Windows Client Operating System

Agenda

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- Types of Networking
- How to Install Windows Operating system
- Computer Hardware Basics
- Windows 10
- Windows 10 Versions and Releases
- Windows 10 Desktop
- Windows and One Drive
- Windows 10 and Edge
- Windows 10 and Cortana
- Windows 10 Getting Help
- Windows 10 Start Menu
- Windows 10 Installation
- Windows 10 Administration

Agenda

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- Windows 10-Minimum Requirement
- Enabling Hyper-V and Win 10 Installation
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- Operating System Properties
- User Management
- Creating User from GUI
- Create Group from GUI
- Windows Updates
- Network Configuration
- Control Panel Items
- Basic Troubleshooting
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- Event Viewer
- Remote Management

Basic hardware requirements for Windows 10

- **Processor**:
  - 1 gigahertz (GHz) or faster processor or System on a Chip (SoC)
- **RAM:**
  - 1 GB for 32-bit or *2 GB for 64-bit*
- **Hard drive space**:
  - 16 GB for 32-bit OS or 20 GB for 64-bit OS
- **Graphics card:**
  - DirectX 9 or later with WDDM 1.0 driver
- **Display**:
  - 800x600 resolution

Basic hardware requirements for Windows 11

- **Processor**:
  - 1 gigahertz (GHz) or faster with at least 2 cores on a compatible 64-bit processor or System on a Chip (SoC)
- **RAM**:
  - 4 GB or more
- **Storage**:
  - 64 GB or larger storage device
- **System firmware**:
  - UEFI, Secure Boot capable
- **TPM**:
  - Trusted Platform Module (TPM) version 2.0
- **Graphics card**:
  - DirectX 12 compatible graphics / WDDM 2.x
- **Display**:
  - >9” with HD Resolution (720p)
- **Internet connection**:
  - Internet connectivity is necessary to perform updates and to download and take advantage of some features.

Windows 10 features

- Windows 10 is a versatile operating system that combines the best features of its predecessors with new functionalities.
- Key Features:
  - **Start Menu**: Reintroduced with a blend of traditional and modern UI elements.
  - **Cortana**: Integrated virtual assistant for voice commands and tasks.
  - **Microsoft Store**: Access to a wide range of apps, games, music, and movies.
  - **Continuum**: Smooth transition between desktop and tablet modes.
  - **Security**: Enhanced security features like Windows Defender, BitLocker, and biometric login with Windows Hello.
  - **Updates**: Regular updates for new features, security patches, and performance improvements.

Windows 11 features

- **New Start Menu and Taskbar:**
  - Centered Start Menu with a simplified design and Taskbar for a cleaner look.
- **Snap Layouts and Snap Groups:**
  - Easily organize open windows into different layouts and quickly switch between them.
- **Virtual Desktops:**
  - Create multiple desktops for different purposes (work, personal, gaming) and switch between them seamlessly.
- **Widgets:**
  - Personalized feed with news, weather, calendar, and more, accessible directly from the Taskbar.
- **Microsoft Teams Integration:**
  - Integrated Teams chat for quick access to messaging, calling, and video conferencing.

Windows 11 features

- **Microsoft Teams Integration:**
  - Integrated Teams chat for quick access to messaging, calling, and video conferencing.
- **Enhanced Gaming Experience:**
  - DirectStorage for faster loading times and Auto HDR for improved visuals in games.
- **Redesigned Microsoft Store:**
  - User-friendly with a wider range of apps, including support for Android apps via the Amazon Appstore.
- **Improved Touch and Pen Support:**
  - Better touch interactions and enhanced pen functionality for tablets and 2-in-1 devices.
- **System Performance Improvements:**
  - Optimizations for better efficiency, battery life, and overall performance.
- **Security Enhancements:**
  - Advanced security features like hardware-based isolation, encryption, and malware protection.
- **New Settings App:**
  - Redesigned Settings app with a more intuitive and organized layout.

Windows Client OS Versions and Release Dates

Windows Version	Release Date
Windows 1.0	November 1985
Windows 2.0	December 1987
Windows 3.0	May 1990
Windows 3.1	April 1992
Windows 95	August 1995
Windows 98	June 1998
Windows ME	September 2000
Windows XP	October 2001
Windows Vista	January 2007
Windows 7	October 2009
Windows 8	October 2012
Windows 8.1	October 2013
Windows 10	July 2015
Windows 11	October 2021

Windows 10 Editions

Windows Edition	Purpose/Target Audience
Windows 10 Home	General consumer use with features like Cortana, Edge, and basic security updates.
Windows 10 Pro	Professionals and small businesses with features like BitLocker, Remote Desktop, and business updates.
Windows 10 Pro for Workstations	Advanced users needing high performance, ReFS file system support, and persistent memory.
Windows 10 Enterprise	Large organizations with advanced security, management, and deployment features like Device Guard and Credential Guard.
Windows 10 Education	Educational institutions with features similar to Windows 10 Enterprise, optimized for students and educators.
Windows 10 Mobile	Smartphones and small tablets with a touch-optimized interface.
Windows 10 Mobile Enterprise	Similar to Windows 10 Mobile but with added management and security features for businesses.
Windows 10 IoT Core	Internet of Things (IoT) devices with limited functionality focused on connected devices and sensors.

Windows 11 Editions

Windows 11 Home	General consumer use with features like Microsoft Teams integration and enhanced gaming experience.
Windows 11 Pro	Professionals and small businesses with features like BitLocker and support for Azure Active Directory.
Windows 11 Enterprise	Large organizations with advanced security and management features.
Windows 11 Education	Educational purposes with features similar to Windows 11 Enterprise, optimized for students and teachers.
Windows 11 SE	Education sector, optimized for low-cost devices and streamlined for classroom efficiency.

Windows One-Drive

- Windows OneDrive is a cloud storage service provided by Microsoft.
- It allows users to store files and data in the cloud, making them accessible from any device with an internet connection.

Key Features of OneDrive	
File Storage	Store documents, photos, videos, and other files in the cloud.
Accessibility	Access your files from anywhere, on any device (PC, Mac, smartphones, tablets).
File Sharing	Share files and folders with others, allowing collaboration in real-time.
Syncing	Automatically sync files between your devices, ensuring you always have the latest version.
Security	Files are encrypted both in transit and at rest, providing robust security.
Integration with Microsoft 365	Seamlessly integrates with Microsoft Office apps like Word, Excel, and PowerPoint for easy collaboration and editing.
Version History	Keep track of changes to your files and revert to previous versions if needed.
Offline Access	Access your files offline by syncing them to your device.

Windows 10 Cortana

- Cortana is a virtual assistant developed by Microsoft that integrates with Windows operating systems and other Microsoft services.
- Key Features of Cortana:

✓ Voice Commands

✓ Reminders and Alarms

✓ Calendar Management

✓ Email Assistance

✓ Web Searches

✓ Task Management

✓ Information and Updates

✓ Smart Home Integration

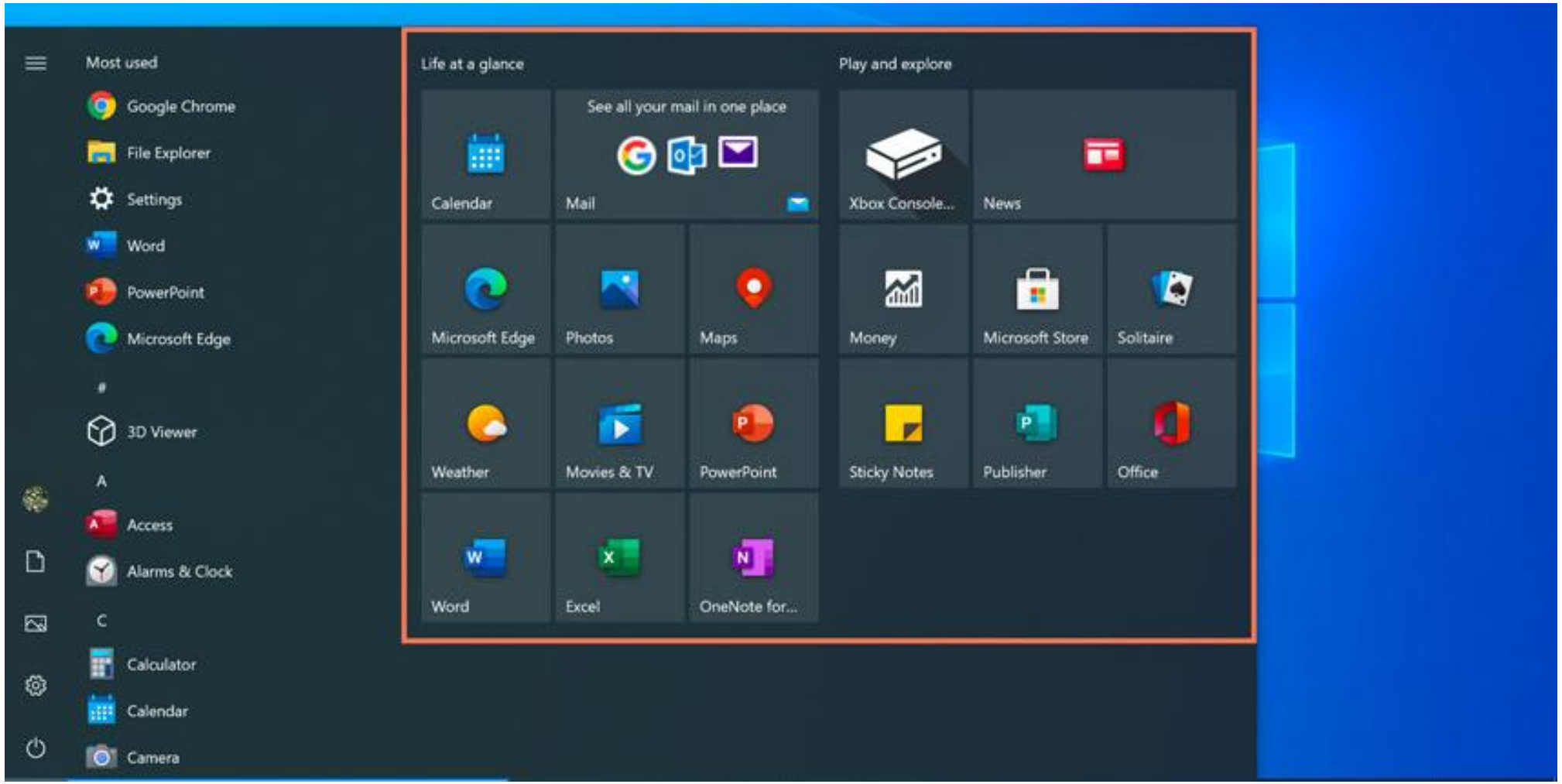
✓ Music and Entertainment

✓ Notebook Feature

✓ Multi-Device Sync

✓ Security and Privacy

Windows 10 Start Menu



Windows 10 Administration

- **Control Panel:**
  - Access to various system settings and configurations.
- **Device Manager:**
  - Manages hardware devices and drivers.
- **Disk Management:**
  - Tools for managing disk partitions and volumes.
- **Task Manager:**
  - Monitors system performance and running applications.
- **Event Viewer:**
  - Logs and reviews system events and errors.

Windows 10 Administration

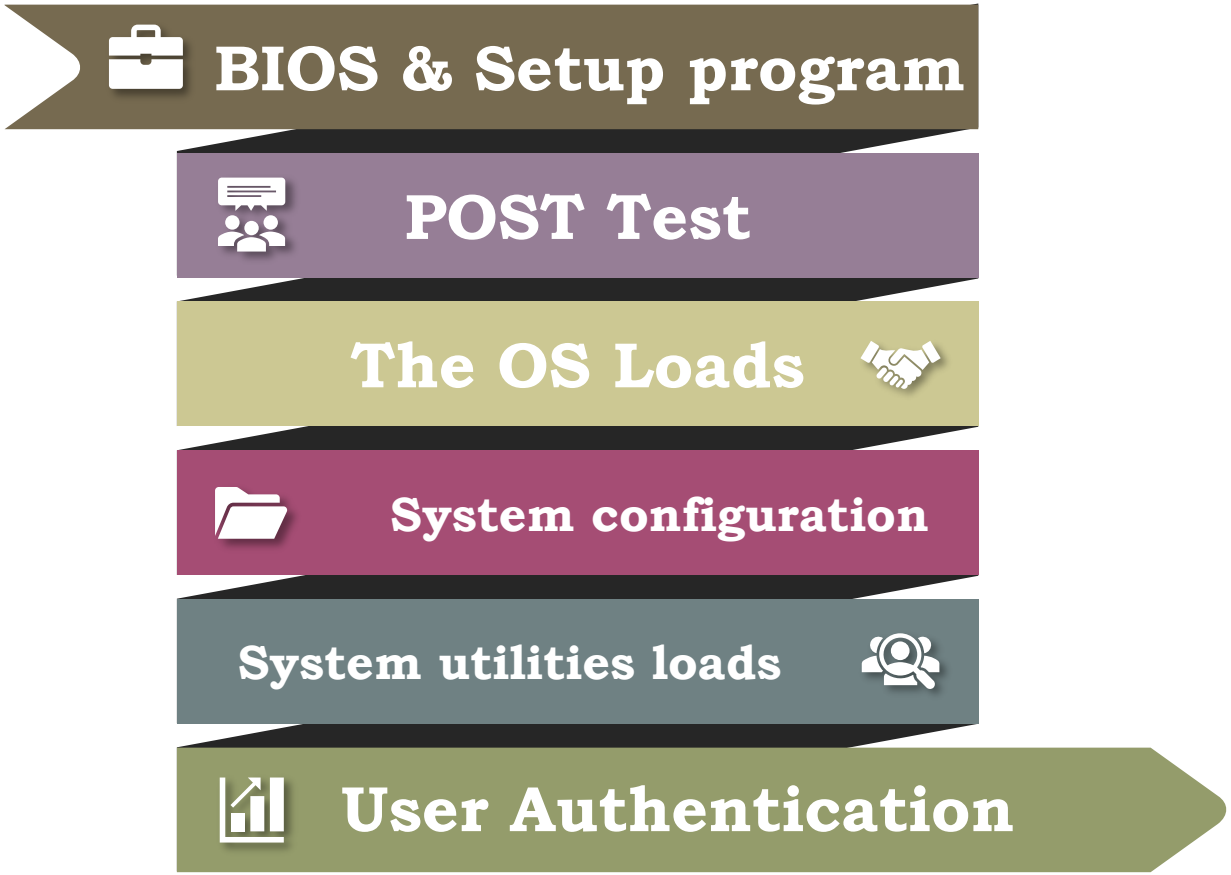
- **Computer Management:**
  - Central hub for various administrative tools like Shared Folders, Local Users and Groups, and more.
- **Administrative Tools:**
  - Includes tools like Performance Monitor, Component Services, and Windows Memory Diagnostic.
- **Local Group Policy Editor:**
  - Manages group policies for users and computers.
- **Windows Update:**
  - Manages updates and patches for the operating system.
- **Backup and Restore:**
  - Tools for backing up and restoring files and system images.

Windows Boot Process

Ways to boot the Windows OS

- **Cold boot**
  - When a computer starts for the 1st time, after power on button is pressed.
- **Hard/Warm boot**
  - Computer restarts while powered on during the hard boot.
  - This is useful while installing or uninstalling the software or updating the machine.

Windows Boot Process



Windows Boot Process (Step 1)

BIOS/EFI

- **BIOS** = Basic Input Output System
  - perform a test POST test
  - Power On Self Test = checking of hardware devices
- **EFI** = Extensible Firmware Interface
  - UEFI = Unified Extensible Firmware Interface
  - its a software between OS & platform firmware (hardware)

Windows Boot Process (Step 2)

MBR

- Master Boot Record
- It contains the **address of operating system**
- The size of MBR is “**512 bytes**”.
- The MBR is limited to handling disk sizes up to 2 terabytes (TB).

Windows Boot Process (Step 3)

Volume Boot Sector

- Its a boot sector (by IBM), that contains necessary code to start the boot process.
- The Volume Boot Sector is the first sector of a partitioned storage device that contains code and data necessary to start the boot process for an operating system installed on that volume.

Windows Boot Process (Step 4)

bootmgr.exe

- It accesses the boot configuration data stored & uses the information to load the operating system and calls "winload.exe" or "winresume.exe"
  - **winload.exe**
    - This loads the necessary device drivers & the core part of the OS i.e, kernel (**ntoskrnl.exe**)
  - **winresume.exe**
    - its an OS file that resumes from hibernate boot mode.

Windows Boot Process (Step 5)

ntoskrnl.exe

- The kernel file getting called by bootmgr.exe.
- Full form is “Windows **NT o**perating **s**ystem **kernel exe**cutable”.
- ntoskrnl.exe is the kernel of the Windows operating system, which acts as the core part of the OS, managing interactions between hardware and software.
- It handles memory allocation and deallocation, ensuring that applications have access to the necessary memory resources.
- It manages running processes, ensuring they operate correctly and efficiently.

Windows Boot Process (Step 6)

HAL.DLL

- *Hardware Abstraction Layer. Dynamic Link Library*
- It is a crucial component of windows OS as it acts as a bridge between hardware & software to communicate efficiently.
- This means that the operating system can interact with hardware devices in a consistent manner, without needing to know the specifics of each device.
- By abstracting hardware details, hal.dll helps ensure system stability and compatibility across different hardware configurations.
- It optimizes hardware performance by managing low-level functions and ensuring efficient use of system resources.

Windows Boot Process (Step 7)

SMSS.exe - Session **M**anager **S**ub-**S**ystem

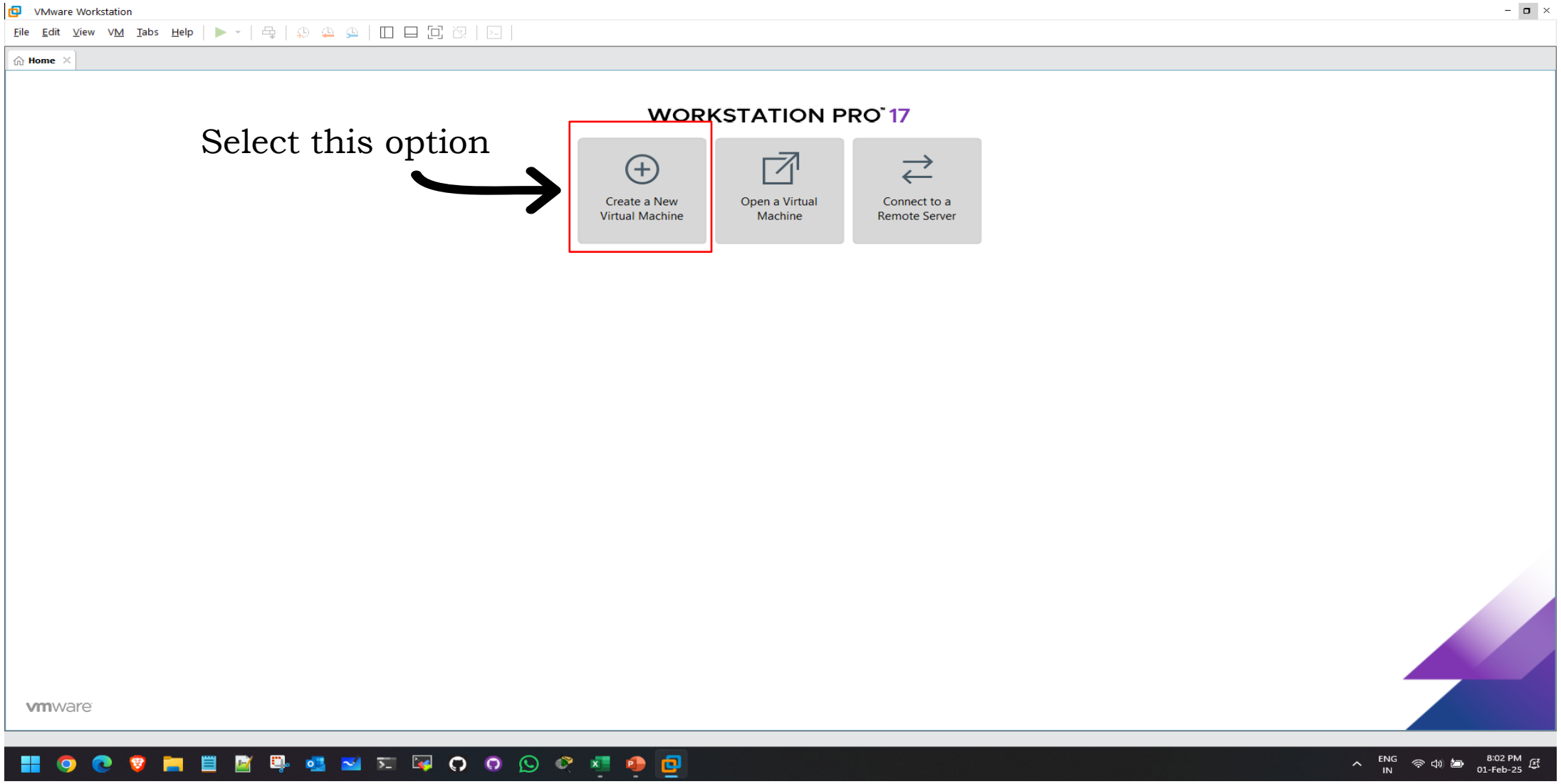
- Its the 1st user mode process started by kernel.
- Once started, it creates additional paging files, env variables located at registry.
- This manager is responsible for starting the kernel and user mode of Win32 system.
- Including win32k.sys, winsrv.dll & csrss.exe (user mode)
- It is also responsible for doing any operations that are requested to be done at the start of the session. Like "autochk" & "convert".
- This manager also started the registry keys.
- After windows vista, SMSS creates a temporary instance of itself that launches the windows startup application (wininit.exe) and a second client/server runtime subsystem (csrss.exe) for dedicated session to start system process
- From here, the windows startup application starts the service control manager (services.exe)

Windows Boot Process (Step 8)

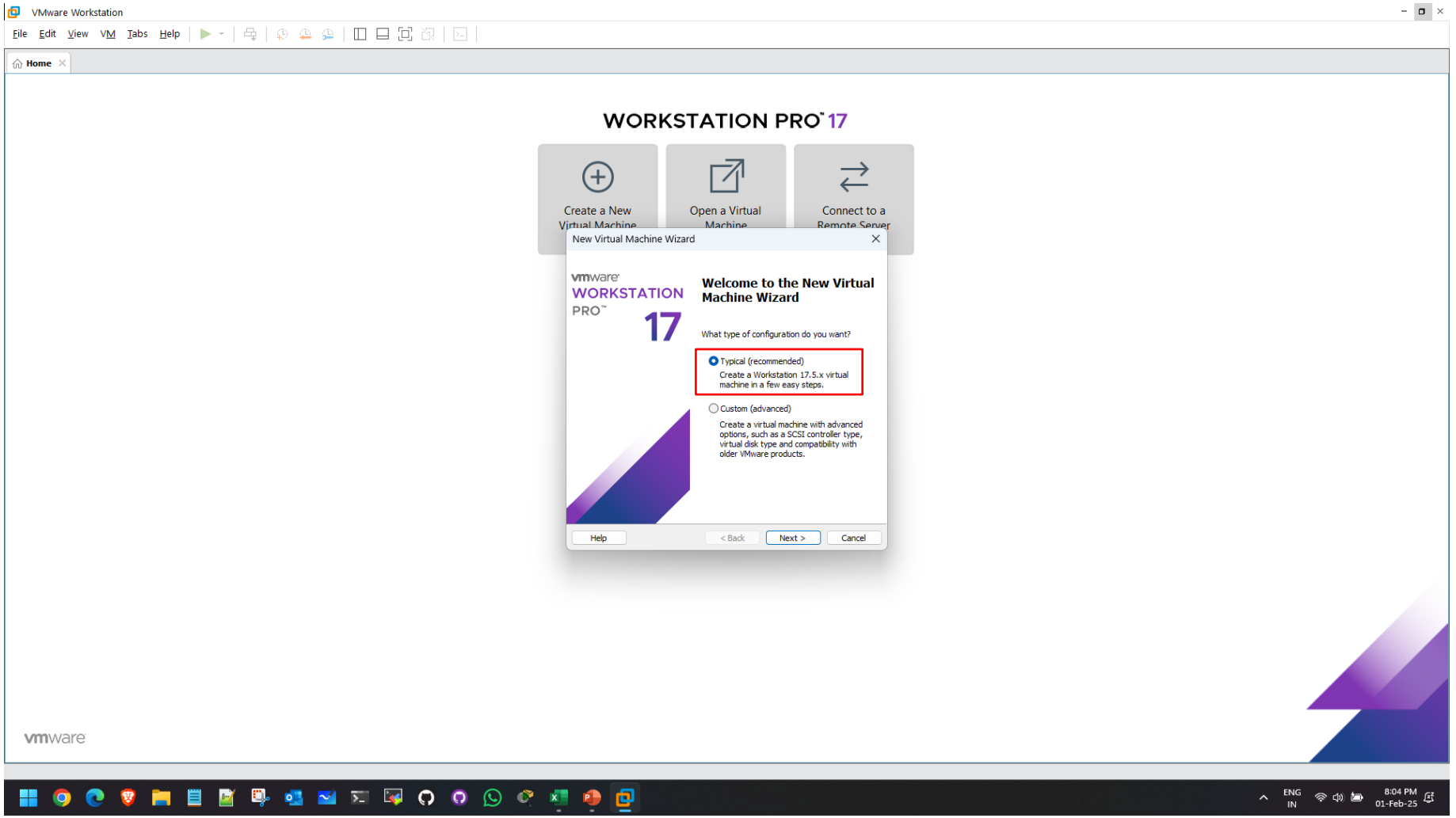
CSRSS.exe

- Client/Server Runtime Sub-System
- Primarily, it will load the process & thread mgmt, console windows handling, side by side assembly & shutdown process.
- This is a very CRUICIAL process, as killing one process can lead to crash of the OS giving the **BSOD** (**B**lue **S**creen **o**f **D**eath).

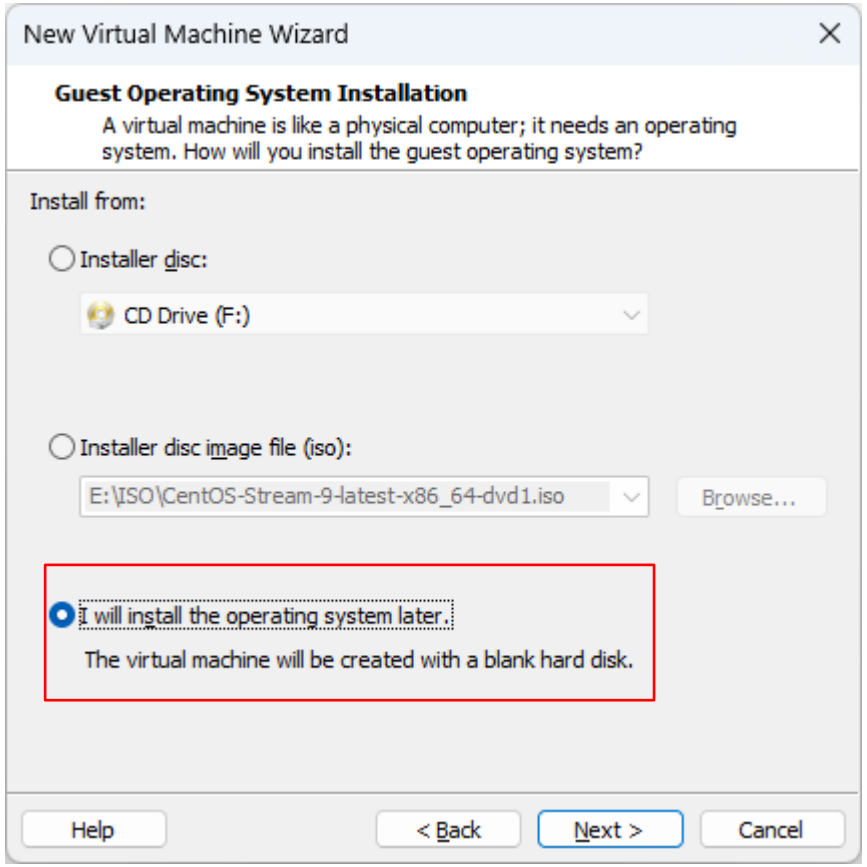
Creating a Virtual Machine



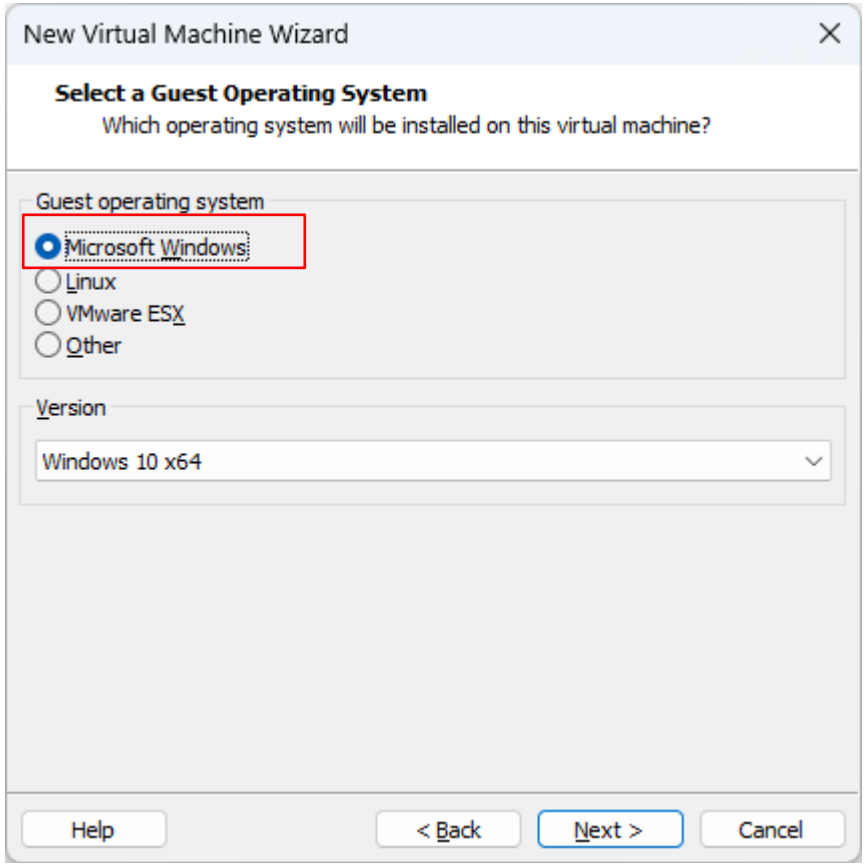
Select typical



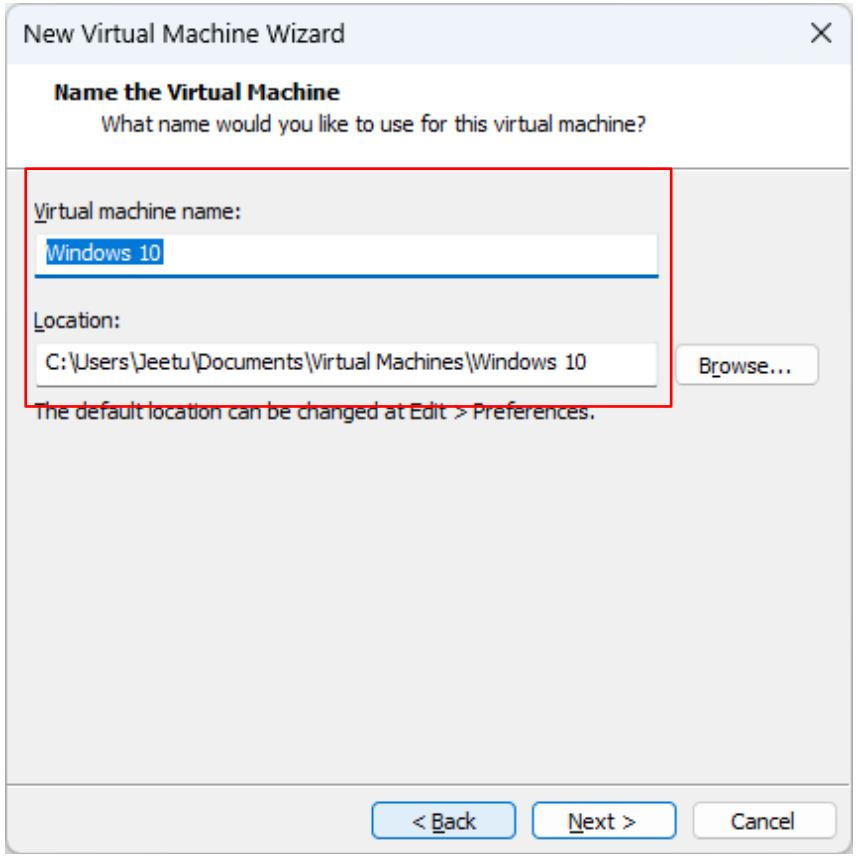
Select “I will install OS later”



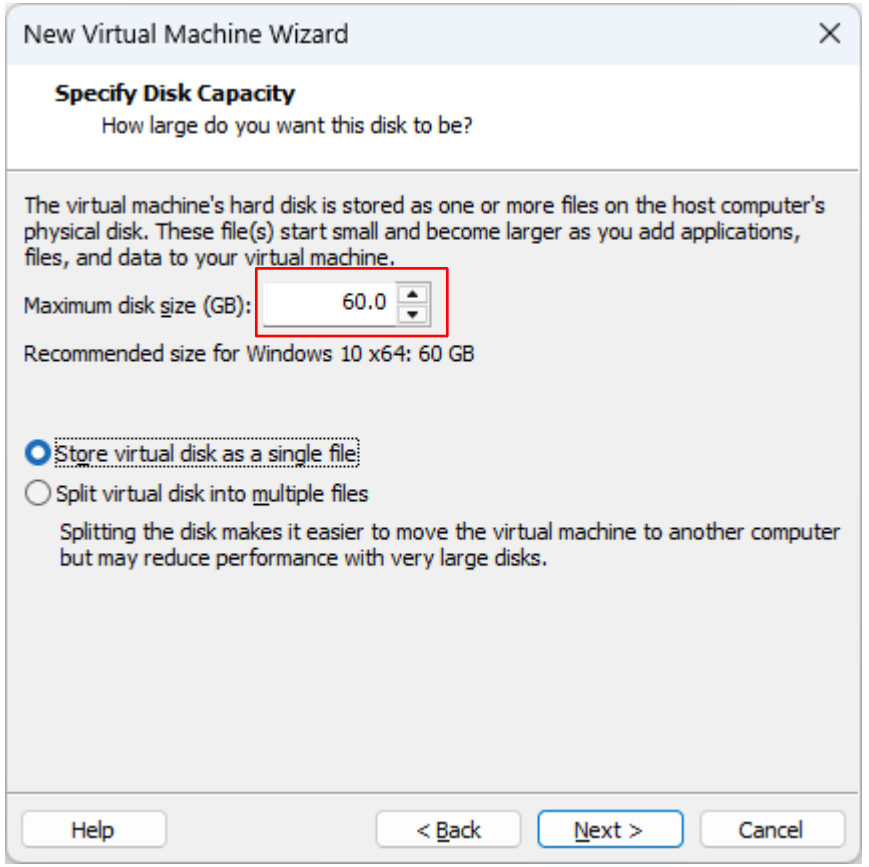
Select Microsoft Windows OS



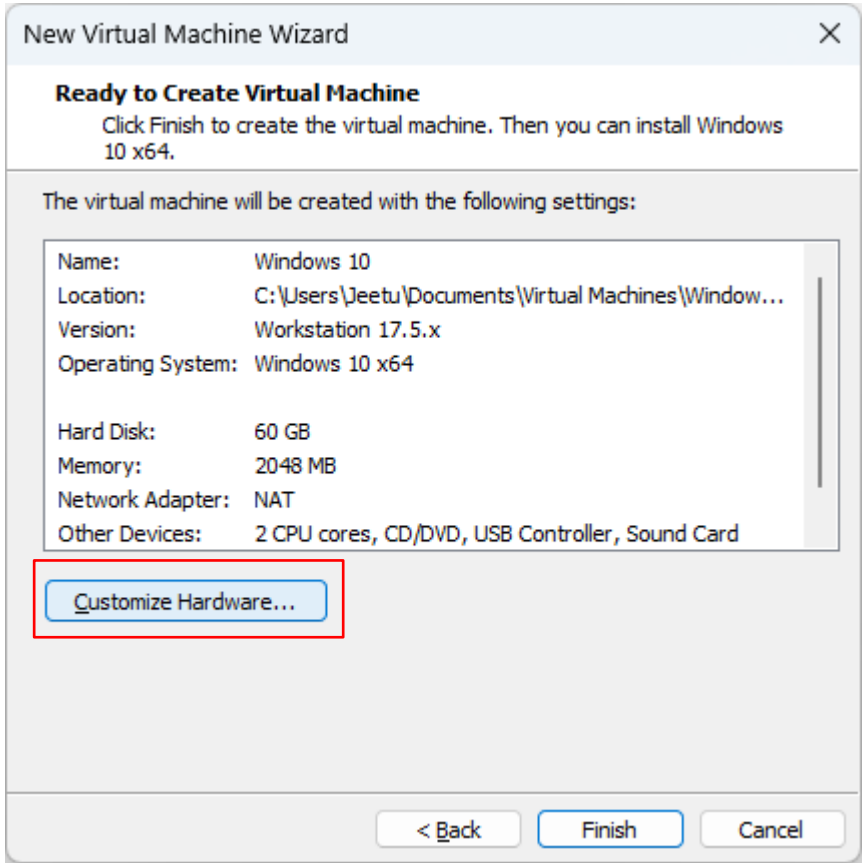
Select VM Name & location



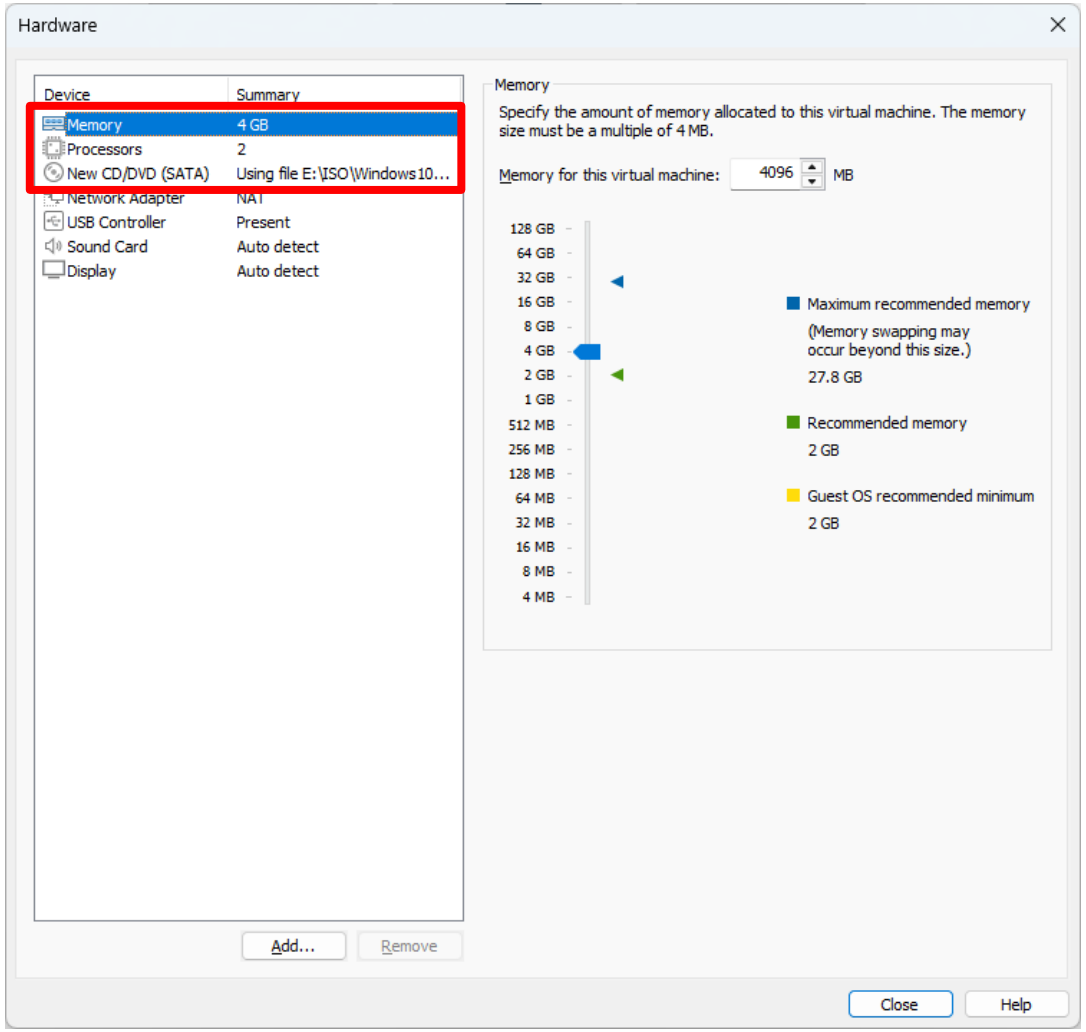
Select HDD size



Customize hardware

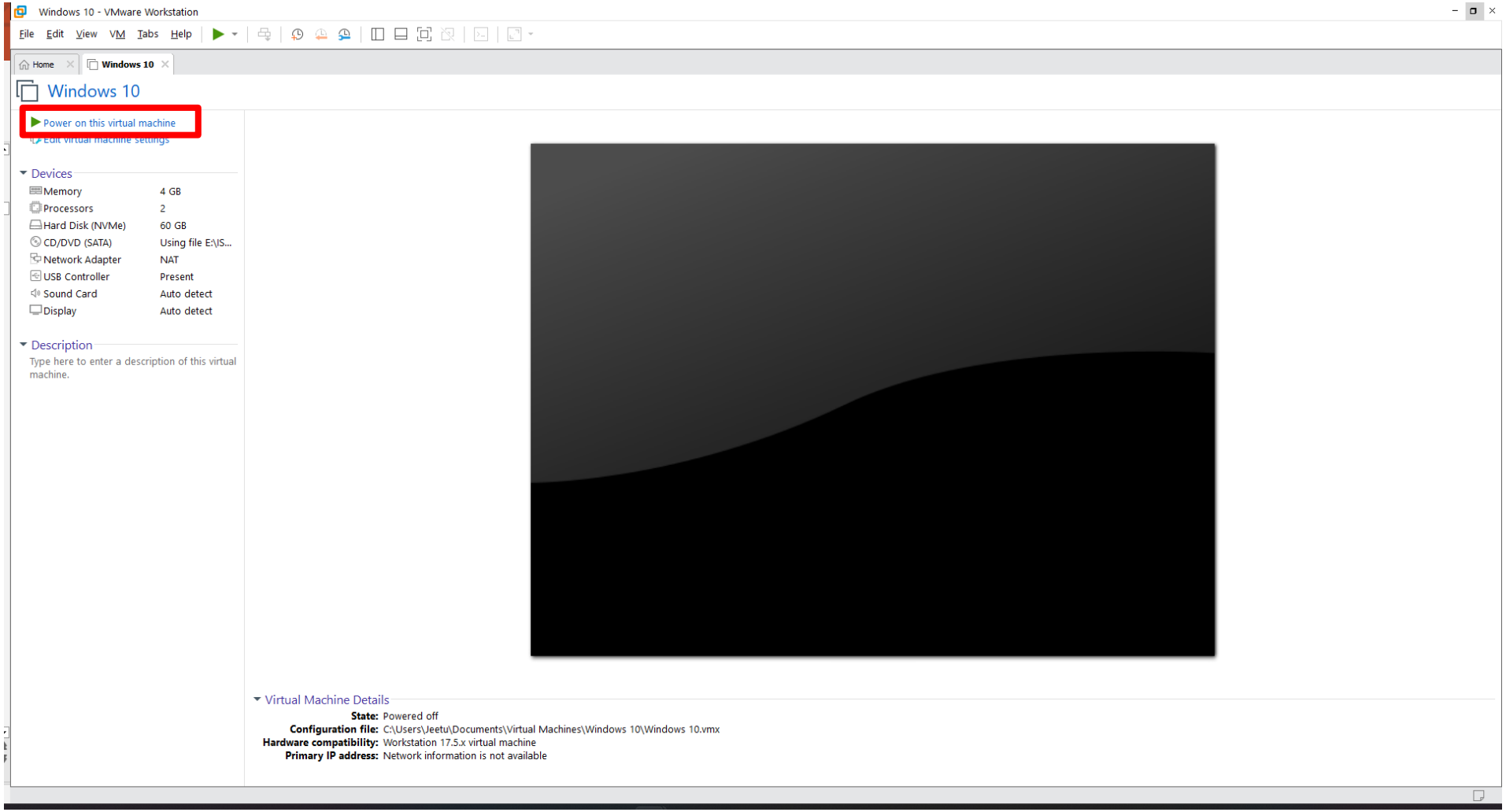


Select RAM & Attach Win10 ISO

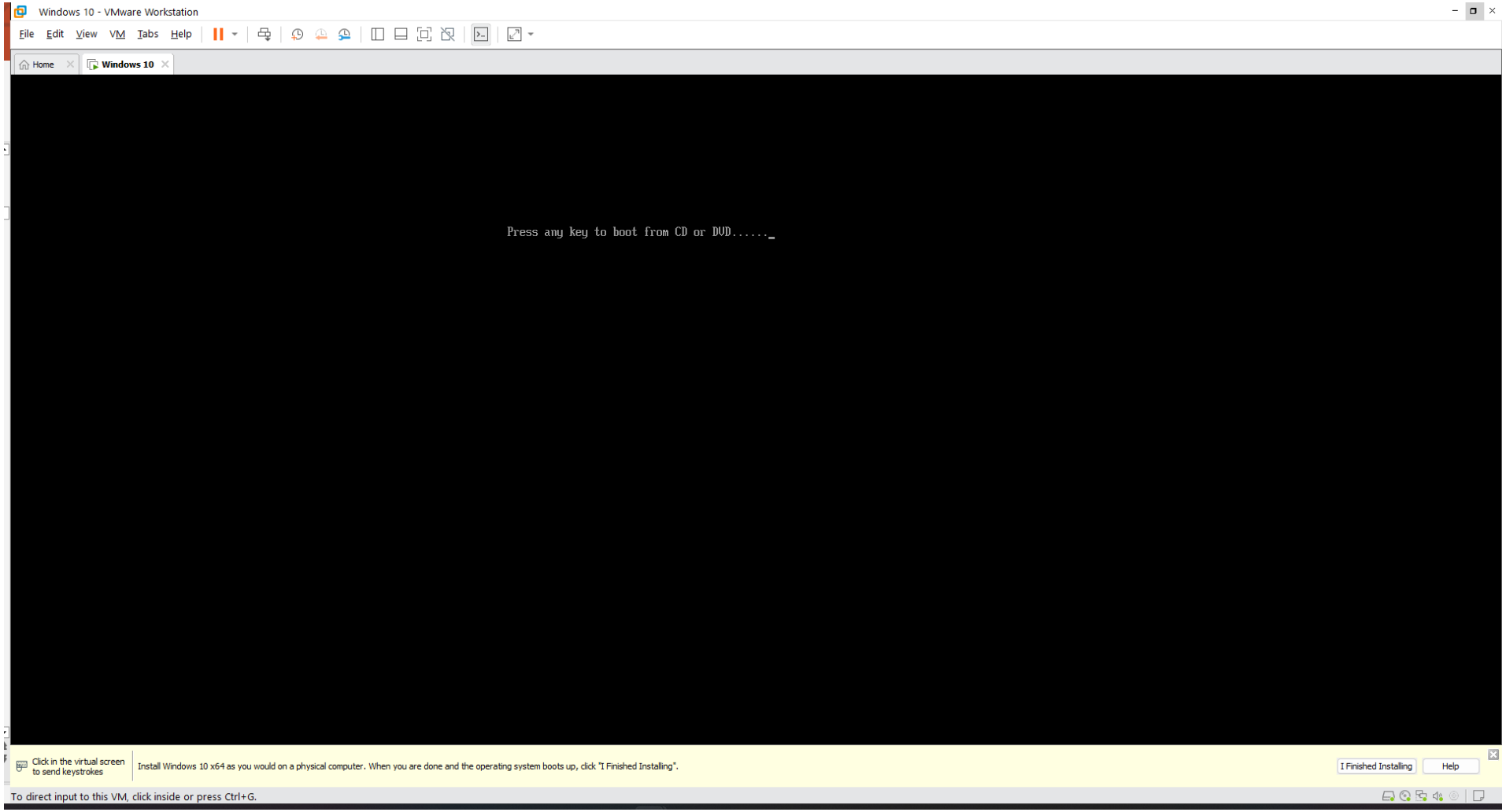


Then close and finish

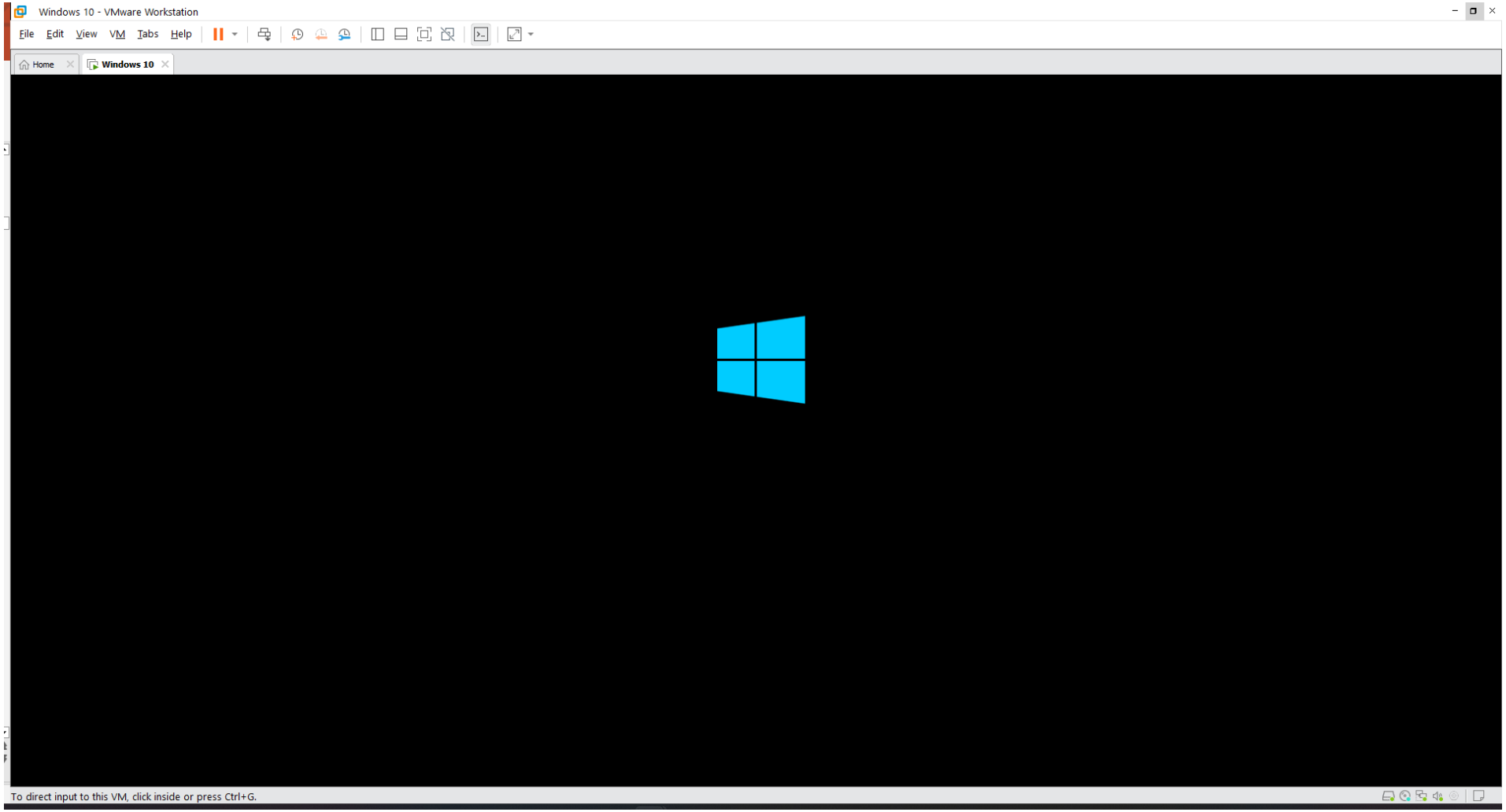
Click on “Power On” to start VM



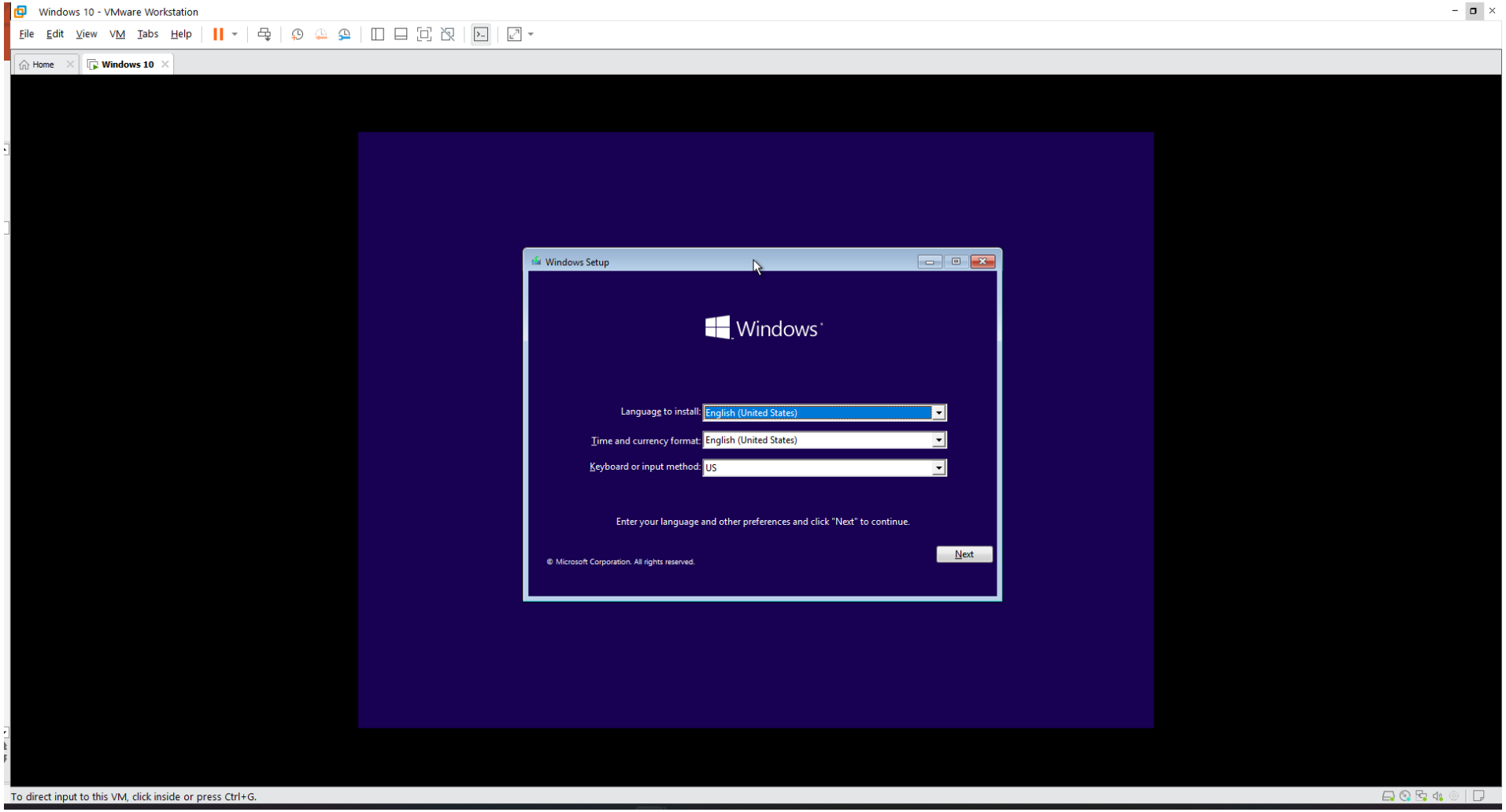
Press any to key to boot



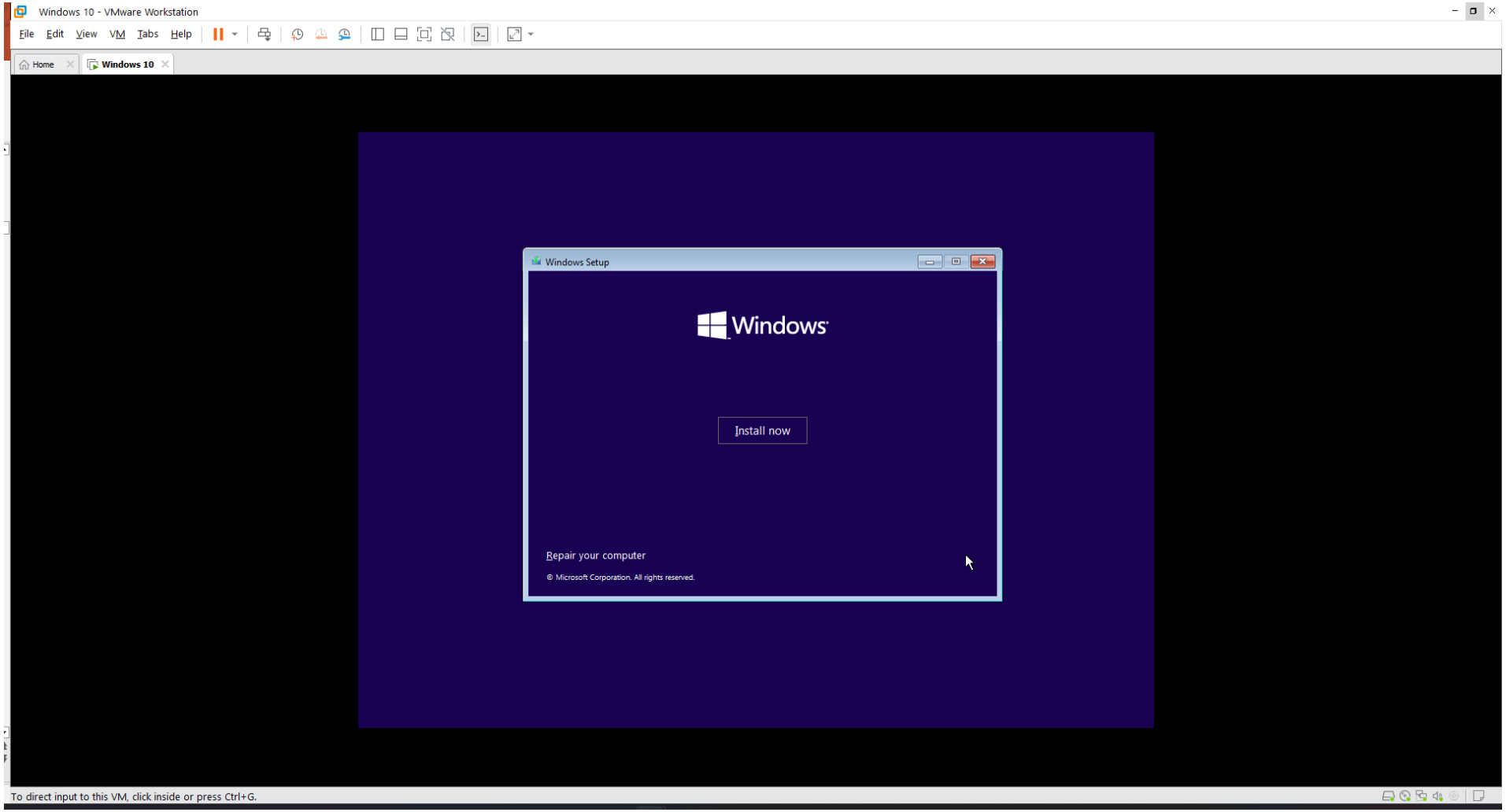
Wait...


Windows 10 - VMware Workstation
File Edit View VM Tabs Help
Home
Windows 10
To direct input to this VM, click inside or press Ctrl+G.

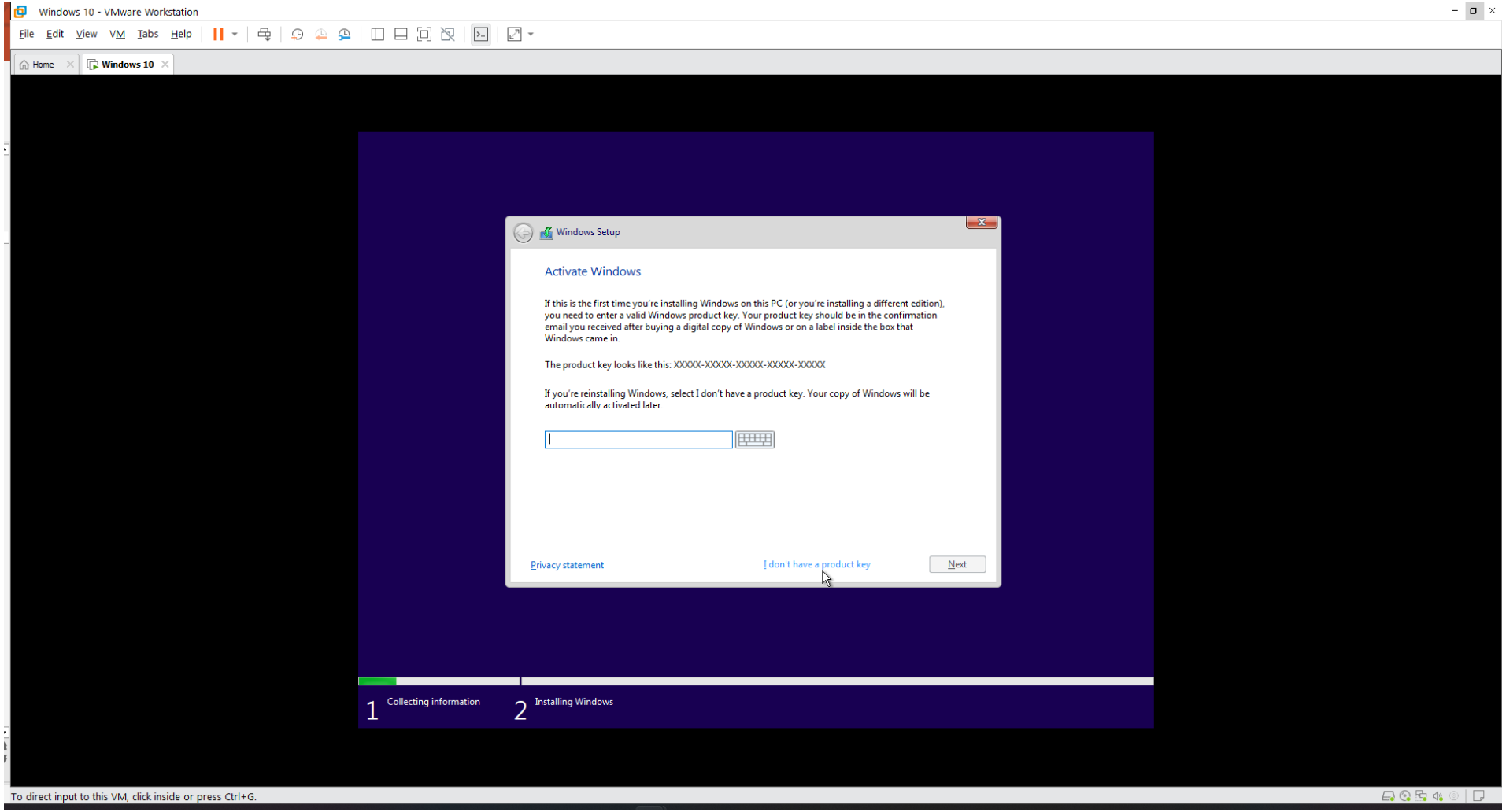
Select valid options & click “Next”



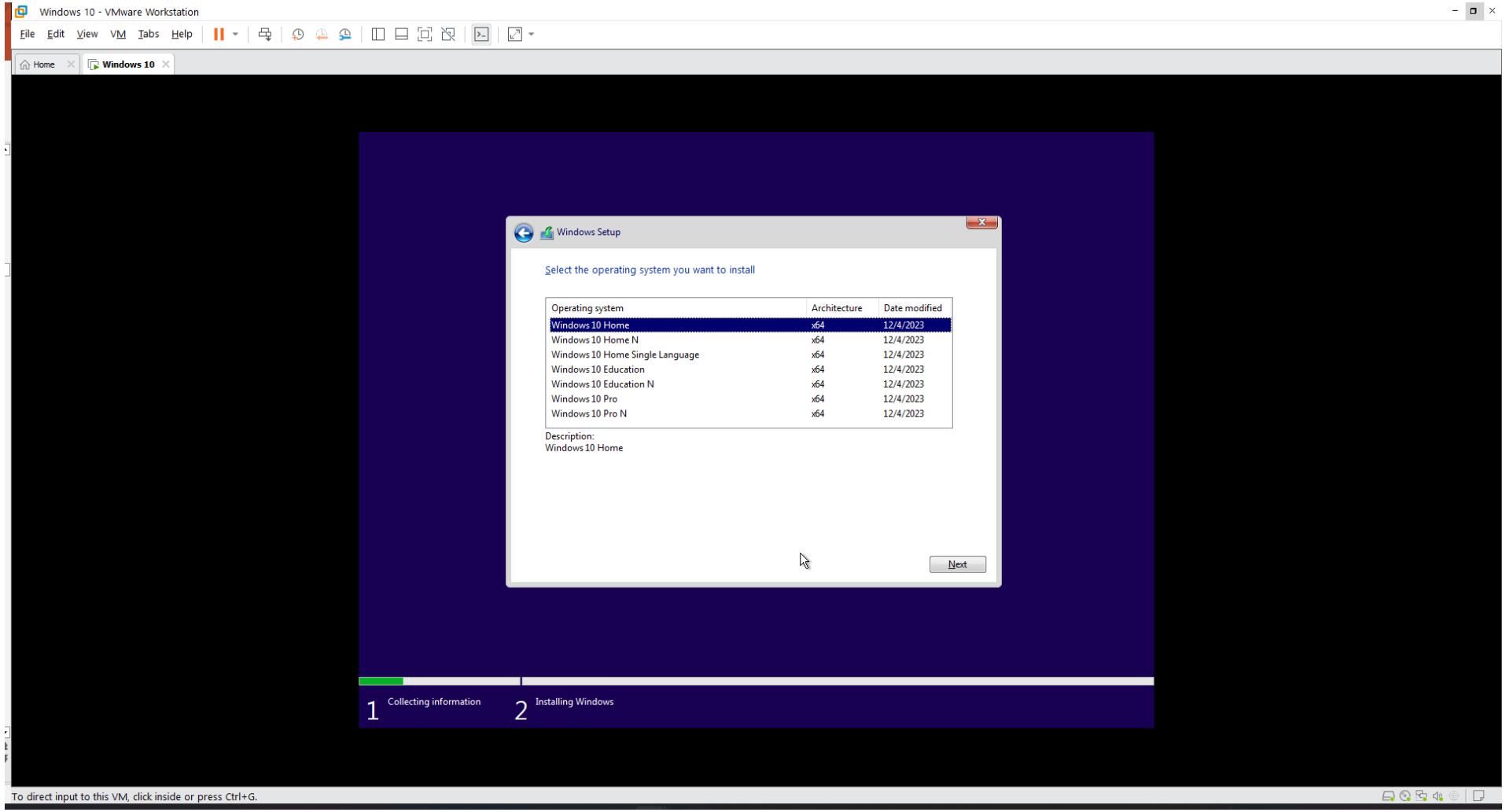
Click “Install”



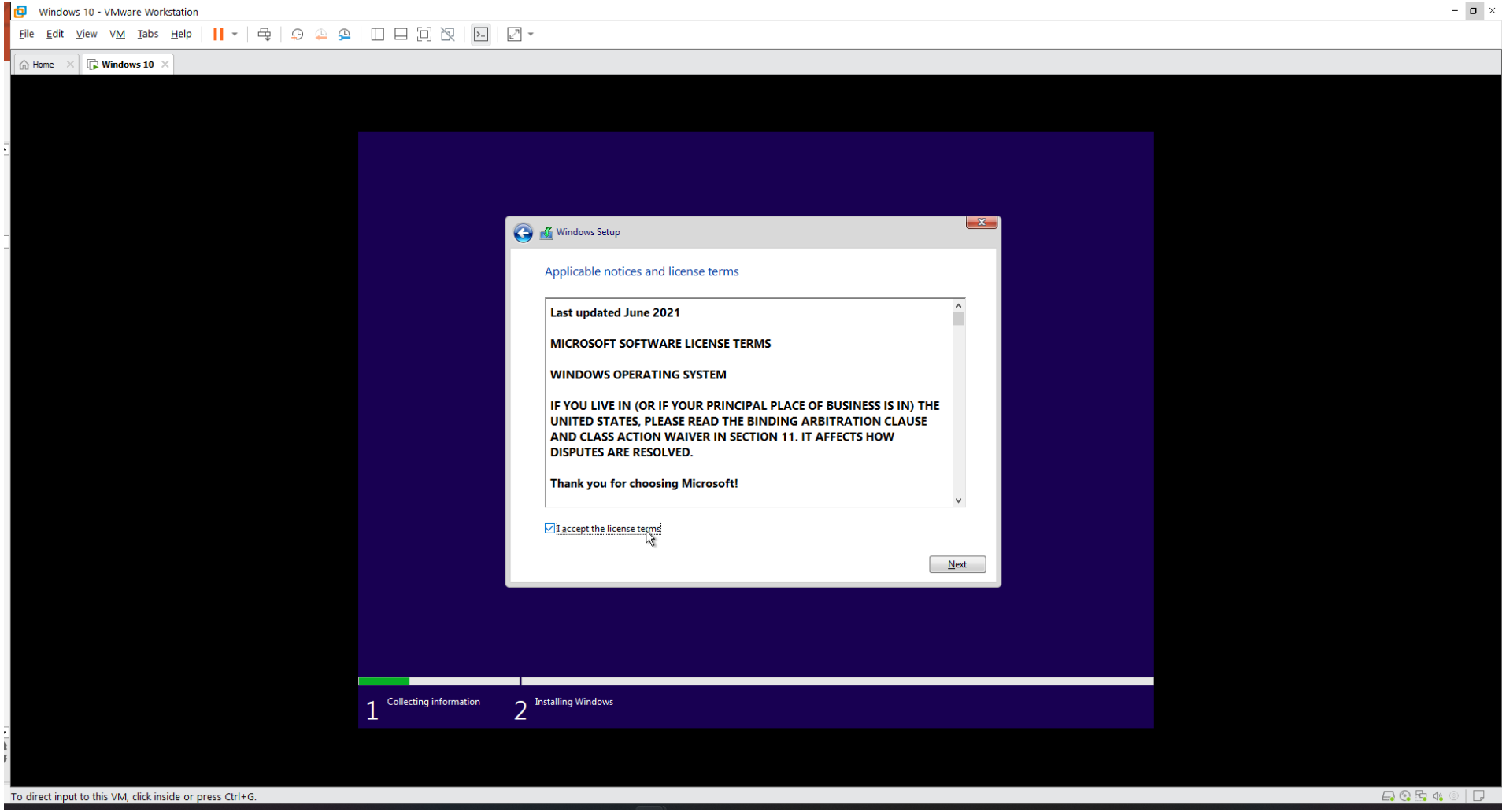
Select “I don’t have a product key”



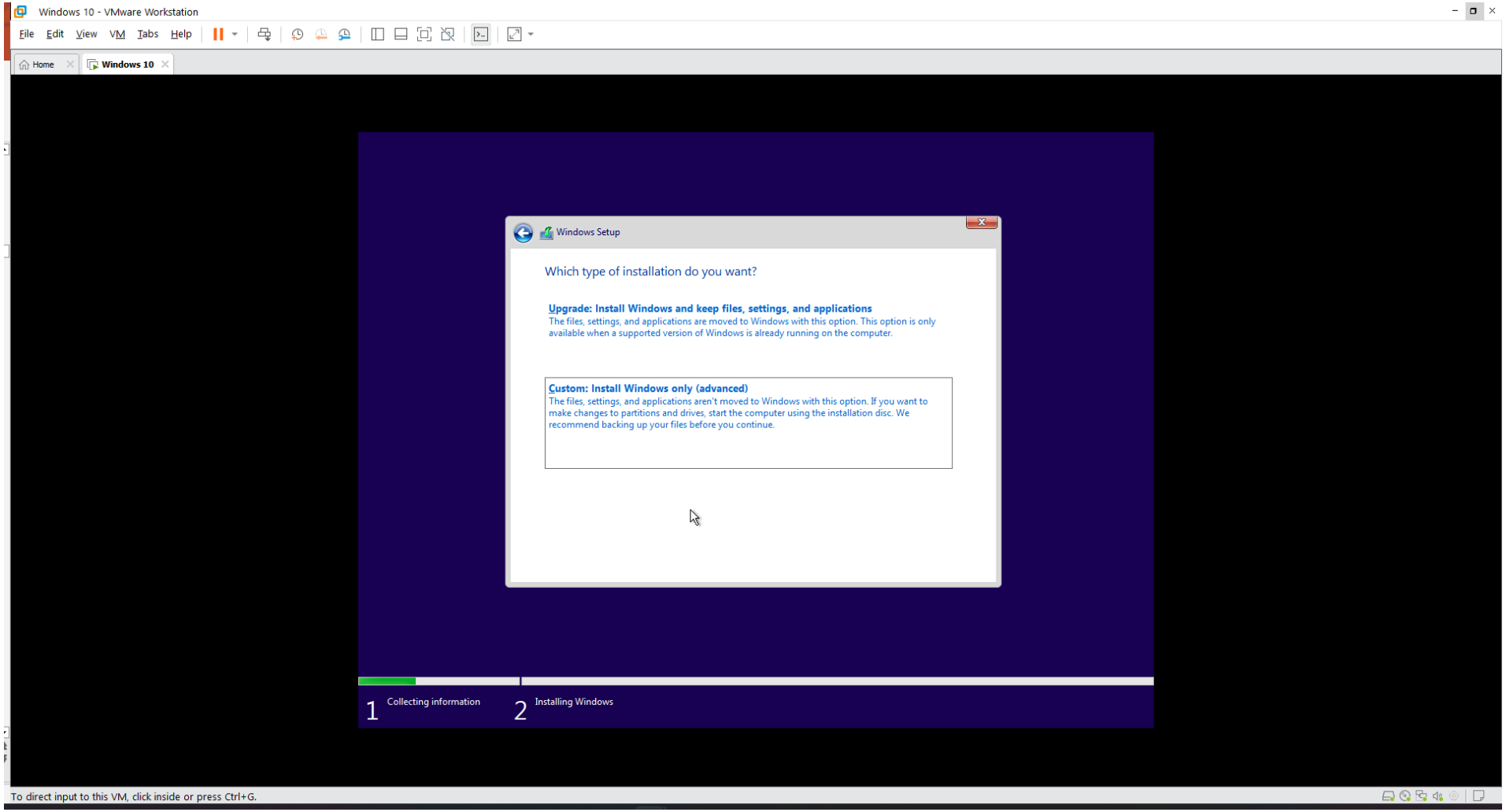
Select the OS you want to install



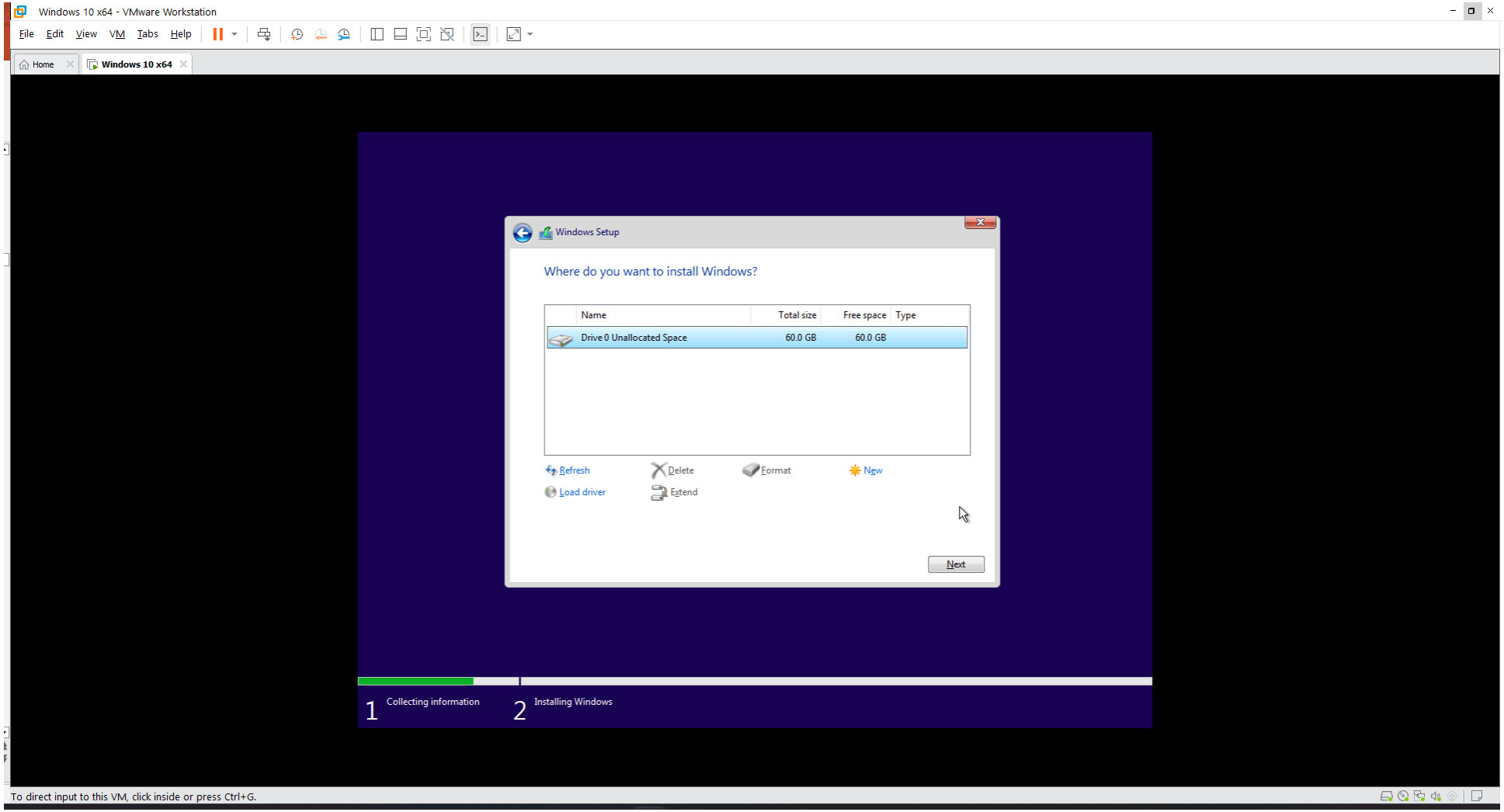
Accept license



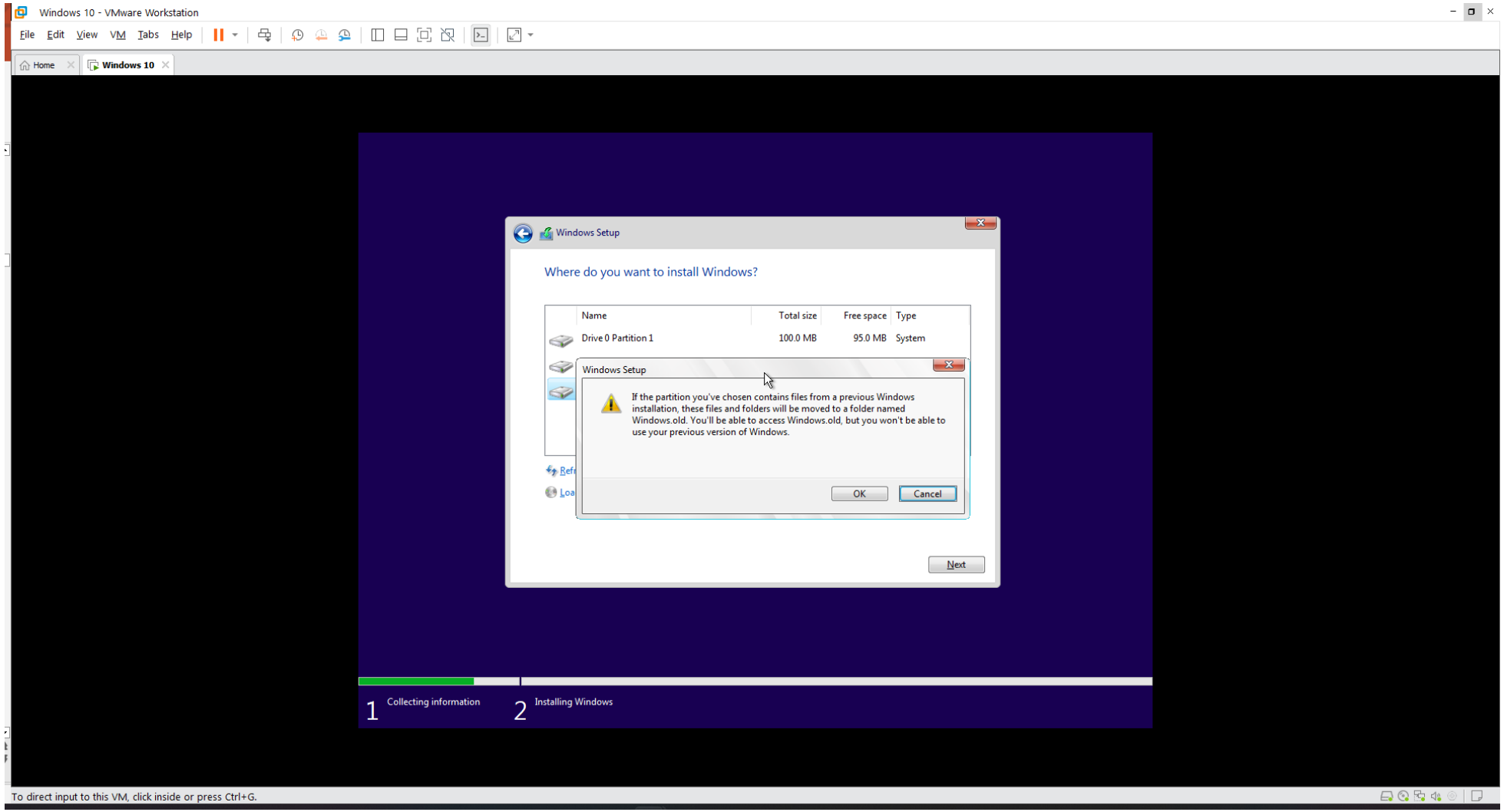
Select “Custom…”



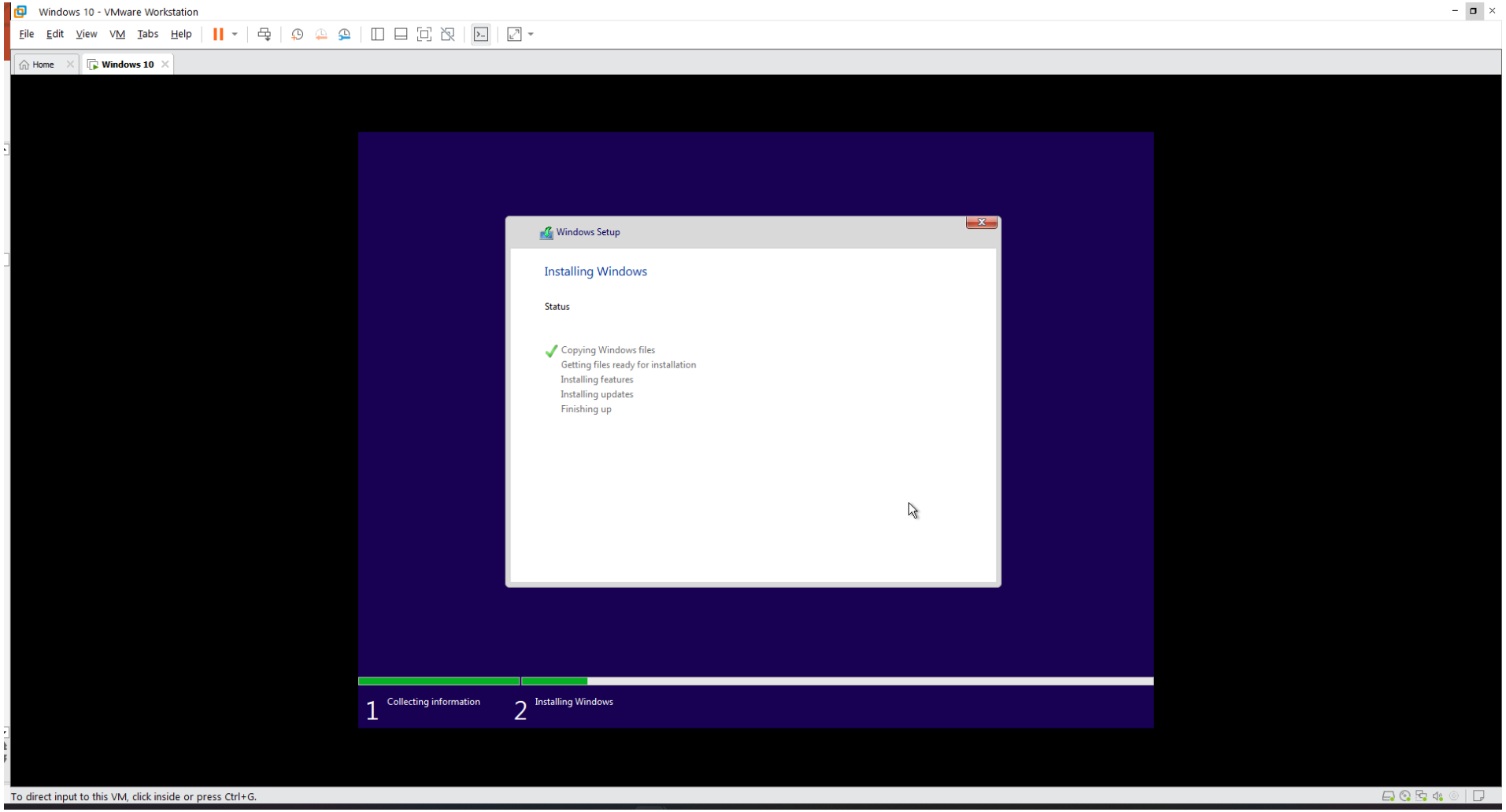
Click Next:


Windows 10 x64 - VMware Workstation
File Edit View VM Tabs Help
Home
Windows 10 x64
Windows Setup
Where do you want to install Windows?
Name
Total size
Free space
Type
Drive 0 Unallocated Space
60.0 GB
60.0 GB
Refresh
Delete
Format
New
Load driver
Extend
Next
1 Collecting information
2 Installing Windows
To direct input to this VM, click inside or press Ctrl+G.

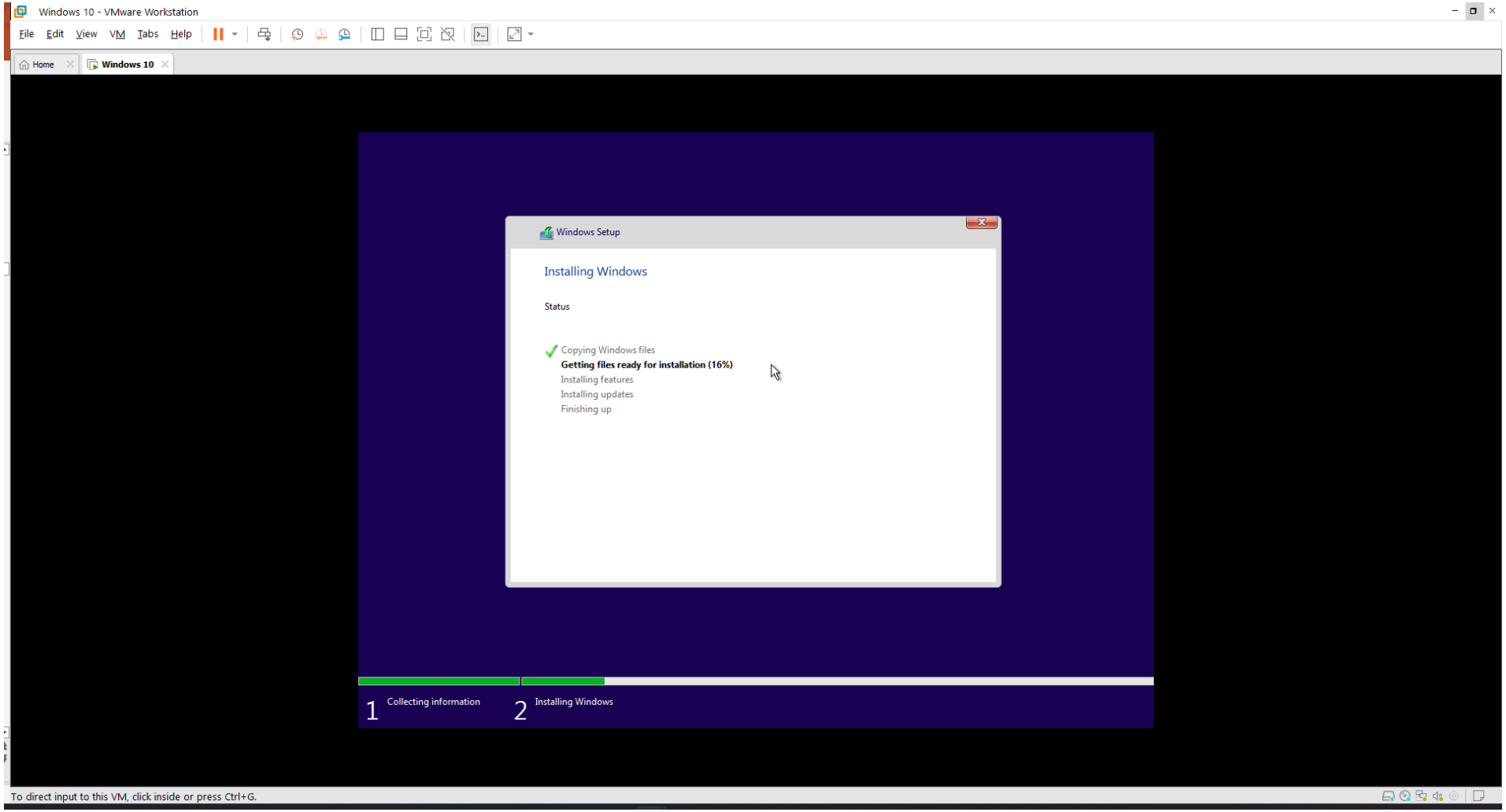
Click OK:


Windows 10 - VMware Workstation
File Edit View VM Tabs Help
Home
Windows 10
Windows Setup
Where do you want to install Windows?
Name
Total size
Free space
Type
Drive 0 Partition 1
100.0 MB
95.0 MB
System
Windows Setup
If the partition you've chosen contains files from a previous Windows installation, these files and folders will be moved to a folder named Windows.old. You'll be able to access Windows.old, but you won't be able to use your previous version of Windows.
OK
Cancel
Next
1 Collecting information
2 Installing Windows
To direct input to this VM, click inside or press Ctrl+G.

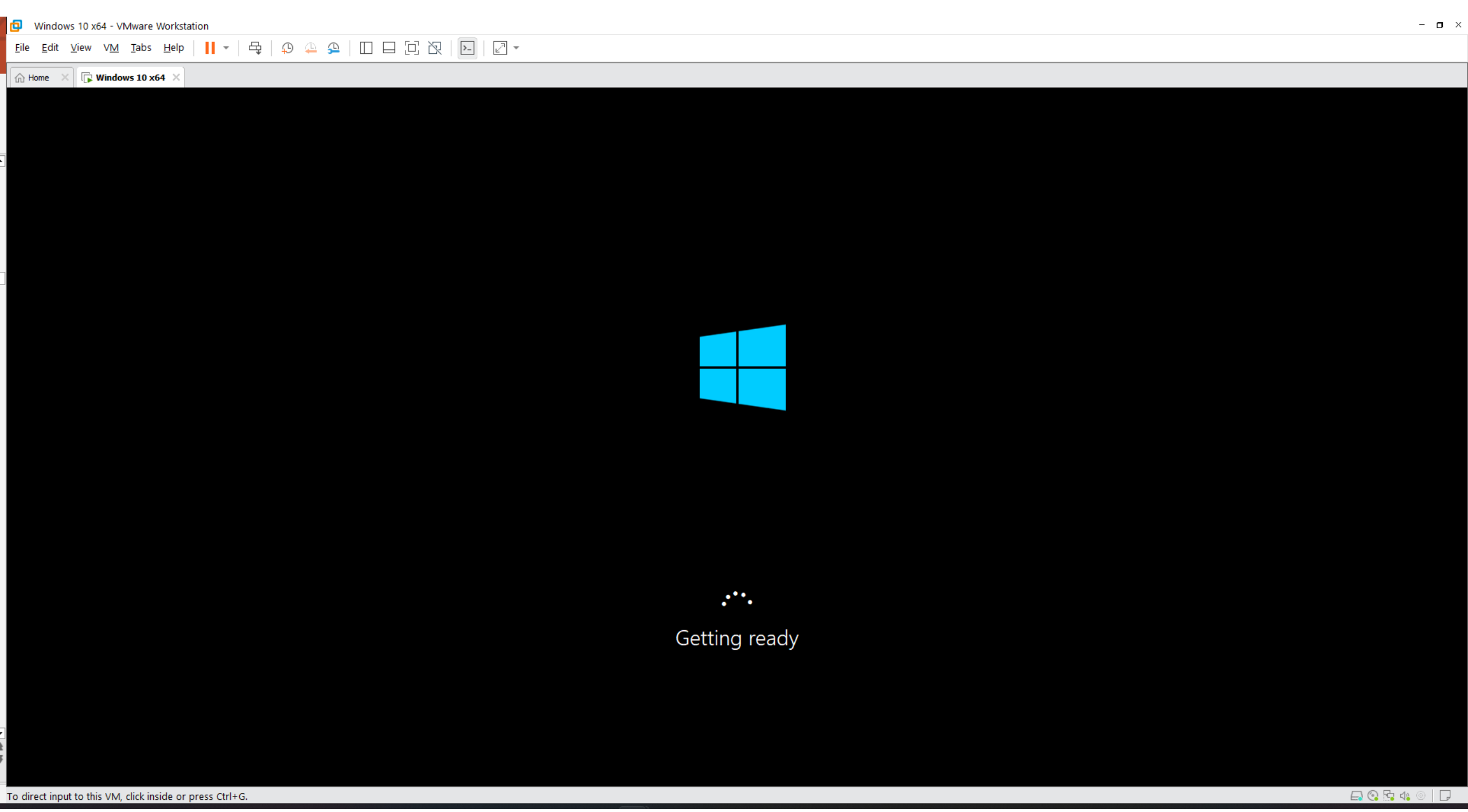
Wait until the OS is installed



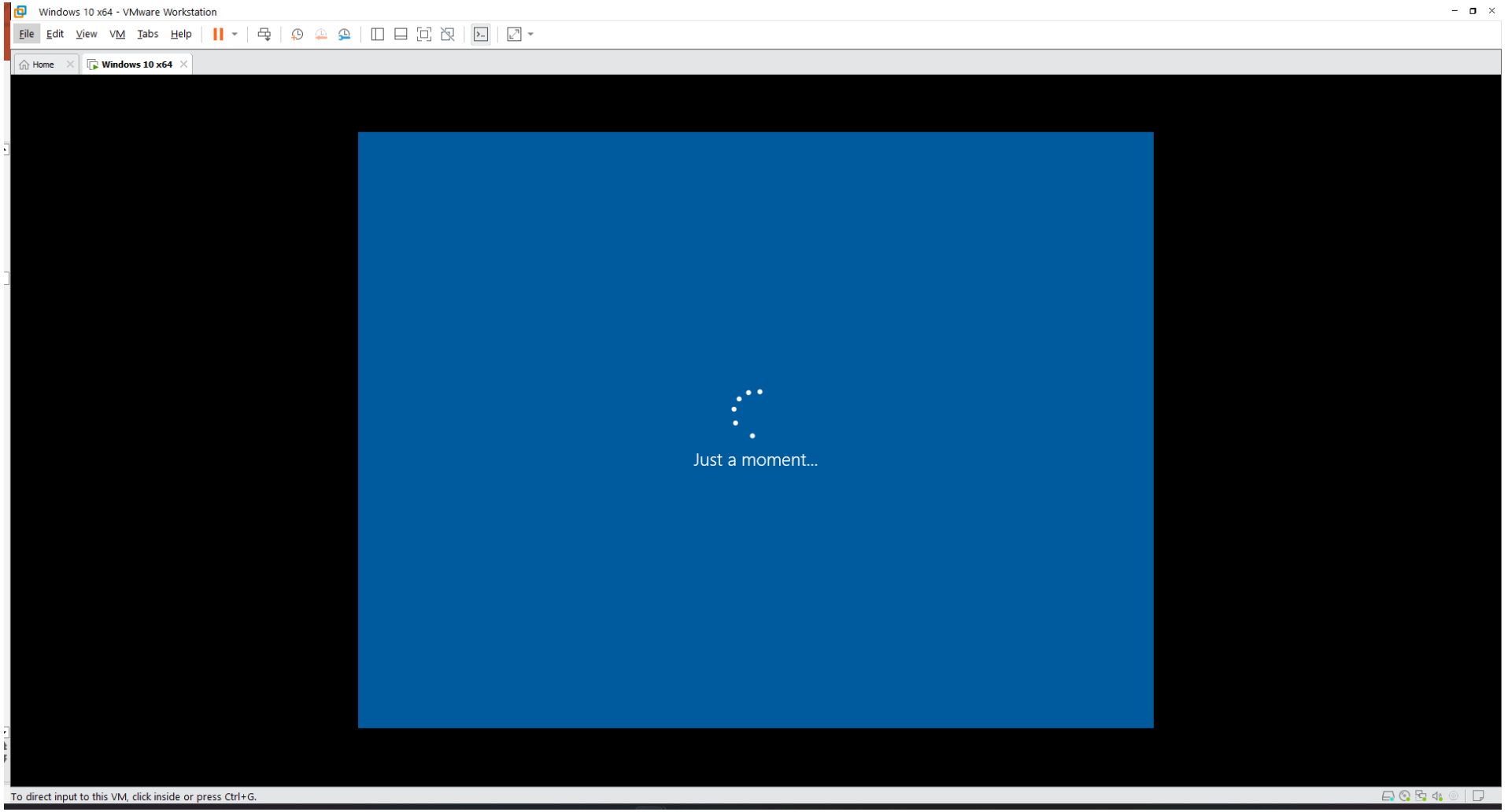
Wait until the OS is installed



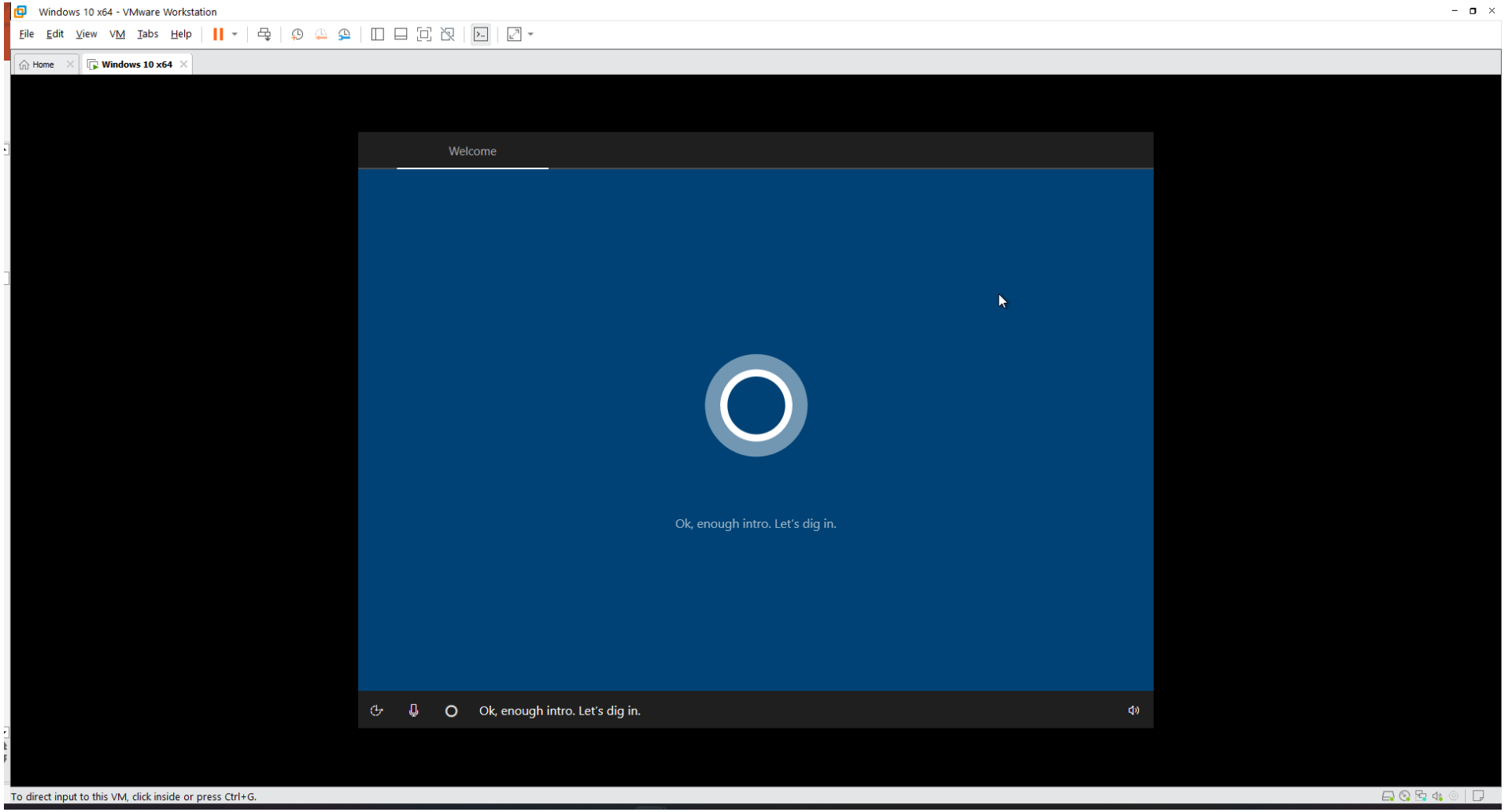
& click on restart


Windows 10 x64 - VMware Workstation
File Edit View VM Tabs Help
Home
Windows 10 x64
Getting ready
To direct input to this VM, click inside or press Ctrl+G.

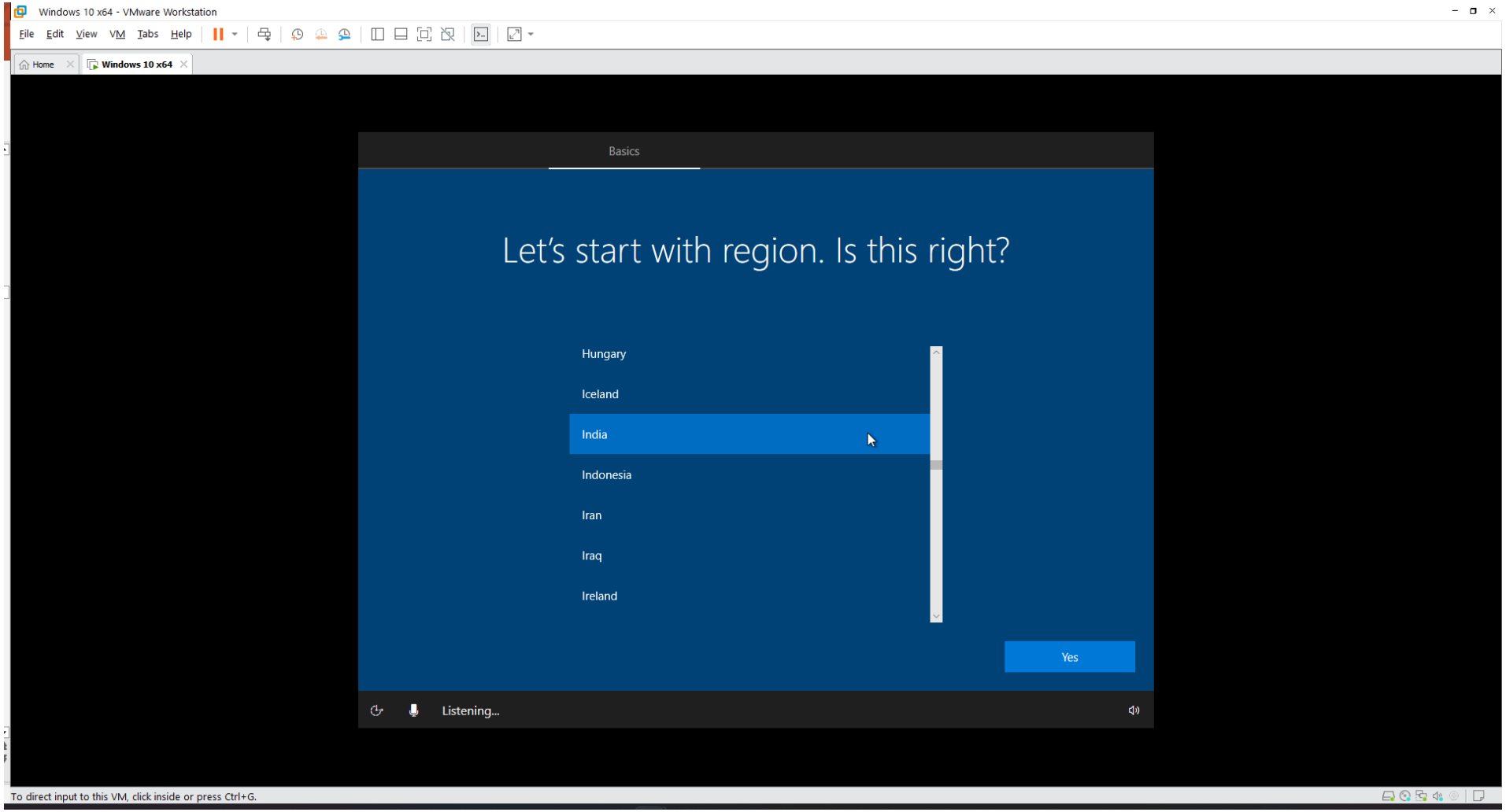
Wait until the loading is over.



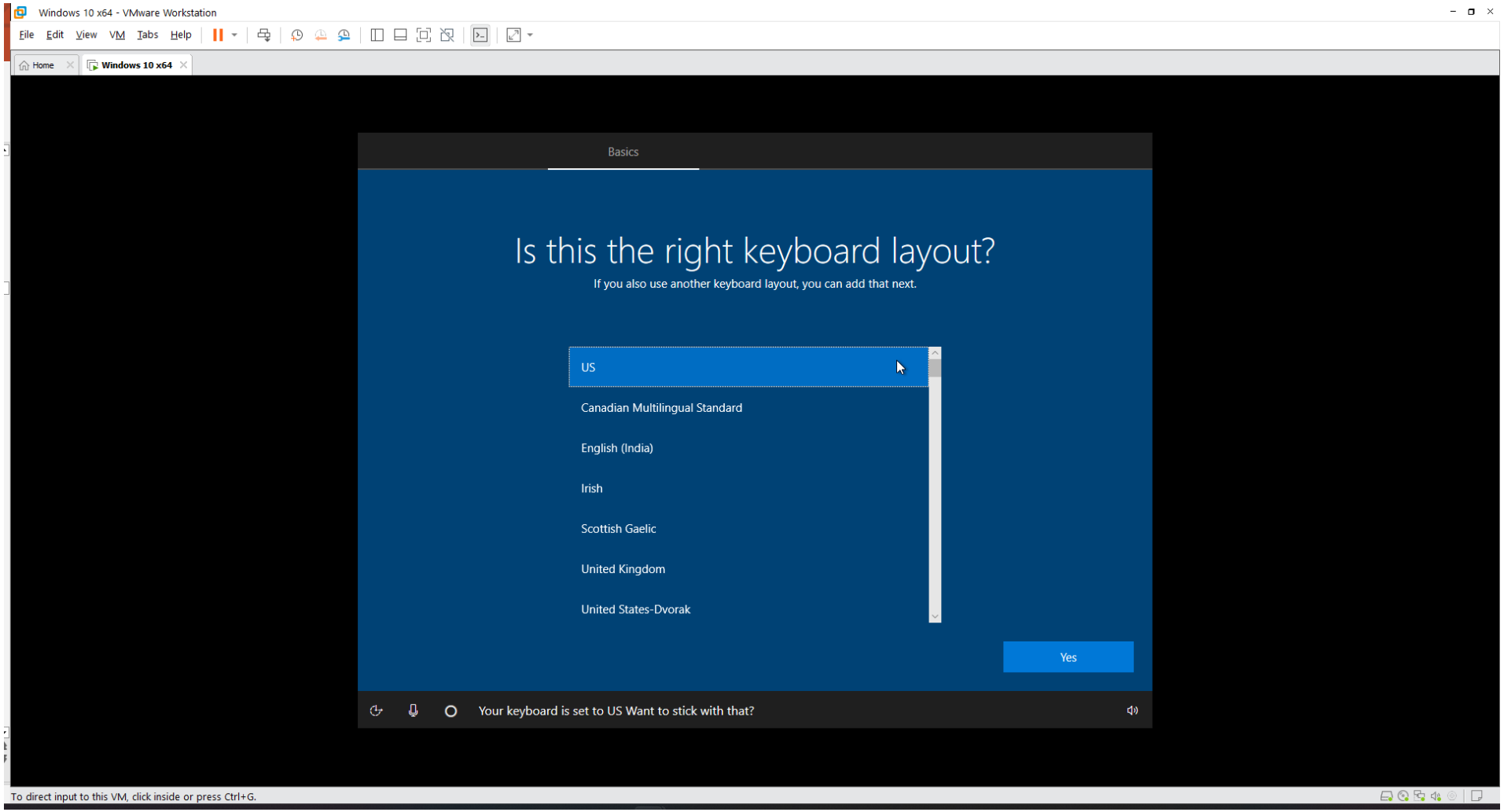
Wait for Welcome speech.



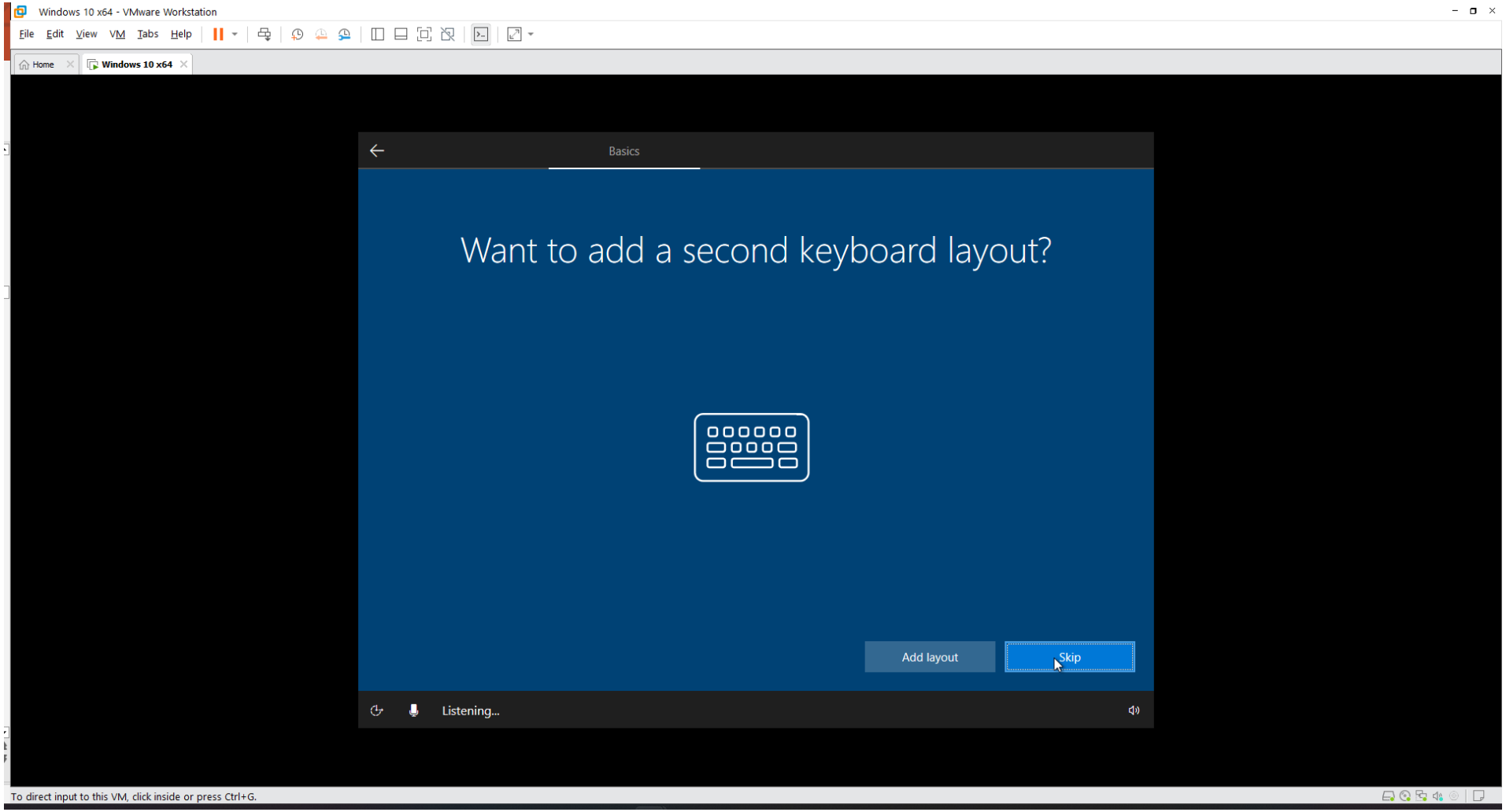
Select India as your region



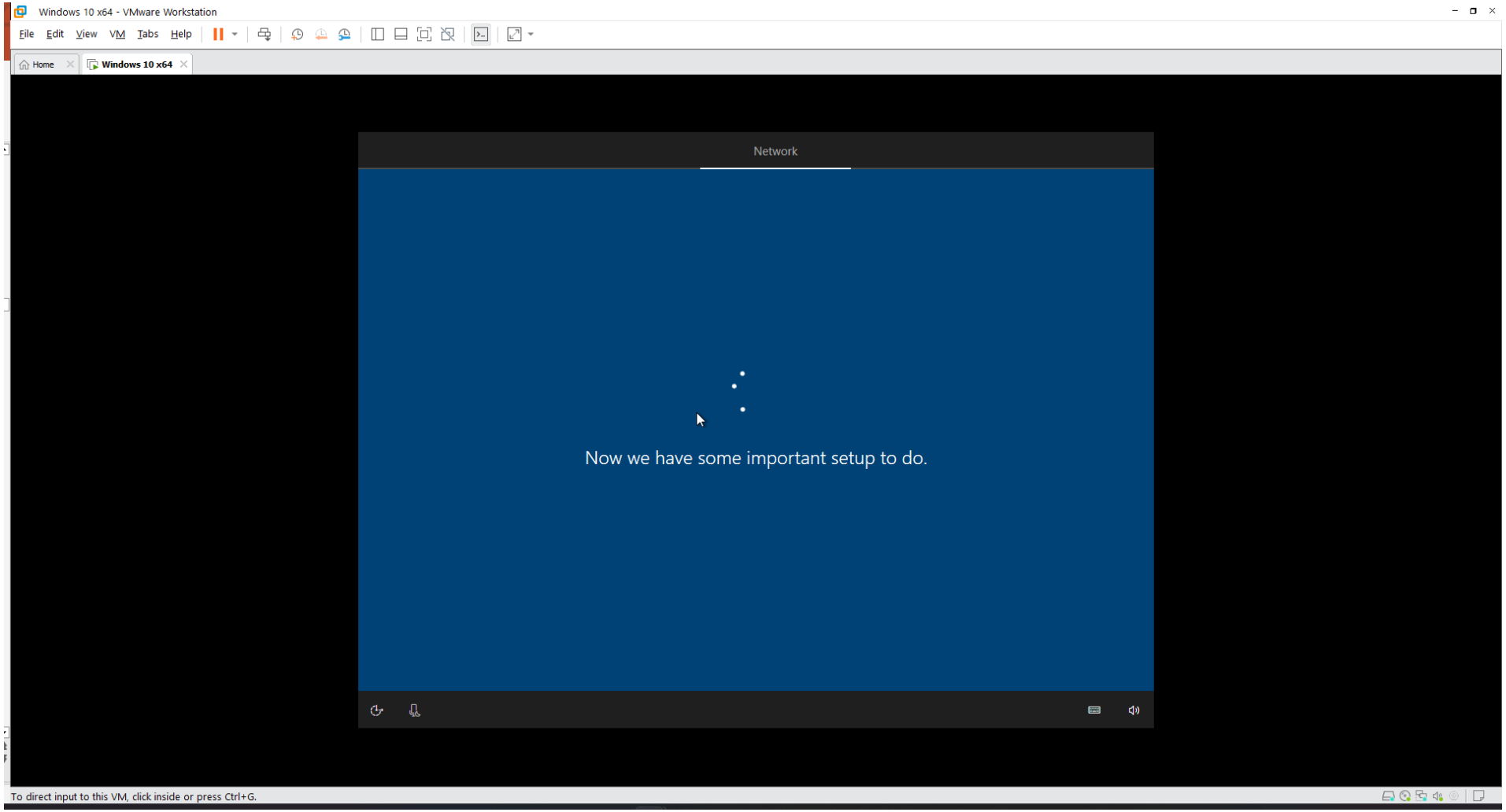
Select keyboard



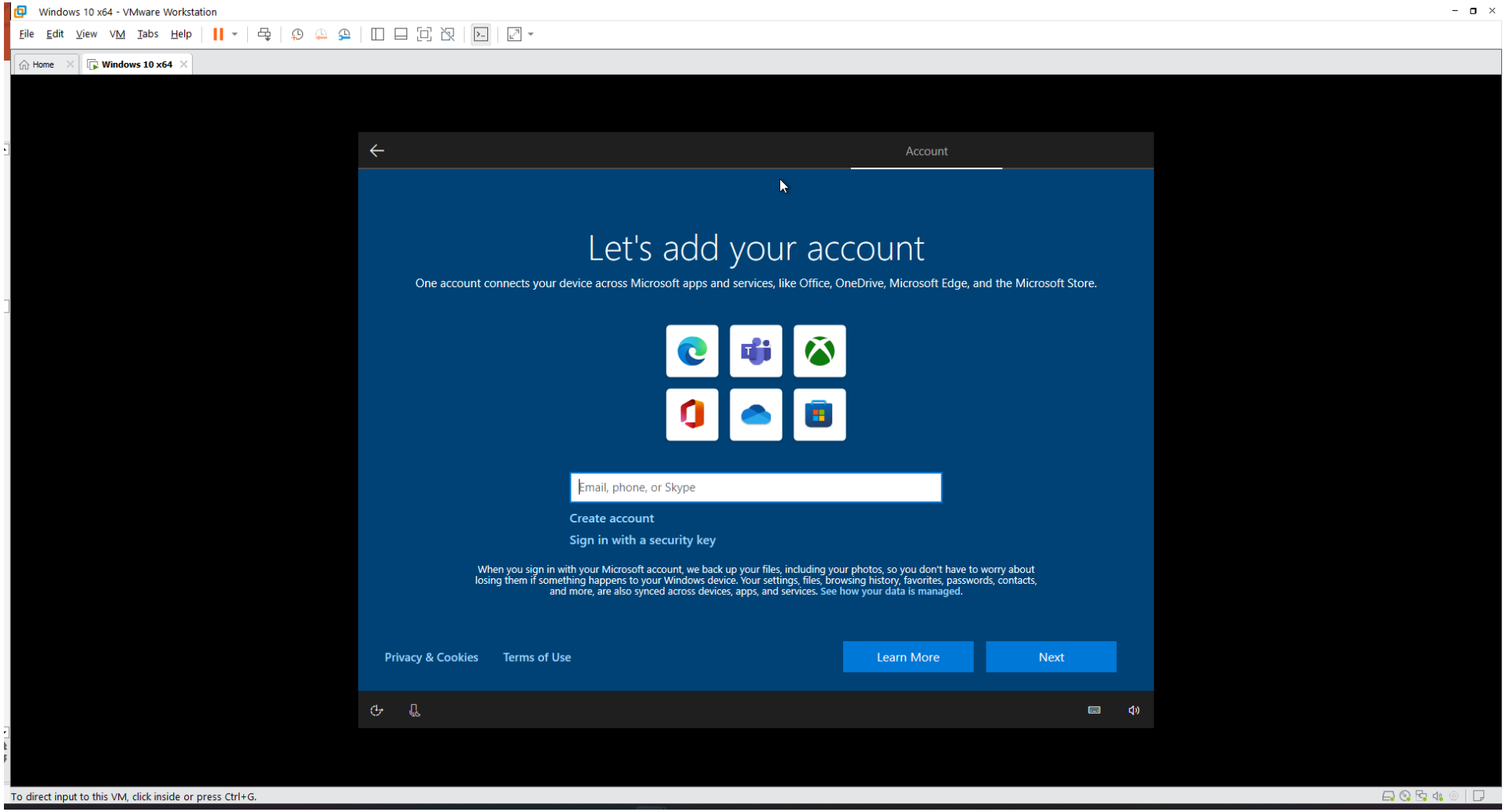
Skip 2nd keyboard



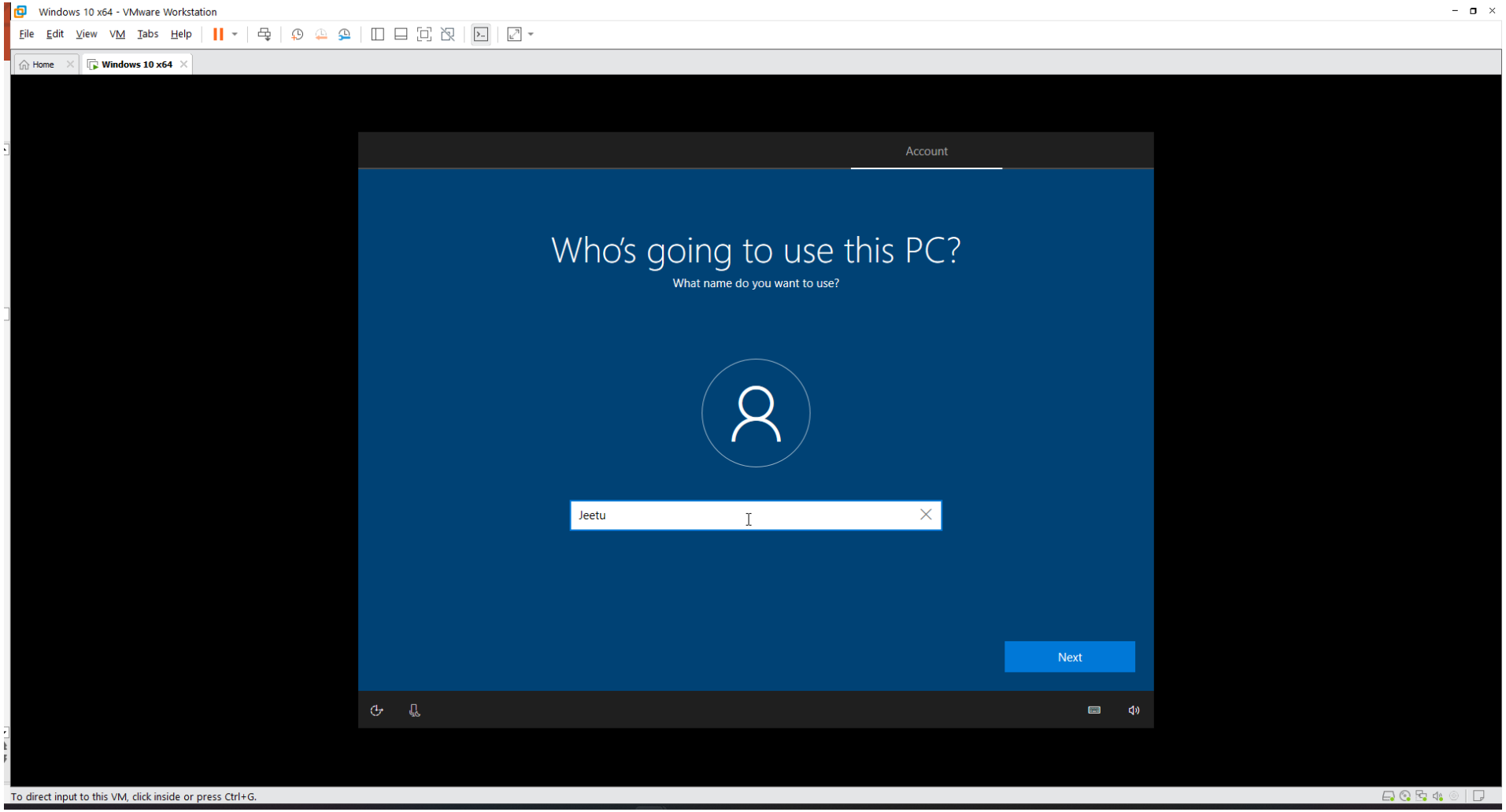
Wait for the setup



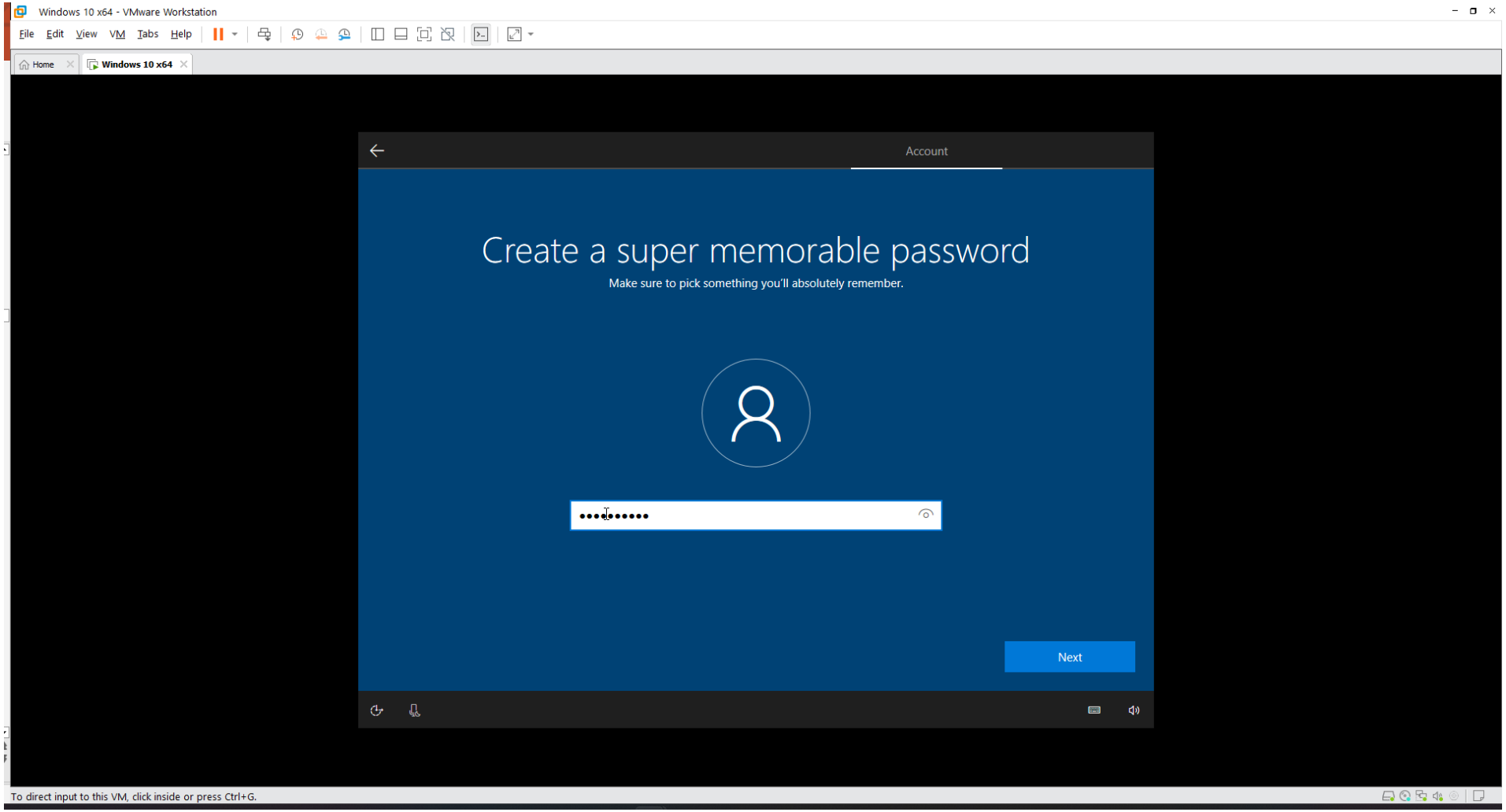
Disconnect your account, on this screen



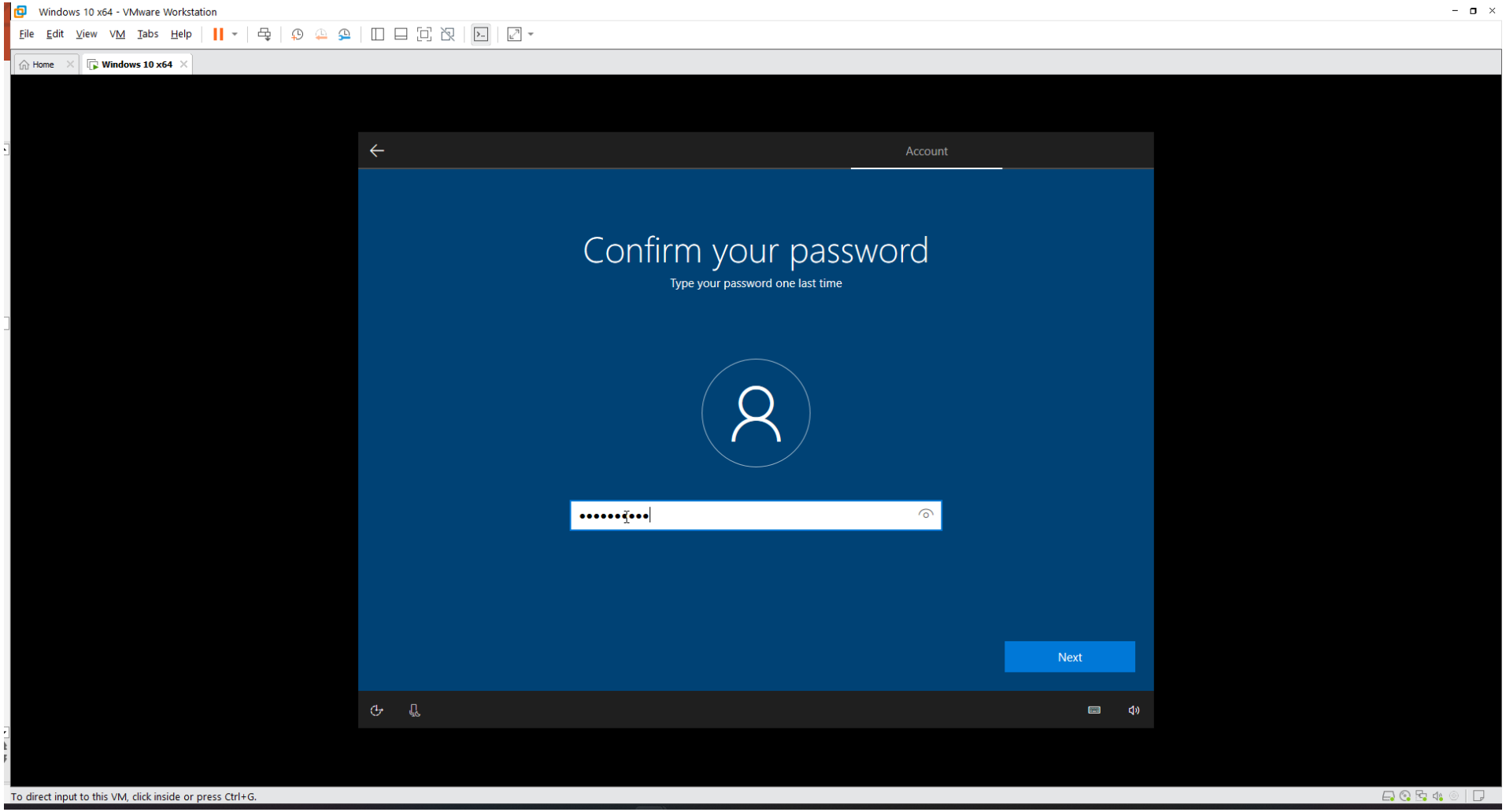
Type your name



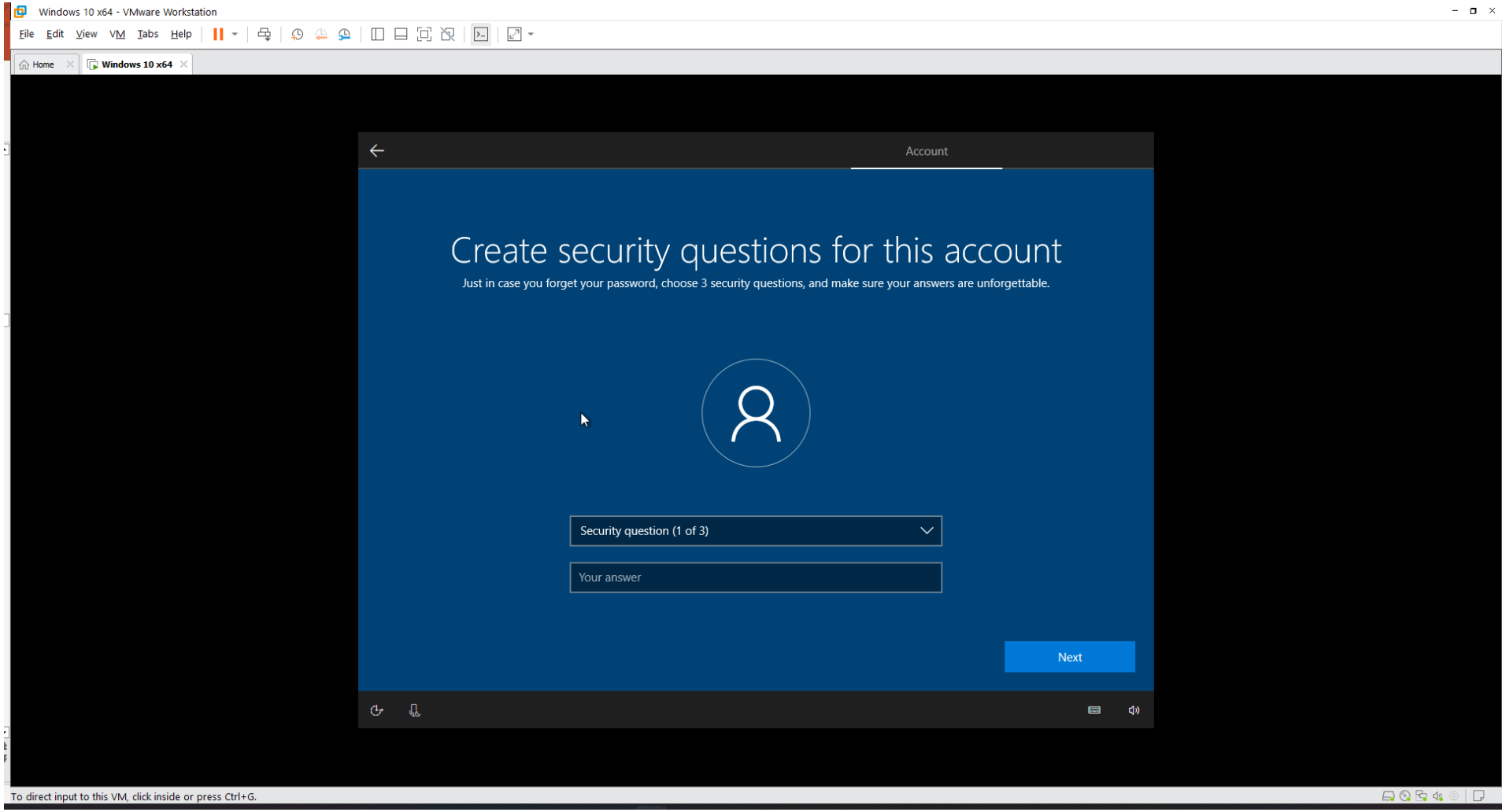
Type a password



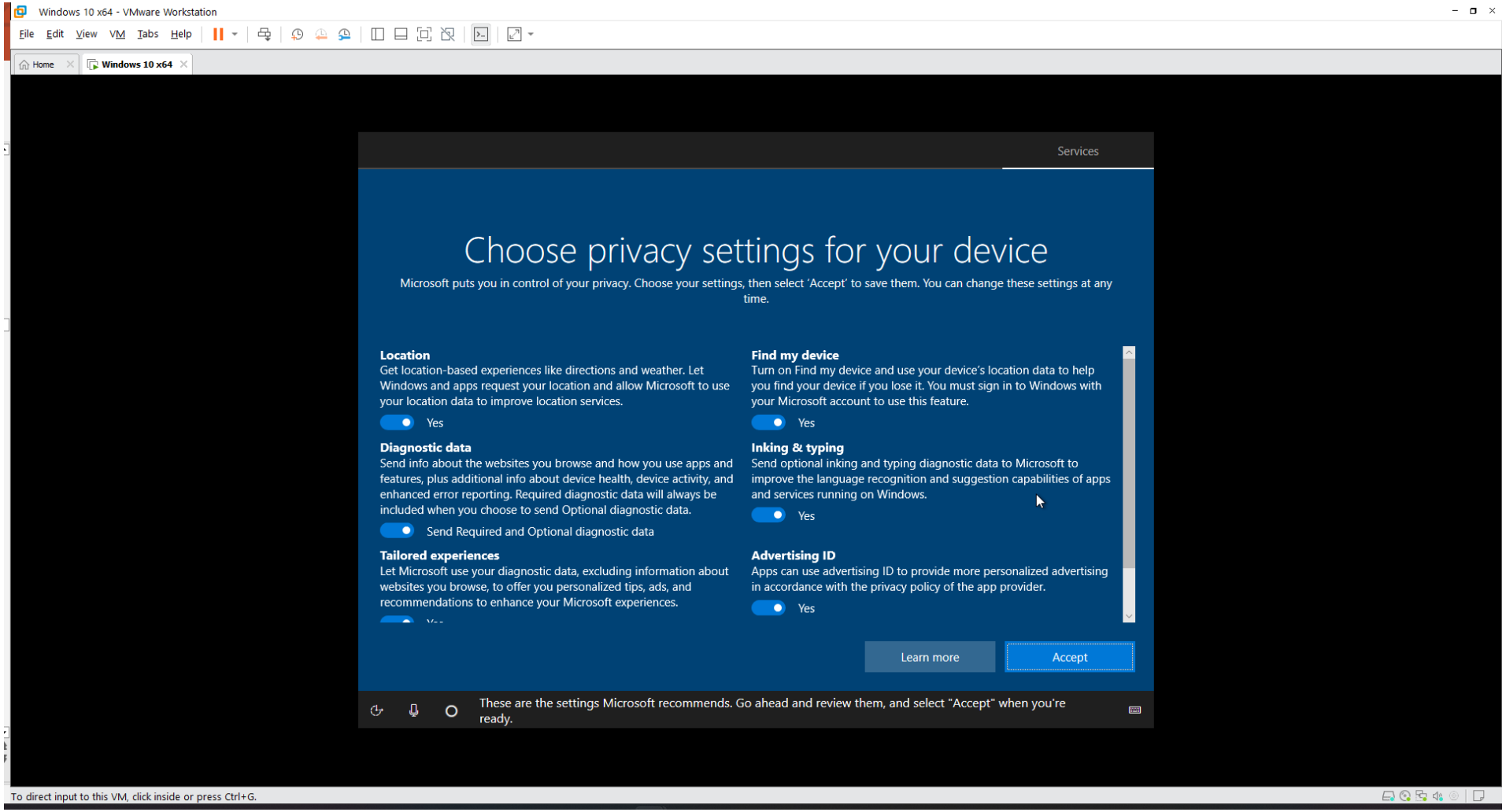
Confirm your password



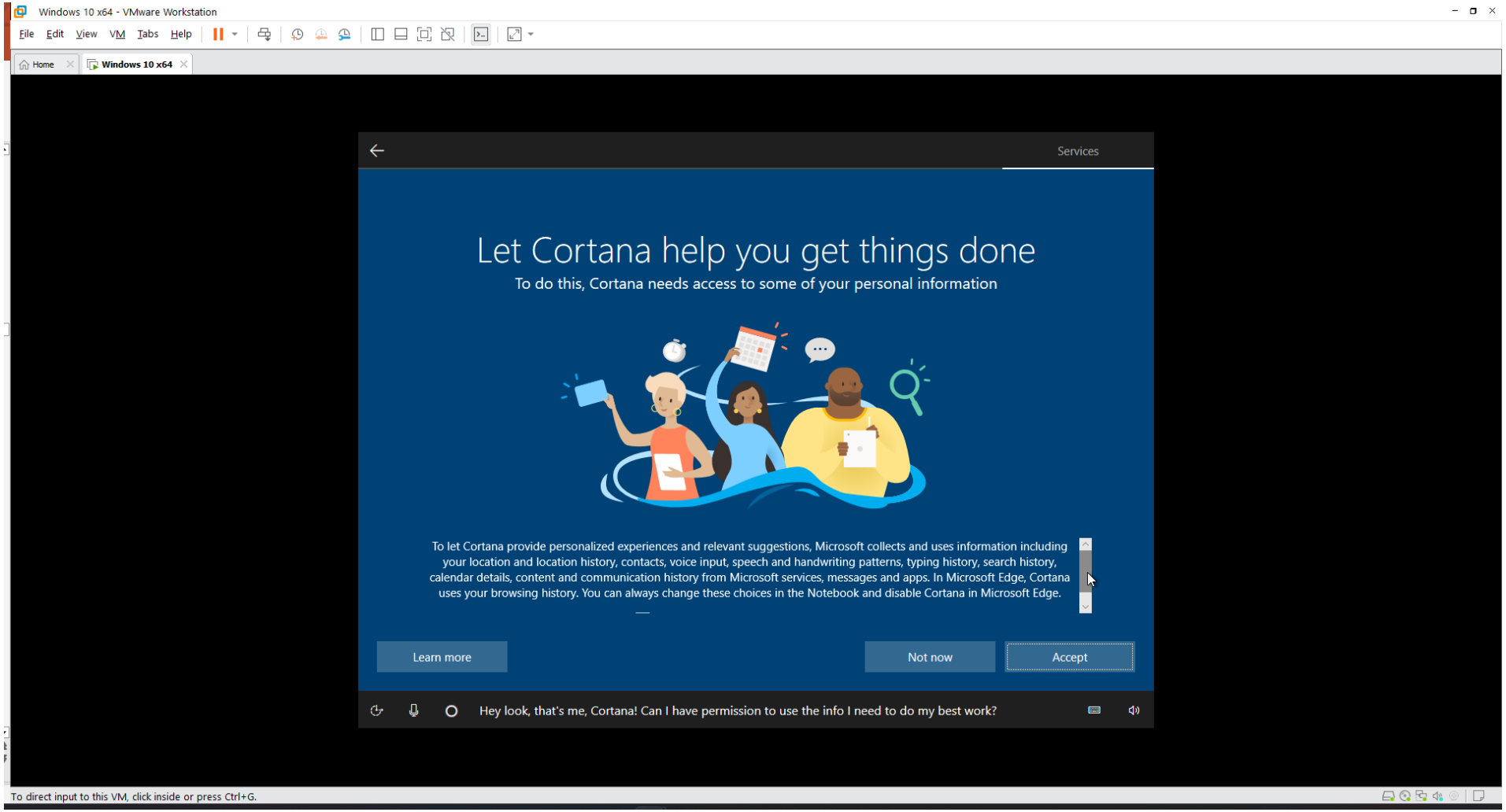
Fill proper question & answers



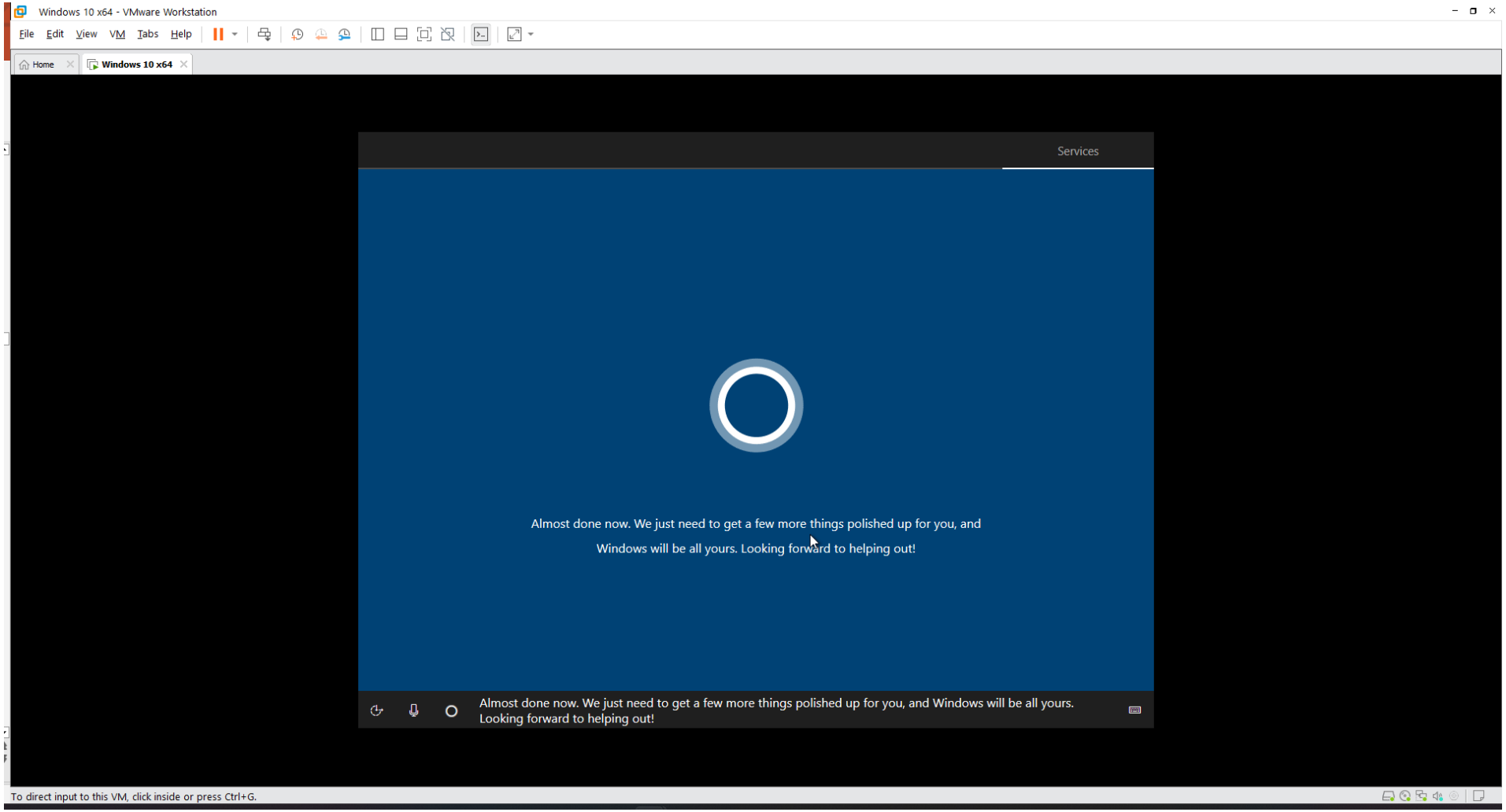
Accept the settings

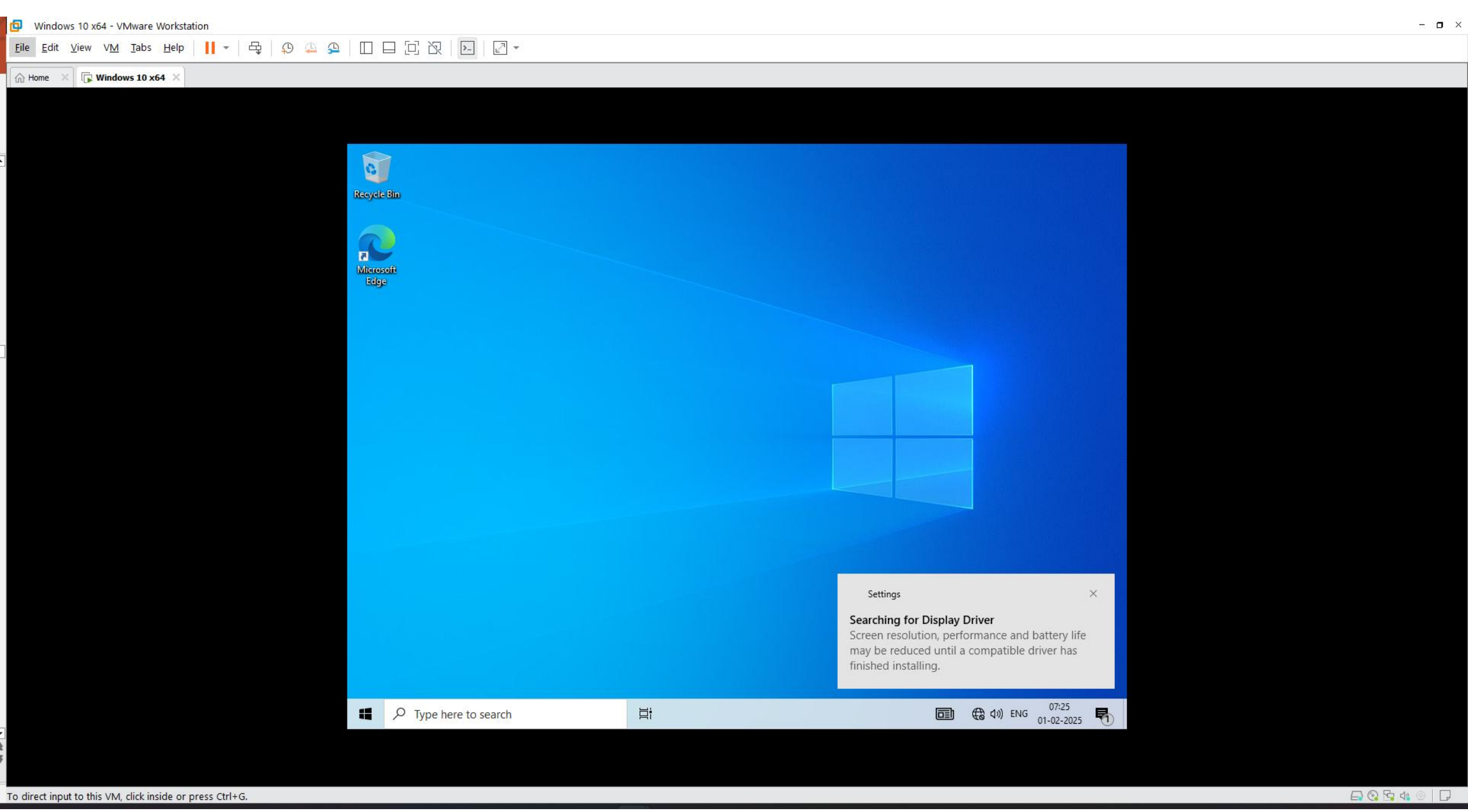


Accept the Cortana permissions



Wait...


Windows 10 x64 - VMware Workstation
File Edit View VM Tabs Help
Home
Windows 10 x64
Services
Almost done now. We just need to get a few more things polished up for you, and
Windows will be all yours. Looking forward to helping out!
Almost done now. We just need to get a few more things polished up for you, and Windows will be all yours.
Looking forward to helping out!
To direct input to this VM, click inside or press Ctrl+G.


Windows 10 x64 - VMware Workstation
File Edit View VM Tabs Help
Home
Windows 10 x64
Recycle Bin
Microsoft Edge
Settings
Searching for Display Driver
Screen resolution, performance and battery life may be reduced until a compatible driver has finished installing.
Type here to search
ENG
07:25
01-02-2025
To direct input to this VM, click inside or press Ctrl+G.

Hyper-V

- Its a **hypervisor**
- it both **type 1** & **type 2**
  - type 1 - Windows Server
  - type 2 - Windows Client
- We can either run VMWare Workstation or Microsoft Hyper-V at a time on a system.

Check requirements Hyper-V

- **Windows 10** (Pro or Enterprise), or **Windows 11** (Pro or *Enterprise*)
- **64-bit Processor** with Second Level Address Translation (SLAT).
  - Second Level Address Translation (SLAT) is a hardware-assisted virtualization technology that improves the performance of virtual machines.
- CPU support for **VM Monitor Mode Extension** (VT-c on Intel CPUs).
  - VT-c (Virtualization Technology for Connectivity) on Intel CPUs, is a feature that enhances the performance and capabilities of virtualized environments
- Minimum of **4 GB memory**.

Enabling Hyper-V - PowerShell

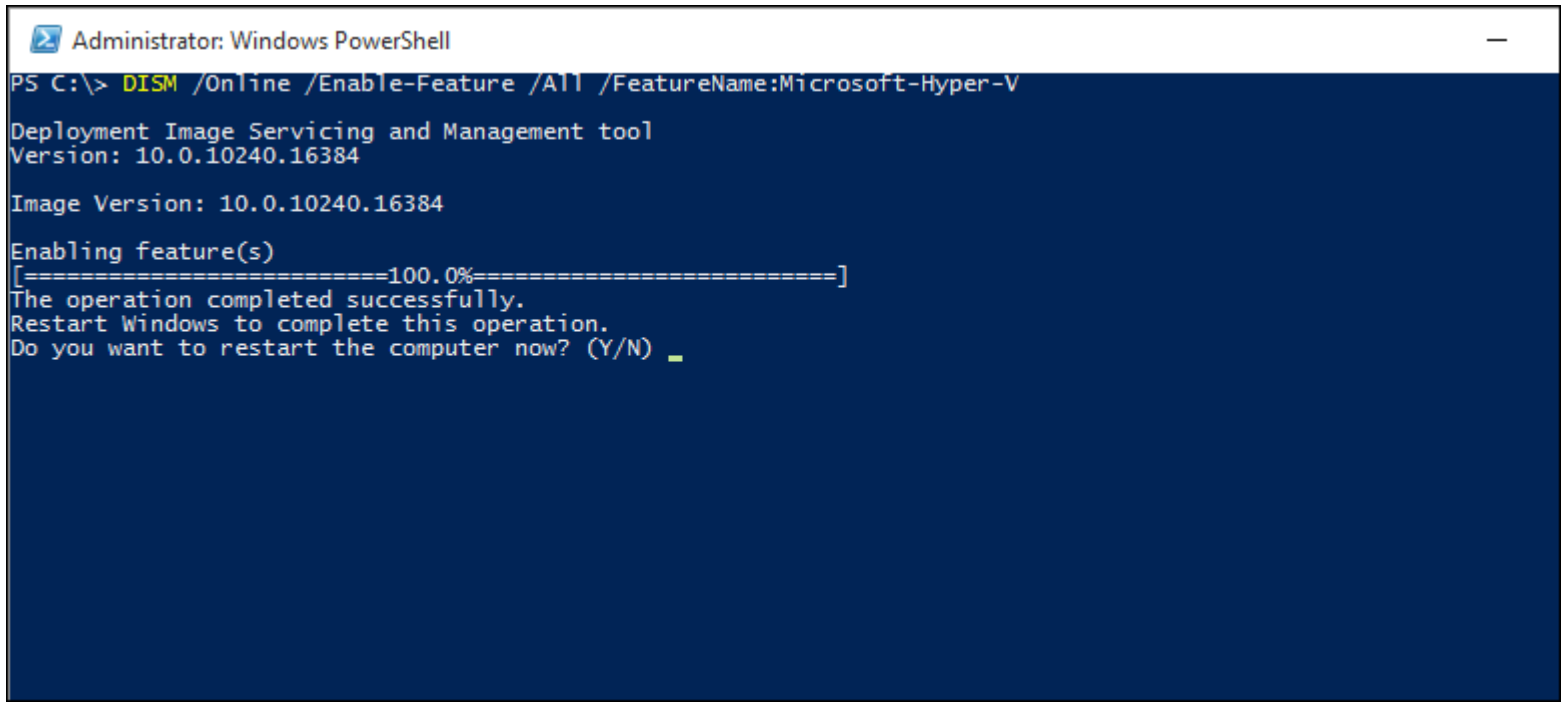
- Open a PowerShell console as Administrator.
- Run the following command:

Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Hyper-V -All

Enabling Hyper-V – Command Prompt

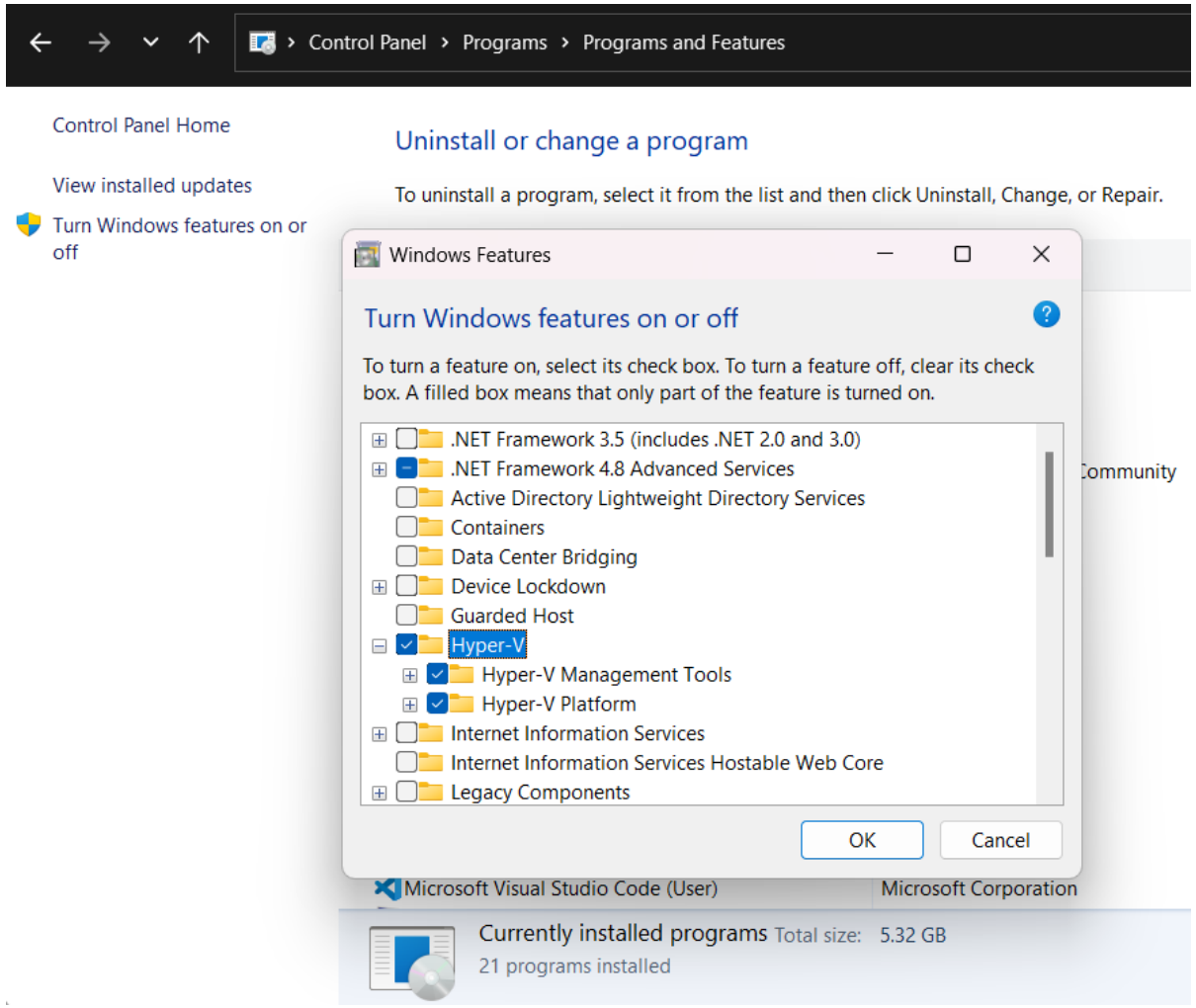
- Open up a PowerShell or CMD session as Administrator.
- Type the following command:

DISM /Online /Enable-Feature /All /FeatureName:Microsoft-Hyper-V

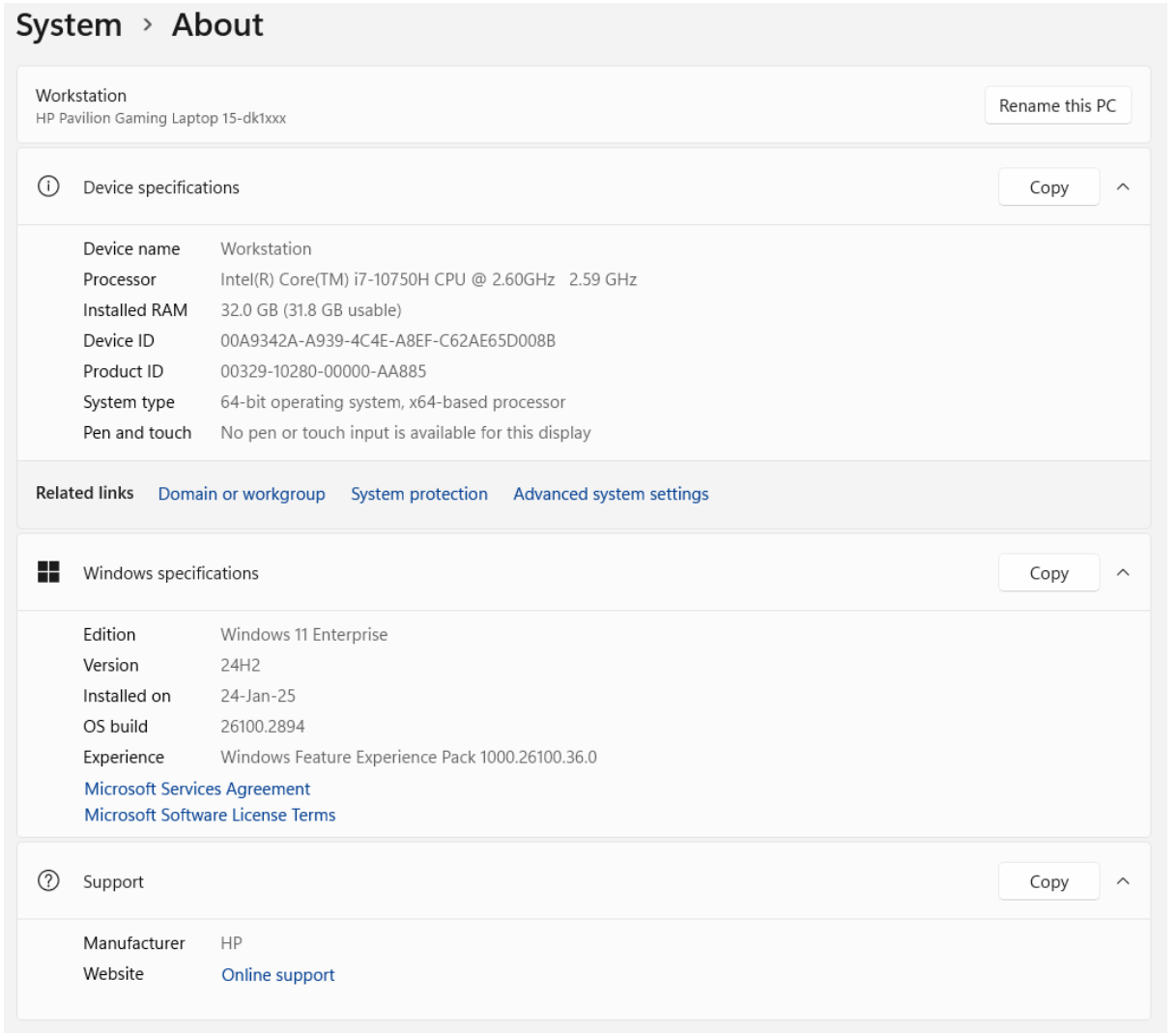


Enabling Hyper-V - Settings

- Navigate to the Control Panel.
- Select Programs, then Programs and Features.
- Select Turn Windows Features on or off.
- Select Hyper-V and then select OK.



Operating System Properties

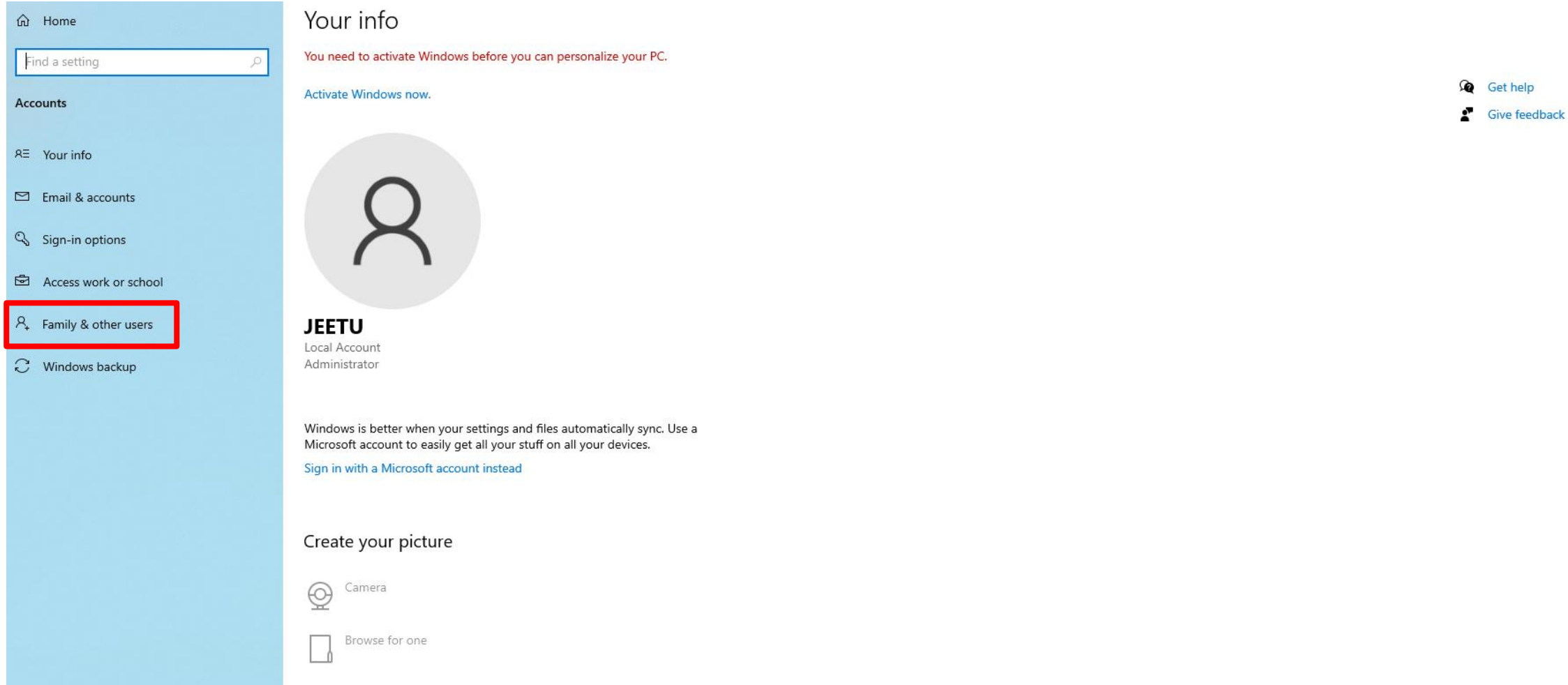


Operating System Properties

User Management

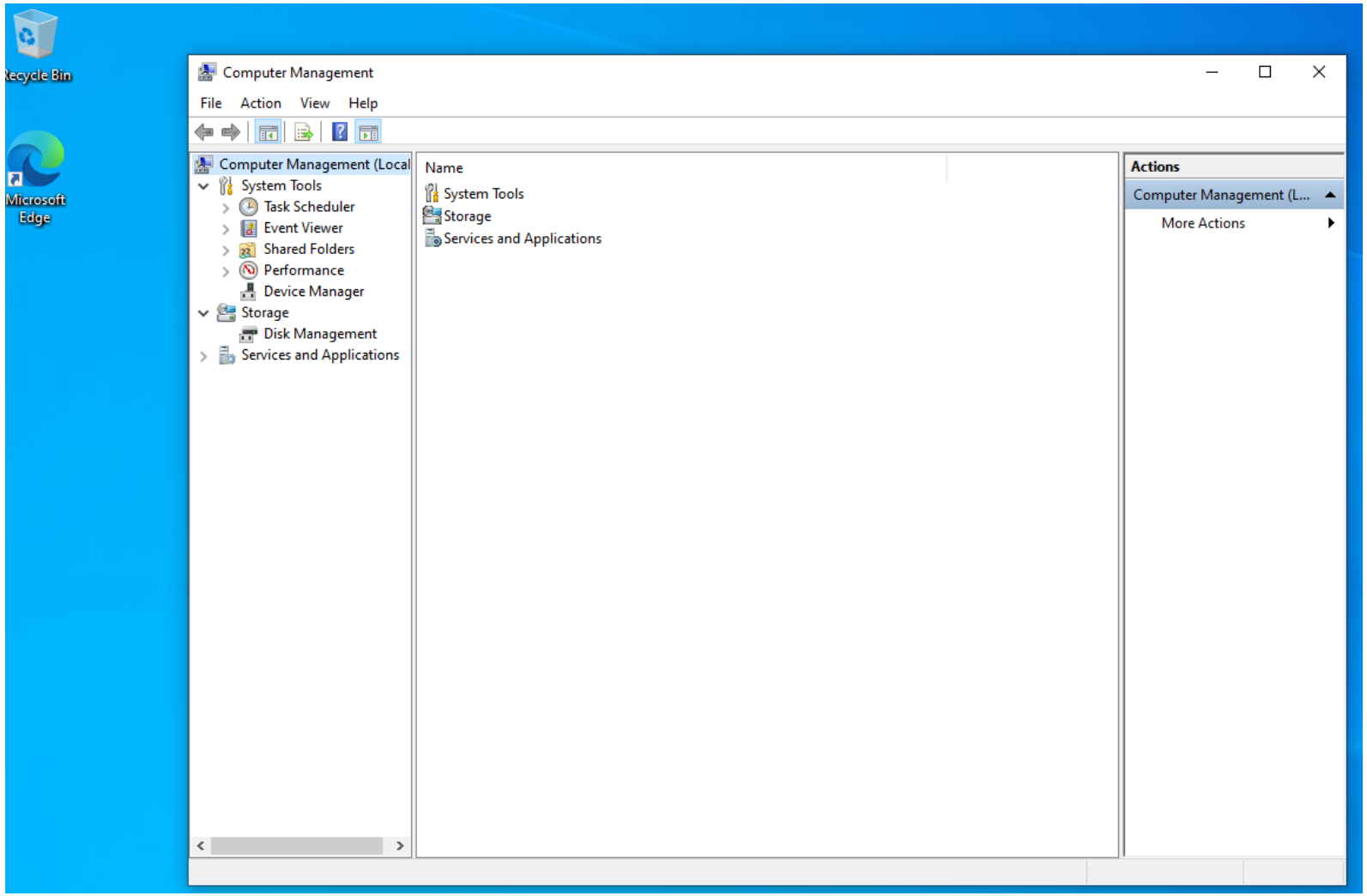
- Windows allows **adding multiple user account** to use the same device, enabling each user to have their own settings, documents, and applications.
- User management on Windows 10 allows users to **add, remove, and manage** user accounts on their device.
- It also allows users to **set restrictions and controls** for each user.
- Managing user accounts:
  - **Set restrictions**: Set restrictions on web browsing, apps, and games.
  - **Set screen time**: Set how much time a user can spend on the computer and when.
  - **Make someone an administrator**: Give someone the ability to install programs and change system settings.
  - **Delete a user account**: Select the account, click Remove, and then click Delete account and data.

Creating User from GUI

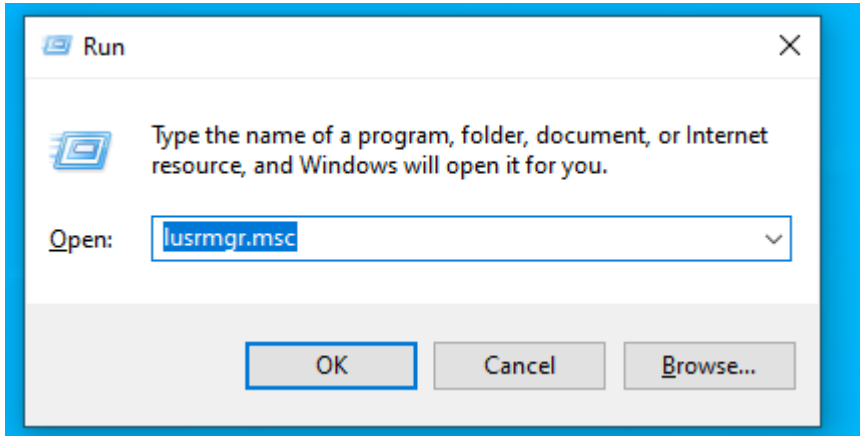


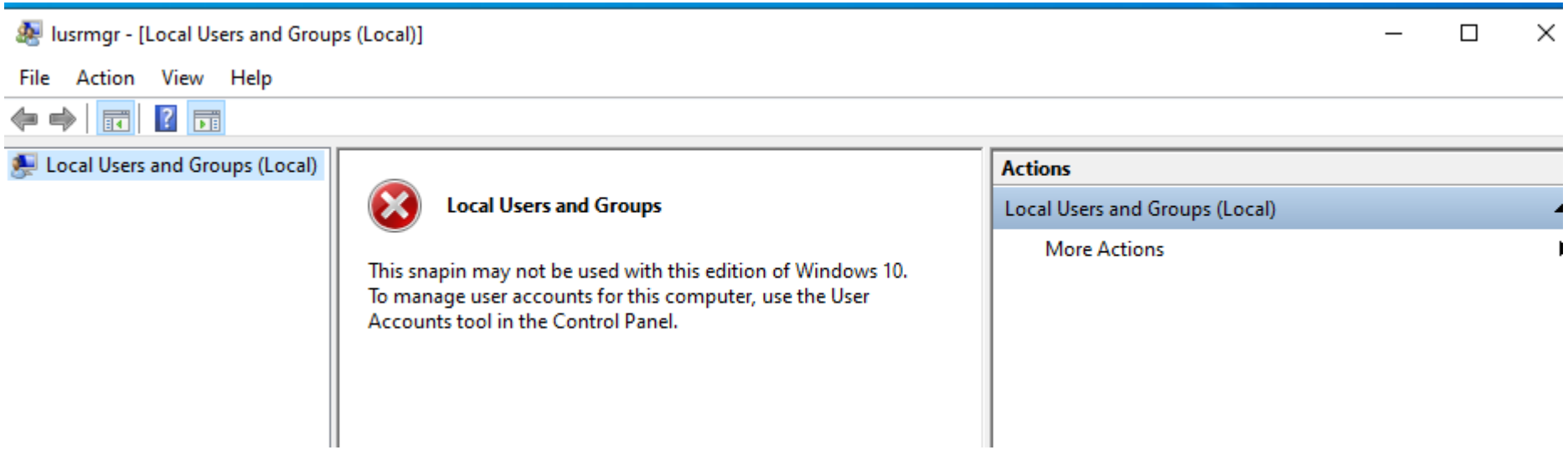
Creating Group from GUI

- Option not present in the Windows 10 Home edition.



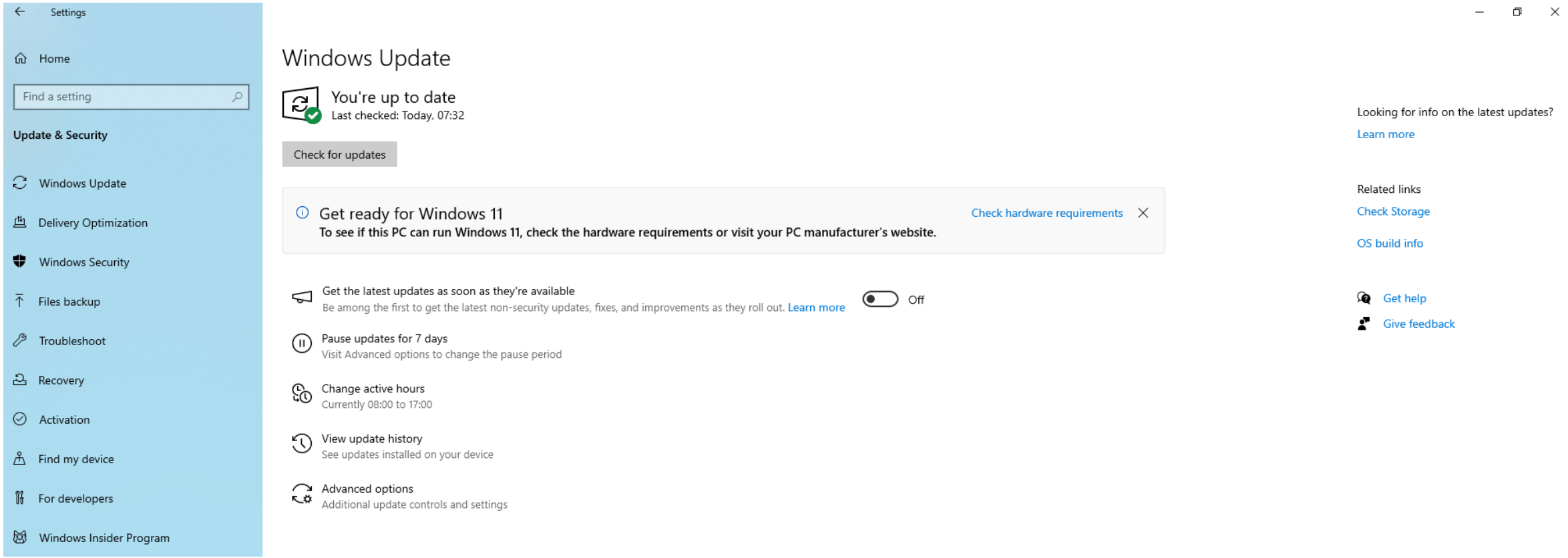
Command – Home Edition



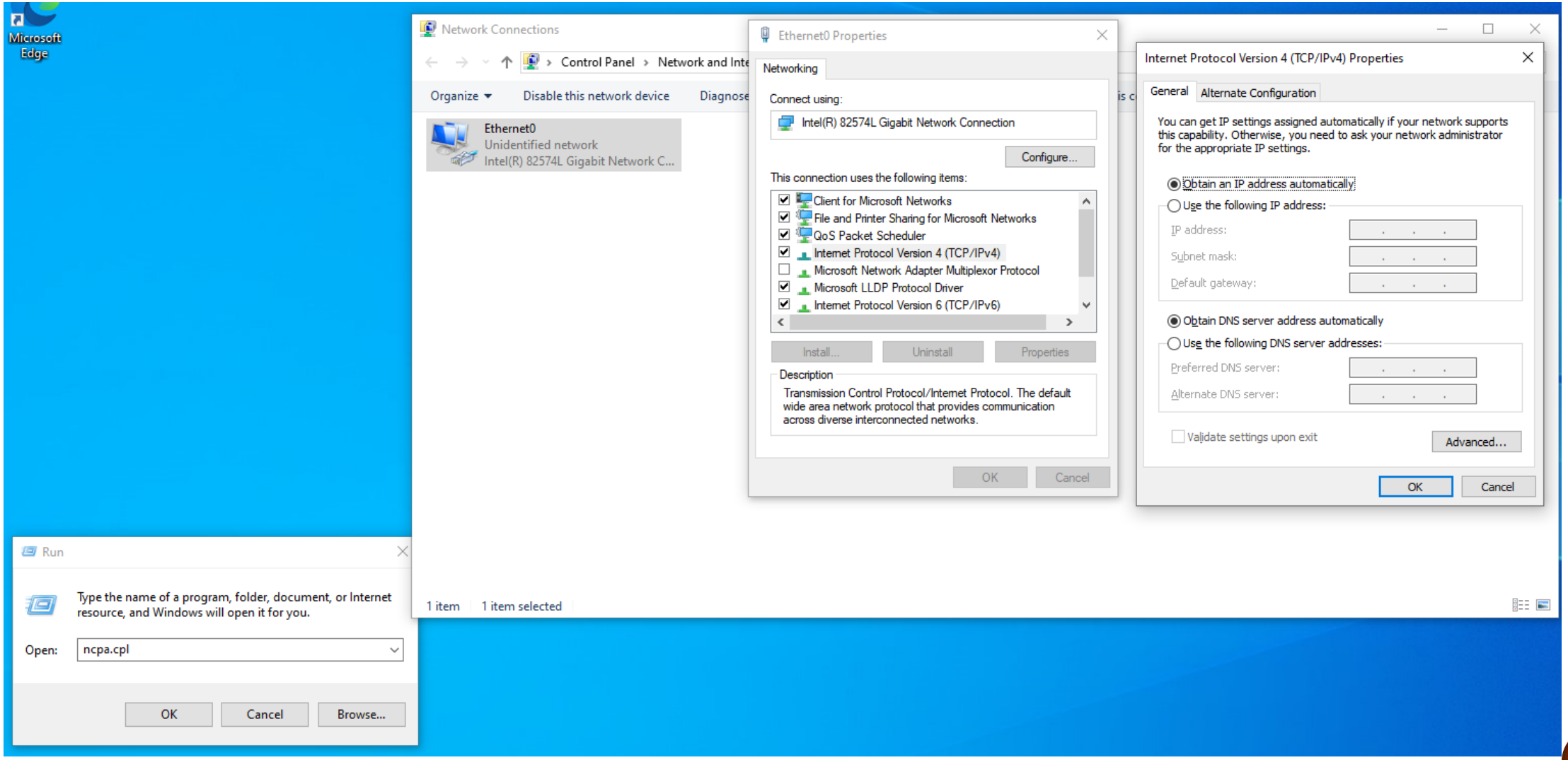


Command – Enterprise Edition

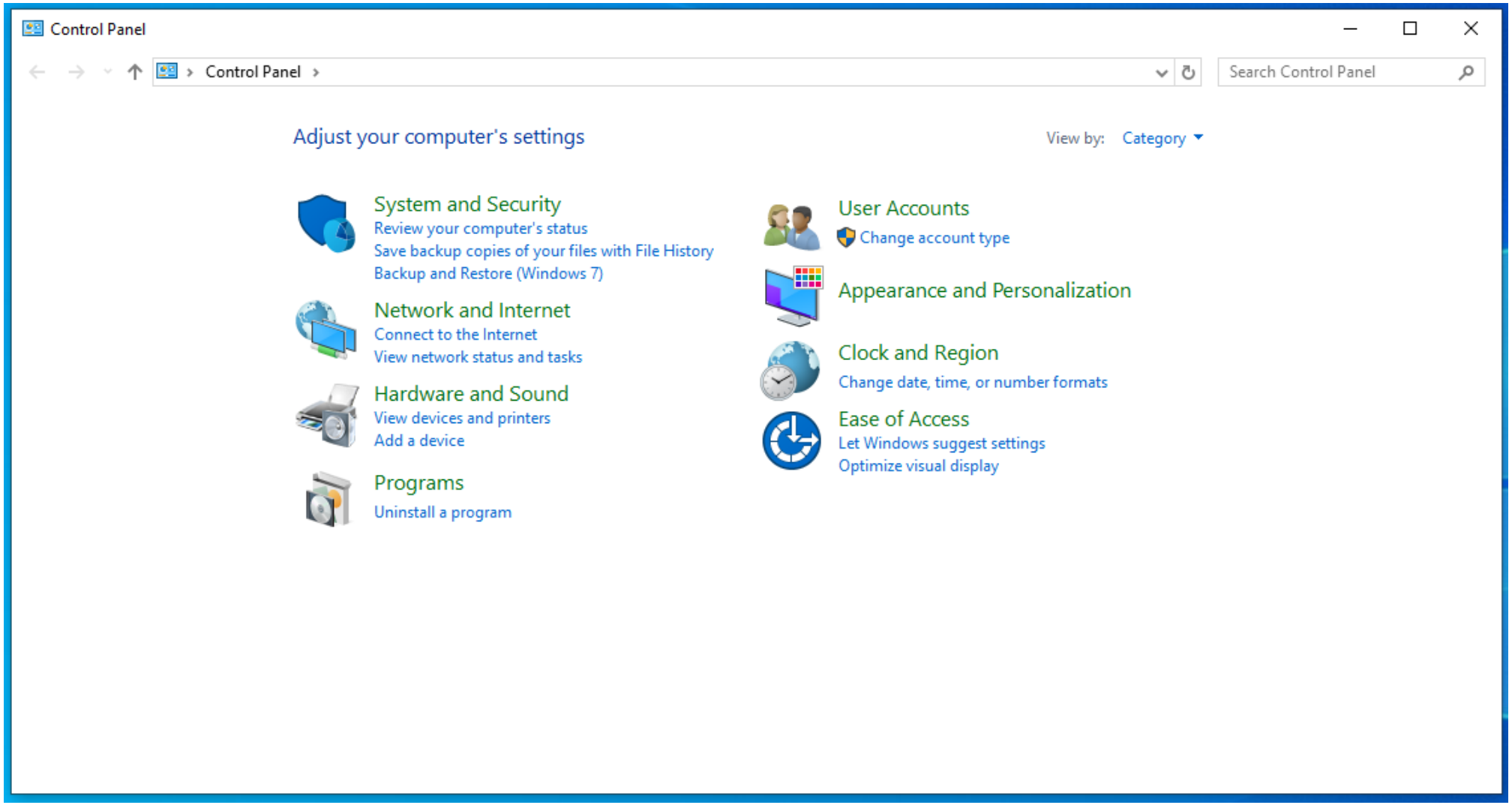
Windows Updates



Network Configuration

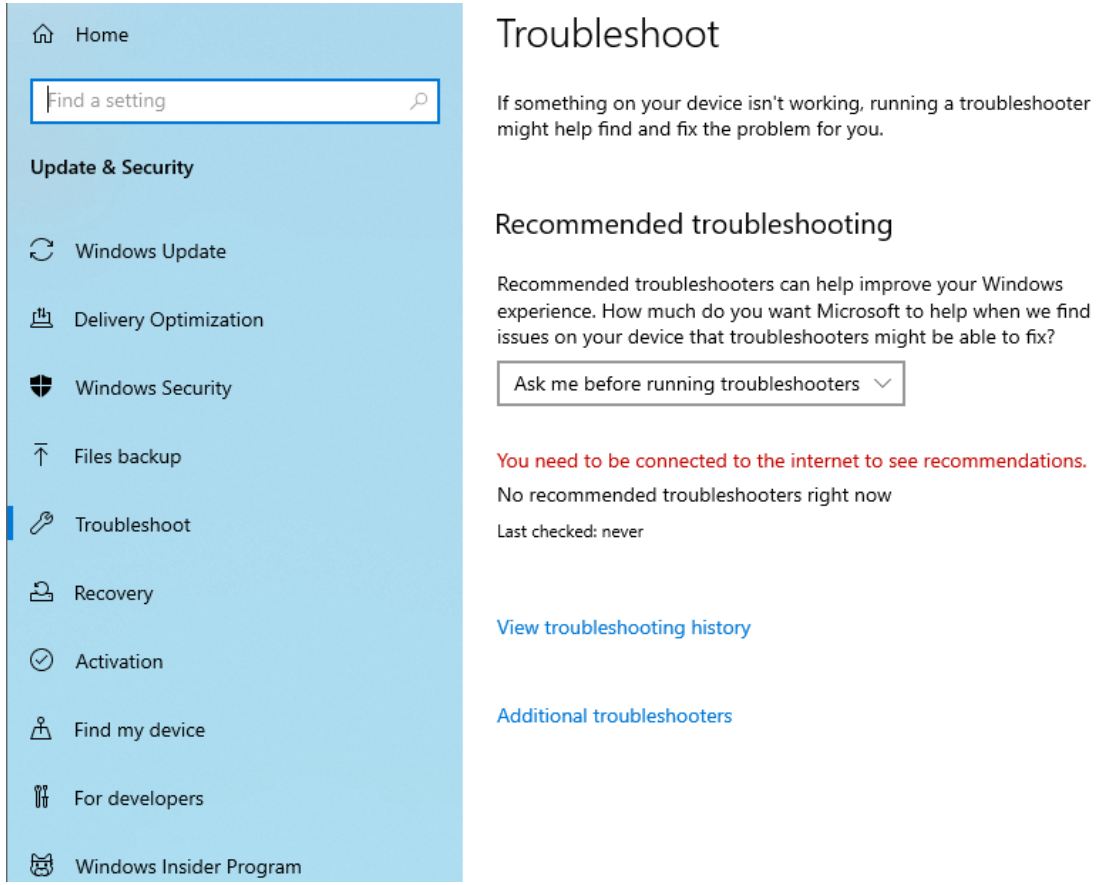


Control Panel Items



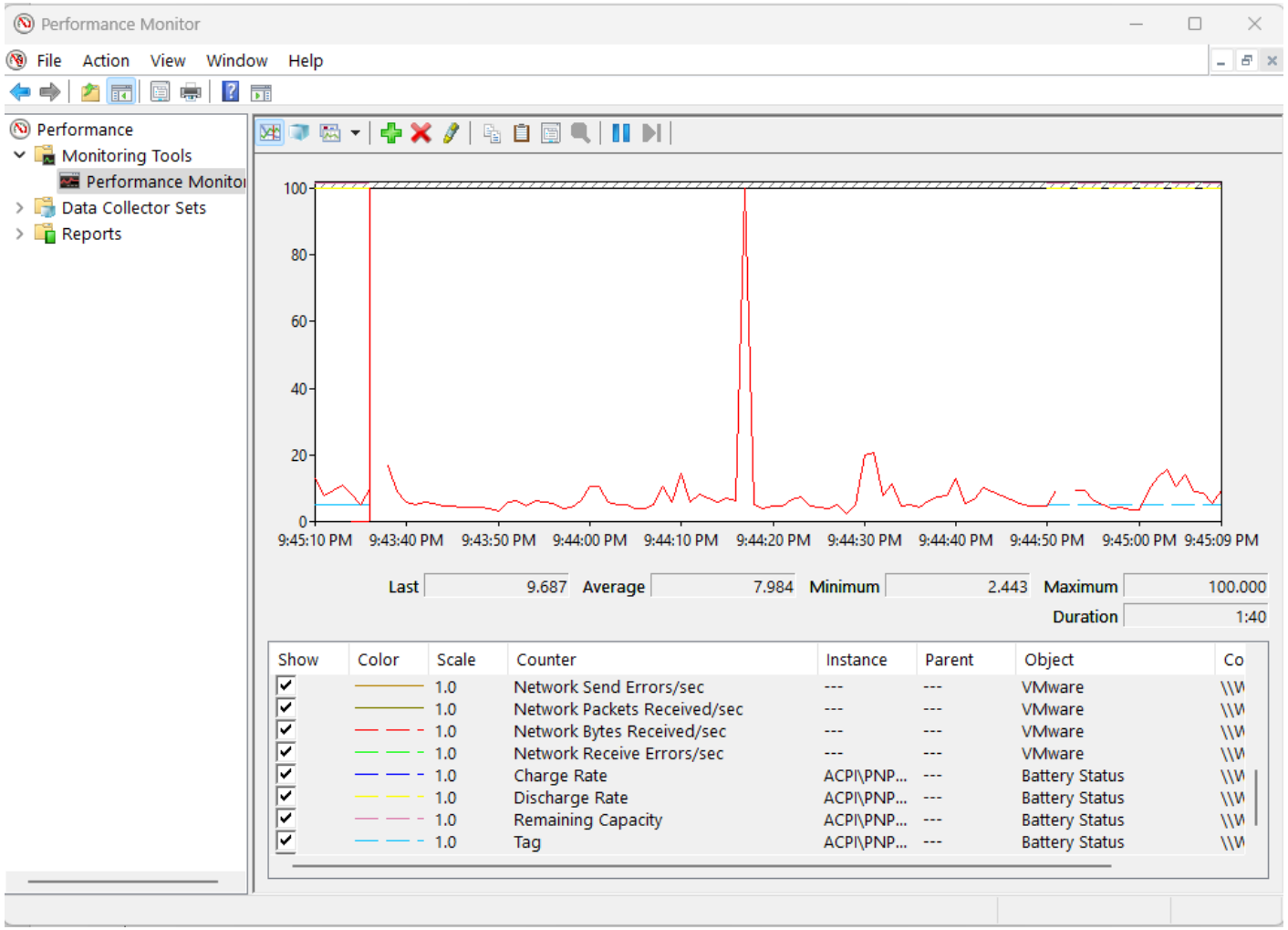
Basic Troubleshooting

- **Start** > **Settings** > **Update & Security** > **Troubleshoot** > **Additional troubleshooters**, and then select **Additional troubleshooters**.

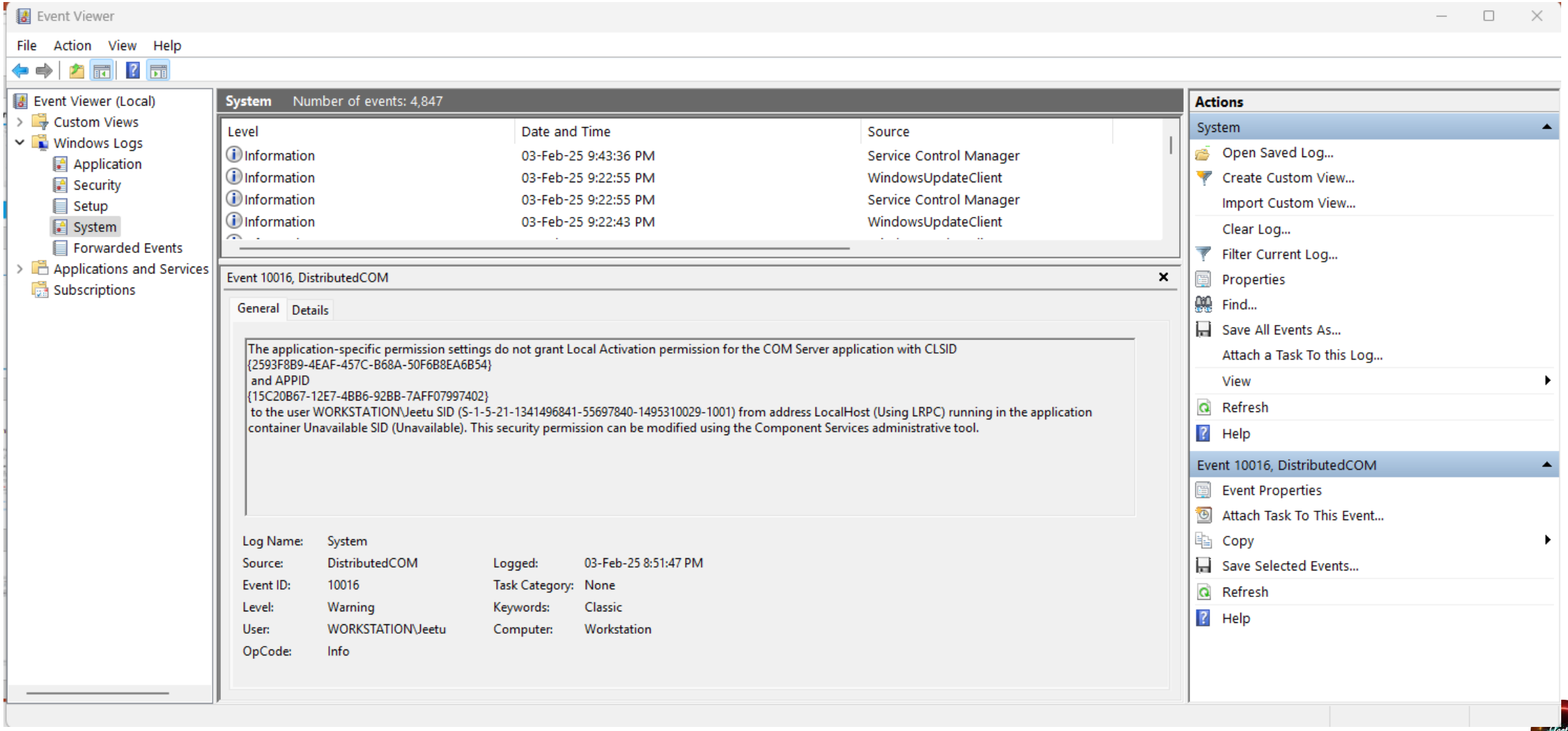


Performance monitor

- Performance Monitor is a built-in tool that allows you to track various system metrics like CPU usage, memory usage, disk activity, and network performance in real-time.
- It is accessed by opening the Start menu, searching for "Performance Monitor", and launching the application; you can also open it by typing "**perfmon**" in the Run dialog box.



Event Viewer



Remote Management

- Tools for remote management:
  - **Remote Desktop Services**: Allows users to remotely access Windows desktops and applications.
  - **Server Manager**: A built-in tool that allows users to manage multiple servers from a single console.
  - **Windows Admin Center**: A browser-based app that allows users to manage Windows Servers on-premises.
  - **Microsoft Management Console (MMC)**: A tool that allows users to manage roles and features on Windows Server.
  - **Windows PowerShell**: A tool that allows users to manage Windows-based systems remotely.


That's all Folks!