

A Course End Project  
on  
**Create Snapshot for Root Volume and Migrate to Southeastasia  
Region. Convert Snap to Volume and Launch the Instance in  
SouthEastAsia Region**

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Requirements  
for the Award of the Degree of  
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**IN**  
**COMPUTER SCIENCE AND ENGINEERING (AI&ML)**

Submitted

By

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)**

**VARDHAMAN COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

Affiliated to **JNTUH**, Approved by **AICTE**, Accredited by **NAAC**, with **A++** Grade, **ISO 9001:2015** Certified  
Kacharam, Shamshabad, Hyderabad – 501218, Telangana, India

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## **Department of Computer Science and Engineering (AI&ML)**

### **CERTIFICATE**

This is to certify that the Course End Project report work entitled “**Create Snapshot for Root Volume and Migrate to Southeastasia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region**” carried out by Mr. **Ashish Sharma**, Roll Number **21881A6671**, Mrs. **B Shaivi Reddy**, Roll Number **21881A6672**, Mr. **E Saiteja**, Roll Number **21881A6681** towards Course End Project and submitted to the Department of Computer Science and Engineering(AI&ML), in partial fulfillment of the requirements for the award of degree of **Bachelor of Technology in Computer Science and Engineering (AI&ML)** during the year 2023-24.

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## ABSTRACT

In today's cloud computing landscape, effective data management and strategic deployment across regions are essential for organizations leveraging platforms like Microsoft Azure. This abstract delves into the operational intricacies of creating a snapshot for a root volume, migrating it to the Southeast Asia region within Azure, converting it into a functional volume, and subsequently launching an instance in the SouthEastAsia region through the Azure Portal.

The process commences with the creation of a snapshot, capturing a precise snapshot of a virtual machine's root volume. This snapshot serves as a foundational element for robust backup strategies, ensuring data integrity and facilitating rapid recovery in the event of operational disruptions. By migrating this snapshot to Azure's Southeast Asia region, organizations adhere to local data residency regulations and bolster disaster recovery capabilities through geographic redundancy. Converting the snapshot into a managed disk streamlines storage management within Azure, offering scalability and operational efficiency benefits. Launching an instance from this managed disk in the SouthEastAsia region optimizes performance by reducing latency and enhancing user experience for stakeholders located in Southeast Asia. Despite challenges such as network bandwidth constraints during data transfer and the critical need for stringent security measures, advancements in automation tools and Azure services promise to further streamline these operations, supporting scalable, resilient, and cost-effective cloud infrastructure solutions.

**Keyword** Azure Snapshot Management ,Regional Deployment ,Cloud Computing ,Managed Disk Conversion ,Virtual Machine Instance Launch ,Azure Portal Operations ,Data Integrity

## ABBREVIATIONS

Abbreviation	Expansion
VM	Virtual Machine
CLI	Command-Line Interface
IT	Information Technology
VHD	Virtual Hard Disk
IAC	Infrastructure as Code

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# **Chapter 1**

## **Introduction**

### **1.1 Scope**

The scope of this process involves a detailed, step-by-step approach to create a snapshot of a root volume from an existing virtual machine in Azure, migrate this snapshot to the Southeast Asia region, convert the snapshot to a managed disk, and subsequently launch a new virtual machine using this managed disk in the Southeast Asia region. This comprehensive task encompasses multiple stages: initiating the snapshot creation from the original VM's root volume, exporting and transferring the snapshot to a storage account in the Southeast Asia region, creating a managed disk from the snapshot in the new region, and finally, deploying a new VM that utilizes the managed disk as its root volume. Each of these steps requires careful execution within the Azure Portal to ensure a seamless migration and deployment process, maintaining data integrity and minimizing downtime. This scope is crucial for businesses aiming to expand their Azure infrastructure into new geographical regions while leveraging existing VM configurations and data.

### **1.2 Objectives**

The objectives of this process are to create a snapshot of an existing VM's root volume and migrate it to the Southeast Asia region. This involves generating the snapshot, transferring it to a Southeast Asia storage account, converting it into a managed disk, and then deploying a new VM using this managed disk as the root volume. This ensures seamless regional expansion of Azure infrastructure while maintaining the original VM's configuration and data integrity.

Some key objectives include:

- Generate a snapshot of the root volume from an existing virtual machine in Azure.
- Transfer the snapshot to a storage account in the Southeast Asia region.
- Create a managed disk from the migrated snapshot in the Southeast Asia region.
- Deploy a new virtual machine using the managed disk as the root volume in the Southeast Asia region.

### **1.3 Azure Introduction**

Azure is Microsoft's cloud computing platform, offering a wide range of services including computing, analytics, storage, and networking. It provides users with the flexibility to build, deploy, and manage applications through Microsoft's global network of data centers. Among its numerous capabilities, Azure enables seamless virtual machine management, including creating snapshots of VM root volumes, migrating these snapshots across regions, and launching new instances based on these snapshots.

## Creating Snapshot for Root Volume and Migrating to Southeast Asia Region

In Azure, creating a snapshot of a VM's root volume is a straightforward process that captures the state and data of the VM at a specific point in time. This snapshot can then be transferred to another region, such as Southeast Asia, to facilitate disaster recovery, data migration, or regional expansion. The process involves creating the snapshot, exporting it, and transferring it to a storage account in the target region. Once transferred, the snapshot can be converted into a managed disk, which can then be used to launch a new virtual machine in the Southeast Asia region.

### Key Features

- **Scalability:** Azure allows easy scaling of services to meet demand, enabling businesses to handle varying workloads efficiently.
- **Global Reach:** With data centers in numerous regions worldwide, Azure enables businesses to deploy services close to their users, reducing latency and improving performance.
- **Disaster Recovery:** The ability to create snapshots and transfer them across regions provides robust disaster recovery solutions, ensuring business continuity.
- **Managed Disks:** Azure Managed Disks simplify storage management by handling the storage account creation and management, providing increased availability and security.
- **Automation:** Azure supports automation of repetitive tasks, including snapshot creation and VM deployment, through tools like Azure PowerShell and Azure CLI.
- **Security:** Azure provides a comprehensive set of security tools and features, including encryption, network security groups, and advanced threat protection, ensuring the safety of data and applications.

By leveraging these features, businesses can efficiently manage their Azure infrastructure, ensuring high availability, data integrity, and optimal performance across different regions.



## **Chapter 2**

# **Problem Statement and Proposed System Methodology**

### **2.1 Problem Statement**

Ensuring business continuity and regional redundancy requires migrating an existing virtual machine's root volume from one Azure region to the Southeast Asia region. This process involves creating a snapshot of the current root volume, transferring the snapshot to the Southeast Asia region, converting it into a managed disk, and finally launching a new virtual machine in the Southeast Asia region using this managed disk. The challenge lies in executing this multi-step process efficiently and accurately within the Azure Portal to maintain data integrity, minimize downtime, and leverage Azure's global infrastructure capabilities for optimal performance and reliability.

### **2.2 Proposed System Methodology**

The proposed system methodology involves a structured approach to ensure a smooth migration of a virtual machine's root volume to the Southeast Asia region using Azure's capabilities. Initially, a snapshot of the VM's root volume will be created to capture its state and data at a specific point in time. This snapshot will then be transferred to a storage account in the Southeast Asia region. After the successful transfer, the snapshot will be converted into a managed disk. Finally, a new virtual machine will be launched in the Southeast Asia region utilizing this managed disk as its root volume. This methodology ensures data integrity, minimizes downtime, and leverages Azure's global infrastructure for enhanced performance and reliability. The process is designed to be executed within the Azure Portal, providing a user-friendly interface and tools to manage each step efficiently.

# Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

## 2.3 Steps

Here are the detailed steps for creating and verifying a snapshot in Azure:

### Step 1: Create a Virtual Machine (VM)

- Log in to the Azure portal.
- In the Azure portal, search for “Virtual machines”. Under Services, select “Virtual machines”.
- In the Virtual machines page, select “Create” and then “Azure virtual machine”.
- Enter the necessary details such as the VM name, region (select Central India), image, size, and administrator account details. Also, allow the necessary inbound port rules.
- Review your settings and then click on “Review + create”. After validation, select “Create” to deploy the VM.

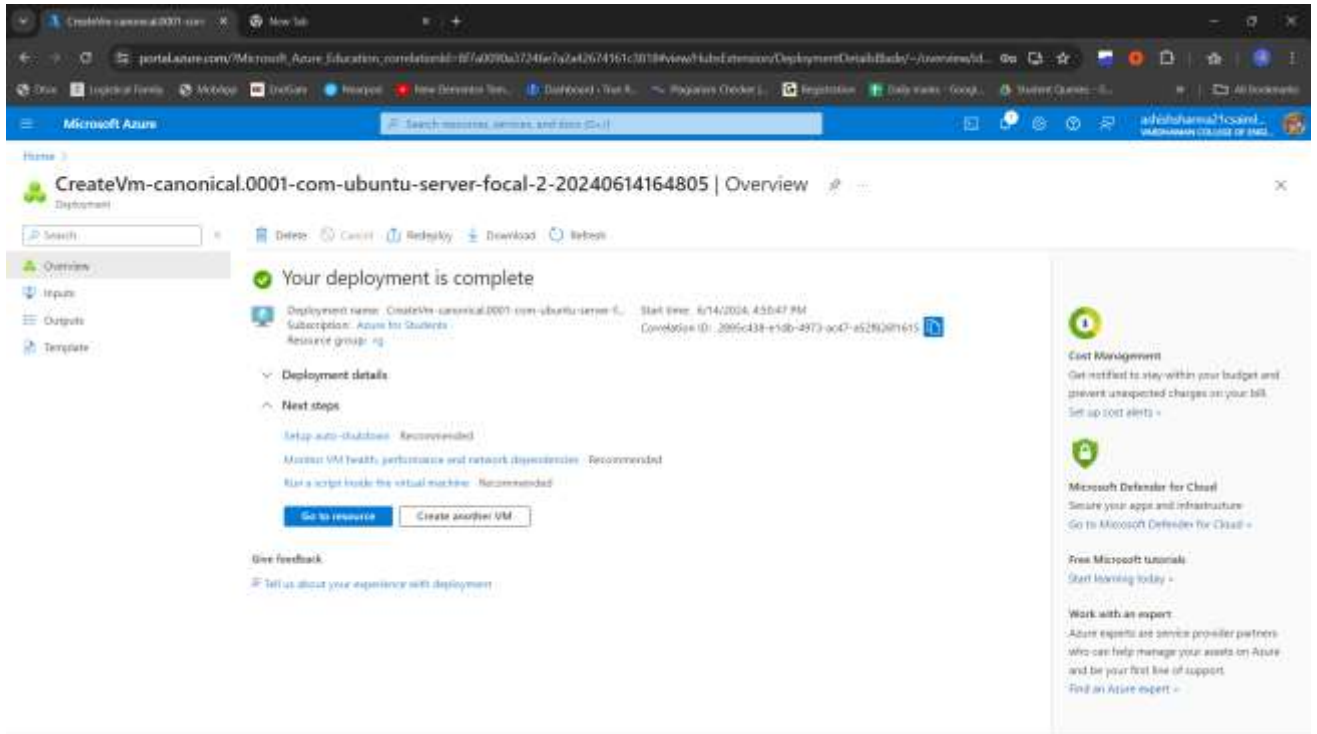


Figure 1

### Step 2: Launch the VM and Create a File

- Once the VM is deployed, connect to it using SSH or RDP.
- Launch a terminal or command prompt within the VM.
- Use the `nano` command (or any text editor) to create a new file. This file will be used later to verify the snapshot.

## Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

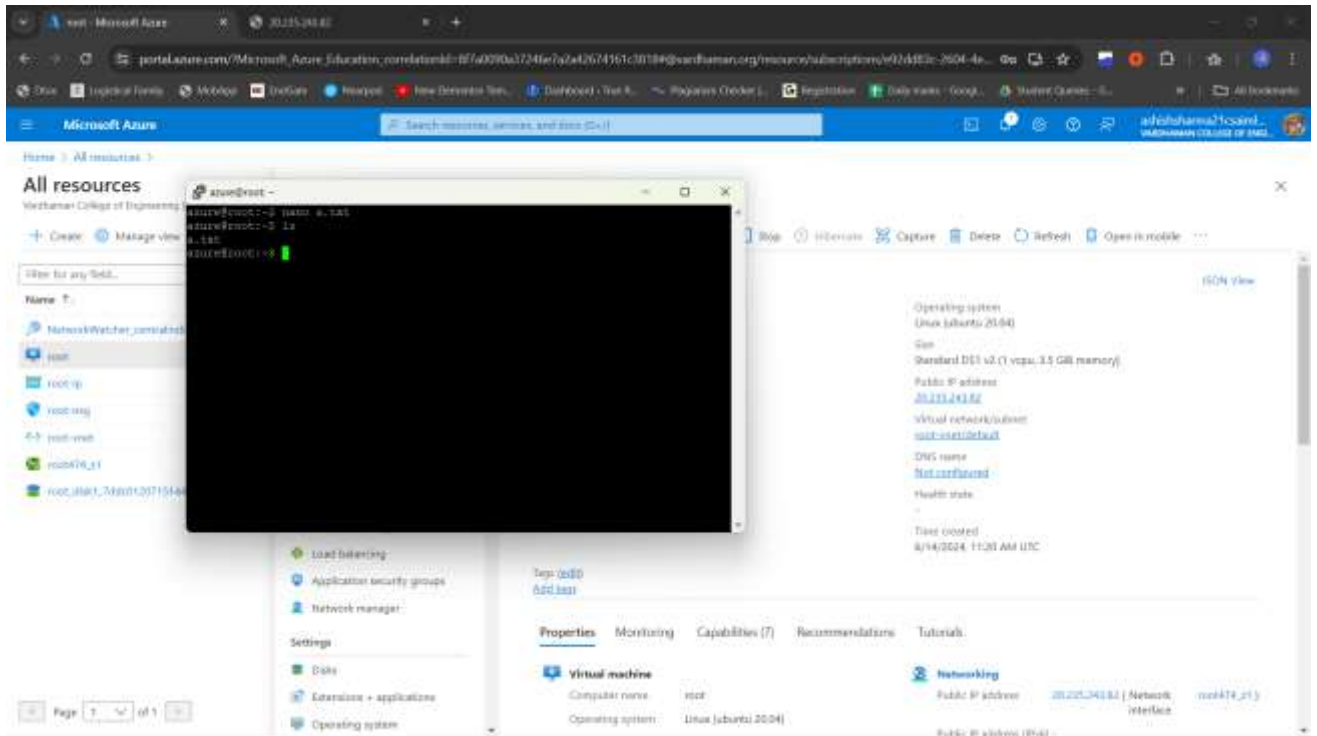


Figure 2

### Step 3: Create a Snapshot for the Root Volume

- Shut down the VM that you want to snapshot to ensure data consistency.
- In the Azure portal, select “Create a resource”. Search for and select “Snapshot”.
- In the Snapshot window, select “Create”. For Resource group, select an existing resource group or create a new one.
- Enter a Name for your snapshot, then select a Region (Central India) and Snapshot type for the new snapshot.
- For Source disk, select the managed disk attached to your VM that you want to snapshot.
- Select “Review + create” and then “Create” after validation.

## Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

The screenshot shows the 'Create snapshot' form in the Microsoft Azure portal. The form is divided into several sections: 'Project details', 'Instance details', and 'Snapshot type'. The 'Project details' section includes 'Subscription' (Azure for Students) and 'Resource group' (rg). The 'Instance details' section includes 'Name' (root), 'Region' (Asia Pacific Central India), and 'Snapshot type' (Full). The 'Snapshot type' section has two options: 'Incremental' and 'Full'. The 'Full' option is selected, with the description 'Make a complete read-only copy of the selected disk.' The 'Source type' is set to 'Disk'. At the bottom, there are buttons for 'Review + create', 'Previous', and 'Next: Encryption'.

**Create snapshot**

Basics Encryption Networking Advanced Tags Review + create

A snapshot is a read-only copy of a virtual hard drive (VHD). You can take a snapshot of an OS or data disk VHD to use as a backup, or to troubleshoot virtual machine (VM) issues. [Learn more about snapshots in Azure.](#)

**Project details**

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 \* rg

Create new

**Instance details**

Name \* root

Region \* Asia Pacific Central India

Snapshot type \* ☐ Incremental: Save on storage costs by making a partial copy of the disk based on the difference between the last snapshots.  
☒ Full: Make a complete read-only copy of the selected disk.

Source type: Disk

Review + create Previous Next: Encryption

Figure 3

The screenshot shows the 'Overview' page for the snapshot 'Snapshot.root-20240614170150' in the Microsoft Azure portal. The page displays the deployment status as 'Your deployment is complete'. It includes deployment details such as 'Deployment name', 'Subscription', 'Resource group', 'Start time', and 'Correlation ID'. A 'Go to resource' button is available. On the right, there is a 'Deployment succeeded' notification and a sidebar with recommendations for 'Cost management', 'Microsoft Defender for Cloud', 'Free Microsoft tutorials', and 'Work with an expert'.

**Snapshot.root-20240614170150 | Overview**

Deployment

Search

Overview Inputs Outputs Template

**Your deployment is complete**

Deployment name: Snapshot.root-20240614170150 Start time: 6/14/2024, 5:01:54 PM

Subscription: Azure for Students Correlation ID: 2305ed6f-2ef2-4838-bd7d-923d88013277

Resource group: rg

Deployment details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

**Deployment succeeded**

Deployment 'Snapshot.root-20240614170150' to resource group 'rg' was successful.

Go to resource Pin to dashboard

**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**

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**Work with an expert**

Azure experts are service provider partners who can help manage your work on Azure and be your first line of support. [Find an Azure expert >](#)

Figure 4

Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

#### Step 4: Migrate Snapshot to Southeast Asia Region

- Use Azure Resource Mover to move the snapshot to the Southeast Asia region.
- In the Azure portal, search for “Resource Mover”. Under Services, select “Azure Resource Mover”.
- In Move resources > Source + destination tab, select your source subscription and region (Central India).
- Select the resources you want to move (the snapshot).
- Select “Move” > “Move to another region”.
- In Source + destination, select Southeast Asia as your target region.

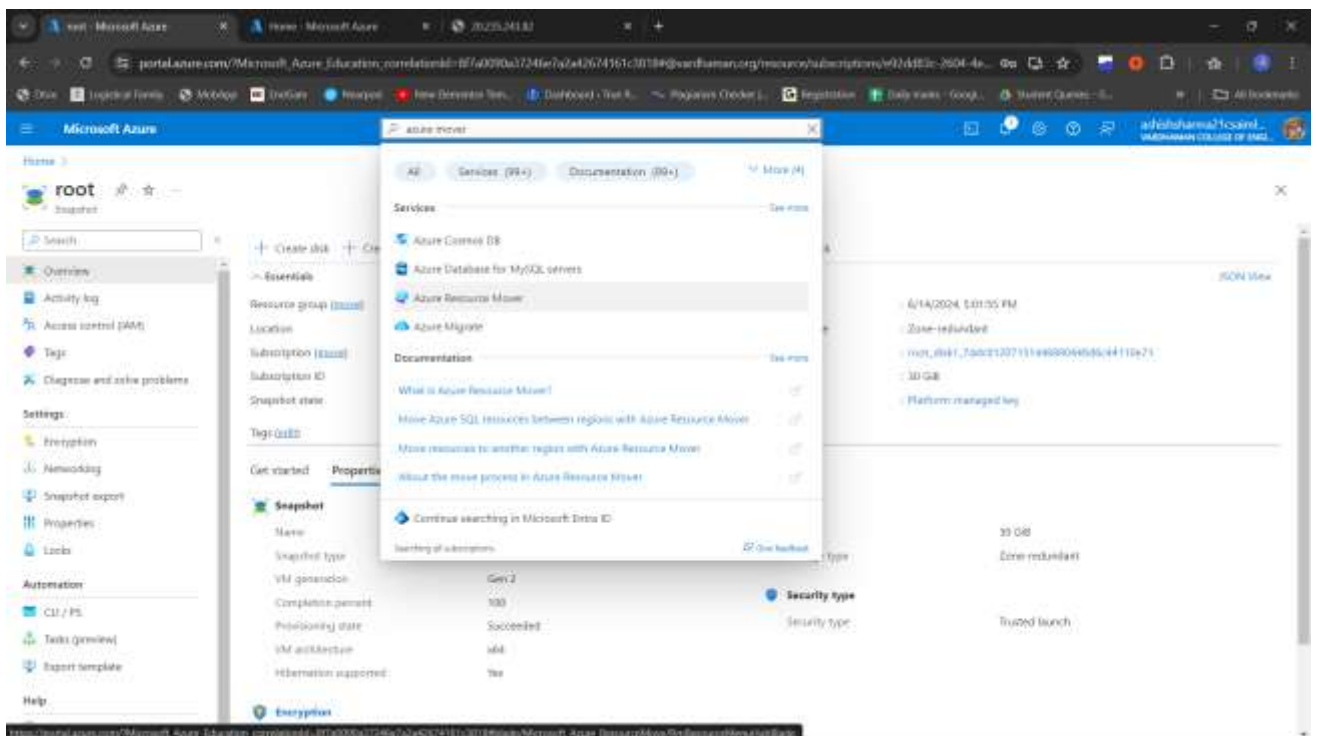


Figure 5

## Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

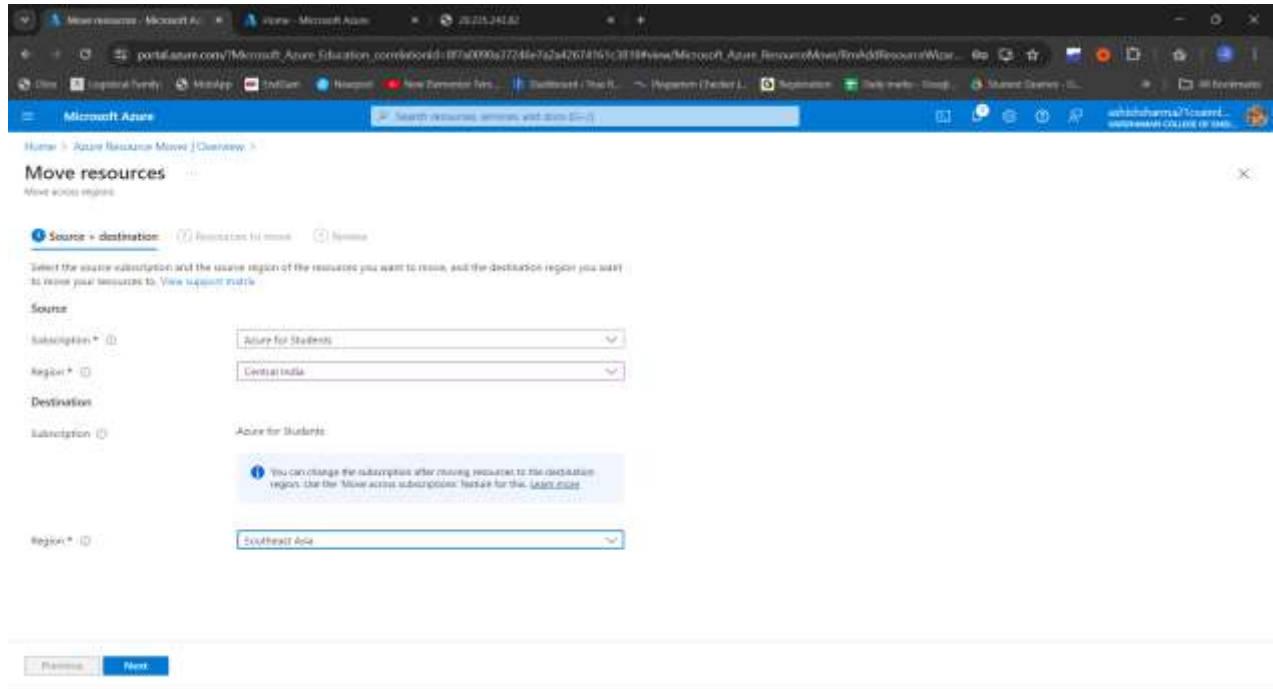


Figure 6

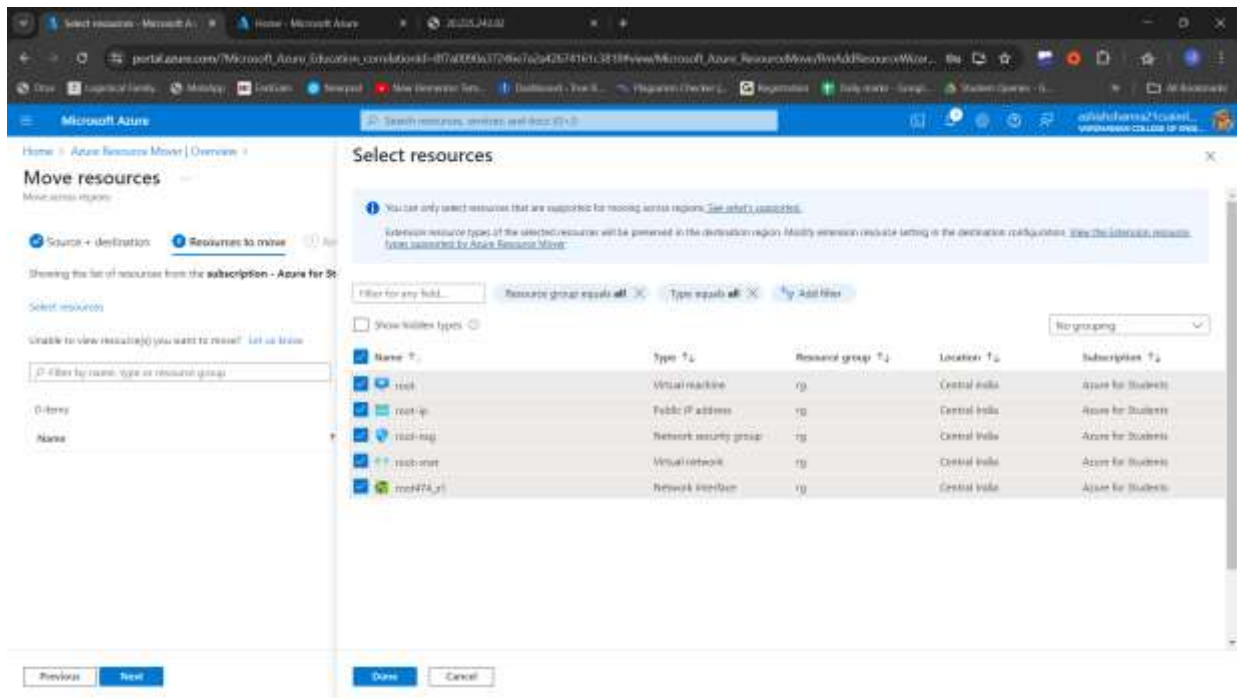


Figure 7

## Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

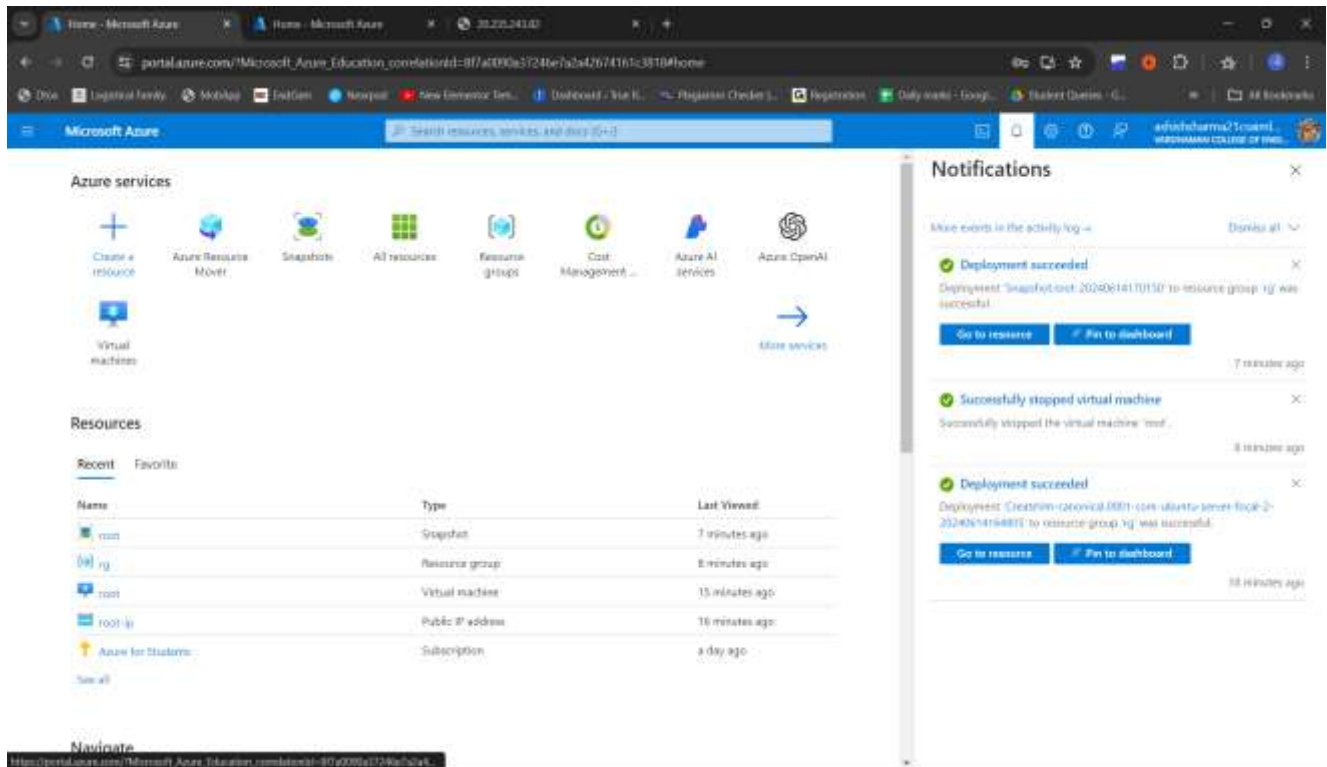


Figure 8

### Step 5: Convert Snapshot to Volume

- Once moved, create a new disk from the snapshot in Southeast Asia region.



Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snapt to Volume and Launch the Instance in SouthEastAsia Region

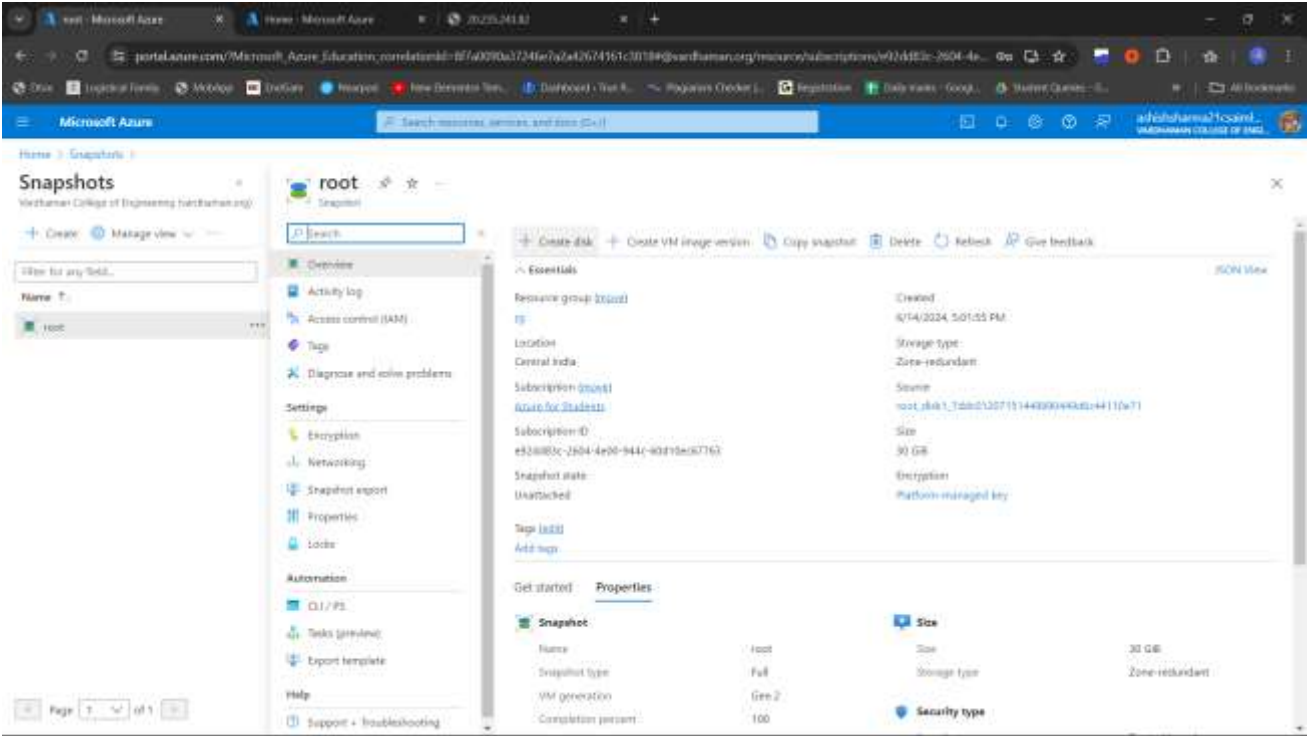


Figure 9

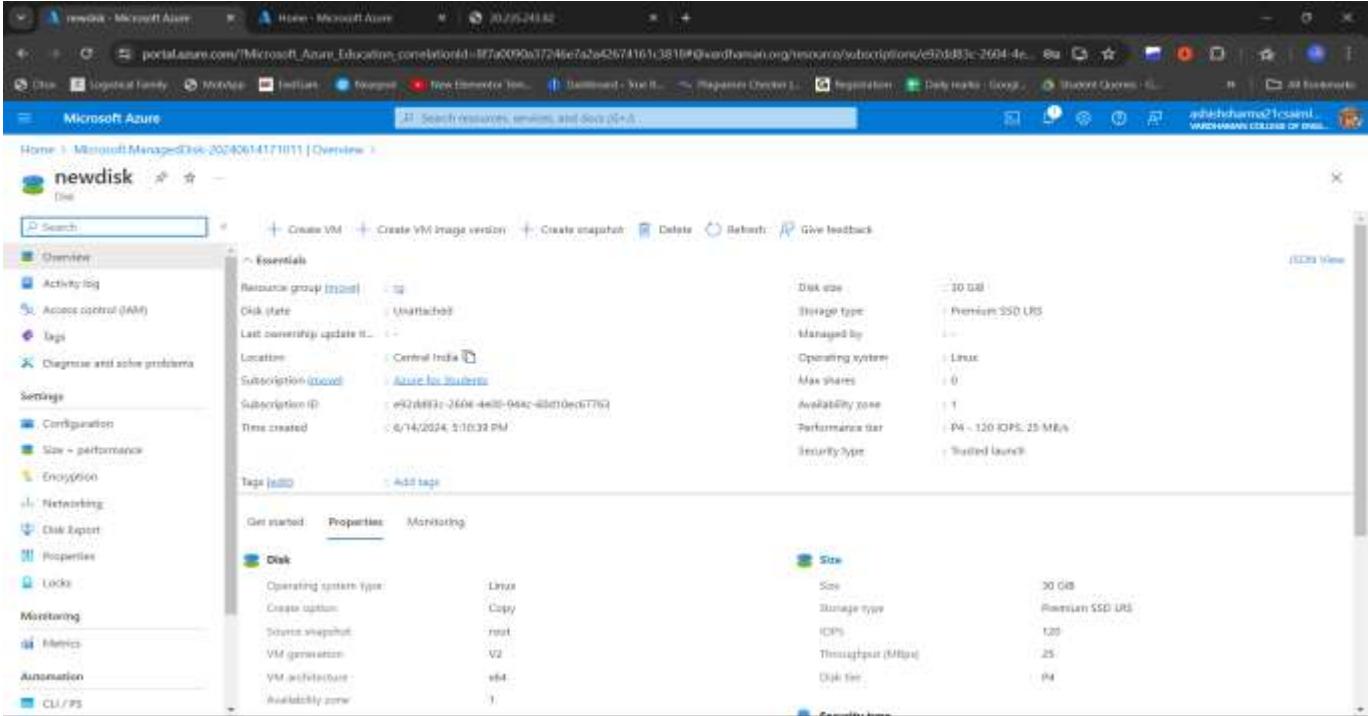


Figure 10



# Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

## Step 6: Launch Instance in Southeast Asia Region

- Create a new VM using this new disk as its OS disk.

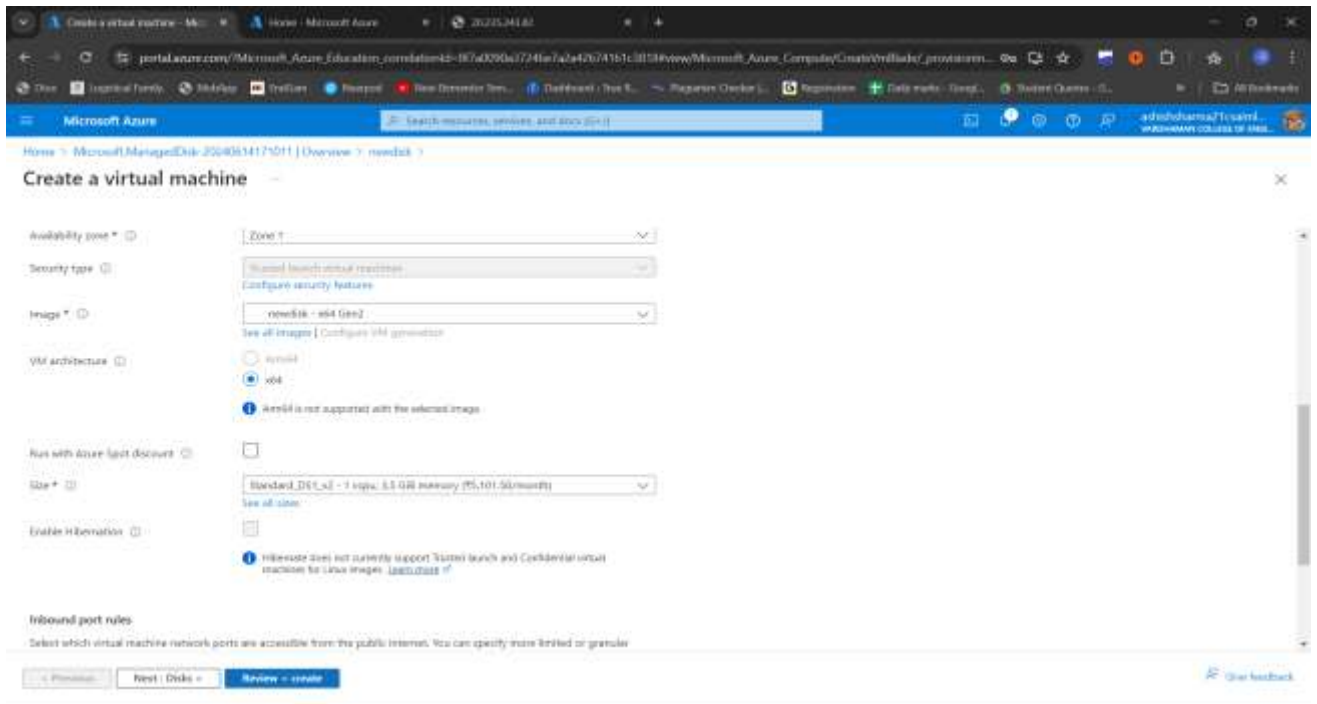


Figure 11

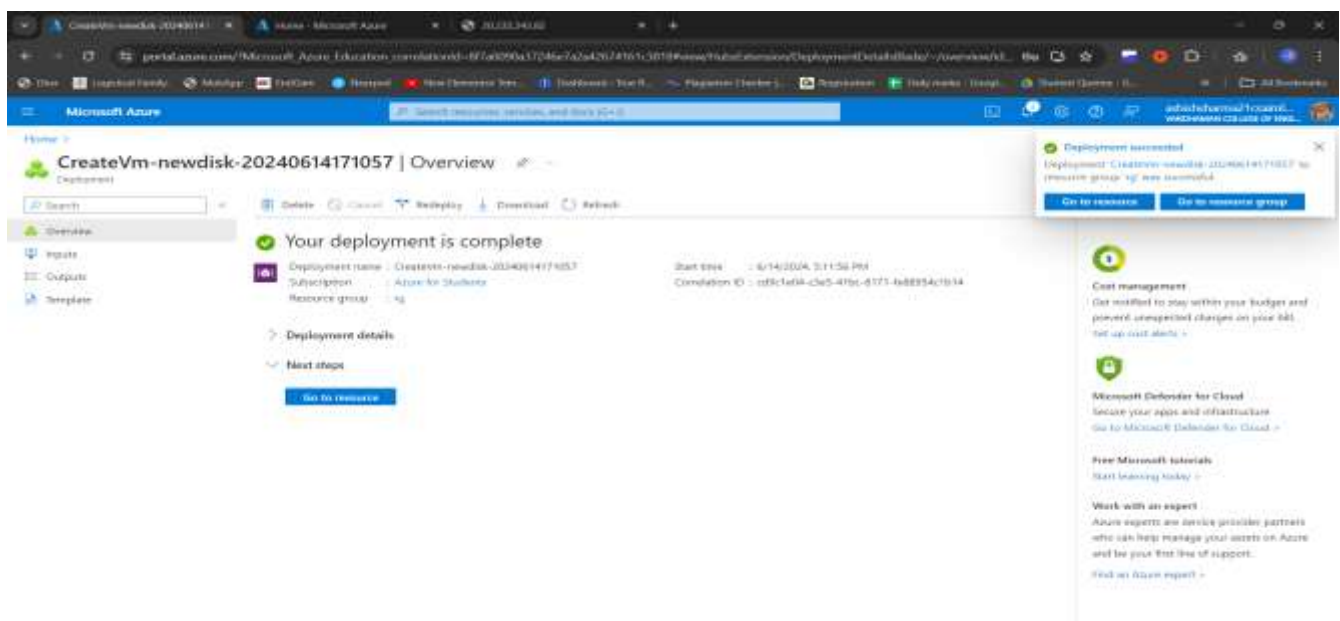


Figure 12

Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

### Step 7: Connect to the New VM and Verify Snapshot

- Connect to this new VM using SSH or RDP.
- Verify that the file you created earlier is present on this new VM. If it is present, your snapshot has been successfully created and verified.

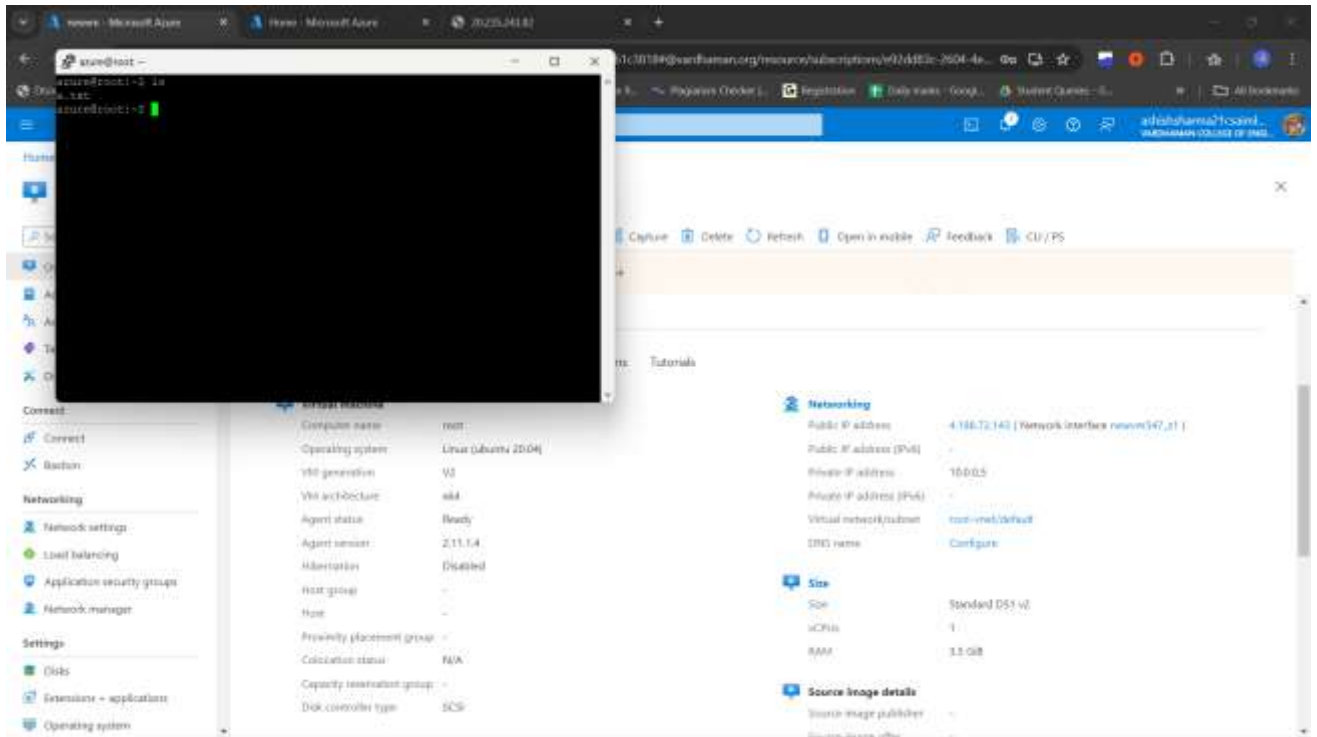


Figure 13

## Chapter 3

# Software Requirements Specification and Hardware Requirements

### 3.1 Software Requirements

The software requirements for executing the process of creating a snapshot for a root volume, migrating it to the Southeast Asia region, converting it to a volume, and launching an instance in Azure's Southeast Asia region are minimal but crucial for successful implementation:

1. **Azure Portal Access:** Ensure access to the Azure Portal ([portal.azure.com](https://portal.azure.com)) with appropriate permissions to manage virtual machines, disks, snapshots, and storage accounts.
2. **Virtual Machine:** A virtual machine (VM) must be provisioned and running in Azure, as the snapshot is created from its root volume.
3. **Azure Storage Account:** You need at least one Azure Storage Account where snapshots can be exported to and imported from, located in the Southeast Asia region.
4. **Azure Managed Disks:** Ability to create and manage Azure Managed Disks, as the snapshot will be converted into a managed disk for use in launching a new VM instance.
5. **Network Connectivity:** Stable internet connection to upload/download snapshots to/from Azure Storage Account and manage resources in the Azure Portal.
6. **Browser:** Use a compatible web browser to access the Azure Portal and navigate through various management interfaces seamlessly.
7. .

### 3.2 Hardware Requirements

For the process of creating a snapshot for a root volume, migrating it to the Southeast Asia region, converting it to a volume, and launching an instance in Azure's Southeast Asia region, the hardware requirements are primarily focused on access to a reliable computing device with internet connectivity. Here are the hardware requirements:

1. **Computing Device:**
  - **Desktop or Laptop:** Any modern desktop or laptop computer capable of running a web browser smoothly.
  - **Operating System:** Compatible with major operating systems like Windows, macOS, or Linux.
2. **Internet Connectivity:**
  - **Stable Internet Connection:** Reliable internet access is crucial for accessing the Azure Portal ([portal.azure.com](https://portal.azure.com)), managing virtual machines, disks, snapshots, and storage accounts.
  -

Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

3. **Browser:**

- **Web Browser:** Use of a compatible web browser (such as Google Chrome, Mozilla Firefox, Microsoft Edge, or Safari) to access and navigate through the Azure Portal.

These hardware requirements ensure that you can effectively access and manage Azure resources through the Azure Portal, perform tasks like creating and managing snapshots, uploading data to storage accounts, and deploying virtual machines in the desired Azure region (Southeast Asia in this case). The actual computation and processing are handled by Microsoft Azure's cloud infrastructure, making the hardware requirements minimal for the user's local device.

## **Chapter 4**

### **Results and Discussions**

The process of creating a snapshot for a root volume, migrating it to the Southeast Asia region, converting it to a volume, and launching an instance in Azure's Southeast Asia region is pivotal for businesses seeking efficient data management and regional deployment capabilities. By initiating a snapshot, organizations capture a precise state of their virtual machine's root volume, facilitating data backup and recovery readiness. Migrating this snapshot to the Southeast Asia region ensures compliance with regional data sovereignty regulations and bolsters disaster recovery measures through geographic redundancy.

Converting the snapshot into a managed disk enhances operational efficiency by simplifying storage management and optimizing data access speeds within the Southeast Asia region. Launching a new instance using this managed disk enables businesses to expand their IT footprint seamlessly, catering to local user demands with minimal latency and enhanced performance.

However, challenges such as network bandwidth constraints during snapshot transfer and the imperative to maintain stringent security protocols throughout the process underscore the importance of meticulous planning and execution. Looking forward, advancements in automation tools and integration with Azure's broader service ecosystem promise to further streamline these operations, empowering organizations with scalable, resilient, and cost-effective cloud infrastructure solutions.

Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snapshot to Volume and Launch the Instance in SouthEastAsia Region

## Chapter 5

### Conclusion and Future Scope

The process of creating a snapshot for a root volume, migrating it to the Southeast Asia region, converting it to a volume, and launching an instance in Azure's Southeast Asia region represents a strategic approach to enhance data management and expand operational capabilities. This methodology provides businesses with robust tools for maintaining data integrity, achieving regulatory compliance, and optimizing performance through regional deployment.

By creating snapshots, organizations establish reliable backups of critical data, essential for disaster recovery and ensuring business continuity. The migration of these snapshots to the Southeast Asia region not only supports compliance with local data residency requirements but also facilitates geographic redundancy, mitigating risks associated with regional outages or disruptions.

Converting snapshots into managed disks streamlines storage management, offering scalability and reliability for deploying new virtual machine instances in the Southeast Asia region. This capability not only improves operational efficiency but also enables businesses to scale resources dynamically according to evolving demands.

Looking ahead, there are several avenues for further enhancing and expanding upon this process:

1. **Automation and Orchestration:** Implementing automated workflows using Azure DevOps or Infrastructure as Code (IaC) tools like Terraform can streamline snapshot creation, migration, and VM deployment tasks, reducing manual intervention and improving deployment agility.
2. **Advanced Data Services:** Leveraging Azure's advanced data services, such as Azure Backup and Azure Site Recovery, can enhance disaster recovery capabilities, offering automated backup schedules and faster recovery times.
3. **Optimized Performance and Cost Management:** Continuously optimizing resource utilization and leveraging Azure Cost Management tools can help organizations achieve cost efficiencies while maintaining high-performance standards.
4. **Enhanced Security Measures:** Integrating advanced security measures, such as Azure Security Center and Azure Sentinel, ensures comprehensive protection against cybersecurity threats and compliance with industry regulations.
5. **Global Expansion Strategies:** Exploring additional Azure regions for deployment and leveraging Azure's global network for improved user experience and reduced latency across diverse geographical locations.

Create Snapshot for Root Volume and Migrate to SouthEastAsia Region. Convert Snap to Volume and Launch the Instance in SouthEastAsia Region

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