



THE UNIVERSITY OF AZAD JAMMU & KASHMIR

MUZAFFARABAD

OPERATING SYSTEM

LAB TASK NO 3

DEPARTMENT OF SOFTWARE ENGINEERING

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Q1: What is meant by virtual machines?

A **virtual machine (VM)** is essentially a software emulation of a physical computer. They allow you to run multiple operating systems on a single physical machine, each acting as if it has its own dedicated hardware.

Key Points About Virtual Machines:

1. **Isolation:** Each VM is isolated from others, which means what happens in one VM does not affect the others.
2. **Multiple OS:** You can run different operating systems on the same physical machine. For example, you could run Windows, Linux, and macOS all on one physical computer.
3. **Resource Allocation:** VMs share the physical resources (CPU, memory, storage) of the host machine, but each VM can be allocated a specific amount of these resources.
4. **Flexibility:** They are very flexible for testing, development, and deploying applications. You can easily create, clone, and delete VMs as needed.

Common Uses:

- **Development and Testing:** Developers use VMs to test software in different environments without needing separate physical machines.
- **Server Consolidation:** Businesses can run multiple server applications on a single physical server, reducing hardware costs and improving efficiency.
- **Isolation and Security:** VMs can run applications in isolated environments, improving security and stability.

Popular VM Software:

- **VirtualBox:** A free and open-source VM software.
- **VMware Workstation:** A powerful VM solution often used in enterprise environments.
- **Microsoft Hyper-V:** Built into Windows, offering strong VM capabilities.

Q2: What Do You Know About Linux Based Operating System

Linux-based operating systems, commonly known as Linux distributions or distros, are open-source operating systems built around the Linux kernel. Here's a breakdown of what makes Linux-based OSs unique and widely used:

Key Features of Linux-Based OS:

1. **Open Source:** The source code is freely available to everyone, allowing users to modify and distribute their own versions.
2. **Security:** Known for strong security features, Linux is less susceptible to malware and viruses compared to other operating systems.
3. **Stability and Performance:** Linux systems are highly stable and efficient, making them ideal for servers and high-performance computing.
4. **Customization:** Users can customize their desktop environment, applications, and settings extensively.
5. **Package Management:** Software installation and updates are managed through package managers, simplifying software management.

Popular Linux Distributions:

- **Ubuntu:** User-friendly and popular among beginners and professionals alike.
- **Fedora:** Known for cutting-edge features and technologies.
- **Debian:** Stable and reliable, used as a base for many other distributions, including Ubuntu.
- **CentOS:** A free alternative to Red Hat Enterprise Linux, widely used in enterprise environments.
- **Arch Linux:** Tailored for advanced users who prefer to build their system from scratch.

Common Uses:

- **Servers:** Powers many of the world's servers due to its reliability and security.
- **Development:** Preferred by developers for its powerful tools and flexibility.
- **Embedded Systems:** Used in a wide range of devices, from smartphones (Android) to appliances and cars.
- **Personal Use:** Desktop environments like GNOME and KDE provide a rich user experience for everyday tasks.

Commands and Interface:

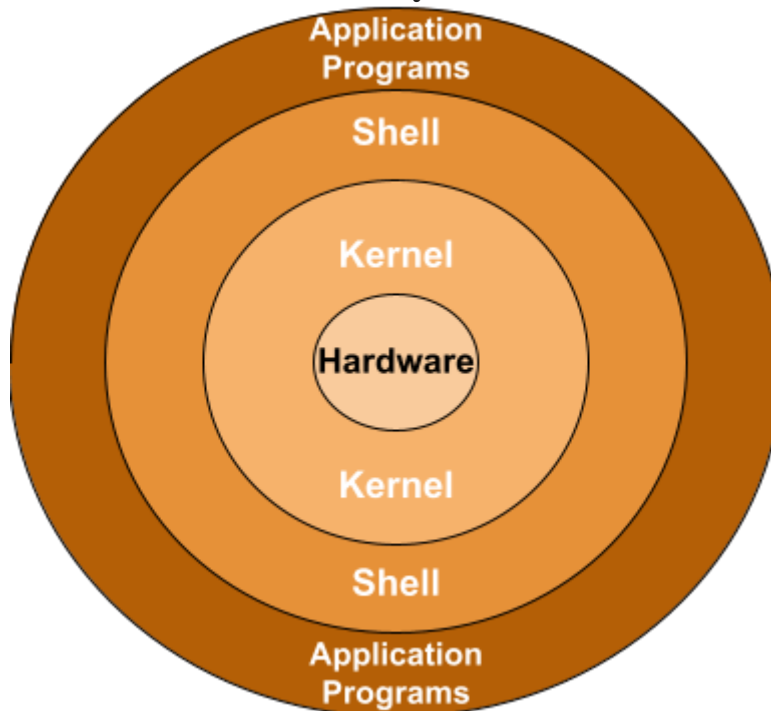
- **Command Line Interface (CLI):** Linux systems often rely heavily on the CLI for advanced tasks.
- **Graphical User Interface (GUI):** Many distros offer user-friendly GUIs for those who prefer graphical interaction.

Linux's versatility and robust performance make it a popular choice across various fields, from personal use to enterprise-level applications. Whether you're setting up a server, developing software, or just exploring a new OS, Linux has a distribution to suit your needs. If you're interested in trying it out or need more detailed information, feel free to ask!

Q3: Draw Architecture Of Unix Based OS.

UNIX ARCHITECTURE

There are several **layers** in the **Unix** architecture. Those **layers** interact between the user and the computer hardware when using **UNIX OS**. The description of each layer structure in the **Unix system** is as follows:



A. Hardware

This layer contains all **hardware-related** information in the **Unix** environment. **Hardware** is the components that are humanly visible. **CPU**, **memories** and other physical components are examples of the **hardware**.

B. Kernel

The **Kernel** is the central component in the **Unix** system that acts as a bridge between the **software** and the **hardware**. It manages the system's resources, such as the **processor**, **memory**, **input/output** devices, and **networking** components. This

provides an interface for other **software** components to access the **hardware** resources of the system.

When the computer is turned on, the **Kernel** is loaded into the **memory** and remains there until the computer is turned off. While the computer is running the **Kernel** has access to all **hardware resources** of the system and other programs request access to the **Kernel** as they do not have direct access to the **hardware** resources.

C. Shell

A **shell** is a piece of **software** that offers a command-line interface for communicating with an **operating system** in computing. It is a user interface that enables input of instructions to carry out different operations, including the launching of applications, controlling of files, and running of scripts.

The **shell** receives the user's input, which then interprets the instructions and calls the appropriate system utilities or programs to carry them out. It also gives the user a way to browse the file system, by displaying the current directory and enabling the user to switch to a different directory.

The **shell** is an essential component of most operating systems, including **Unix**, **Linux**, and **macOS**. The Command Prompt or **PowerShell** shell that comes with **Windows** also offers comparable features. Many **shells** also include features like history, tab completion, and scripting skills in addition to the command-line interface.

D. Application Programs

This is the outer layer of a **Unix** machine that executes the given external tasks such as creating and editing documents, managing files, and running scripts. **Unix** provides a wide range of application programs and the command line or a **graphical user interface (GUI)** can run those applications.

Q4: Difference Between Ubuntu And Linux

There's a bit of a distinction between Ubuntu and Linux. Let's break it down:

Linux:

- **Linux** refers to the kernel, which is the core part of the operating system. The kernel manages system resources and hardware communication.
- **Linux Distribution (Distro):** An operating system based on the Linux kernel. Distros include the kernel, system libraries, user applications, and other necessary tools. Examples include Ubuntu, Fedora, Debian, and CentOS.

Ubuntu:

- **Ubuntu** is a popular Linux distribution based on Debian. It's known for being user-friendly and is often recommended for beginners.
- **Features:**
 - **Ease of Use:** Ubuntu comes with a polished graphical user interface (GUI) and is designed to be intuitive.
 - **Software:** It includes a wide range of pre-installed applications and has easy access to thousands of more applications through its package manager.
 - **Community Support:** Ubuntu has a large and active community that provides extensive documentation and support.
 - **Regular Updates:** It offers regular updates and a clear release schedule, with Long-Term Support (LTS) versions that provide extended support and stability.

Summary:

- **Linux** is the underlying kernel that powers many different operating systems.
- **Ubuntu** is a specific Linux distribution that builds on the Linux kernel to provide a complete and user-friendly operating system.

Q5 Difference Between Linux And Kali Linux

Linux:

- **Linux** refers to the kernel, the core part of an operating system, which manages hardware and system resources. It's the foundation for various Linux distributions (distros).
- **Distributions:** There are many Linux distributions, each tailored for different purposes, like Ubuntu, Fedora, Debian, and CentOS.
- **General Use:** Linux distros cater to a wide range of uses, from desktop computing to servers and embedded systems.

Kali Linux:

- **Kali Linux** is a specific Linux distribution designed primarily for penetration testing and cybersecurity tasks.
- **Specialization:**
 - **Security Tools:** Kali Linux comes pre-installed with numerous tools for penetration testing, security research, computer forensics, and reverse engineering.
 - **Usage:** Often used by cybersecurity professionals and ethical hackers to assess and improve the security of networks and systems.
- **User Base:** Geared towards users with a background in cybersecurity, rather than general users.

Summary:

- **Linux** is a versatile kernel used as the base for various distributions.
- **Kali Linux** is a specialized distribution focused on security and penetration testing, built on the Linux kernel but tailored for specific use cases.

Kali Linux is like a Swiss Army knife for security professionals, while Linux distributions, in general, offer a broad spectrum of applications ranging from everyday desktop use to powerful server management

Q6: Difference Between Ubuntu And Kali Linux

Ubuntu:

- **Purpose:** Ubuntu is designed to be a user-friendly, general-purpose operating system suitable for desktops, servers, and various other applications.
- **Target Audience:** It caters to a wide range of users, from beginners to professionals.
- **Default Software:** Comes with a variety of pre-installed software for everyday use, such as office suites, web browsers, and media players.
- **User Experience:** Known for its ease of use and polished graphical user interface (GUI). It's a great starting point for those new to Linux.
- **Support and Community:** Has a large, active community and strong support resources.

Kali Linux:

- **Purpose:** Kali Linux is specifically designed for penetration testing, cybersecurity, and digital forensics.
- **Target Audience:** Aimed at security professionals and ethical hackers.
- **Default Software:** Comes pre-installed with a vast array of security tools for network analysis, vulnerability scanning, and penetration testing.
- **User Experience:** More focused on functionality related to security tasks rather than general desktop use. Requires more technical knowledge to use effectively.
- **Support and Community:** Has a specialized community of security experts and enthusiasts.

Summary:

- **Ubuntu** is a versatile, user-friendly operating system suitable for general computing needs.
- **Kali Linux** is a specialized OS tailored for security and penetration testing.

They both share the Linux kernel but are tailored for very different use cases and audiences.

Q7 Which One Is Best For Deployment Linux, Kali Linux Or Ubuntu.

When it comes to deployment, the best choice among Linux, Ubuntu, and Kali Linux depends on your specific needs and use case. Here's a breakdown to help you decide:

Ubuntu:

- **Best For:** General-purpose deployments, including web servers, application servers, and desktop environments.
- **Advantages:**
 - User-friendly and widely used, making it easier to find support and resources.
 - Regular updates and Long-Term Support (LTS) versions provide stability and security over extended periods.
 - Extensive package repositories and software support.
- **Why Choose It:** If you're looking for a stable, versatile, and easy-to-manage system for a wide range of applications, Ubuntu is often the go-to choice.

Linux (General):

- **Best For:** Specific needs that might require a more tailored or lightweight distribution, like servers or embedded systems.
- **Advantages:**
 - Flexibility to choose a distribution that fits exact requirements (e.g., CentOS for enterprise servers, Debian for stability, Arch Linux for customization).
 - Can be optimized for performance and resource management.
- **Why Choose It:** If you have specific requirements and need to select a distribution that perfectly matches those needs, going with a particular Linux distro could be beneficial.

Kali Linux:

- **Best For:** Security-focused deployments, such as penetration testing labs, security research, and forensic investigations.
- **Advantages:**
 - Comes pre-installed with a comprehensive suite of security tools.
 - Specifically designed for cybersecurity professionals.

- **Why Choose It:** If your primary focus is on cybersecurity and penetration testing, Kali Linux is built for that purpose. However, it is not typically used for general-purpose deployment.

Conclusion:


- **For General Deployment:** Ubuntu is the best choice due to its balance of ease of use, support, and stability.
- **For Specialized Needs:** Consider other Linux distributions based on your specific requirements.
- **For Security and Penetration Testing:** Kali Linux is unmatched in its field but not suitable for general deployment purposes.

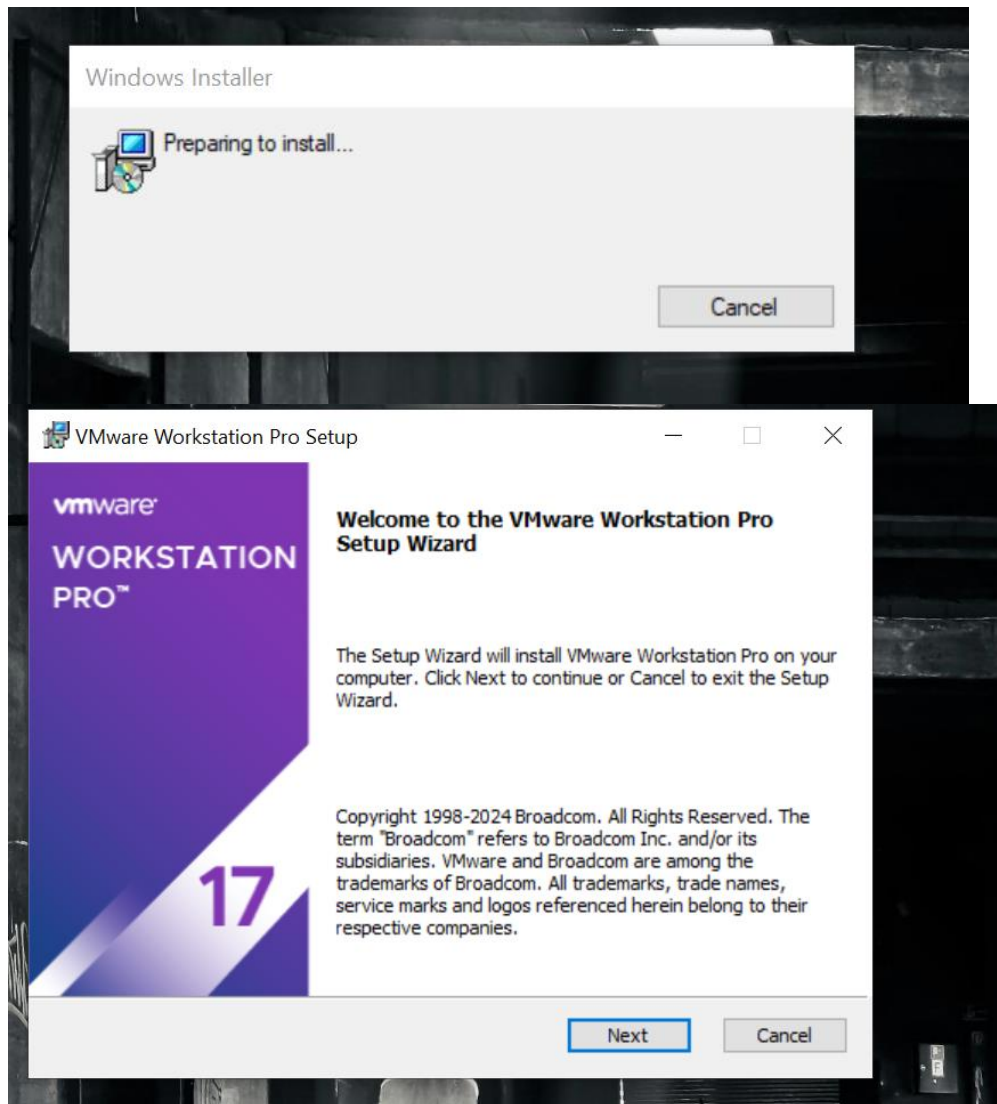
Q: Installation Process Of VMWARE:

Here are the steps to install VMware Workstation on a Windows PC:

Step-by-Step Installation Process:

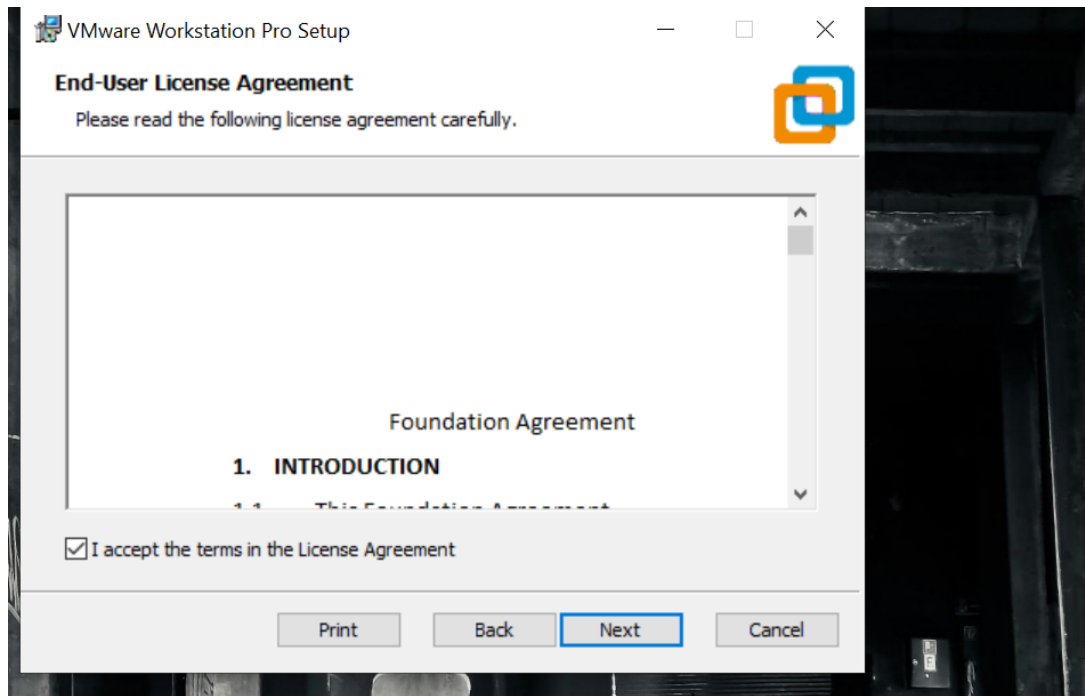
1. **Download VMware Workstation:**
 - Visit the official VMware website.
 - Hover over the "Downloads" tab and select "Workstation Pro" or "Workstation Player" depending on your needs.
 - Click on "Free Trials & Demos" and then "Workstation Pro" to download the installer.
2. **Run the Installer:**
 - Once the download is complete, locate the installer file in your downloads folder and double-click it to start the installation process.

Name	Date modified	Type	Size
Today (1)			
 VMware-workstation-full-17.6.1-24319023	26/11/2024 18:52	Application	458,684 KB



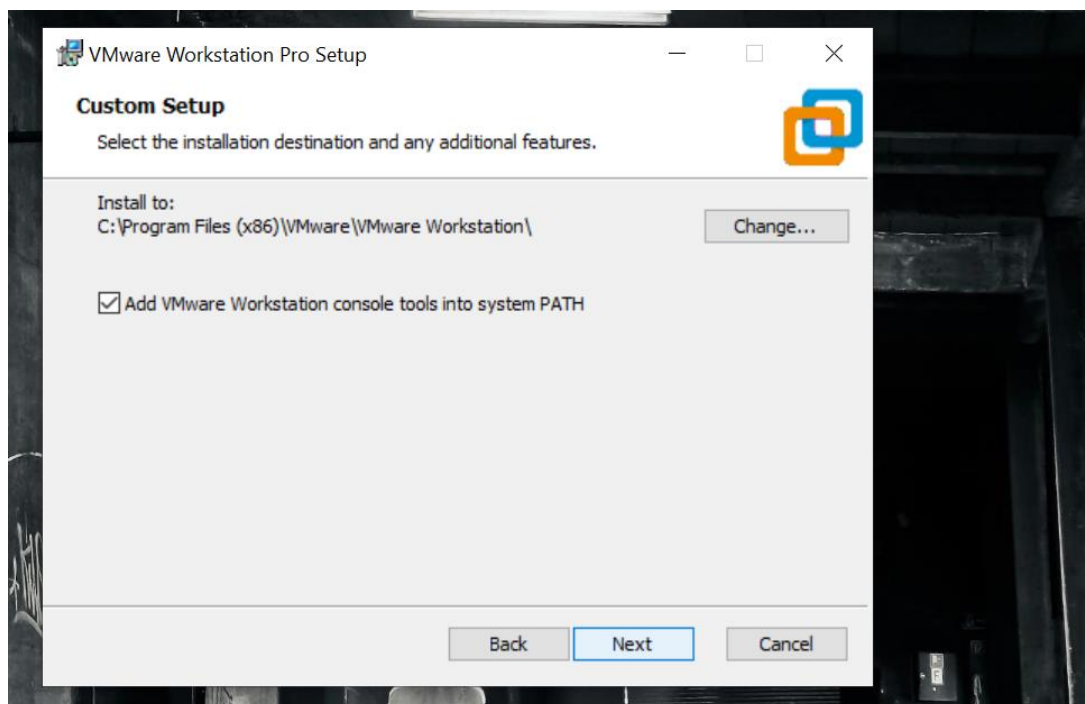
3. Accept the License Agreement:

- The installer will prompt you to accept the license agreement. Read and accept it to proceed.



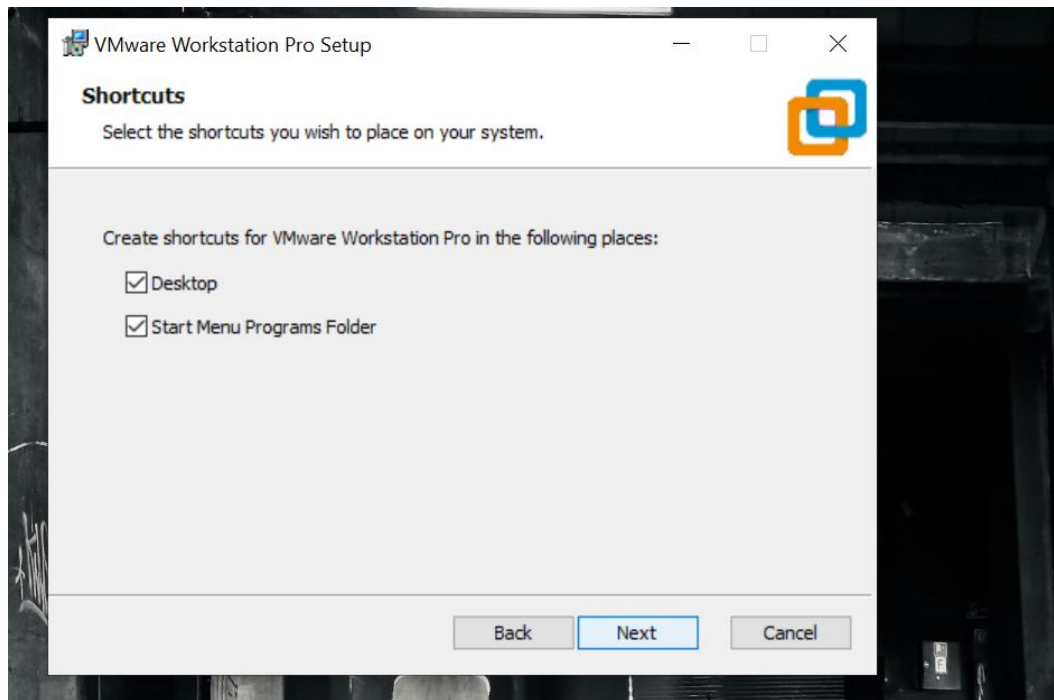
4. **Choose Installation Folder:**

- Select the directory where you want VMware Workstation to be installed. You can use the default location or choose a custom path.



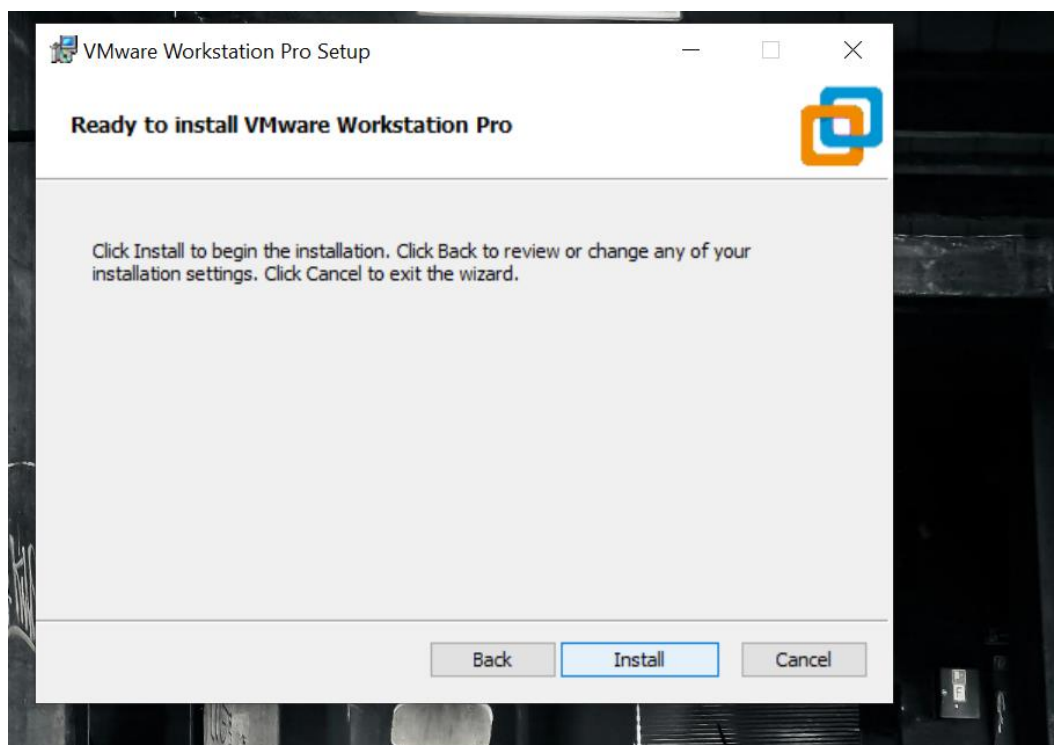
5. **Customize Shortcuts:**

- Decide if you want shortcuts to be created on the desktop or in the start menu.



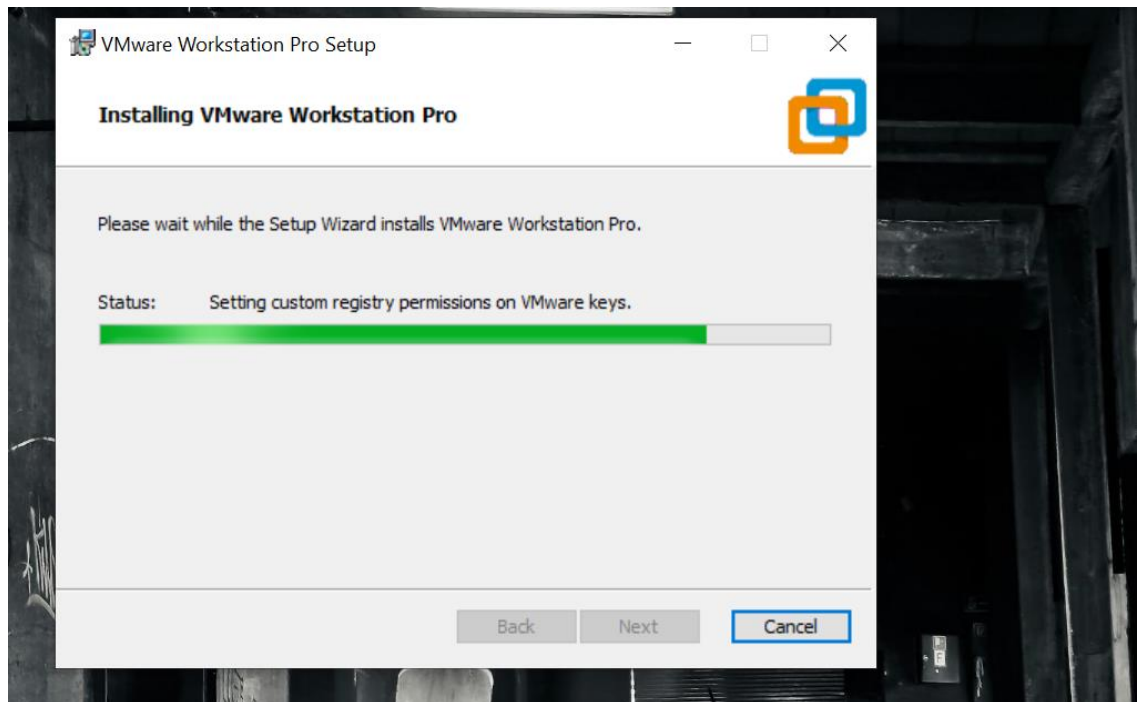
6. Begin Installation:

- Click on the "Install" button to start the installation process.



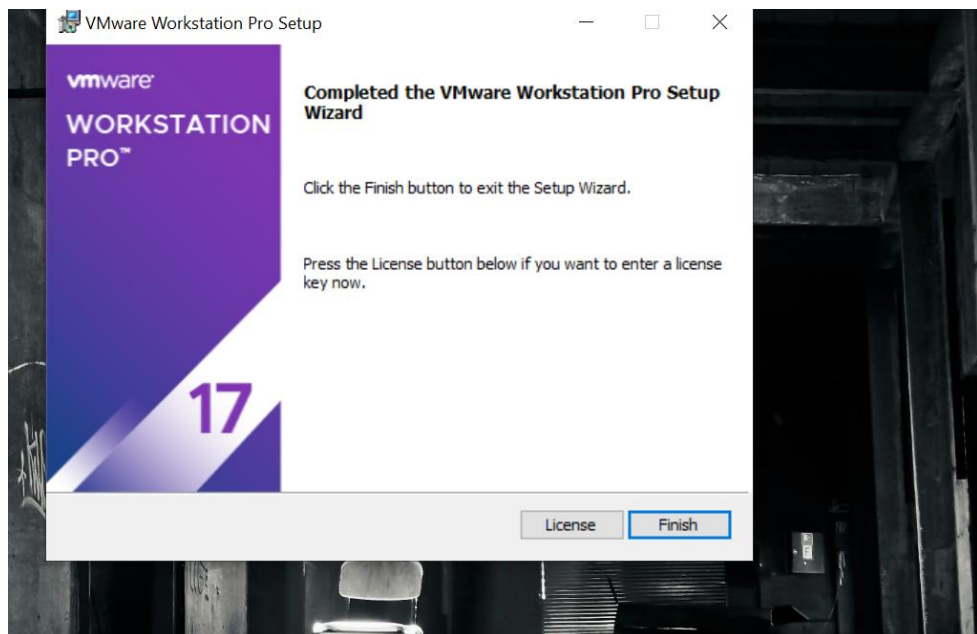
7. Complete the Installation:

- The installer will complete the installation and prompt you to restart your computer.



8. Launch VMware Workstation:

- After restarting, open VMware Workstation from the start menu or desktop shortcut to begin using it.



System Requirements:

- **Operating System:** Windows 10 or 11
- **Processor:** 64-bit processor with four or more cores
- **Memory:** At least 16 GB of RAM (32 GB or more recommended)
- **Disk Space:** 4 GB of disk space (SSD recommended for better performance)
- **License:** A valid license for VMware Workstation