

# AZURE CLOUD COMPUTING CAPSTONE PROJECT REPORT

Submitted by :

Sasi.k – [Cloud Computing – January Batch]

[sasi93458466@gmail.com](mailto:sasi93458466@gmail.com)

9345846647

Mindenious Edutech - Bangalore

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Under the Guidance of :

Mr. Arib Nawal

Trainer@MindeniousEdutech

## DECLARATION

I hereby declare that this project report titled “AZURE CLOUD COMPUTING CAPSTONE PROJECT” is an original work submitted as part of my institutional curriculum. The findings and results presented in this report are based on my own efforts and have not been submitted elsewhere for any degree or diploma.

Signature

k.sasi

## ACKNOWLEDGMENT

I would like to express my sincere gratitude to Mr.Arib Nawal, my trainer, for his invaluable guidance and support throughout this project. I also extend my thanks to Mindenious Edutech, my institution for providing the necessary resources and a conducive learning environment.

# Report:

## TASK1: AZURE VIRTUAL MACHINE

### Create an Ubuntu VM and connect to the Ubuntu GUI (Install Xfce and XRDP) using RDP connection.

- Signing up my azure portal and activating the free trial for students' package in the Microsoft azure portal.
- Creating a virtual machine as per the task – Ubuntu VM.

The screenshot shows the Microsoft Azure Virtual Machines dashboard. At the top, there is a header bar with various tabs and a search bar. A notification on the right side states "Multifactor authentication required" and provides a link to "Manage multifactor authentication". Below the header, the main content area is titled "Virtual machines" and shows a message "No virtual machines to display". It includes instructions to "Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image." There are two "Create" buttons: one for Windows and one for Linux. The bottom of the screen shows the Windows taskbar with icons for File Explorer, Start, Search, and various pinned applications like Spotify and Google Chrome.

Create Your Azure Free Account | Create a virtual machine - Microsoft Azure

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

## Microsoft Azure

Search resources, services, and docs (G+)

Copilot

Home > Virtual machines >

### Create a virtual machine

Help me create a low cost VM | Help me create a VM optimized for high availability | Help me choose the right VM size for my workload

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

Subscription \* ⓘ: Azure for Students

Resource group \* ⓘ: (New) sasi-ubuntu\_group | Create new

Instance details

Virtual machine name \* ⓘ: sasi-ubuntu

Region \* ⓘ: (US) East US

Availability options ⓘ: Availability zone

Zone options ⓘ:

- Self-selected zone  
Choose up to 3 availability zones, one VM per zone
- Azure-selected zone (Preview)  
Let Azure assign the best zone for your needs

Availability zone \* ⓘ: Zone 3

You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

< Previous | Next: Disks > | Review + create

6 32°C Partly sunny

Search

Cloud, Pen, Pencil, Document, File, Folder, Database, Application, User, Google, Spotify

- Creating Username and password for the Ubuntu VM
- After checking disks ,networking ,monitoring and tags .
- Give upon review +create.

The screenshot shows the Microsoft Azure 'Create a virtual machine' wizard. At the top, there's a green validation bar with a checkmark and the text 'Validation passed'. Below it, there are three help buttons: 'Help me create a low cost VM', 'Help me create a VM optimized for high availability', and 'Help me choose the right VM size for my workload'. The main section displays the selected VM configuration: '1 X Standard D2s v3 by Microsoft'. It also shows 'Subscription credits apply' and the price '7.9867 INR/hr'. There are links for 'Terms of use' and 'Privacy policy'. Below this, the 'TERMS' section contains a detailed legal notice about agreeing to terms and conditions. At the bottom, there are input fields for 'Name' (Sasi K), 'Preferred e-mail address' (sasi93458466@gmail.com), and 'Preferred phone number'. A 'Create' button is highlighted in blue. The browser status bar at the bottom shows the URL 'https://go.microsoft.com/fwlink/?linkid=512132'.

- After Setting up management, monitoring and tags simultaneously validation is passed.
- It goes for Deployment process.

Microsoft Azure | portal.azure.com

Microsoft Azure | Microsoft Copilot | sasi9345846@gmail.com | DEFAULT DIRECTORY

Home > CreateVm-canonical.0001-com-ubuntu-server-focal-2-20250322121940 | Overview

Deployment

Search | Deployment name: CreateVm-canonical.0001-com-ubuntu-server-f... | Start time: 22/03/2025, 12:33:44 | Correlation ID: 88d1bc1c-c78f-4e44-b021-9f22422db775

Deployment succeeded. Deployment 'CreateVm-canonical.0001-com-ubuntu-server-focal-2-20250322121940' to resource group 'ubuntu\_group' was successful.

Go to resource | Pin to dashboard

Overview

Your deployment is complete

Deployment name: CreateVm-canonical.0001-com-ubuntu-server-f... Start time: 22/03/2025, 12:33:44

Subscription: Azure for Students Correlation ID: 88d1bc1c-c78f-4e44-b021-9f22422db775

Resource group: sasi-ubuntu\_group

Inputs

Outputs

Template

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.

Set up cost alerts >

Microsoft Defender for Cloud

Secure your apps and infrastructure

Go to Microsoft Defender for Cloud >

Free Microsoft tutorials

Start learning today >

Work with an expert

Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.

Find an Azure expert >

**sasi-ubuntu** Virtual machine

Help me copy this VM in any region

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Connect

Networking

Settings

Availability + scale

Security

Backup + disaster recovery

Operations

Monitoring

Automation

Help

Essentials

Resource group ([move](#)) : [sasi-ubuntu\\_group](#)

Status : Running

Location : East US 2 (Zone 3)

Subscription ([move](#)) : [Azure for Students](#)

Subscription ID : fa041214-fe78-4404-80bb-6872b91c68be

Availability zone : 3

Operating system : Linux (ubuntu 20.04)

Size : Standard D2s v3 (2 vcpus, 8 GiB memory)

Public IP address : [172.203.114.3](#)

Virtual network/subnet : [sasi-ubuntu-vnet/default](#)

DNS name : [Not configured](#)

Health state : -

Time created : 22/03/2025, 07:04 UTC

Tags ([edit](#)) : [Add tags](#)

Properties Monitoring Capabilities (7) Recommendations Tutorials

**Virtual machine**

Computer name : sasi-ubuntu

Operating system : Linux (ubuntu 20.04)

VM generation : V2

VM architecture : x64

Agent status : Ready

**Networking**

Public IP address : [172.203.114.3](#) ( Network interface [sasi-ubuntu506\\_z3](#) )

Public IP address (IPv6) : -

Private IP address : 10.0.0.4

Private IP address (IPv6) : -

Virtual network/subnet : [sasi-ubuntu-vnet/default](#)

EUR/INR -0.72%

Search

File Explorer

Calculator

WhatsApp

PowerShell

OneDrive

Teams

Edge

File Explorer

Google Chrome

Spotify

System tray icons: ENG IN, WiFi, battery, date/time

- Connecting through the PuTTY app which I have already installed and logging in with the credentials I have created.

```
sasi@sasi-ubuntu: ~  
[sasi@sasi-ubuntu ~]# login as: sasi  
[sasi@sasi-ubuntu ~]# sasi@172.203.114.3's password:  
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1082-azure x86_64)  
  
 * Documentation: https://help.ubuntu.com
```

System information as of Sat Mar 22 07:23:34 UTC 2025

```
System load: 0.0          Processes:           111
Usage of /: 5.3% of 28.89GB    Users logged in:   0
Memory usage: 3%            IPv4 address for eth0: 10.0.0.4
Swap usage: 0%
```

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.

```
sasi@sasi-ubuntu:~$ sudo apt-get update
Hit:1 http://azure.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://azure.archive.ubuntu.com/ubuntu focal-updates InRelease [128 kB]
Get:3 http://azure.archive.ubuntu.com/ubuntu focal-backports InRelease [128 kB]
Get:4 http://azure.archive.ubuntu.com/ubuntu focal-security InRelease [128 kB]
Get:5 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 Packages [8628 kB]
Get:6 http://azure.archive.ubuntu.com/ubuntu focal/universe Translation-en [5124 kB]
Get:7 http://azure.archive.ubuntu.com/ubuntu focal/universe amd64 c-n-f Metadata [265 kB]
Get:8 http://azure.archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [144 kB]
Get:9 http://azure.archive.ubuntu.com/ubuntu focal/multiverse Translation-en [104 kB]
Get:10 http://azure.archive.ubuntu.com/ubuntu focal/multiverse amd64 c-n-f Metadata [9136 B]
Get:11 http://azure.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [3844 kB]
```



- Updating and Upgrading the VM.
- Installing xfce4 and xrdp.
- Confirming the xfce4 and xrdp sessions.
- Initiating RDP connection in azure portal and in the system's RDP connection.

**sasi-ubuntu | Network settings**

Virtual machine

This is a new experience. Please provide feedback.

List all my network interfaces for sasi-ubuntu. What are the requirements for attaching or detaching a network interface? How can I make my virtual machine secure?

Attach network interface Detach network interface View topology Troubleshoot Refresh Give feedback

Network interface / IP configuration  
sasi-ubuntu506\_z3 (primary) / ipconfig1 (primary)

**Essentials**

Network interface	:	sasi-ubuntu506_z3	Load balancers	:	0 (Configure)
Virtual network / subnet	:	sasi-ubuntu-vnet / default	Application security gro...	:	0 (Configure)
Public IP address	:	172.203.114.3	Network security group	:	sasi-ubuntu-nsg
Private IP address	:	10.0.0.4	Accelerated networking	:	Disabled
Admin security rules	:	0 (Configure)	Effective security rules	:	0

**Rules** Collapse all

Network security group sasi-ubuntu-nsg (attached to networkInterface: sasi-ubuntu506\_z3)  
Impacts 0 subnets, 1 network interfaces

+ Create port rule

33°C Partly sunny

Search

Cloud, All, Destination, All, Protocol, All, Action

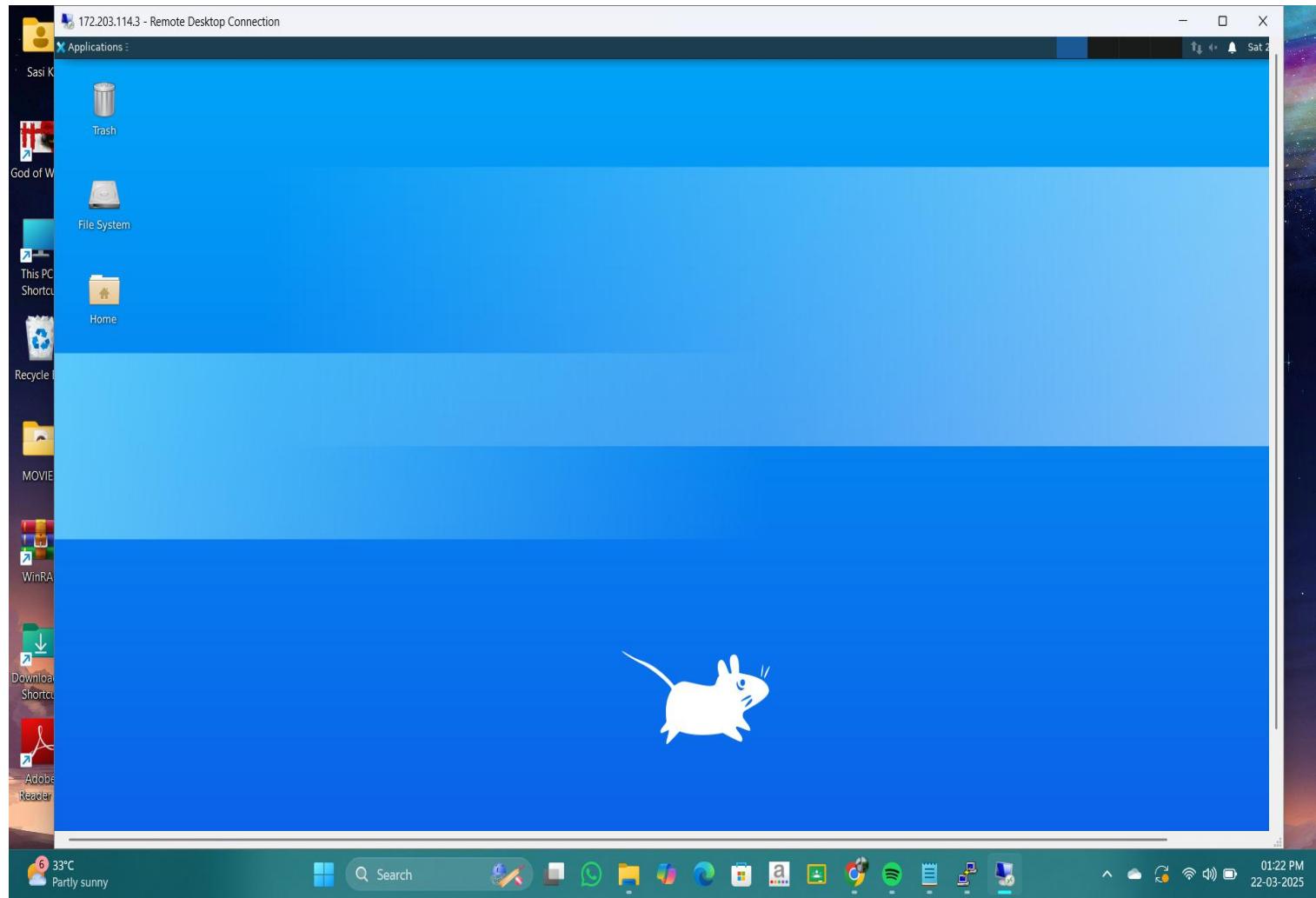
ENG IN 01:14 PM 22-03-2025

The screenshot shows the Microsoft Azure portal interface. On the left, the 'sasi-ubuntu' virtual machine details are displayed, including its status as 'Running', location as 'East US 2 (Zone 3)', and operating system as 'Linux (ubuntu 20.04)'. A 'Connect' button is present. On the right, a 'Remote Desktop Connection' window is open, showing the connection details: Computer: 172.203.114.3, User name: None specified. The 'Connect' button is highlighted. Below the main sections, there are tabs for Properties, Monitoring, Capabilities (7), Recommendations, and Tutorials. The 'Virtual machine' properties are listed under the 'Properties' tab, and the 'Networking' section shows the public IP address as 172.203.114.3.

- Connection is successfully made using the IP address and the Ubuntu VM starts.
- Logging in with our login credentials.

## OUTPUT:

Successfully created an Ubuntu VM and connected to the Ubuntu GUI (Install XFCE and XRDP) using RDP connection.



## TASK 2: AZURE STORAGE ACCOUNT

### Add any image into a blob storage and make it publicly accessible.

- Creating a storage account as instructed.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the Microsoft logo, a search bar, and various icons for Copilot, notifications, and settings. The main title is "Storage accounts". Below the title, there are filter options: "Subscription equals all", "Resource group equals all", and "Location equals all". A message at the top states "Showing 0 to 0 of 0 records." In the center, there is a large placeholder icon for a storage account. Below the icon, the text "No storage accounts to display" is centered. To the right of this text is a link "Create storage account". At the bottom of the page, there is a "Learn more" link and a "Give feedback" button. The bottom of the screen shows the Windows taskbar with various pinned apps like File Explorer, Edge, and Mail, along with system status icons for battery, signal, and volume.

Create Your Azure Free Account X | +

portal.azure.com/#create/Microsoft.StorageAccount

Microsoft Azure Search resources, services, and docs (G+) Copilot Home Storage accounts Create a storage account ...

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 \* Azure for Students

Resource group \* sasi-ubuntu\_group Create new

Instance details

Storage account name \* sasiithubstorage

Region \* (US) East US 2 Deploy to an Azure Extended Zone

Primary service Select a primary service

Performance \* Standard: Recommended for most scenarios (general-purpose v2 account)  
Premium: Recommended for scenarios that require low latency.

Redundancy \* Geo-redundant storage (GRS)  
 Make read access to data available in the event of regional unavailability.

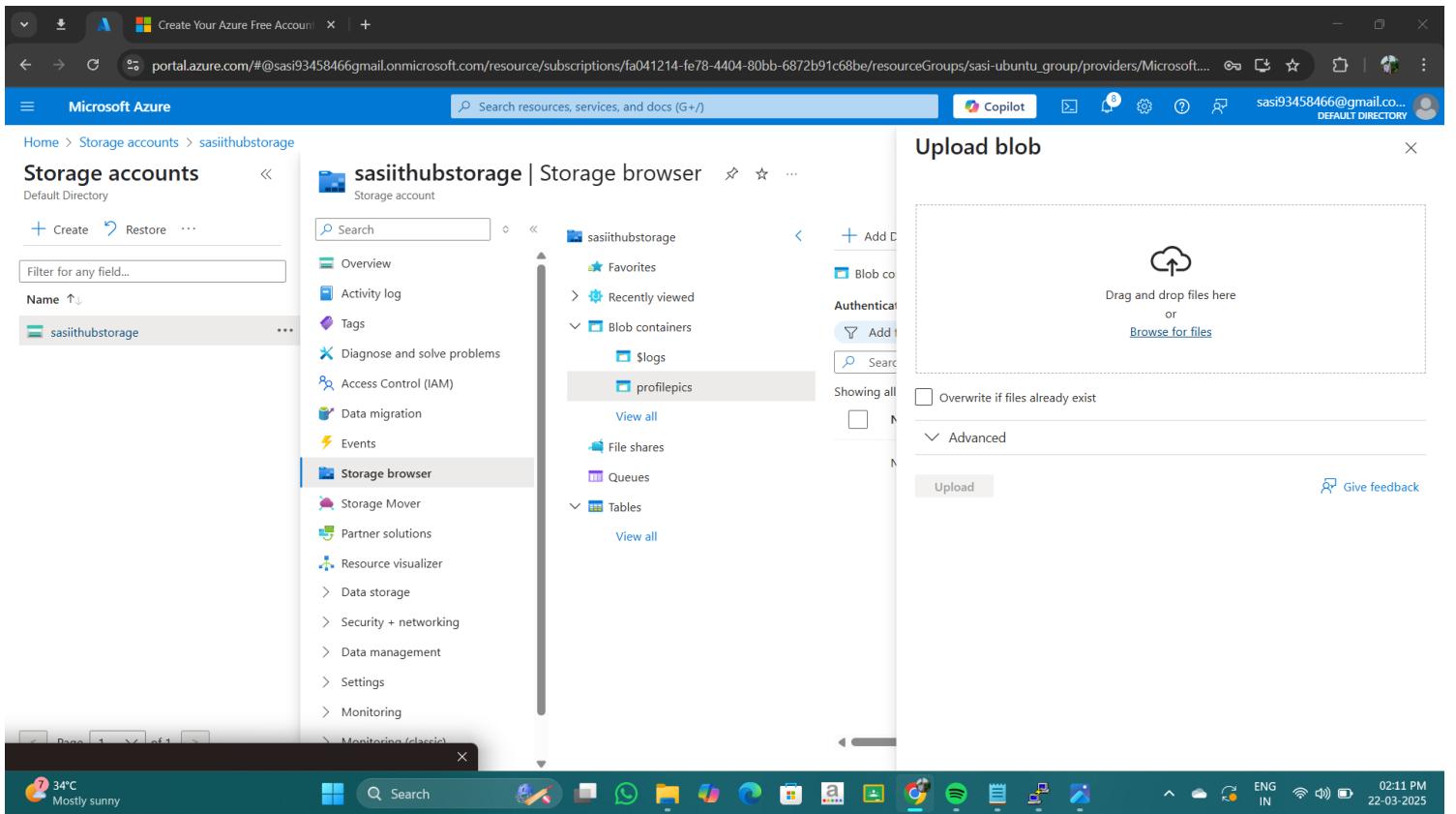
Previous Next Review + create Give feedback

33°C Mostly sunny Search

ENG IN 01:39 PM 22-03-2025

The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with links like 'Create Your Azure Free Account' and 'Copilot'. Below it is the main header 'Microsoft Azure' and a search bar. The main content area displays a deployment summary for a storage account named 'sasiithubstorage\_1742631422771'. The status is 'Deployment succeeded'. Deployment details include the name, subscription ('Azure for Students'), and resource group ('sasi-ubuntu\_group'). A message says 'Your deployment is complete'. Below this, there are sections for 'Deployment details' (with a dropdown arrow) and 'Next steps' (with a dropdown arrow). A blue button labeled 'Go to resource' is visible. On the left, a sidebar shows navigation options: 'Overview' (selected), 'Inputs', 'Outputs', and 'Template'. On the right, there are several promotional cards: 'Cost Management' (with a green dollar sign icon), 'Microsoft Defender for Cloud' (with a shield icon), 'Free Microsoft tutorials' (with a book icon), and 'Work with an expert' (with a person icon). The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators.

- Successful deployment of the storage account is ensured.
- Configuring for the public access of the image.



- Creating a blob container called “profilepics” for the images to be added.
- Adding the 2 images that I have downloaded from the web browser.

The screenshot shows the Microsoft Azure Storage account overview for 'sasiithubstorage'. The URL is <https://sasiithubstorage.blob.core.windows.net/>. Key properties include:

Property	Value
URL	<a href="https://sasiithubstorage.blob.core.windows.net/">https://sasiithubstorage.blob.core.windows.net/</a>
LAST MODIFIED	22/03/2025, 2:13:19 pm
CREATION TIME	22/03/2025, 2:13:19 pm
VERSION ID	-
TYPE	Block blob
SIZE	3.84 MiB
ACCESS TIER	Hot (Inferred)
ACCESS TIER LAST MODIFIED	N/A
ARCHIVE STATUS	-
REHYDRATE PRIORITY	-
SERVER ENCRYPTED	true
ETAG	0x8DD691D98E1CA61
VERSION-LEVEL IMMUTABILITY POLICY	Disabled
CACHE-CONTROL	(empty)
CONTENT-TYPE	image/jpeg
CONTENT-MD5	kwiCit48mPmcODz/KO3esg...
CONTENT-ENCODING	(empty)
CONTENT-LANGUAGE	(empty)
CONTENT-DISPOSITION	(empty)
LEASE STATUS	Unlocked

- Uploading and reviewing the images in the storage browser.

- Fetching the link for the images and searching them in the web browser.

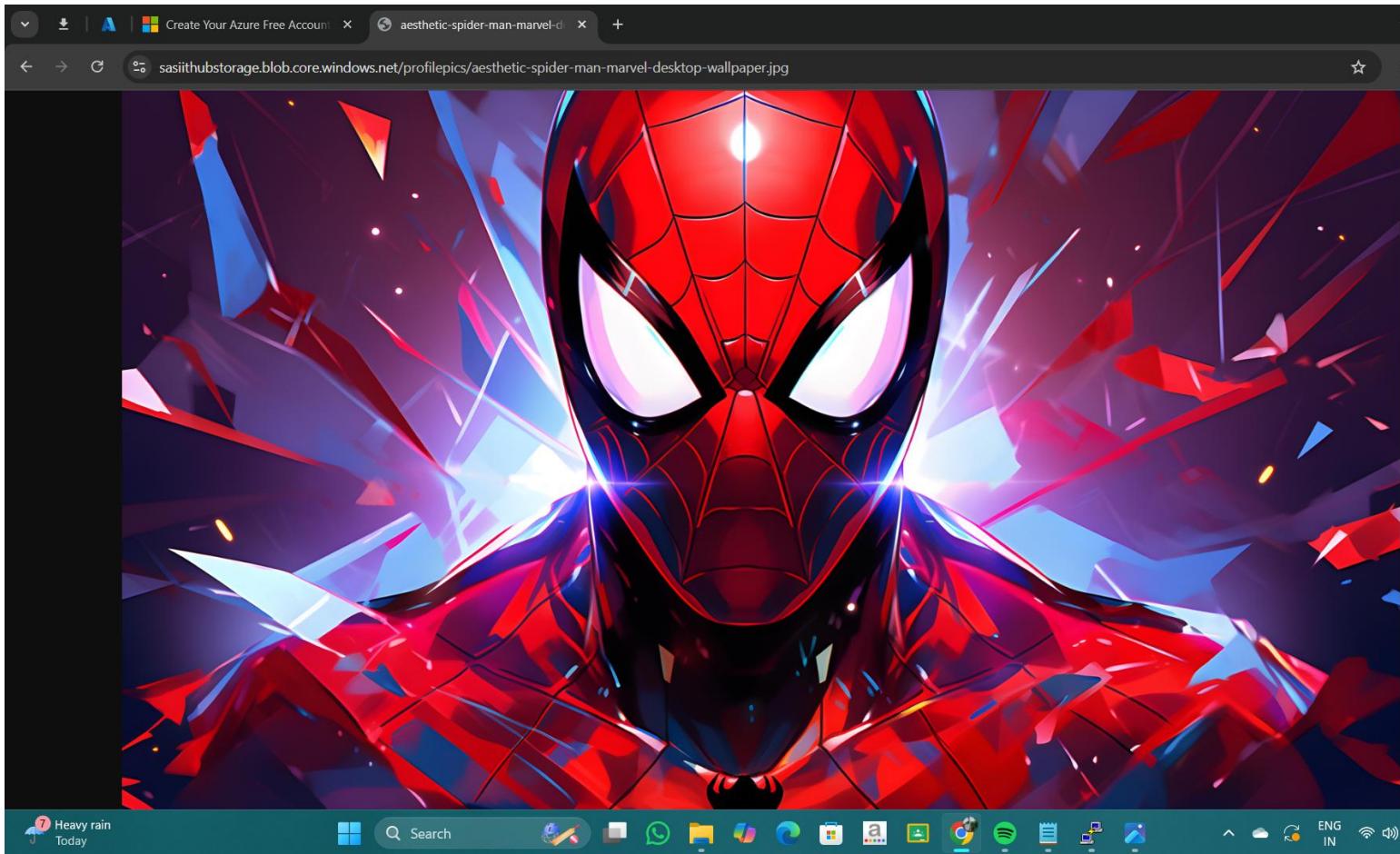
The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes tabs for 'Create Your Azure Free Account', 'New Tab', and 'Microsoft Azure'. The main search bar says 'Search resources, services, and docs (G+/)'. On the right, there's a Copilot button, a gear icon, and a user profile for 'sasi93458466@gmail.co... DEFAULT DIRECTORY'.

The left sidebar shows 'Storage accounts' under 'Default Directory'. A search bar at the top of the sidebar has 'st' typed into it. Below the search bar, a list of storage accounts is shown, with 'sasiithubstorage' selected. Other accounts listed include 'Default Directory' and 'sasiithubstorage'.

The main content area is titled 'sasiithubstorage | Static website'. It displays the configuration for enabling a static website. The 'Static website' section is highlighted in the sidebar. Key settings shown include:

- Static website status:** Enabled (button)
- Primary endpoint:** https://sasiithubstorage.z20.web.core.windows.net/
- Secondary endpoint:** https://sasiithubstorage-secondary.z20.web.core.windows.net/
- Index document name:** index.html
- Error document path:** 404.html

A note at the bottom suggests improving page load times using Azure Front Door. The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators like battery level, signal strength, and date/time (22-03-2025).



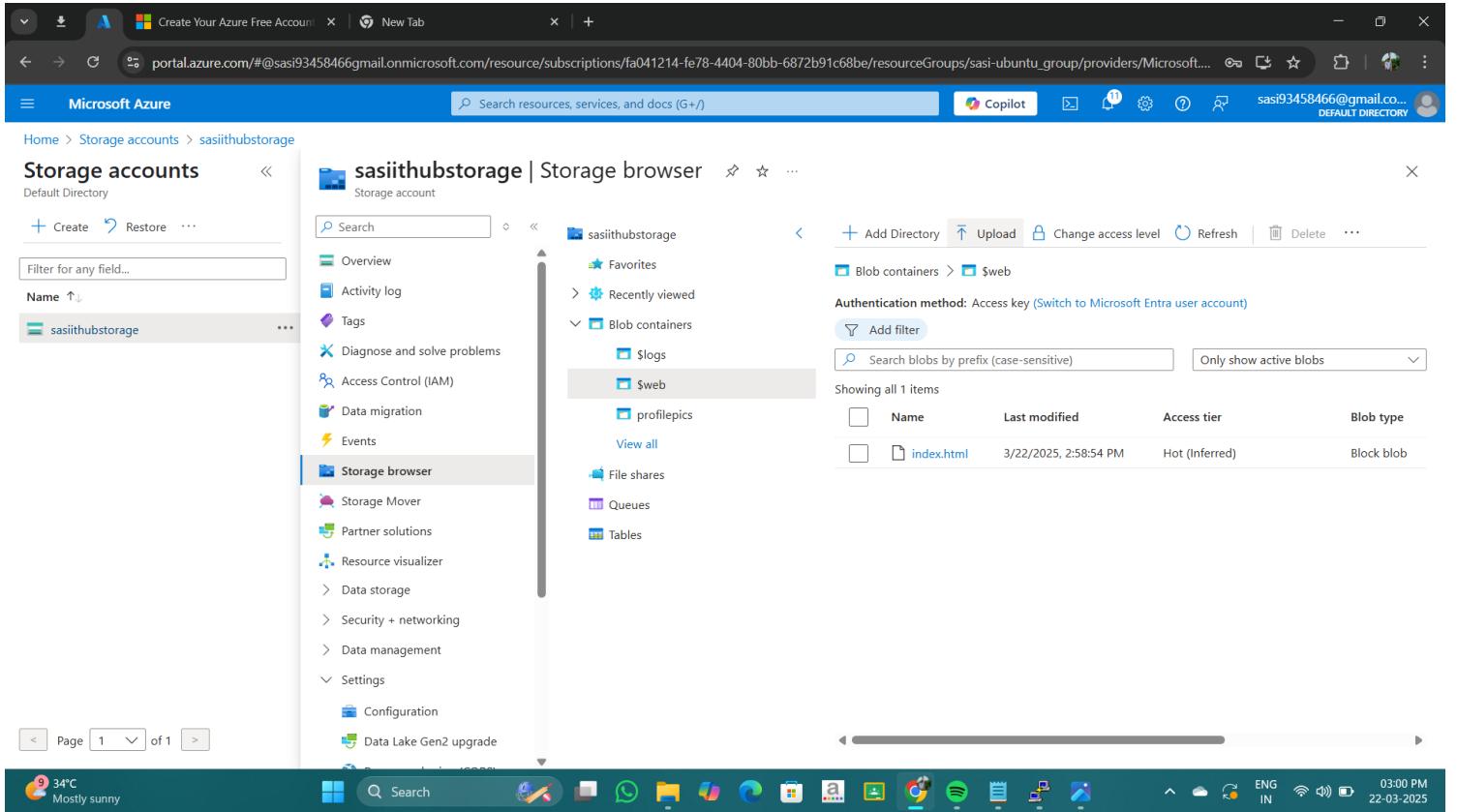
## OUTPUT:

**Successfully created a storage account, container and uploaded two images with public accessibility.**

# Host a simple Hello world webpage using static website hosting.

- I have created another storage account for hosting this static website and successfully deployed it.
- Setting up the static website configurations to host a “hello world webpage”.
- Created a simple html program for it and saved it as “index.html”
- **Program:**
  - <!DOCTYPE html>
  - <html lang="en">
  - <head>
  - <meta charset="UTF-8">
  - <meta name="viewport" content="width=device-width, initial-scale=1.0">
  - <title>Hello World</title>
  - </head>
  - <body>
  - <h1>Hello, World!</h1>
  - </body>
  - </html>
- Create a storage account as per the procedure .

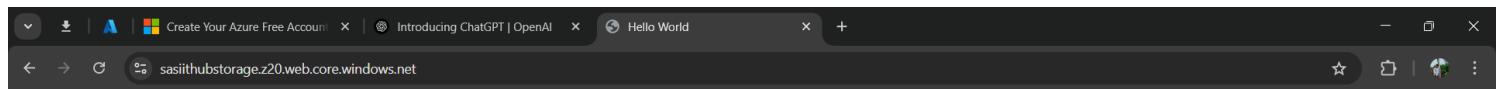
The screenshot shows the Azure Storage Accounts blade. On the left, there's a navigation pane with 'Storage accounts' and a search bar. A list of storage accounts is shown, with 'sasiithubstorage' selected. The main area displays the 'sasiithubstorage | Static website' configuration. It includes sections for 'Overview', 'Data management', 'Static website' (which is currently enabled), 'Settings', and 'Endpoints'. Under 'Static website', the 'Index document name' is set to 'index.html' and the 'Error document path' is set to '404.html'. At the bottom, there are pagination controls ('Page 1 of 1') and a taskbar with various icons.



- Uploading the saved html program for hosting the webpage successfully.
- Fetch the link of the webpage from the static website tool (check it in the above picture) and check it in a web browser.

## OUTPUT:

Successfully created a storage account and hosted a simple “hello world” program using the static website tool.



Hello World



# Configure a lifecycle management policy to change the blob tier from hot to cool if the blob is not accessed for more than 100 days

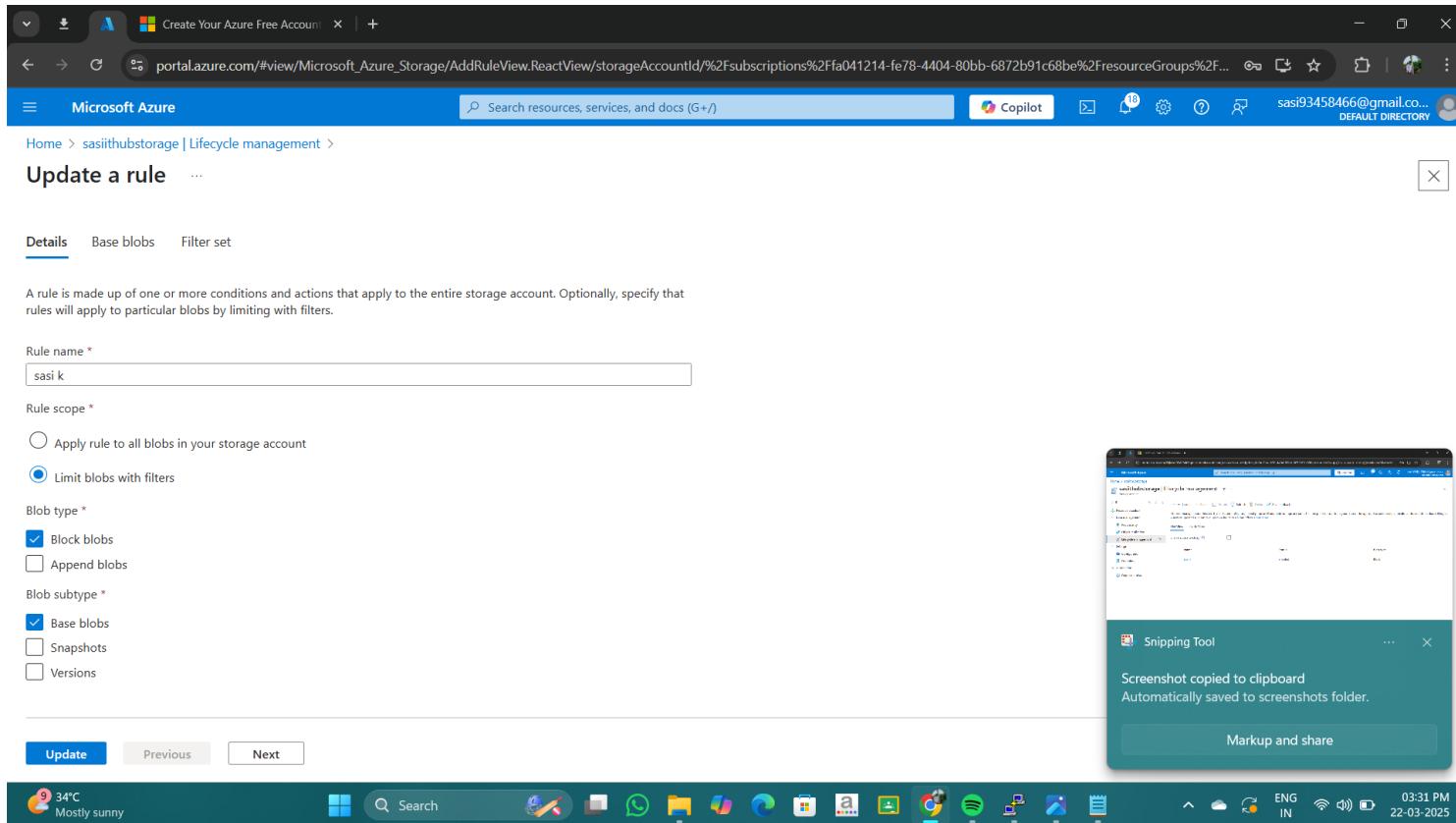
- I have taken the same storage account and searched for the lifecycle management tool to create the rule.

The screenshot shows the Microsoft Azure portal interface. The URL in the address bar is [https://portal.azure.com/#@sasi93458466@gmail.onmicrosoft.com/resource/subscriptions/fa041214-fe78-4404-80bb-6872b91c68be/resourceGroups/sasi-ubuntu\\_group/providers/Microsoft.Storage/storageAccounts/sasiithubstorage/managementPolicies](https://portal.azure.com/#@sasi93458466@gmail.onmicrosoft.com/resource/subscriptions/fa041214-fe78-4404-80bb-6872b91c68be/resourceGroups/sasi-ubuntu_group/providers/Microsoft.Storage/storageAccounts/sasiithubstorage/managementPolicies). The page title is "sasiithubstorage | Lifecycle management". The left sidebar shows navigation options like Resource visualizer, Data management, Redundancy, Object replication, and Lifecycle management (which is selected). The main content area displays a table of lifecycle policies:

Name	Status	Blob type
sasi k	Enabled	Block

At the bottom of the browser window, the taskbar shows various pinned icons and the system tray indicates it's 34°C, mostly sunny, with the date and time as 22-03-2025 at 03:31 PM.

- Creating a rule to all blob accounts that if a blob storage is not changed or modified or used for more than 100 days, its storage type moves from hot to cool.
- Setting up all the configurations according to the above step.

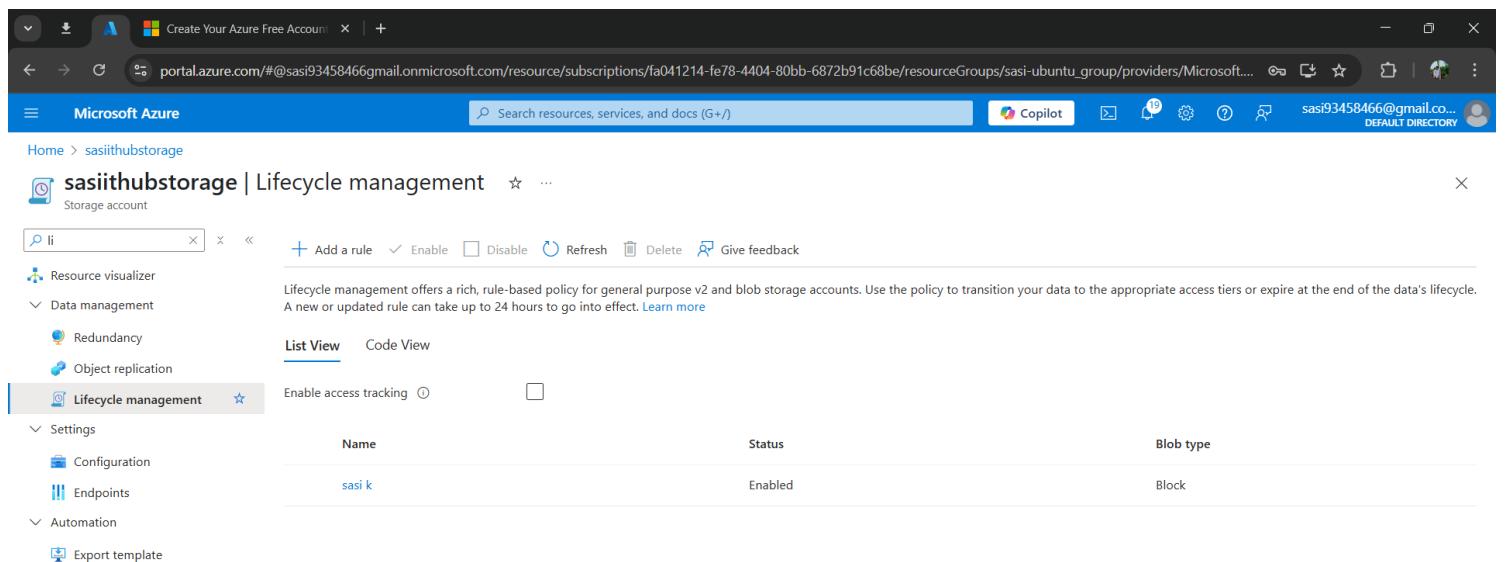


The screenshot shows the Azure Storage Lifecycle Management interface. A modal window titled "Update a rule" is open, showing the configuration for a new rule named "sasi k". The rule is set to apply to all blobs in the storage account. It is configured to change blob storage type to "cool" if a blob has not been modified for 100 days. The "Limit blobs with filters" option is selected. The "Base blobs" checkbox is checked under "Blob type", while "Append blobs" is unchecked. Under "Blob subtype", "Base blobs" is checked, while "Snapshots" and "Versions" are unchecked. At the bottom of the modal, there are "Update", "Previous", and "Next" buttons. The background shows the Azure portal with the "Lifecycle management" section for the storage account "sasiithubstorage". A Snipping Tool notification is visible at the bottom right, stating "Screenshot copied to clipboard" and "Automatically saved to screenshots folder". The taskbar at the bottom includes icons for weather, search, and various applications like Microsoft Word, Excel, and Edge.

- Naming the rule as - “sasik” and reviewing it.

## OUTPUT:

And the rule has been created with the help of lifecycle management tool.



The screenshot shows the Microsoft Azure portal interface for managing lifecycle rules in a storage account. The URL in the address bar is [https://portal.azure.com/#/resource/subscriptions/fa041214-fe78-4404-80bb-6872b91c68be/resourceGroups/sasi-ubuntu\\_group/providers/Microsoft.Storage/storageAccounts/sasiithubstorage/lifecyclePolicies](https://portal.azure.com/#/resource/subscriptions/fa041214-fe78-4404-80bb-6872b91c68be/resourceGroups/sasi-ubuntu_group/providers/Microsoft.Storage/storageAccounts/sasiithubstorage/lifecyclePolicies). The page title is "sasiithubstorage | Lifecycle management". The left sidebar shows navigation options like Resource visualizer, Data management, Redundancy, Object replication, and Lifecycle management (which is currently selected). The main content area displays a table with one row of data:

Name	Status	Blob type
sasi k	Enabled	Block

Below the table, there's a note: "Lifecycle management offers a rich, rule-based policy for general purpose v2 and blob storage accounts. Use the policy to transition your data to the appropriate access tiers or expire at the end of the data's lifecycle. A new or updated rule can take up to 24 hours to go into effect." There are also buttons for "Add a rule", "Enable", "Disable", "Refresh", "Delete", and "Give feedback".


The taskbar at the bottom of the screen shows the Windows Start button, a search bar, and several pinned icons for applications like File Explorer, WhatsApp, Microsoft Edge, and Spotify. On the right side, it displays the date and time (22-03-2025, 03:32 PM), battery level, signal strength, and network status.

**TASK 3: AZURE KEY VAULT**

**Configure, create and store cryptographic keys in azure key vault**

**Save a password ABCD@1234567 as a secret in the azure key vault**

- Creating a key vault called- “sasi-secret-vault”
- With enabling all vault access policy
- Successfully deploying it
- Creating a secret named – “SecretPassword”
- Hiding the secret i.e., **password sasi9790252445**
- Reviewing the secret created.
- Configuring steps to attain the secret value.

Microsoft Azure | portal.azure.com/#create/Microsoft.KeyVault

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

Copilot

sasi93458466@gmail.co... DEFAULT DIRECTORY

Home > Create a resource > Create a key vault ...

Basics Access configuration Networking Tags Review + create

Review + create

**Basics**

Subscription	Azure for Students
Resource group	sasi-ubuntu_group
Key vault name	sasik
Region	East US
Pricing tier	Standard
Soft-delete	Enabled
Purge protection during retention period	Disabled
Days to retain deleted vaults	90 days

**Access configuration**

Azure Virtual Machines for deployment	Disabled
Azure Resource Manager for template deployment	Disabled
Azure Disk Encryption for volume encryption	Disabled

Previous Next Create Give feedback

34°C Mostly sunny Search

ENG IN 03:40 PM 22-03-2025

The screenshot shows the Microsoft Azure portal's Deployment Details blade for a deployment named "sasik". The main message is "Your deployment is complete". Deployment details include: Deployment name: sasik, Subscription: Azure for Students, Resource group: sasi-ubuntu\_group. The deployment started at [redacted] with Correlation ID: ea08a6e4-525f-4971-b074-332d3c9aac8c. Below the main message, there are sections for "Deployment details" (with a link to "Go to resource") and "Next steps". At the bottom, there are links for "Give feedback" and "Tell us about your experience with deployment". To the right, there are cards for "Cost management", "Microsoft Defender for Cloud", and "Free Microsoft tutorials". A sidebar on the left lists "Overview", "Inputs", "Outputs", and "Template". The top navigation bar includes a search bar, Copilot, and user information.

The screenshot shows the Microsoft Azure Key Vault interface for the 'sasi1k' vault. On the left, a sidebar lists various management options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Access policies, Resource visualizer, Events, and Objects. Under Objects, the 'Keys' section is selected. The main content area displays a table of secrets. A message at the top states, 'The secret 'sasi' has been successfully created.' The table shows one entry:

Name	Type	Status	Expiration date
sasi	Text	✓ Enabled	

At the bottom of the browser window, a status bar indicates 'meet.google.com is sharing your screen.' and shows the date and time as 22-03-2025 04:13 PM.

The screenshot shows the Microsoft Azure Key Vault interface for the secret '428d8db1ca944a668d9b486bbc2cf2bb'. The 'Properties' section includes details like creation and update times, a secret identifier (a long URL), and settings for activation and expiration dates. The 'Enabled' status is set to 'Yes'. The 'Secret' section allows for optional content type specification and shows a 'Show Secret Value' button. The 'Secret value' field is present but contains redacted content. The status bar at the bottom shows the date and time as 22-03-2025 04:14 PM.

## OUTPUT:

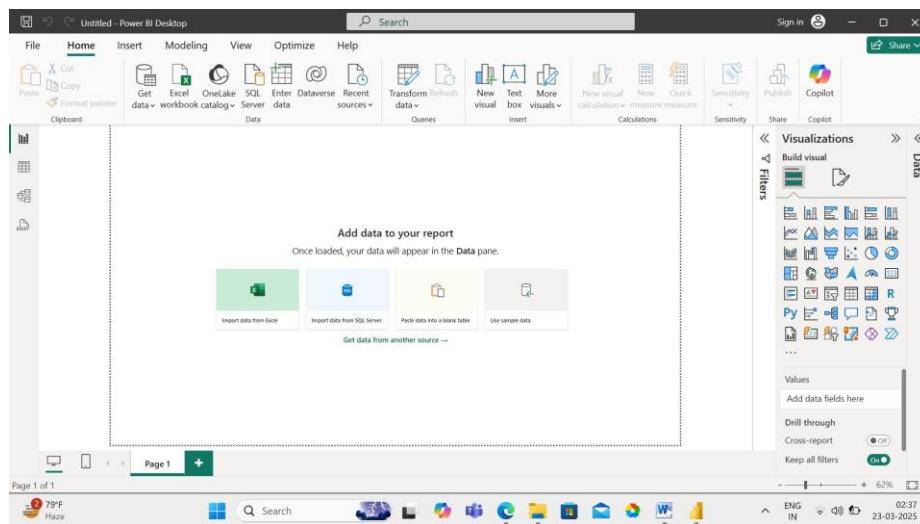
**Successfully created a key vault, a secret in that key vault to hide the given password and ways to attain the secret value.**

The screenshot shows the Microsoft Azure portal interface. The URL in the address bar is [https://portal.azure.com/#@sasi93458466@gmail.onmicrosoft.com/asset/Microsoft\\_Azure\\_KeyVault/Secret/https://sasi1k.vault.azure.net/secrets/sasi/428d8db1ca944a668d9b486bbc2cf2bb](https://portal.azure.com/#@sasi93458466@gmail.onmicrosoft.com/asset/Microsoft_Azure_KeyVault/Secret/https://sasi1k.vault.azure.net/secrets/sasi/428d8db1ca944a668d9b486bbc2cf2bb). The page displays a secret named "428d8db1ca944a668d9b486bbc2cf2bb". The "Properties" section shows the secret was created on 22/03/2025, 16:14:21 and updated on the same date. The "Secret Identifier" is a URL: <https://sasi1k.vault.azure.net/secrets/sasi/428d8db1ca944a668d9b486...>. Under "Settings", there are checkboxes for "Set activation date" and "Set expiration date", both of which are unchecked. The "Enabled" setting is set to "Yes". The "Tags" section shows "0 tags". In the "Secret" section, the "Content type (optional)" field contains "Text" and the "Secret value" field contains "Sasi9790252445". A "Hide Secret Value" button is visible above the secret value field. The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators.

## TASK 4: AZURE SQL DATABASE

# Create an Azure SQL Database and create a Power BI report with multiple graphs using the tables obtained from the azure SQL sample database AdventureWorksLT.

- Installed a Power BI desktop primarily to connect with the database.



- Initiating with the creation of a SQL Database in the azure portal.

A screenshot of the Microsoft Azure portal's 'SQL databases' blade. The URL is 'portal.azure.com/#view/HubsExtension/BrowseResource/resourceType/Microsoft.Sql%2Fservers%2Fdatabases'. The page shows a table with columns: Name, Server, Replica type, Pricing tier, Location, and Subscription. A large 'Create' button is at the top left. A search bar and filter options are also present. Below the table, it says 'No SQL databases to display' and provides a link to 'Create SQL database'. The bottom of the screen shows the Windows taskbar with various pinned icons.

- Creating a new database server for connection with its own login credentials.

**Create SQL Database Server**

Server name \*  .database.windows.net

Location \*

Authentication

Azure Active Directory (Azure AD) is now Microsoft Entra ID. [Learn more](#)

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Microsoft Entra authentication [Learn more](#) using an existing Microsoft Entra user, group, or application as Microsoft Entra admin [Learn more](#), or select both SQL and Microsoft Entra authentication.

Authentication method  Use Microsoft Entra-only authentication  Use both SQL and Microsoft Entra authentication  Use SQL authentication

Set Microsoft Entra admin   
Admin Object/App ID: 48ac1a2a-0356-4f43-b8d2-323db0b3121d  
[Set admin](#)

**OK**



Microsoft Azure | portal.azure.com/#create/Microsoft.SQLDatabase

Home > SQL databases >

## Configure

Feedback

**Service and compute tier**

Select from the available tiers based on the needs of your workload. The vCore model provides a wide range of configuration controls and offers Hyperscale and Serverless to automatically scale your database based on your workload needs. Alternately, the DTU model provides set price/performance packages to choose from for easy configuration. [Learn more](#)

**SQL Database Hyperscale**: Low price, high scalability, and best feature set. [Learn more](#)

Service tier: General Purpose (Most budget friendly) [Compare service tiers](#)

Compute tier:  **Provisioned** - Compute resources are pre-allocated. Billed per hour based on vCores configured.

**Serverless** - Compute resources are auto-scaled. Billed per second based on vCores used.

Compute Hardware

Select the hardware configuration based on your workload requirements. Availability of compute optimized, memory optimized, and confidential computing hardware depends on the region, service tier, and compute tier.

Hardware Configuration: Standard-series (Gen5) up to 128 vCores, up to 625 GB memory [Change configuration](#)

Cost summary:

General Purpose (GP_Gen5_2)	15315.61
vCores selected	x 2
Cost per GB (in INR)	9.57
Max storage selected (in GB)	x 1086.8
ESTIMATED COST / MONTH	41029.05 INR

Apply

33°C Mostly sunny ENG IN 02:43 PM 23-03-2025

Microsoft Azure | portal.azure.com/#create/Microsoft.SQLDatabase

Home > SQL databases >

## Configure

Feedback

Select the hardware configuration based on your workload requirements. Availability of compute optimized, memory optimized, and confidential computing hardware depends on the region, service tier, and compute tier.

Hardware Configuration: Standard-series (Gen5) up to 128 vCores, up to 625 GB memory [Change configuration](#)

Save money

Already have a SQL Server License? Save with a license you already own with Azure Hybrid Benefit. Actual savings may vary based on region and performance tier. [Learn more](#)

Yes  No

vCores [Compare vCore options](#)

Data max size (GB)

250.8 GB LOG SPACE ALLOCATED

Apply

33°C Mostly sunny ENG IN 02:44 PM 23-03-2025

Microsoft Azure

portal.azure.com/#create/Microsoft.SQLDatabase

Home > SQL databases >

## Create SQL Database

Microsoft

Connection Policy: Default

**Security**

Identity	Not enabled
Transparent data encryption (Server level)	Service-managed key selected
Database level customer-managed key	Not configured
Database level user assigned managed identity	Not configured
Advanced data security	Start free trial
Always Encrypted with secure enclaves	Not configured
Sql Ledger(Database)	Disabled
Digest Storage	Disabled

**Additional settings**

Use existing data	Sample
Collation	SQL_Latin1_General_CI_AS

**Tags**

**Create** < Previous Download a template for automation

4 33°C Mostly sunny

Search

Cloud, File Explorer, WhatsApp, Microsoft Edge, Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft Teams, Spotify

ENG IN 02:46 PM 23-03-2025

The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with tabs for 'New Tab', 'portal.azure.com', and 'Home'. Below the navigation bar is a search bar and a Copilot button. The main content area has a blue header bar with the text 'Microsoft.SQLEDatabase.newDatabaseNewServer\_c69396568bd1413789ef6 | Overview'. On the left, there's a sidebar with a 'Deployment' icon, a search bar, and buttons for 'Delete', 'Cancel', 'Redeploy', 'Download', and 'Refresh'. The main content area displays a message 'Your deployment is complete' with a green checkmark icon. It lists deployment details: 'Deployment name : Microsoft.SQLEDatabase.newDatabaseNewServer\_c693...', 'Subscription : Azure for Students', 'Correlation ID : 61e52c77-a1b-4b90-91e7-47d0ff685f5e', and 'Resource group : sasi-ubuntu\_group'. Below this, there are sections for 'Deployment details' (with a 'View' link) and 'Next steps' (with a 'Go to resource' button). At the bottom of the main content area, there are links for 'Give feedback' and 'Tell us about your experience with deployment'. To the right of the main content area, there are several promotional cards: 'Cost management' (with a green dollar sign icon), 'Microsoft Defender for Cloud' (with a shield icon), 'Free Microsoft tutorials' (with a book icon), and 'Work with an expert' (with a person icon). The bottom of the screen shows the Windows taskbar with various pinned icons like File Explorer, Edge, and Mail, along with system status icons for battery, signal, and volume.

- SQL database is successfully deployed.
- Logging into Query Editor (preview) for data connectivity.

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

Home > SQL databases >

## SQL databases

Default Directory (sasi93458466@gmail.onmicrosoft....)

+ Create    Reservations    ...

Filter for any field...

Name ↑↓

processingdev (sasik/processingdev) ...

processingdev (sasik/processingdev)

Overview

Activity log

Tags

Diagnose and solve problems

Query editor (preview)

Mirror database in Fabric (preview)

Resource visualizer

Settings

Data management

Integrations

Power Platform

Security

Intelligent performance

Monitoring

Automation

Help

Copy    Restore    Export    Set server firewall    Delete    Connect with...    Feedback

Resource group ([move](#))  
[sasi-ubuntu\\_group](#)

Status  
Online

Location  
East US 2

Subscription ([move](#))  
[Azure for Students](#)

Subscription ID  
fa041214-fe78-4404-80bb-6872b91c68be

Tags ([edit](#))  
[Add tags](#)

Getting started    Monitoring    Properties    Features    Notifications (1)    Integrations    Tutorial

Start working with your database

Connect to your database and start working with data with a few simple steps. [Learn more](#)

< Page 1 of 1 >

Very high UV Now

Search

uv 4 Now

Cloud icon

File icon

Chat icon

Folder icon

Power BI icon

Excel icon

Word icon

Google Sheets icon

Google Slides icon

Google Forms icon

Google Sheets icon

Spotify icon

Cloud icon

The screenshot shows the Microsoft Azure portal interface. The top navigation bar has tabs for 'Connectivity settings - Azure SQL', 'Meet - dko-zqgu-us', and 'Azure Private Link - Azure SQL'. Below the navigation bar, the URL is 'portal.azure.com/#@sasi93458466@gmail.onmicrosoft.com/resource/subscriptions/fa041214-fe78-4404-80bb-6872b91c68be/resourceGroups/sasi-ubuntu\_group/providers/Microsoft...'. The main title is 'Microsoft Azure' and the sub-page title is 'Home > SQL databases > processingdev (sasik/processingdev)'. On the left sidebar, under 'SQL databases', there are options like '+ Create', 'Reservations', and a search bar. A dropdown menu for 'processingdev (sasik/processingdev)' is open, showing 'Query editor (preview)' as the selected item. The main content area is titled 'processingdev (sasik/processingdev) | Query editor (preview)'. It includes a search bar, login information, and a 'New Query' button. The 'Query 1' pane contains the query '1 select \* from [SalesLT].[product description]'. The results pane shows a table with several rows of data, and a message at the bottom says 'Query succeeded | 4s'. The status bar at the bottom shows weather (33°C, mostly sunny), system icons, and the date/time (23-03-2025, 03:12 PM).

- Running queries and checking data availability (select \* from [SalesLT].[product description]), I have used the salesLT Product description data for this task.
- Now selected the Power Platform-Power BI tool to connect with the Power BI Desktop.
- Logging into the Power BI Desktop with our database login credentials.

This screenshot is identical to the one above, showing the Microsoft Azure portal and the 'Query editor (preview)' for the 'processingdev' database. The main difference is the content of the 'Results' pane, which now displays a table with the following data:

ID	Product Name	Color	Unit Price	Quantity
1	Cherry Wood	Dark Brown	1400.00	100
2	Aluminum alloy cups	Blue	20.00	1000
3	Aluminum alloy cups	Blue	20.00	1000
4	Aluminum alloy cups	Blue	20.00	1000
5	Aluminum alloy cups	Blue	20.00	1000
6	Suitable for any type	Black	100.00	1000
7	This bike delivers a hi...	Black	100.00	1000
8	For true trail addicts ...	Black	100.00	1000
9	Various book counter	Black	100.00	1000

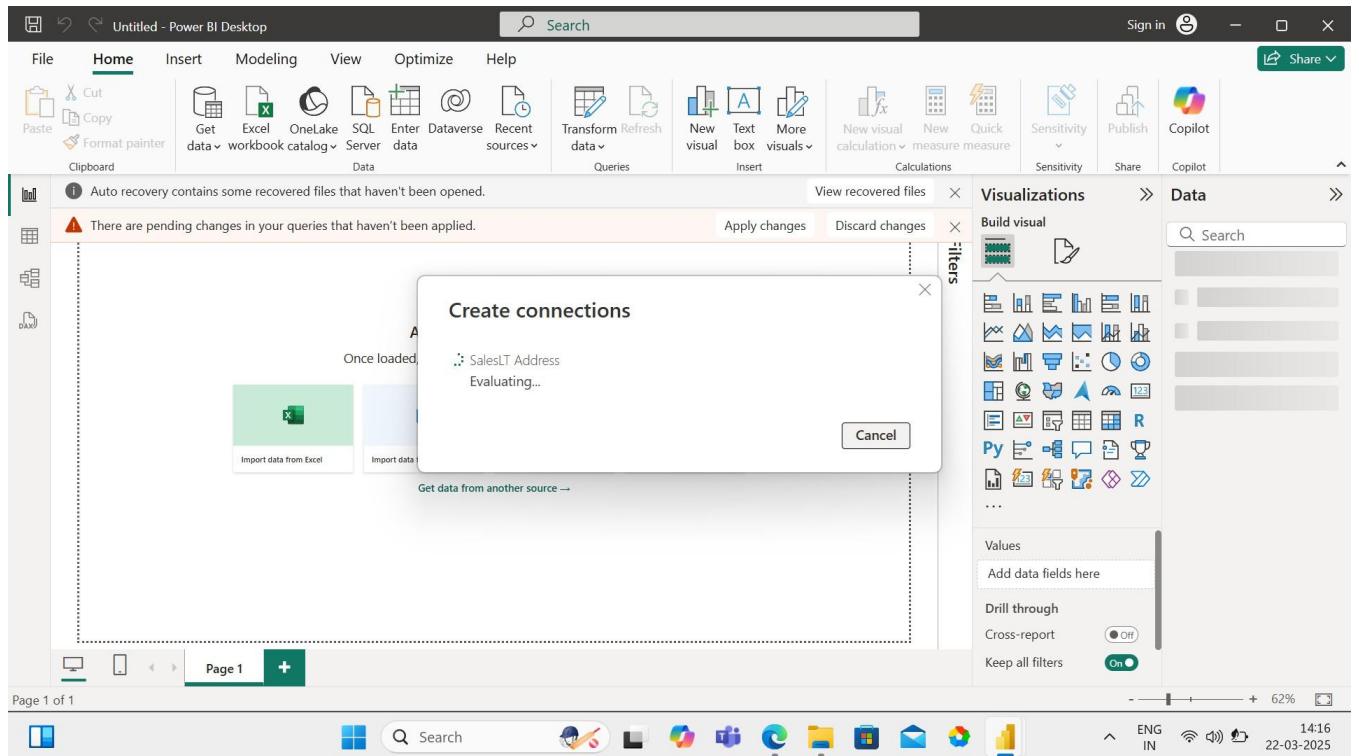
- After a successful connection, data items are selected to make a report of multiple graphs.

The screenshot shows the Microsoft Azure Power BI Desktop interface. The left side features the 'Navigator' pane, which lists various data items from the 'processingdev' database, including tables like SalesLT.vGetAllCategories, SalesLT.vProductAndDescription, and SalesLT.Product. The right side features the 'Visualizations' pane, which displays a grid of visualization icons such as charts, maps, and tables. A message at the top of the visualizations pane says 'No items selected for preview'.

This screenshot shows the same Microsoft Azure Power BI Desktop interface. In the Navigator pane, the 'SalesLT.Product' table is selected. To the right, a detailed view of the 'SalesLT.Product' table is displayed in a grid format. The columns are ProductID, Name, ProductNumber, Color, and StandardCost. The data includes various products like 'HL Road Frame - Black, 58', 'Sport-100 Helmet, Red', and 'Mountain Bike Socks, M'. The bottom right corner of the table view shows a 'Values' section with the placeholder 'Add data fields here'.

ProductID	Name	ProductNumber	Color	StandardCost
680	HL Road Frame - Black, 58	FR-R92B-58	Black	
706	HL Road Frame - Red, 58	FR-R92R-58	Red	
707	Sport-100 Helmet, Red	HL-U509-R	Red	
708	Sport-100 Helmet, Black	HL-U509	Black	
709	Mountain Bike Socks, M	SO-B909-M	White	
710	Mountain Bike Socks, L	SO-B909-L	White	
711	Sport-100 Helmet, Blue	HL-U509-B	Blue	
712	AWC Logo Cap	CA-1098	Multi	
713	Long-Sleeve Logo Jersey, S	UJ-O192-S	Multi	
714	Long-Sleeve Logo Jersey, M	UJ-O192-M	Multi	
715	Long-Sleeve Logo Jersey, L	UJ-O192-L	Multi	
716	Long-Sleeve Logo Jersey, XL	UJ-O192-X	Multi	
717	HL Road Frame - Red, 62	FR-R92R-62	Red	
718	HL Road Frame - Red, 44	FR-R92R-44	Red	
719	HL Road Frame - Red, 48	FR-R92R-48	Red	
720	HL Road Frame - Red, 52	FR-R92R-52	Red	
721	HL Road Frame - Red, 56	FR-R92R-56	Red	
722	LL Road Frame - Black, 58	FR-R38B-58	Black	
723	LL Road Frame - Black, 60	FR-R38B-60	Black	
724	LL Road Frame - Black, 62	FR-R38B-62	Black	
725	LL Road Frame - Red, 44	FR-R38R-44	Red	
726	LL Road Frame - Red, 48	FR-R38R-48	Red	
727	LL Road Frame - Red, 52	FR-R38R-52	Red	

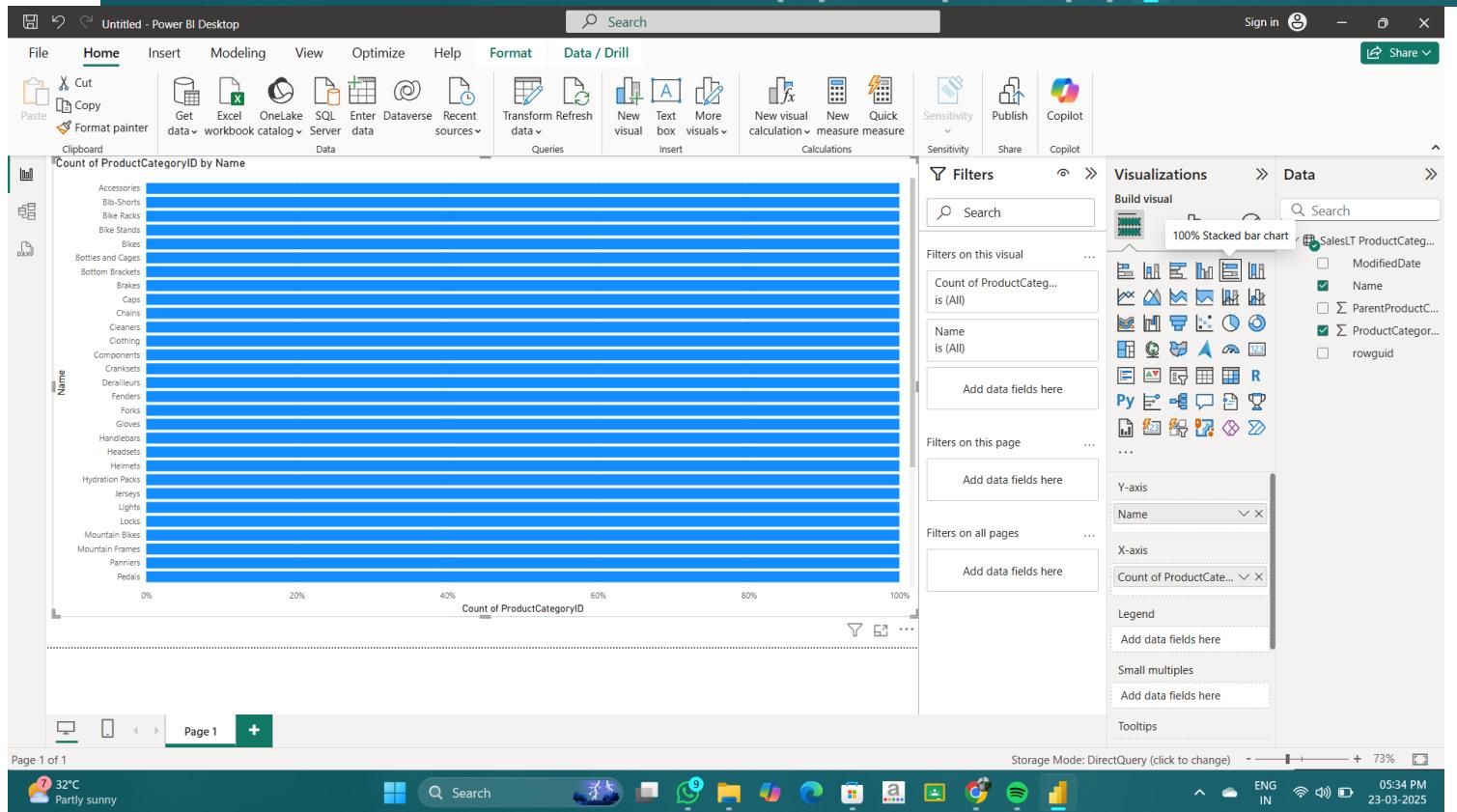
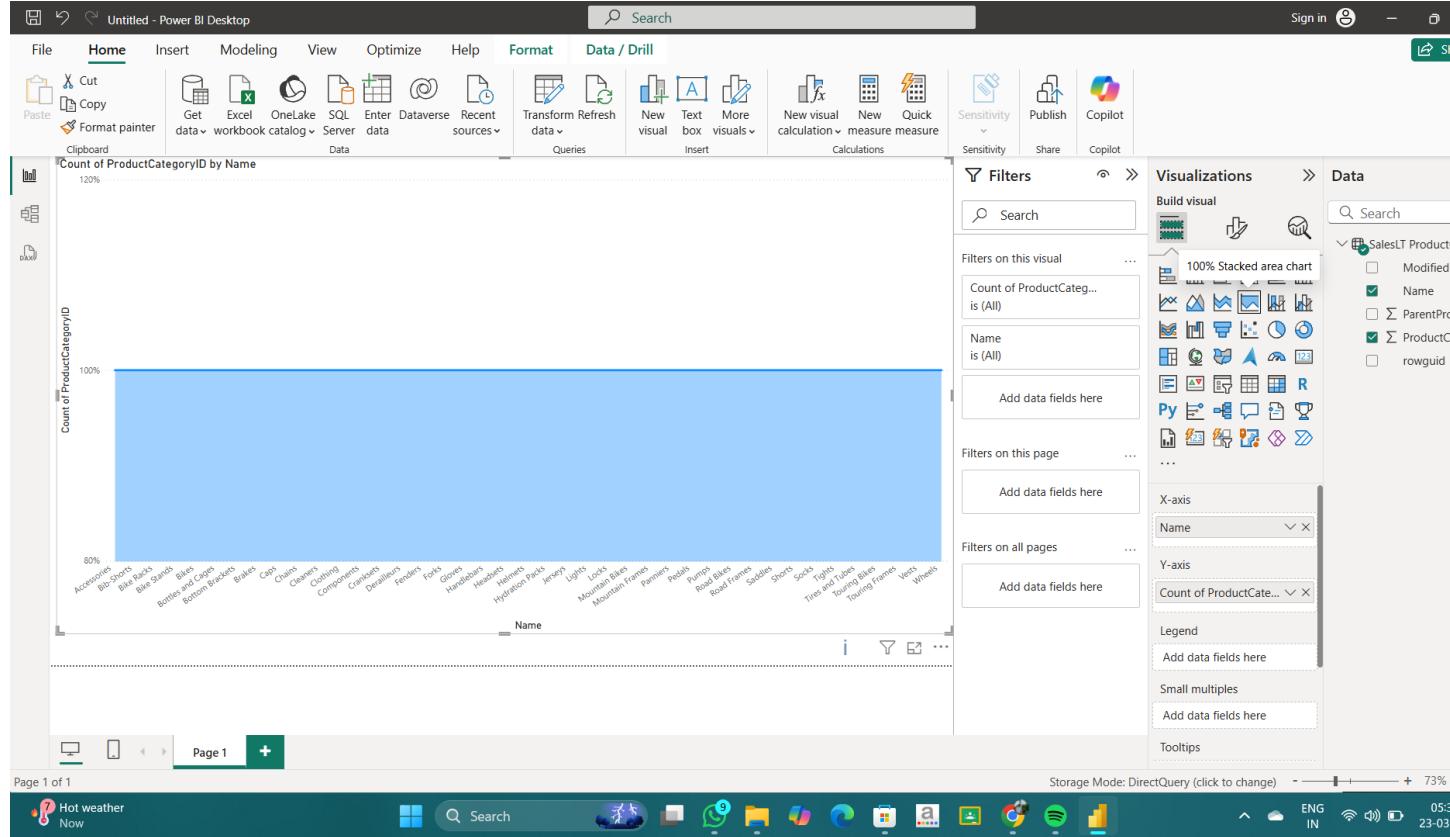
- Data has been selected to produce reports of multiple Power BI graphs – selected – SalesLT Product description.
- Evaluating the data and establishing the connection.

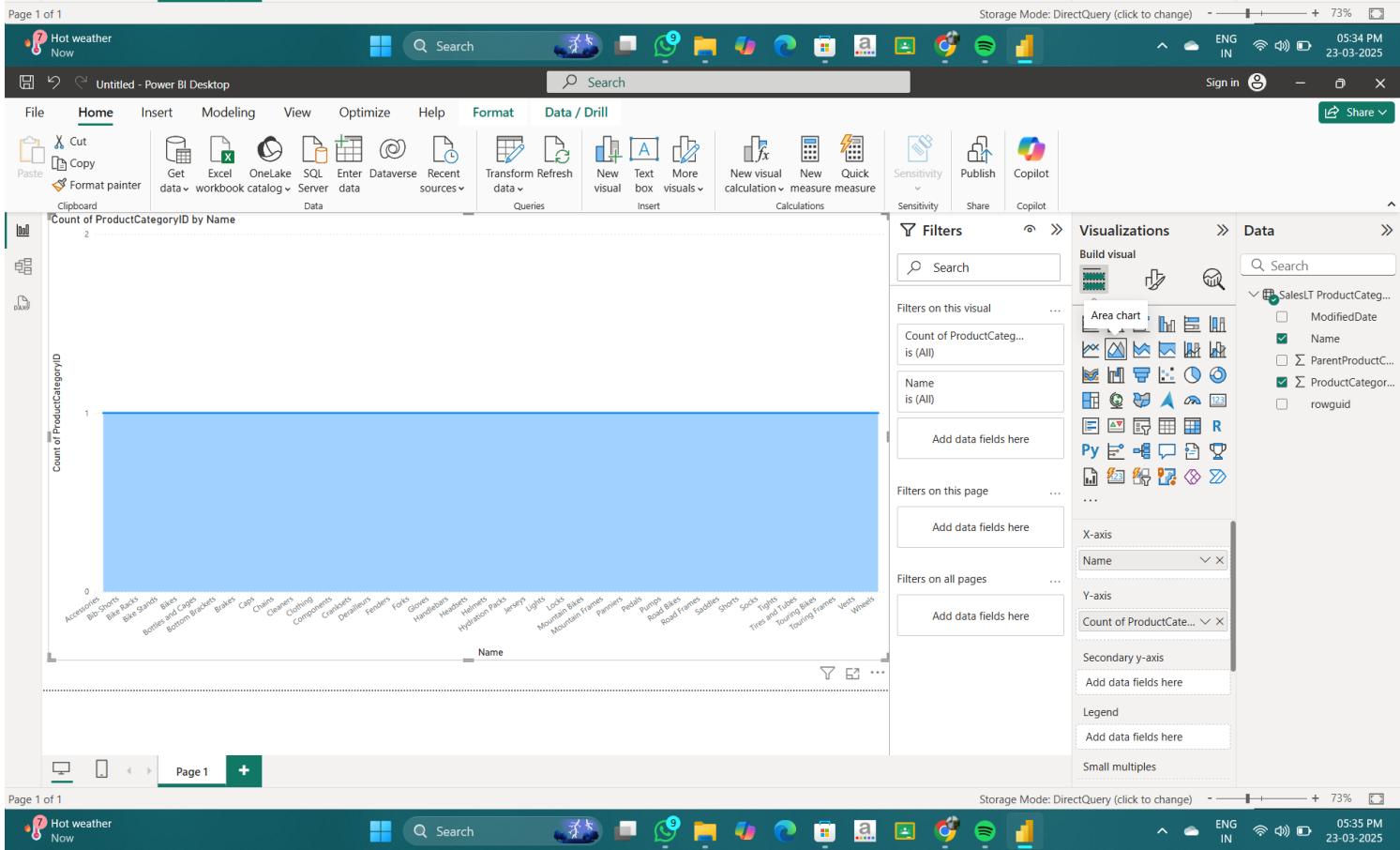
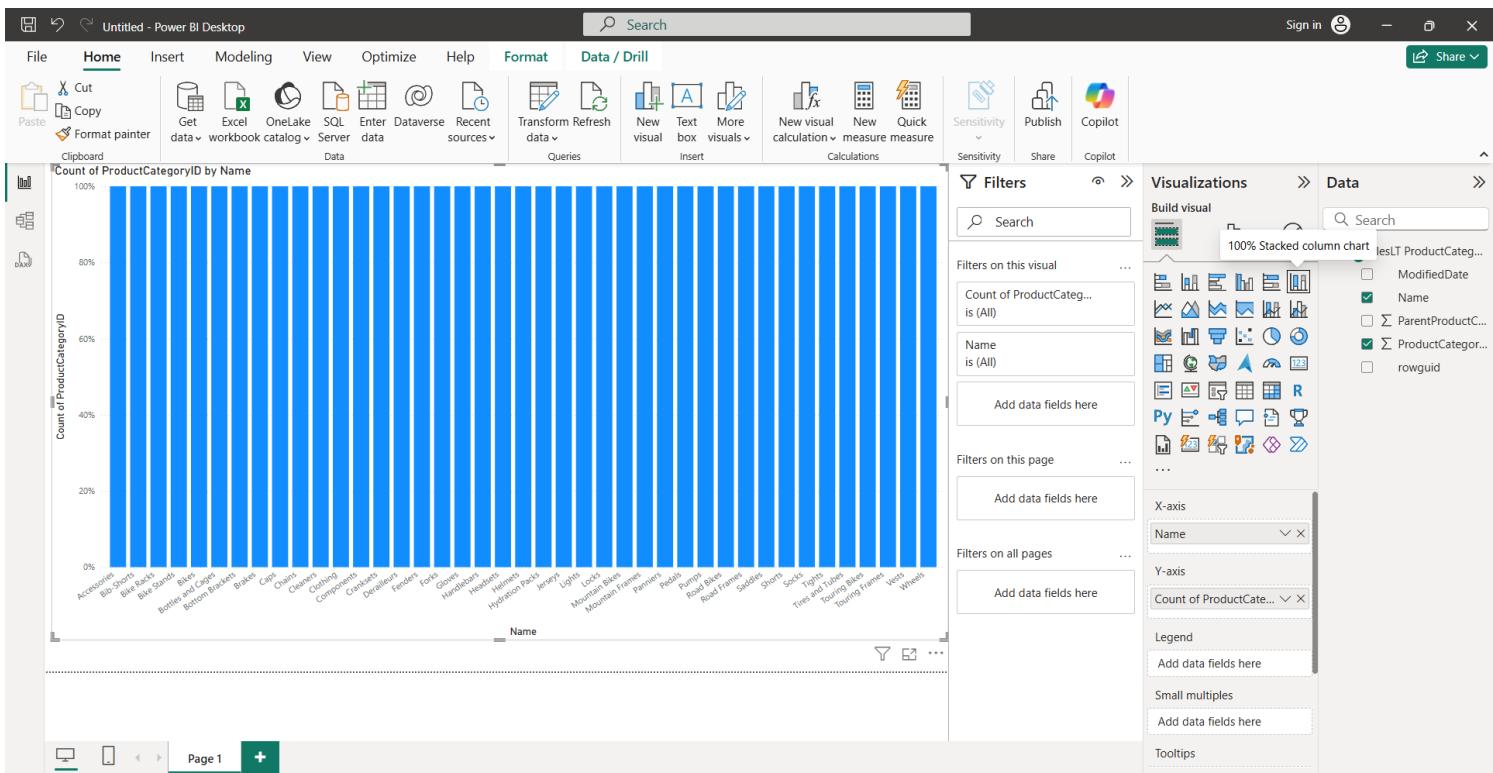


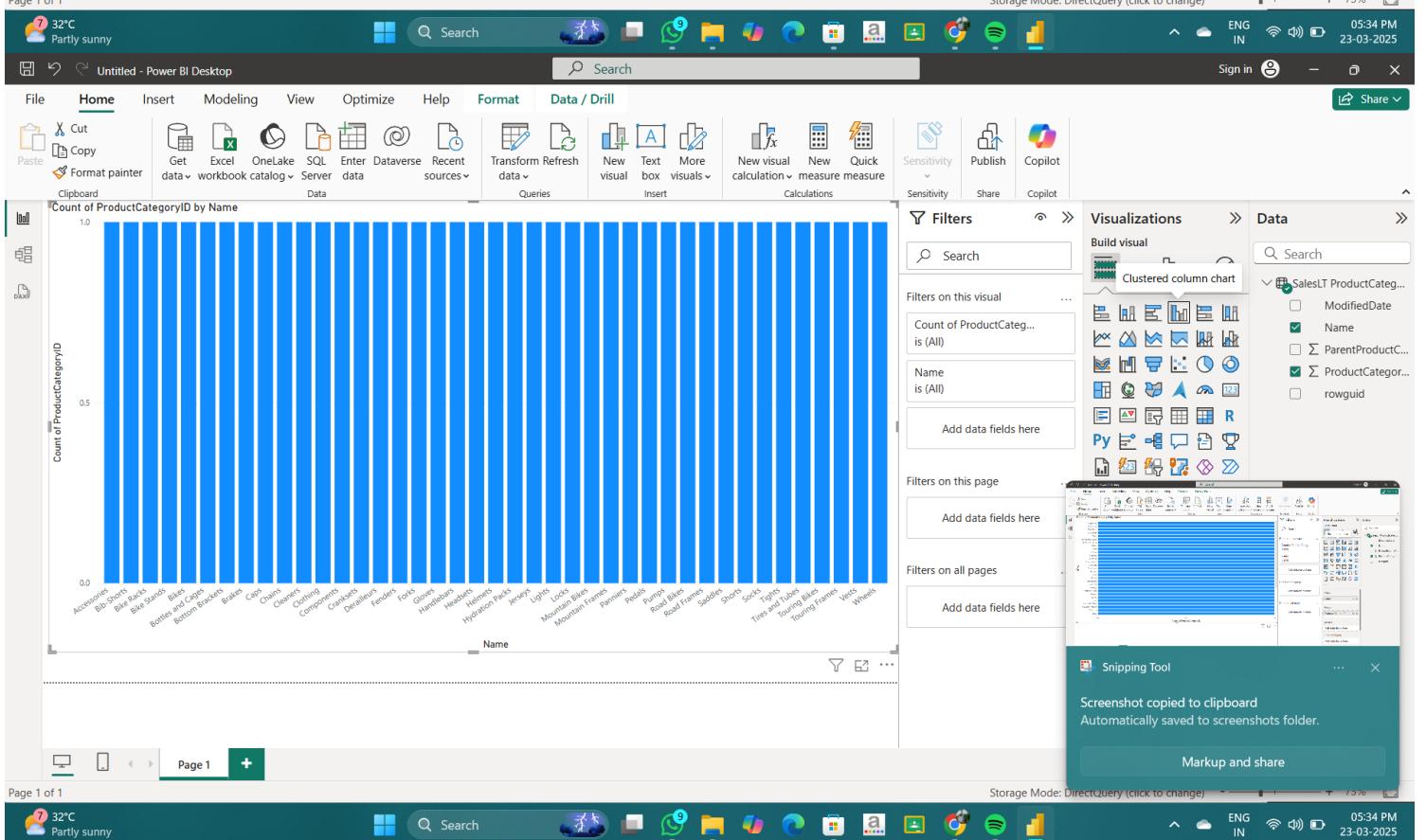
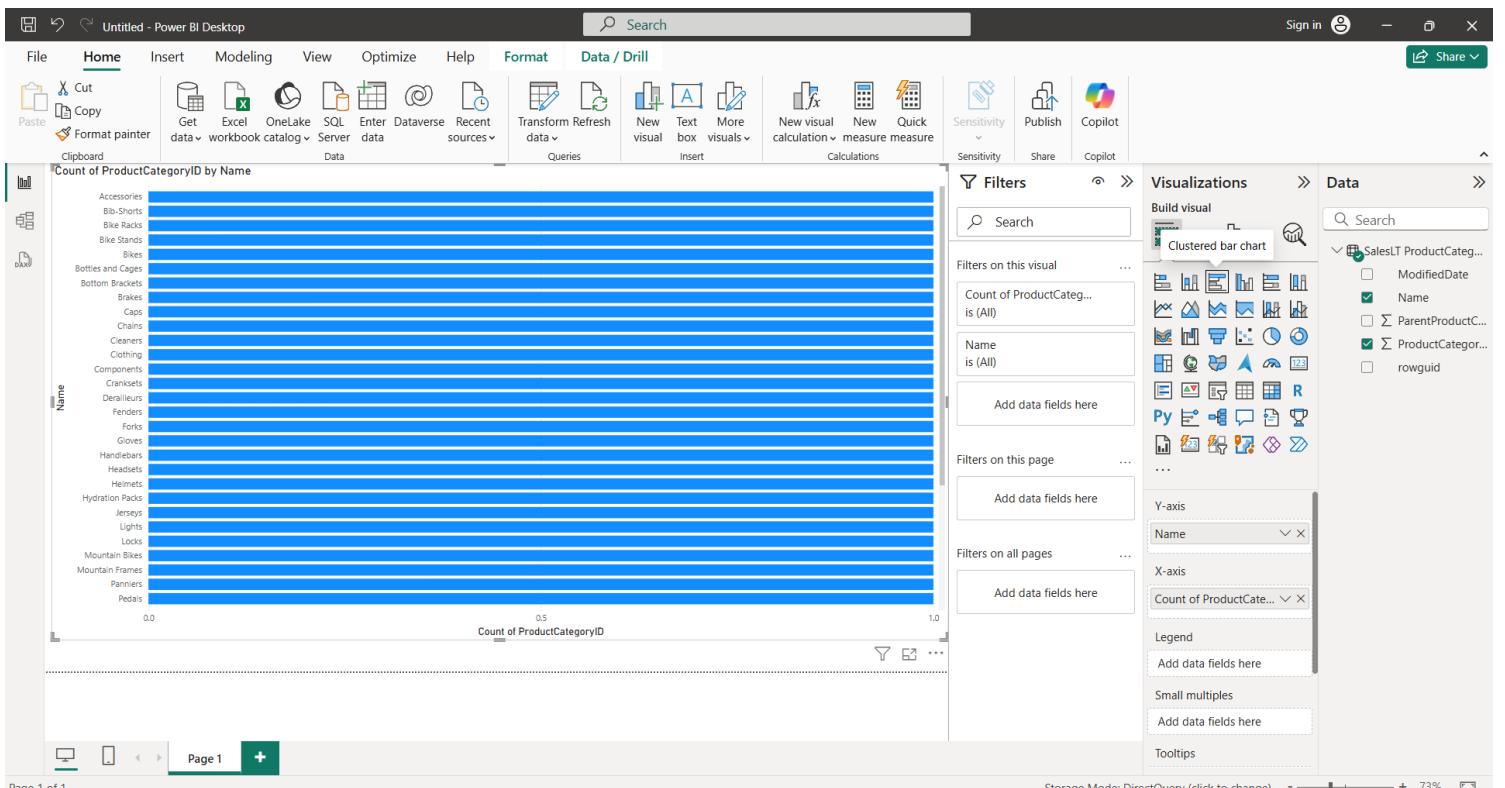
- After the successful connection, multiple graphs are created with the specific data selected from the SQL database.

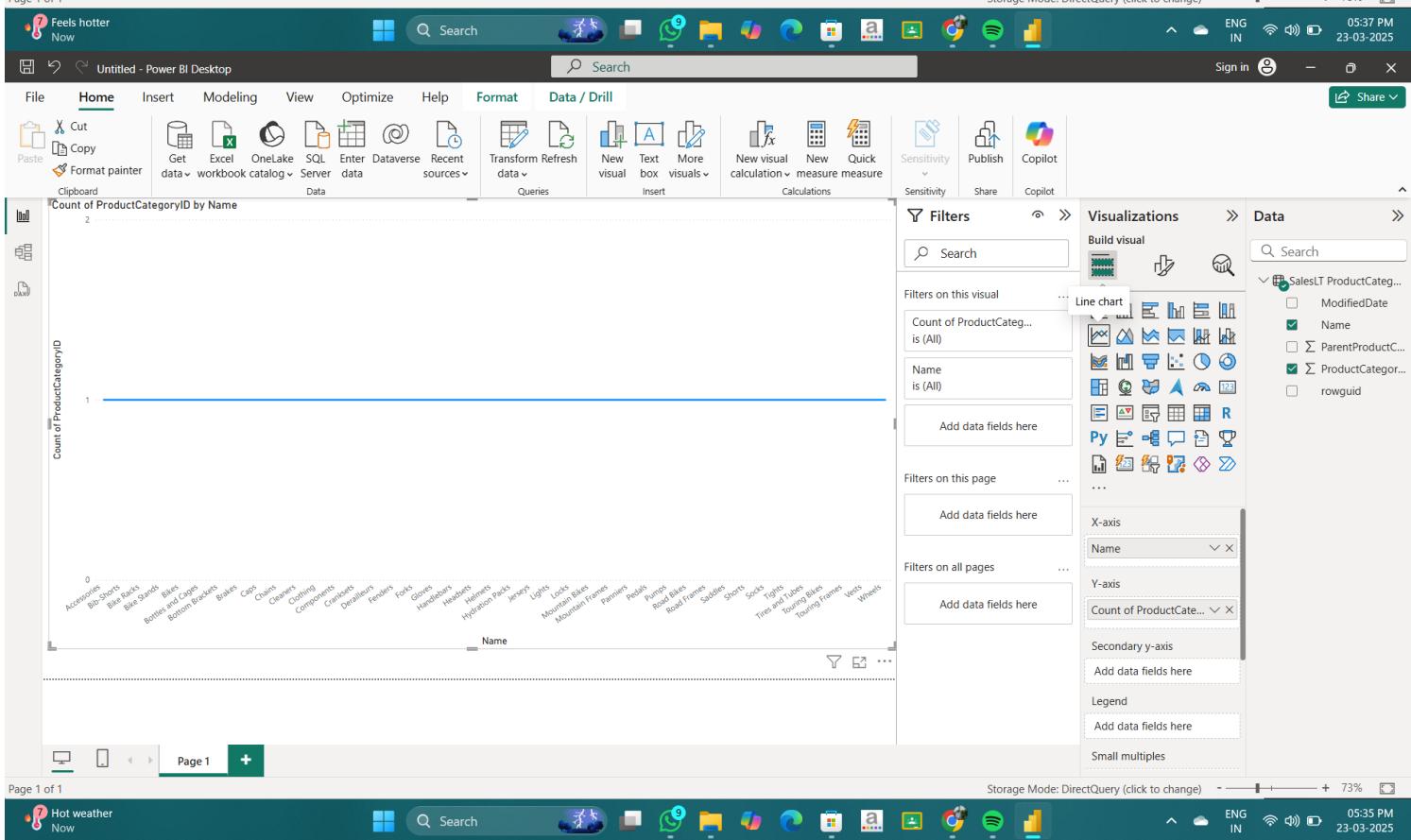
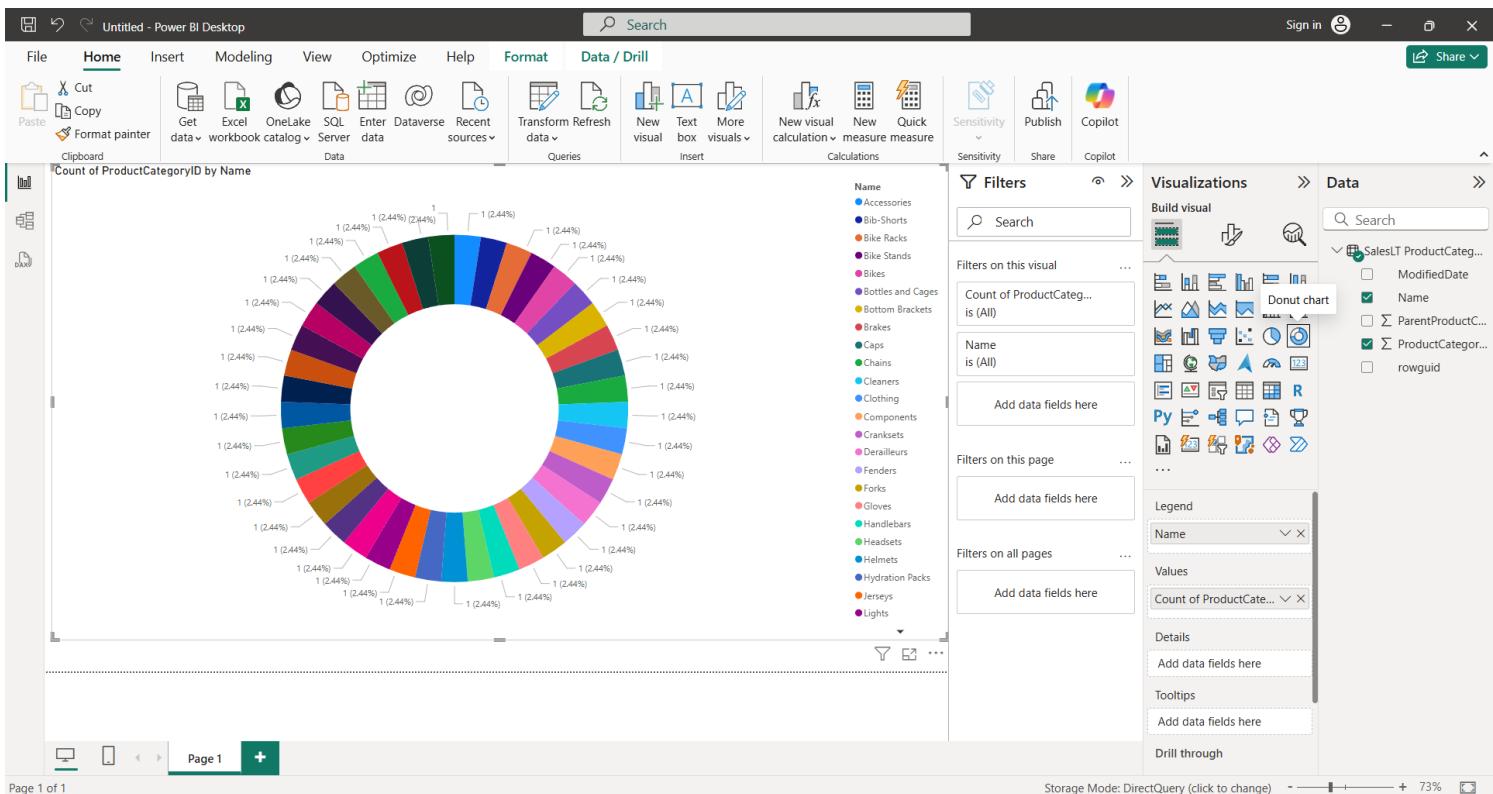
## OUTPUT:

Successfully created an Azure SQL Database and created a Power report with multiple graphs using the tables obtained from the azure SQL sample database AdventureWorksLT.





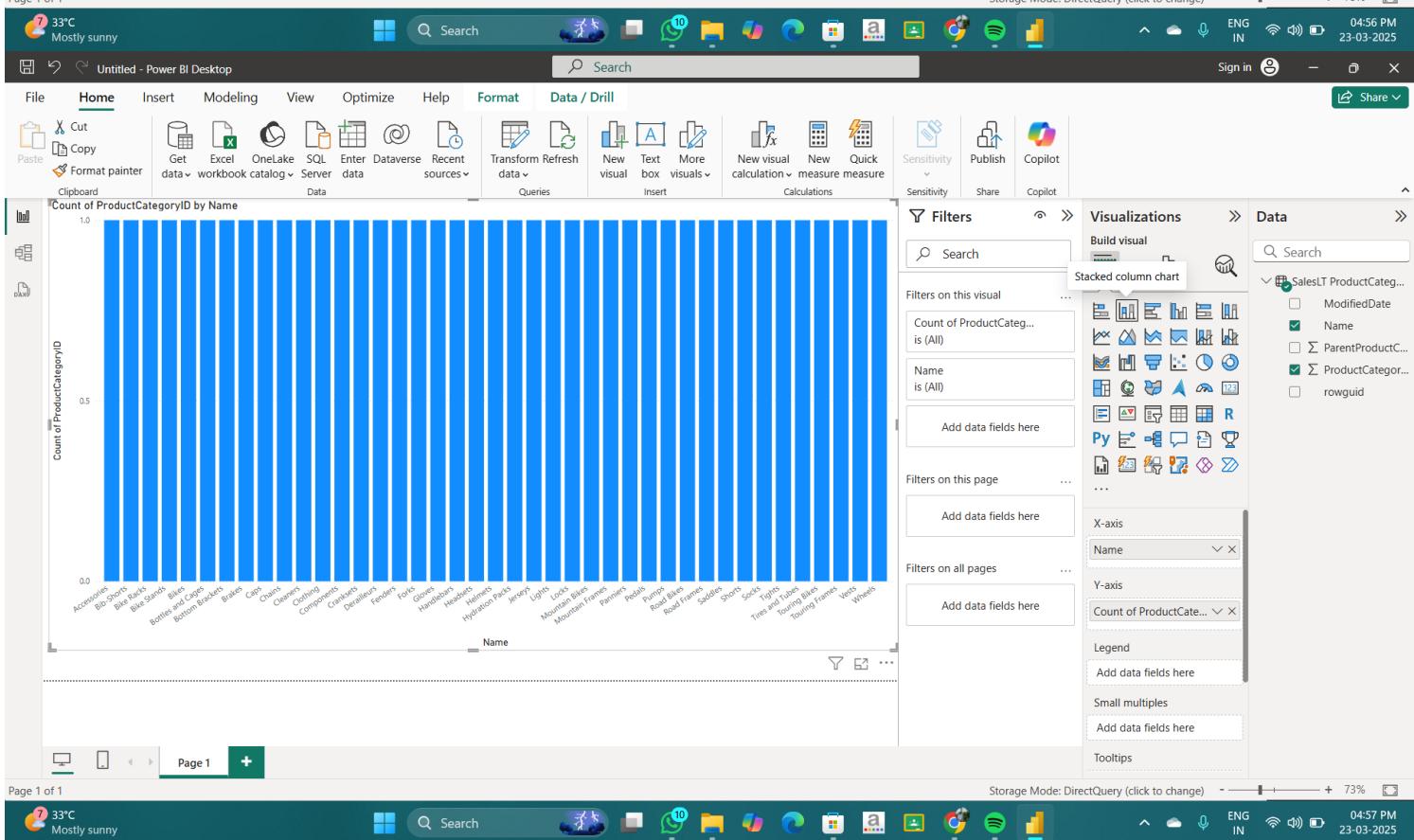
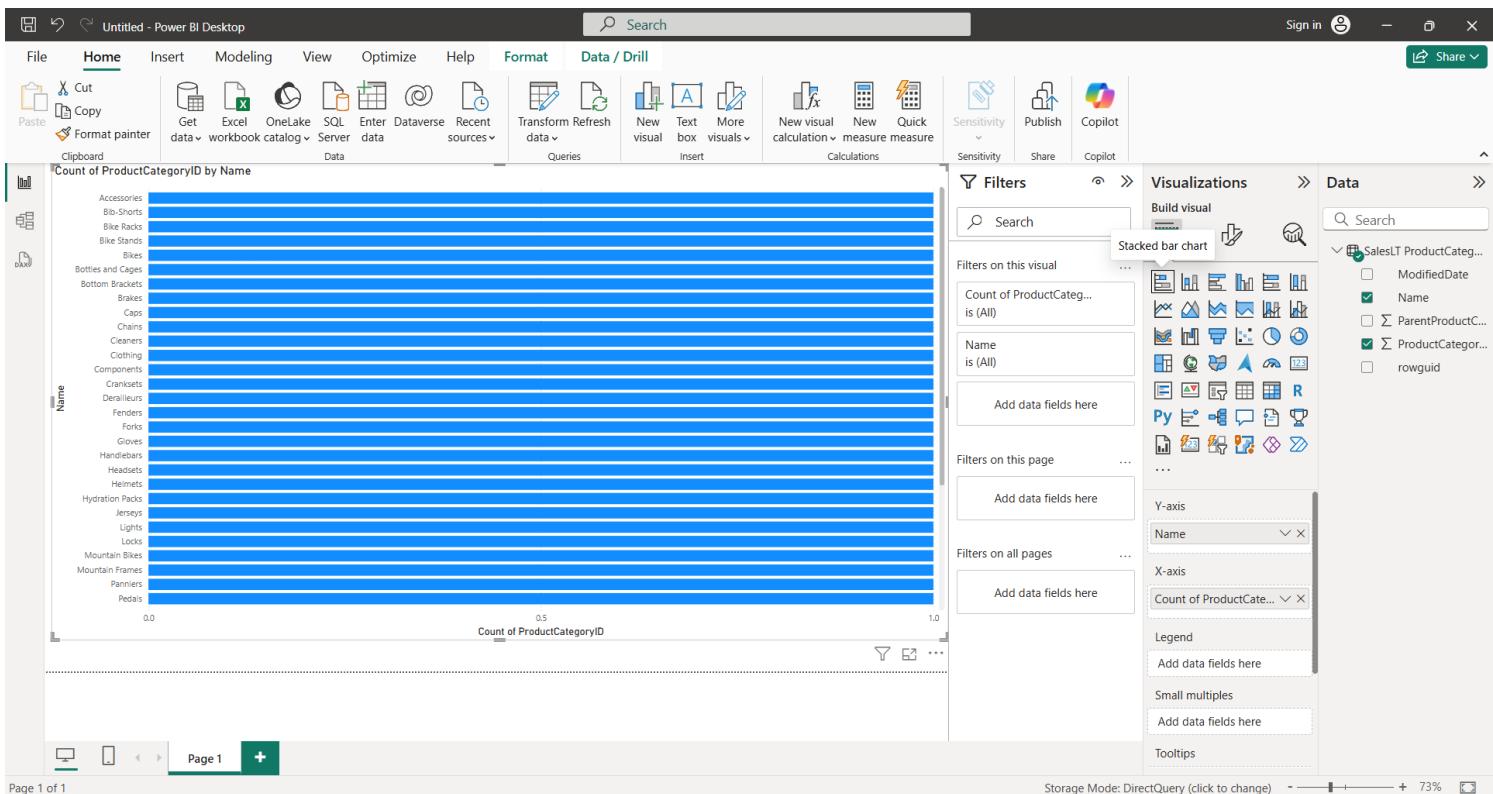




The screenshot shows the Power BI Desktop interface with the following details:

- File**, **Home** (selected), **Insert**, **Modeling**, **View**, **Optimize**, **Help** menu bar.
- Format** and **Data / Drill** tabs in the ribbon.
- Clipboard** section with icons for Cut, Copy, Paste, and Format painter.
- Data** section with options: Get data (Excel, OneLake, SQL Server, Enter data, Recent sources), Transform Refresh data, New visual, Insert, More visuals, New calculation, New measure, and Quick Calculations.
- Sensitivity** and **Share** buttons.
- Calculated fields** section with Sensitivity, Publish, and Copilot buttons.
- Visualizations** pane on the right showing various chart types: Build visual, Ribbon chart, Bar chart, Line chart, Map, Gantt chart, Scatter chart, Box plot, Treemap, Radar chart, Pyramid chart, Funnel chart, Gauge, Timeline, and Radar chart.
- Data** pane on the far right showing the data source: SalesLT ProductCateg... with fields: ModifiedDate, Name, ParentProductCateg..., ProductCateg..., and rowguid.
- Chart Details**:
  - Y-axis: Count of ProductCategoryID by Name (ranging from 0.0 to 1.0).
  - X-axis: Name (categories: Accessories, Bike Shorts, Bike Packs, Bike Stands, Bikes, Bottom Brackets, Brakes, Cams, Chains, Clevers, Clothing, Components, Cranksets, Derailleurs, Fenders, Forks, Gloves, Handpads, Helmets, Hydration Packs, Jerseys, Lights, Louis, Mountain Bikes, Mountain Frames, Panniers, Pedals, Pumps, Road Bikes, Road Frames, Saddles, Shorts, Socks, Tights, Tires and Tubes, Touring Bikes, Vests, Wheels).
- Page Navigation**: Page 1 of 1.

The screenshot shows the Microsoft Power BI Desktop interface. The ribbon menu at the top includes File, Home, Insert, Modeling, View, Optimize, Help, Format, Data / Drill, and several sub-options like Cut, Copy, Format painter, Get data, OneLake, SQL Server, Enter data, Dataverse, Recent sources, Transform data, New visual, Text box, More visuals, New visual calculation, New measure measure, Sensitivity, Publish, and Copilot. The main workspace displays a stacked area chart titled "Count of ProductCategoryID by Name". The Y-axis is labeled "Count of ProductCategoryID" and ranges from 0 to 2. The X-axis is labeled "Name" and lists various product categories: Accessories, Bike Chocks, Bike Racks, Bike Stands, Bikes, Bottom Brackets, Brakes, Caps, Chains, Cleaners, Clothing, Components, Cranksets, Derailleurs, Fenders, Forks, Gloves, Handlebars, Helmets, Hydration Packs, Jerseys, Lights, Loops, Mountain Frames, Panniers, Pedals, Road Bikes, Saddles, Shorts, Socks, Tights, Tires and Tubes, Touring Frames, Vests, and Wheels. The chart shows that most categories have a count of 0, except for one category which has a count of 1. A context menu is open over the chart, showing options for Filters, Visualizations, and Data. The Visualizations pane on the right lists various chart types like Stacked area chart, Line chart, Bar chart, etc., with "Stacked area chart" selected. The Data pane shows a list of fields: SalesLT ProductCateg..., ModifiedDate, Name, ParentProductCateg..., ProductCateg..., and rowguid, with "Name" and "ProductCateg..." checked. The bottom navigation bar includes icons for monitor, printer, and file operations, along with a "Page 1" button and a "+" button. The status bar at the bottom indicates "Storage Mode: DirectQuery (click to change)" and shows system information like battery level (73%), signal strength, and network connection.



The screenshot shows the Microsoft Azure portal homepage. At the top, there is a navigation bar with several tabs open, including "chat gpt - Yahoo India Search", "ChatGPT | OpenAI", "HTML Hello World Code", "pdf to word converter - Yahoo", "Download file | iLovePDF", and "portal.azure.com/#home". Below the navigation bar is the Microsoft Azure logo and a search bar labeled "Search resources, services, and docs (G+ /)". To the right of the search bar are icons for Copilot, a magnifying glass, a gear, a question mark, a refresh arrow, and a user profile. The main content area has a blue header titled "Microsoft Azure". Below the header are several service icons: "Create a resource" (plus sign), "SQL databases" (SQL icon), "Storage accounts" (cloud with bars), "Virtual machines" (monitor icon), "Subscriptions" (key icon), "Quickstart Center" (rocket icon), "Azure AI services" (cloud with brain icon), "Kubernetes services" (kubernetes icon), "App Services" (globe icon), and "More services" (arrow icon). On the far right of the header, it says "sasi9345846@gmail.co... DEFAULT DIRECTORY".  
  
The main content area is divided into sections:

- Resources**: A table showing recent resources. The columns are "Name", "Type", and "Last Viewed".

Name	Type	Last Viewed
processingdev (sasik/processingdev)	SQL database	3 hours ago
sasik	SQL server	a day ago
sasi-ubuntu_group	Resource group	a day ago
sasiithubstorage	Storage account	2 days ago
sasi-ubuntu	Virtual machine	2 days ago

[See all](#)
- Navigate**: Buttons for "Subscriptions" (key icon), "Resource groups" (cube icon), "All resources" (grid icon), and "Dashboard" (dash icon).
- Tools**: A taskbar at the bottom with various icons for weather, search, file explorer, and other applications. It also shows system status like "27°C Partly cloudy", "ENG IN", and the date/time "24-03-2025 09:47 PM".

ALL THE RESOURCES ,VIRTUAL MACHINES, STORAGE ACCOUNTS ,KEY VALUT AND DATABASES I HAVE CREATED.

## REFERENCES

TASK 1:

<https://learn.microsoft.com/en-us/azure/virtual-machines/linux/quick-create-portal?tabs=ubuntu>

<https://learn.microsoft.com/en-us/training/modules/create-windows-virtual-machine-in-azure/5-exercise-connect-to-a-windows-vm-using-rdp>

<https://learn.microsoft.com/en-us/azure/virtual-machines/linux/use-remote-desktop?tabs=azure-cli>

TASK 2:

<https://docs.microsoft.com/en-us/azure/storage/blobs/lifecycle-management-policy-configure?tabs=azure-portal>

<https://docs.microsoft.com/en-us/azure/storage/blobs/storage-blob-static-website-how-to?tabs=azure-portal>

TASK 3:

<https://learn.microsoft.com/en-us/training/modules/configure-and-manage-azure-key-vault/4-store-secrets-in-akv>

TASK 4:

<https://learn.microsoft.com/en-us/training/modules/azure-sql-deploy-configure/3-exercise-deploy-database>

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