

Setting Up Cloud Infrastructure on Microsoft Azure

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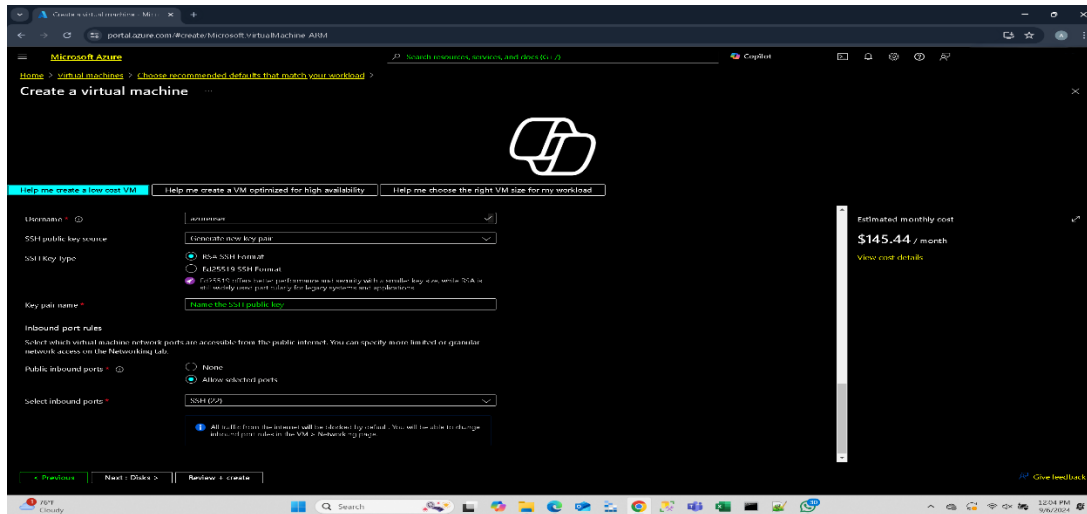
Sept 6th, 2024

(CS 651 03) Cloud Computing & Big Data Analytic 2024

Introduction - This project aims to set up and configure a basic cloud infrastructure using Microsoft Azure, focusing on creating virtual machine (VM) instances, configuring storage, and setting up networking. This document will guide the process of setting up the infrastructure and provide step-by-step instructions for replicating the environment.

Step 1: Creating Virtual Machine Instances

1. **Log in to Azure Portal:** Navigate to portal.azure.com and sign in using your credentials.
2. **Create a Virtual Machine:**
 - In the Azure dashboard, click "Create a resource" and search for "Virtual Machine."
 - Pick a region close to your users for faster access.
 - Choose the right VM size based on what your project needs (e.g., Standard_B1ms for small-scale use).
 - Select the OS (e.g., Ubuntu 20.04 or Windows Server).
 - Set up inbound ports like HTTP, HTTPS, and SSH/RDP.
 - Create an admin username and password for accessing the VM.

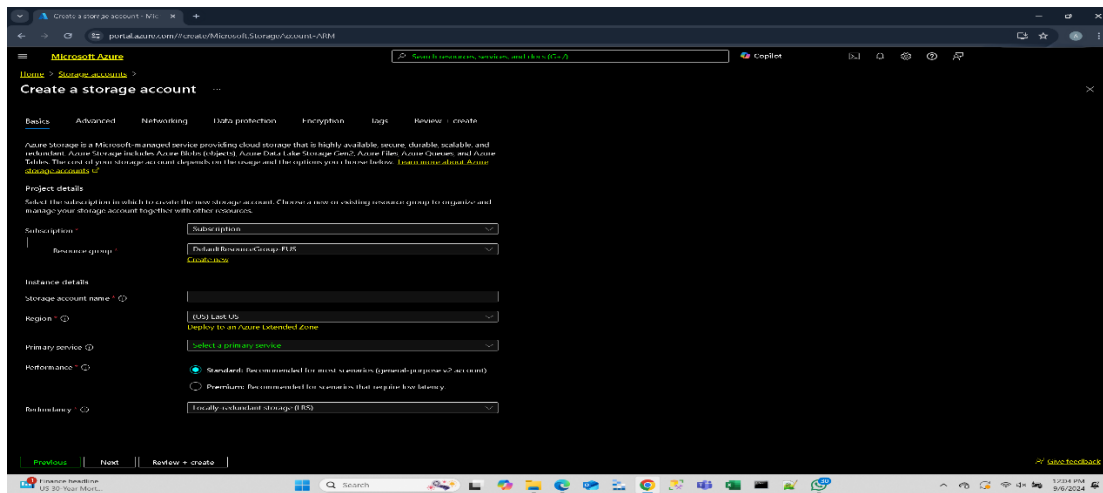


3. **Configure Disk & Storage:**
 - Select an SSD for better performance.
 - Attach extra storage if needed, like for a database or more application data.
4. **Review and Deploy:** After reviewing your configuration, click "Create" to deploy the VM.

Step 2: Configuring Storage Solutions

1. **Set Up Azure Storage Account:**
 - From the Azure dashboard, click on "Create a resource" and search for "Storage account."

- Select the storage account type (e.g., *Standard performance* for general-purpose storage).



- Choose replication options based on availability needs (e.g., *LRS* for budget-friendly redundancy).
2. **Create Blob Storage for Unstructured Data:**
 - Once the storage account is created, create a *container* for storing unstructured data (e.g., images, logs).
 - Set appropriate permissions for access control (e.g., private, public).
 3. **Attach Storage to VM:**
 - Go to the VM settings and attach the storage account for direct access from the VM.
 - Mount the disk to the file system for use within the VM environment.

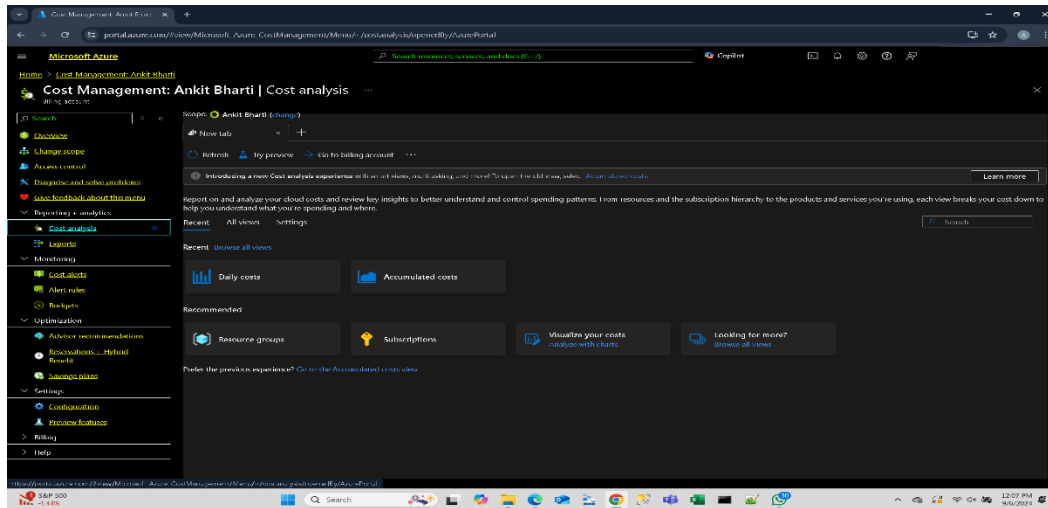
Step 3: Setting Up Networking

1. **Create a Virtual Network (VNet):**
 - In the Azure dashboard, go to "Create a resource" and search for "Virtual Network."
 - Set an IP address range and create subnets for different components (like a web server or database).
 - Keep subnets separated for added security.
2. **Configure Network Security Groups (NSG):**
 - NSGs allow or deny traffic to resources within the VNet.
 - Add rules to allow HTTP, HTTPS, and SSH traffic while denying other types for improved security.
3. **Set Up Public and Private IPs:**
 - Assign a public IP to the web-facing VM and a private IP to the database server, ensuring secure communication between them.
4. **Implement Load Balancing:**
 - If needed, set up an Azure Load Balancer to distribute traffic across multiple VM instances for higher availability.

Step 4: Monitoring and Cost Management

1. **Set Up Azure Monitor:**
 - Use Azure Monitor to keep track of the performance of VMs, storage, and network traffic.

- Set up alerts for key metrics like CPU usage, memory consumption, and network activity.



2. Cost Management:

- Use the Azure Cost Management tool to track and optimize your spending.
- Set a budget limit to avoid surprises and get alerts if you go over it.

Conclusion

This project walked through how to set up cloud infrastructure on Azure, including creating virtual machines, configuring storage, and setting up networking. It's built with scalability, security, and cost-efficiency in mind. By following the steps, you can easily replicate this setup for your projects.

References

- Microsoft. (2023). *Azure Virtual Machines documentation*. Retrieved from <https://learn.microsoft.com/en-us/azure/virtual-machines/>
- Microsoft. (2023). *Azure Storage documentation*. Retrieved from <https://learn.microsoft.com/en-us/azure/storage/>
- Microsoft. (2023). *Azure Networking documentation*. Retrieved from <https://learn.microsoft.com/en-us/azure/networking/>