



# Parul University

FACULTY OF ENGINEERING & TECHNOLOGY  
BACHELOR OF TECHNOLOGY

GLOBAL CERTIFICATIONS - FUNDAMENTALS  
(303105153)

2nd SEMESTER

COMPUTER SCIENCE & ENGINEERING DEPARTMENT

Laboratory Manual

## CERTIFICATE

*This is to certify that*

*Mr./Ms.....with  
enrolment no.....has successfully completed his/her  
laboratory experiments in the **Global Certification - Fundamental (303105153)**  
from the department of.....during the  
academic year .....*



Date of Submission:.....

Staff In charge:.....

Head of Department:.....



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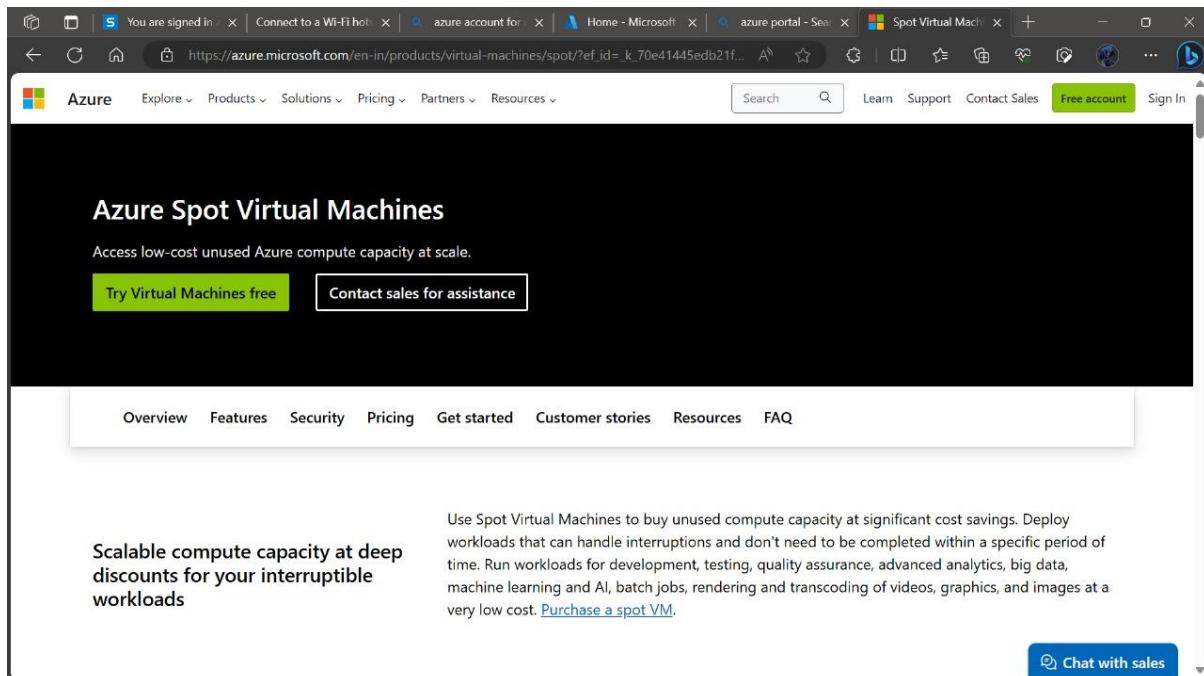
Sr. No.	Practical Title	Page No.		Date of Performance	Date of Completion	Sign.	Marks <small>{Out of 10}</small>
		FROM	TO				
1.	Introduction to azure portal						
2.	Creating & managing virtual machines						
3.	Implementing Azure storage						
4.	Deploying web apps						
5.	Azure networking Basics						
6.	Introduction to Azure Identity						
7.	Azure Security best practices						
8.	Monitoring Azure resources						
9.	Introduction to azure cost management						
10.	Azure support and SLAs						

## P1: Introduction to Azure Portal

- Navigation the Azure Portal interface
- Understanding Azure resources group
- Managing Subscription and access control
- Exploring Azure services and Marketplaces

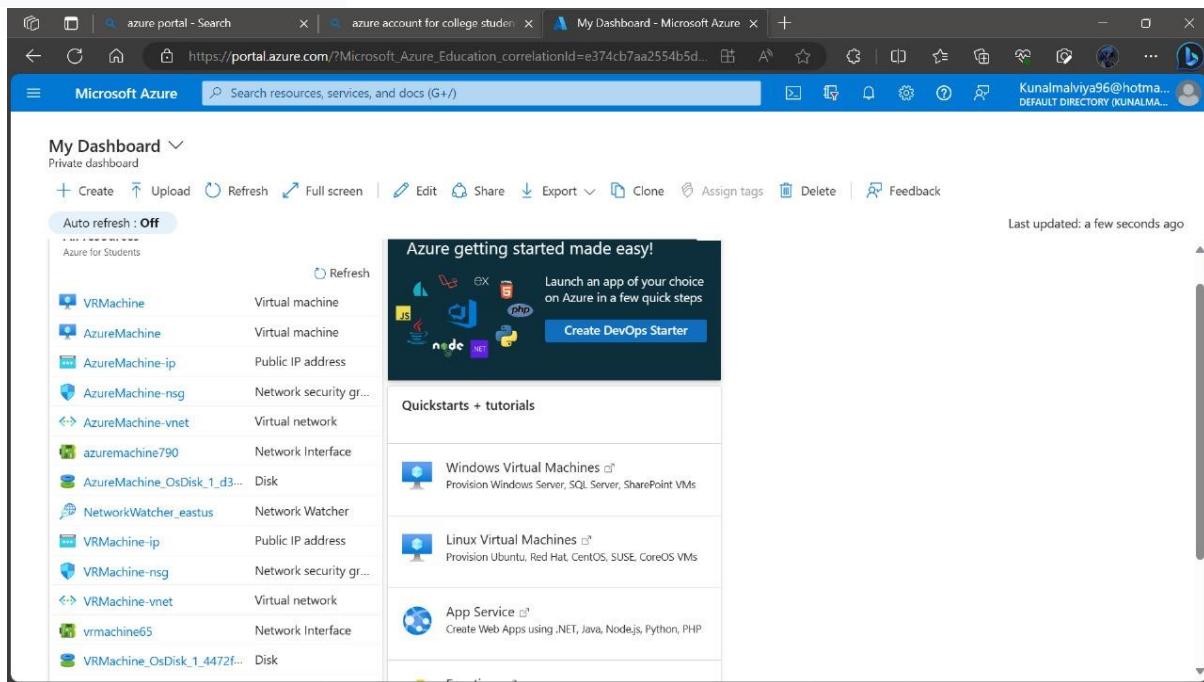
Step 1: Sign in to Azure Portal:

Open your web browser and go to the Azure Portal at <https://portal.azure.com>.



Step 2: Navigate the Azure Portal Interface

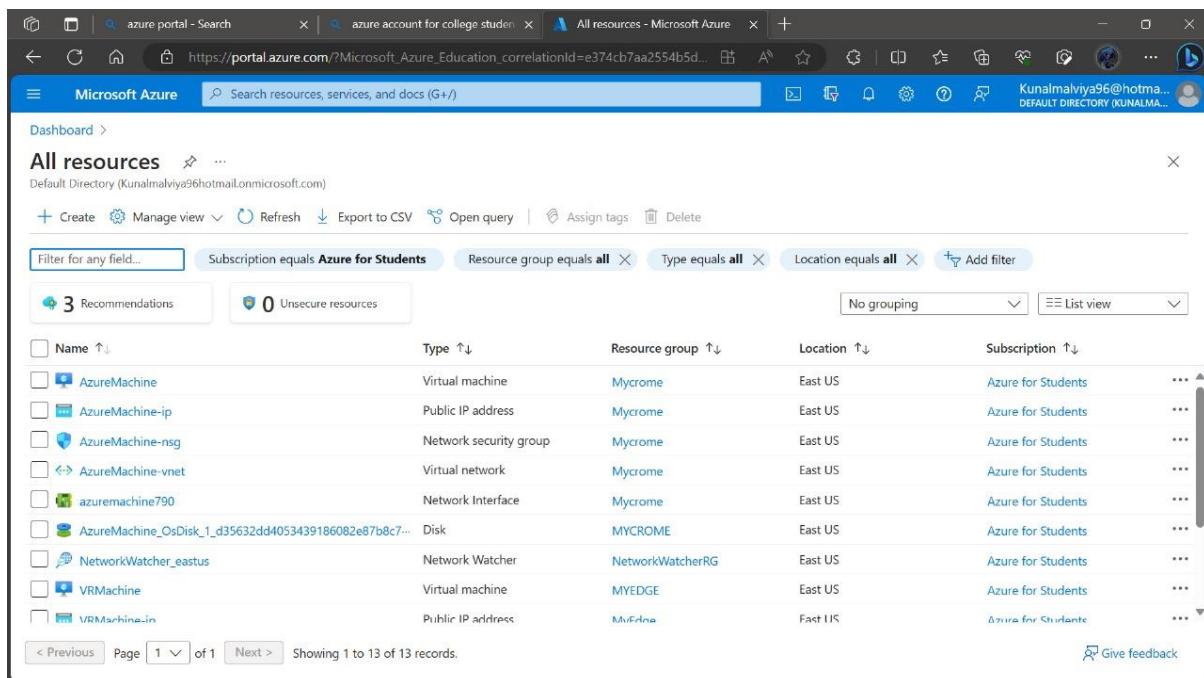
1. After signing in, you'll be on the Azure Portal dashboard. Take a moment to familiarize yourself with the dashboard's layout.
2. The left-hand menu provides access to various Azure services and resources.
3. Explore the different sections and icons in the portal interface, such as Home, All services, Dashboard, and Notifications.



The screenshot shows the Microsoft Azure portal's My Dashboard. On the left, there's a sidebar with a 'Create' button, 'Upload', 'Refresh', 'Full screen', 'Edit', 'Share', 'Export', 'Clone', 'Assign tags', 'Delete', and 'Feedback' buttons. Below this is an 'Auto refresh : Off' toggle. The main area has a heading 'My Dashboard' with a dropdown arrow. Underneath, it says 'Private dashboard'. There's a 'Last updated: a few seconds ago' message. The content includes a section titled 'Azure getting started made easy!' with icons for various services like JS, EX, PHP, Node.js, and MySQL, followed by a 'Create DevOps Starter' button. Another section titled 'Quickstarts + tutorials' lists 'Windows Virtual Machines', 'Linux Virtual Machines', and 'App Service' with their respective descriptions.

### Step 3: Understanding Azure Resource Groups

1. Click on "Resource groups" in the left-hand menu.
2. In the Resource groups blade, you'll see a list of existing resource groups (if any). Resource groups are used to organize and manage Azure resources.
3. Create a new resource group by clicking the "+ Add" button and following the prompts. Give it a meaningful name and location.
4. Understand that you can group related Azure resources under resource groups for better organization and management.



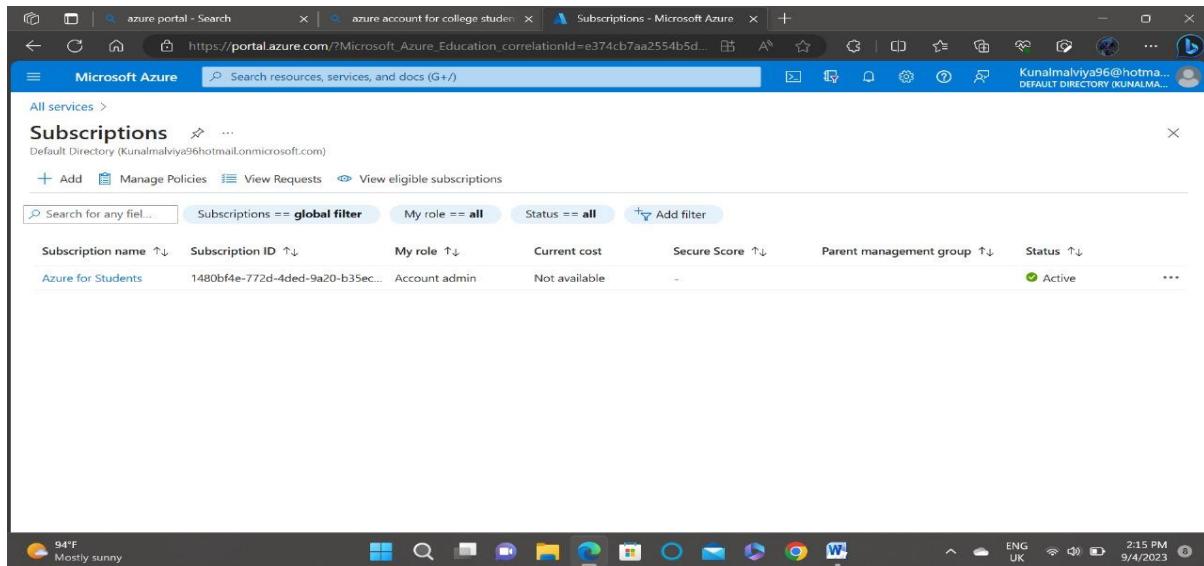
The screenshot shows the Microsoft Azure portal's 'All resources' blade. At the top, there are buttons for '+ Create', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', 'Assign tags', and 'Delete'. Below this is a search bar and a filter bar with options like 'Filter for any field...', 'Subscription equals Azure for Students', 'Resource group equals all', 'Type equals all', 'Location equals all', and 'Add filter'. The main area is a table with the following data:

Name	Type	Resource group	Location	Subscription
AzureMachine	Virtual machine	Mycrome	East US	Azure for Students
AzureMachine-ip	Public IP address	Mycrome	East US	Azure for Students
AzureMachine-nsg	Network security group	Mycrome	East US	Azure for Students
AzureMachine-vnet	Virtual network	Mycrome	East US	Azure for Students
azuremachine790	Network Interface	Mycrome	East US	Azure for Students
AzureMachine_OsDisk_1_d35632dd4053439186082e87b8c7...	Disk	MYCROME	East US	Azure for Students
NetworkWatcher_eastus	Network Watcher	NetworkWatcherRG	East US	Azure for Students
VRMachine	Virtual machine	MYEDGE	East US	Azure for Students
VRMachine_ip	Public IP address	Mycrome	East US	Azure for Students

At the bottom, there are navigation buttons for '< Previous', 'Page 1 of 1', 'Next >', and 'Showing 1 to 13 of 13 records.' There's also a 'Give feedback' link.

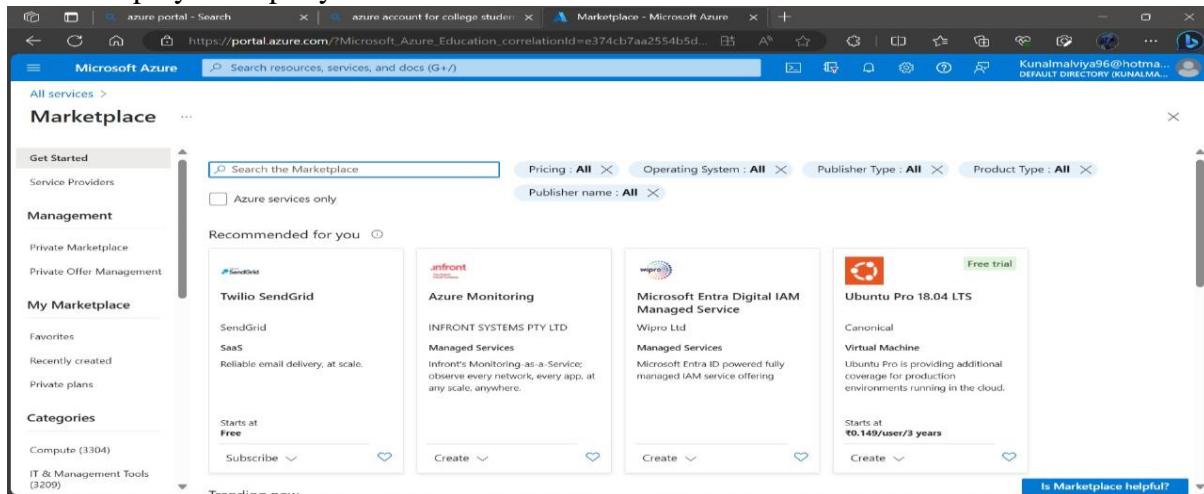
#### Step 4: Managing Subscriptions and Access Control

1. Click on "Subscriptions" in the left-hand menu.
2. In the Subscriptions blade, you'll see a list of your Azure subscriptions. Select one if you have multiple subscriptions.
3. Explore the subscription details, including its type, status, and resource usage.
4. Click on "Access control (IAM)" to manage access to your subscription.
5. You can add users, assign roles, and set permissions for various Azure services and resources within your subscription.



#### Step 5: Exploring Azure Services and Marketplace

1. Click on "All services" in the left-hand menu. Here, you'll find a comprehensive list of Azure services grouped by categories.
2. Explore the different categories and services to get an overview of what Azure offers.
3. Click on "Marketplace" to access the Azure Marketplace, where you can find and deploy third-party solutions and services



#### P2: Creating and Managing Virtual Machines:

- Creating virtual machines (VM) using Azure Portal

- Configuring VM sizes and options
- Connecting to VMs using Remote Desktop Protocol (RDP) or SSH
- Managing VMs, including starting, stopping, and deleting them.

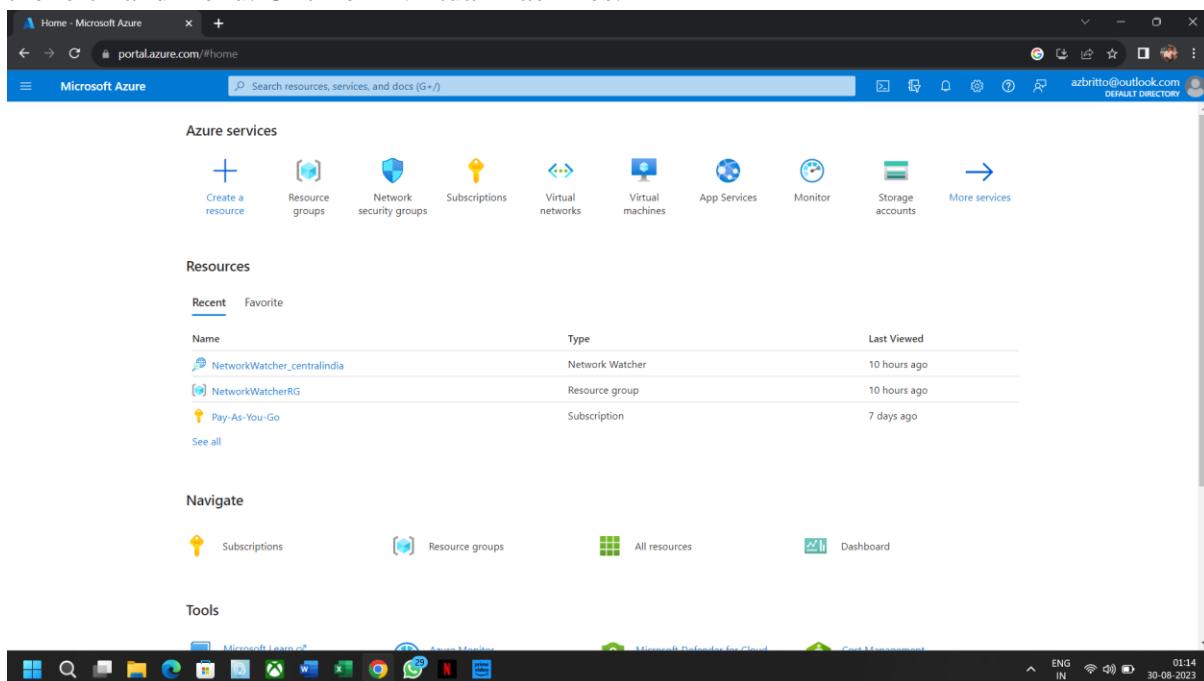
Creating virtual machines (VM) using Azure Portal

STEP 1: Sign in to the Azure Portal:

Log in to your Azure account at <https://portal.azure.com/>.

STEP 2: Navigate to the Virtual Machines Service:

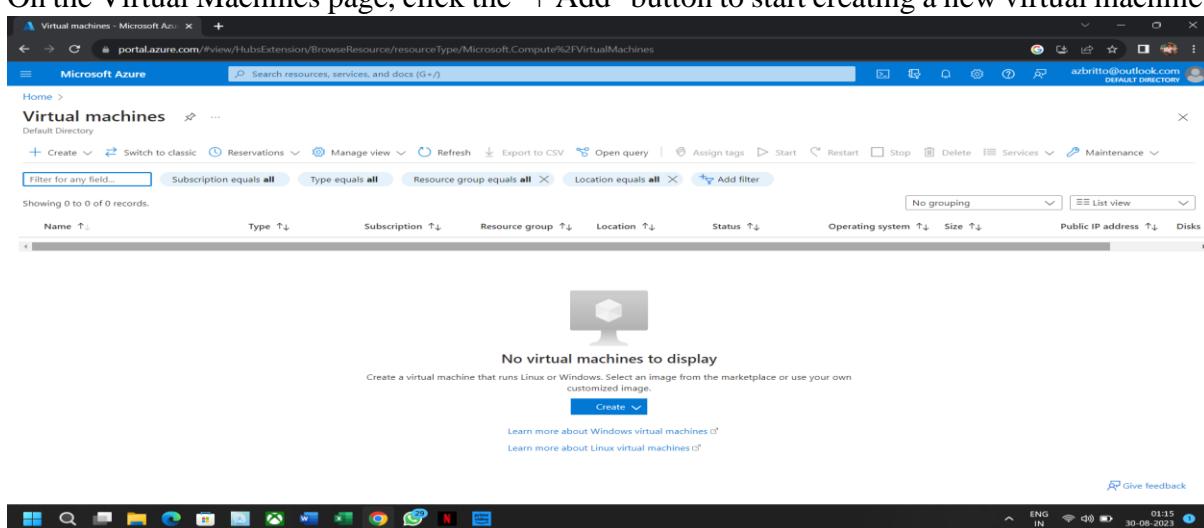
Once logged in, click on the "Create a resource" button, or you can find "Virtual machines" in the left-hand menu. Click on "Virtual machines."



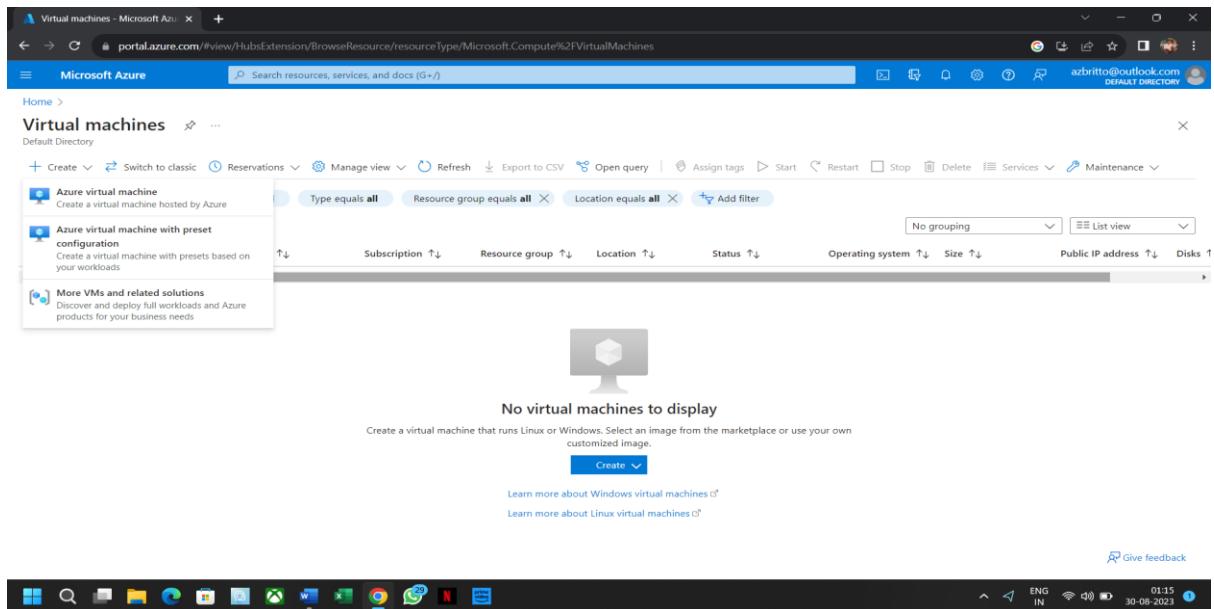
The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with links for Home, Search, and various account settings. Below it is the Microsoft Azure logo and a search bar. The main content area is titled 'Azure services' and features a 'Create a resource' button. Under 'Resources', there are sections for 'Recent' and 'Favorite'. The 'Recent' section lists three items: 'NetworkWatcher\_centralindia' (Network Watcher), 'NetworkWatcherRG' (Resource group), and 'Pay-As-You-Go' (Subscription). Below this is a 'See all' link. The 'Navigate' section includes links for 'Subscriptions', 'Resource groups', 'All resources', and 'Dashboard'. The 'Tools' section has links for Microsoft Learn, Azure Marketplace, Microsoft Defender for Cloud, and Cost Management. At the bottom, there's a taskbar with various icons and a system status bar showing the date and time (30-08-2023).

Click on "Add" to Create a New VM:

On the Virtual Machines page, click the "+ Add" button to start creating a new virtual machine.



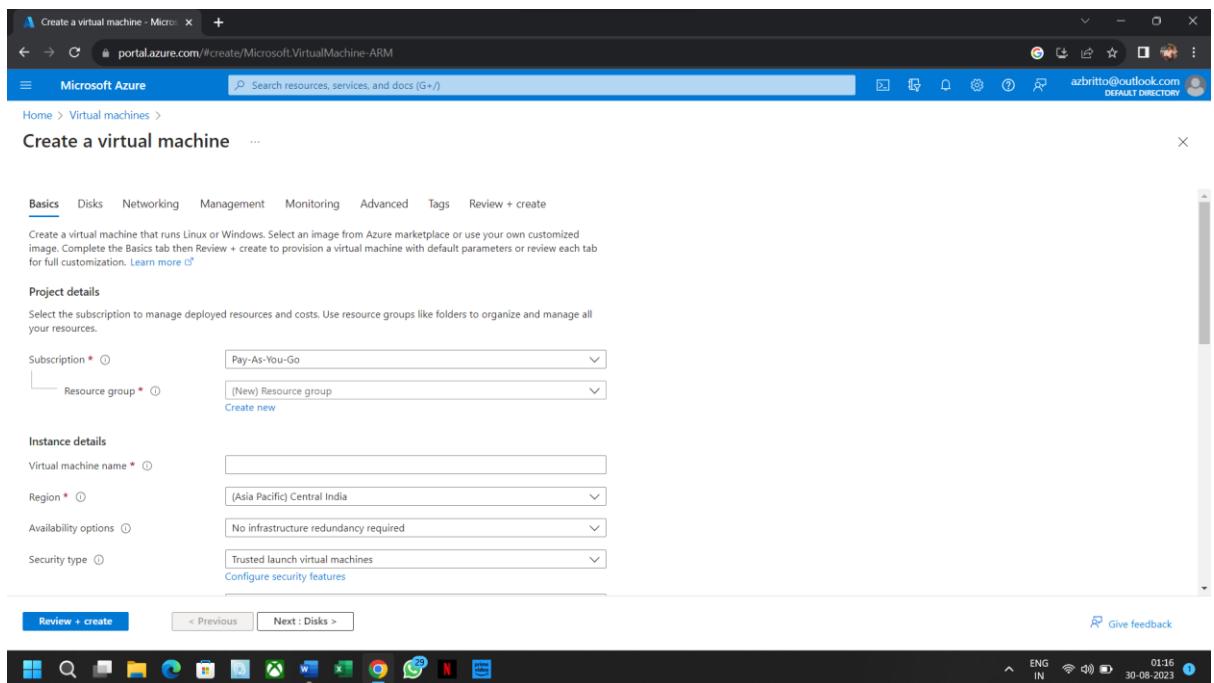
The screenshot shows the 'Virtual machines' page in the Microsoft Azure portal. The URL in the address bar is <https://portal.azure.com/#view/HubsExtension/BrowseResource/resourceType/Microsoft.Compute%2FVirtualMachines>. The page title is 'Virtual machines - Microsoft Azure'. The top navigation bar includes links for Home, Search, and account settings. The main content area is titled 'Virtual machines' and shows a message 'No virtual machines to display'. It provides instructions to 'Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image.' Below this is a large 'Create' button. There are also links for 'Learn more about Windows virtual machines' and 'Learn more about Linux virtual machines'. The bottom of the screen shows a taskbar with various icons and a system status bar.



The screenshot shows the Microsoft Azure portal's Virtual Machines page. At the top, there are several filter options: Type equals all, Resource group equals all, Location equals all, and Add filter. Below these are sorting options: Subscription, Resource group, Location, Status, Operating system, Size, Public IP address, and Disks. A large central message says "No virtual machines to display". Below this, there is a link to "Create a virtual machine" and two informational links: "Learn more about Windows virtual machines" and "Learn more about Linux virtual machines". The bottom of the screen shows the Windows taskbar with various pinned icons and the system tray indicating the date and time as 30-08-2023.

### Basic Configuration:

**Basics Tab:** Provide basic information like the subscription, resource group, region, and instance details (name, username, and authentication method - password or SSH key).



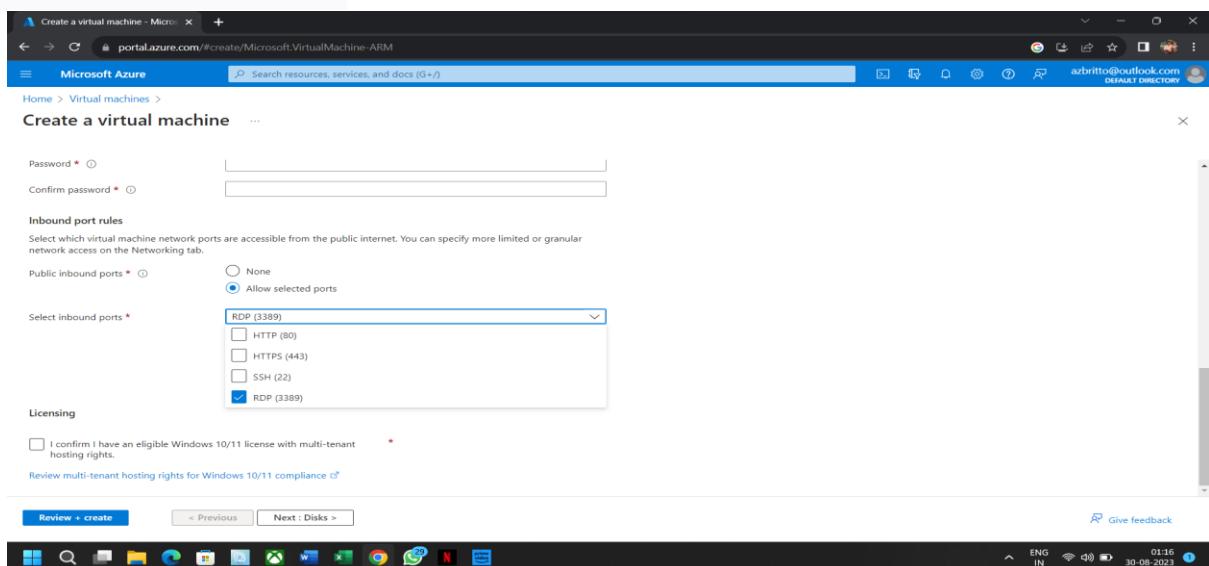
The screenshot shows the "Create a virtual machine" wizard on the "Basics" tab. The tab navigation bar includes Basics, Disks, Networking, Management, Monitoring, Advanced, Tags, and Review + create. The main content area is titled "Create a virtual machine" and contains the following fields:

- Project details:** Subscription (Pay-As-You-Go) and Resource group ((New) Resource group, Create new).
- Instance details:** Virtual machine name (empty), Region (Asia Pacific) Central India, Availability options (No infrastructure redundancy required), and Security type (Trusted launch virtual machines, Configure security features).

At the bottom, there are "Review + create" and "Next : Disks >" buttons, along with a "Give feedback" link. The bottom of the screen shows the Windows taskbar and system tray.

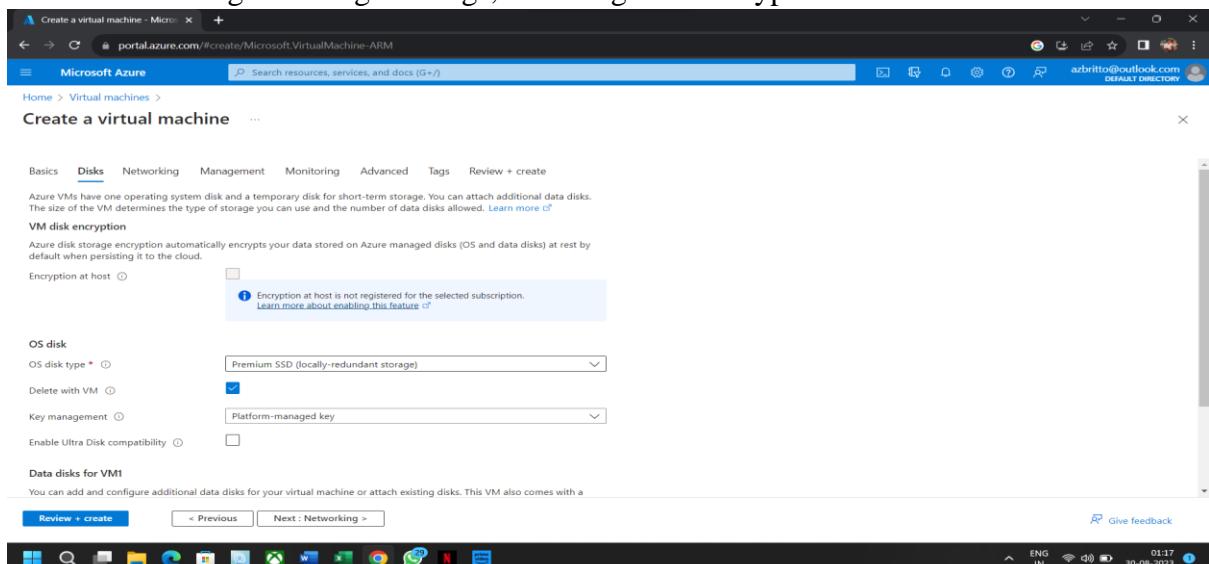
### Choose a Size:

Azure offers various VM sizes based on CPU, memory, and disk requirements. Select an appropriate size based on your needs.



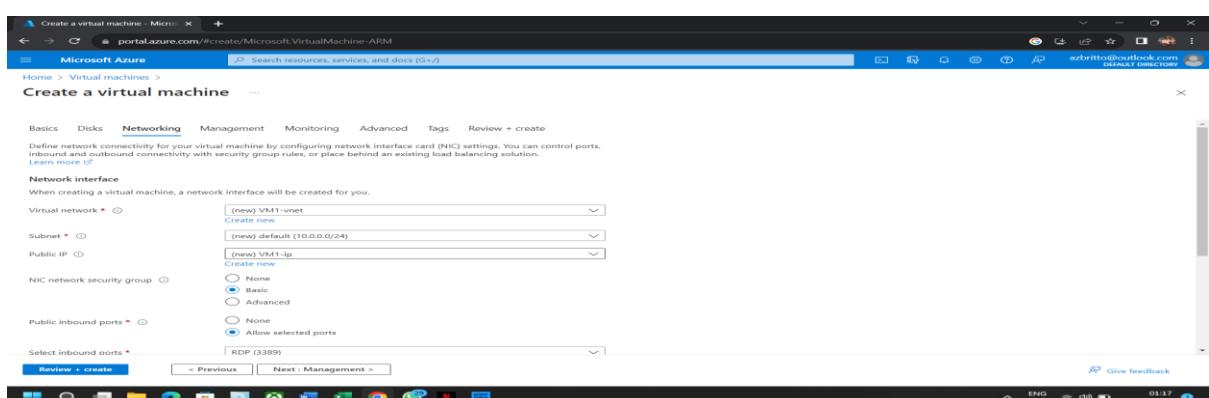
## Configure Settings:

**Disks Tab:** Configure storage settings, including OS disk type and size.



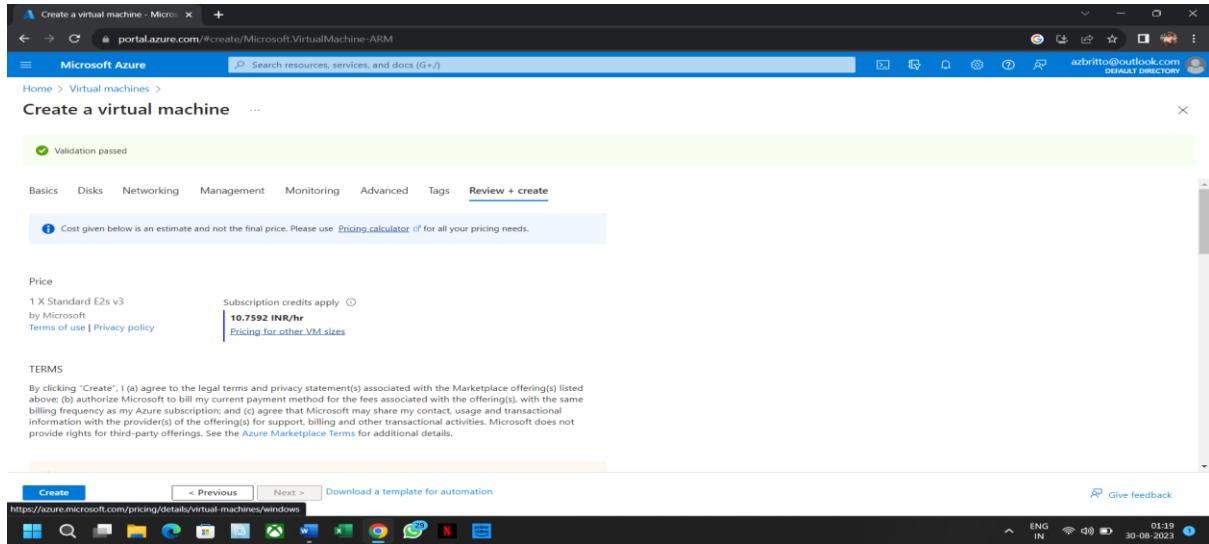
**Networking Tab:** Configure networking settings, including virtual network, subnet, and public IP address (if needed).

**Management Tab:** Set up advanced options like boot diagnostics and monitoring.



**Review + Create:**

Review your settings to ensure they are correct. You can also download the ARM template if you want to automate this setup in the future.

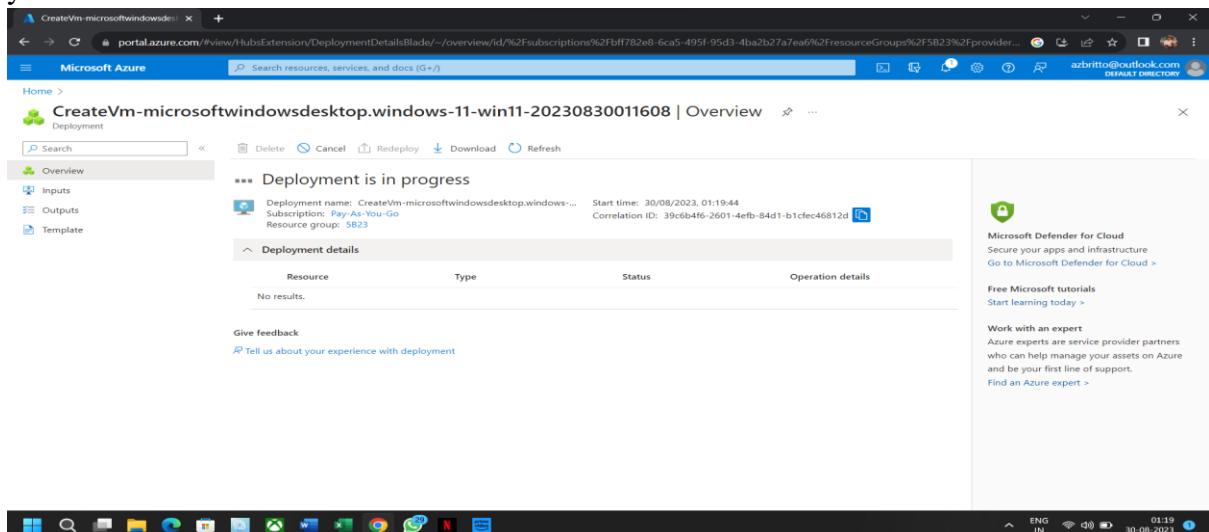


### Create VM:

Once you've reviewed and confirmed your settings, click the "Create" button to create the VM. Azure will start provisioning the resources.

### Deployment Progress:

You can monitor the deployment progress in the Azure Portal. It may take a few minutes for your VM to be created.



### Access Your VM:

Once the VM is created, you can access it through SSH (for Linux) or RDP (for Windows) using the credentials you provided during the setup.



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Azure Fundamentals (203105376)

The screenshot shows the Microsoft Azure portal interface. On the left, a sidebar lists options like Overview, Activity log, Tags, Diagnose and solve problems, Settings, Networking, Connect, Disks, Size, Microsoft Defender for Cloud, Advisor recommendations, Extensions + applications, Availability + scaling, Configuration, Identity, Properties, and Help. The main content area displays details for 'VM1' under the 'Virtual machine' section. Key information includes:

- Resource group: 5823
- Status: Running
- Location: Central India
- Subscription ID: bff782e8-6ca5-495f-95d3-4ba2b27a7ea6
- Health state: -
- Tags: (edit) : Add tags
- Operating system: Windows
- VM availability status: Available
- Size: Standard E2s v3 (2 vcpus, 16 GiB memory)
- Public IP address: 20.219.149.219
- Virtual network/subnet: VM1-vnet/default
- DNS name: Not configured

Below the main content, there are tabs for Properties, Monitoring, Capabilities (7), Recommendations, and Tutorials. The 'Virtual machine' tab is selected.

The screenshot shows the 'Remote Desktop Connection' window. It has fields for 'Computer:' (Example: computer.fabrikam.com) and 'User name:' (None specified). A message at the bottom states: 'The computer name field is blank. Enter a full remote computer name.' There are 'Show Options' and 'Connect' buttons, along with a 'Help' link.

The screenshot shows the Microsoft Azure portal with the same VM1 details as the first screenshot. A 'Windows Security' dialog box is overlaid, prompting for credentials. The dialog title is 'Enter your credentials' and it says 'These credentials will be used to connect to 20.219.149.219.' It contains fields for 'User name' (B VARUN KUMAR GOUD) and 'Password' (MicrosoftAccount\varungoud3930@gmail.com), with a 'Remember me' checkbox. Below the fields are 'OK' and 'Cancel' buttons. In the background, the VM1 properties are visible.

The screenshot shows the Windows desktop environment of the VM1 virtual machine. The desktop has a blue theme with a large circular icon in the center. The text 'VM1' is displayed below the icon, and 'Welcome' is at the bottom. The taskbar at the bottom shows various pinned icons. The system tray indicates the date as 30-08-2023 and the time as 01:26.

### P3: Implementing Azure Storage:

- Creating and configuring Azure Storage accounts
- Understanding Azure Blob Storage for unstructured data
- Utilizing Azure Table Storage for NoSQL data
- Implementing Azure File Storage for file shares
- Working with Azure Disk Storage for VMs

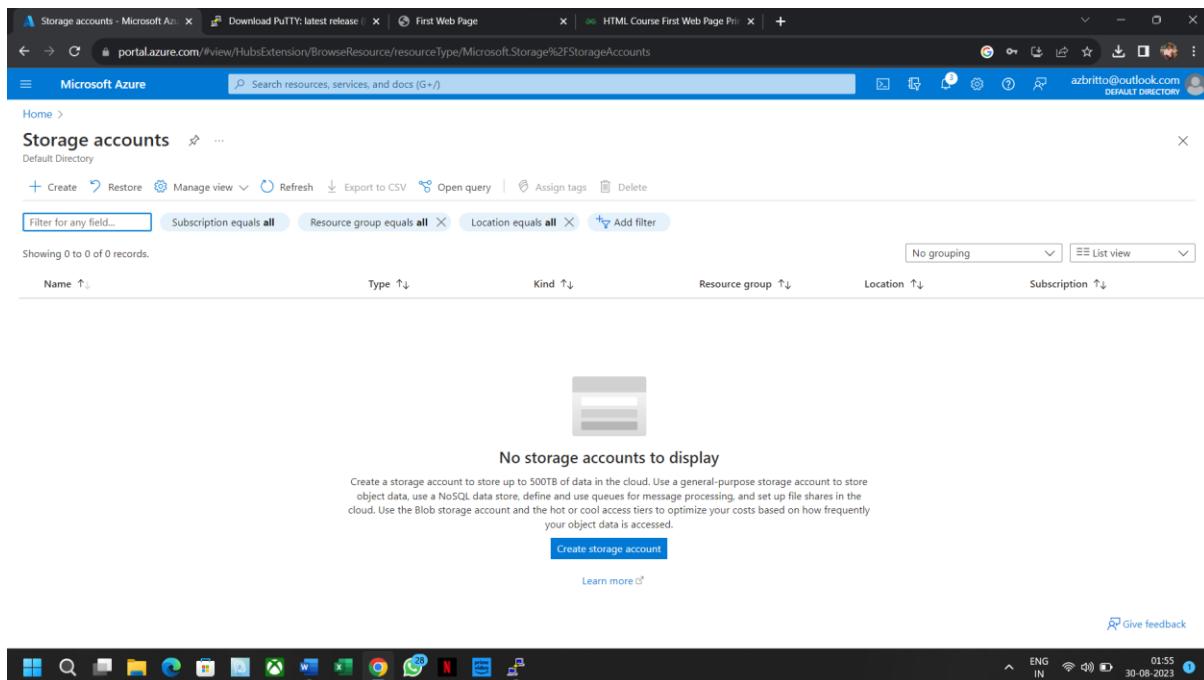
Creating and configuring Azure Storage accounts

To create a new storage account, follow these steps:

Click on "Create a resource."

Search for "Storage account" and select it.

Click the "Create" button.



The screenshot shows the Microsoft Azure portal interface. The user is on the 'Storage accounts' page under the 'Microsoft Azure' section. The search bar at the top contains 'Search resources, services, and docs (G+)'. Below the search bar, there's a navigation bar with icons for Home, Microsoft Azure, and a user profile. The main content area has a title 'Storage accounts' with a 'Default Directory' dropdown. Below the title are several filter options: 'Subscription equals all', 'Resource group equals all', and 'Location equals all'. There are also buttons for '+ Create', 'Restore', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', 'Assign tags', and 'Delete'. A message at the top states 'Showing 0 to 0 of 0 records.' Below this, there's a large empty table with columns labeled 'Name ↑', 'Type ↑', 'Kind ↑', 'Resource group ↑↓', 'Location ↑↓', and 'Subscription ↑↓'. At the bottom of the table, there's a note: 'No storage accounts to display' followed by a small icon of a storage unit. Below this note, there's a brief description of what storage accounts are used for and a 'Create storage account' button. The status bar at the bottom of the browser window shows the date and time as '30-08-2023 01:55'.

Fill out the required information:

Subscription: Choose your Azure subscription.

Resource Group: Create a new one or select an existing group.

Storage account name: Unique name for your storage account.

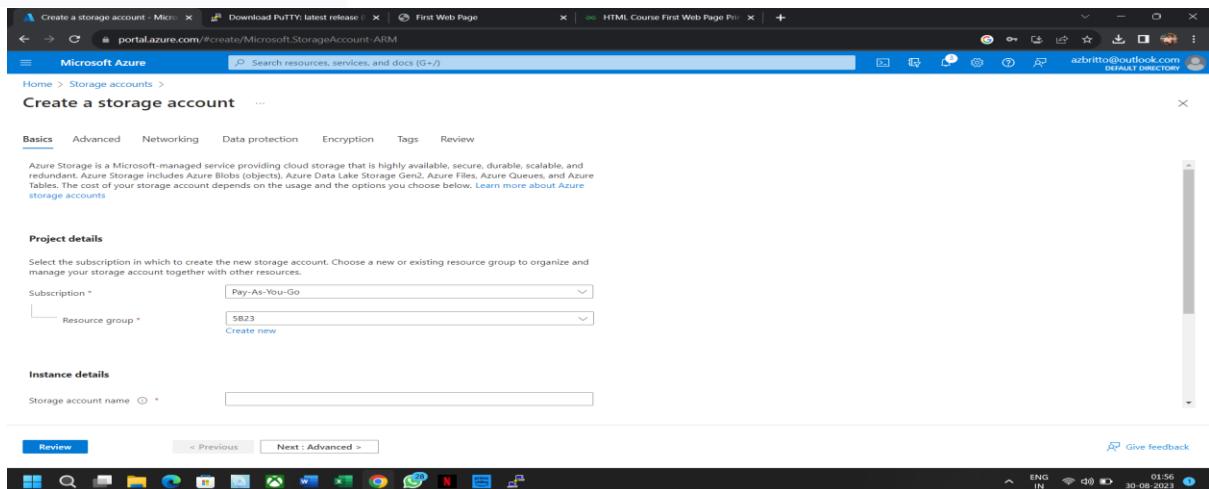
Location: Choose a region for your storage account.

Performance: Select the performance type (Standard or Premium).

Account kind: Choose between StorageV2 (general purpose) or BlobStorage (optimized for blob storage).

Replication: Choose replication options for data redundancy.

Click "Review + create" and then "Create" to create the storage account.



**Project details**

Select the subscription in which to create the new storage account. Choose a new or existing resource group to organize and manage your storage account together with other resources.

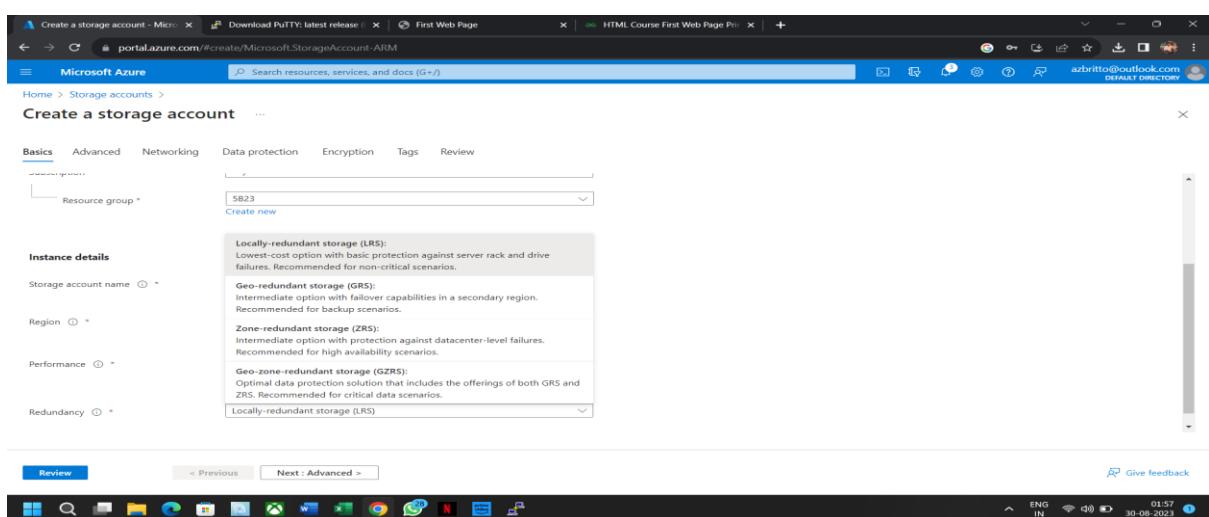
Subscription \*

Resource group \*

**Instance details**

Storage account name

**Review**



**Basics** Advanced Networking Data protection Encryption Tags Review

Resource group \*

**Instance details**

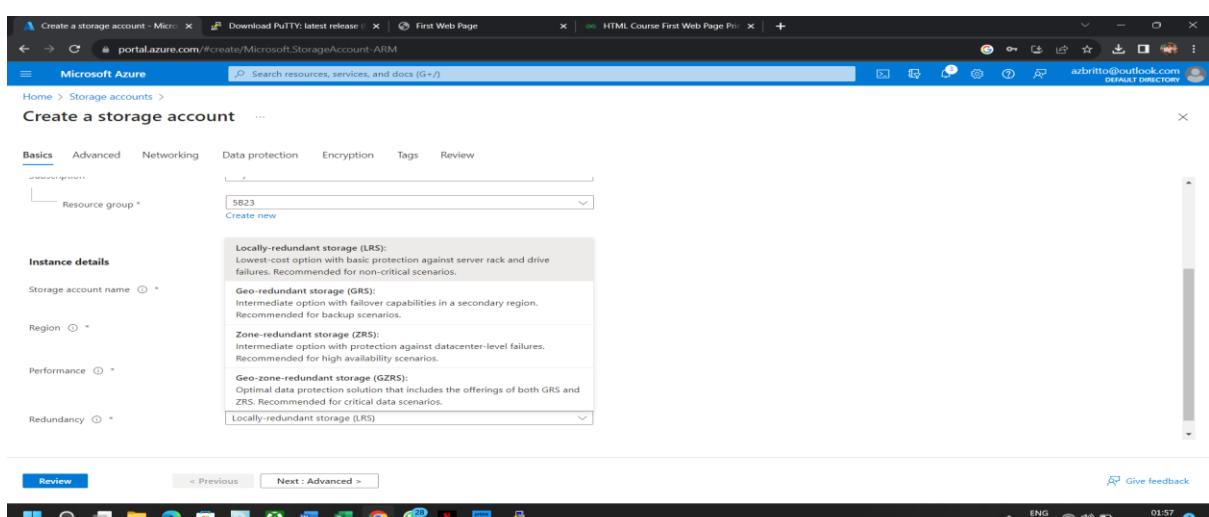
Storage account name

Region

Performance

Redundancy  Locally-redundant storage (LRS)

**Review**



**Basics** Advanced Networking Data protection Encryption Tags Review

Resource group \*

**Instance details**

Storage account name

Region

Performance

Redundancy  Locally-redundant storage (LRS)

**Review**

**Blob storage**

Allow cross-tenant replication

Access tier  **Hot:** Frequently accessed data and day-to-day usage scenarios  
 **Cool:** Infrequently accessed data and backup scenarios

[Home](#) > [Storage accounts](#) >

## Create a storage account

[Basics](#)   [Advanced](#)   [Networking](#)   [Data protection](#)   [Encryption](#)   [Tags](#)   [Review](#)

You can connect to your storage account either publicly, via public IP addresses or service endpoints, or privately, using a private endpoint.

Network access \*

- Enable public access from all networks
  - Enable public access from selected virtual networks and IP addresses
  - Disable public access and use private access
- Enabling public access from all networks might make this resource available publicly. Unless public access is required, we recommend using a more restricted access type. [Learn more](#)

### Network routing

Determine how to route your traffic as it travels from the source to its Azure endpoint. Microsoft network routing is recommended for most customers.

Routing preference ⓘ \*

- Microsoft network routing
- Internet routing

[Review](#)
[< Previous](#)
[Next : Data protection >](#)

### Recovery

Protect your data from accidental or erroneous deletion or modification.



Enable point-in-time restore for containers

Use point-in-time restore to restore one or more containers to an earlier state. If point-in-time restore is enabled, then versioning, change feed, and blob soft delete must also be enabled. [Learn more](#)



Enable soft delete for blobs

Soft delete enables you to recover blobs that were previously marked for deletion, including blobs that were overwritten. [Learn more](#)

Days to retain deleted blobs ⓘ

7



Enable soft delete for containers

Soft delete enables you to recover containers that were previously marked for deletion. [Learn more](#)

Days to retain deleted containers ⓘ

7



Enable soft delete for file shares

Soft delete enables you to recover file shares that were previously marked for deletion. [Learn more](#)

Days to retain deleted file shares ⓘ

7

[Review](#)
[< Previous](#)
[Next : Encryption >](#)

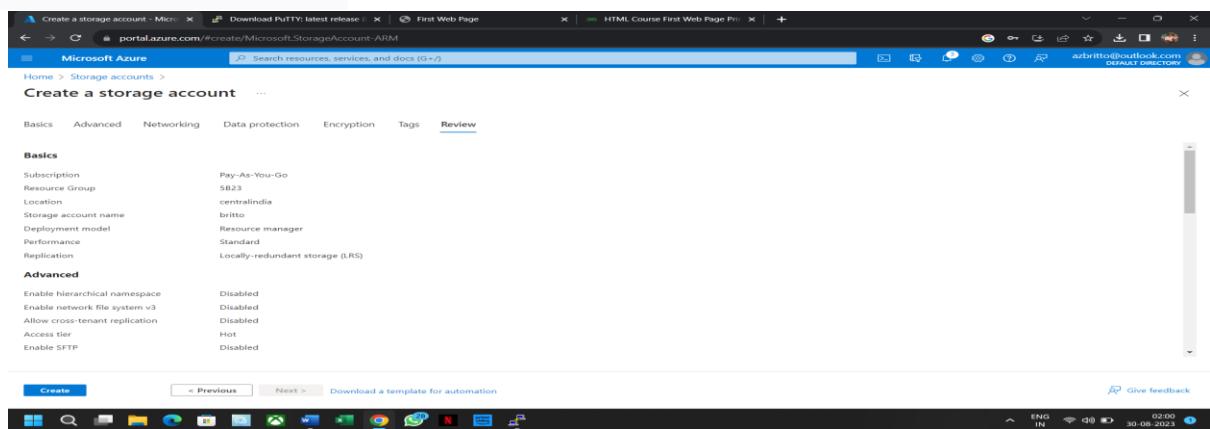
### Tracking

Manage versions and keep track of changes made to your blob data.

Enable versioning for blobs

Use versioning to automatically maintain previous versions of your blobs. [Learn more](#)

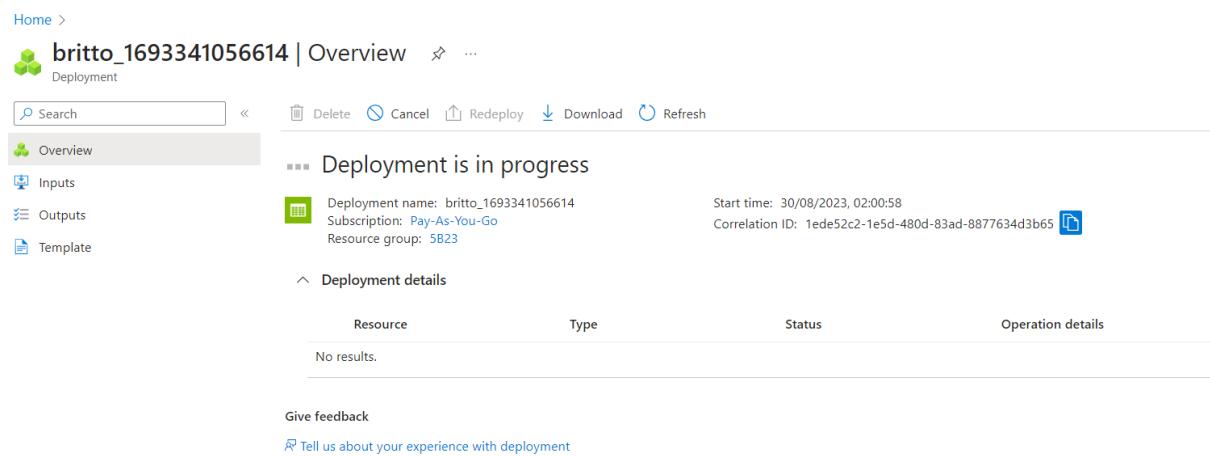
Consider your workloads, their impact on the number of versions created, and the resulting costs. Optimize costs by automatically managing the data lifecycle. [Learn more](#)



The screenshot shows the 'Create a storage account' wizard in Microsoft Azure. The 'Basics' tab is selected. Key configuration details include:

- Subscription:** Pay-As-You-Go
- Resource Group:** SB23
- Location:** centralindia
- Storage account name:** britto
- Deployment model:** Resource manager
- Performance:** Standard
- Replication:** Locally-redundant storage (LRS)

Other tabs available are Advanced, Networking, Data protection, Encryption, Tags, and Review.



The screenshot shows the 'Overview' page for the storage account 'britto\_1693341056614'. The deployment status is shown as 'Deployment is in progress'.

**Deployment Details:**

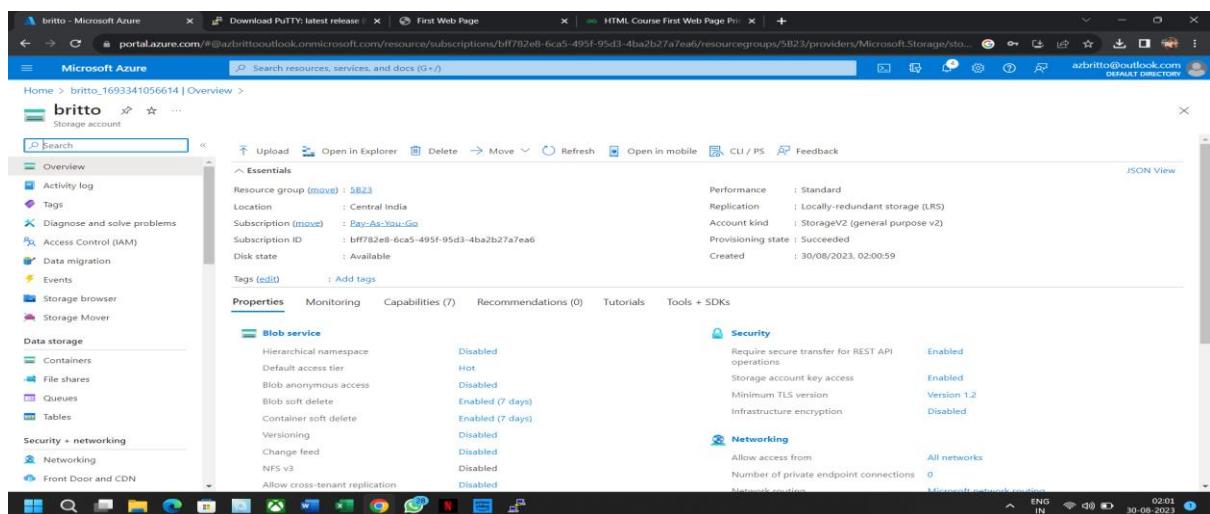
- Deployment name: britto\_1693341056614
- Subscription: Pay-As-You-Go
- Resource group: SB23
- Start time: 30/08/2023, 02:00:58
- Correlation ID: 1ede52c2-1e5d-480d-83ad-8877634d3b65

**Deployment details table:**

Resource	Type	Status	Operation details
No results.			

**Feedback:**

- Give feedback
- Tell us about your experience with deployment



The screenshot shows the 'Properties' page for the storage account 'britto'. The 'Blob service' section is highlighted.

**Essentials:**

- Resource group: SB23
- Location: Central India
- Subscription: Pay-As-You-Go
- Subscription ID: bff7b2e8-6ca5-495f-95d3-4ba2b27a7ea6
- Disc state: Available
- Tags: Add tags

**Properties:**

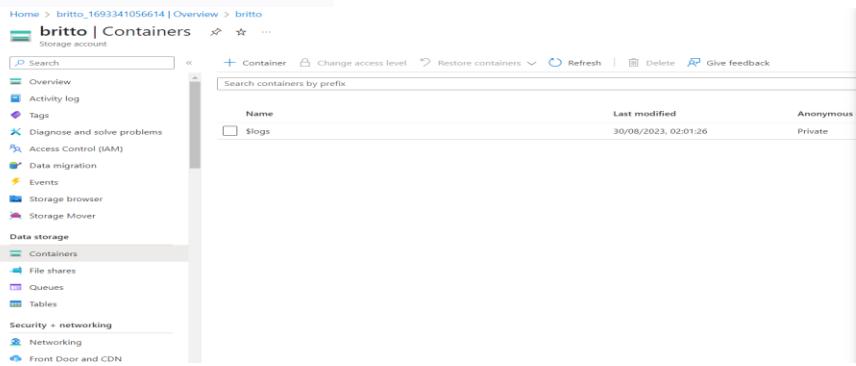
- Hierarchical namespace: Disabled
- Default access tier: Hot
- Blob anonymous access: Disabled
- Blob soft delete: Enabled (7 days)
- Container soft delete: Enabled (7 days)
- Versioning: Disabled
- Change feed: Disabled
- NFS v3: Disabled
- Allow cross tenant replication: Disabled

**Security:**

- Require secure transfer for REST API operations: Enabled
- Storage account key access: Enabled
- Minimum TLS version: Version 1.2
- Infrastructure encryption: Disabled

**Networking:**

- Allow access from: All networks
- Number of private endpoint connections: 0
- Network interface: Microsoft Network Interface



Home > britto\_1693341056614 | Overview > britto | Containers

**Container** + Container Change access level Restore containers Refresh Delete Give feedback

Name Last modified Anonymous:

logs	30/08/2023, 02:01:26	Private
------	----------------------	---------

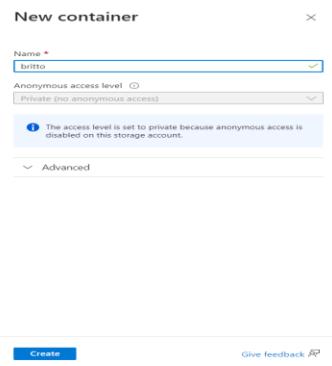
Search containers by prefix

Container Data storage

- Containers
- File shares
- Queues
- Tables

Security + networking

- Networking
- Front Door and CDN



**New container**

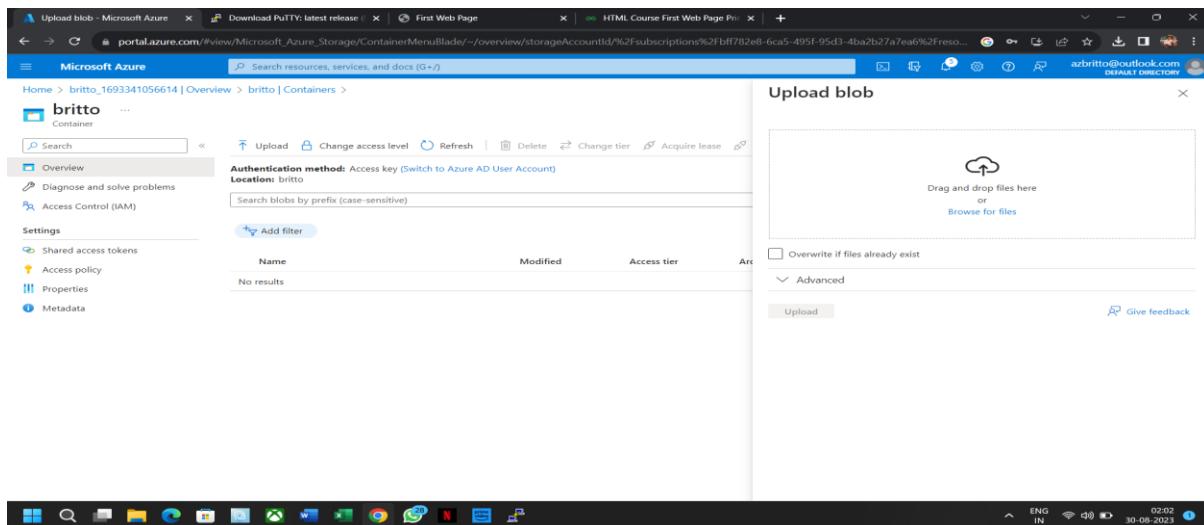
Name \* britto

Anonymous access level Private (no anonymous access)

The access level is set to private because anonymous access is disabled on this storage account.

Advanced

Create Give feedback



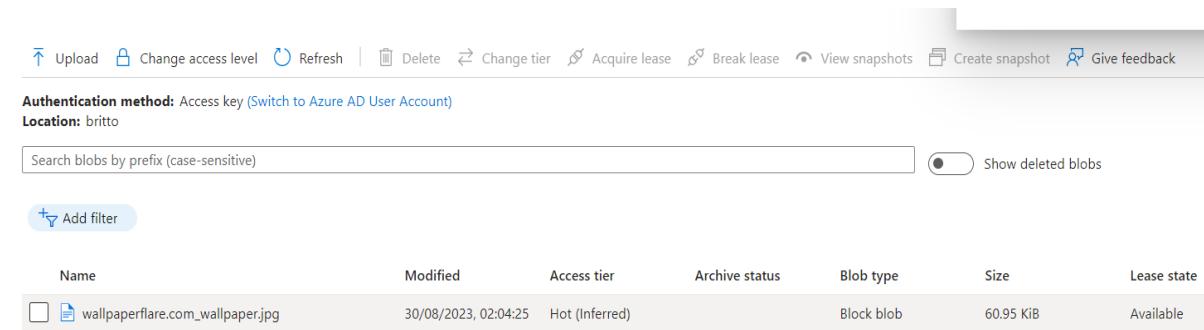
**Upload blob**

Drag and drop files here or Browse for files

Overwrite if files already exist

Advanced

Upload Give feedback



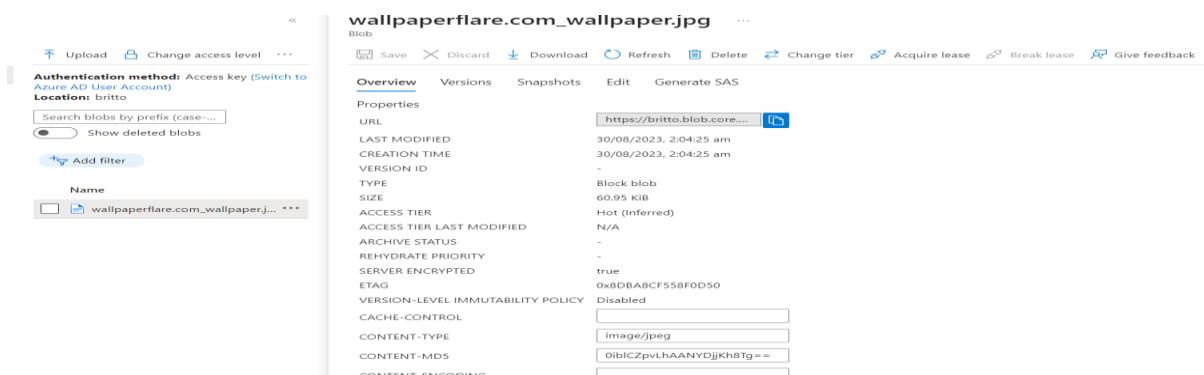
Upload Change access level Refresh Delete Change tier Acquire lease Break lease View snapshots Create snapshot Give feedback

**Authentication method:** Access key (Switch to Azure AD User Account)  
**Location:** britto

Search blobs by prefix (case-sensitive)

Add filter Show deleted blobs

Name	Modified	Access tier	Archive status	Blob type	Size	Lease state
wallpaperflare.com_wallpaper.jpg	30/08/2023, 02:04:25	Hot (Inferred)	-	Block blob	60.95 KiB	Available



wallpaperflare.com\_wallpaper.jpg ...

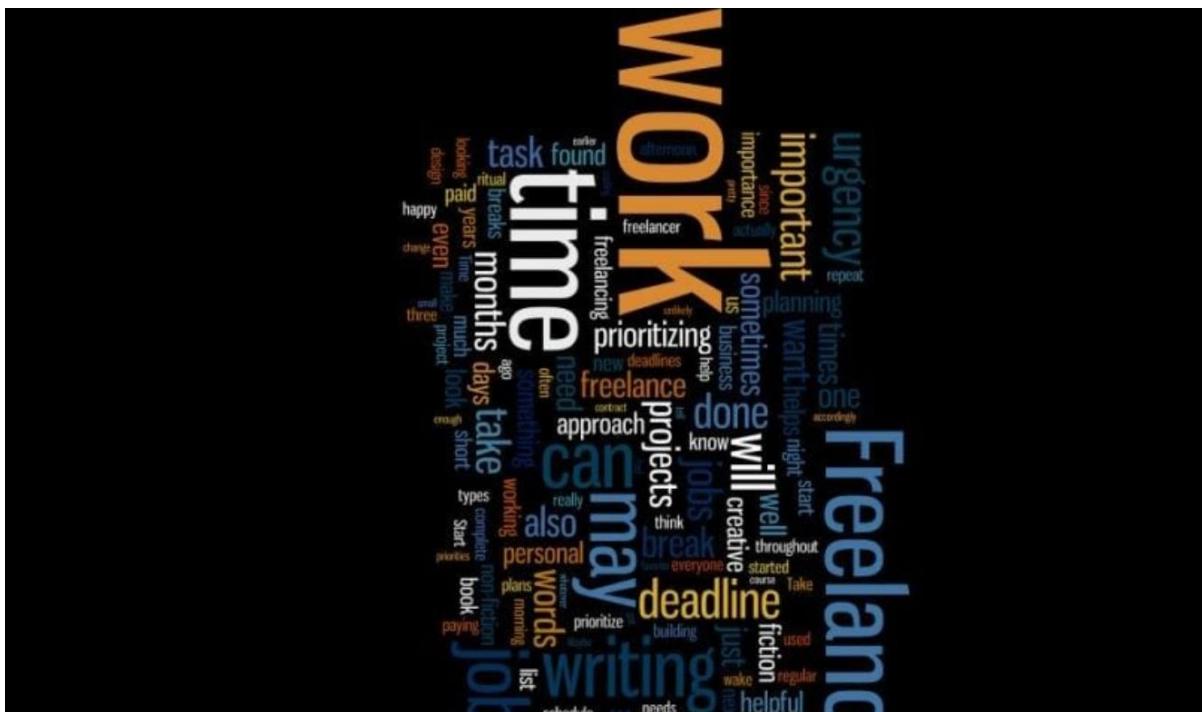
Save Discard Download Refresh Delete Change tier Acquire lease Break lease Give feedback

**Overview** Versions Snapshots Edit Generate SAS

**Properties**

URL	<a href="https://britto.blob.core...">https://britto.blob.core...</a>
LAST MODIFIED	30/08/2023, 2:04:25 am
CREATION TIME	30/08/2023, 2:04:25 am
VERSION ID	-
TYPE	Block blob
SIZE	60.95 KiB
ACCESS TIER	Hot (Inferred)
ACCESS TIER LAST MODIFIED	N/A
ARCHIVE STATUS	-
REHYDRATE PRIORITY	-
SERVER ENCRYPTED	true
ETAG	0x8DBA8CF558F0D50
VERSION-LEVEL IMMUTABILITY POLICY	Disabled
CACHE-CONTROL	
CONTENT-TYPE	image/jpeg
CONTENT-MD5	0ibICZpvLhAANYDjjKh8Tg==
CONTENT-ENCODING	

A screenshot of a Microsoft Edge browser window. The address bar shows the URL https://britto.blob.core.windows.net/britto/wallpaperflare.com\_wallpaper.jpg. The page content is a Google search result for the same query, showing the image file as a thumbnail and a link to the Google Search results page.



Virtual Network

The screenshot shows the Microsoft Azure portal interface for managing virtual networks. The top navigation bar includes the Azure logo, a search bar, and a user profile for azbrutto@outlook.com. Below the header, the 'Virtual networks' section is displayed under the 'Microsoft Azure' menu. A breadcrumb trail shows 'Home > Virtual networks'. The main content area lists one item: 'VM1-vnet' (Resource group: 5B23, Location: Central India, Subscription: Pay-As-You-Go). Filter options at the top include 'Subscription equals all', 'Resource group equals all', 'Location equals all', and an 'Add filter' button. A 'Manage view' dropdown and a 'List view' link are also present.

Name	Resource group	Location	Subscription
VM1-vnet	5B23	Central India	Pay-As-You-Go

Create virtual network - Microsoft Azure | portal.azure.com/#create/Microsoft.VirtualNetwork-ARM

Microsoft Azure | Search resources, services, and docs (G+/)

Home > Virtual networks > Create virtual network ...

Basics Security IP addresses Tags Review + create

Learn more ⓘ

**Project details**

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Pay-As-You-Go  
Resource group \* SB23 Create new

**Instance details**

Virtual network name \* virtualnetwork  
Region (Asia Pacific) Central India Deploy to an edge zone

Previous Next Review + create

Microsoft Azure | Search resources, services, and docs (G+/)

Home > Virtual networks > Create virtual network ...

Basics Security IP addresses Tags Review + create

Configure your virtual network address space with the IPv4 and IPv6 addresses and subnets you need. [Learn more ⓘ](#)

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. [Learn more ⓘ](#)

Add IPv4 address space | ↴

10.2.0.0/16 Delete address space  
10.2.0.0 /16 (65,536 addresses)  
10.2.0.0 - 10.2.255.255 (65536 addresses)

+ Add a subnet

Subnets	IP address range	Size	NAT gateway
---------	------------------	------	-------------

ⓘ A NAT gateway is recommended for outbound internet access from subnets. Edit the subnet to add a NAT gateway. [Learn more ⓘ](#)

Previous Next Review + create

## Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more ⓘ](#)

IP address space ⓘ 10.2.0.0/16  
10.2.0.0 - 10.2.255.255 (65536 addresses)

**Subnet details**

Subnet template ⓘ Default

Name \* ⓘ public

Starting address \* ⓘ 10.2.0.0

Subnet size ⓘ /24 (256 addresses)

IP address space ⓘ 10.2.0.0 - 10.2.0.255 (256 addresses)

**Security**

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more ⓘ](#)

NAT gateway ⓘ None Create new

Network security group ⓘ None Create new

Add Cancel

## Add a subnet

X

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

IP address space (i)

10.2.0.0/16

10.2.0.0 - 10.2.255.255 (65536 addresses)

### Subnet details

Subnet template (i)

Default

Name \* (i)

private

Starting address \* (i)

10.2.1.0

Subnet size (i)

/24 (256 addresses)

IP address space (i)

10.2.1.0 - 10.2.1.255 (256 addresses)

### Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more](#)

NAT gateway (i)

None

[Create new](#)

Network security group (i)

None

[Create new](#)

**Add**

**Cancel**

Microsoft Azure Search resources, services, and docs (G+/-)

Home > Virtual networks > **Create virtual network** ...

Basics Security **IP addresses** Tags Review + create

Add IPv4 address space 10.2.0.0/16

10.2.0.0 /16 (65,536 addresses) [Delete address space](#)

10.2.0.0 - 10.2.255.255 (65536 addresses)

+ Add a subnet

Subnets	IP address range	Size	NAT gateway
public	10.2.0.0 - 10.2.0.255	/24 (256 addresses)	-
private	10.2.1.0 - 10.2.1.255	/24 (256 addresses)	-

(i) A NAT gateway is recommended for outbound internet access from subnets. Edit the subnet to add a NAT gateway. [Learn more](#)

[Previous](#)

[Next](#)

**Review + create**

**britto - Microsoft Azure**

portal.azure.com/#@azbruttooutlook.onmicrosoft.com/resource/subscriptions/bff782e8-6ca5-495f-95d3-4ba2b27a7ea6/resourcegroups/5B23/providers/Microsoft.Network/virtualNetworks/britto/connectedDevices

Microsoft Azure | Search resources, services, and docs (G+)

Home > britto

**britto | Connected devices**

Virtual network

Search | Refresh | Delete

Export to CSV | No grouping

Activity log | Type : all | Subnet : all

Overview | Tags | Diagnose and solve problems

Settings | Address space | Connected devices

- Subnets
- Bastion
- DDoS protection
- Firewall
- Microsoft Defender for Cloud
- Network manager
- DNS servers
- Peerings
- Service endpoints

No results.

Give feedback

https://portal.azure.com/#@azbruttooutlook.onmicrosoft.com/resource/subscriptions/bff782e8-6ca5-495f-95d3-4ba2b27a7ea6/resourcegroups/5B23/providers/Microsoft.Network/virtualNetworks/britto/connectedDevices

ENG IN 15:50 30-08-2023

**Create a virtual machine - Microsoft Azure**

portal.azure.com/#create/Microsoft.VirtualMachine-ARM

Microsoft Azure | Search resources, services, and docs (G+)

Home > Virtual machines >

**Create a virtual machine**

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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](#)

**Project details**

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Pay-As-You-Go

Resource group \* 5B23

[Create new](#)

**Instance details**

Virtual machine name \* appserver

Region \* (Asia Pacific) Central India

Availability options \* No infrastructure redundancy required

Security type \* Standard

Image \* Ubuntu Server 20.04 LTS - x64 Gen2

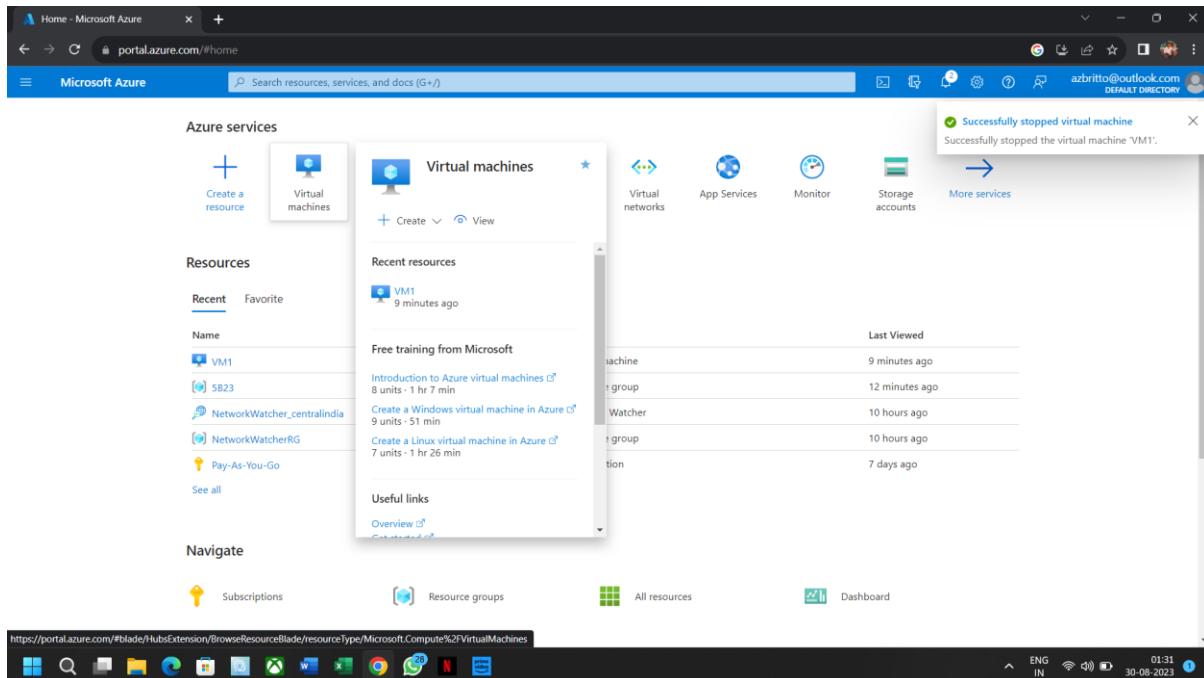
Review + create < Previous Next : Disks > Give feedback

ENG IN 15:52 30-08-2023

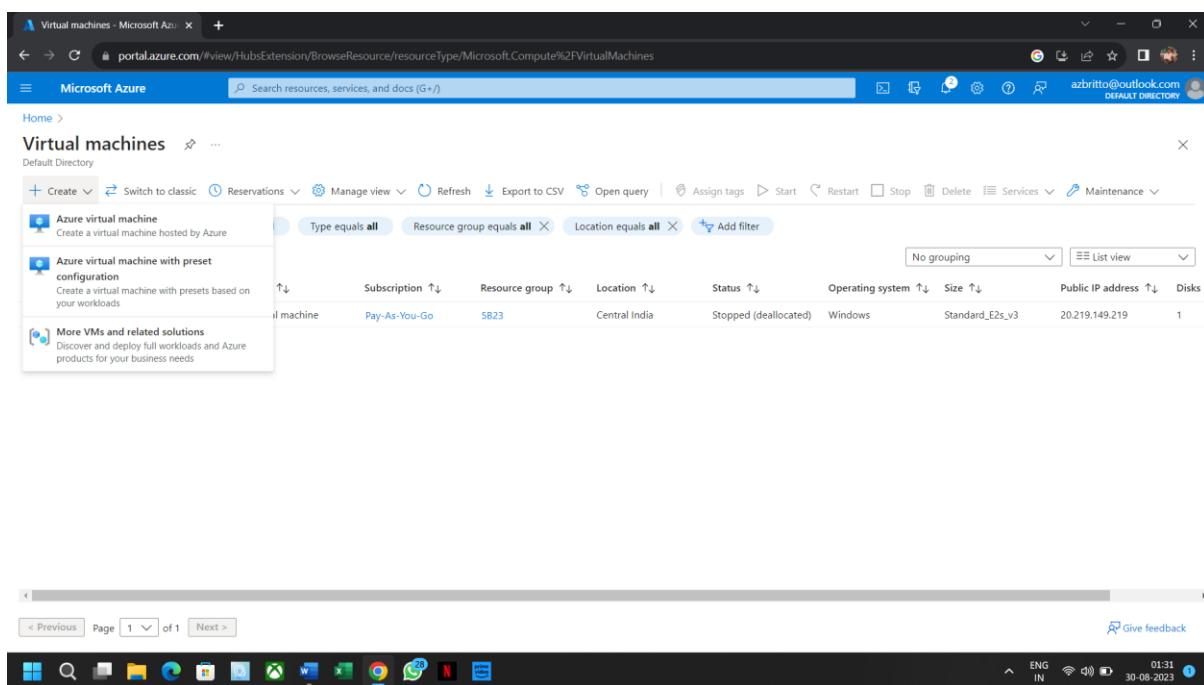
## P4: Deploying Web Apps:

- Creating and configuring an Azure Web App
- Deploying web applications using various methods (e.g., Git, FTP)
- Managing web app settings and configurations
- Scaling web apps to handle increased traffic

Deploying web application



The screenshot shows the Microsoft Azure portal home page. The 'Virtual machines' section is highlighted. A notification at the top right says 'Successfully stopped virtual machine VM1'. The 'Recent resources' list includes 'VM1' (9 minutes ago), 'Free training from Microsoft' (Introduction to Azure virtual machines, 8 units - 1 hr 7 min), 'Create a Windows virtual machine in Azure' (9 units - 51 min), 'Create a Linux virtual machine in Azure' (7 units - 1 hr 26 min), and 'Pay-As-You-Go'. The 'Last Viewed' section lists recent activities like 'Machine group' (9 minutes ago), 'Network Watcher' (12 minutes ago), 'Network Watcher group' (10 hours ago), and 'Subscription' (10 hours ago). Below these are 'Useful links' for 'Overview'.



The screenshot shows the 'Virtual machines' blade in the Azure portal. It displays a list of virtual machines. One machine, 'VM1', is listed with the following details: Type equals all, Resource group equals all, Location equals all. The machine is a 'Windows' VM with a Public IP address of 20.219.149.219 and 1 disk. The blade includes filters for Type, Resource group, Location, Status, Operating system, Size, Public IP address, and Disks. At the bottom, there are navigation buttons for 'Previous', 'Page 1 of 1', and 'Next >'. The status bar at the bottom right shows 'ENG IN 01:31 30-08-2023'.

Create a virtual machine - Microsoft Azure

portal.azure.com/#create/Microsoft.VirtualMachine-ARM

Microsoft Azure

Search resources, services, and docs (G+)

azbritto@outlook.com  
DEFAULT DIRECTORY

Home > Virtual machines >

## Create a virtual machine

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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](#)

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Pay-As-You-Go

Resource group \* (New) Resource group Create new

### Instance details

Virtual machine name \*

Region \* (Asia Pacific) Central India

Availability options No infrastructure redundancy required

Security type Trusted launch virtual machines Configure security features

Review + create < Previous Next : Disks > Give feedback

ENG IN 01:33 30-08-2023

Create a virtual machine - Microsoft Azure

portal.azure.com/#create/Microsoft.VirtualMachine-ARM

Microsoft Azure

Search resources, services, and docs (G+)

azbritto@outlook.com  
DEFAULT DIRECTORY

Home > Virtual machines >

## Create a virtual machine

**⚠️** Changing Basic options may reset selections you have made. Review all options prior to creating the virtual machine.

Subscription \* Pay-As-You-Go

Resource group \* 5B23  
Create new

**Instance details**

Virtual machine name \* VM2

Region \* (Asia Pacific) Central India

Availability options No infrastructure redundancy required

Security type Standard

Image \* Ubuntu Server 20.04 LTS - x64 Gen2  
See all images | Configure VM generation

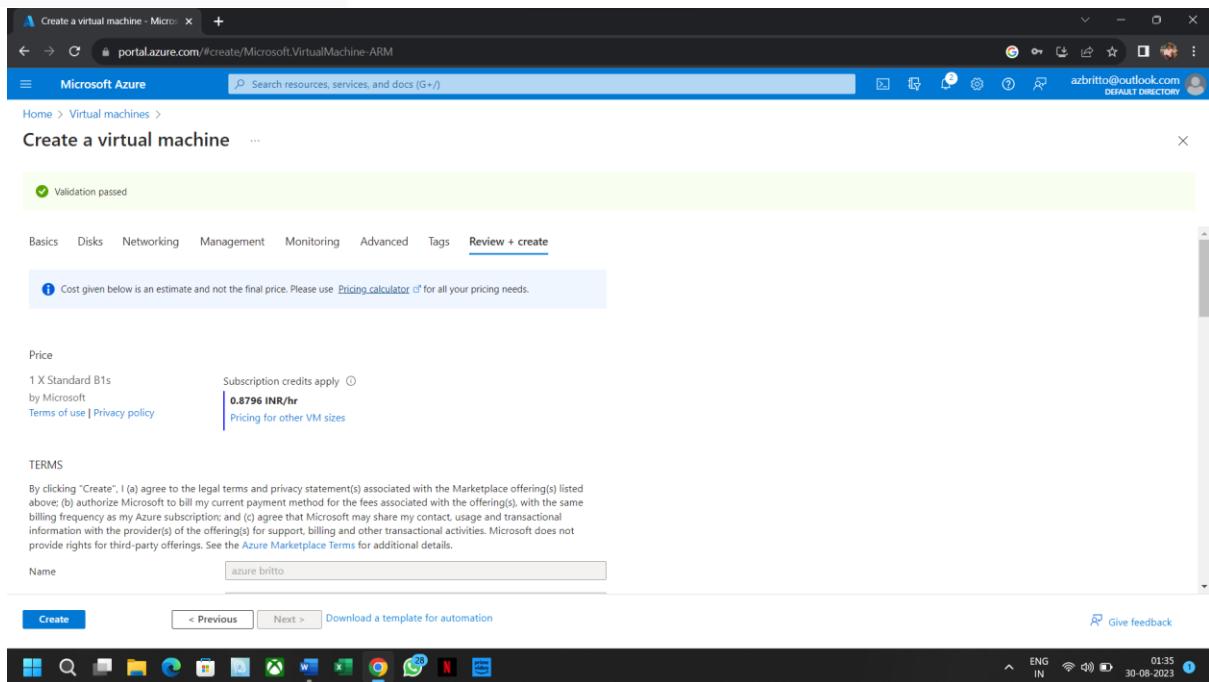
VM architecture  Arm64  
 x64

Run with Azure Spot discount

**Review + create** < Previous Next : Disks > Give feedback

go.microsoft.com/fwlink/?LinkId=2127231

ENG IN 01:35 30-08-2023



**Validation passed**

Basics Disks Networking Management Monitoring Advanced Tags **Review + create**

**Price**  
1 X Standard B1s by Microsoft **0.8796 INR/hr**  
[Terms of use](#) | [Privacy policy](#)

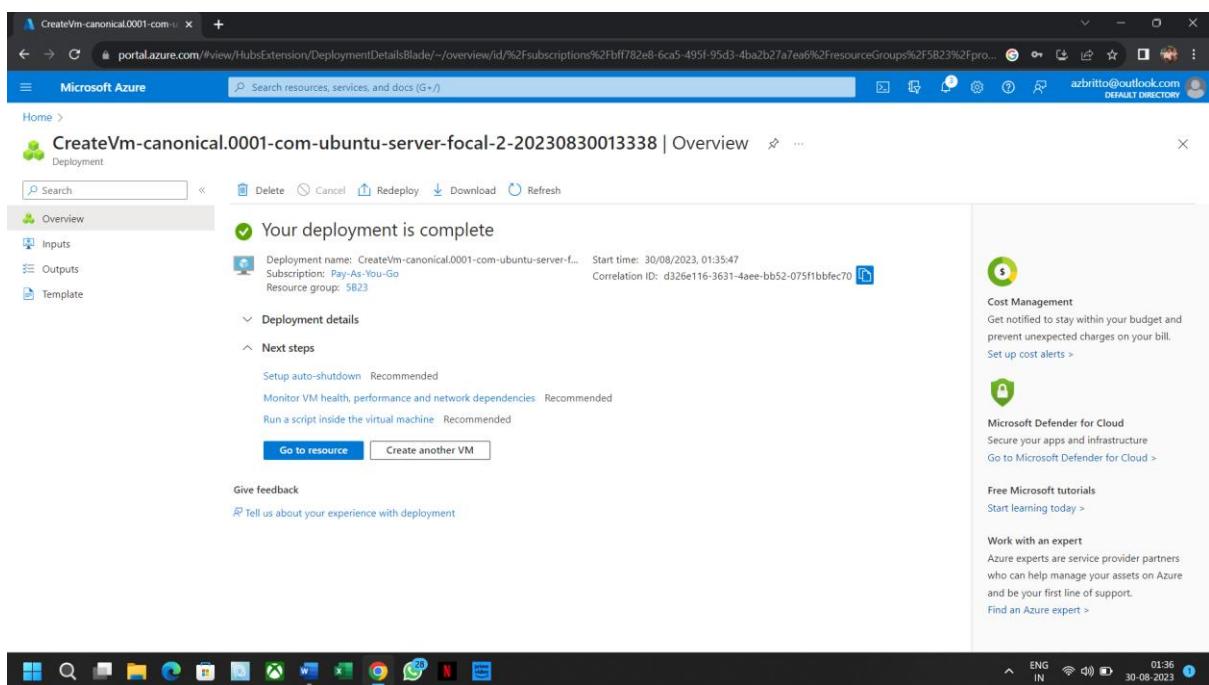
**Subscription credits apply** ⓘ **Pricing for other VM sizes**

**TERMS**  
By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

Name: **azure britto**

**Create** < Previous Next > Download a template for automation Give feedback

Windows Taskbar: ENG IN 01:35 30-08-2023



**Your deployment is complete**

Deployment name: CreateVm-canonical.0001-com-ubuntu-server-f... Start time: 30/08/2023, 01:35:47  
Subscription: Pay-As-You-Go Correlation ID: d326e116-3631-4aee-bb52-075f1bbfec70

**Deployment details**

**Next steps**

- Setup auto-shutdown Recommended
- Monitor VM health, performance and network dependencies Recommended
- Run a script inside the virtual machine Recommended

**Go to resource** **Create another VM**

**Give feedback** Tell us about your experience with deployment

**Cost Management**  
Get notified to stay within your budget and prevent unexpected charges on your bill.  
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[Go to Microsoft Defender for Cloud >](#)

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Windows Taskbar: ENG IN 01:36 30-08-2023



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Azure Fundamentals (203105376)

VM2 - Microsoft Azure    putty - Google Search

Google

putty

Images Download Videos For Mac How to use Portable For Windows Linux Shopping All filters Tools SafeSearch

About 14,50,00,000 results (0.29 seconds)

**PUTTY**  
https://www.putty.org

**Download PUTTY - free SSH and telnet client for Windows**

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 ...

**People also ask :**

- What is PutTY used for?
- What is the full form of PutTY?
- Can I use PowerShell instead of PutTY?
- How do I download PutTY on my laptop?

**Chiark.greenend.org.uk**  
https://www.chiark.greenend.org.uk/~sgtatham/putty/latest

**Download PutTY: latest release (0.79)**

https://www.putty.org

Feedback ENG IN 01:36 30-08-2023

VM2 - Microsoft Azure    Download PutTY: latest release (0.79)

chiark.greenend.org.uk/~sgtatham/putty/latest.html

**Download PutTY: latest release (0.79)**

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Download: [Stable](#) | [Snapshot](#) | [Docs](#) | [Changes](#) | [Wishlist](#)

This page contains download links for the latest released version of PutTY. Currently this is 0.79, released on 2023-08-26.

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 0.79 release](#).

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.

**Package files**

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:	<a href="#">putty_64bit-0.79-installer.msi</a>	(signature)
64-bit Arm:	<a href="#">putty-arm64-0.79-installer.msi</a>	(signature)
32-bit x86:	<a href="#">putty-0.79-installer.msi</a>	(signature)

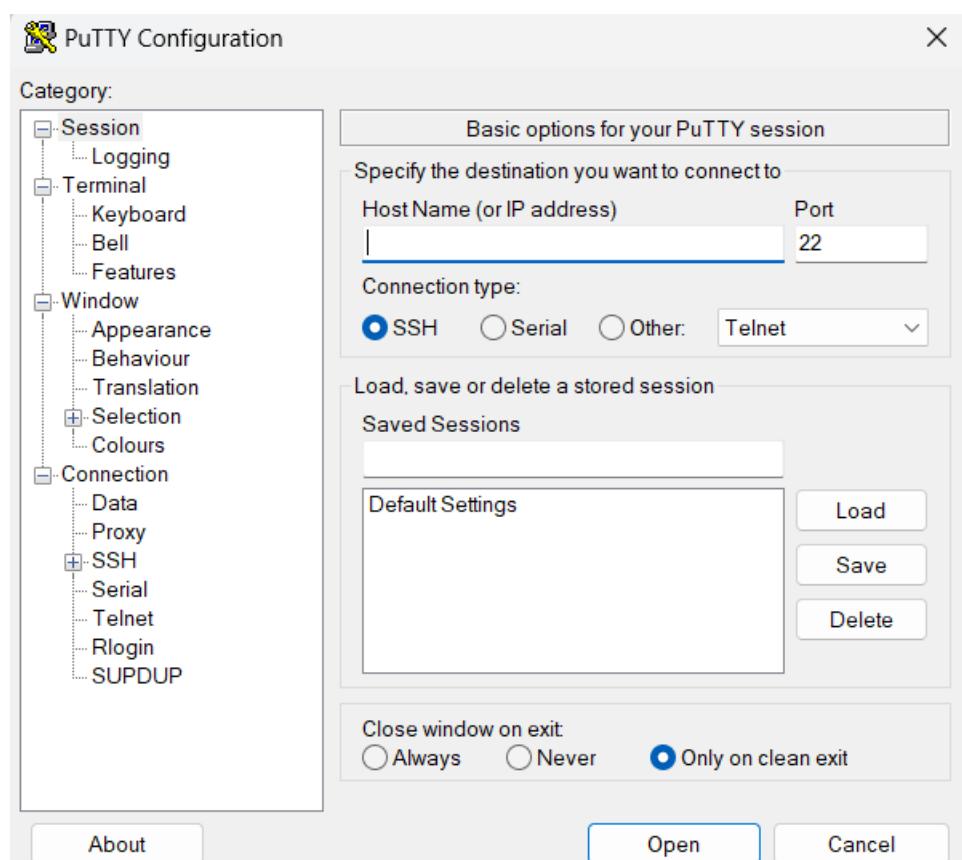
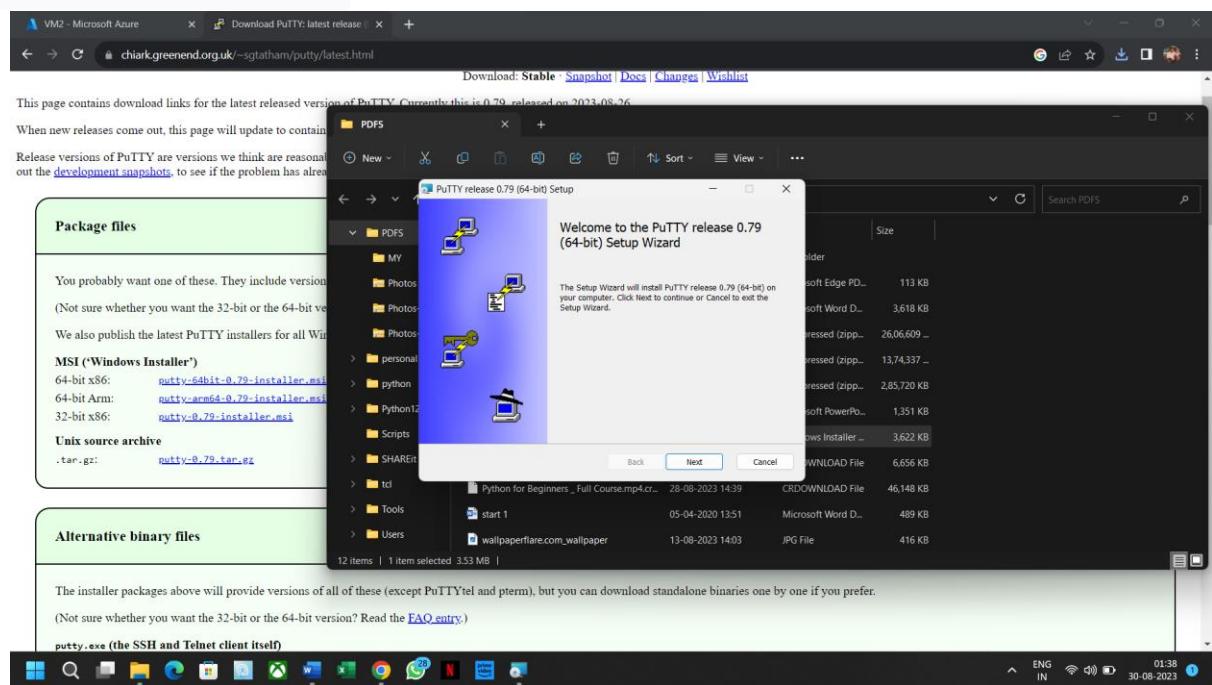
**Unix source archive**

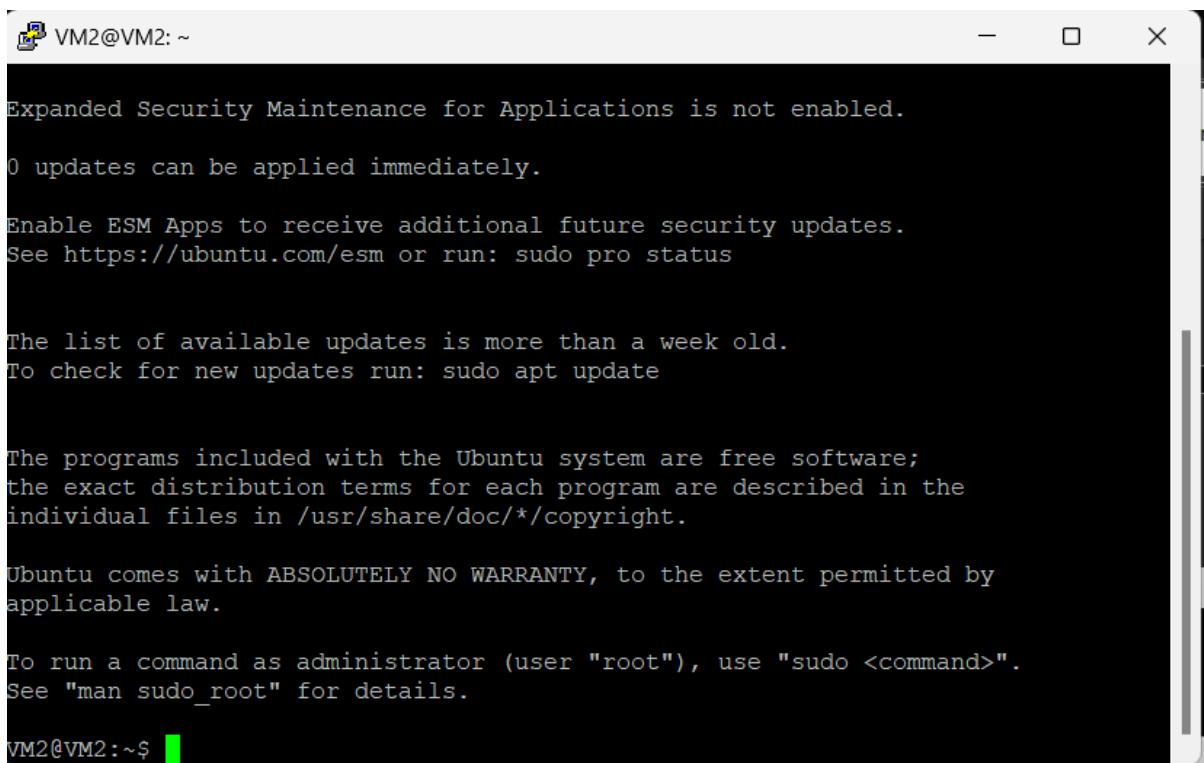
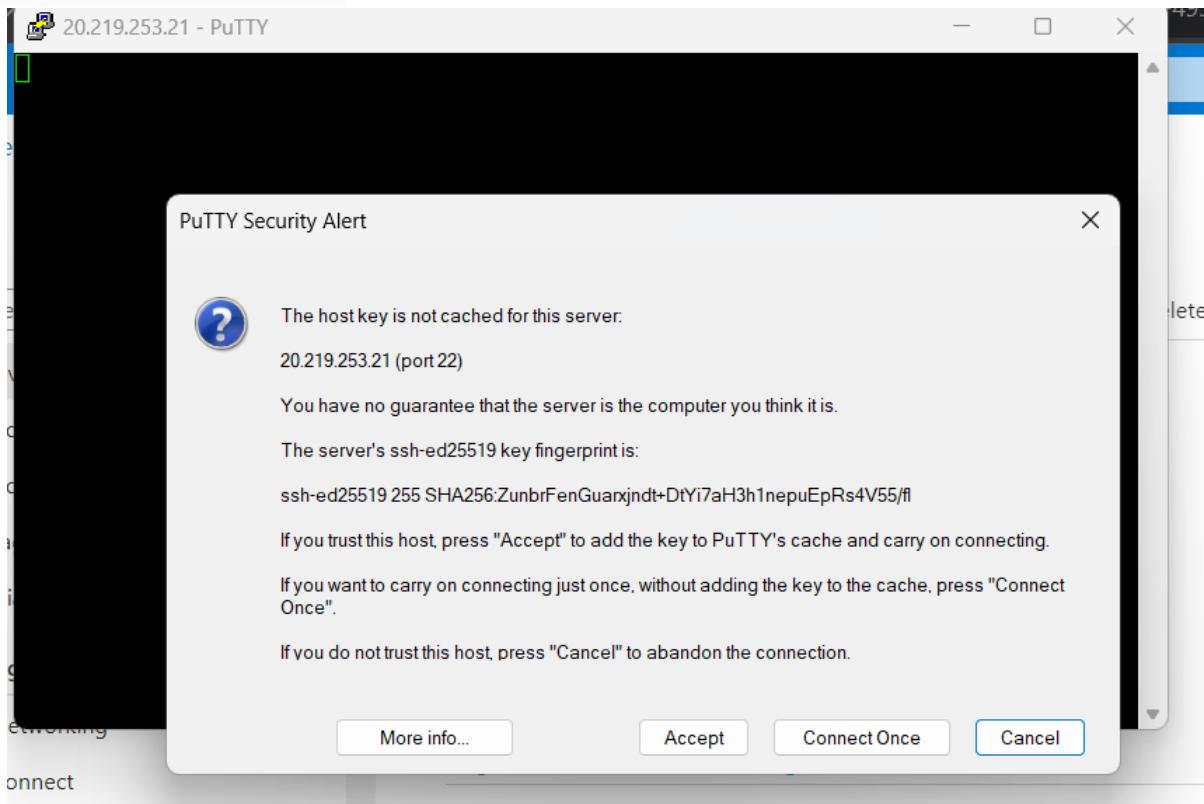
.tar.gz:	<a href="#">putty-0.79.tar.gz</a>	(signature)
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**Alternative binary files**

The installer packages above will provide versions of all of these (except PutTYtel and pterm), but you can download standalone binaries one by one if you prefer.

ENG IN 01:37 30-08-2023





```
VM2@VM2: ~
Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

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

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

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.

VM2@VM2:~$
```



```
root@VM2:~$ sudo su
root@VM2:~/home/VM2# apt update
Hit:1 http://azure.archive.ubuntu.com/ubuntu focal InRelease [114 kB]
Get:2 http://azure.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:4 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 Packages [8628 kB]
Get:5 http://azure.archive.ubuntu.com/ubuntu focal/universe Translation-en [5124 kB]
Get:6 http://azure.archive.ubuntu.com/ubuntu focal/multiverse amd64 c-n-f Metadata [265 kB]
Get:7 http://azure.archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [144 kB]
Get:8 http://azure.archive.ubuntu.com/ubuntu focal/multiverse Translation-en [104 kB]
Get:9 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 c-n-f Metadata [9136 B]
Get:10 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2776 kB]
Get:11 http://azure.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [459 kB]
Get:12 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [17.0 kB]
Get:13 http://azure.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [2219 kB]
Get:14 http://azure.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [311 kB]
Get:15 http://azure.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 c-n-f Metadata [576 B]
Get:16 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1103 kB]
Get:17 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [264 kB]
Get:18 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [25.4 kB]
Get:19 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [25.0 kB]
Get:20 http://azure.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 c-n-f Metadata [25.9 kB]
Get:21 http://azure.archive.ubuntu.com/ubuntu focal-updates/multiverse Translation-en [7484 B]
Get:22 http://azure.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 c-n-f Metadata [620 B]
Get:23 http://azure.archive.ubuntu.com/ubuntu focal-backports/main amd64 Packages [45.7 kB]
Get:24 http://azure.archive.ubuntu.com/ubuntu focal-backports/main Translation-en [16.3 kB]
Get:25 http://azure.archive.ubuntu.com/ubuntu focal-backports/main amd64 c-n-f Metadata [1420 B]
Get:26 http://azure.archive.ubuntu.com/ubuntu focal-backports/restricted amd64 c-n-f Metadata [116 B]
Get:27 http://azure.archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [25.0 kB]
Get:28 http://azure.archive.ubuntu.com/ubuntu focal-backports/universe Translation-en [16.3 kB]
Get:29 http://azure.archive.ubuntu.com/ubuntu focal-backports/universe amd64 c-n-f Metadata [880 B]
Get:30 http://azure.archive.ubuntu.com/ubuntu focal-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:31 http://azure.archive.ubuntu.com/ubuntu focal-security/main amd64 Packages [2390 kB]
Get:32 http://azure.archive.ubuntu.com/ubuntu focal-security/main Translation-en [376 kB]
Get:33 http://azure.archive.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [13.0 kB]
Get:34 http://azure.archive.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [2109 kB]
Get:35 http://azure.archive.ubuntu.com/ubuntu focal-security/restricted Translation-en [295 kB]
Get:36 http://azure.archive.ubuntu.com/ubuntu focal-security/universe amd64 Packages [873 kB]
Get:37 http://azure.archive.ubuntu.com/ubuntu focal-security/universe Translation-en [16.3 kB]
Get:38 http://azure.archive.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [19.0 kB]
Get:39 http://azure.archive.ubuntu.com/ubuntu focal-security/universe amd64 Packages [23.6 kB]
Get:40 http://azure.archive.ubuntu.com/ubuntu focal-security/multiverse Translation-en [5504 B]
Get:41 http://azure.archive.ubuntu.com/ubuntu focal-security/multiverse amd64 c-n-f Metadata [548 B]
Get:42 http://azure.archive.ubuntu.com/ubuntu focal-security/multiverse Translation-en [548 B]
92% [11 Packages store 0 B] [
```

ENG IN 01:44 30-08-2023

```
root@VM2:~$ sudo su
root@VM2:~/home/VM2# apt update
Hit:1 http://azure.archive.ubuntu.com/ubuntu focal InRelease [114 kB]
Get:2 http://azure.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:4 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 Packages [8628 kB]
Get:5 http://azure.archive.ubuntu.com/ubuntu focal/universe Translation-en [5124 kB]
Get:6 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 c-n-f Metadata [265 kB]
Get:7 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 Packages [144 kB]
Get:8 http://azure.archive.ubuntu.com/ubuntu focal/universe Translation-en [104 kB]
Get:9 http://azure.archive.ubuntu.com/ubuntu focal/multiverse amd64 c-n-f Metadata [9136 B]
Get:10 http://azure.archive.ubuntu.com/ubuntu focal/multiverse Translation-en [2776 kB]
Get:11 http://azure.archive.ubuntu.com/ubuntu focal/multiverse amd64 c-n-f Metadata [459 kB]
Get:12 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2219 kB]
Get:13 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [17.0 kB]
Get:14 http://azure.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [2219 kB]
Get:15 http://azure.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [311 kB]
Get:16 http://azure.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 c-n-f Metadata [576 B]
Get:17 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1103 kB]
Get:18 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [264 kB]
Get:19 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [25.4 kB]
Get:20 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [25.0 kB]
Get:21 http://azure.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [7484 B]
Get:22 http://azure.archive.ubuntu.com/ubuntu focal-backports/main amd64 Packages [45.7 kB]
Get:23 http://azure.archive.ubuntu.com/ubuntu focal-backports/main Translation-en [16.3 kB]
Get:24 http://azure.archive.ubuntu.com/ubuntu focal-backports/main amd64 c-n-f Metadata [1420 B]
Get:25 http://azure.archive.ubuntu.com/ubuntu focal-backports/restricted amd64 c-n-f Metadata [116 B]
Get:26 http://azure.archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [25.0 kB]
Get:27 http://azure.archive.ubuntu.com/ubuntu focal-backports/universe Translation-en [16.3 kB]
Get:28 http://azure.archive.ubuntu.com/ubuntu focal-backports/universe amd64 c-n-f Metadata [880 B]
Get:29 http://azure.archive.ubuntu.com/ubuntu focal-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:30 http://azure.archive.ubuntu.com/ubuntu focal-security/main amd64 Packages [2390 kB]
Get:31 http://azure.archive.ubuntu.com/ubuntu focal-security/main Translation-en [376 kB]
Get:32 http://azure.archive.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [13.0 kB]
Get:33 http://azure.archive.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [2109 kB]
Get:34 http://azure.archive.ubuntu.com/ubuntu focal-security/restricted Translation-en [295 kB]
Get:35 http://azure.archive.ubuntu.com/ubuntu focal-security/universe amd64 Packages [873 kB]
Get:36 http://azure.archive.ubuntu.com/ubuntu focal-security/universe Translation-en [16.3 kB]
Get:37 http://azure.archive.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [19.0 kB]
Get:38 http://azure.archive.ubuntu.com/ubuntu focal-security/universe amd64 Packages [23.6 kB]
Get:39 http://azure.archive.ubuntu.com/ubuntu focal-security/multiverse Translation-en [5504 B]
Get:40 http://azure.archive.ubuntu.com/ubuntu focal-security/multiverse amd64 c-n-f Metadata [548 B]
Get:41 http://azure.archive.ubuntu.com/ubuntu focal-security/multiverse Translation-en [548 B]
Get:42 http://azure.archive.ubuntu.com/ubuntu focal-security/multiverse Translation-en [548 B]
92% [11 Packages store 0 B] [
```

ENG IN 01:44 30-08-2023

```
Processing triggers for ufw (0.38-0ubuntu1) ...
Processing triggers for systemd (245.4-4ubuntu3.22) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...
root@VM2:/home/VM2# apache2 -version
Server version: Apache/2.4.41 (Ubuntu)
Server built: 2023-03-08T17:32:54
root@VM2:/home/VM2#
```



The screenshot shows a Microsoft Azure VM interface. In the center is a browser window titled "Apache2 Ubuntu Default Page" with the Ubuntu logo. The page content includes a "It works!" message, a configuration overview, and a code snippet of the Apache2 configuration files. Below the browser is a Windows taskbar with various icons and system status indicators.

```
root@VM2:/home/VM2# apache2 -version
Server version: Apache/2.4.41 (Ubuntu)
Server built:   2023-03-08T17:32:54
root@VM2:/home/VM2# cmd /var/www/html

Command 'cmd' not found, but there are 18 similar ones.

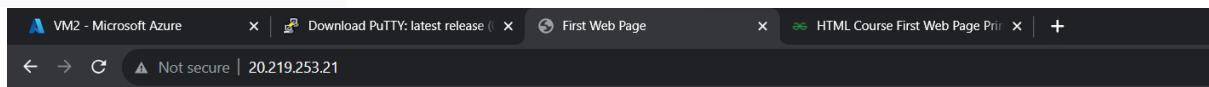
root@VM2:/home/VM2# cd /var/www/html/
root@VM2:/var/www/html#
```

```
root@VM2:/var/www/html#
<!DOCTYPE html>
<html>

<head>
    <title>
        First Web Page
    </title>
</head>

<body>
    Hello World!
</body>

</html>
```

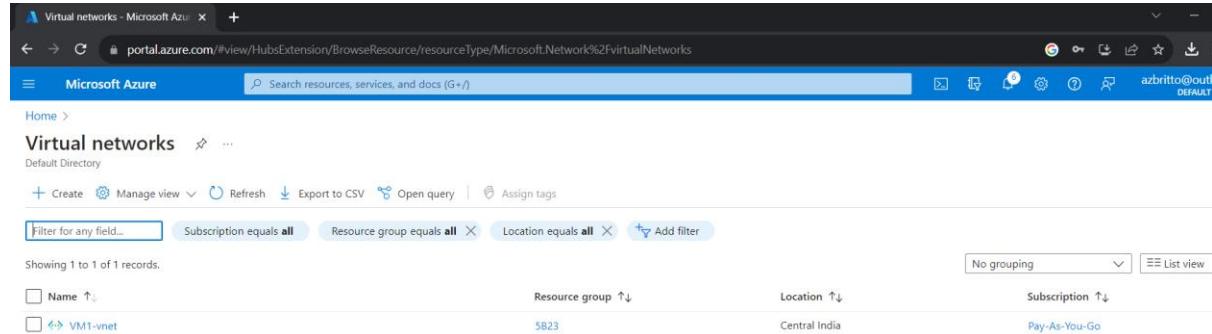


# Hello World!

### P5: Azure Networking Basics:

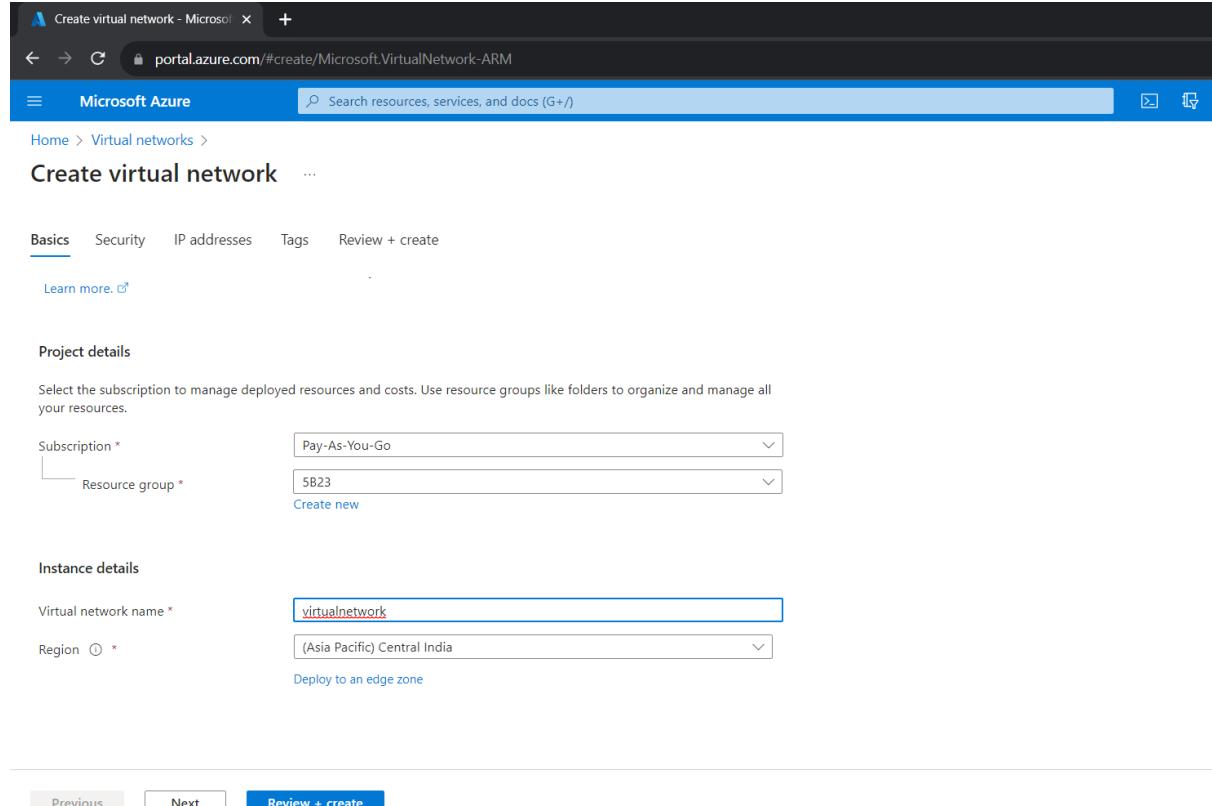
- **Understanding Azure Virtual Networks (VNet)**
- **Configuring network security groups and rules**
- **Setting up virtual private networks (VPN) and point-to-site connectivity**
- **Implementing load balancers for high availability.**

#### Understanding Azure Virtual Networks (VNet)



The screenshot shows the Microsoft Azure portal interface for managing Virtual networks. The URL is <https://portal.azure.com/#view/HubsExtension/BrowseResource/resourceType/Microsoft.Network%2FvirtualNetworks>. The page title is "Virtual networks". It displays a single record: "VM1-vnet" located in "SB23" (Resource group), "Central India" (Location), and "Pay-As-You-Go" (Subscription). There are filters at the top and a "List view" option on the right.

#### Configuring network security groups and rules



The screenshot shows the "Create virtual network" wizard in the Microsoft Azure portal. The current step is "Basics".

**Project details:**  
 Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

**Subscription:** Pay-As-You-Go  
**Resource group:** SB23 (selected from dropdown, "Create new" option available)

**Instance details:**  
**Virtual network name:** virtualnetwork  
**Region:** (Asia Pacific) Central India

At the bottom, there are "Previous" and "Next" buttons, and a prominent blue "Review + create" button.

#### Setting up virtual private networks (VPN) and point-to-site connectivity

≡ Microsoft Azure
Search resources, services, and docs (G+)
[Home](#) > [Virtual networks](#) >

## Create virtual network

[Basics](#)   [Security](#)   [IP addresses](#)   [Tags](#)   [Review + create](#)

Configure your virtual network address space with the IPv4 and IPv6 addresses and subnets you need. [Learn more ↗](#)

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. [Learn more ↗](#)

[Add IPv4 address space](#) | ▾

▲ 10.2.0.0/16

>Delete address space

/16 (65,536 addresses) ▾

10.2.0.0 - 10.2.255.255 (65536 addresses)

+ Add a subnet
[Subnets](#)
[IP address range](#)
[Size](#)
[NAT gateway](#)

ⓘ A NAT gateway is recommended for outbound internet access from subnets. Edit the subnet to add a NAT gateway. [Learn more ↗](#)

[Previous](#)
[Next](#)
[Review + create](#)

## Setting up virtual private networks (VPN) and point-to-site connectivity

### Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more ↗](#)

[IP address space](#) ⓘ

10.2.0.0 - 10.2.255.255 (65536 addresses)

#### Subnet details

[Subnet template](#) ⓘ

[Name](#) \* ⓘ

[Starting address](#) \* ⓘ

[Subnet size](#) ⓘ

[IP address space](#) ⓘ

10.2.0.0 - 10.2.0.255 (256 addresses)

#### Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more ↗](#)

[NAT gateway](#) ⓘ

[Create new](#)

[Network security group](#) ⓘ

[Create new](#)

[Add](#)
[Cancel](#)

## Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

IP address space ⓘ

10.2.0.0/16

10.2.0.0 - 10.2.255.255 (65536 addresses)

### Subnet details

Subnet template ⓘ

Default

Name \* ⓘ

private

Starting address \* ⓘ

10.2.1.0

Subnet size ⓘ

/24 (256 addresses)

IP address space ⓘ

10.2.1.0 - 10.2.1.255 (256 addresses)

### Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more](#)

NAT gateway ⓘ

None

[Create new](#)

Network security group ⓘ

None

[Create new](#)

**Add**

**Cancel**

## Implementing load balancers for high availability

Microsoft Azure

Search resources, services, and docs (G+/)

Home > Virtual networks >

### Create virtual network

Basics Security IP addresses Tags Review + create

Add IPv4 address space ⓘ

10.2.0.0/16

10.2.0.0 /16 (65,536 addresses)

10.2.0.0 - 10.2.255.255 (65536 addresses)

+ Add a subnet

Subnets	IP address range	Size	NAT gateway
public	10.2.0.0 - 10.2.0.255	/24 (256 addresses)	-
private	10.2.1.0 - 10.2.1.255	/24 (256 addresses)	-

Delete address space

(i) A NAT gateway is recommended for outbound internet access from subnets. Edit the subnet to add a NAT gateway. [Learn more](#)

Previous Next Review + create

**britto - Microsoft Azure**

portal.azure.com/#@azbruttooutlook.onmicrosoft.com/resource/subscriptions/bff782e8-6ca5-495f-95d3-4ba2b27a7ea6/resourcegroups/5B23/providers/Microsoft.Network/virtualNetworks/britto/connectedDevices

Microsoft Azure | Search resources, services, and docs (G+)

Home > britto

**britto | Connected devices**

Virtual network

Search | Refresh | Delete

Export to CSV | No grouping

Activity log | Type : all | Subnet : all

Overview | Tags | Diagnose and solve problems

Settings | Address space | Connected devices

- Subnets
- Bastion
- DDoS protection
- Firewall
- Microsoft Defender for Cloud
- Network manager
- DNS servers
- Peerings
- Service endpoints

No results.

Give feedback

https://portal.azure.com/#@azbruttooutlook.onmicrosoft.com/resource/subscriptions/bff782e8-6ca5-495f-95d3-4ba2b27a7ea6/resourcegroups/5B23/providers/Microsoft.Network/virtualNetworks/britto/connectedDevices

ENG IN 15:50 30-08-2023

**Create a virtual machine - Microsoft Azure**

portal.azure.com/#create/Microsoft.VirtualMachine-ARM

Microsoft Azure | Search resources, services, and docs (G+)

Home > Virtual machines >

**Create a virtual machine**

Basics Disks Networking Management Monitoring Advanced Tags Review + create

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](#)

**Project details**

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Pay-As-You-Go

Resource group \* 5B23

[Create new](#)

**Instance details**

Virtual machine name \* appserver

Region \* (Asia Pacific) Central India

Availability options \* No infrastructure redundancy required

Security type \* Standard

Image \* Ubuntu Server 20.04 LTS - x64 Gen2

Review + create < Previous Next : Disks > Give feedback

ENG IN 15:52 30-08-2023

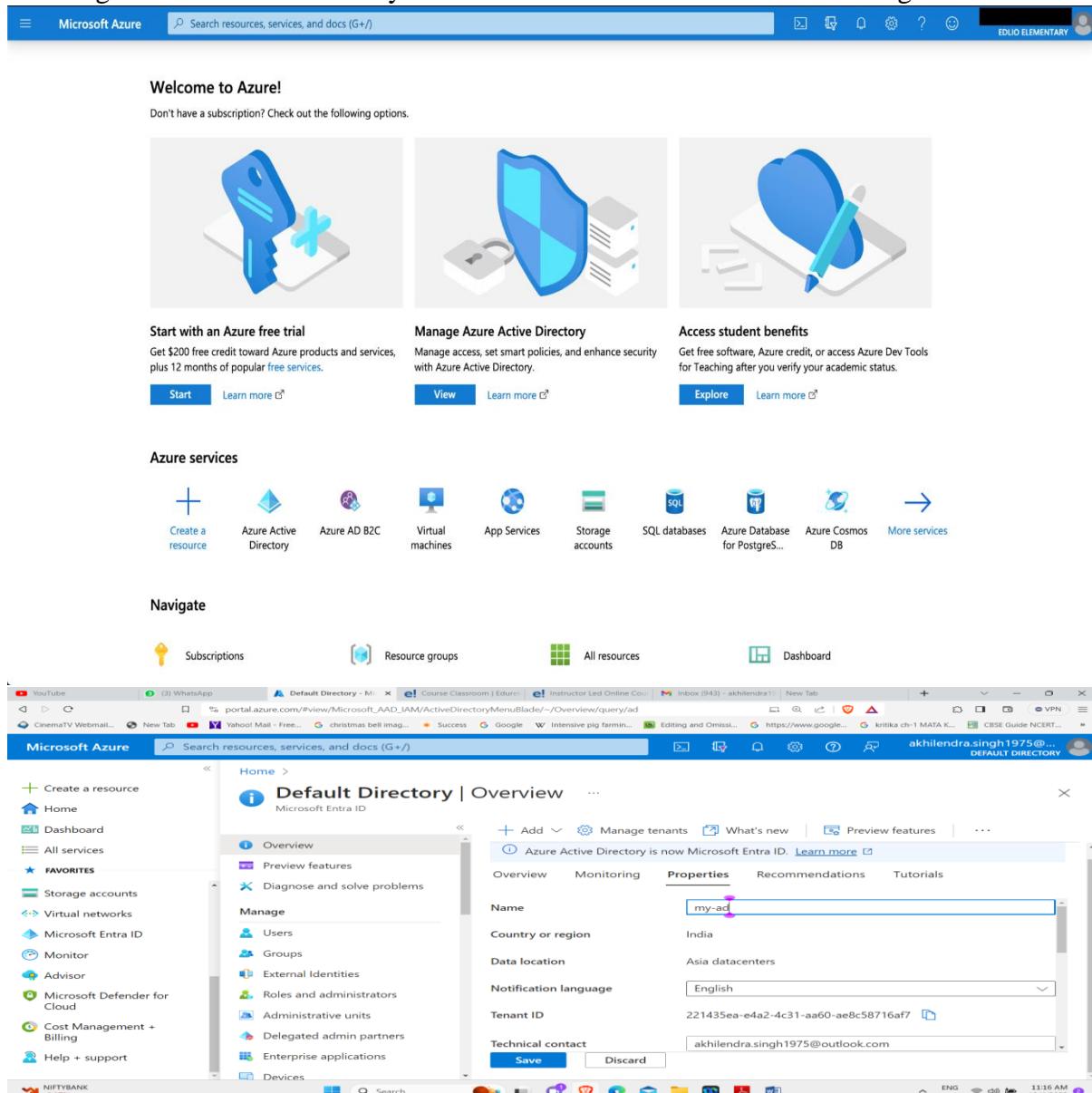
## P6: Introduction to Azure Identity:

- Creating and managing Azure Active Directory (Azure AD)
- Adding and managing users, groups, and roles
- Configuring single sign-on (SSO) for applications
- Understanding Azure AD B2B and B2C for external collaboration.

### Creating and Managing Azure Active Directory (Azure AD):

Azure Active Directory (Azure AD) is Microsoft's cloud-based identity and access management service. To create and manage Azure AD, you can follow these steps:

Create an Azure AD: You can create an Azure AD instance through the Azure portal by selecting "Azure Active Directory" from the left-hand menu and then clicking "Create."



The screenshot shows the Microsoft Azure portal interface. At the top, there is a search bar and a user profile icon. Below the search bar, there are three main sections: "Welcome to Azure!", "Azure services", and "Navigate".

**Welcome to Azure!**

This section features three icons: "Start with an Azure free trial" (key and shield), "Manage Azure Active Directory" (shield and server), and "Access student benefits" (pen and book). Each icon has a "View" or "Learn more" button below it.

**Azure services**

This section lists various Azure services with their icons: Create a resource, Azure Active Directory, Azure AD B2C, Virtual machines, App Services, Storage accounts, SQL databases, Azure Database for PostgreSQL, Azure Cosmos DB, and More services.

**Navigate**

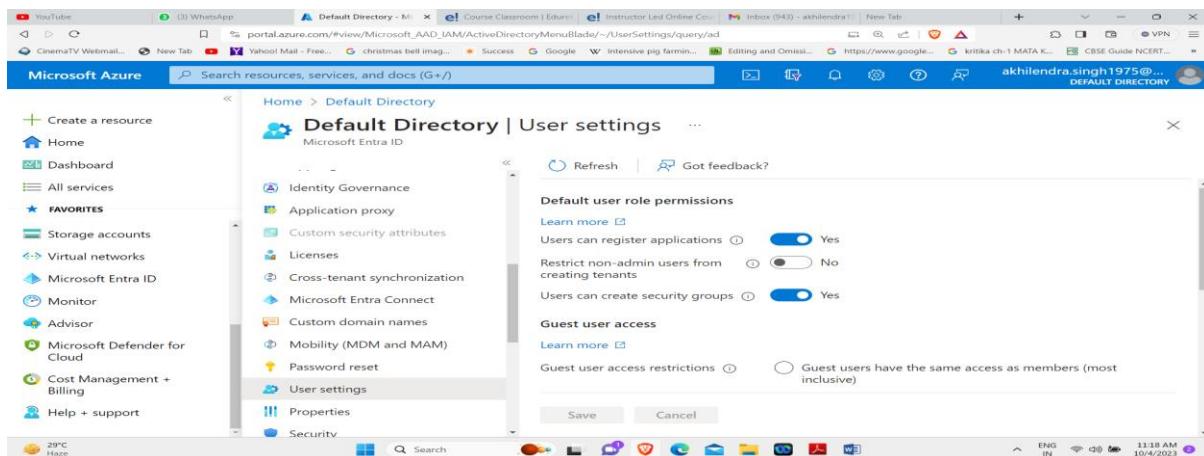
This section includes links to Subscriptions, Resource groups, All resources, and Dashboard.

**Default Directory | Overview**

This is the main configuration page for an Azure Active Directory instance named "my-ad". It shows details like Country or region (India), Data location (Asia datacenters), Notification language (English), Tenant ID (22143Sea-e4a2-4c31-aa60-ae8c58716af7), and Technical contact (akhilendra.singh1975@outlook.com). Buttons for Save and Discard are at the bottom.

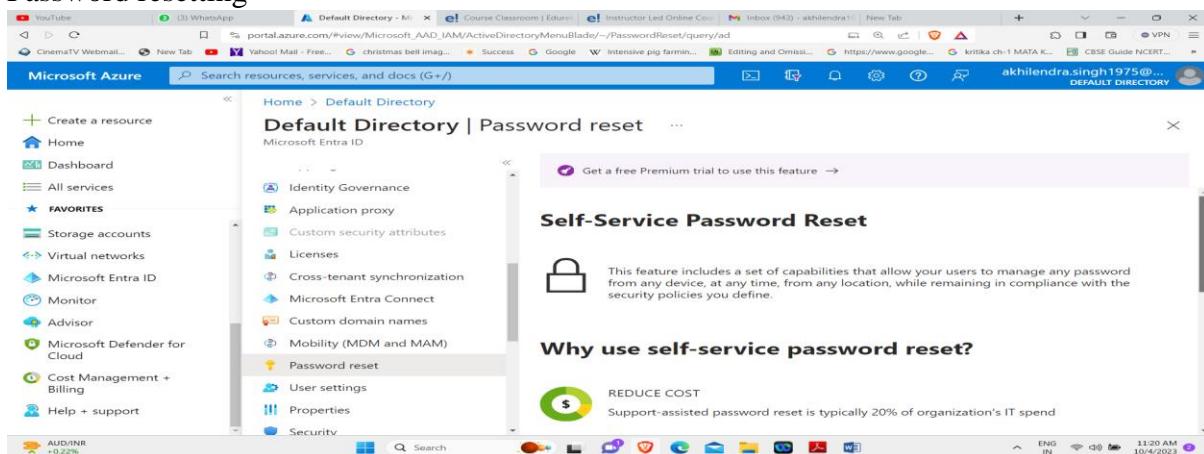
**Configure Azure AD settings:** Customize your Azure AD settings, such as user attributes, password policies, and security options.

**Manage Azure AD:** Use the Azure portal to add users, groups, and applications to Azure AD. You can also configure authentication and security settings.



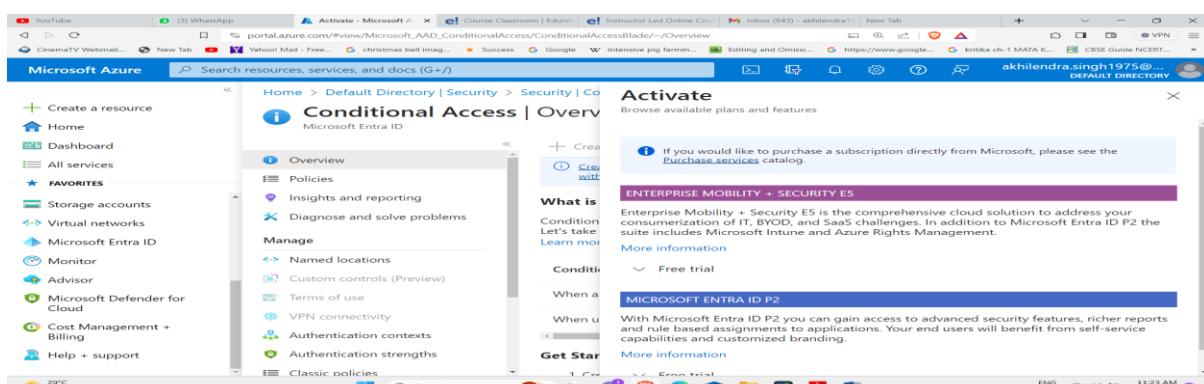
The screenshot shows the 'Default Directory | User settings' page in Microsoft Azure. On the left, there's a sidebar with various service icons. The main area displays 'Default user role permissions' and 'Guest user access' settings. Under 'Default user role permissions', 'Users can register applications' is set to 'Yes'. Under 'Guest user access', 'Guest users have the same access as members (most inclusive)' is selected. At the bottom, there are 'Save' and 'Cancel' buttons.

## Password resetting



The screenshot shows the 'Default Directory | Password reset' page in Microsoft Azure. It highlights the 'Self-Service Password Reset' feature, which allows users to manage their password from any device at any time while remaining compliant with security policies. Below this, there's a section titled 'Why use self-service password reset?' with a 'REDUCE COST' icon and text stating it's typically 20% of organization's IT spend.

4 security setting with conditional access we need to upgrade the conditional access



The screenshot shows the 'Conditional Access | Overview' page in Microsoft Azure. It features sections for 'Activate' (Browse available plans and features), 'What is Conditional Access' (with a 'Learn more' link), and two product offerings: 'ENTERPRISE MOBILITY + SECURITY E5' and 'MICROSOFT ENTRA ID P2'. Both products are described as comprehensive cloud solutions for IT, BYOD, and SaaS challenges, including Intune and Azure Rights Management.

Sync with on-premises AD: If you have an on-premises Active Directory, you can set up Azure AD Connect to synchronize identities between on-premises AD and Azure AD.

Adding and Managing Users, Groups, and Roles:

In Azure AD, you can:

Add Users: Create user accounts for individuals who will access Azure resources.

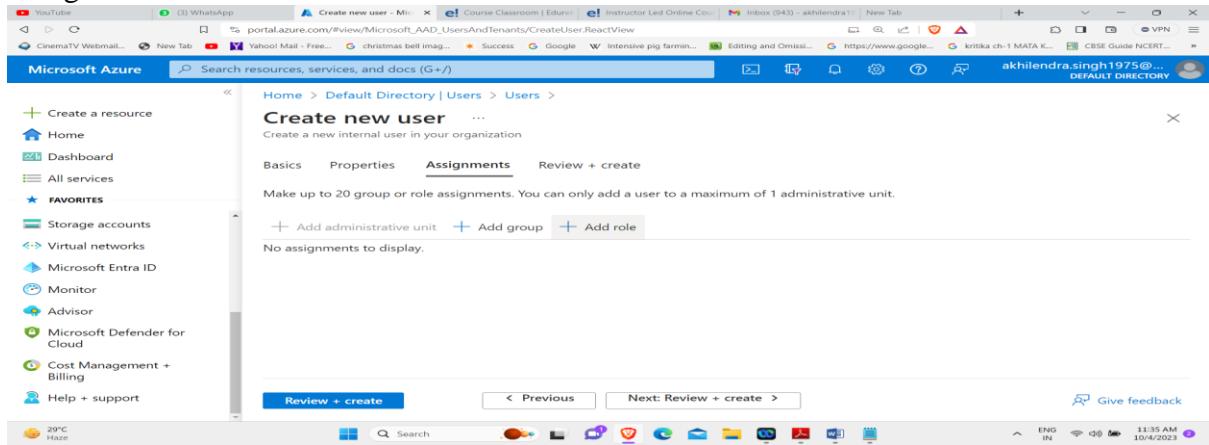
Create user name and password



## Create user name and password

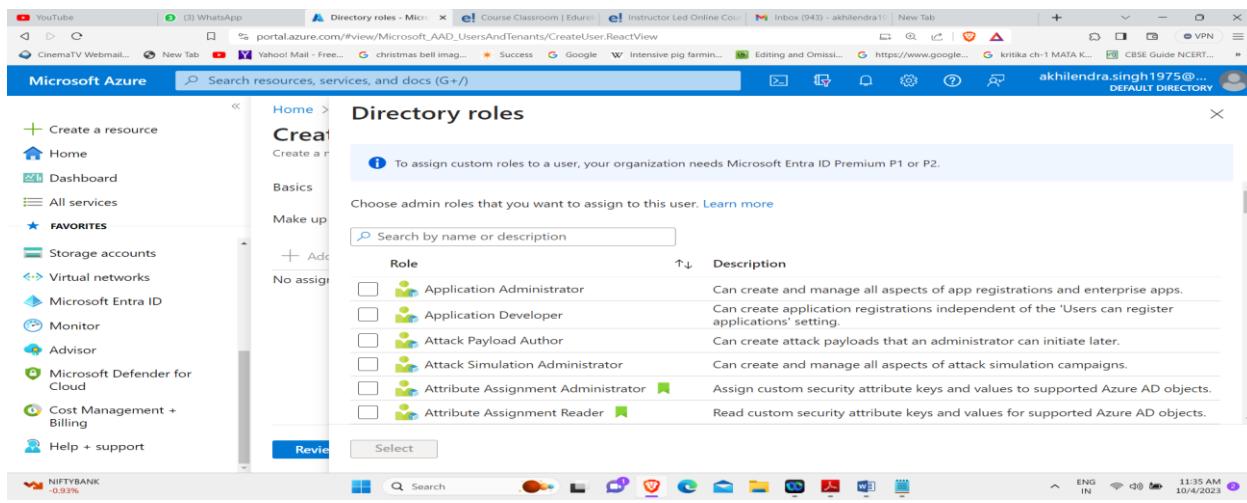
## Provide the details information of user

## Assign the role to user



The screenshot shows the Microsoft Azure portal interface. The left sidebar includes 'Create a resource', 'Home', 'Dashboard', 'All services', and 'FAVORITES' (Storage accounts, Virtual networks, Microsoft Entra ID, Monitor, Advisor, Microsoft Defender for Cloud, Cost Management + Billing, Help + support). The main content area is titled 'Create new user' under the 'Assignments' tab. It says 'Create a new internal user in your organization'. Below this, it states 'Make up to 20 group or role assignments. You can only add a user to a maximum of 1 administrative unit.' There are three buttons: '+ Add administrative unit', '+ Add group', and '+ Add role'. A note below says 'No assignments to display.' At the bottom are 'Review + create' and 'Next: Review + create' buttons.

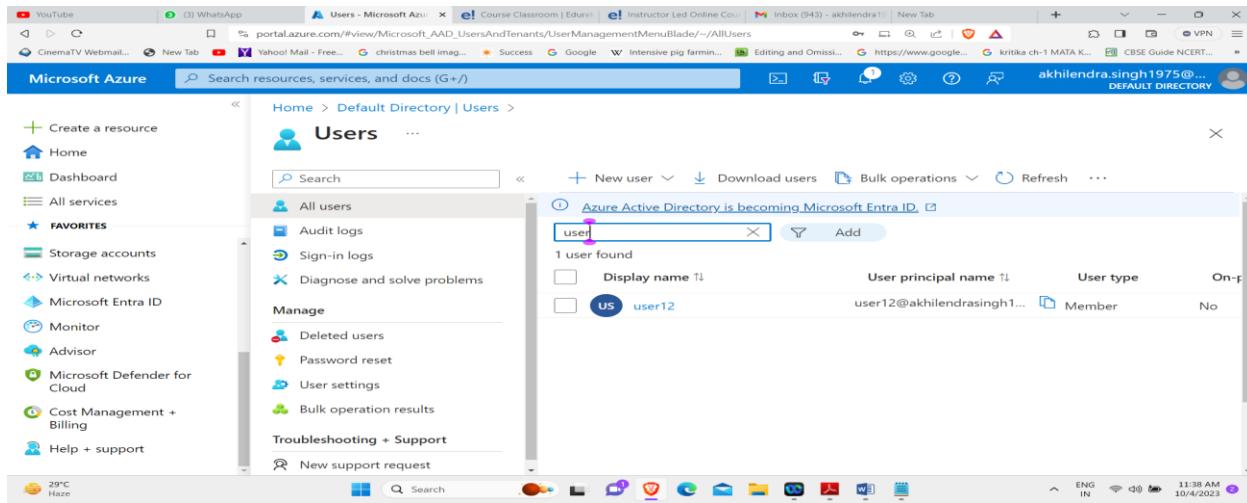
## Select the administrative role user



The screenshot shows the Microsoft Azure portal interface. The left sidebar includes 'Create a resource', 'Home', 'Dashboard', 'All services', and 'FAVORITES' (Storage accounts, Virtual networks, Microsoft Entra ID, Monitor, Advisor, Microsoft Defender for Cloud, Cost Management + Billing, Help + support). The main content area is titled 'Directory roles'. It says 'To assign custom roles to a user, your organization needs Microsoft Entra ID Premium P1 or P2.' Below this, it says 'Choose admin roles that you want to assign to this user.' A search bar 'Search by name or description' is present. A table lists roles with descriptions:

Role	Description
Application Administrator	Can create and manage all aspects of app registrations and enterprise apps.
Application Developer	Can create application registrations independent of the 'Users can register applications' setting.
Attack Payload Author	Can create attack payloads that an administrator can initiate later.
Attack Simulation Administrator	Can create and manage all aspects of attack simulation campaigns.
Attribute Assignment Administrator	Assign custom security attribute keys and values to supported Azure AD objects.
Attribute Assignment Reader	Read custom security attribute keys and values for supported Azure AD objects.

## Then Review and create and user is created



The screenshot shows the Microsoft Azure portal interface. The left sidebar includes 'Create a resource', 'Home', 'Dashboard', 'All services', and 'FAVORITES' (Storage accounts, Virtual networks, Microsoft Entra ID, Monitor, Advisor, Microsoft Defender for Cloud, Cost Management + Billing, Help + support). The main content area is titled 'Users'. It shows a search bar and buttons for '+ New user', 'Download users', 'Bulk operations', 'Refresh', and '...'. A message 'Azure Active Directory is becoming Microsoft Entra ID' is displayed. The 'Manage' section includes 'Deleted users', 'Password reset', 'User settings', 'Bulk operation results', 'Troubleshooting + Support', and 'New support request'. On the right, a table lists users:

Display name	User principal name	User type	On-premises sync
user12	user12@akhilendrasingh1...	Member	No

**Create Groups:** Organize users into groups to simplify access management. You can assign permissions to groups rather than individual users



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Azure Fundamentals (203105376)

The screenshot shows the Microsoft Azure portal interface. The left sidebar includes links for Home, Dashboard, All services, Favorites, Storage accounts, Virtual networks, Microsoft Entra ID, Monitor, Advisor, Microsoft Defender for Cloud, Cost Management + Billing, and Help + support. The main content area displays the 'Groups | All groups' page under 'Default Directory - Microsoft Entra ID'. It lists three groups: 'Developer' (Object Id: b7ef08cb-24a3-4d09-b695-e44), 'HRGrp' (Object Id: d7887b1e-01ee-499d-a54f-086), and 'Programer' (Object Id: 36cec26b-fa5c-438d-9994-3cf). A message at the top states: 'Dynamic group memberships have not been updated due to system delays. We're working to resolve this issue.' A search bar and filter options are also present.

Select new group

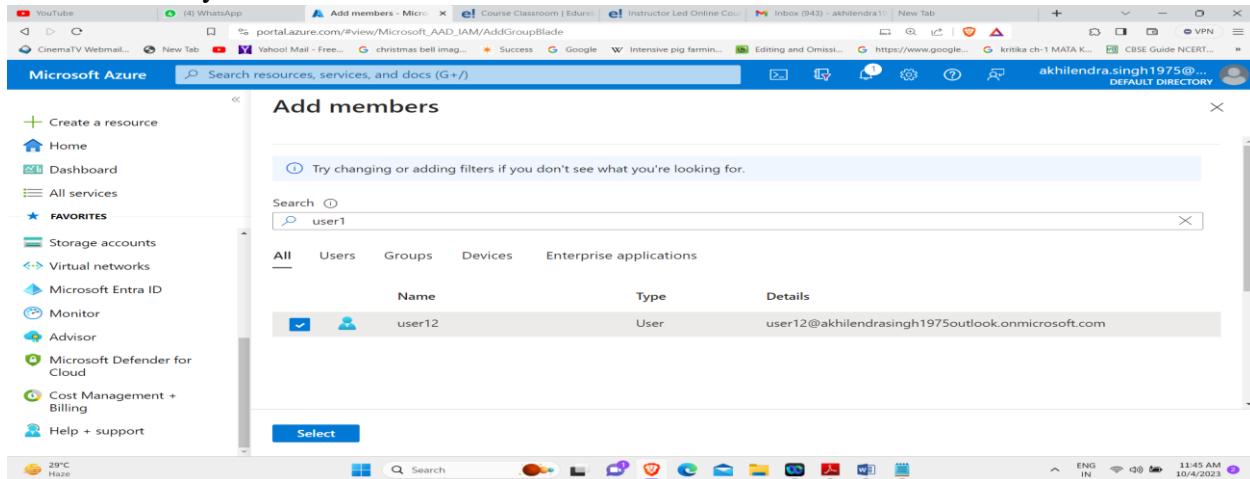
Mention the group name

The screenshot shows the 'New Group' creation page in the Microsoft Azure portal. The left sidebar is identical to the previous screenshot. The main form fields include: 'Group type' set to 'Security'; 'Group name' set to 'newusergrp'; 'Group description' field empty; 'Membership type' set to 'Assigned'; and 'Owners' field showing 'No owners selected'. A 'Create' button is at the bottom.

We can add the users in-group by selecting member name

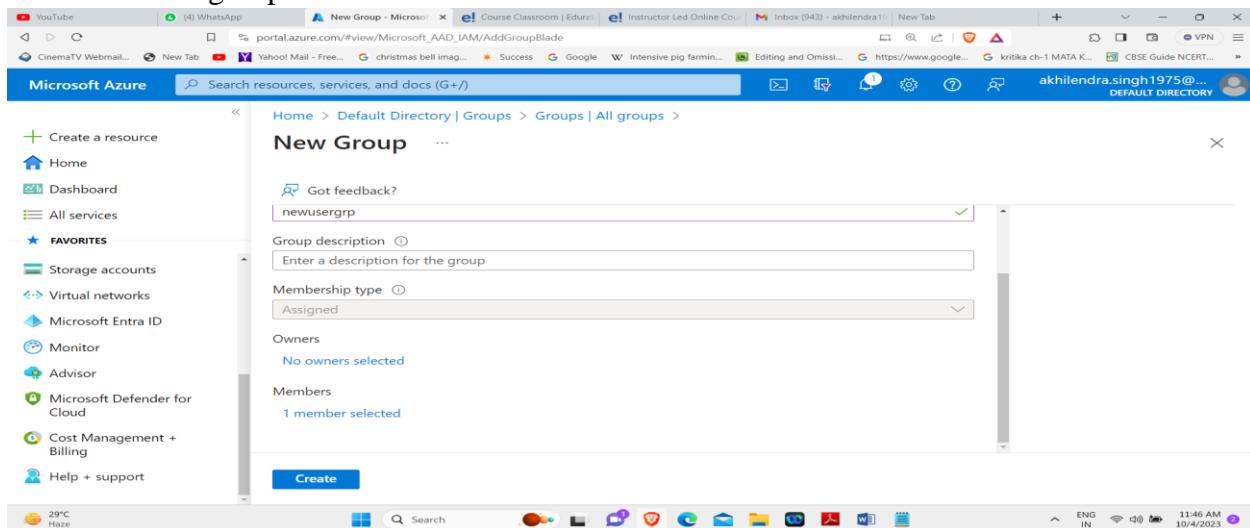
The screenshot shows the 'New Group' creation page again, but with the 'Members' section expanded. The 'Members' field shows 'No members selected'. The rest of the form fields are the same as the previous screenshot: 'Group type' (Security), 'Group name' (newusergrp), 'Group description' (empty), 'Membership type' (Assigned), and 'Owners' (No owners selected). A 'Create' button is at the bottom.

Select the newly created user name

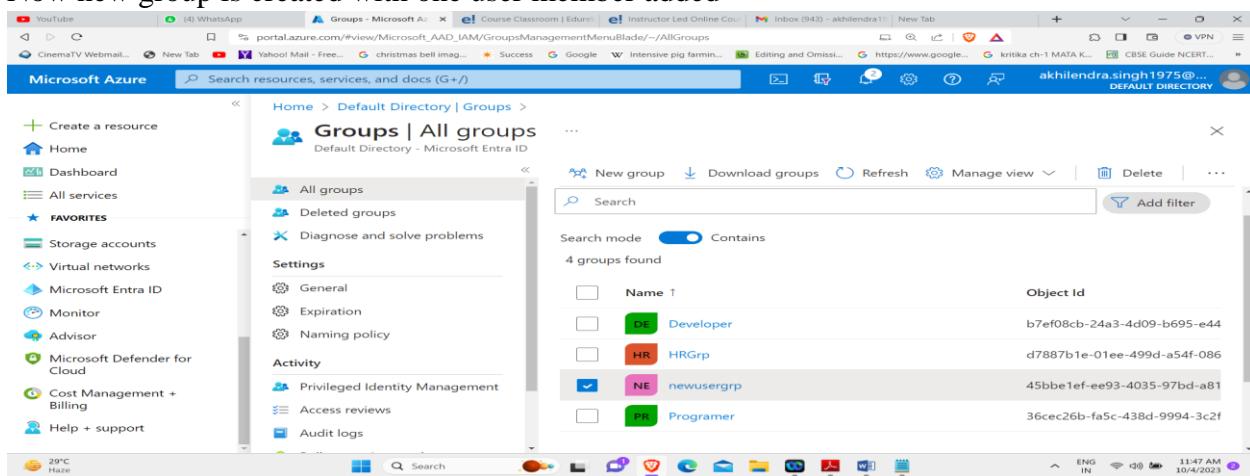


Name	Type	Details
user12	User	user12@akhilendrasingh1975outlook.onmicrosoft.com

Click on create group



Now new group is created with one user member added



Name	Object Id
Developer	b7ef08cb-24a3-4d09-b695-e44
HRGrp	d7887b1e-01ee-499d-a54f-086
<b>newusergrp</b>	<b>45bbe1ef-ee93-4035-97bd-a81</b>
Programer	36cec26b-fa5c-438d-9994-3c2f

Select newly created group \* select overview option to view the details



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Azure Fundamentals (203105376)

The screenshot shows the Microsoft Azure portal interface. The left sidebar includes links for Home, Dashboard, All services, Favorites (Storage accounts, Virtual networks, Microsoft Entra ID, Monitor, Advisor, Microsoft Defender for Cloud, Cost Management + Billing, Help + support), and a weather widget (29°C Haze). The main content area displays the 'newusergrp' group details. The 'Overview' tab is selected, showing a purple square icon with 'NE' and the group name 'newusergrp'. Below it, the 'Manage' section lists Properties, Members, Owners, Roles and administrators, Administrative units, Group memberships, Applications, and Licenses. On the right, detailed information is provided for the group, including Membership type (Assigned), Source (Cloud), Type (Security), Object Id (45bbe1ef-ee93-4035-97bd-a81985284828), and Created at (10/4/2023, 11:46:56 AM). The bottom navigation bar shows various icons for search, file operations, and system status.

We can view details manage tools

The screenshot shows the Microsoft Azure portal interface. The left sidebar includes links for Home, Dashboard, All services, Favorites (Storage accounts, Virtual networks, Microsoft Entra ID, Monitor, Advisor, Microsoft Defender for Cloud, Cost Management + Billing, Help + support), and a weather widget (29°C Haze). The main content area displays the 'newusergrp' group members. The 'Members' tab is selected under the 'Manage' section. It shows a table with one row for 'user12', which is highlighted with a pink circle. The columns are Name, Type, Email, and User type. The table header includes '+ Add members', 'Remove', 'Refresh', 'Bulk operations', 'Columns', and '...'.

Assign Roles: Use Azure RBAC (Role-Based Access Control) to assign roles to users or groups, granting them specific permissions to Azure resources.

The screenshot shows the Microsoft Azure portal interface. The left sidebar includes links for Home, Dashboard, All services, Favorites (Storage accounts, Virtual networks, Microsoft Entra ID, Monitor, Advisor, Microsoft Defender for Cloud, Cost Management + Billing, Help + support), and a weather widget (29°C Haze). The main content area displays the 'newusergrp' group Azure role assignments. The 'Azure role assignments' tab is selected under the 'Manage' section. A message states: 'If this identity has role assignments that you don't have permission to read, they won't be shown in the list.' Below it, a 'Subscription' dropdown is set to 'Pay-As-You-Go (5970f8cd-3e3c-469d-ae19-3cc7b729adbd)'. The table below shows no role assignments found for the selected subscription. The table columns are Role, Resource Name, Resource Type, Assigned To, and Cc.

Azure application assignments



The screenshot shows the Microsoft Azure portal interface. The user is navigating through the 'Groups' section under 'All groups'. The current view is 'Applications'. The sidebar on the left lists various Azure services, and the main content area displays a table with columns for Name, Role, Assignment, and Date. A message at the top states 'Up to 1000 direct, inherited, or user consented assignments shown. Search by any visible text.' Below the table, it says 'No application assignments found.'

### Configuring Single Sign-On (SSO) for Applications:

Azure AD provides SSO capabilities for applications.

To configure SSO: Add an Application: Register the application with Azure AD.

Configure SSO: Set up SSO options for the application, such as using SAML or OpenID Connect protocols.

Assign Users or Groups: Specify who can access the application and configure their access levels.

Test SSO: Verify that users can log in to the application without providing separate credentials.  
Log in to the [Microsoft Azure](#) portal.

The screenshot shows the Microsoft Azure portal homepage. The top navigation bar includes links for 'Search resources, services, and docs (G+)', 'Instructor Led Online Course', 'Inbox (943)', 'New Tab', and user profile information. Below the navigation is a 'Create a resource' button and a 'Dashboard' link. The main content area is divided into sections: 'Azure services' (with links to Create a resource, Azure Active Directory, App Services, Virtual machines, SQL databases, Marketplace, All resources, Quickstart Center, Storage accounts, and More services), 'Resources' (listing recent and favorite resources, including several virtual machines), and 'Navigate' (links to Subscriptions, Resource groups, All resources, and Dashboard).

1. Click **Azure Active Directory** below Azure services.
2. In the window that opens, select **Enterprise Applications** under the **Manage** tab.
3. Now, click **New Application** available at the top of the **Enterprise applications** page.



The screenshot shows the Microsoft Azure portal's 'Enterprise applications' section. The left sidebar includes links for Overview, Manage, Security, Activity, and Admin consent requests. The main area displays a table of applications with columns for Name, Object ID, Application ID, Homepage URL, Created on, Certificate Expiry Status, and Identifier URI (Entity ID). The table lists various applications like 'Insignia SAML SSO', 'Mapiq SSO (SAML 2.0)', 'Azure AD SAML Toolkit', etc., each with a small icon and a 'Delete' button.

You will be taken to the **All Applications** page, from which you can choose and add your desired applications. In the search bar, type '**SAML**' and press Enter.

The screenshot shows the 'Browse Azure AD Gallery' page with a search bar containing 'SAML'. Below the search bar, there are filters for Single Sign-on (All), User Account Management (All), and Categories (All). The results section shows 32 out of 32 results, each with a thumbnail, name, and publisher. Some visible results include 'Insignia SAML SSO' by Insignia Software, 'Mapiq SSO (SAML 2.0)' by Mapiq, 'Azure AD SAML Toolkit' by Microsoft Corporation, and 'JIRA SAML SSO by Microsoft' by Microsoft Corporation.

From the search results, click on **SAML 1.1 Token enabled LOB App**. The application will open in a minimized window on the right pane.

Edit the application name as the desired name and click **Create**.

The screenshot shows the 'Browse Azure AD Gallery' page with a search bar containing 'SAML'. The right pane displays the configuration for the 'SAML 1.1 Token enabled LOB App'. The 'Name' field is set to 'SAML 1.1 Token enabled LOB App'. The 'Publisher' is listed as 'Microsoft Corporation'. Under 'Single Sign-On Mode', it says 'SAML-based sign-on (Local Sign-in)'. The 'URL' field contains 'http://www.microsoft.com/'. At the bottom right, there is a 'Create' button.

Now, the application will be added as the **Enterprise Application** successfully.



The screenshot shows the Microsoft Azure Enterprise Application Overview page. In the left sidebar under 'Manage', 'Users and groups' is selected. The main area displays the 'Properties' section with fields for Name, Application ID, and Object ID. Below this is the 'Getting Started' section, which includes five steps: 1. Assign users and groups, 2. Set up single sign-on, 3. Provision User Accounts, 4. Conditional Access, and 5. Self-service.

## Assigning Azure Users to the Enterprise Application.

Under the **Manage** section on the left pane, select **Users and groups** and click **Add user/group** at the top pane.

The screenshot shows the Microsoft Azure Enterprise Application 'Users and groups' page. The left sidebar shows 'Manage' with 'Users and groups' selected. The main area displays a table with columns for 'Display Name', 'Object Type', and 'Role assigned'. A message at the top states: '+ Add user/group | Edit assignment | Remove | Update credentials | Columns | Get feedback! | The application will appear for assigned users within My Apps. Set 'Visible to users?' to no in properties to prevent this.' Below the table, it says 'No application assignments found'.

In the **Add Assignment** page that opens, click on **None Selected** to open up a list of users.

Select the required users and then click the **Select** button.

The screenshot shows the Microsoft Azure 'Add Assignment' page. The left sidebar shows 'Manage' with 'None Selected' selected under 'Users'. The main area has a search bar and a table with columns for 'Name', 'Type', and 'Details'. Three users are listed, each with a checkbox next to their name. The third user's checkbox is checked. On the right, a 'Selected (1)' panel shows a single user. At the bottom are 'Assign' and 'Select' buttons.

After the required users have been selected, click **Assign** to assign them to the enterprise application.

### Configuring SAML SSO with Password Manager Pro

Under the **Manage** section on the left pane, click on **Single sign-on**.

In the **Select a single sign-on method** section, select **SAML**.

To set up a single sign-on with SAML, you need to provide basic SAML configuration details, such as **Identifier**, **Reply URL**, and **Sign on URL**.

You can get all the required entities from the Password Manager Pro interface. To do so,

Log in to Password Manager Pro and navigate to **Admin > Authentication > SAML Single Sign On**.

Under **Service Provider Details**, you will find all the required URLs.

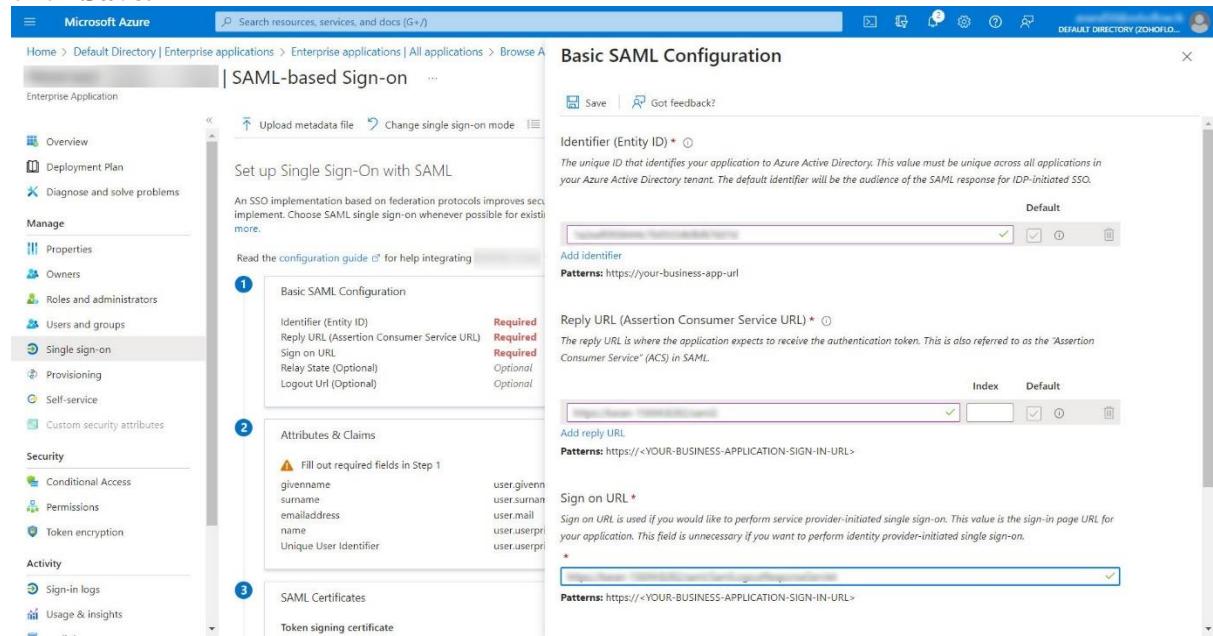
Now, go back to the Microsoft Azure portal and click the edit icon to edit the **Basic SAML Configuration** details:

For Non-MSP, enter the **Entity Id** (copied from Password Manager Pro) under **Identifier**. Enter your **Password Manager Pro web interface URL** under the **Sign on URL** (e.g., <https://<Host-Name-of-PMP-Server OR IP address>:<Port>>) and provide the **Assertion Consumer Service URL** under **Reply URL**.

For MSP Client Organizations, enter the **Entity Id** (copied from Password Manager Pro) under **Identifier**. Enter the **Assertion Consumer URL** under the **Reply URL** and enter the **Org URL** (eg. [https://<Host-Name-of-PMP-Server OR IP address>:<Port>/<Org\\_name>](https://<Host-Name-of-PMP-Server OR IP address>:<Port>/<Org_name>)) under **Sign on URL**.

Now,

click **Save**.



The screenshot shows the Microsoft Azure portal interface for configuring a SAML-based application. The left sidebar shows the navigation menu for the application, including Overview, Deployment Plan, Diagnose and solve problems, Manage (Properties, Owners, Roles and administrators, Users and groups, Single sign-on, Provisioning, Self-service, Custom security attributes), Security (Conditional Access, Permissions, Token encryption), and Activity (Sign-in logs, Usage & insights). The 'Single sign-on' option is selected.

The main content area is titled 'Basic SAML Configuration' and displays three numbered steps:

- Step 1: Basic SAML Configuration**
  - Identifier (Entity ID) \***: Required field. Value: <https://<Host-Name-of-PMP-Server OR IP address>:<Port>>
  - Reply URL (Assertion Consumer Service URL) \***: Required field. Value: <https://<YOUR-BUSINESS-APPLICATION-SIGN-IN-URL>>
  - Sign on URL**: Optional field. Value: <https://<YOUR-BUSINESS-APPLICATION-SIGN-IN-URL>>
- Step 2: Attributes & Claims**
  - Fill out required fields in Step 1**
  - Attributes listed: givenname, user.surname, emaiaddress, name, Unique User Identifier.
  - Values mapped to claims: user.givenname, user.surname, user.emaiaddress, user.name, user.uniqueidentifier.
- Step 3: SAML Certificates**
  - Token signing certificate**: Token signing certificate field.

To configure SAML Single Logout,

Mention **Single Logout Service URL** (copied from Password Manager Pro) in the field next to **Logout URL**.

Navigate

to **<Password\_Manager\_Pro\_Installation\_Directory\conf\system\_properties.conf>** and append the following system property under the existing properties.

**saml.logout.redirect.slo=true**



Now the SAML configuration details taken from Password Manager Pro will be saved in the Azure portal.

In the **SAML Certificates** section of the SAML configuration settings window, download the XML file named **Federation Metadata XML** or copy the **Login URL**, **Azure AD Identifier**, and the **Logout URL** values and download the file named **Certificate (Base64)**.

Return to the Password Manager Pro interface and navigate to **Admin >> Authentication >> SAML Single Sign-On**.

Under **Configure Identity Provider Details**, you have to provide your Idp information via an XML file or manually.

If you opt to update your Idp information via an XML file, select **Upload IdP metadata file** and click **Browse** to select the downloaded **Federation Metadata XML** file.

If you opt to update your Idp information manually, enter the values copied from the **SAML Certificates** section - **Issuer** (Azure AD Identifier), **Idp Login URL** (Login URL), and **Idp Logout URL** (Logout URL).

Now, click **Upload** to save the Azure SAML SSO settings in Password Manager Pro.



The screenshot shows the 'Configuration For Single Sign-On Using SAML' page. It includes sections for Service Provider Details, Configure Identity Provider Details, Import IdP's Certificate, and Enable / Disable SAML Single Sign On. The 'Enable / Disable SAML Single Sign On' section has a 'Save' button and a 'Next Step' link.

Once the properties are added, restart the Password Manager Pro server for the changes to take effect.

Finally, under **Enable/Disable SAML Single Sign On**, click **Enable Now** to activate the SAML SSO.

The screenshot shows the same configuration page as above, but the 'Enable / Disable SAML Single Sign On' section is highlighted, indicating the step to enable the feature.

To validate if the single sign-on works, go to the Azure portal, and in the **Single sign on** section under **Manage**, click **Test**.

The screenshot shows the 'Test single sign-on with' section in the Azure portal. It includes fields for 'Thumbprint', 'Expiration', 'Notification Email', 'App Federation Metadata Url', 'Certificate (Base64)', 'Certificate (Raw)', and 'Federation Metadata XML'. Below these are sections for 'Verification certificates (optional)' and 'Set up'. The 'Set up' section contains fields for 'Login URL', 'Azure AD Identifier', and 'Logout URL'. At the bottom, there is a 'Test' button and a 'Get resolution guidance' link.

## Understanding Azure AD B2B and B2C for External Collaboration:

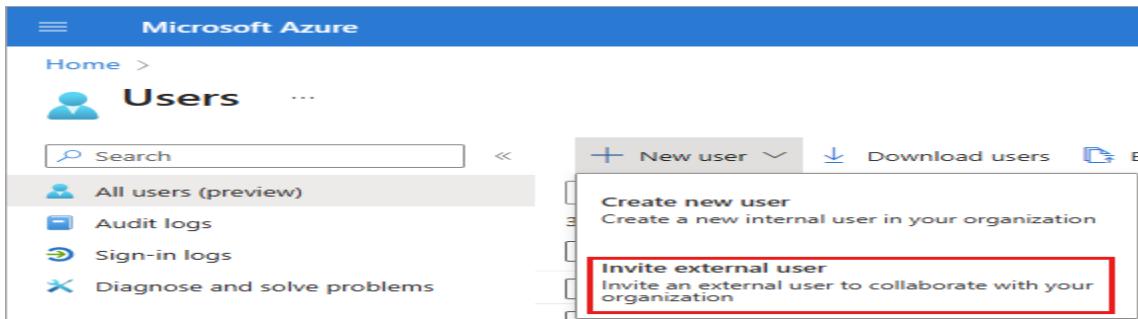
Azure AD B2B (Business-to-Business): Allows organizations to collaborate with external partners by providing them access to Azure AD-controlled resources. You can invite external users (guests) to access specific resources and applications in your Azure AD tenant.

To add B2B collaboration users to the directory, follow these steps:

Sign in to the [Microsoft Entra admin center](#) as at least a [User administrator](#).

Browse to **Identity > Users > All users**.

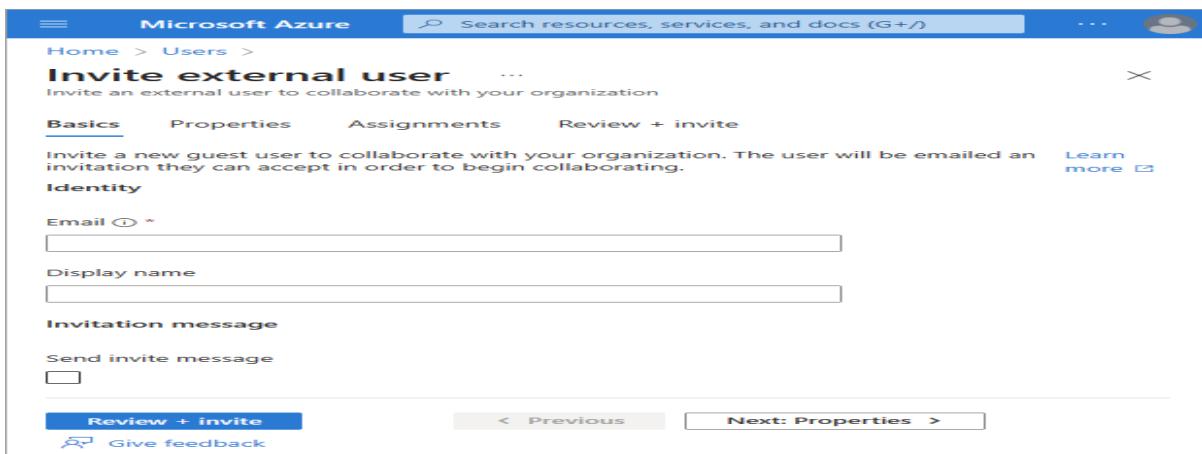
Select **New user > Invite external user** from the menu.



### Basics

In this section, you're inviting the guest to your tenant using *their email address*. If you need to create a guest user with a domain account, use the [create new user process](#) but change the **User type** to **Guest**.

- **Email:** Enter the email address for the guest user you're inviting.
- **Display name:** Provide the display name.
- **Invitation message:** Select the **Send invite message** checkbox to customize a brief message to the guest. Provide a Cc recipient, if necessary.


 A screenshot of the 'Invite external user' form. It has tabs for 'Basics', 'Properties', 'Assignments', and 'Review + invite'. The 'Basics' tab is selected. It shows fields for 'Email' (with a red box around it), 'Display name', and 'Invitation message'. There is a checkbox for 'Send invite message'. At the bottom are buttons for 'Review + invite' (highlighted with a red box) and 'Give feedback'.

Either select the **Review + invite** button to create the new user or **Next: Properties** to complete the next section.

## Properties

There are six categories of user properties you can provide. These properties can be added or updated after the user is created. To manage these details, go to **Identity > Users > All users** and select a user to update.

**Identity:** Enter the user's first and last name. Set the User type as either Member or Guest. For more information about the difference between external guests and members, see [B2B collaboration user properties](#)

**Job information:** Add any job-related information, such as the user's job title, department, or manager.

**Contact information:** Add any relevant contact information for the user.

**Parental controls:** For organizations like K-12 school districts, the user's age group may need to be provided. *Minors* are 12 and under, *Not adult* are 13-18 years old, and *Adults* are 18 and over. The combination of age group and consent provided by parent options determine the Legal age group classification. The Legal age group classification may limit the user's access and authority.

**Settings:** Specify the user's global location.

Either select the **Review + invite** button to create the new user or **Next: Assignments** to complete the next section.

### Assignments

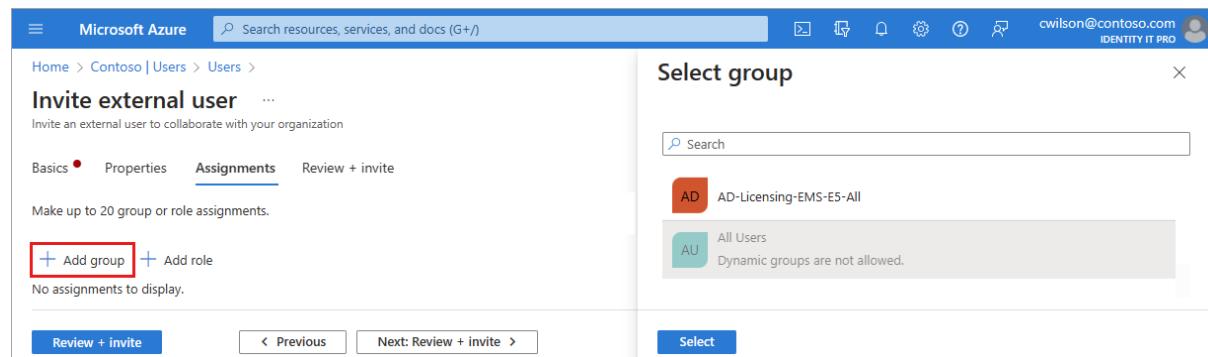
You can assign external users to a group, or Microsoft Entra role when the account is created. You can assign the user to up to 20 groups or roles. Group and role assignments can be added after the user is created. The **Privileged Role Administrator** role is required to assign Microsoft Entra roles.

#### To assign a group to the new user:

Select **+ Add group**.

From the menu that appears, choose up to 20 groups from the list and select the **Select** button.

Select the **Review + create** button.



The screenshot shows the Microsoft Azure portal interface for creating a new user. On the left, there's a navigation bar with 'Microsoft Azure' and a search bar. Below that, it says 'Home > Contoso | Users > Users'. There are tabs for 'Invite external user', 'Basics', 'Properties', 'Assignments' (which is selected), and 'Review + invite'. Under 'Assignments', it says 'Make up to 20 group or role assignments.' and has buttons for '+ Add group' and '+ Add role'. Below that, it says 'No assignments to display.' At the bottom of the main pane are buttons for 'Review + invite' and 'Next: Review + invite >'. On the right, a modal window titled 'Select group' is open. It has a search bar at the top. Below it, there are two items: 'AD AD-Licensing-EMS-E5-All' and 'AU All Users'. A note below 'AU' says 'Dynamic groups are not allowed.' At the bottom right of the modal is a blue 'Select' button.

#### To assign a role to the new user:

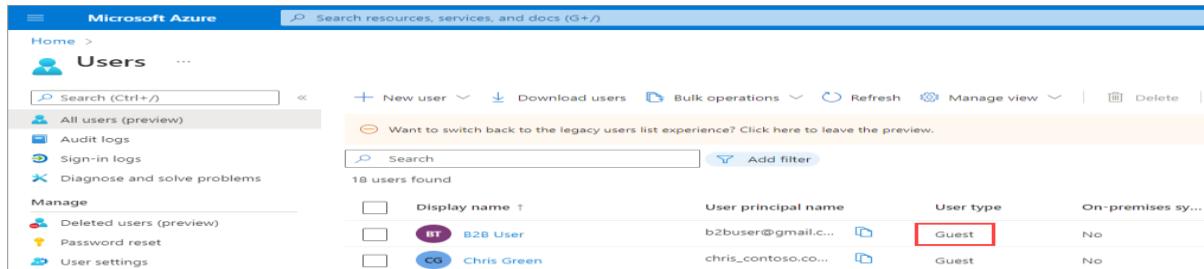
Select **+ Add role**.

From the menu that appears, choose up to 20 roles from the list and select the **Select** button.

Select the **Review + invite** button.

## Review and create

The final tab captures several key details from the user creation process. Review the details and select the **Invite** button if everything looks good. An email invitation is automatically sent to the user. After you send the invitation, the user account is automatically added to the directory as a guest.



## External user invitations

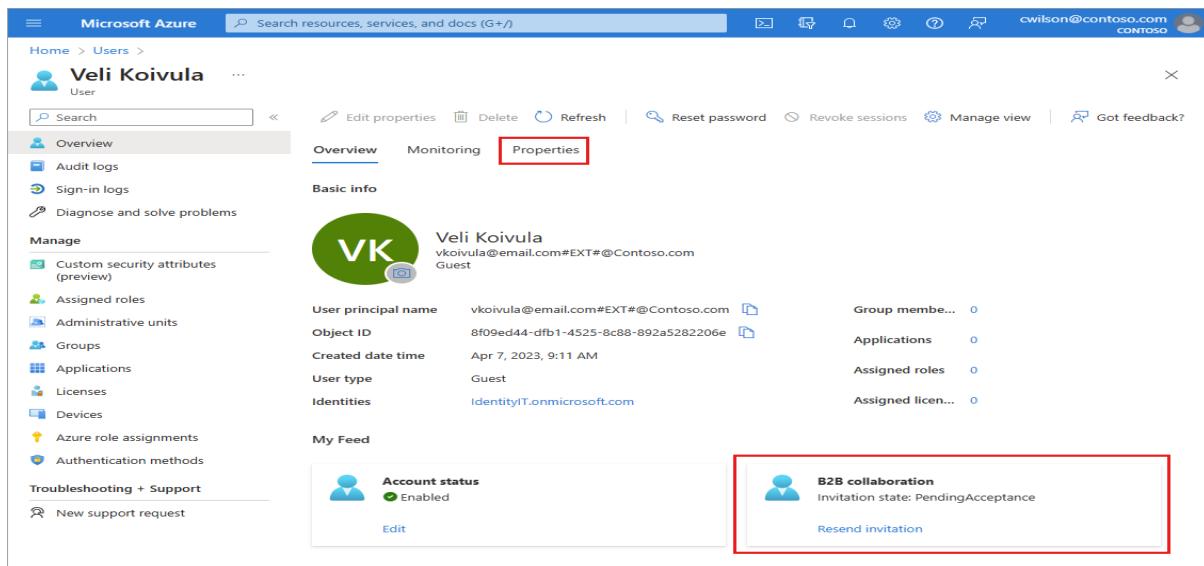
When you invite an external guest user by sending an email invitation, you can check the status of the invitation from the user's details. If they haven't redeemed their invitation, you can resend the invitation email.

Go to **Identity > Users > All users** and select the invited guest user.

In the **My Feed** section, locate the **B2B collaboration** tile.

If the invitation state is **Pending Acceptance**, select the **Resend invitation** link to send another email and follow the prompts.

You can also select the **Properties** for the user and view the **Invitation state**.



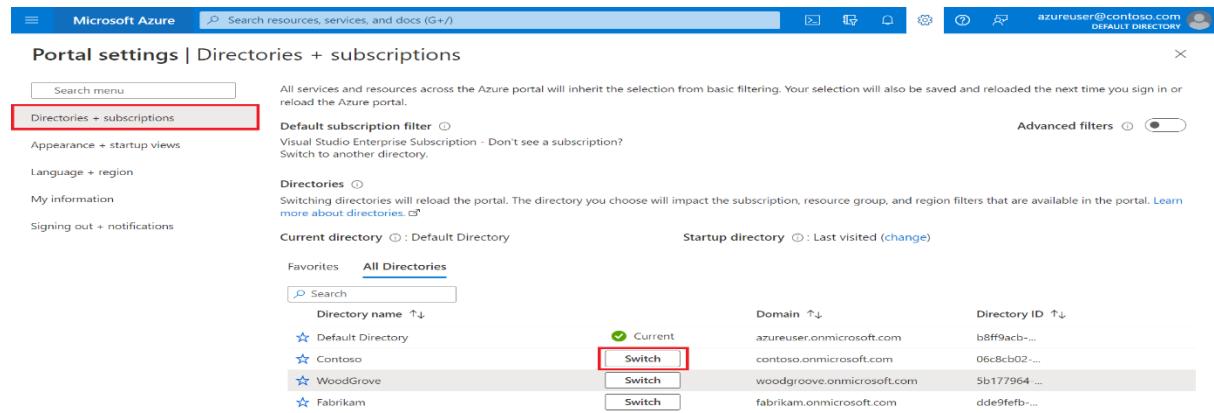
**Azure AD B2C (Business-to-Consumer):** Provides identity and access management solutions for customer-facing applications. It allows you to customize and brand authentication experiences for consumers, supporting social identity providers and multi-factor authentication.

Sign in to the [Azure portal](#).

Make sure you're using the Microsoft Entra tenant that contains your subscription:

In the Azure portal toolbar, select the **Directories + subscriptions** (grid icon) icon.

On the **Portal settings | Directories + subscriptions** page, find your Microsoft Entra directory that contains your subscription in the **Directory name** list, and then select **Switch** button next to it.



The screenshot shows the 'Portal settings | Directories + subscriptions' page in the Azure portal. The left sidebar has a 'Directories + subscriptions' link highlighted with a red box. The main area shows a list of directories. The first row, 'Default Directory', has a 'Current' checkbox checked and a 'Switch' button highlighted with a red box. Other rows include 'Contoso', 'WoodGrove', and 'Fabrikam', each with a 'Switch' button.

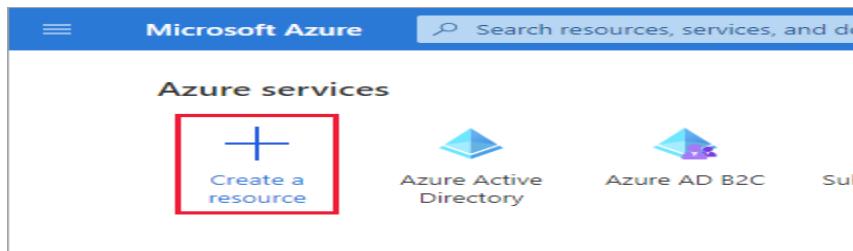
Add **Microsoft.AzureActiveDirectory** as a resource provider for the Azure subscription you're using:

On the Azure portal, search for and select **Subscriptions**.

Select your subscription, and then in the left menu, select **Resource providers**. If you don't see the left menu, select the **Show the menu for < name of your subscription >** icon at the top left part of the page to expand it.

Make sure the **Microsoft.AzureActiveDirectory** row shows a status of **Registered**. If it doesn't, select the row, and then select **Register**.

On the Azure portal menu or from the **Home** page, select **Create a resource**.



The screenshot shows the 'Azure services' section of the Azure portal home page. A large 'Create a resource' button is highlighted with a red box. To its right are icons for 'Azure Active Directory', 'Azure AD B2C', and 'Subscription'.

Search for **Azure Active Directory B2C**, and then select **Create**.

Select **Create a new Azure AD B2C Tenant**.



The screenshot shows the 'Create new B2C Tenant or Link to existing Tenant' page. At the top, there are two options: 'Create a new Azure AD B2C Tenant' (highlighted with a red box) and 'Link an existing Azure AD B2C Tenant to my Azure subscription'. Both options have small icons to their left.



On the **Create a directory** page:

- For **Organization name**, enter a name for your Azure AD B2C tenant.
- For **Initial domain name**, enter a domain name for your Azure AD B2C tenant.
- For **Location**, select your country/region from the list. If the country/region you select has a Go-Local add-on option, such as Japan or Australia, and you want to store your data exclusively within that country/region, select the **Store Microsoft Entra Core Store data and Microsoft Entra components and service data in the location selected above** checkbox. Go-Local add-on is a paid add-on whose charge is added to your Azure AD B2C Premium P1 or P2 licenses charges, see [Billing model](#). You can't change the data residency region after you create your Azure AD B2C tenant.
- For **Subscription**, select your subscription from the list.
- For **Resource group**, select or search for the resource group that will contain the tenant.

The screenshot shows the 'Create a tenant' configuration page in the Azure Active Directory portal. The 'Configuration' tab is active. In the 'Directory details' section, the organization name is 'Contoso B2C Organization', the initial domain name is 'contosob2corgansation', and the location is 'United States'. A note below specifies that the location determines where Microsoft stores Azure AD Core Store data only. In the 'Subscription' section, the subscription is 'Contoso Subscription' and the resource group is 'ContosoRG'. At the bottom, there are 'Review + create' and 'Create new' buttons.

Select **Review + create**.

Review your directory settings. Then select **Create**.

Activate Azure AD B2C Go-Local add-on

Azure AD B2C allows you to activate Go-Local add-on on an existing tenant as long as your tenant stores data in a country/region that has local data residence option. To opt-in to Go-Local add-on, use the following steps:

Sign in to the Azure portal.

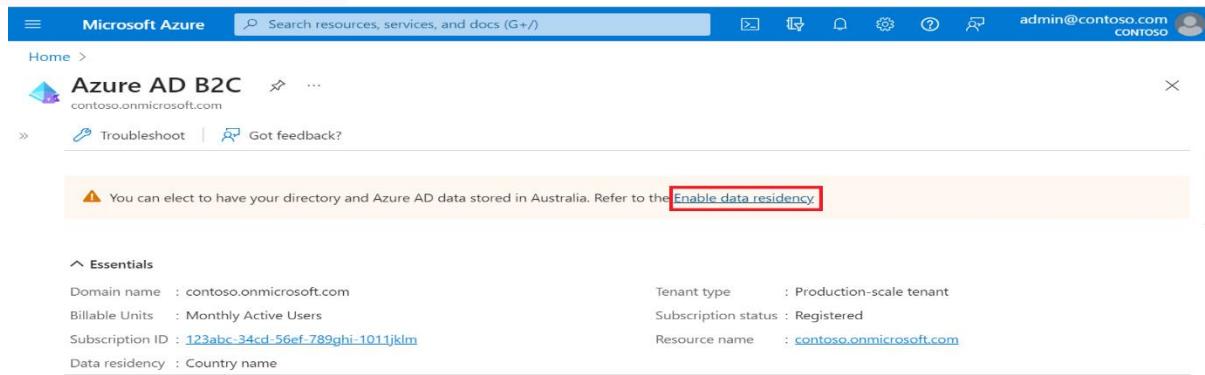
Make sure you're using the directory that contains your Azure AD B2C tenant:

In the Azure portal toolbar, select the Directories + subscriptions.

On the Portal settings | Directories + subscriptions page, find your Azure AD B2C directory in the Directory name list, and then select the Switch button next to it.

In the Azure portal, search for and select Azure AD B2C.

On the tenant management page that appears, on the top of the page, select Enable data residency link.



Microsoft Azure Search resources, services, and docs (G+/) Home > Azure AD B2C contoso.onmicrosoft.com Troubleshoot Got feedback? ⚠ You can elect to have your directory and Azure AD data stored in Australia. Refer to the [Enable data residency](#).

**Essentials**

Domain name : contoso.onmicrosoft.com	Tenant type : Production-scale tenant
Billable Units : Monthly Active Users	Subscription status : Registered
Subscription ID : 123abc-34cd-56ef-789ghi-1011jklm	Resource name : contoso.onmicrosoft.com
Data residency : Country name	

On the **Data residency** pane that appears, select the **Store my directory and Microsoft Entra data in <Country>** checkbox, then select **Save** button.

Close the **Data residency** pane.

Select your B2C tenant directory

To start using your new Azure AD B2C tenant, you need to switch to the directory that contains the tenant:

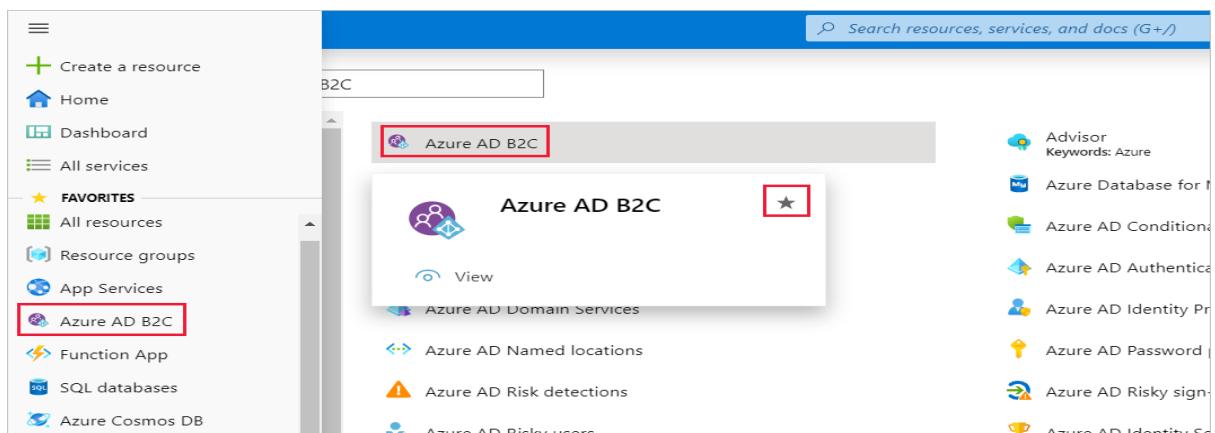
In the Azure portal toolbar, select the **Directories + subscriptions** filter icon (  ).

On the **All Directories** tab, find the directory that contains your Azure AD B2C tenant and then select the **Switch** button next to it.

If at first you don't see your new Azure B2C tenant in the list, refresh your browser window or sign out and sign back in. Then in the Azure portal toolbar, select the **Directories + subscriptions** filter again.

Add Azure AD B2C as a favorite (optional)

1. Sign in to the [Azure portal](#).
2. In the Azure portal menu, select **All services**.
3. In the **All services** search box, search for **Azure AD B2C**, hover over the search result, and then select the star icon in the tooltip. **Azure AD B2C** now appears in the Azure portal under **Favorites**.
4. If you want to change the position of your new favorite, go to the Azure portal menu, select **Azure AD B2C**, and then drag it up or down to the desired position.



Search resources, services, and docs (G+/) B2C

**Azure AD B2C** ★

**Azure AD B2C** View ★

- Azure AD Domain Services**
- Azure AD Named locations**
- Azure AD Risk detections**
- Azure AD Risky users**

**FAVORITES**

- Azure AD B2C** ★
- Function App**
- SQL databases**
- Azure Cosmos DB**

**Advisor Keywords: Azure**

**Azure Database for MySQL**

**Azure AD Conditional Access**

**Azure AD Authentication**

**Azure AD Identity Protection**

**Azure AD Password Protection**

**Azure AD Risky sign-ins**

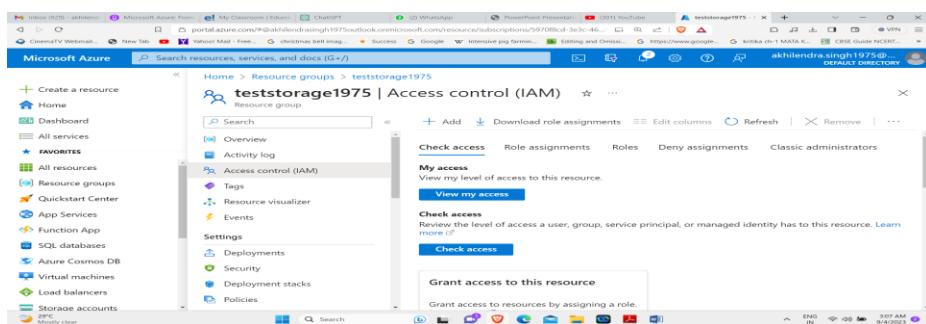
**Azure AD Identity Security**

## P7: Azure Security Best Practices:

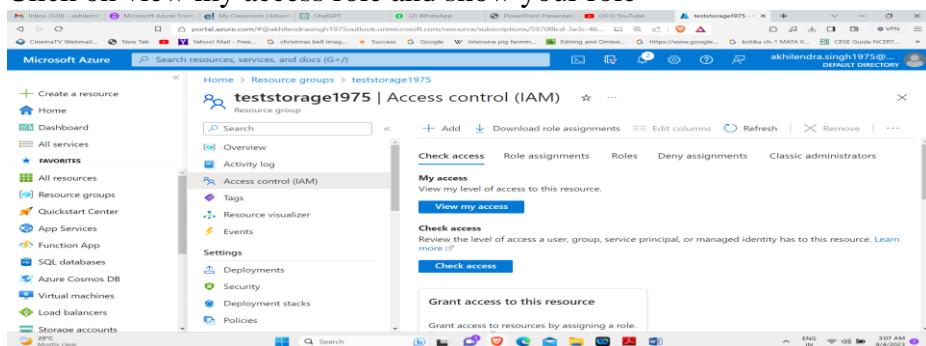
- Securing Azure resources with role-based access control (RBAC)
- Implementing network security best practices
- Utilizing Azure Key Vault for secure key and secret management
- Monitoring and detecting security threats with Azure Security Centre

1. Create resource Group
2. Create resource ( In this Example: Storage Account)
3. Role Based Access policy can be implemented at Resource Group level or Resource level
4. Subscription level
5. Using Azure AD Assign Administrative level Role

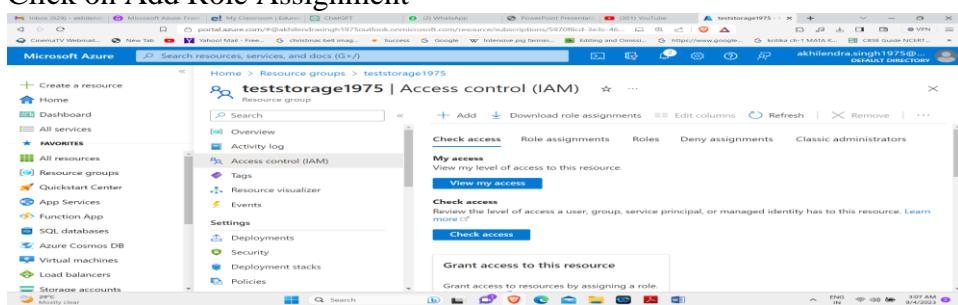
I am demonstrating here in lab Resource Group level or Resource level RBAC



Click on view my access role and show your role



Click on Add Role Assignment



Here you can select Job function roles or Privileged administrator roles



Parul®  
University

NAAC A++

Faculty of Engineering & Technology  
Azure Fundamentals (203105376)

The screenshot shows the Microsoft Azure portal interface. The left sidebar includes 'Create a resource', 'Home', 'Dashboard', 'All services', and 'FAVORITES' (All resources, Resource groups, Quickstart Center, App Services, Function App, SQL databases, Azure Cosmos DB, Virtual machines, Load balancers, Storage accounts). The main content area is titled 'Add role assignment' under 'Resource groups > teststorage1975 | Access control (IAM)'. It displays a table of 'Job function roles' and 'Privileged administrator roles'. The 'Privileged administrator roles' section is highlighted. The table columns are Name, Description, Type, Category, and Details. Roles listed include Reader, AcrDelete, AcrImageSigner, AcrPull, AcrPush, and AcrQuarantineReader, all categorized as 'BuiltInRole' under 'General' or 'Containers'.

I am going to select here as a Privileged administrator roles I am selecting here as contributor role which allows user to full access the resources but can't assign the role other users.

This screenshot shows the same 'Add role assignment' page as the previous one, but the 'Contributor' role is now selected in the list. The table shows the following roles:

Name	Description	Type	Category	Details
Owner	Grants full access to manage ...	BuiltInRole	General	View
Contributor	Grants full access to manage ...	BuiltInRole	General	View
Access Review Operator Service Role	Lets you grant Access Review ...	BuiltInRole	None	View
Role Based Access Control Administ...	Manage access to Azure resou...	BuiltInRole	None	View
User Access Administrator	Lets you manage user access t...	BuiltInRole	General	View

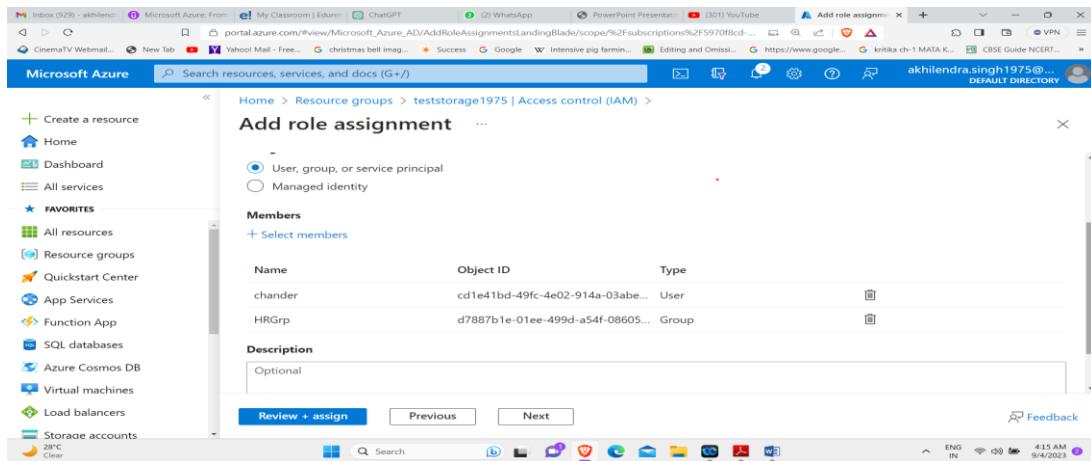
And select Next to assign the role User, group, or service principal

This screenshot shows the 'Add role assignment' page with the 'Contributor' role selected. The 'Assign access to' field is set to 'User, group, or service principal'. The 'Members' section is expanded, showing a table with columns Name, Object ID, and Type. The table currently has one row: 'No members selected'. Below the table is a 'Description' input field and a 'Review + assign' button.

Select Members

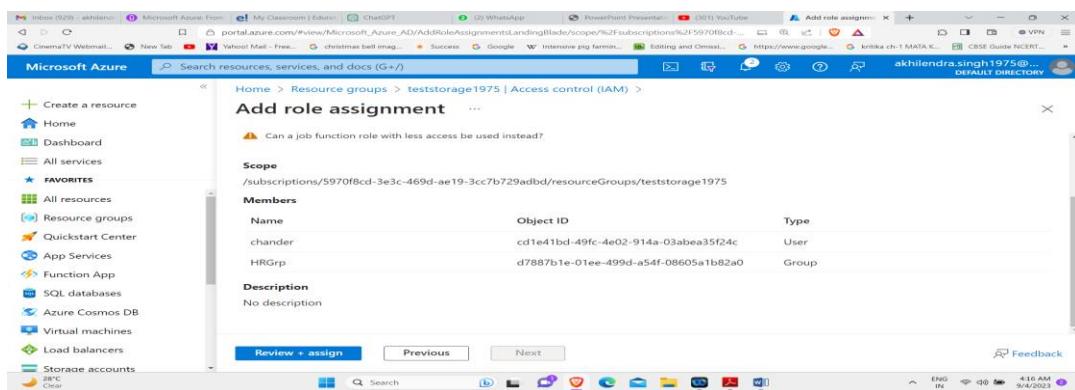
This screenshot shows the 'Select members' dialog box. It contains a search bar 'Search by name or email address' and a list of results. The results include 'akhilendra pratap' (Object ID: akhilendra.singh1975\_outlook.com#EXT#@akhil...', Type: Developer), 'Java Programmer' (Object ID: javauer@akhilendrasingh1975outlook.onmicrosoft.com, Type: HRGrp), and 'chander' (Object ID: chanderpalsingh@akhilendrasingh1975outlook.onmicrosoft.com, Type: HRGrp). There is also a 'Remove' link next to each result. At the bottom, there are 'Select' and 'Close' buttons.

Click on after selecting Members



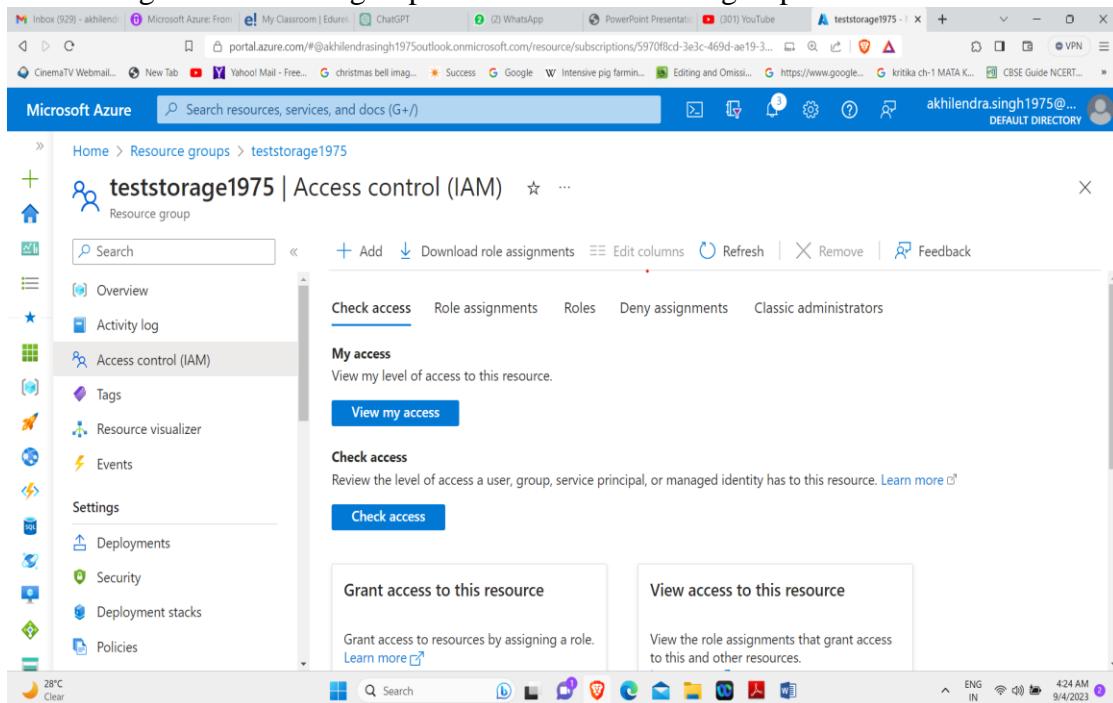
The screenshot shows the 'Add role assignment' dialog in Microsoft Azure. The 'Members' section is open, displaying two entries: 'chander' (User) and 'HRGrp' (Group). Both entries have their Object IDs listed next to them. There is an optional 'Description' field at the bottom. At the bottom right of the dialog are 'Review + assign', 'Previous', and 'Next' buttons.

Click on Review and Assign



This screenshot is identical to the one above, showing the 'Add role assignment' dialog with the 'Members' section open. The 'chander' and 'HRGrp' entries are visible. The 'Review + assign' button is highlighted in blue at the bottom left of the dialog.

Now Navigate to resource group and intended resource group



The screenshot shows the 'teststorage1975 | Access control (IAM)' page in Microsoft Azure. The 'Access control (IAM)' tab is selected in the navigation menu on the left. The main area displays 'My access' and 'Check access' sections. Below these are 'Grant access to this resource' and 'View access to this resource' buttons. The top navigation bar includes links for 'Inbox', 'Microsoft Azure', 'From', 'My Classroom | Edu...', 'ChatGPT', 'WhatsApp', 'PowerPoint Present...', 'YouTube', 'Add role assignments', and 'Feedback'. The status bar at the bottom shows 'ENG IN' and the date '9/4/2023'.

Click on Role Assignment



The screenshot shows the Microsoft Azure portal interface. The user is navigating through the 'Resource groups' section, specifically within the 'teststorage1975' resource group. The 'Access control (IAM)' blade is open, displaying the 'Role assignments' tab. The table lists one role assignment:

Name	Type	Role	Scope	Condition
chanderpalsing...	User	Contributor	This resource	None

Now I can check the role is assigned to users

### P8: Monitoring Azure Resources:

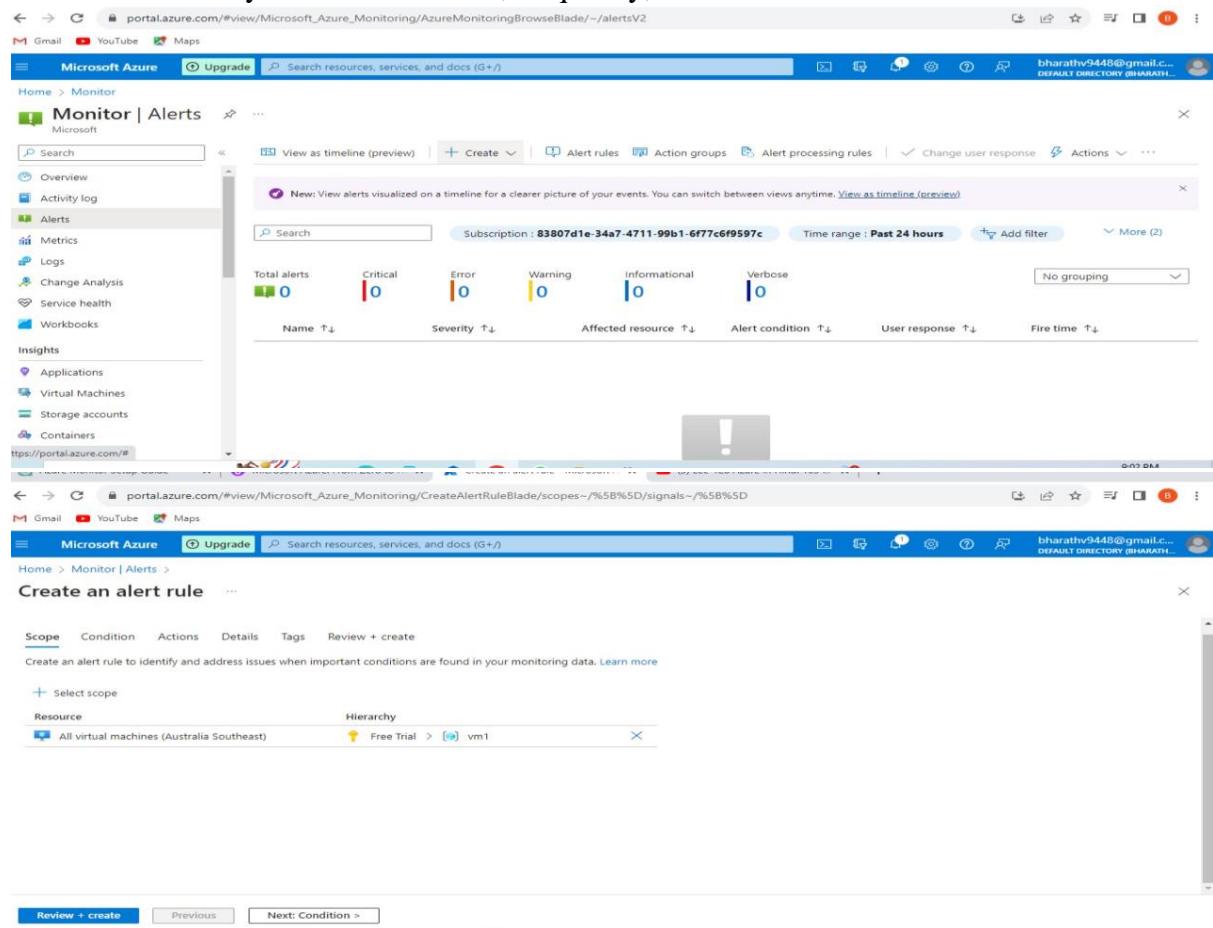
- Setting up Azure Monitor for resource monitoring
- Creating and customizing alerts for resource health and performance
- Analysing resource logs and metrics
- Using Azure Log Analytics for advanced monitoring and querying

Create an Alert Rule:

- In the Azure Monitor instance, select "Alert rules" from the left-hand menu.
- Click on the "+ New alert rule" button.
- Define the condition for the alert. For example, you can set a condition for CPU usage exceeding 80%.
- Configure the actions to take when the alert triggers, such as sending an email notification or running a webhook.

Customize Alert Rules:

- To customize an existing alert rule, select it from the list.
- You can modify the alert threshold, frequency, and notification channels as needed.



The image shows two screenshots of the Microsoft Azure portal interface.

The top screenshot displays the 'Monitor | Alerts' page. The left sidebar includes options like Overview, Activity log, Alerts (which is selected), Metrics, Logs, Change Analysis, Service health, Workbooks, and Insights. The main area shows a summary of alert counts by severity: Critical (0), Error (0), Warning (0), Informational (0), and Verbose (0). It also features a search bar, a subscription ID (83807d1e-34a7-4711-99b1-6f77c6f9597c), a time range (Past 24 hours), and filter buttons. A large exclamation mark icon is prominently displayed in the center.

The bottom screenshot shows the 'Create an alert rule' wizard. The title is 'Create an alert rule'. The top navigation bar includes 'Scope', 'Condition', 'Actions', 'Details', 'Tags', and 'Review + create'. The 'Scope' tab is active, showing a tree view under 'Resource' with 'All virtual machines (Australia Southeast)' selected. The 'Hierarchy' section shows 'Free Trial > vm1'. At the bottom, there are buttons for 'Review + create', 'Previous', and 'Next: Condition >'.

Gmail YouTube Maps

Microsoft Azure  Search resources, services, and docs (G+/-)

Home > Monitor | Alerts > Create an alert rule ...

Scope Condition Actions Details Tags Review + create

Create an alert rule to identify and address issues when important conditions are found.

+ Select scope

Resource Hierarchy

No resource selected yet

Review + create Previous Next: Condition >

### Select a resource

Search to filter items...

Resource	Resource type	Location
> [?] vm1	Resource group	-
> [?] vnet1	Resource group	-

Metric and Log signals might not be available if the scope includes multiple resources.

Refine scope

Resource type: Virtual machines Location: Australia Southeast

Selected resources: 1 scope

[?] vm1 Resource group: -

No results found

Apply Cancel Clear all selections

portal.azure.com/#home

Gmail YouTube Maps

Microsoft Azure  monitor

Hi bharath, see what's new

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All Services (15) Marketplace (31) Documentation (99+) Azure Active Directory (4) Resources (0)

Resource Groups (0)

Services

- Monitor
- Azure Native New Relic Service
- Azure Monitor workspaces
- Azure Monitor Private Link Scopes
- Azure Monitors for SAP solutions
- Logz.io
- Datadog - An Azure Native ISV Service
- Elastic Cloud (Elasticsearch) - An Azure Native ISV Service

Marketplace

- Azure Monitoring
- Elastic Cloud (Elasticsearch) - An Azure Native ISV Service
- Azure Monitor for VMs
- InfluxDB Cloud (Official Version)
- Metrics Advisor
- Azure Monitoring service
- Datadog - An Azure Native ISV Service
- Azure Monitor Private Link Scope

Documentation

Continue searching in Azure Active Directory

Searching all subscriptions. Give feedback

[https://portal.azure.com/#blade/Microsoft\\_Azure\\_Monitoring/AzureMonitoringBrowseBlade](https://portal.azure.com/#blade/Microsoft_Azure_Monitoring/AzureMonitoringBrowseBlade)

portal.azure.com/#view/Microsoft\_Azure\_Monitoring/CreateAlertRuleBlade/scopes-/signals-/

Microsoft Azure  Search resources, services, and docs (G+/-)

Home > Monitor | Alerts > Create an alert rule ...

Scope Condition Actions Details Tags Review + create

Configure when the alert rule should trigger by selecting a signal and defining its logic.

Signal name \*  Restart Virtual Machine (Virtual Machines)

See all signals

Chart period

- Over the last 6 hours
- Over the last 6 hours
- Over the last 12 hours
- Over the last 24 hours
- Over the last 3 days
- Over the last week

Review + create Previous Next: Actions >



Parul®  
University

NAAC A++

Faculty of Engineering & Technology  
Azure Fundamentals (203105376)

portal.azure.com/#view/Microsoft\_Azure\_Monitoring/AzureMonitoringBrowseBlade/-/alertsV2

Microsoft Azure Upgrade Search resources, services, and docs (G+/-)

Home > Monitor

Monitor | Alerts

Search View as timeline (preview) Create Alert rules Action groups Alert processing rules Change user response Actions

New: View alerts visualized on a timeline for a clearer picture of your events. You can switch between views anytime. [View as timeline \(preview\)](#)

Subscription : 83807d1e-34a7-4711-99b1-6f77c6f9597c Time range : Past 24 hours Add filter More (2)

Total alerts Critical Error Warning Informational Verbose

Name Severity Affected resource Alert condition User response Fire time

No grouping

https://portal.azure.com/#view/Microsoft\_Azure\_Monitoring/AzureMonitoringBrowseBlade/-/alertsV2

portal.azure.com/#view/Microsoft\_Azure\_Monitoring\_Alerts/CreateActionGroupBlade/subscriptionId/83807d1e-34a7-4711-99b1-6f77c6f9597c/subscriptionN... Gmail YouTube Maps

Microsoft Azure Upgrade Search resources, services, and docs (G+/-)

Home > Monitor | Alerts > Alert rules > restart vm > Edit alert rule >

Create action group ...

An action group invokes a defined set of notifications and actions when an alert is triggered. [Learn more](#)

Project details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription : Free Trial

Resource group \* : vm-rg1

Create new

Region \* : Global

Instance details

Action group name \* : actalert

Display name \* : actionalert

The display name is limited to 12 characters

Review + create Previous Next: Notifications >

https://portal.azure.com/#view/Microsoft\_Azure\_Monitoring\_Alerts/CreateActionGroupBlade/subscriptionId/83807d1e-34a7-4711-99b1-6f77c6f9597c/subscriptionN... Gmail YouTube Maps

Microsoft Azure Upgrade Search resources, services, and docs (G+/-)

Home > Monitor | Alerts > Alert rules > restart vm > Edit alert rule >

Create action group ...

Basics Notifications Actions Tags Review + create

Choose how to get notified when the action group is triggered. This step is optional.

Notification type : Email/SMS message/Push/Voice

Name : alert

Please configure the notification by clicking the edit button.

Email  xyz@gmail.com

SMS (Carrier charges may apply)   
Country code : 1  
Phone number :

Azure mobile app notification   
Azure account email :

Voice   
Country code : 1  
Phone number :

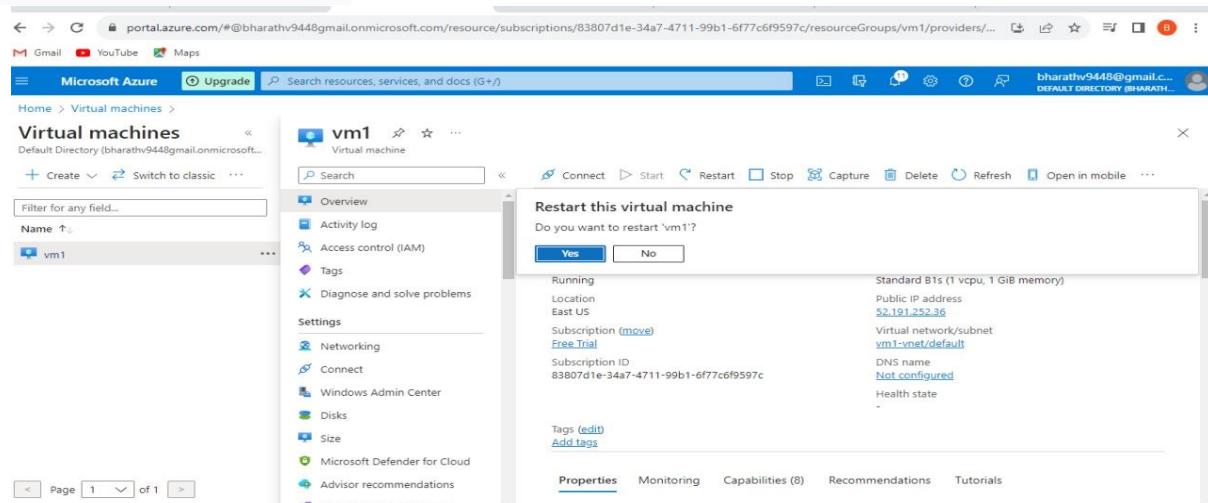
Enable the common alert schema. [Learn more](#)

Yes No

OK

Review + create Previous Next: Actions >

https://portal.azure.com/#view/Microsoft\_Azure\_Monitoring\_Alerts/CreateActionGroupBlade/subscriptionId/83807d1e-34a7-4711-99b1-6f77c6f9597c/subscriptionN... Gmail YouTube Maps



Virtual machines

Default Directory (bharathv9448@gmail.onmicrosoft.com)

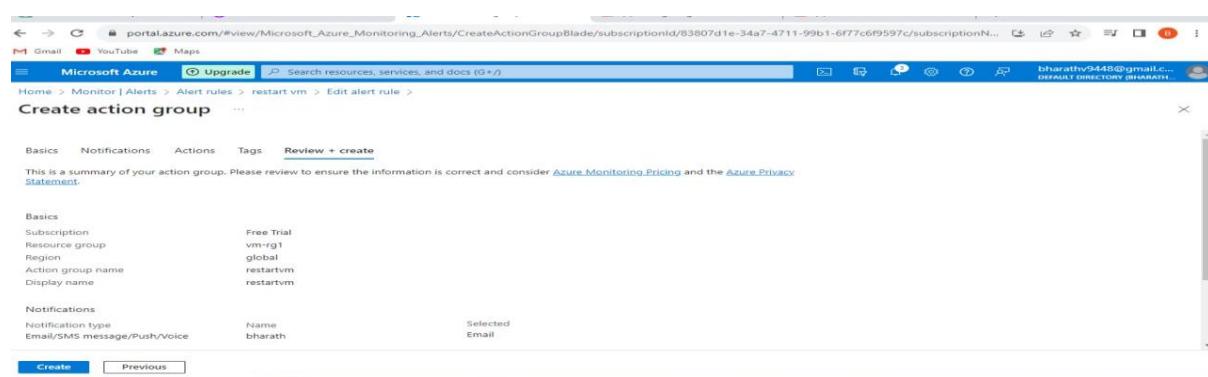
vm1 Virtual machine

Restart this virtual machine

Do you want to restart 'vm1'?

Yes No

Properties Monitoring Capabilities (8) Recommendations Tutorials



Create action group

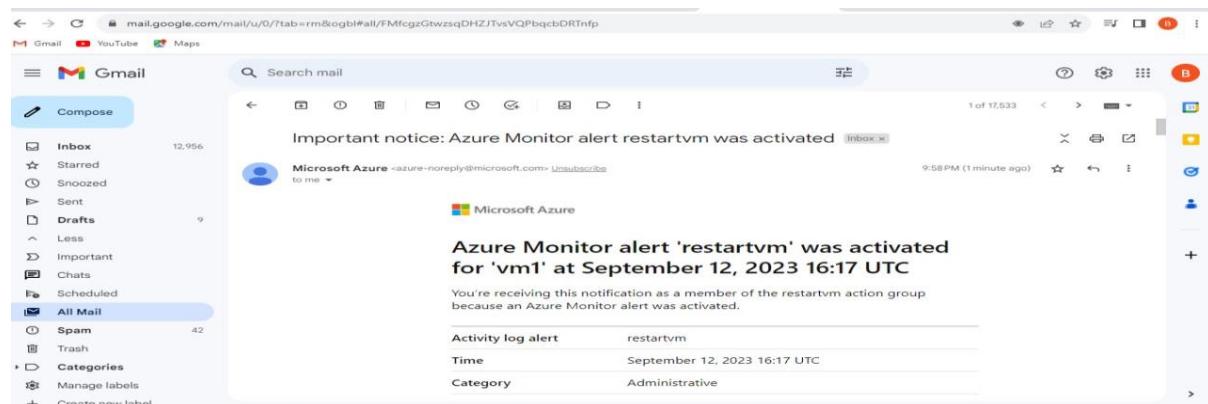
Basics Notifications Actions Tags Review + create

This is a summary of your action group. Please review to ensure the information is correct and consider [Azure Monitoring Pricing](#) and the [Azure Privacy Statement](#).

Subscription: Free Trial  
Resource group: vm-rg1  
Region: global  
Action group name: restartvm  
Display name: restartvm

Notifications:  
Notification type: Email/SMS message/Push/Voice  
Name: bharath  
Selected: Email

Create Previous



Important notice: Azure Monitor alert restartvm was activated

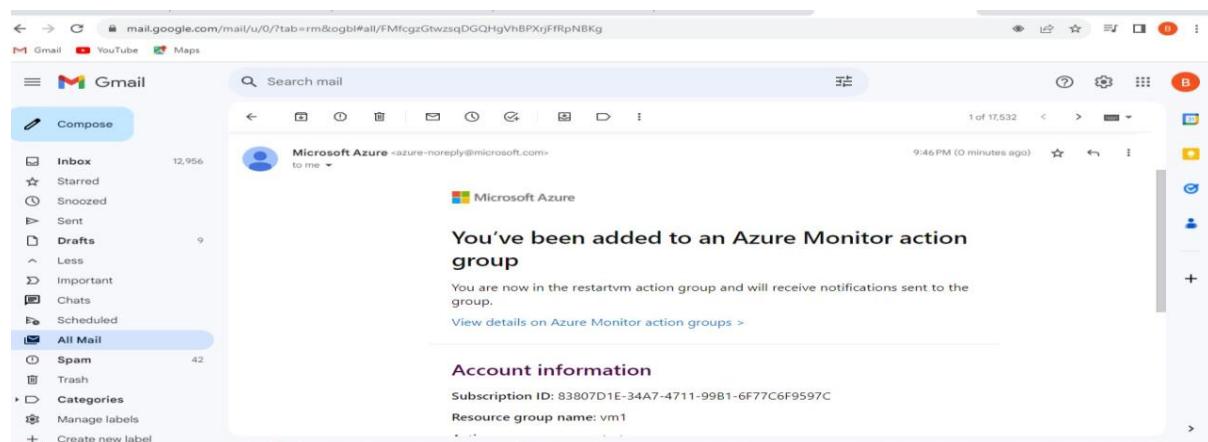
Microsoft Azure <azure-noreply@microsoft.com> Unsubscribe

9:58PM (1 minute ago)

Azure Monitor alert 'restartvm' was activated for 'vm1' at September 12, 2023 16:17 UTC

You're receiving this notification as a member of the restartvm action group because an Azure Monitor alert was activated.

Activity log alert	restartvm
Time	September 12, 2023 16:17 UTC
Category	Administrative



Microsoft Azure <azure-noreply@microsoft.com>

9:46PM (0 minutes ago)

You've been added to an Azure Monitor action group

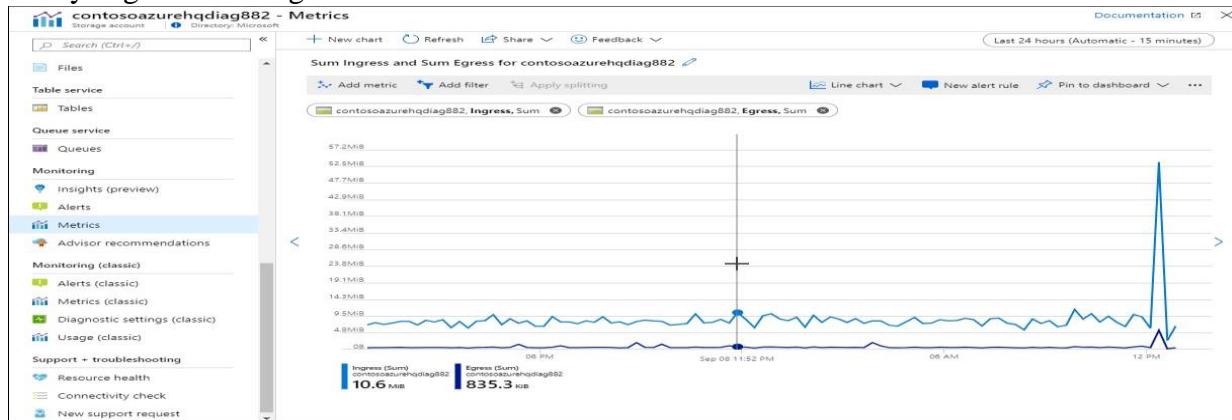
You are now in the restartvm action group and will receive notifications sent to the group.

[View details on Azure Monitor action groups >](#)

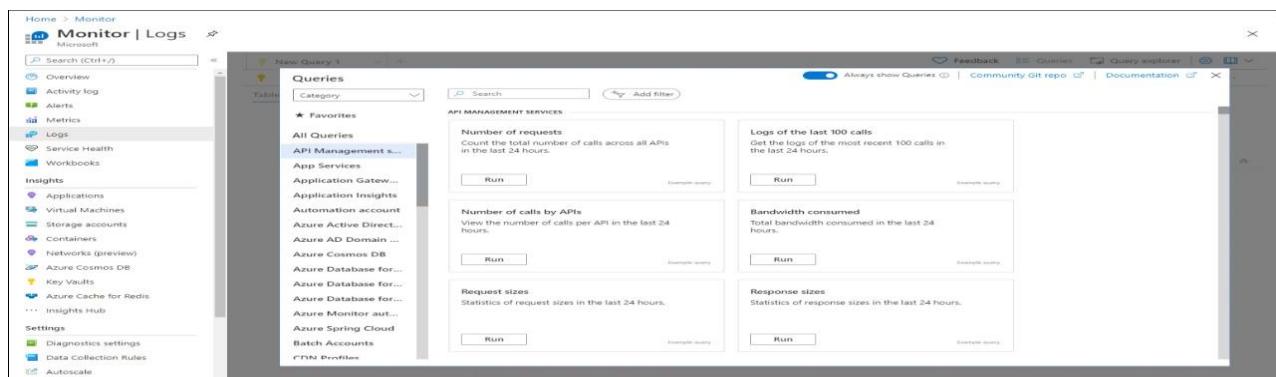
**Account information**

Subscription ID: 83807D1E-34A7-4711-99B1-6F77C6F9597C  
Resource group name: vm1

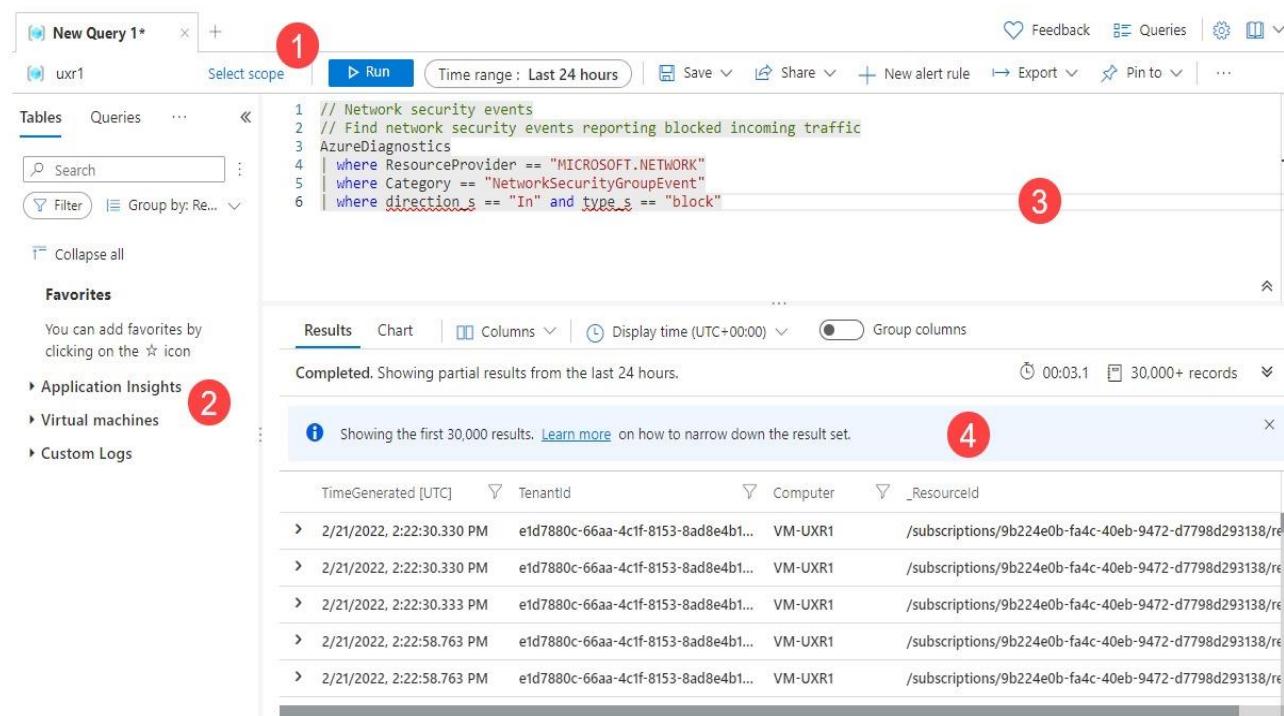
## Analysing resource logs and metrics



## Using Azure Log Analytics for advanced monitoring and querying



The screenshot shows the Azure Monitor Logs blade. The left sidebar includes sections for Overview, Activity log, Alerts, Metrics, Logs (selected), Service Health, Workbooks, Insights, and Settings. The main area is titled 'New Query 1' and shows a list of pre-defined queries under 'API MANAGEMENT SERVICES'. These include 'Number of requests', 'Logs of the last 100 calls', 'Number of calls by APIs', 'Bandwidth consumed', 'Request sizes', and 'Response sizes'. Each query has a 'Run' button and an 'Example query' link.



The screenshot shows the Azure Log Analytics workspace. The top navigation bar includes 'Feedback', 'Queries', 'Alerts', 'Export', 'Pin to', and '...'. The main area is divided into three sections: 'New Query 1' (with a red circle 1), 'Favorites' (with a red circle 2), and 'Results' (with a red circle 3). The 'New Query 1' section contains a query editor with the following code:

```

1 // Network security events
2 // Find network security events reporting blocked incoming traffic
3 AzureDiagnostics
4 | where ResourceProvider == "MICROSOFT.NETWORK"
5 | where Category == "NetworkSecurityGroupEvent"
6 | where direction_s == "In" and type_s == "block"

```

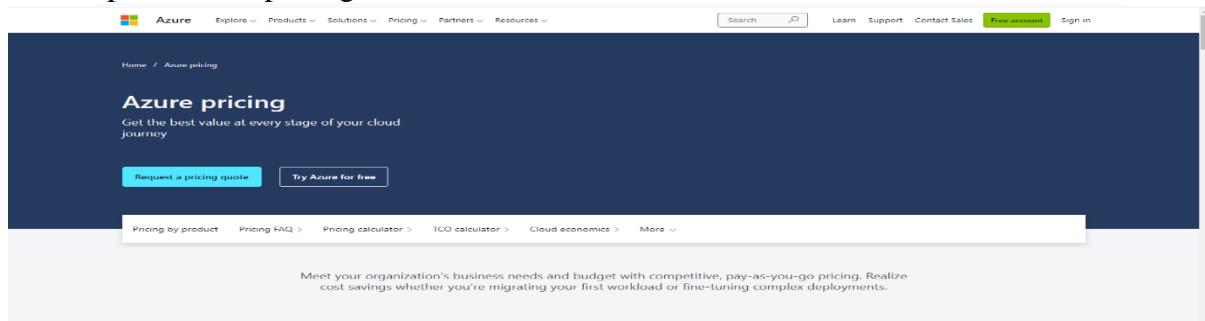
The 'Favorites' section lists Application Insights, Virtual machines, and Custom Logs. The 'Results' section shows a table of partial results from the last 24 hours, with a note indicating 30,000+ records. The table includes columns: TimeGenerated [UTC], Tenantid, Computer, and \_ResourceId. The results show multiple entries for VM-UXR1 with various resource IDs.

### P9: Introduction to Azure Cost Management:

- Understanding Azure pricing models and billing
- Analyzing cost reports and usage details
- Implementing cost-saving measures and resource optimization
- Setting up budgets and alerts for cost control

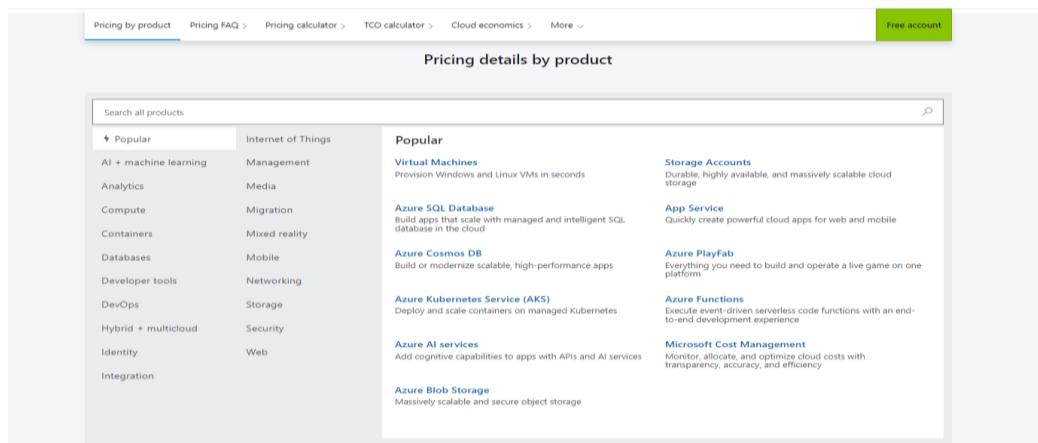
#### Understanding Azure Pricing Models and Billing:

Azure offers various pricing models, including pay-as-you-go, reserved instances, and consumption-based pricing.



The screenshot shows the Azure Pricing page. At the top, there's a navigation bar with links for Home, Explore, Products, Solutions, Pricing, Partners, and Resources. Below the navigation is a search bar and a "Free account" button. The main content area has a dark blue header with the title "Azure pricing" and a sub-header "Get the best value at every stage of your cloud journey". It features two prominent buttons: "Request a pricing quote" and "Try Azure for free". Below these buttons, there are links for "Pricing by product", "Pricing FAQ", "Pricing calculator", "TCO calculator", "Cloud economics", and "More". A large text block below the buttons states: "Meet your organization's business needs and budget with competitive, pay-as-you-go pricing. Realize cost savings whether you're migrating your first workload or fine-tuning complex deployments."

Visit the Azure Pricing page on the Azure website to explore the different services and their associated costs.



The screenshot shows the "Pricing details by product" page. At the top, there's a navigation bar with links for "Pricing by product", "Pricing FAQ", "Pricing calculator", "TCO calculator", "Cloud economics", and "More". Below the navigation is a "Free account" button. The main content area features a grid of service cards. On the left, there's a sidebar with a search bar and categories like "Popular", "Internet of Things", "Management", "Media", "Migration", "Mixed reality", "Mobile", "Networking", "Storage", "Web", and "Integration". The main grid contains cards for various services: "Virtual Machines" (Provision Windows and Linux VMs in seconds), "Storage Accounts" (Durable, highly available, and massively scalable cloud storage), "Azure SQL Database" (Build apps that scale with managed and intelligent SQL database in the cloud), "App Service" (Quickly create powerful cloud apps for web and mobile), "Azure Cosmos DB" (Build or modernize scalable, high-performance apps), "Azure PlayFab" (Everything you need to build and operate a live game on one platform), "Azure Kubernetes Service (AKS)" (Deploy and scale containers on managed Kubernetes), "Azure Functions" (Execute event-driven serverless code functions with an end-to-end development experience), "Azure AI services" (Add cognitive capabilities to apps with APIs and AI services), "Microsoft Cost Management" (Monitor, allocate, and optimize cloud costs with transparency, accuracy, and efficiency), and "Azure Blob Storage" (Massively scalable and secure object storage).

Familiarize yourself with the Azure Pricing Calculator, which allows you to estimate your monthly costs based on your usage.

A) Estimate workload cost using the pricing calculator:

1. Go to the [Azure Pricing Calculator](#) page.
2. Find the Products tab, and click on the Virtual Machines option. Next, scroll down to see the VM options, and add the configuration details of your VM. Change the text—Your Estimate and Virtual Machines—with descriptive names.
3. The image below replaces the generic Your Estimate text with My Pricing Calculator Estimate, and the generic Virtual Machines.



The screenshot shows the Azure Pricing calculator interface. At the top, there's a banner with the text "Pricing calculator" and "Calculate your estimated hourly or monthly costs for using Azure." Below the banner, there are two buttons: "Try Azure for free" and "Create a pay-as-you-go account". A large digital clock-like display shows the number "011734". The main area has tabs for "Products", "Example Scenarios", "Saved Estimates", and "FAQs". A sidebar on the left lists "Featured" services: Compute, Networking, Storage, Web, Mobile, and Containers. The main content area displays several service cards: Virtual Machines (Provision Windows and Linux virtual machines in seconds), Storage Accounts (Durable, highly available and massively scalable cloud storage), Azure SQL Database (Managed, intelligent SQL in the cloud), App Service (Quickly create powerful cloud apps for web and mobile), Azure Cosmos DB (Fast NoSQL database with open APIs for any scale), Azure Kubernetes Service (AKS) (Build and scale with managed Kubernetes), Azure Functions, Azure Cognitive Services, and Azure Cost Management and.

#### 4. Replace the default VM configuration with your own specifications.

The screenshot shows the "Your Estimate" page for a Virtual Machine. It displays the configuration: "1 A0 (1 Core, 0.75 GB RAM) x 730 Hours (Pay as you go)" with an "Upfront: \$0.00" and a "Monthly: \$14.60". Below this, there's a section for "Virtual Machines" with dropdown menus for Region (East US), Operating system (Windows), Type (OS Only), Tier (Standard), Category (All), Instance Series (A-series), and a detailed view of the "INSTANCE (Need help finding the right VM?)" section showing "1 A0 Cores, 0.75 GB RAM, 20 GB Temporary storage, \$0.020/hour". There are also sections for "Savings Options" and "Compute (A0)" and "OS (Windows)". A "Chat with Sales" button is visible in the bottom right corner.

#### 5. In the Billing Option menu, choose Pay as you go. This option uses market on-demand pricing. And in the OS(Windows), choose Azure Hybrid Benefit.

The screenshot shows the "Savings Options" page. It includes sections for "Compute (A0)", "OS (Windows)", and "Managed Disks". Under Compute (A0), it shows that "Pay as you go" is selected. Under OS (Windows), it shows "License included" and "Azure Hybrid Benefit" are selected. The Managed Disks section shows "Standard HDD" as the tier and "S6: 64 GiB, \$3.008/month" as the disk size. The total cost is listed as "\$14.60 Average per month (\$0.00 charged upfront)". A "Chat with Sales" button is visible in the bottom right corner.

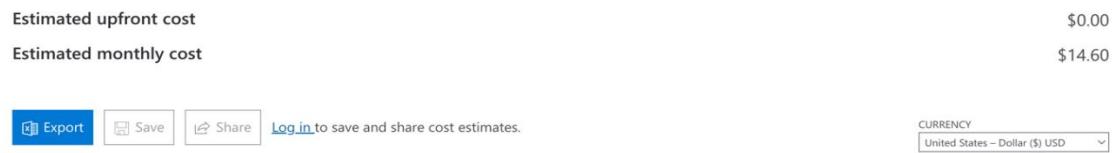
#### 6. Go to the Managed OS Disks pane and change the default configuration of your VM's storage.

The screenshot shows the "Managed Disks" configuration pane. It has a "Tier:" dropdown set to "Standard HDD" and a "DISK SIZE:" dropdown set to "S6: 64 GiB, \$3.008/month". Below these, there are fields for "Disks" (set to 0) and "Per month" (set to \$3.01). A "Chat with Sales" button is visible in the bottom right corner.

- Review the Pricing Estimate

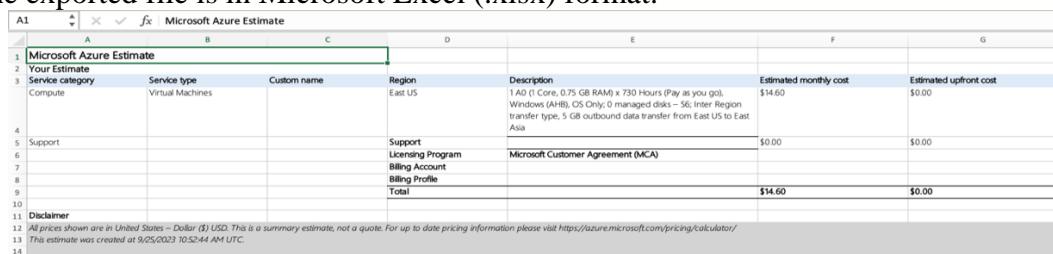
⇒ Here is a quick walkthrough that explains how you can review the results provided by the Azure Pricing Calculator:

1. Go to the main page of the Azure Pricing Calculator, and scroll down to see the total Estimated monthly cost.
2. You can change the currency. This example modified the default to Euro. You can view the estimate offline as well as online. To download a copy for offline use, select Export.



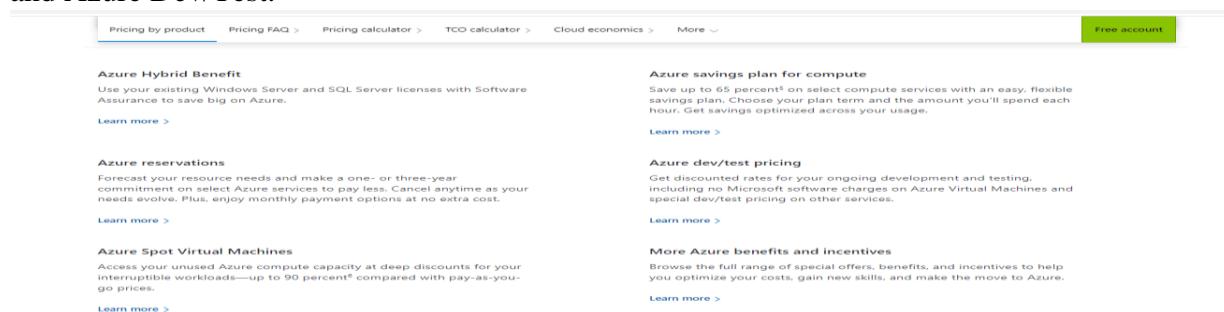
The screenshot shows the Azure Pricing Calculator interface. At the top, it displays 'Estimated upfront cost' as \$0.00 and 'Estimated monthly cost' as \$14.60. Below these, there are buttons for 'Export' (which is highlighted), 'Save', and 'Share'. A link to 'Log in' is present, along with a note to 'Log in to save and share cost estimates.' On the right, a 'CURRENCY' dropdown menu is set to 'United States – Dollar (\$ USD)'.

3. The exported file is in Microsoft Excel (.xlsx) format.



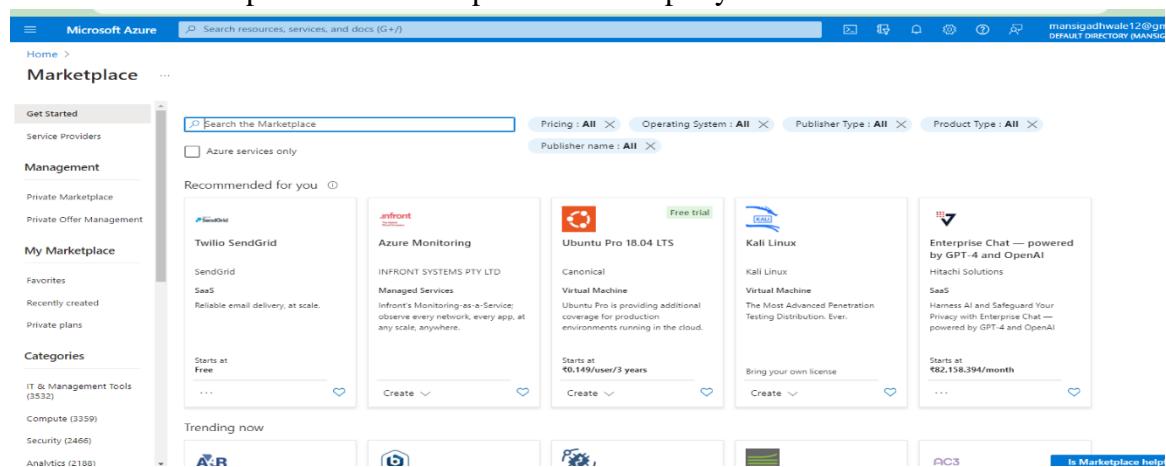
The Excel spreadsheet has a header row 'Microsoft Azure Estimate'. It contains several rows of data, including service categories like Compute and Support, and details like 'Custom name', 'Region', 'Description', 'Estimated monthly cost', and 'Estimated upfront cost'. Row 13 contains a 'Disclaimer' note: 'All prices shown are in United States – Dollar (\$ USD). This is a summary estimate, not a quote. For up-to-date pricing information please visit https://azure.microsoft.com/pricing/calculator/'. Row 14 notes the creation date: 'This estimate was created at 9/25/2023 10:52:44 AM UTC.'

Understand Azure subscription types, such as Enterprise Agreement (EA), Pay-As-You-Go, and Azure Dev/Test.



The screenshot shows the Azure website's 'Pricing by product' section. It features several cards: 'Azure Hybrid Benefit' (using existing Windows Server and SQL Server licenses), 'Azure savings plan for compute' (saving up to 65% on select services), 'Azure reservations' (forecasting needs for one or three years), 'Azure dev/test pricing' (discounted rates for development and testing), 'Azure Spot Virtual Machines' (deep discounts for interruptible workloads), and 'More Azure benefits and incentives' (special offers and discounts). Each card includes a 'Learn more' link.

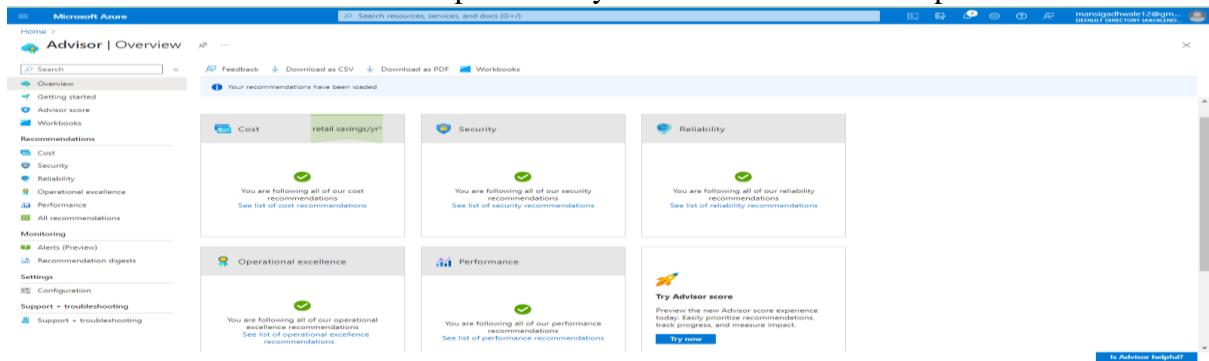
## The Azure Marketplace and how to purchase third-party services.



The screenshot shows the Azure Marketplace search results. The left sidebar includes sections for 'Get Started', 'Service Providers', 'Management', 'My Marketplace', 'Favorites', 'Recently created', 'Private plans', 'Categories' (with links to IT & Management Tools, Compute, Security, and Analytics), and 'Trending now' (listing services like Twilio SendGrid, Azure Monitoring, Ubuntu Pro, Kali Linux, and Enterprise Chat).

## Implementing Cost-Saving Measures and Resource Optimization:

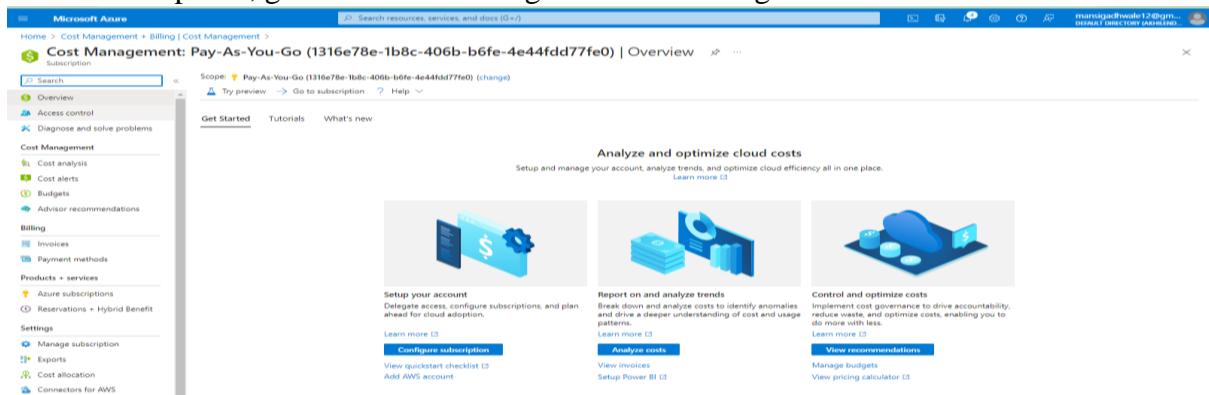
To implement cost-saving measures and resource optimization:  
 Review the cost recommendations provided by Azure Advisor for cost optimization.



### Setting Up Budgets and Alerts for Cost Control:

To set up budgets and alerts for cost control:

In the Azure portal, go to the Cost Management and Billing section.

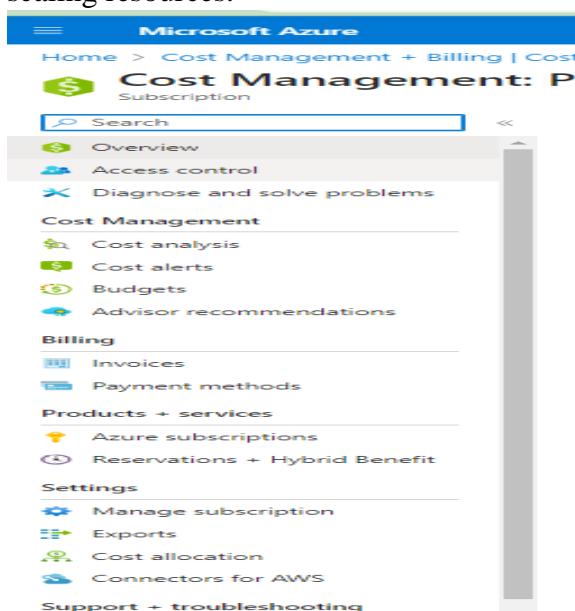


Navigate to the "Cost Management" blade.

Create a budget by specifying a spending limit, time frame, and associated resources.

Configure alerts to notify you when spending exceeds a defined threshold.

Use action groups to automate responses to budget alerts, such as sending notifications or scaling resources.



### P10: Azure Support and SLAs:

- Exploring Azure support plans and tiers
- Understanding Service Level Agreements (SLAs) for Azure services
- Initiating and managing support requests
- Utilizing Azure Service Health for service status updates and notifications.

#### Exploring Azure Support Plans and Tiers:

Azure offers various support plans with different levels of support, including Basic, Developer, Standard, and Professional Direct.

##### Compare support plans

Explore the range of Azure support options and choose the plan that best fits, whether you're a developer just starting your cloud journey or a large organization deploying business-critical, strategic applications.

If you're looking for a comprehensive, organization-wide support plan that includes Azure, Microsoft 365, and Dynamics 365, explore [support for business](#).

	Basic	DEVELOPER	STANDARD	PROFESSIONAL DIRECT
	<a href="#">Request Support</a>	<a href="#">Purchase Support</a>	<a href="#">Purchase Support</a>	<a href="#">Purchase Support</a>
PRICE	Included for all Azure customers	USD 29 per month	USD 100 per month	USD 1,000 per month
SCOPE	Included for all Azure customers	Trial and non-production environments	Production workload environments	Business-critical dependence
BILLING AND SUBSCRIPTION MANAGEMENT SUPPORT	✓	✓	✓	✓
24/7 SELF-HELP RESOURCES, INCLUDING <a href="#">MICROSOFT LEARN</a> , <a href="#">AZURE PORTAL HOW-TO VIDEOS</a> , <a href="#">DOCUMENTATION</a> , AND <a href="#">COMMUNITY SUPPORT</a>	✓	✓	✓	✓
ABILITY TO SUBMIT AS MANY SUPPORT TICKETS AS YOU NEED	✓	✓	✓	✓
<a href="#">AZURE ADVISOR</a> —YOUR FREE, PERSONALIZED GUIDE TO AZURE BEST PRACTICES	✓	✓	✓	✓
<a href="#">AZURE HEALTH STATUS AND NOTIFICATIONS</a>	✓	✓	✓	✓
THIRD-PARTY SOFTWARE SUPPORT WITH INTEROPERABILITY AND CONFIGURATION GUIDANCE AND TROUBLESHOOTING		✓	✓	✓
24/7 ACCESS TO TECHNICAL SUPPORT BY EMAIL AND PHONE AFTER A SUPPORT REQUEST IS SUBMITTED	Available during business hours by email only.		✓	✓
CASE SEVERITY AND RESPONSE TIME	Minimal business impact <small>(Sev C)</small>	Minimal business impact <small>(Sev C)</small>	Minimal business impact <small>(Sev C) within four business hours</small>	

#### Understanding Service Level Agreements (SLAs) for Azure Services:

Azure provides SLAs for many of its services, guaranteeing certain levels of uptime and availability.

##### Service Level Agreements (SLA) for Online Services

The Service Level Agreements (SLA) describe Microsoft's commitments for uptime and connectivity for Microsoft Online Services. The current and archived editions of the SLA are available for download and they cover Azure, Dynamics 365, Office 365, and Intune.

Download the most recent version (English) (October 2023): Service Level Agreement for Microsoft Online Services (WW)
[Download](#)

Year	Language	Asset Types	Type	Month	Day	Year	Language
2023	English	All Asset types	⌚	October	01	2023	English
			⌚	September	01	2023	English
			⌚	August	01	2023	English
			⌚	July	01	2023	English
			⌚	June	01	2023	English
			⌚	May	01	2023	English
			⌚	April	01	2023	English
			⌚	March	03	2023	English
			⌚	March	01	2023	English
			⌚	February	01	2023	English

#### Initiating and Managing Support Requests:

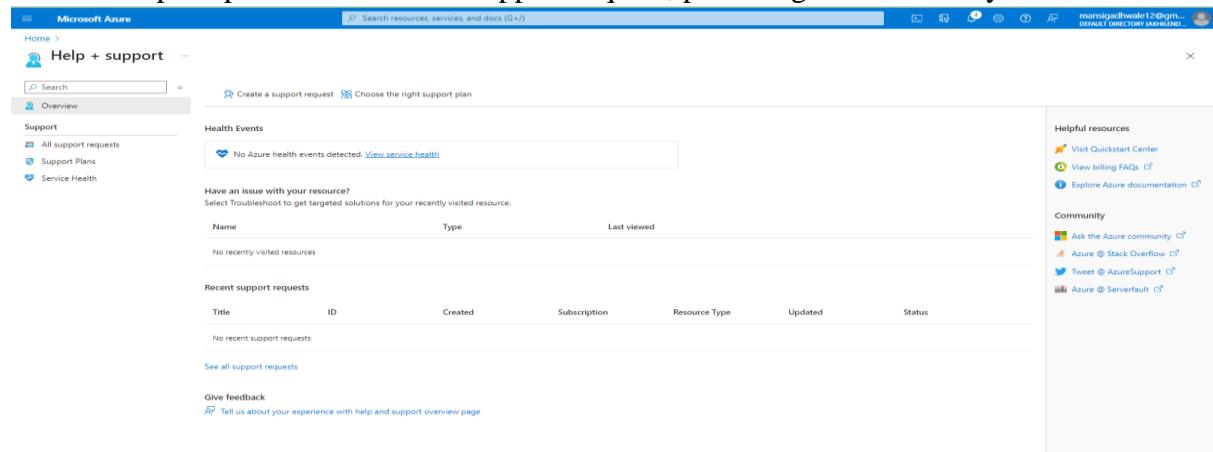
To initiate and manage support requests, you can use the Azure portal. Here are the general steps:

Log in to the Azure portal (<https://portal.azure.com/>).

Click on "Help + support" on the left-hand menu.

Under "Help + support," you can create and manage support requests, chat with a Microsoft support representative, or access support resources.

Follow the prompts to create a new support request, providing details about your issue.



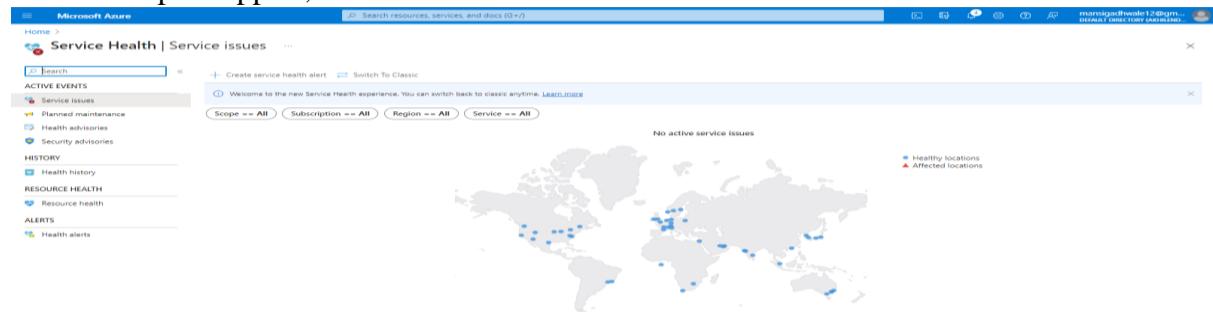
### Utilizing Azure Service Health for Service Status Updates and Notifications:

Azure Service Health provides status updates and notifications about the health of Azure services and regions.

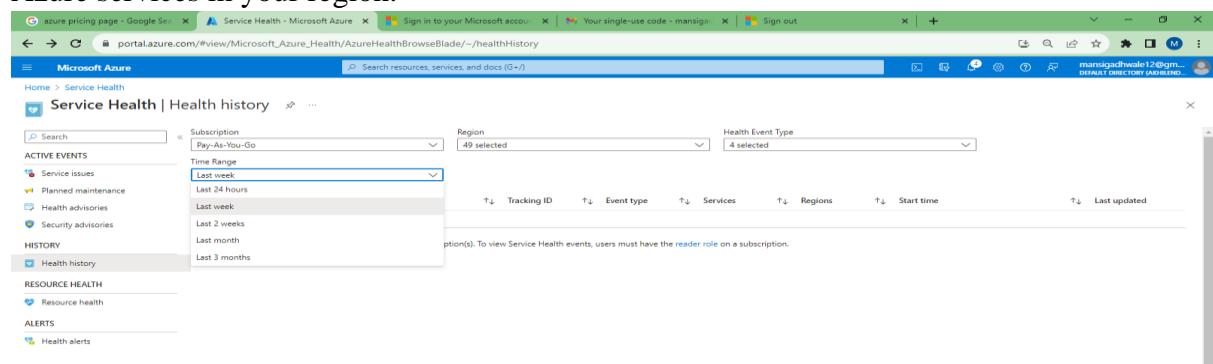
Log in to the Azure portal (<https://portal.azure.com/>).

Click on "Help + support."

Under "Help + support," select "Service health."



Here, you can view current incidents, upcoming maintenance, and past incidents related to Azure services in your region.



**Microsoft Azure**

- [Create a resource](#)
- [Home](#)
- [Dashboard](#)
- [All services](#)
- FAVORITES**
- [All resources](#)
- [Management groups](#)
- [Resource groups](#)
- [Service Health](#)

**Dashboard > Service Health - Health history**

## Service Health - Health history

Search (Ctrl+I) <>

**ACTIVE EVENTS**

- [Service issues](#)
- [Planned maintenance](#)
- [Health advisories](#)

**HISTORY**

- [Health history](#)

You can also set up alerts and notifications to receive updates about service health incidents that may affect your resources.

Home > Service Health

### Service Health | Health alerts

Search <> + Create Columns Refresh Export to CSV Open query Delete Enable Disable

Welcome to the new Service Health Alerts experience. Easily monitor Azure service health notifications with customized alerts. [Learn more](#)

Name ↑	Services	Regions	Event types	Target scope	Target resource type	Status	...
<input type="checkbox"/> Service Health Alert 1	All	All	All	d3t6d5rf-2n98-17ad-g619-01gk3378714	Subscription	<input checked="" type="checkbox"/> Enabled	<input type="button" value="..."/>
<input type="checkbox"/> Service Health Alert 2	All	All	Service issues	d3t6d5rf-2n98-17ad-g619-01gk3378714	Subscription	<input checked="" type="checkbox"/> Enabled	<input type="button" value="..."/>
<input type="checkbox"/> Service Health Alert 3	All	East US	All	5567h43p-zh21-8950-3d71-47j9z5162gf0	Subscription	<input checked="" type="checkbox"/> Enabled	<input type="button" value="..."/>
<input type="checkbox"/> Service Health Alert 4	Virtual Machines	All	Service issues	657b814g-r47u-8jk0-m3nc-1162m5zp0g6	Subscription	<input checked="" type="checkbox"/> Enabled	<input type="button" value="..."/>
<input type="checkbox"/> Service Health Alert 5	Virtual Machines	All	Service issues	5567h43p-zh21-8950-3d71-47j9z5162gf0	Subscription	<input checked="" type="checkbox"/> Enabled	<input type="button" value="..."/>

No grouping <>

Group by subscription

Group by status

Enabled