

Virtualization

- In computing, **virtualization** is the act of creating a virtual (rather than actual) version of something, including virtual computer hardware platforms, storage devices, and computer network resources.

Benefits of Virtualization



Reduced capital and operating costs.



Minimized or eliminated downtime.



Increased IT productivity, efficiency, agility and responsiveness.



Faster provisioning of applications and resources.



Greater business continuity and disaster recovery.



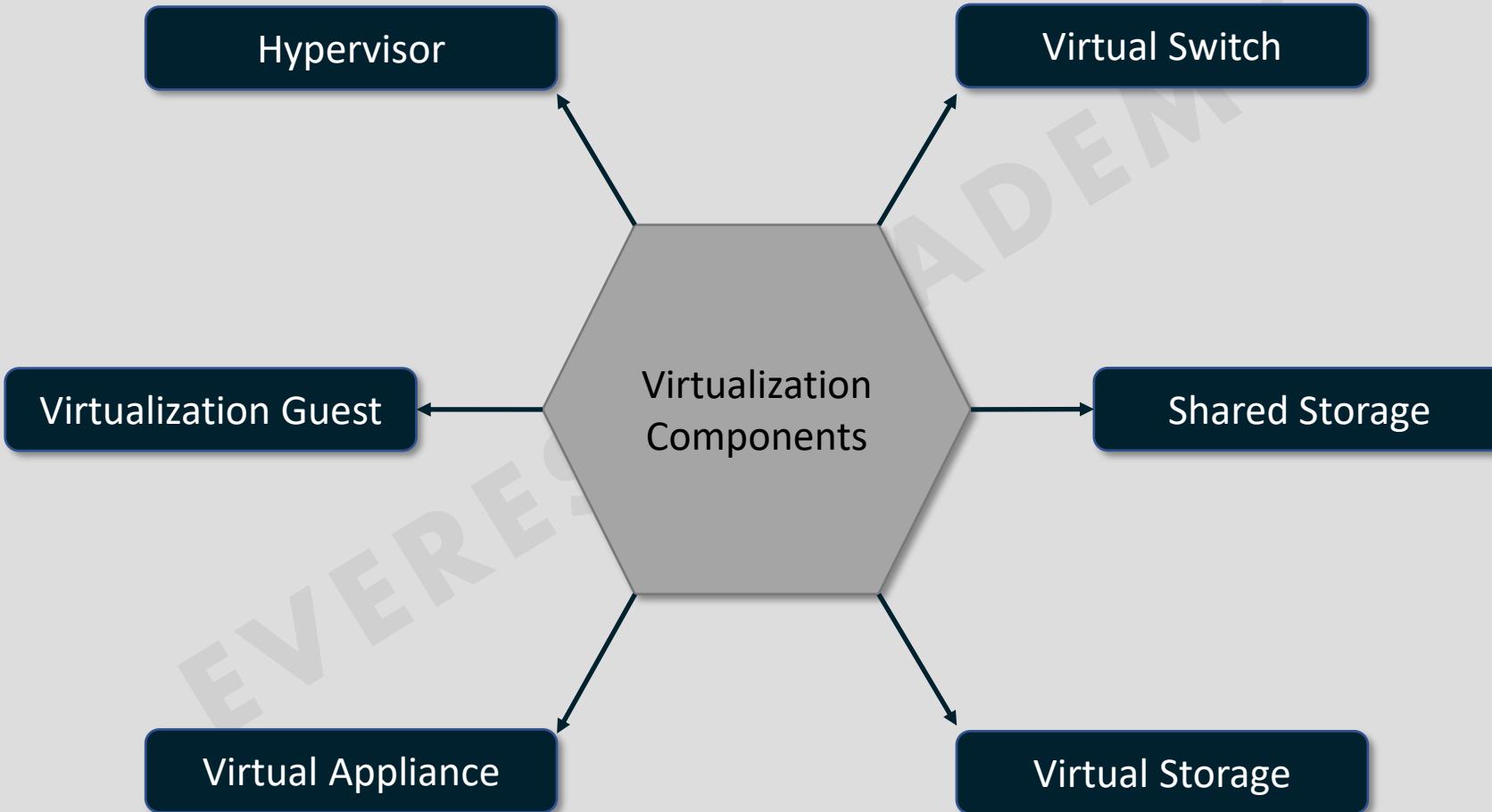
Simplified data center management.



Availability of a true Software-Defined Data Center.



Virtualization Components

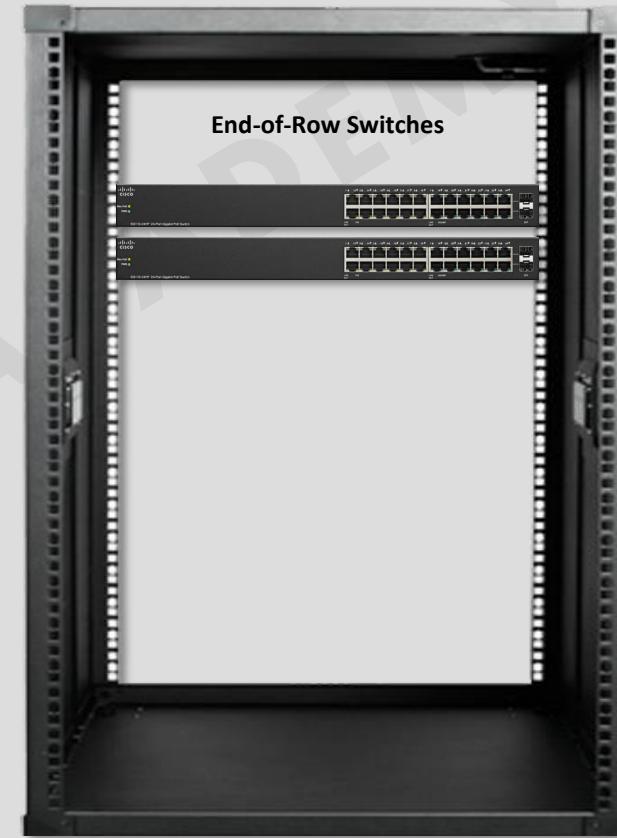


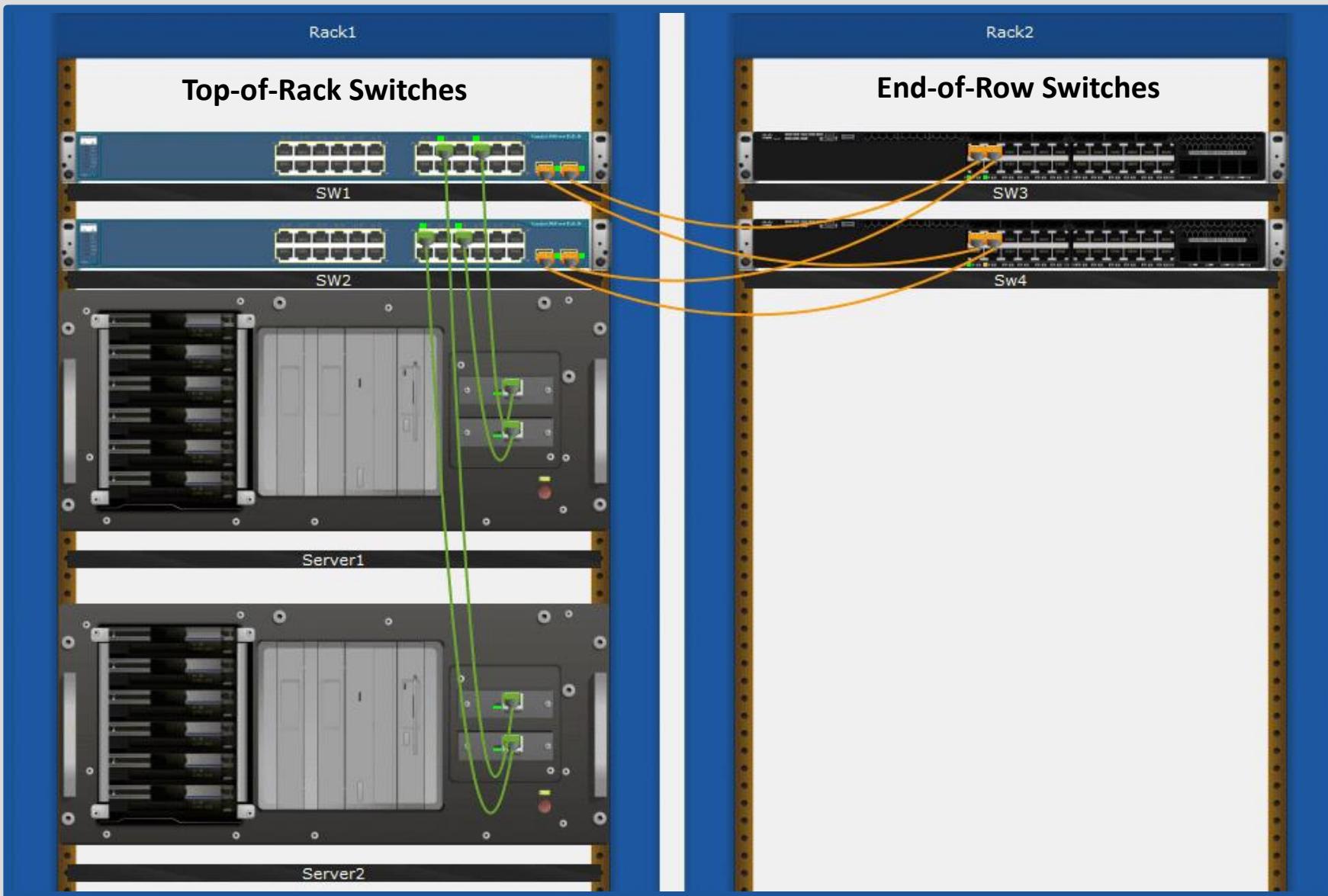
Traditional Data Center

Rack 1



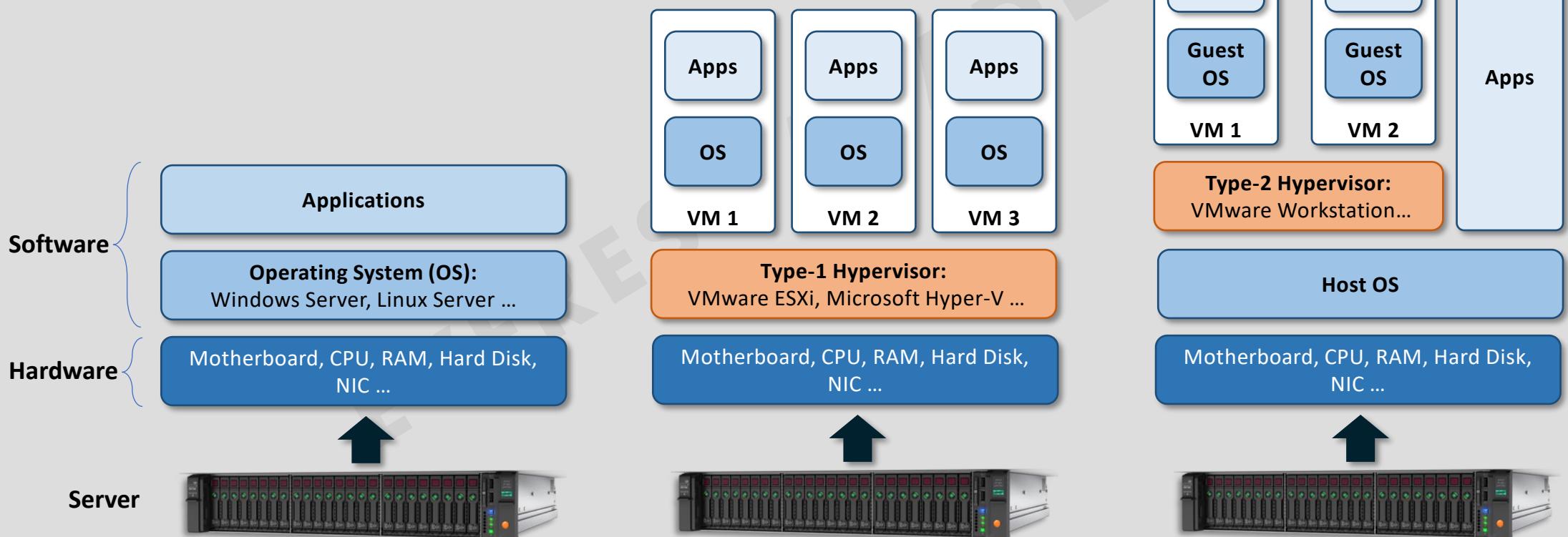
Rack 2



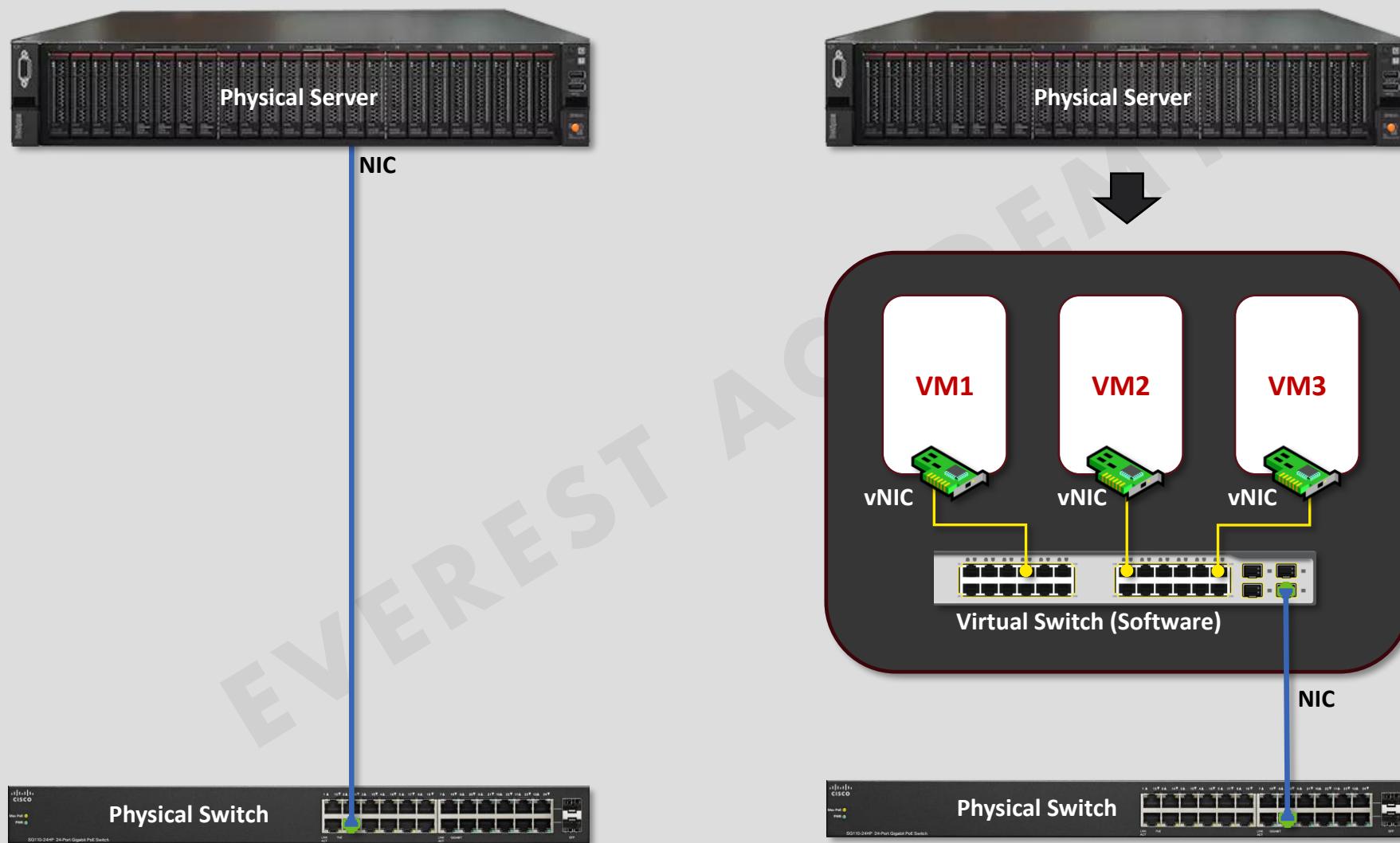


Server Virtualization

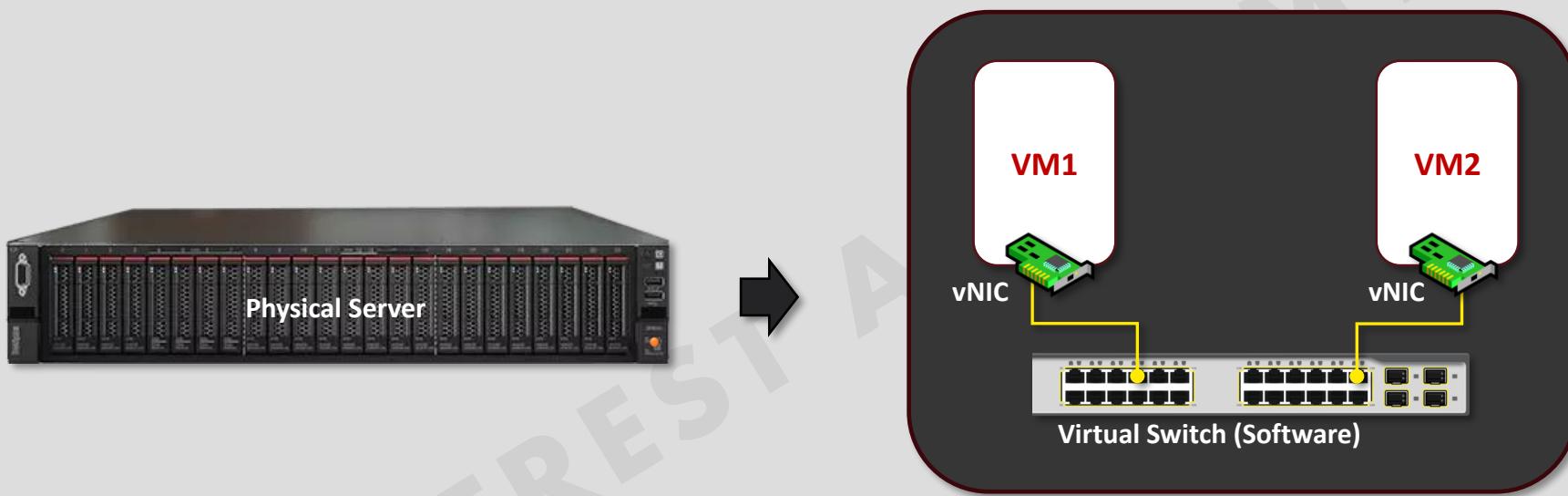
- A Hypervisor also known as a **virtual machine monitor** or **VMM**, is software that creates and runs **virtual machines** (**VMs**). A hypervisor allows one host computer to support multiple guest VMs by virtually sharing its resources, such as *memory*, *CPU* and *Hard Disk*.
 - Type-1 (Native or Bare-metal) Hypervisor.
 - Type-2 (Hosted) Hypervisor.



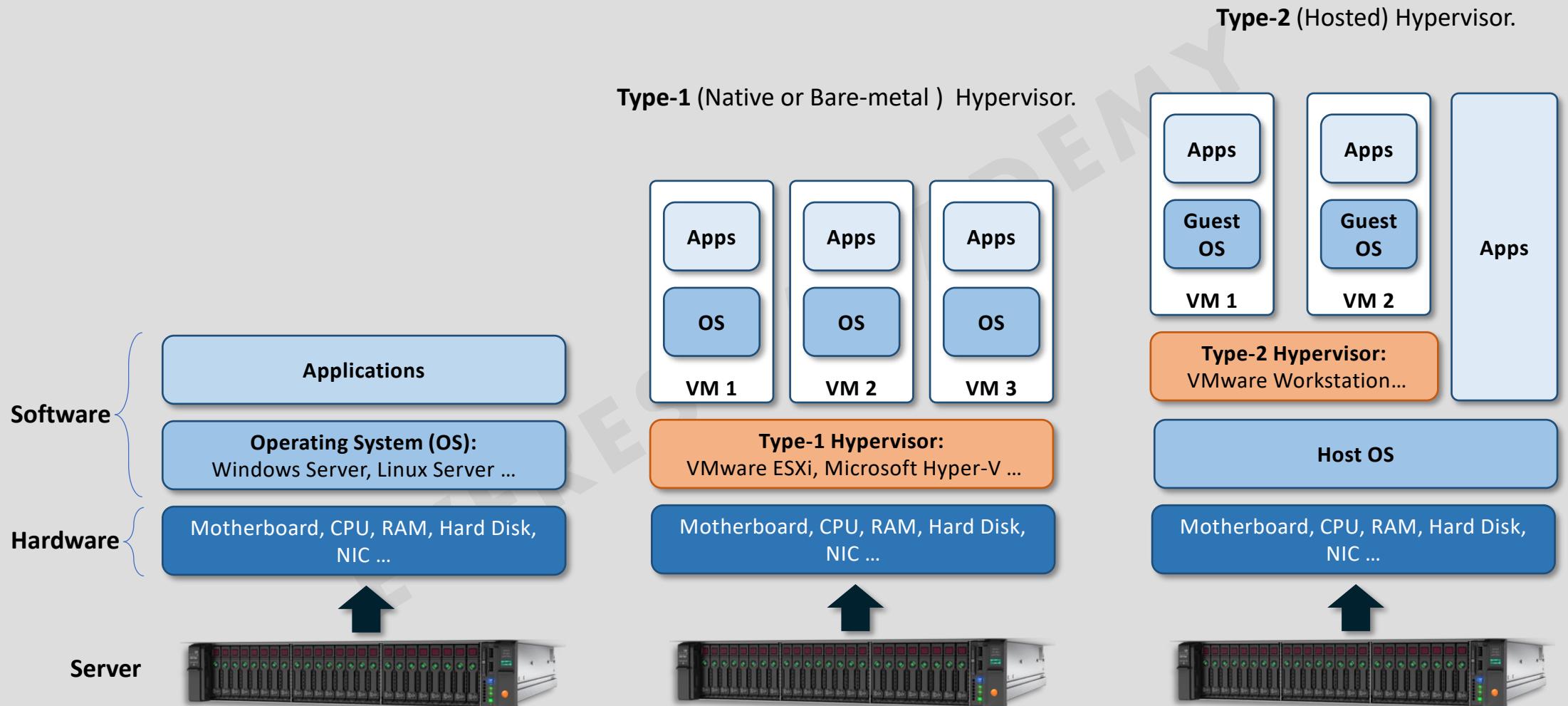
Virtual Switch



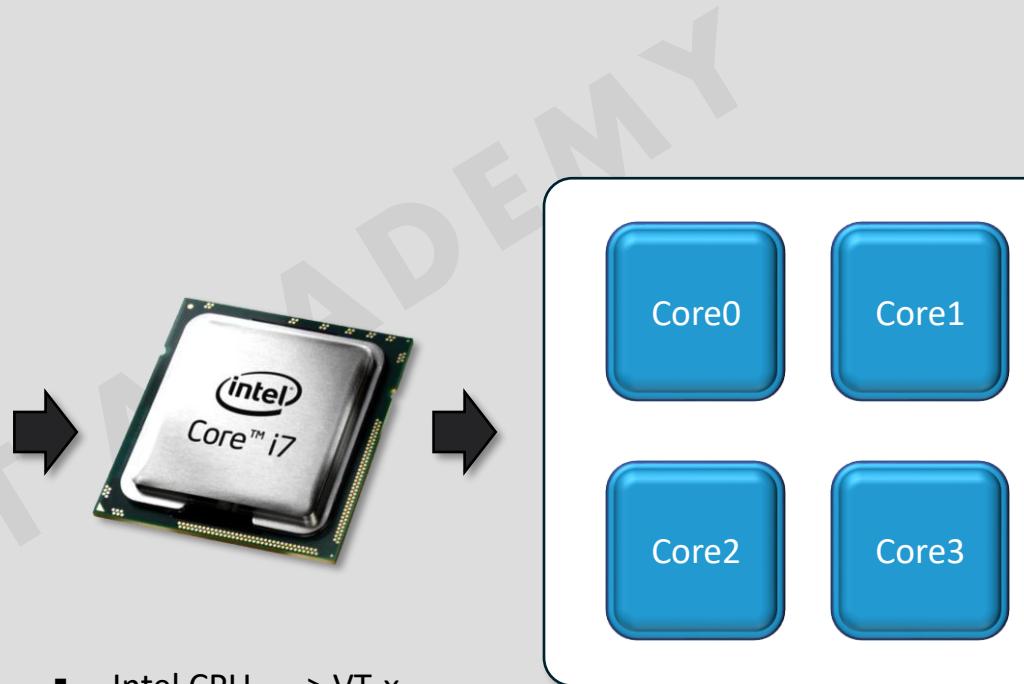
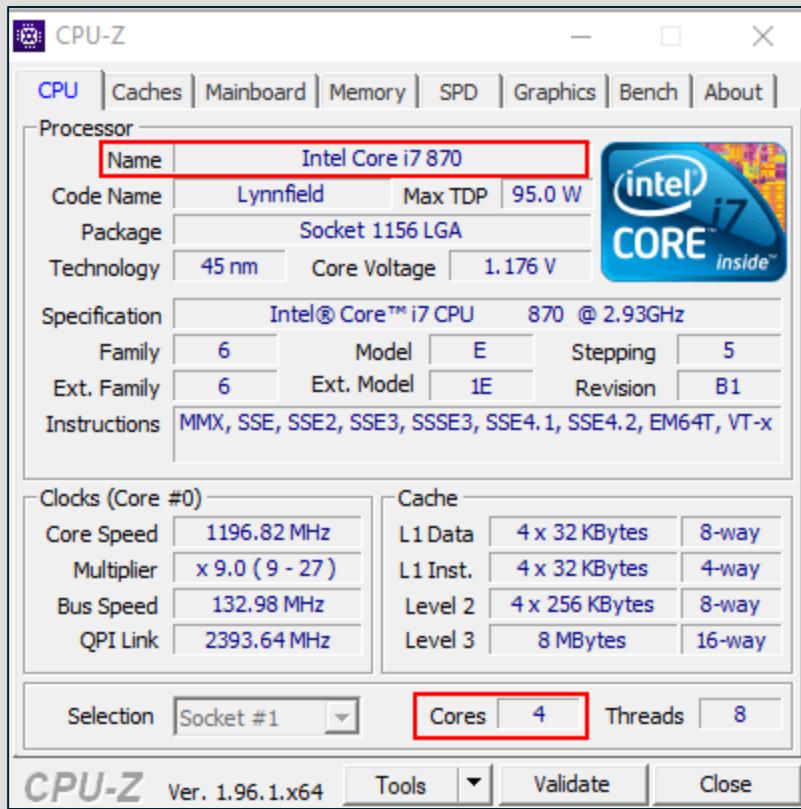
Server Virtualization Lab



Server Virtualization Lab

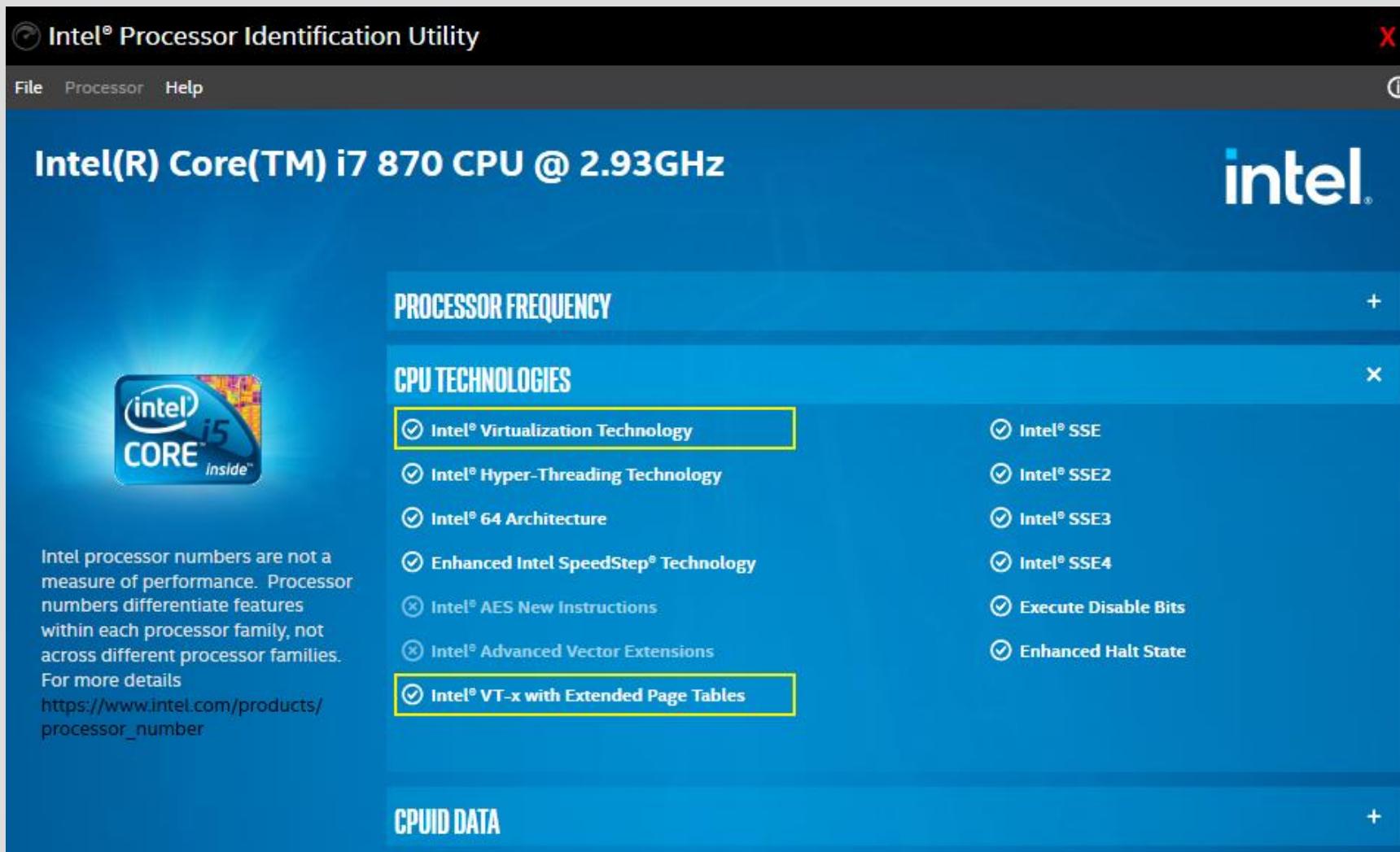


Processor Requirements

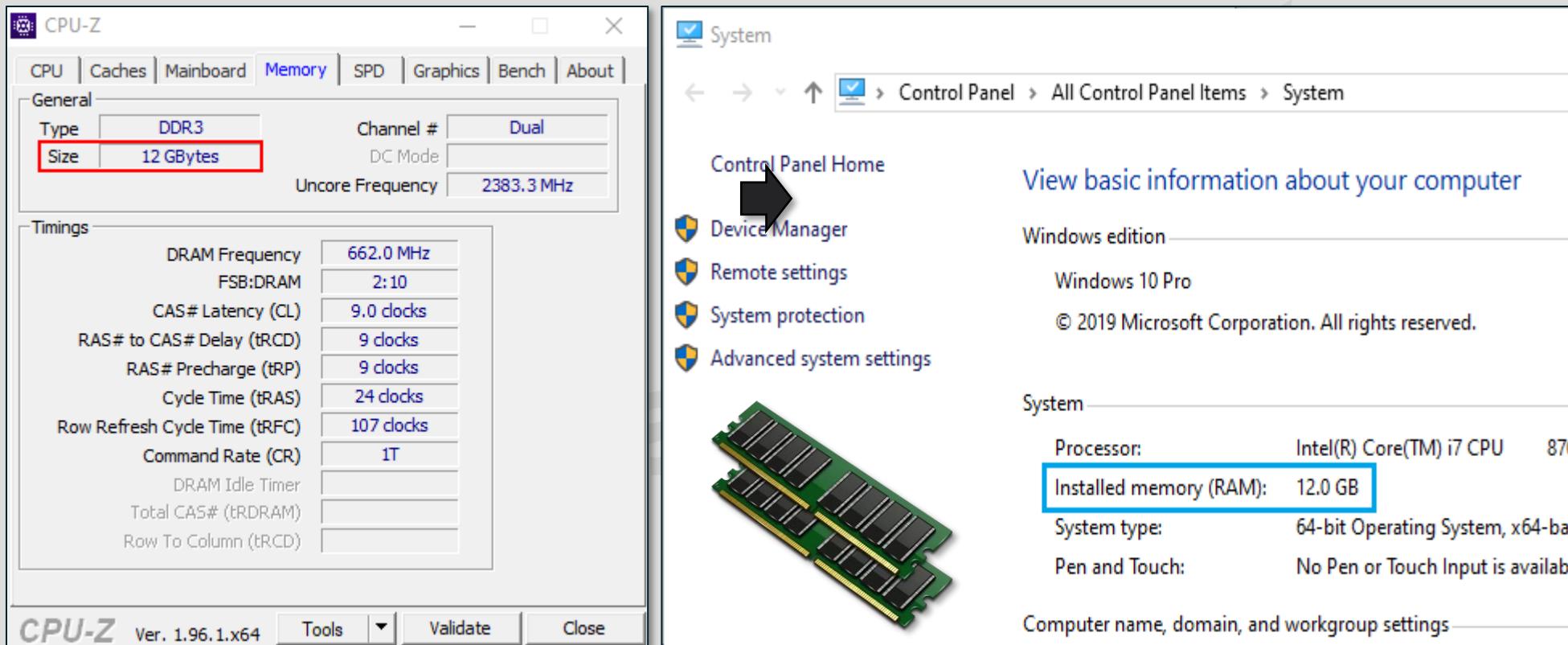


- Intel CPU ----> VT-x
- AMD CPU ----> AMD-V

Processor Requirements



Memory



- RAM size ----> 8GB or more.

Hard Disk



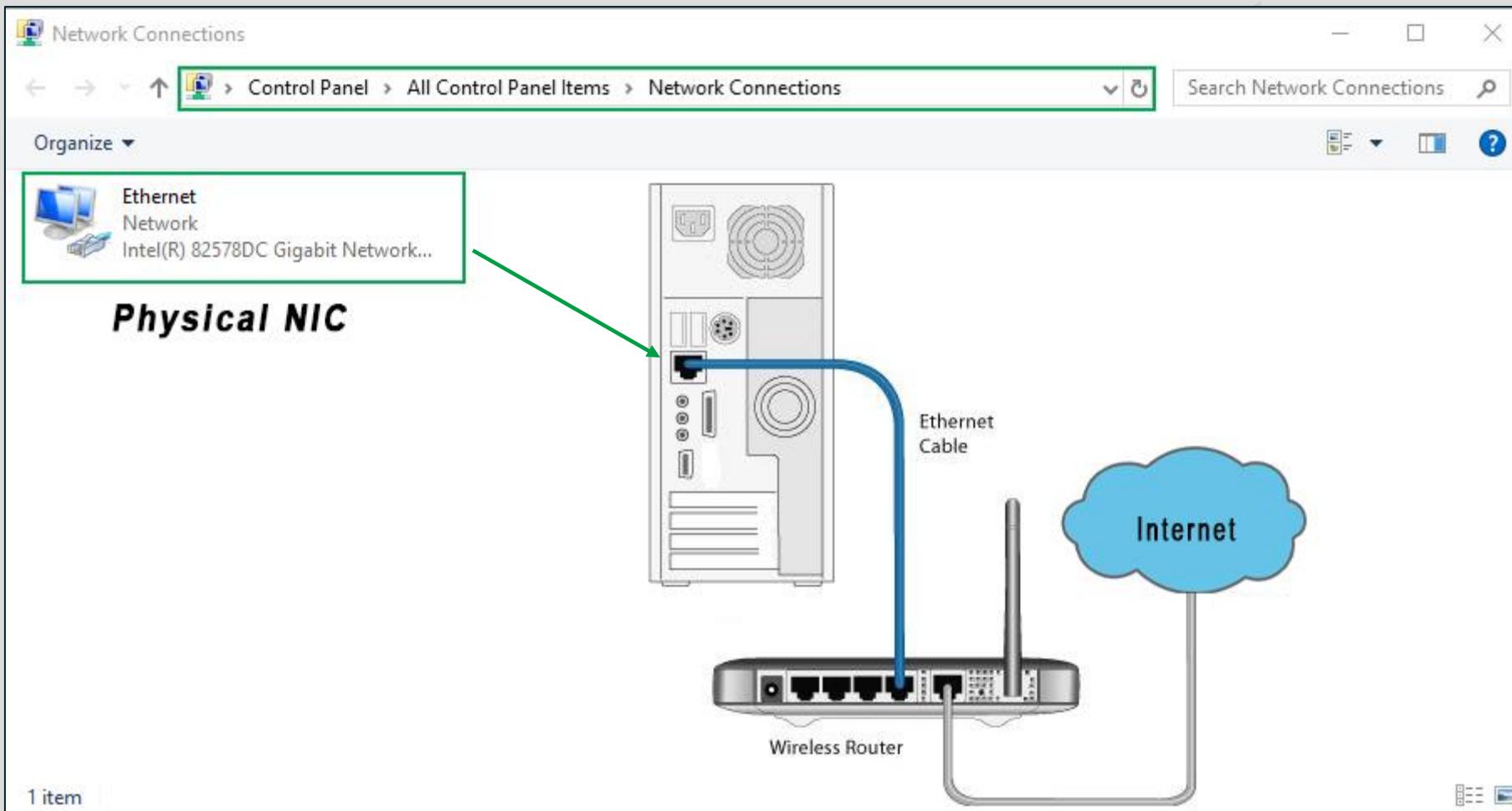
HDD



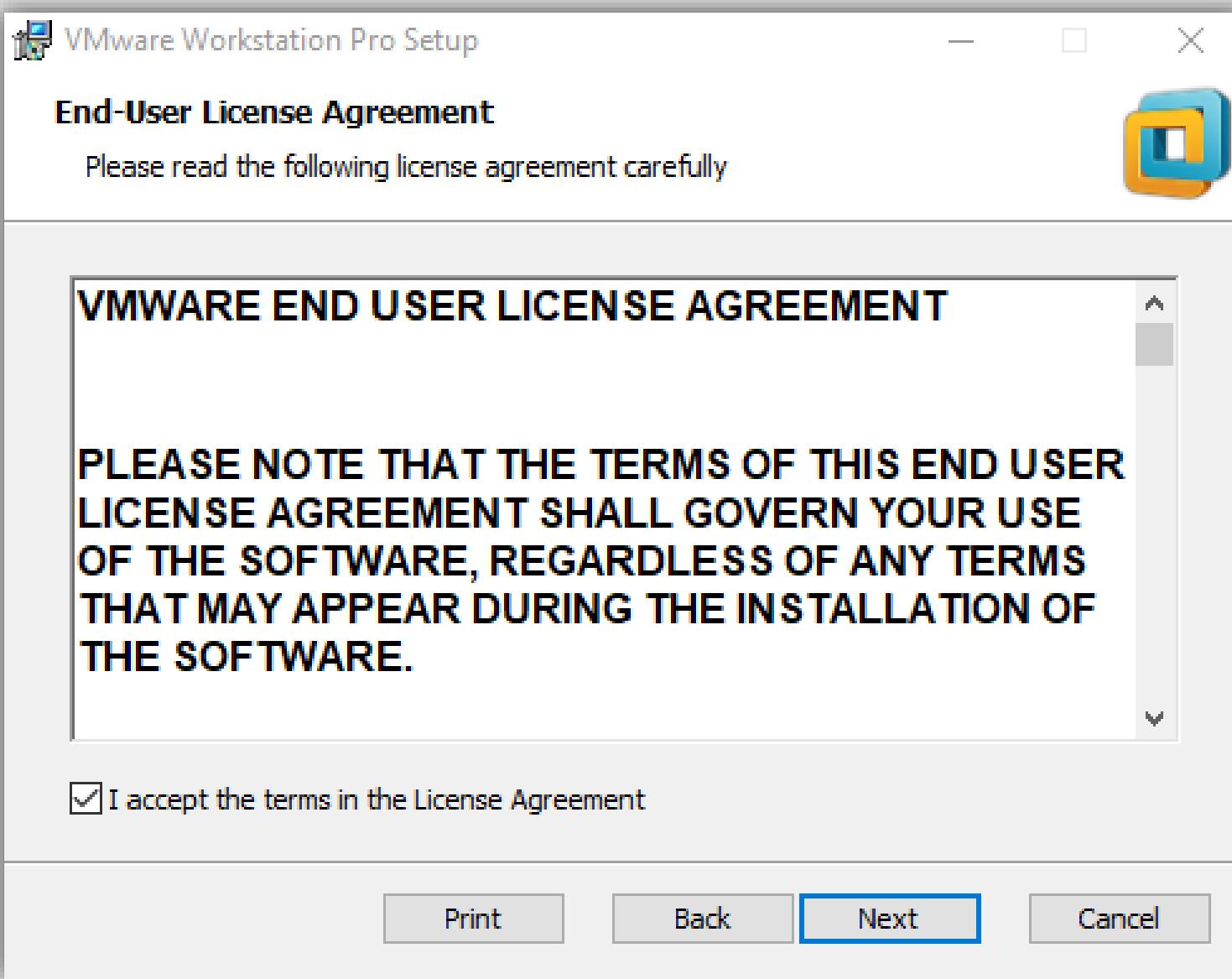
SSD

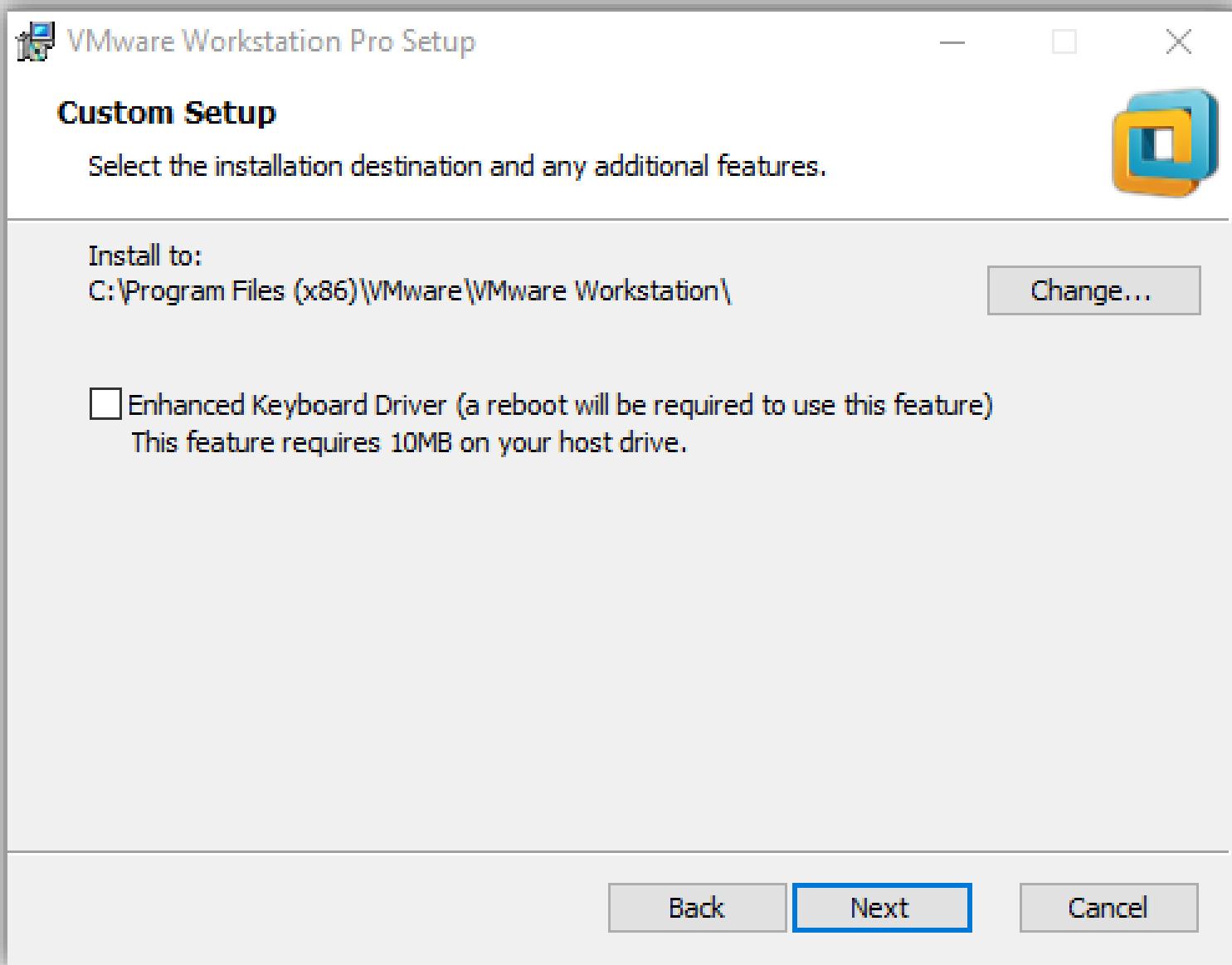


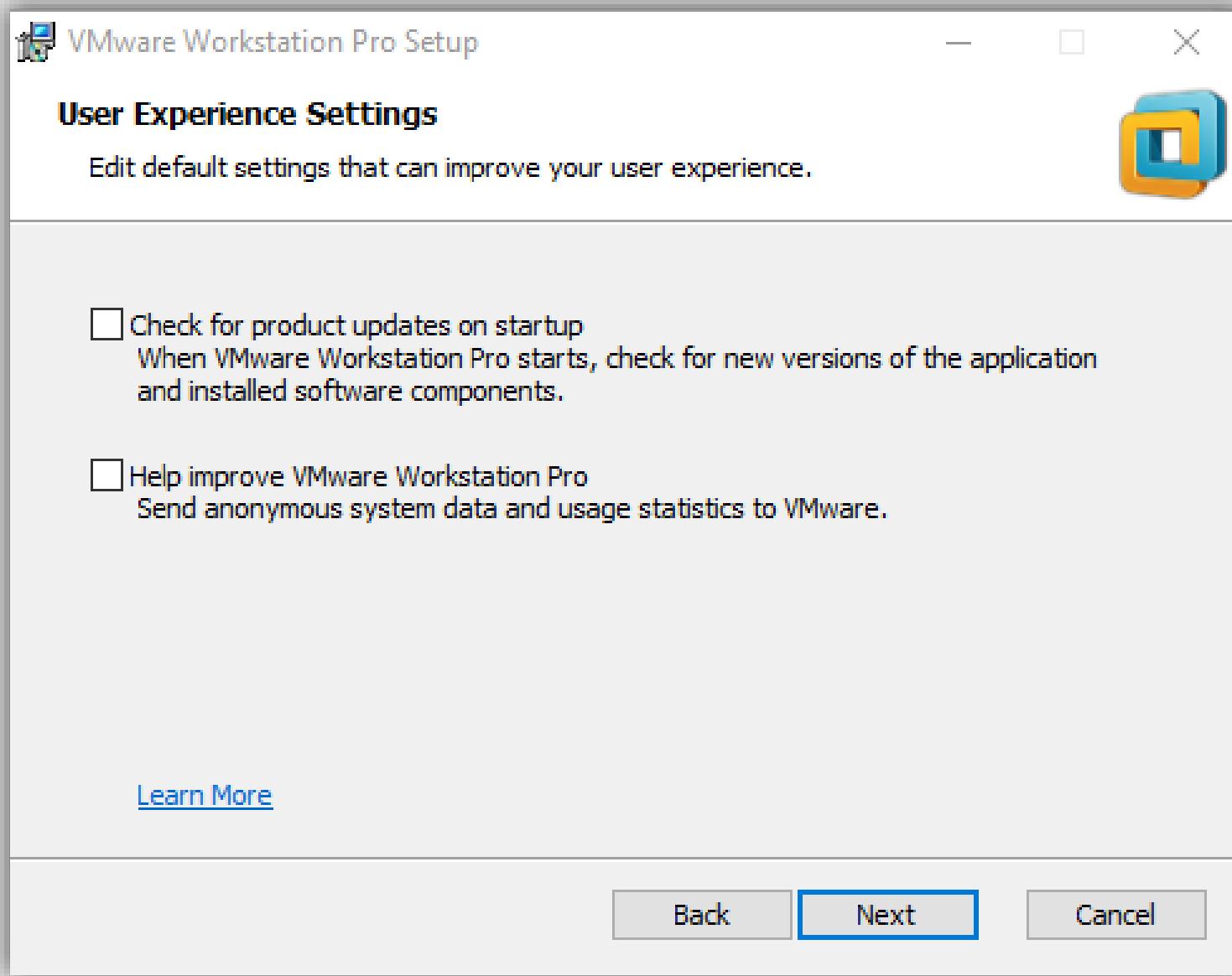
Installing VMware Workstation 12 Pro

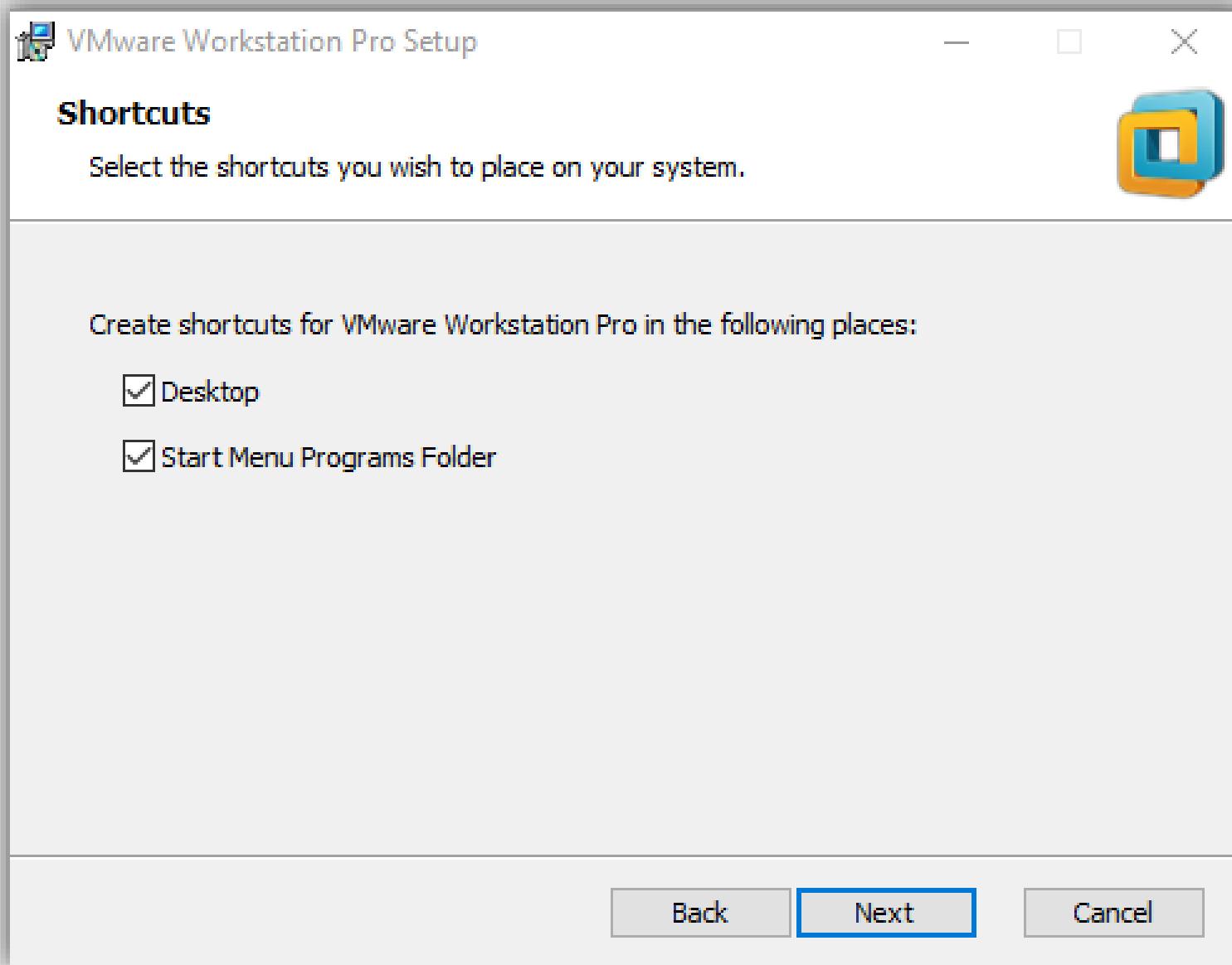


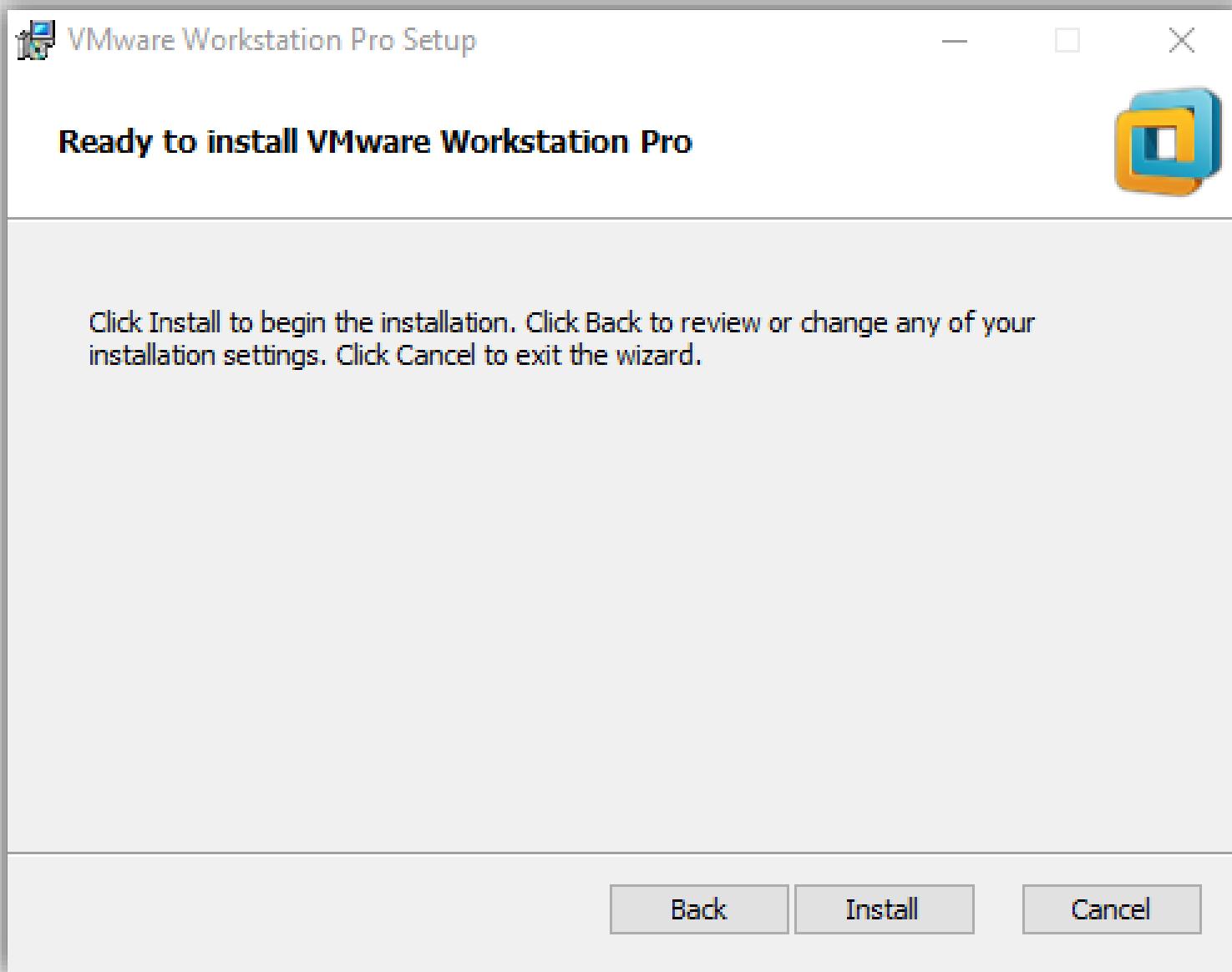


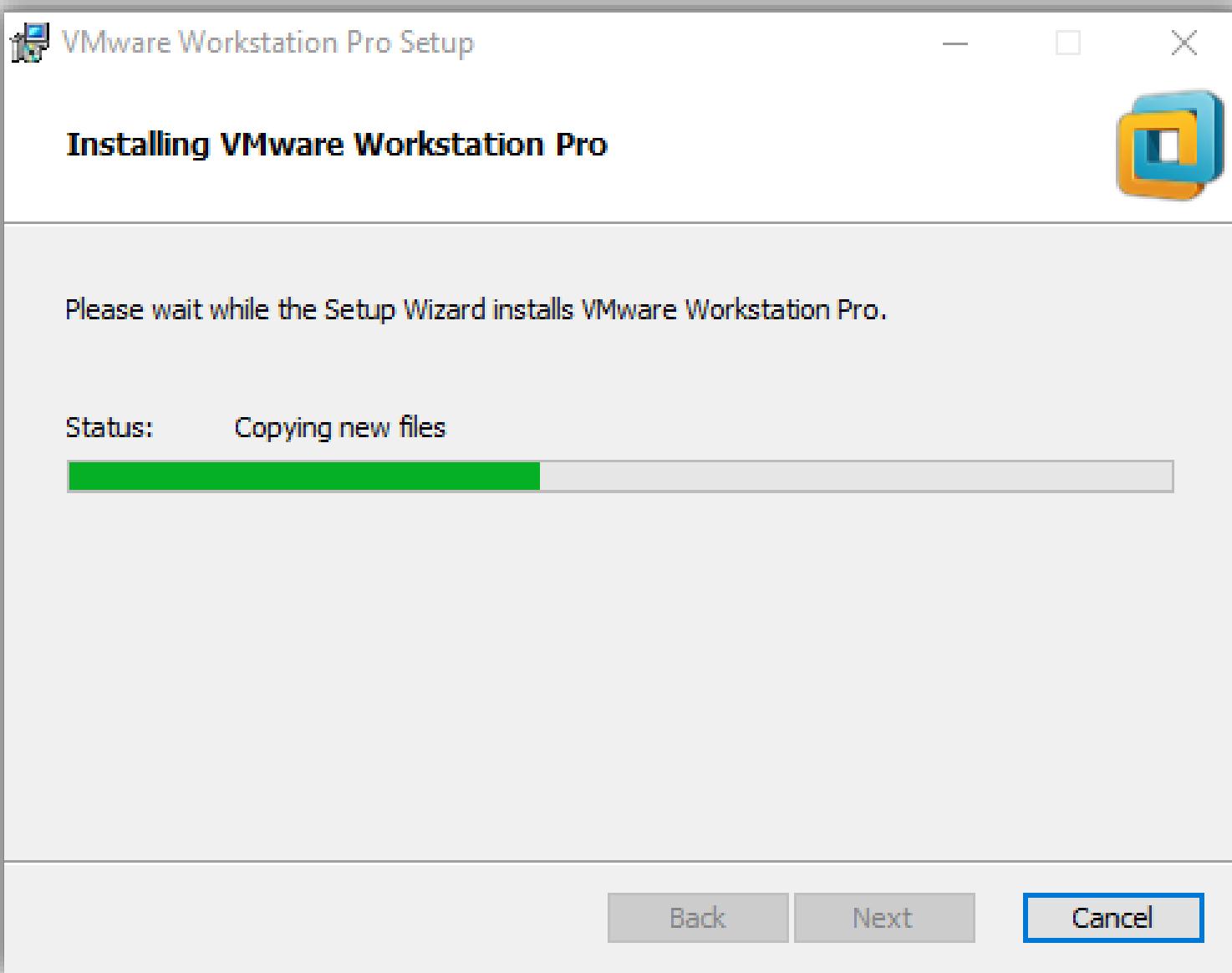




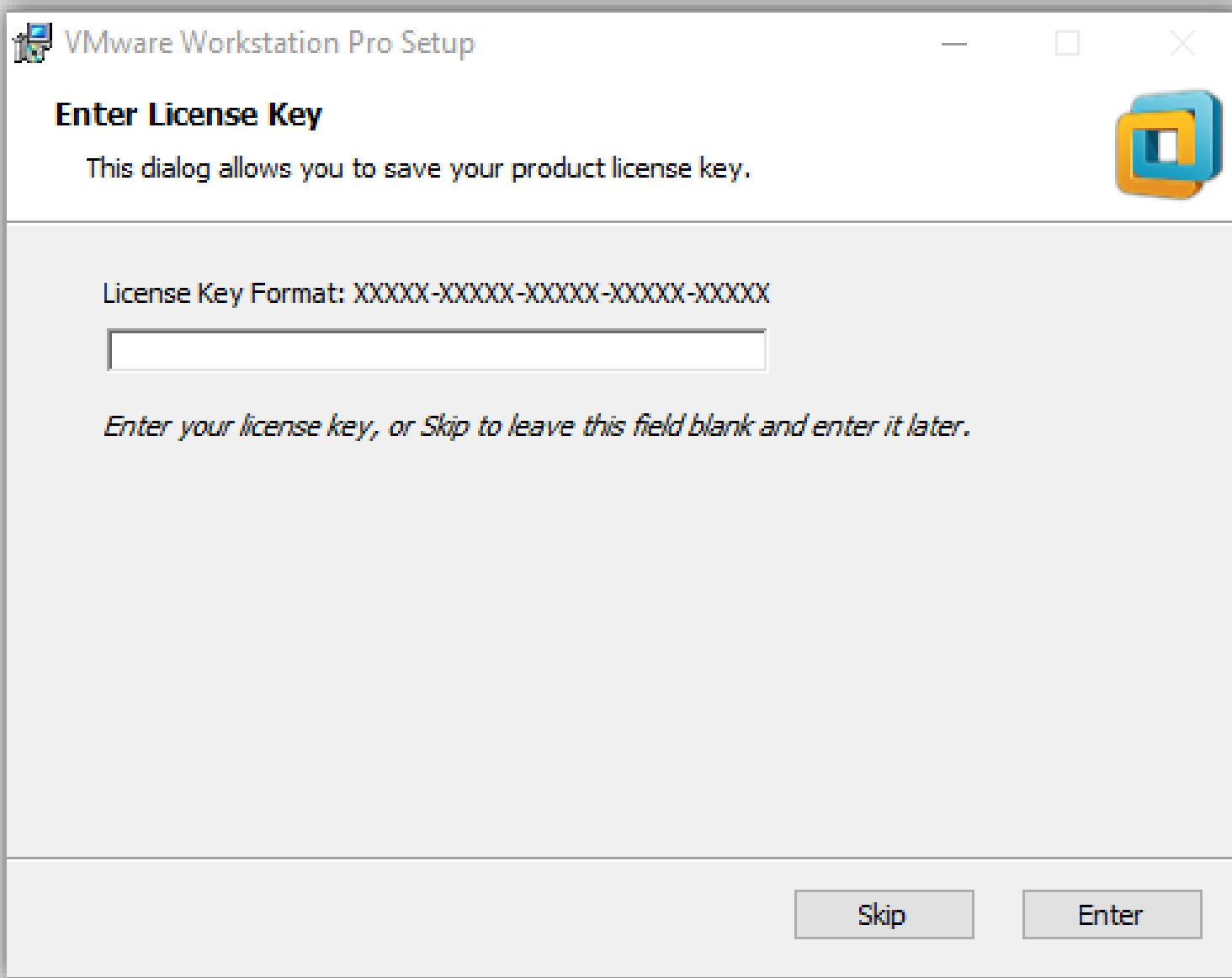


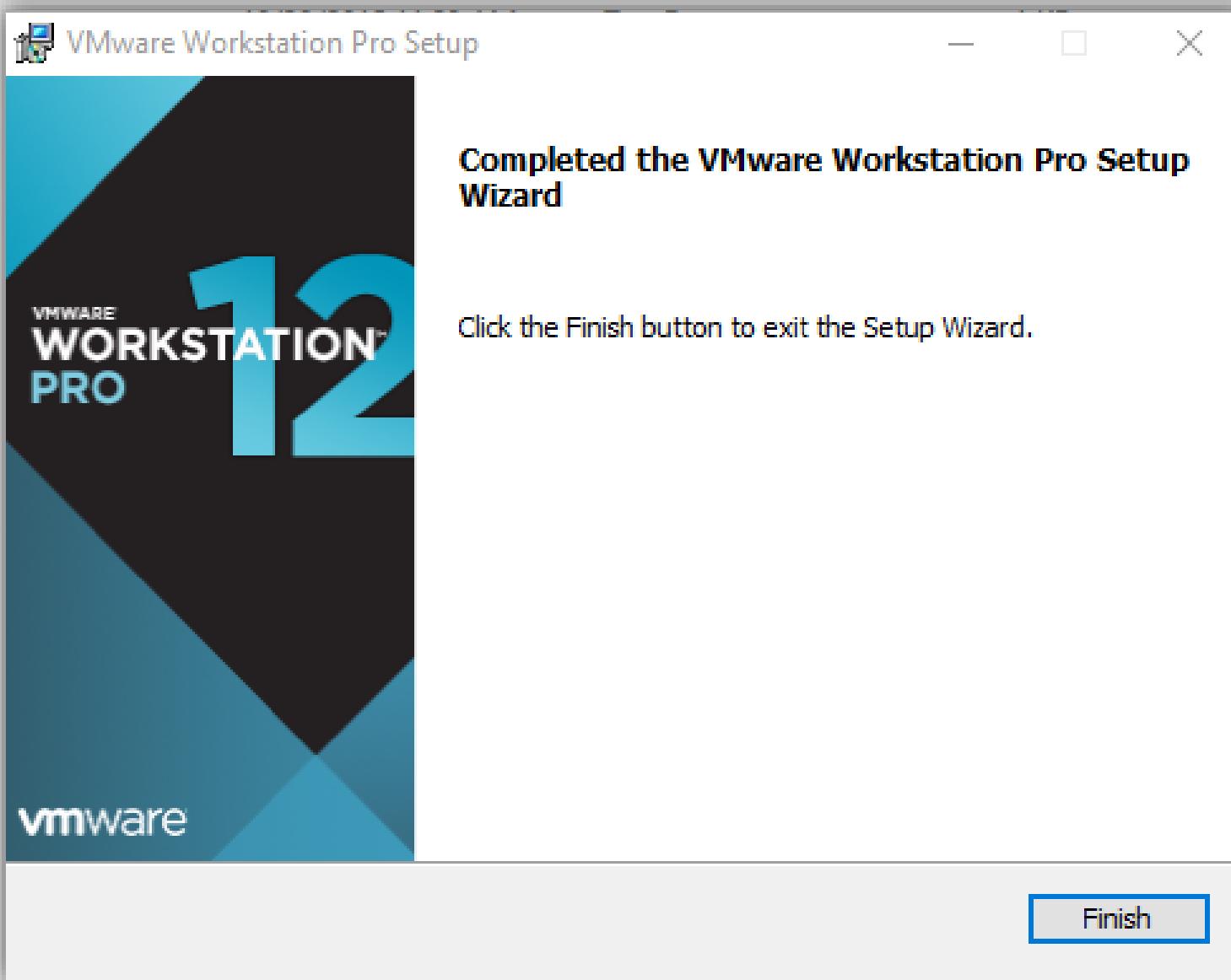


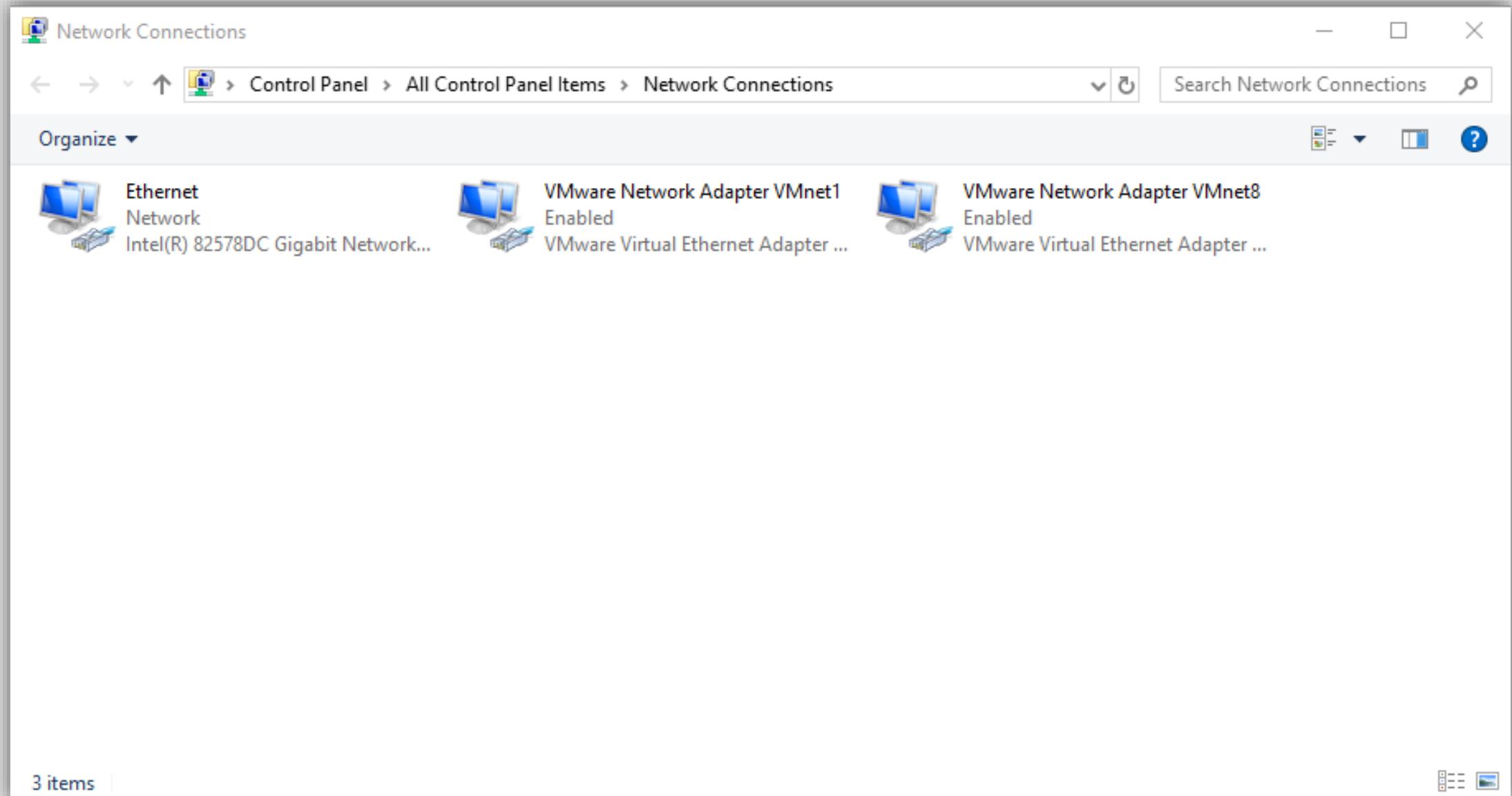


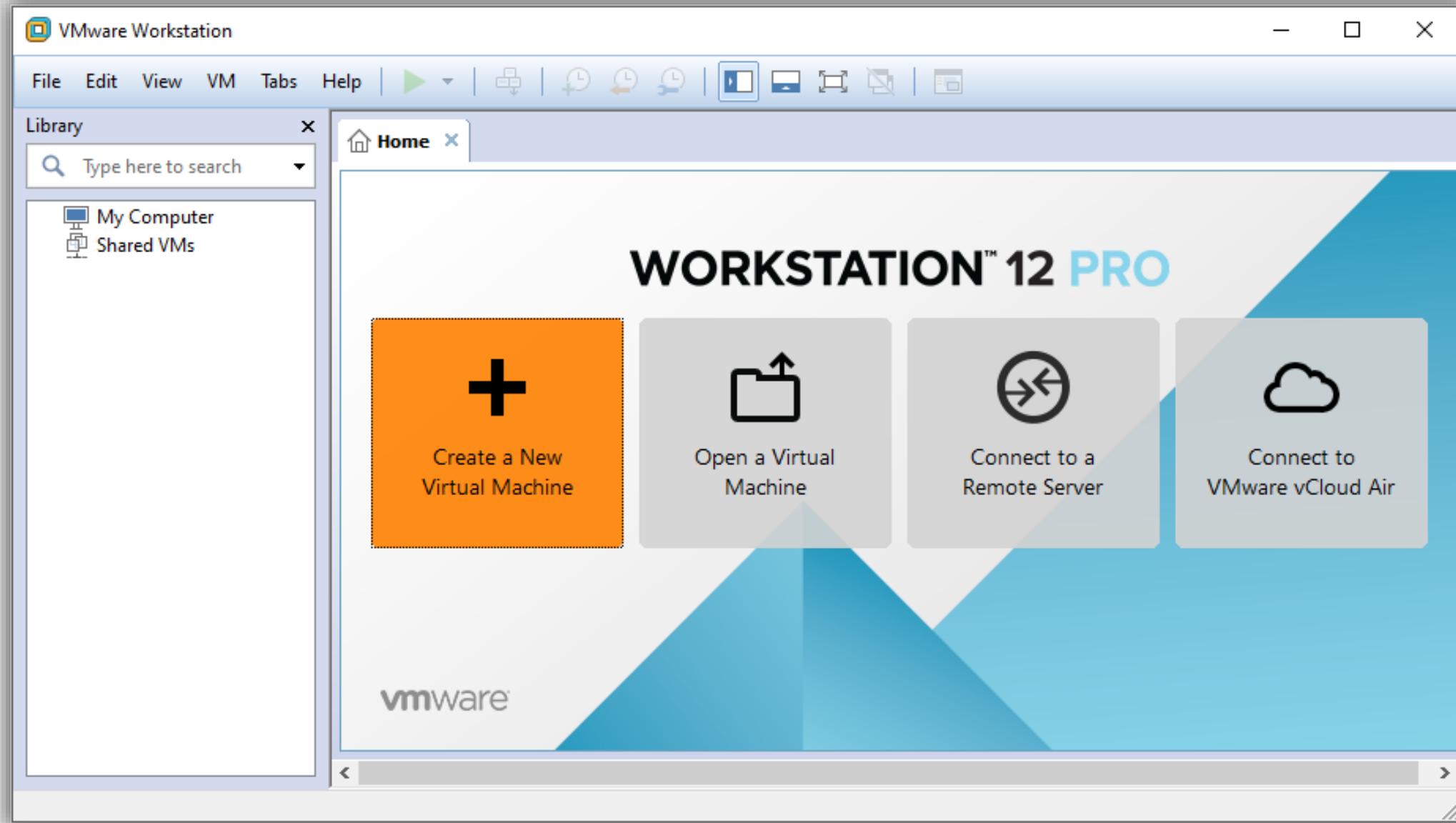




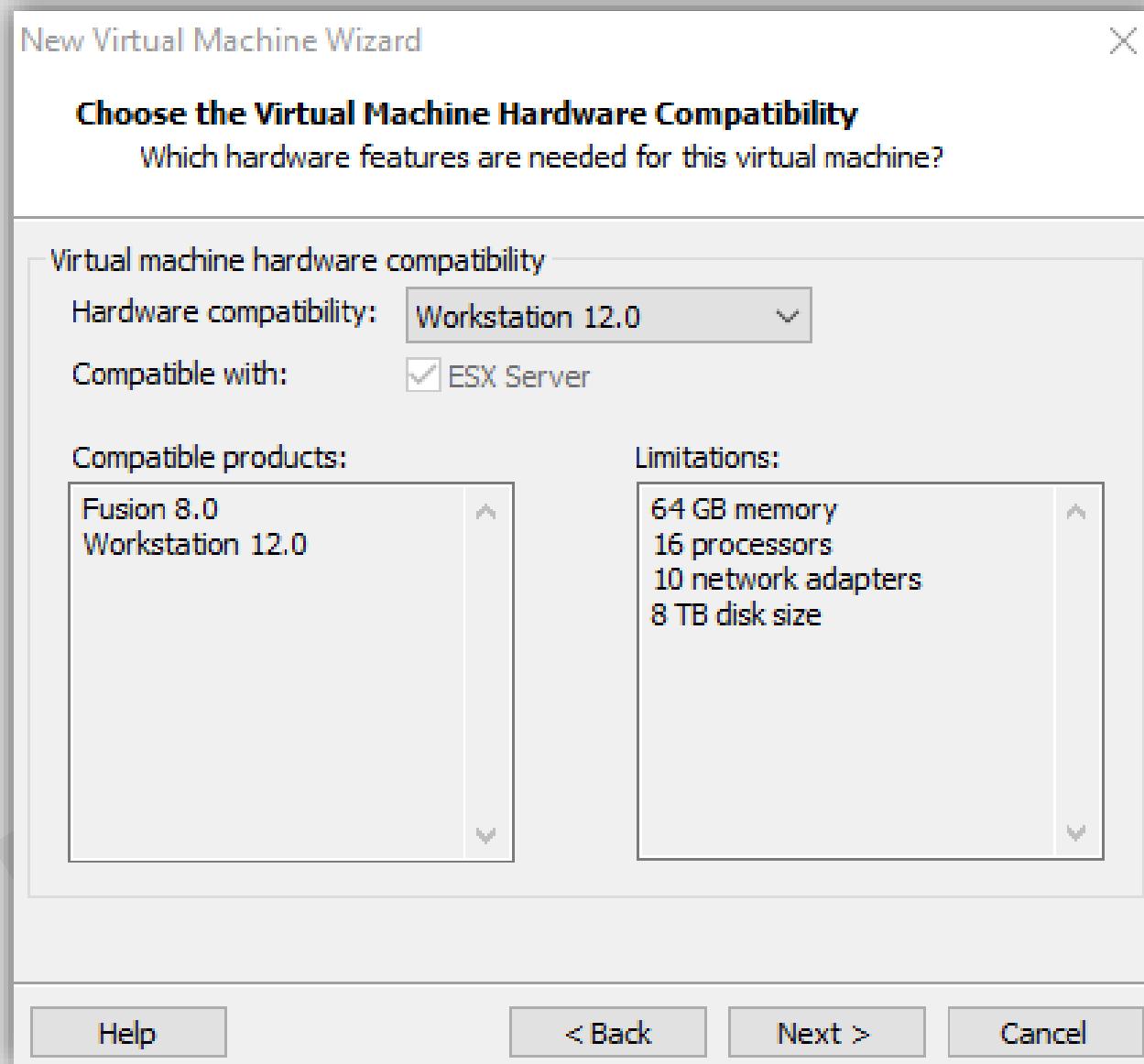


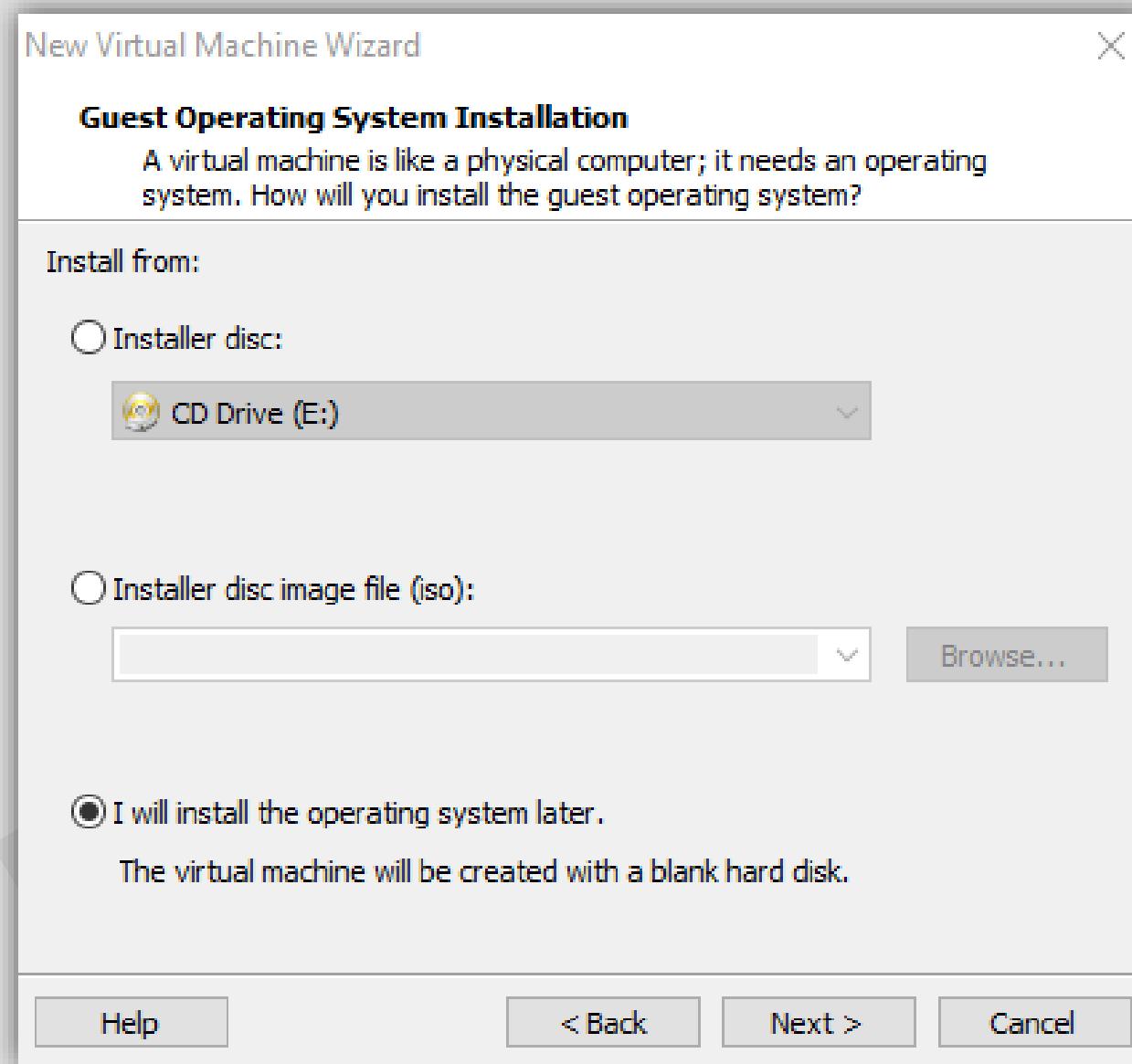


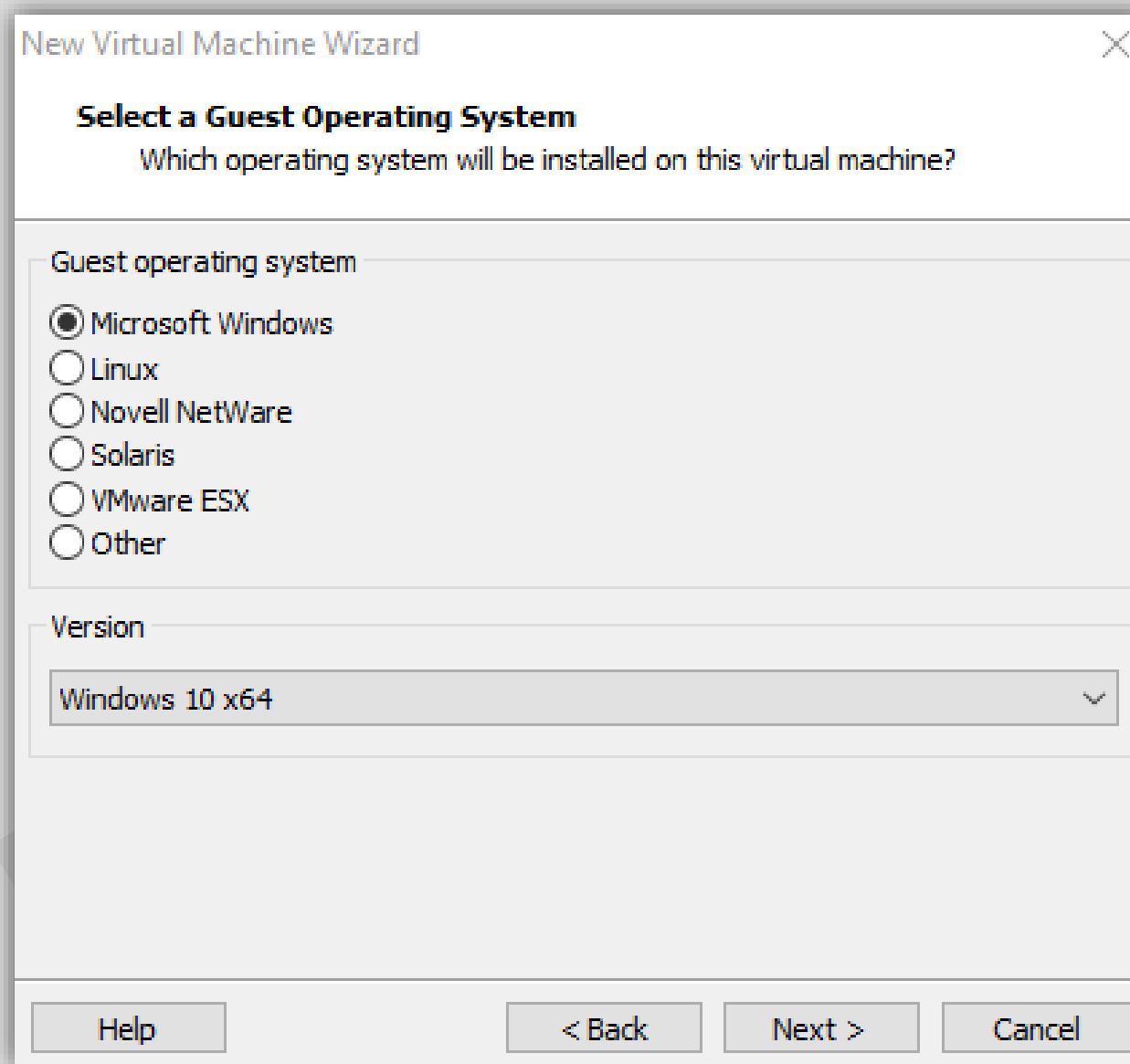


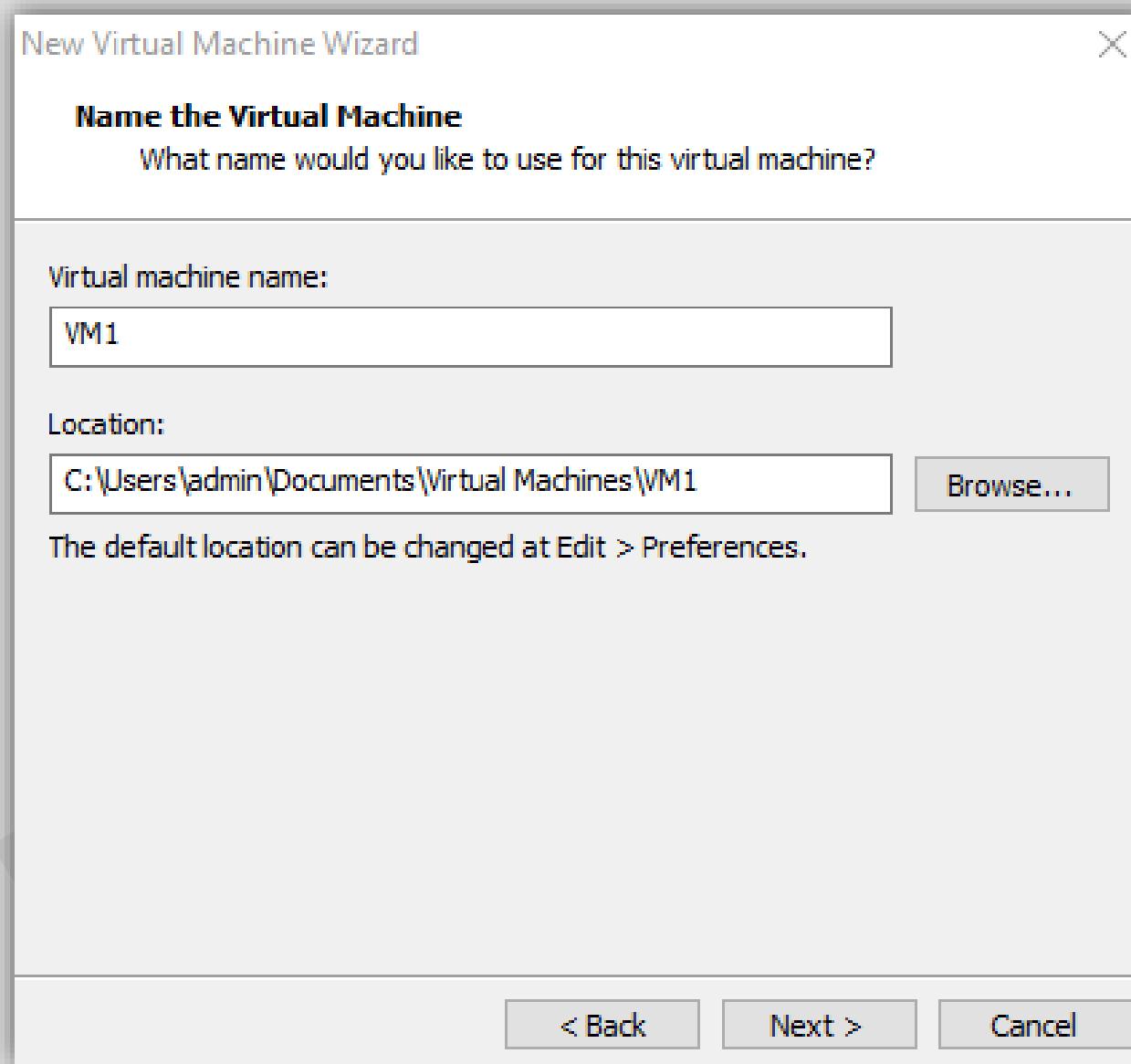


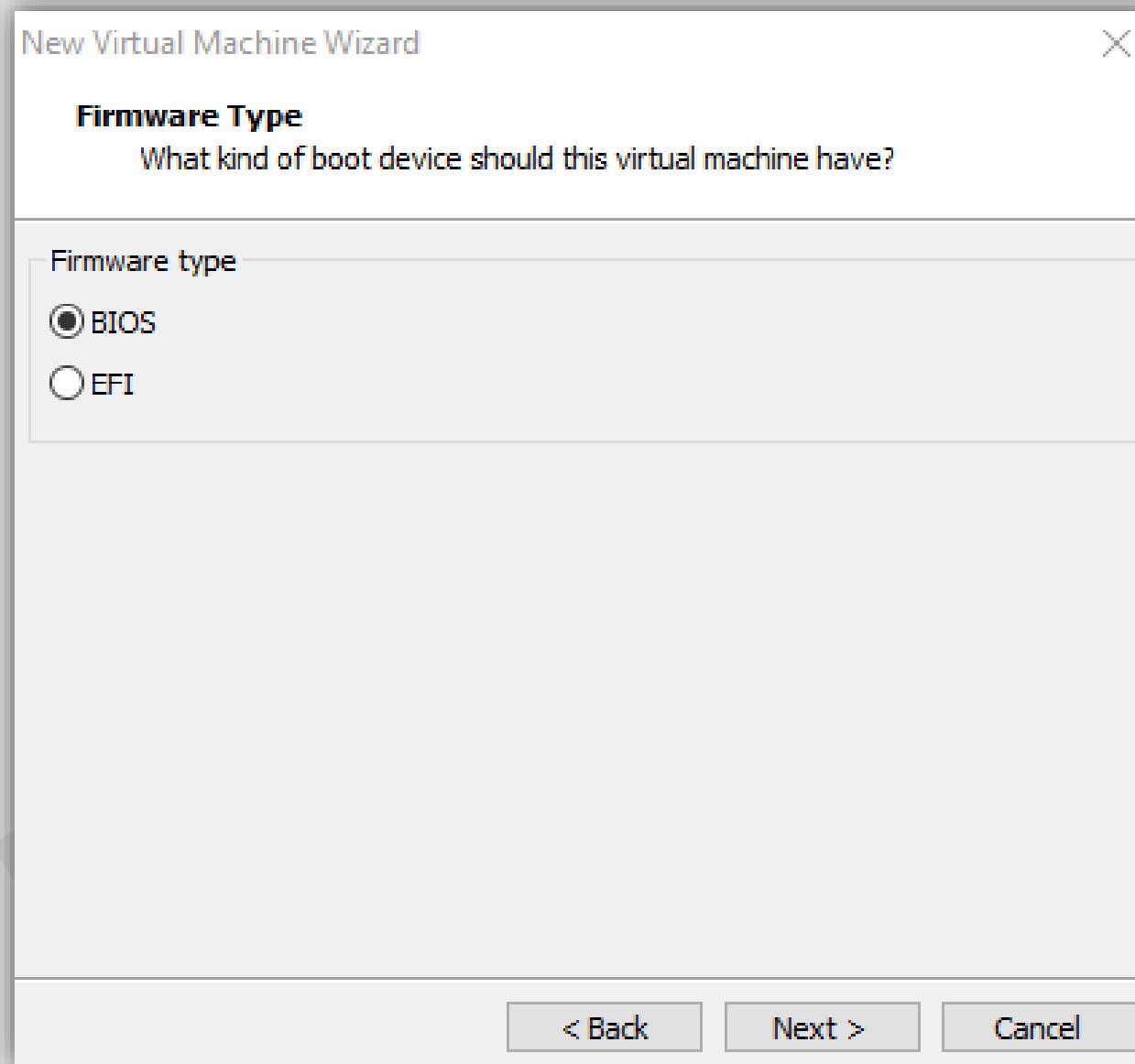


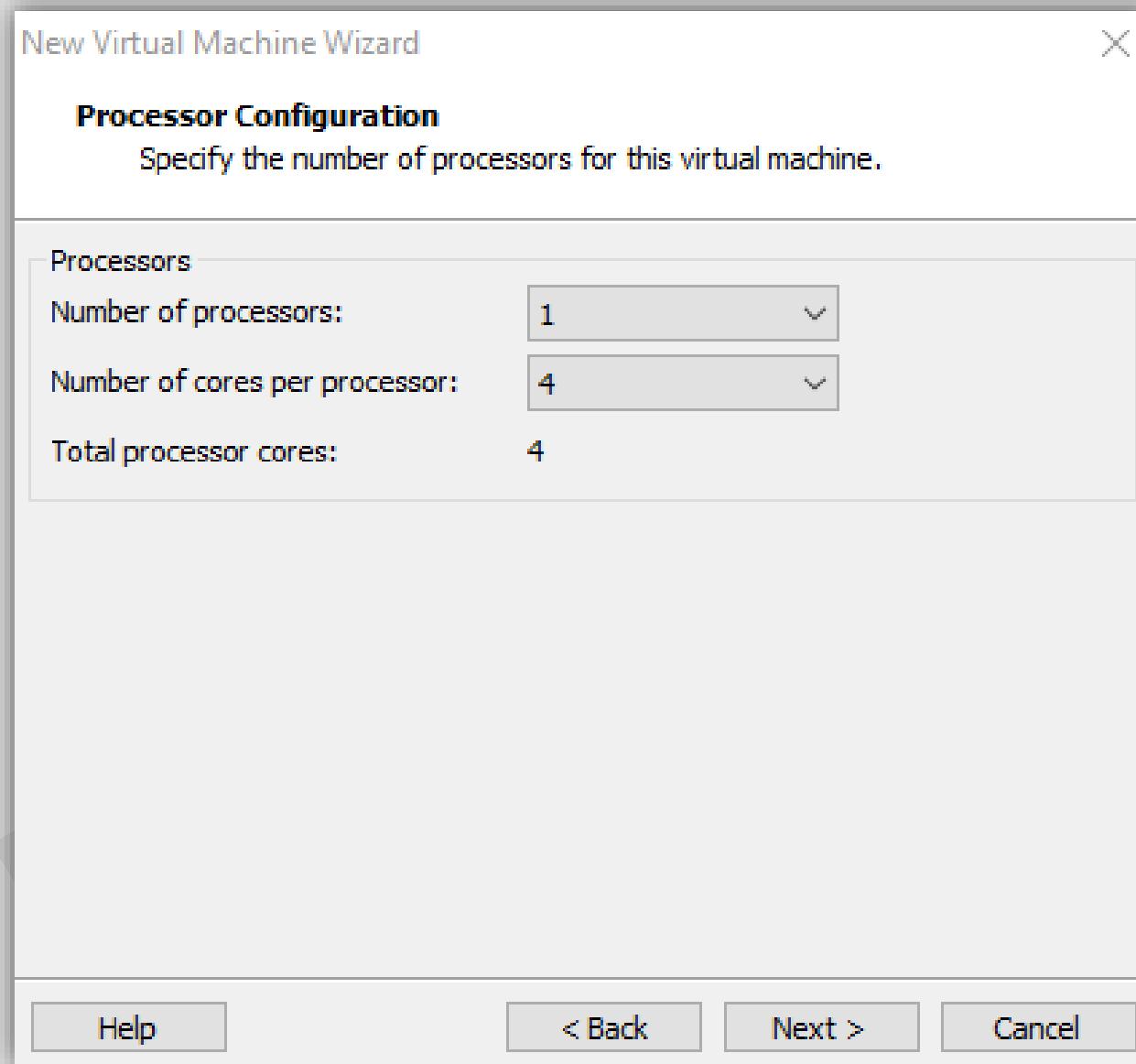


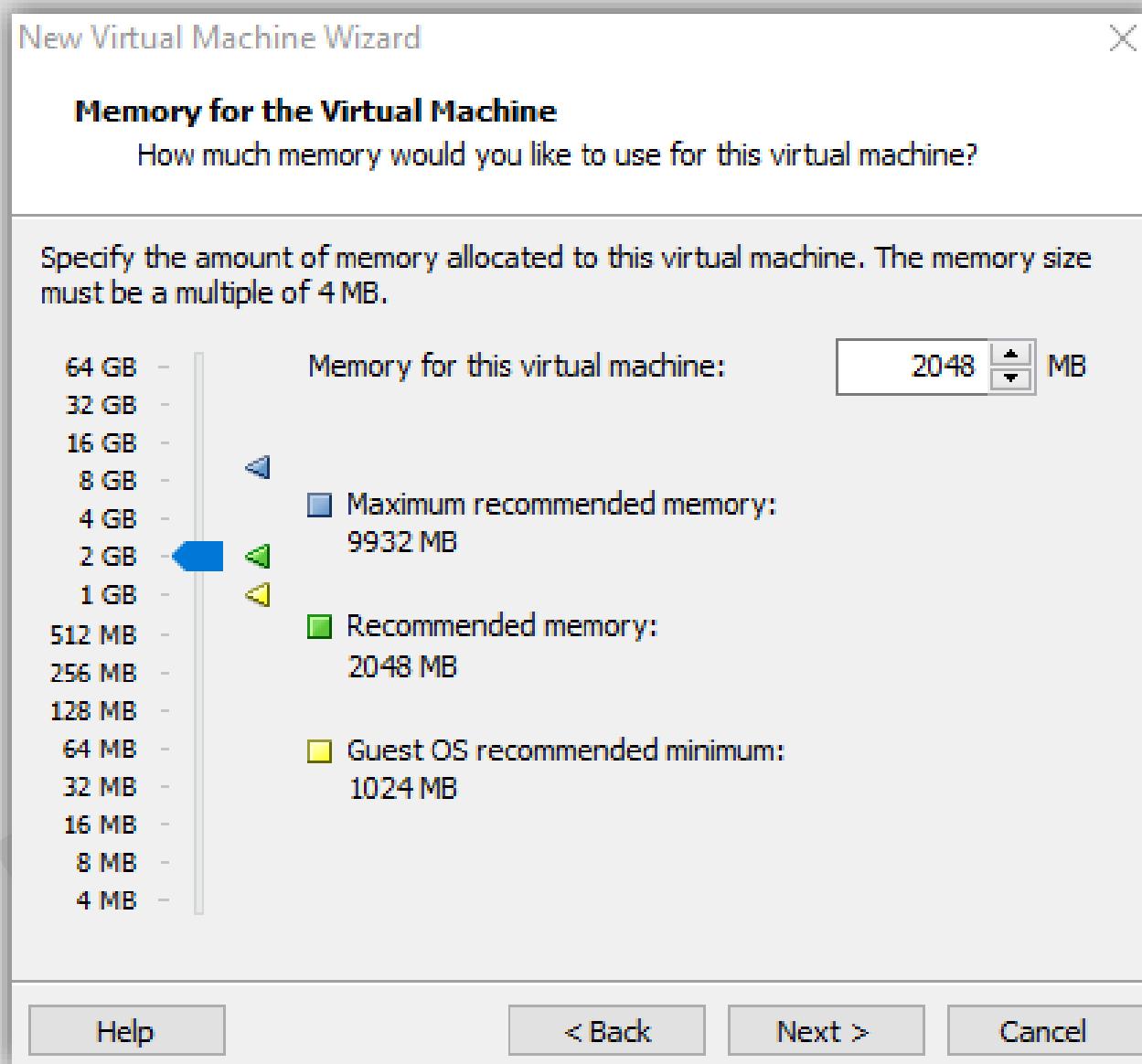


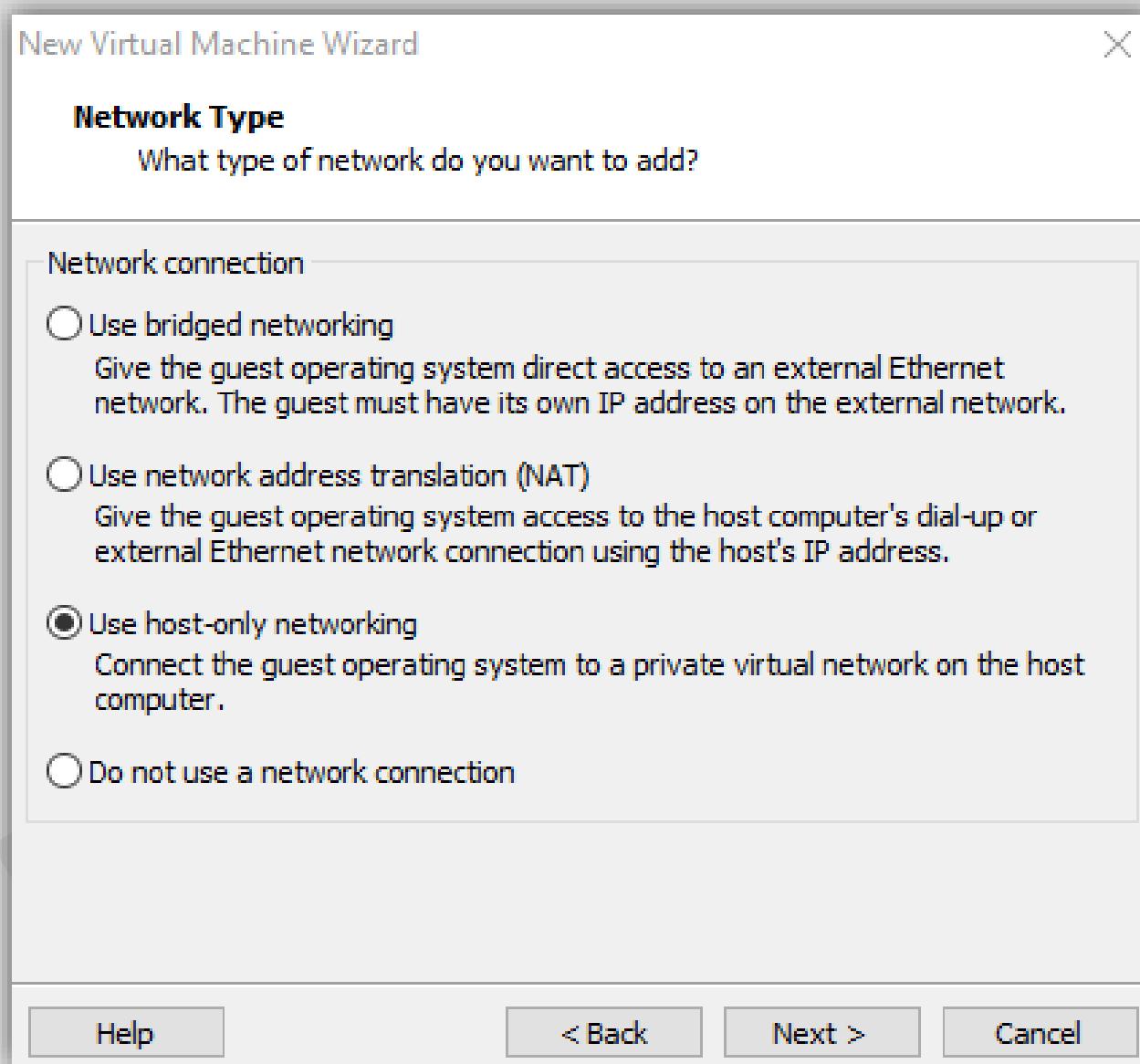


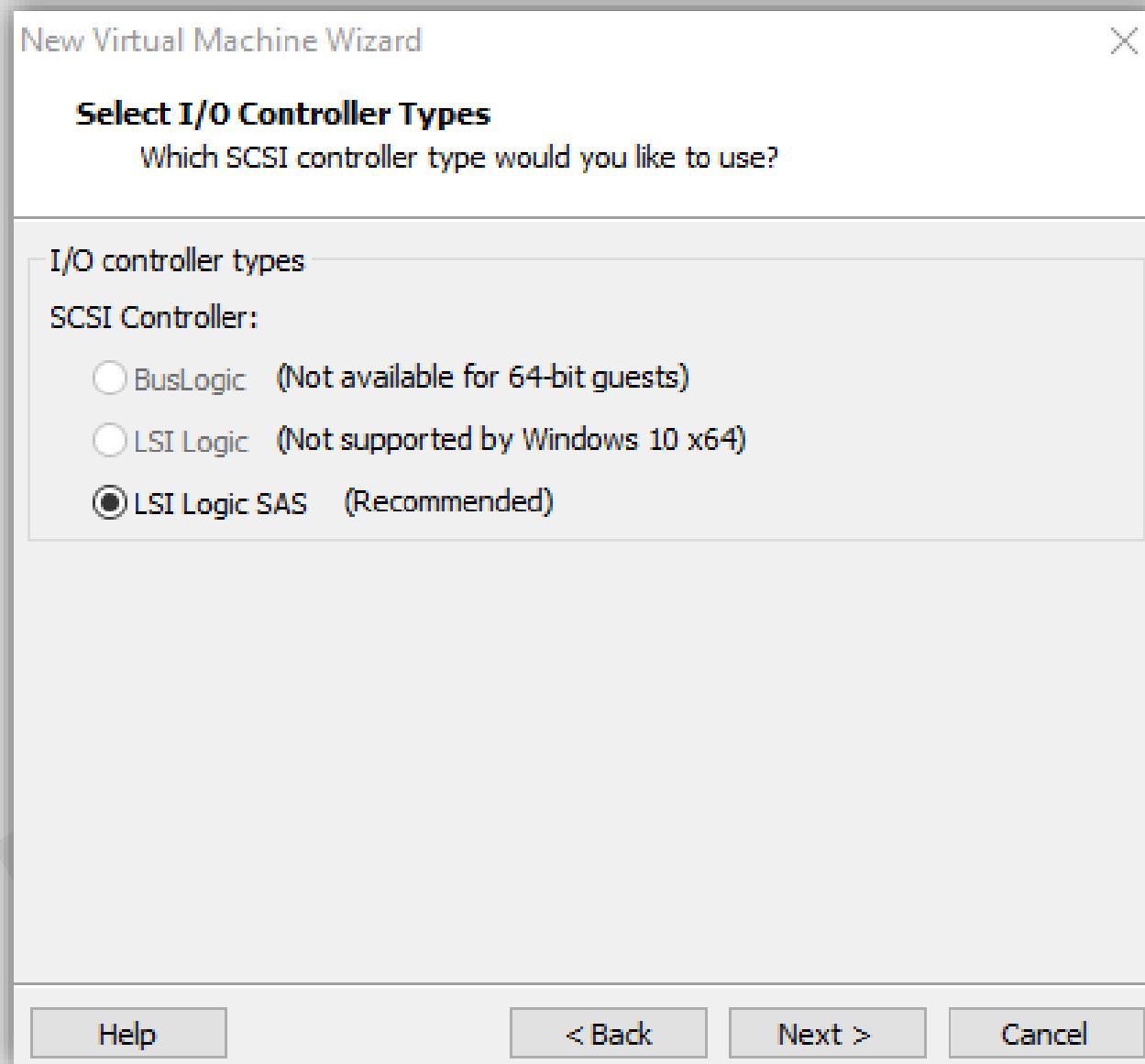


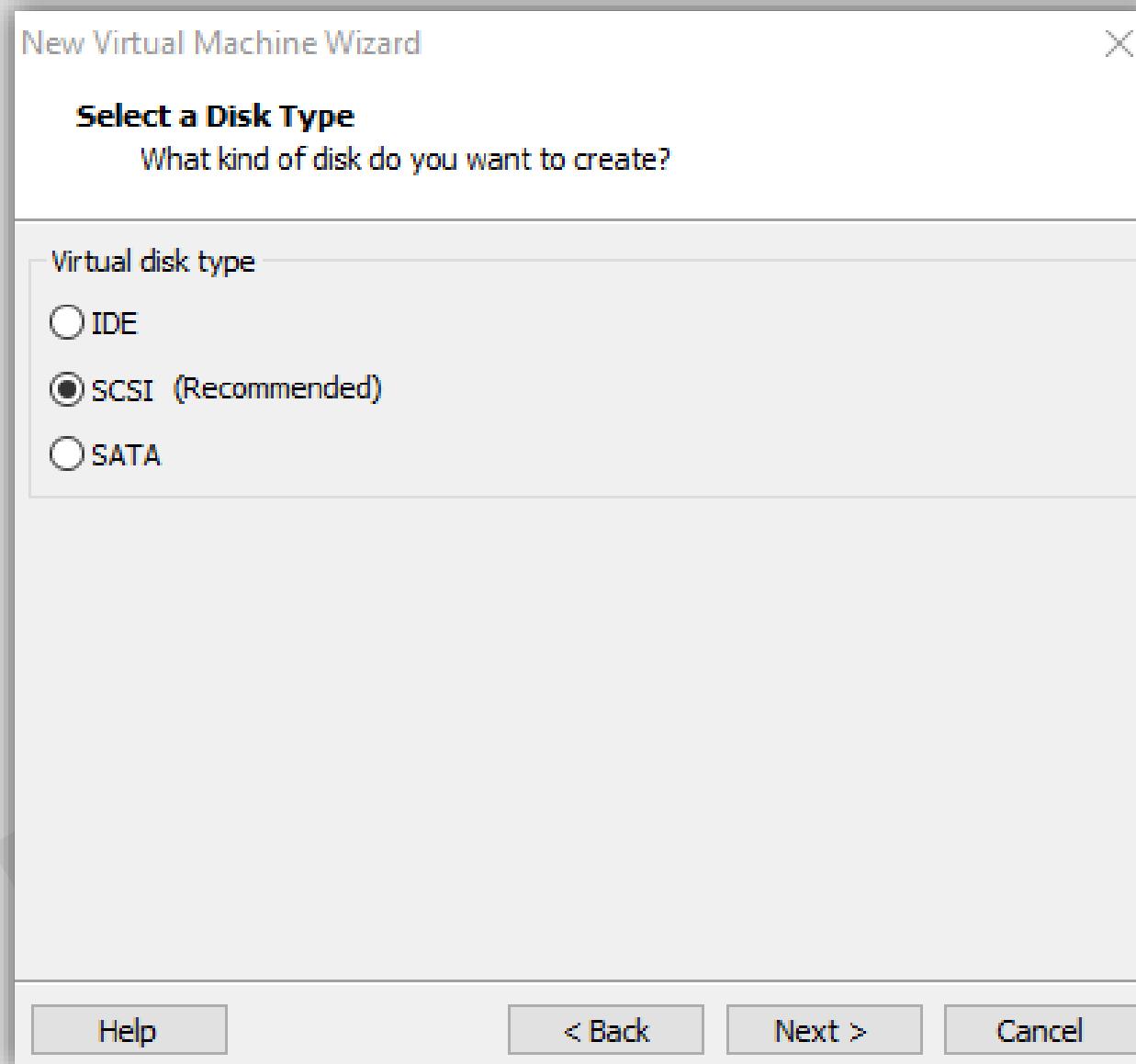


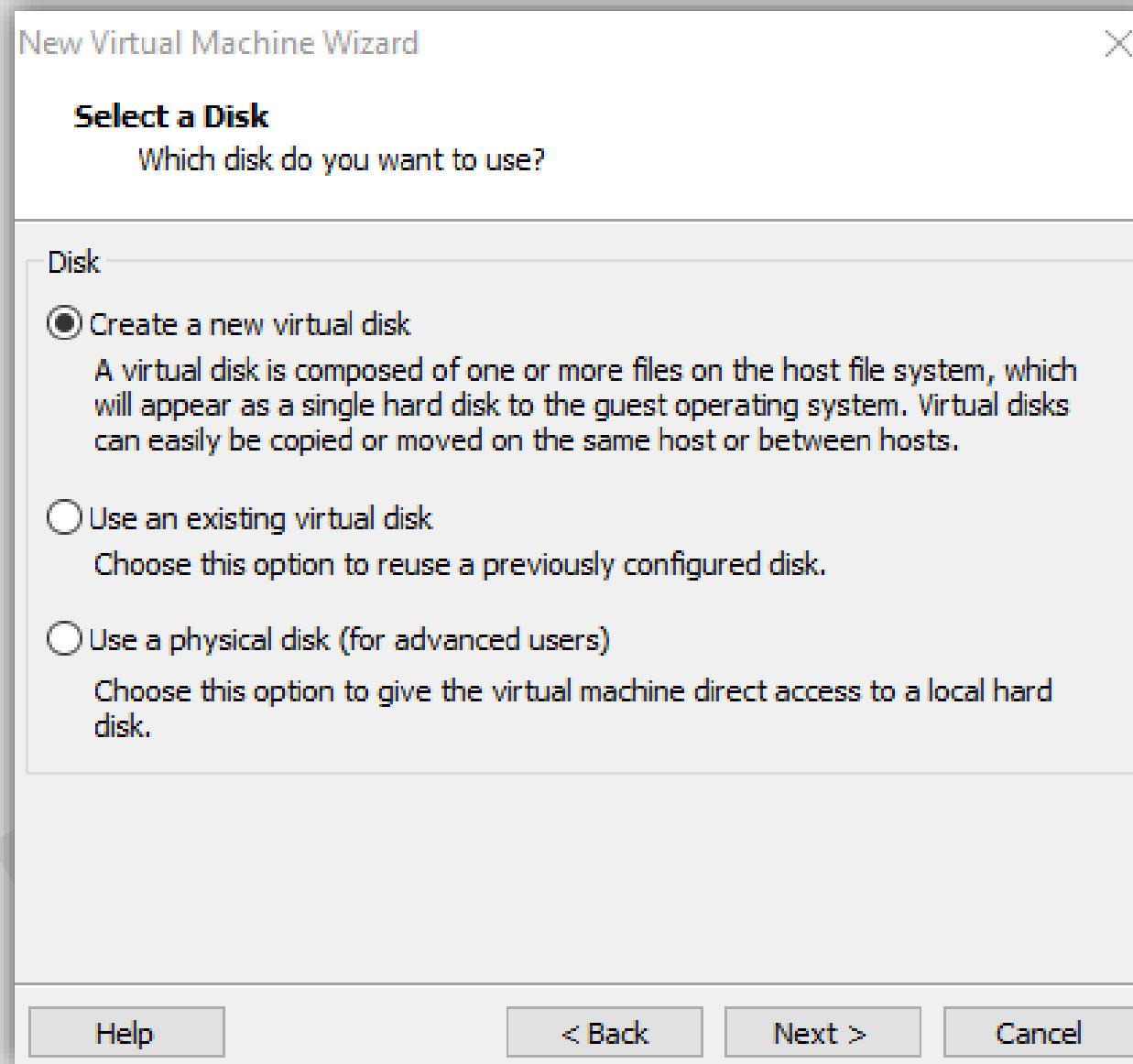


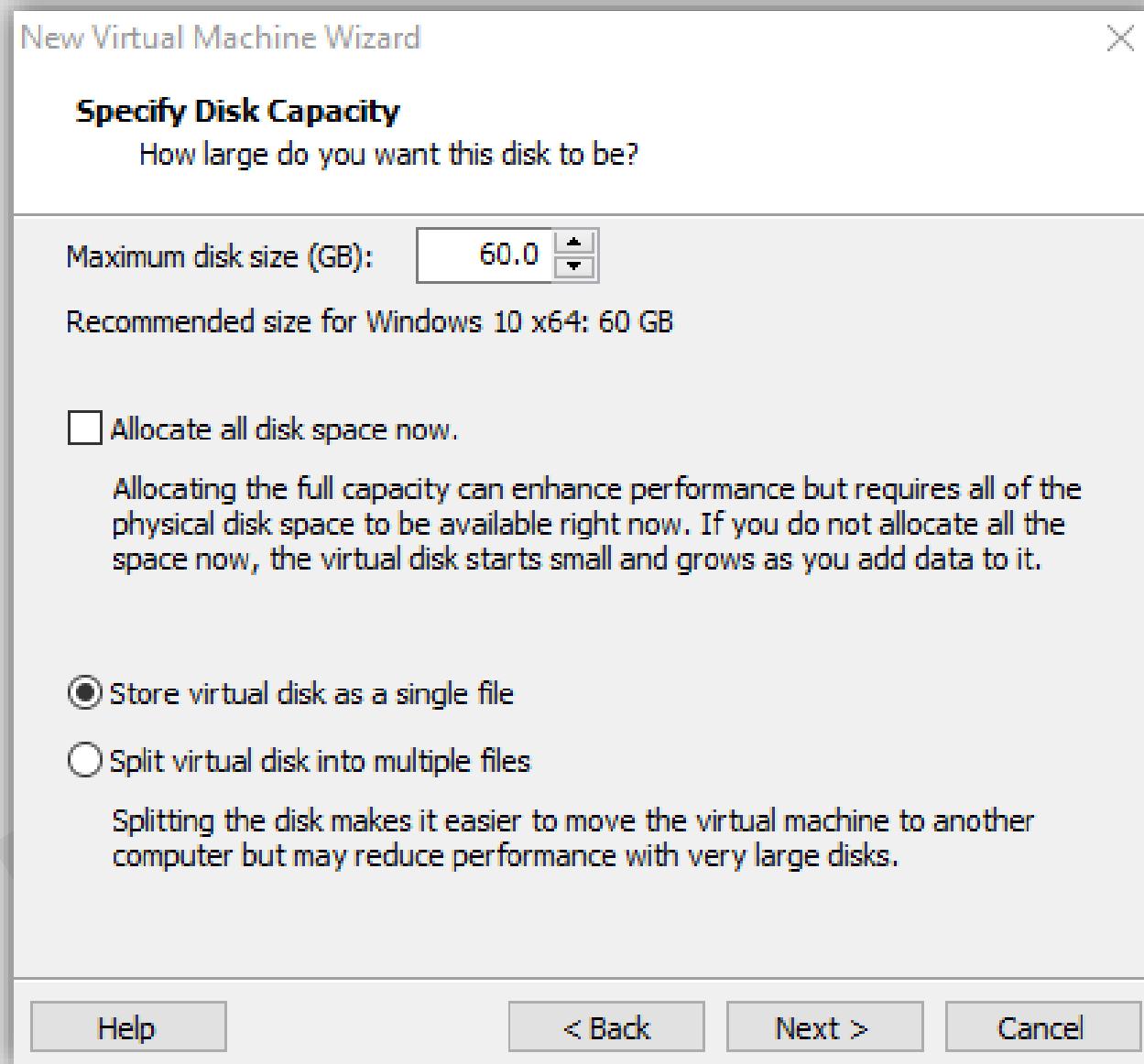


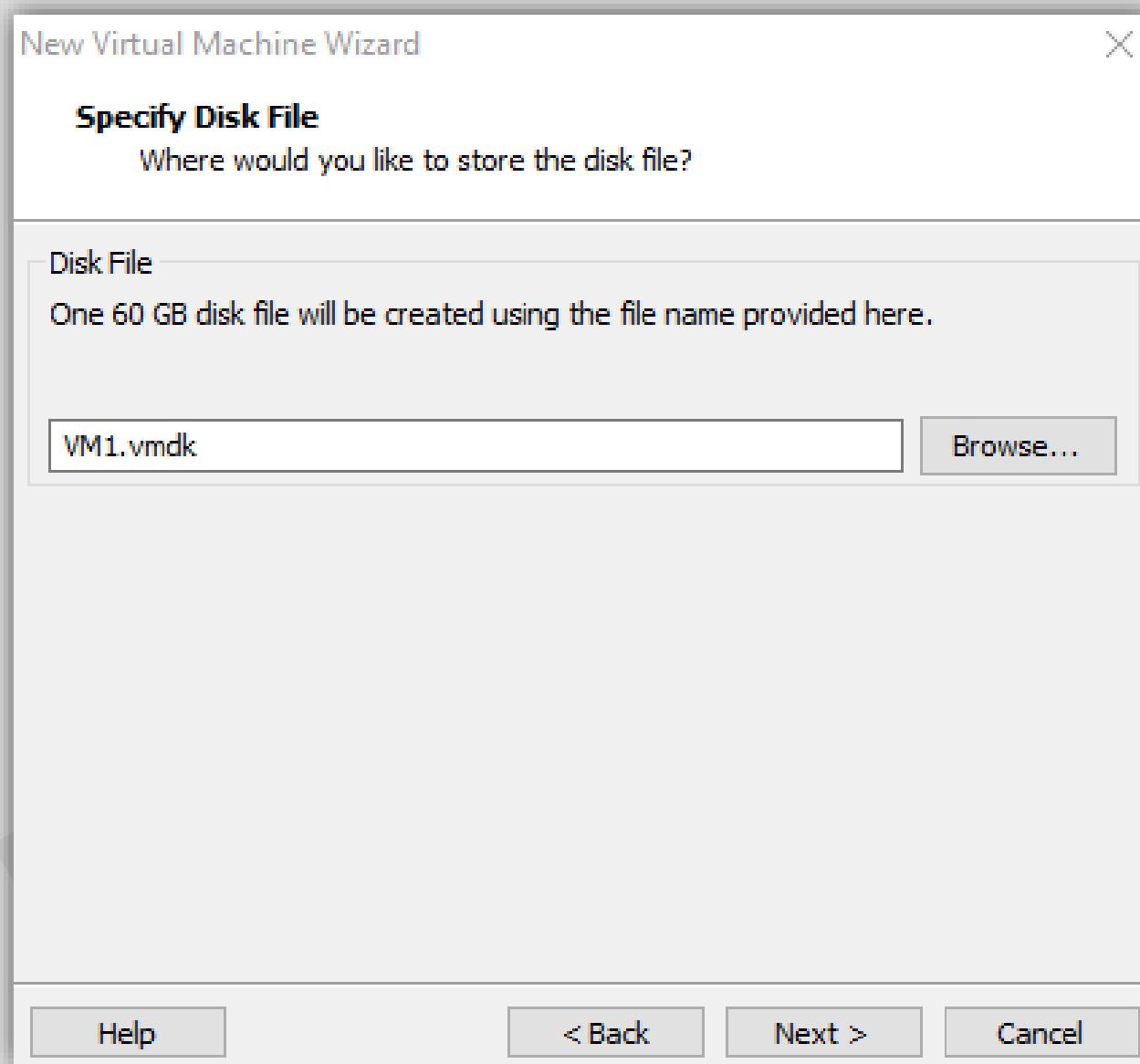


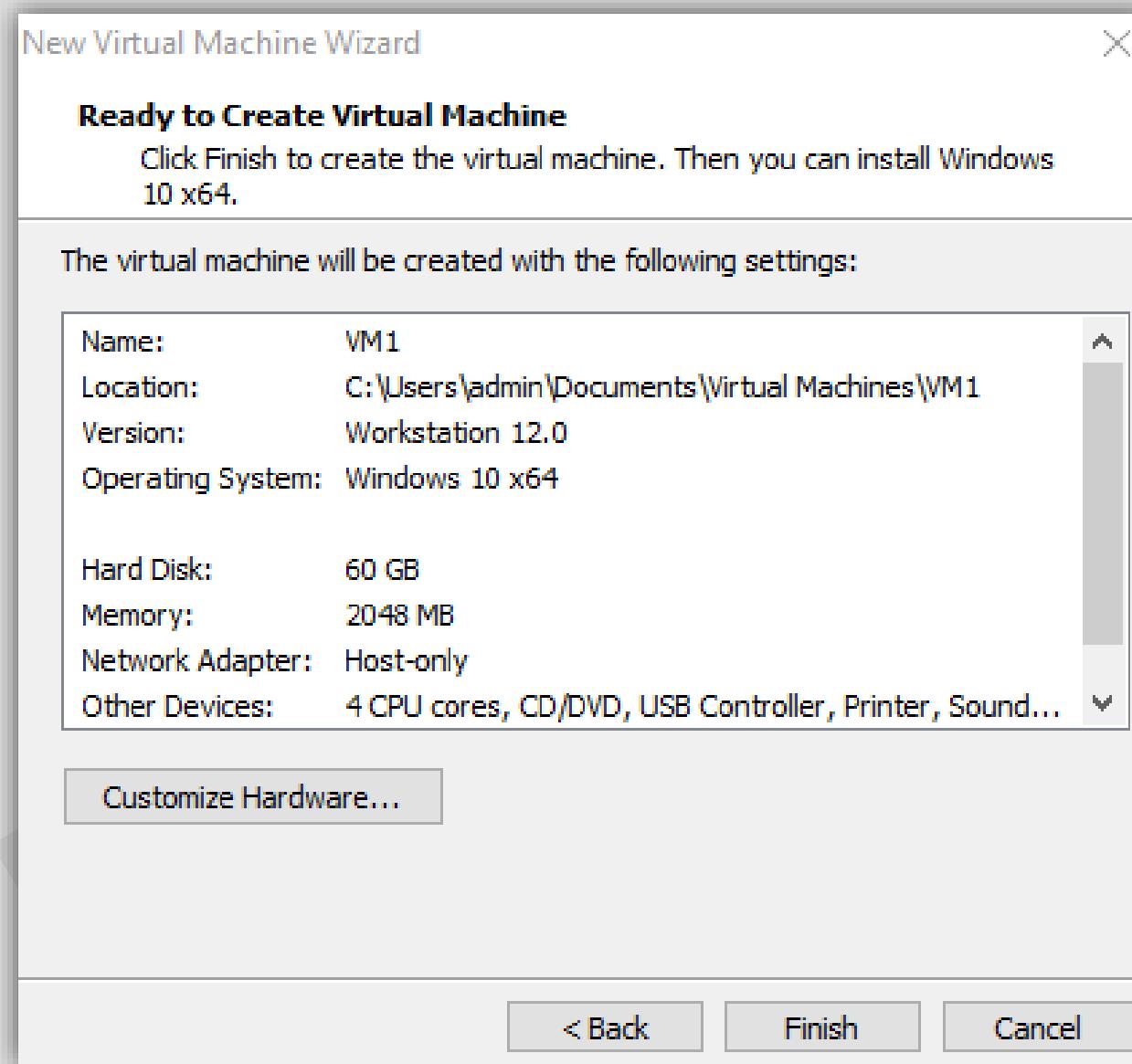


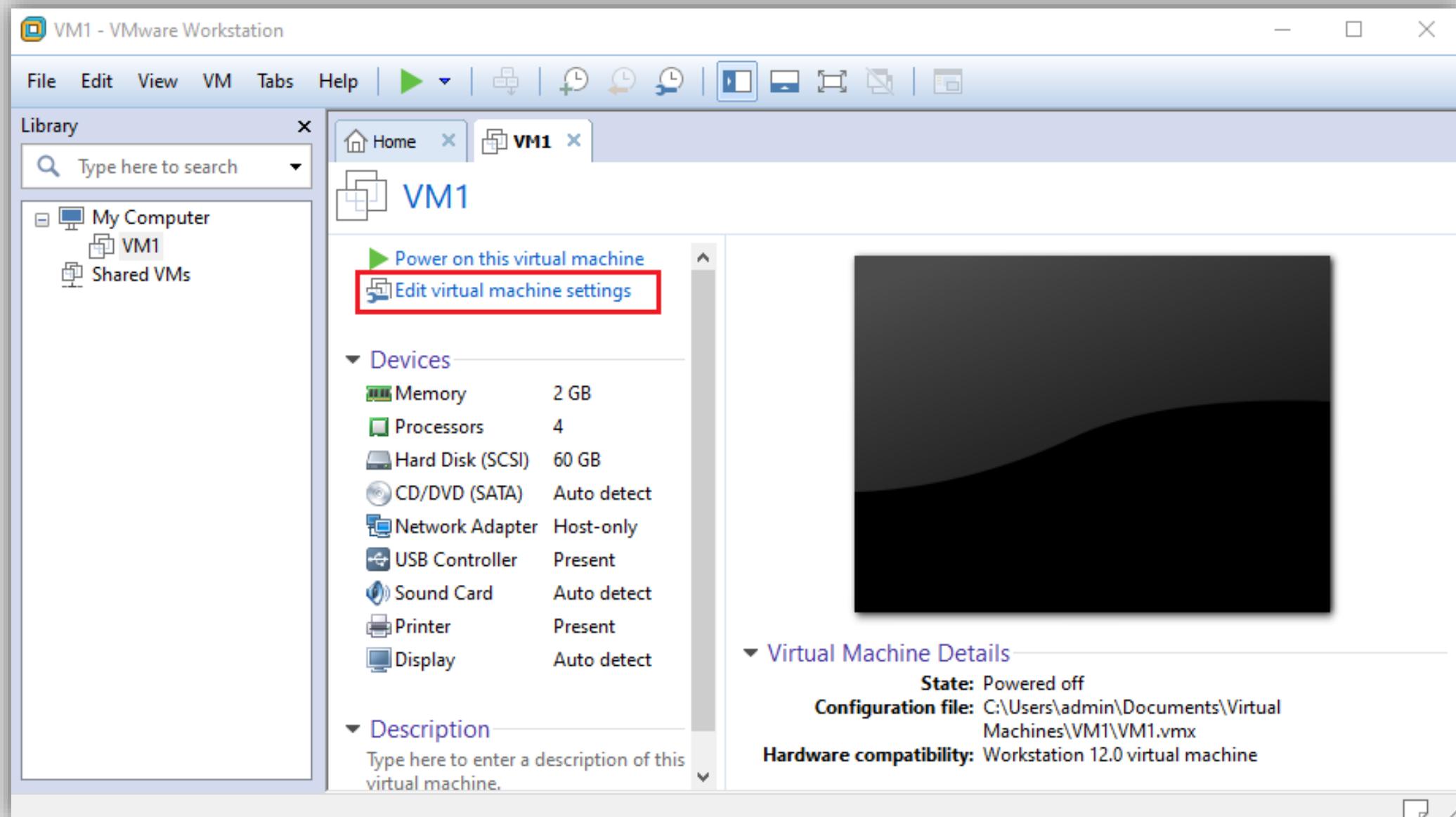


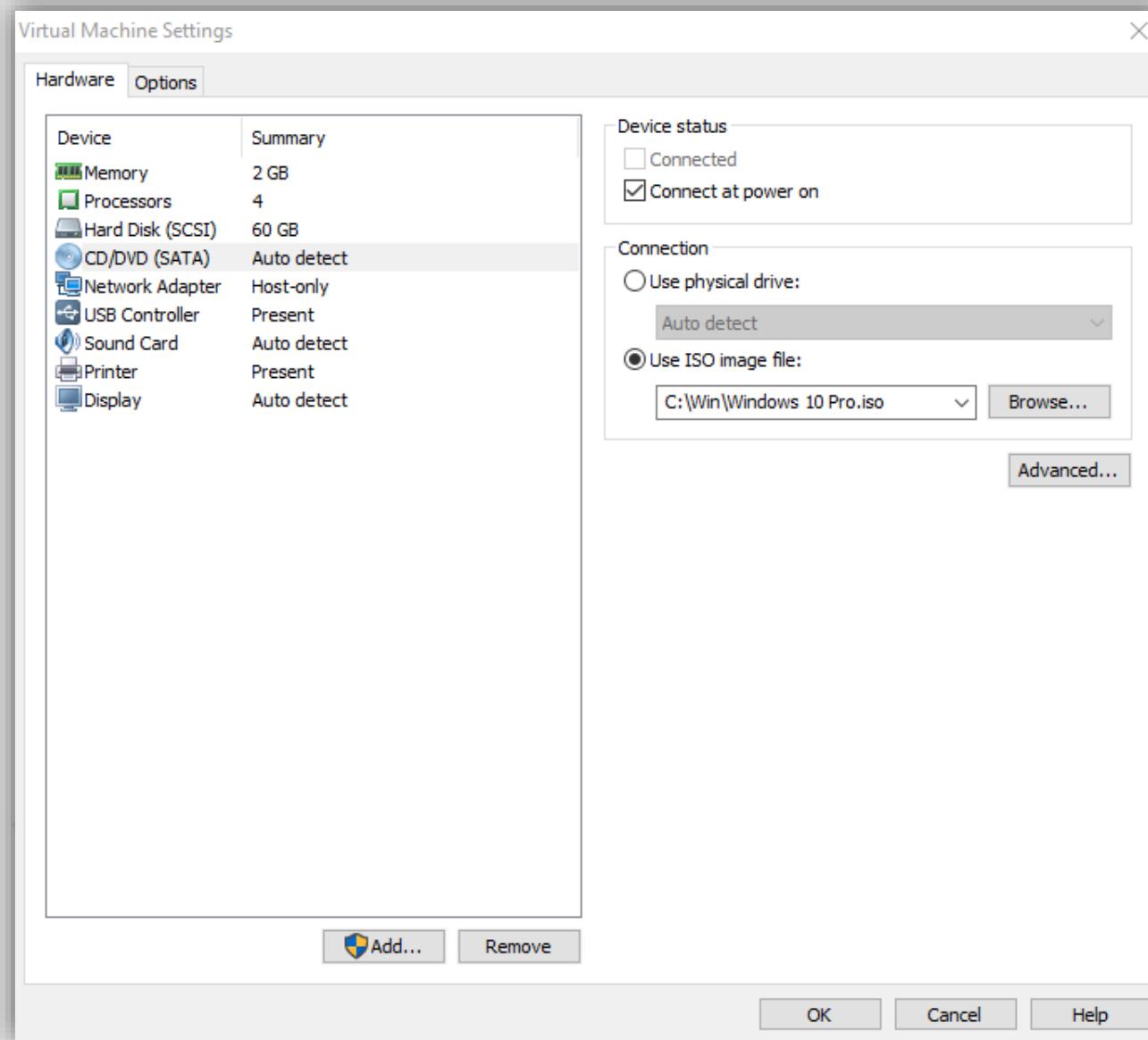


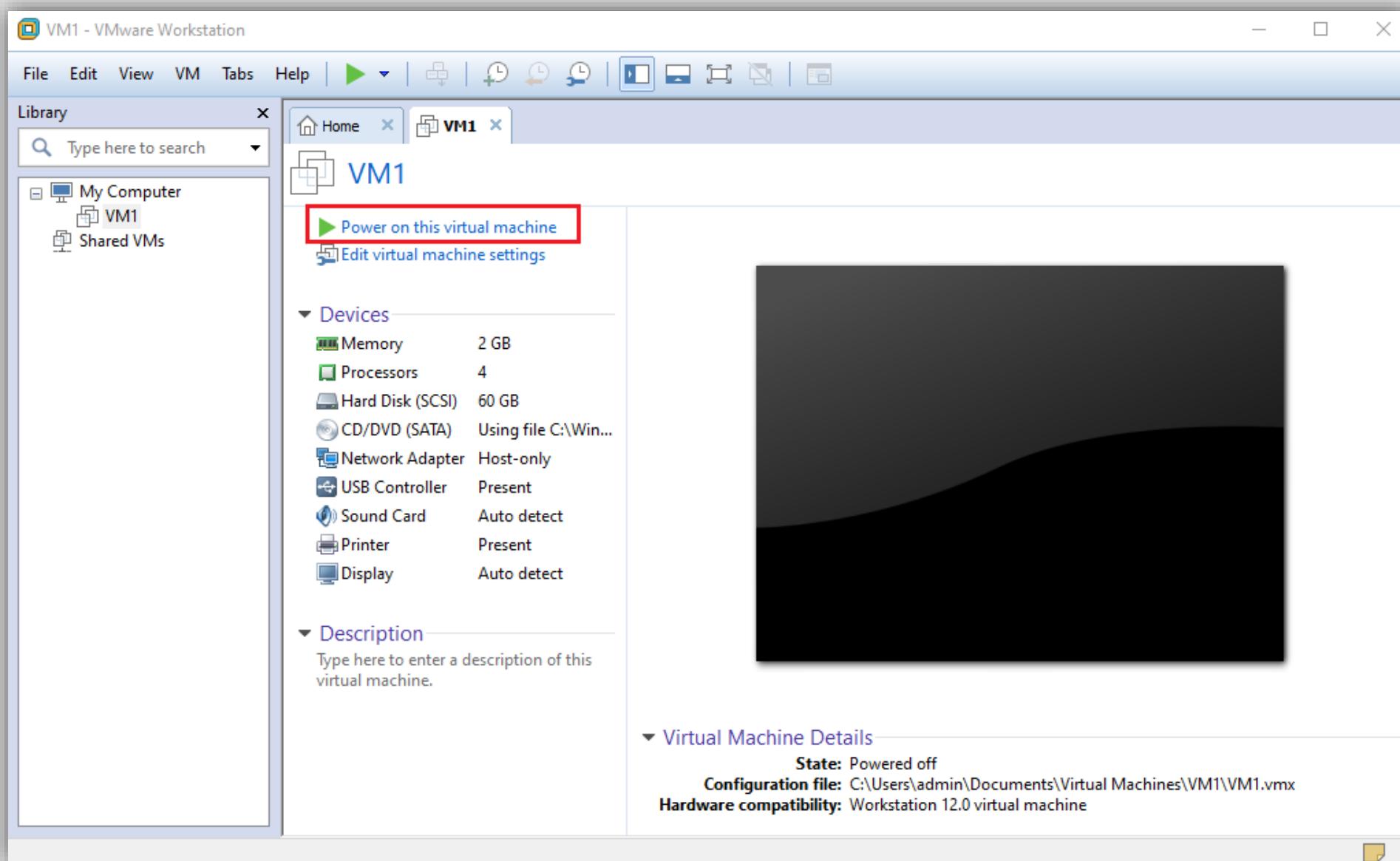


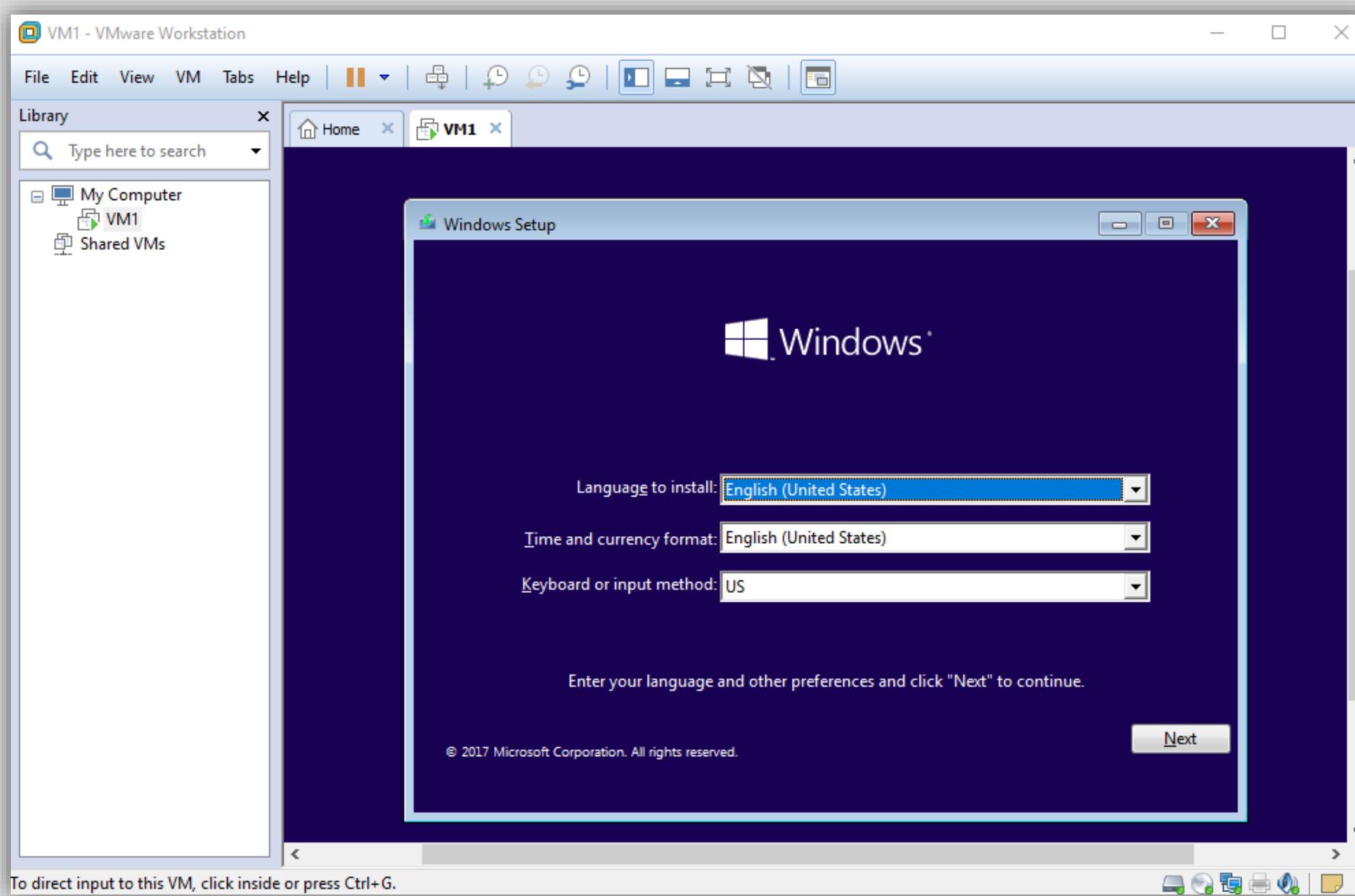


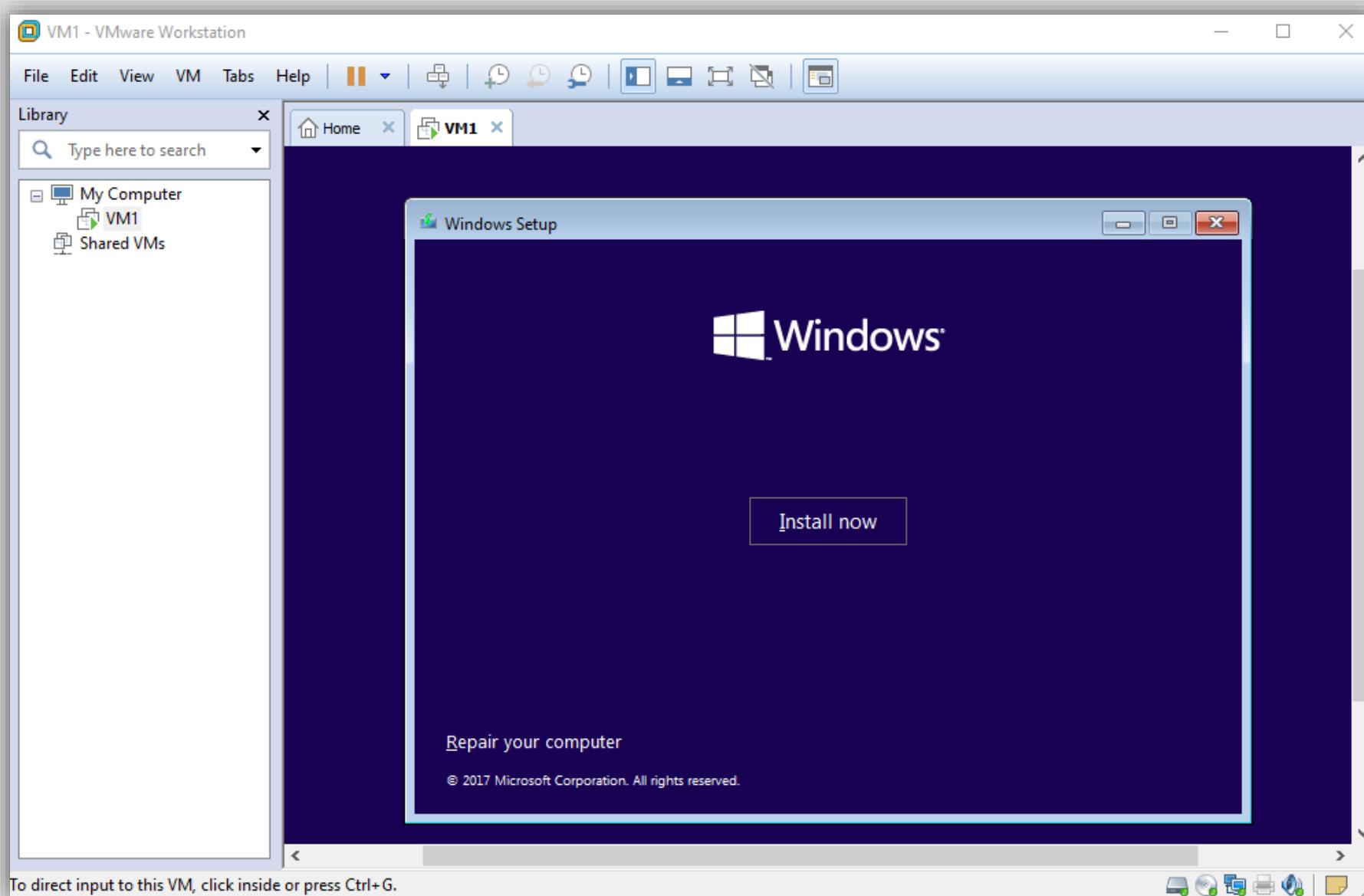


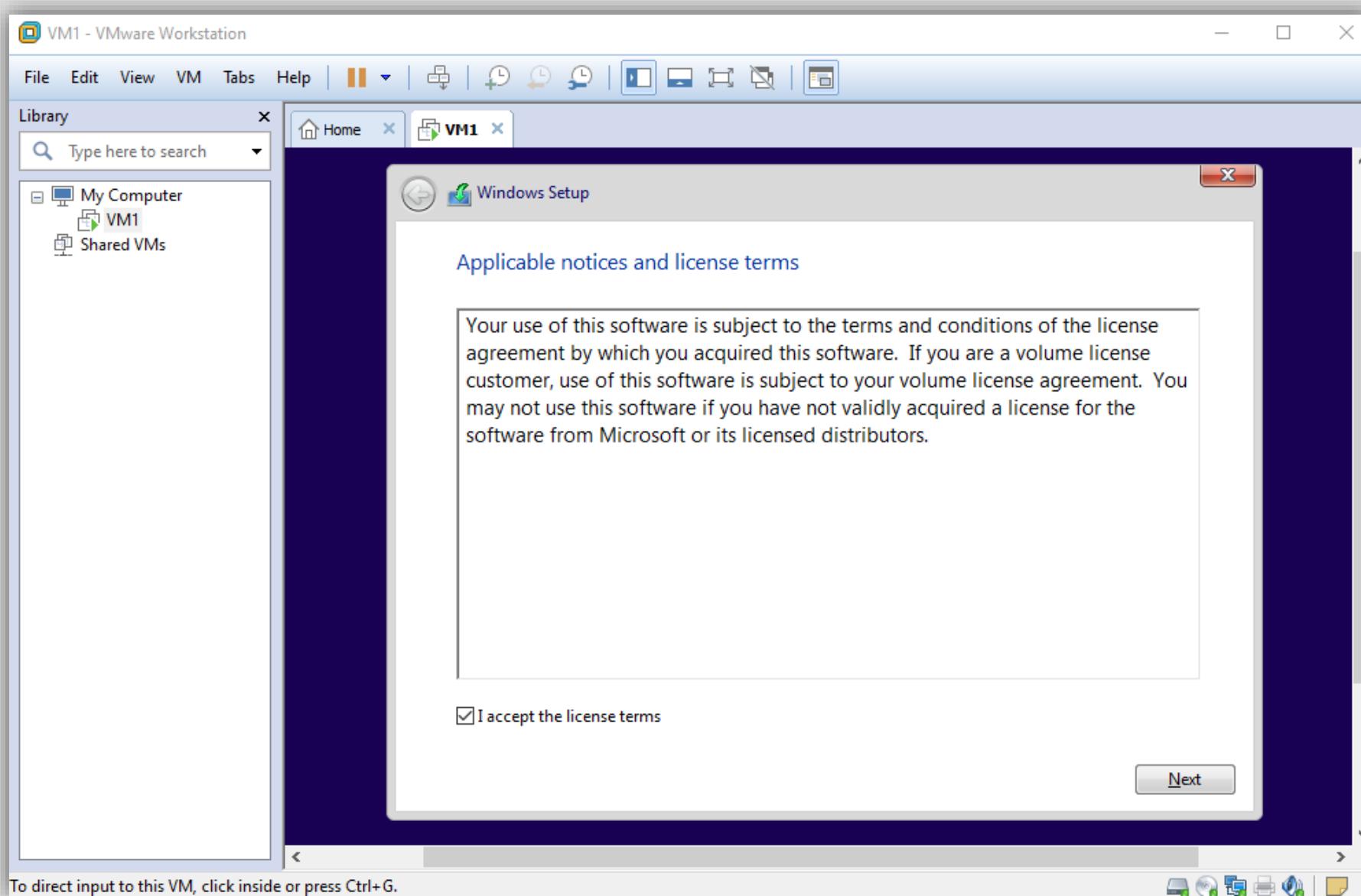


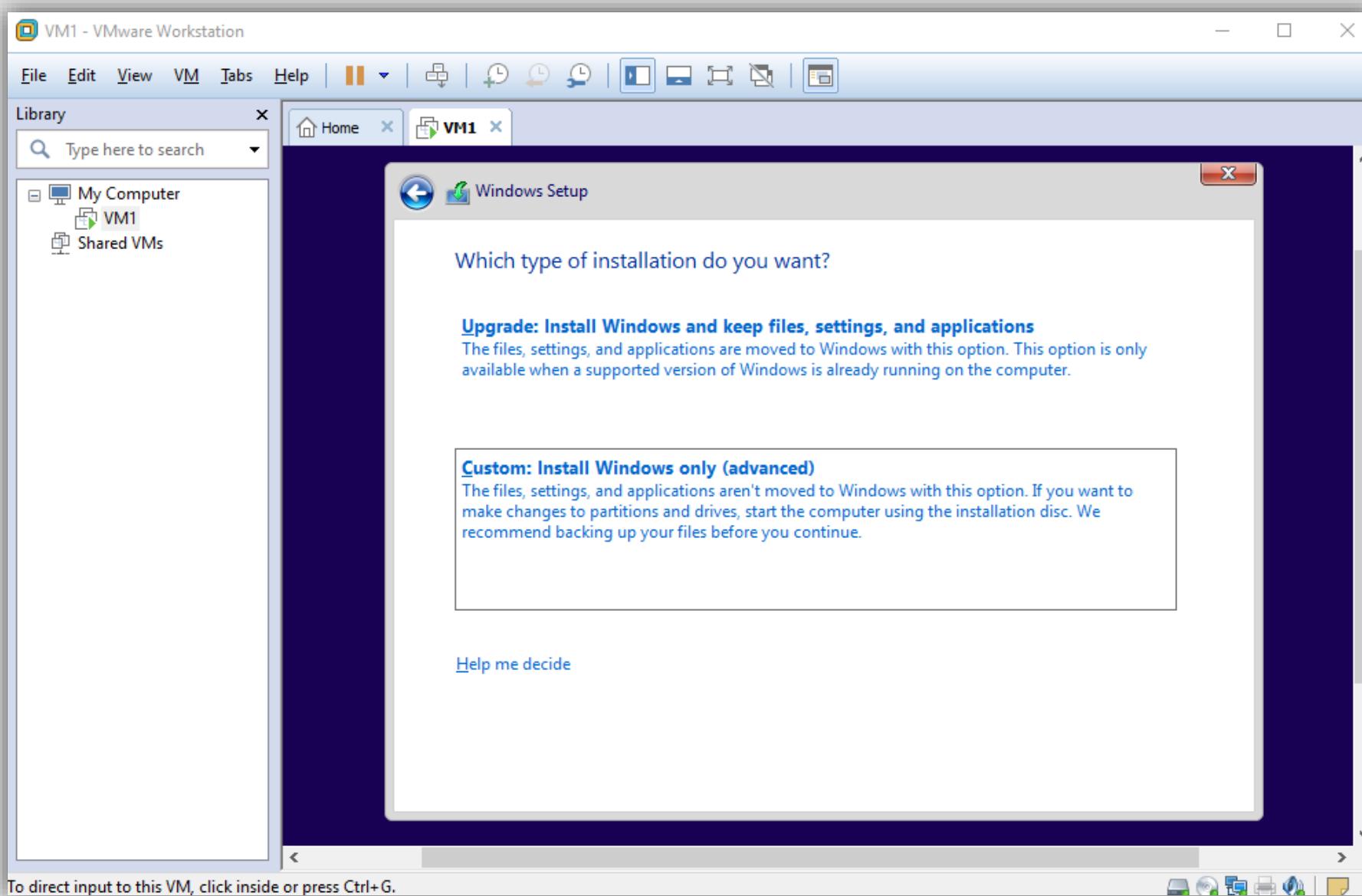


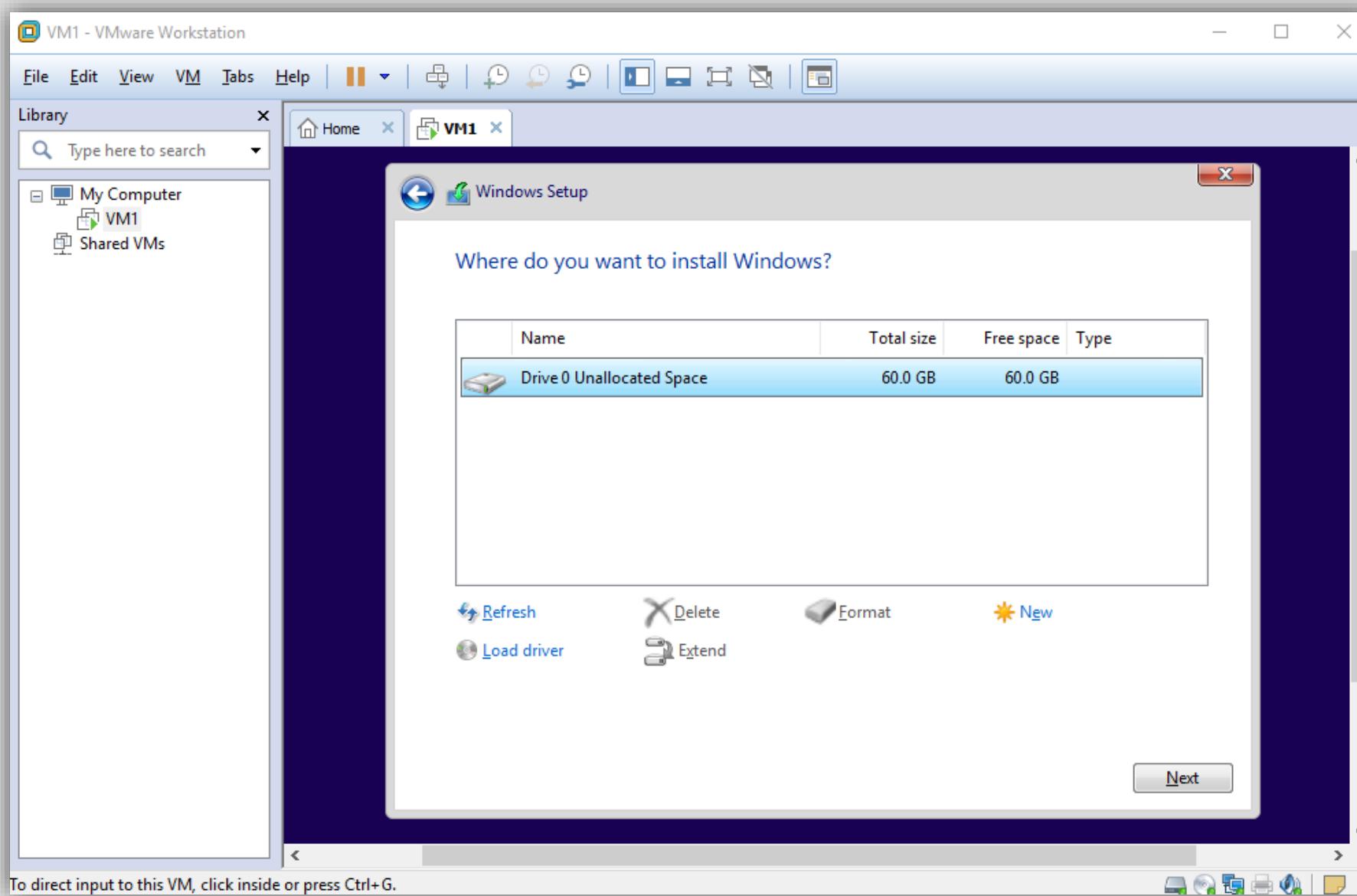


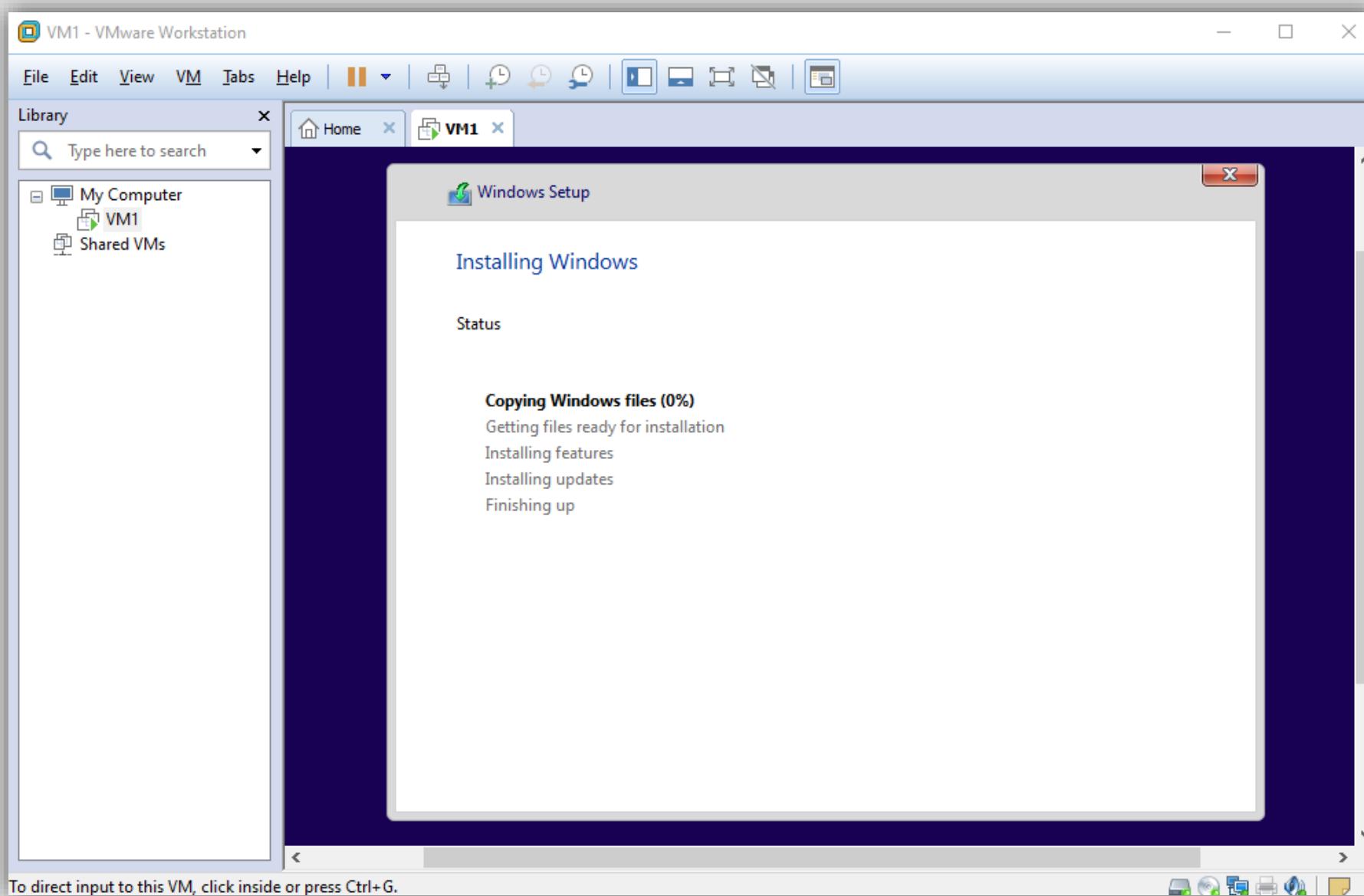


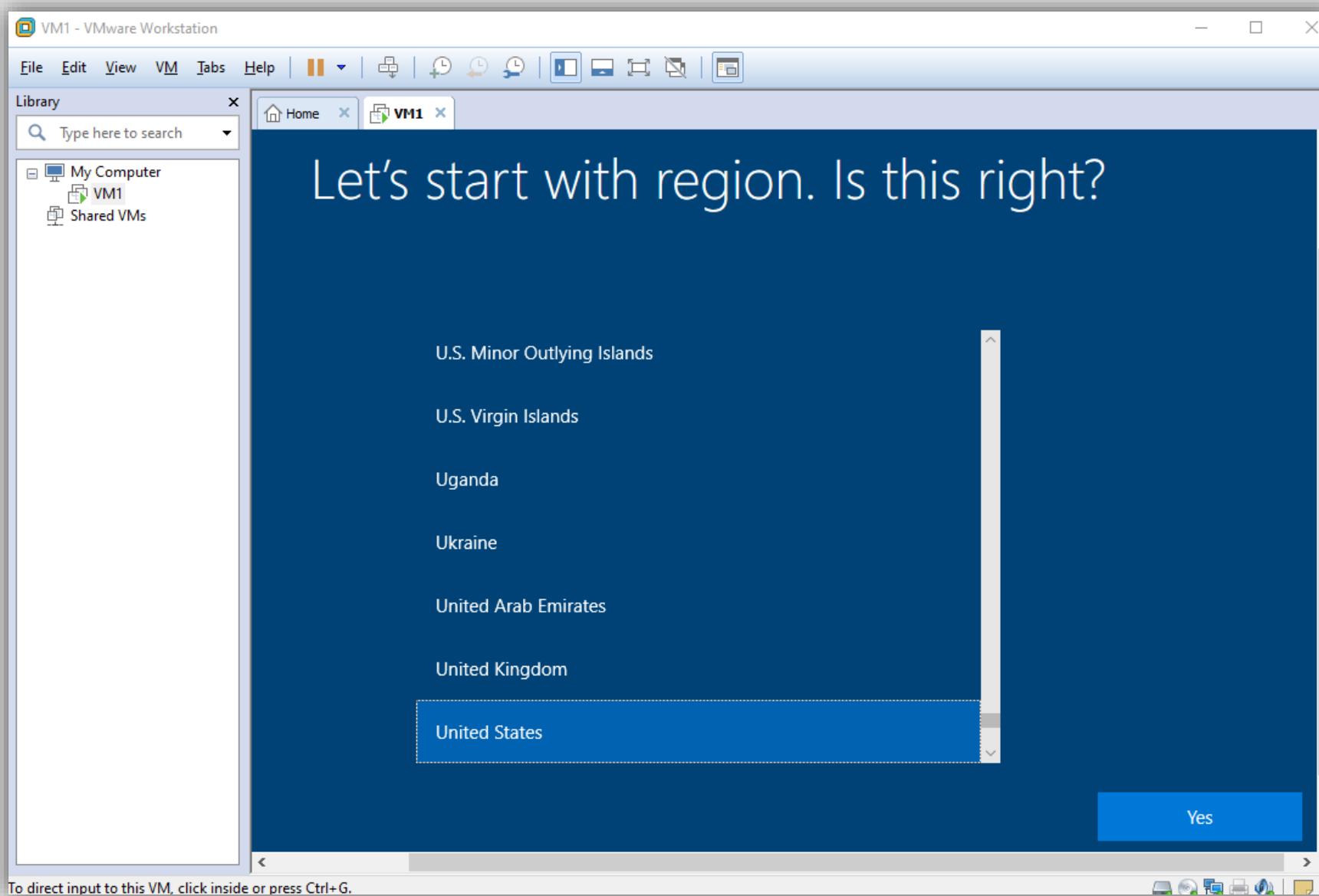


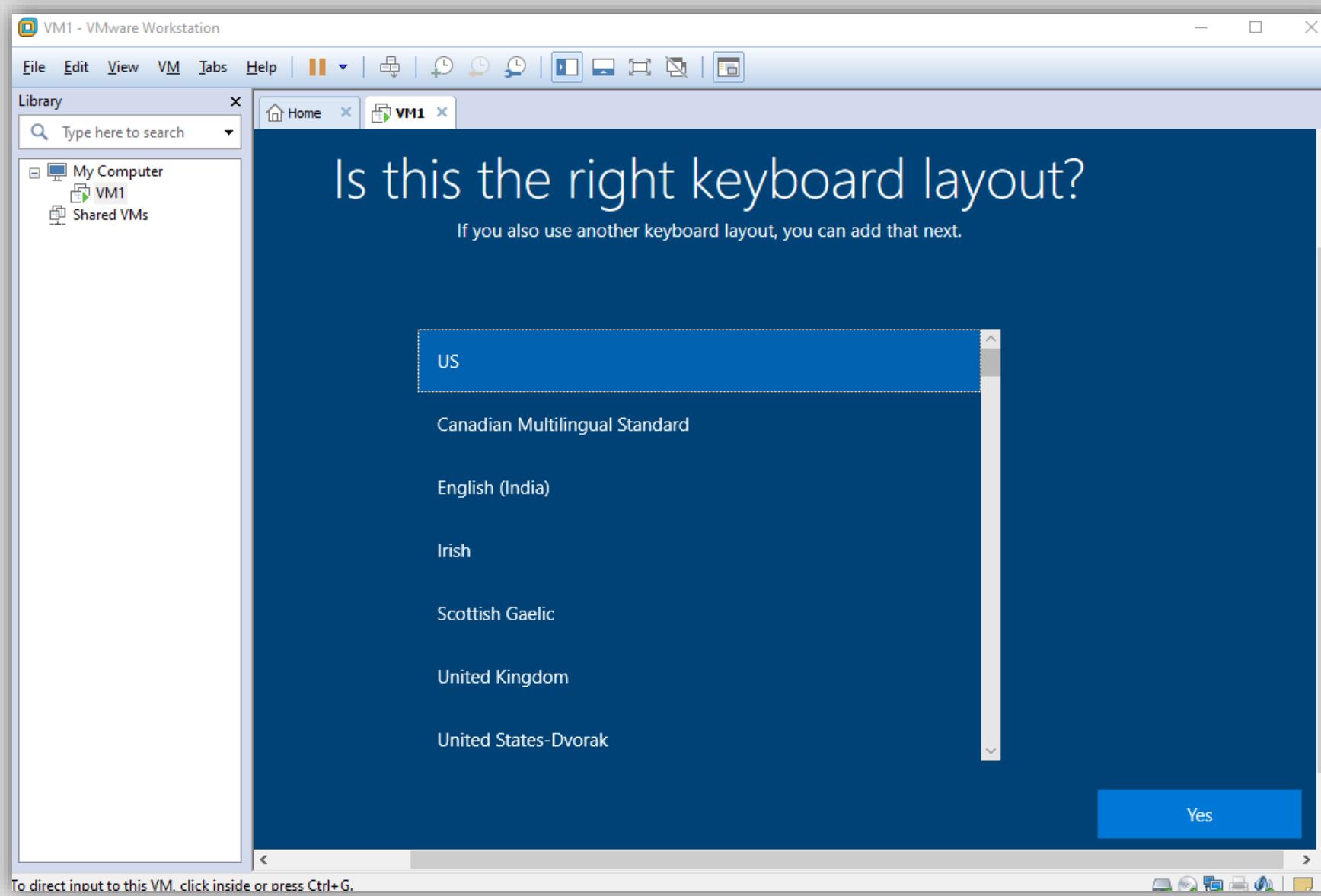


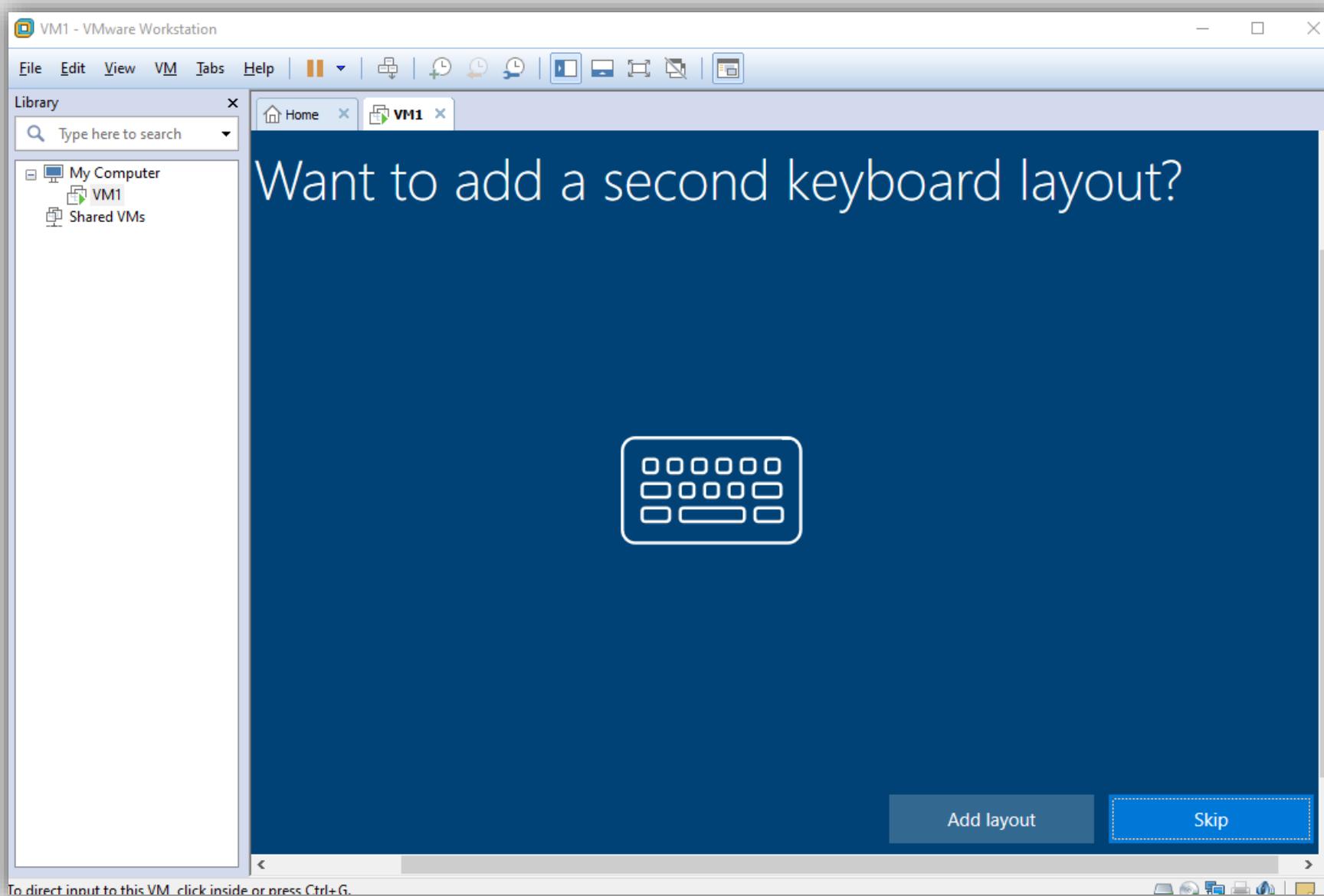


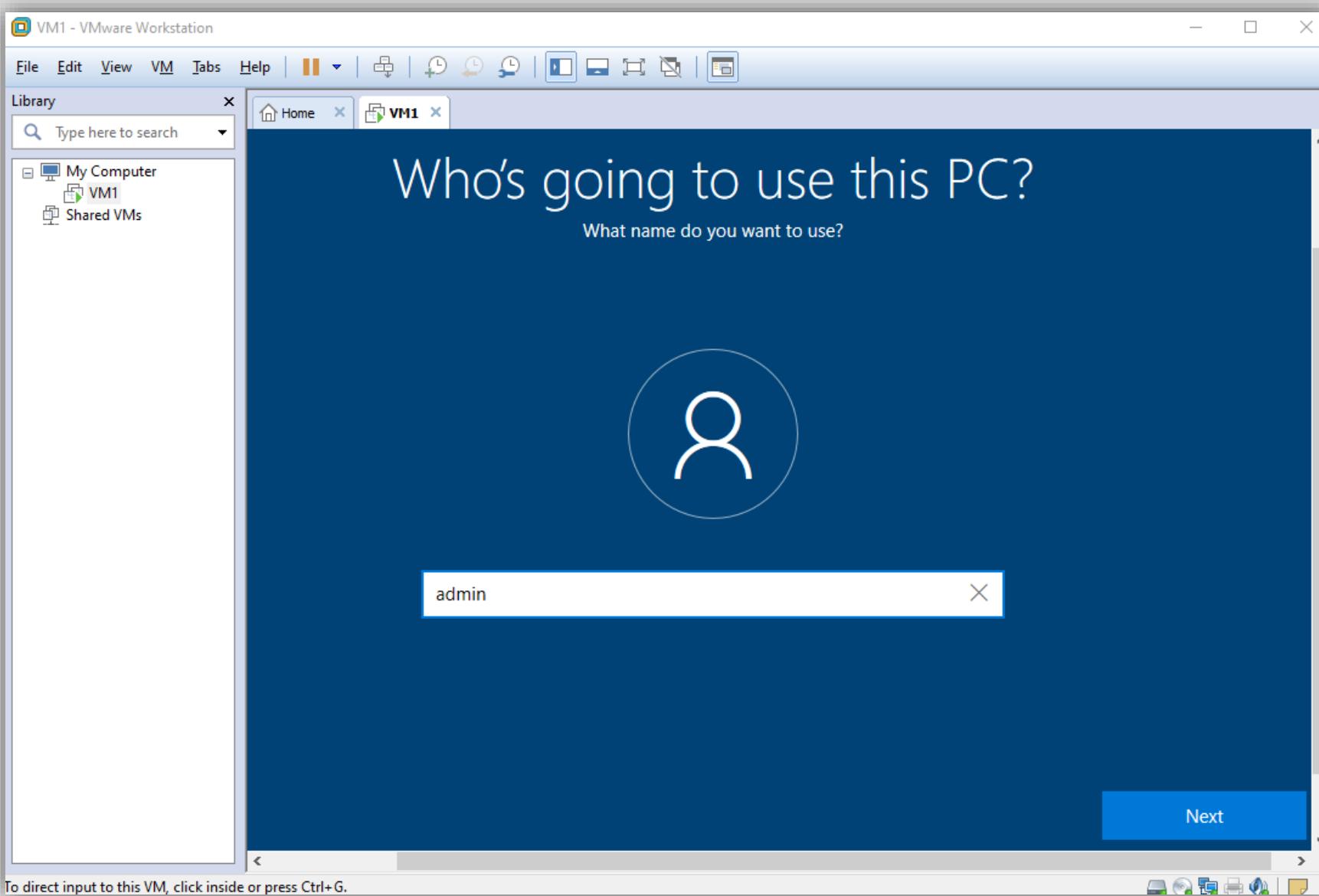


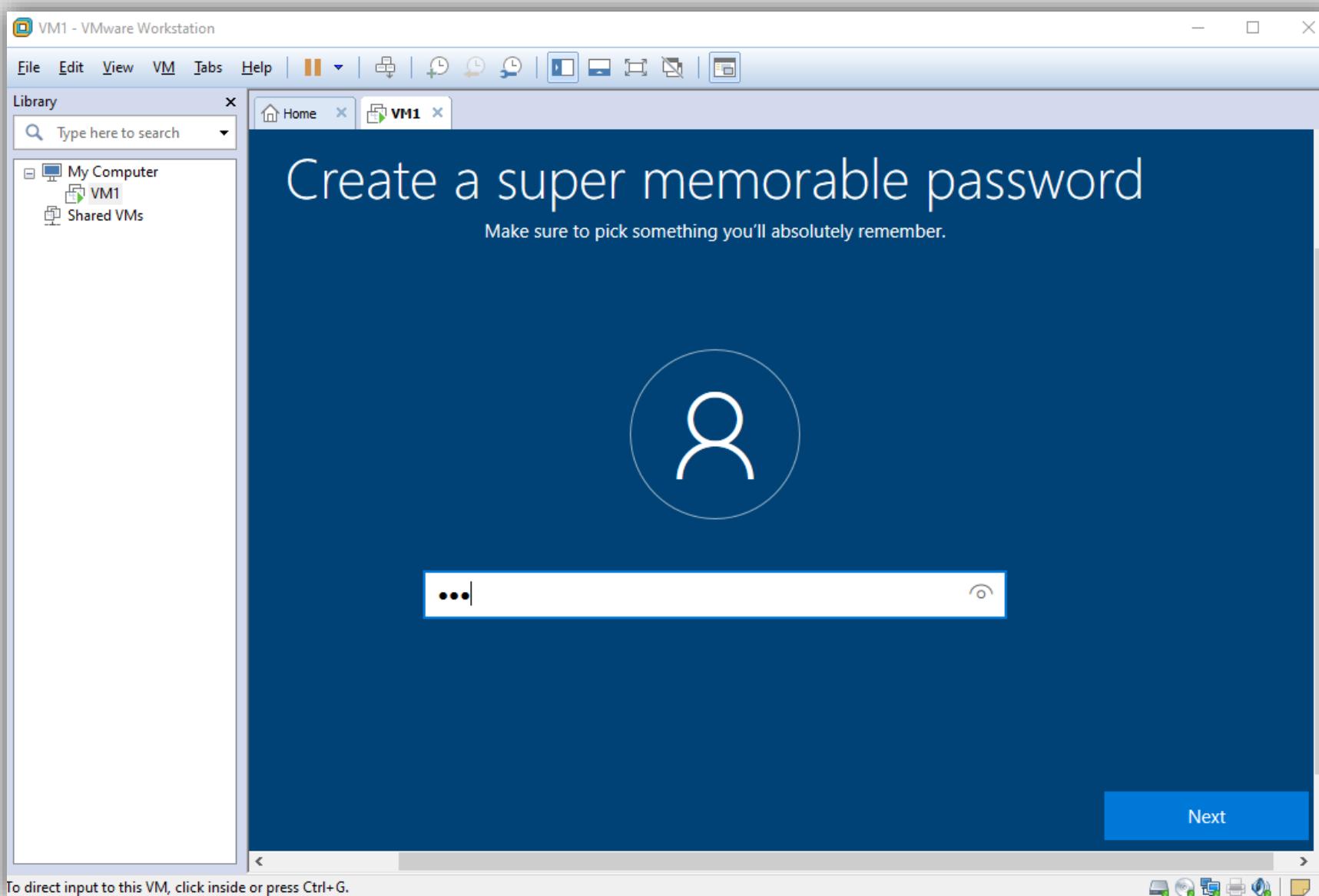


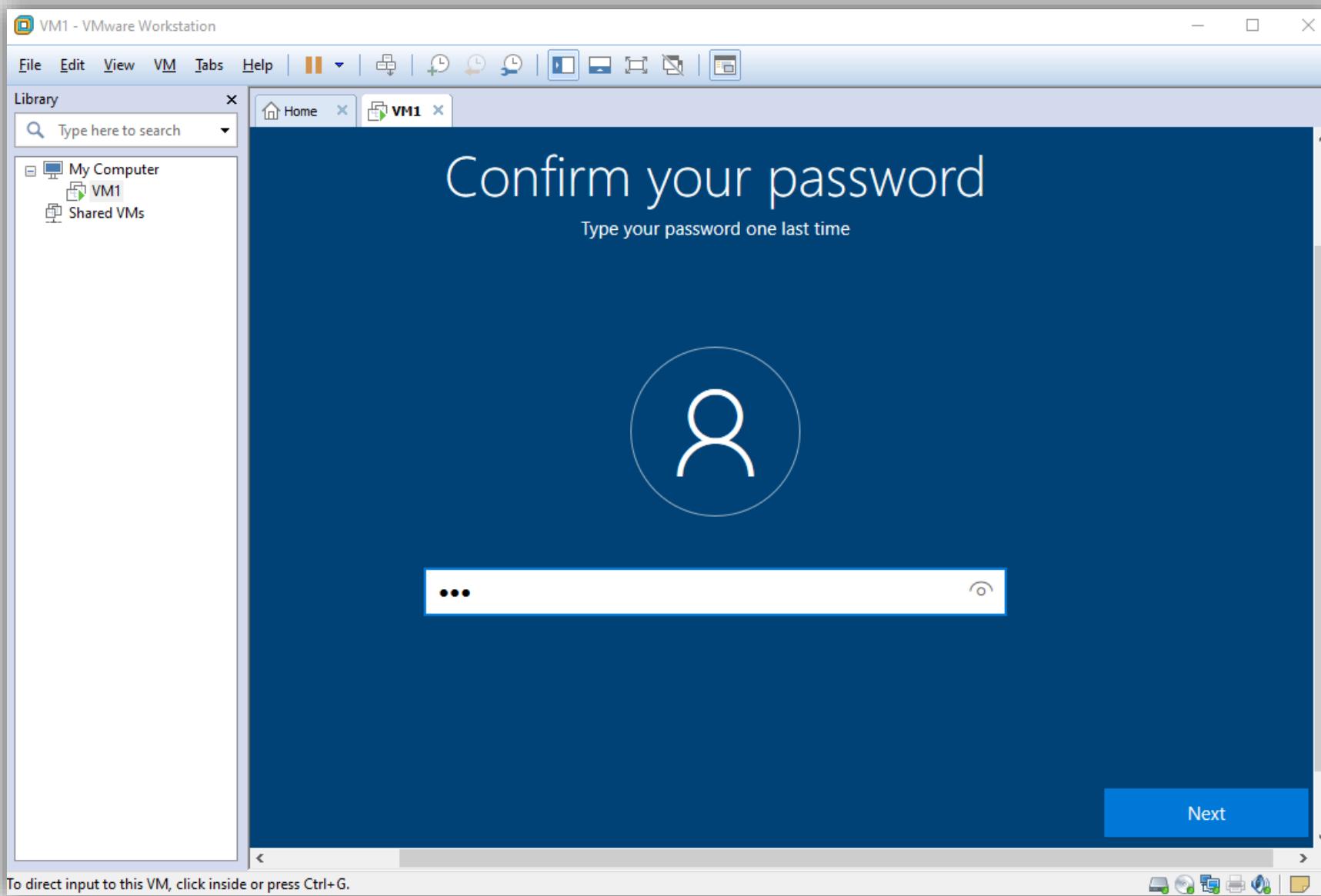


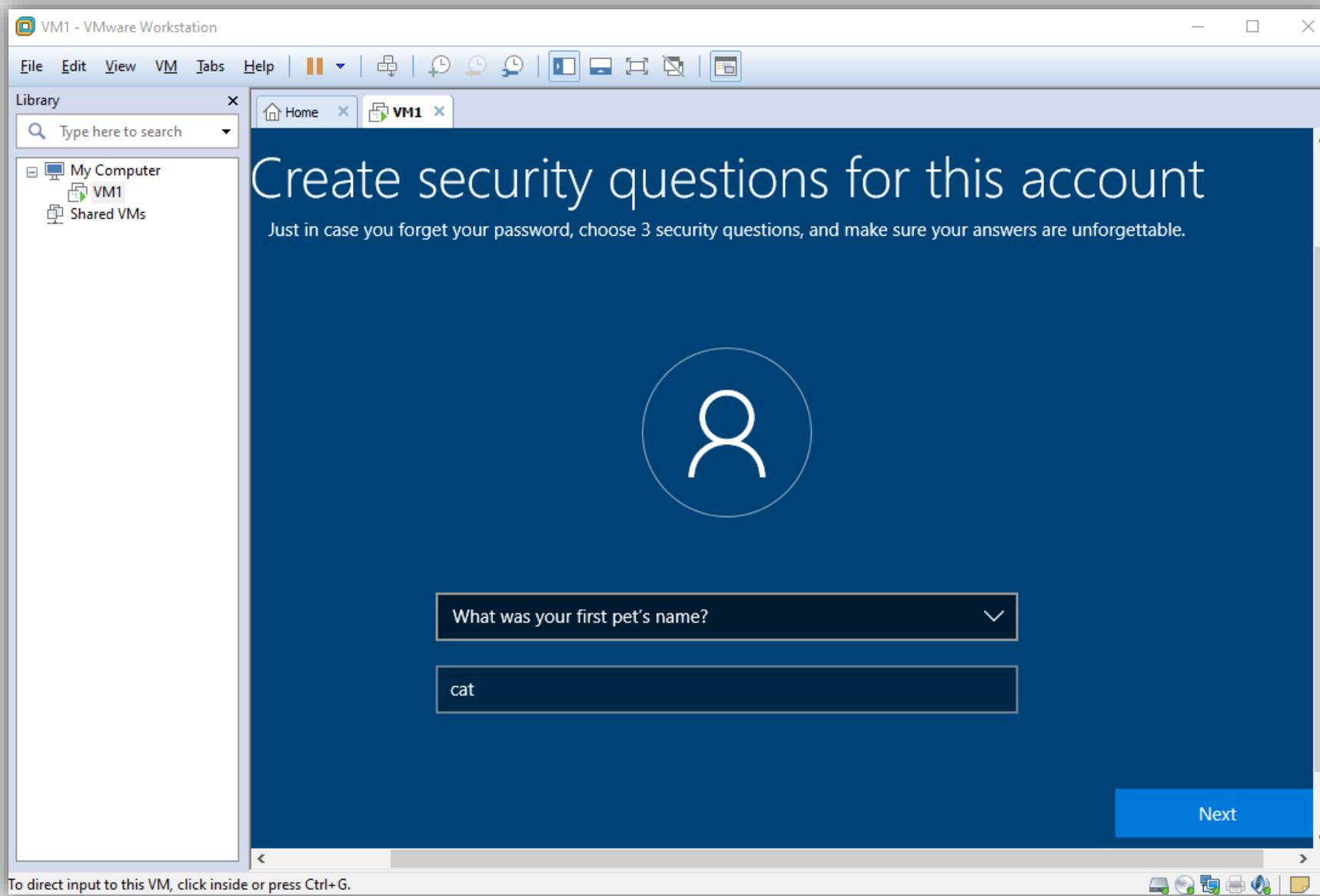


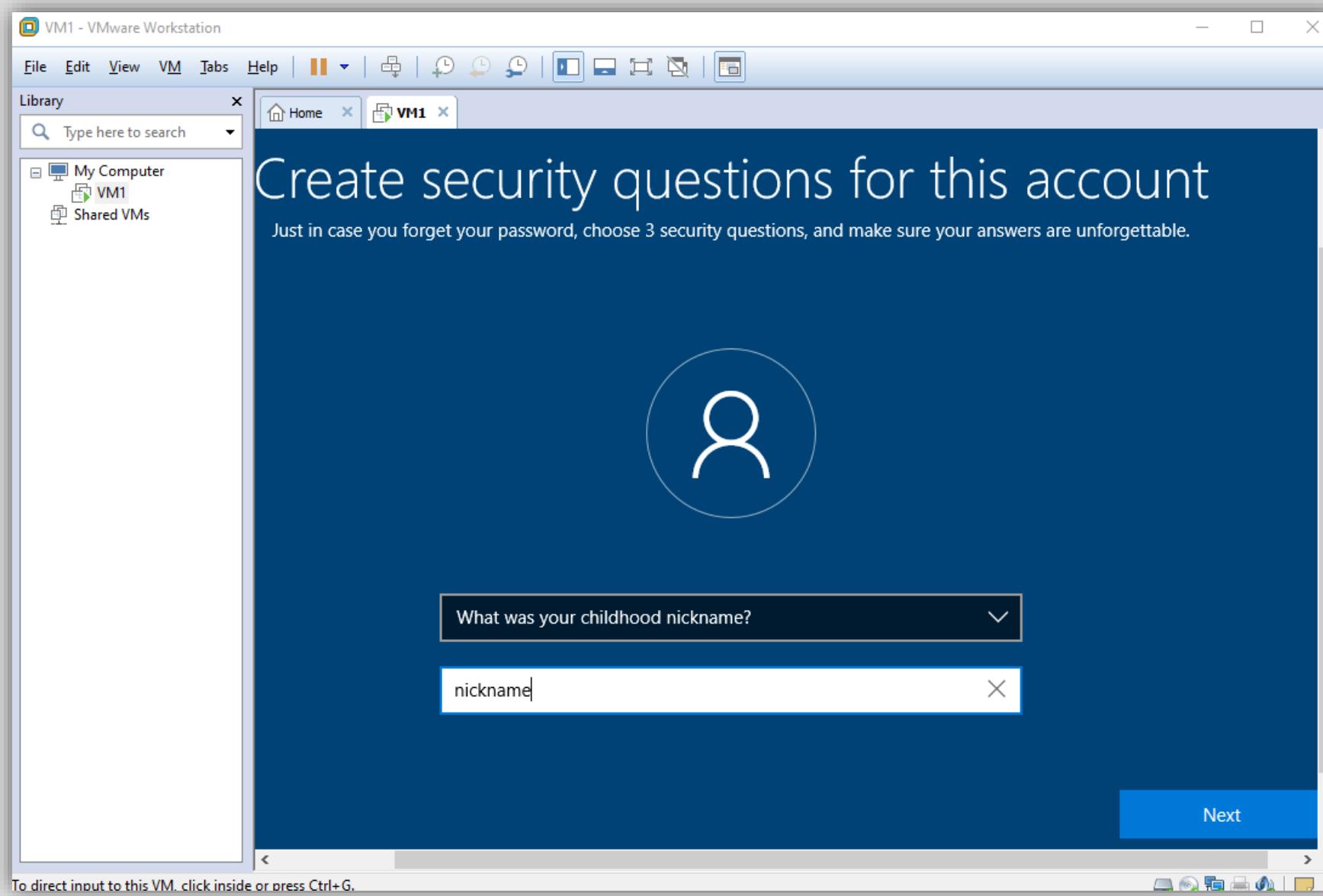


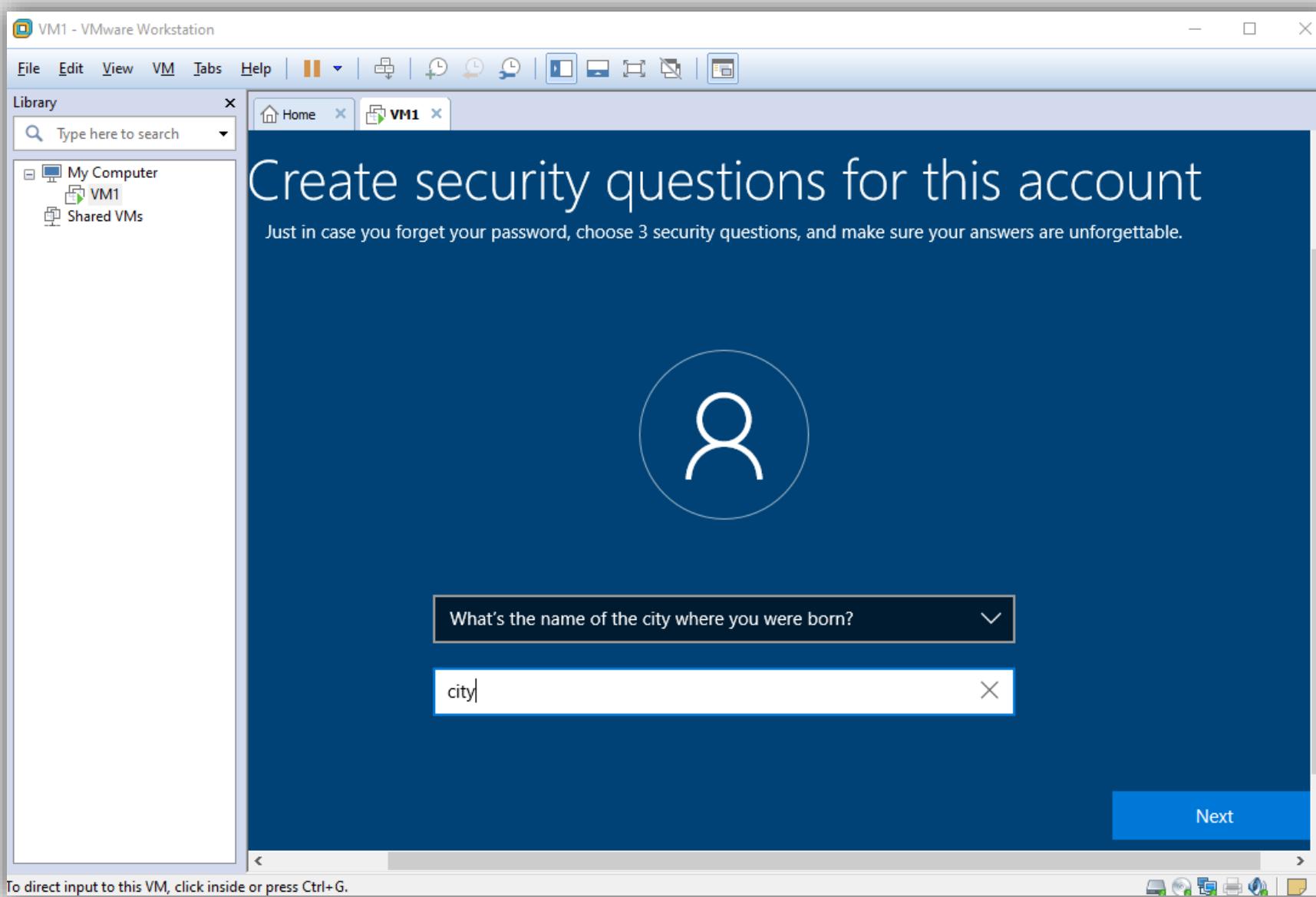


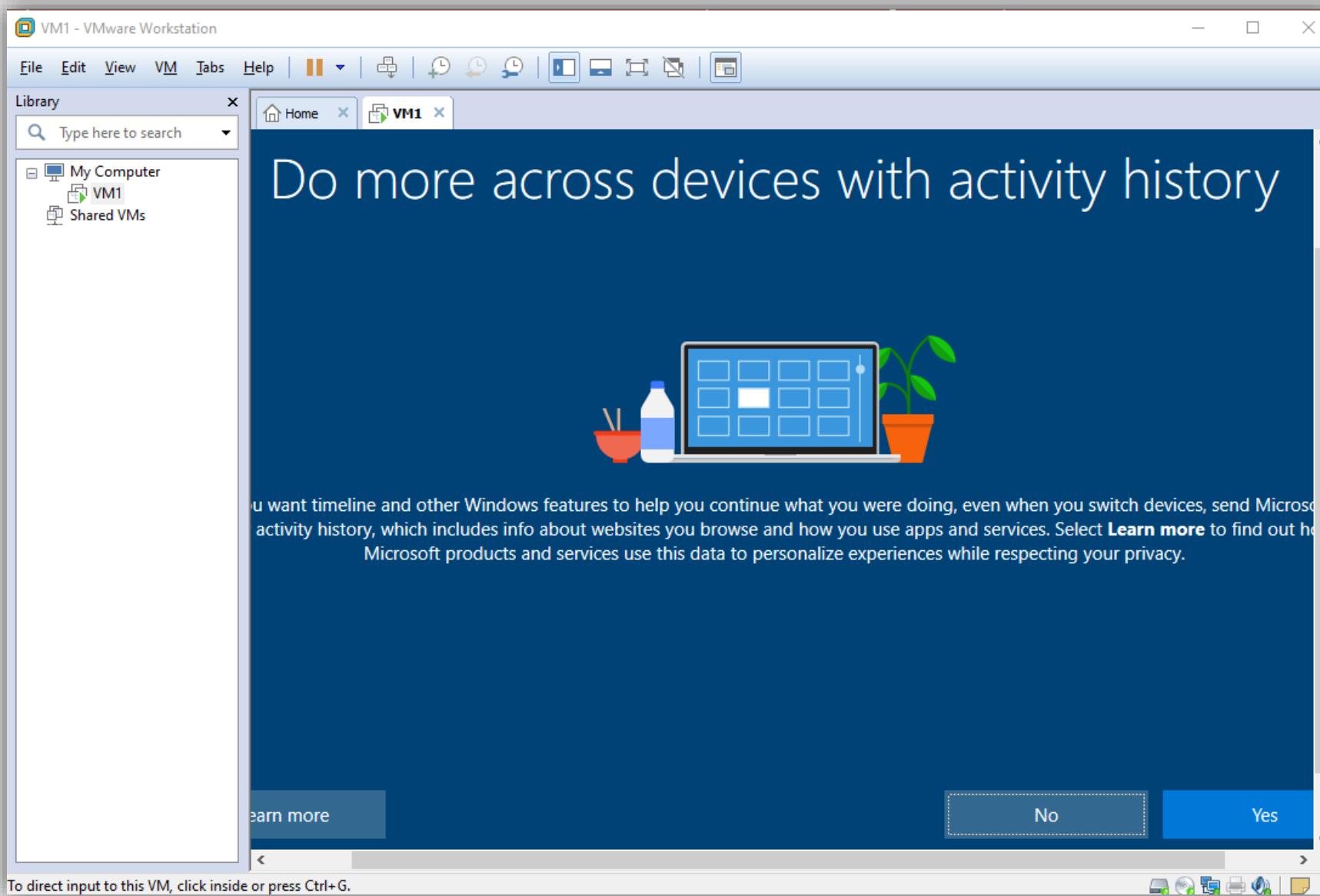


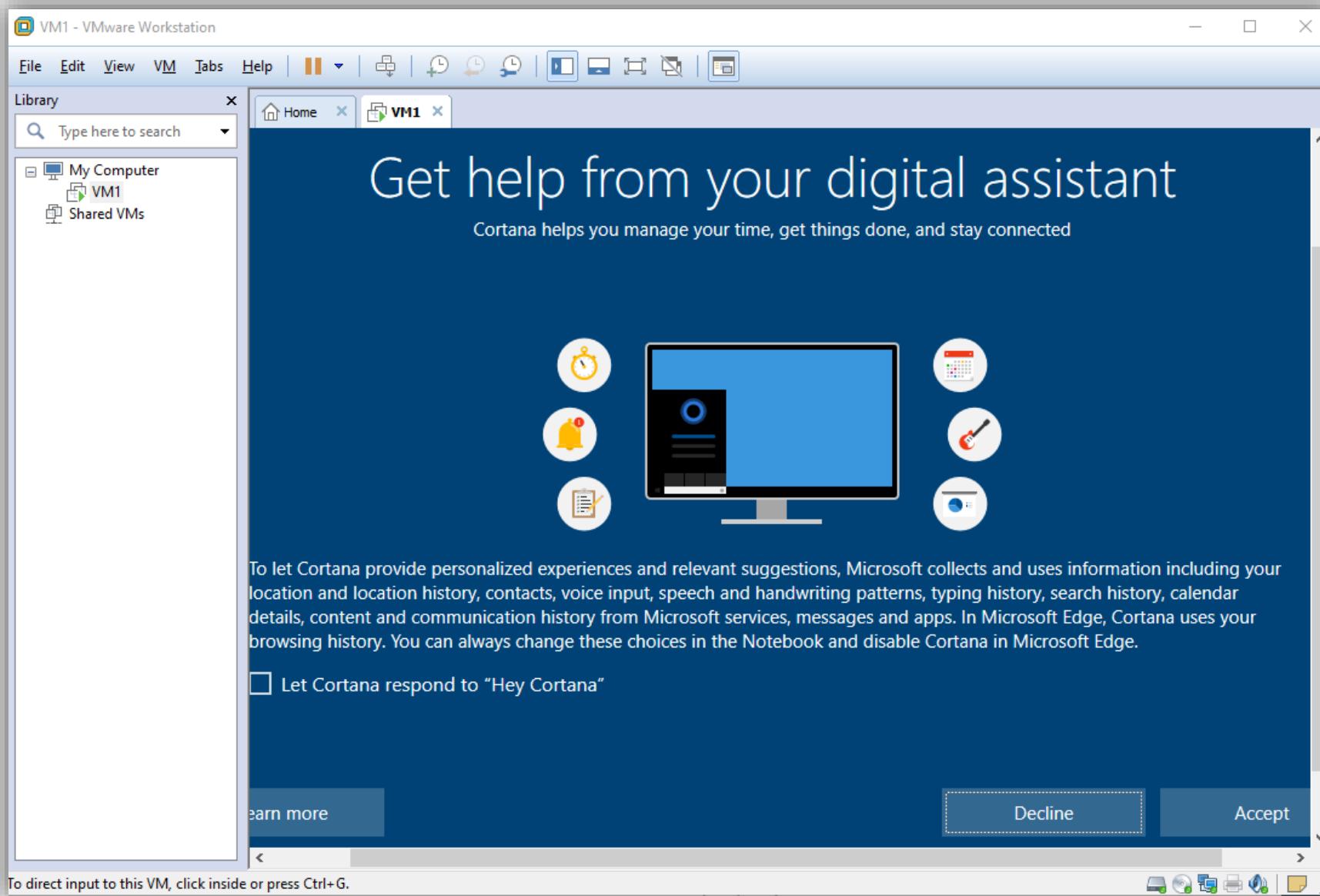


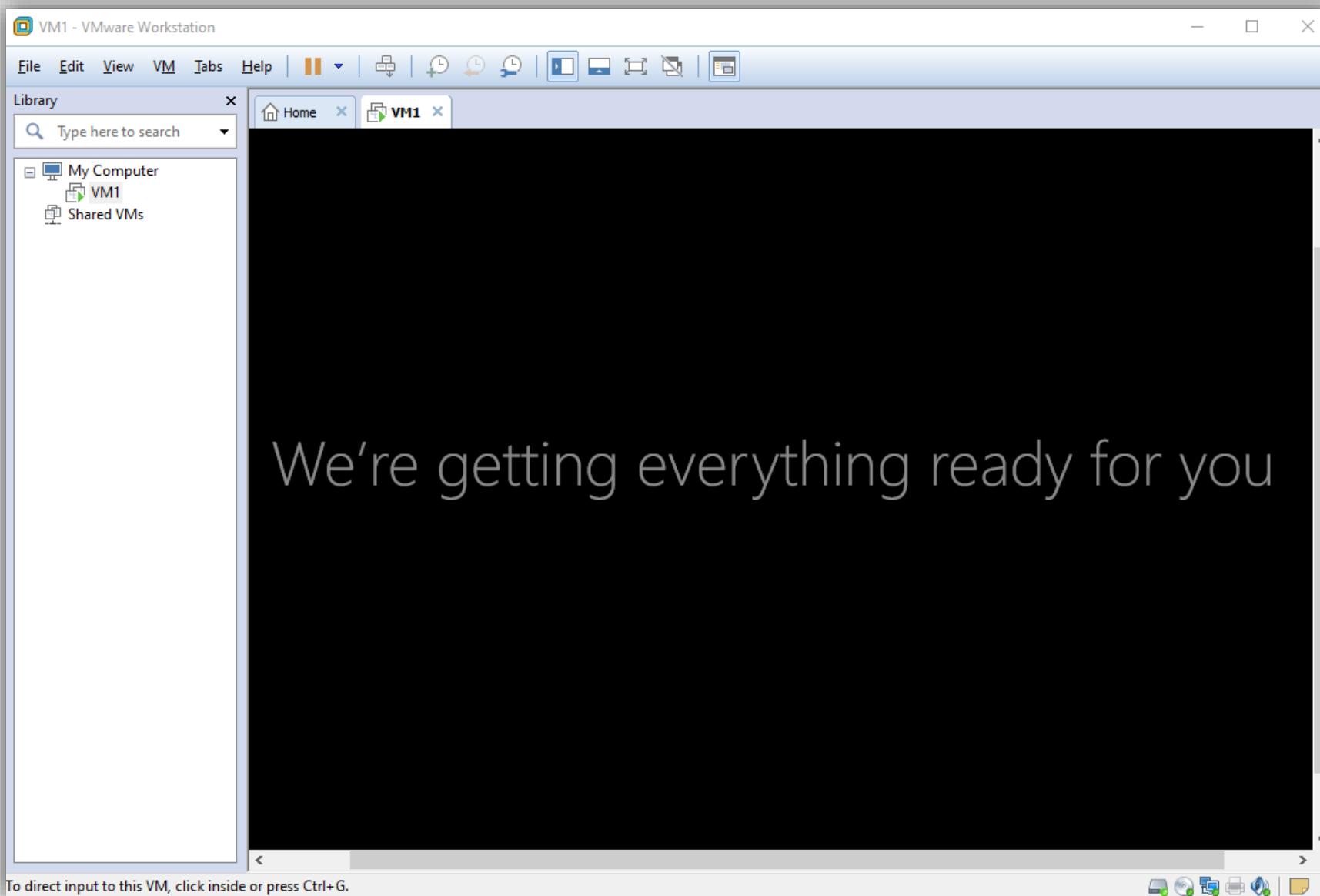


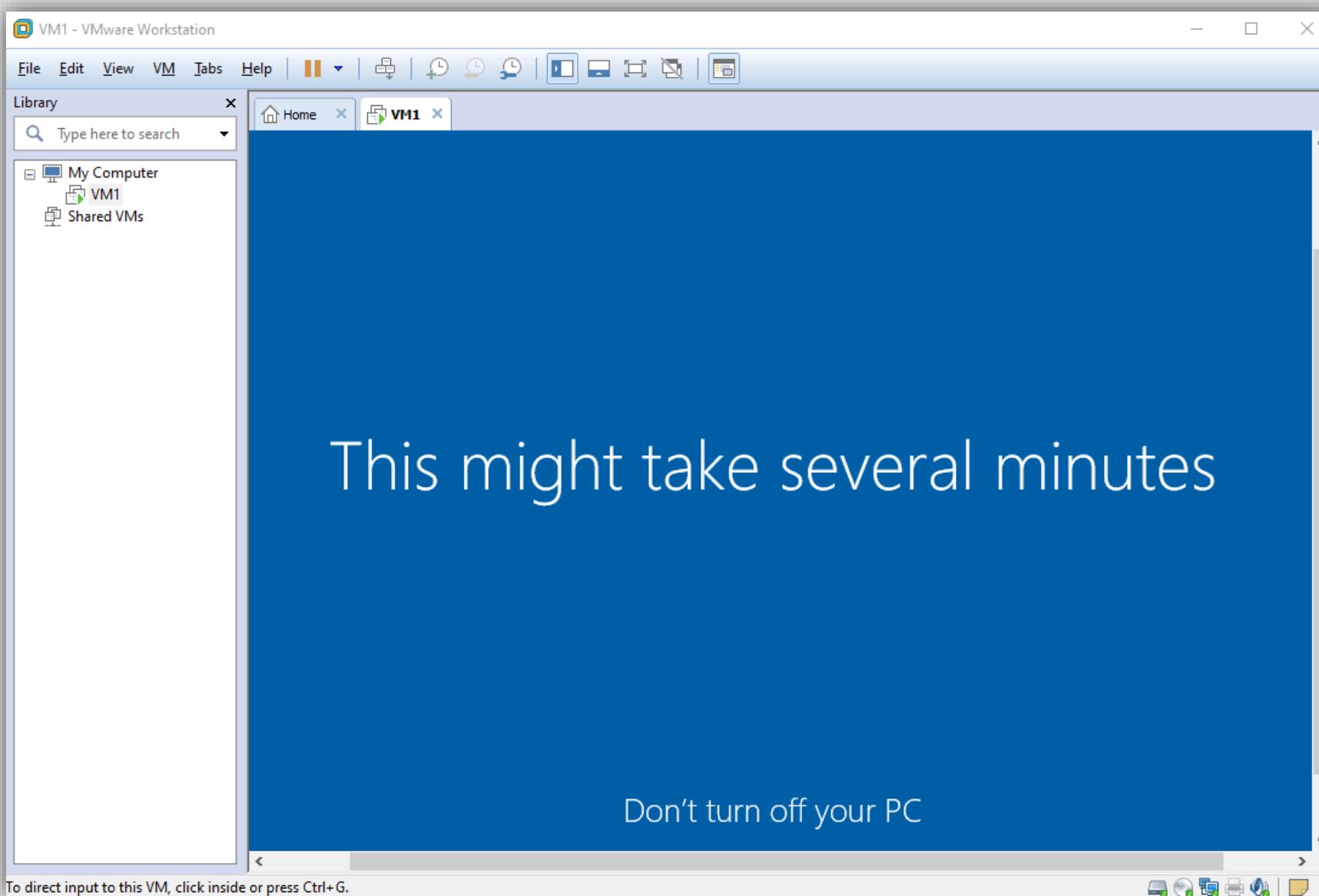


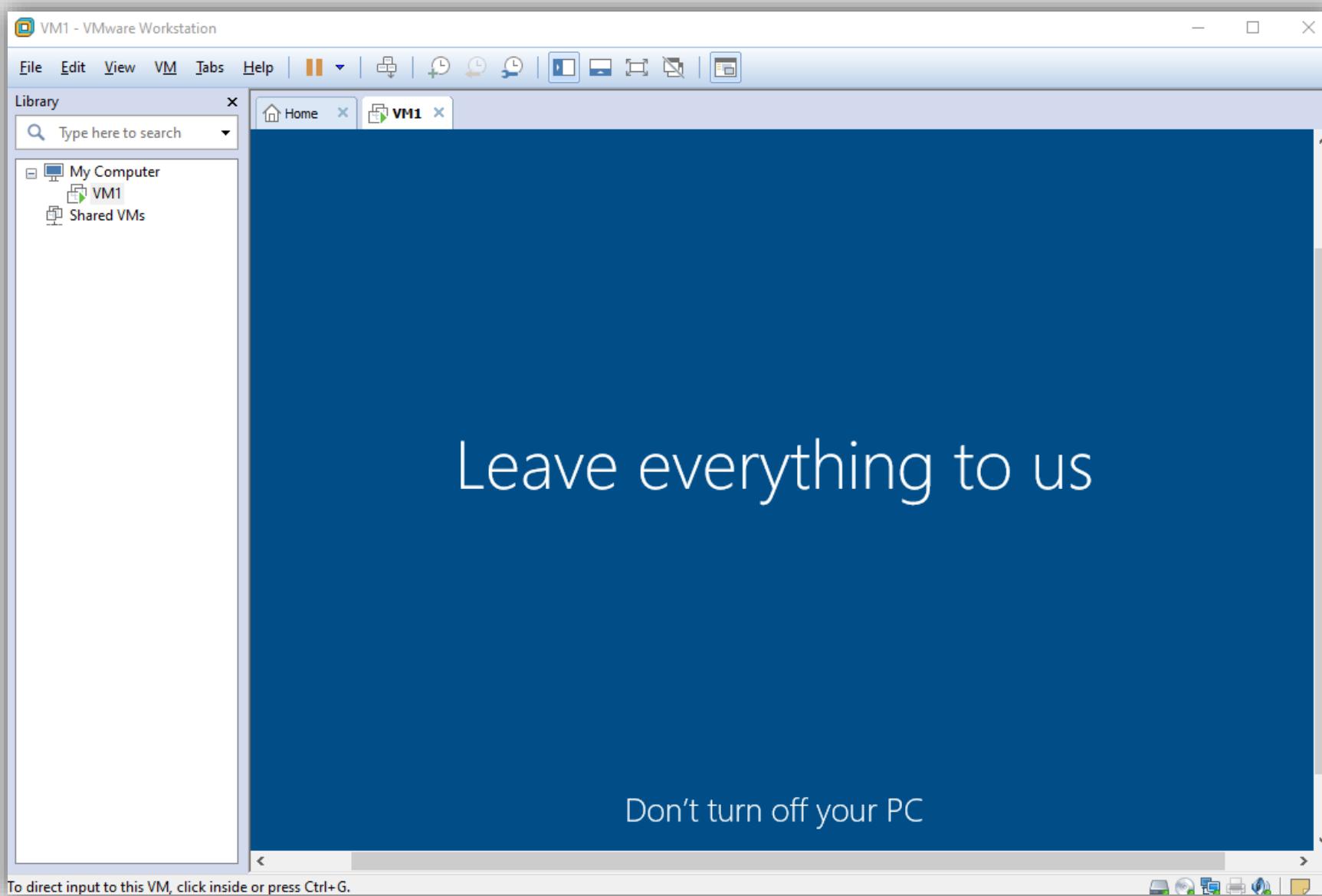


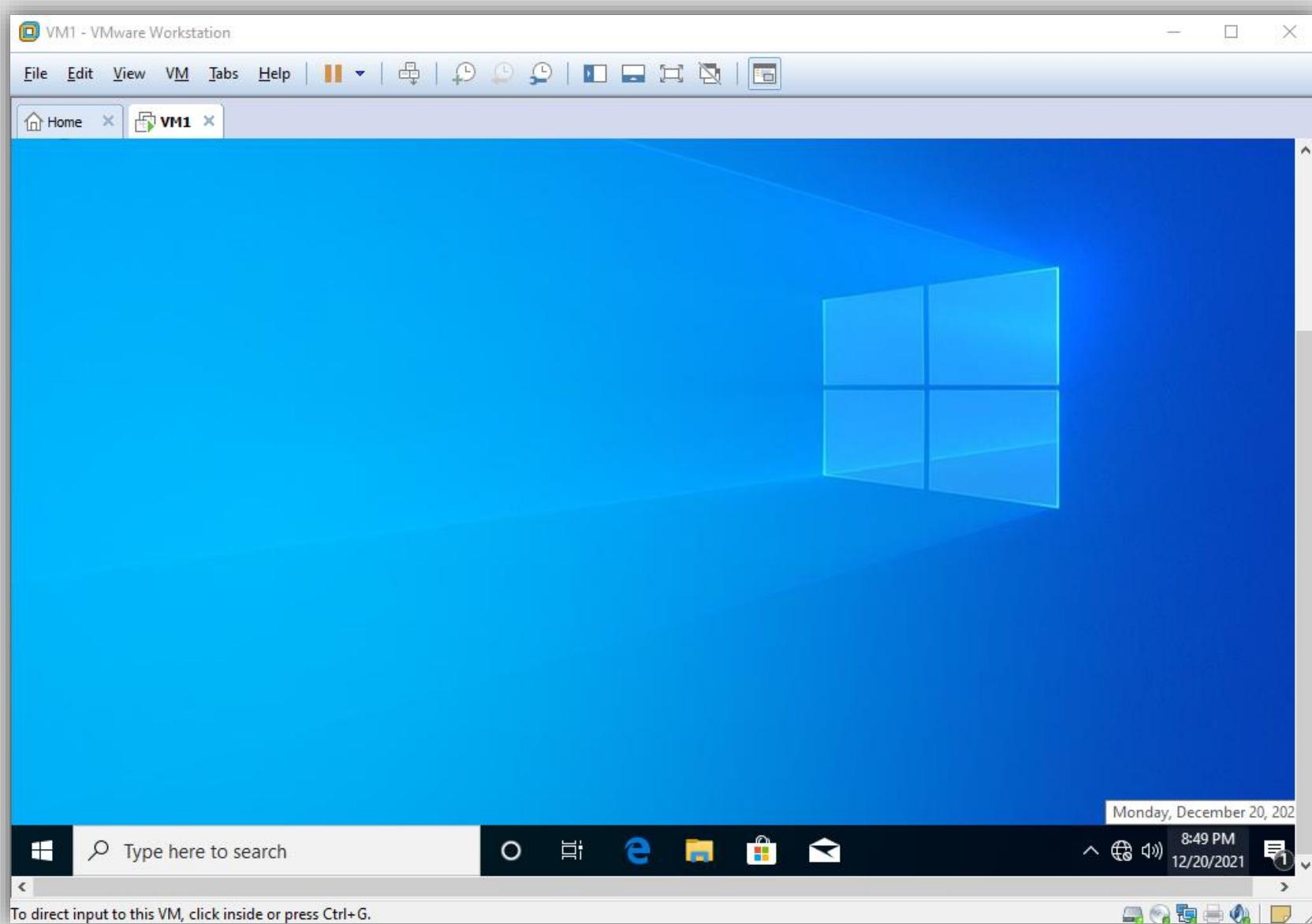


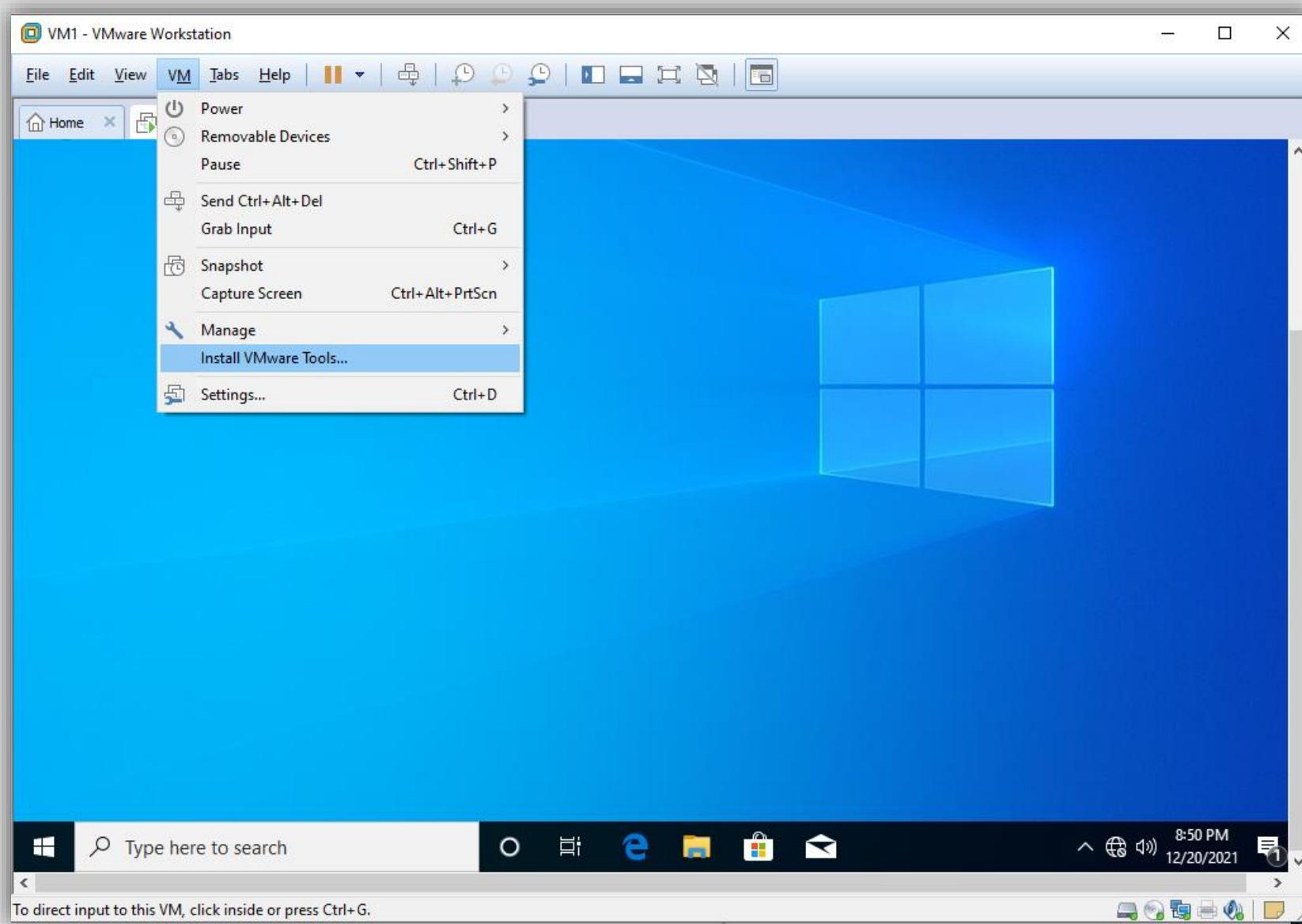


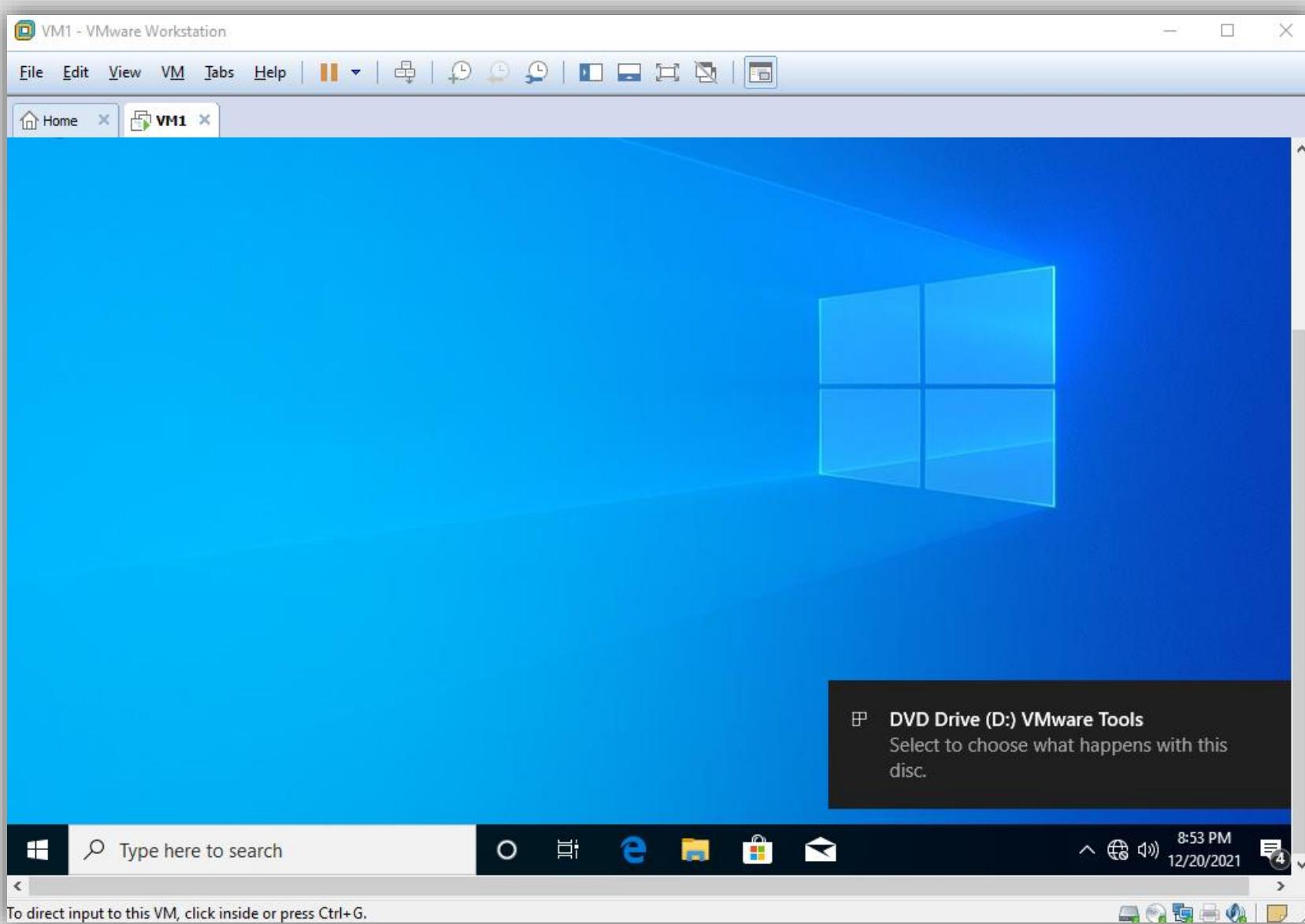


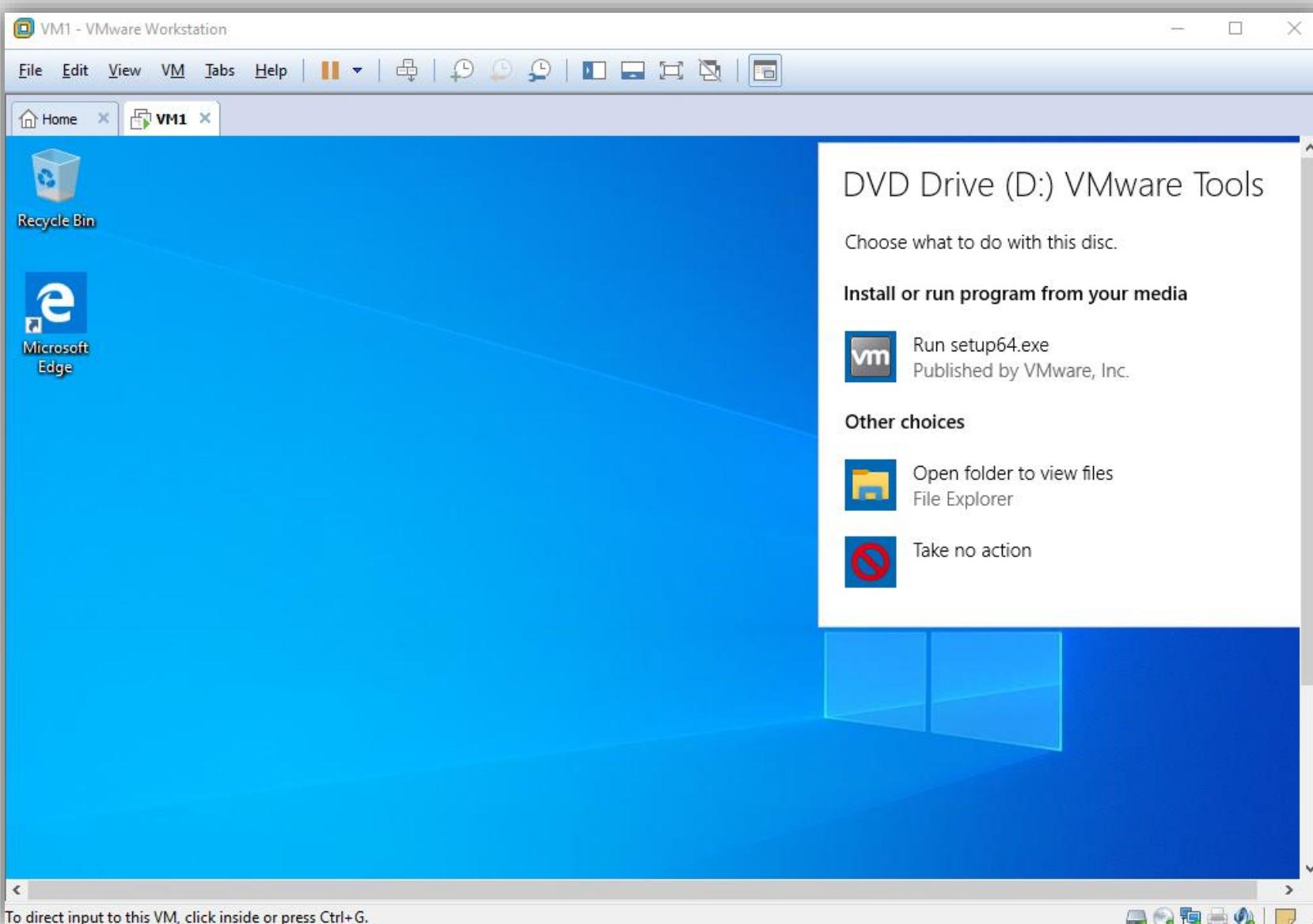


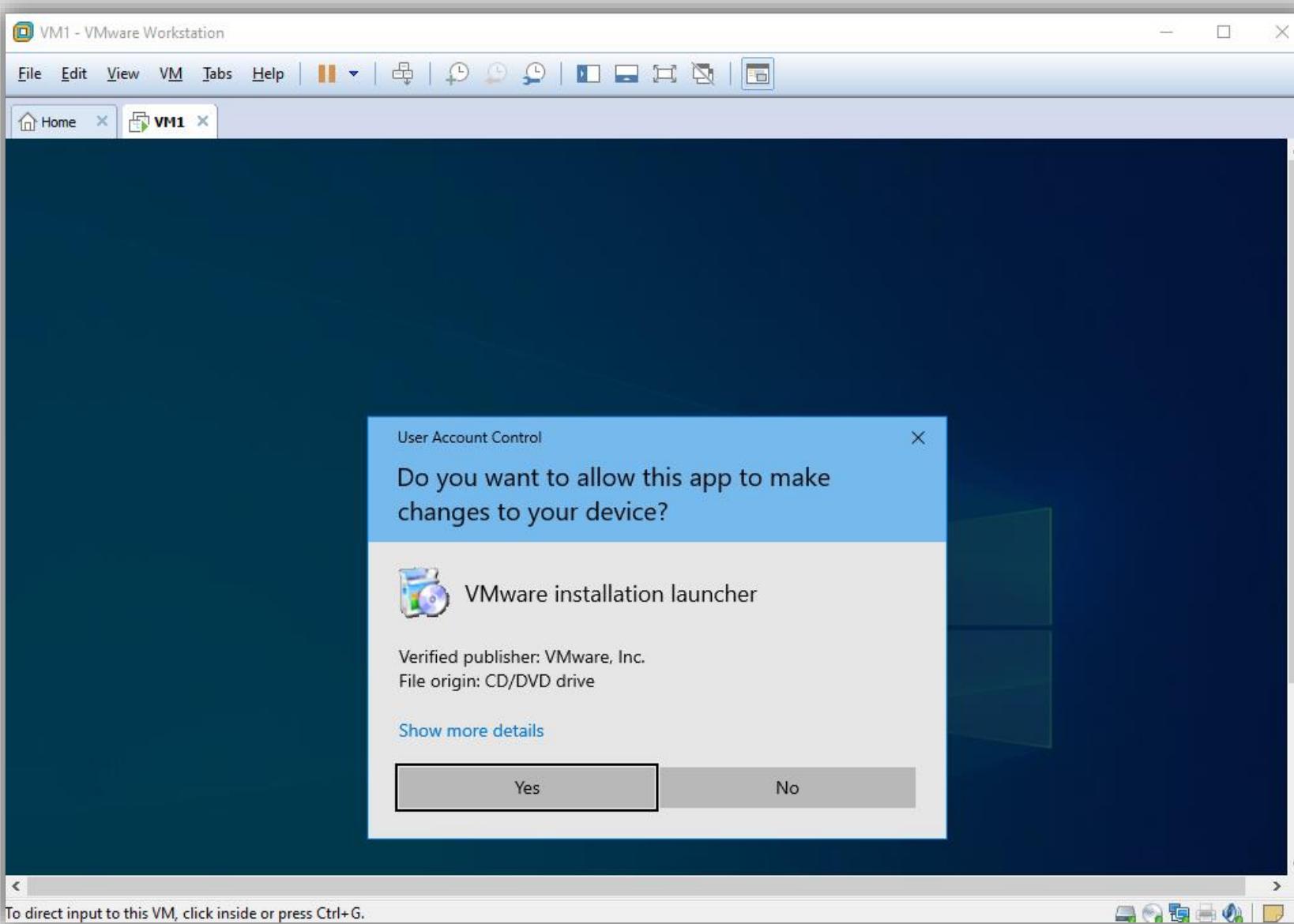


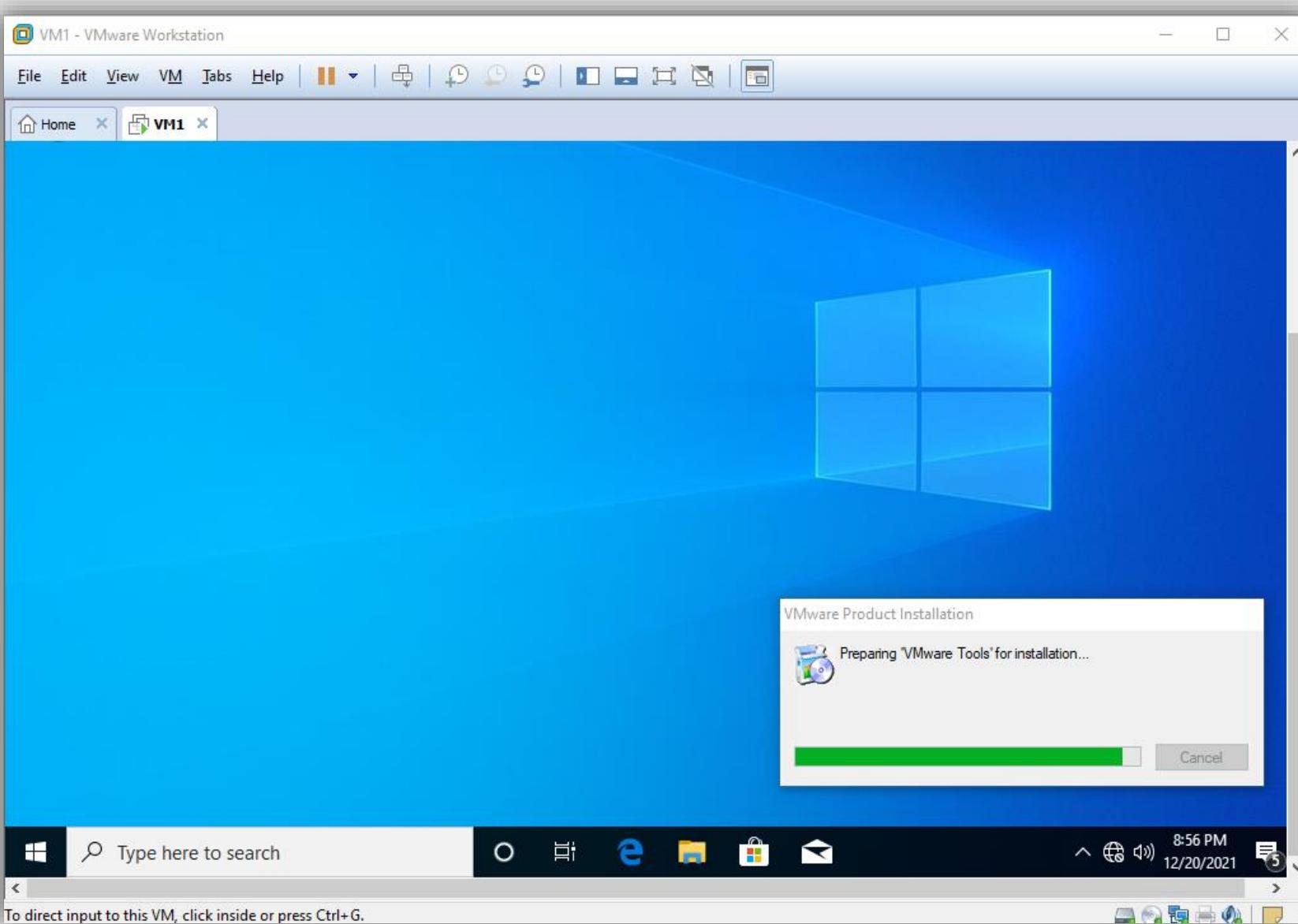


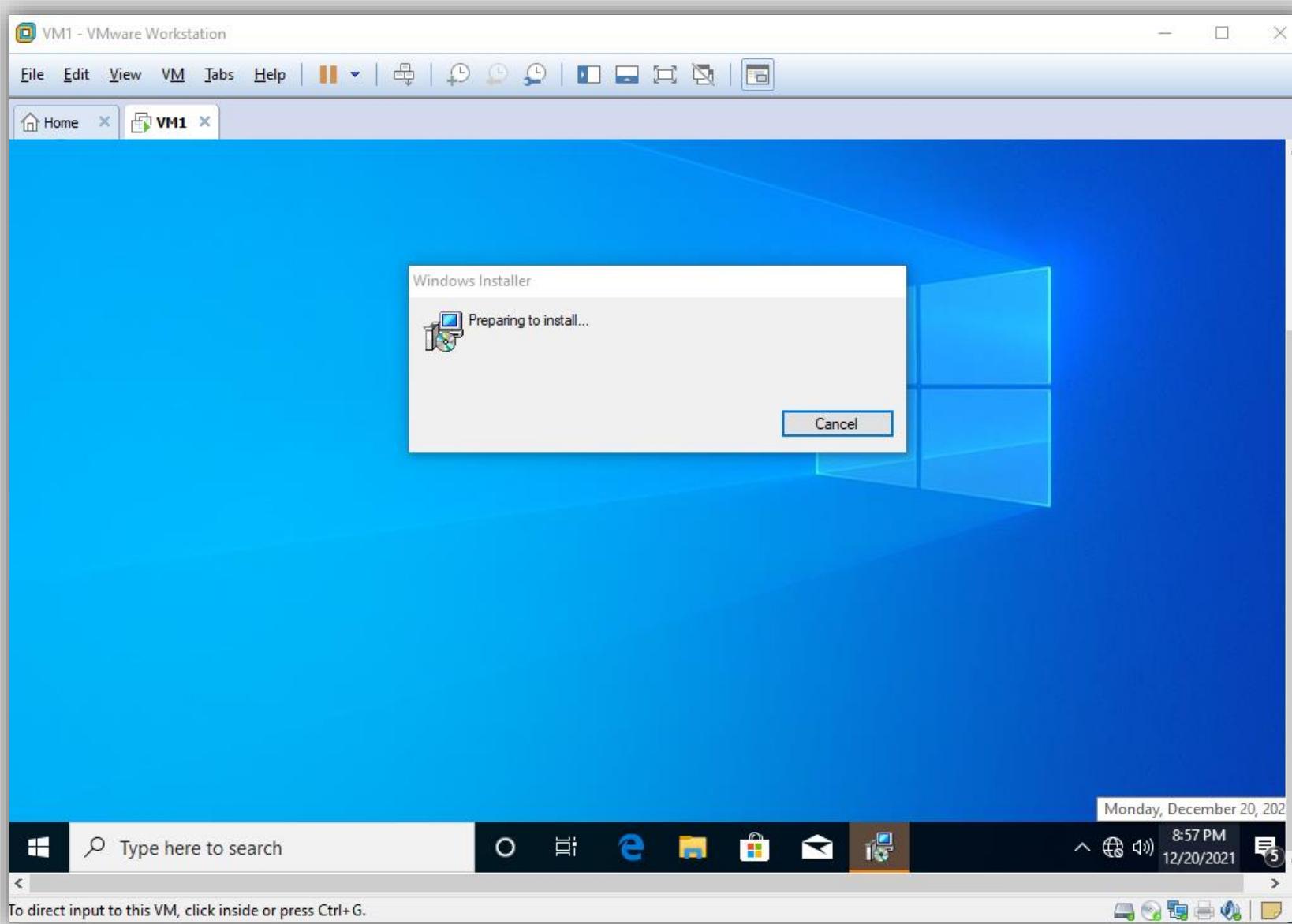


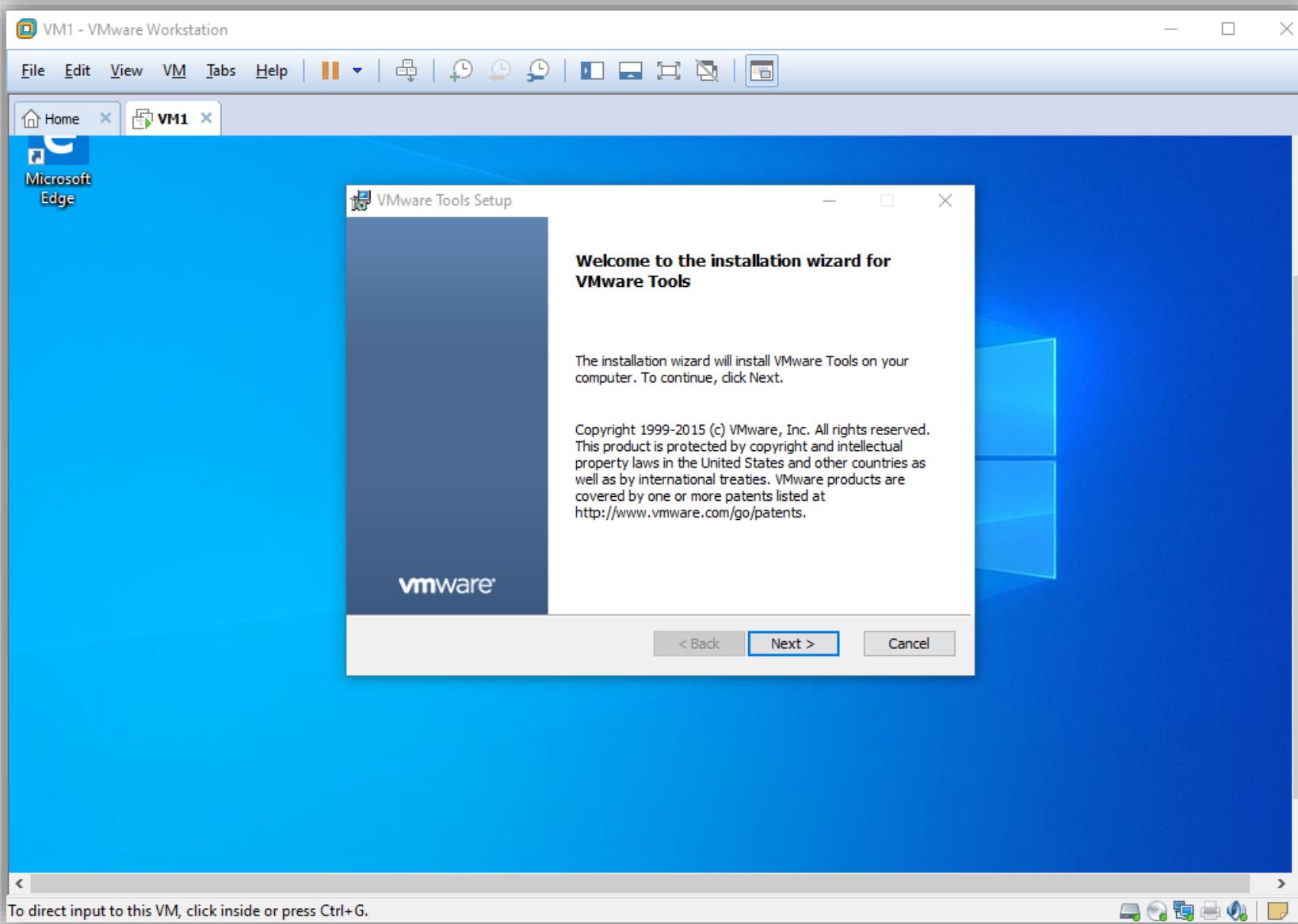


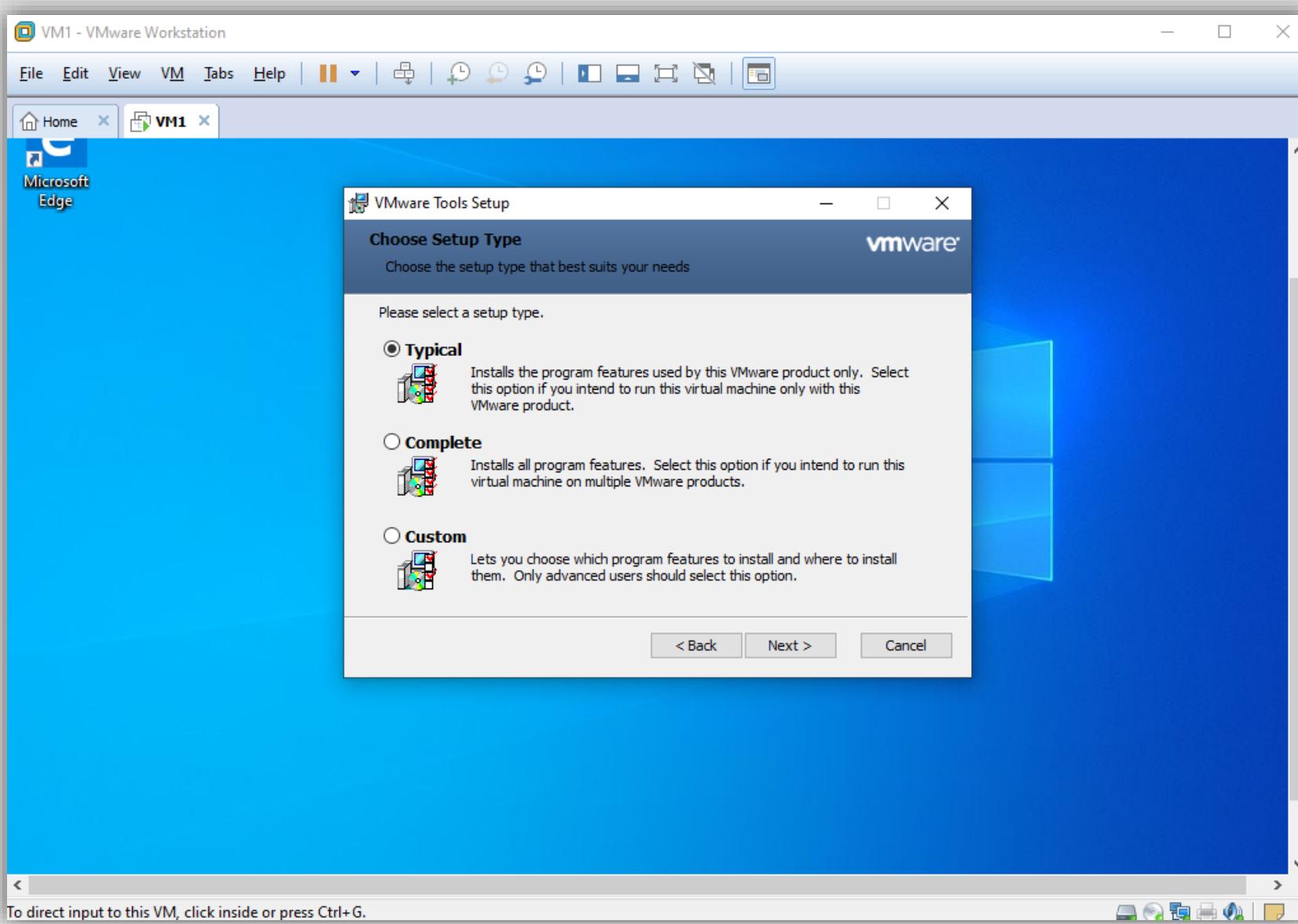


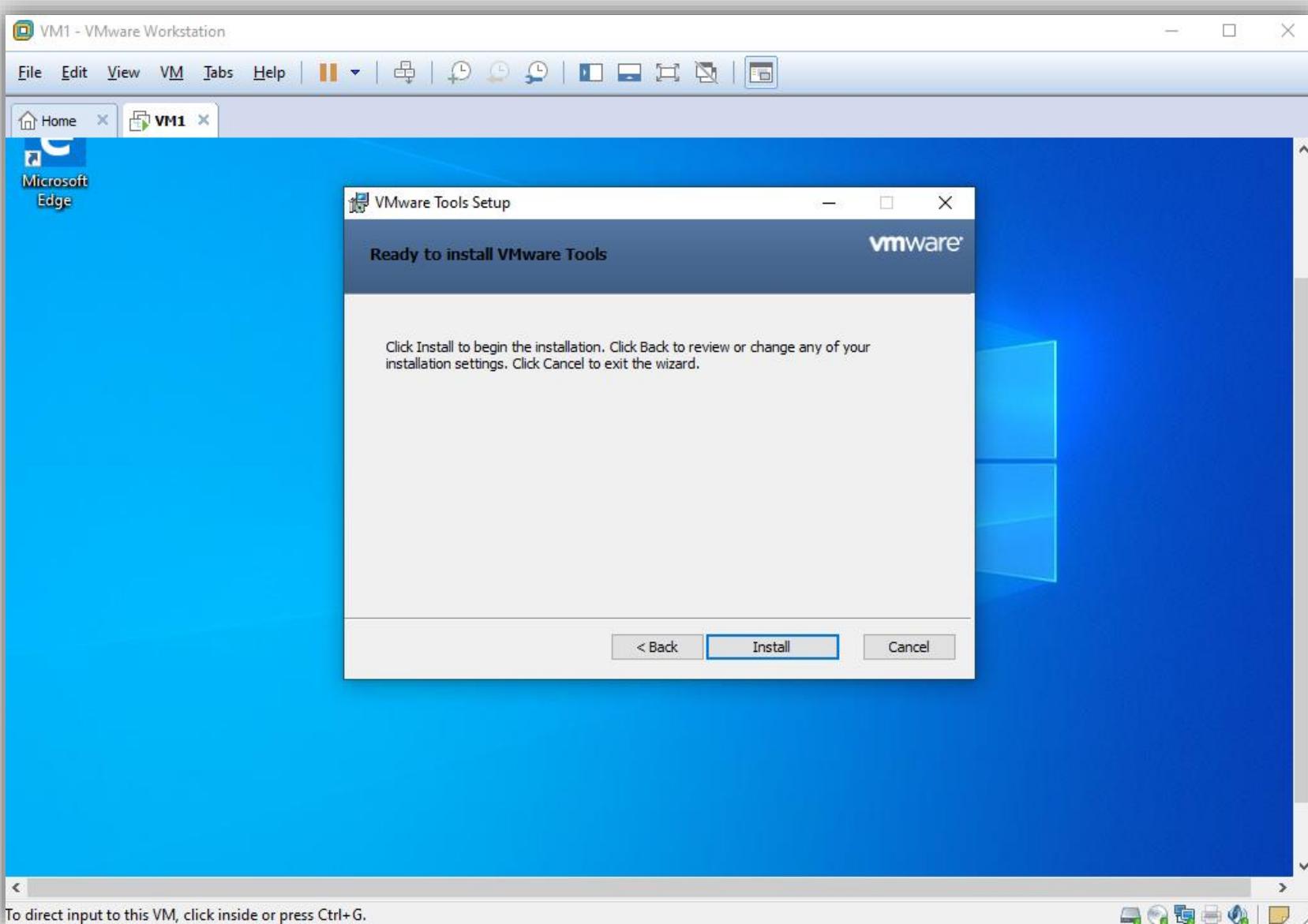


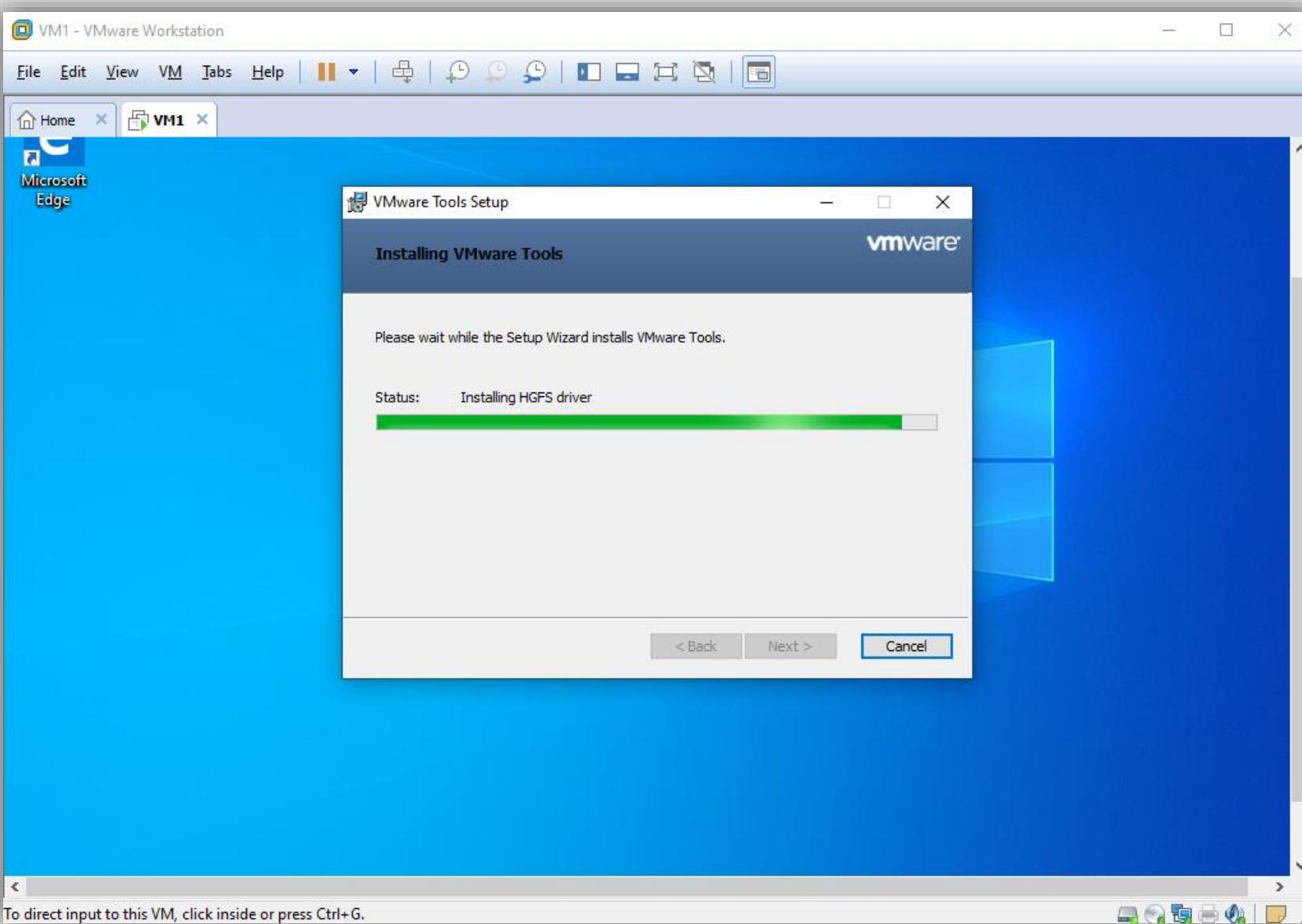


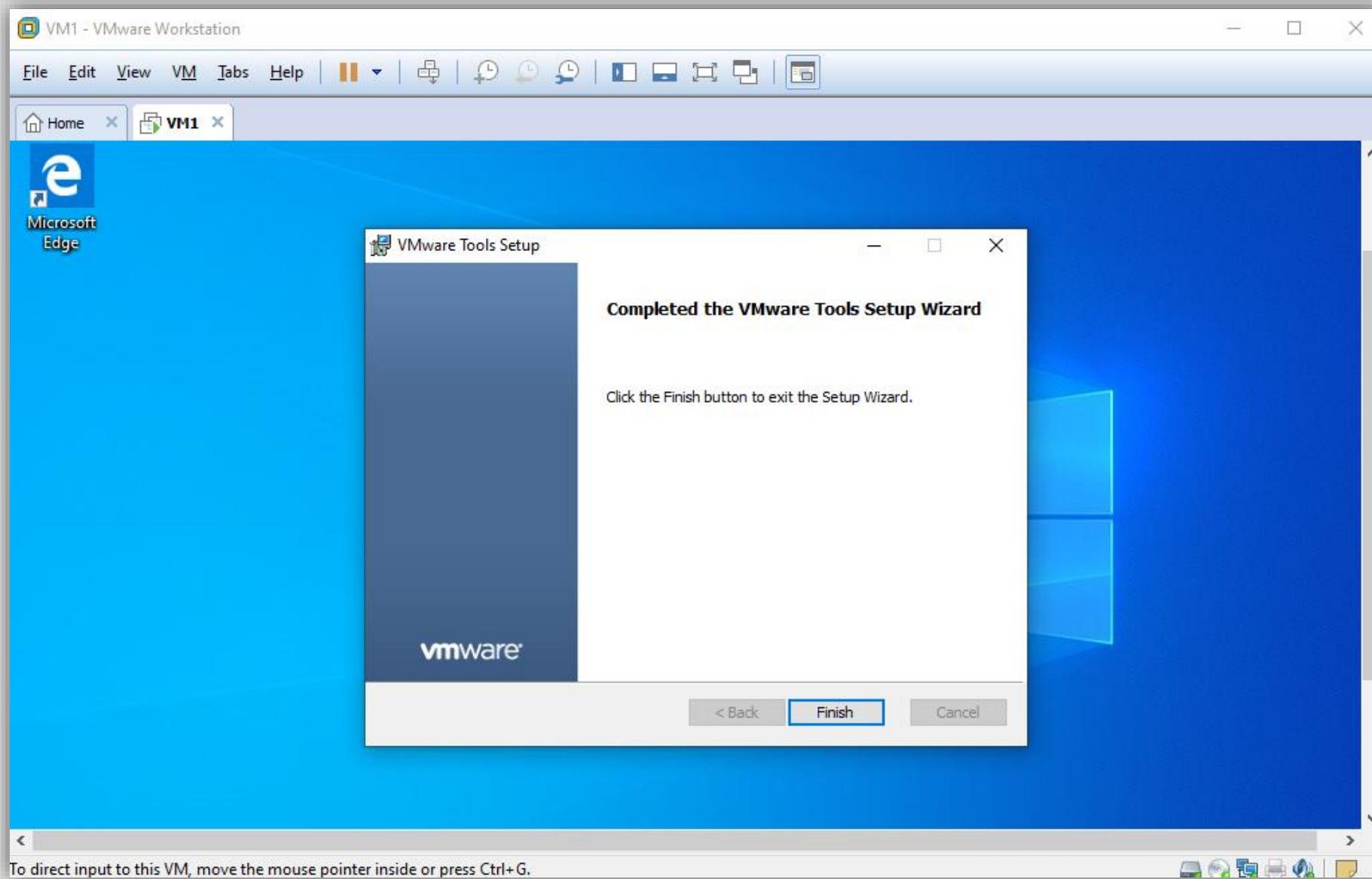


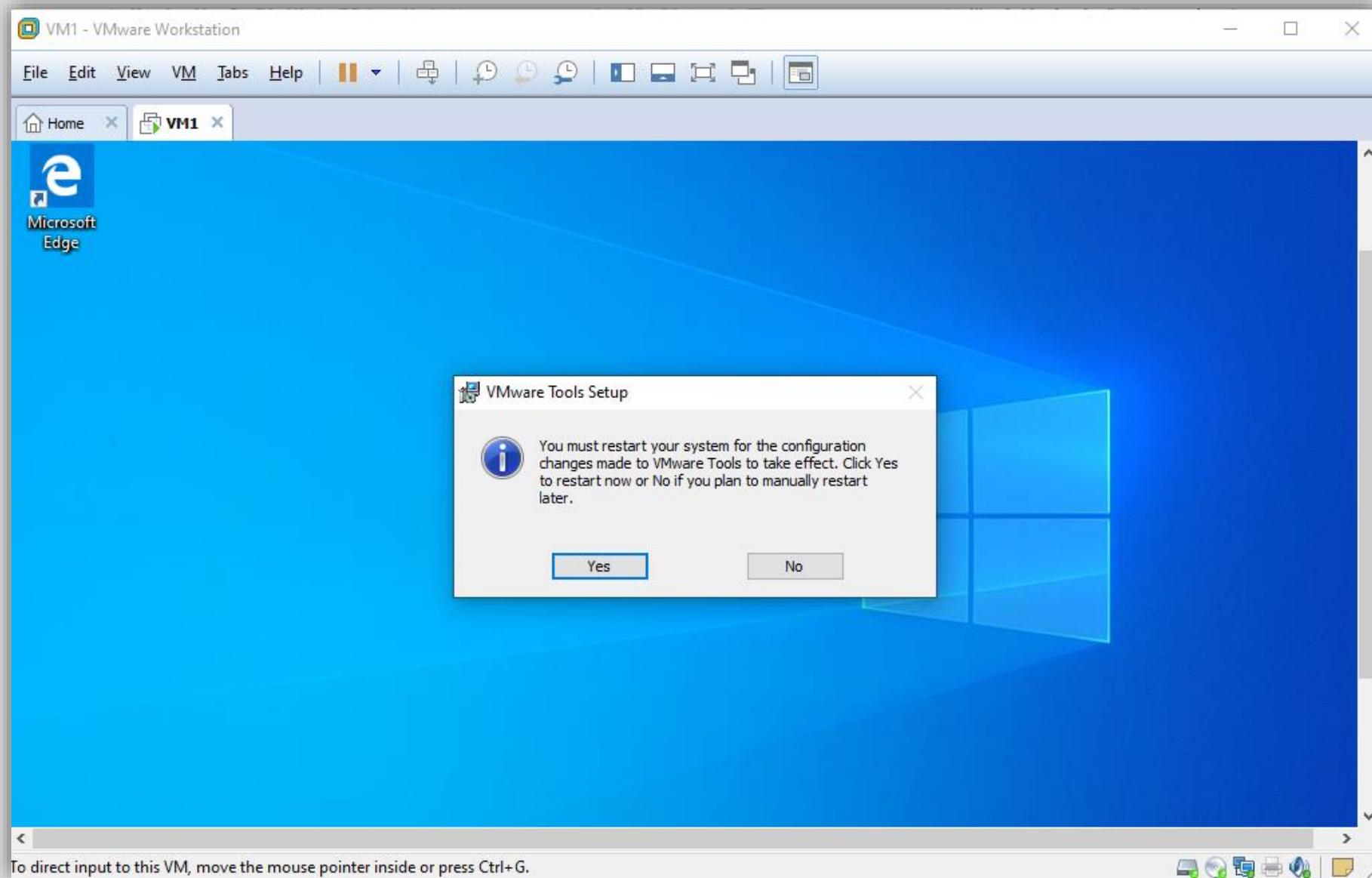


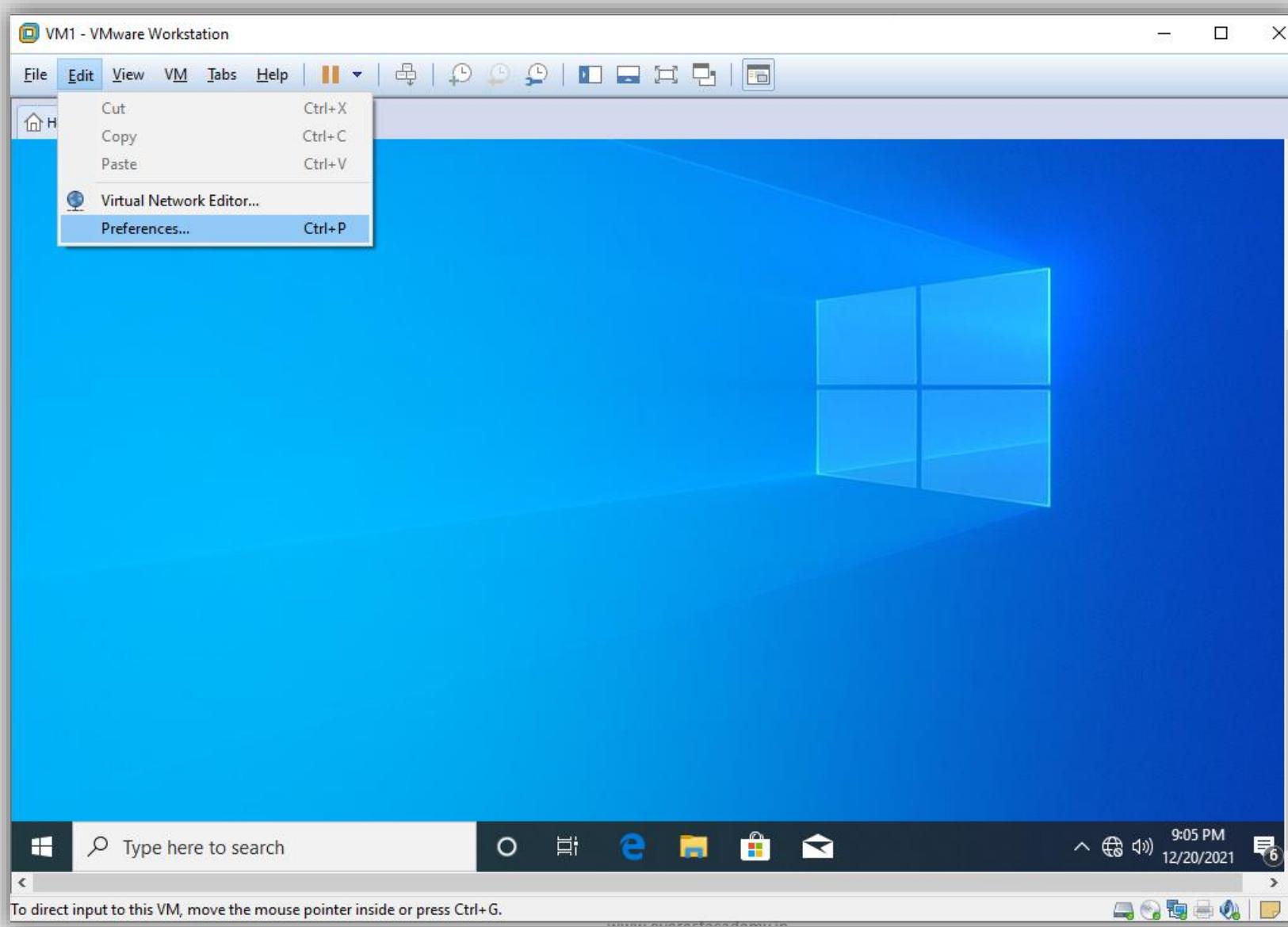


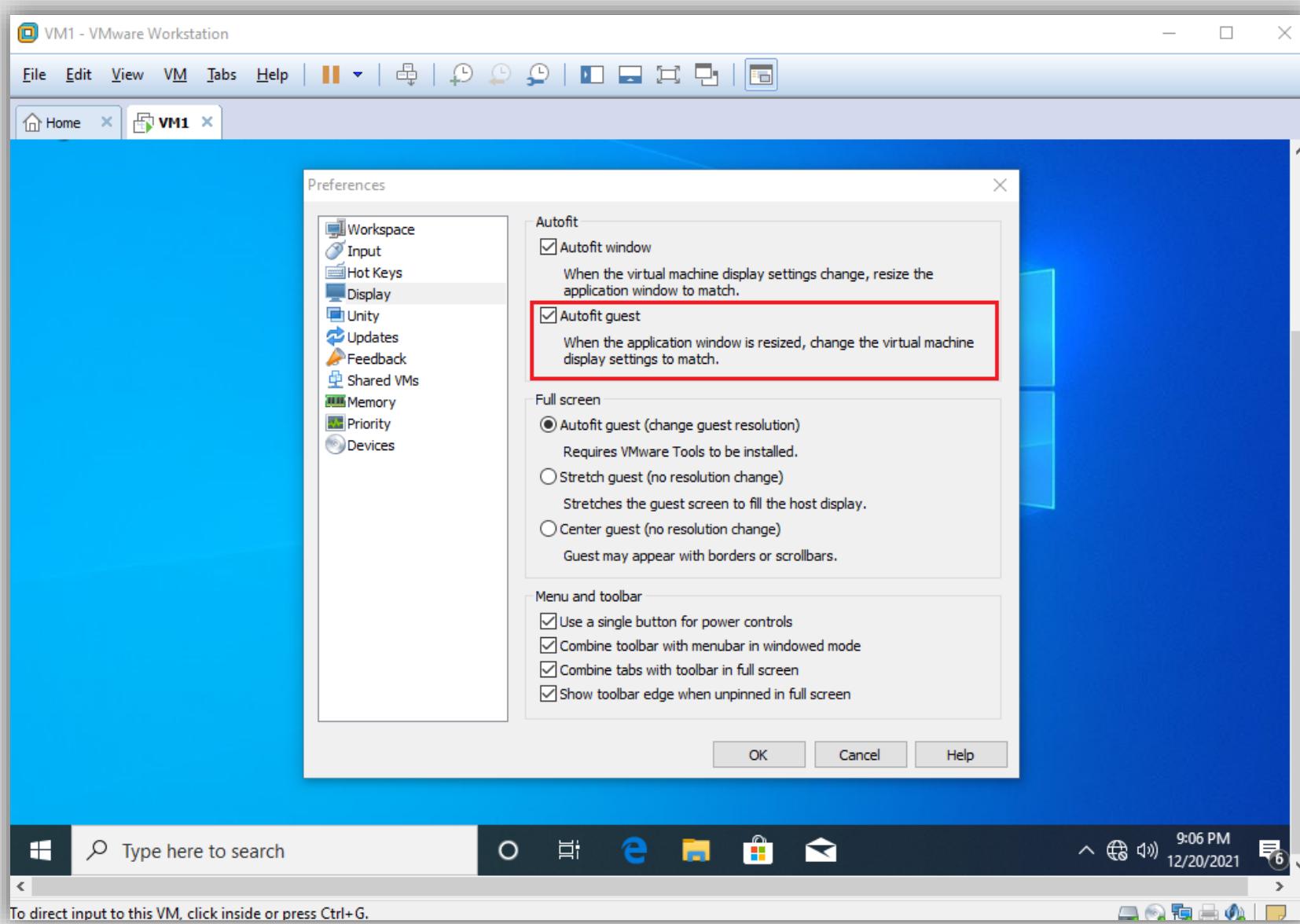


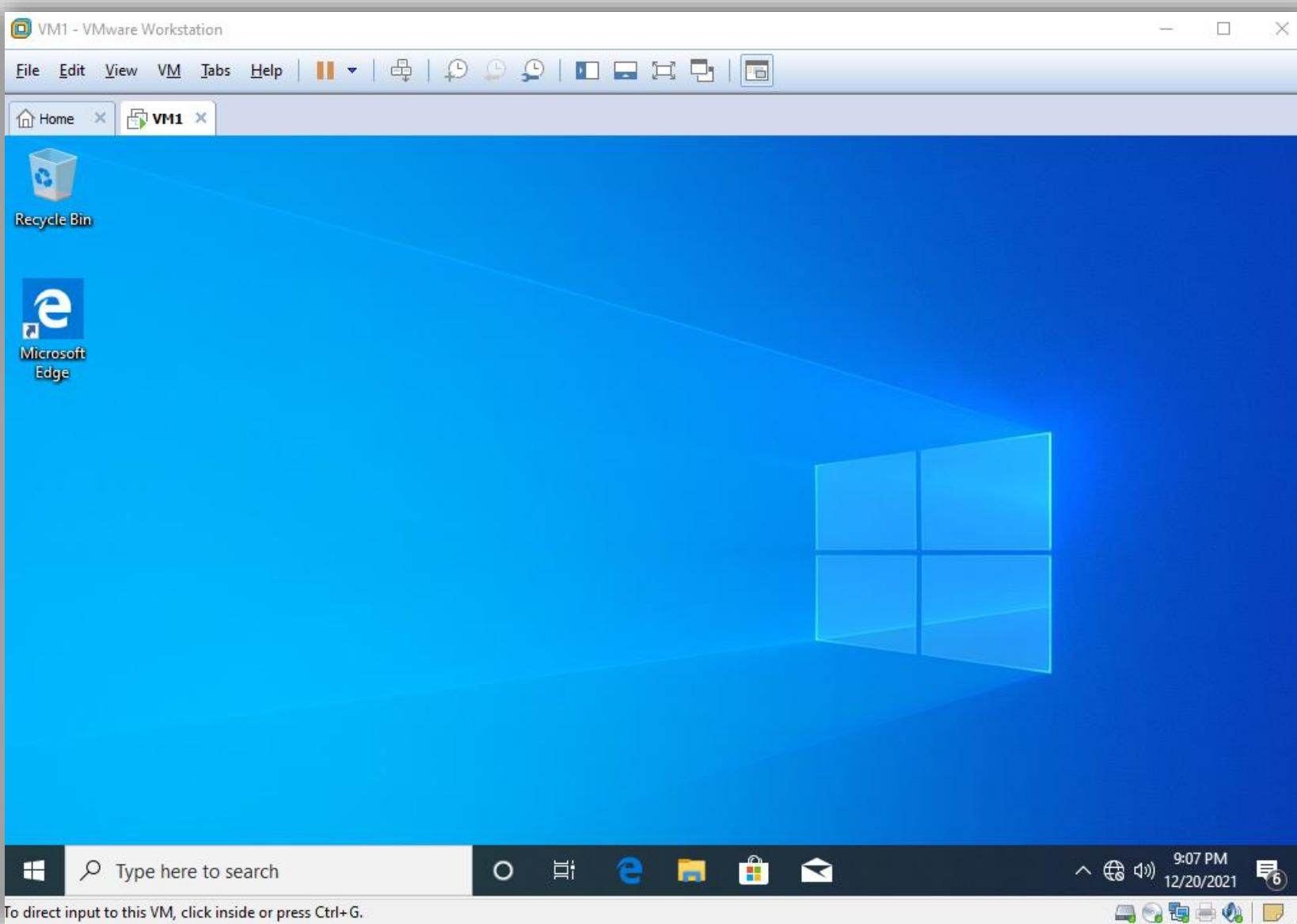


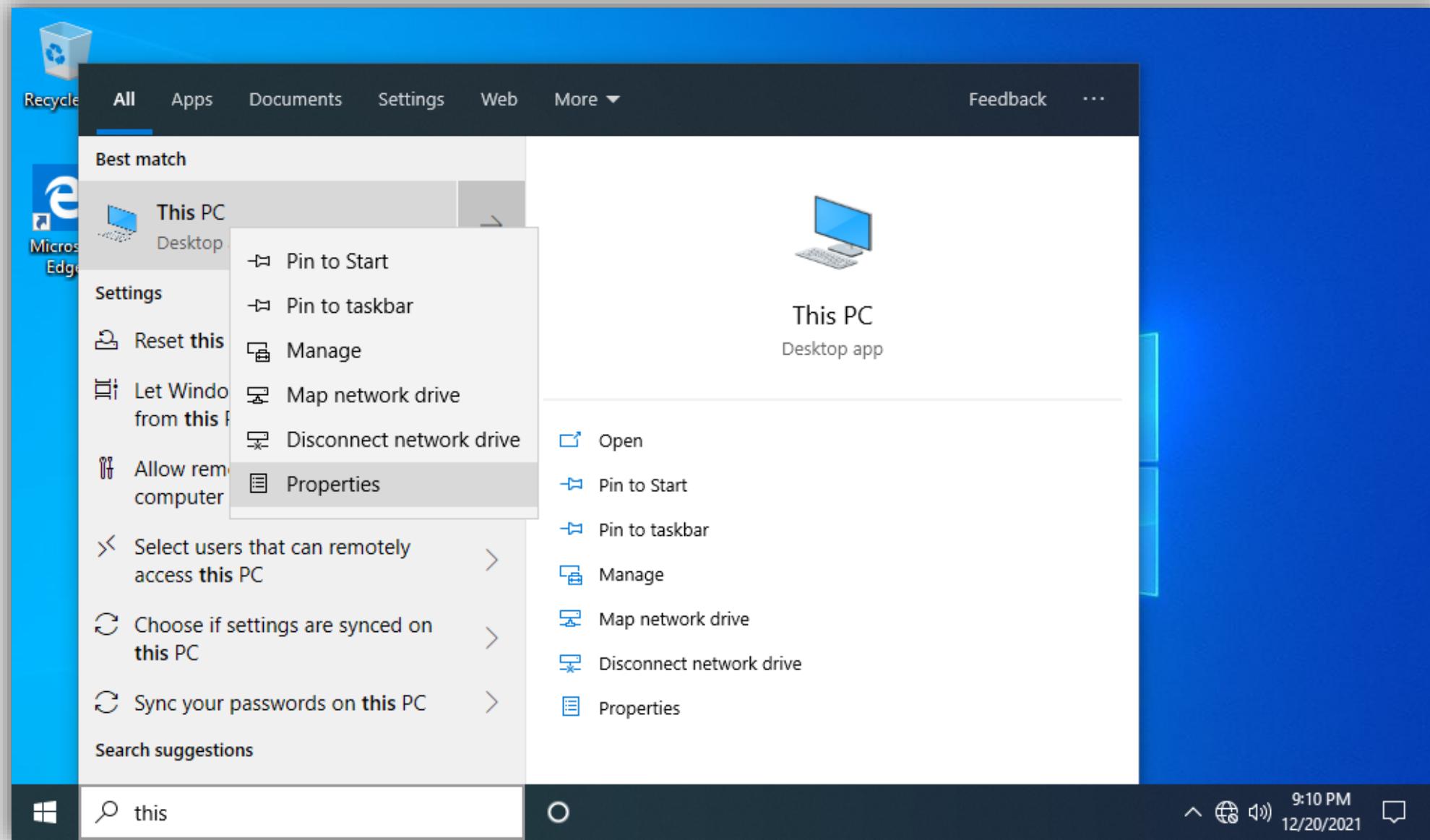


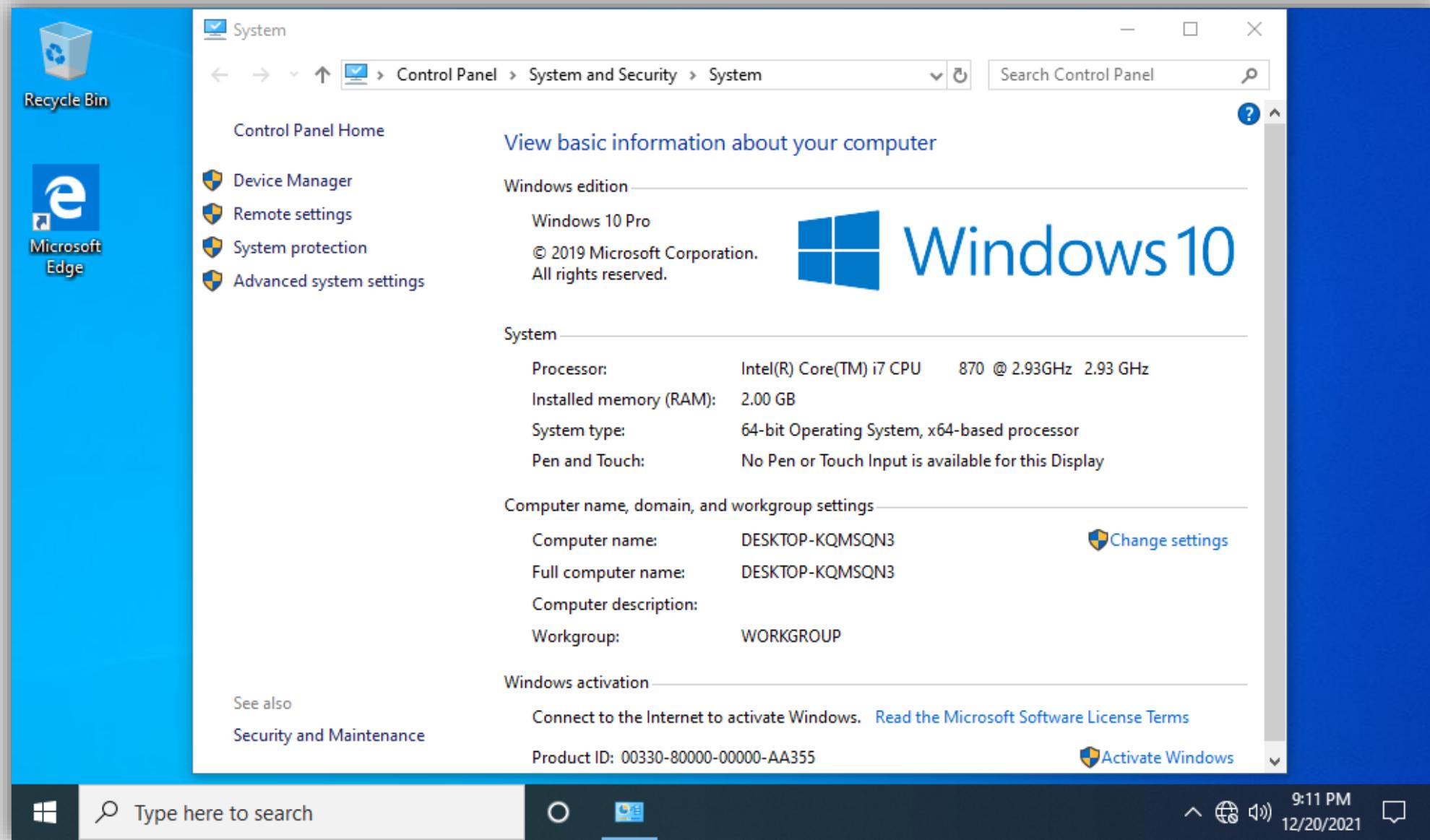


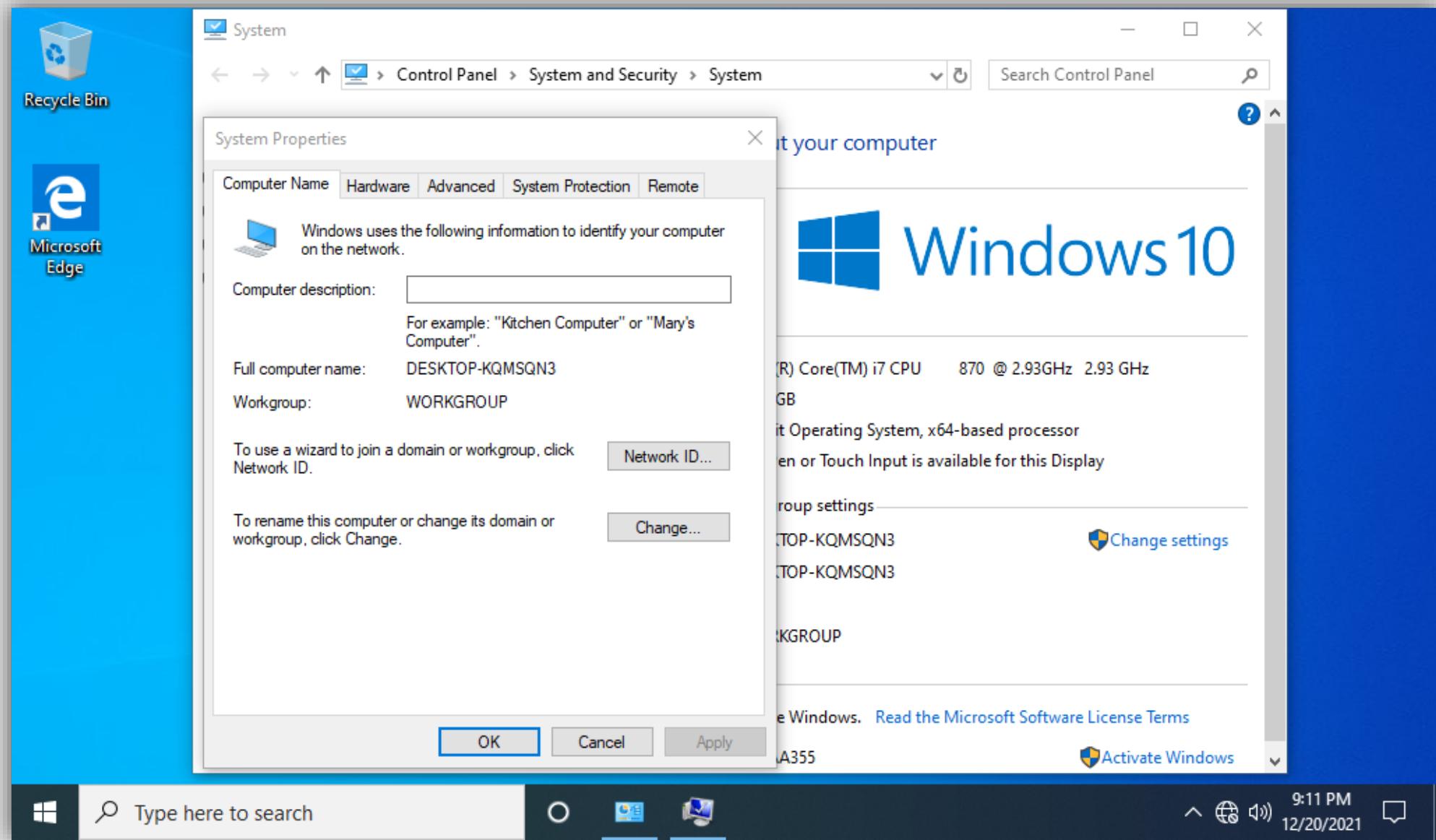


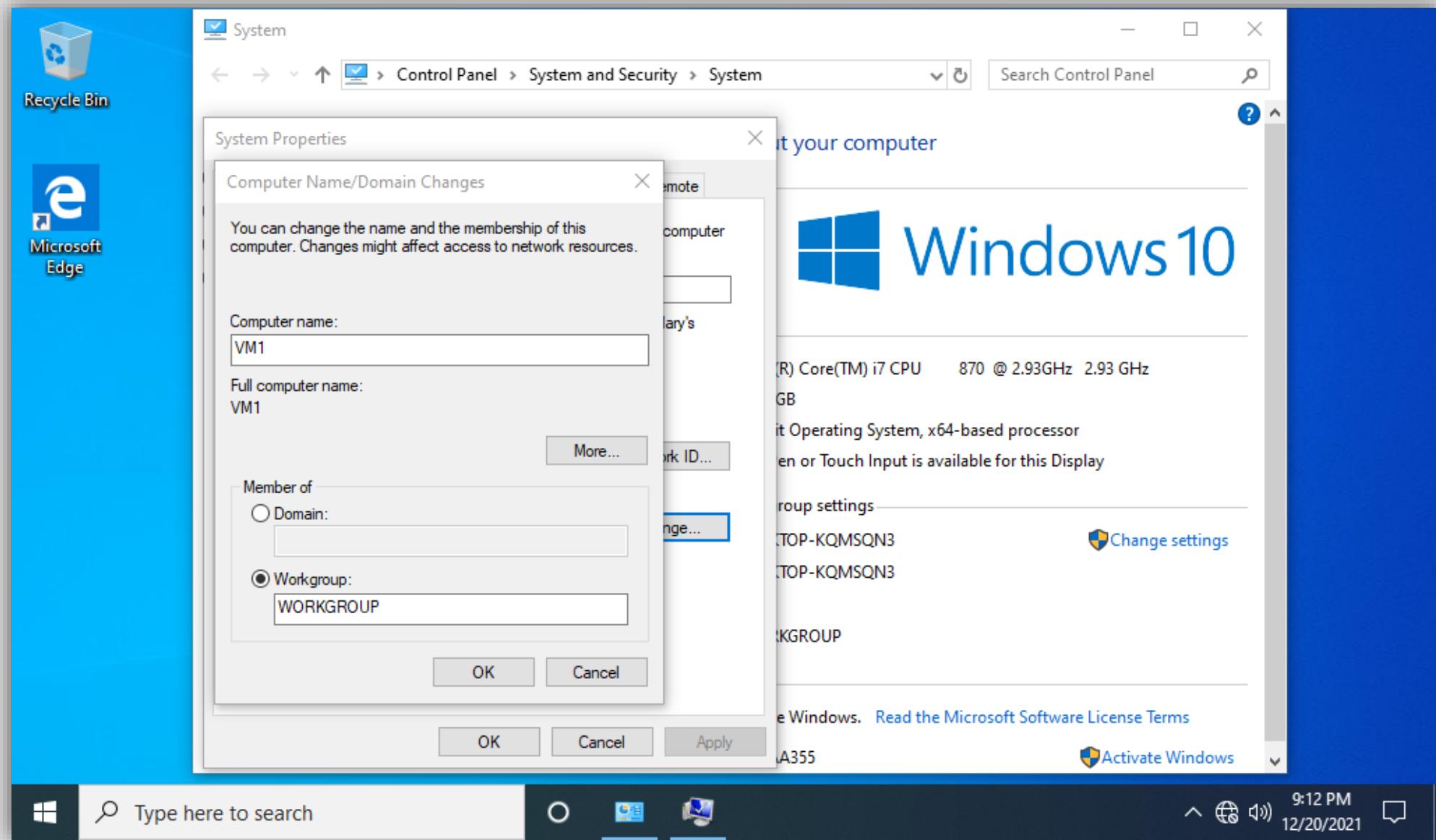


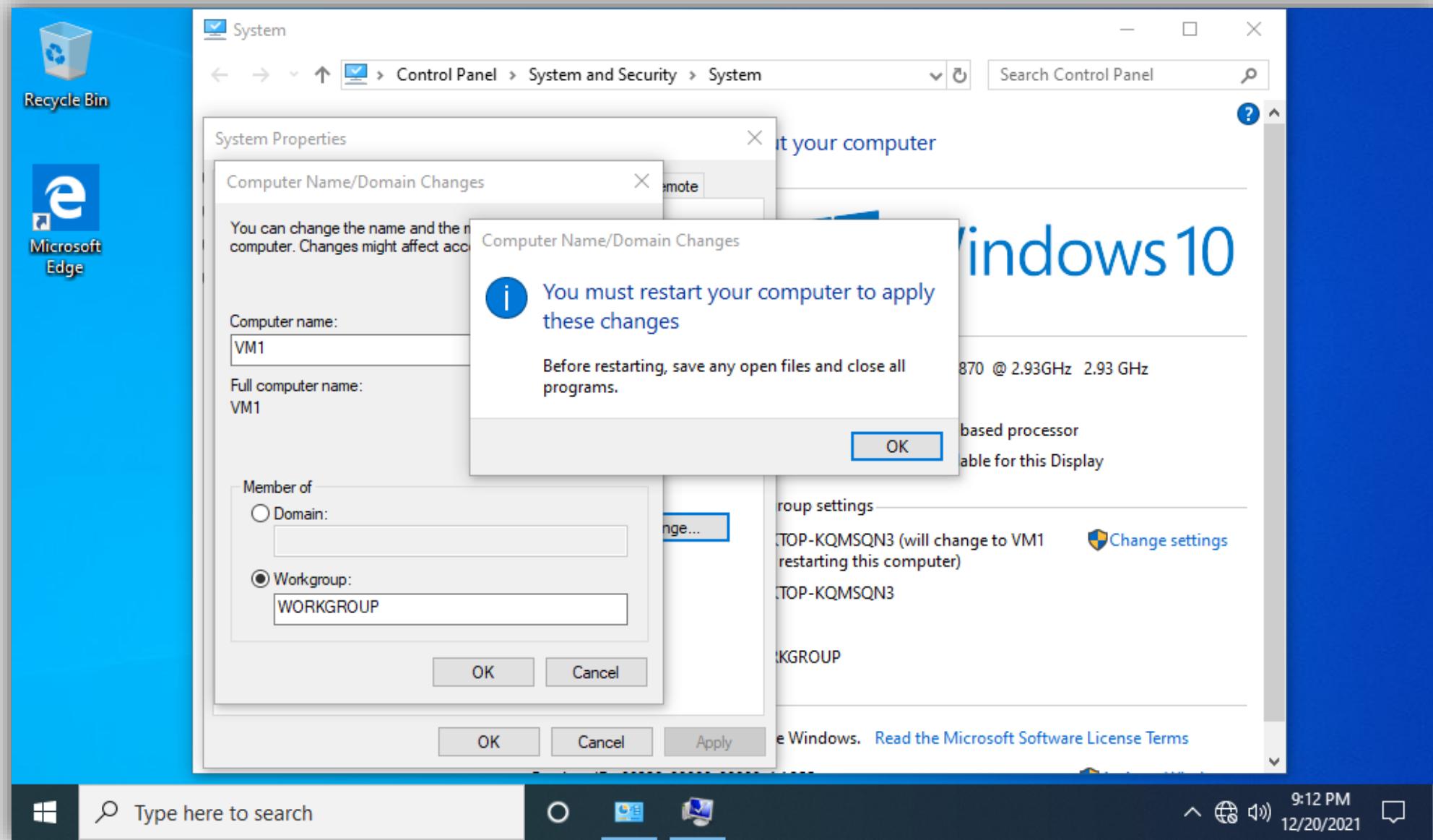


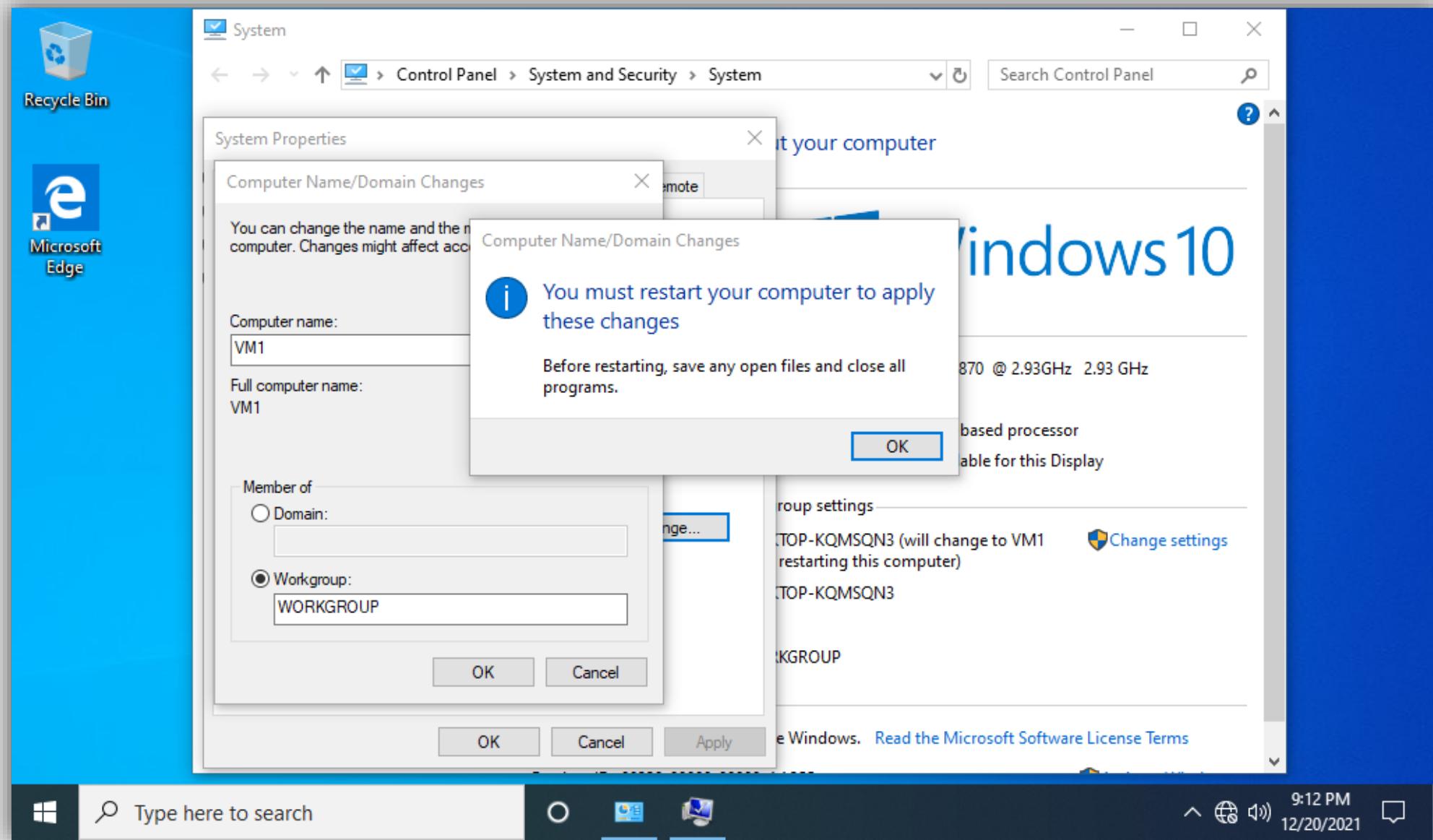


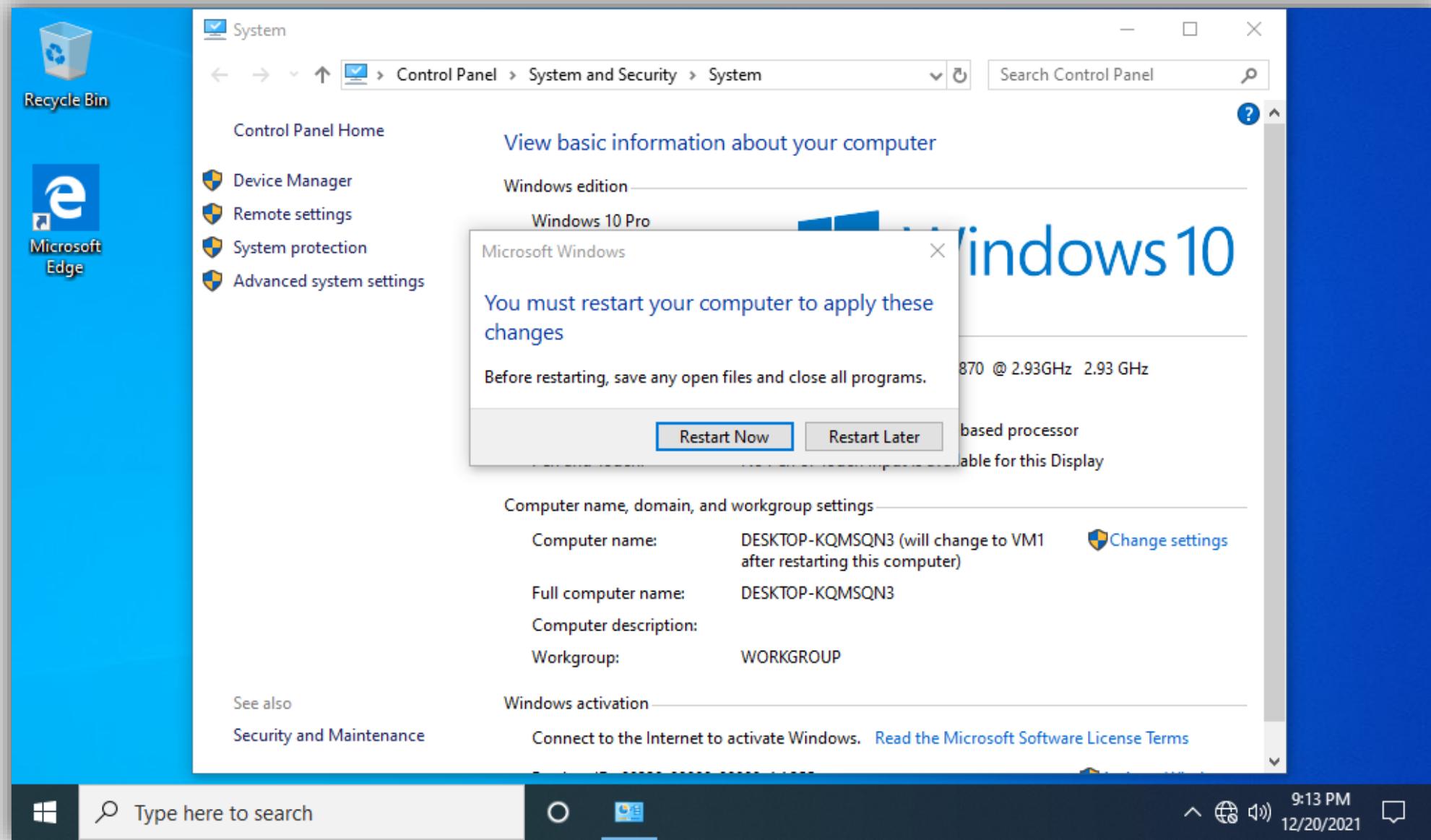


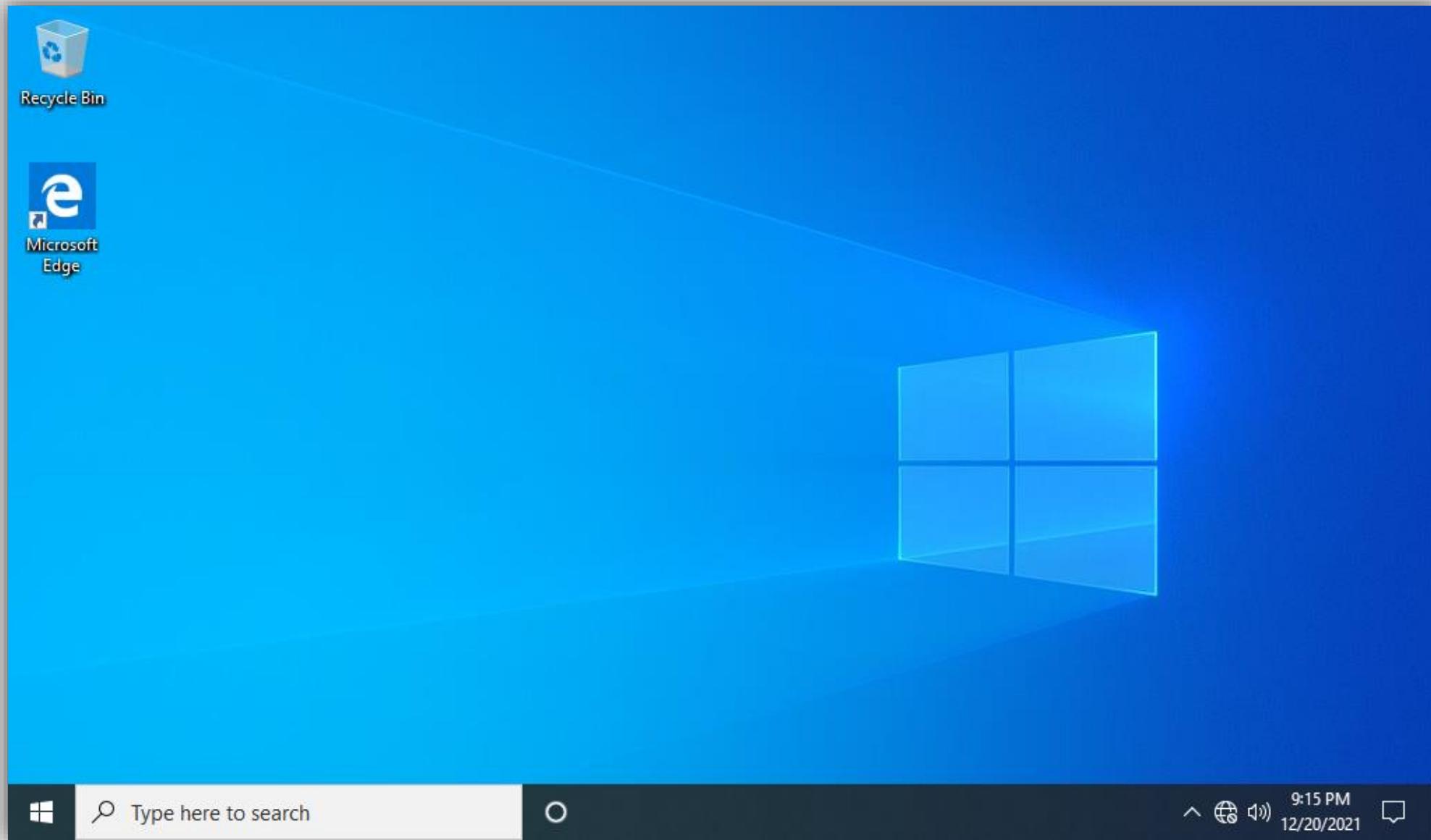


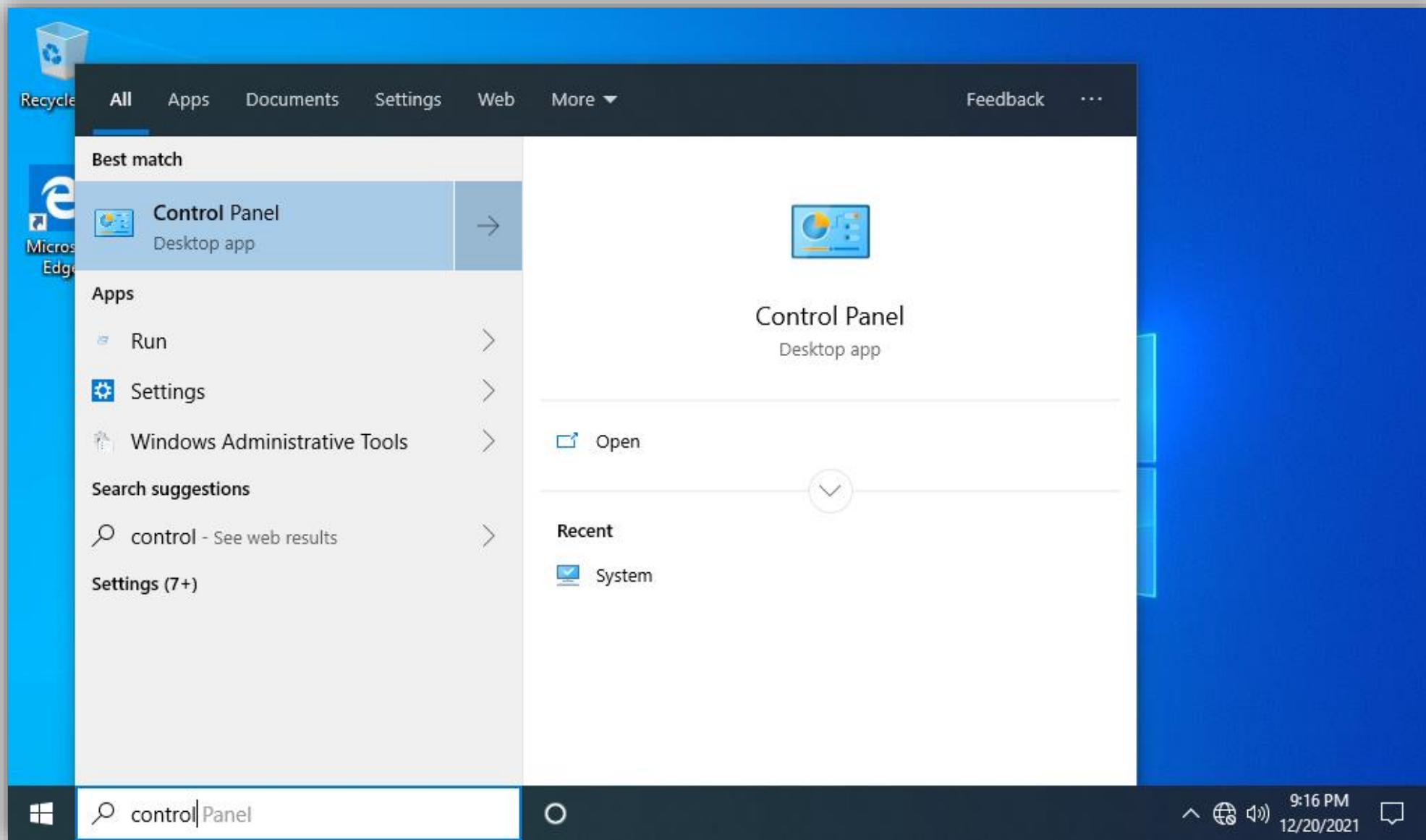


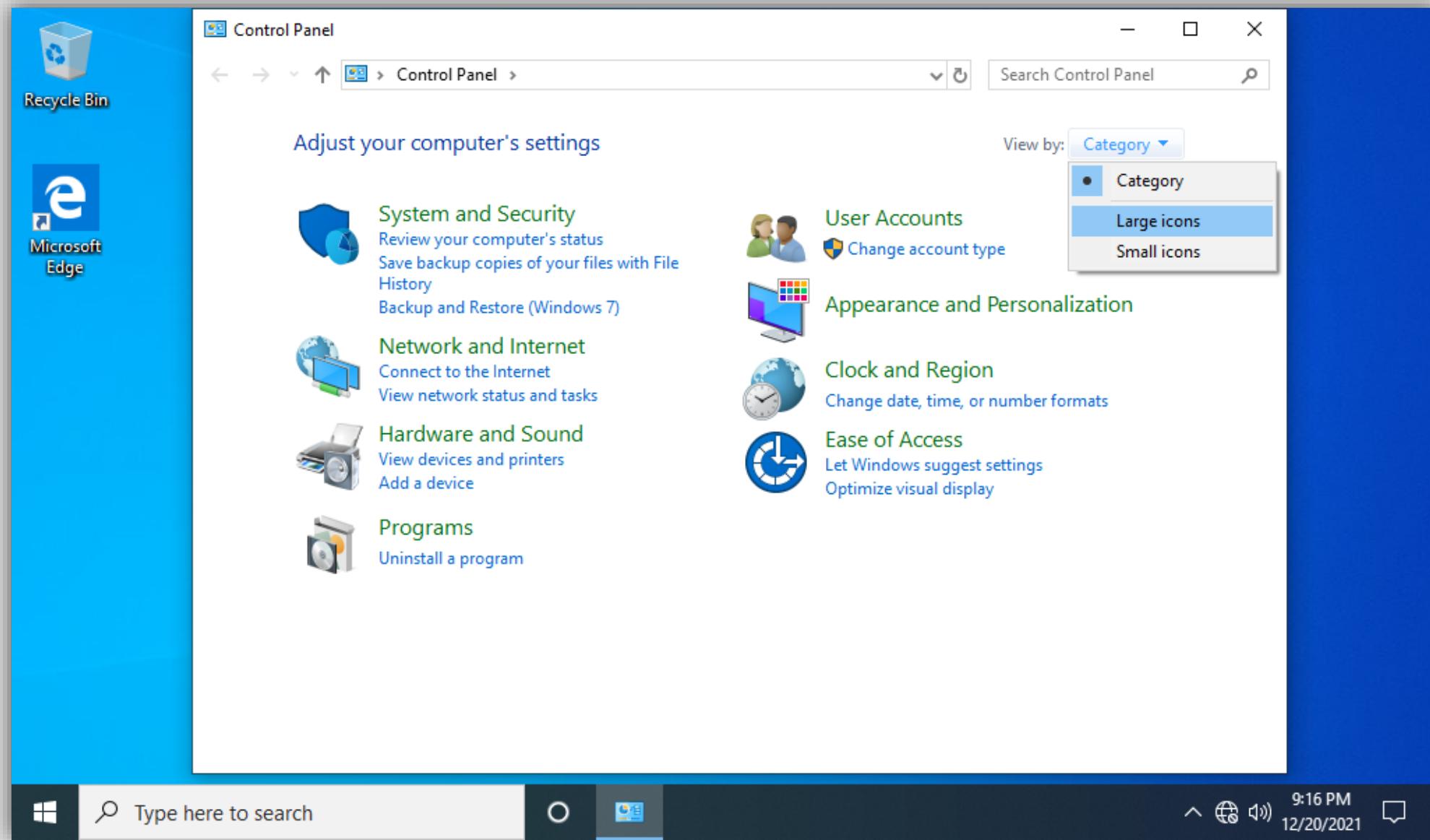


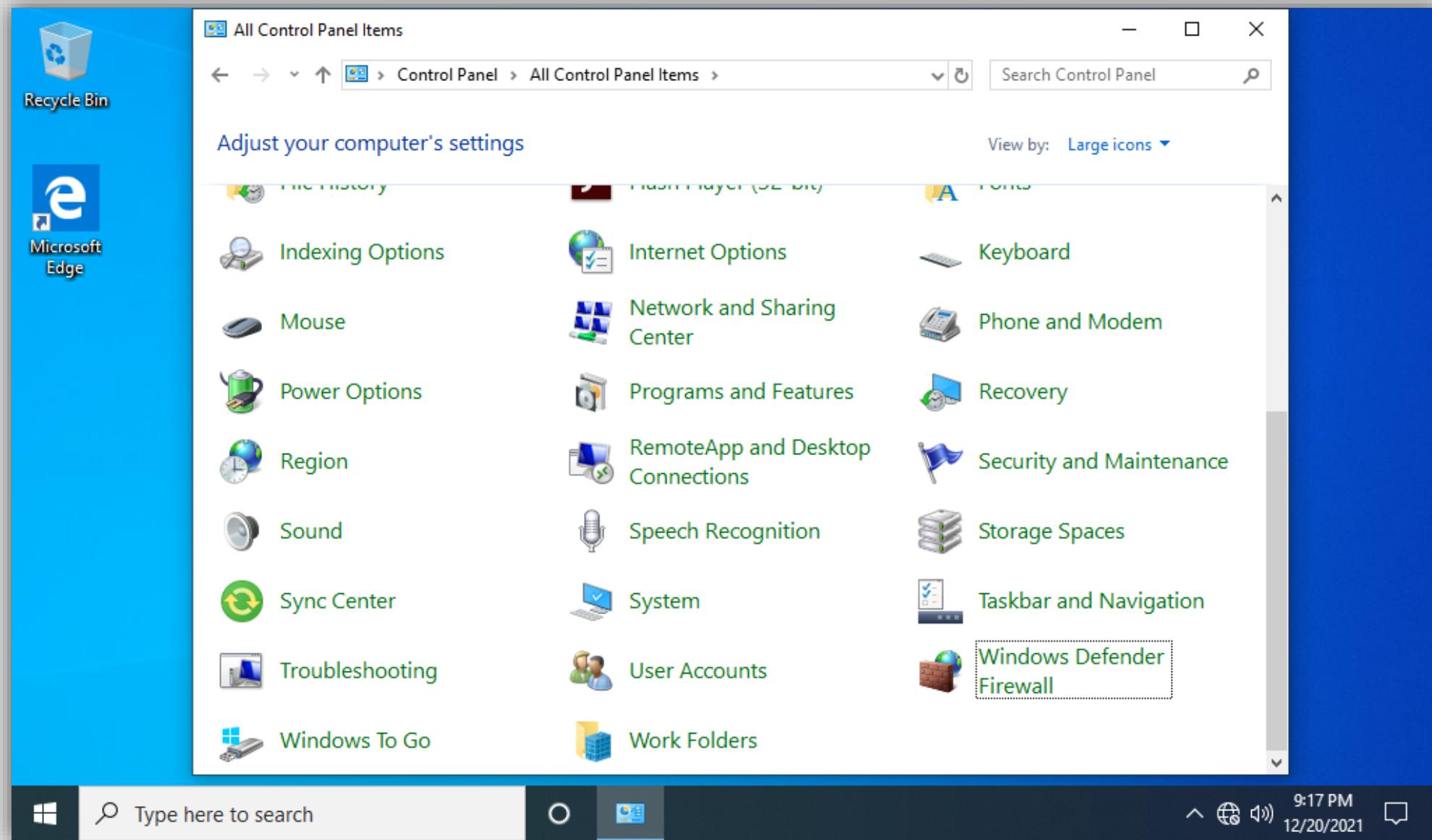


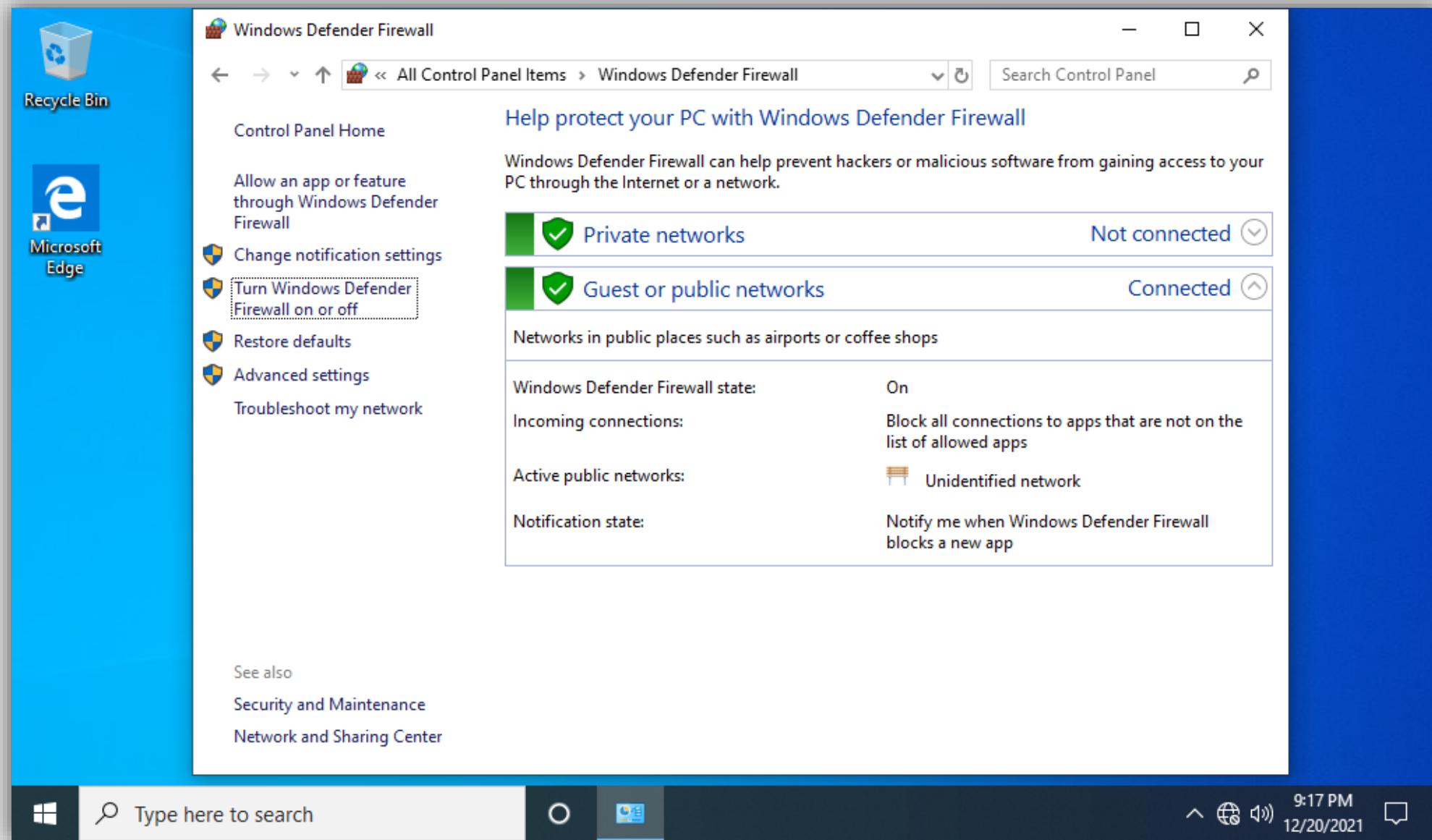


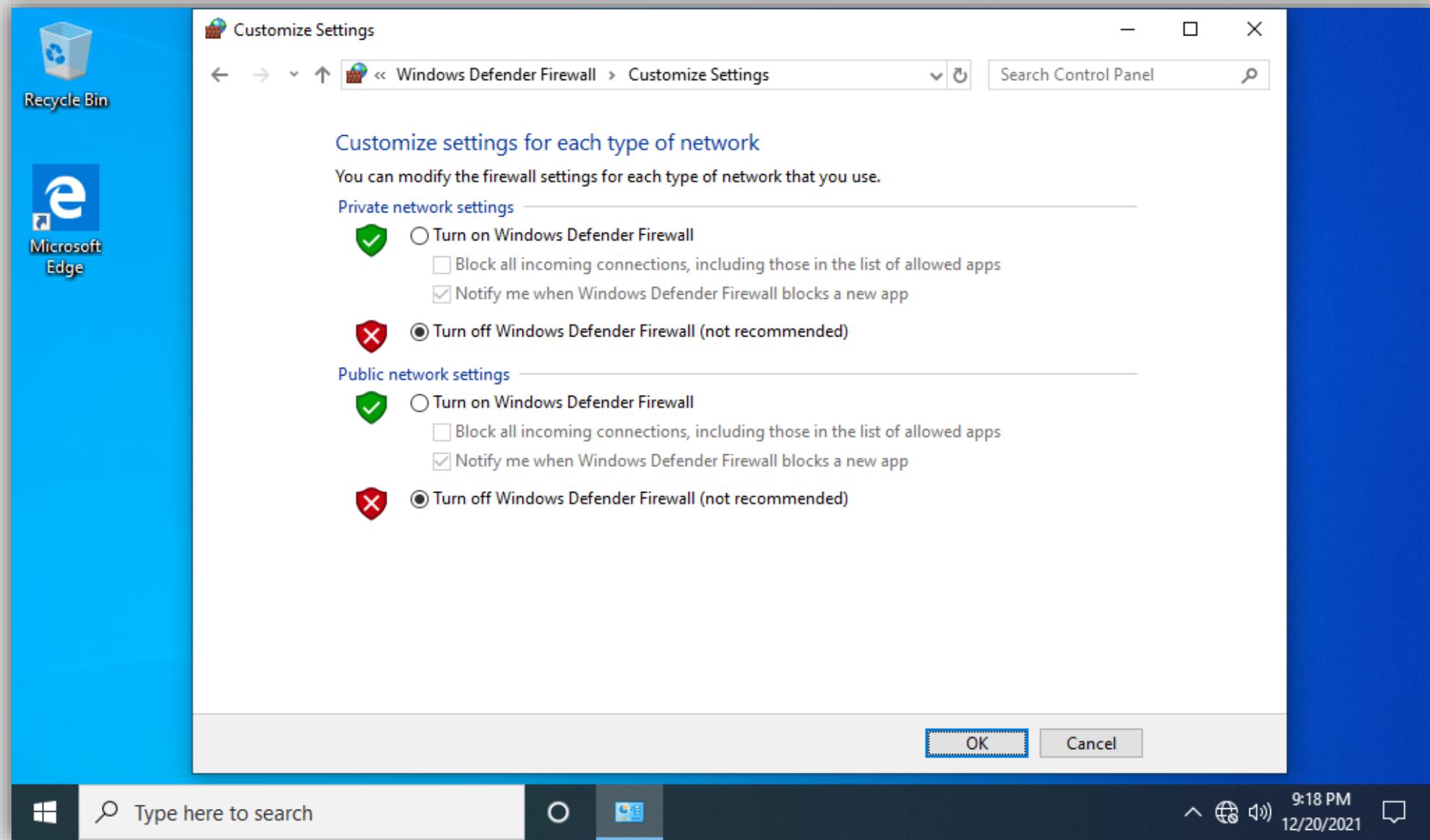


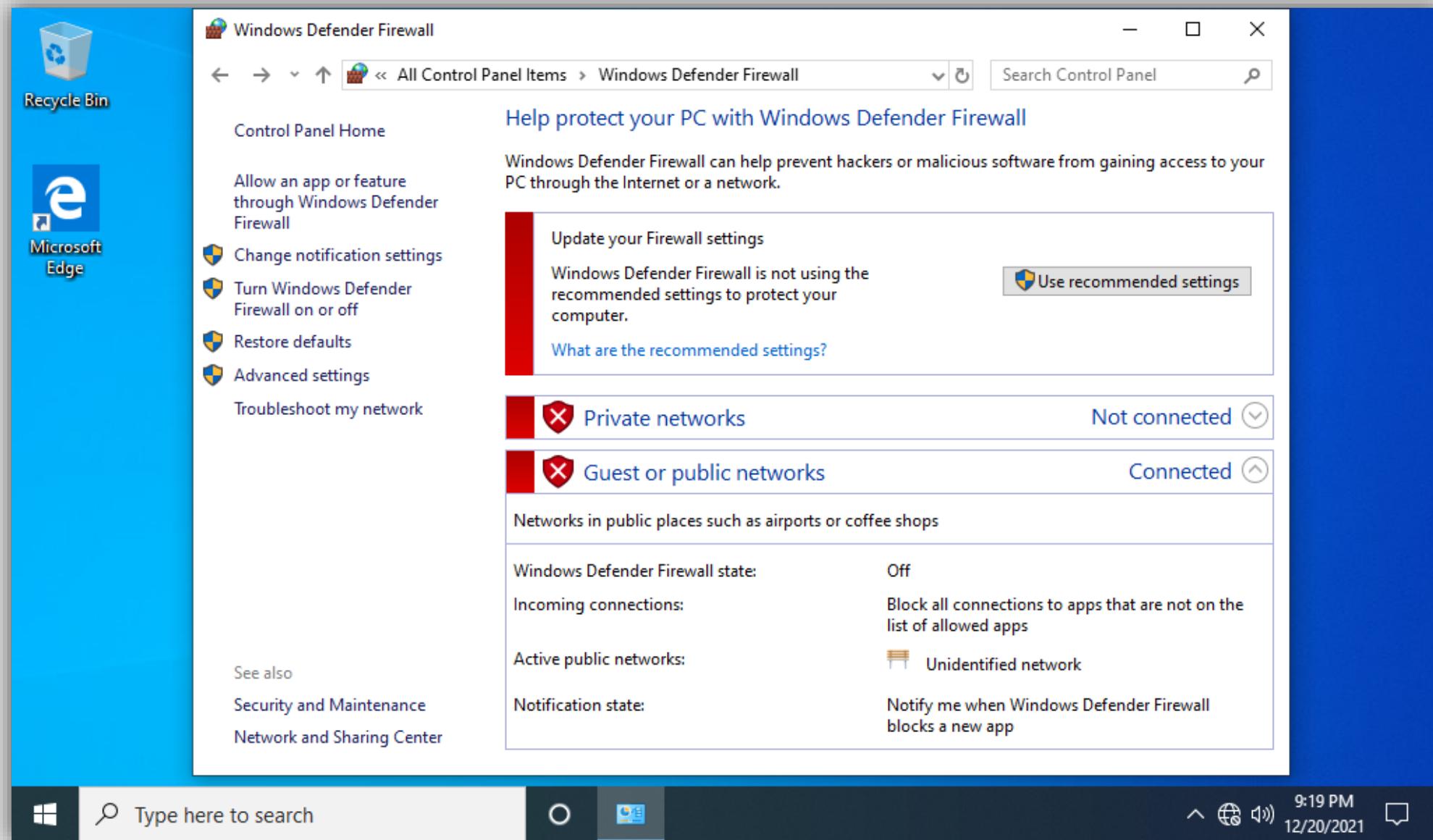


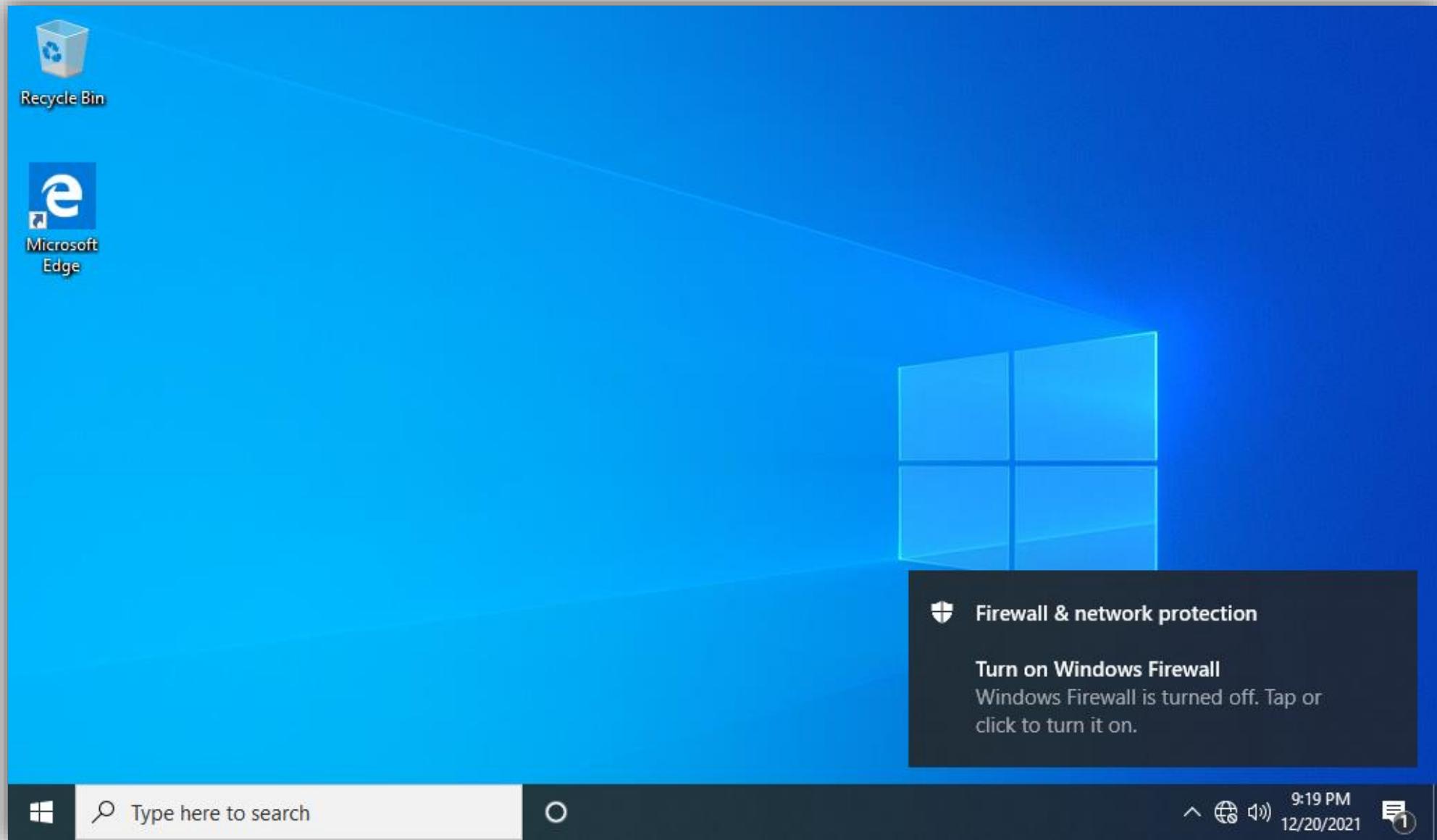


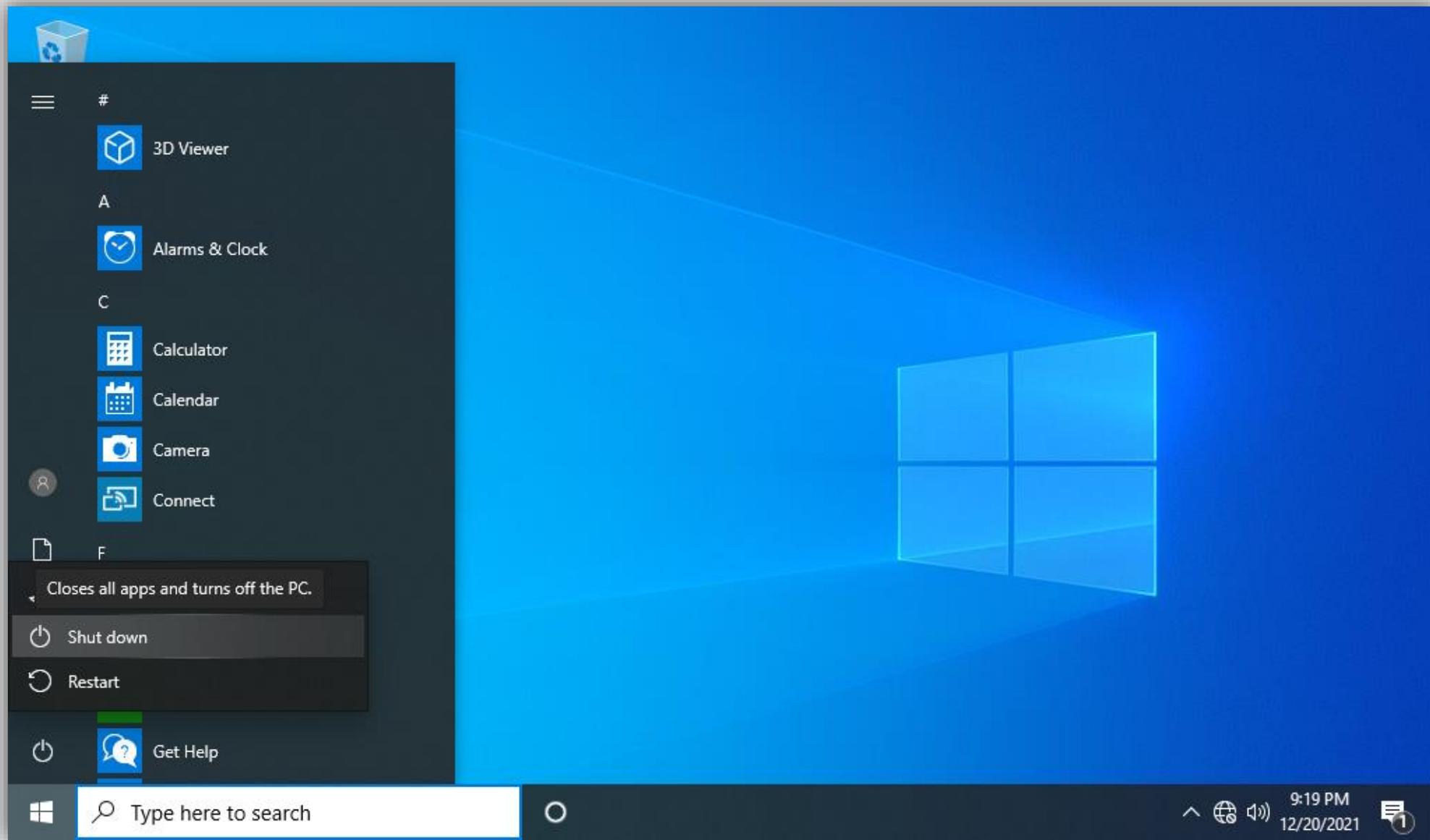


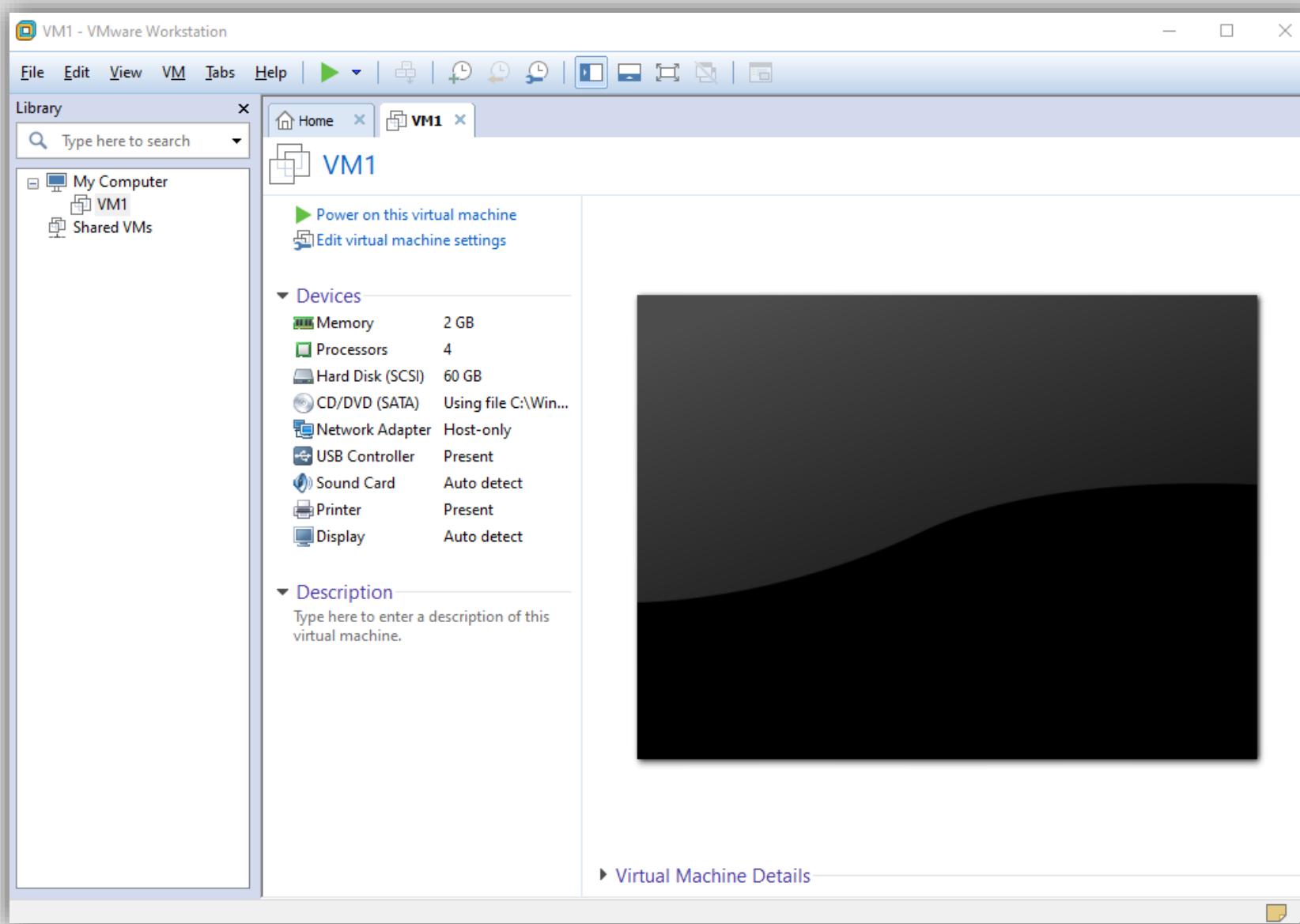


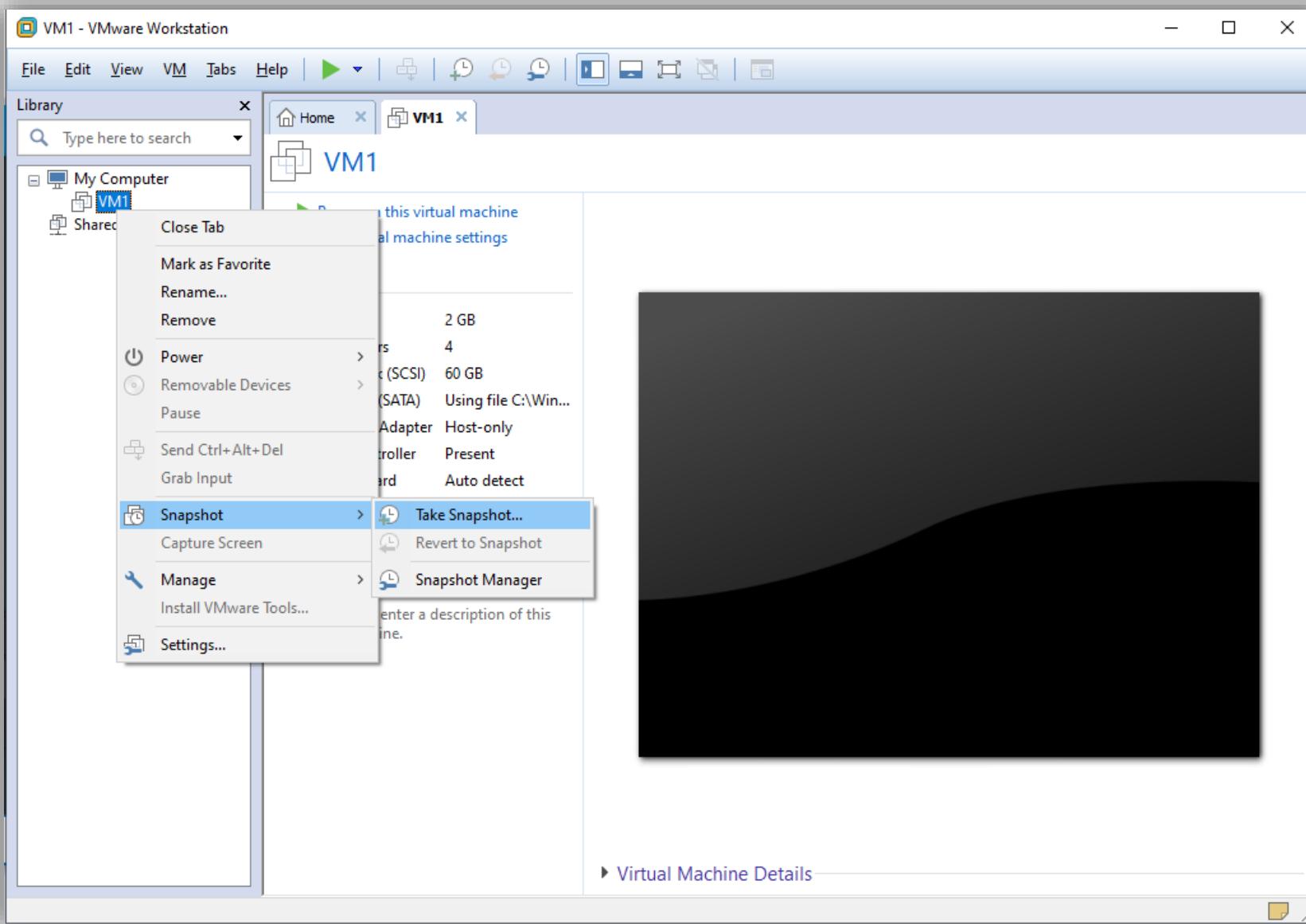


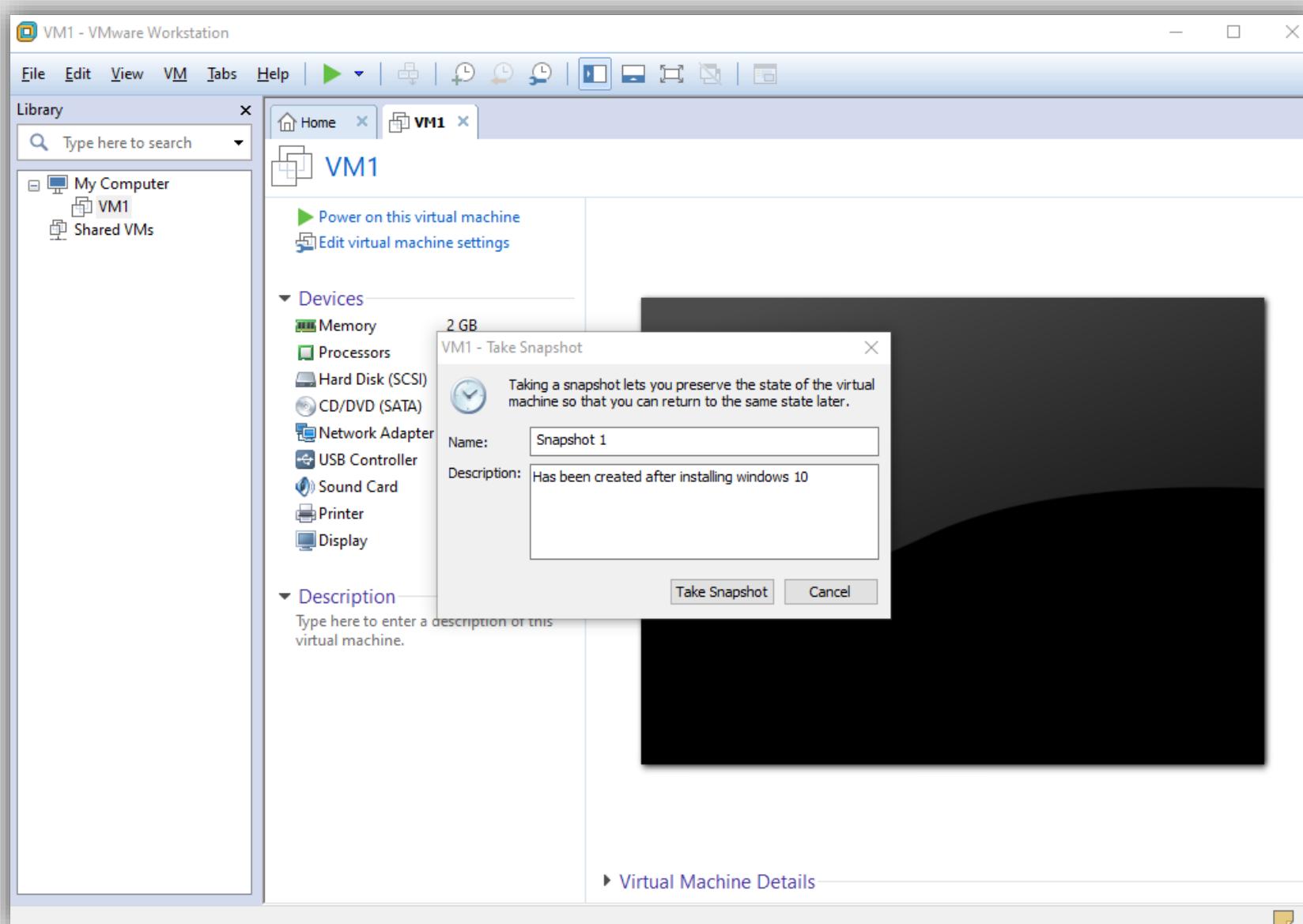


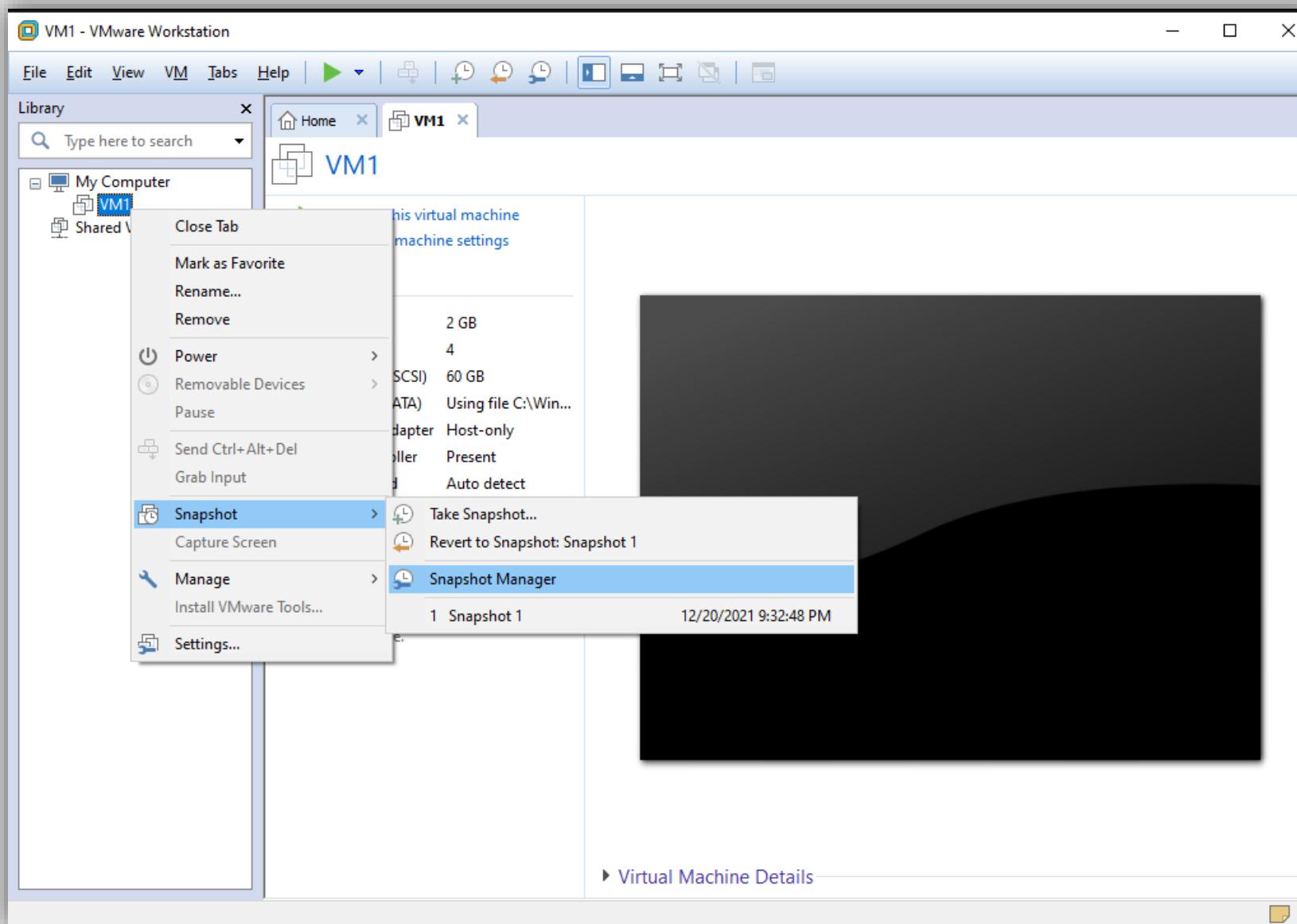


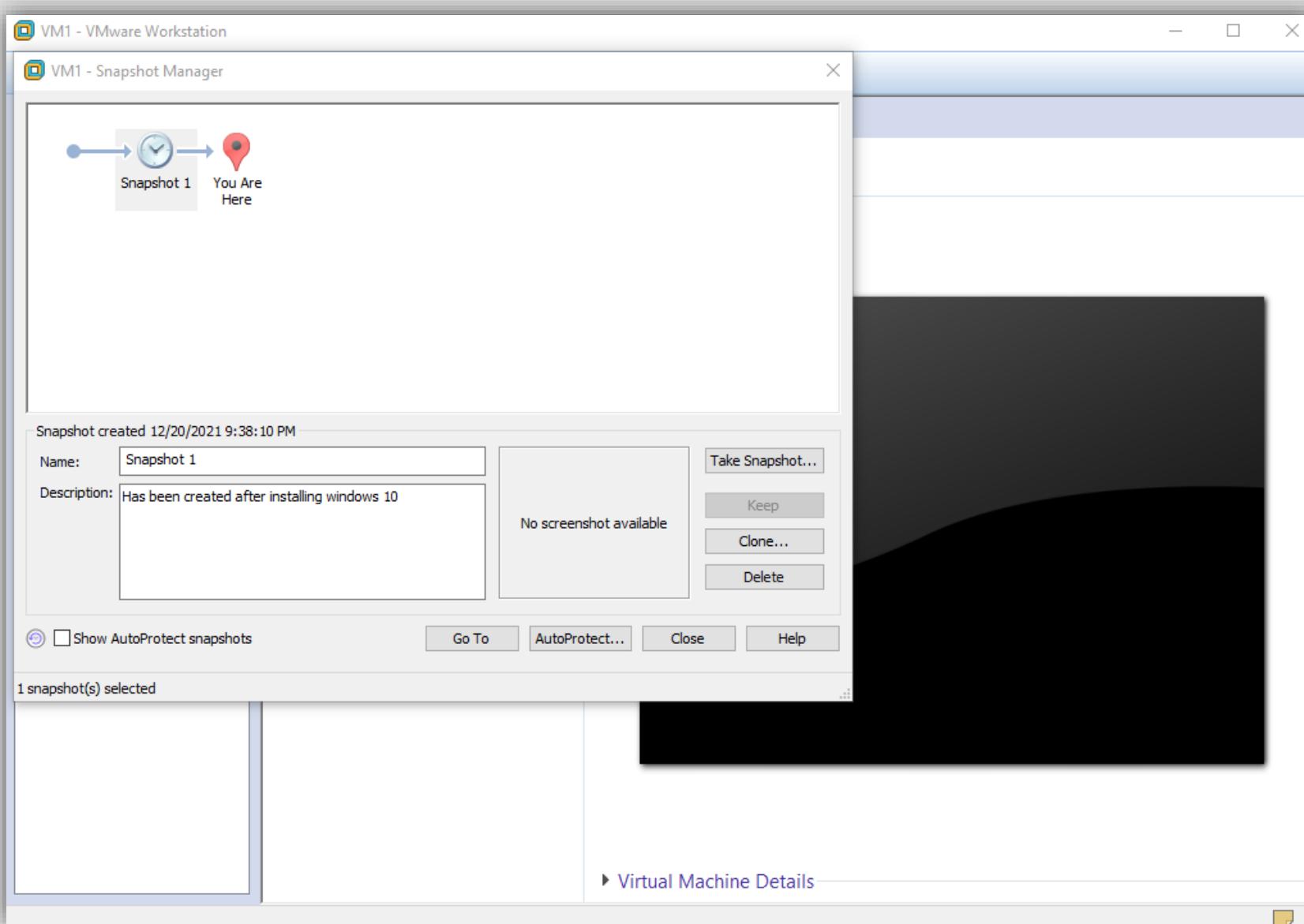


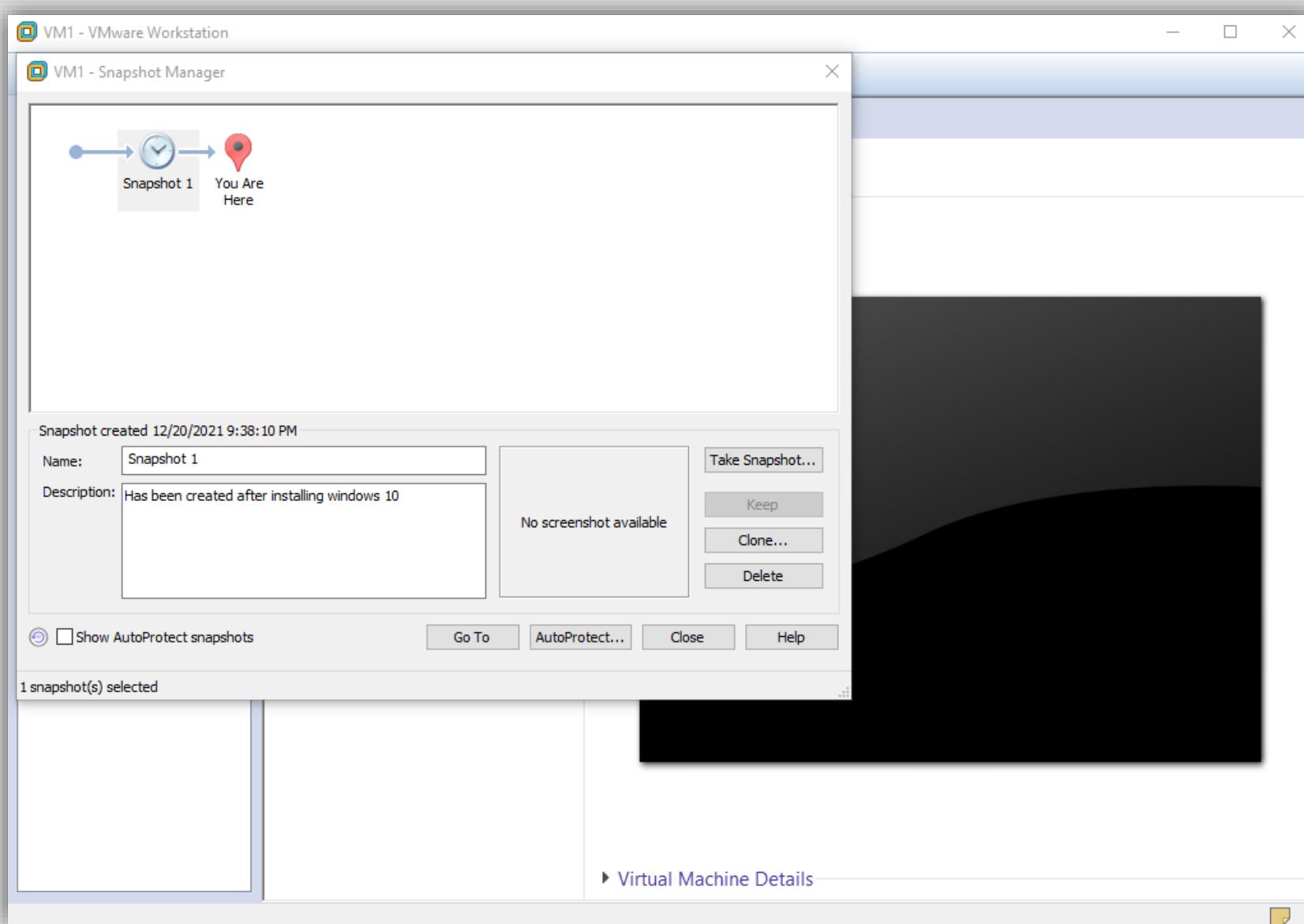


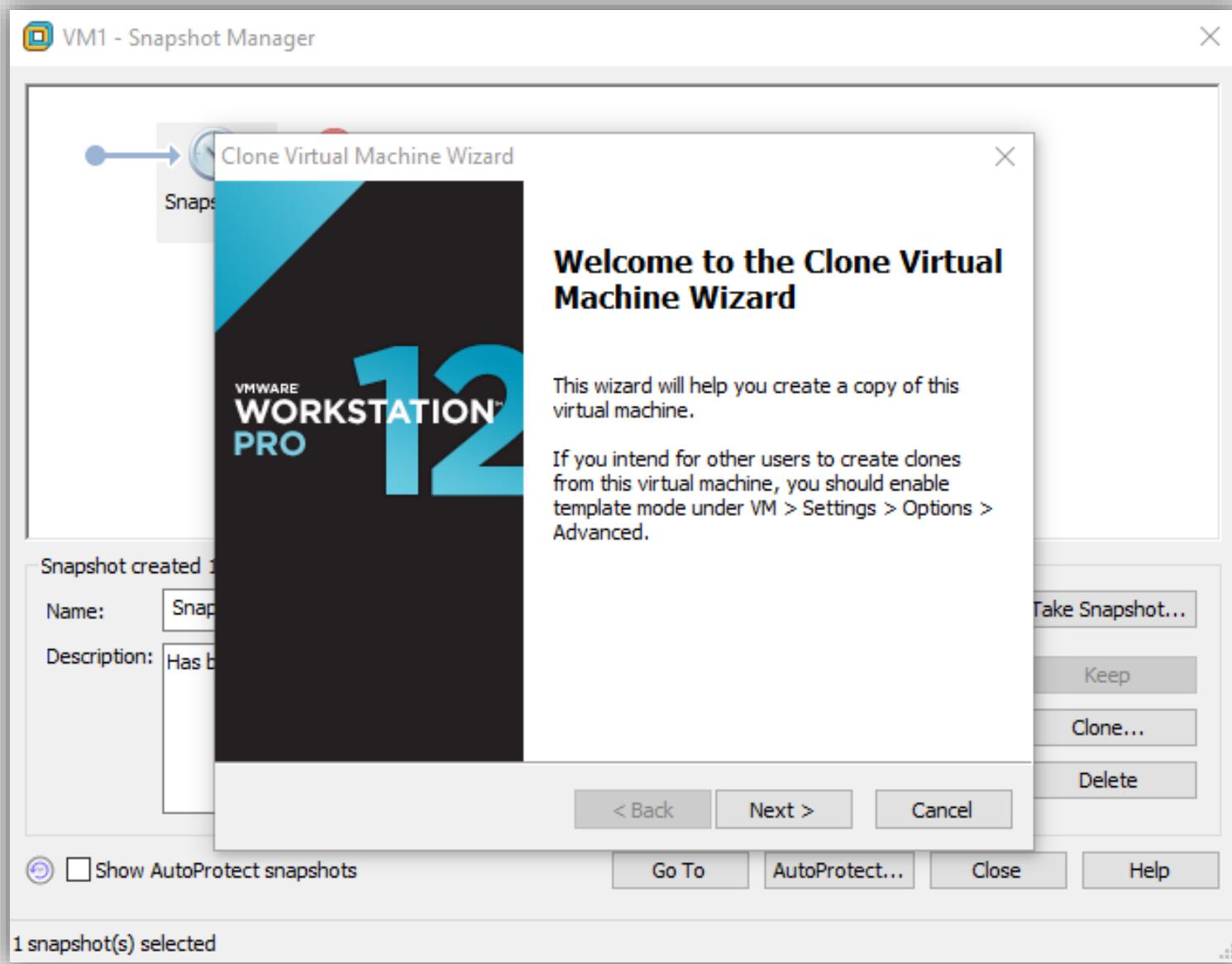


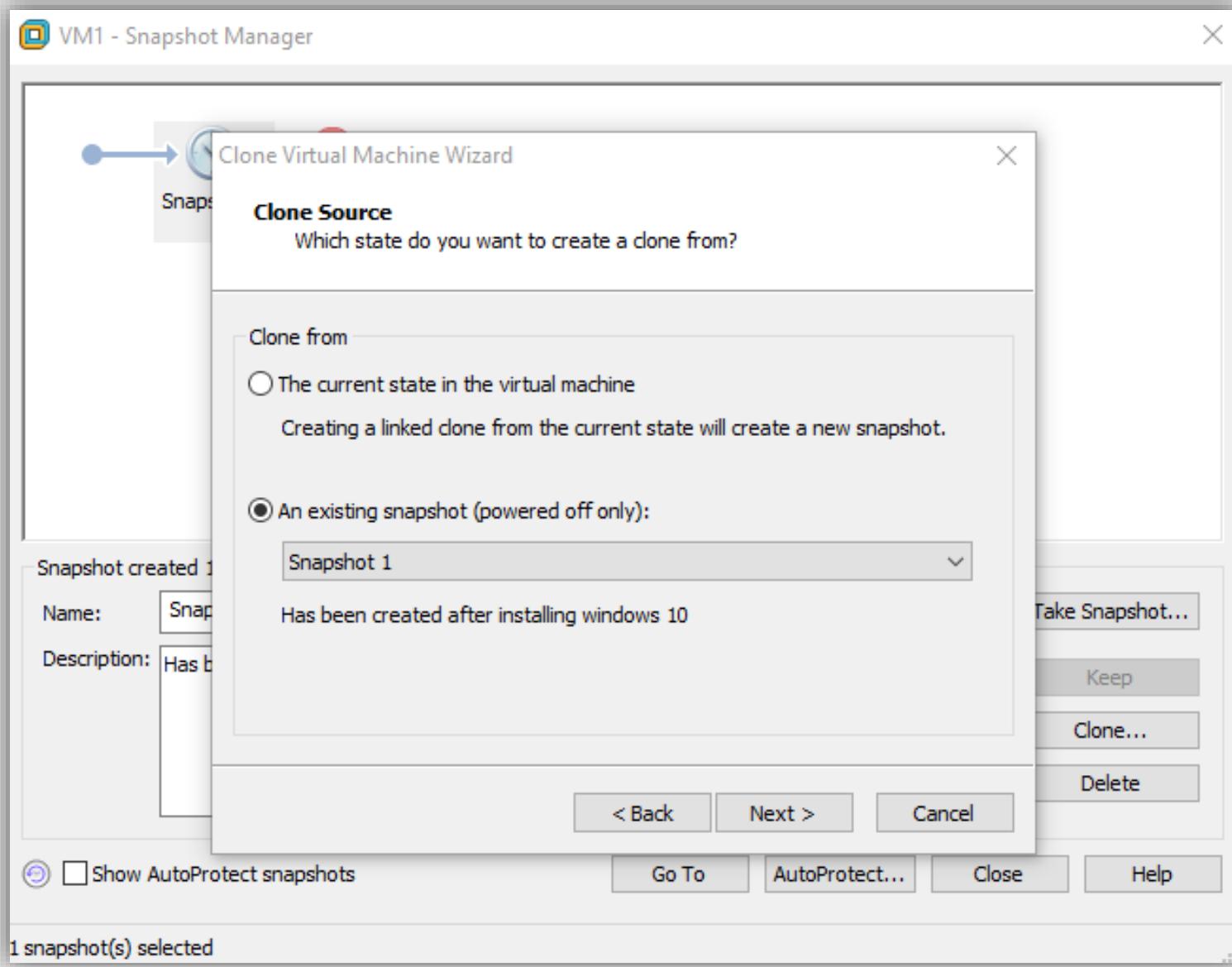


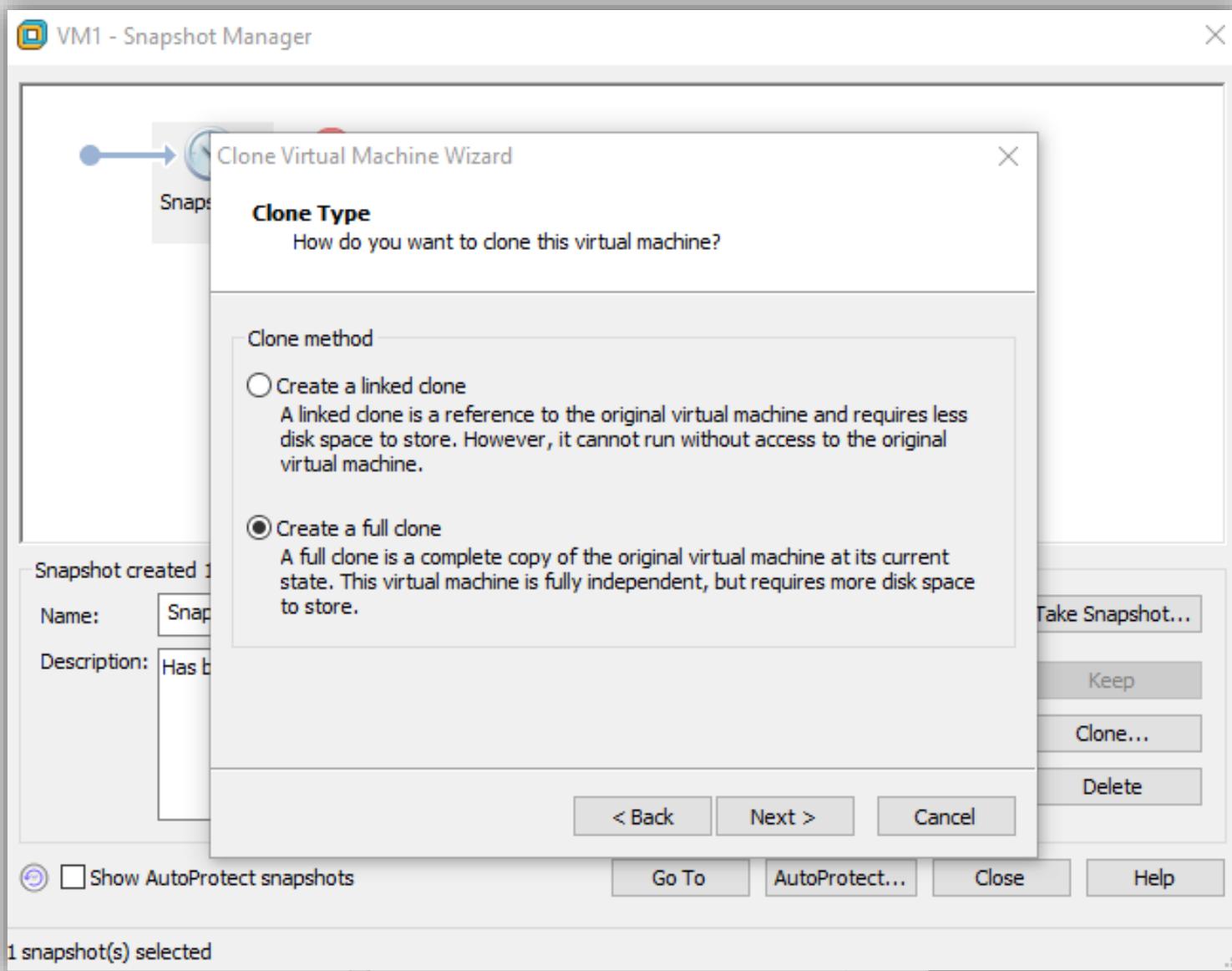


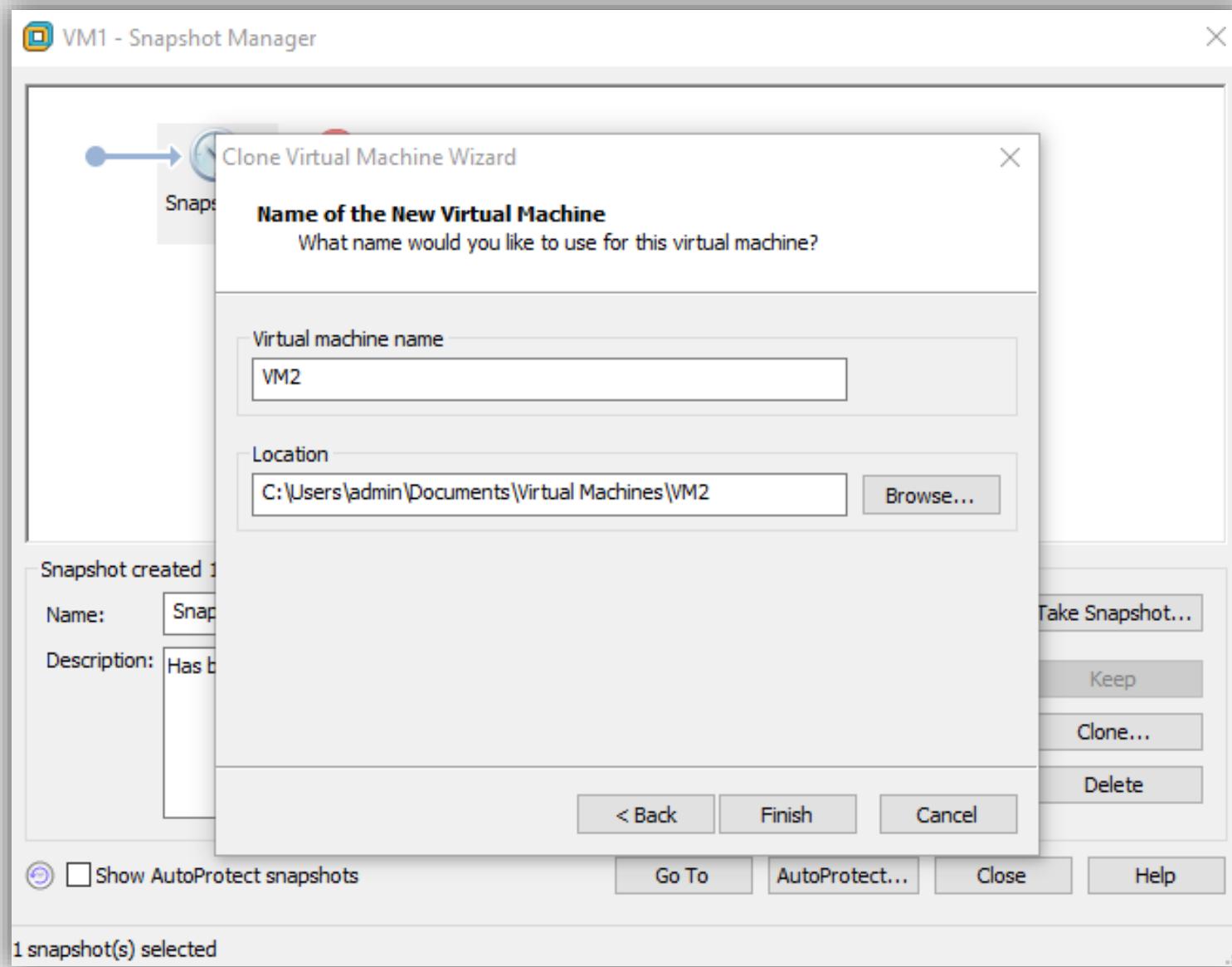


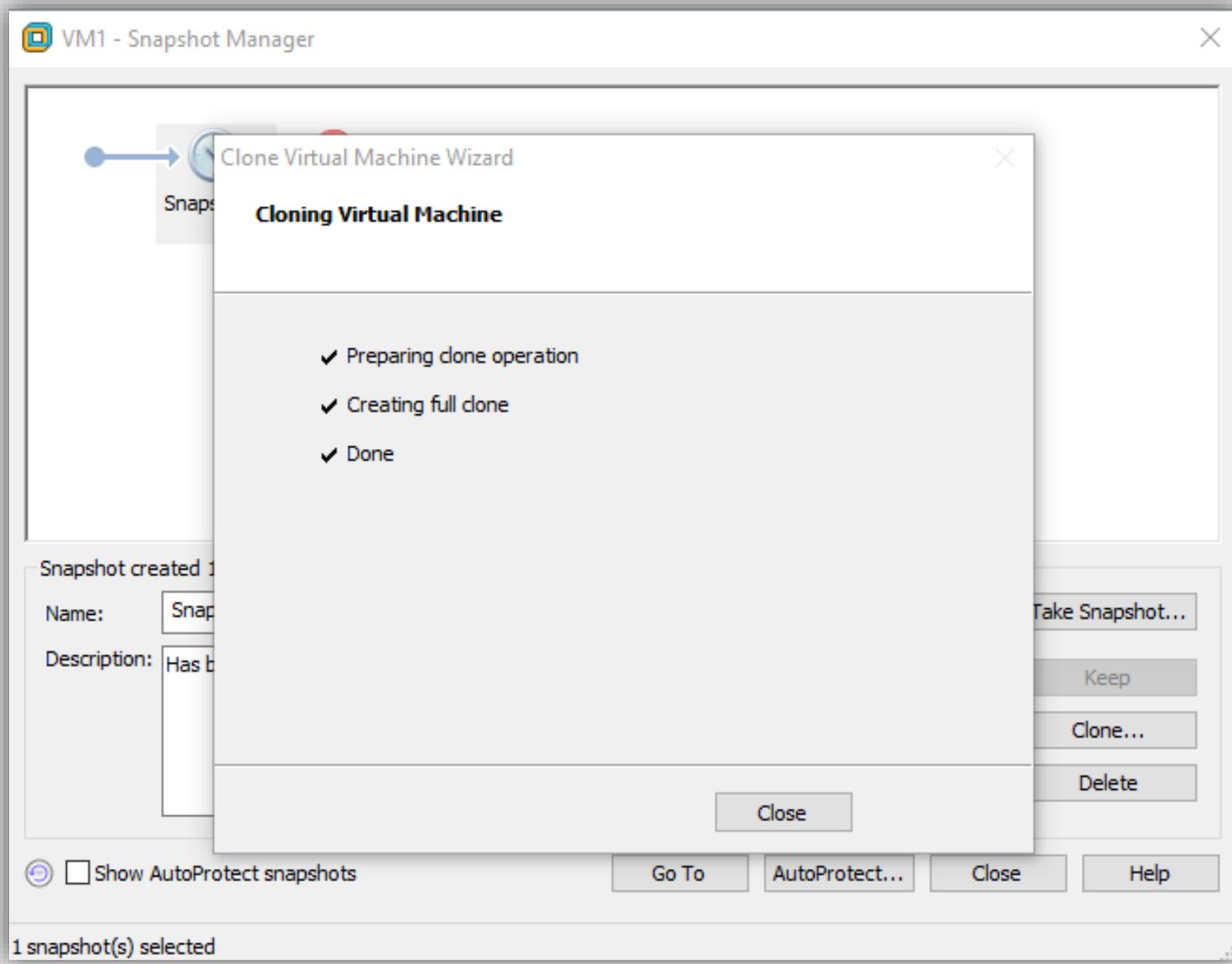


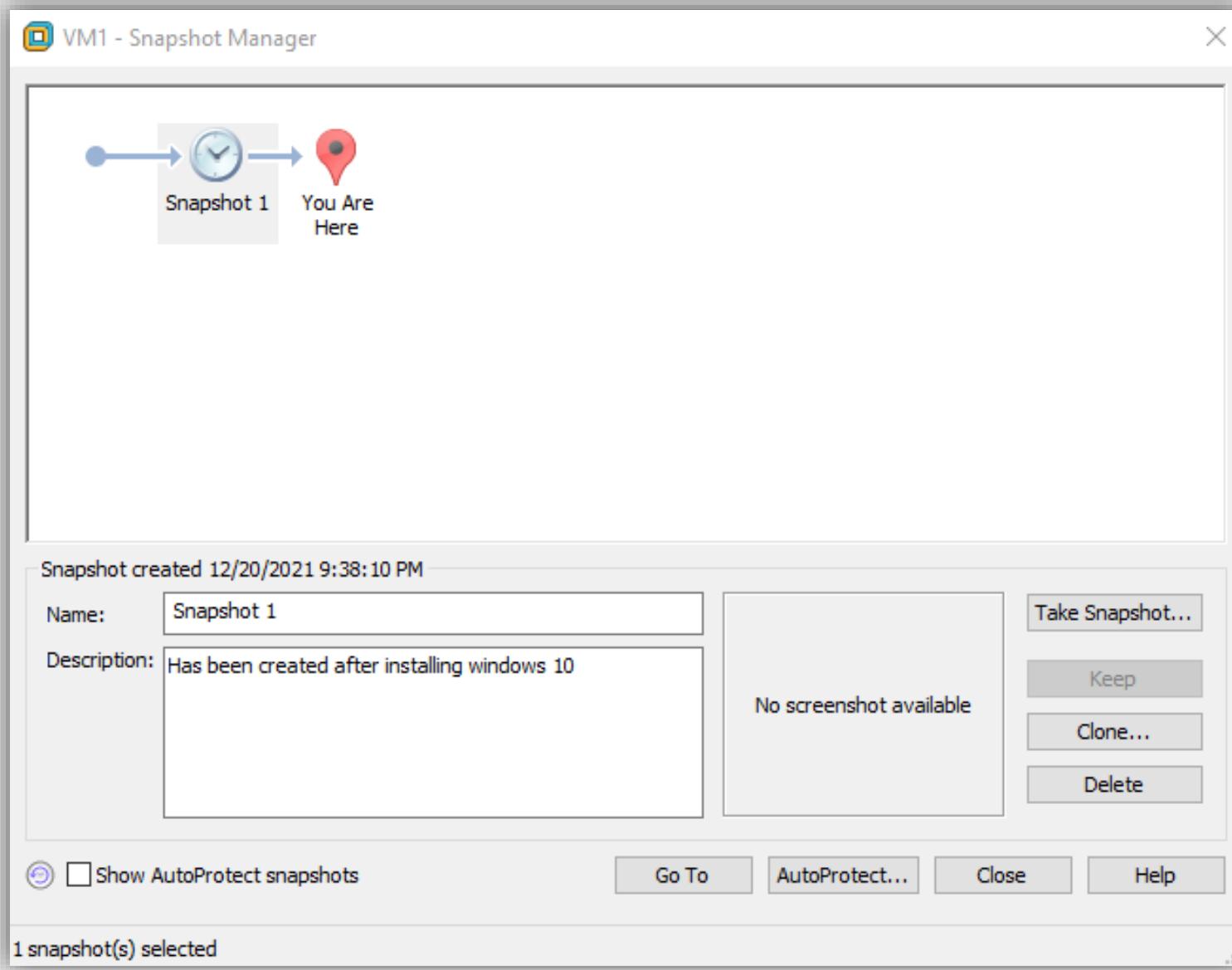


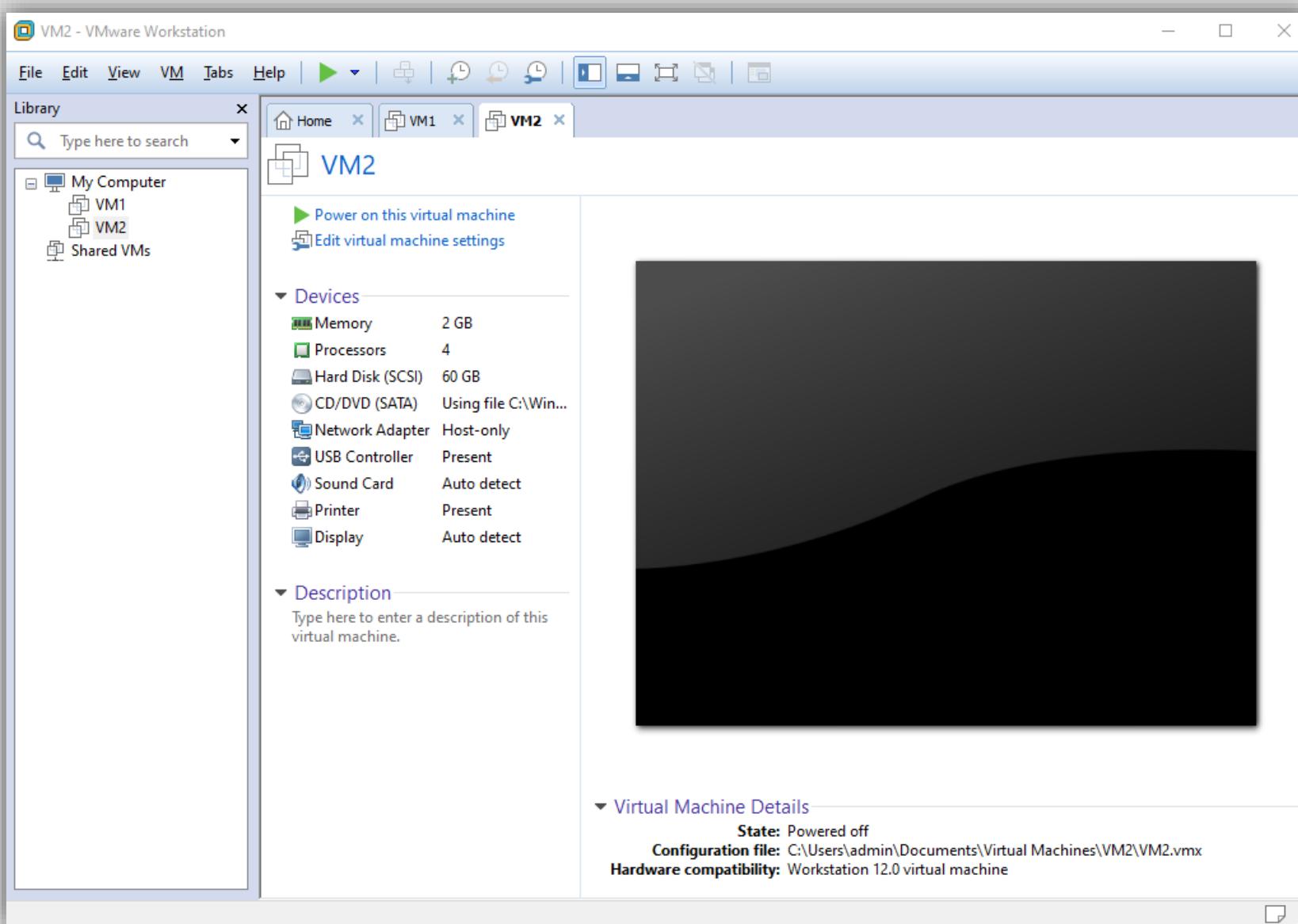


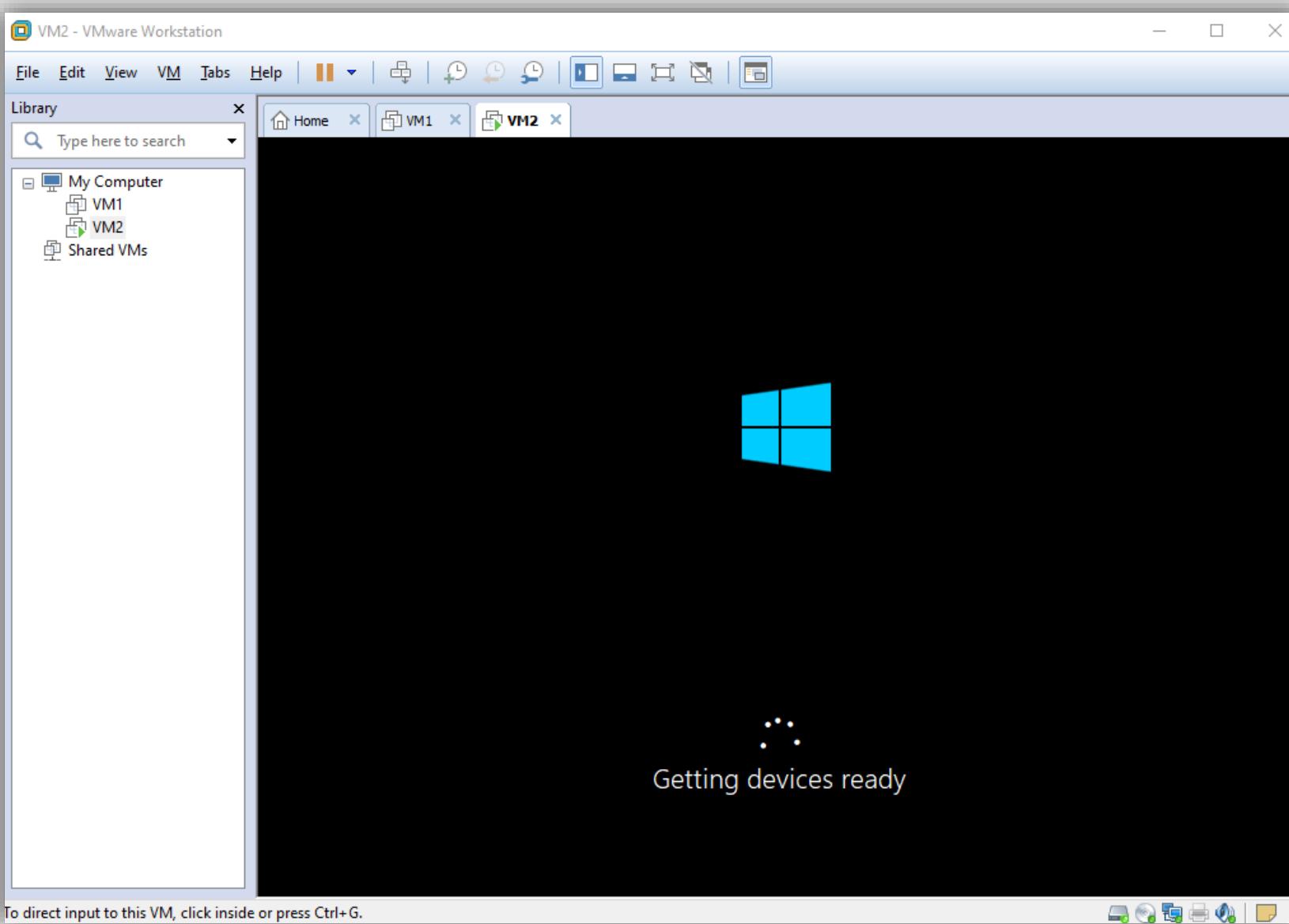


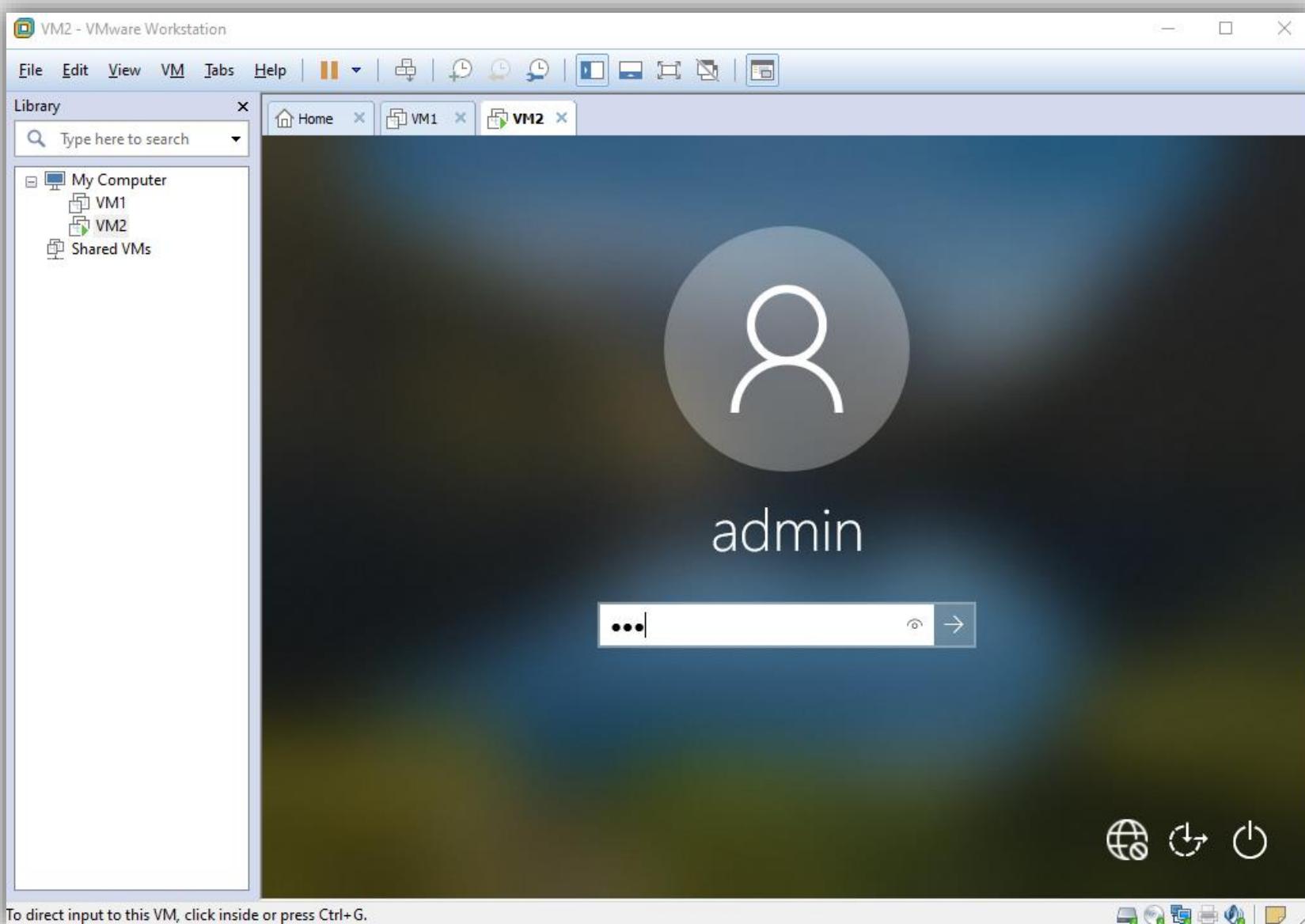


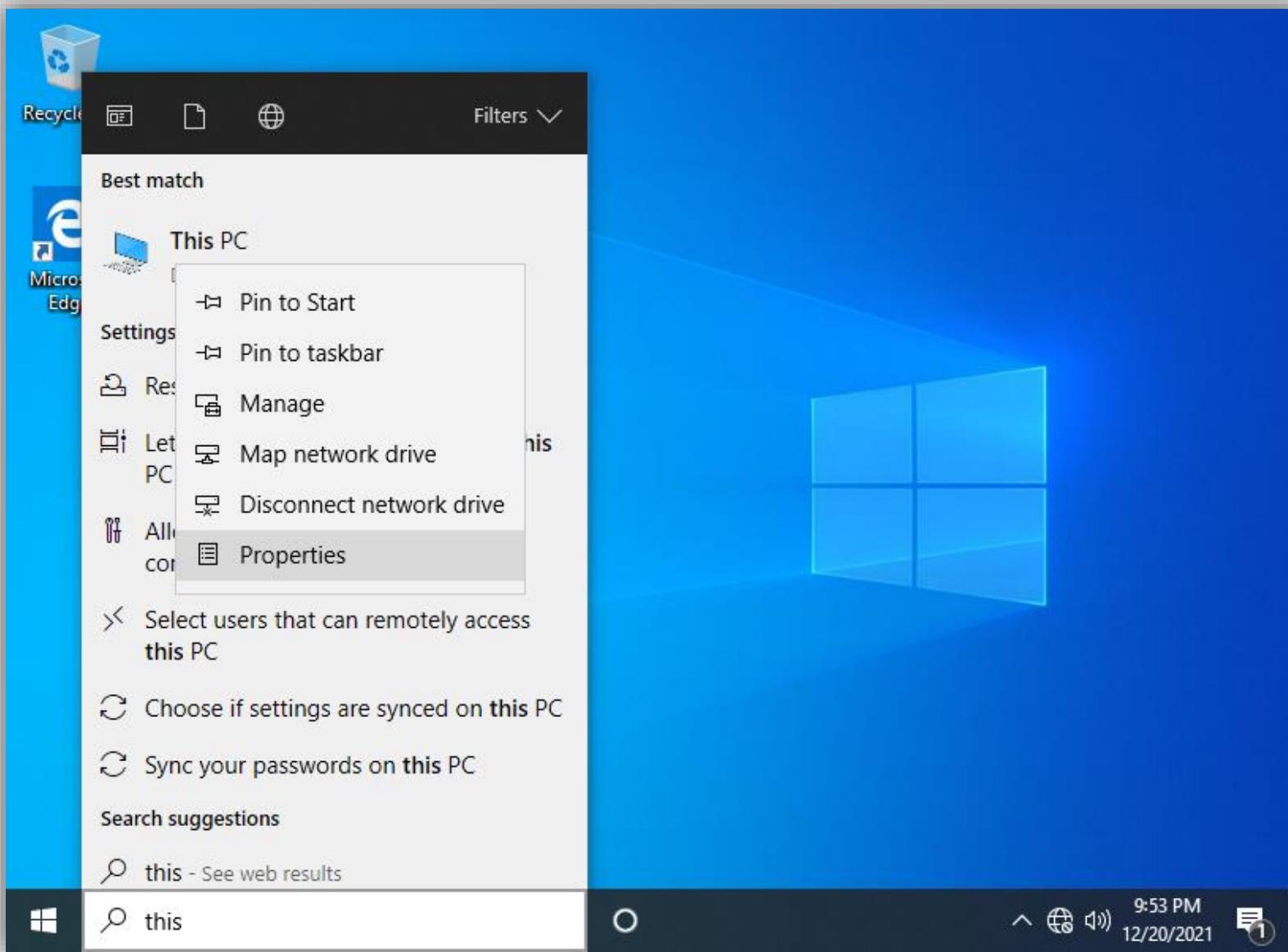


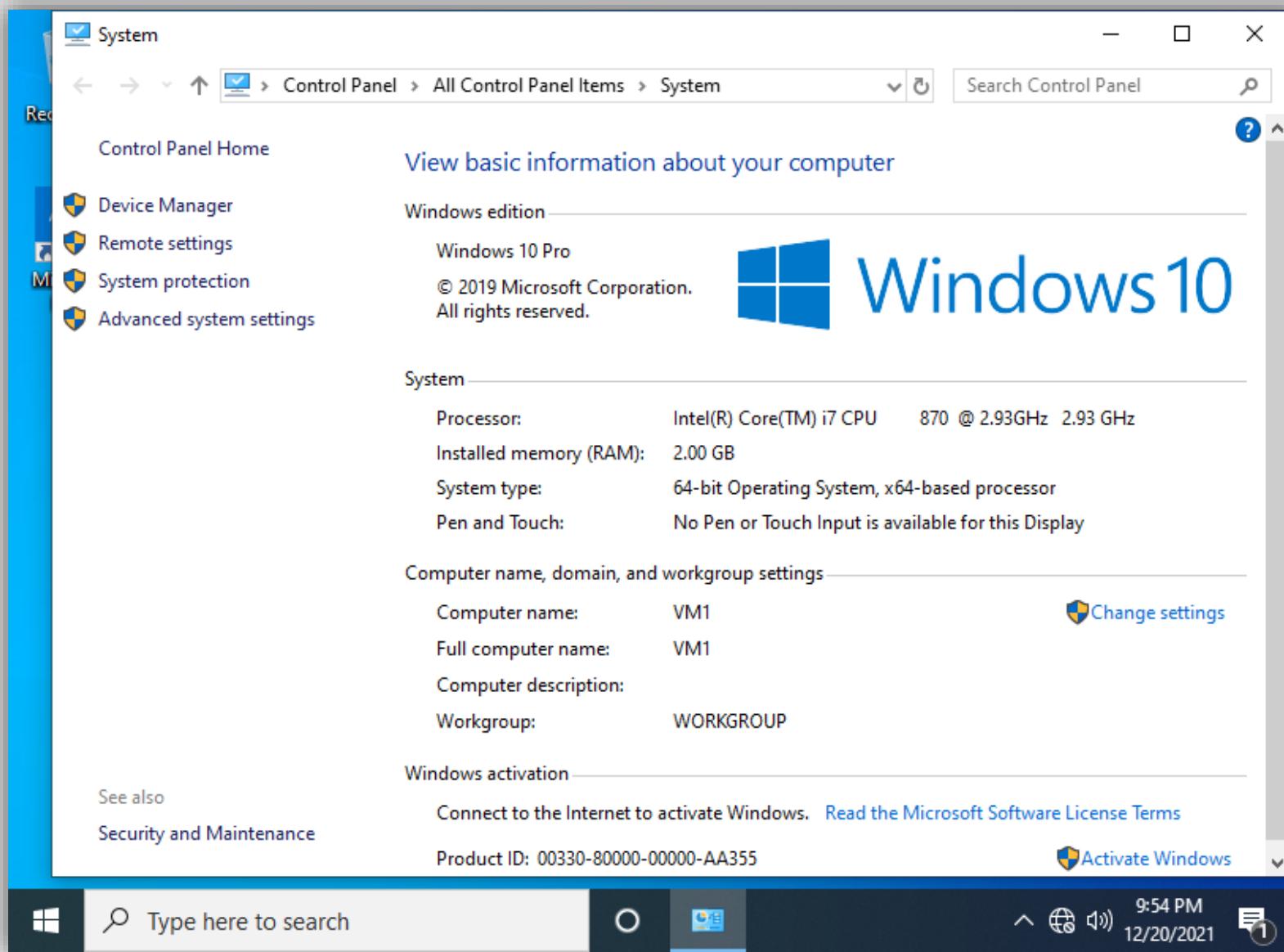


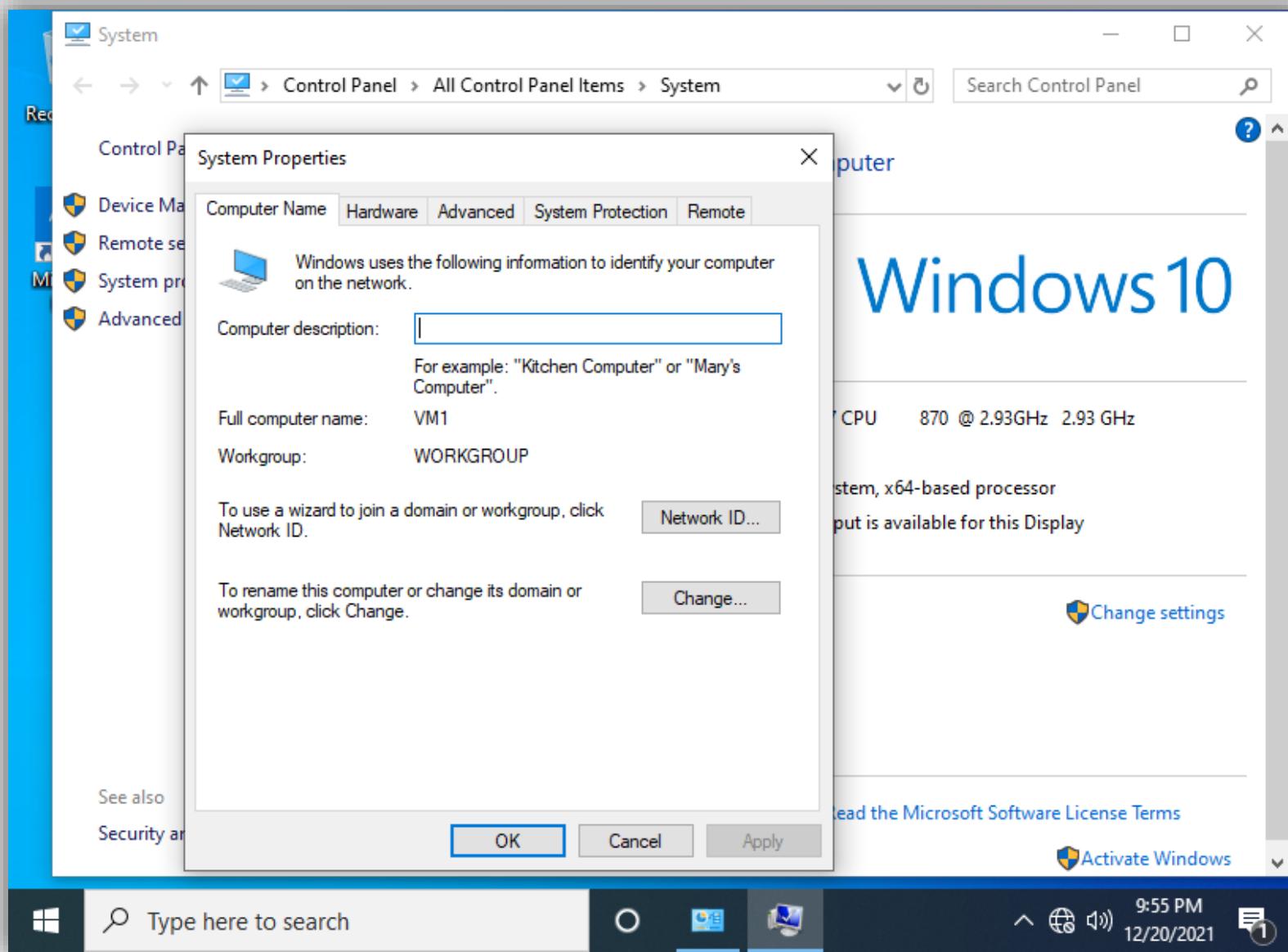


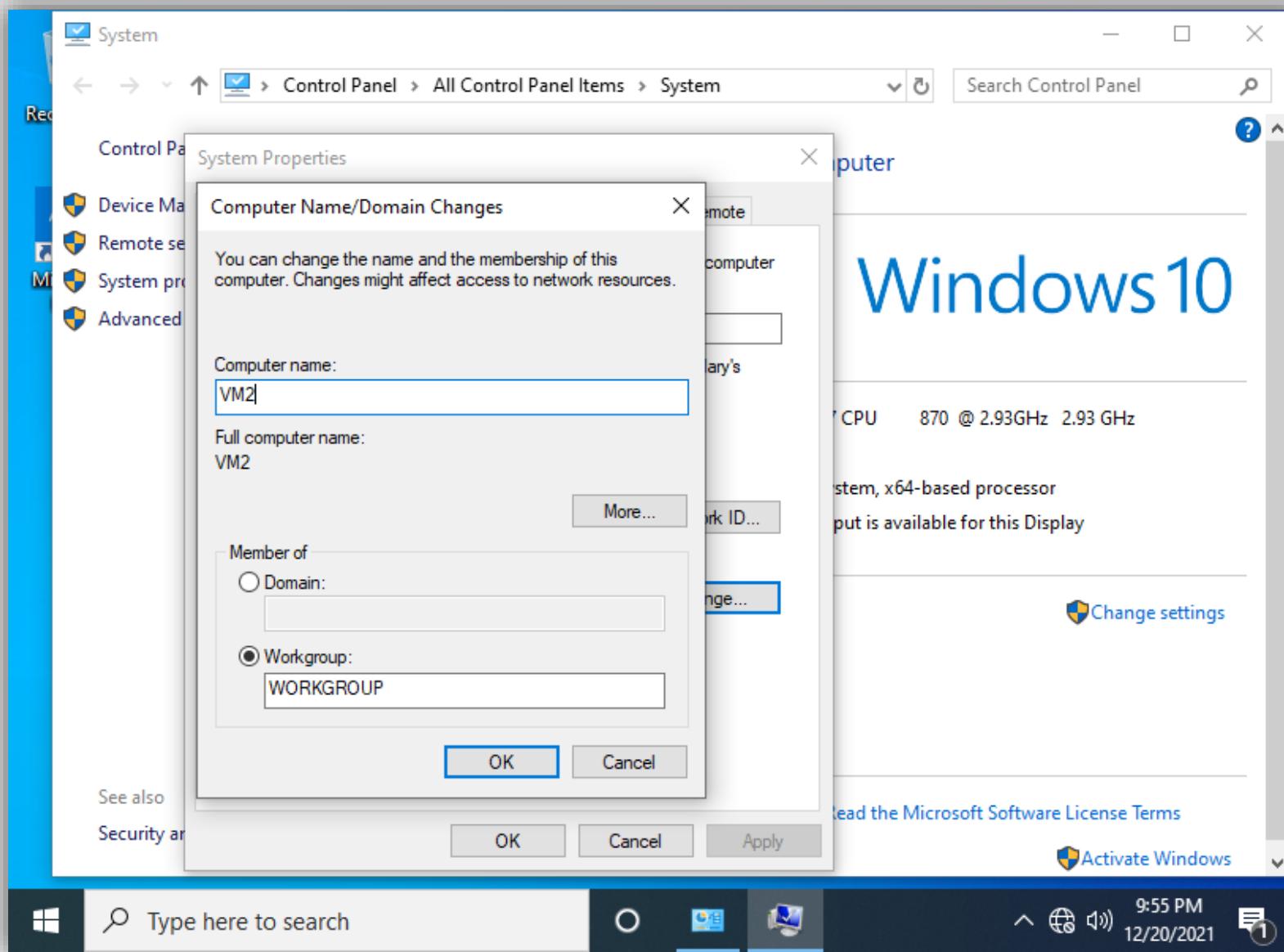


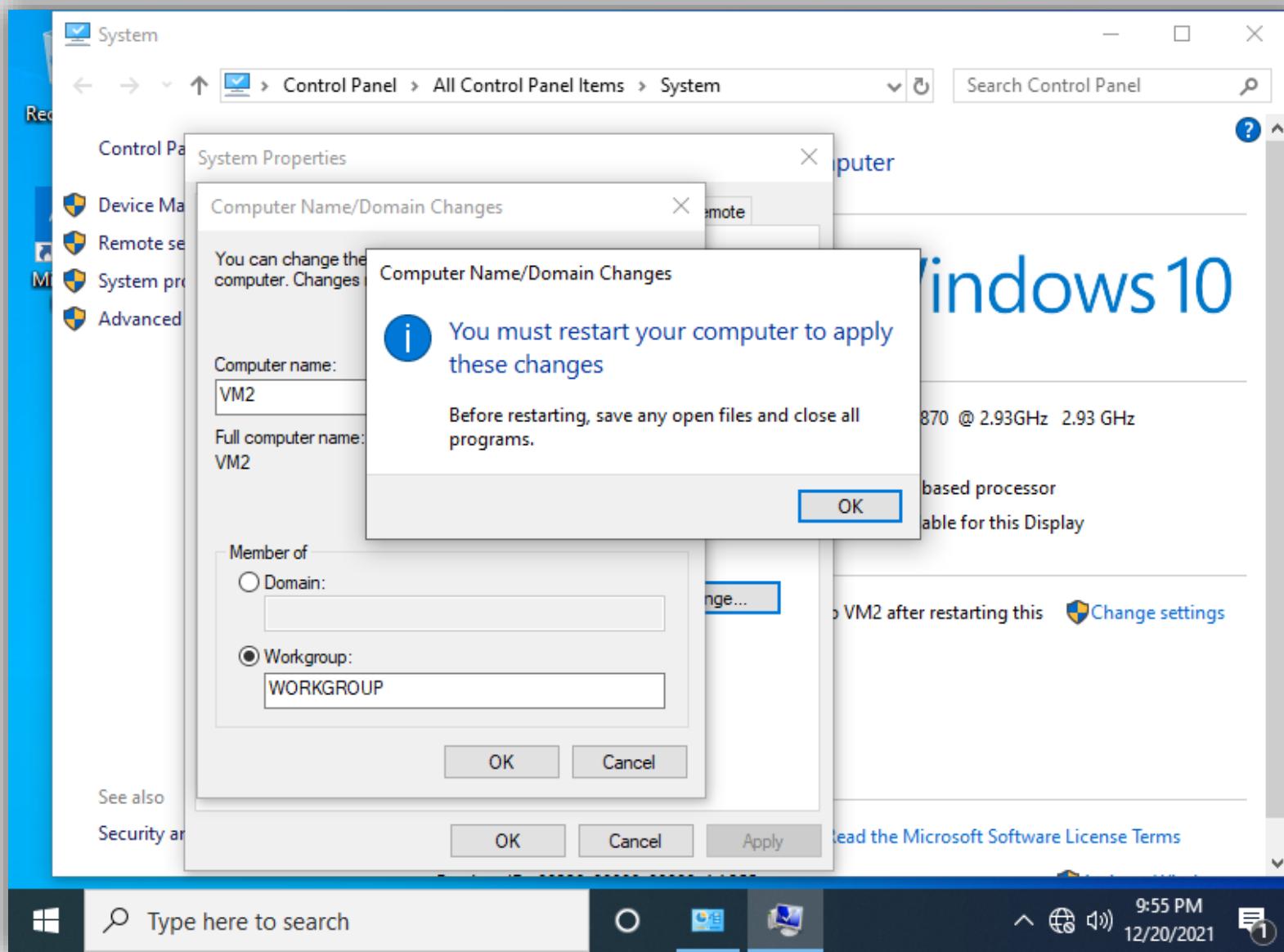


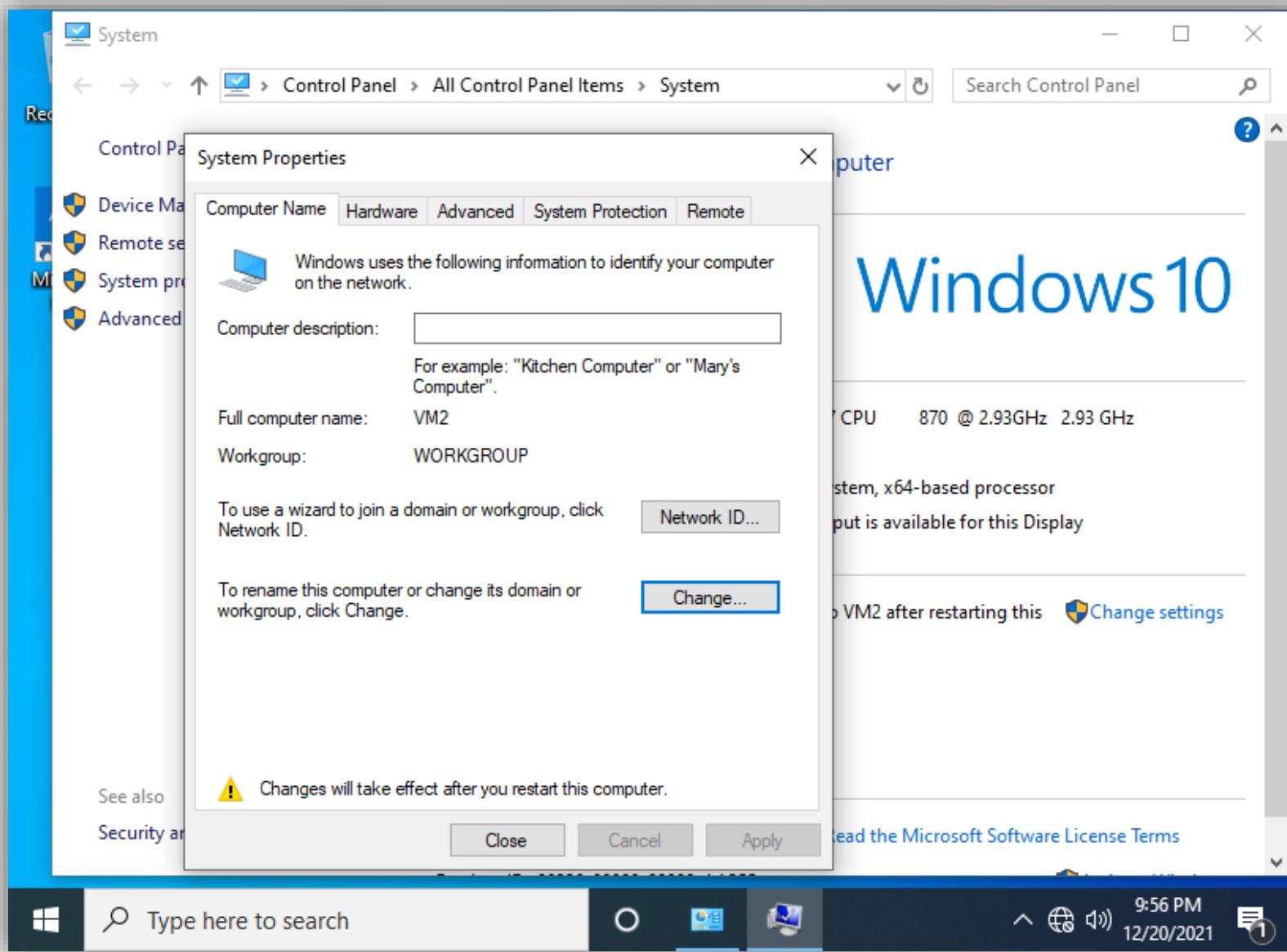


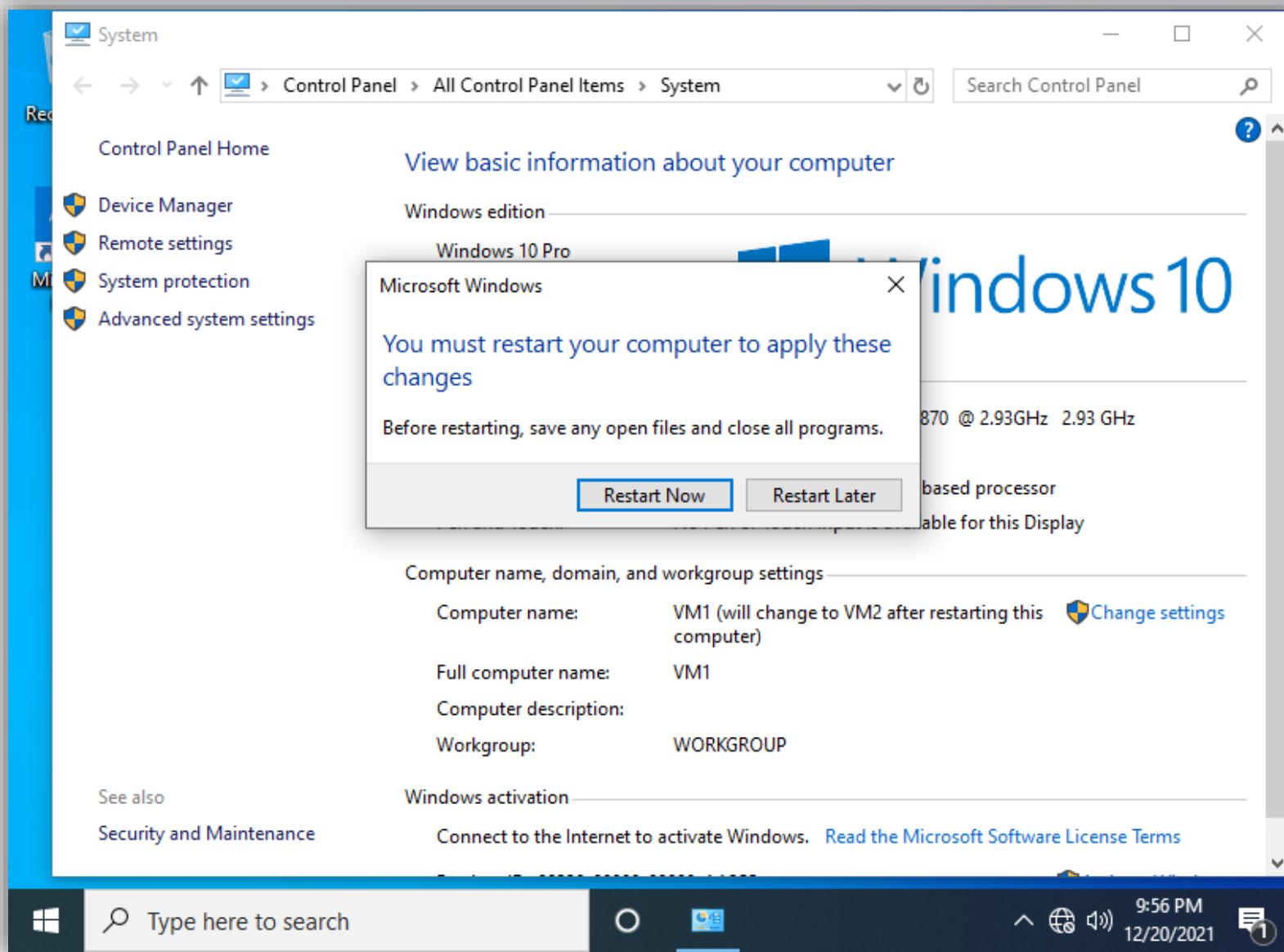


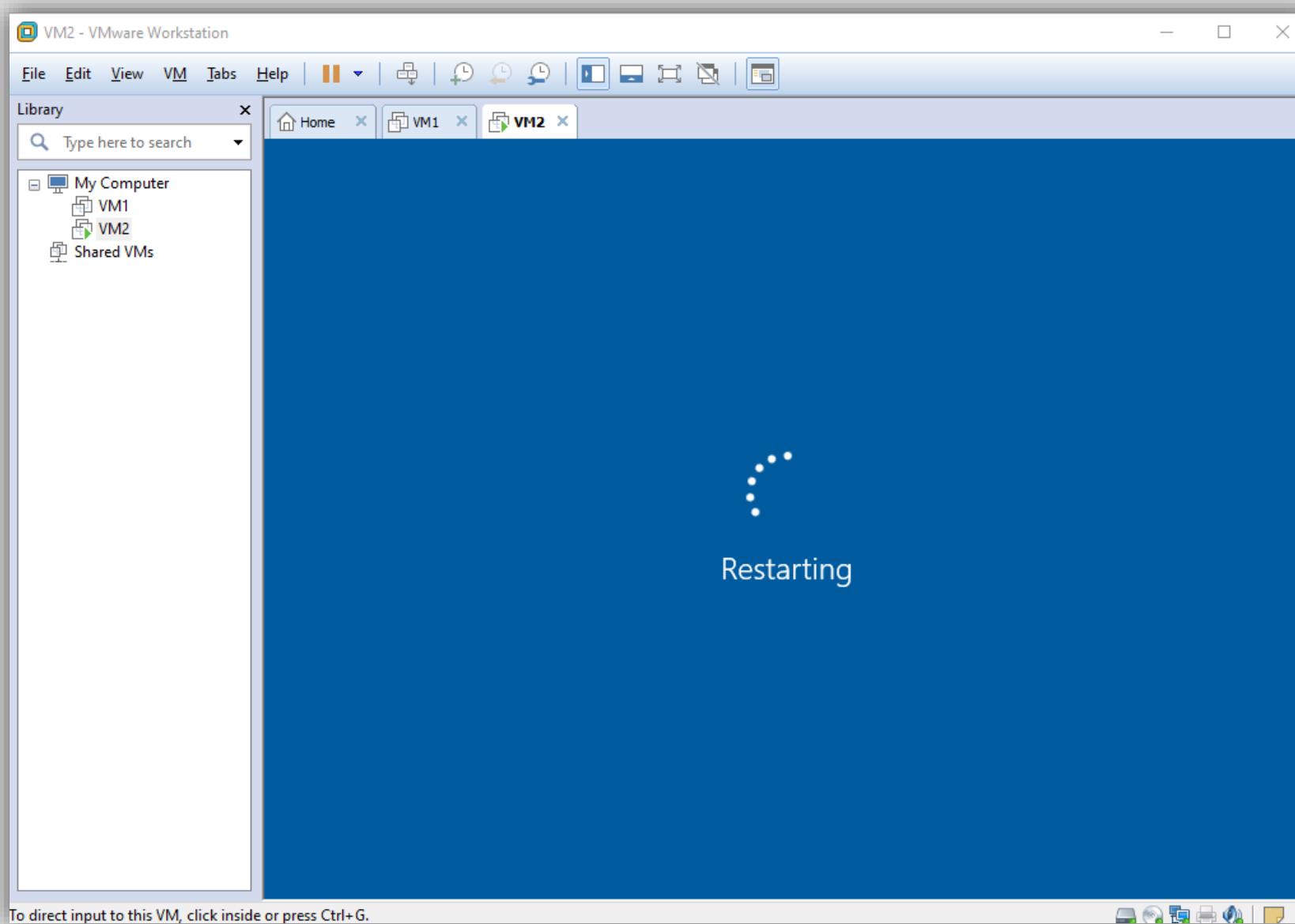


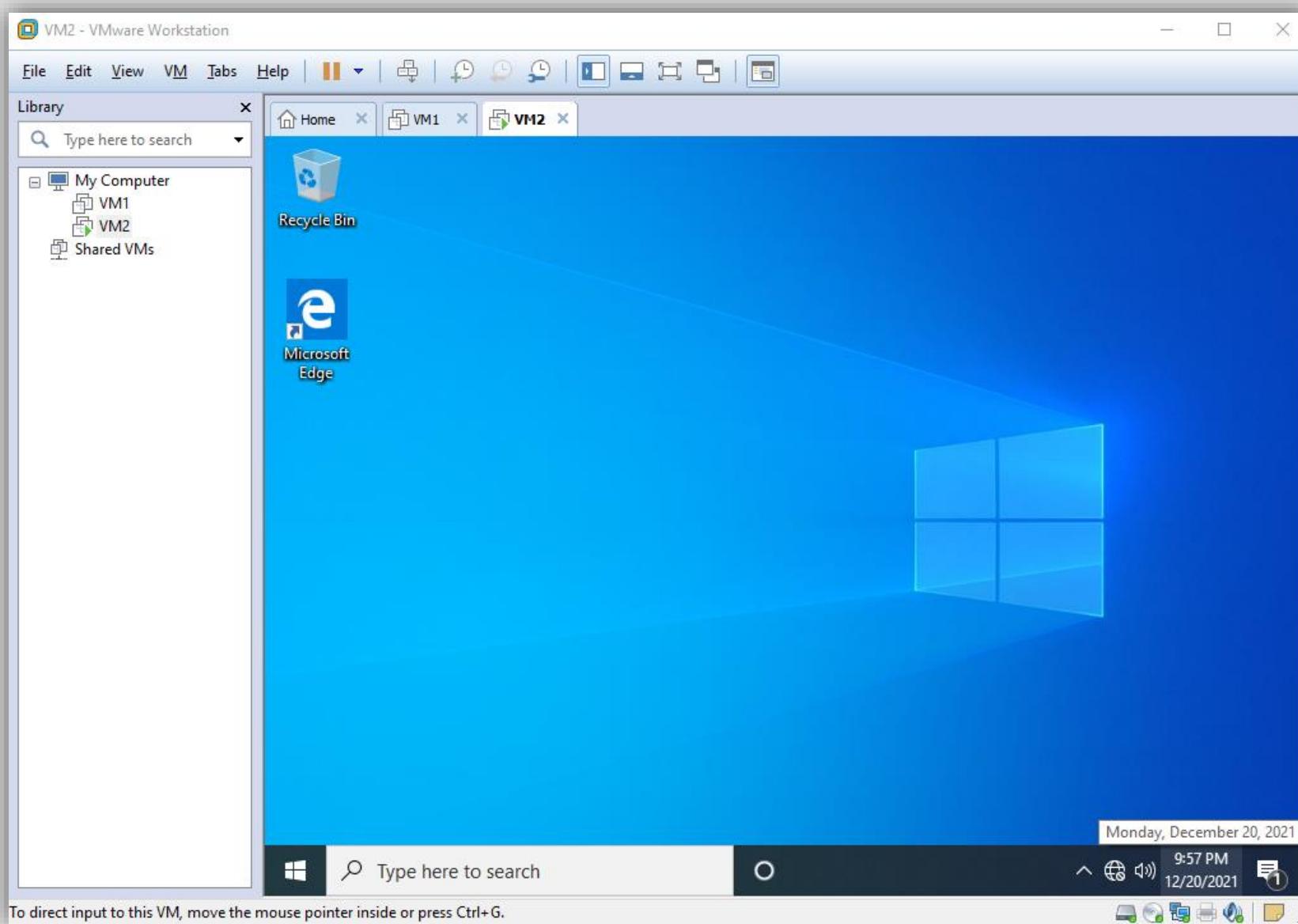




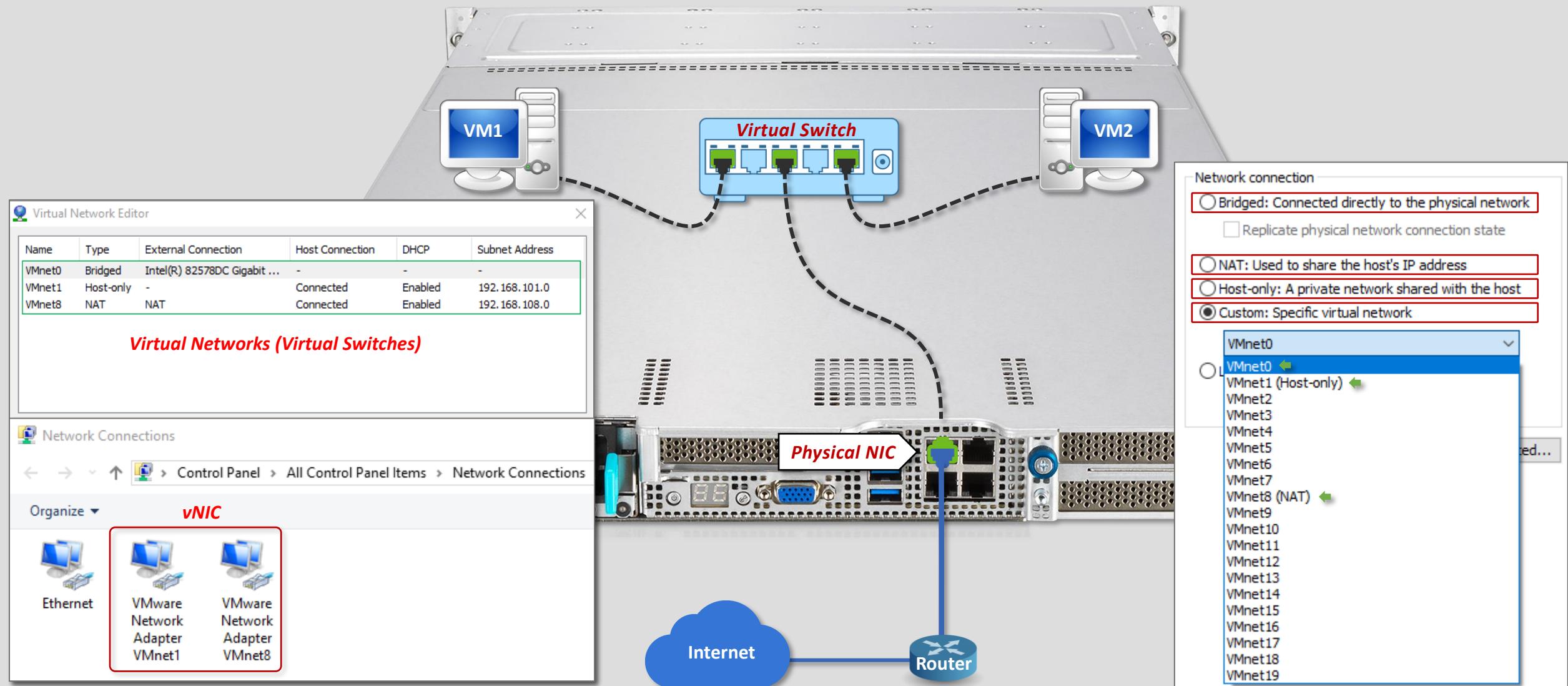




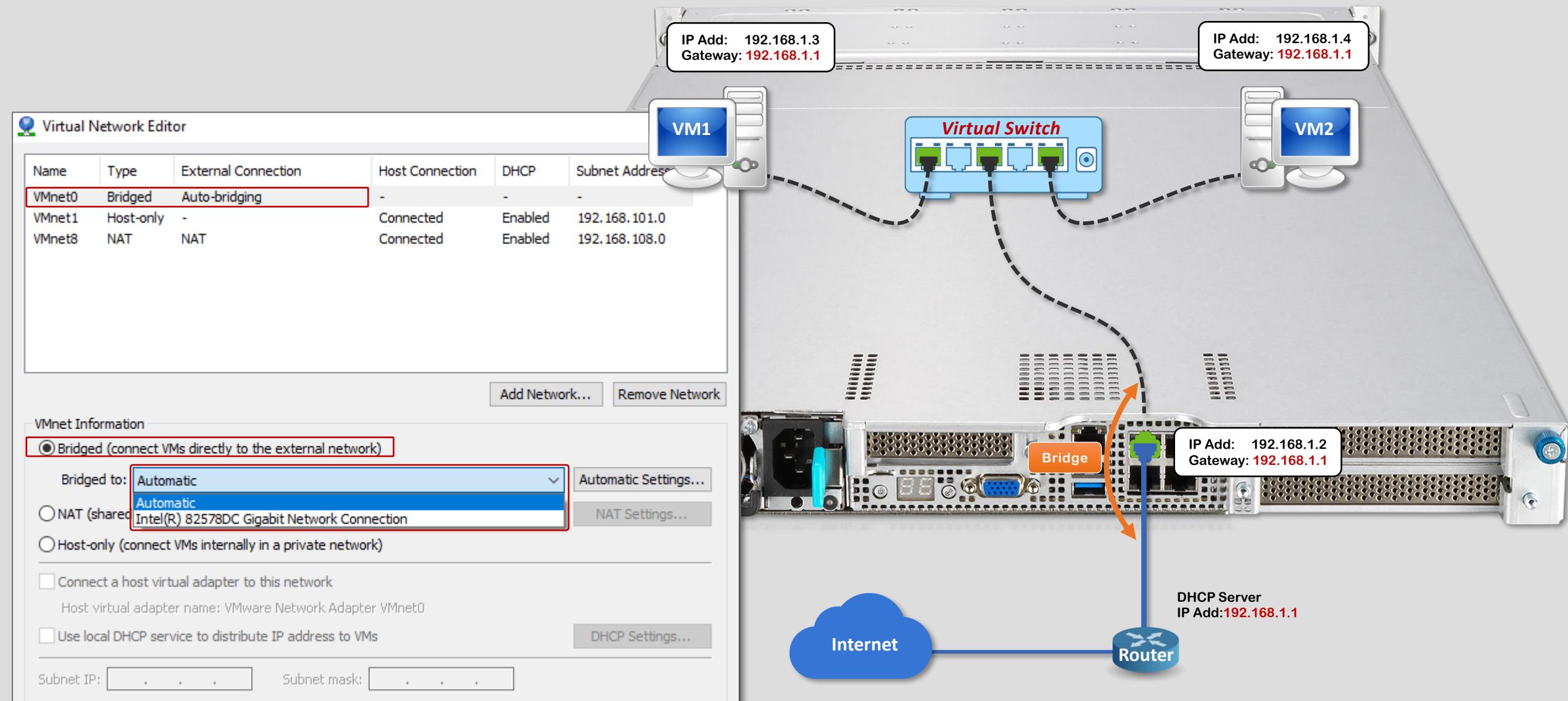




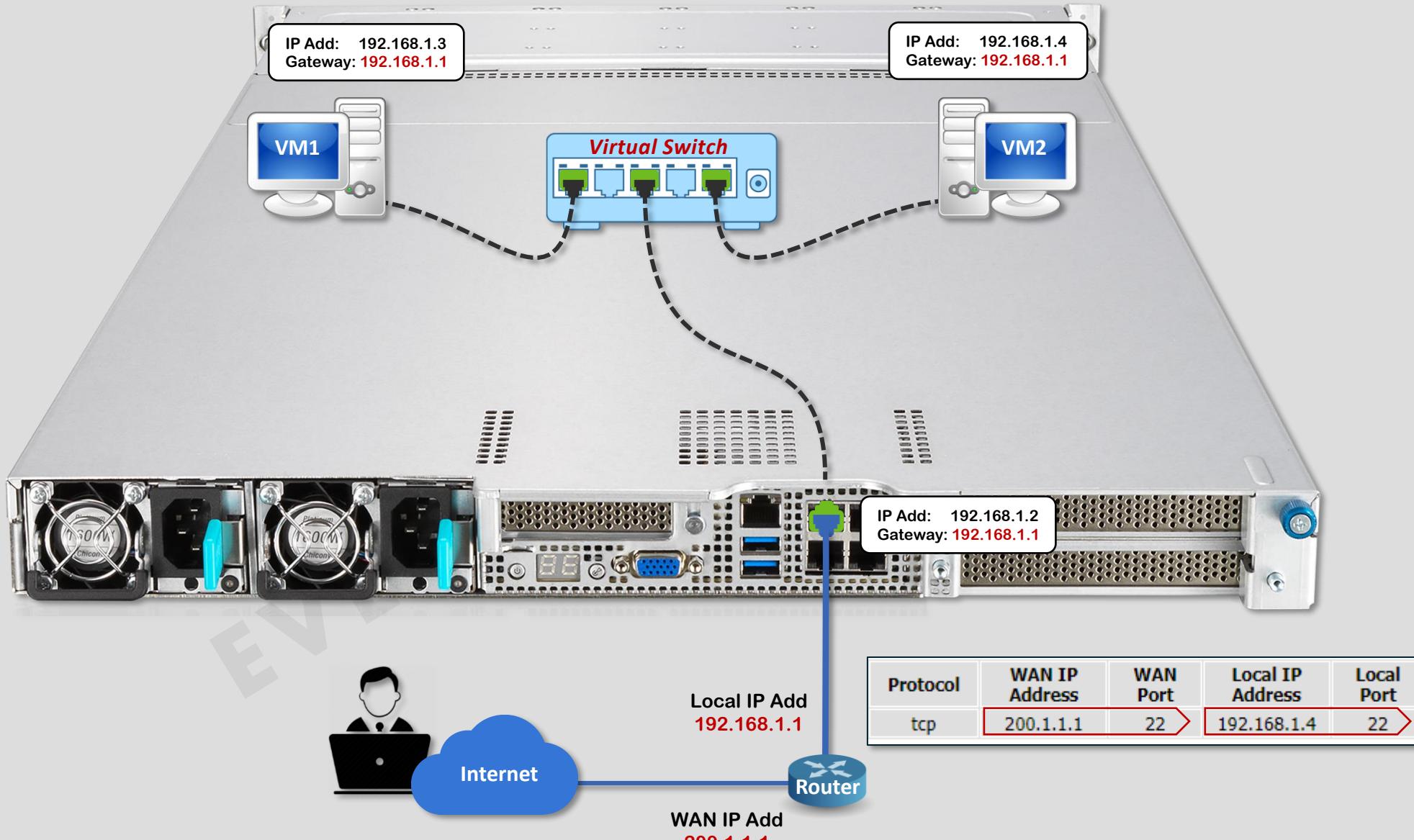
Virtual Switch



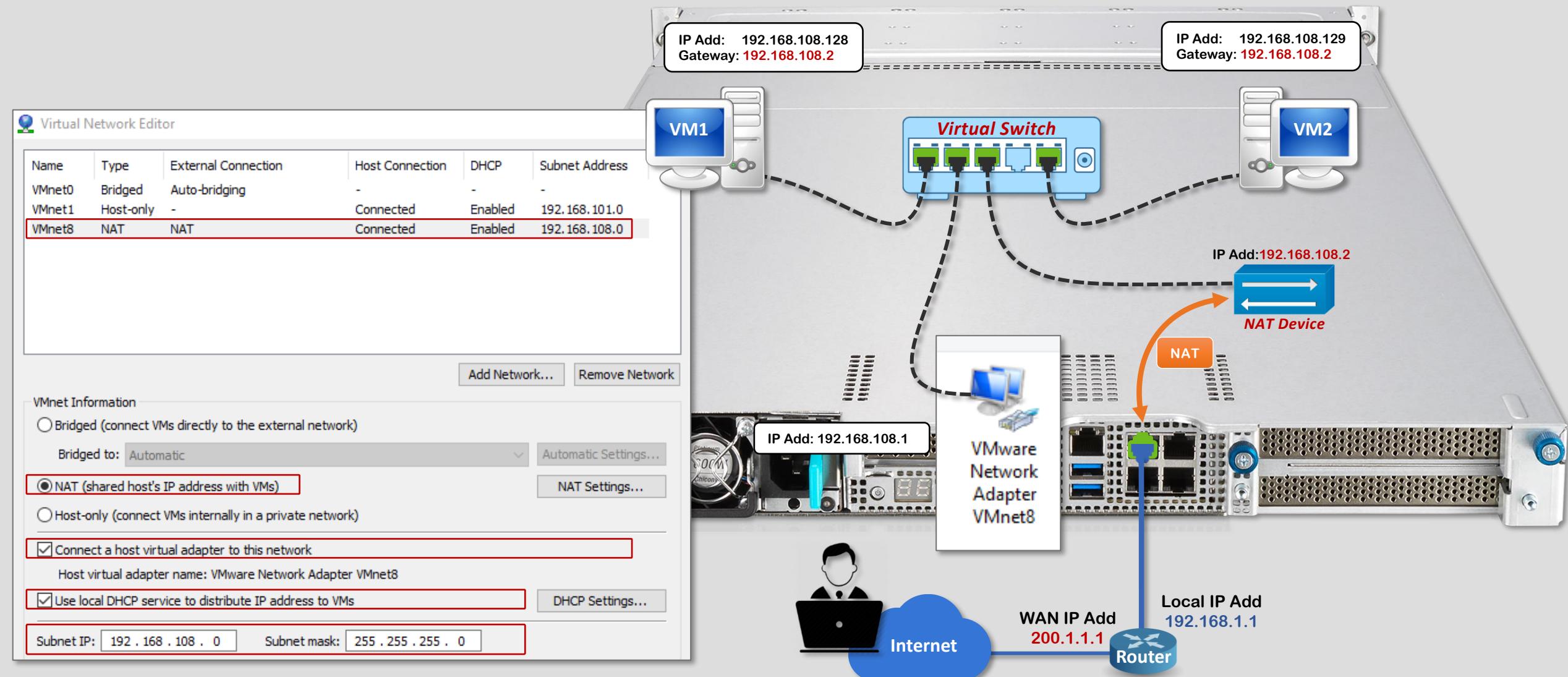
Bridged Network Connection



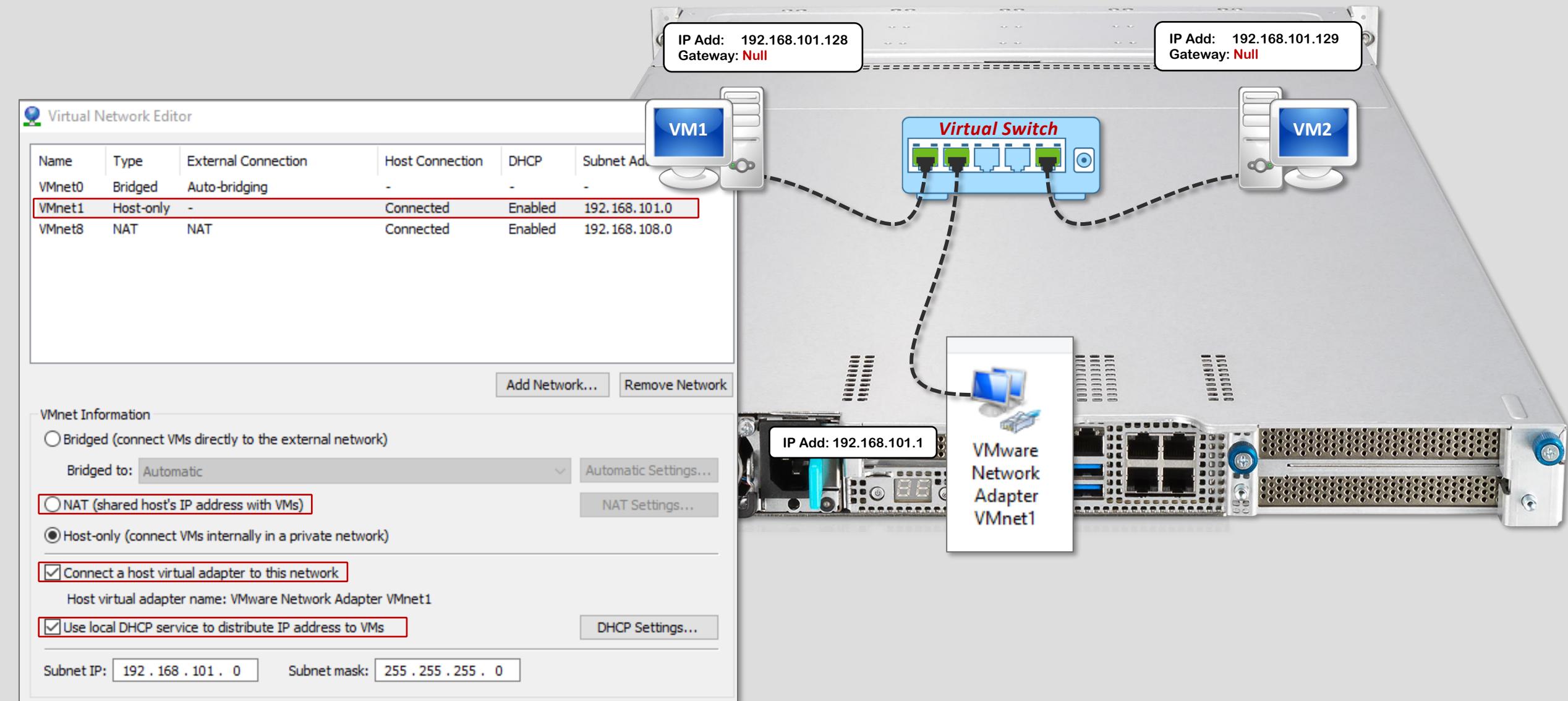
Bridged Network Connection and Port Forwarding



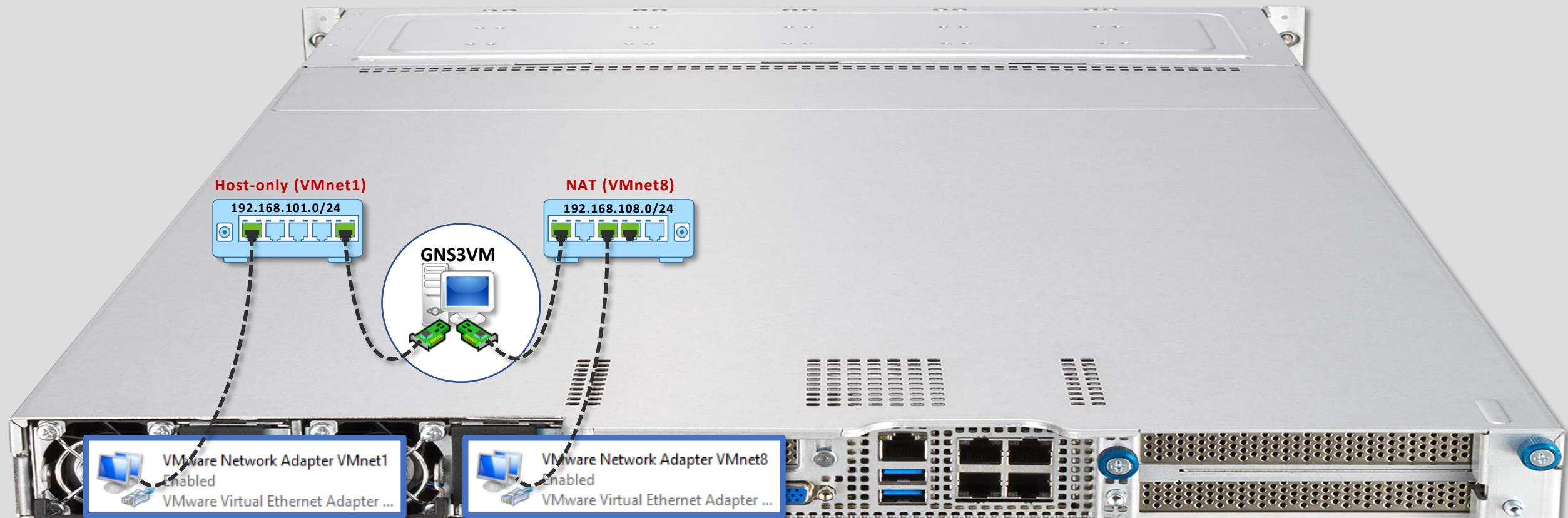
NAT Network Connection



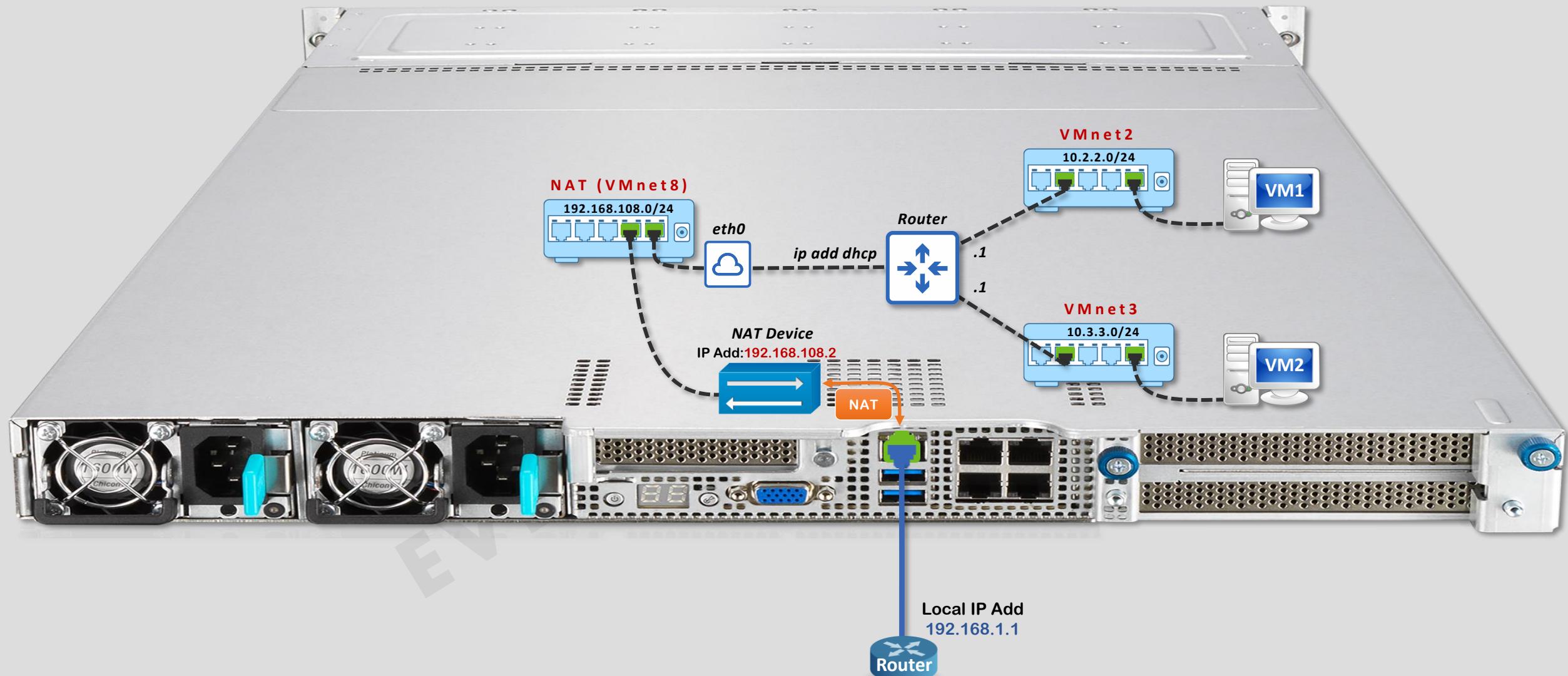
Host-only Network Connection



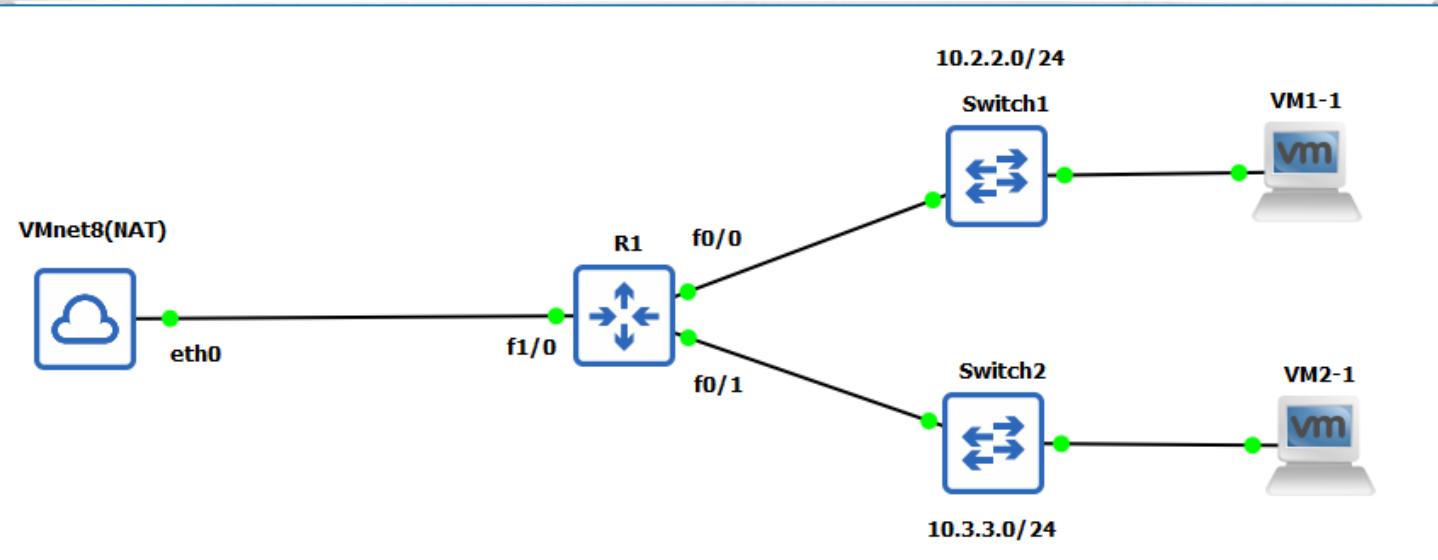
Setting up a Virtual Lab (GNS3)



Setting up a Virtual Lab (GNS3)



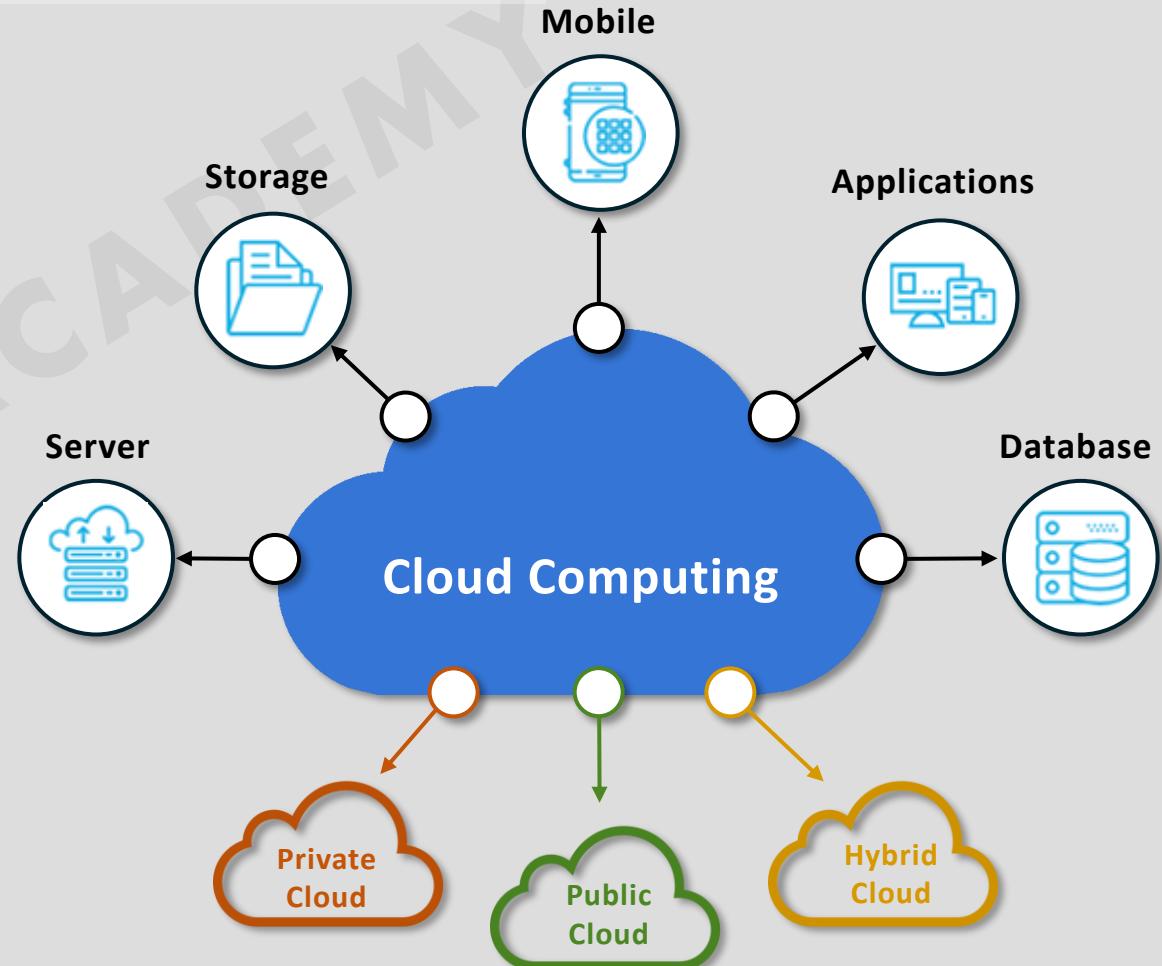
Setting up a Virtual Lab (GNS3)



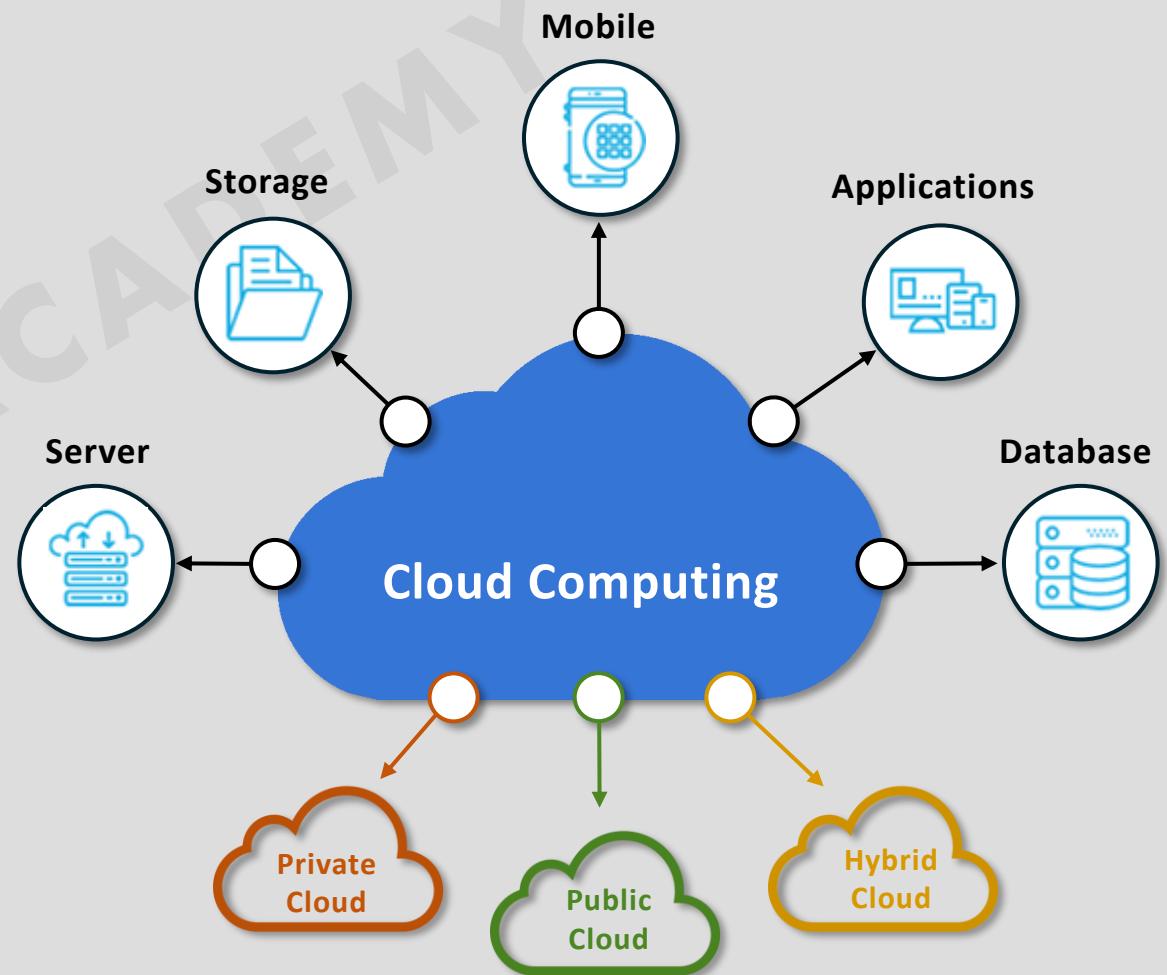
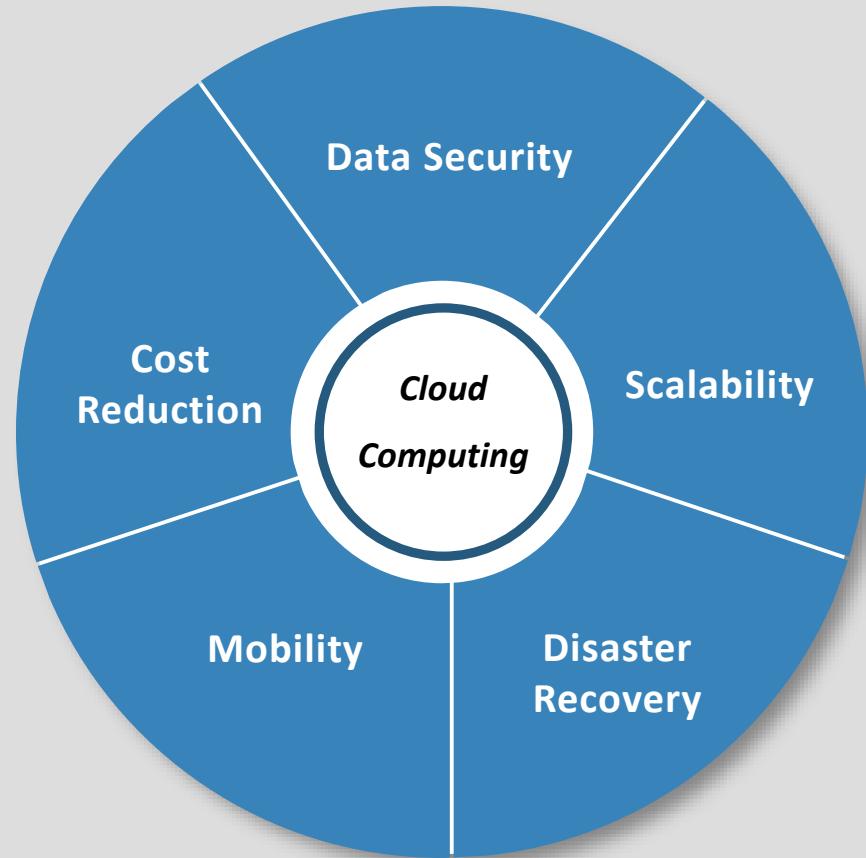
Cloud Computing

- **Cloud computing** is the on-demand delivery of computing services such as servers, storages, databases, applications and software without direct active management by the user.

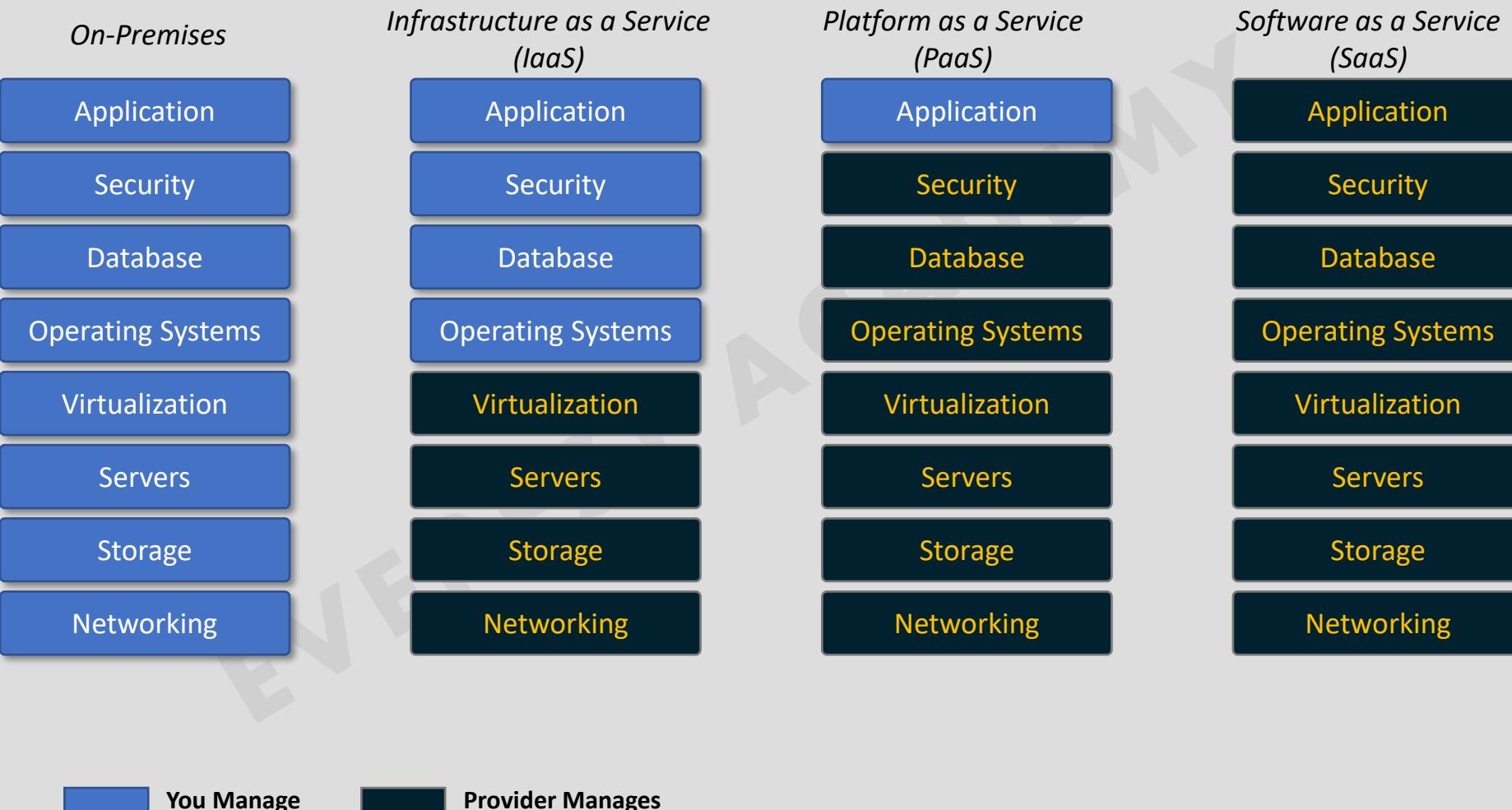
- **On-demand self-service:** The IT consumer chooses when to start and stop using the service, without any direct interaction with the provider of the service.
- **Broad network access:** The service must be available from many types of devices and over many types of networks (including the Internet).
- **Resource pooling:** The provider creates a pool of resources and dynamically allocates resources from that pool for each new request from a consumer.
- **Rapid elasticity:** To the consumer, the resource pool appears to be unlimited and the requests for new service are filled quickly.
- **Measured service:** The provider can measure the usage and report that usage to the consumer, both for transparency and for billing.



Advantages of Cloud Computing

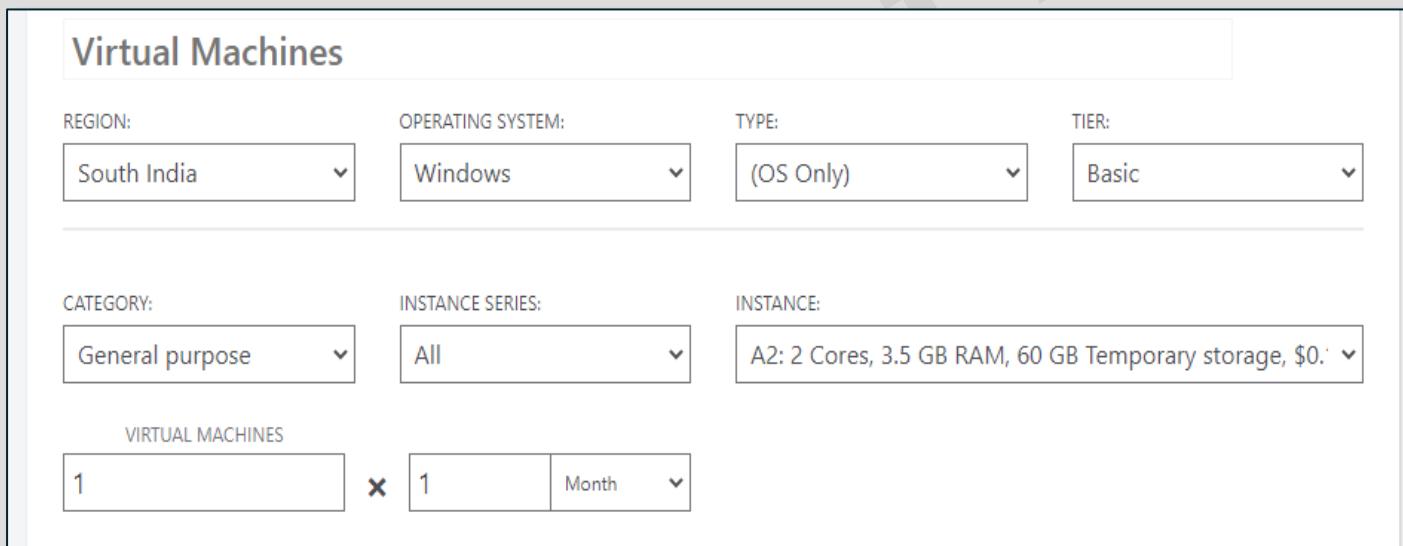


Cloud Computing Models



Infrastructure as a Service (IaaS)

- Infrastructure as a Service (IaaS)** is a cloud computing solution that consists of provisioning and managing computing resources over the Internet; such as servers, storage, networking and virtualization.
- IaaS customers** access their infrastructure via a dashboard, but they do not have to physically manage it.
- IaaS model** offers a lot of flexibility to companies, as they purchase computing resources on-demand, instead of buying their own hardware.
- Some examples of IaaS** vendors include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform.



The screenshot shows the AWS Lambda console interface for searching virtual machines. It includes the following search parameters:

- REGION:** South India
- OPERATING SYSTEM:** Windows
- TYPE:** (OS Only)
- TIER:** Basic
- CATEGORY:** General purpose
- INSTANCE SERIES:** All
- INSTANCE:** A2: 2 Cores, 3.5 GB RAM, 60 GB Temporary storage, \$0.10/hour
- VIRTUAL MACHINES:** 1

Infrastructure as a Service (IaaS)



IT
Administrators



Platform as a Service (PaaS)

- Platform as a Service (PaaS)** provides a ready-to-use development environment, where developers can focus on writing and executing high-quality code in order to create customized applications.
- Platform as a Service (PaaS)** is delivered via the website of the provider.
- Some examples of PaaS vendors include Windows Azure, Google App Engine and AWS Elastic Beanstalk.

Platform

Platform

- PHP
- .NET Core on Linux
- .NET on Windows Server
- Docker
- GlassFish
- Go
- Java
- Node.js
- PHP**
- Python
- Ruby
- Tomcat

Upload a source bundle from your computer or copy one from Amazon S3.

*Platform as a Service
(PaaS)*

Application

Security

Database

Operating Systems

Virtualization

Servers

Storage

Networking

Software
Developers

Software as a Service (SaaS)

- ❑ **Software as a Service (SaaS)** consists of delivering cloud-based applications to users over the Internet. In this cloud service model, software is hosted online and made available to customers on a subscription basis or for purchase
- ❑ In SaaS model, the provider is responsible for developing, maintaining and updating the software.
- ❑ Some examples of SaaS are Adobe Creative Cloud and Microsoft 365.



Photoshop

The world's best imaging and graphic design software is at the core of just about every creative project, from photo editing and compositing to digital painting, animation, and graphic design.

Payment

- Annual plan, paid monthly — US\$20.99/mo
- Annual plan, prepaid — US\$239.88/yr
- Monthly plan — US\$31.49/mo

Software as a Service (SaaS)

Application

Security

Database

Operating Systems

Virtualization

Servers

Storage

Networking

End Users