

Azure Virtual Machines

1. What is Azure Virtual Machine?

Azure Virtual Machine (VM) is a cloud-based computing service that provides on-demand, scalable computing resources in Microsoft's Azure cloud platform. Virtual machines allow you to run applications and operating systems in a virtualized environment without the need for physical hardware.

Key Benefits:

- **Cost-effective:** Pay only for the resources you use
- **Scalable:** Easily increase or decrease computing power as needed
- **Flexible:** Choose from various operating systems (Windows, Linux distributions)
- **Accessible:** Connect from anywhere with internet access
- **Managed:** Azure handles the underlying infrastructure maintenance

Azure VMs are ideal for development, testing, hosting applications, and learning cloud technologies. In this lab, we'll create both Ubuntu (Linux) and Windows virtual machines to demonstrate different use cases and connection methods.

2. Ubuntu Virtual Machine Setup

Prerequisites: Download Required Tools

Before creating your Ubuntu VM, you'll need to download the necessary SSH clients.

Step 1: Download PuTTY

1. Visit the official PuTTY website: <https://www.putty.org/>

The screenshot shows the official Putty website at <https://www.putty.org>. The main content is titled "Download PuTTY". It features a screenshot of the PuTTY configuration window and a brief description of what PuTTY is: "PuTTY is an SSH and telnet client, developed originally by Simon Tatham for the Windows platform. PuTTY is open source software that is available with source code and is developed and supported by a group of volunteers." Below this, there is a link to "Download PuTTY". A horizontal line separates this from a section titled "Bitvise SSH Client". This section includes a screenshot of the Bitvise interface and a detailed description: "Bitvise SSH Client is an SSH and SFTP client for Windows. It is developed and supported professionally by Bitvise. The SSH Client is robust, easy to install, easy to use, and supports all features supported by PuTTY, as well as the following: graphical SFTP file transfer; single-click Remote Desktop tunneling; auto-reconnecting capability; dynamic port forwarding through an integrated proxy; an FTP-to-SFTP protocol bridge." It also states that "Bitvise SSH Client is free to use.".

2. Download the Windows installer package (putty-64bit-0.83-installer.msi)

The screenshot shows the "Putty: latest release (0.83)" page at <https://www.chia.greenend.org.uk/~sgtatham/putty/latest.html>. The page title is "Download PuTTY: latest release (0.83)". It contains a navigation bar with links to Home, FAQ, Feedback, Licence, Updates, Mirrors, Keys, Links, Team, Snapshot, Docs, Privacy, Changes, and Wishlist. Below the navigation, it says "Download: Stable · Snapshot · Docs · Privacy · Changes · Wishlist". A note states: "This page contains download links for the latest released version of PuTTY. Currently this is 0.83, released on 2025-02-08." It also says: "When new releases come out, this page will update to contain the latest, so this is a good page to bookmark or link to. Alternatively, here is a [permanent link to the 0.83 release](#)." Another note says: "Release versions of PuTTY are versions we think are reasonably likely to work well. However, they are often not the most up-to-date version of the code available. If you have a problem with this release, then it might be worth trying out the [development snapshots](#), to see if the problem has already been fixed in those versions." A large green box on the right is titled "Package files" and contains the following information:

You probably want one of these. They include versions of all the PuTTY utilities (except the new and slightly experimental Windows pterm).
 (Not sure whether you want the 32-bit or the 64-bit version? Read the [FAQ entry](#).)
 We also publish the latest PuTTY installers for all Windows architectures as a free-of-charge download at the [Microsoft Store](#); they usually take a few days to appear there after we release them.

MSI ('Windows Installer')

64-bit x86:	putty-64bit-0.83-installer.msi	(signature)
64-bit Arm:	putty-arm64-0.83-installer.msi	(signature)
32-bit x86:	putty-0.83-installer.msi	(signature)

Unix source archive

.tar.gz:	putty-0.83.tar.gz	(signature)
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3. Install PuTTY on your local machine

This page contains download links for the latest released version of PuTTY. Currently this is 0.83, released on 2025-01-15.

When new releases come out, this page will update to contain the latest, so this is a good page to bookmark or link to.

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Downloads

putty-64bit-0.83-installer.msi

Open file

See more

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Unix source archive

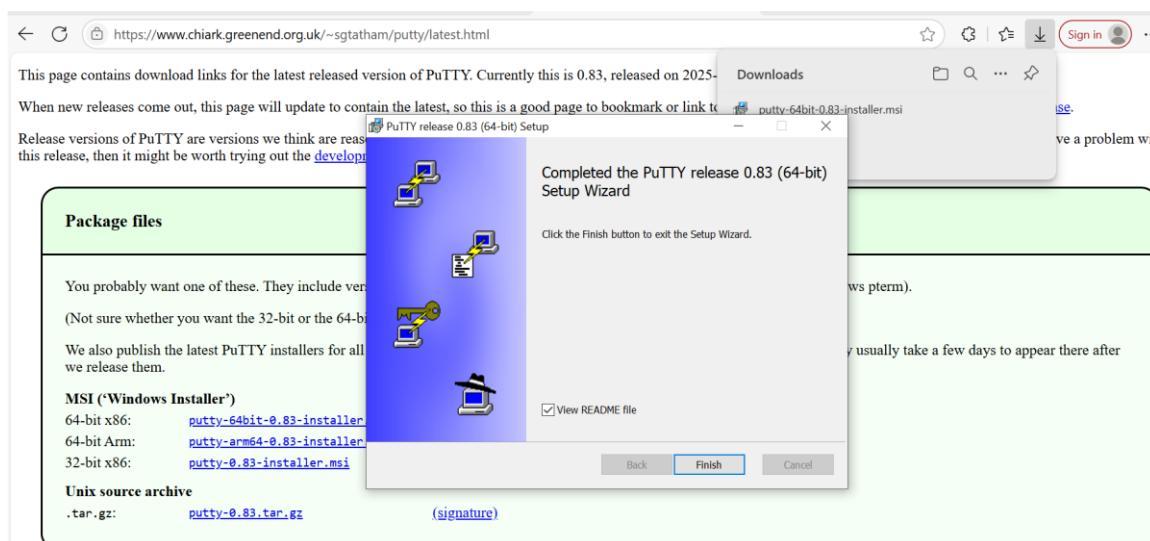
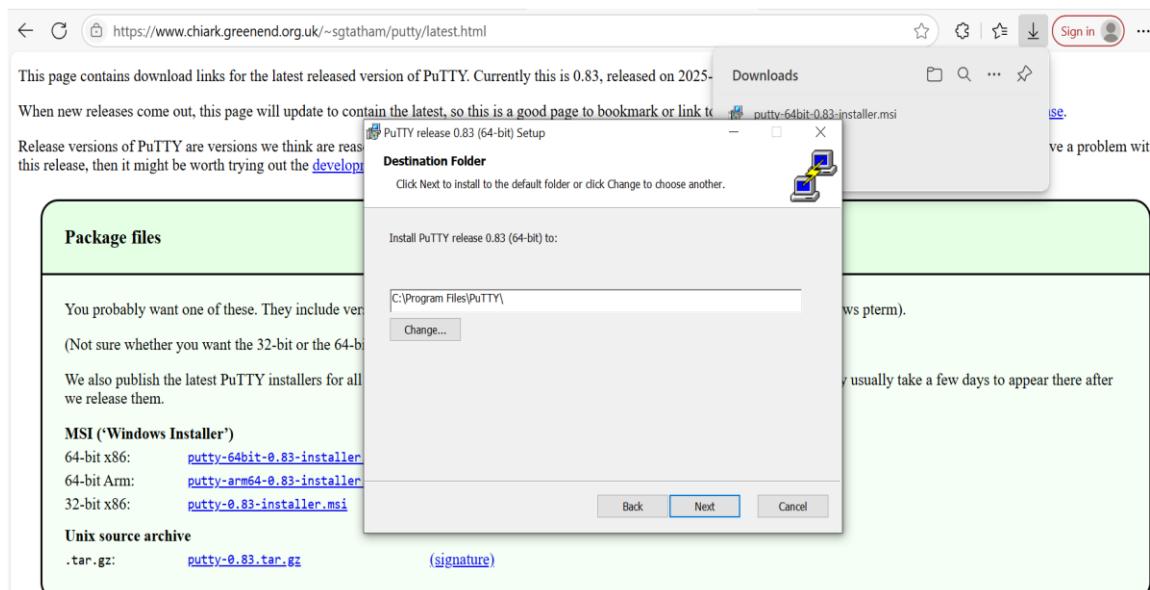
.tar.gz:	putty-0.83.tar.gz	(signature)
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PUTTY release 0.83 (64-bit) Setup

Welcome to the PuTTY release 0.83 (64-bit) Setup Wizard

The Setup Wizard will install PuTTY release 0.83 (64-bit) on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

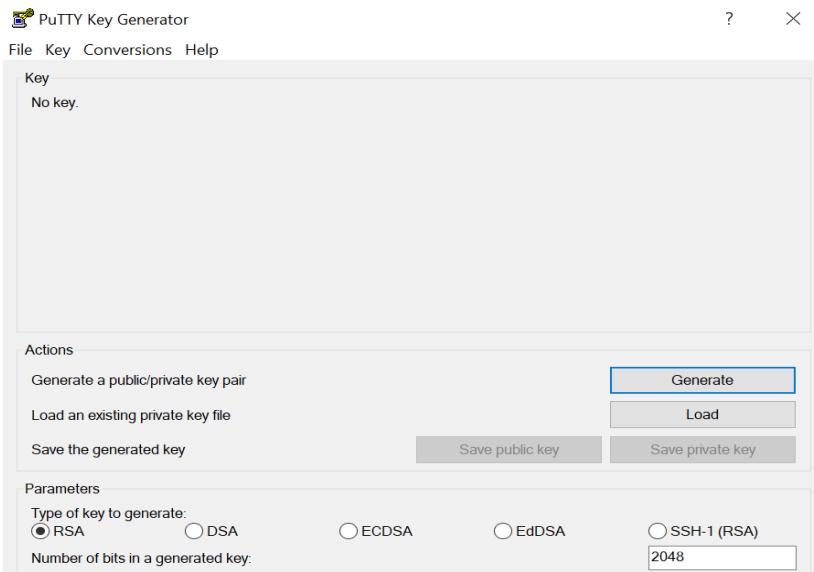
Back Next Cancel



Congratulations! Successfully downloaded PuTTY

Step 2: PuTTY Key Generator (PuTTYgen)

1. Once you [install the PuTTY](#) on your machine, you can easily run PuTTYgen. For the same, go to Windows -> Start Menu -> All Programs -> PuTTY -> PuTTYgen.
2. You will see the PuTTY key generator dialog box on your screen
3. You will find a “Generate” button in that dialog. Clicking on it will lead to generating the keys for you.



4. Now you will need to add a unique key passphrase in the Key passphrase and Confirm passphrase field.
5. Click on the “Save Public Key” and “Save Private Key” buttons to save your public and private keys.

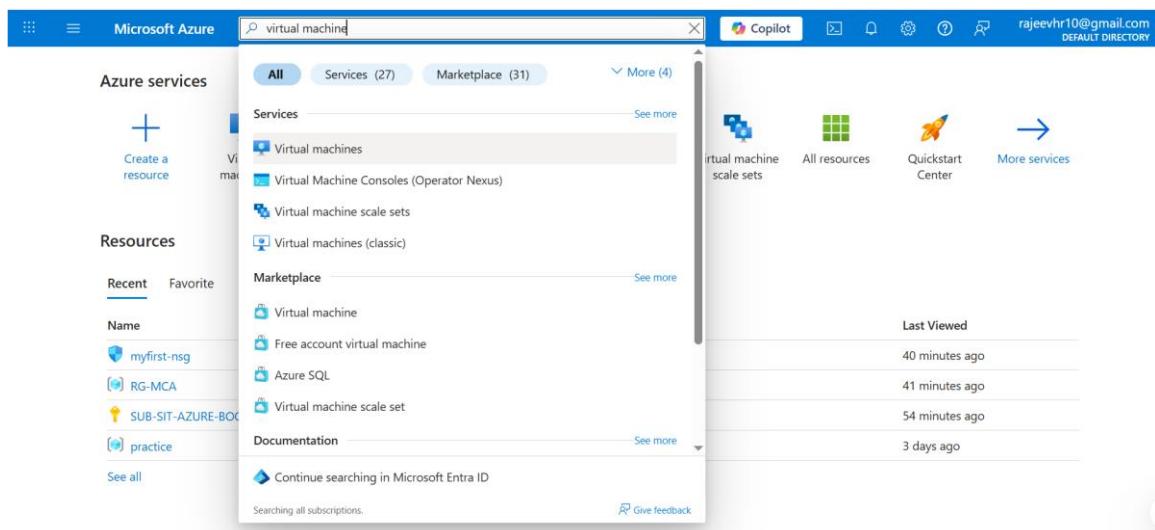
Creating an Ubuntu Virtual Machine

Step 3: Access Azure Portal

1. Log into your Azure account at portal.azure.com
 2. Navigate to the Azure Dashboard

Step 4: Start VM Creation

1. Click on "Virtual machines" from the Azure services menu



- ## 2. Click the "+ Create" button

The screenshot shows the Microsoft Azure portal interface. The URL is portal.azure.com/#view/Microsoft_Azure_ComputeHub/ComputeHubMenuBlade/-/virtualMachinesBrowse. The top navigation bar includes 'Microsoft Azure', a search bar, 'Copilot', and user information 'rajeevhr10@gmail.com DEFAULT DIRECTORY'. Below the navigation is a breadcrumb trail 'Home > Compute infrastructure'. The main title is 'Compute infrastructure | Virtual machines'. On the left, a sidebar menu under 'Virtual machines' lists 'Virtual Machine Scale Set (VMSS)', 'Compute Fleet', 'Disks + images', 'Capacity + placement', 'Related services', and 'Help'. The central content area displays a message 'No virtual machines to display' with a sub-instruction 'Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image.' A large 'Create' button is present. At the bottom, there's a note 'Showing 1 - 0 of 0. Display count: auto' and a 'Give feedback' link.

3. Select "virtual machine"

This screenshot is similar to the previous one but includes a vertical sidebar on the right side. The sidebar contains several sections: 'Virtual machine' (described as best for lower-traffic workloads, testing, or controlling highly customized apps), 'Virtual machine scale set (VMSS)' (described as built-in scaling for 1 to 1,000 VMs), 'Presets' (described as pre-configured VMs for memory, capacity, or general use), and 'Hybrid, preconfigured, and high volume solutions' (described as exploring pre-configured starter kits). The rest of the interface is identical to the first screenshot, showing the 'No virtual machines to display' message and the 'Create' button.

Step 5: Configure Basic Settings

Fill in the following information:

- Subscription:** Select your Azure subscription

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The screenshot shows the Microsoft Azure portal with the URL portal.azure.com/#create/Microsoft.VirtualMachine-ARM. The page title is "Create a virtual machine". The top navigation bar includes "Microsoft Azure", a search bar, and user information "rajeevhr10@gmail.com DEFAULT DIRECTORY". Below the title, there are three buttons: "Help me create a low cost VM", "Help me create a VM optimized for high availability", and "Help me choose the right VM size for my workload". The "Basics" tab is selected. A note says: "Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)". A warning message in a blue box says: "This subscription may not be eligible to deploy VMs of certain sizes in certain regions." The "Project details" section shows "Subscription" set to "SUB-SIT-AZURE-BOOTCAMP" and "Resource group" set to "(New) Resource group". At the bottom are buttons for "< Previous", "Next : Disks >", "Review + create", and "Give feedback".

- **Resource Group:** Create a new resource group or select an existing one

The screenshot shows the Microsoft Azure portal with the URL portal.azure.com/#create/Microsoft.VirtualMachine-ARM. The page title is "Create a virtual machine". The top navigation bar includes "Microsoft Azure", a search bar, and user information "rajeevhr10@gmail.com DEFAULT DIRECTORY". Below the title, there are three buttons: "Help me create a low cost VM", "Help me create a VM optimized for high availability", and "Help me choose the right VM size for my workload". The "Basics" tab is selected. A note says: "your resources." The "Project details" section shows "Subscription" set to "SUB-SIT-AZURE-BOOTCAMP" and "Resource group" set to "RG-MCA". A dropdown menu for "Select existing..." shows "NetworkWatcherRG" and "practice" listed, with "RG-MCA" highlighted. The "Instance details" section includes "Virtual machine name" set to "practice", "Region" set to "RG-MCA", and "Availability options" set to "Availability zone". Under "Zone options", the "Self-selected zone" radio button is selected, with the note "Choose up to 3 availability zones, one VM per zone". At the bottom are buttons for "< Previous", "Next : Disks >", "Review + create", and "Give feedback".

- **Virtual machine name:** Enter a descriptive name (e.g., "my-first-vm")

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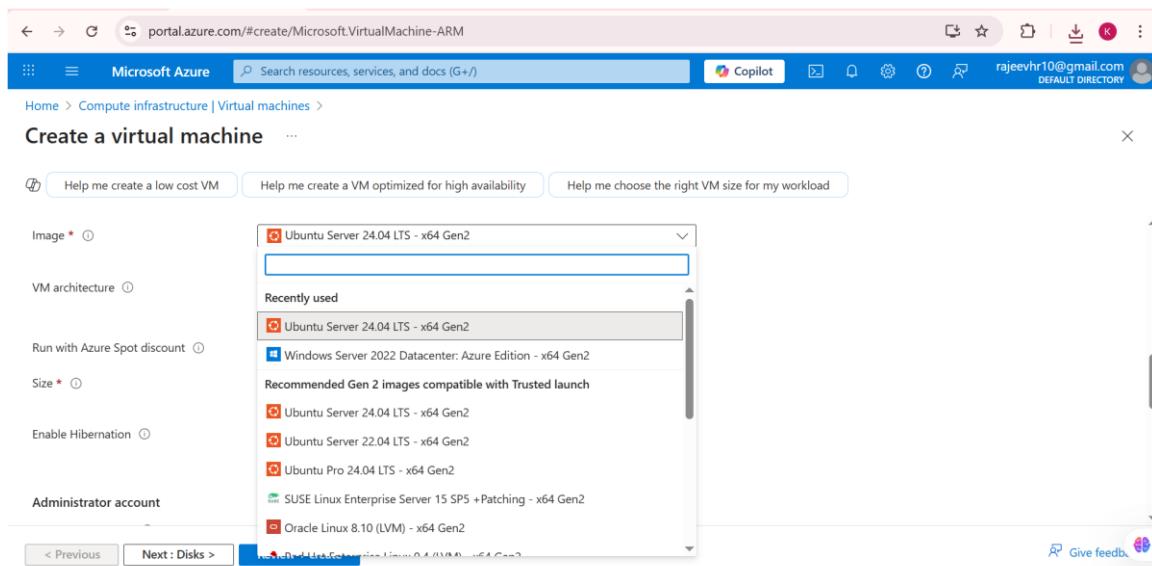
The screenshot shows the 'Create a virtual machine' wizard in the Azure portal. The 'Instance details' step is selected. The 'Virtual machine name' field contains 'my-first-vm'. The 'Region' dropdown is set to '(Asia Pacific) Australia East'. Under 'Availability options', the 'Self-selected zone' radio button is selected, with the note 'Choose up to 3 availability zones, one VM per zone'. Below it, the 'Azure-selected zone (Preview)' option is available with the note 'Let Azure assign the best zone for your needs'. The 'Availability zone' dropdown is set to 'Zone 1'. A note at the bottom states: 'You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)'.

- **Region:** Choose a region closest to your location (ex: Asia pacific – Australia East)
- **Availability options:** Leave as default

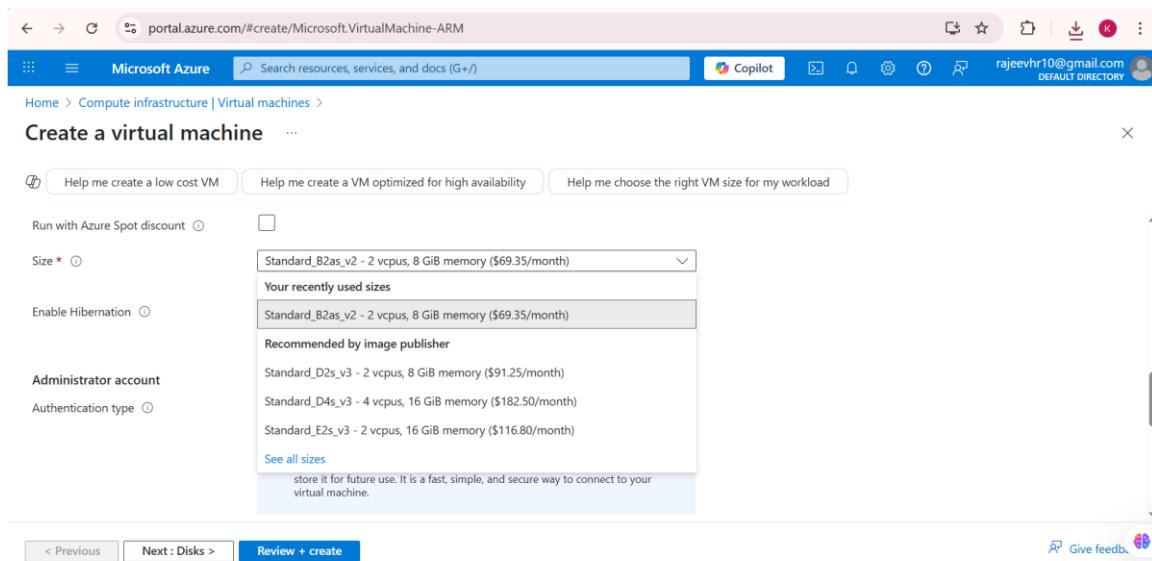
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Step 6: Select Ubuntu Image

1. **Image:** Search for and select "Ubuntu Server 20.04 LTS" or latest version



2. Size: Choose "Standard_B2as_v2 – 2vcpus"



Step 7: Configure Authentication

1. **Authentication type:** Select "SSH public key"
2. **Username:** Enter "azureuser" (or your preferred username)
3. **SSH public key source:** Select "Generate new key pair"

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The screenshot shows the Azure portal interface for creating a virtual machine. The user is on Step 4 of the wizard, titled 'Create a virtual machine'. The section is titled 'Administrator account' and specifically focuses on 'Authentication type'. The 'SSH public key' option is selected, indicated by a blue radio button. Below this, there is a note: 'Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine.' A text input field contains the value 'azureuser'. Under 'SSH public key source', a dropdown menu is set to 'Generate new key pair'. Another dropdown for 'SSH Key Type' has 'RSA SSH Format' selected. A note below states: 'Ed25519 provides a fixed security level of no more than 128 bits for 256-bit key, while RSA could offer better security with keys longer than 3072 bits.' Navigation buttons at the bottom include '< Previous', 'Next : Disks >', and 'Review + create'.

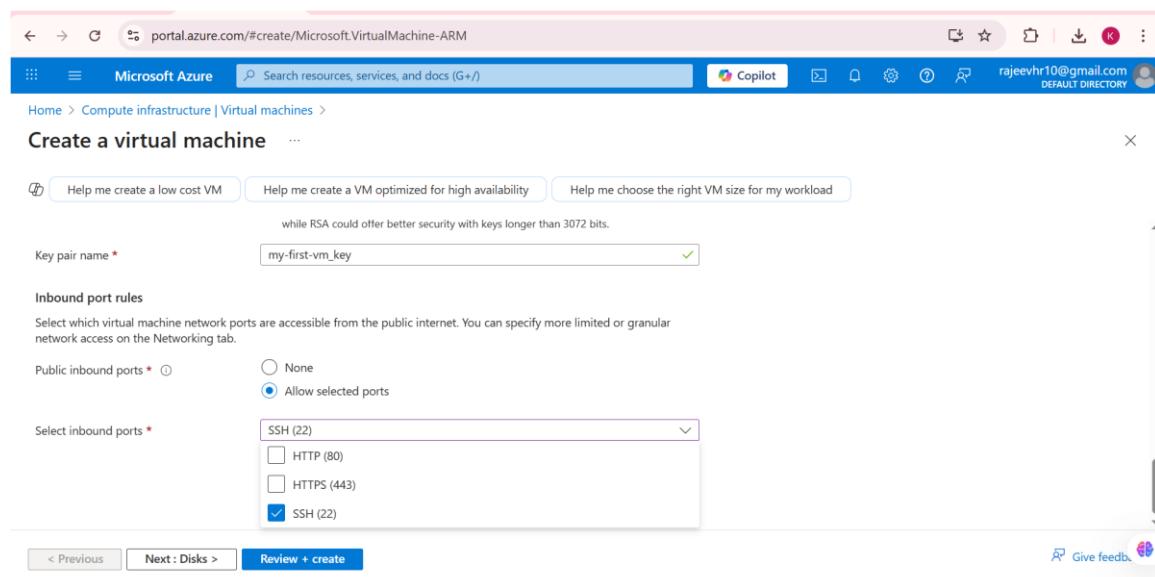
4. **Key pair name:** Enter a name for your key pair

The screenshot shows the continuation of the 'Create a virtual machine' wizard. The user is on Step 5, titled 'Create a virtual machine'. The section is titled 'Inbound port rules' with the sub-instruction: 'Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.' Under 'Public inbound ports', the 'Allow selected ports' option is selected. In the 'Select inbound ports' dropdown, 'SSH (22)' is checked, while 'HTTP (80)' and 'HTTPS (443)' are unchecked. Navigation buttons at the bottom include '< Previous', 'Next : Disks >', and 'Review + create'.

Step 8: Configure Networking

1. **Public inbound ports:** Select "Allow selected ports"
2. **Select inbound ports:** Choose "SSH (22)"

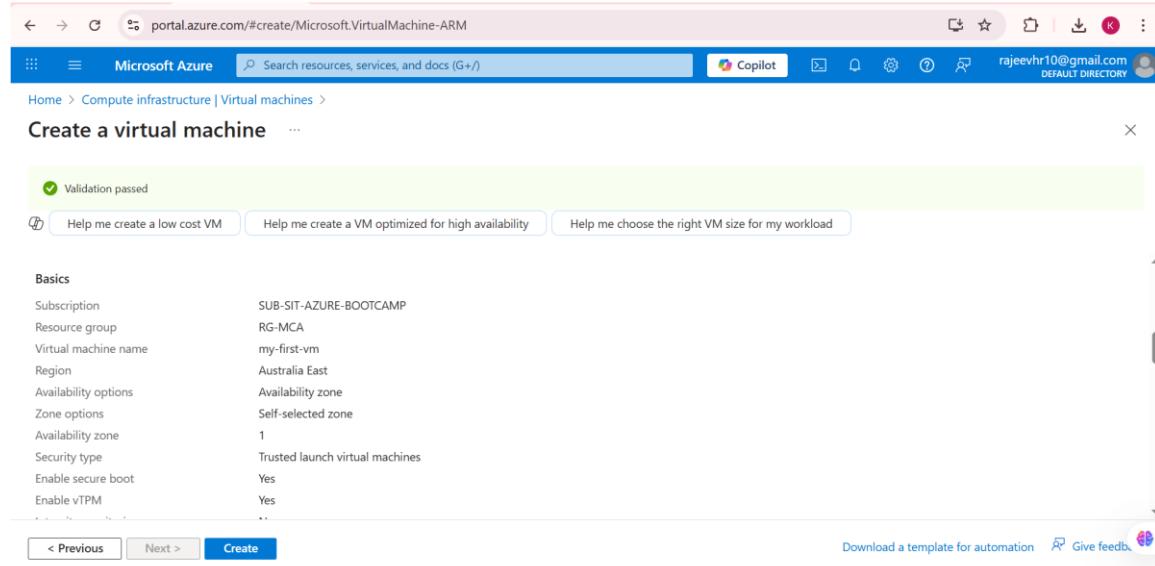
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The screenshot shows the Azure portal interface for creating a virtual machine. The URL is portal.azure.com/#create/Microsoft.VirtualMachine-ARM. The page title is "Create a virtual machine". There are three help buttons at the top: "Help me create a low cost VM", "Help me create a VM optimized for high availability", and "Help me choose the right VM size for my workload". Below these is a note about RSA key length. A "Key pair name" input field contains "my-first-vm_key". Under "Inbound port rules", the "Allow selected ports" option is selected. In the "Select inbound ports" dropdown, "SSH (22)" is checked. At the bottom, there are navigation buttons: "< Previous", "Next : Disks >", and a blue "Review + create" button.

Step 9: Review and Create

1. Click "Review + create"
2. Review all settings carefully
3. Click "Create" to deploy the virtual machine



The screenshot shows the Azure portal interface for creating a virtual machine, step 9. The URL is portal.azure.com/#create/Microsoft.VirtualMachine-ARM. The page title is "Create a virtual machine". A green banner at the top says "Validation passed". There are three help buttons: "Help me create a low cost VM", "Help me create a VM optimized for high availability", and "Help me choose the right VM size for my workload". Below is a "Basics" section with the following configuration:

Subscription	SUB-SIT-AZURE-BOOTCAMP
Resource group	RG-MCA
Virtual machine name	my-first-vm
Region	Australia East
Availability options	Availability zone
Zone options	Self-selected zone
Availability zone	1
Security type	Trusted launch virtual machines
Enable secure boot	Yes
Enable vTPM	Yes

At the bottom, there are navigation buttons: "< Previous", "Next >", and a blue "Create" button. There are also links for "Download a template for automation" and "Give feedback".

Step 10: Download Private Key

1. When the deployment dialog appears, download and save the private key (.pem file)
2. Store it securely as you'll need it for SSH connection

The screenshot shows the Azure portal interface for creating a virtual machine. On the left, there's a sidebar with 'Networking' and 'Management' sections. In the center, a modal window titled 'Generate new key pair' provides instructions about SSH key pairs and offers options to download the private key or return to the main creation page.

Step 11: Wait for Deployment

Monitor the deployment progress until it shows "Your deployment is complete"

This screenshot shows the 'Deployment Details' blade for a specific deployment. The deployment name is 'CreateVm-canonical.ubuntu-24_04-Its-server-20250723215341'. The status is indicated as 'Deployment is in progress'. The blade also displays deployment details such as the deployment name, subscription, start time, and correlation ID. It includes sections for giving feedback, working with experts, and promotional links for Microsoft Defender for Cloud and free Microsoft tutorials.

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The screenshot shows the Microsoft Azure portal with a deployment overview page. The deployment name is "CreateVm-canonical.ubuntu-24_04-Its-server-20250723215341". A prominent message says "Your deployment is complete" with a green checkmark. Deployment details include a start time of 7/23/2025, 10:07:05 PM, and a correlation ID of 98ab5cd6-6fe6-488a-b860-8. The portal also features a sidebar with links like "Cost Management", "Microsoft Defender for Cloud", and "Free Microsoft tutorials".

Step 12: Go to Resource

Click "Go to resource" to access your newly created VM

The screenshot shows the Azure portal with the "my-first-vm" virtual machine details page. The "Overview" tab is selected, displaying essential information such as the operating system (Linux, Ubuntu 24.04), size (Standard B2as v2), and public IP address (20.70.130.108). The "Connect" button is highlighted at the top of the page.

Click on the “Connect” button at the top.

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The screenshot shows the Azure portal interface for a virtual machine named 'my-first-vm'. The left sidebar has a 'Connect' section highlighted. The main content area displays the VM's configuration, including its operating system (Linux, ubuntu 24.04), size (Standard B2as v2), and public IP address (20.70.130.108). A 'Connect' button is visible at the top right of the main content area.

- Under “Recommended” connection methods, choose **SSH using Azure CLI**.
- Click “Select” under **SSH using Azure CLI**.

The screenshot shows the 'my-first-vm | Connect' page. The 'Connect' section is highlighted in the sidebar. The main area shows a 'Connecting using' section with the Public IP address set to 20.70.130.108. Below it, there are two options: 'SSH using Azure CLI' and 'Native SSH'. Both options have a 'Select' button. The 'SSH using Azure CLI' option is described as quickly connecting via browser or Microsoft Entra ID authentication.

- Check the box: “**I understand just-in-time policy...**”
- Click on “**Configure + connect**” to initiate the SSH session via Azure CLI.

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The screenshot shows the Azure portal interface for a virtual machine named 'my-first-vm'. In the 'Connect' section, there are two main options: 'SSH using Azure CLI' and 'Native SSH'. The 'SSH using Azure CLI' option is selected. A modal window titled 'SSH using Azure CLI' provides instructions and prerequisites for connecting via the Azure CLI. It lists 'System assigned managed identity' and 'Microsoft Entra ID SSH Login Extension' as required features. The public IP address of the VM is shown as 20.70.130.108.

- The Azure Cloud Shell opens at the bottom.
- You'll be prompted to verify the authenticity of the SSH host.
- Type yes when asked:
Are you sure you want to continue connecting (yes/no/[fingerprint])?

The screenshot shows the Azure portal interface for a virtual machine named 'my-first-vm'. In the 'Connect' section, there are two main options: 'SSH using Azure CLI' and 'Native SSH'. The 'SSH using Azure CLI' option is selected. A modal window titled 'SSH using Azure CLI' provides instructions and prerequisites for connecting via the Azure CLI. It lists 'System assigned managed identity' and 'Microsoft Entra ID SSH Login Extension' as required features. The public IP address of the VM is shown as 20.70.130.108. Below the modal, the Azure Cloud Shell interface is visible, showing a welcome message and a prompt for confirming the connection.

- Successfully Logged Into the VM

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The screenshot shows the Microsoft Azure portal interface. On the left, there's a sidebar with options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, and Connect. Under Connect, the 'my-first-vm' virtual machine is selected. The main pane shows the VM details: Admin username (azureuser), Port (22), and Just-in-time policy (Unsupported by plan). Below this, there are two tabs: Recommended and Most common, with the Most common tab selected. A 'Connect' button is visible. At the bottom, there are tabs for Local machine, Azure portal, and another Local machine tab. A modal window titled 'SSH using Azure CLI' is open on the right, with the sub-section 'Configure prerequisites for SSH using Azure CLI'. It lists two items: 'Prerequisites configured' (with a green checkmark) and 'System assigned managed identity' (with a note about Azure configuring a system-assigned managed identity for the extension). The terminal window at the bottom shows the following text:

```
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

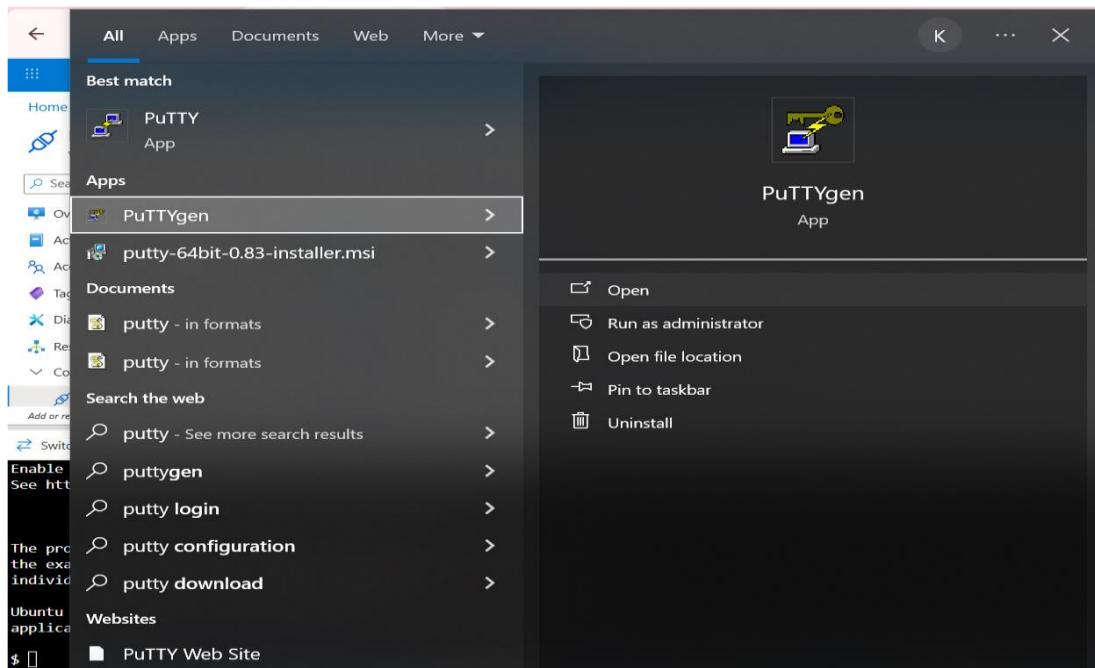
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
```

Connecting to Ubuntu VM using PuTTY

Step 13: Convert .pem to .ppk using PuTTYgen

1. Open PuTTYgen

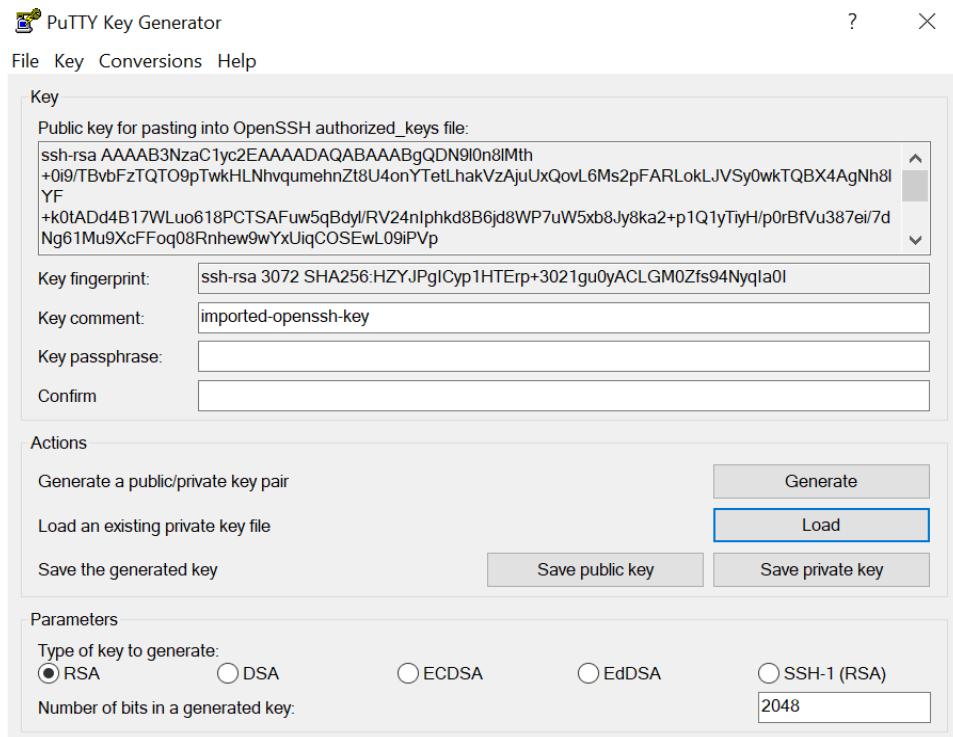
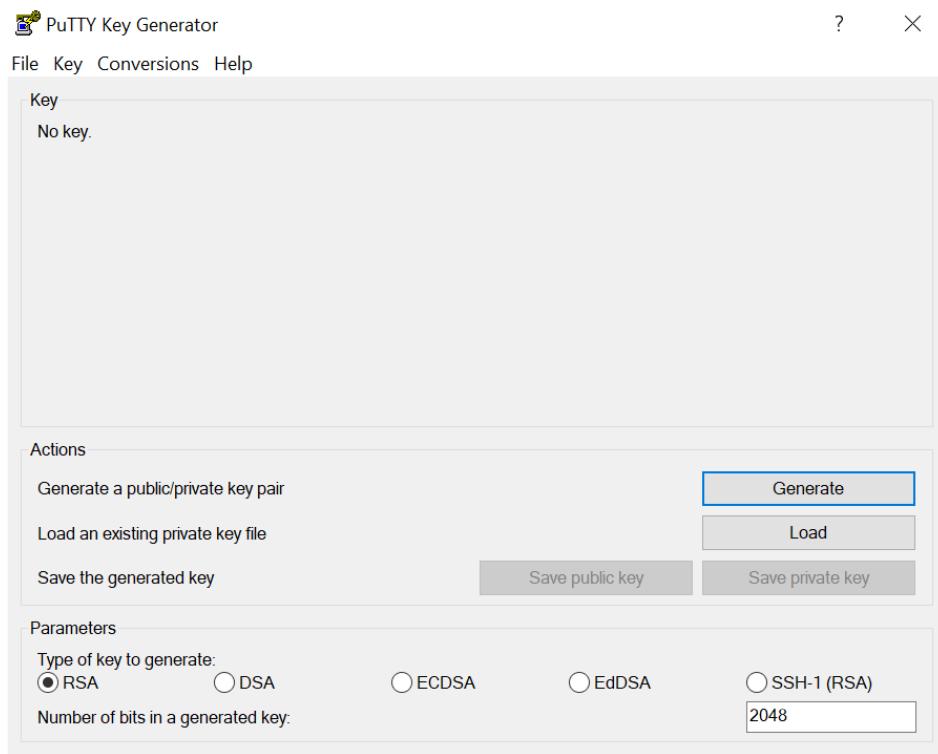
- o Launch the PuTTY Key Generator application



Load the Private Key

- Click "Load" button
- Change file type to "All Files (.)"
- Navigate to your Downloads folder
- Select the .pem file you downloaded from Azure
- Click "Open"

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Save Private Key

- Click "Save private key"
- Choose "Yes" when prompted about saving without passphrase
- Save the file with .ppk extension in a secure location

Step 14: Get VM Public IP Address

1. In Azure Portal, go to your VM resource
2. Copy the Public IP address from the overview page

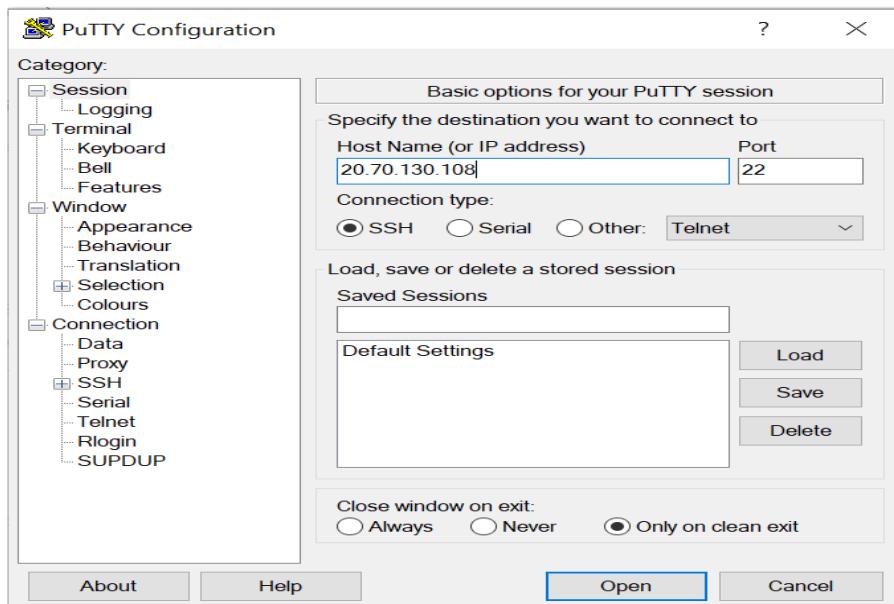
The screenshot shows the Microsoft Azure portal interface. The URL in the address bar is `portal.azure.com/#@rajeevhr10@gmail.onmicrosoft.com/resource/subscriptions/891a9d51-d066-4ae2-9b87-27a799e096a6/resourcegr...`. The user is signed in as `rajeevhr10@gmail.com`. The main page title is "my-first-vm" under the "Virtual machine" category. The left sidebar contains navigation links like Home, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Connect (with options for Connect and Bastion), Networking, Settings, Availability + scale, Security, Backup + disaster recovery, Operations, Monitoring, and Automation. The central pane is titled "Overview" and displays the following details for the VM:

Essentials	
Resource group (move)	: RG-MCA
Status	: Running
Location	: Australia East (Zone 1)
Subscription (move)	: SUB-SIT-AZURE-BOOTCAMP
Subscription ID	: 891a9d51-d066-4ae2-9b87-27a799e096a6
Availability zone	: 1
Tags (edit)	: Add tags

On the right side, there are sections for Properties, Monitoring, Capabilities (7), Recommendations, and Tutorials. Under the "Properties" tab, the "Virtual machine" section shows the Computer name as "my-first-vm", Operating system as "Linux (ubuntu 24.04)", VM generation as "V2", VM architecture as "x64", and Agent status as "Ready". The "Networking" section lists the Public IP address as "20.70.130.108" (Network interface "my-first-vm19_z1"). Other networking details include Public IP address (IPv6) as "-", Private IP address as "10.0.0.5", Private IP address (IPv6) as "-", and Virtual network/subnet as "VirtualNetwork1/default".

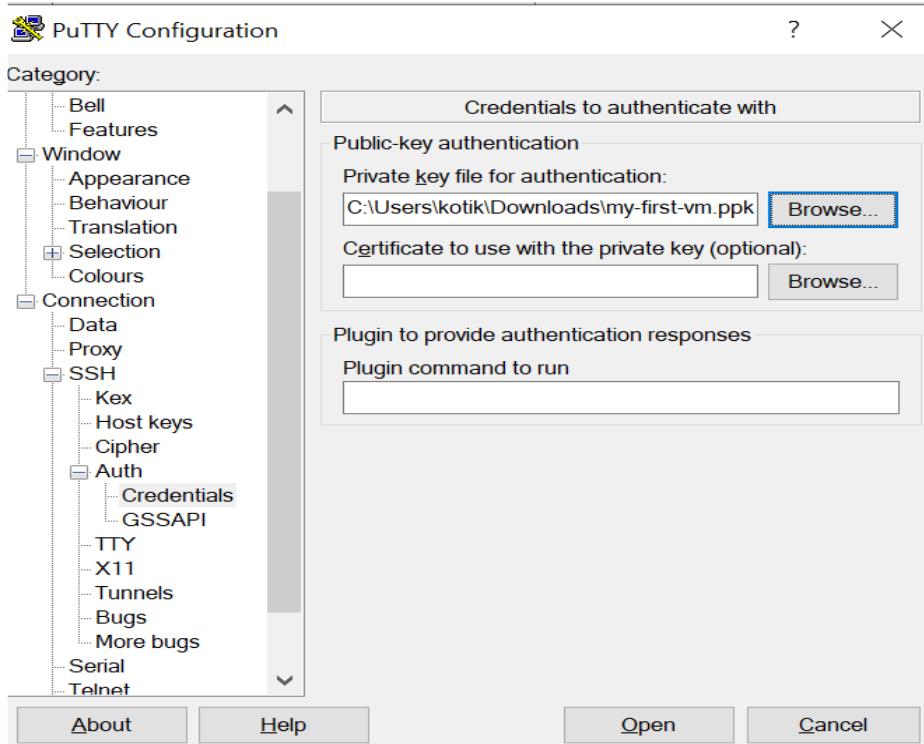
Step 15: Configure PuTTY Connection

1. Open PuTTY application
2. **Host Name:** Paste the copied public IP address
3. **Port:** 22 (default for SSH)
4. **Connection type:** SSH



Step 16: Configure SSH Authentication

1. In the left panel, expand "SSH" → "Auth" → "Credentials"
2. Click "Browse" next to "Private key file for authentication"
3. Select the .ppk file you created earlier



Step 17: Establish Connection

1. Click "Open" to connect
2. **Login as:** Enter your username (e.g., "azureuser")

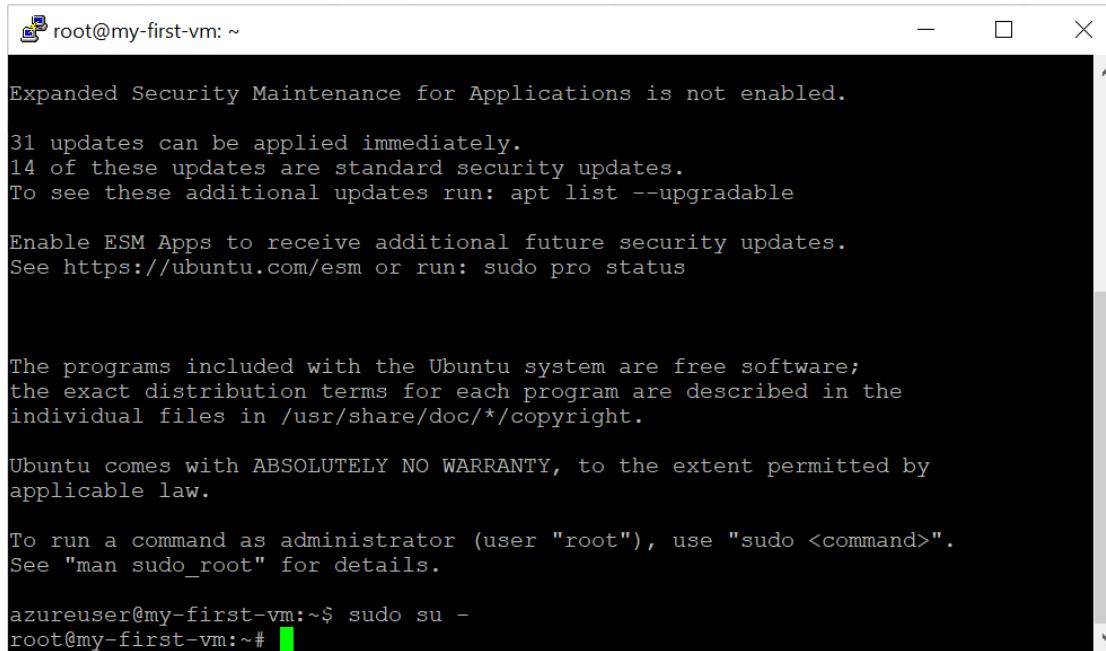


Initial System Setup

Step 18: Switch to Root User

Once connected to your Ubuntu VM, run:

```
sudo su -
```



```
root@my-first-vm: ~
Expanded Security Maintenance for Applications is not enabled.

31 updates can be applied immediately.
14 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

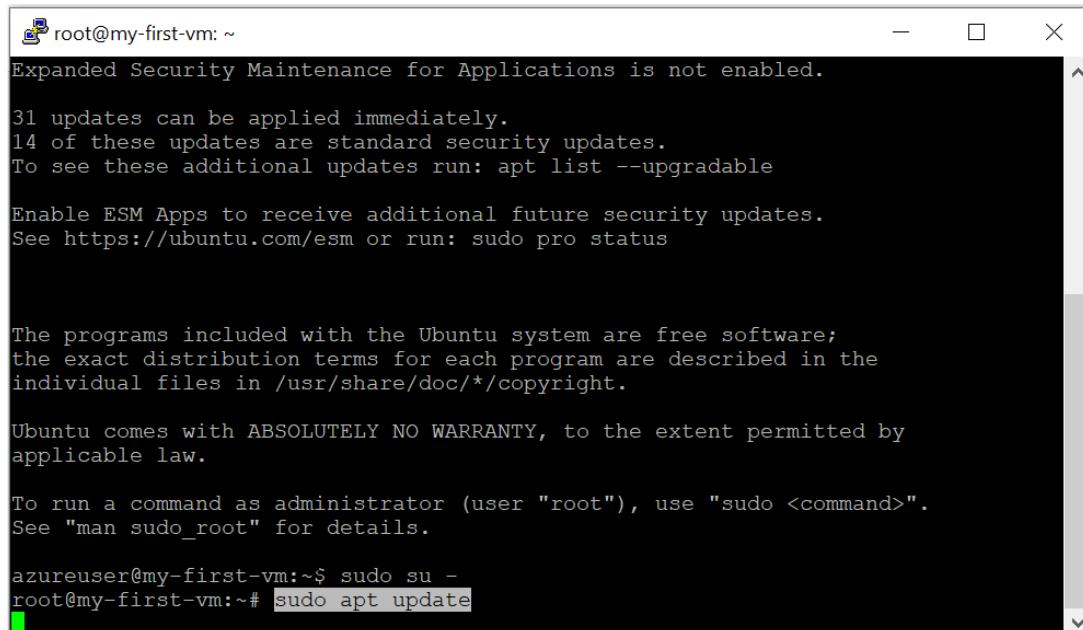
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@my-first-vm:~$ sudo su -
root@my-first-vm:~#
```

Step 19: Update System Packages



```
root@my-first-vm: ~
Expanded Security Maintenance for Applications is not enabled.

31 updates can be applied immediately.
14 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
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Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

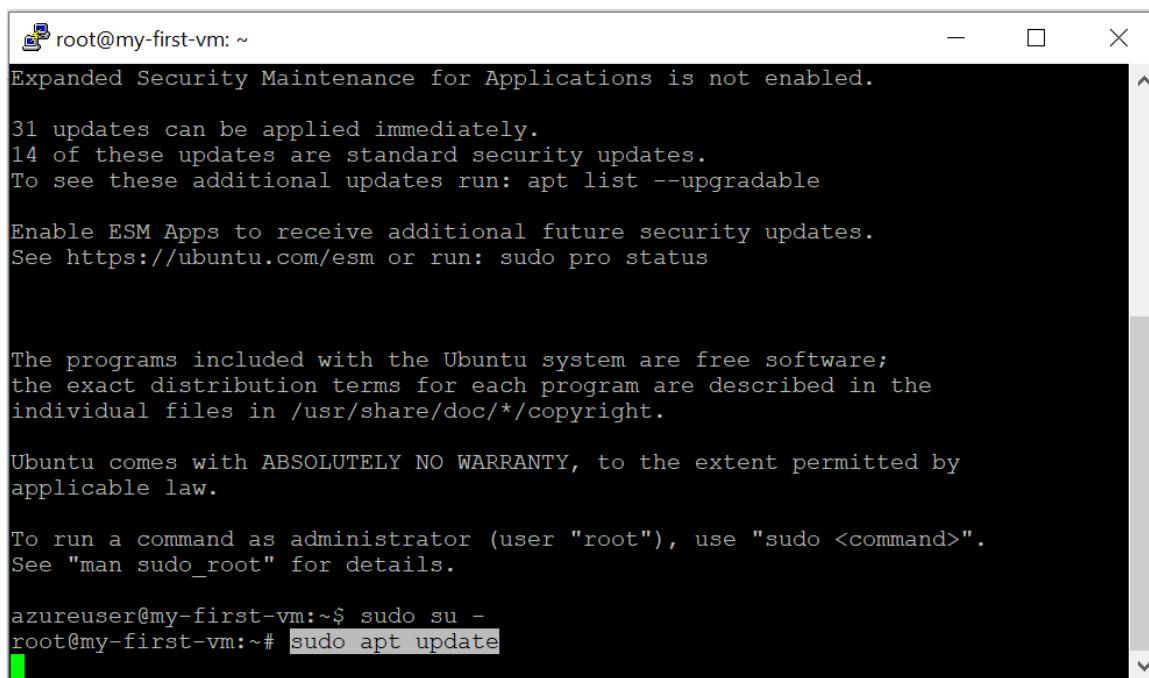
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@my-first-vm:~$ sudo su -
root@my-first-vm:~# sudo apt update
```

Installing Apache and PHP

Step 20: Install Apache Web Server and PHP

```
sudo apt install -y apache2 php libapache2-mod-php
```



The screenshot shows a terminal window with the following text:

```
root@my-first-vm: ~
Expanded Security Maintenance for Applications is not enabled.

31 updates can be applied immediately.
14 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@my-first-vm:~$ sudo su -
root@my-first-vm:~# sudo apt update
```

Step 21: Verify PHP Installation

```
php -v
```

Expected output should show PHP version information.

Creating and Testing PHP File

Step 22: Navigate to Web Root Directory

```
cd /var/www/html
```

Step 23: Create PHP Info File

```
sudo nano info.php
```

Step 24: Add PHP Code

Type the following content in the nano editor:

```
<?php
phpinfo();
?>
```

Step 25: Save and Exit

- Press **Ctrl + O** to save
- Press **Enter** to confirm filename
- Press **Ctrl + X** to exit

Step 26: Restart Apache Service

```
sudo systemctl restart apache2
```

Enabling HTTP Access (Port 80)

Step 27: Access Networking Settings

1. In Azure Portal, go to your VM
2. Click "Networking" from the left menu
3. Click "Network settings"

Step 28: Create Inbound Port Rule

1. Click "Create port rule"
2. Select "Inbound port rule"

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Step 29: Configure HTTP Rule

Fill in the following:

- Service:** Select "HTTP"
- Protocol:** TCP
- Destination port ranges:** 80
- Action:** Allow
- Name:** HTTP-80

- Click "Add" to create the rule

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The screenshot shows the Azure portal interface for managing network settings. The left sidebar navigation includes: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Connect, Networking, Network settings (selected), Load balancing, Application security groups, Network manager, Settings, Availability + scale, Security, Backup + disaster recovery, and Operations. The main content area displays the 'my-first-vm' virtual machine's network settings, specifically the Network security group 'my-first-vm-nsg'. It lists five inbound port rules and three outbound port rules. The inbound rules include SSH (Priority 300, Port 22, TCP, Any, Any, Allow), AllowAnyHTTPInbound (Priority 310, Port 80, TCP, Any, Any, Allow), AllowVnetInbound (Priority 65000, Port Any, Any, VirtualNetwork, VirtualNetwork, Allow), AllowAzureLoadBalancerInbound (Priority 65001, Port Any, Any, AzureLoadBalancer, Any, Allow), and DenyAllInbound (Priority 65500, Port Any, Any, Any, Any, Deny). The outbound rules include AllowVnetOutbound (Priority 65000, Port Any, Any, VirtualNetwork, VirtualNetwork, Allow), AllowAzureLoadBalancerOutbound (Priority 65001, Port Any, Any, AzureLoadBalancer, Any, Allow), and DenyAllOutbound (Priority 65500, Port Any, Any, Any, Any, Deny).

Priority	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
310	AllowAnyHTTPInbound	80	TCP	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInbound	Any	Any	Any	Any	Deny
> Outbound port rules (3)						
65000	AllowVnetOutbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerOutbound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllOutbound	Any	Any	Any	Any	Deny

Test Web Server

Step 30: Test Apache Default Page

1. Open a web browser
2. Navigate to: [http://\[YOUR-VM-PUBLIC-IP\]/](http://[YOUR-VM-PUBLIC-IP]/) [Ex: http://20.70.130.108/]
3. You should see the Apache2 default page



Step 31: Test PHP Configuration

1. Navigate to: [http://\[YOUR-VM-PUBLIC-IP\]/info.php](http://[YOUR-VM-PUBLIC-IP]/info.php)
2. You should see the PHP information page with configuration details

System	Linux my-first-vm 6.11.0-1018-azure #18~24.04.1-Ubuntu SMP Sat Jun 28 04:46:03 UTC 2025 x86_64
Build Date	Jul 14 2025 18:30:55
Build System	Linux
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.3/apache2
Loaded Configuration File	/etc/php/8.3/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/8.3/apache2/conf.d
Additional .ini files parsed	/etc/php/8.3/apache2/conf.d/10-opcache.ini, /etc/php/8.3/apache2/conf.d/10-pdo.ini, /etc/php/8.3/apache2/conf.d/20-calendard.ini, /etc/php/8.3/apache2/conf.d/20-ctype.ini, /etc/php/8.3/apache2/conf.d/20-exif.ini, /etc/php/8.3/apache2/conf.d/20-fil.ini, /etc/php/8.3/apache2/conf.d/20-filinfo.ini, /etc/php/8.3/apache2/conf.d/20-fp.ini, /etc/php/8.3/apache2/conf.d/20-gettext.ini, /etc/php/8.3/apache2/conf.d/20-gd.ini, /etc/php/8.3/apache2/conf.d/20-phar.ini, /etc/php/8.3/apache2/conf.d/20-posix.ini, /etc/php/8.3/apache2/conf.d/20-pspell.ini, /etc/php/8.3/apache2/conf.d/20-shmop.ini, /etc/php/8.3/apache2/conf.d/20-sockets.ini, /etc/php/8.3/apache2/conf.d/20-sysvmsg.ini, /etc/php/8.3/apache2/conf.d/20-sysvsem.ini, /etc/php/8.3/apache2/conf.d/20-sysvshm.ini, /etc/php/8.3/apache2/conf.d/20-tokenizer.ini
PHP API	20230831
PHP Extension	20230831
Zend Extension	420230831
Zend Extension Build	API420230831.NTS
PHP Extension Build	API20230831.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled

Accessing Ubuntu VM using FileZilla

Downloading and Installing FileZilla

Access FileZilla Website

1. Open your web browser
2. Navigate to the official FileZilla website: <https://filezilla-project.org/>

The screenshot shows the official FileZilla Project website at filezilla-project.org. The page features a red header with the FileZilla logo and the tagline "The free FTP solution". A promotion for "FileZilla Pro" is displayed, showing its logo and the text "The Best FTP Solution" along with icons for various cloud storage services. Below the header, there's a sidebar with links for "Home", "FileZilla" (Features, Screenshots, Download, Documentation), "FileZilla Server" (Download), "Community" (Forum, Wiki), "General" (FAQ, Support, Contact, License, Privacy Policy, Trademark Policy), and "Development" (Source code, Nightly builds, Translations, Version history, Changelog). The main content area has a section titled "Overview" with text about the software's capabilities and support. It also features two prominent download buttons: "Download FileZilla Client" and "Download FileZilla Server", both with arrows pointing downwards and the note "All platforms". A message at the bottom encourages users to pick the client or server based on their needs.

Download FileZilla Client

1. Click on "Download FileZilla Client" button
2. The website will automatically detect your operating system

The screenshot shows the official FileZilla download page at filezilla-project.org/download.php?type=client. On the left, there's a sidebar with links for Home, FileZilla (Features, Screenshots, Download, Documentation, FileZilla Pro, RemoteDrive), FileZilla Server (Download), Community (Forum, Wiki), General (FAQ, Support, Contact, License, Privacy Policy, Trademark Policy), and Development (Source code, Nightly builds). The main content area features a promotion for FileZilla Pro. Below it, a section titled "Download FileZilla Client for Windows (64bit x86)" displays the latest stable version (3.69.2) and asks the user to select their platform. A green button labeled "Download FileZilla Client" with a red arrow points to the Windows 64-bit x86 link. To the right, there's a screenshot of the FileZilla interface and links for "More download options" and "Other platforms".

- Click "Download" to begin downloading the installer

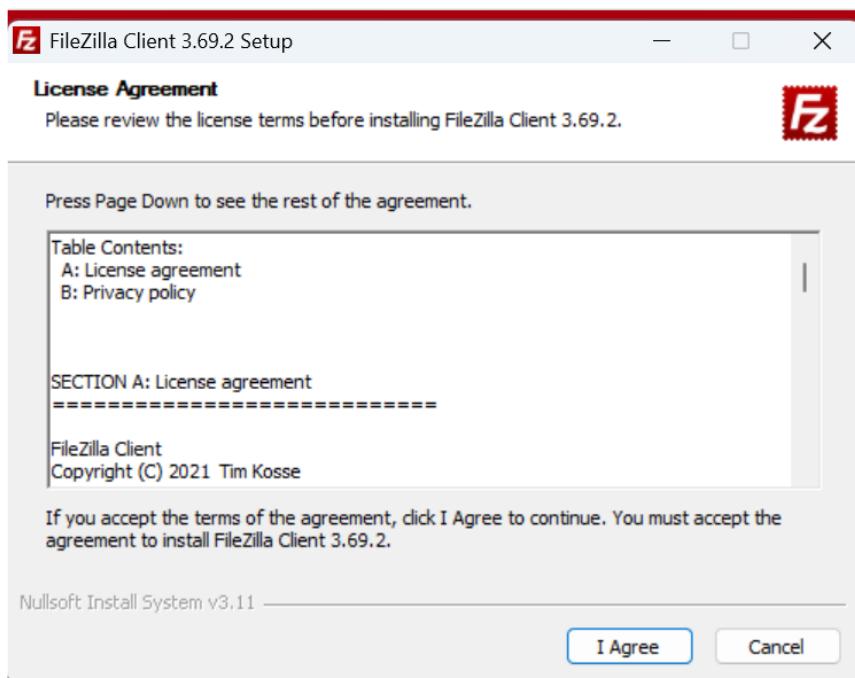
This screenshot shows the "FileZilla Client: Select your edition" page. It lists four editions: FileZilla, FileZilla Bundle, FileZilla Pro, and FileZilla Pro Bundle. The "FileZilla" edition is selected. A table compares the features of each edition across various functions: FTP/FTPS/SFTP, Detailed Manual, Batch Automation, Multi-cloud Support, and Synchronization. Under "FileZilla", all features are marked with a checkmark. Under "FileZilla Bundle", "FileZilla Pro", and "FileZilla Pro Bundle", some features have a checkmark while others are marked with an 'X'. Below the table, there's a note about bundled offers and supported Windows versions (10 and 11), and links for "More download options" and "Other platforms". On the right, there's a screenshot of the FileZilla interface.

Run the Installer

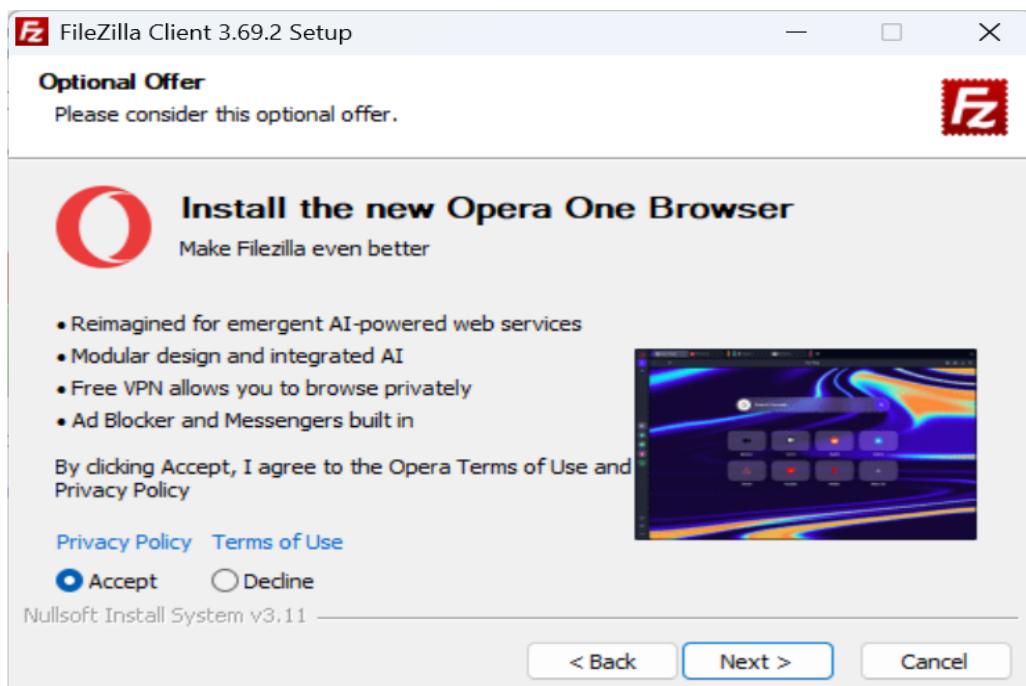
1. Locate the downloaded installer file (usually in Downloads folder)
2. Double-click the installer to run it
3. If prompted by Windows Security, click "Yes" to allow the installation

Accept License Agreement

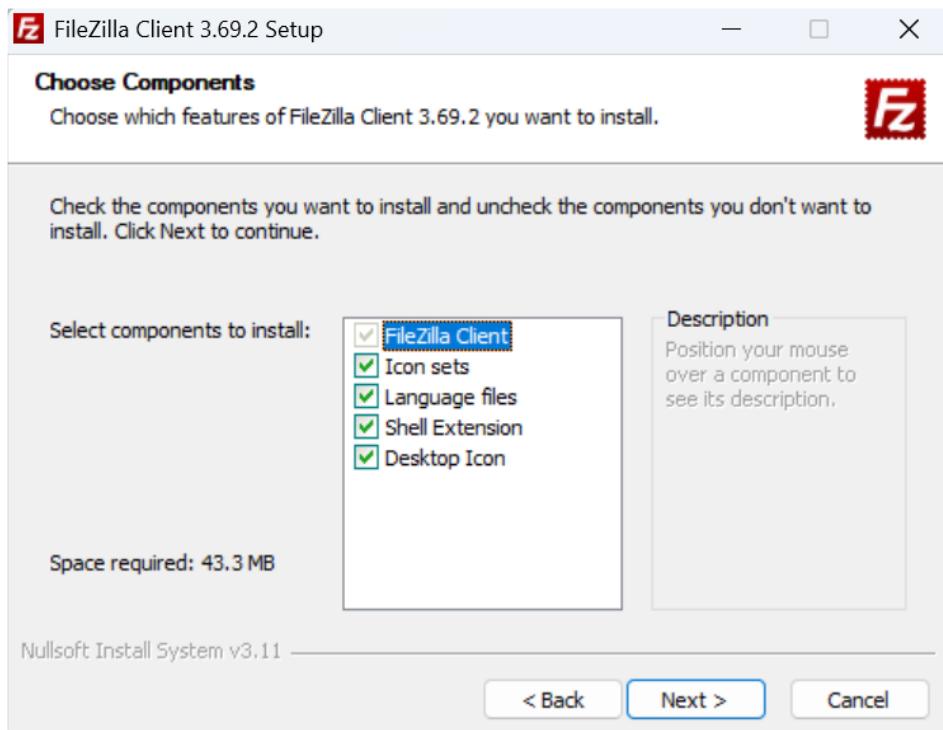
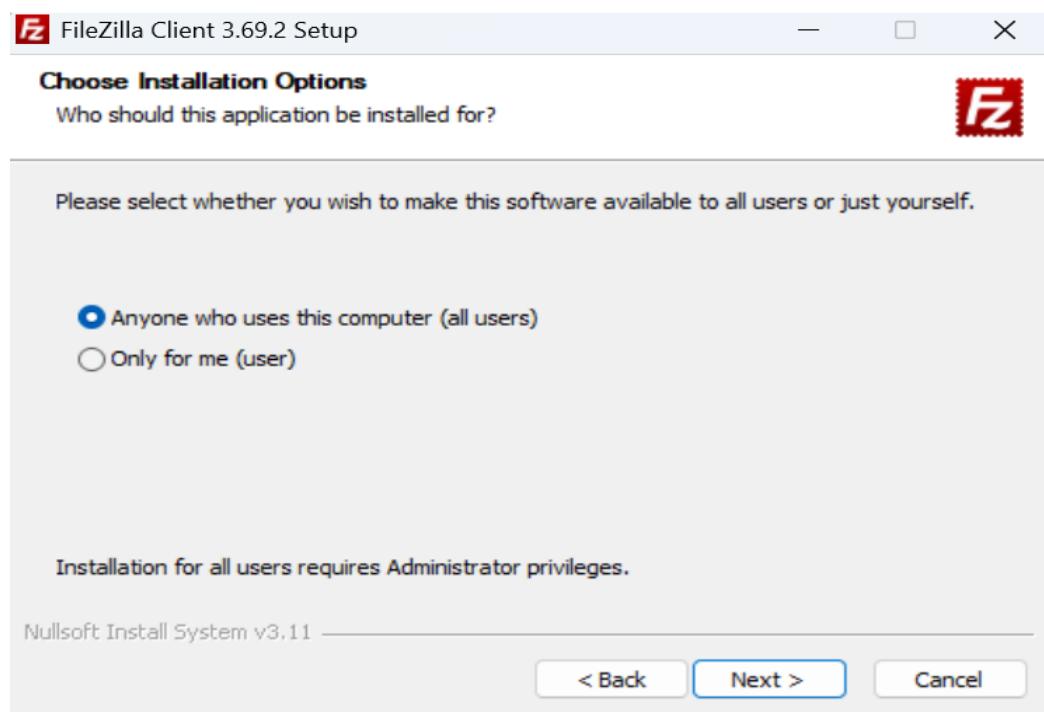
1. Read the license agreement
2. Click "I Agree" to accept the terms and conditions



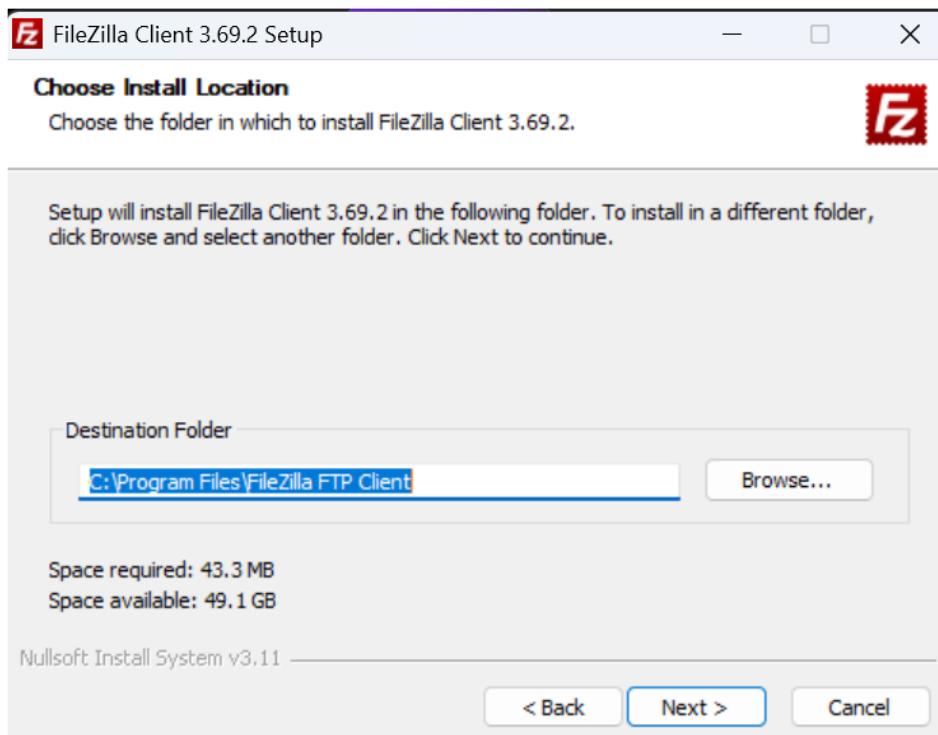
- Select "Accept" and click "Next" to continue



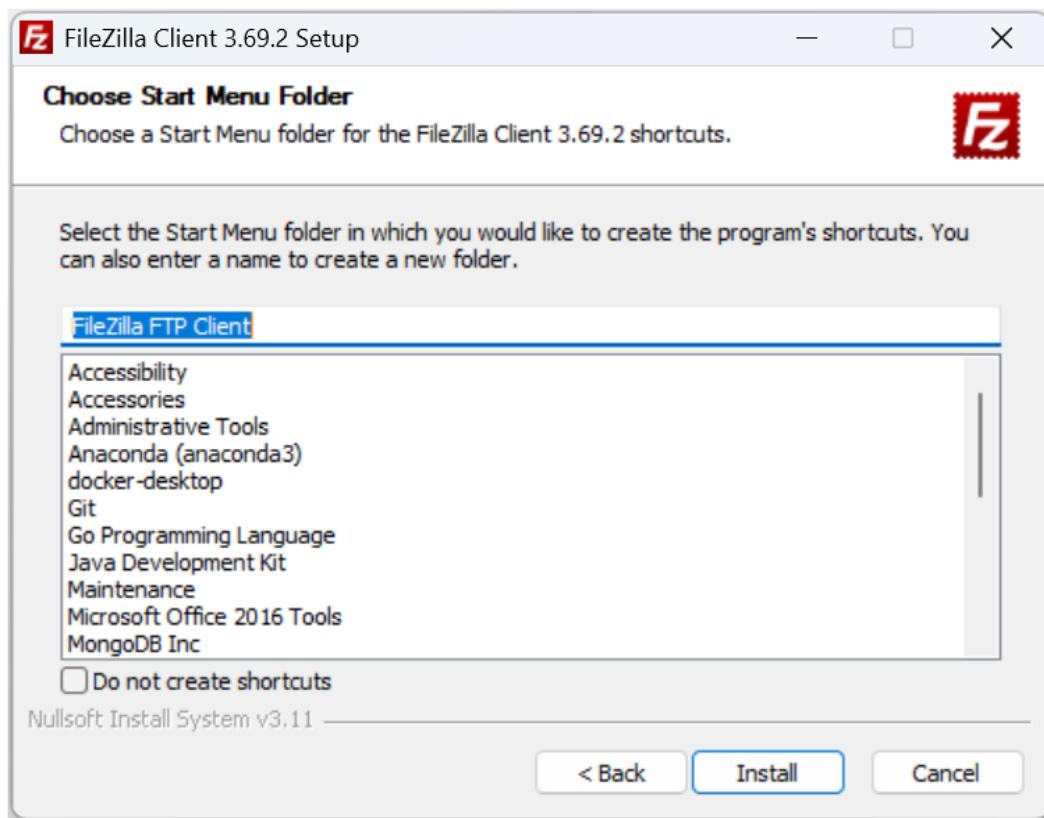
- Select "Standard" installation (recommended for most users)
- Click "Next" to continue



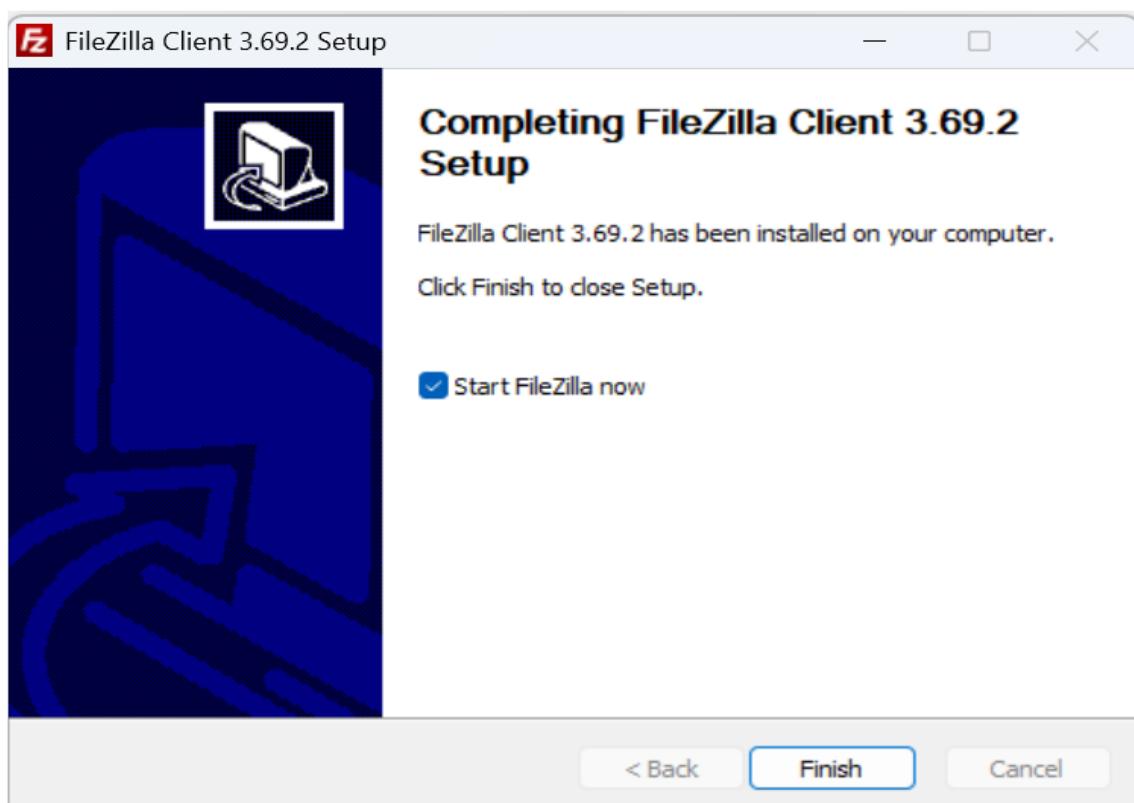
- Choose the installation directory (default is usually fine)
- Click "Next" to proceed



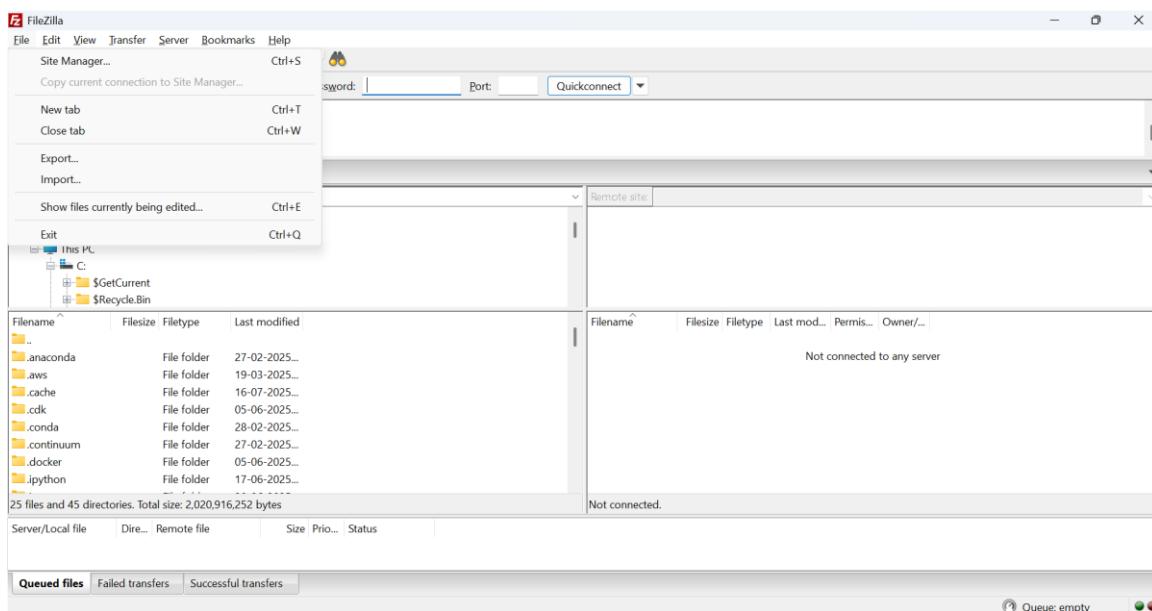
- Select or create a Start Menu folder for FileZilla shortcuts
- Click "Install" to begin the installation process



- Wait for the installation to complete
- The progress bar will show installation status
- Uncheck "Start FileZilla now" if you want to configure it later
- Click "Finish" to complete the installation

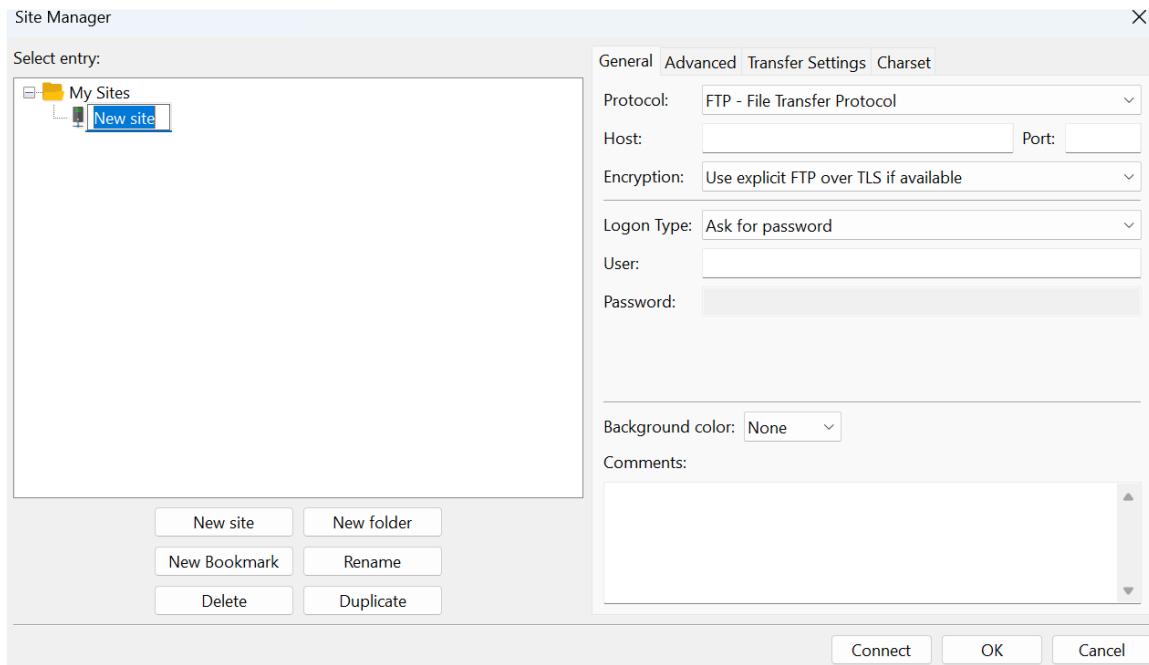


- Launch FileZilla application
- Go to **File → Site Manager** (or press **Ctrl+S**)

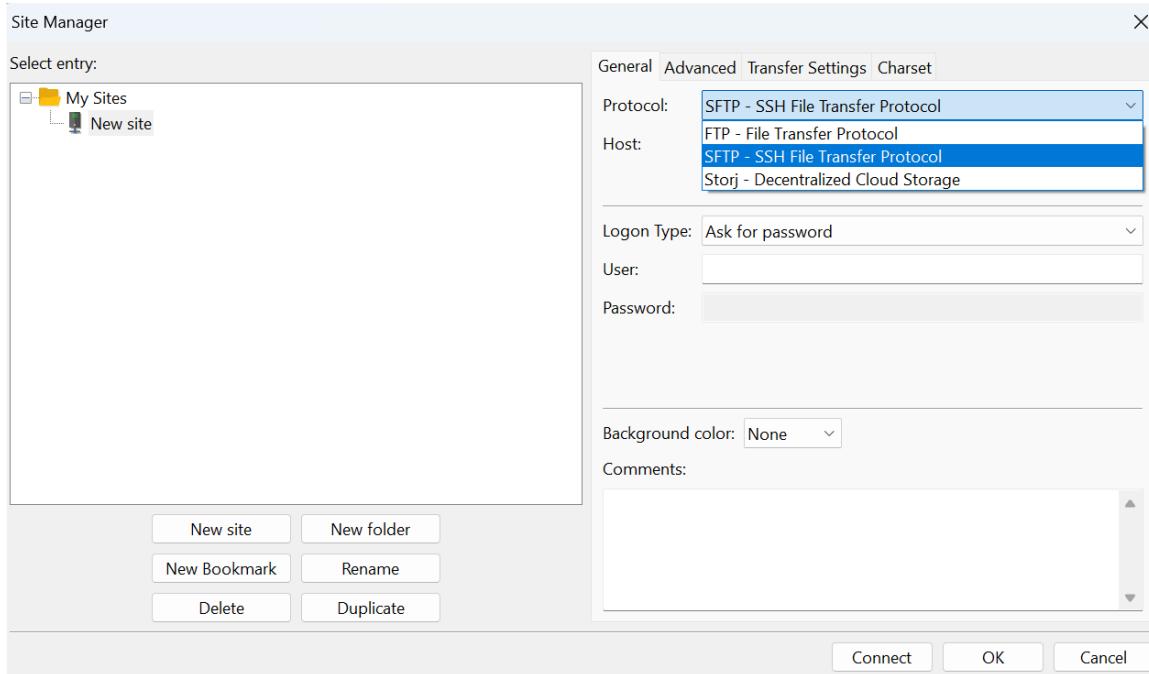


- In the Site Manager dialog, click "New Site" button

- A new site entry will be created in the left panel

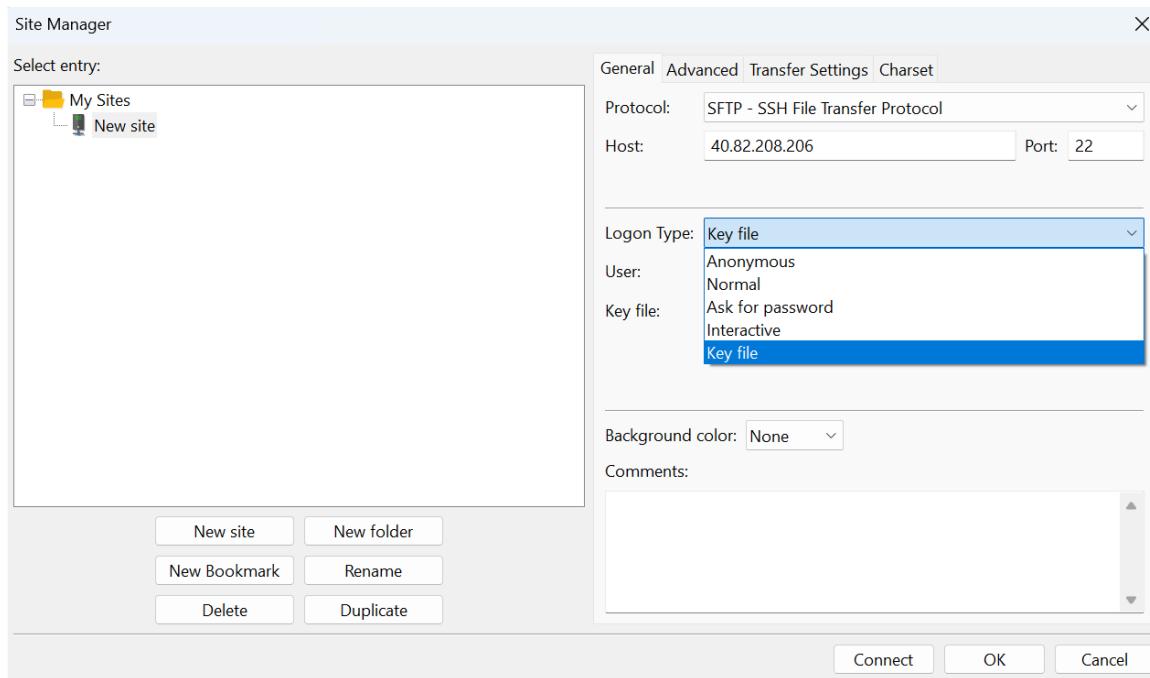


- Replace "New site" with a descriptive name (e.g., "Ubuntu-Azure-VM")
- This name will help you identify the connection later
- In the **Protocol** dropdown, select **SFTP - SSH File Transfer Protocol**

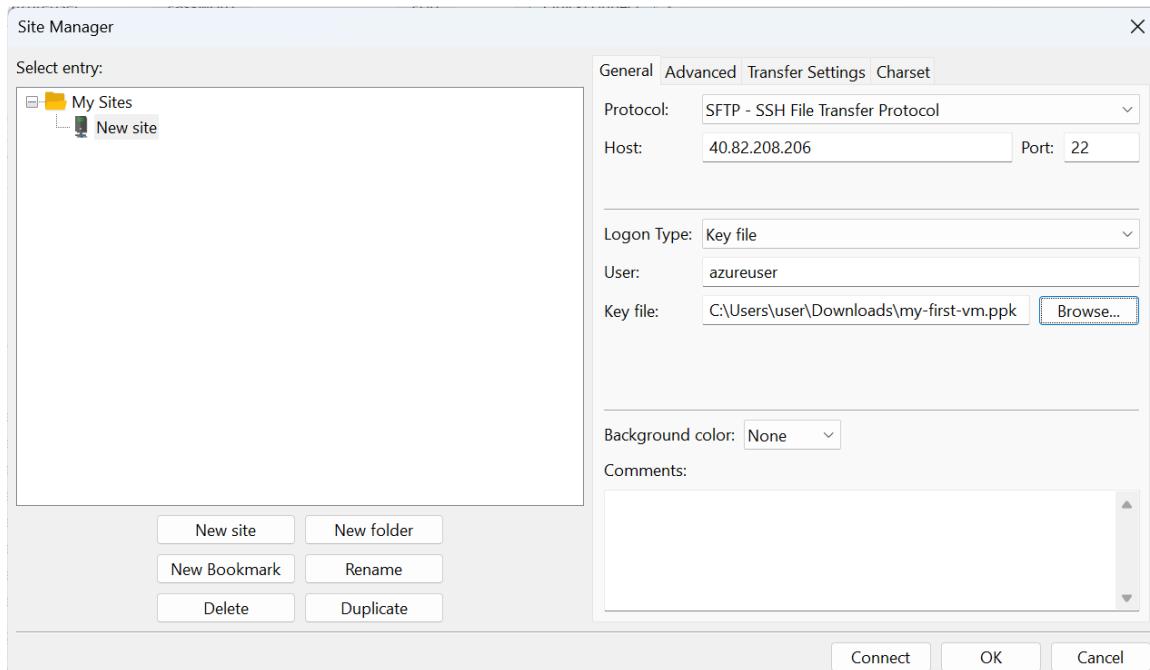


Enter Host Information

- **Host:** Enter your Ubuntu VM's public IP address
 - Example: 20.70.130.108 (use your actual VM IP)
- **Port:** Leave as default 22 (standard SSH/SFTP port)
- **Logon Type:** Select "Key file" from the dropdown
 - This enables SSH key-based authentication



- **User:** Enter your VM username (typically "azureuser")
- Click the **Browse** button next to "Key file"
- Navigate to the location where you saved your .ppk file
- Select your private key file (.ppk format)
- Click "Open"
- Click "Connect" to establish connection to your Ubuntu VM



- On first connection, you'll see a host key verification dialog
- Click "OK" to accept and remember the host key

Once connected, you'll see:

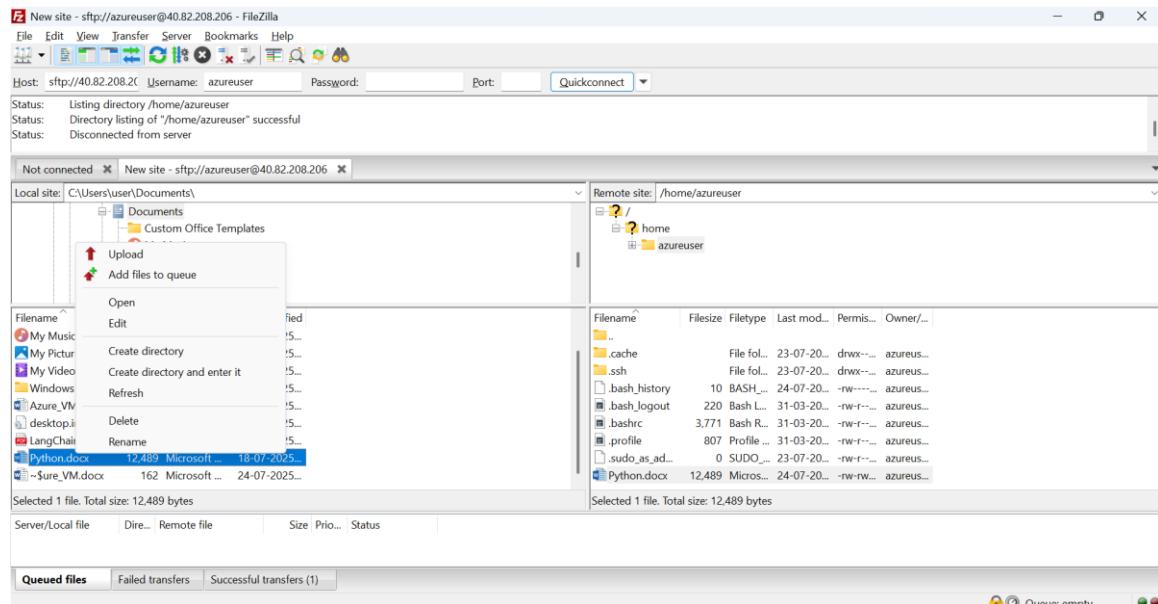
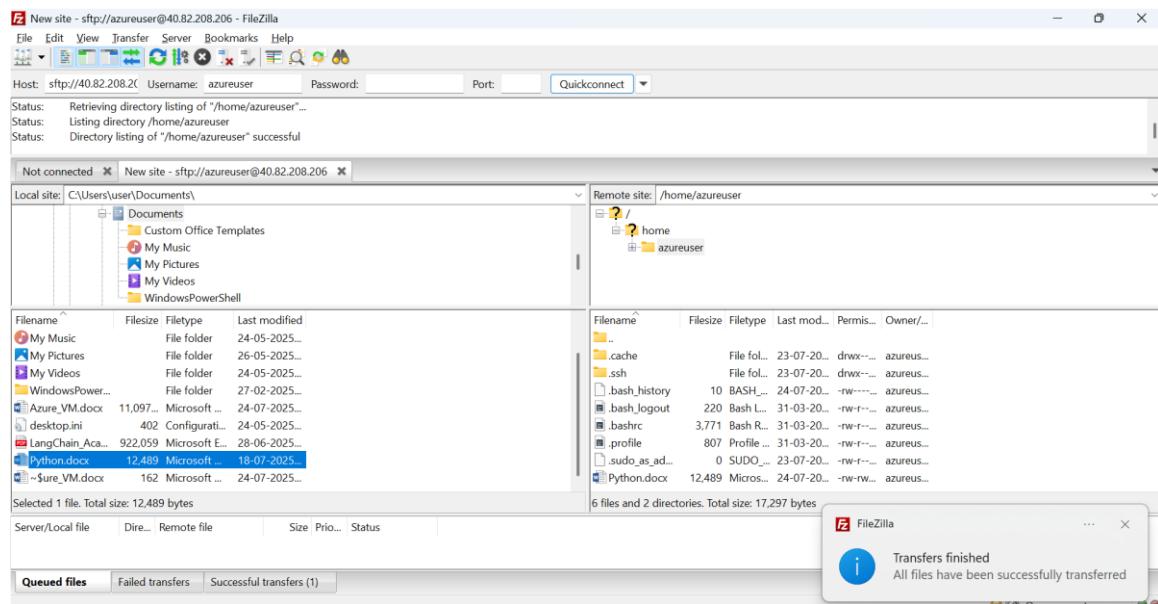
- **Left Panel:** Your local computer's file system
- **Right Panel:** Your Ubuntu VM's file system
- **Status Window:** Connection messages and transfer logs

Basic FileZilla Operations:

Uploading Files to Ubuntu VM:

1. Navigate to desired local folder in left panel
2. Navigate to target remote folder in right panel (e.g., /home/azureuser/)
3. Drag and drop files from left to right panel
4. Or right-click local file → "Upload"

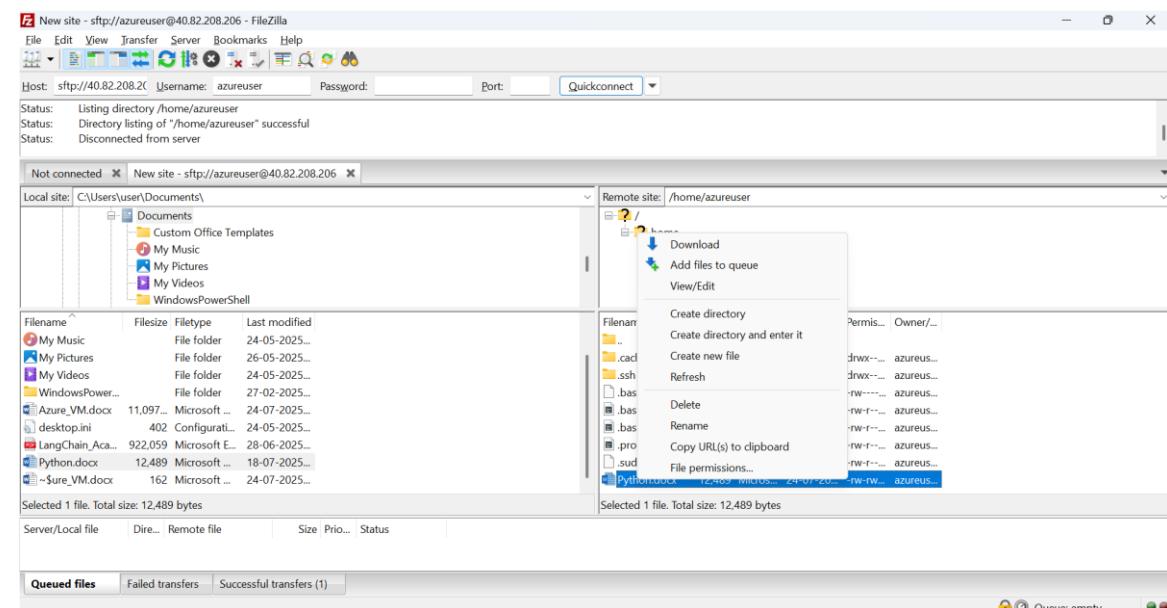
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Downloading Files from Ubuntu VM:

1. Navigate to remote folder containing desired files
2. Navigate to target local folder
3. Drag and drop files from right to left panel
4. Or right-click remote file → "Download"

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3. Windows Virtual Machine Setup

Creating a Windows Virtual Machine

Step 33: Start New VM Creation

1. In Azure Portal, go to "Virtual machines"
2. Click "+ Create" → "Azure virtual machine"

Step 34: Configure Basic Settings

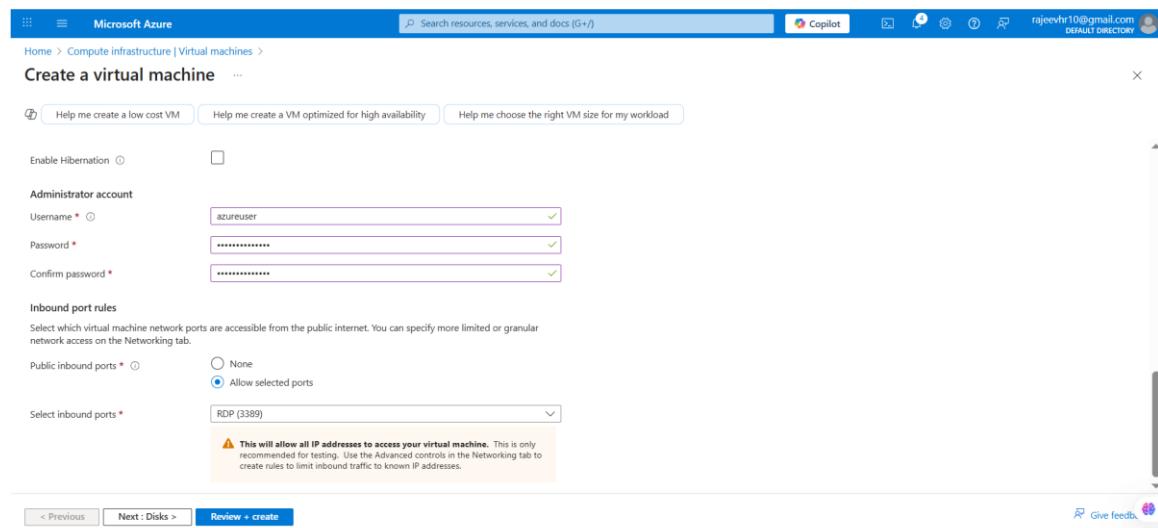
Fill in the following information:

- **Resource Group:** Use existing or create new
- **Virtual machine name:** Enter descriptive name (e.g., "Windows-Lab-VM")
- **Region:** Select appropriate region
- **Image:** Select "Windows Server 2022 Datacenter; Azure Edition – x64 Gen2"

Step 35: Configure Size and Authentication

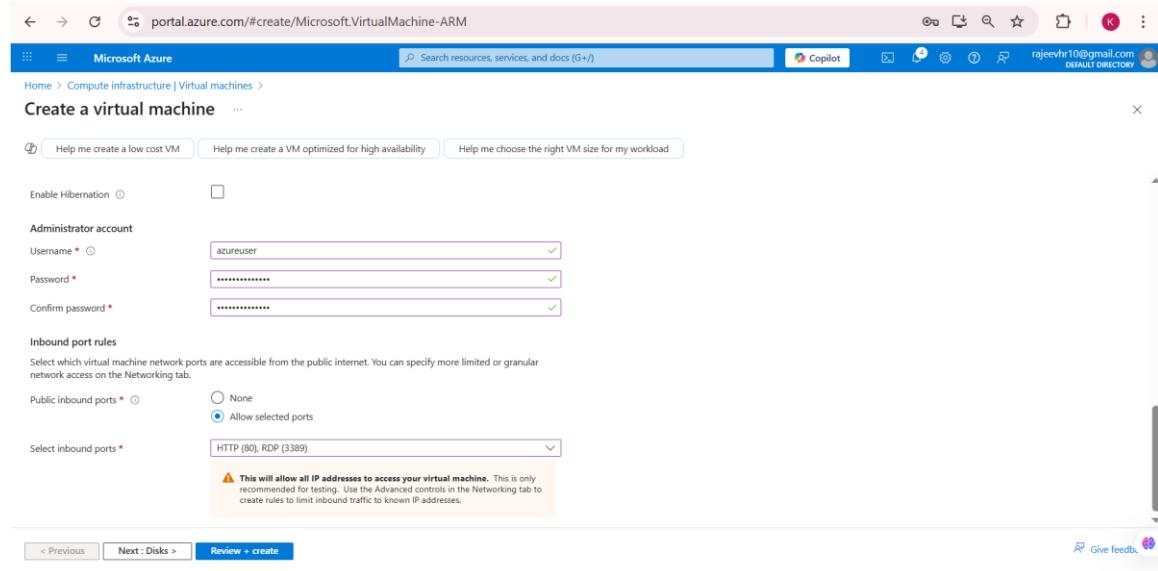
- **Size:** Choose "Standard_B2s" (2 vCPUs, 8 GB RAM) for Windows
- **Username:** Create administrator username
- **Password:** Set strong password (remember this!)
- **Confirm password:** Re-enter password

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Step 36: Configure Inbound Ports

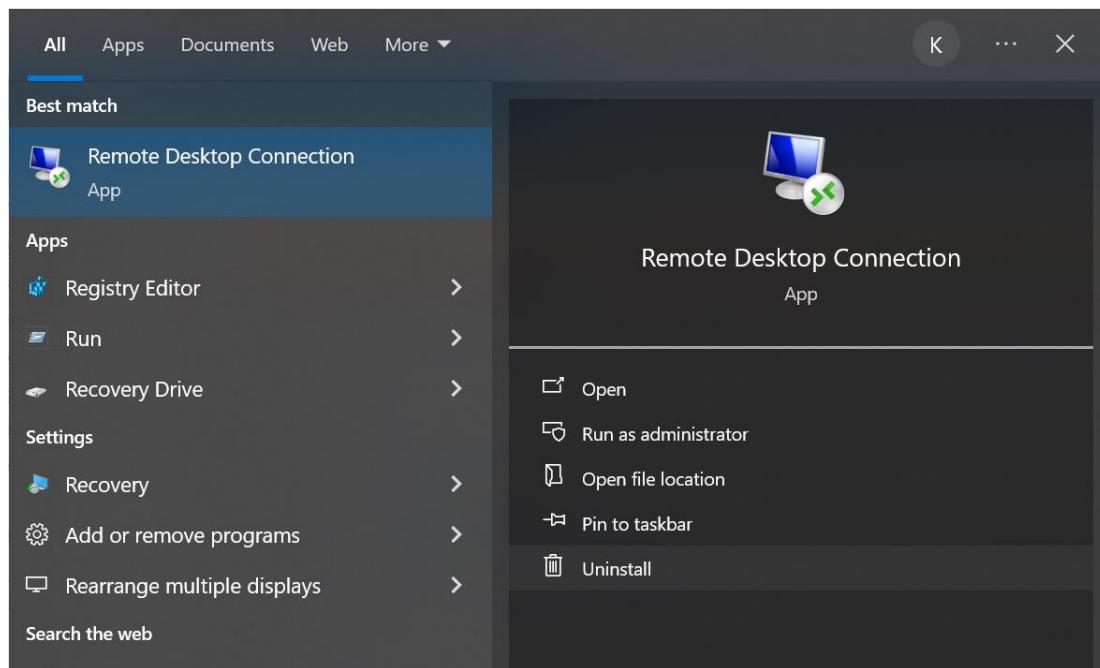
- **Public inbound ports:** Allow selected ports
- **Select inbound ports:** Choose "RDP (3389)" and "HTTP (80)"
- Click "Review + create"
- Wait for deployment to complete.



Connecting to Windows VM via RDP

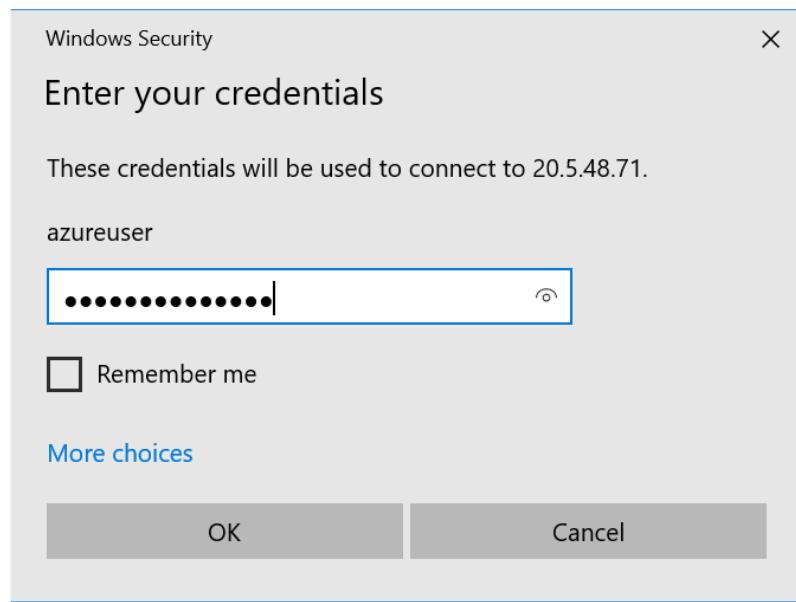
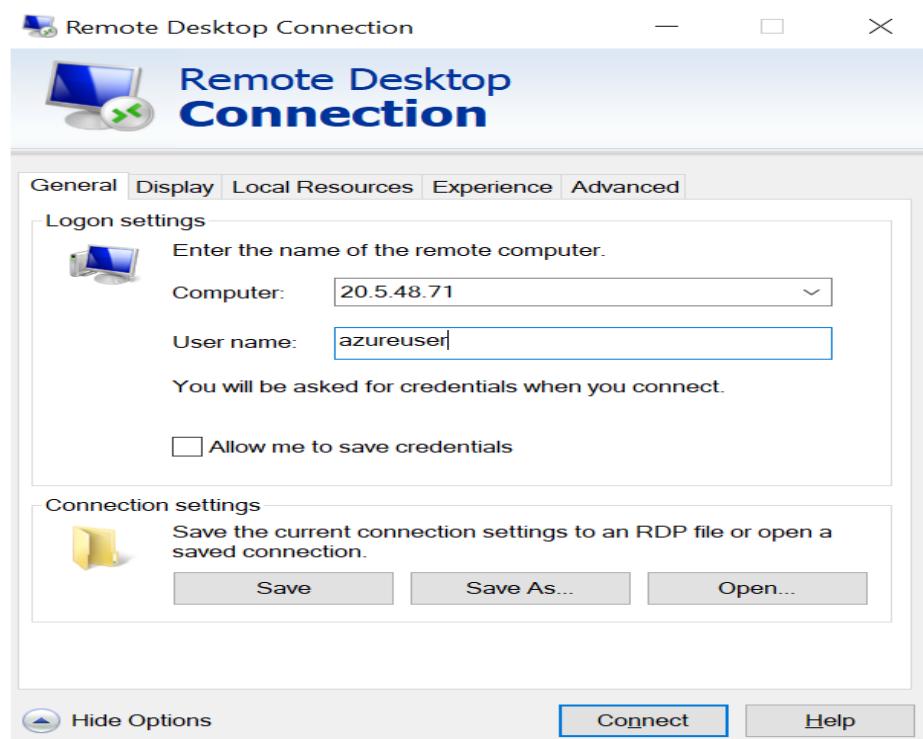
Step 38: Access Connection Settings

1. Go to your Windows and Select "RDP"

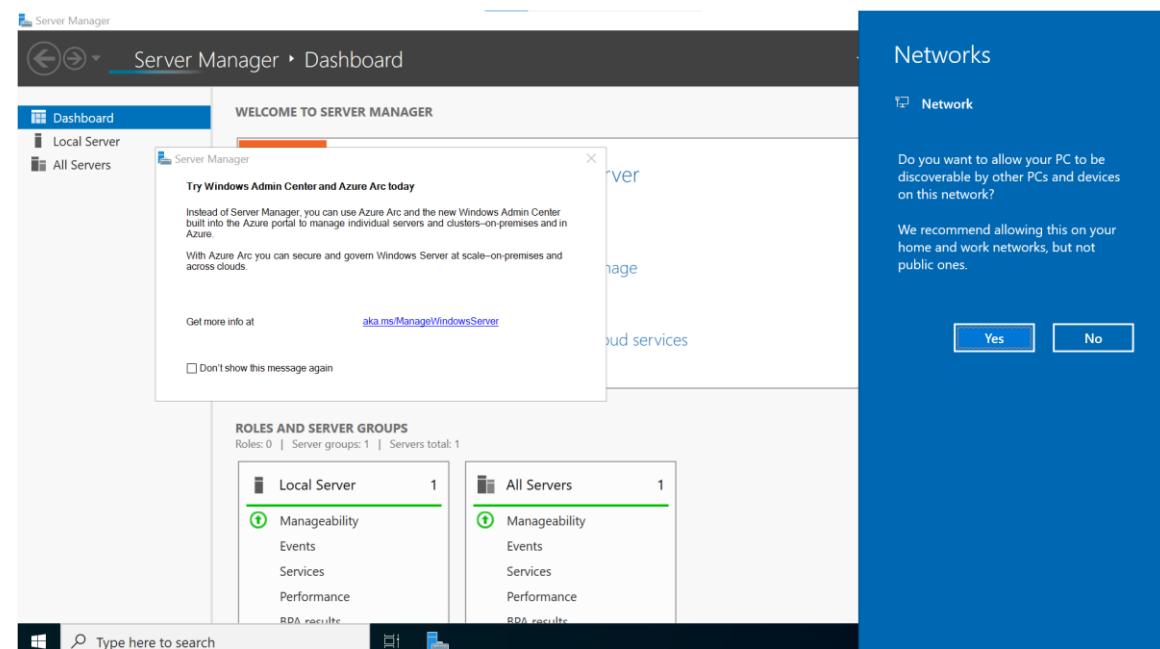


Step 39: Get Connection Details

- Note the Public IP address and user name
- Click "Connect"
- Enter your credentials



- You should now be connected to your Windows VM desktop



Installing XAMPP

Step 41: Download XAMPP

1. Open web browser in your Windows VM
2. Navigate to: <https://www.apachefriends.org/index.html>
3. Click "Download" for Windows version

XAMPP Apache + MariaDB + PHP + Perl

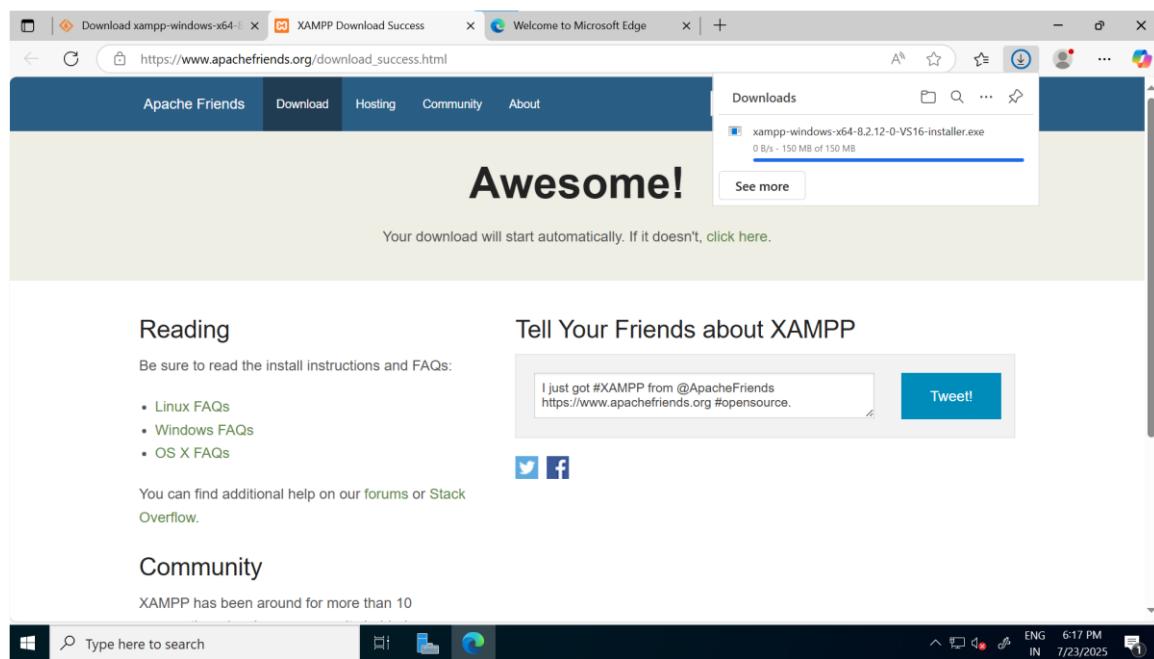
What is XAMPP?
XAMPP is the most popular PHP development environment
XAMPP is a completely free, easy to install Apache distribution containing MariaDB, PHP, and Perl. The XAMPP open source package has been set up to be incredibly easy to install and to use.

Download Click here for other versions

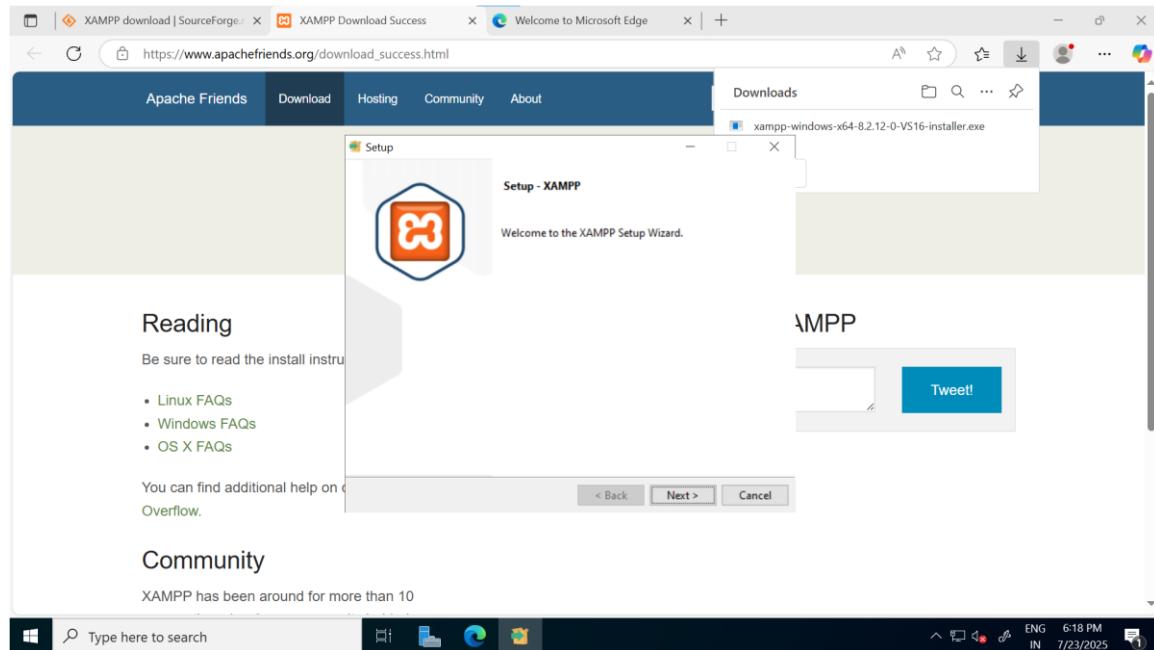
XAMPP for Windows 8.2.12 (PHP 8.2.12)

XAMPP for Linux 8.2.12 (PHP 8.2.12)

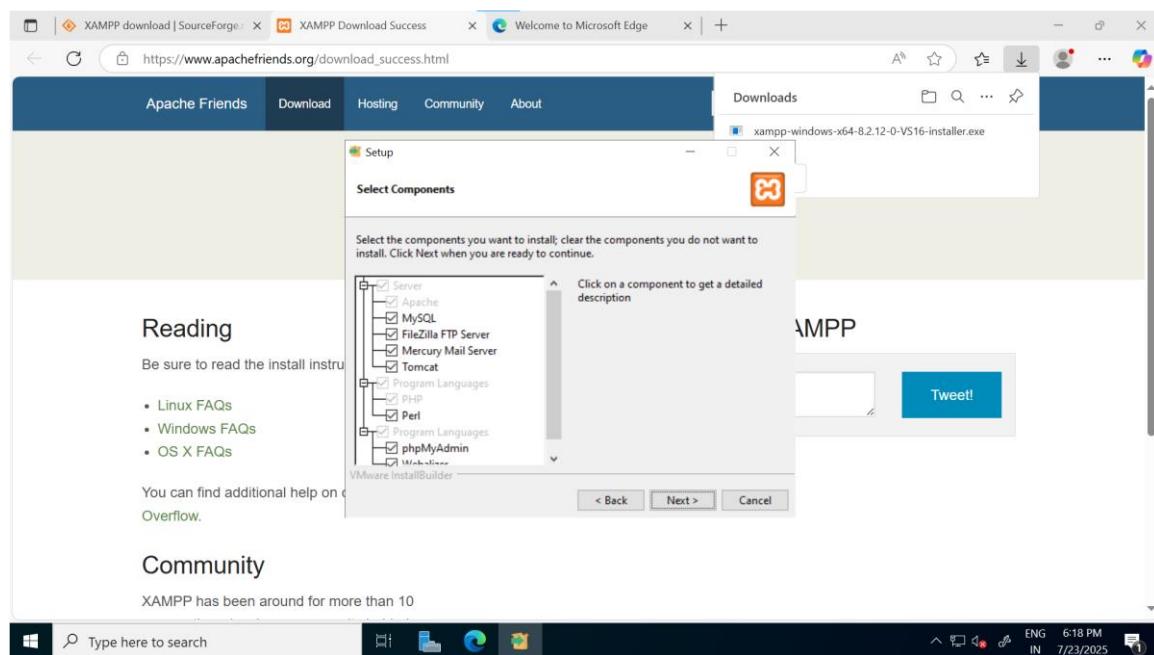
XAMPP for OS X 8.2.4 (PHP 8.2.4)



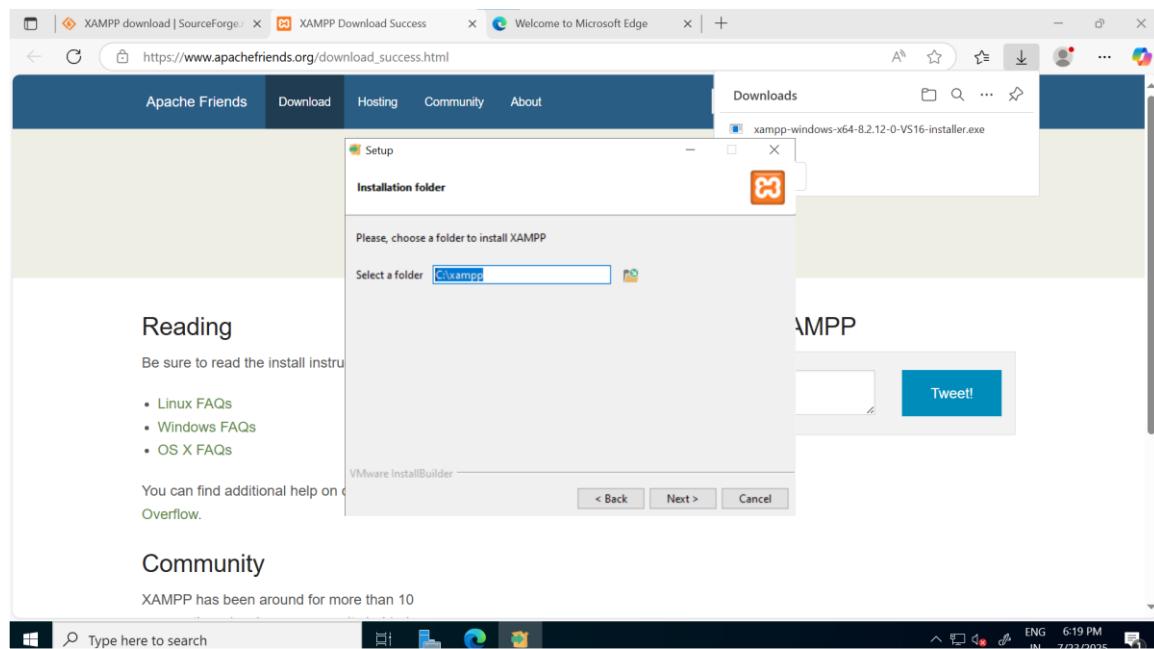
- Click on “Next” button.



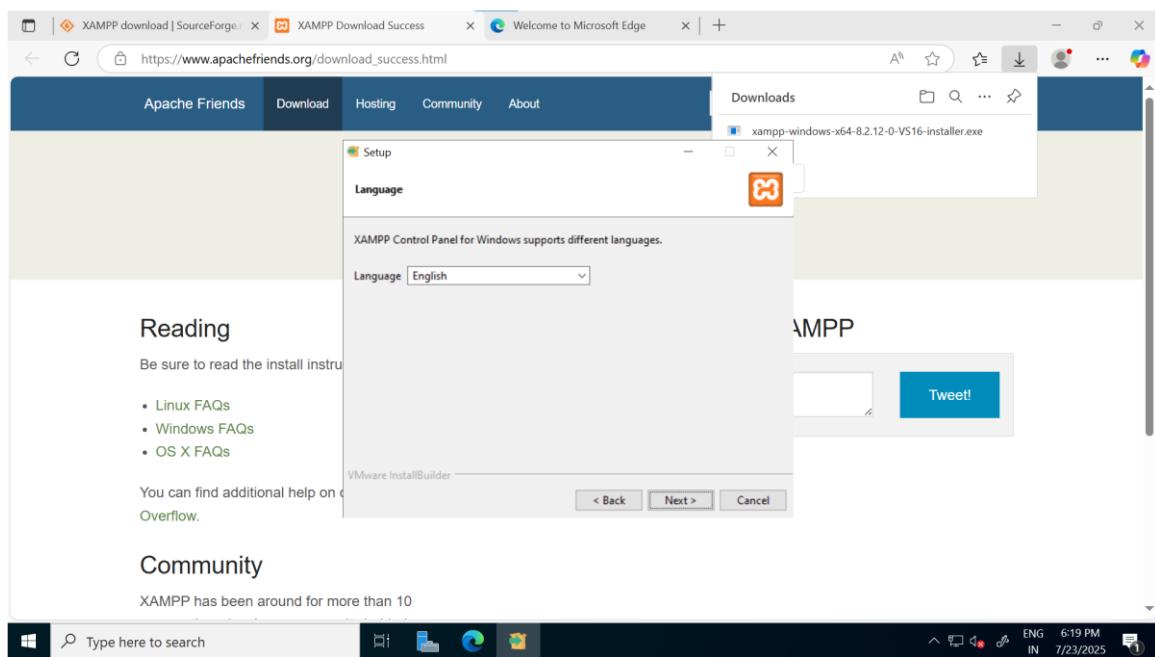
- Click on “Next” button.



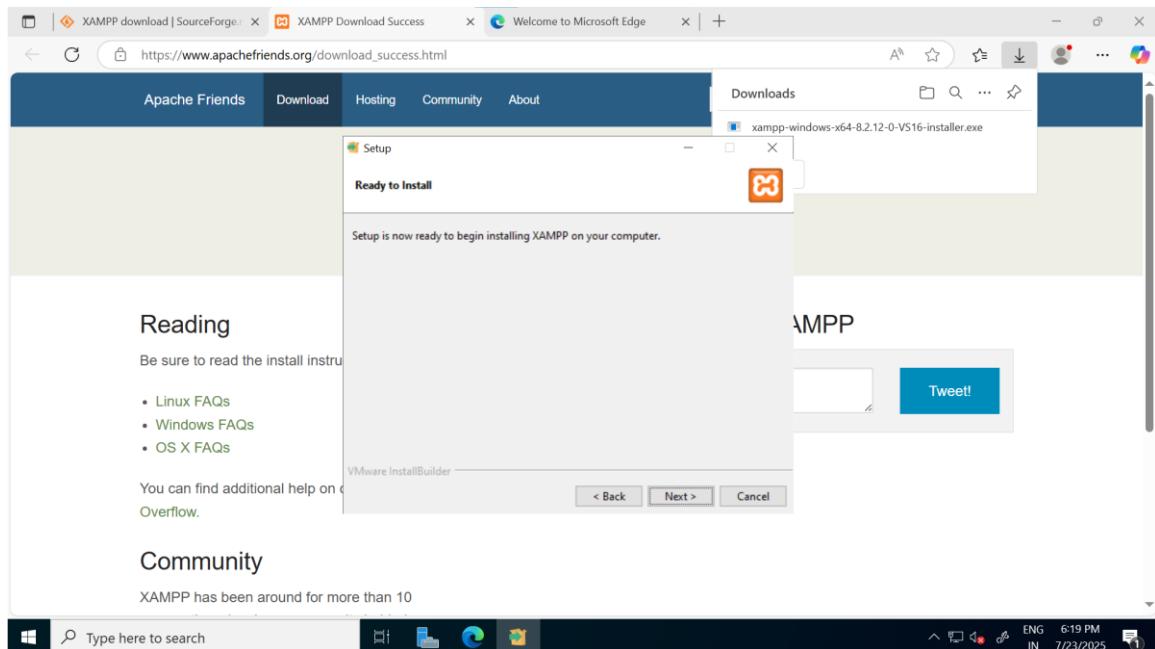
- Click on “Next” button.



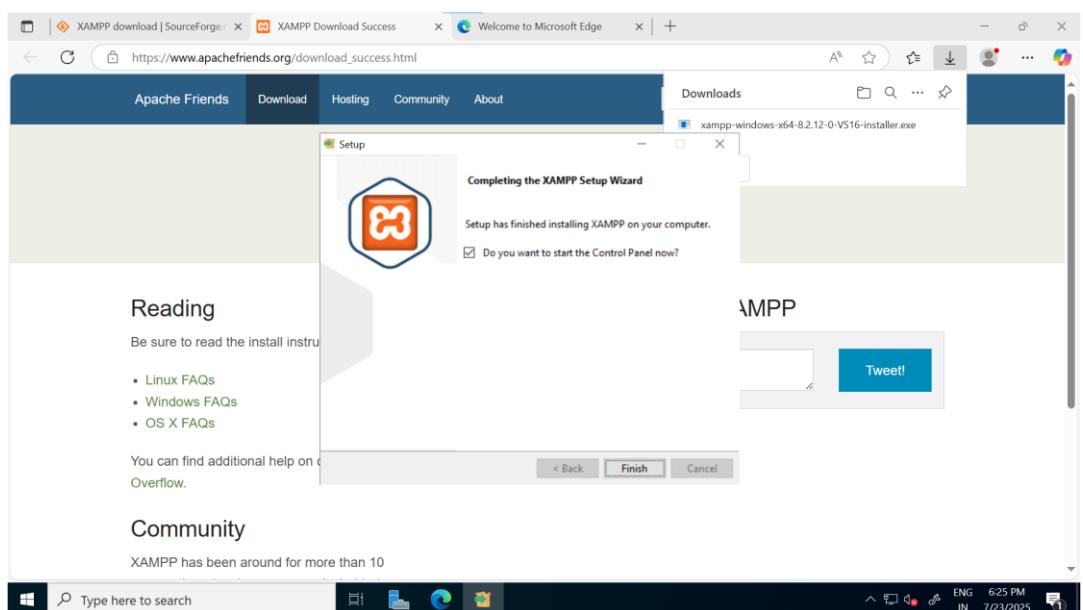
- Click on “Next” button.



- Click on “Next” button.

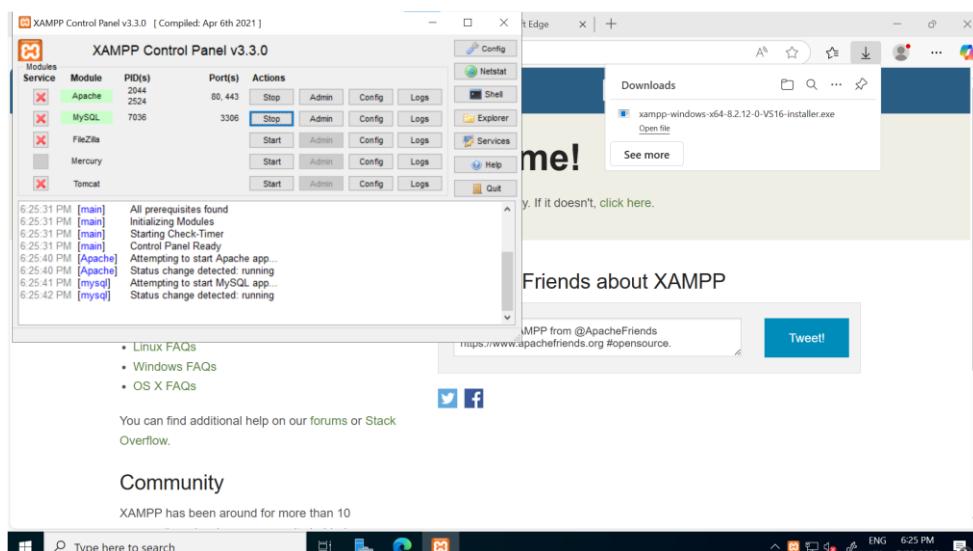


- Click on “Finish” button.



Start XAMPP Services

1. Open XAMPP Control Panel
2. Click "Start" next to Apache
3. Click "Start" next to MySQL
4. Services should show "Running" status



Verifying XAMPP Installation

Test Default Page

1. Open web browser in Windows VM
2. Navigate to: <http://localhost/dashboard/>
3. You should see the XAMPP welcome page

