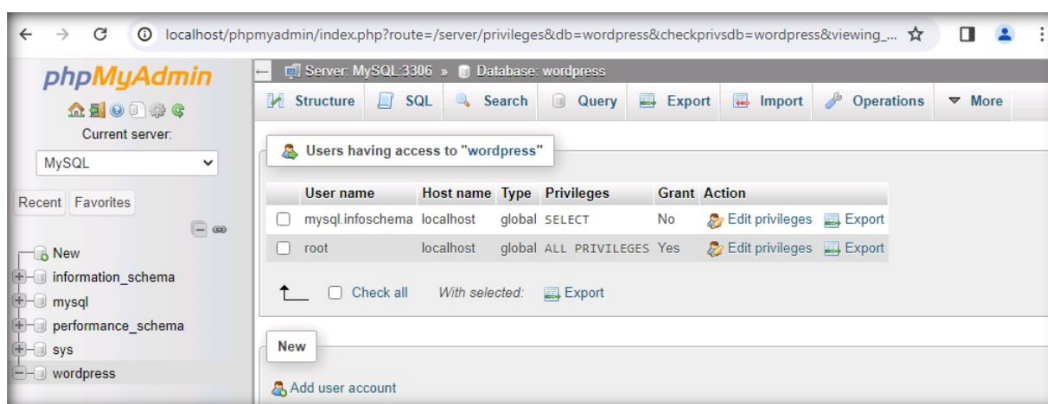
7. The newly added **wordpress** database appears in the left pane, click on it.



8. **Wordpress** database's webpage appears, click Privileges by clicking More drop down.



9. Here, you will be adding a user to the database. To add, click the **Add user account** link.



10. Under Login Information section:

- a. Type admin in the Username: text field,
- b. Select Local from the Host: drop-down list.
- c. Type the password as qwerty@123 in Password: and Re-type: password fieldsIn the Global privileges section:
- d. Click Check All link.
- e. Click Go button in the bottom of the page

Server: MySQL-3306

Databases SQL Status User accounts Export Import Settings Replication

Add user account

Login Information

User name: Use text field: admin

Host name: Local localhost

Password: Use text field: Strength: Weak

Re-type:

Authentication Plugin: Native MySQL authentication

Generate password: Generate

☐ Grant all privileges on wildcard name (username_%).

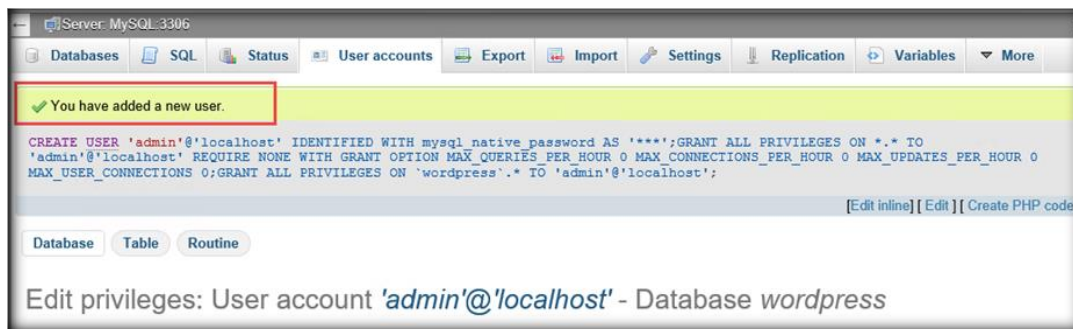
☒ Grant all privileges on database wordpress.

Global privileges ☒ Check all

Note: MySQL privilege names are expressed in English.

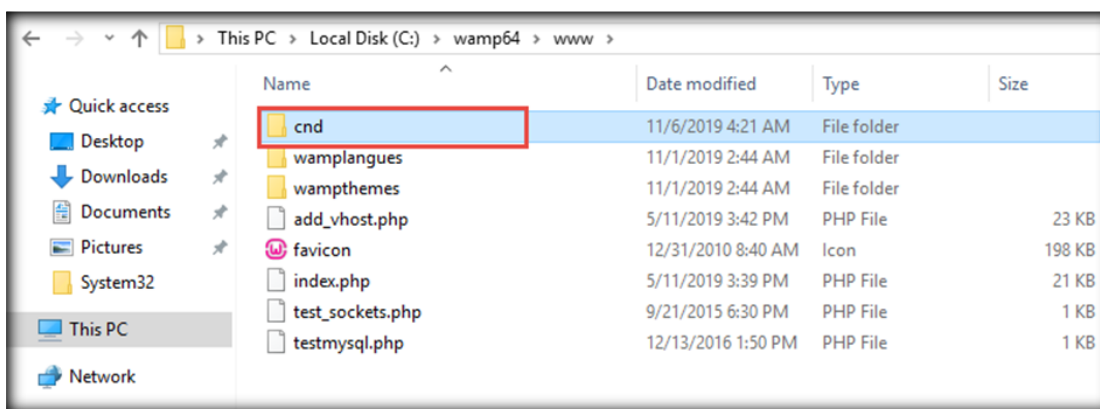
<input checked="" type="checkbox"/> Data	<input checked="" type="checkbox"/> Structure	<input checked="" type="checkbox"/> Administration
<input checked="" type="checkbox"/> SELECT	<input checked="" type="checkbox"/> CREATE	<input checked="" type="checkbox"/> GRANT
<input checked="" type="checkbox"/> INSERT	<input checked="" type="checkbox"/> ALTER	<input checked="" type="checkbox"/> SUPER
<input checked="" type="checkbox"/> UPDATE	<input checked="" type="checkbox"/> INDEX	<input checked="" type="checkbox"/> PROCESS
<input checked="" type="checkbox"/> DELETE	<input checked="" type="checkbox"/> DROP	<input checked="" type="checkbox"/> RELOAD
<input checked="" type="checkbox"/> FILE	<input checked="" type="checkbox"/> CREATE TEMPORARY TABLES	<input checked="" type="checkbox"/> SHUTDOWN
	<input checked="" type="checkbox"/> SHOW VIEW	<input checked="" type="checkbox"/> SHOW DATABASES
	<input checked="" type="checkbox"/> CREATE ROUTINE	<input checked="" type="checkbox"/> LOCK TABLES
	<input checked="" type="checkbox"/> ALTER ROUTINE	<input checked="" type="checkbox"/> REFERENCES
	<input checked="" type="checkbox"/> EXECUTE	<input checked="" type="checkbox"/> REPLICATION CLIENT
	<input checked="" type="checkbox"/> CREATE VIEW	<input checked="" type="checkbox"/> REPLICATION SLAVE
	<input checked="" type="checkbox"/> EVENT	<input checked="" type="checkbox"/> CREATE USER
	<input checked="" type="checkbox"/> TRIGGER	

11. You will observe the newly added user in the wordpress database's webpage as shown in the following screenshot:

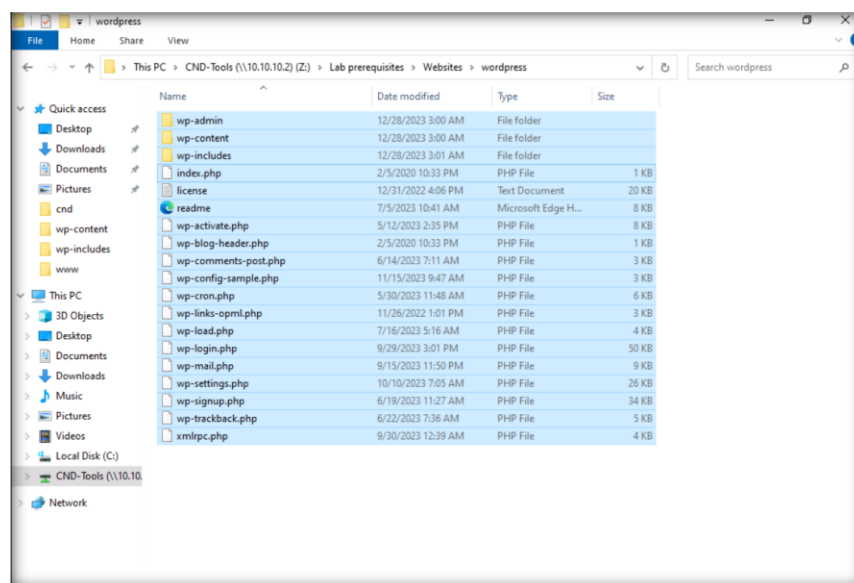


12. Close the Web browser.

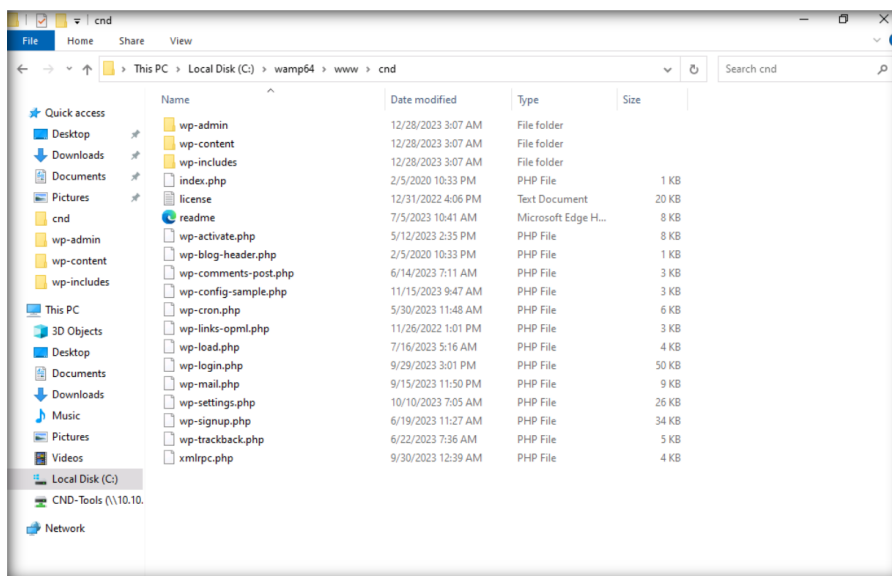
13. Navigate to C:\wamp64\www and create a new folder named cnd.



14. Navigate to Z:\Lab Prerequisites\Websites\WordPress and copy all the contents in the location.



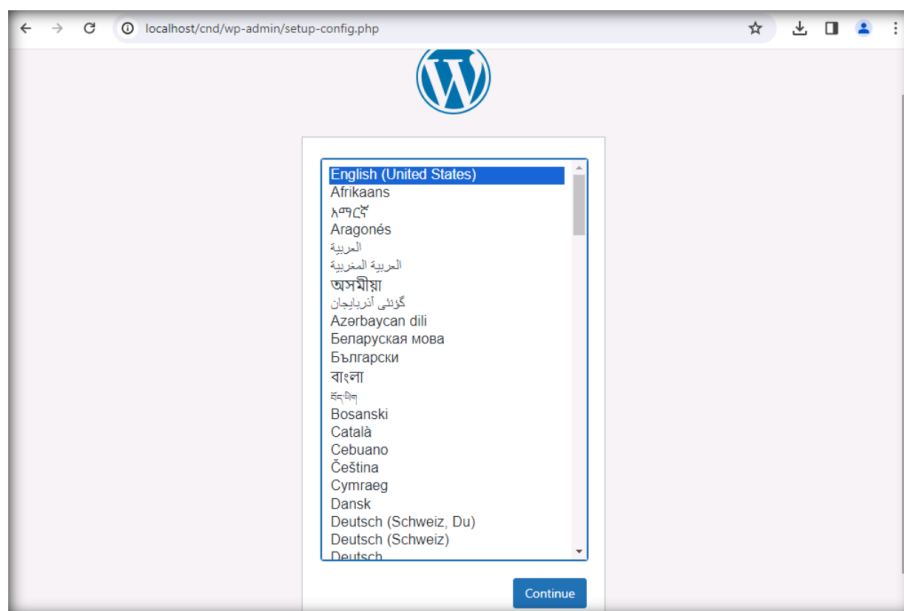
15. Navigate to **C:\wamp64\www\cnd** and paste all the contents that were copied from **Z:\Lab Prerequisites\Websites\WordPress**.



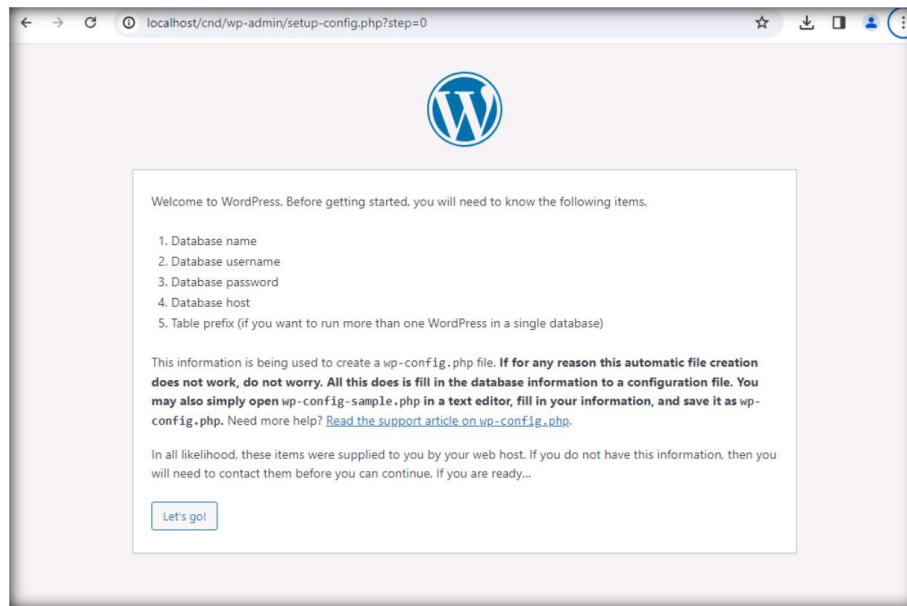
16. Launch a web browser, type the URL **http://localhost/cnd** and press Enter.

17. Setup Configuration webpage appears, click Continue.

Note: Screenshots may differ if you are using different browser.



18. Setup Configuration webpage appears, click **Let's go!** button

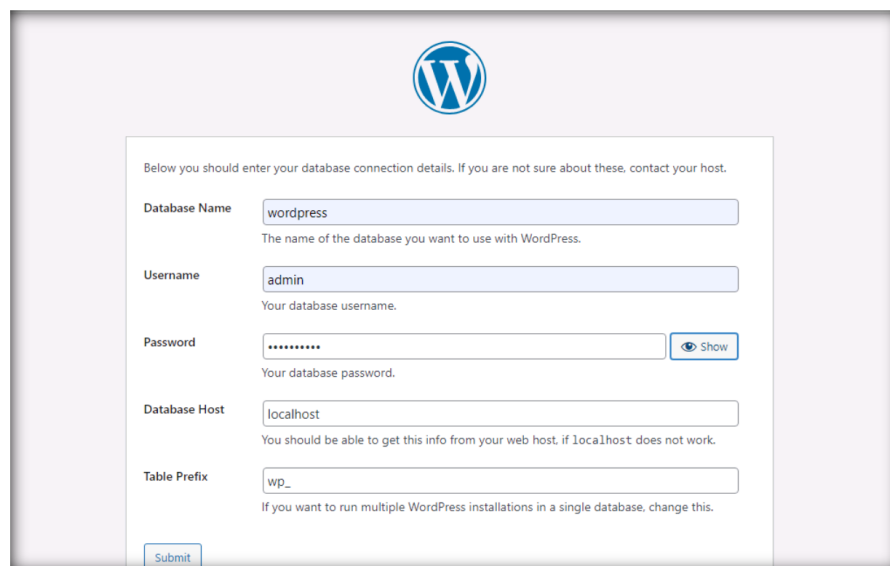


19. Now, you need to specify the database connection details

Type:

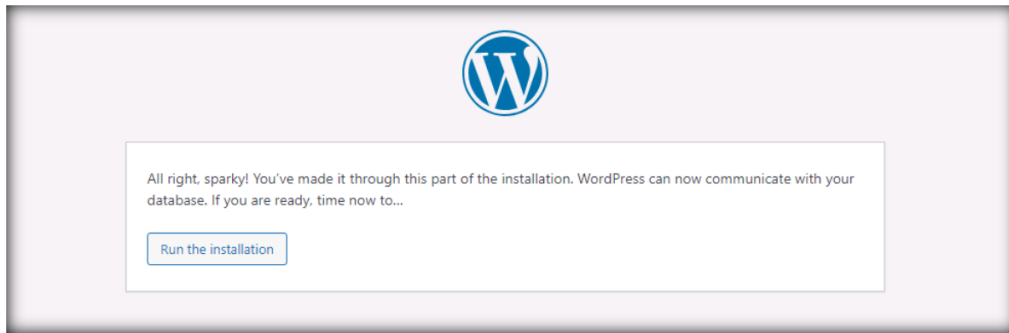
- a. wordpress in Database Name field
- b. admin in User Name field
- c. qwerty@123 in Password field
- d. localhost in Database Host field

20. Click Submit button.



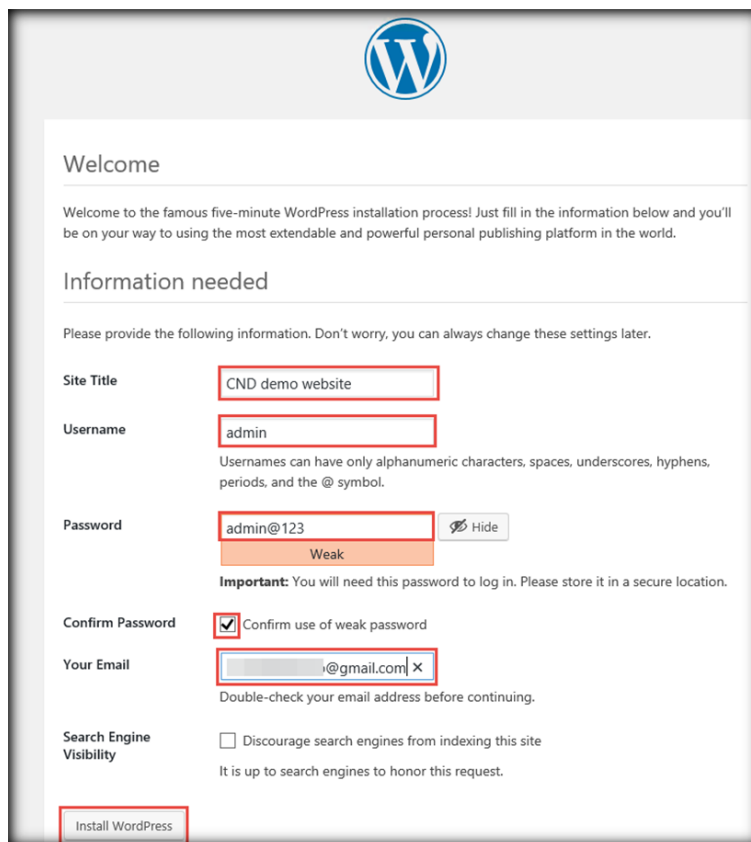
1.

21. Click on **Run the Installation.**

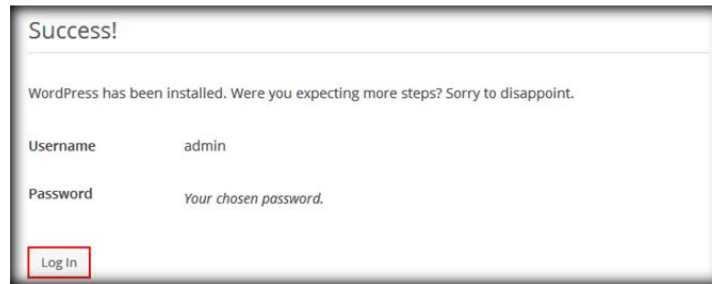


22. Welcome page appears, scroll down the webpage, type:

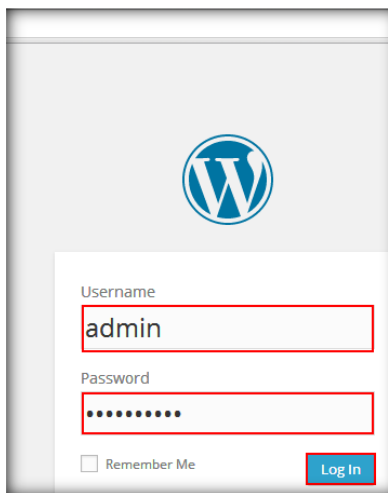
- a. CND demo website in Site Title field
- b. admin in the Username field
- c. qwerty@123 in Password and Re-type password field
- d. and email ID in Your E-mail text field
- e. Uncheck Allow search engines to index this site. option and click Install WordPress button.

A screenshot of the WordPress "Welcome" screen during installation. The page has a light gray header with the WordPress logo. The main content area is white. It starts with a "Welcome" heading, followed by a paragraph: "Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world." Below this is a section titled "Information needed" with a subtext: "Please provide the following information. Don't worry, you can always change these settings later." The form contains several fields: "Site Title" with the value "CND demo website"; "Username" with the value "admin", with a note below stating "Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol."; "Password" with the value "admin@123", a "Hide" button, and a "Weak" status indicator; "Confirm Password" with a checked checkbox and the text "Confirm use of weak password"; "Your Email" with a partially filled field ending in "@gmail.com" and a "Double-check your email address before continuing." note; and "Search Engine Visibility" with an unchecked checkbox and the text "Discourage search engines from indexing this site. It is up to search engines to honor this request." At the bottom left is a button labeled "Install WordPress".

23. On successful installation, a webpage appears stating that the installation is successful. Click Log In button.

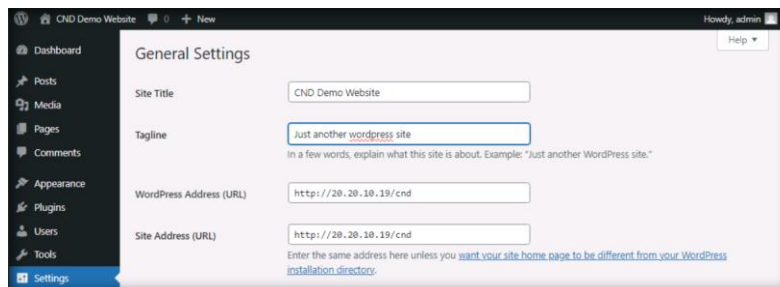


24. Log In webpage appears, type admin in Username field, qwerty@123 in Password field and click Log In button.

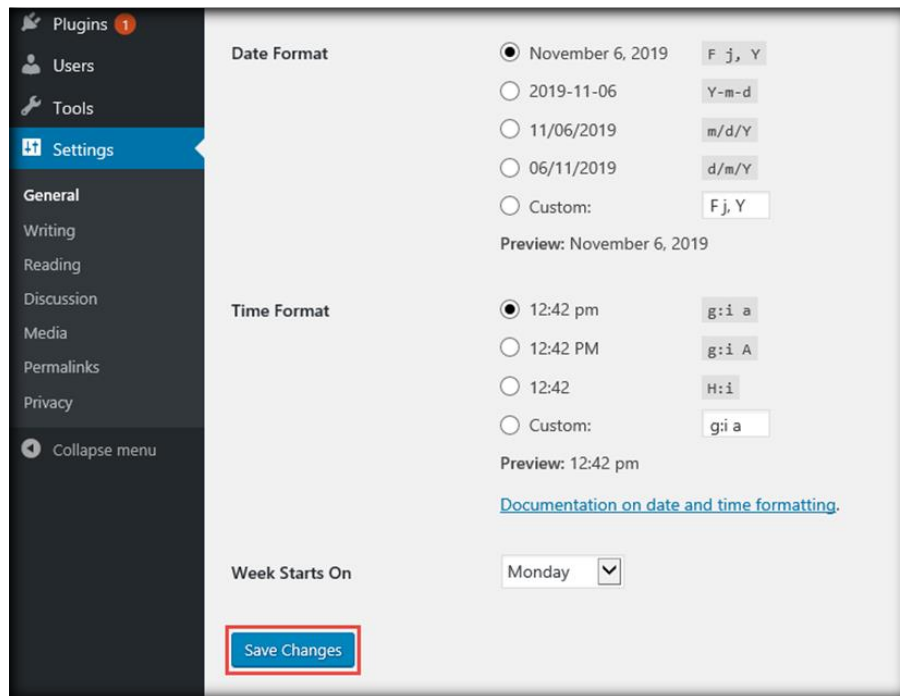


25. Once you have logged in to the website, WordPress Dashboard appears.
26. Hover the mouse cursor on Settings and click General.
27. WordPress Settings webpage appears, type `http://[IP Address of AD Domain Controller]/cnd` in WordPress Address (URL) and Site Address (URL) fields.

Note: In this lab setup, the IP Address of AD Domain Controller is 20.20.10.19 and this address may vary in your lab environment.



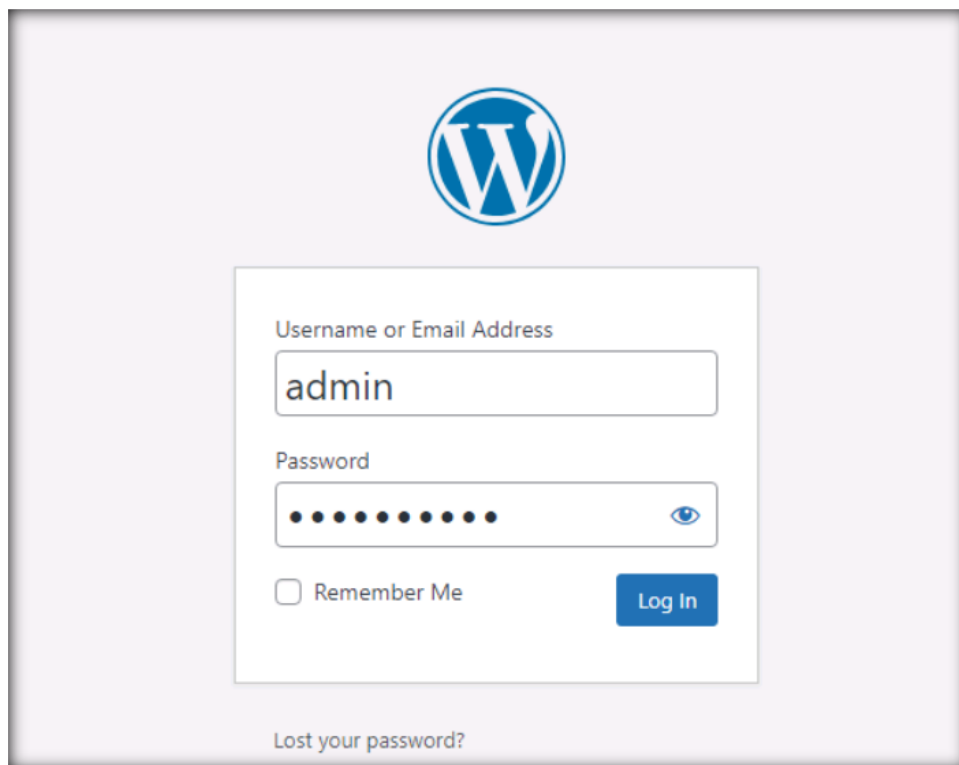
28. Scroll down the webpage and click Save Changes button.



The image shows the WordPress Settings page for Date and Time. The left sidebar contains a menu with 'Plugins' (1), 'Users', 'Tools', 'Settings' (selected), 'General', 'Writing', 'Reading', 'Discussion', 'Media', 'Permalinks', 'Privacy', and 'Collapse menu'. The main content area has three sections: 'Date Format' with radio buttons for 'November 6, 2019' (selected), '2019-11-06', '11/06/2019', '06/11/2019', and 'Custom:' (with a text input 'F j, Y'); 'Time Format' with radio buttons for '12:42 pm' (selected), '12:42 PM', '12:42', and 'Custom:' (with a text input 'g:i a'); and 'Week Starts On' with a dropdown menu set to 'Monday'. A 'Save Changes' button is highlighted with a red rectangle at the bottom left.

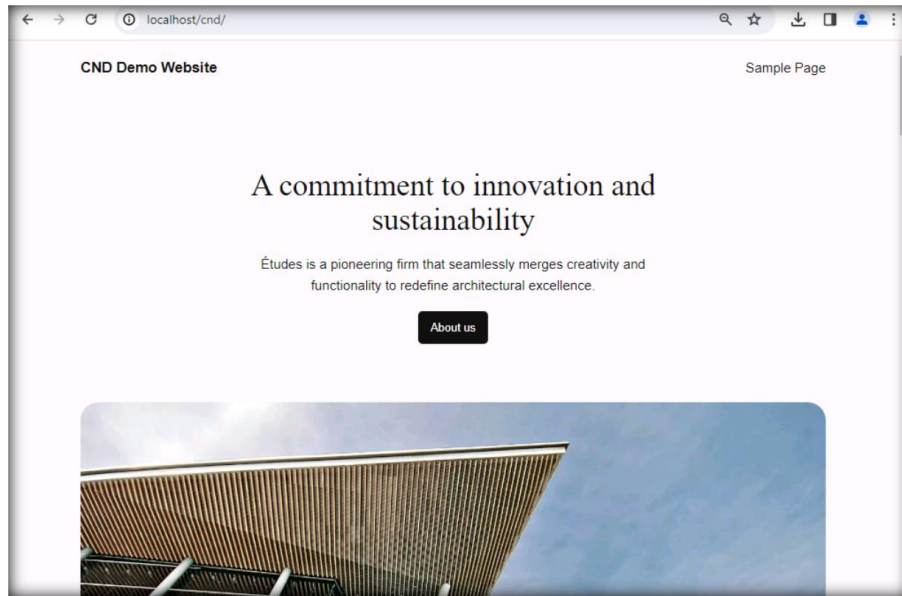
29. On clicking the button, you will be redirected back to the login page.

30. Enter the user credentials (admin/qwerty@123) and click Log In button.



The image shows the WordPress login page. At the top center is the WordPress logo. Below it is a white box containing the login form. The form has two input fields: 'Username or Email Address' with the text 'admin' and 'Password' with masked characters. Below the password field is a 'Remember Me' checkbox and a blue 'Log In' button. At the bottom of the form is a link that says 'Lost your password?'.

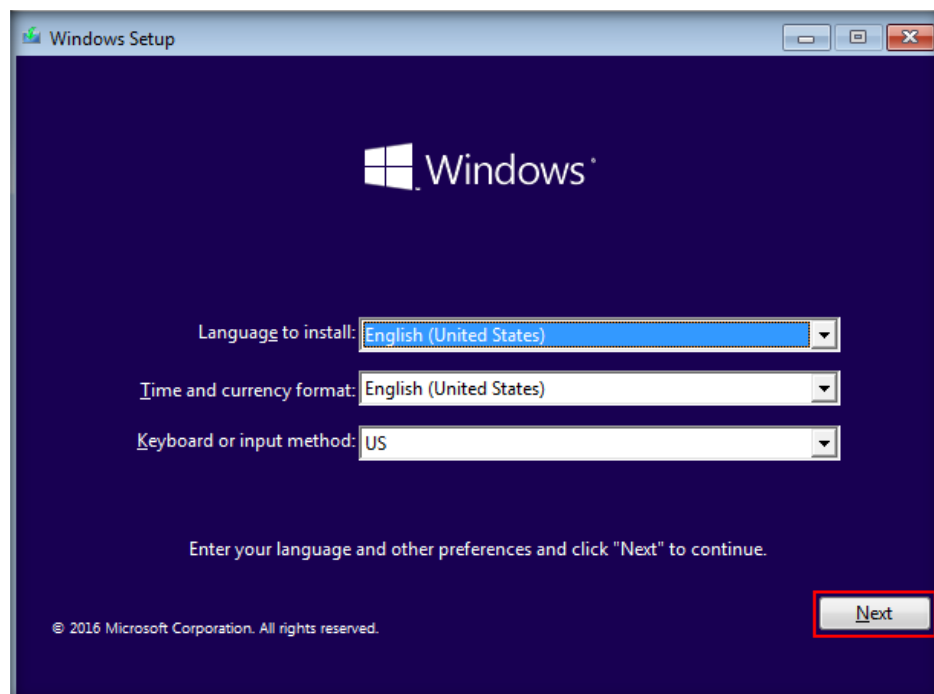
31. No, open a new tab in the browser and type **http://localhost/cnd** in the URL bar and press **Enter**.



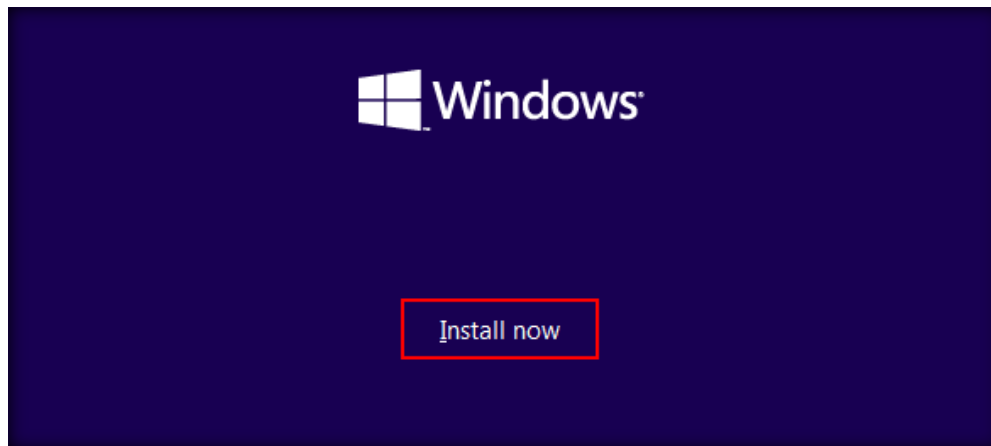
CT#10: Configuring Windows 11 Enterprise Guest OS as Finance Dept

CT#10.1: Installing Windows 11 Enterprise Guest OS as Finance Dept

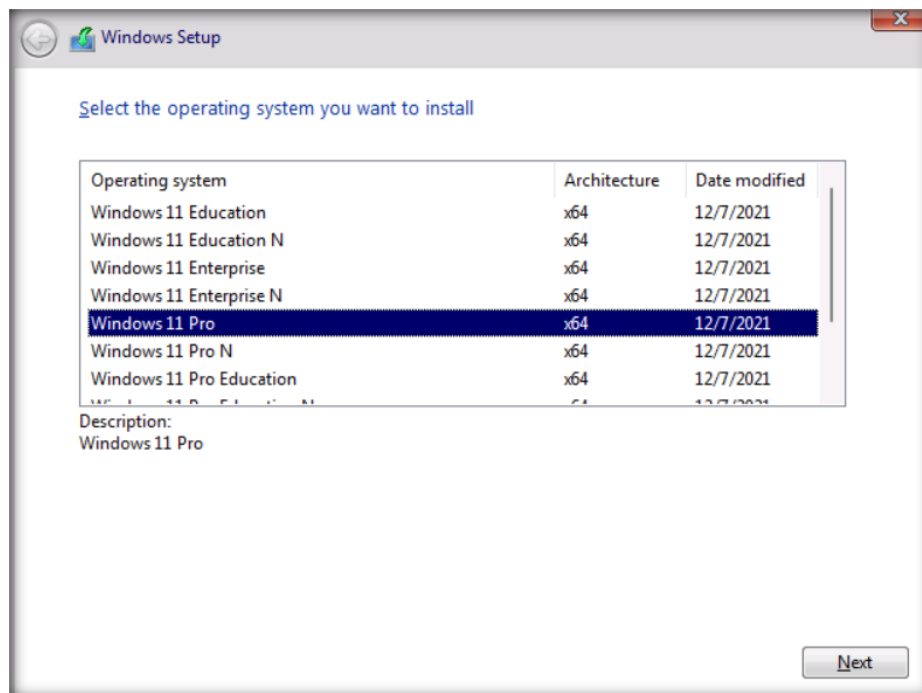
1. Click on **Finance Dept** virtual machine in VMware Workstation and click **Power on this virtual machine**.
2. Wait until Windows Setup screen appears, in Windows Setup screens choose the **Language** and other preferences then click **Next**.



- Click Install now button to start the installation process of Windows 11.

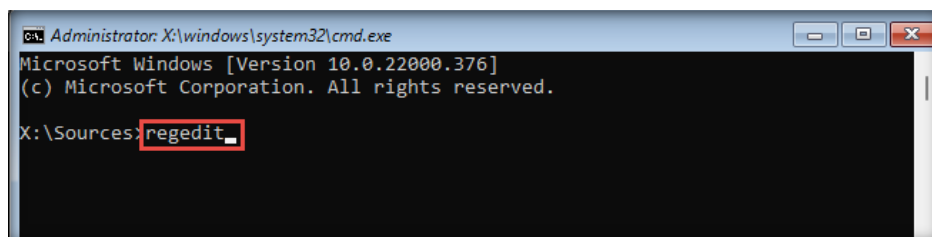


- In the **Select the operating system you want to install** wizard, select **Windows 11 Pro** and click **Next**.

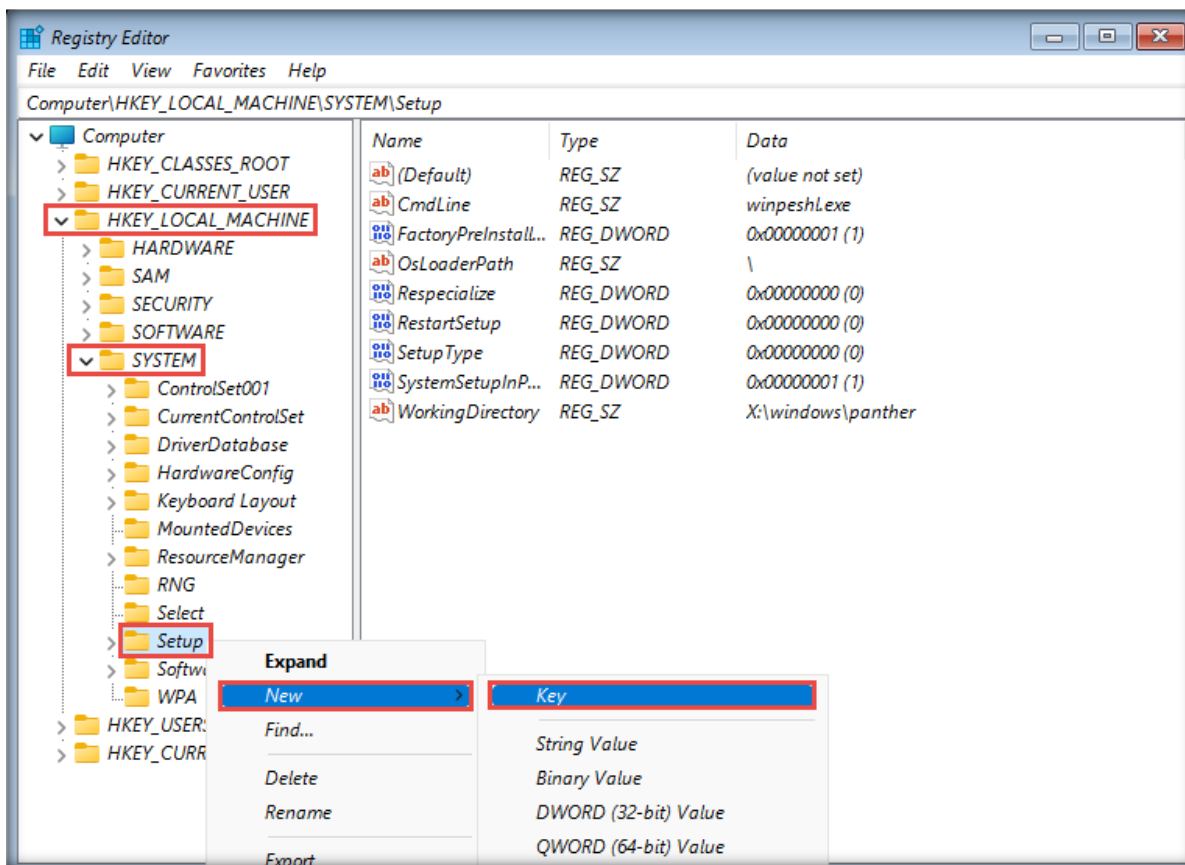


- If **This PC can't run Windows 11** error appears, follow the below steps:

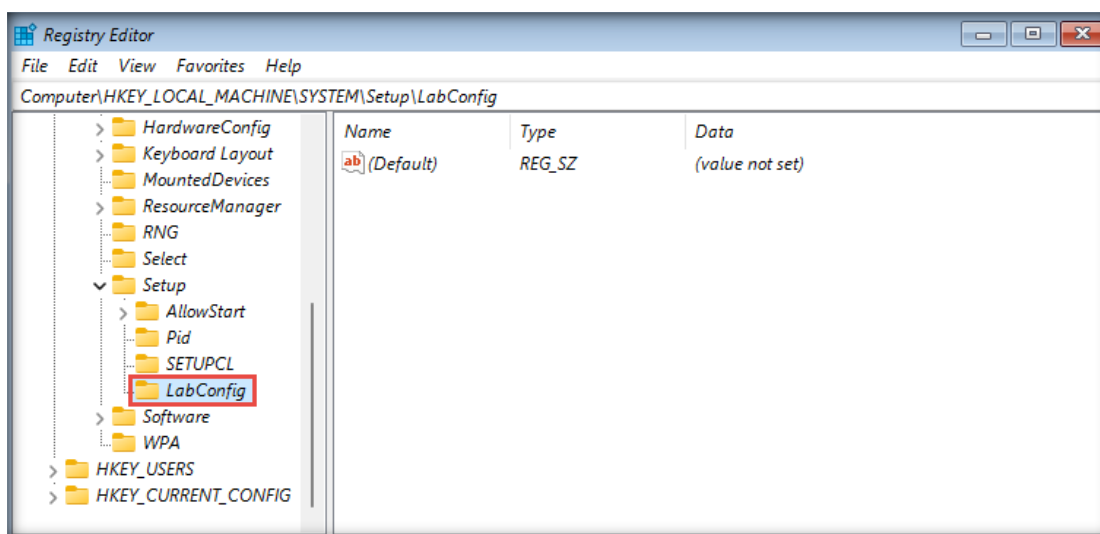
- Press **Shift+F10** and a **Command Prompt** window appears.
- In the **Command Prompt** window, type **regedit** and press **Enter**.



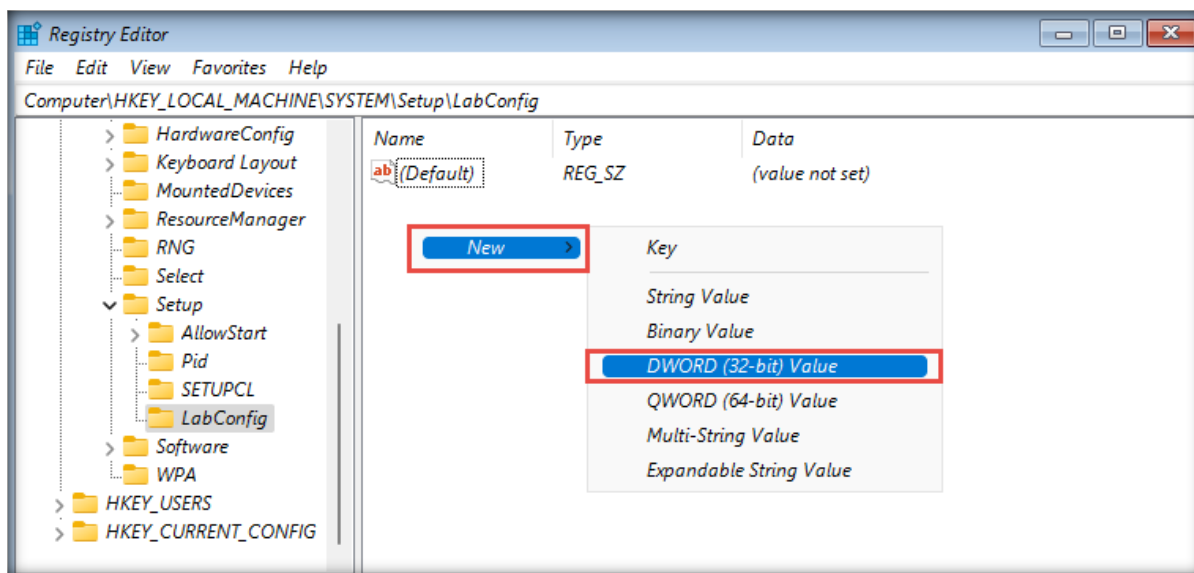
6. The **Registry Editor** window appears, from the left-pane navigate to **HKEY_LOCAL_MACHINE** → **SYSTEM**. Right-click **Setup** node and navigate to **New** → **Key**.



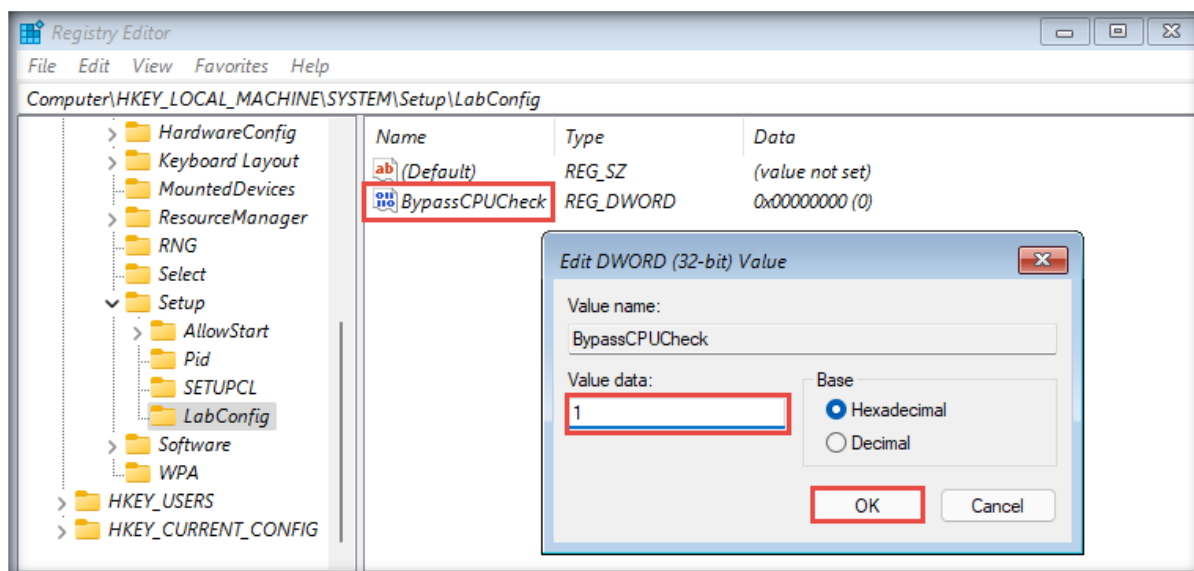
7. A new key has been created, rename it as **LabConfig** and press **Enter**.



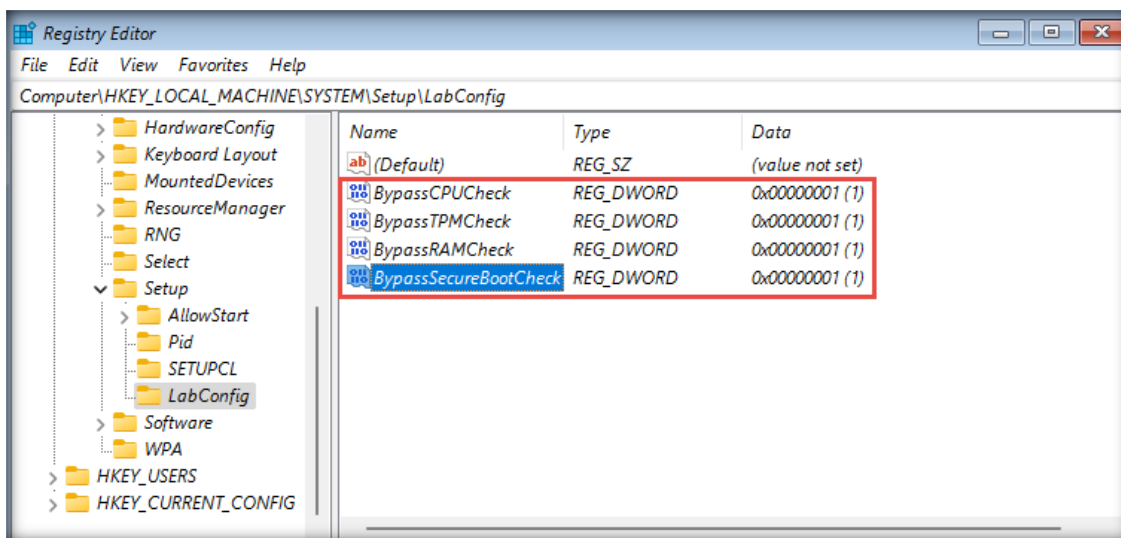
8. Right-click anywhere in the right pane and navigate to **New → DWORD (32-bit) Value**.



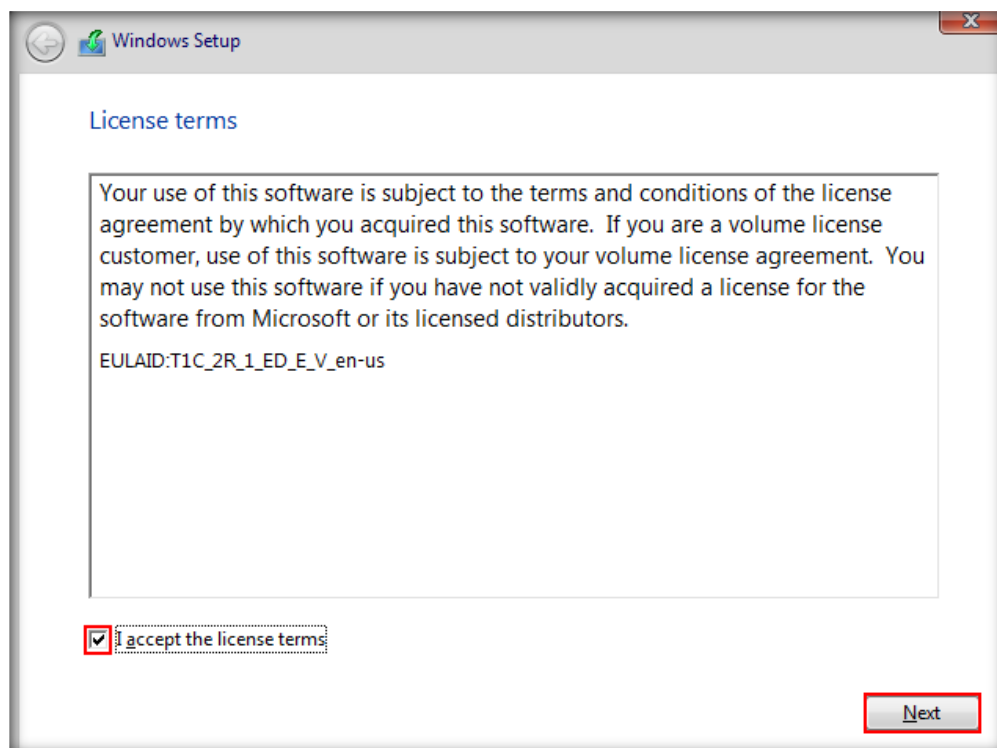
9. Rename the value as **BypassCPUCheck** and press **Enter**.
10. Now, right-click **BypassCPUCheck** value and select **Modify...** option.
11. **Edit DWORD (32-bit Value)** pop-up appears, change the **Value data** to **1** and click **OK**.



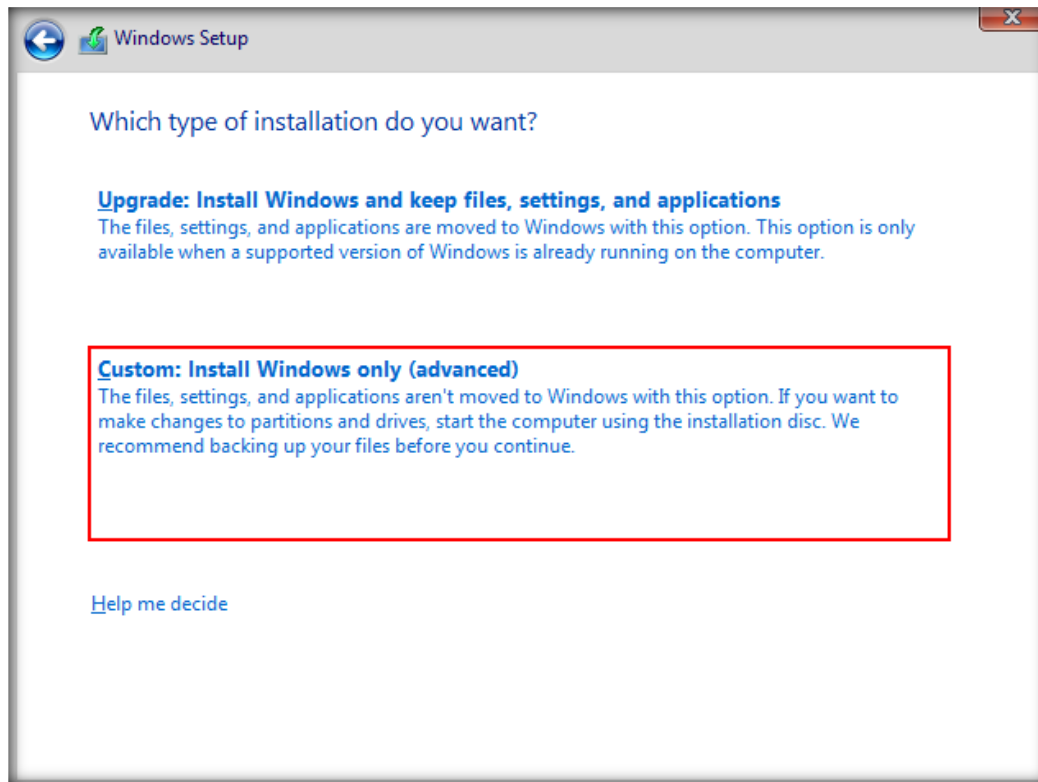
12. Similarly, create **BypassTPMCheck**, **BypassRAMCheck**, and **BypassSecureBootCheck** values (for each value, set **Value data=1**).



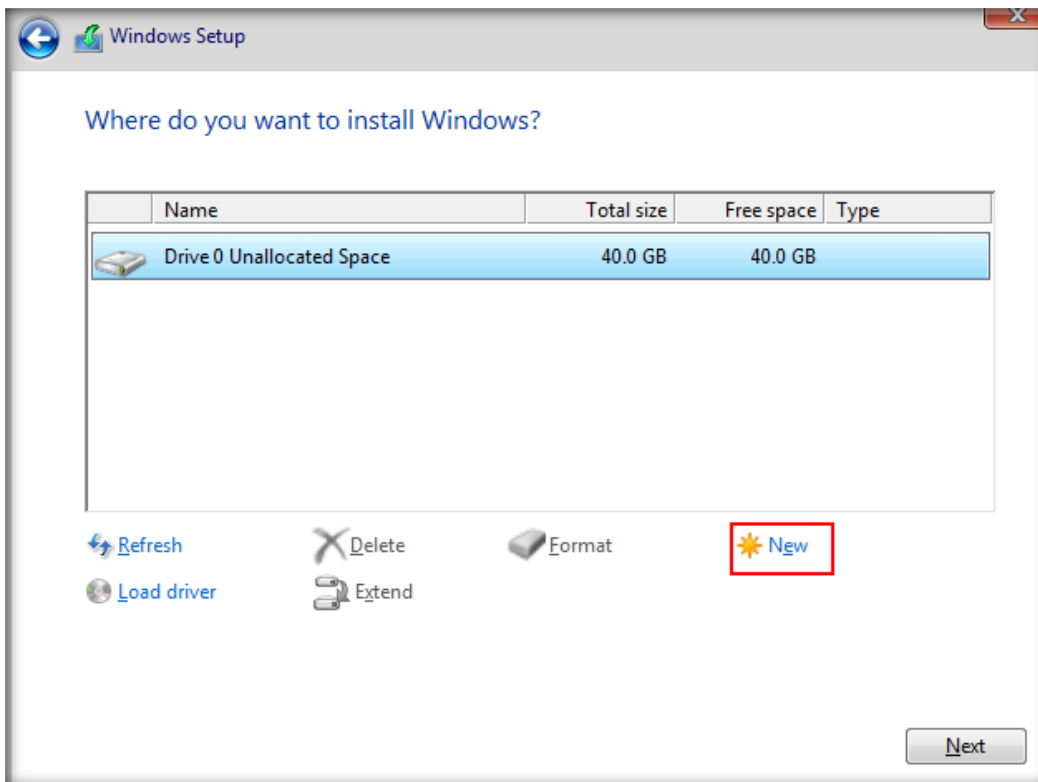
13. Now, close all the windows (Registry Editor, Command Prompt and Error window).
14. In **Windows Setup** window, click **Yes**.
15. Click **Install Now** button.
16. The **Select the operating system you want to install** wizard appears again; select **Windows 11 Pro** and click **Next**.
17. **Applicable notices and license terms** wizard appears, accept the license terms by clicking on **I accept...** checkbox and click **Next**.



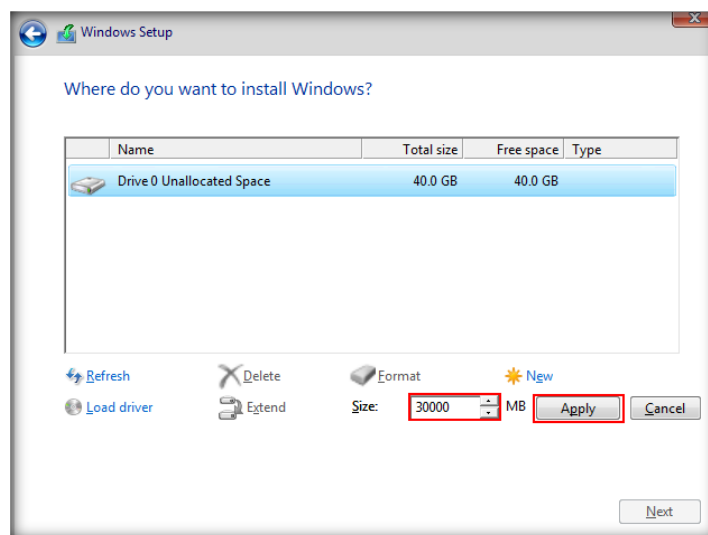
18. Click **Custom: Install Windows only (advanced)** option to proceed with the installation.



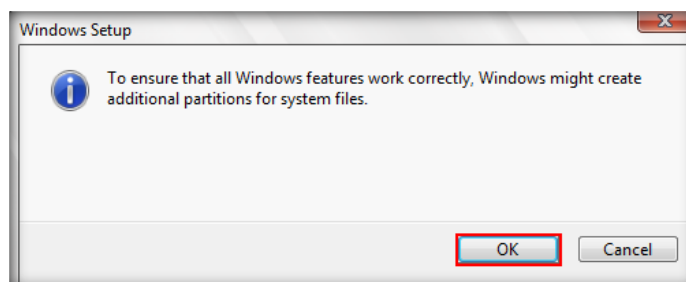
19. Where do you want to install Windows? wizard appears, click **New** to create a partition.



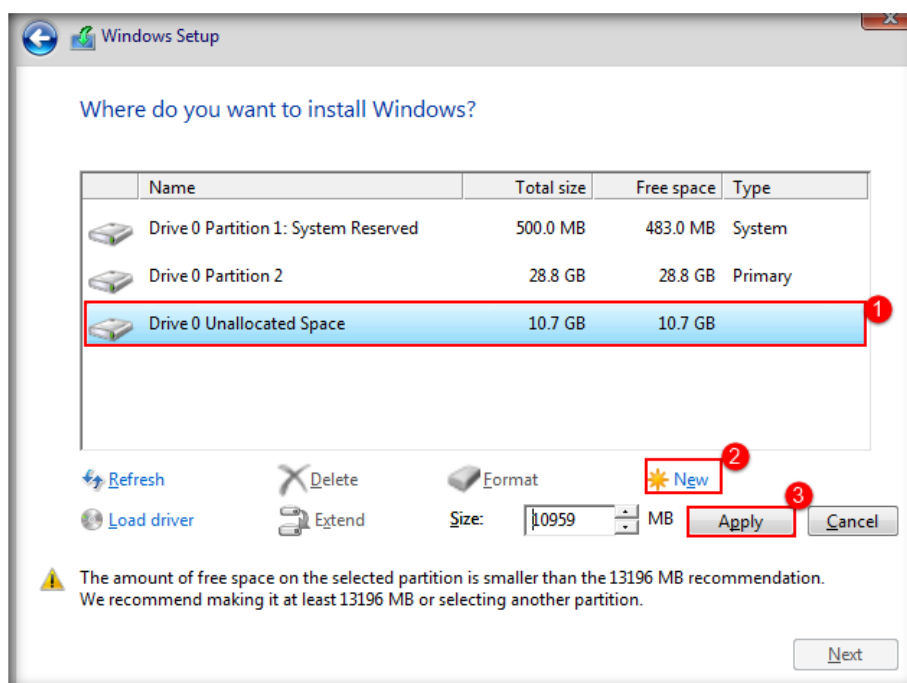
20. Provide **30000 MB** in the Size field and click **Apply**.



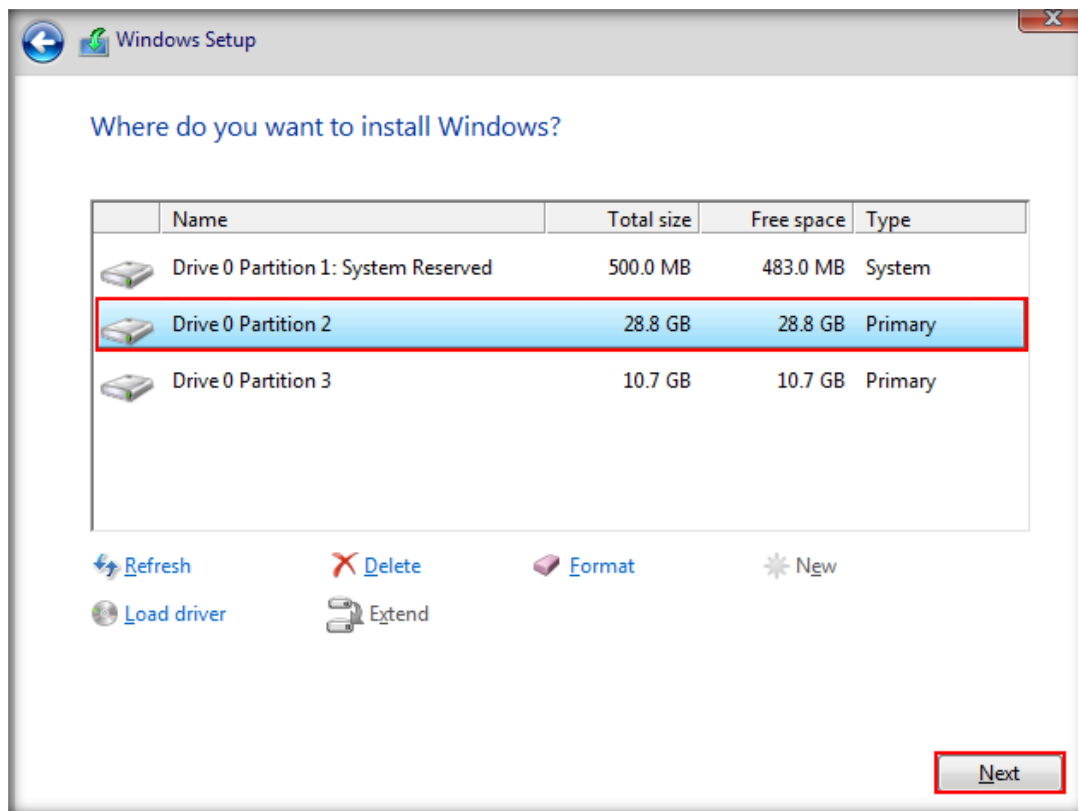
21. Windows Setup pop-up appears, click **OK**.



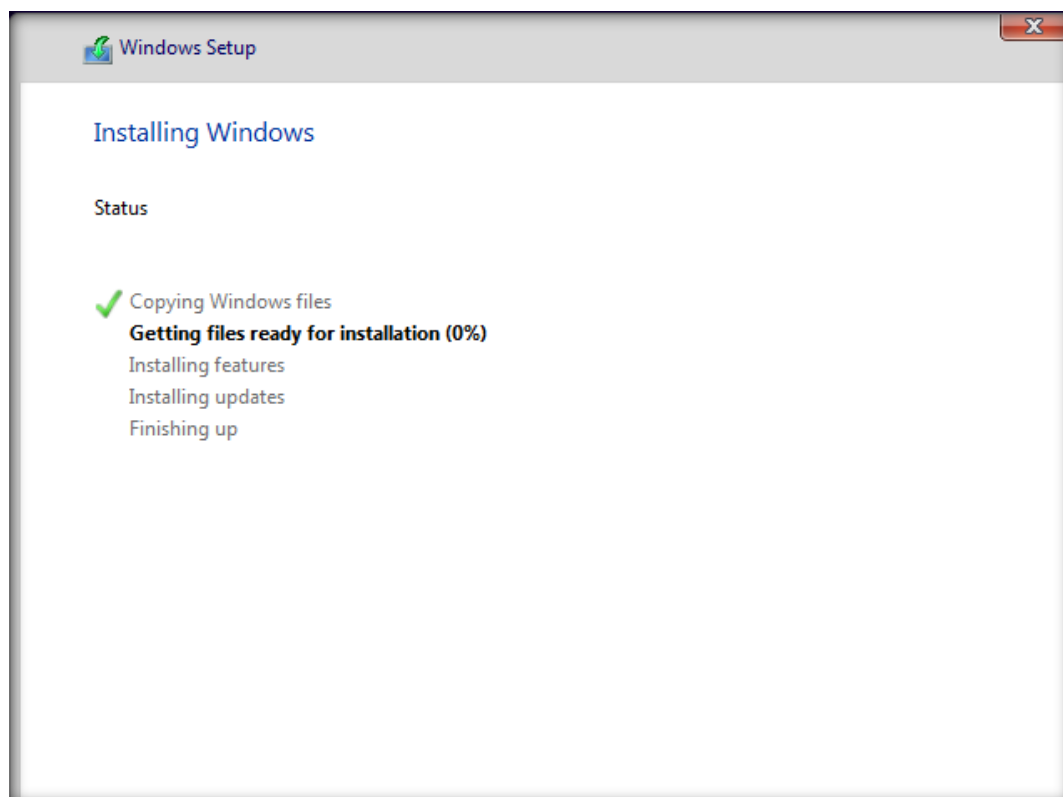
22. Click Unallocated Space partition, then click on **New**, and then leave the size to default and then click **Apply**.



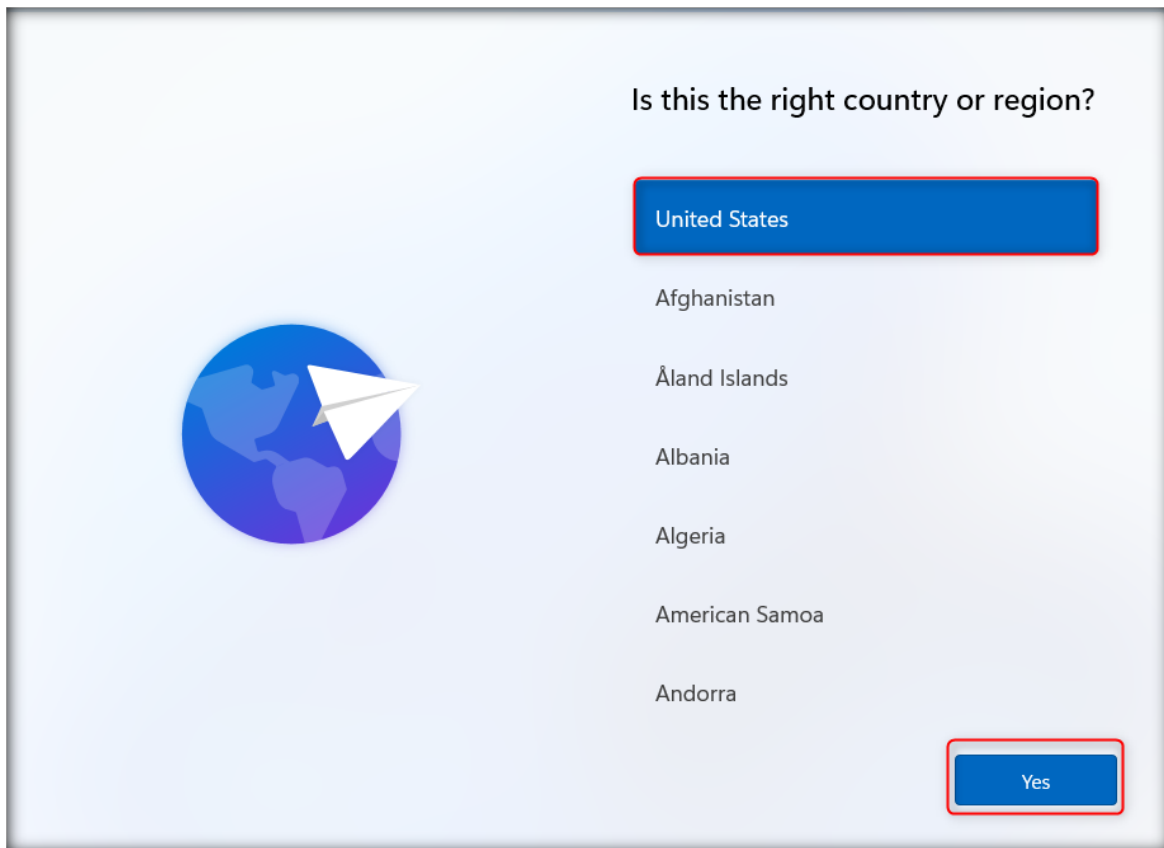
23. After partitions are created, choose the partition to install Windows 11, and click **Next**.



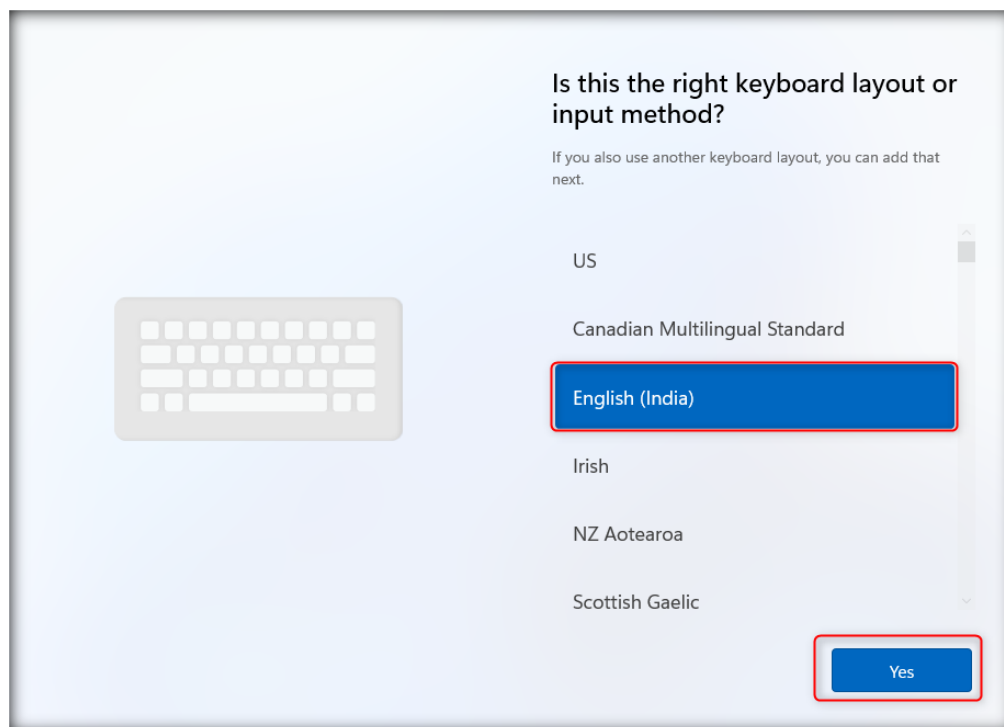
24. The **Installing Windows** screen appears; wait until installation is complete.



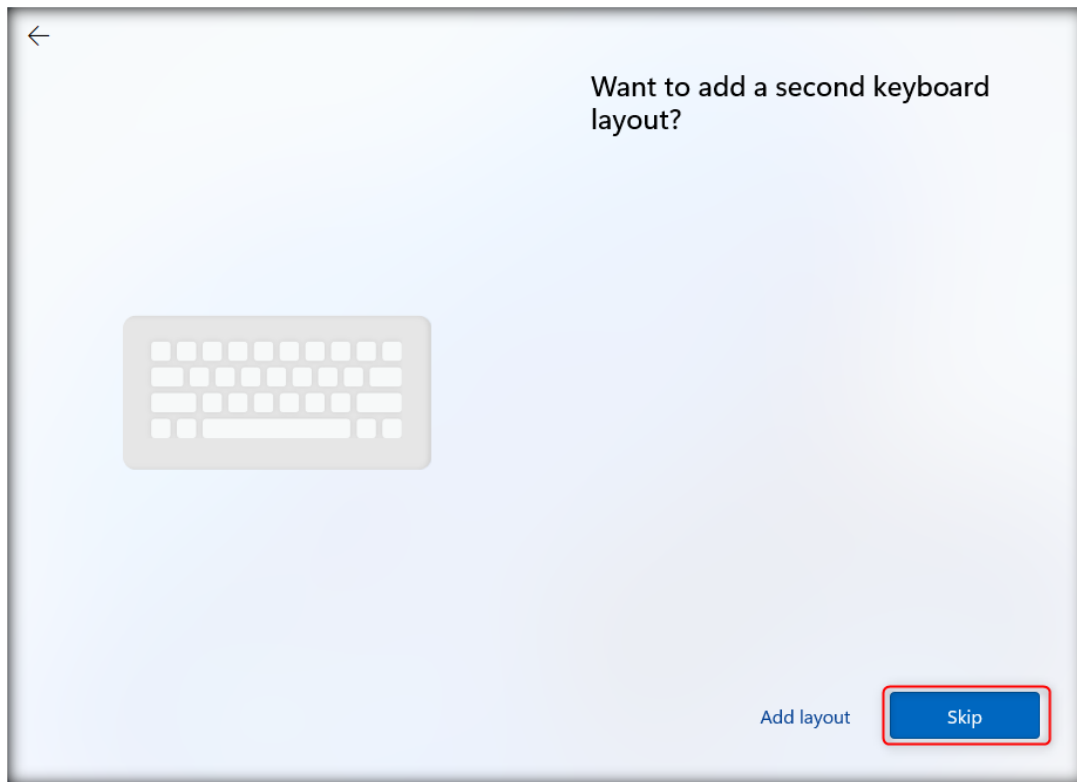
25. Use Default location and click yes.



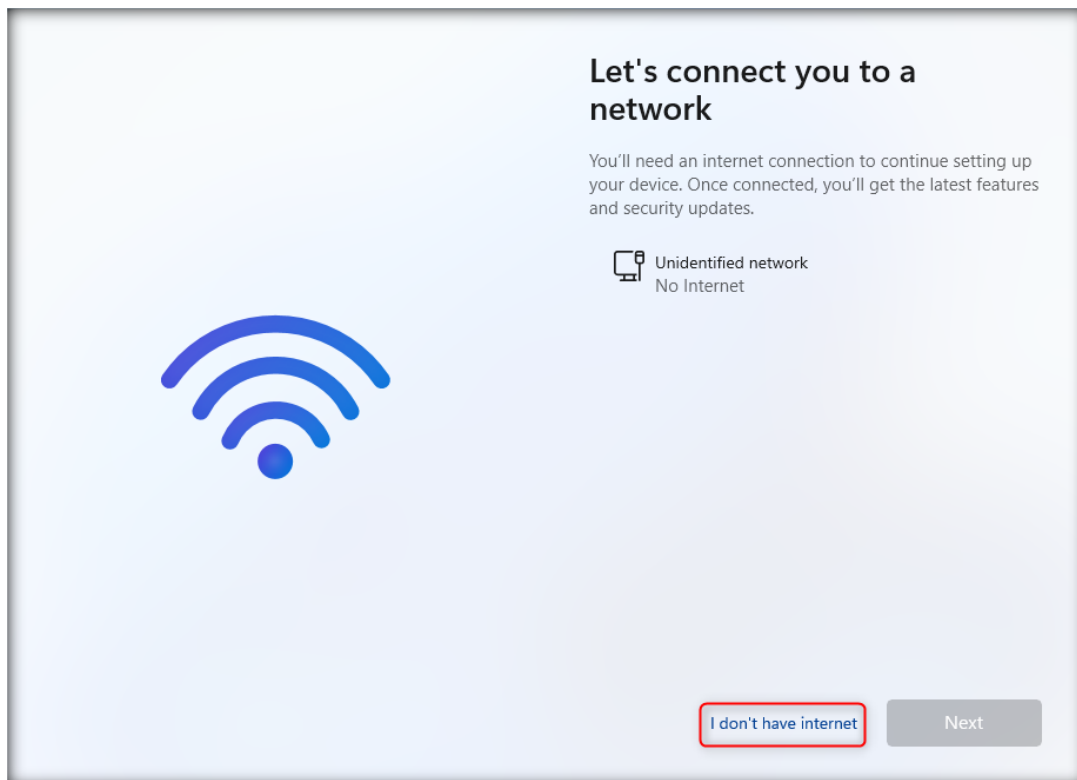
26. Select **English (India)** as **Keyboard layout** and click on **Yes**.



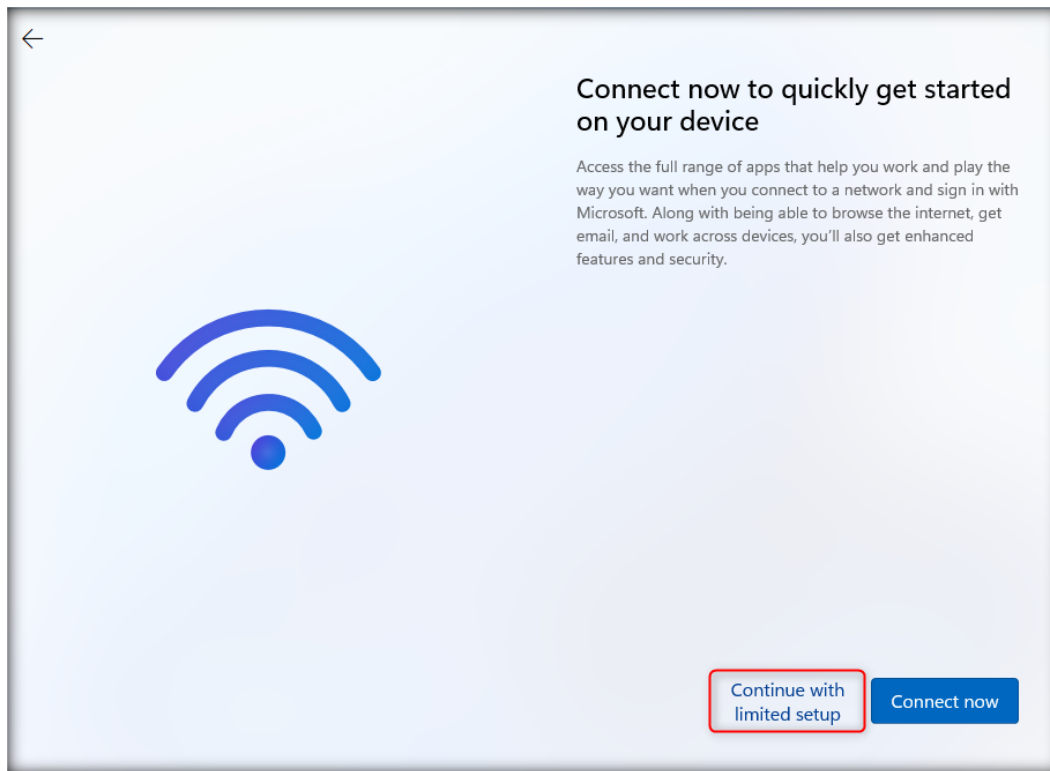
27. Click **Skip**.



28. Click on **I don't have internet**.

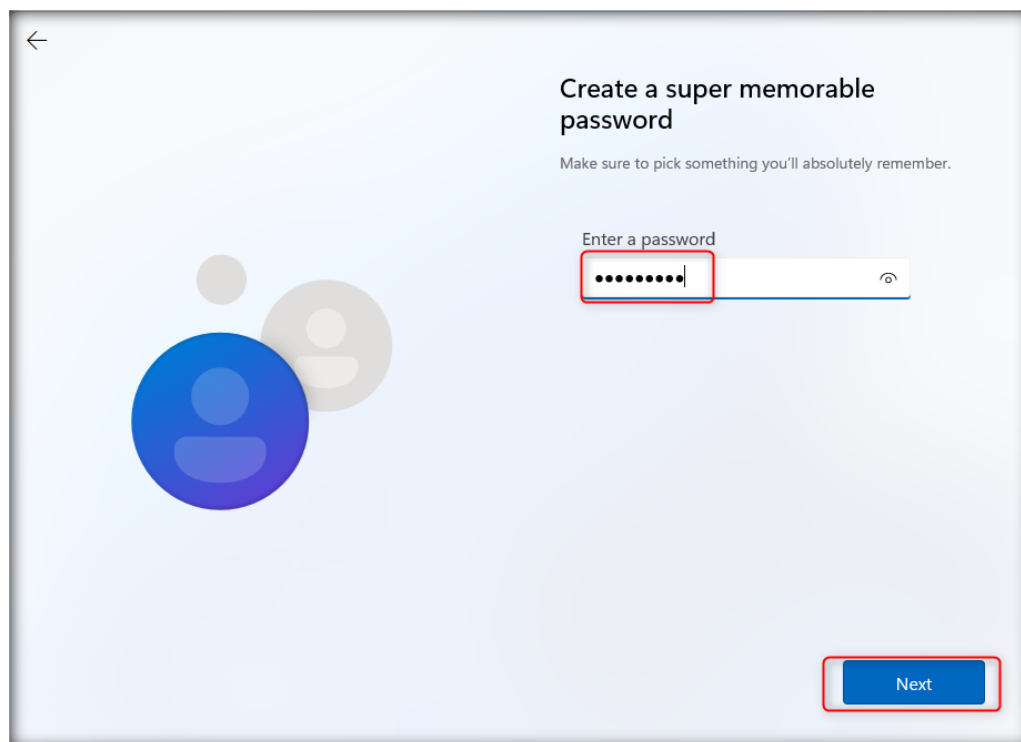


29. Click **Continue with limited setup**.



30. In Who's going to use this device type **Martin** and click on **Next**.

31. Type **user@123** as password and click on **Next**.



32. Type **user@123** to confirm the password and click on **Next**.

←

Confirm your password

Enter your password one last time.

Password confirmation

.....

Next

33. **Select** one security question and type the answer. Click on **Next**.

←

Now add security questions

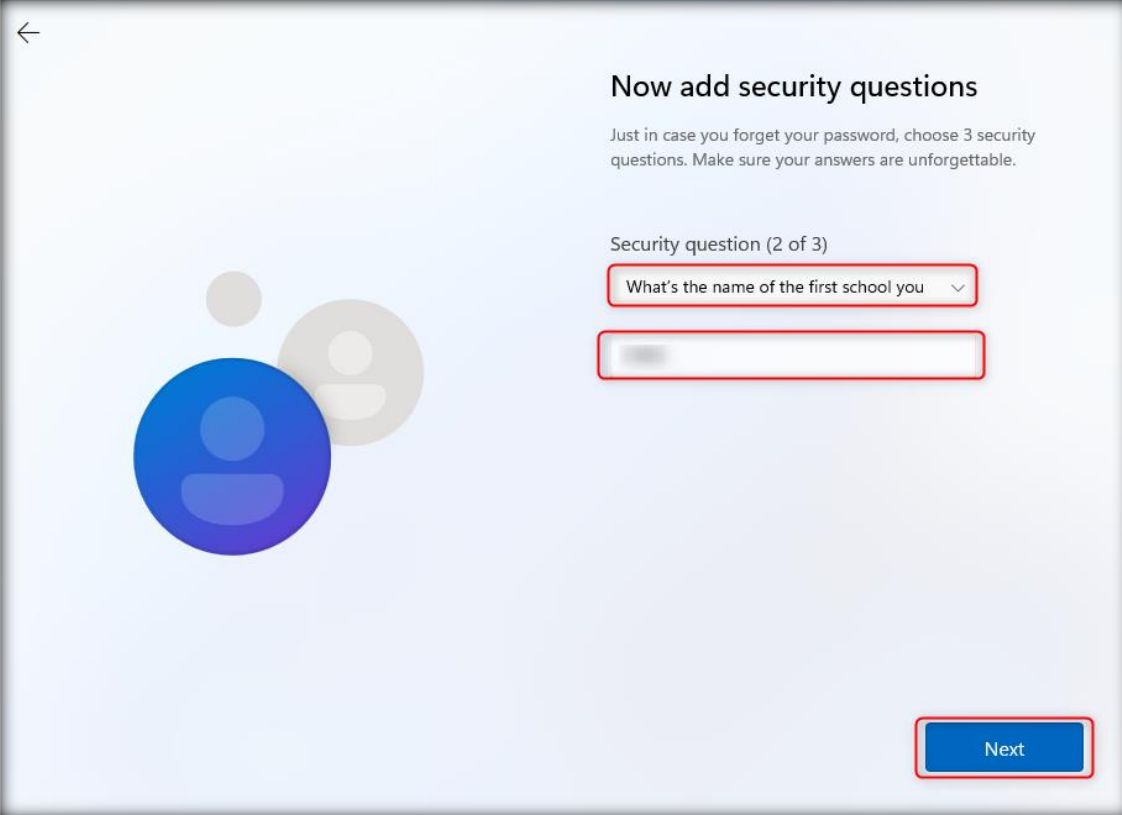
Just in case you forget your password, choose 3 security questions. Make sure your answers are unforgettable.

Security question (1 of 3)

What was your first pet's name?

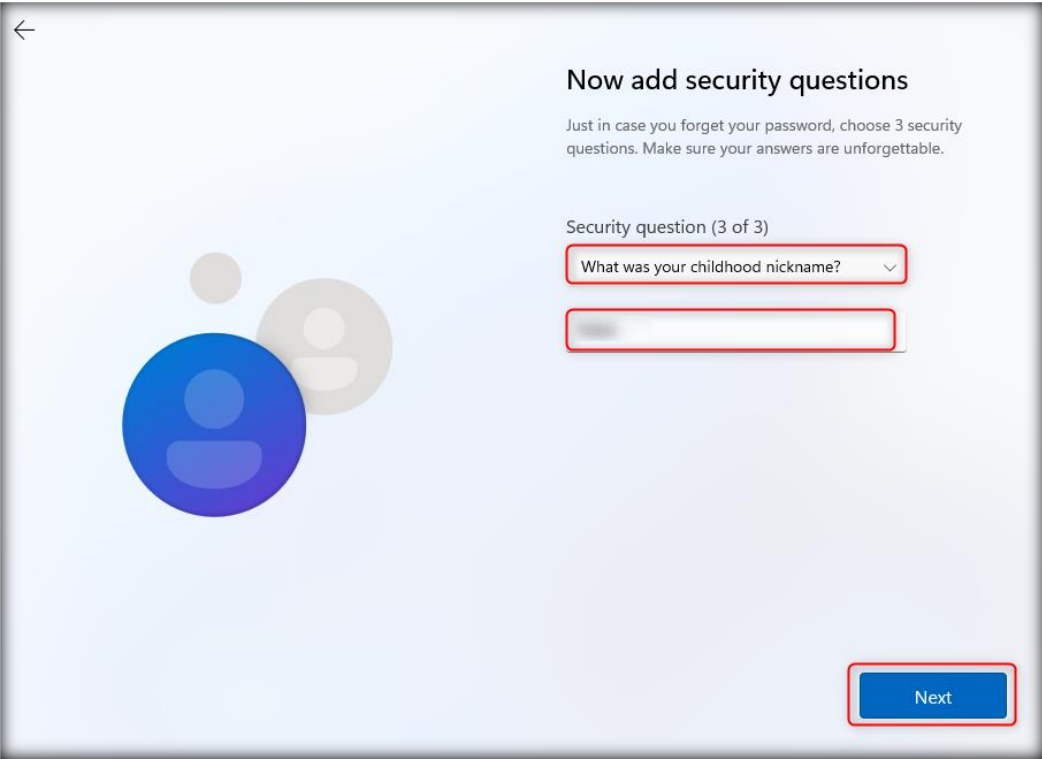
Next

34. Select another security question and type the answer. Click on **Next**.



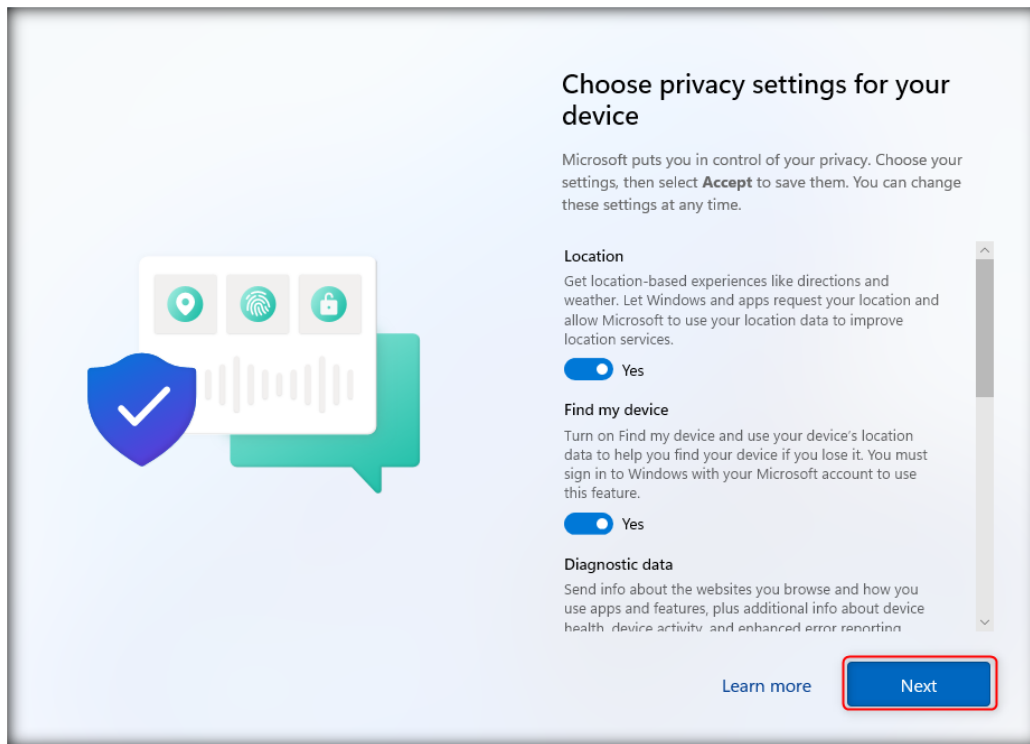
The screenshot shows a user account setup screen titled "Now add security questions". Below the title is a subtitle: "Just in case you forget your password, choose 3 security questions. Make sure your answers are unforgettable." On the left side, there is a large blue circular profile picture placeholder with a person icon, and two smaller, faded circular placeholders above it. On the right side, the text "Security question (2 of 3)" is displayed above a dropdown menu. The dropdown menu is open, showing the selected question: "What's the name of the first school you". Below the dropdown is a text input field for the answer. At the bottom right of the screen is a blue button labeled "Next".

35. Select the last security question and type the answer. Click on **Next**.

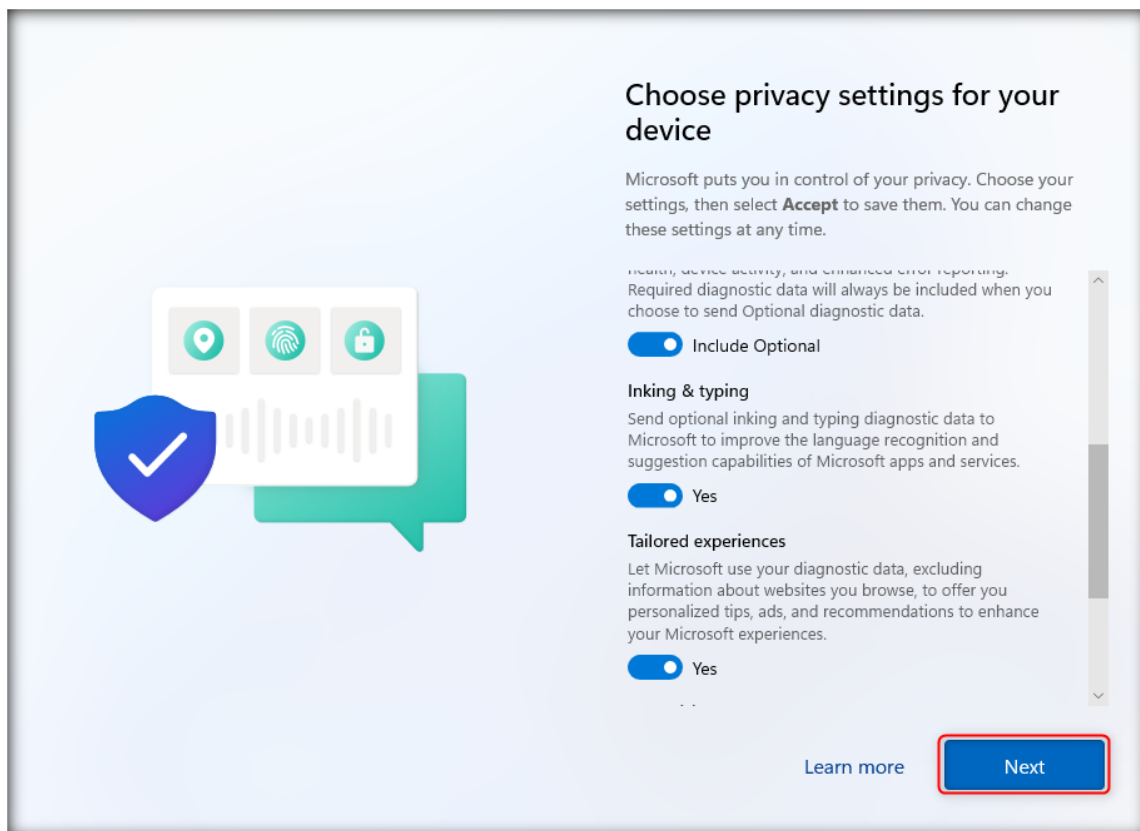


The screenshot shows the same user account setup screen titled "Now add security questions" with the same subtitle. On the left side, the profile picture placeholders are the same. On the right side, the text "Security question (3 of 3)" is displayed above a dropdown menu. The dropdown menu is open, showing the selected question: "What was your childhood nickname?". Below the dropdown is a text input field for the answer. At the bottom right of the screen is a blue button labeled "Next".

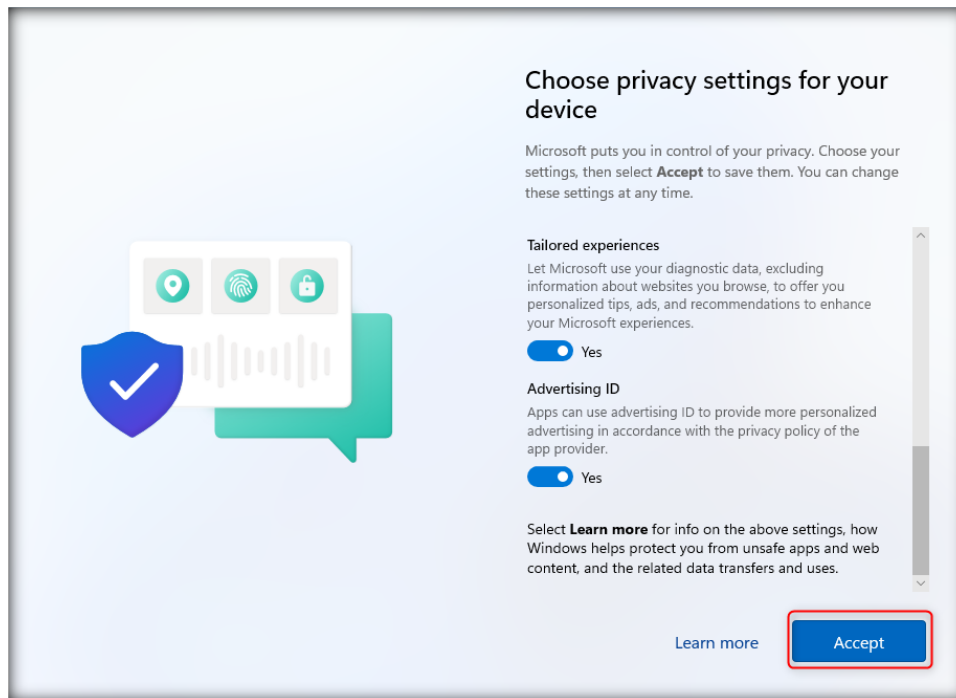
36. Click on **Next**.



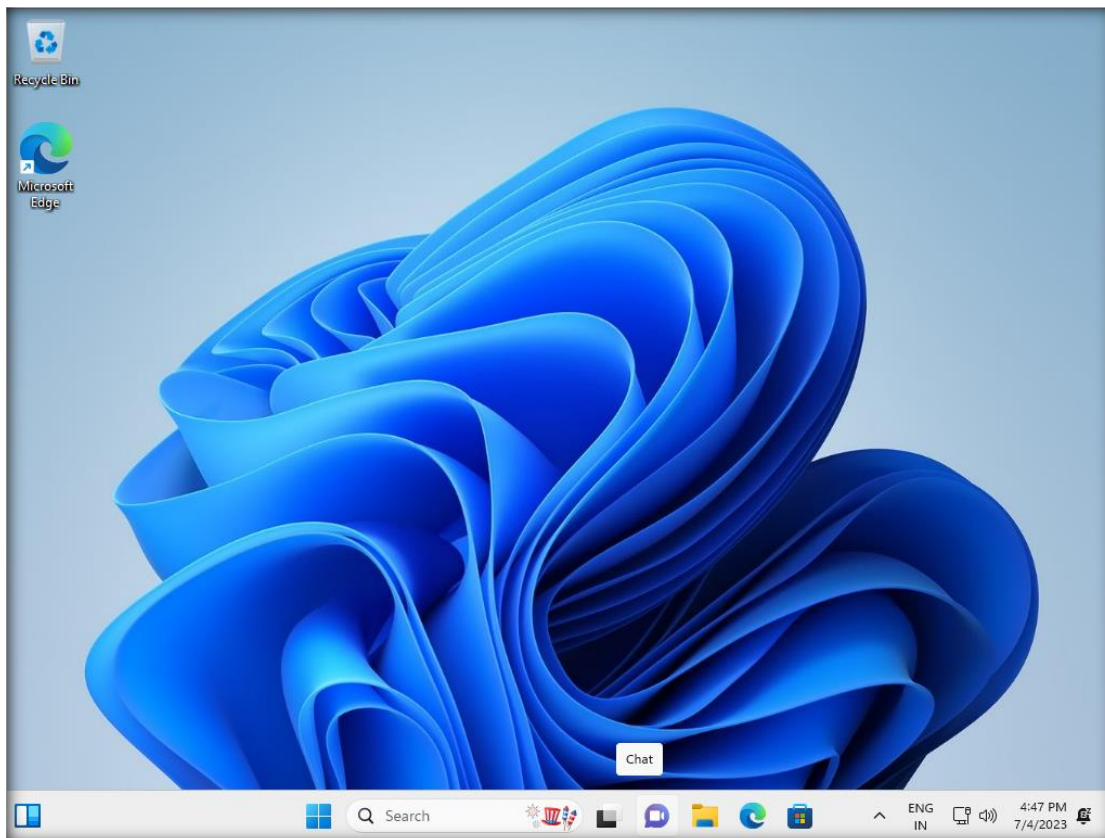
37. Click on **Next**.



38. Click on **Accept**.

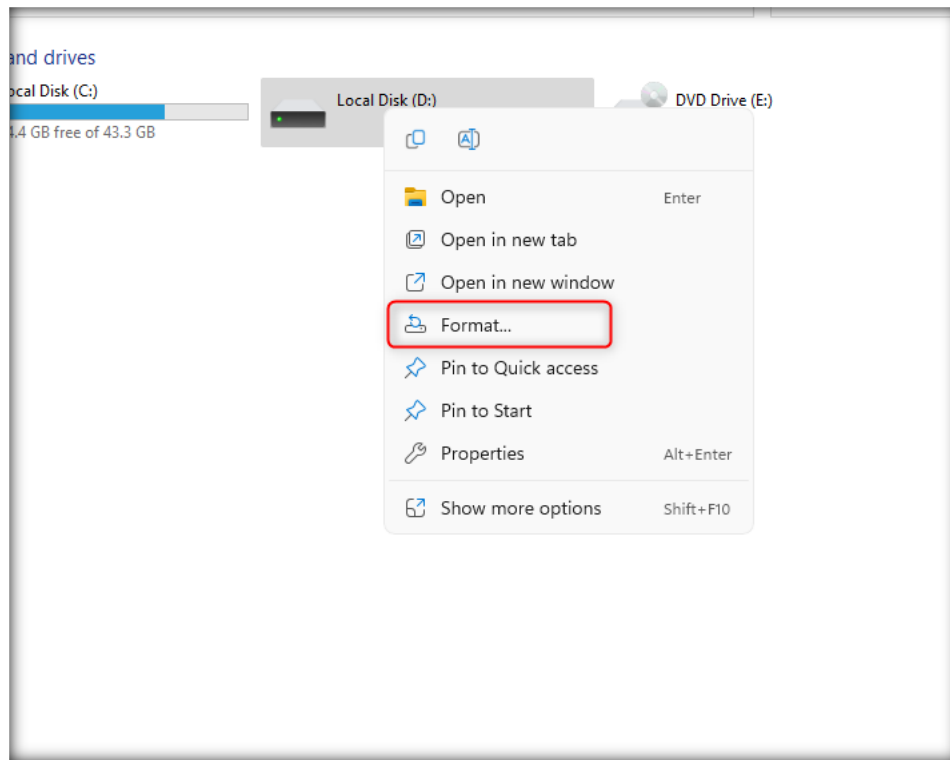


39. Now, the Windows 11 machine is ready, as shown in the screenshot below.

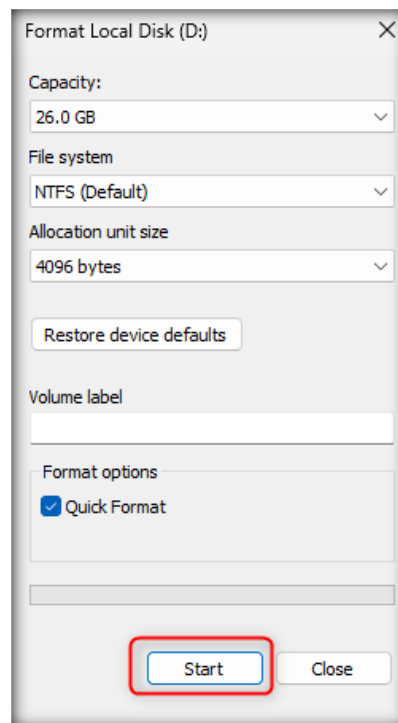


40. Open File Explorer window and click This PC in the left pane, then right-click on Local Disk (D:) and click Format from the context menu.

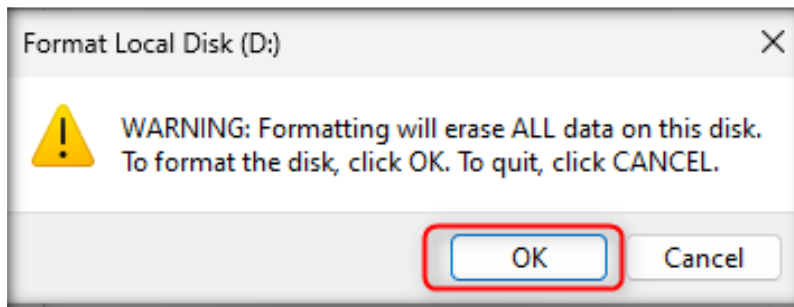
Note: Drive letter may vary in your lab environment.



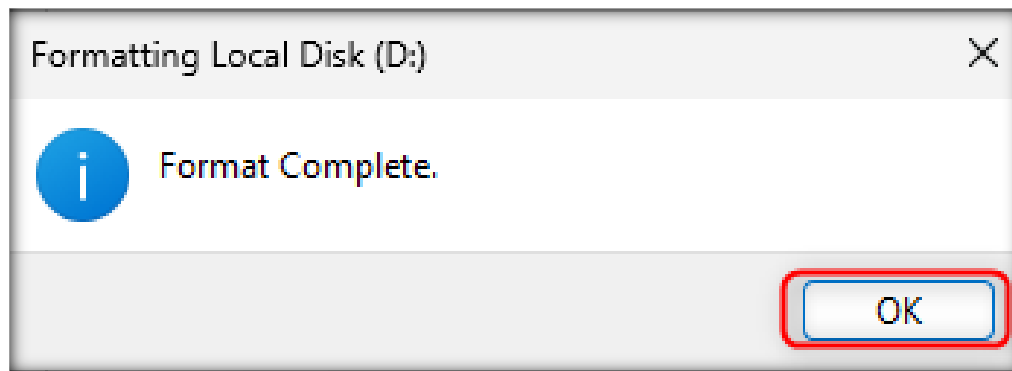
41. Format Local Disk (D:) window appears, leave the settings to default and click Start.



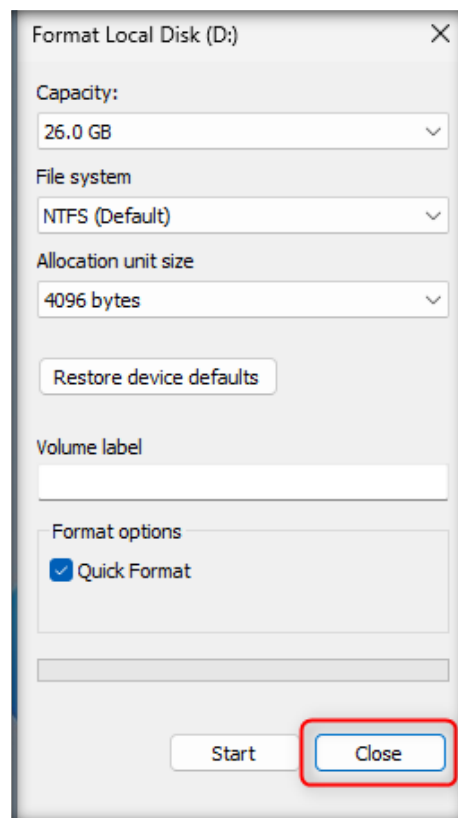
42. Warning pop-up appears click OK



43. In Format Complete message box click OK.

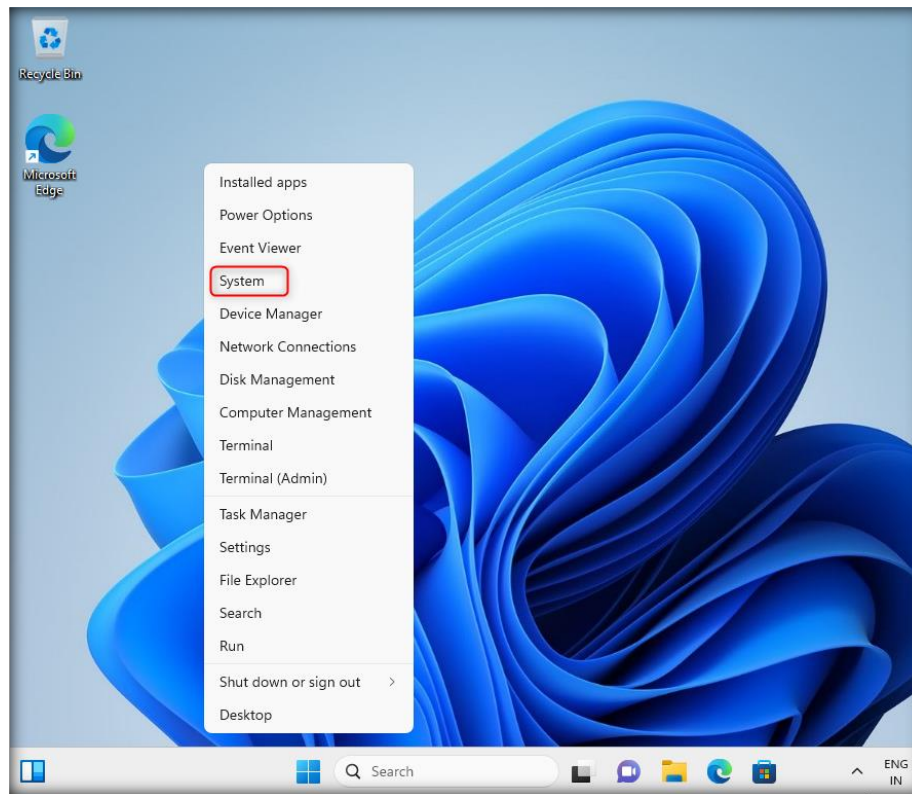


44. Once the formatting of Local Disk (D:) is completed click Close.

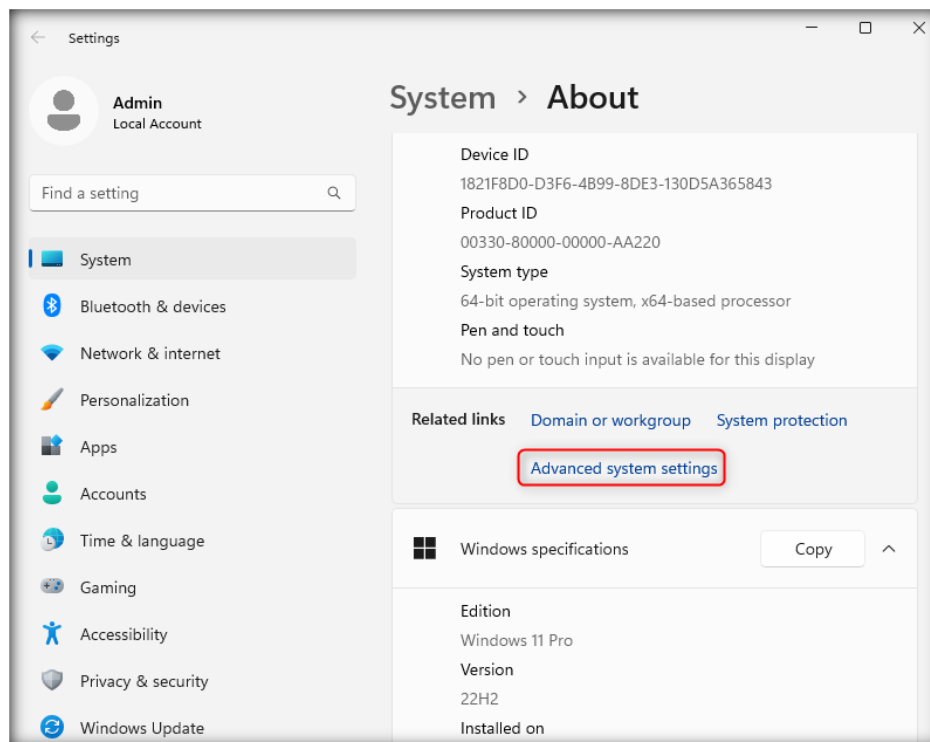


CT#10.2: Changing the Computer Name

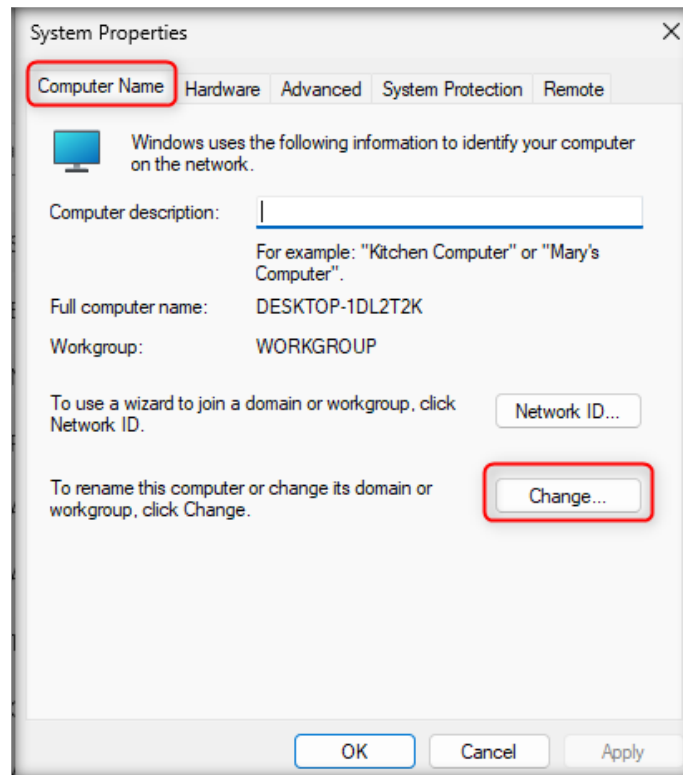
1. Right-click Start icon and click on System.



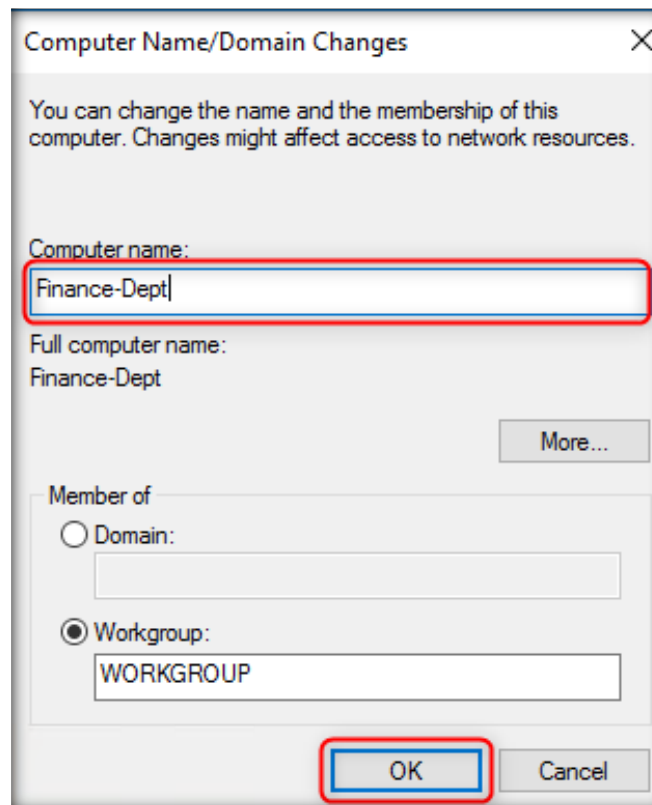
2. In the System properties window, click Advanced system settings.



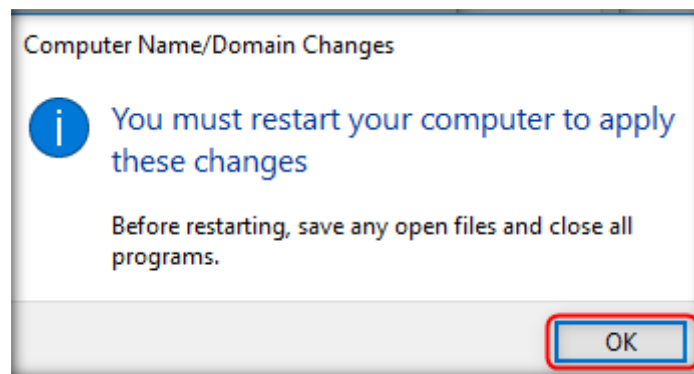
3. In the Computer Name tab of the System Properties window, click Change.



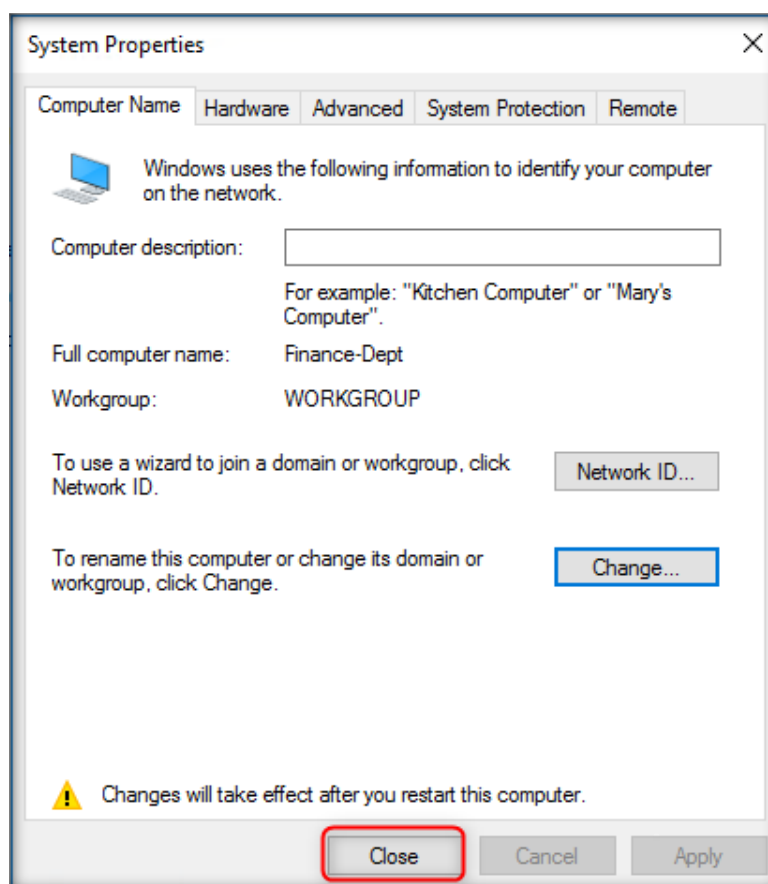
4. In the Computer Name field enter Finance-Dept and click OK.



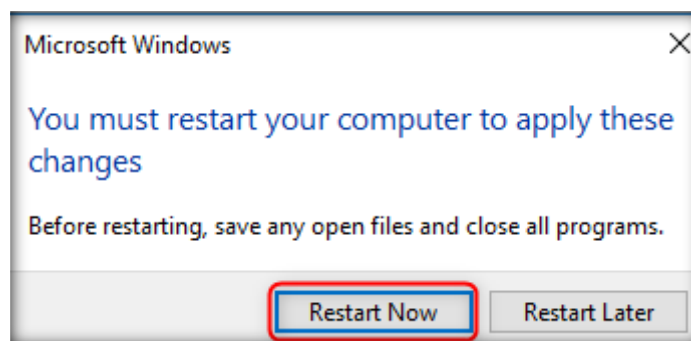
5. When prompted to restart the system, click OK.



6. You will be returned back to System Properties window, click Close

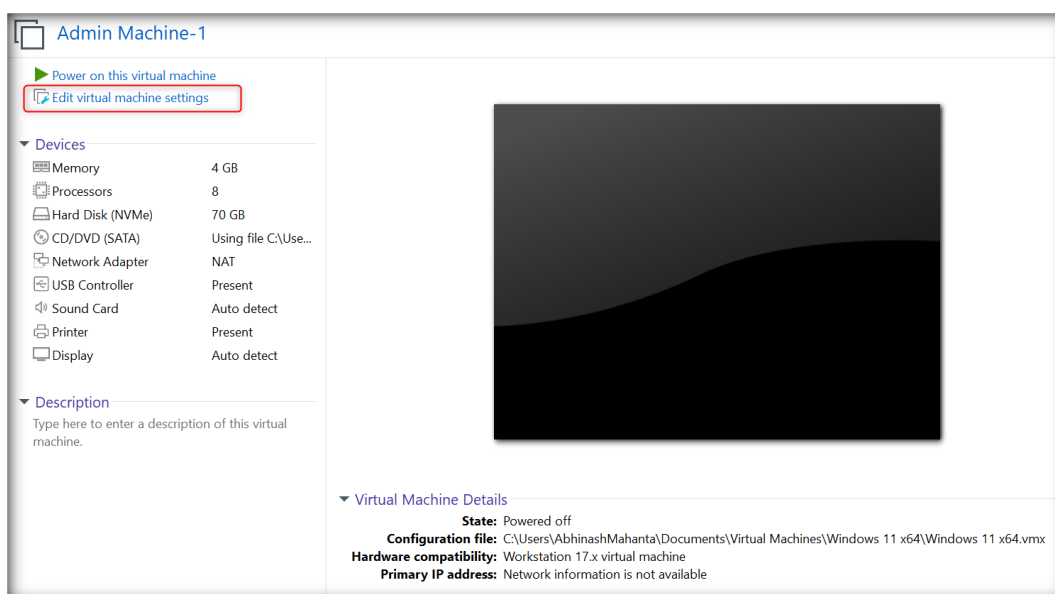


7. You will be prompted to restart the system, click **Restart Now**.

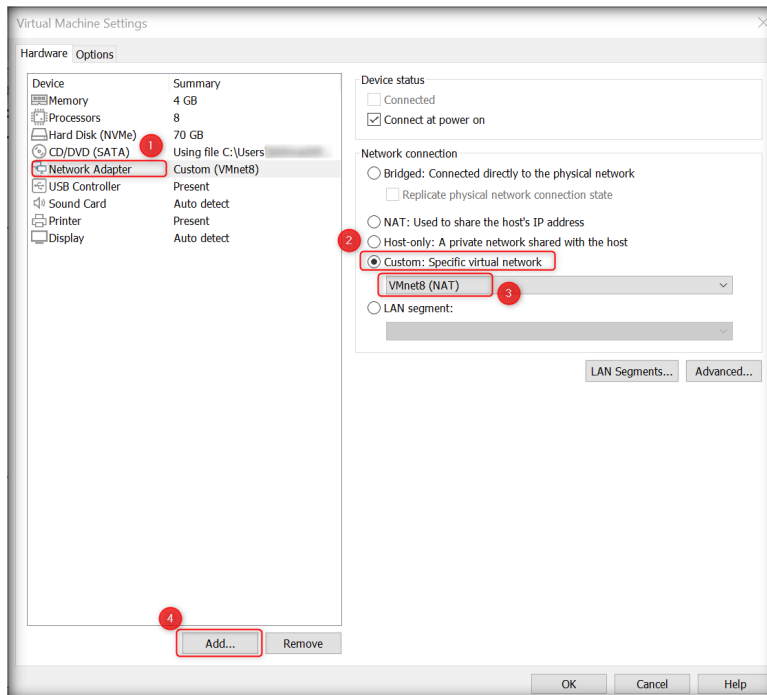


CT#10.3: Setting up IP address for Finance Dept

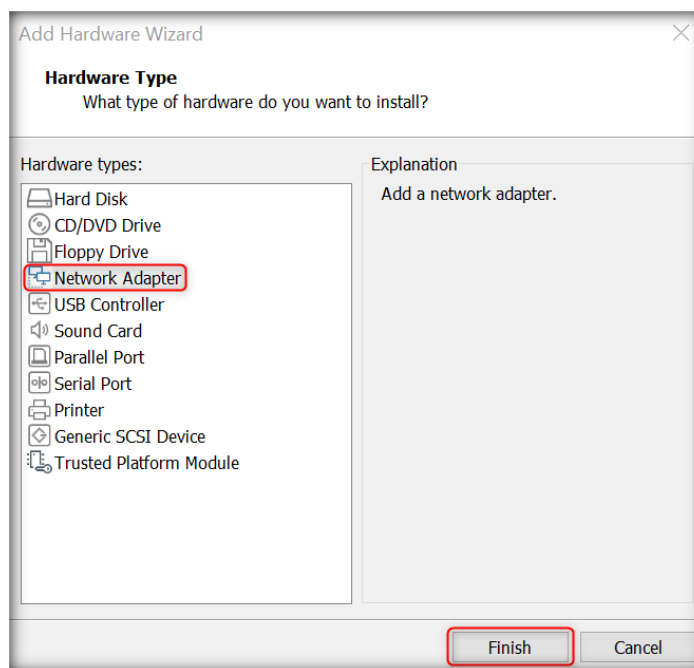
1. Launch VMWare Workstation.
2. Click on **Admin Machine-1** virtual machine profile and click **Edit virtual machine settings**.



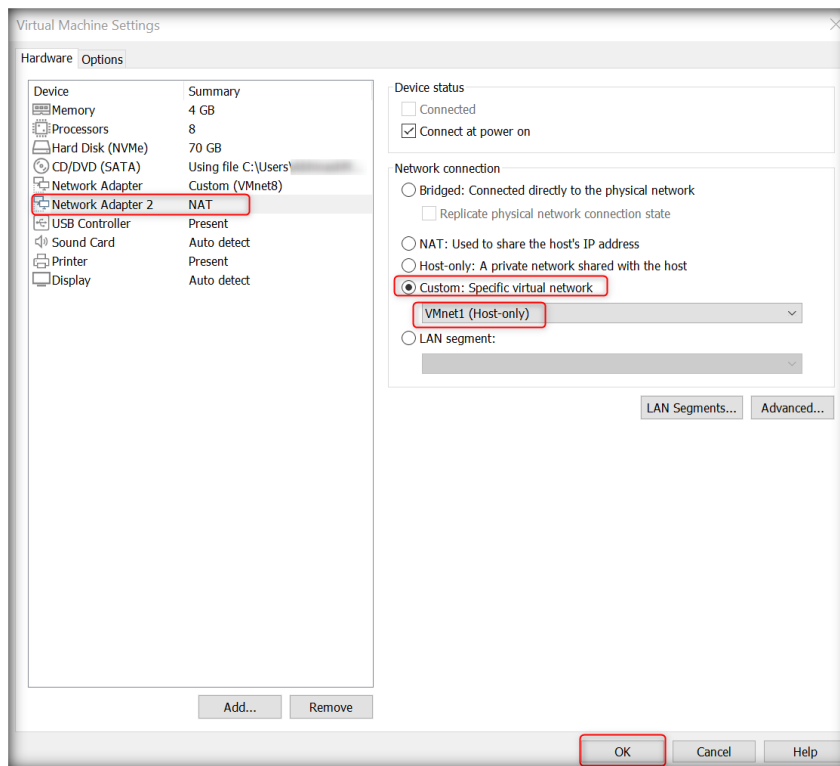
3. **Settings for Admin Machine-1** window opens, click **Network Adapter** in left side pane, click **Custom: Specific virtual network** radio button and select **VMnet8** from dropdown, click **Add....**



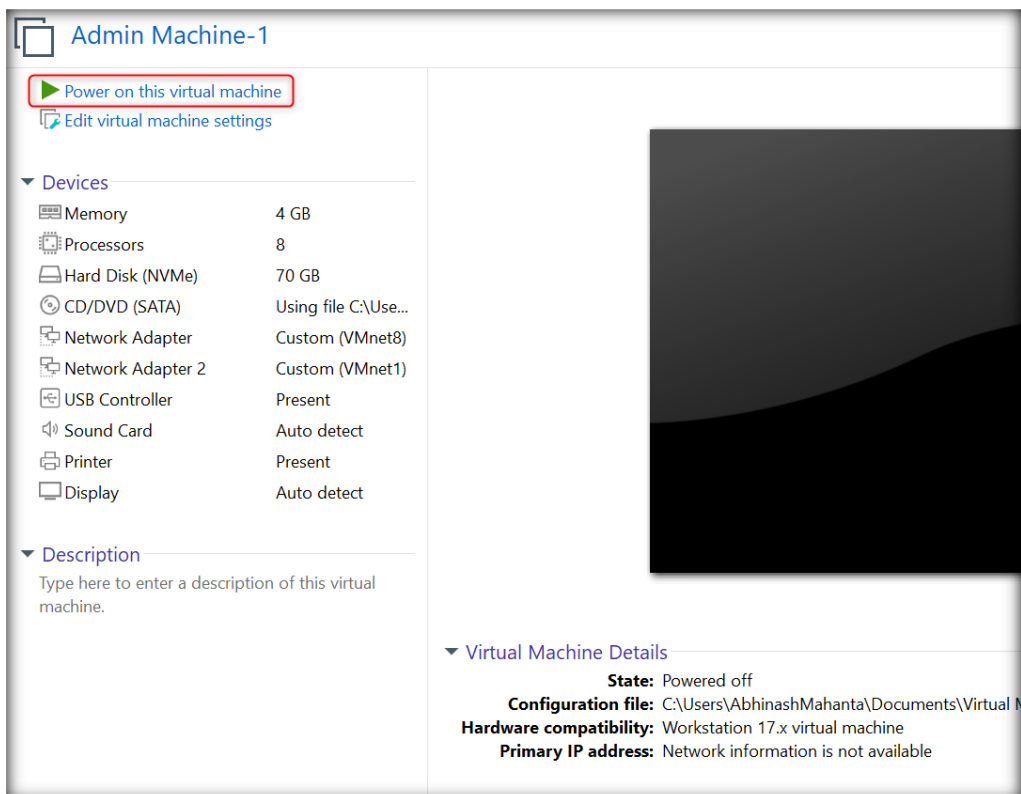
4. The PrivateVS switch for internet purpose which is connected to PfSense External Firewall, now we need one more switch that is **InternalVS** for Lan connection.
5. Select **Network Adapter** in left side pane and click **Finish** button.



6. The new **Network Adapter** will be added, select newly added Network adaptor, click **Custom: Specific virtual network** radio button and select **VMnet1**. Then, click **OK**.



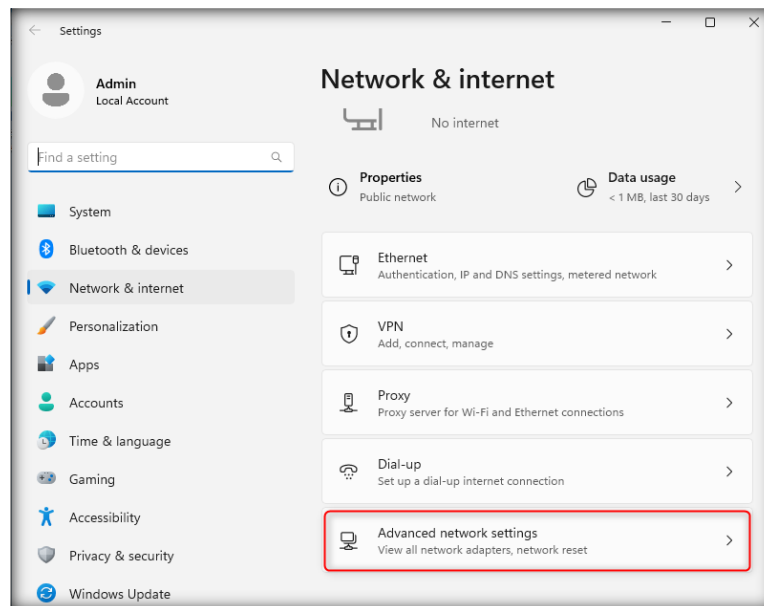
7. In VMware Workstation, click **Power on this virtual machine**.



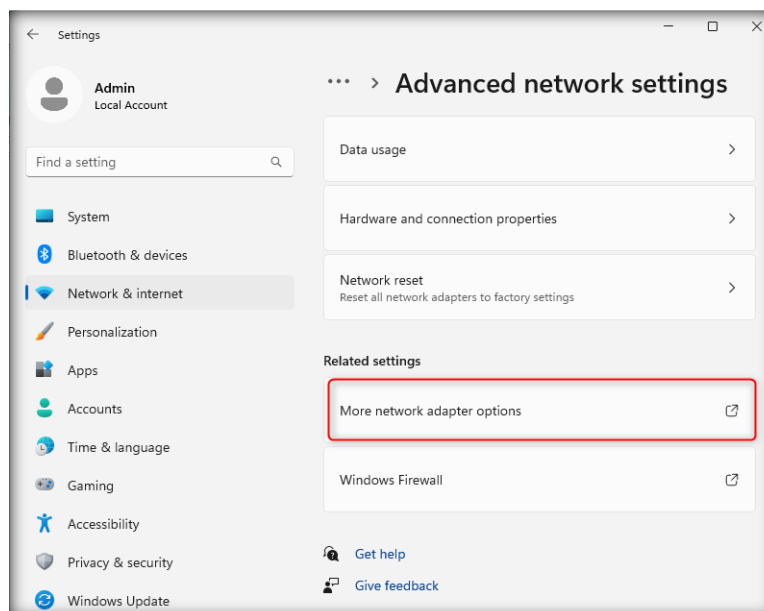
8. Login as Admin. after successful sign in, right-click on **Network** icon (lower right corner of the desktop) and click **Network and Internet Settings** from the context menu.



9. The **Settings** window opens, scroll down and click on **Change adaptor options**.

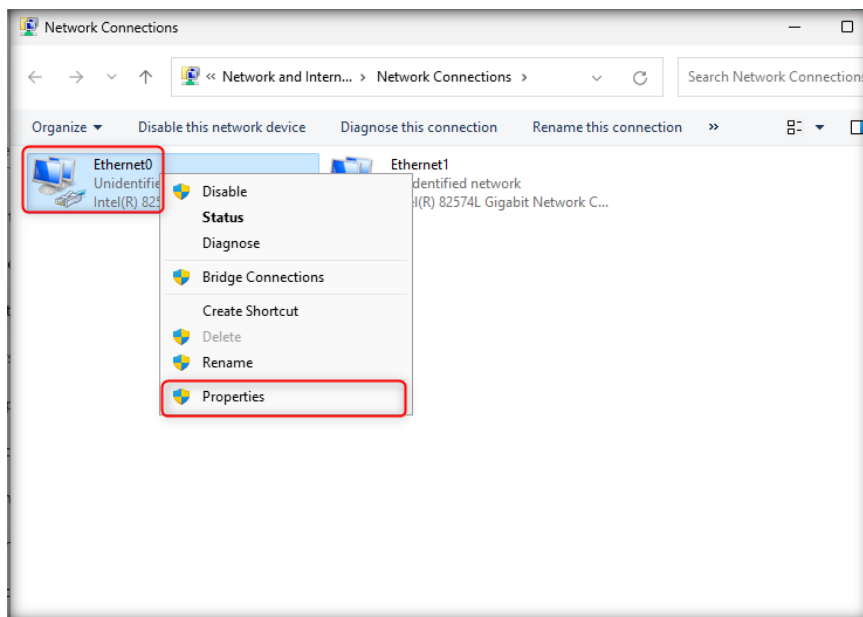


10. The **Advanced network settings** page appears; scroll down and click on **More network adapter options**.

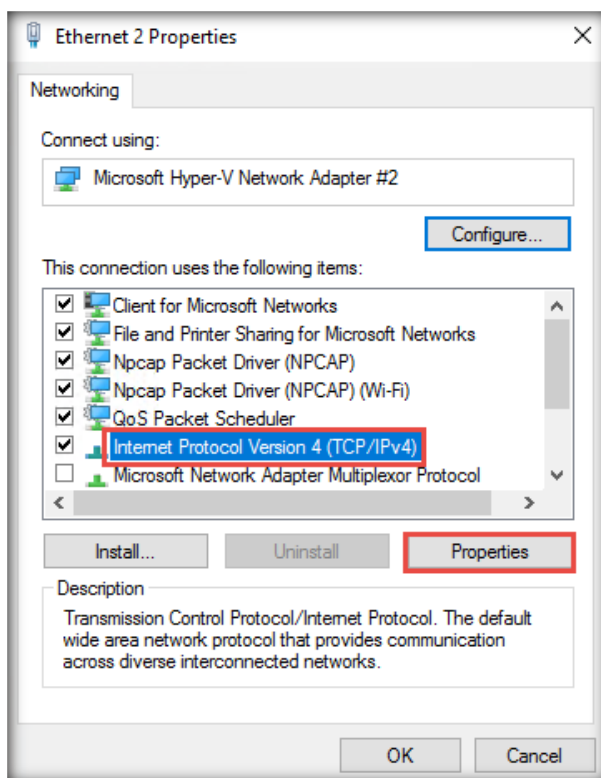


11. Network Connections window opens, we have added two hardware virtual switch, so there are two adaptors will be visible here, choose first one (here Ethernet 0 in your case switch number is different) right-click on **Ethernet 0** switch, select **Properties** from the context menu.

Note: The Name of Unidentified network may vary.



12. Ethernet adapter Properties window appears; and select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.



13. Select **Use the following IP address** and **Use the following DNS server addresses** radio buttons, and type the following values as shown in the screenshot and click **OK**.

- a. IP address: **20.20.10.10**
- b. Subnet mask: **255.255.255.0**
- c. Default gateway: **20.20.10.53**
- d. Preferred DNS server: **20.20.10.19**
- e. Alternate DNS server: **8.8.8.8**

Note: Once you click on **OK** button if Networks section appears on the right side of the desktop screen, and then click **Yes**.

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 20 . 20 . 10 . 10

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 20 . 20 . 10 . 53

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 20 . 20 . 10 . 19

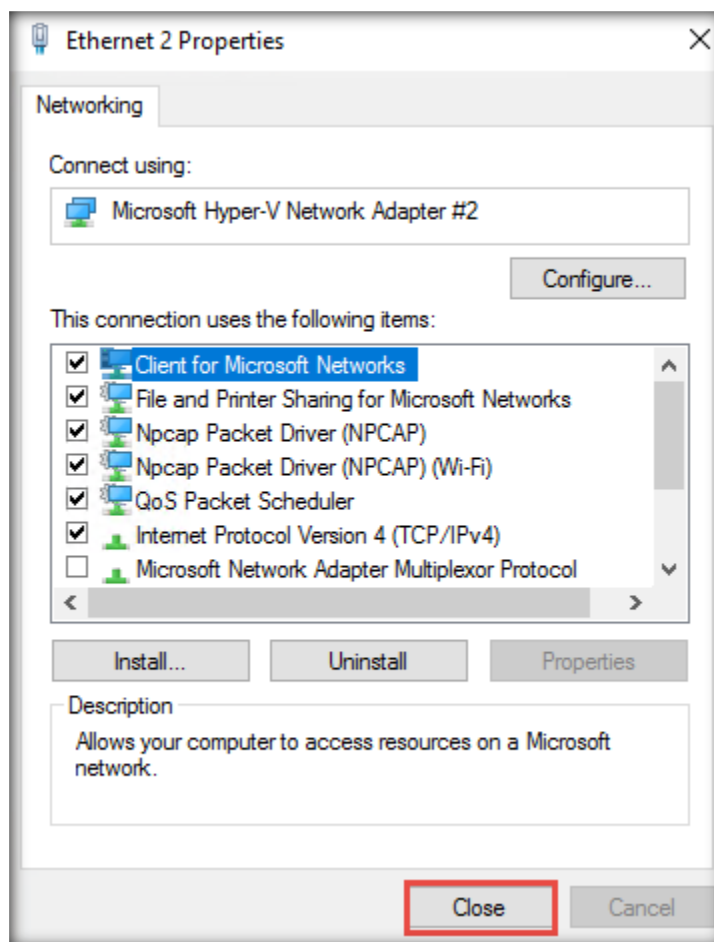
Alternate DNS server: 8 . 8 . 8 . 8

☐ Validate settings upon exit

Advanced...

OK Cancel

14. Click **Close** to close the Ethernet Properties window.



15. Now, check whether Finance-Dept is installed and working properly.

Note: Map CND-Tools folder to finance dept following **CT#9.8**

CT#10.4: Installing Adobe Acrobat Reader

1. Navigate to Z:\CND-Tools\Lab Prerequisites\Adobe Reader folder
2. Alternatively, you may download the latest version of Adobe Reader Adobe website
3. Double-click .exe to begin the installation
4. Follow wizard-driven installation steps and complete the install by choosing default options throughout the installation process

CT#10.5: Installing WinRAR

1. Navigate to Z:\CND-Tools\Lab Prerequisites\WinRAR folder
2. Alternatively, you can also download the latest version of WinRAR from Vendor
3. Double click on .exe to begin the installation
4. WinRAR setup window appears
5. In the WinRAR 5.10 setup window, click Install

6. Complete the install by choosing defaults throughout the installation process
7. After completing the installation, the installation location of WinRAR files window opens automatically
8. Close the window

CT#10.6: Installing Web Browsers

1. Navigate to Z:\CND-Tools\Lab Prerequisites in guest operating systems
2. Open Web Browsers folder
3. Follow wizard-driven installation steps and install Firefox and Chrome web browsers
4. You can also download latest version of web browsers from respective vendors

CT#10.7: Installing Notepad++

1. Navigate to Z:\CND-Tools\Lab Prerequisites in guest operating systems
2. Open Notepad++ folder and double-click .exe file
3. Follow the wizard-driven installation steps, to install Notepad++
4. You can also download latest version of Notepad++ from its vendor site

CT#10.8: Enabling Remote Desktop Connection

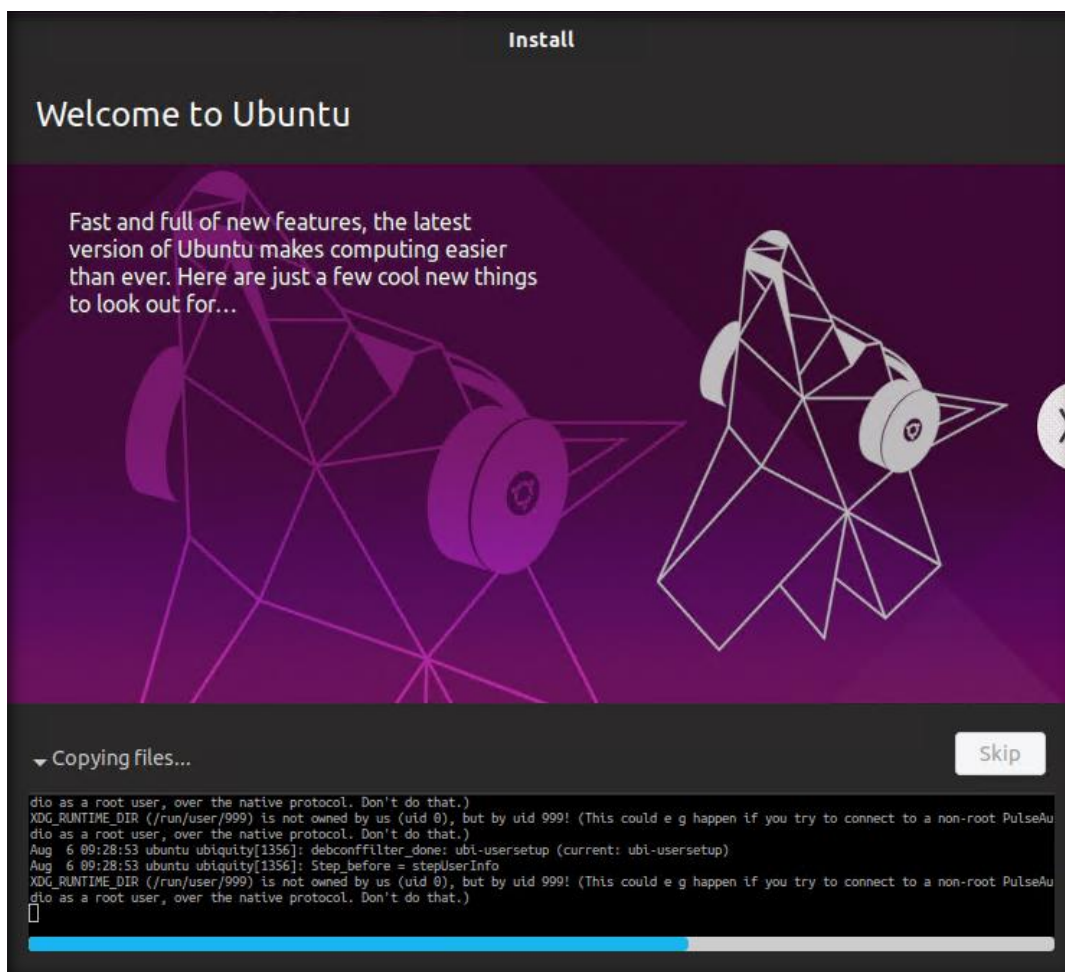
1. Navigate to **Settings > System > Remote Desktop** and toggle the “Enable Remote Desktop” button to ON.

CT#11: Configuring Ubuntu Linux Guest OS as Operation Dept

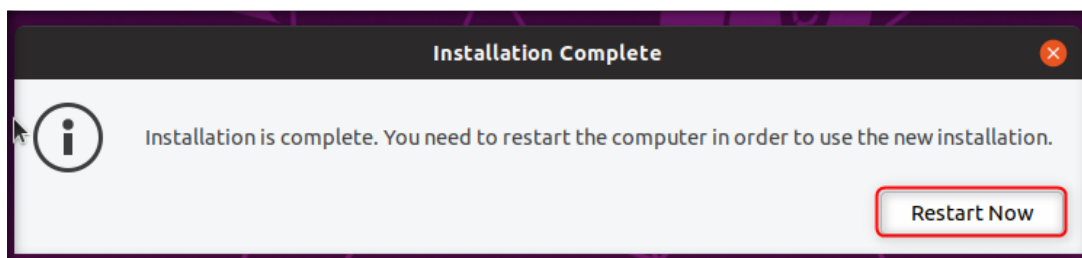
CT#11.1: Installing Ubuntu Linux as Operation Dept

1. Click on **Operation Dept** virtual machine in VMware Workstation and click **Power on this virtual machine**.
2. Ubuntu virtual machine starts booting with the provided source. Choose preferred language on the left hand-side and click **Install Ubuntu** in the Welcome screen.
3. Preparing to install Ubuntu wizard appears, check the check box as shown in the screenshot and click **Continue**.
4. Leave default selection of keyboard layout and click **continue**.
5. Select **Normal Installation** option and click **Continue**.
6. In Installation type, choose **Erase disk and install Ubuntu** radio button and click **Install Now**
7. Write the changes to disks pop-up appears, click Continue
8. Where are you screen appears, choose the location or leave the settings to default and click Continue
9. Keyboard layout screen appears, leave the settings to default and click Continue

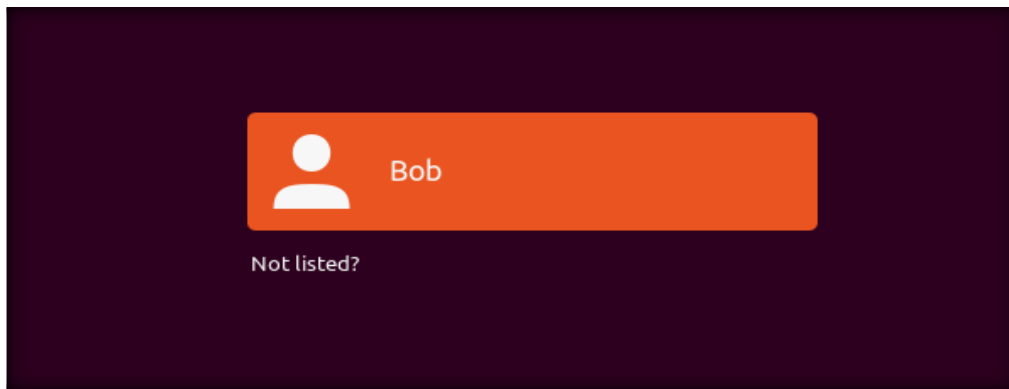
10. Who are you screen appears, type **Bob** in Your name field. The corresponding fields Your computer's name and Pick a username are auto filled. Type **user@123** in Choose a password and Confirm your password fields and click **Continue**
11. Ubuntu installation will start, wait till you get the Ubuntu login screen as shown the screenshot below:



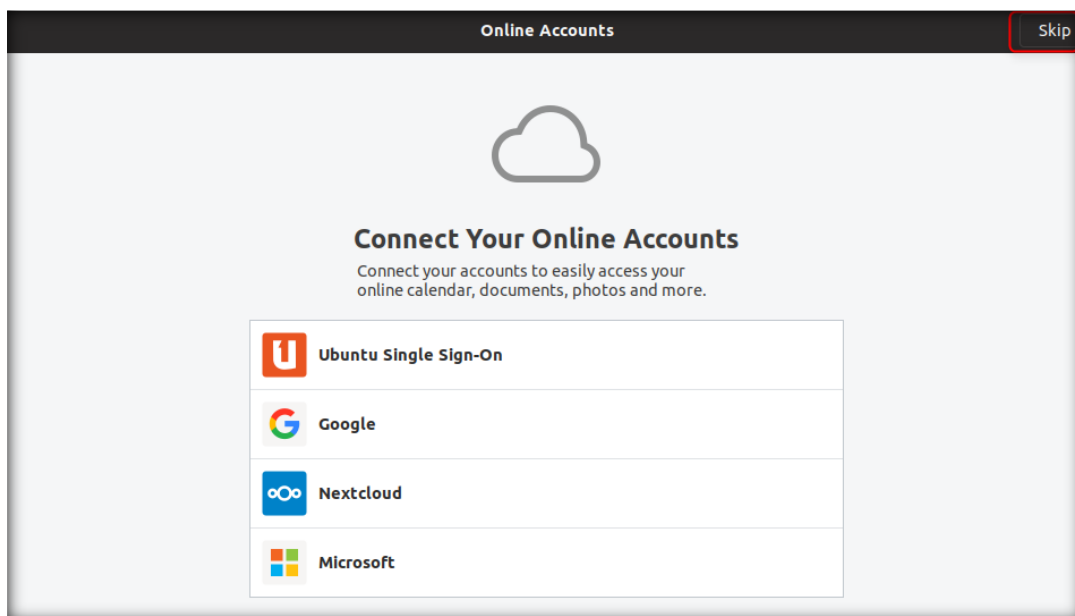
12. Click **Restart Now** button, once the installation is completed. Login screen appears, type **user@123** in the Password field and press **Enter**.



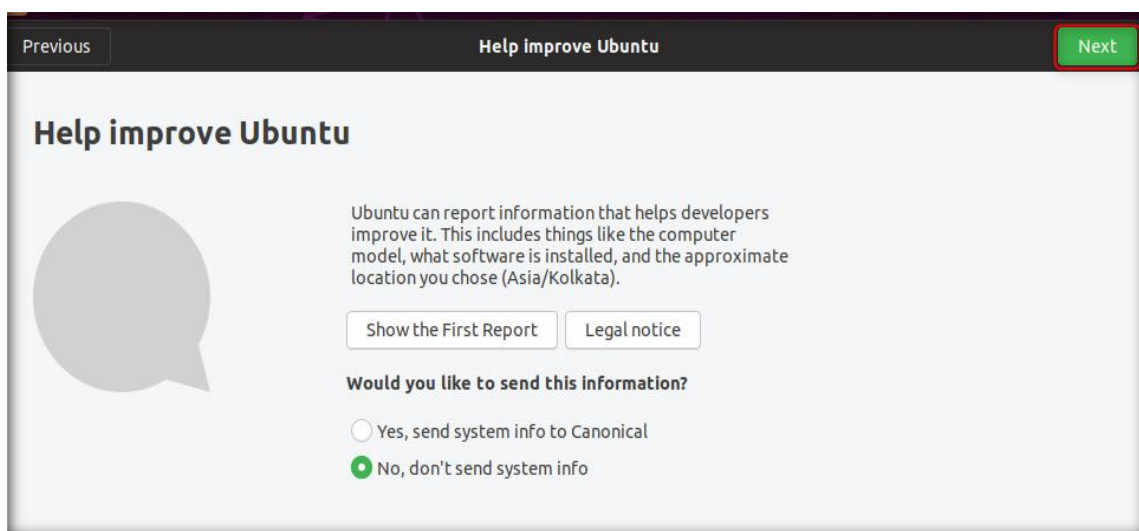
13. If Keyboard Shortcuts pop-up appears click **Close**.



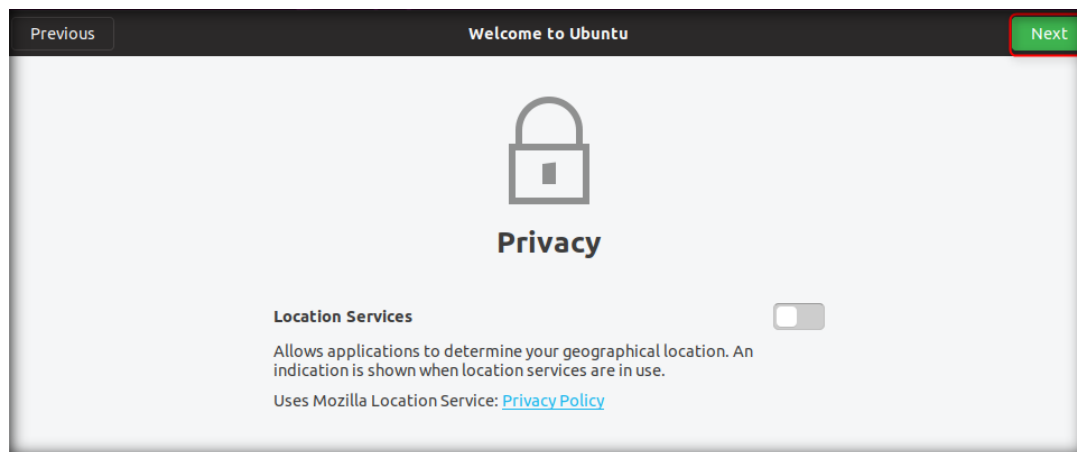
14. Once Successful login you will see Online Accounts window, click **Skip**.



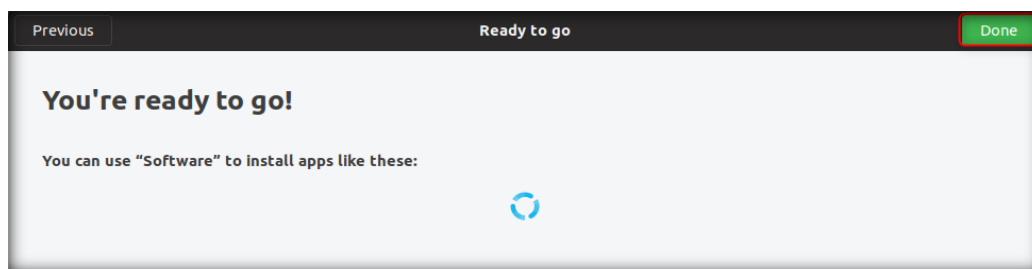
15. Click Next on **Help improve Ubuntu** window.



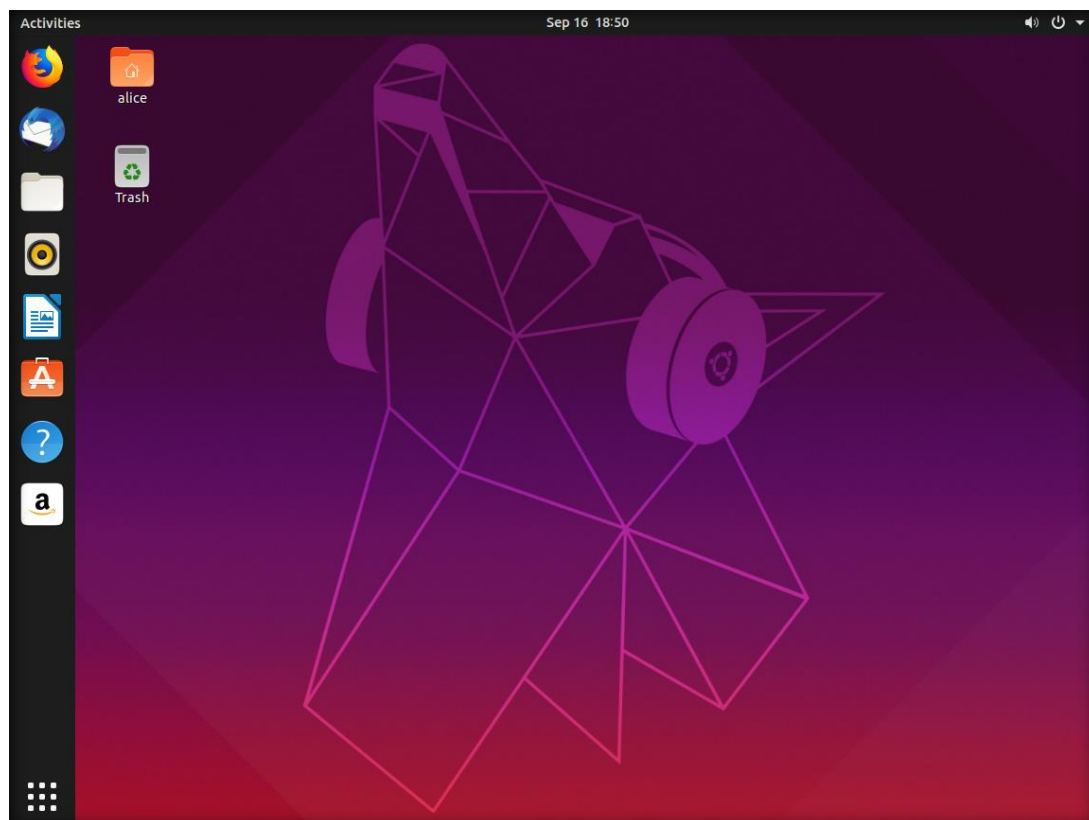
16. Click **Next** on **welcome to ubuntu** window.



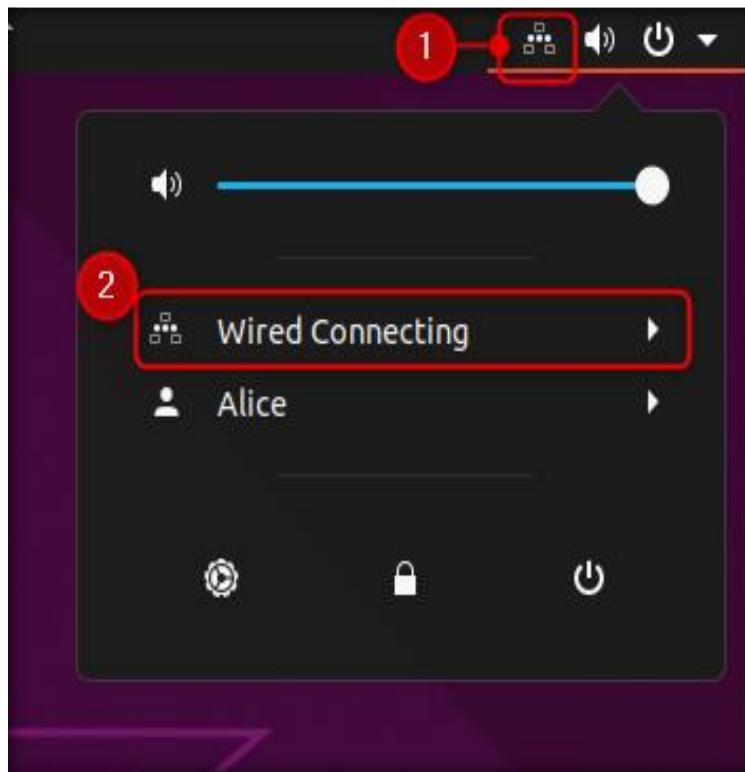
17. Click **Done** on Ready to go window to continue with Ubuntu.



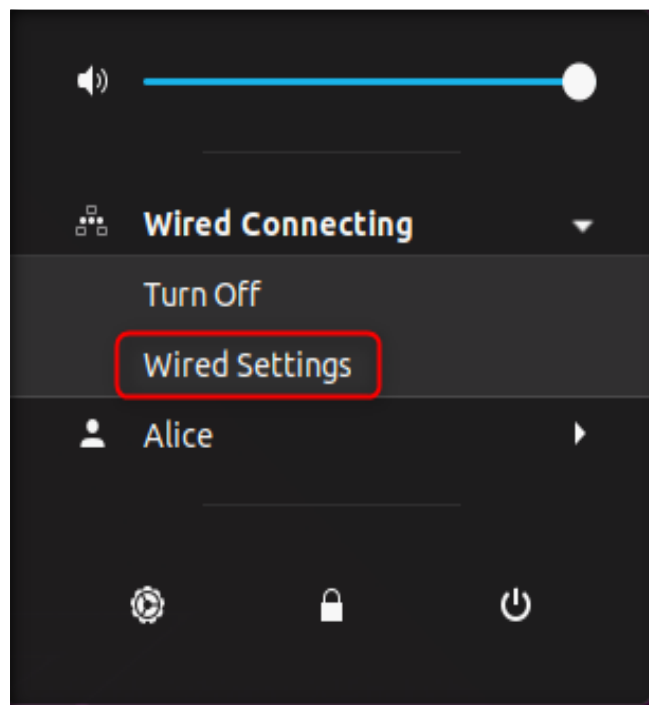
18. Once Successful login you will see desktop as shown in following screenshot.



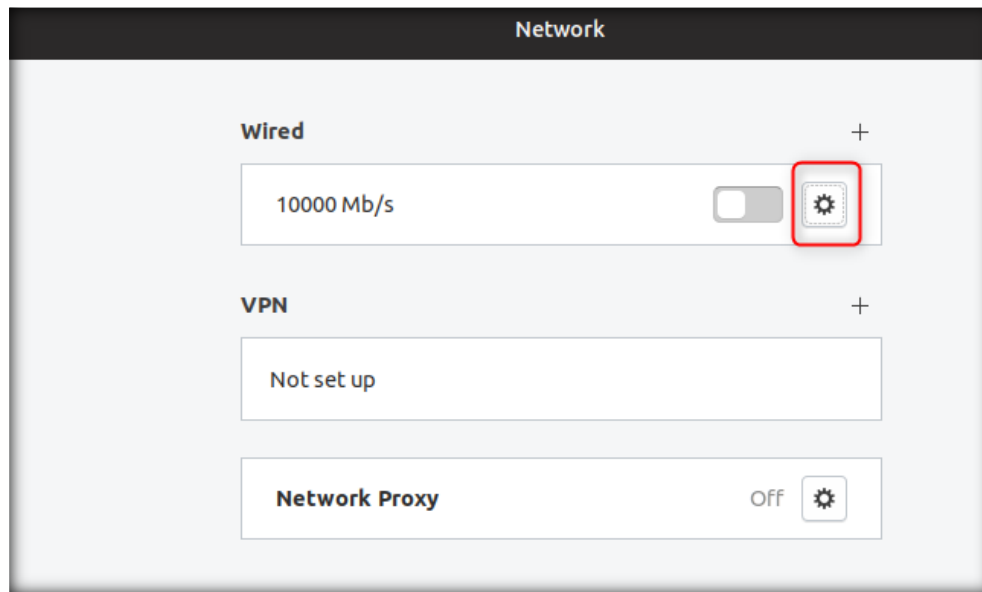
19. Login with user name as **Alice** and password as user@123.
20. Navigate to Wired Connection icon from right upper side corner of desktop and select **Wired connecting**.



21. **Wired Connecting** option will expand select **Wired Settings**.



22. Network window will open, click setting icon as shown in following screenshot.

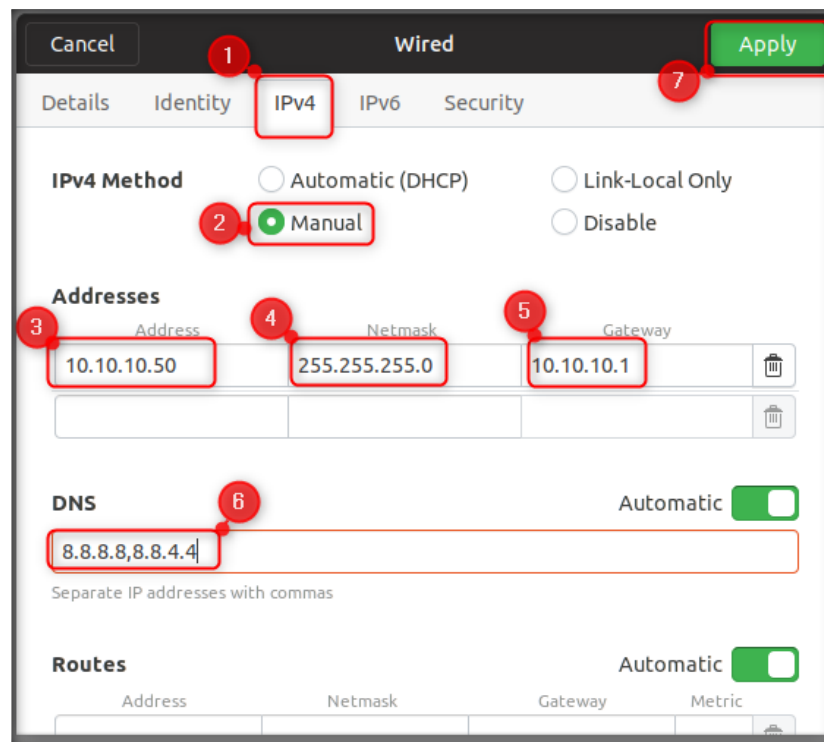


23. **Wired** window will open select **IPv4** tab check manual radio button and enter following details in **Address** section.

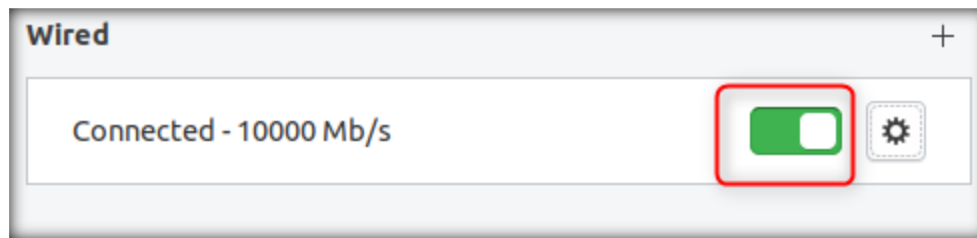
Address: 10.10.10.50

Netmask: 255.255.255.0

Gateway: 10.10.10.1



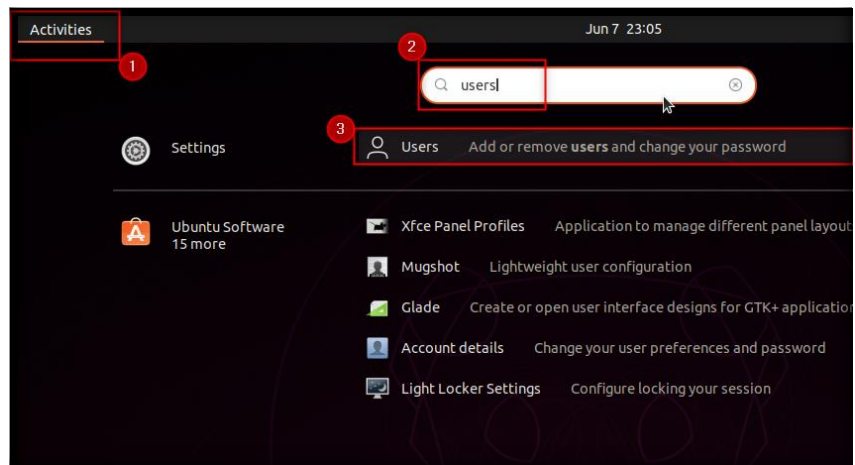
24. Click **toggle** button **off/on** to refresh the network connection as shown in following screenshot.



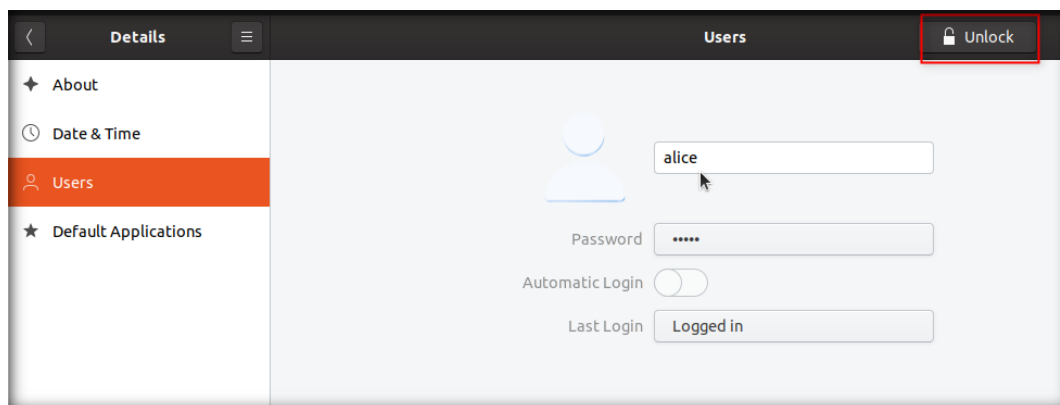
25. Close **Network** window.

CT#11.2: Add User to Operation Dept

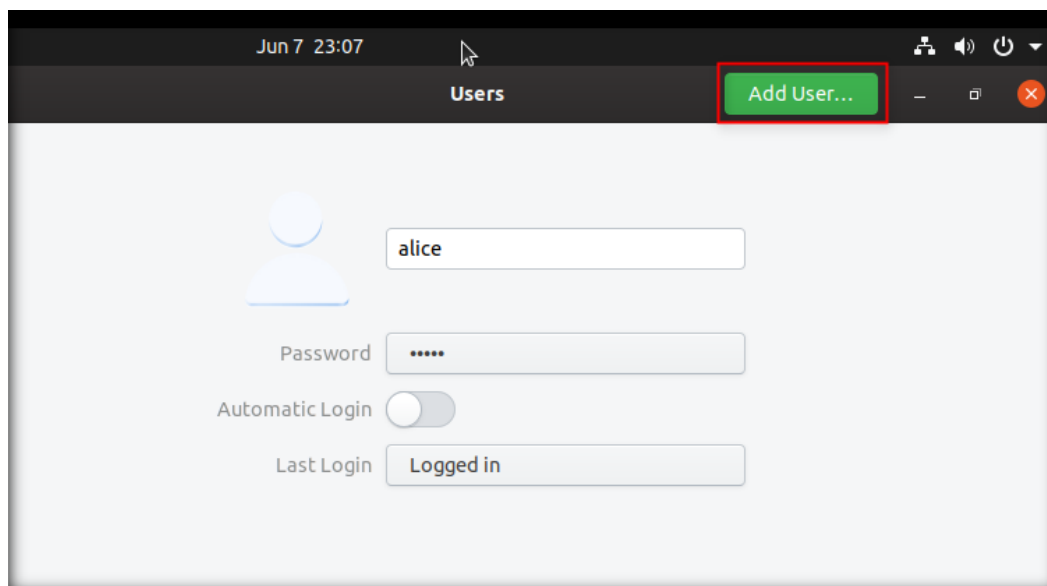
1. Click on **Activities** in the left corner of the desktop; type user in the search box and select Users.



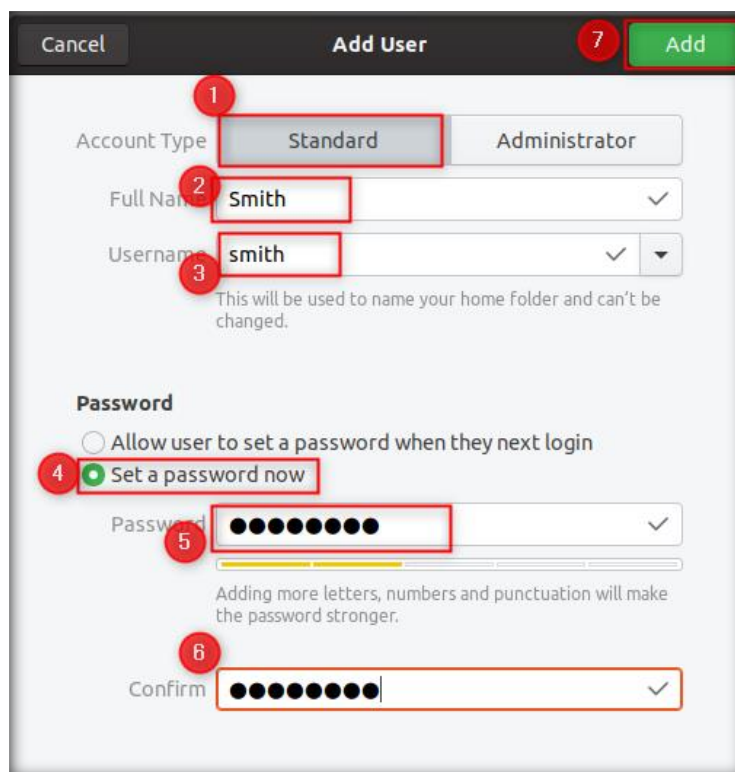
2. The Users panel opens; click **Unlock** button.



3. The Authentication required pop-up appears. Once you type the password **user@123**, the **Unlock** button turns to **Add User...**

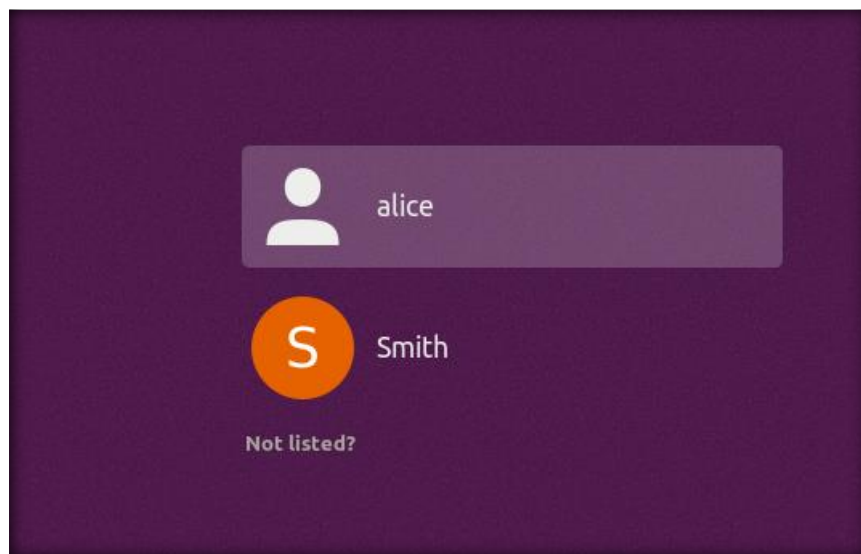


4. Click on Add User to open the panel and select Account type as **Standard** with user full name **Smith** and username **smith**. Select **Set a password now** and type user@123. Then, click **Add**.

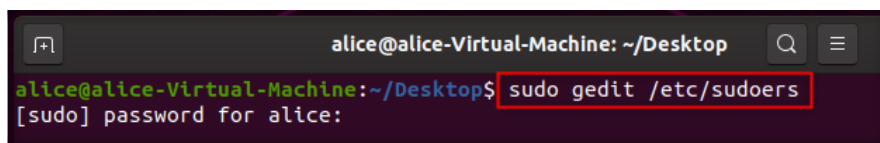


5. Once you click Add, the user Smith will be created.

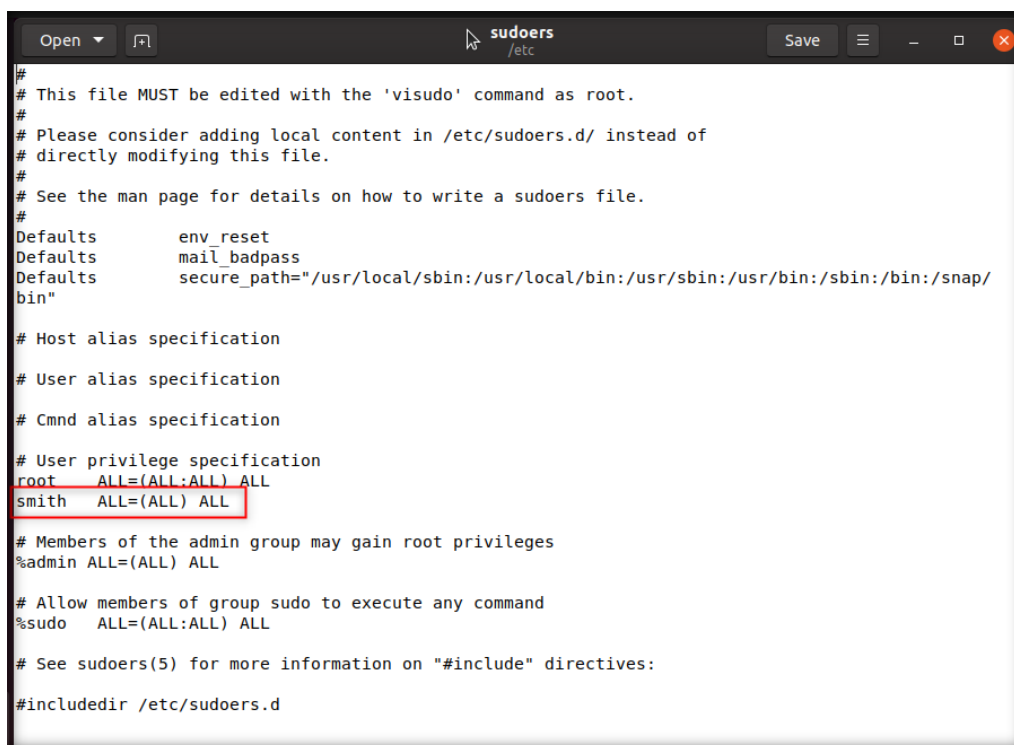
6. Now log in as user Alice.



7. Open the terminal and type **sudo gedit /etc/sudoers** and press **Enter**. If you encounter a password prompt, type **user@123**.



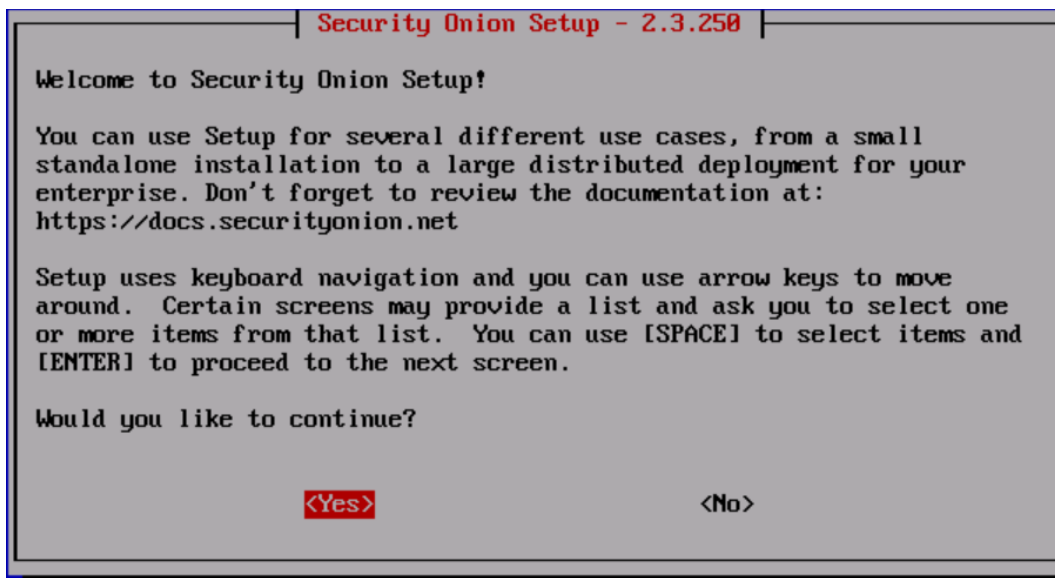
8. The sudors file opens in gedit; add the following line in the file and click Save.



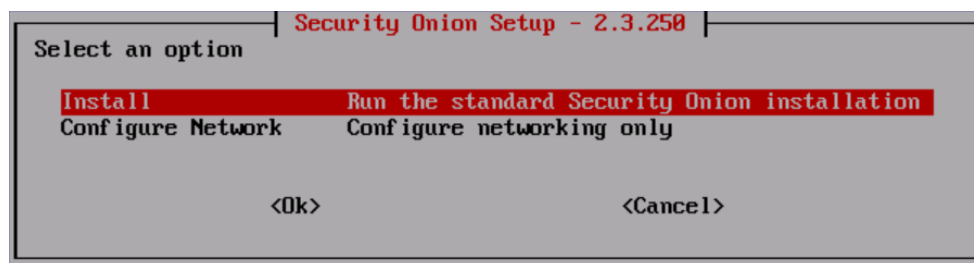
CT#12: Configuring Security Onion Guest OS as Admin Machine-2

CT#12.1: Installing Security Onion as Admin Machine-2

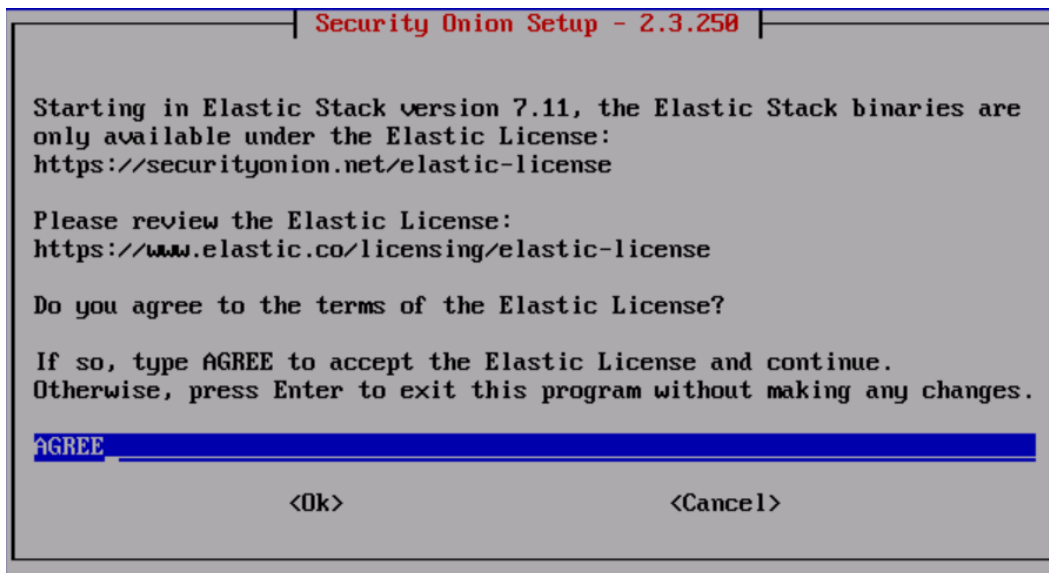
1. Launch VMWare and **Power on Admin Machine-2** virtual machine virtual machine profile in VMware Workstation.
2. The security Onion setup starts click **Yes**.



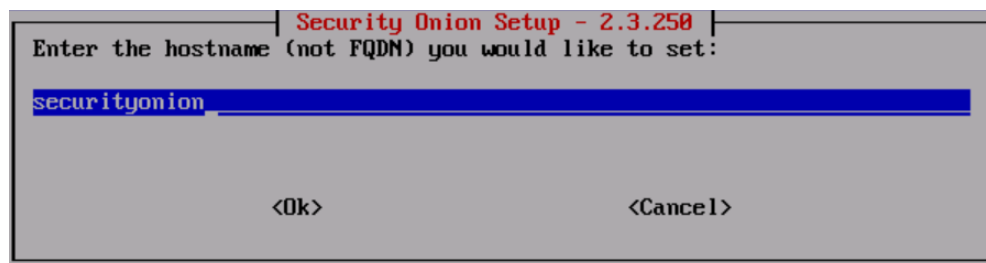
3. Select Install option in the setup window and click **Ok**.



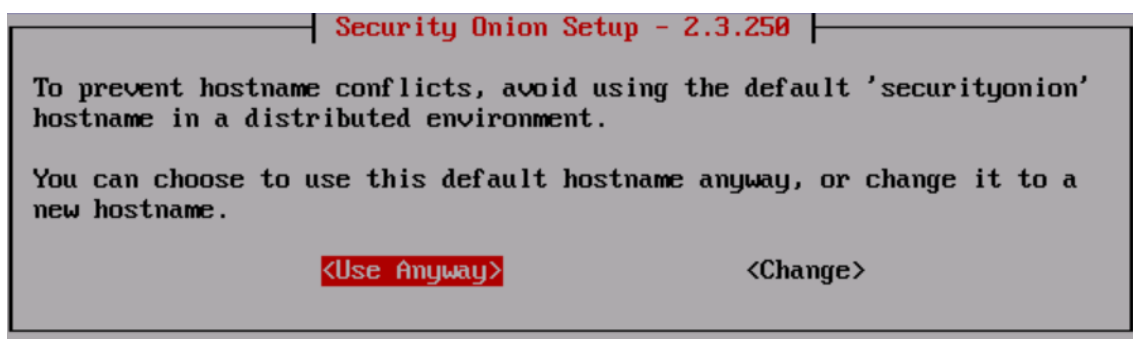
4. Type AGREE in the setup window and click **Ok**.



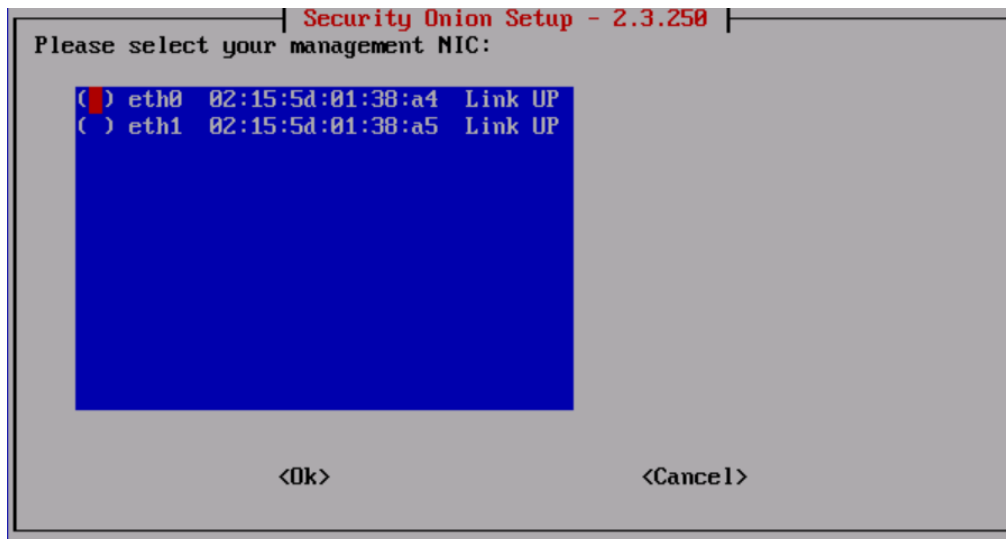
5. Enter securityonion as host name and click **Ok**.



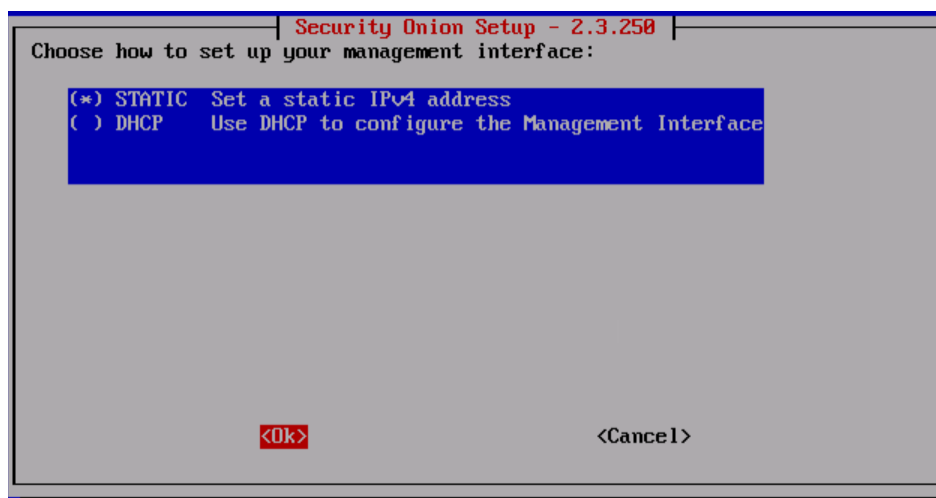
6. Select **Use Anyway** in the setup window to proceed.



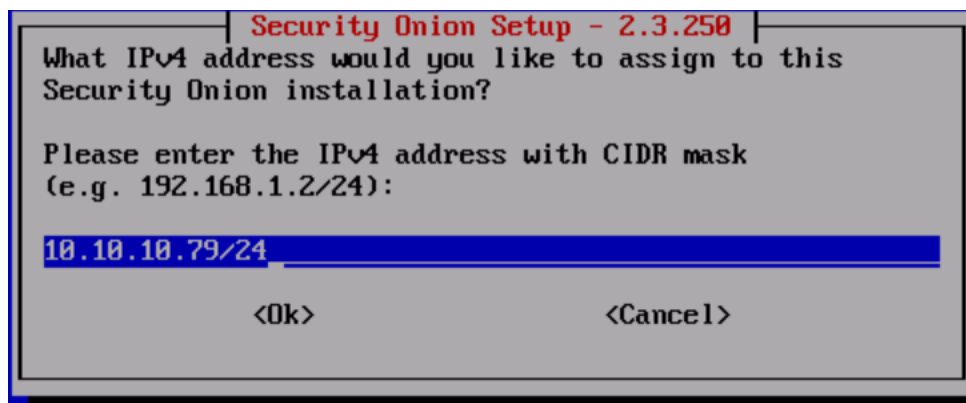
7. Setup prompts for selecting the management NIC Select **eth0**



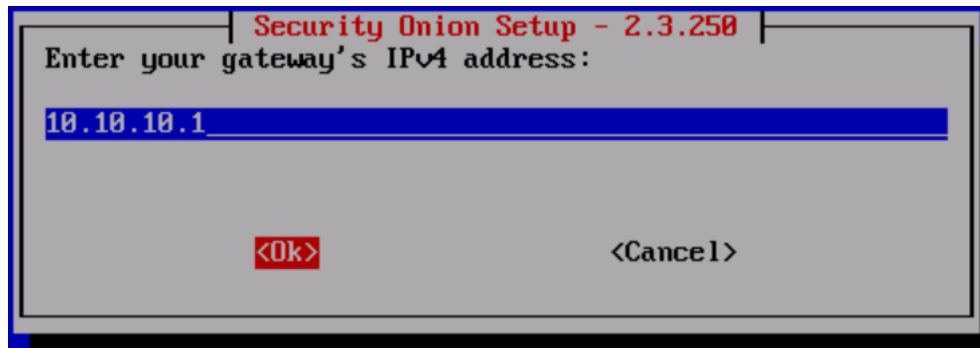
8. Setup prompts for selecting the management NIC Select **eth0**



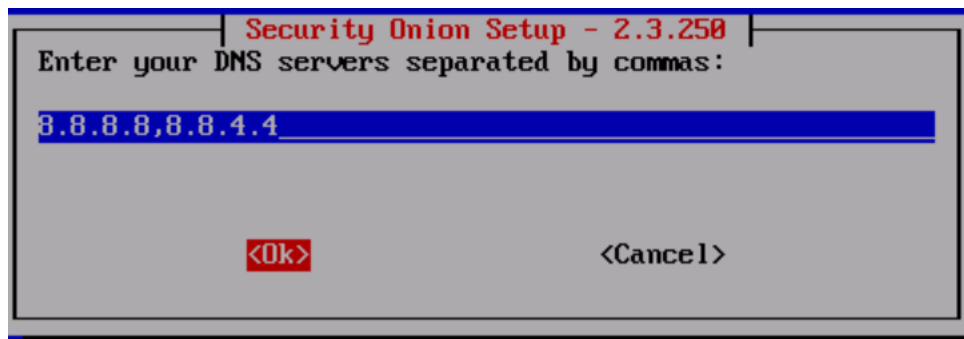
9. Type 10.10.10.79/24 as IPv4 address for security Onion installation



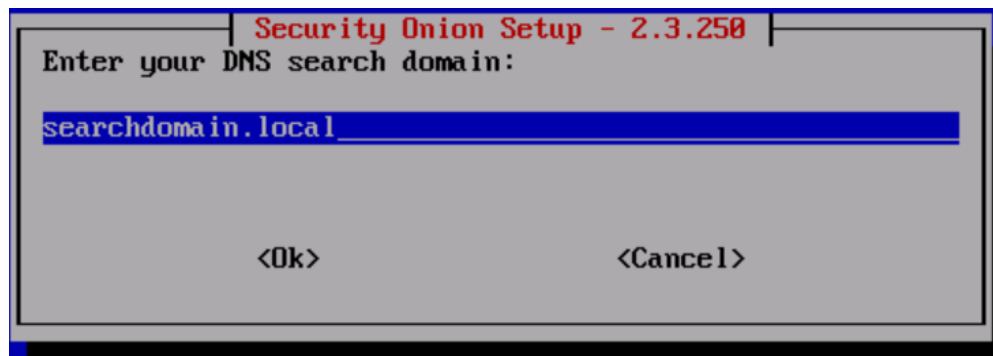
10. Type **10.10.10.1** as gateway's IPv4 address.



11. Type **8.8.8.8,8.8.4.4** as DNS servers separated by commas.



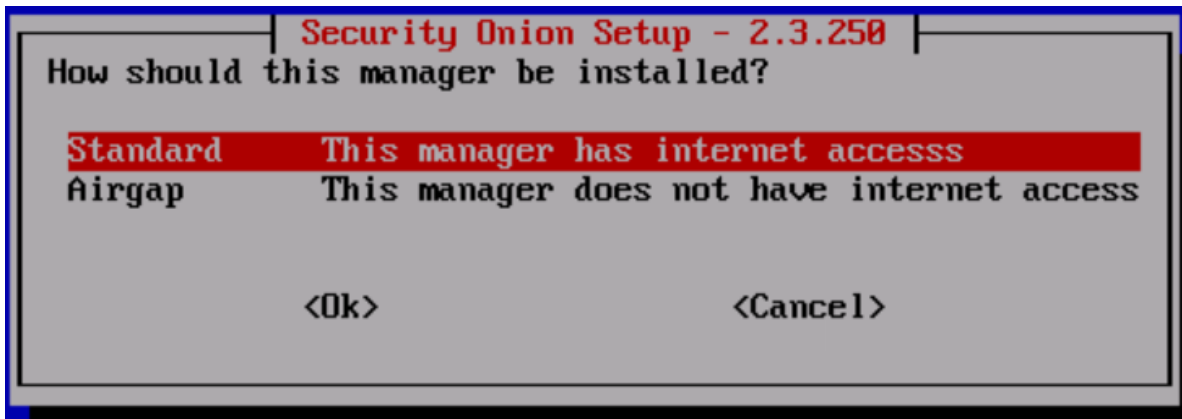
12. Leave default DNS search domain and click **Ok**.



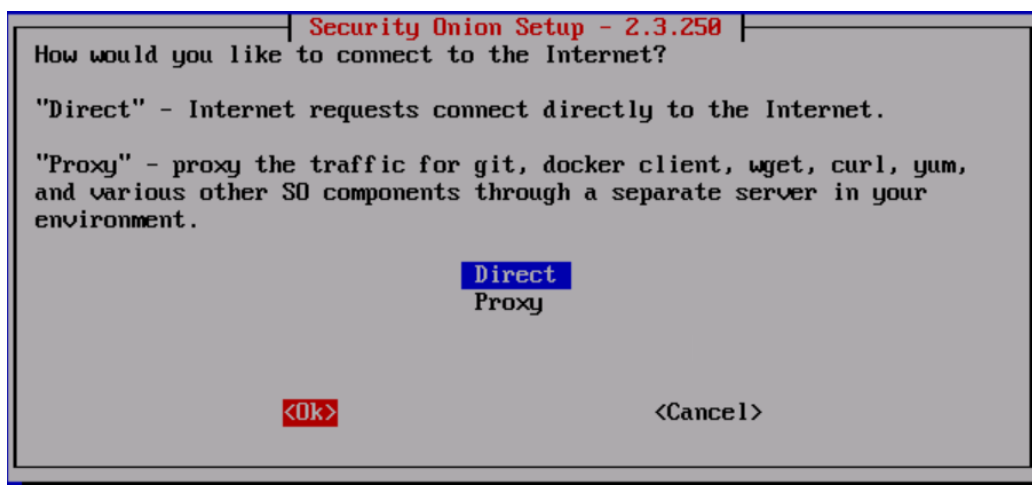
13. Select **Ok** to proceed with the installation.



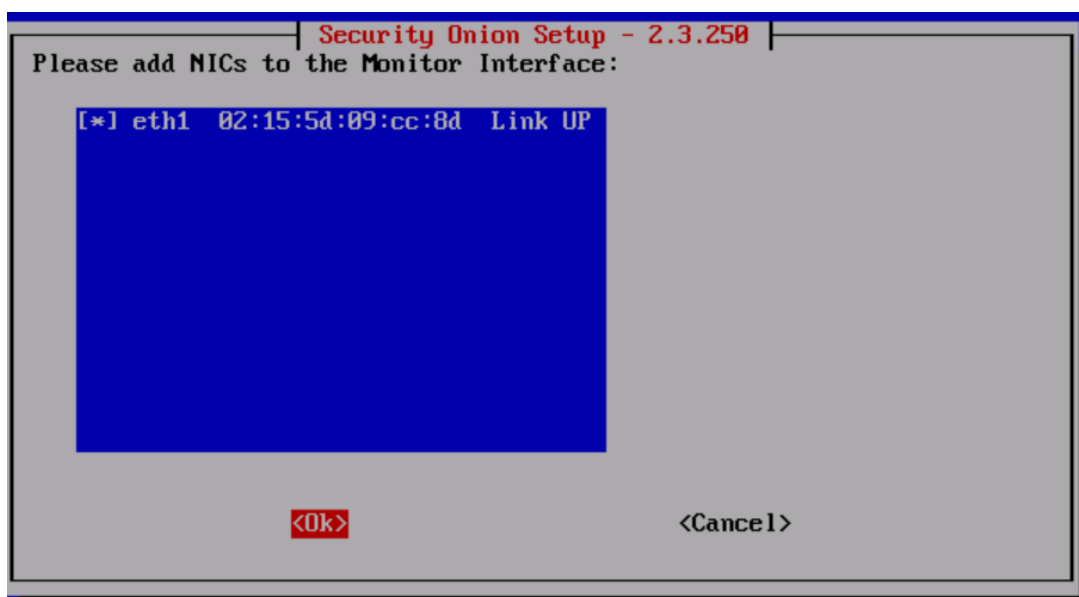
14. Select **Standard** for **How should this manager be installed?** and click **Ok**.



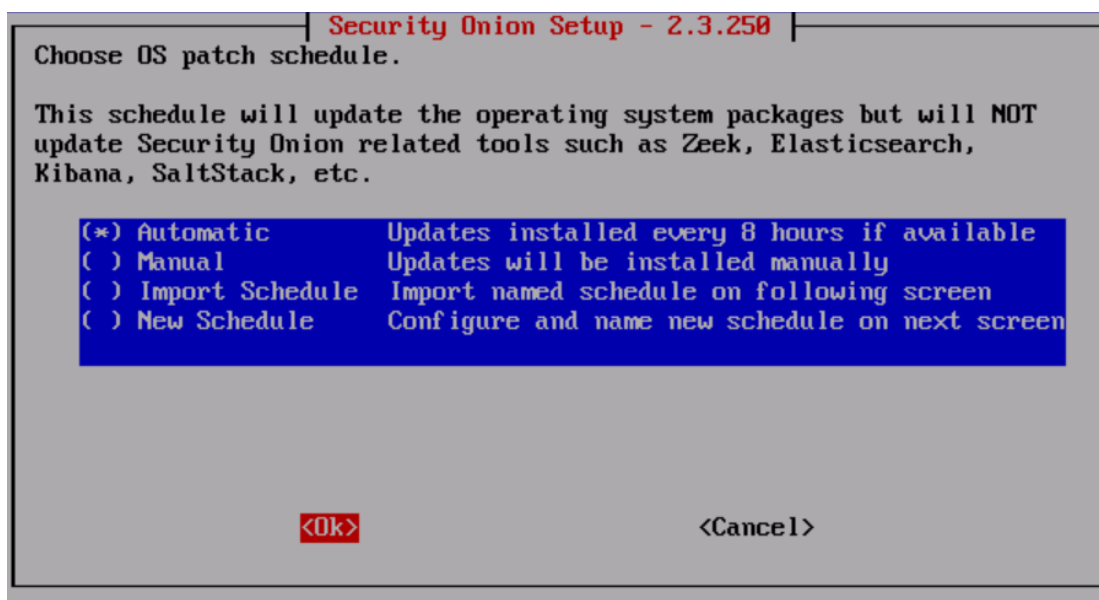
15. Select **Direct** as **How would you like to connect to internet?** To connect directly to the internet and click **Ok**.



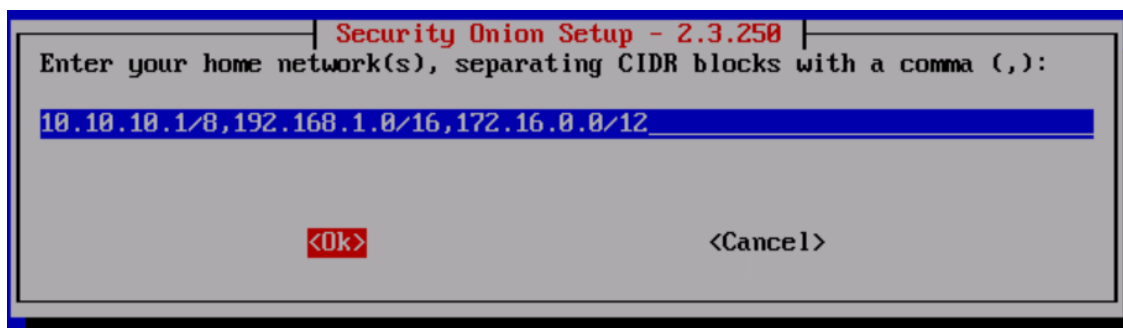
16. Select **eth1** as monitoring interface and click **Ok**.



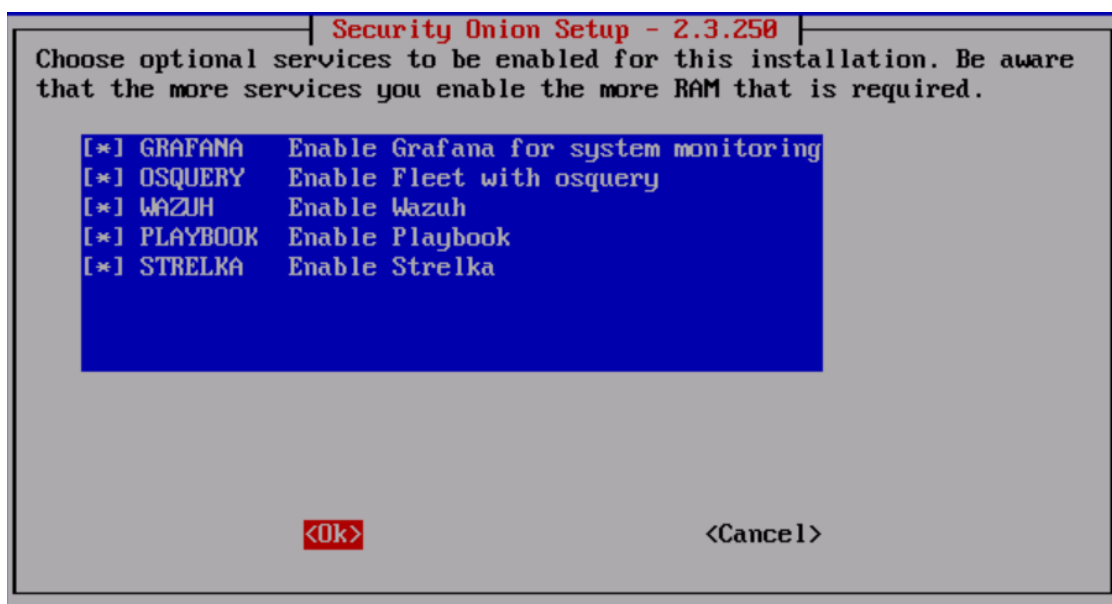
17. In **Choose OS patch schedule** select Automatic and click **Ok**.



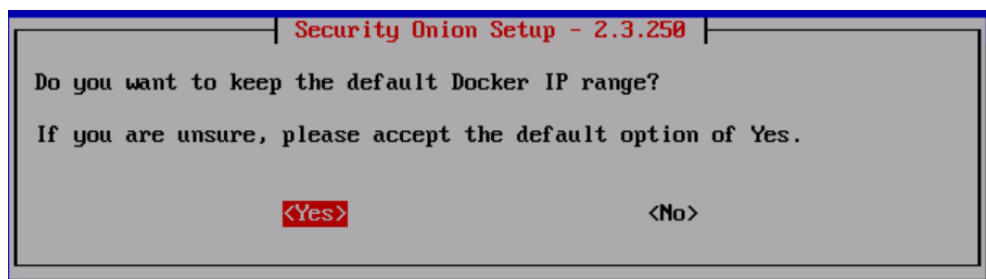
18. Enter 10.10.10.1/8, 192.168.1.0/16, 172.16.0.0/12 and click **Ok**.



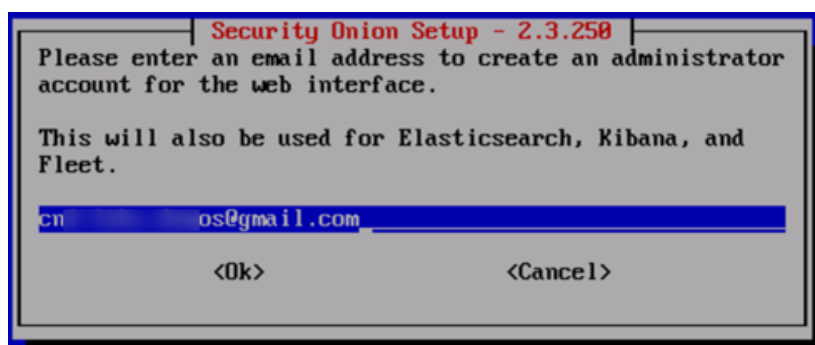
19. Select all the optional services to be enabled and click **Ok**.



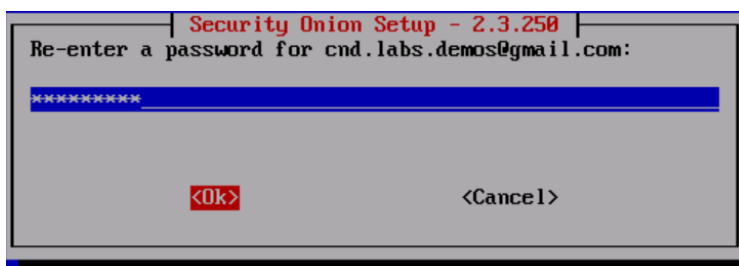
20. Select **Yes** for **Do you want to keep the default Docker IP range?**



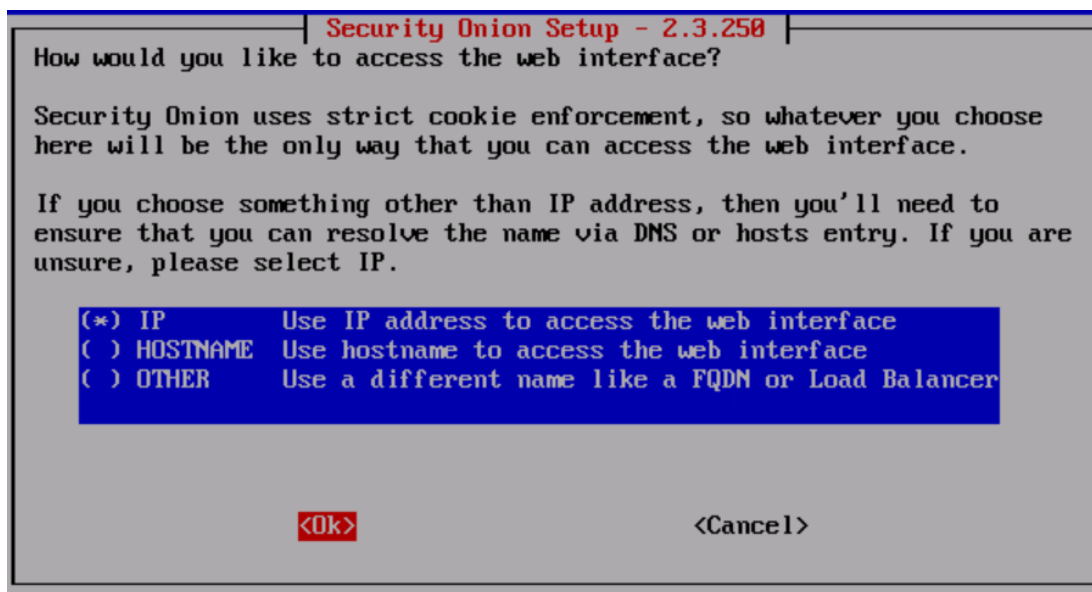
21. Type the email address for the administrator account for the web interface.



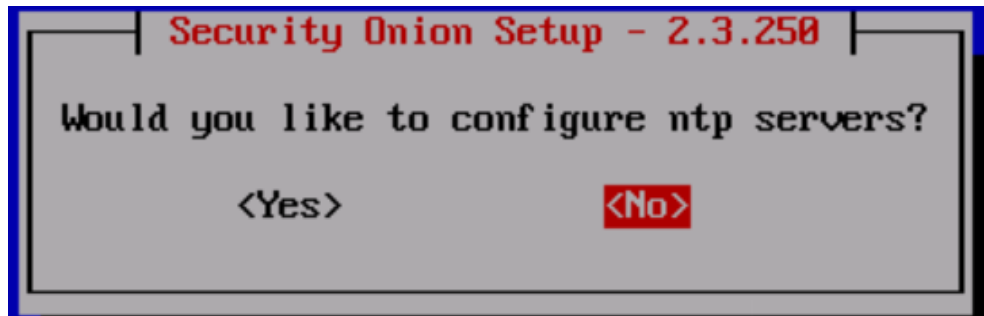
22. Enter and re-enter the password for the administrator account email address.



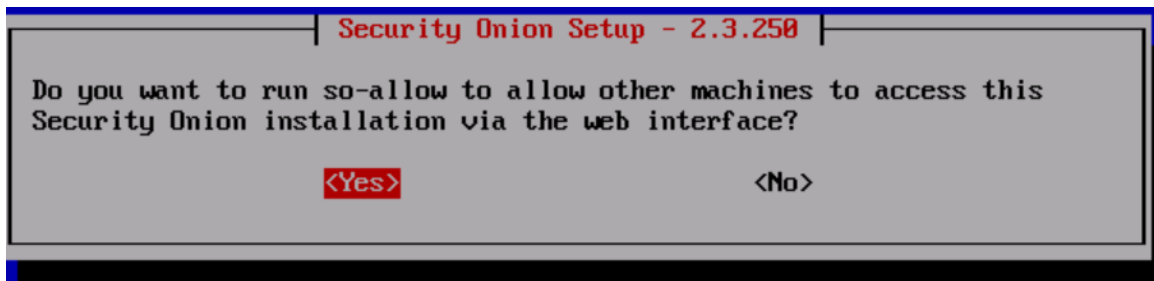
23. Select **IP** option to access the web interface.



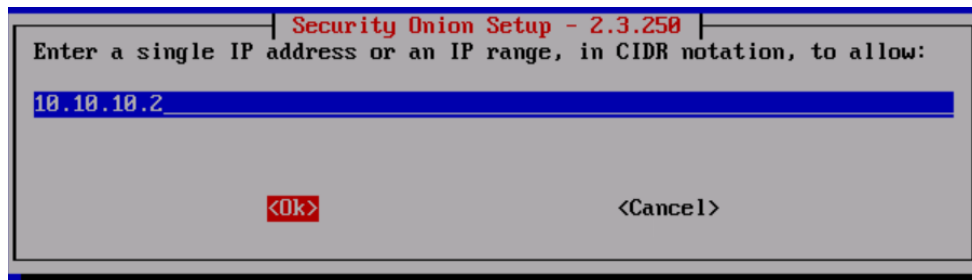
24. Select **No** for configuring ntp servers



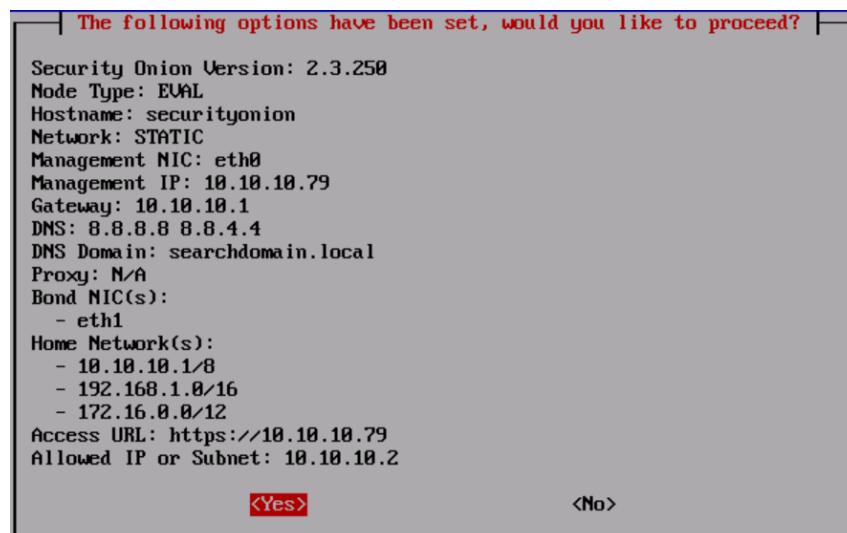
25. Select **Yes** to run so-allow to allow other machines to access security Onion via web interface



26. Type 10.10.10.2 as Ip address to allow web access to Admin Machine.



27. Click Yes in the Installation summary window to proceed with Security Onion installation.



CT#12.2: Configuring Security Onion as Admin Machine-2

1. Once the Security Onion is installed successfully, login screen appears. Login as **Sam** give password as **admin@123** and press **Enter**

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1160.90.1.el7.x86_64 on an x86_64

securityonion login: sam
Password:
Last login: Thu Jan  4 07:41:22 on tty1

Access the Security Onion web interface at https://10.10.10.79
(You may need to run so-allow first if you haven't yet)

[sam@securityonion ~]$ sudo su
[sudo] password for sam: _
```

2. Type **Sudo Su** and press **Enter** when asked for password enter **admin@123** and press **Enter**.

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1160.90.1.el7.x86_64 on an x86_64

securityonion login: sam
Password:
Last login: Thu Jan  4 07:41:22 on tty1

Access the Security Onion web interface at https://10.10.10.79
(You may need to run so-allow first if you haven't yet)

[sam@securityonion ~]$ sudo su
[sudo] password for sam:
```

3. Type **so-allow** to allow roles for the IP. Type **a** and press **Enter**, for **Please enter your selection**.

```
[root@securityonion sam]# so-allow

Choose the role for the IP or Range you would like to allow

[a] - Analyst - 80/tcp, 443/tcp
[b] - Logstash Beat - 5044/tcp
[e] - Elasticsearch REST API - 9200/tcp
[f] - Strelka frontend - 57314/tcp
[o] - Osquery endpoint - 8090/tcp
[s] - Syslog device - 514/tcp/udp
[w] - Wazuh agent - 1514/tcp/udp
[p] - Wazuh API - 55000/tcp
[r] - Wazuh registration service - 1515/tcp

Please enter your selection: a_
```

4. Type **so-allow** and allow with **b,e,w,p** and **r** options for **10.10.10.2**

5. Type so-allow and allow with w,p and r options for 10.10.10.16

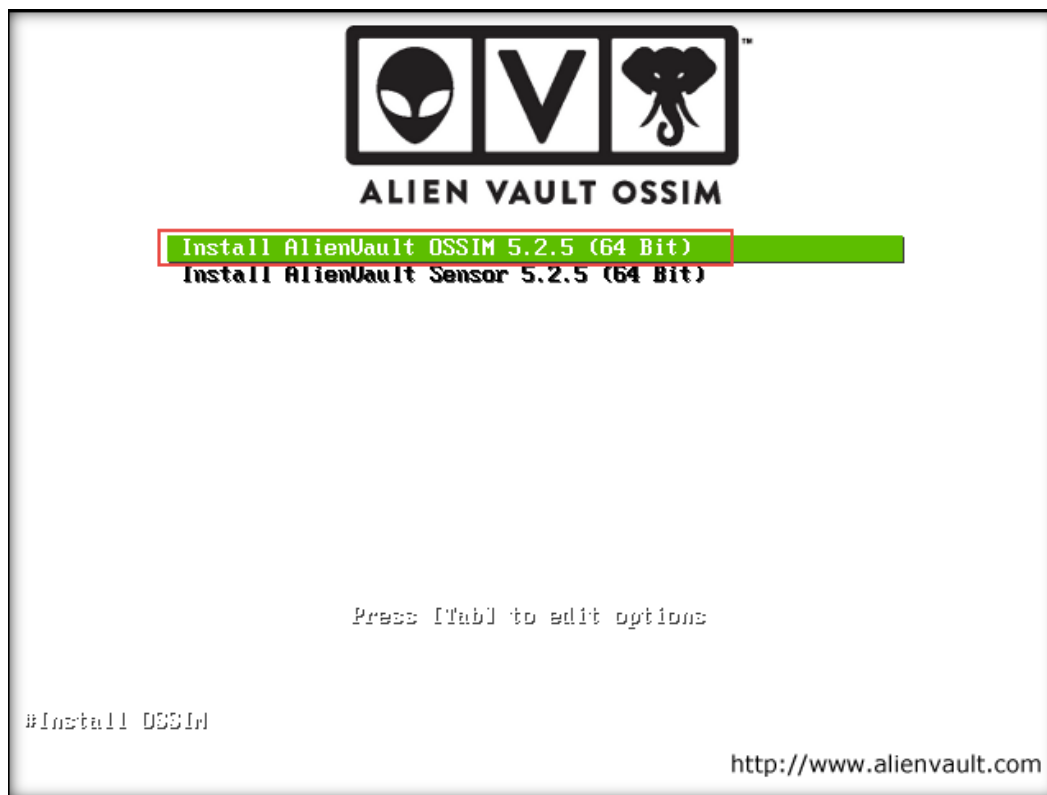
CT#13: Configuring OSSIM Server Guest OS as OSSIM Server

CT#13.1: Installing OSSIM Server

It is recommended that you have a system with at least 16 GB of RAM. Before starting installation of OSSIM virtual machine, ensure that you have set RAM to 4096 MB, no. of virtual CPU to 4, network interface to Internal and hard disk to 20 GB

6. Launch the OSSIM Server VM. OSSIM virtual machine starts booting with the provided source.
7. ALIEN VAULT OSSIM setup wizard appears, choose AlienVault OSSIM 5.2.5 (64 Bit) option and press Enter.

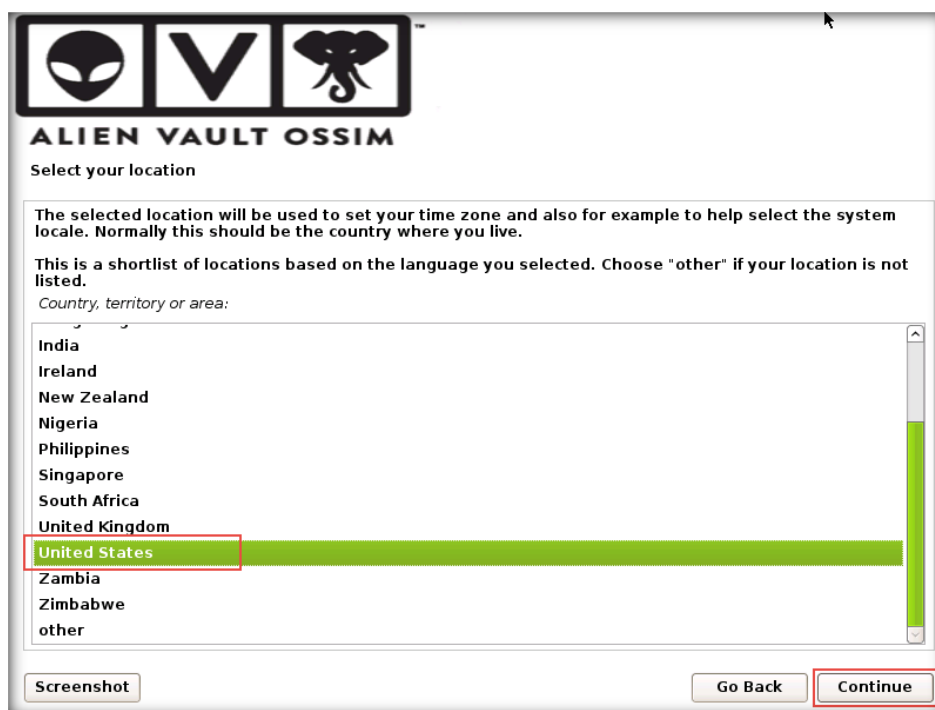
Note: The screenshots might differ if you have downloaded the latest version of AlienVault OSSIM



8. Select a language screen appears. Select your language and click Continue.



9. Select your location screen appears. Select your country and click Continue.



10. Configure the keyboard window appears. Select your preferred language and click Continue.

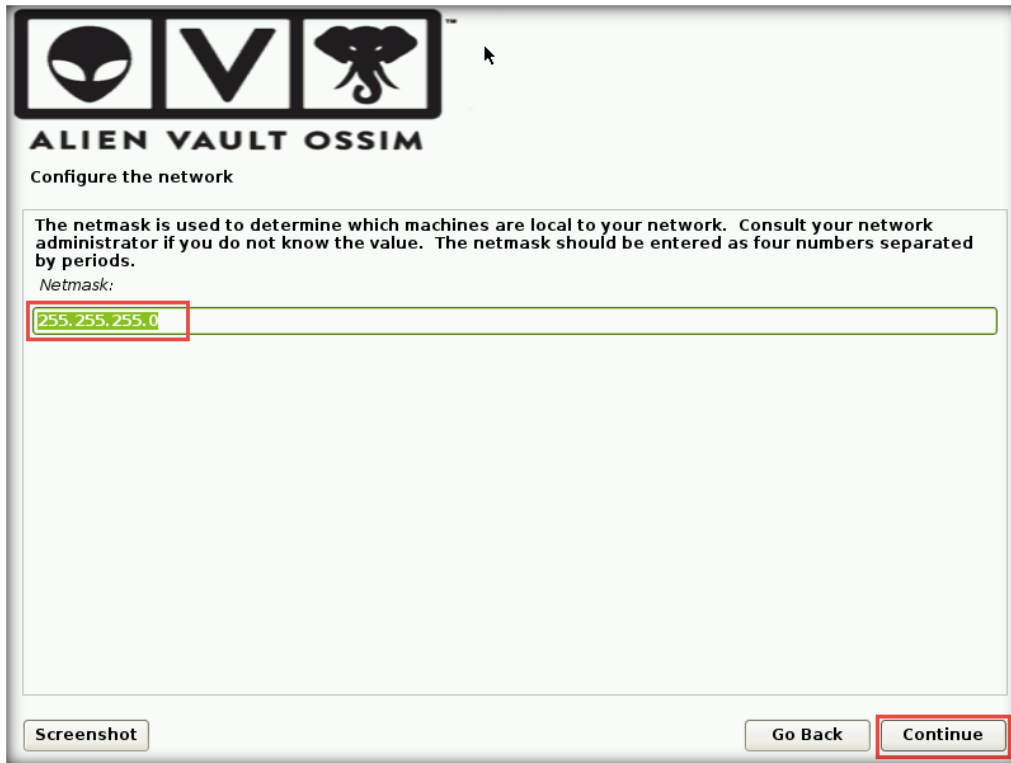


11. Configure the network window appears. Enter 10.10.10.14 in the IP address: field and click Continue.

Note: IP may differ if you have chosen a different IP while configuring OSSIM.

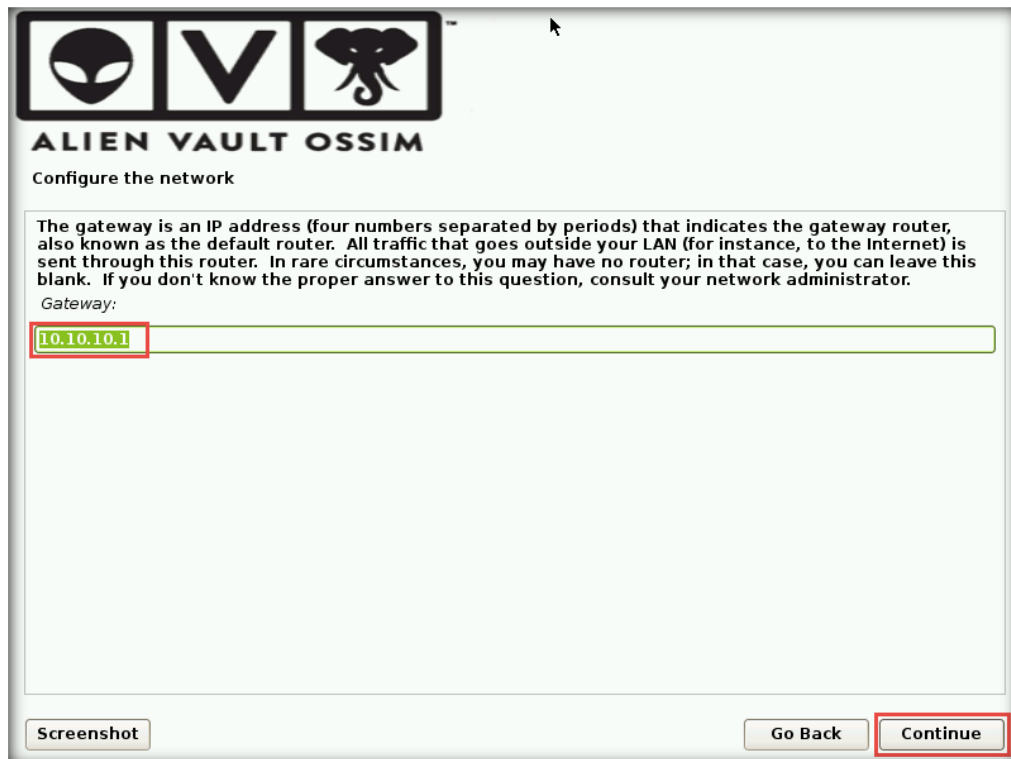


12. Netmask: screen appears. Ensure the mask is set to 255.255.255.0 and click Continue.



The screenshot shows the 'Configure the network' window in Alien Vault OSSIM. At the top is the logo with an alien head, a 'V', and an elephant, followed by the text 'ALIEN VAULT OSSIM'. Below the logo is the title 'Configure the network'. A text box contains instructions: 'The netmask is used to determine which machines are local to your network. Consult your network administrator if you do not know the value. The netmask should be entered as four numbers separated by periods.' Below this, the label 'Netmask:' is followed by a text input field containing '255.255.255.0'. At the bottom are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

13. Gateway: screen appears. Ensure that gateway is set to 10.10.10.1 and click Continue.



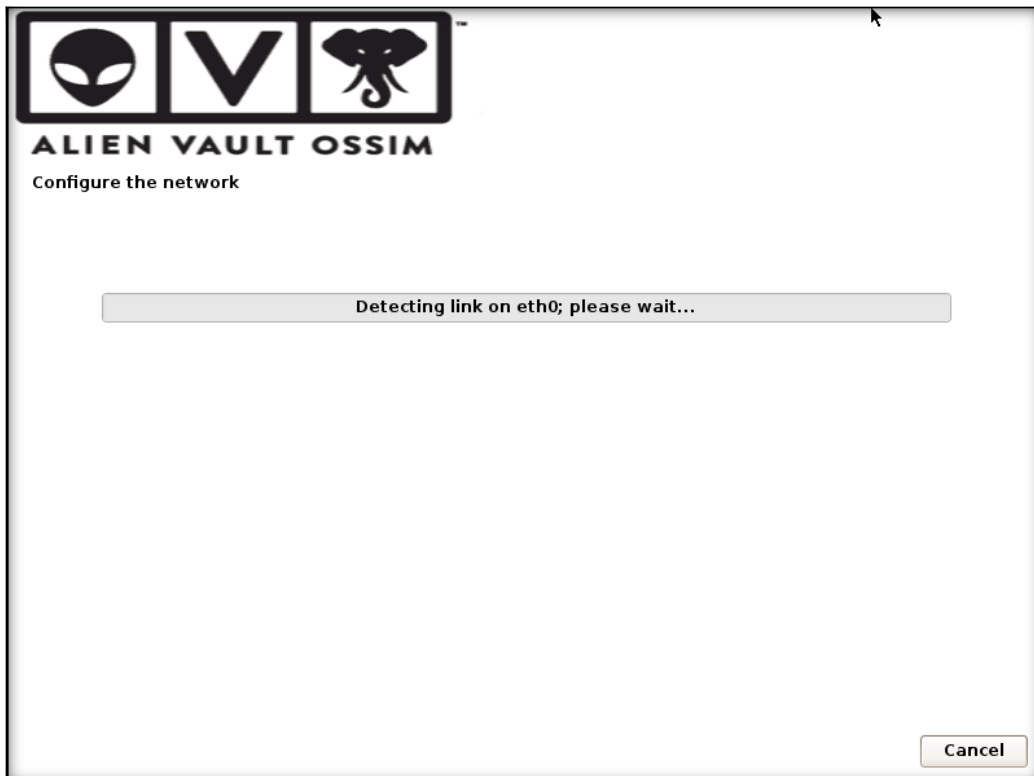
The screenshot shows the 'Configure the network' window in Alien Vault OSSIM. At the top is the logo with an alien head, a 'V', and an elephant, followed by the text 'ALIEN VAULT OSSIM'. Below the logo is the title 'Configure the network'. A text box contains instructions: 'The gateway is an IP address (four numbers separated by periods) that indicates the gateway router, also known as the default router. All traffic that goes outside your LAN (for instance, to the Internet) is sent through this router. In rare circumstances, you may have no router; in that case, you can leave this blank. If you don't know the proper answer to this question, consult your network administrator.' Below this, the label 'Gateway:' is followed by a text input field containing '10.10.10.1'. At the bottom are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

14. Name server addresses: screen appears. You can enter the DNS server address, or you can leave the field default and click Continue.



The screenshot shows the 'Configure the network' window in Alien Vault OSSIM. At the top, there are three icons: an alien head, a 'V', and an elephant. Below them is the text 'ALIEN VAULT OSSIM'. The window title is 'Configure the network'. A text box contains instructions: 'The name servers are used to look up host names on the network. Please enter the IP addresses (not host names) of up to 3 name servers, separated by spaces. Do not use commas. The first name server in the list will be the first to be queried. If you don't want to use any name server, just leave this field blank.' Below this, it says 'Name server addresses:'. A text input field contains '8.8.8.8'. At the bottom, there are three buttons: 'Screenshot', 'Go Back', and 'Continue'. The 'Continue' button is highlighted with a red box.

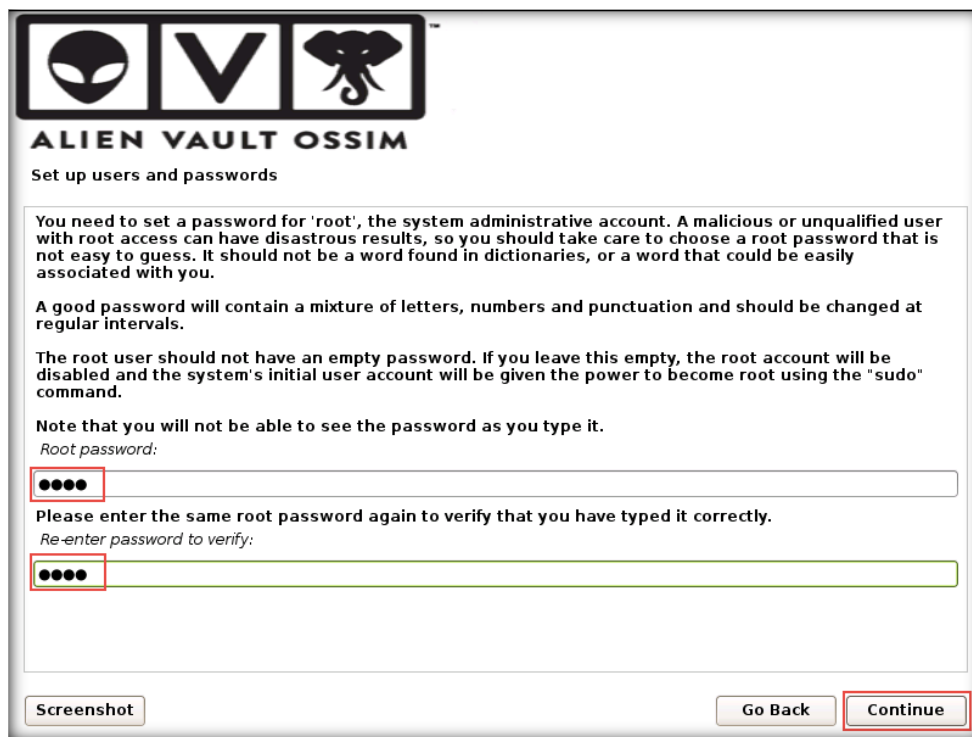
15. Wait until the network configuration is completed.



The screenshot shows the same 'Configure the network' window. The text input field is now empty. A progress bar is visible in the center of the window with the text 'Detecting link on eth0; please wait...'. At the bottom right, there is a 'Cancel' button.

16. Set up users and passwords screen appears. Enter toor in Root password: and Re-enter password to verify fields and click Continue.

Note: You can type any password of your choice.



ALIEN VAULT OSSIM

Set up users and passwords

You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you.

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command.

Note that you will not be able to see the password as you type it.

Root password:

••••

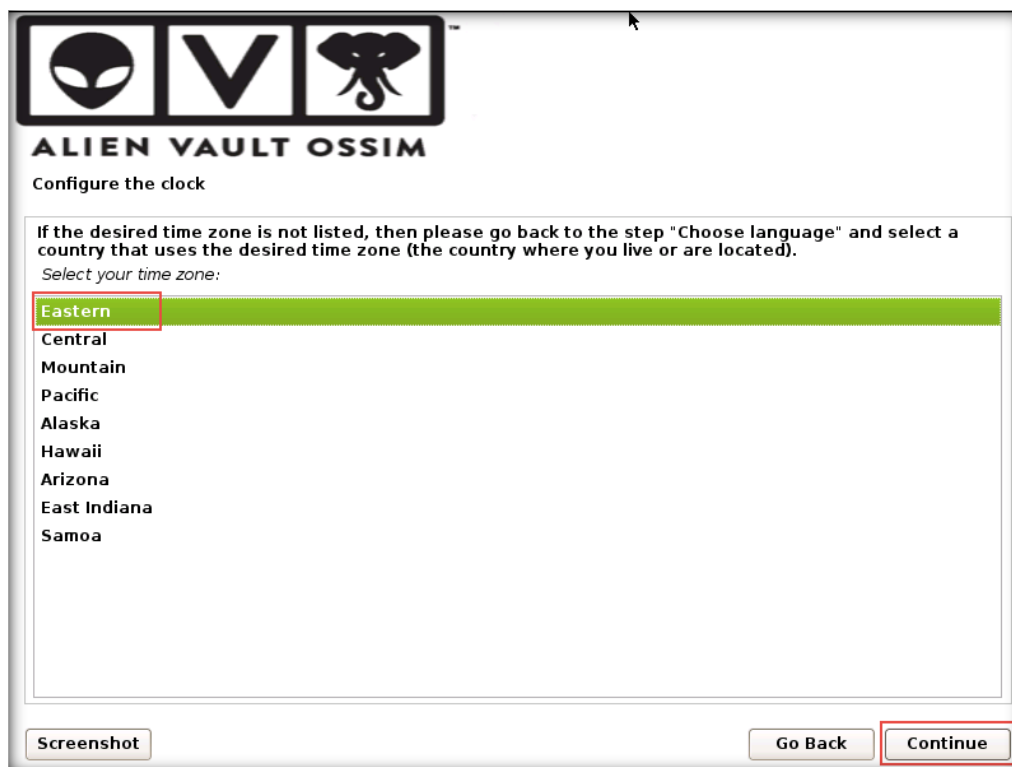
Please enter the same root password again to verify that you have typed it correctly.

Re-enter password to verify:

••••

Screenshot Go Back Continue

17. Configure the clock screen appears. Select your preferred time zone and click Continue



ALIEN VAULT OSSIM

Configure the clock

If the desired time zone is not listed, then please go back to the step "Choose language" and select a country that uses the desired time zone (the country where you live or are located).

Select your time zone:

Eastern

Central

Mountain

Pacific

Alaska

Hawaii

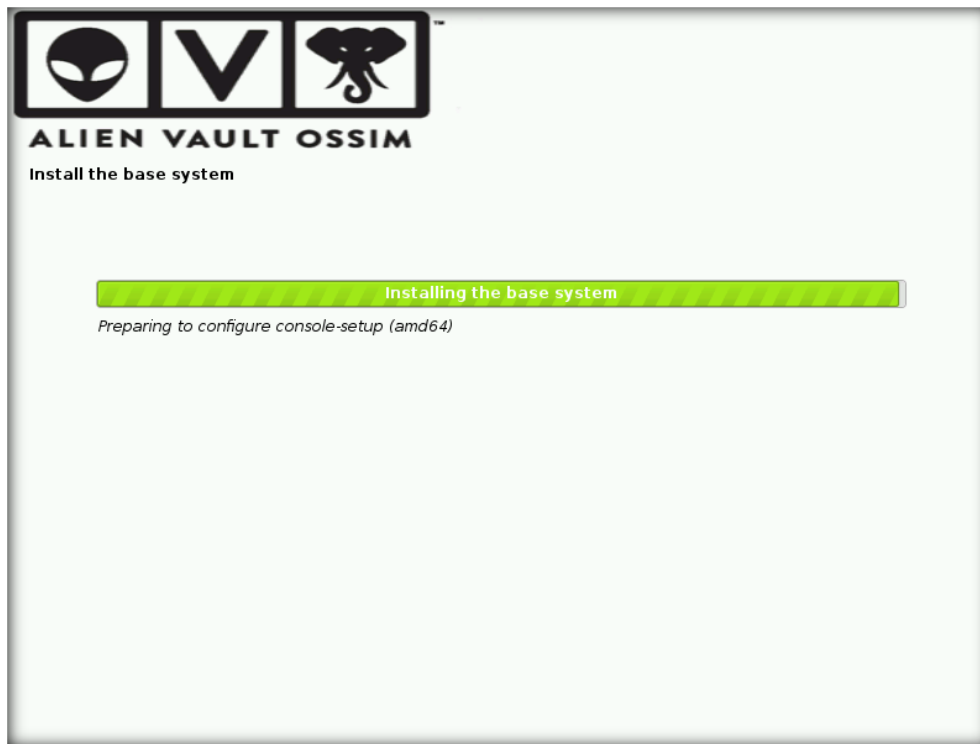
Arizona

East Indiana

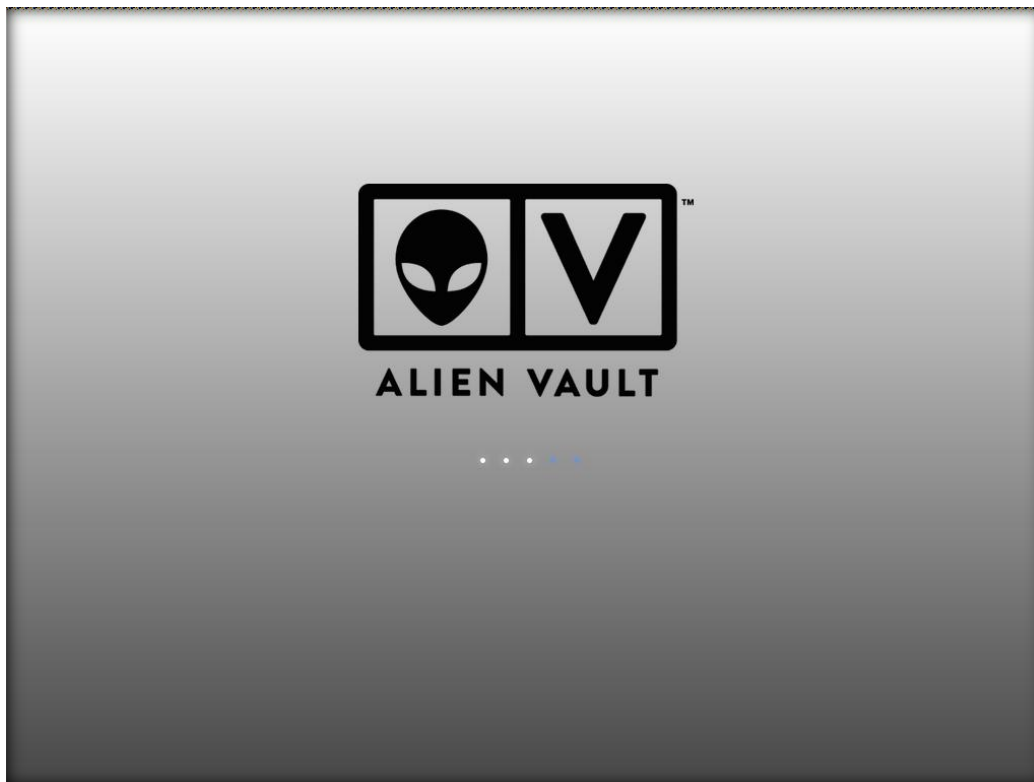
Samoa

Screenshot Go Back Continue

18. It will take some time to complete the configuration, wait until it finishes.



19. Once configurations are completed, the ALIEN VAULT screen appears as shown in the screenshot. Restart the machine.



20. After restart wait for the login screen to appear, and enter root as the username and press Enter key then type toor as password and press Enter.

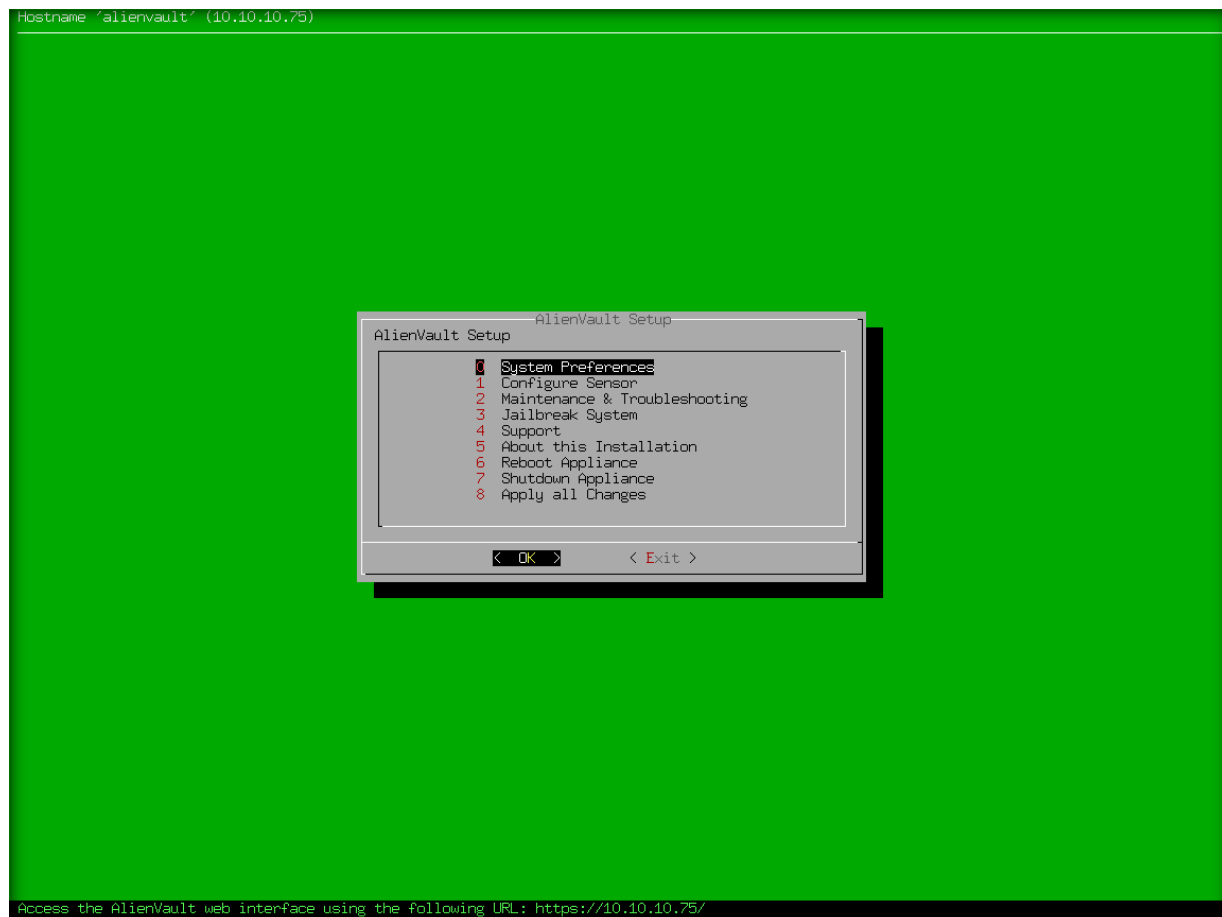
Note: The password that you have set at step 20 in this Configuration Task.

```
=====
===== http://www.alienvault.com =====
=====
==== Access the AlienVault web interface using the following URL: =====
===== https://10.10.10.75/ =====
=====

AlienVault USM 5.7.4 - x86_64 - tty1

alienvault login: root
Password:
Last login: Fri Oct  4 07:06:06 EDT 2019 on tty1
Linux alienvault 4.9.0-0.bpo.9-amd64 #1 SMP Debian 4.9.168-1+deb9u3~deb8u1 (2019-06-17) x86_64
You have new mail.
_
```

21. AlienVault Setup screen appears as shown in the screenshot; leave the machine running.

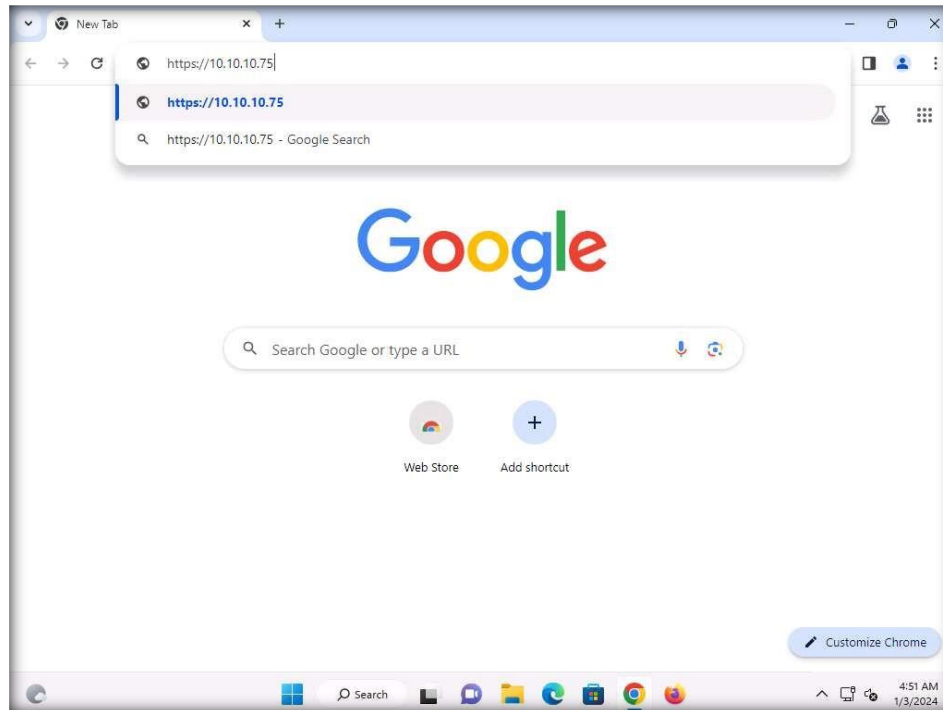


CT#13.2: Configuring OSSIM Server Web Interface

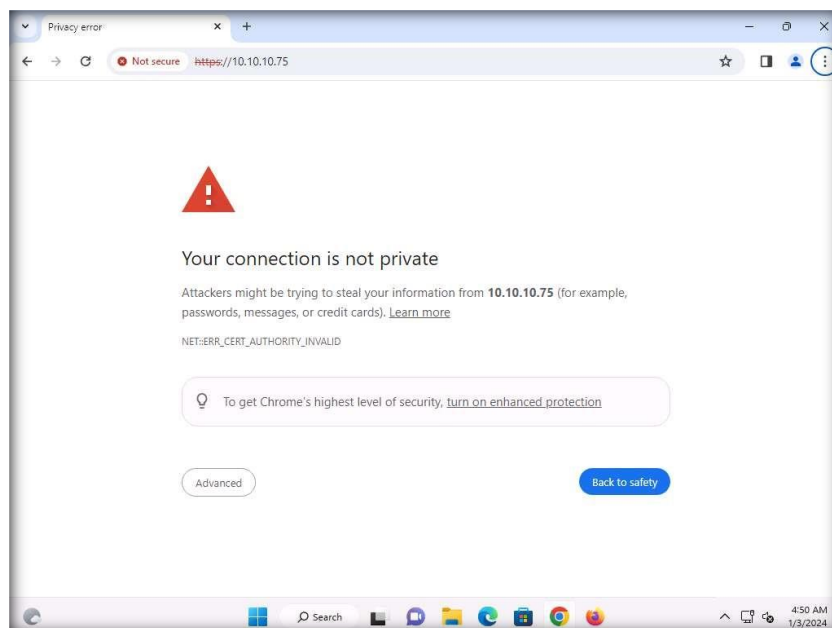
Launch Admin machine-1 and login with the user name as Admin, password as admin@123.

1. Launch any browser, and type `https://[IP address of the OSSIM machine]`, in the address bar and press Enter.

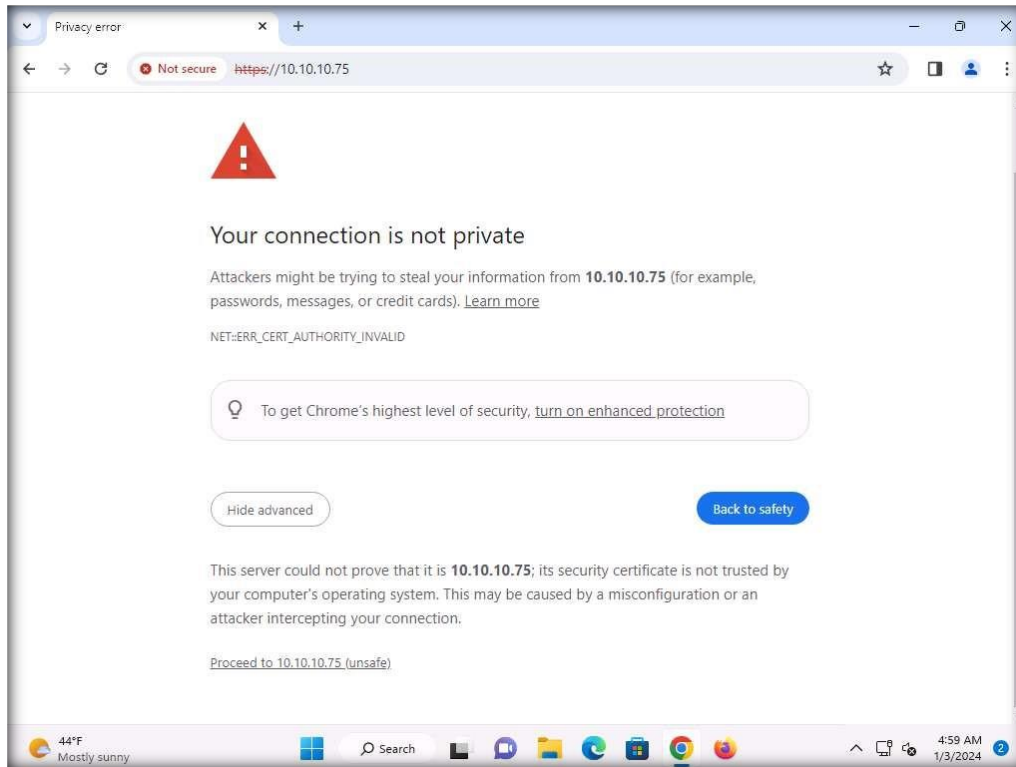
Note: In this lab setup, we are using chrome browser, if you are using different browser then screenshots may vary. The OSSIM machine is running on 10.10.10.75.



2. Your connection is not private page appears, click ADVANCED.

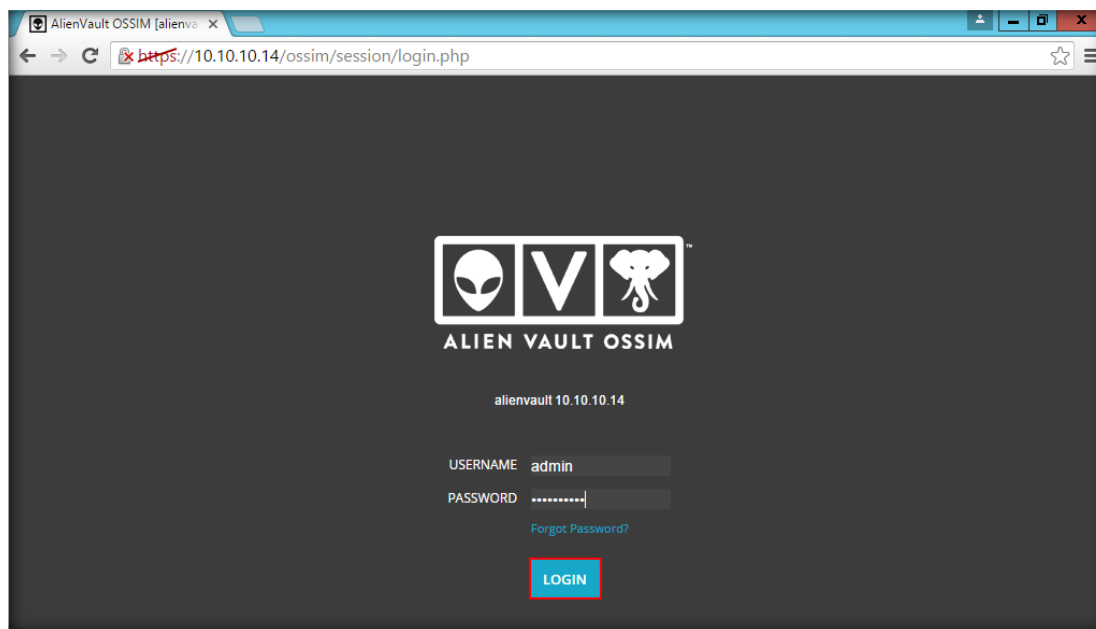


- Click Proceed to [IP Address of the OSSIM machine] (unsafe) link. Here the IP address of the OSSIM machine is 10.10.10.79.

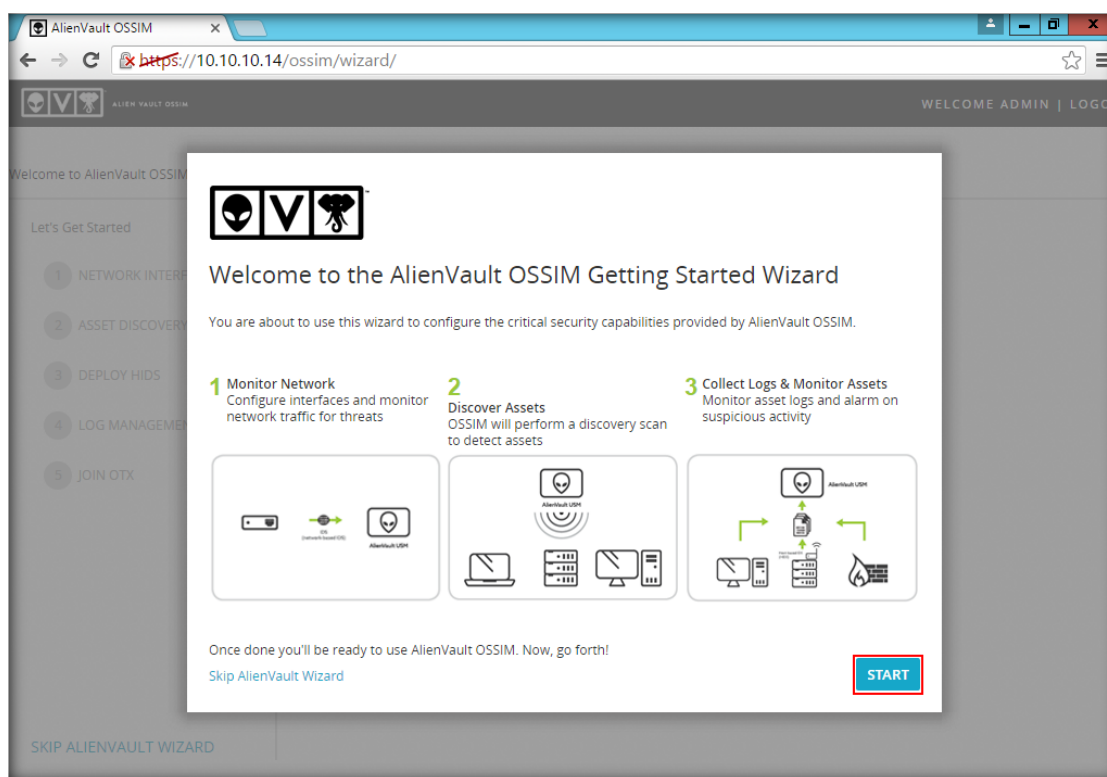


- Welcome screen appears. Fill all the * marked fields, and click START USING ALIENVAULT as shown in the screenshot. Here we have used Administrator in FULL NAME field; we have set the password as qwerty@123 and email as cnduser1@gmail.com

5. Login page appears. Enter admin in USERNAME field, qwerty123 in PASSWORD field and click LOGIN.



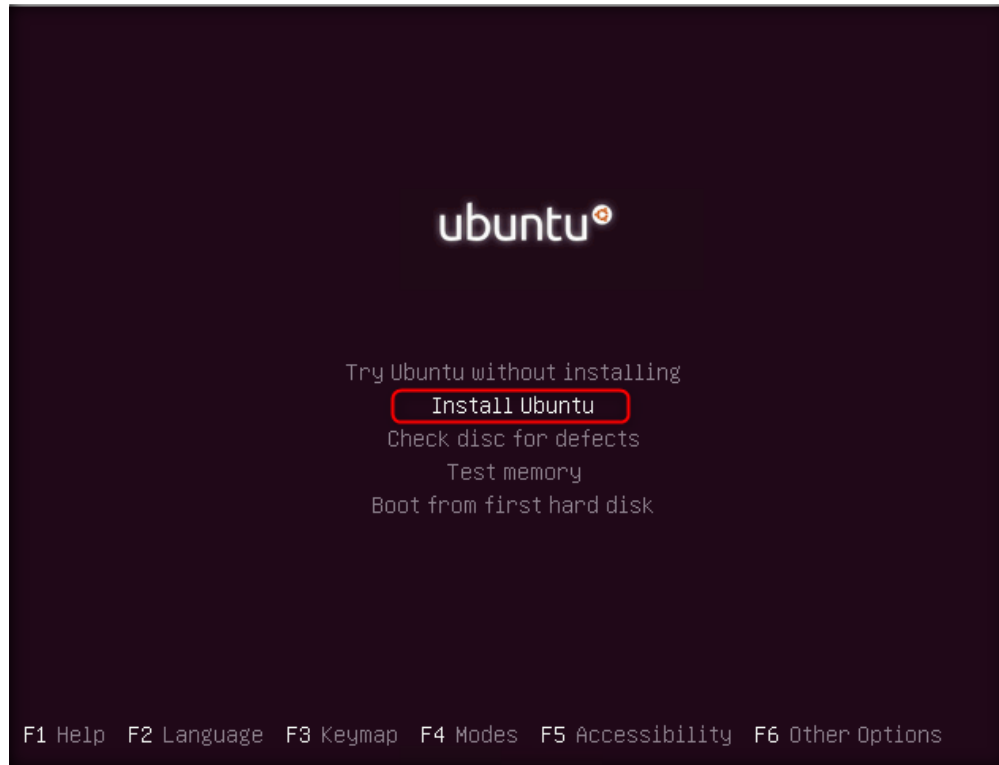
6. Welcome to the AlienVault OSSIM Getting Started wizard appears; click Start.



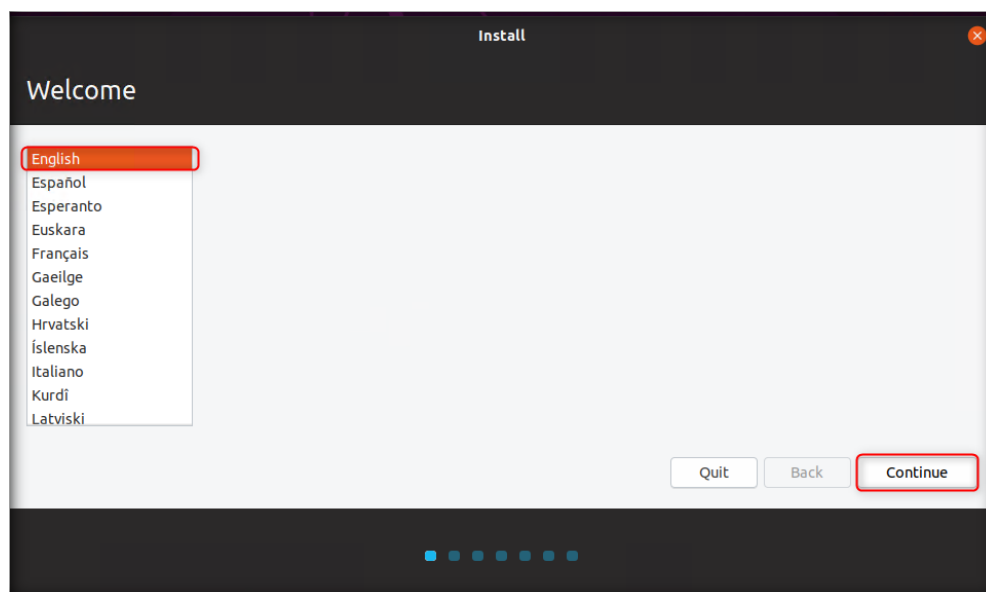
CT#14: Configuring Ubuntu Linux Guest OS as Attacker Machine

CT#14.1: Installing Ubuntu Linux as Attacker Machine

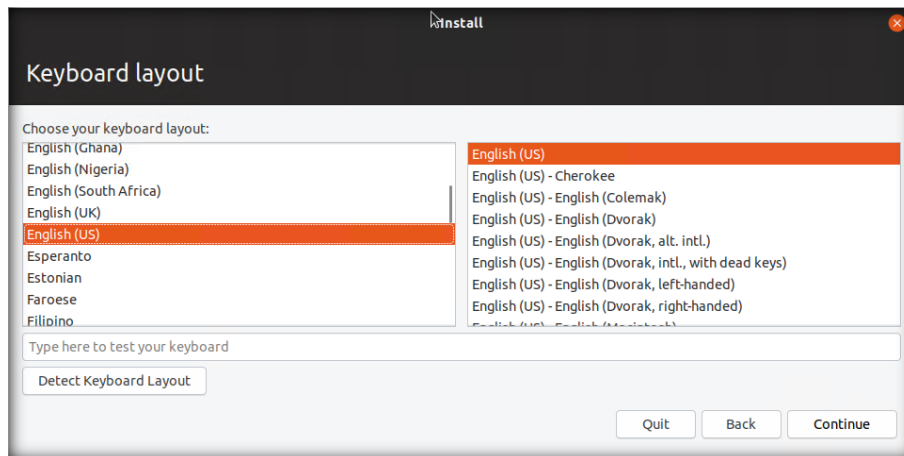
1. launch **Attacker Machine** VM from VMware. Ubuntu virtual machine starts booting with the provided source. Choose preferred language on the left hand-side and click **Install Ubuntu** in the Welcome screen.



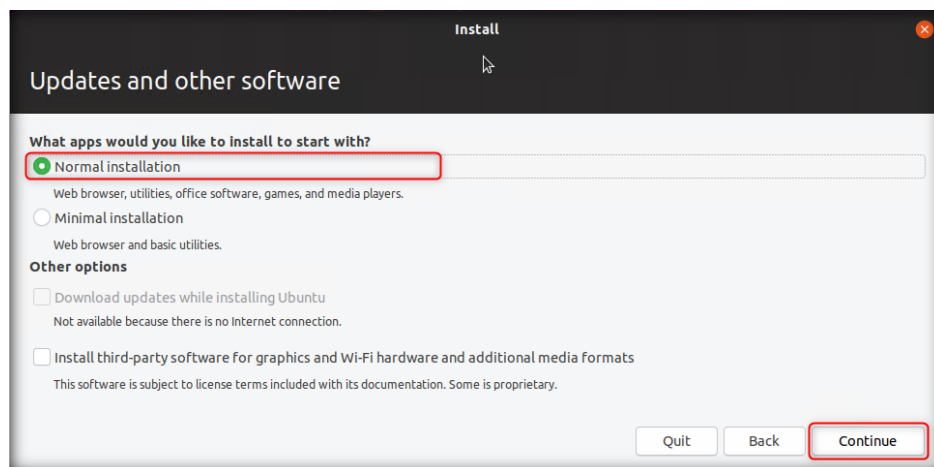
2. Preparing to install Ubuntu wizard appears, check the check box as shown in the screenshot and click **Continue**.



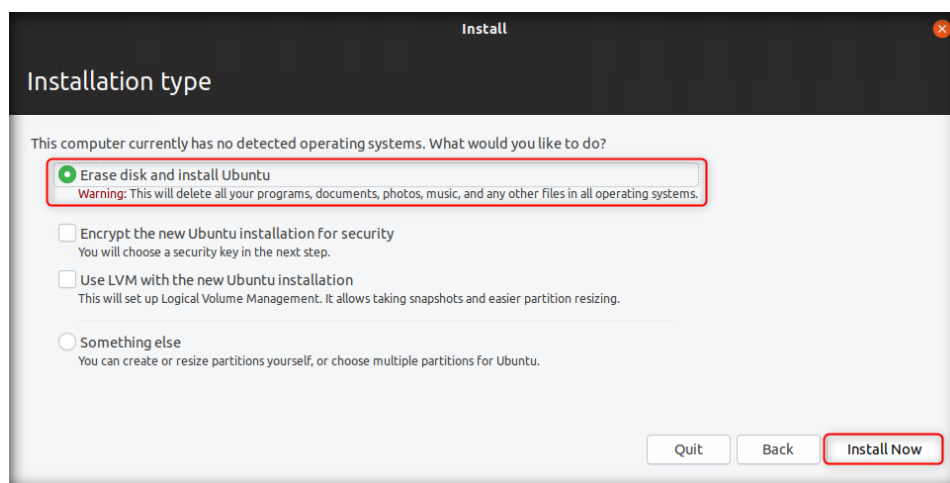
3. Leave default selection of keyboard layout and click **continue**.



4. Select **Normal Installation** option and click **Continue**.

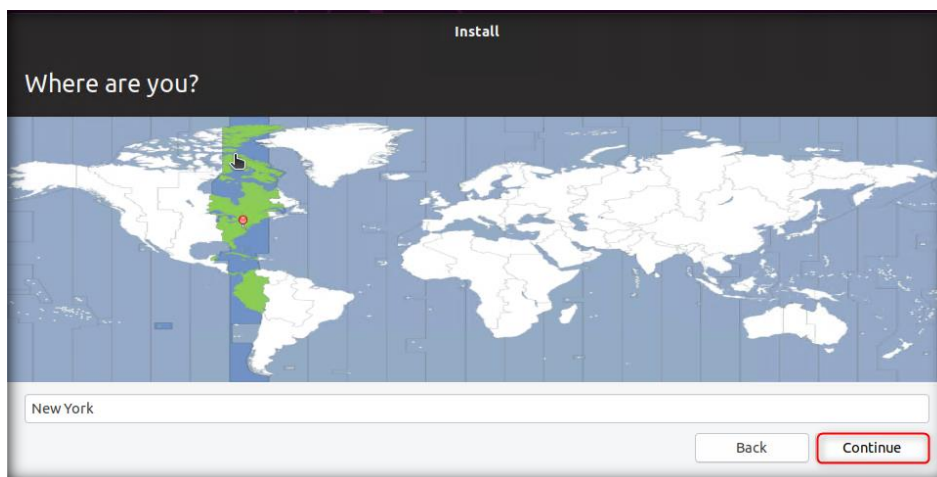


5. In Installation type, choose **Erase disk and install Ubuntu** radio button and click **Install Now**

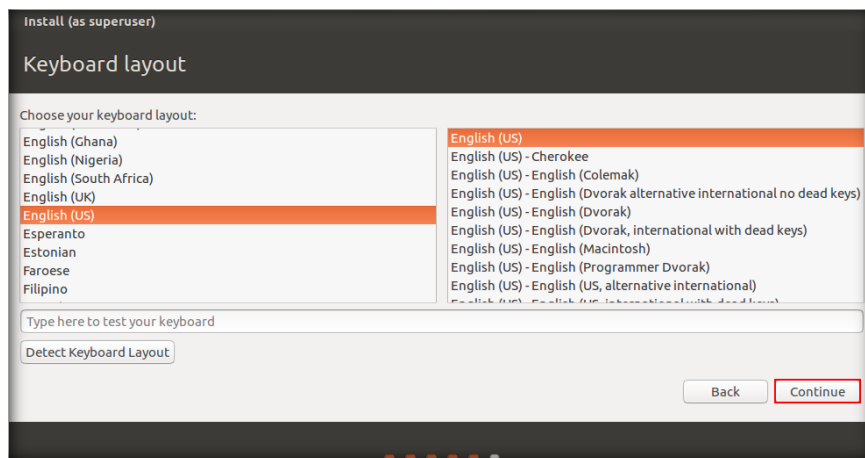


6. Write the changes to disks pop-up appears, click Continue

- Where are you screen appears, choose the location or leave the settings to default and click Continue

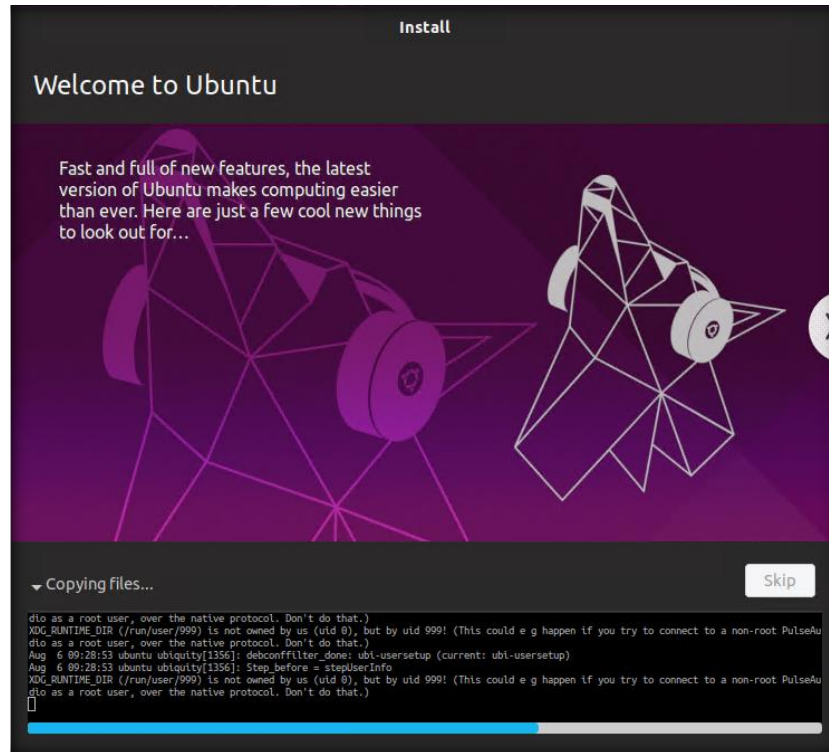


- Keyboard layout screen appears, leave the settings to default and click Continue

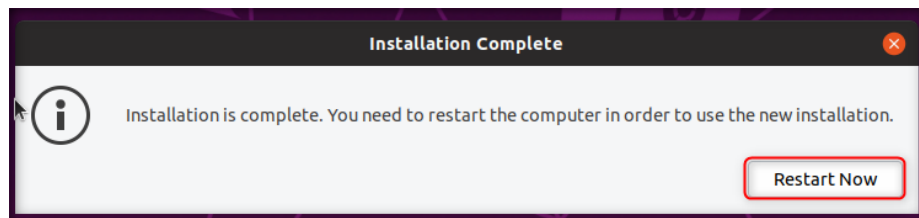


- Who are you screen appears, type **Bob** in Your name field. The corresponding fields Your computer's name and Pick a username are auto filled. Type **user@123** in Choose a password and Confirm your password fields and click **Continue**

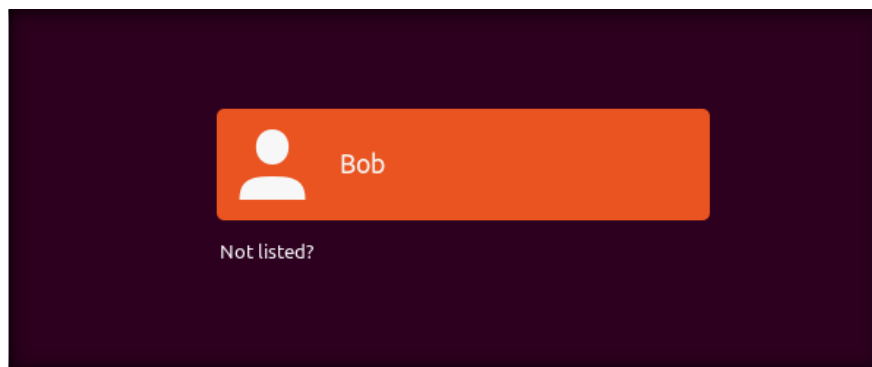
10. Ubuntu installation will start, wait till you get the Ubuntu login screen as shown the screenshot below:



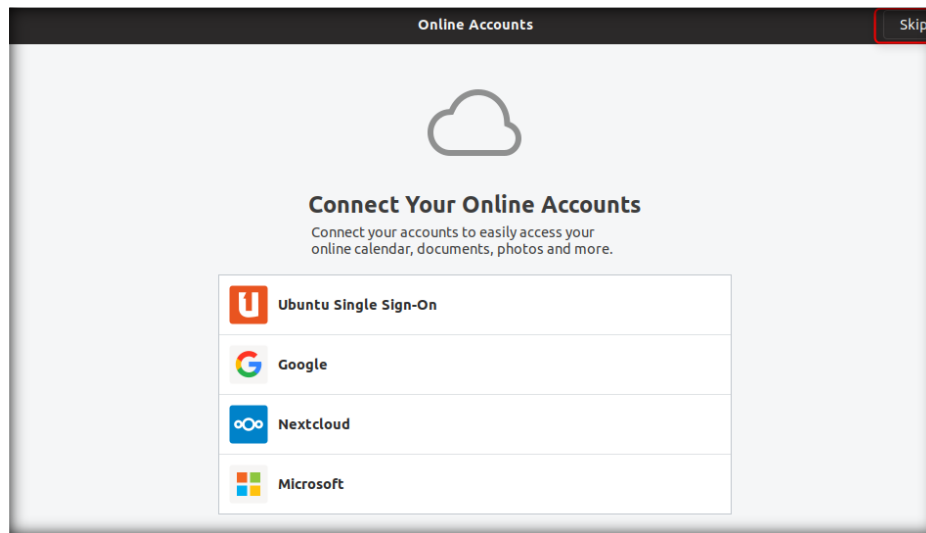
11. Click **Restart Now** button, once the installation is completed. Login screen appears, type **user@123** in the Password field and press **Enter**.



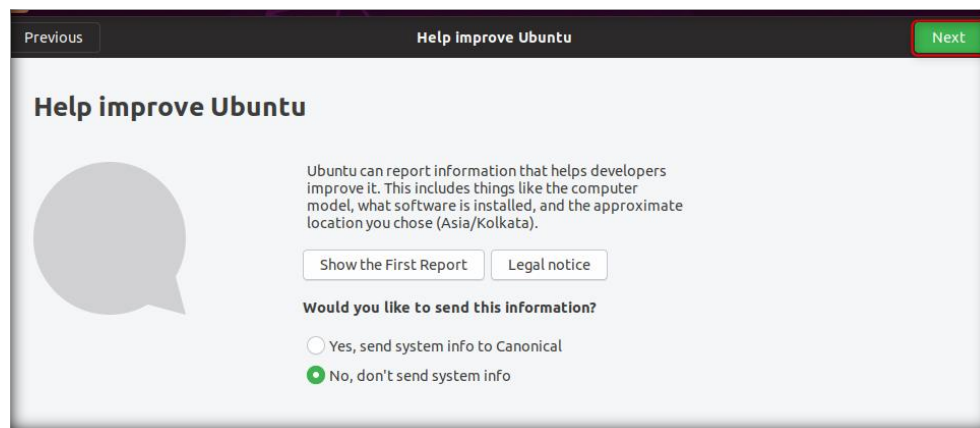
12. If Keyboard Shortcuts pop-up appears click **Close**.



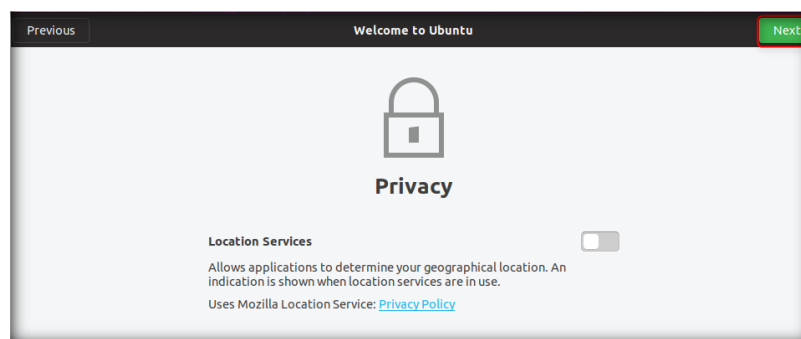
13. Once Successful login you will see Online Accounts window, click **Skip**.



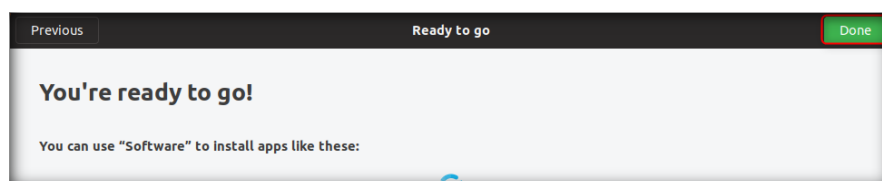
14. Click Next on **Help improve Ubuntu** window.



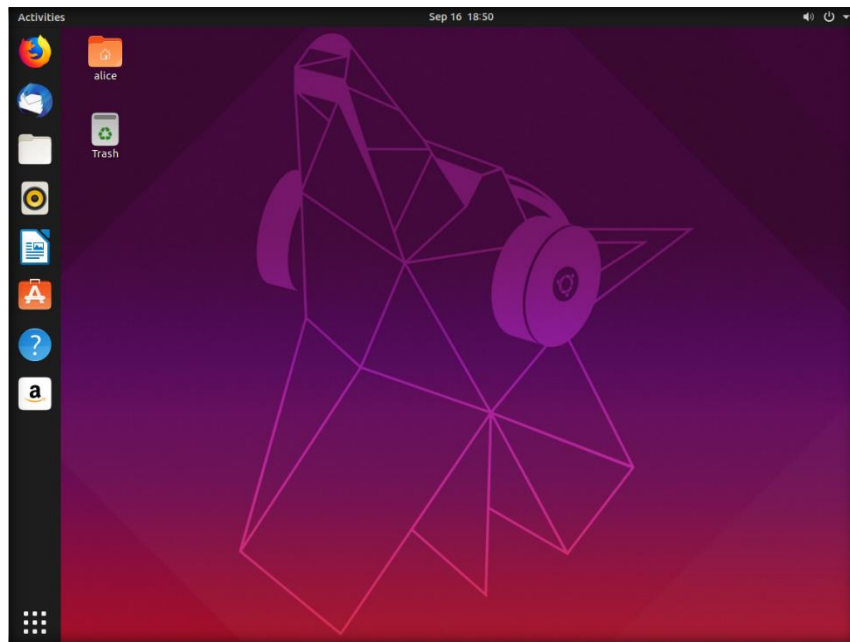
15. Click **Next** on **welcome to ubuntu** window.



16. Click **Done** on Ready to go window to continue with Ubuntu.

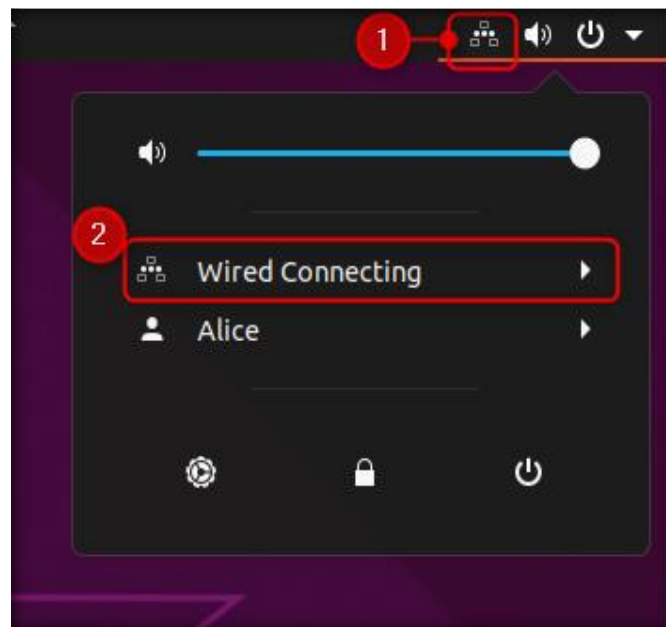


17. Once Successful login you will see desktop as shown in following screenshot.

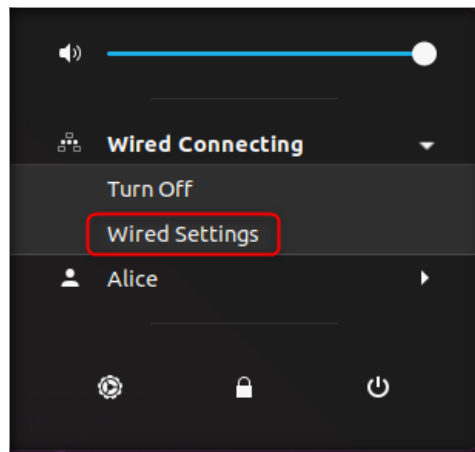


CT#14.2: Setting up IP address for Attacker Machine

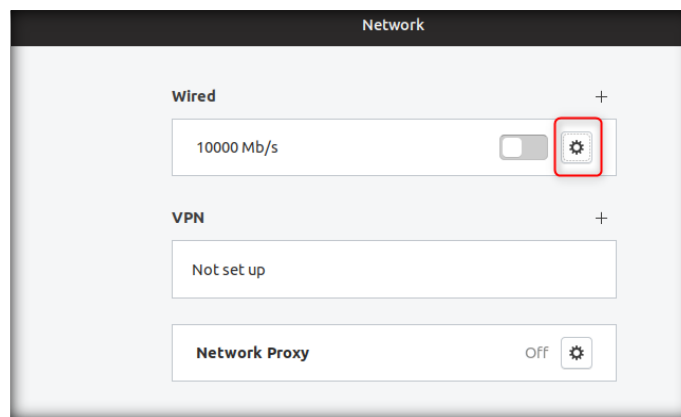
1. Launch VMWare start Attacker VM, Login with user name as Bob and password as user@123.
2. Navigate to Wired Connection icon from right upper side corner of desktop and select **Wired connecting**.



3. **Wired Connecting** option will expand select **Wired Settings**.



4. Network window will open, click setting icon as shown in following screenshot.

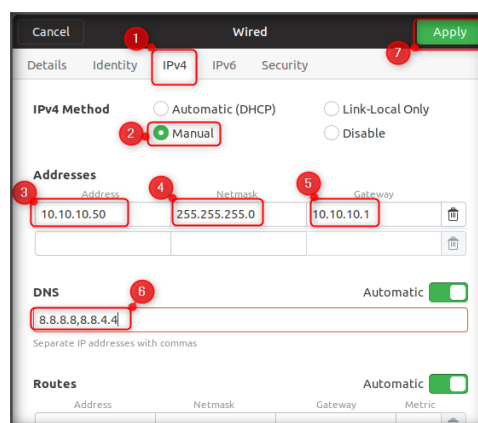


5. **Wired** window will open select **IPv4** tab check manual radio button and enter following details in **Address** section.

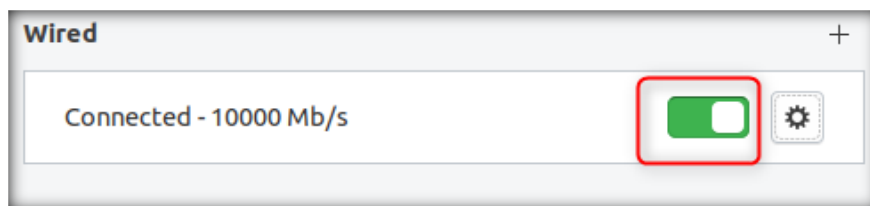
Address: **10.10.10.50**

Netmask: **255.255.255.0**

Gateway: **10.10.10.1**



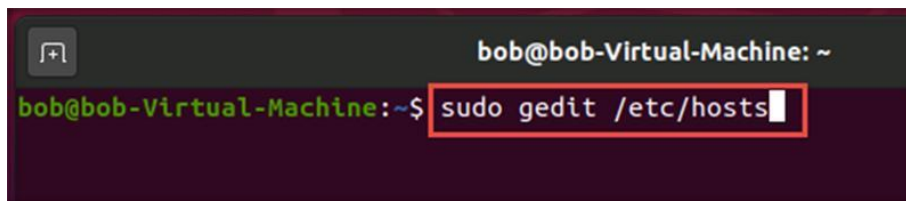
- Click **toggle** button **off/on** to refresh the network connection as shown in following screenshot.



- Close **Network** window.

CT#14.3: Configuring Hosts file

- Press **Alt+Ctrl+t** to open terminal window.
- Type command **sudo gedit /etc/hosts** and press **Enter**. If prompts for password type **user@123**



- The hosts file opens in Gedit. Add hostname with IP address as given below.

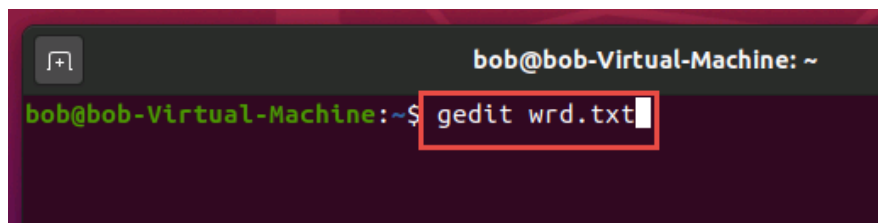
10.10.10.16 www.luxurytreats.com



- Save the file.

CT#14.4: Creating files in Attacker Machine

- Once login to Attacker machine, press **Ctrl+Alt+t** to open terminal, type **gedit wrd.txt** and hit **Enter**. If prompt for password enter password **user@123**.



- The Gedit editor opens, type following list of username and click **Save**, close the file.

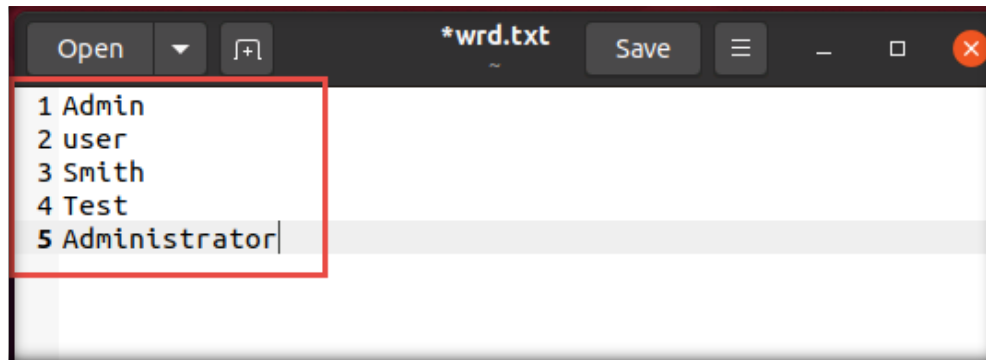
Admin

User

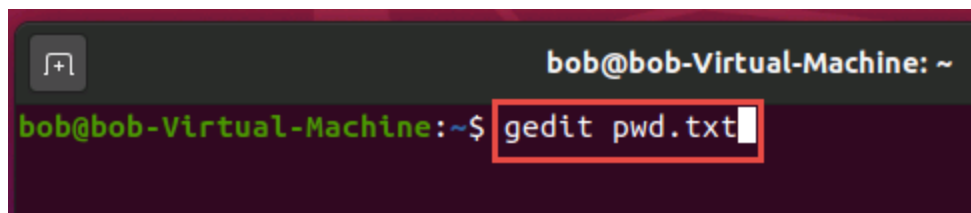
Smith

Test

Administrator



3. Type **gedit pwd.txt** and hit **Enter**. If prompt for password enter password **user@123**.



4. The Gedit editor opens, type following list of username and click **Save**, close the file.

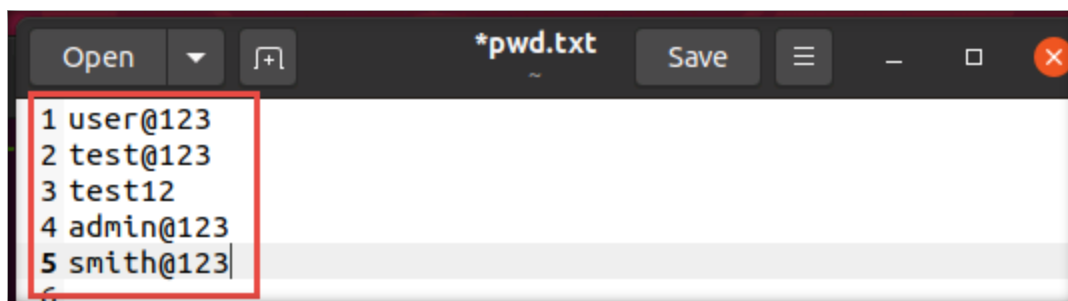
user@123

test@123

test12

admin@123

smith@123



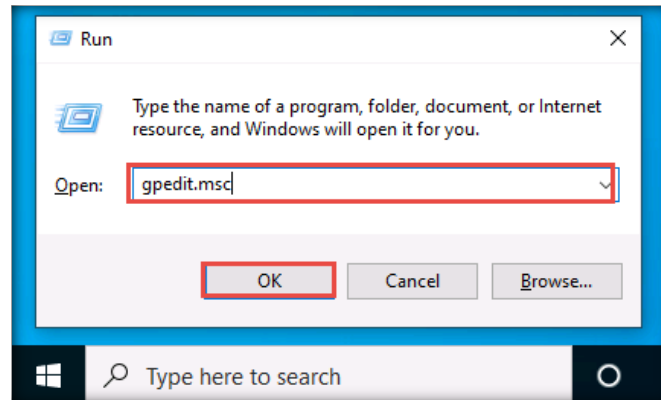
CT#15: Set Time Zone

CT#15.1: Set Time Zone of VMs

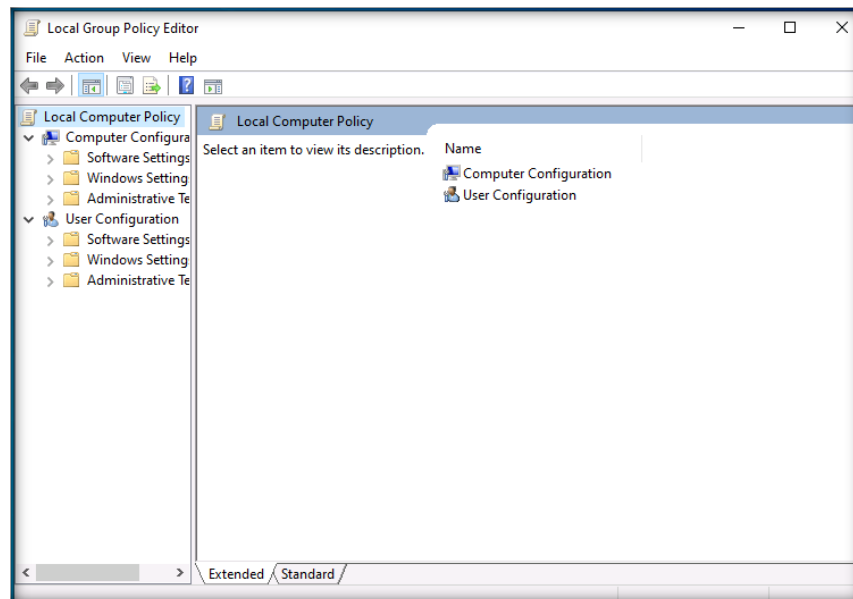
1. Navigate to **Date and Time** Settings to ensure that all VMs' Time zone configuration is consistent.

CT#16: Disable Real-time Protection

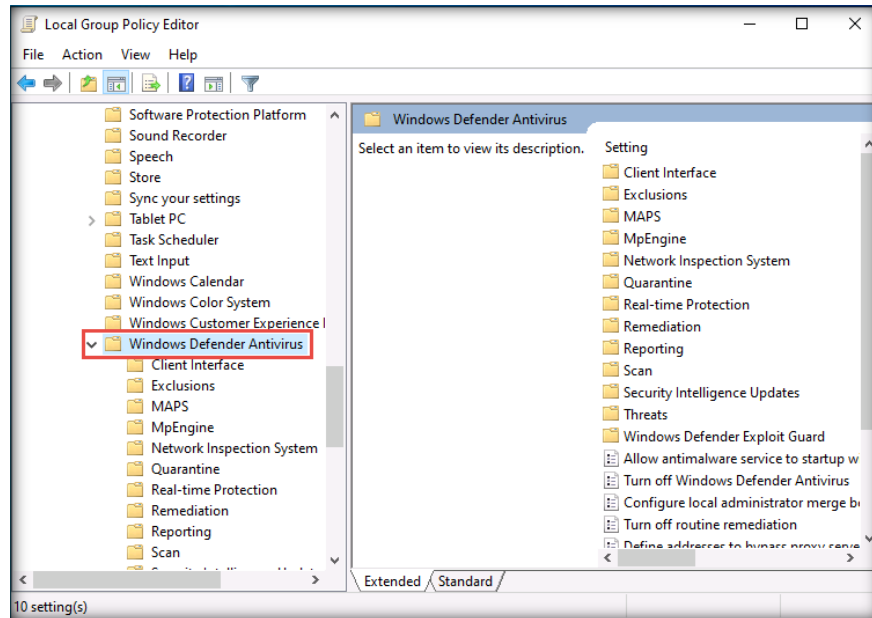
1. Launch **Admin Machine-1** and log in with username as **Admin** and password **admin@123**.
2. Press **Windows key + R** on the keyboard shortcut to open the **Run** command, type **gpedit.msc** and click **OK**.



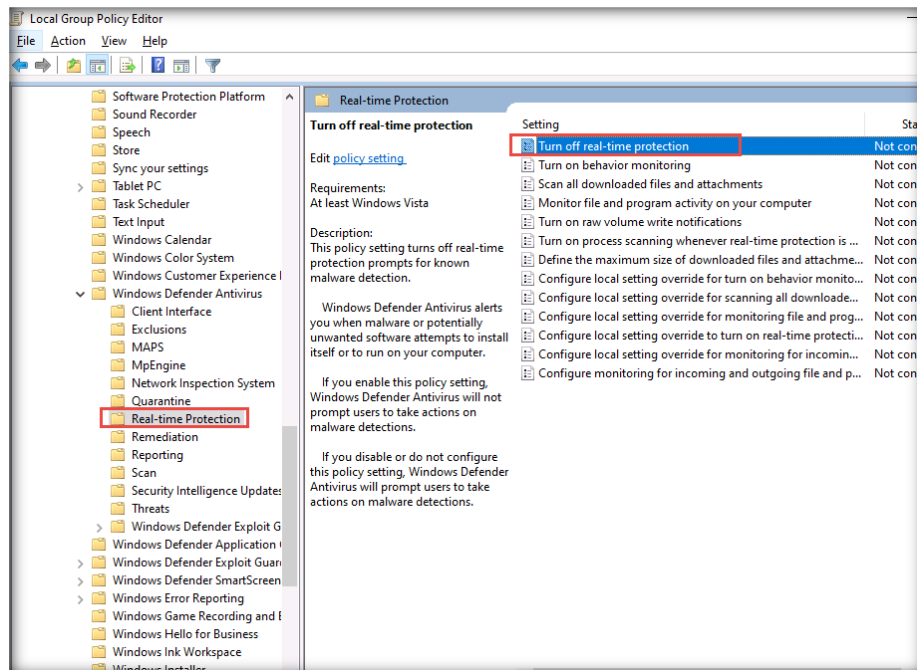
3. The **Local Group Policy** Editor window opens.



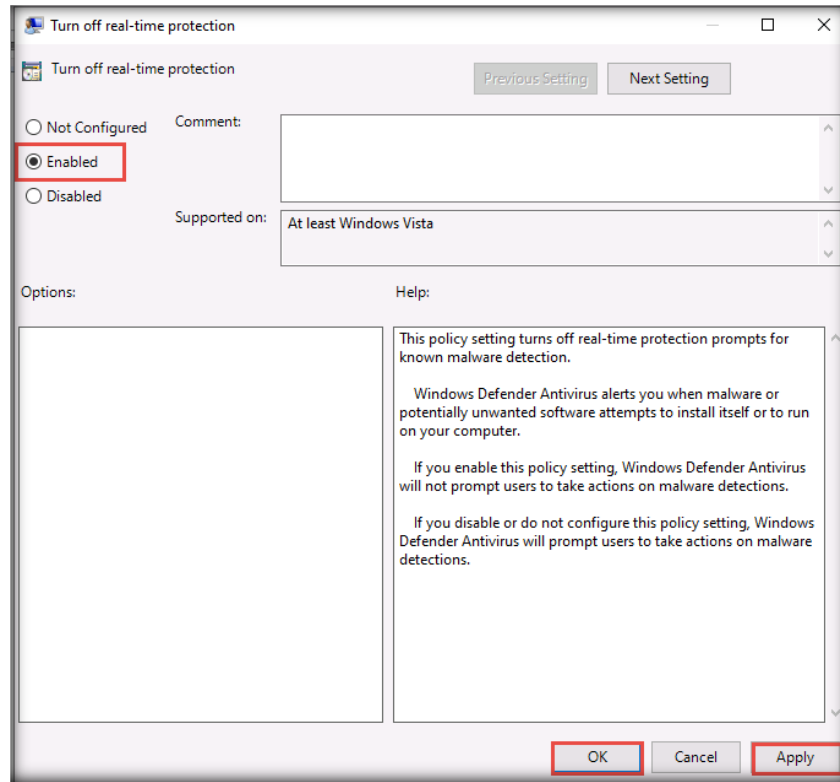
4. Navigate to Computer Configuration > Administrative Templates > Windows Components > Windows Defender Antivirus



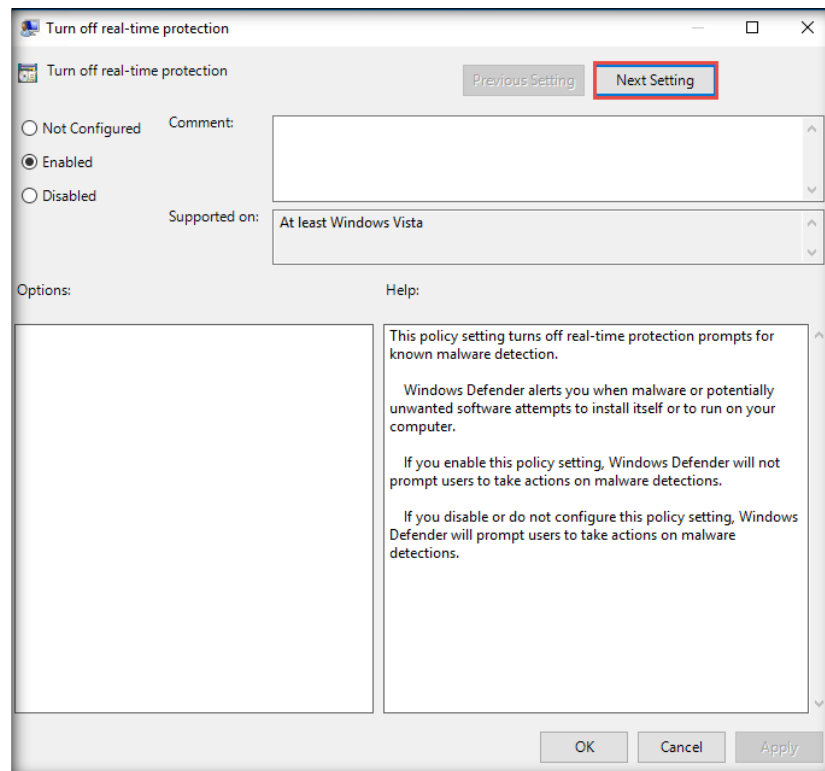
5. Select **Real-time Protection** and double-click the **Turn off real-time protection** in the right-side pane.



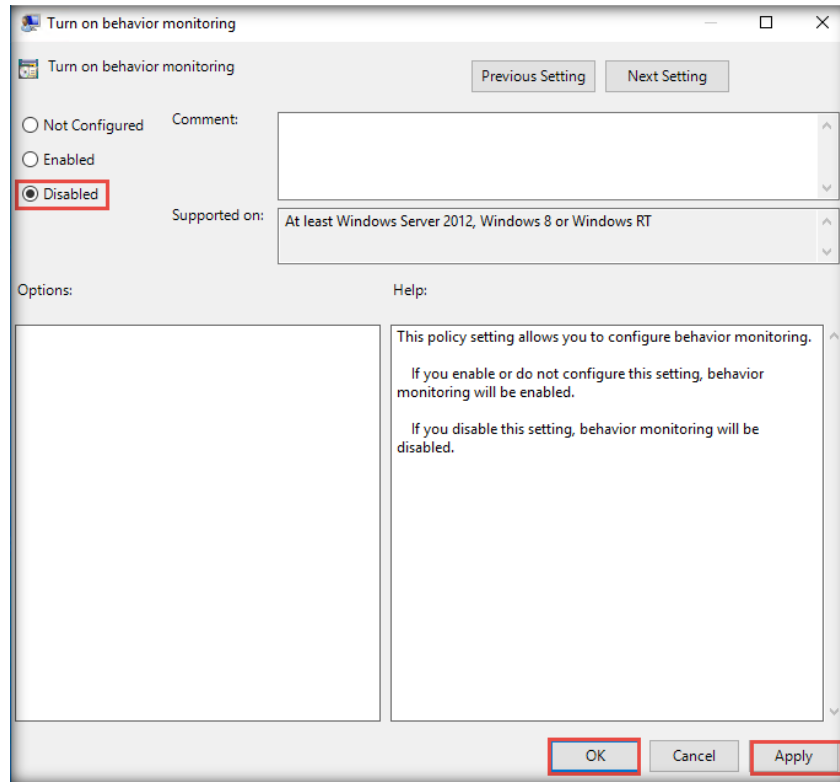
6. **Turn off real-time protection** window opens, select the Enabled option, click **Apply** and **OK**.



7. Click **Next Setting** Button to navigate Turn on behavior monitoring settings.



8. The Turn on behavior monitoring settings appears, select Disabled option and click Apply and **OK**.

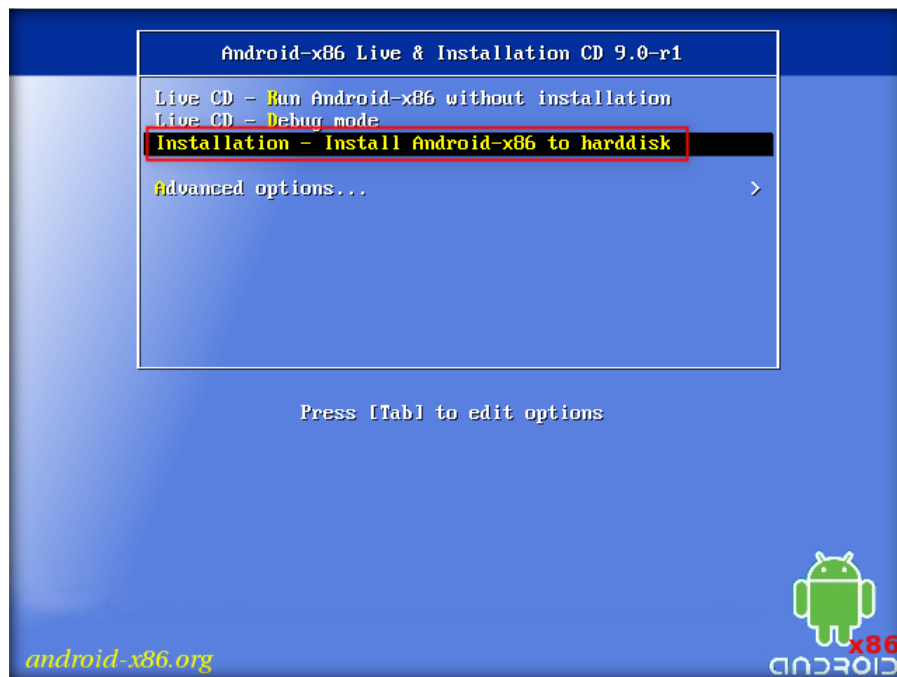


9. **Close** the Group Policy Window. Restart the system.
10. Close the **Local group policy Editor** window.
11. Repeat **steps 1** to 10 in all VM's with Windows OS (Web Server VM, Backup Server VM, Ad Domain Controller VM, and Finance-Dept VM)

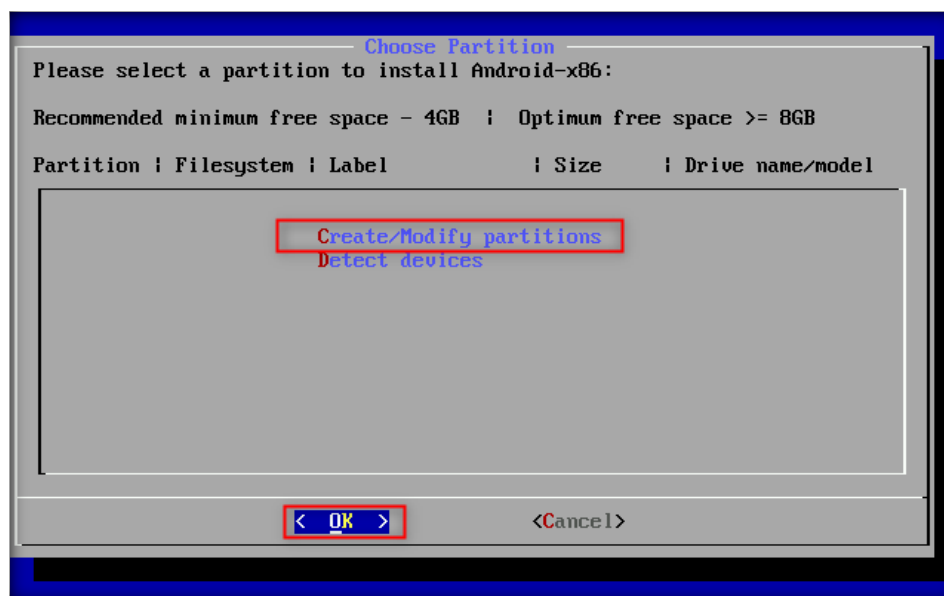
CT#17: Install and Configure Android Device VM

CT#17.1: Install Android

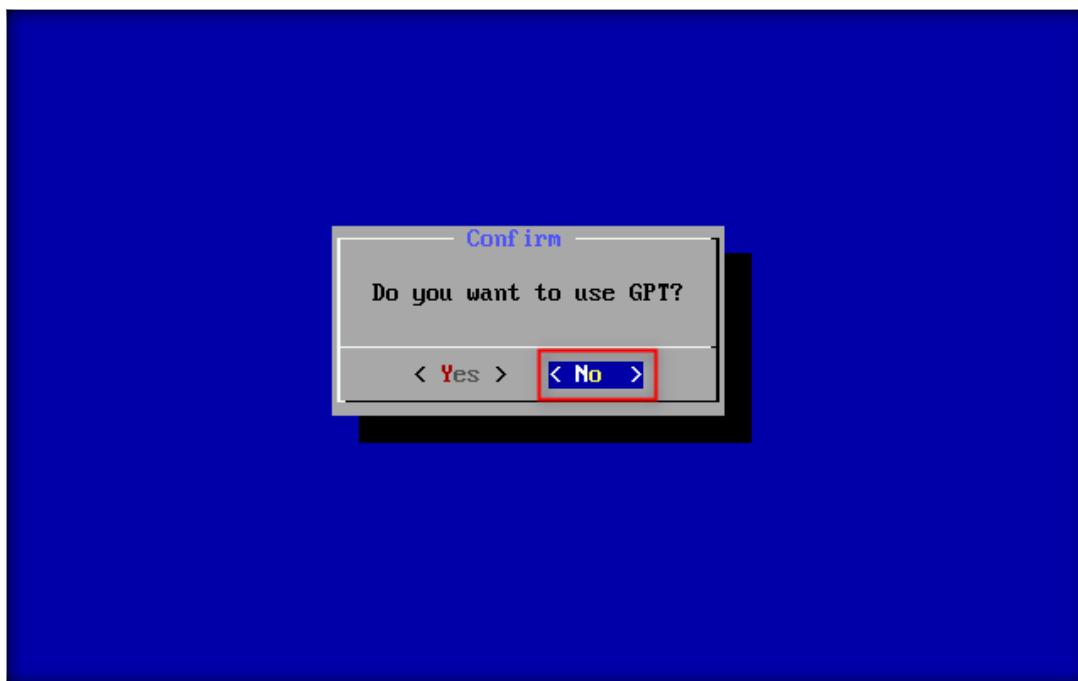
1. Launch VMWare and power On Android VM.
2. The Android VM window appears; click **Start** button, as shown in the screenshot below.
3. The Android installation screen appears; select **Installation - Install Android-x86 to harddisk** using the down arrow button and press **Enter**.



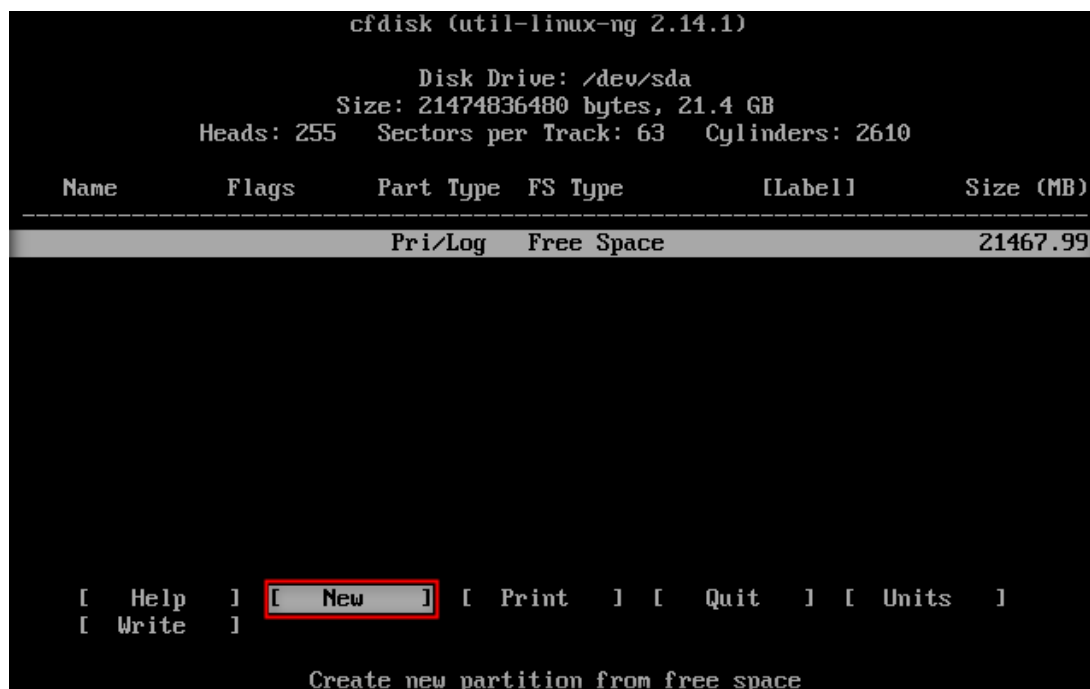
4. The Choose Partition screen appears; press **c** to select **Create/Modify partitions** and click **OK** to continue.



5. The confirm prompt appears; select **No** and press **Enter** to continue.



6. Select New and press **Enter**.



7. The size of the disk appears as you set while creating the VM; press **Enter** to continue.

```

cfdisk (util-linux-ng 2.14.1)

        Disk Drive: /dev/sda
        Size: 21474836480 bytes, 21.4 GB
        Heads: 255   Sectors per Track: 63   Cylinders: 2610

    Name      Flags      Part Type  FS Type      [Label]      Size (MB)
    -----
    Pri/Log   Free Space      21467.99

Size (in MB): 21467.98

```

8. The new partition is created; select the **Bootable** option.

```

cfdisk (util-linux-ng 2.14.1)

        Disk Drive: /dev/sda
        Size: 21474836480 bytes, 21.4 GB
        Heads: 255   Sectors per Track: 63   Cylinders: 2610

    Name      Flags      Part Type  FS Type      [Label]      Size (MB)
    -----
    sda1                               Primary  Linux
    -----

[ Bootable ] [ Delete ] [ Help ] [ Maximize ] [ Print ]
[ Quit ] [ Type ] [ Units ] [ Write ]

Toggle bootable flag of the current partition

```

9. After selecting the Bootable option, press **Enter**; the Flag of the partition will be **Boot**.

```

cfdisk (util-linux-ng 2.14.1)

        Disk Drive: /dev/sda
        Size: 21474836480 bytes, 21.4 GB
        Heads: 255   Sectors per Track: 63   Cylinders: 2610

-----
Name      Flags      Part Type  FS Type      [Label]      Size (MB)
-----
sda1      Boot       Primary   Linux         21467.99

[ Bootable ] [ Delete ] [ Help   ] [ Maximize ] [ Print   ]
[ Quit    ] [ Type   ] [ Units  ] [ Write    ]

Toggle bootable flag of the current partition_

```

10. Select the **Write** option and press **Enter** to continue.

```

cfdisk (util-linux-ng 2.14.1)

        Disk Drive: /dev/sda
        Size: 21474836480 bytes, 21.4 GB
        Heads: 255   Sectors per Track: 63   Cylinders: 2610

-----
Name      Flags      Part Type  FS Type      [Label]      Size (MB)
-----
sda1      Boot       Primary   Linux         21467.99

[ Bootable ] [ Delete ] [ Help   ] [ Maximize ] [ Print   ]
[ Quit    ] [ Type   ] [ Units  ] [ Write    ]

Write partition table to disk (this might destroy data)_

```

11. Type **yes** for the writing partition and press **Enter**.

```
cfdisk (util-linux-ng 2.14.1)

Disk Drive: /dev/sda
Size: 21474836480 bytes, 21.4 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2610

-----
Name      Flags      Part Type  FS Type      [Label]      Size (MB)
-----
sda1      Boot       Primary   Linux         21467.99

Are you sure you want to write the partition table to disk? (yes or no): ye

Warning!! This may destroy data on your disk!
```

12. Wait before continuing; when the previous option screen appears, select **Quit** and press **Enter**.

```
cfdisk (util-linux-ng 2.14.1)

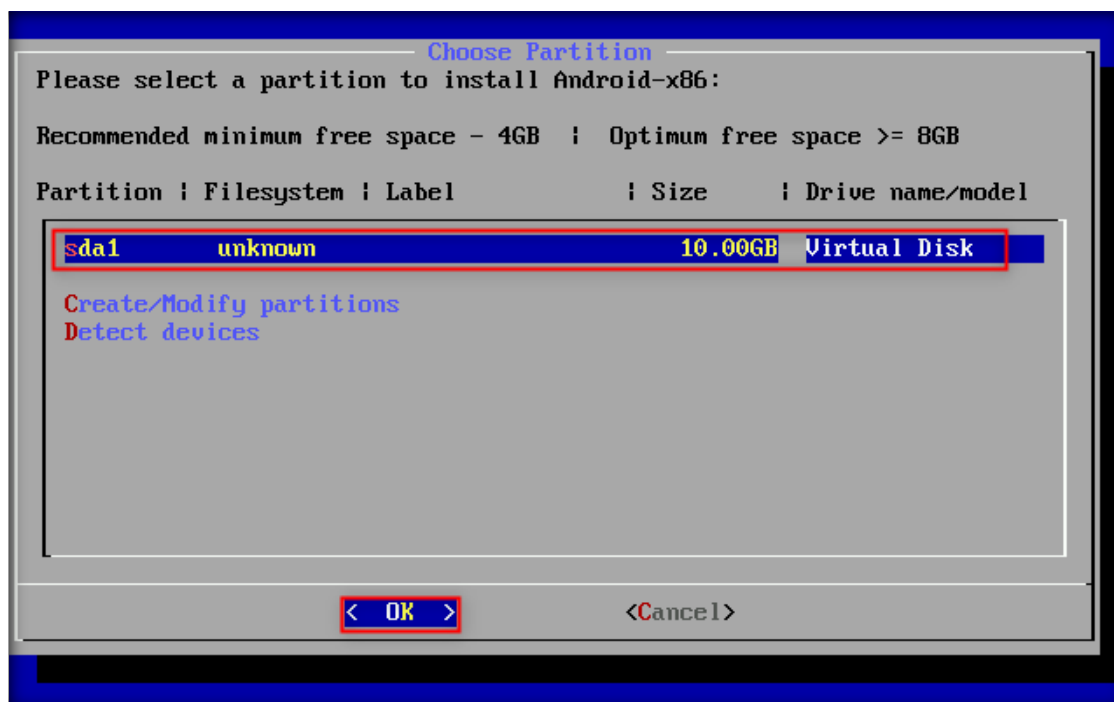
Disk Drive: /dev/sda
Size: 21474836480 bytes, 21.4 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2610

-----
Name      Flags      Part Type  FS Type      [Label]      Size (MB)
-----
sda1      Boot       Primary   Linux         21467.99

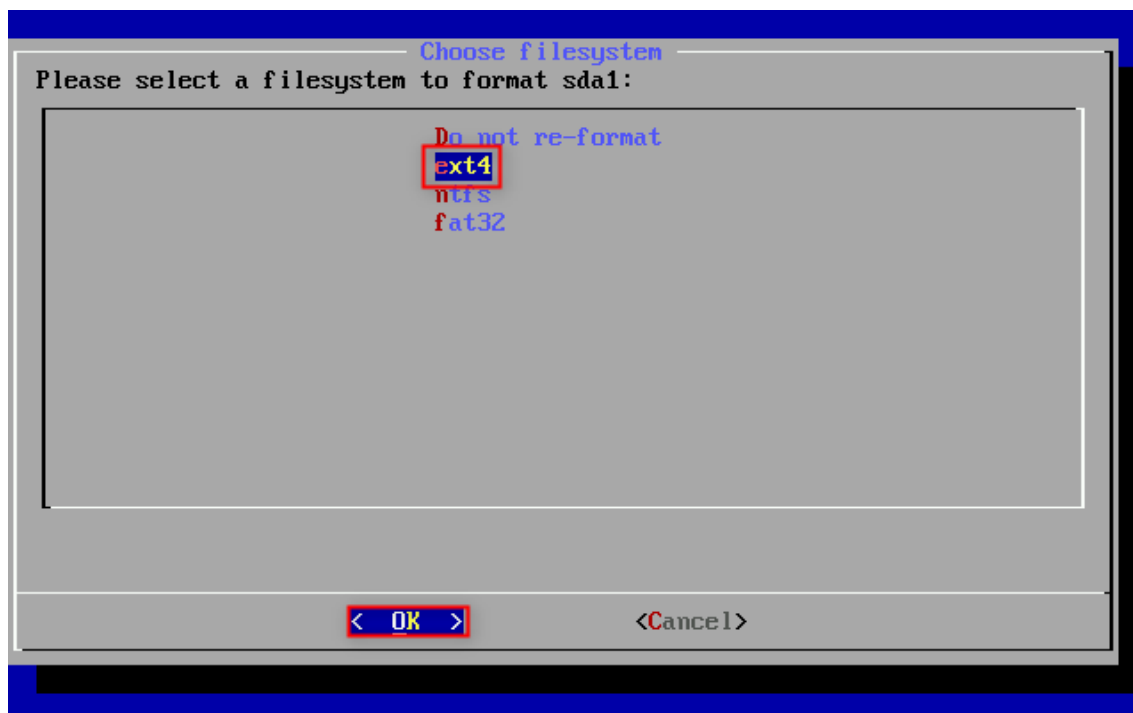
[ Bootable ] [ Delete ] [ Help ] [ Maximize ] [ Print ]
[ Quit ] [ Type ] [ Units ] [ Write ]

Quit program without writing partition table.
```

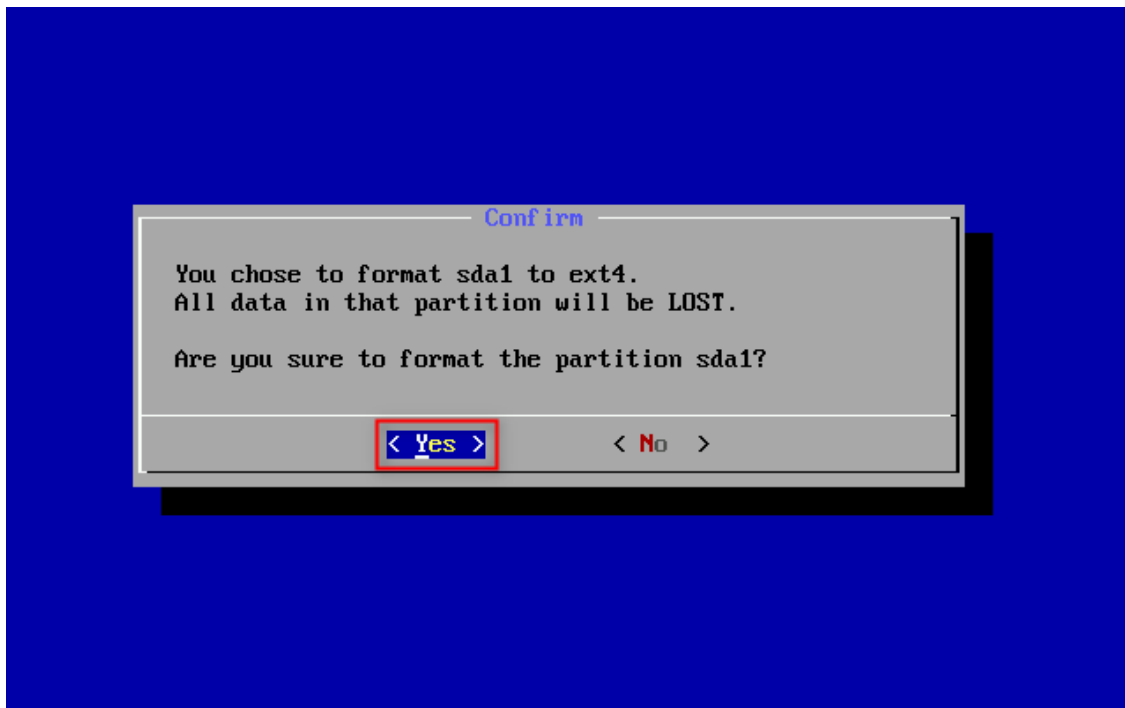

13. Select the partition for sa1 and select **OK** to continue.



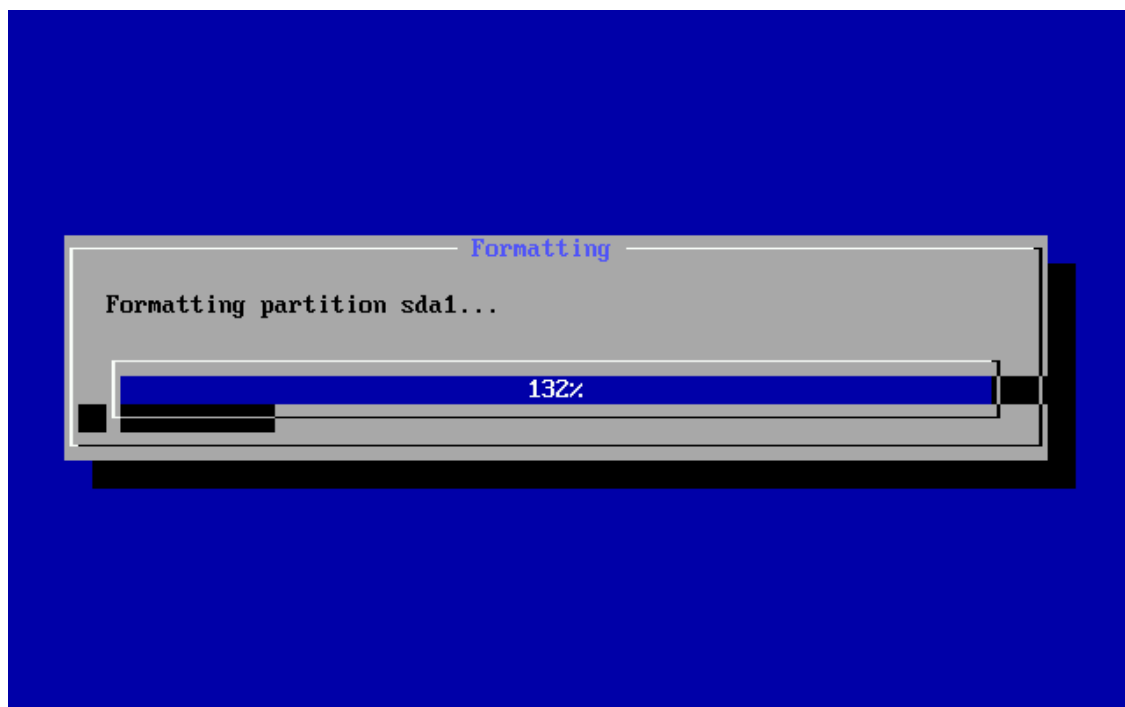
14. On the Choose filesystem screen, select partition **ext4** and select **OK** to format.



15. When the confirm prompt appears, select **Yes** and press **Enter**.

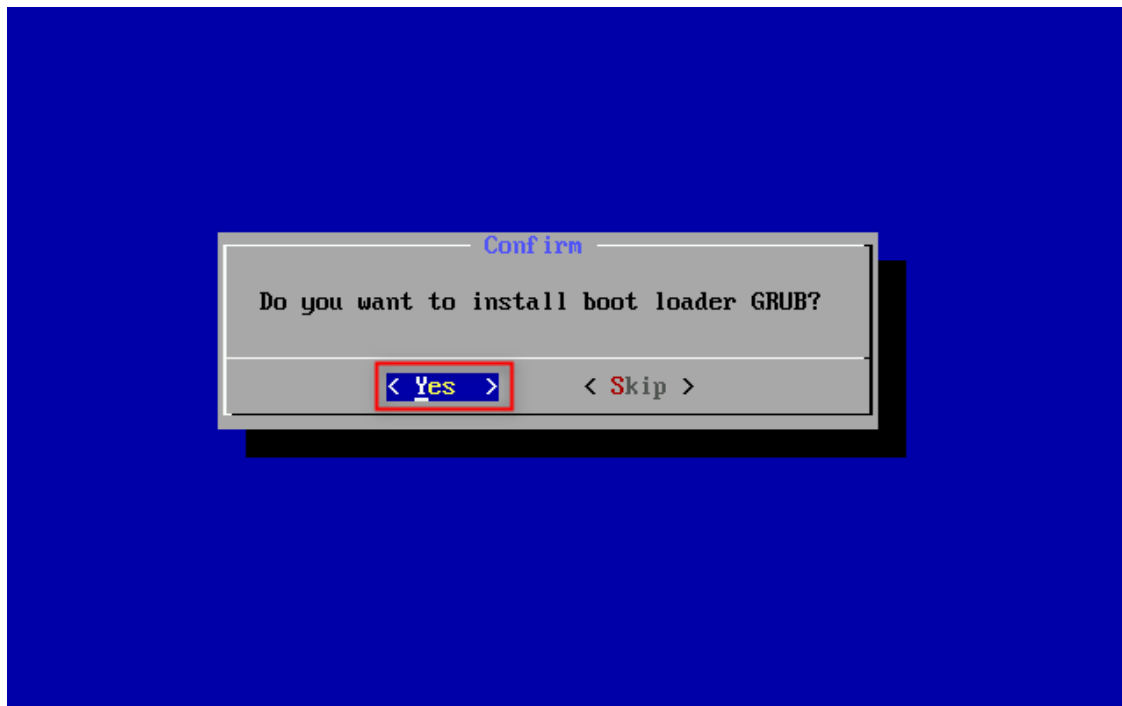


16. Wait for the formatting to complete.

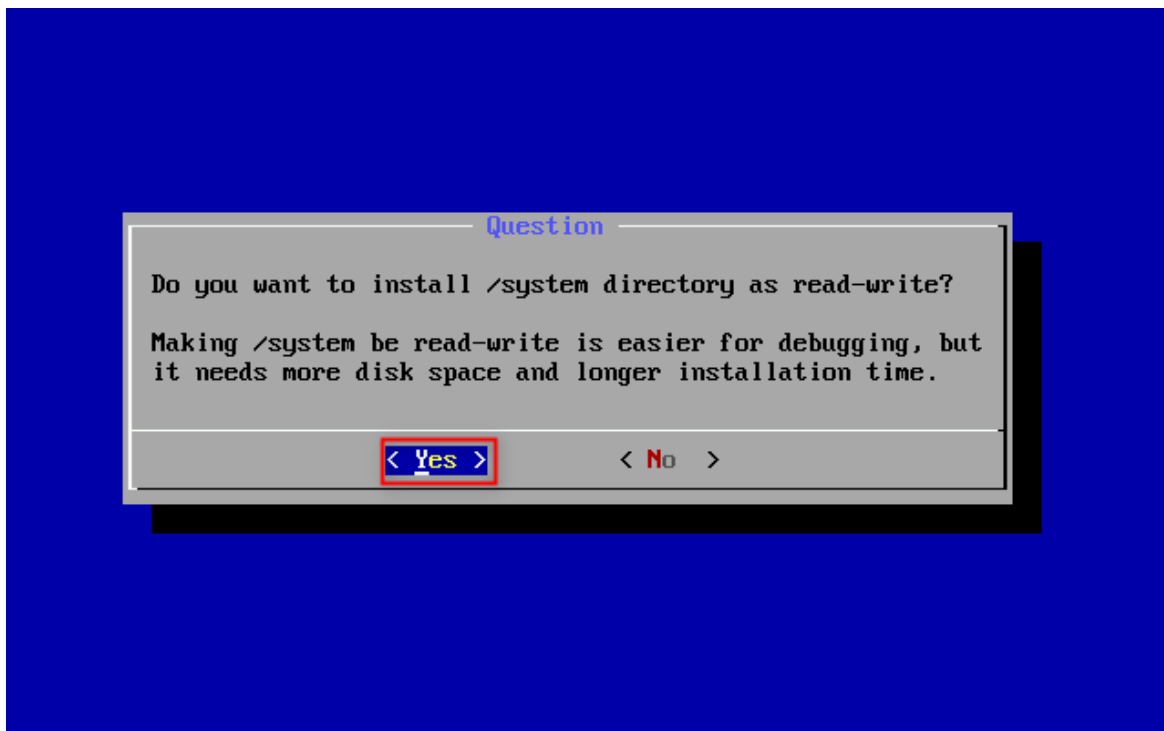


17.

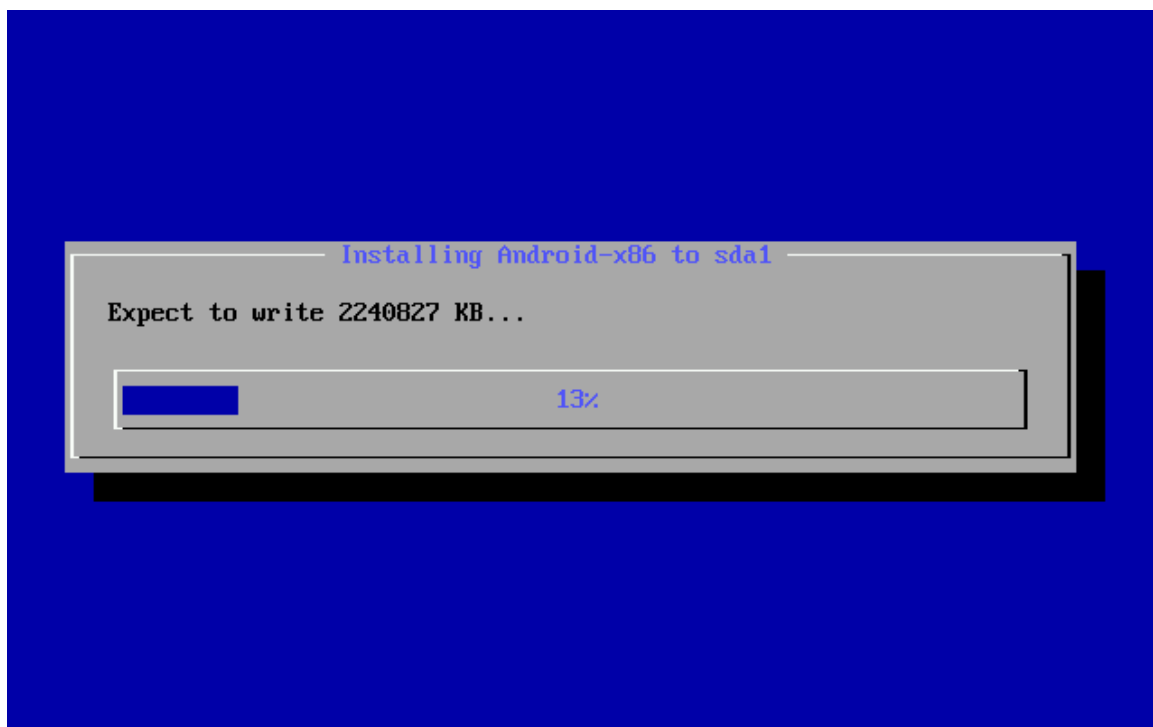
18. The Boot loader installation confirm prompt appears; select **Yes** and press **Enter**.



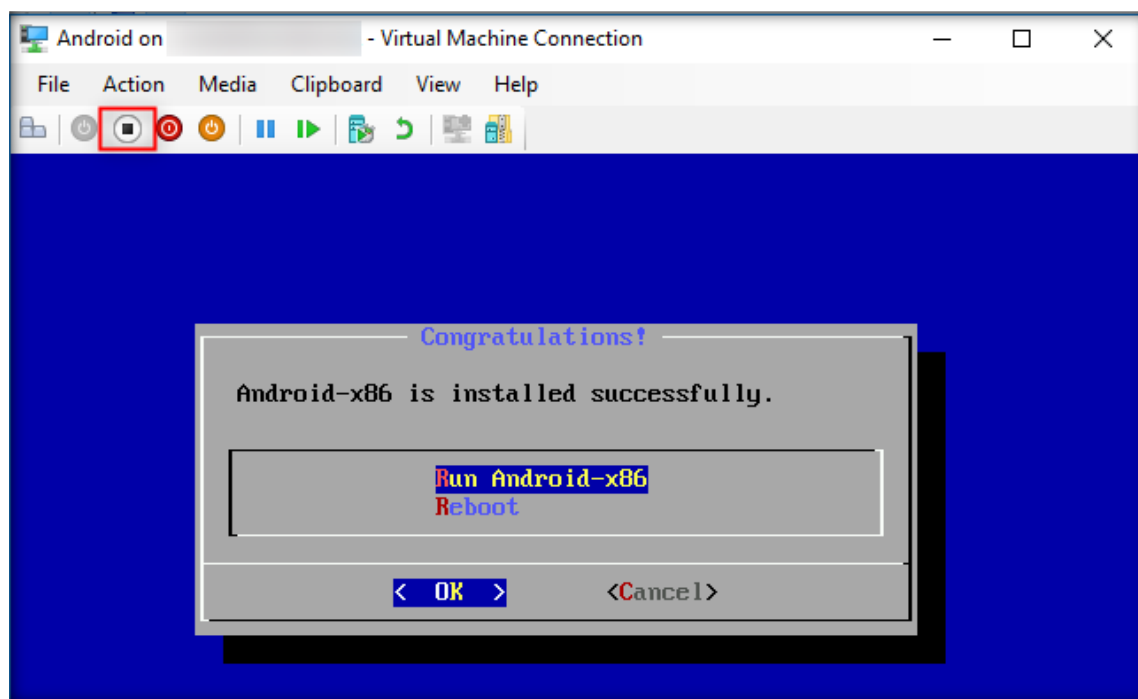
19. The Question section appears regarding the read-write installation; select **Yes** and press **Enter**.



20. Wait for the installation to complete.

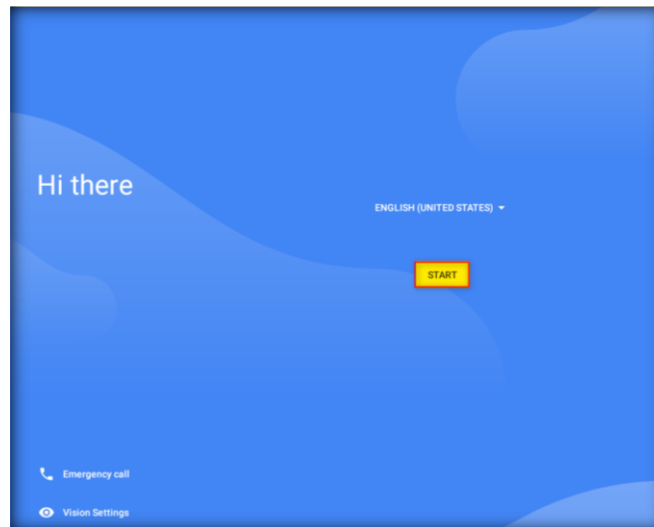


21. Once the installation is complete, a message indicating successful installation appears. Turn off the VM.

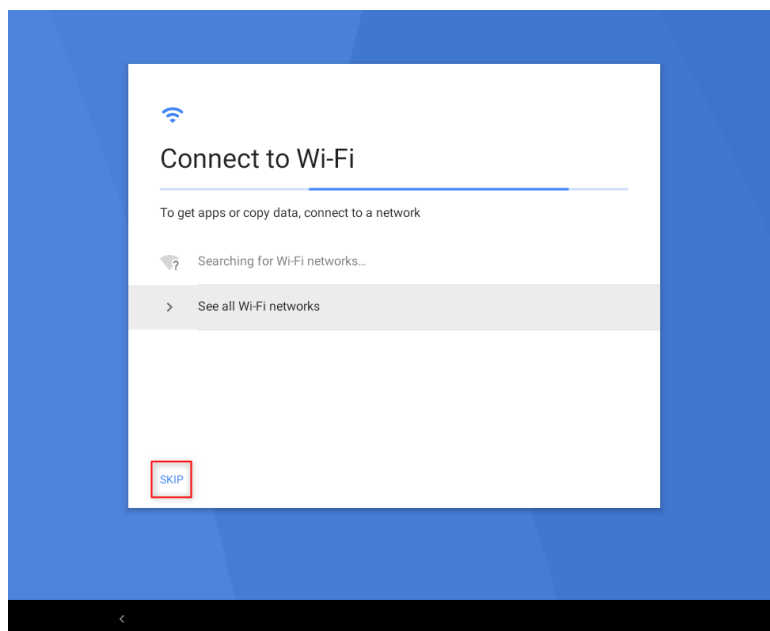


CT#17.2: Configure IP Addresses for Android

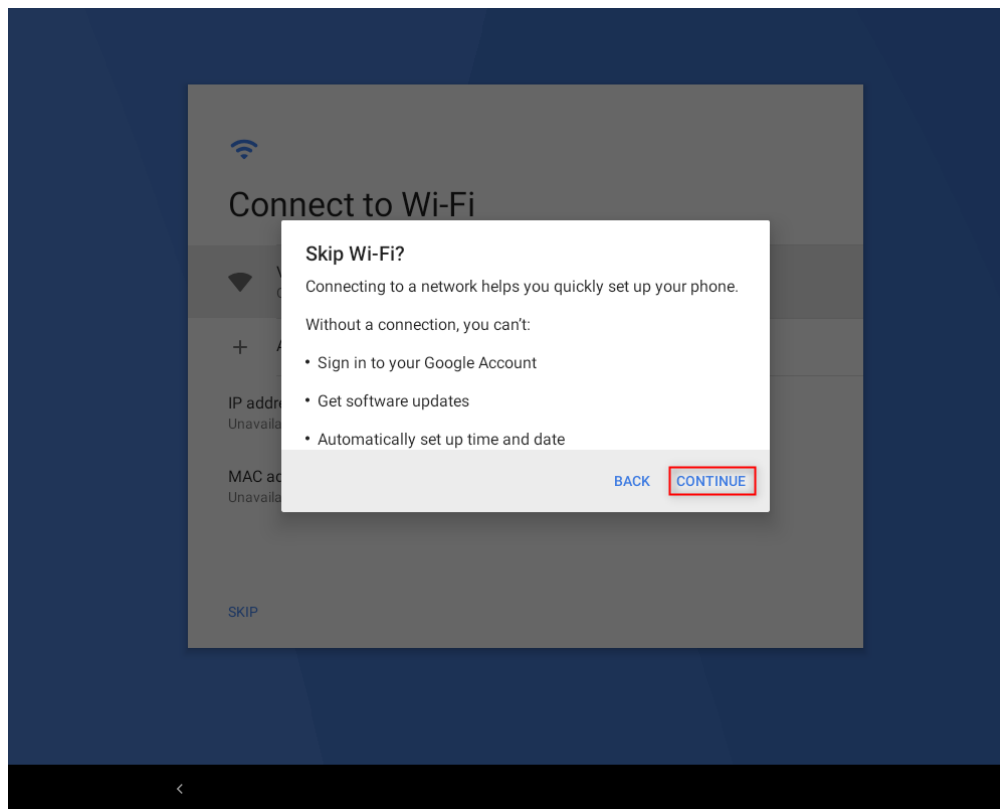
1. Before starting these configuration settings, make sure that the **pfSense Firewall VM** is running.
2. Launch VMWare and power On Android VM. Wait for the system to load the necessary files; once the Android screen appears, select **Next**.



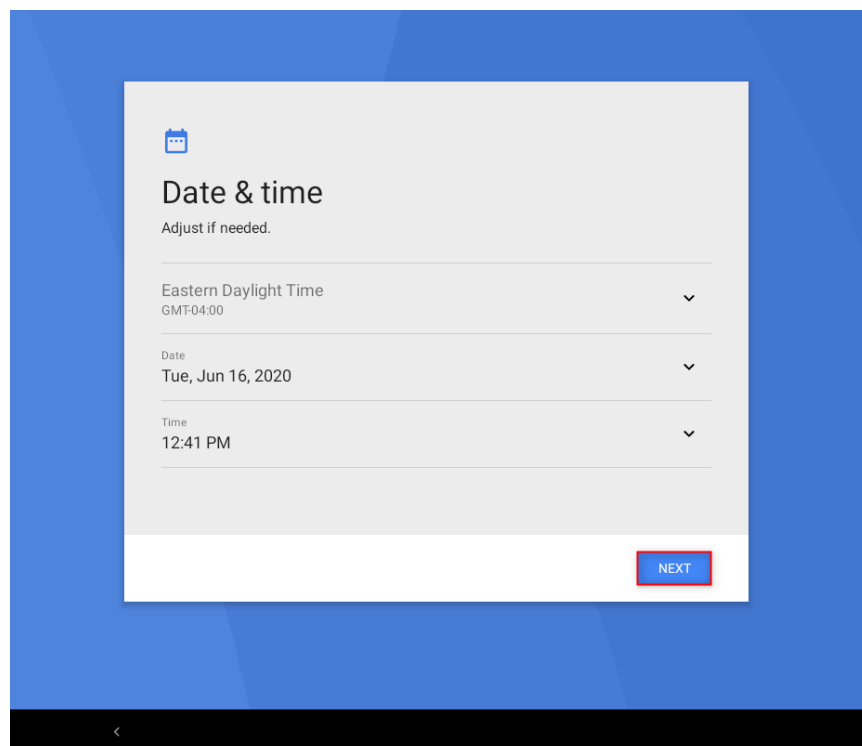
3. On the **Connect to Wi-Fi** screen, click **SKIP**.



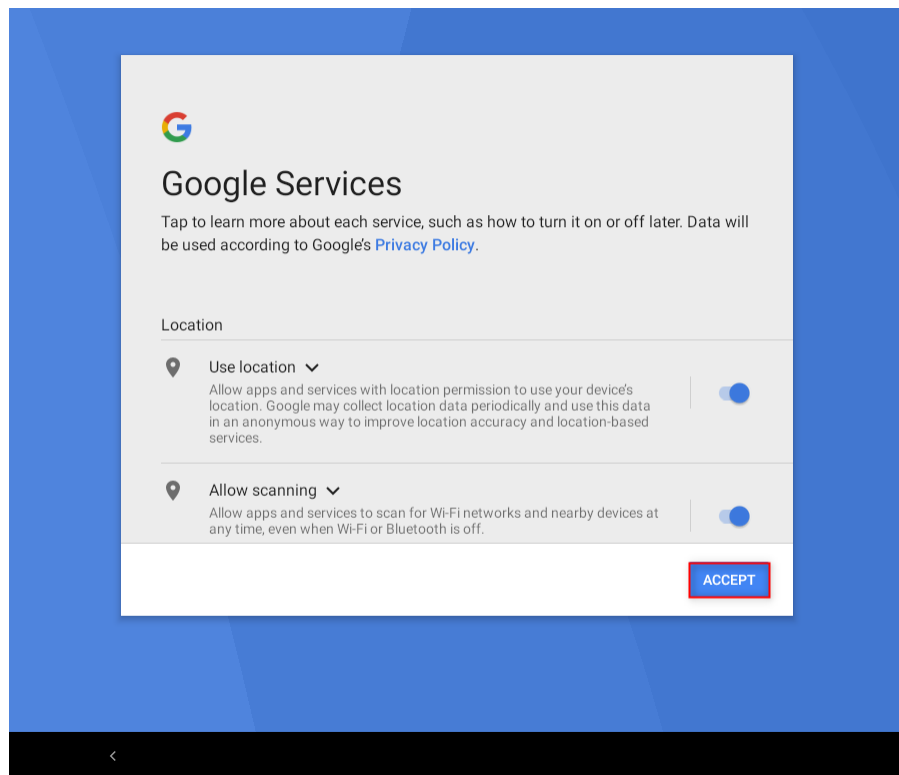
4. On the Skip screen, select **Continue**.



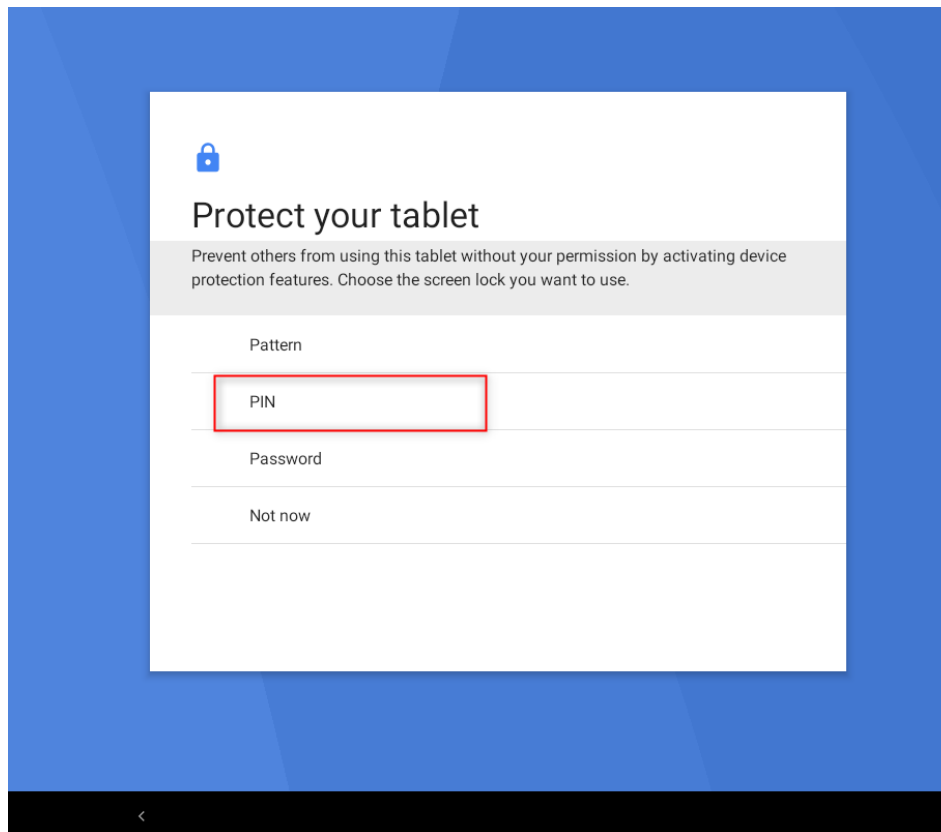
5. Set the date and time click **Next**.



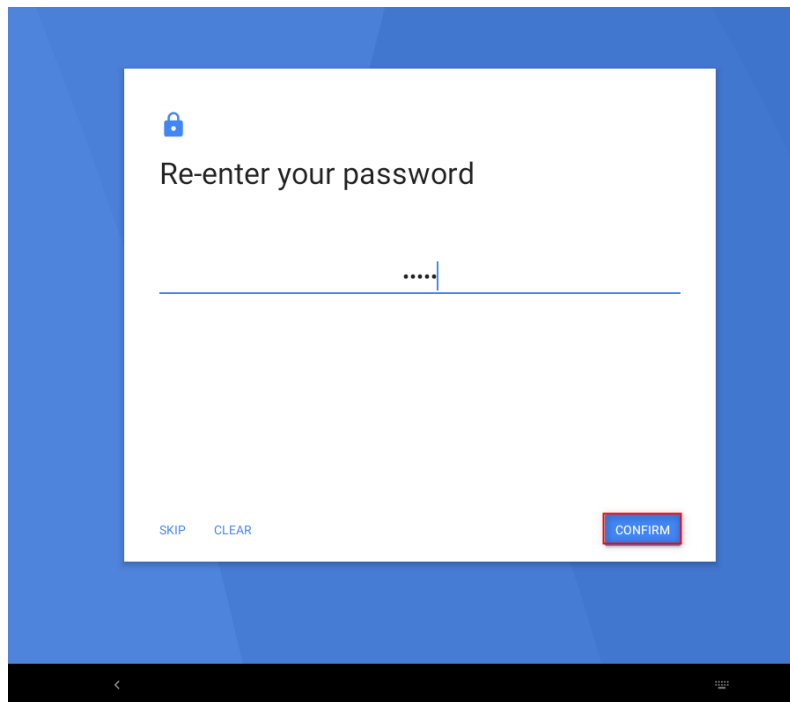
6. The Google services screen appears; scroll down and click **Accept**.



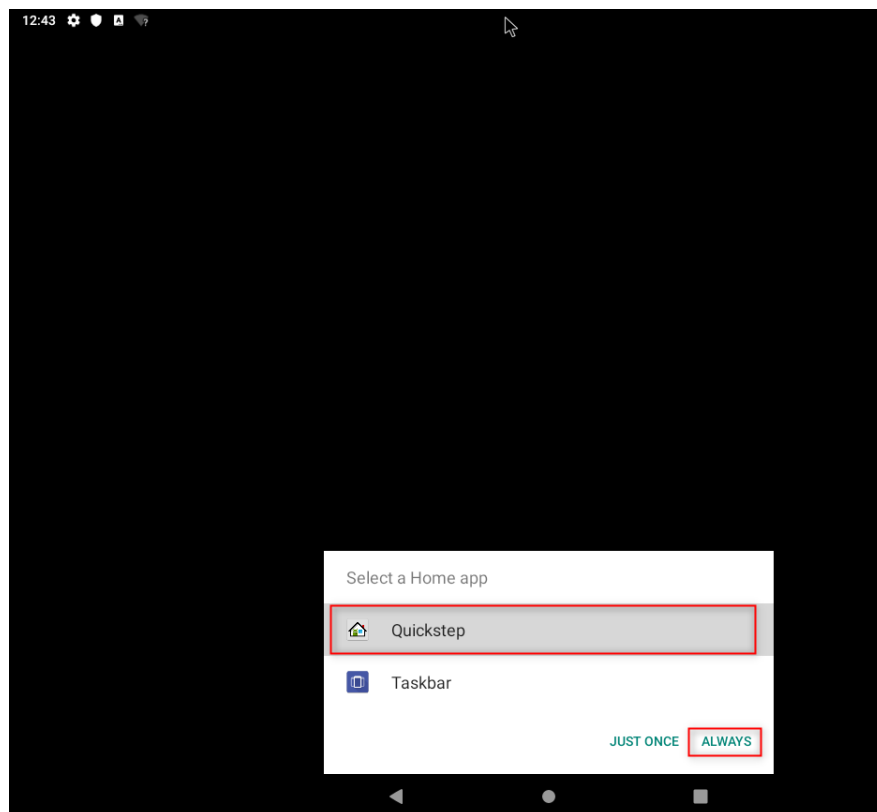
7. The Protect your tablet screen appears; select **Not Now**.



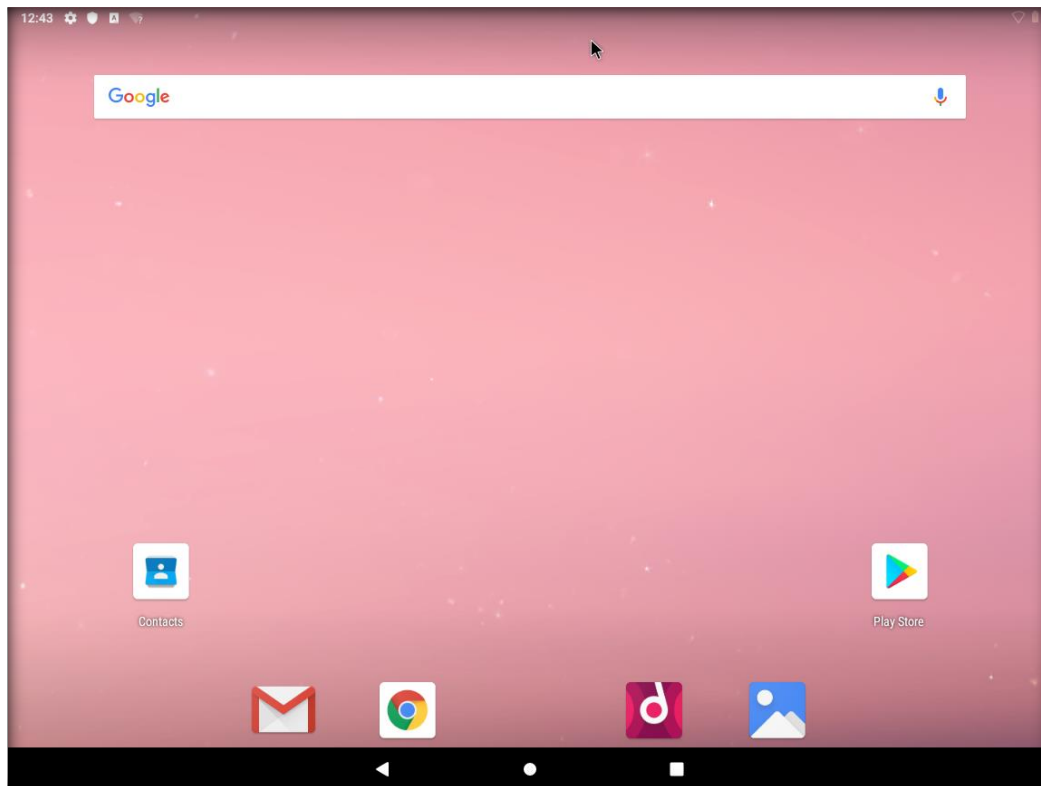
8. Enter Pin and **CONFIRM** to continue.



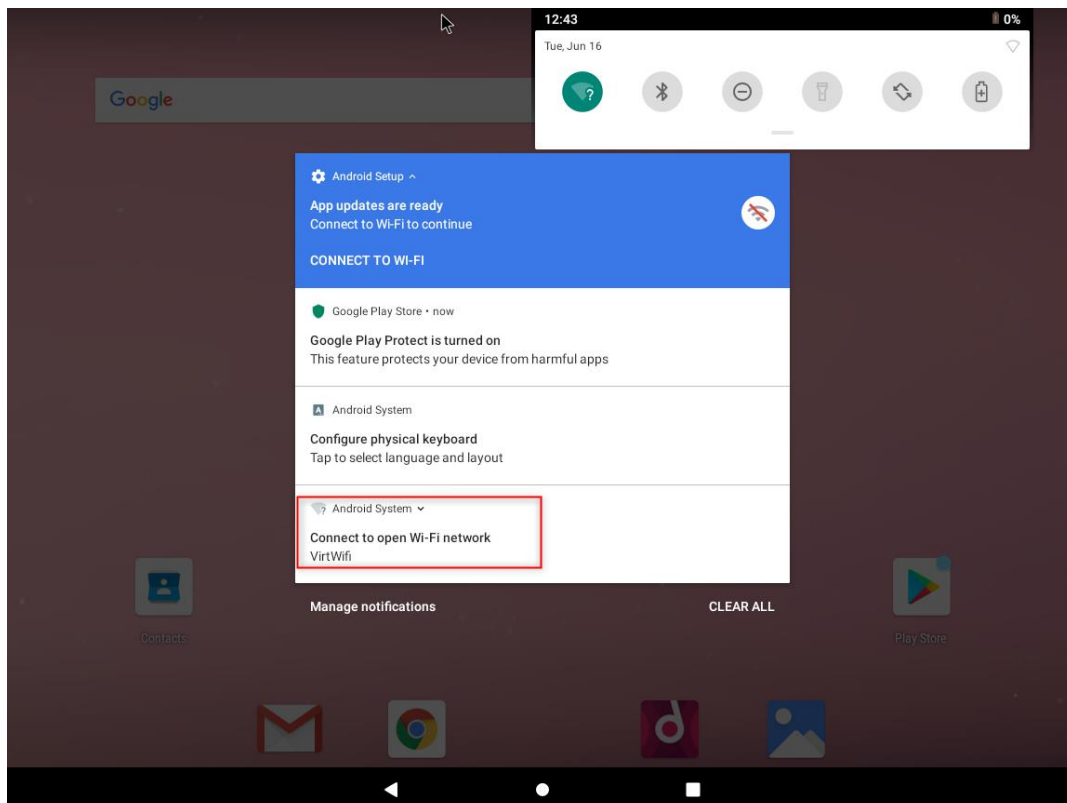
9. On the Android home screen, the home app selection appears; select **QuickStep** and click **Always**.



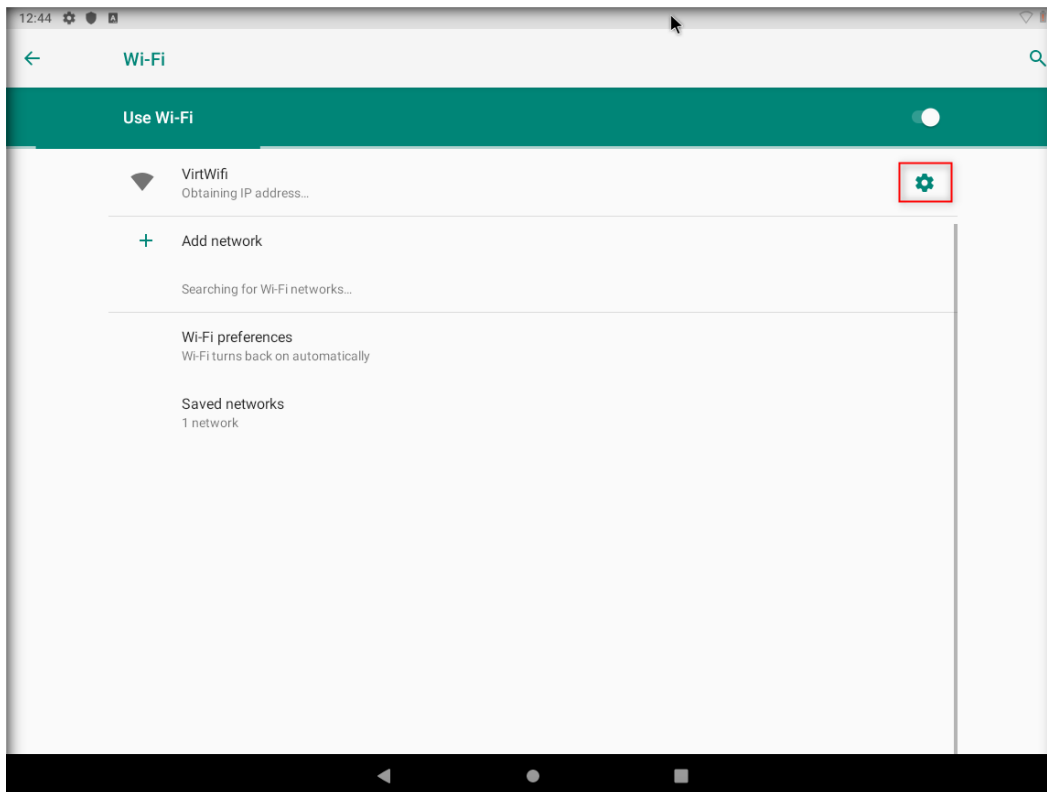
10. The Android Screen appears.



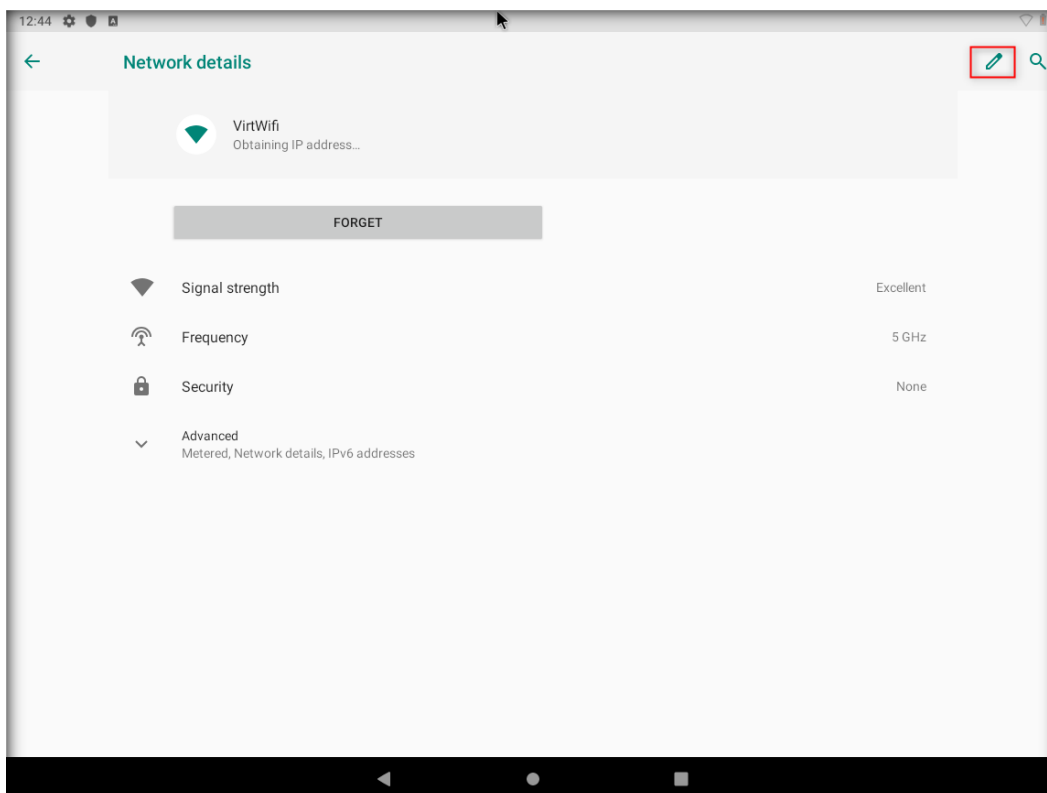
11. Slide down the Android setting from the top edge of the screen and select **Android System**.



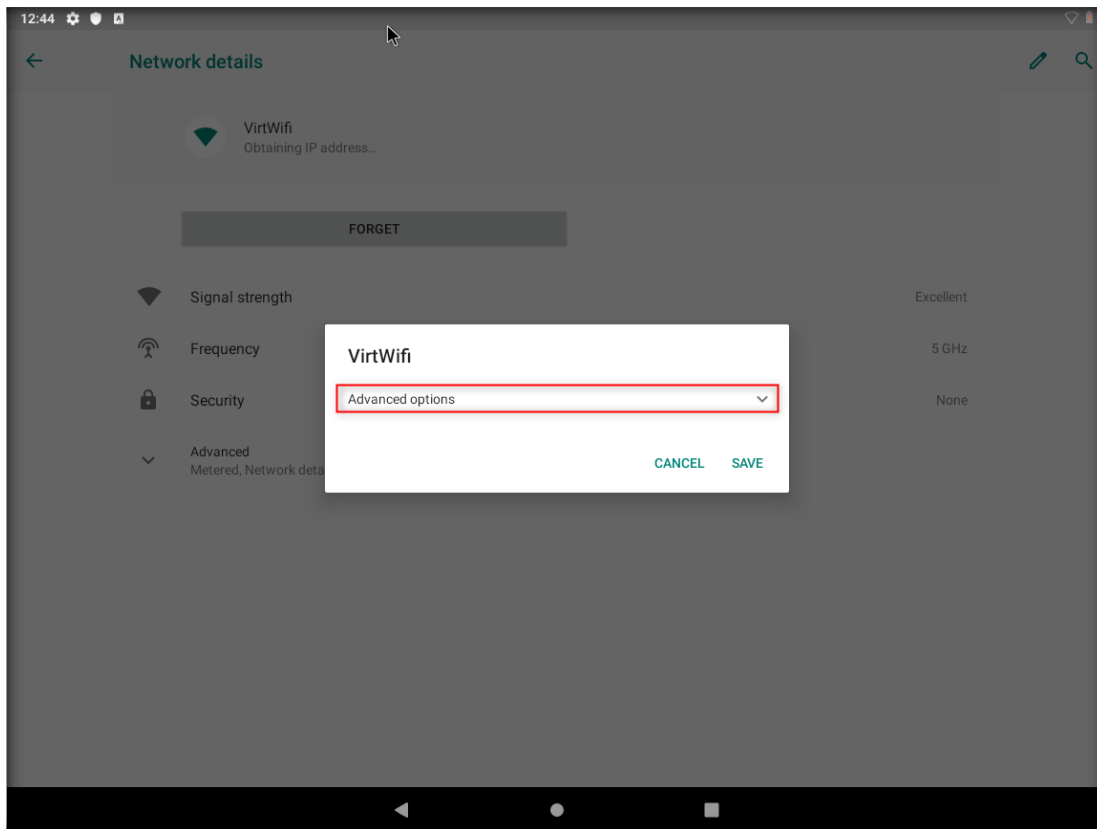
12. The **Wi-Fi** screen appears; select the setting icon of the **VirtWifi** connection.



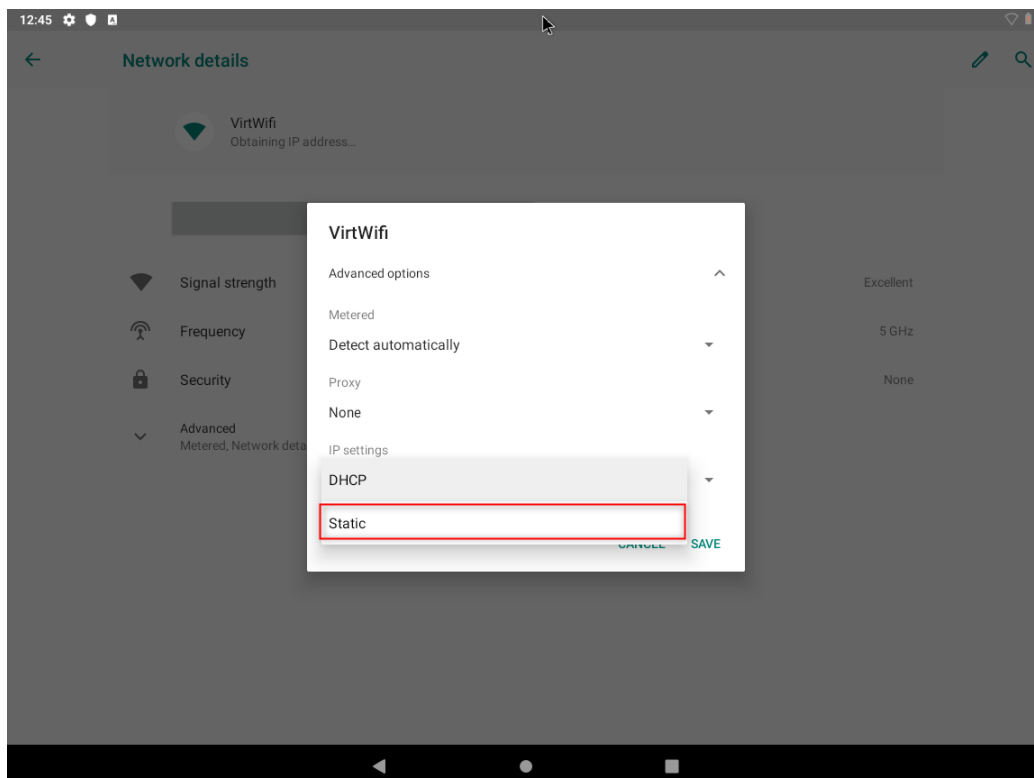
13. The Network details screen appears; select the **Edit** icon, as shown in the screenshot below.



14. The VirtWifi pop-up appears; select **Advanced option**.



15. Next, under IP settings, select **Static**.



16. In the static IP setting fields, type the following details and click **Save**:

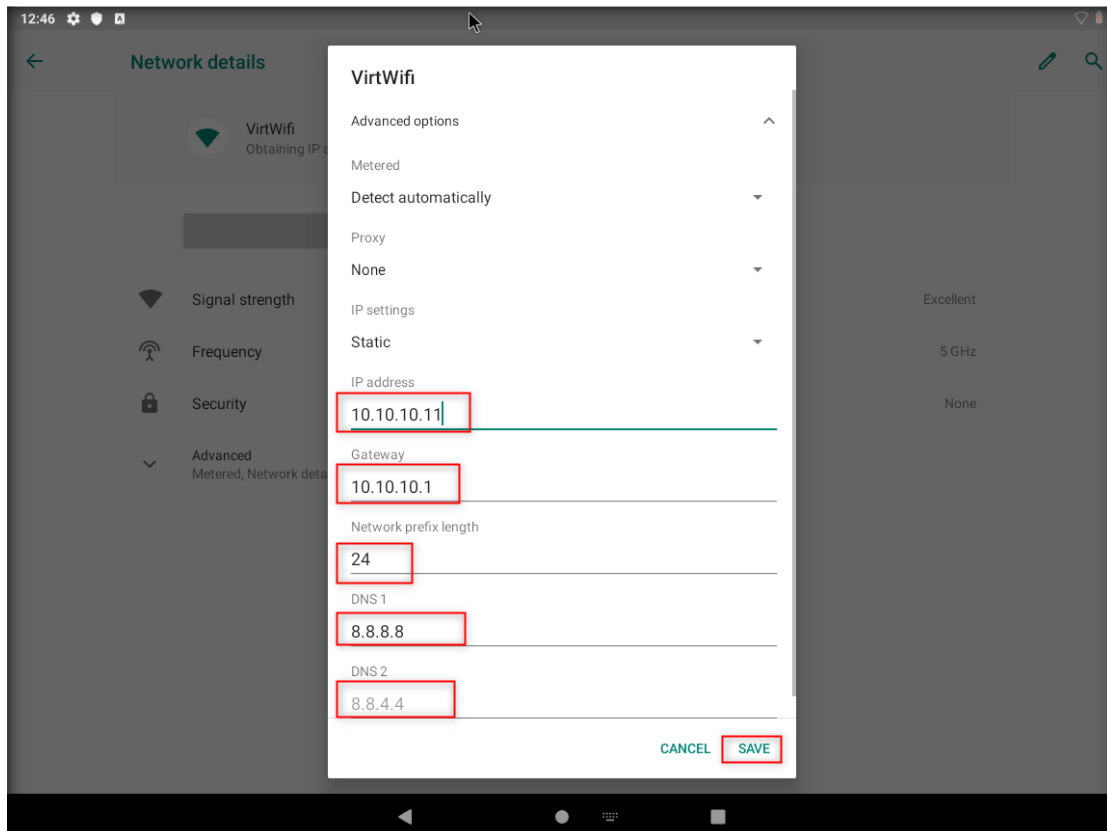
IP address: **10.10.10.11**

Gateway: **10.10.10.1**

Network prefix length: **24**

DNS1: **8.8.8.8**

DNS2: **8.8.4.4**



17. The network is now connected.

End of the Document