

Batch: A-4 Roll No.: 16010122151

Experiment No. 04

Signature of the Staff In-charge with date

Title: Azure Hands-On Lab

Objective:

In this hands-on lab you will learn how to:

- How to create and manage Linux VM
- Log in to Azure portal with a Microsoft account
- View the Azure portal service associated with Virtual Machine

Expected Outcome of Experiment:

CO	Outcome
2	Investigate the system virtualization and outline its role in enabling the cloud computing System model

Books/ Journals/ Websites referred:

<https://portal.azure.com/#home>

Abstract:-

This report documents the hands-on experience with Microsoft Azure Student Pack, focusing on the creation and management of a Virtual Machine (VM). The experiment involved logging into the Azure portal, setting up a VM, exploring various options available, and understanding its significance in cloud computing. The study aims to analyze system virtualization and its role in enabling cloud computing models.

Related Theory: -

Cloud computing provides scalable computing resources over the internet. It enables on-demand access to services like Virtual Machines (VMs), storage, and networking. Microsoft Azure is a leading cloud platform offering Infrastructure-as-a-Service (IaaS), allowing users to deploy, manage, and scale applications efficiently.

A **Virtual Machine (VM)** is a software-based emulation of a physical computer. It allows multiple operating systems to run on the same hardware, improving resource utilization and scalability. **System Virtualization** plays a crucial role in cloud computing by enabling efficient resource allocation, cost reduction, and flexibility.

Key Concepts:

- **Azure Virtual Machines:** Compute resources for running applications and workloads.
- **Resource Group:** A container holding related resources.
- **SSH Authentication:** A secure method to access the VM.
- **Networking:** Ensuring secure communication between VMs and external services.
- **Storage Options:** Azure provides various disk types like Premium SSDs for different workloads.

Implementation Details:

1. Enlist all the steps followed and various options explored.

- Logged into Microsoft Azure Student Pack via <https://portal.azure.com>.
- Navigated to Virtual Machines and selected Create a virtual machine.
- Configured basic settings:
 - **Subscription:** Azure for Students
 - **Resource Group:** Created Sam30_group
 - **VM Name:** Sam30
 - **Region:** Central India
 - **Availability Zone:** Selected self-zone.
 - **Security Features:** Enabled secure boot and vTPM.
- Defined VM Size: Standard D2s v3 (2 vCPUs, 8 GiB memory).
- Authentication Type: SSH Public Key with username azureuser.
- Configured storage and networking:
 - **OS Disk:** Premium SSD LRS (30GB)
 - **Networking:** Created a new Virtual Network Sam30-vnet.
 - **Public IP:** Assigned Sam30-ip.
- Created and deployed the VM successfully.
- Added additional disk Hard_Disk_(128GB) for extended storage.

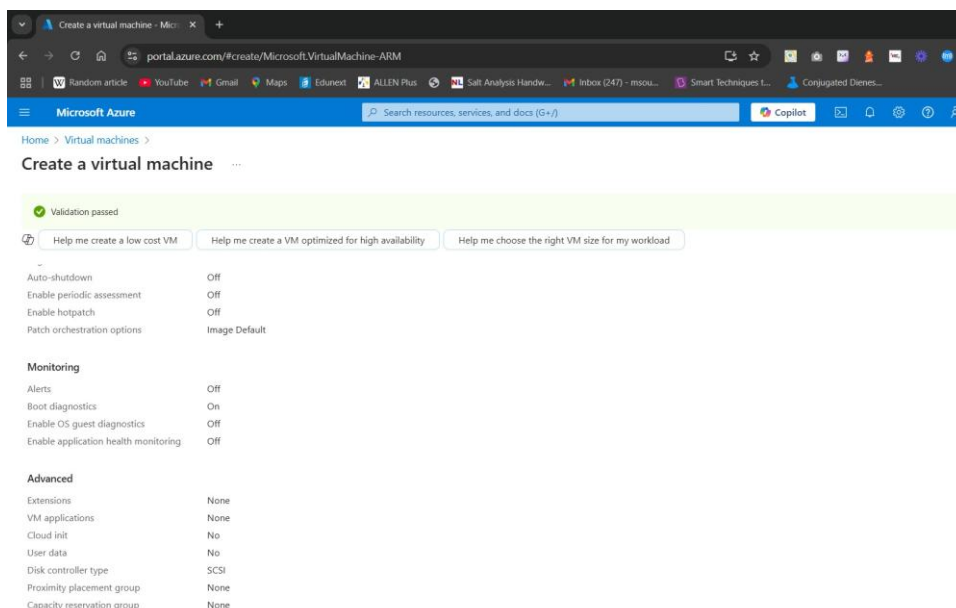
2. Explain your program logic, classes and methods used.

- **Infrastructure as Code (IaC):** Azure's resource deployment follows a declarative approach.
- **PowerShell & Azure CLI:** Used for managing resources programmatically.
- **Classes & Methods:**

- VirtualMachine class: Defines the VM properties and lifecycle.
- ResourceGroup class: Manages Azure resource groups.
- Disk class: Defines storage parameters.
- NetworkInterface class: Configures network connectivity.
- SSH Key Pair Generation: Ensures secure authentication.

3. Explain the Importance of the approach followed by you

- **Scalability:** Azure VMs can be resized based on demand.
- **Cost-Efficiency:** Student Pack allows free-tier access to resources.
- **Security:** Secure boot and vTPM enhance VM protection.
- **Automation:** Using scripts, resources can be deployed consistently.
- **Resource Optimization:** Proper selection of VM size, storage, and networking improves efficiency.



Azure Portal Dashboard

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

Home > Virtual machines >

Create a virtual machine

Validation passed

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

Basics

Disks

Networking

Management

Monitoring

Advanced

Tags

Review + create

Price

1 X Standard D2s v3

by Microsoft

Terms of use | Privacy policy

Subscription credits apply

8.7354 INR/hr

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.

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Create Virtual Machine Basics Tab

Basics	
Subscription	Azure for Students
Resource group	(new) Sam30_group
Virtual machine name	Sam30
Region	Central India
Availability options	Availability zone
Zone options	Self-selected zone
Availability zone	1
Security type	Trusted launch virtual machines
Enable secure boot	Yes
Enable vTPM	Yes
Integrity monitoring	No
Image	Ubuntu Server 24.04 LTS - Gen2
VM architecture	x64
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)
Enable Hibernation	No
Authentication type	SSH public key
Username	azureuser
SSH Key format	RSA
Key pair name	Sam30_key

Public inbound ports	SSH
Azure Spot	No

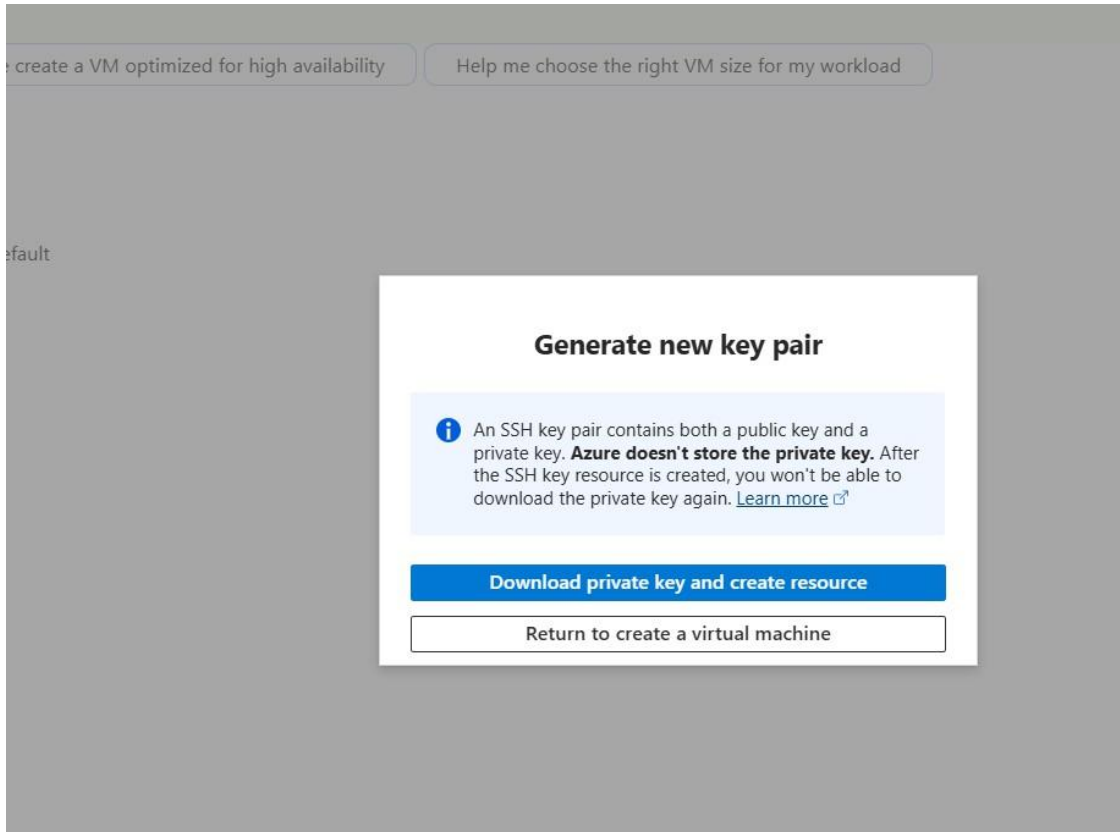
Disks

OS disk size	Image default
OS disk type	Premium SSD LRS
Use managed disks	Yes
Delete OS disk with VM	Enabled
Ephemeral OS disk	No

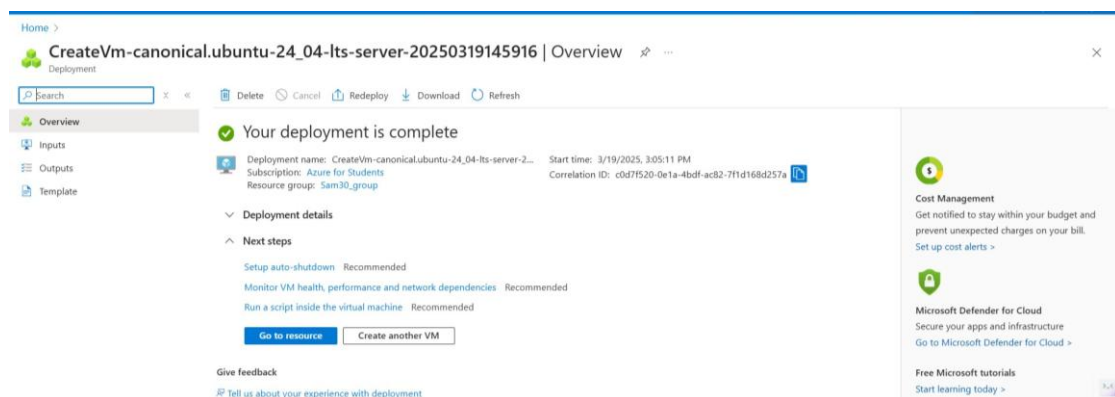
Networking

Virtual network	(new) Sam30-vnet
Subnet	(new) default (10.0.0.0/24)
Public IP	(new) Sam30-ip
Accelerated networking	Off
Place this virtual machine behind an existing load balancing solution?	No
Delete public IP and NIC when VM is deleted	Disabled

Disks Configuration & Networking Tab



Key generation



Review + Create

Home > CreateVm-canonical.ubuntu-24_04-lts-server-20250319145916 | Overview

Deployment

Search

Overview

Inputs

Outputs

Template

Your deployment is complete

Deployment name: CreateVm-canonical.ubuntu-24_04-lts-server-2... Start time: 3/19/2025, 3:05:11 PM
Subscription: Azure for Students Correlation ID: c0d7f520-0e1a-4bd1-ac82-7f1d168d257a

Resource group: Sam30_group

Deployment details

Resource	Type	Status	Operation details
Sam30	Microsoft.Compute/virtualMachines	OK	Operation details
Sam30788_21	Microsoft.Network/networkInterfaces	Created	Operation details
Sam30-ip	Microsoft.Network/publicIPAddresses	OK	Operation details
Sam30-vnet	Microsoft.Network/virtualNetworks	OK	Operation details
Sam30-nsg	Microsoft.Network/networkSecurityGroups	OK	Operation 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](#)

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VM Running

Home > Virtual machines > Sam30

Virtual machines
somaiya.edu (somaiya.edu)

+ Create Switch to classic

Filter for any field...

Name ↑

Sam30

Sam30 | Disks

Virtual machine

Search Refresh Additional settings Feedback Troubleshoot

Connect

Bastion

Networking

Network settings

Load balancing

Application security groups

Network manager

Settings

Disks

Extensions + applications

Operating system

Configuration

Advisor recommendations

Properties

Locks

Availability + scale

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption
Sam30_OsDisk_1_f75c5d699f07463ca	Premium SSD LRS	30	120	25	SSE with PMK

Data disks

Filter by name

Showing 0 of 0 attached data disks

+ Create and attach a new disk Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encry
No data disks attached						

VM Running with disk

Home > Sam30

Sam30 | Disks ☆ ...

Virtual machine

Search Refresh Additional settings Feedback Troubleshoot

Connect Bastion Networking Network settings Load balancing Application security groups Network manager Settings Disks Extensions + applications Operating system Configuration Advisor recommendations Properties Locks Availability + scale Size Availability + scaling

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption	Host caching
Sam30_OsDisk_1_f75c5d699f07463ca39	Premium SSD LRS	30	120	25	SSE with PMK	Read/write

Data disks

Filter by name

Showing 1 of 1 attached data disks

Create and attach a new disk Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption	Host caching
0	Hard_Disk_Soumil	Premium SSD LRS	4	120	25	Platform-managed ...	Read-only

Apply Discard changes

Updating virtual machine
Updating virtual machine 'Sam30'...

Successfully created disk
Successfully created disk 'Hard_Disk_Soumil'.

15:16 19-03-2025

Home > Sam30

Sam30 | Disks ☆ ...

Virtual machine

Search Refresh Additional settings Feedback Troubleshoot

Connect Bastion Networking Network settings Load balancing Application security groups Network manager Settings Disks Extensions + applications Operating system Configuration Advisor recommendations Properties Locks Availability + scale Size Availability + scaling

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption	Host caching
Sam30_OsDisk_1_f75c5d699f07463ca39	Premium SSD LRS	30	120	25	SSE with PMK	Read/write

Data disks

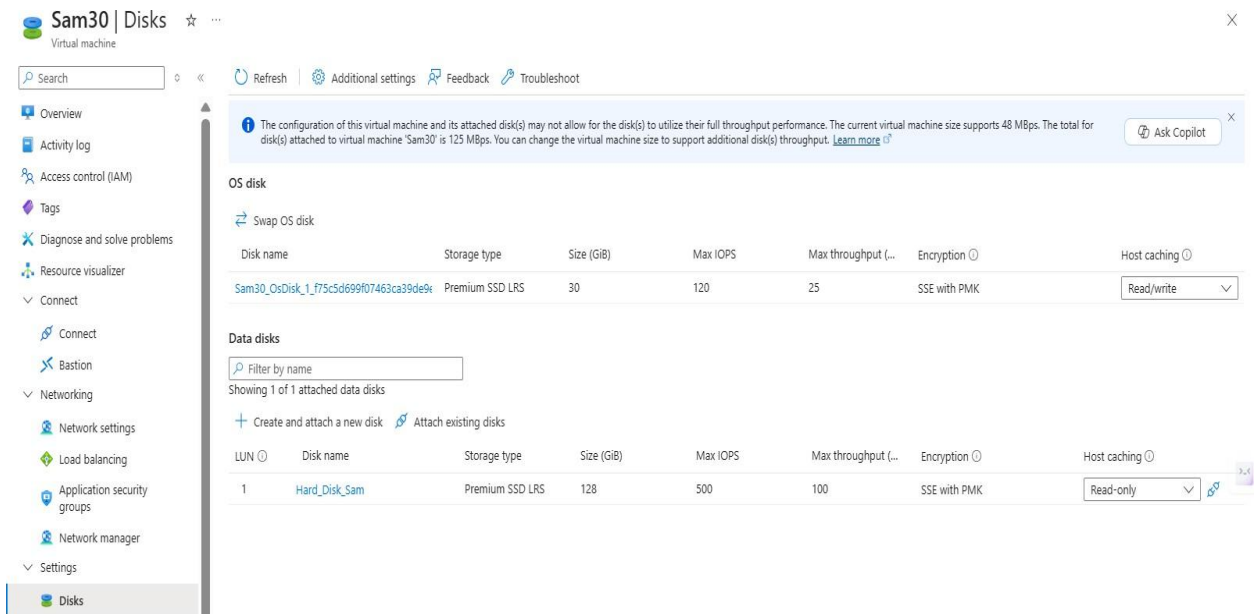
Filter by name

Showing 1 of 1 attached data disks

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LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption	Host caching
0	Hard_Disk_Soumil	Premium SSD LRS	4	120	25	SSE with PMK	Read-only

Apply Discard changes



Sam30 | Disks ☆ ...

Virtual machine

Search Refresh Additional settings Feedback Troubleshoot

The configuration of this virtual machine and its attached disk(s) may not allow for the disk(s) to utilize their full throughput performance. The current virtual machine size supports 48 MBps. The total for disk(s) attached to virtual machine 'Sam30' is 125 MBps. You can change the virtual machine size to support additional disk(s) throughput. [Learn more](#)

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption	Host caching
Sam30_OsDisk_1_f75c5d699f07463ca39de9e	Premium SSD LRS	30	120	25	SSE with PMK	Read/write

Data disks

Filter by name

Showing 1 of 1 attached data disks

Create and attach a new disk Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)	Encryption	Host caching
1	Hard_Disk_Sam	Premium SSD LRS	128	500	100	SSE with PMK	Read-only

Conclusion:- Thus, from this experiment, we learnt about setting up a free virtual machine on Microsoft Azure and then attached a data disk to it as well, thus successfully completing it.