Azure Cloud Infrastructure Deployment and Management

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Introduction

This document provides a comprehensive, step-by-step technical guide to deploying and managing an Azure Cloud infrastructure over a four-week cadence using the Azure Portal exclusively. All tasks are described with portal navigation, screenshots reference, and best-practice callouts.

Prerequisites

- **Azure Subscription**: Owner or Contributor role with portal access
- **Browser**: Modern browser (Edge, Chrome) with access to https://portal.azure.com
- **Permissions**: Ability to create resource groups, VMs, VNets, storage accounts, and configure Azure AD in the portal.
- **Tools (optional)**: Azure Architecture Diagrams tool (Visio or Draw.io)

Naming Conventions & Tagging

To ensure consistency and ease of management, adopt the following pattern for all resources:

Element	Pattern	Example
Resource Group	`<env>-rg-<app>-<region>`	`prod-rg-webapp-weu`
Virtual Network	`<env>-vnet-<app>-<region>`	`prod-vnet-webapp-weu`
Subnet	`<env>-subnet-<role>-<cidr>`	`prod-subnet-web-10-0-1`
Network SG	`<env>-nsg-<app>-<region>`	`prod-nsg-webapp-weu`
VM	`<env>-vm-<role>-<index>`	`prod-vm-web-01`
Storage Account	`<env>st<app><uniquestring>`	`prodstweb001`

Tags: Always include `Environment`, `Project`, `Owner`, and `CostCenter` when creating resources.

Azure Cloud Infrastructure Deployment and Management

Week 1: Azure Fundamentals & Setup

Azure Concepts Overview

- **Cloud Models**: Public, Private, Hybrid, Community
- **Service Models**: IaaS, PaaS, SaaS
- **Key Benefits**: Cost-efficiency, scalability, reliability, security, innovation acceleration

Subscription Setup (Portal)

1. Sign in at https://portal.azure.com.
2. Click on **Subscriptions** in the left-hand menu.
3. Select or create a subscription. Review billing profile and role assignments under **Access control (IAM)**.
4. Add users or groups as needed with Owner/Contributor roles.

Resource Group Creation (Portal)

1. In the Azure Portal menu, select **Resource groups**.
2. Click **+ Create**.
3. Under **Basics**, choose:
    - **Subscription**: Your Azure subscription
    - **Resource group**: `<env>-rg-<app>-<region>`
    - **Region**: e.g., *West Europe*
4. Under **Tags**, add `Environment=Production`, `Project=WebApp`, `Owner=Alice`, `CostCenter=12345`.
5. Click **Review + create**, then **Create**.

Best Practice: Group resources that share a lifecycle and apply RBAC at the group level. □cite□turn0file0□

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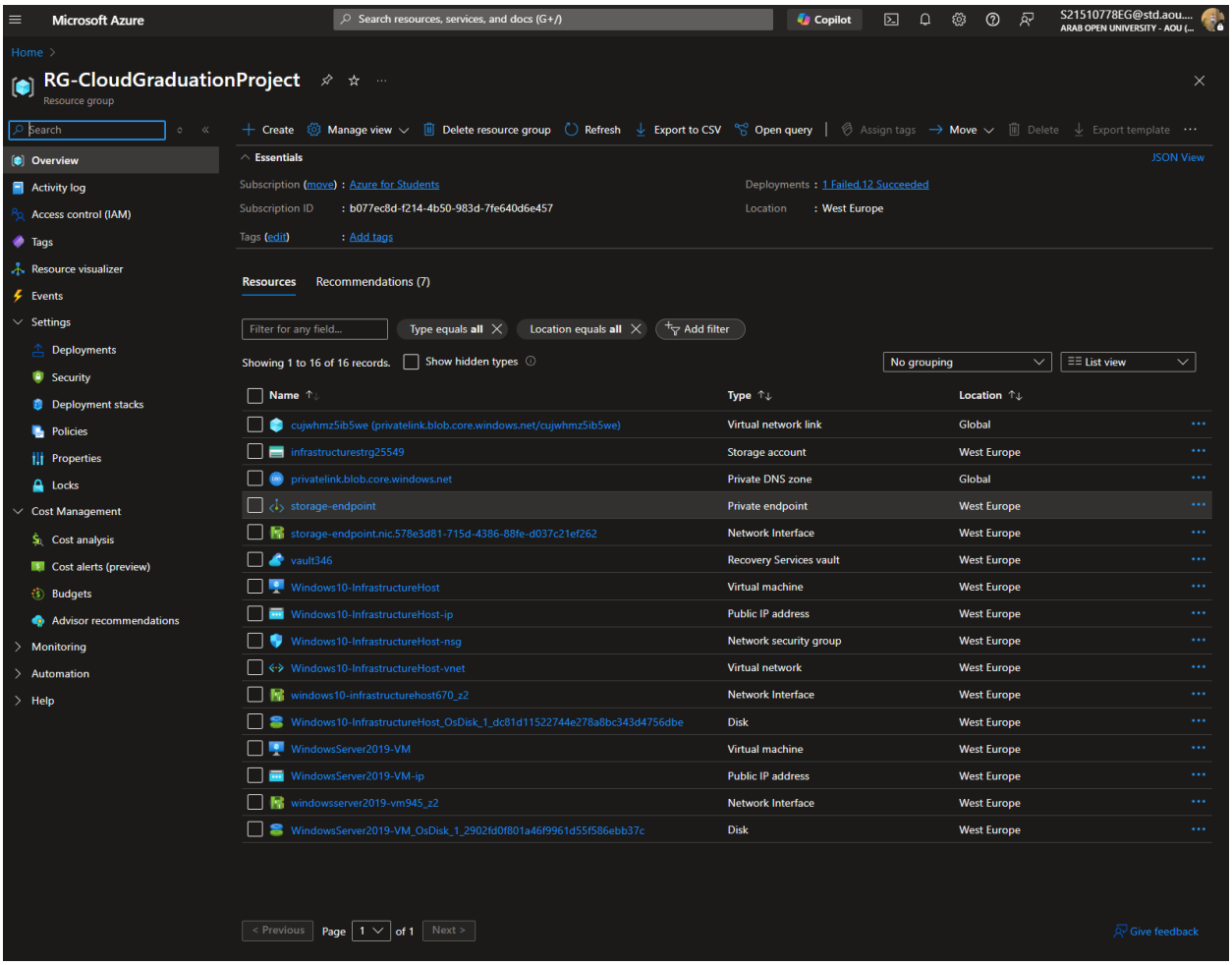
RG Components



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Week 2: Deploy and Manage Azure Resources

Virtual Machine Deployment (Portal)

1. In the portal menu, go to **Virtual machines** > **+ Create** > **Azure virtual machine**.
2. Under **Basics**, configure:
    - **Subscription** and **Resource group**: select the one created in Week 1.
    - **Virtual machine name**: `<env>-vm-<role>-<index>` (e.g., `prod-vm-web-01`).
    - **Region**: same as RG.
    - **Image**: e.g., *Ubuntu LTS*.
    - **Size**: click **See all sizes** and pick appropriate SKU (e.g., *Standard_B2s*).
3. Under **Administrator account**, choose SSH public key or password.
4. Under **Networking**, select:
    - **Virtual network**: `<env>-vnet-<app>-<region>` (or **Create new**).
    - **Subnet**: `<env>-subnet-<role>-<cidr>`.
    - **Public inbound ports**: select SSH (22) or RDP (3389).
    - **NIC network security group**: choose basic, then allow HTTP/HTTPS if needed.
5. Under **Management**, enable **Boot diagnostics**, **Auto-shutdown**, and **Backup** if desired.
6. Click **Review + create**, then **Create**.

Tip: Immediately configure Managed Disks and enable automated backups after VM creation.

Network Configuration (Portal)

Create Virtual Network & Subnet

1. Navigate to **Virtual networks** > **+ Create**.
2. Under **Basics**, set:
    - **Name**: `<env>-vnet-<app>-<region>`.
    - **Address space**: `10.0.0.0/16`.
    - **Subscription** and **Resource group**.
    - **Region**.

3. Under **IP Addresses**, click **+ Add subnet**:
    - **Subnet name**: `<env>-subnet-<role>-<cidr>`.
    - **Subnet address range**: e.g., `10.0.1.0/24`.
4. Click **Review + create**, then **Create**.

Configure Network Security Group (NSG)

1. Go to **Network security groups** > **+ Create**.
2. Under **Basics**, set:
    - **Name**: `<env>-nsg-<app>-<region>`.
    - **Subscription**, **Resource group**, **Region**.
3. After creation, open the NSG and select **Inbound security rules** > **+ Add**.
    - **Source**: Any
    - **Source port ranges**: *
    - **Destination**: Any
    - **Destination port ranges**: e.g., `80` for HTTP
    - **Protocol**: TCP
    - **Action**: Allow
    - **Priority**: `100`
    - **Name**: `Allow-HTTP`
4. Associate NSG with the VM NIC or subnet under **Network interfaces**.

Best Practice: Use NSGs to segment traffic; monitor flow logs with Azure Network Watcher. cite turn0file0

Azure Active Directory Configuration (Portal)

1. In the portal menu, select **Azure Active Directory**.
2. Under **Users**, click **+ New user**:
    - Fill in **Name**, **User name**, **Profile**.
3. Under **Groups**, click **+ New group**:
    - **Group type**: Security.
    - **Group name**: e.g., `WebAppAdmins`.
4. To assign roles, go to **Subscriptions**, select your subscription, then **Access control (IAM)** > **Add role assignment**.
    - **Role**: e.g., Contributor.
    - **Assign access to**: User, group, or service principal.
5. Select the group or user and click **Save**.

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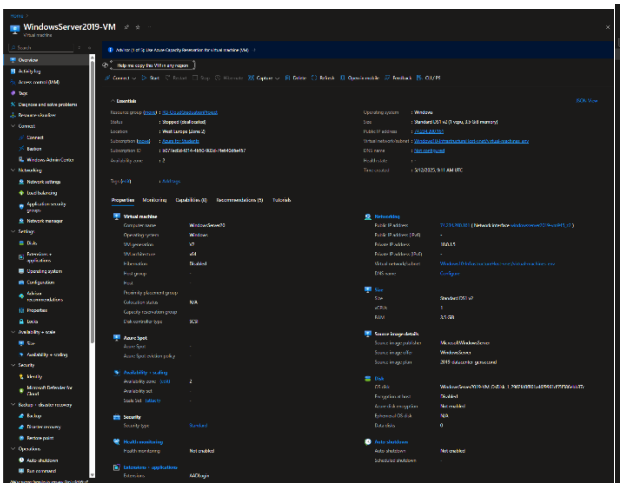
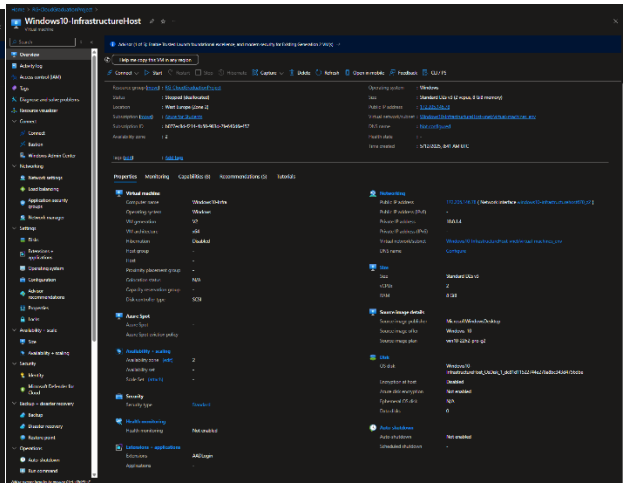
Virtual Machine Deployment

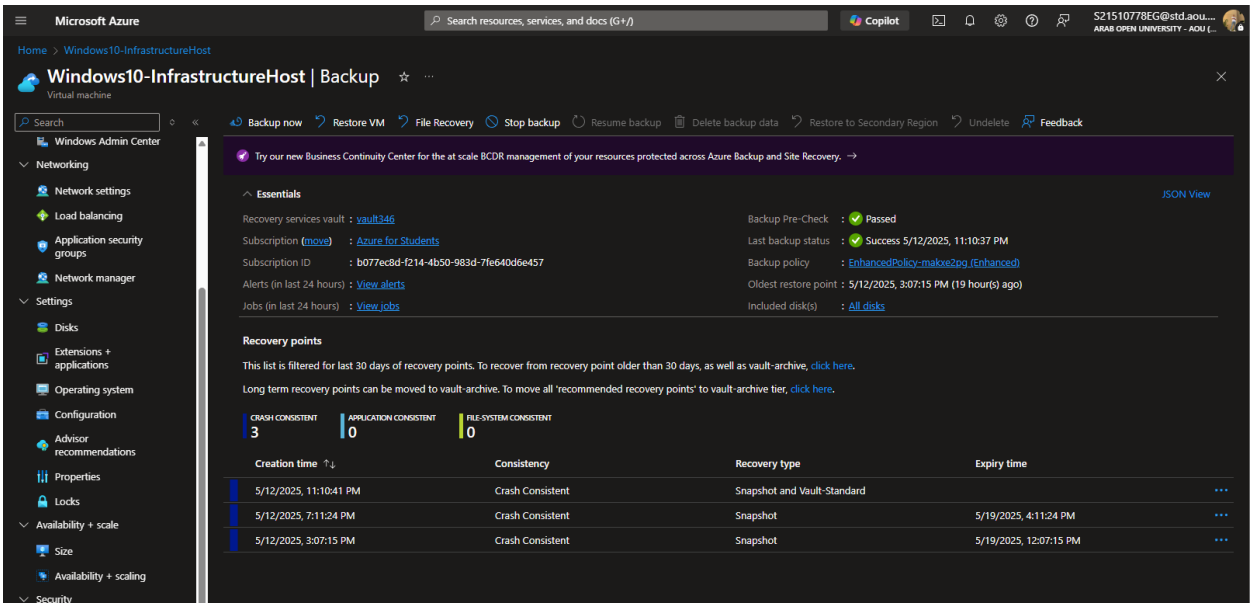
Server VM

Host VM





Host VM backup



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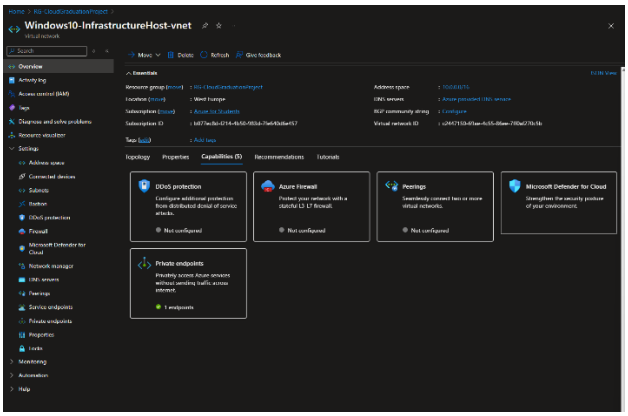
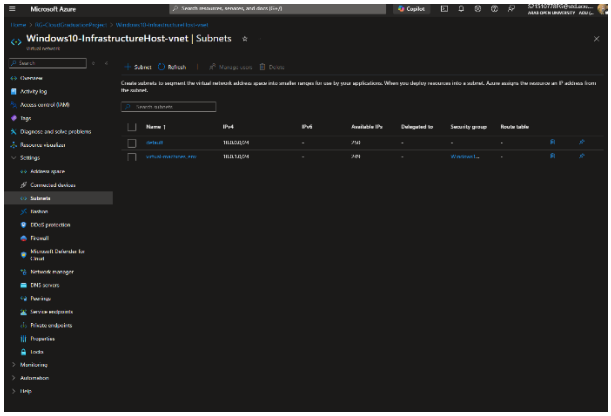
Network Configuration

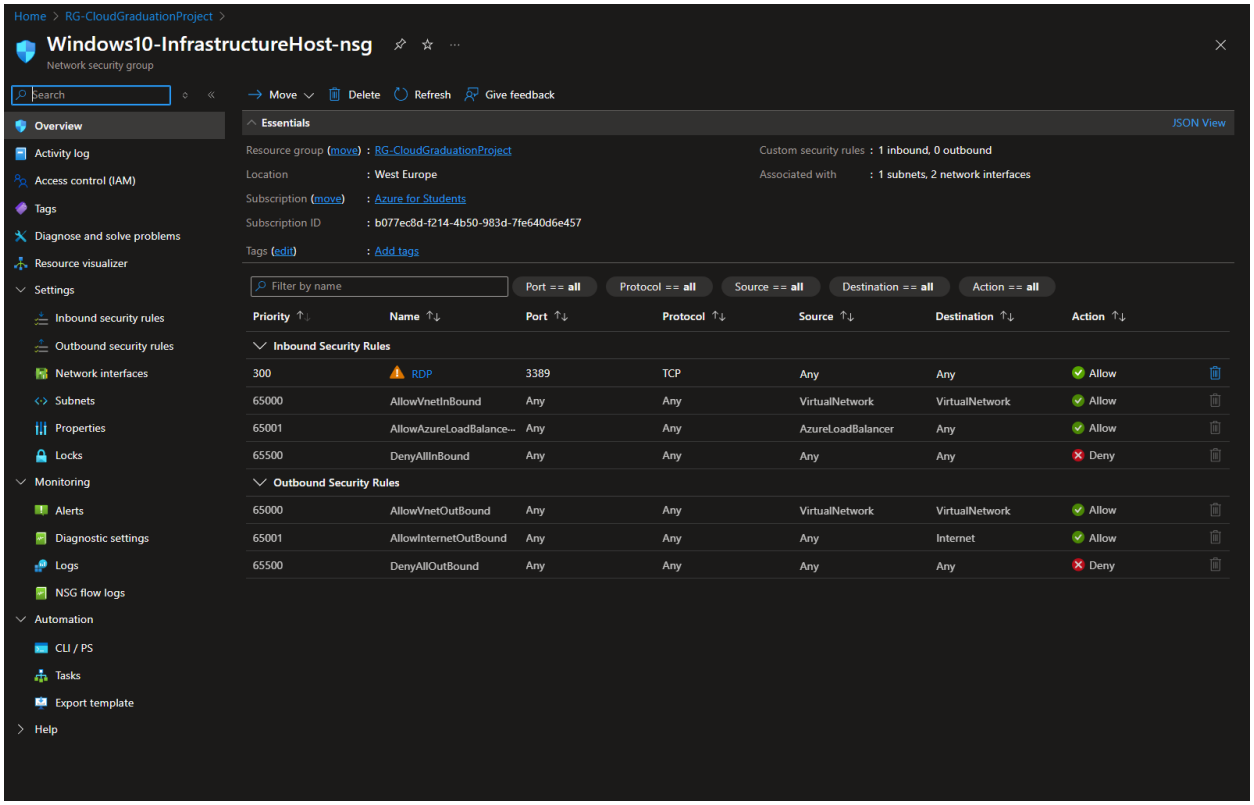
VNET



VNET Subnets



NSG



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Week 3: Implement Storage Solutions

Storage Account Provisioning (Portal)

1. Navigate to **Storage accounts** > **+ Create**.
2. Under **Basics**, configure:
    - **Subscription** and **Resource group**.
    - **Storage account name**: `<env>st<app><unique>`.
    - **Location**: same region.
    - **Performance**: Standard.
    - **Replication**: Geo-redundant (GRS).
3. Under **Advanced**, enable **Soft delete** and **Secure transfer required**.
4. Under **Networking**, choose **Private endpoint** or **Public endpoint (default)**.
5. Click **Review + create**, then **Create**.

Tip: Use private endpoints for production to restrict network exposure. cite turn0file0

Blob Storage Configuration (Portal)

1. Open the created storage account and go to **Containers** > **+ Container**.
    - **Name**: e.g., `logs-container`.
    - **Public access level**: Private (no anonymous access).
2. Click **Create**.
3. To change access tier, select a blob, then **Change tier** > choose Hot/Cool/Archive.

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Backup Solutions (Portal)

Recovery Services Vault Setup

1. Go to **Recovery Services vaults** > **+ Create**.
2. Under **Basics**, set:
   - **Name**: `<env>-rsv-<app>`.
   - **Subscription**, **Resource group**, **Region**.
3. Click **Review + create**, then **Create**.

Configure Backup

1. Open the vault and click **Backup** > **+ Backup**.
2. **Where is your workload running?**: Azure.
3. **What do you want to back up?**: Azure Virtual Machine / File Shares / SQL.
4. Click **Backup goal**, select VMs, then **Start discovery**.
5. After discovery, under **Backup items**, select VMs and click **Backup**.
6. Choose or create a **Backup policy** (schedule, retention), then **Enable backup**.

Best Practice: Test restore regularly and document RTO/RPO objectives. □cite□turn0file0□

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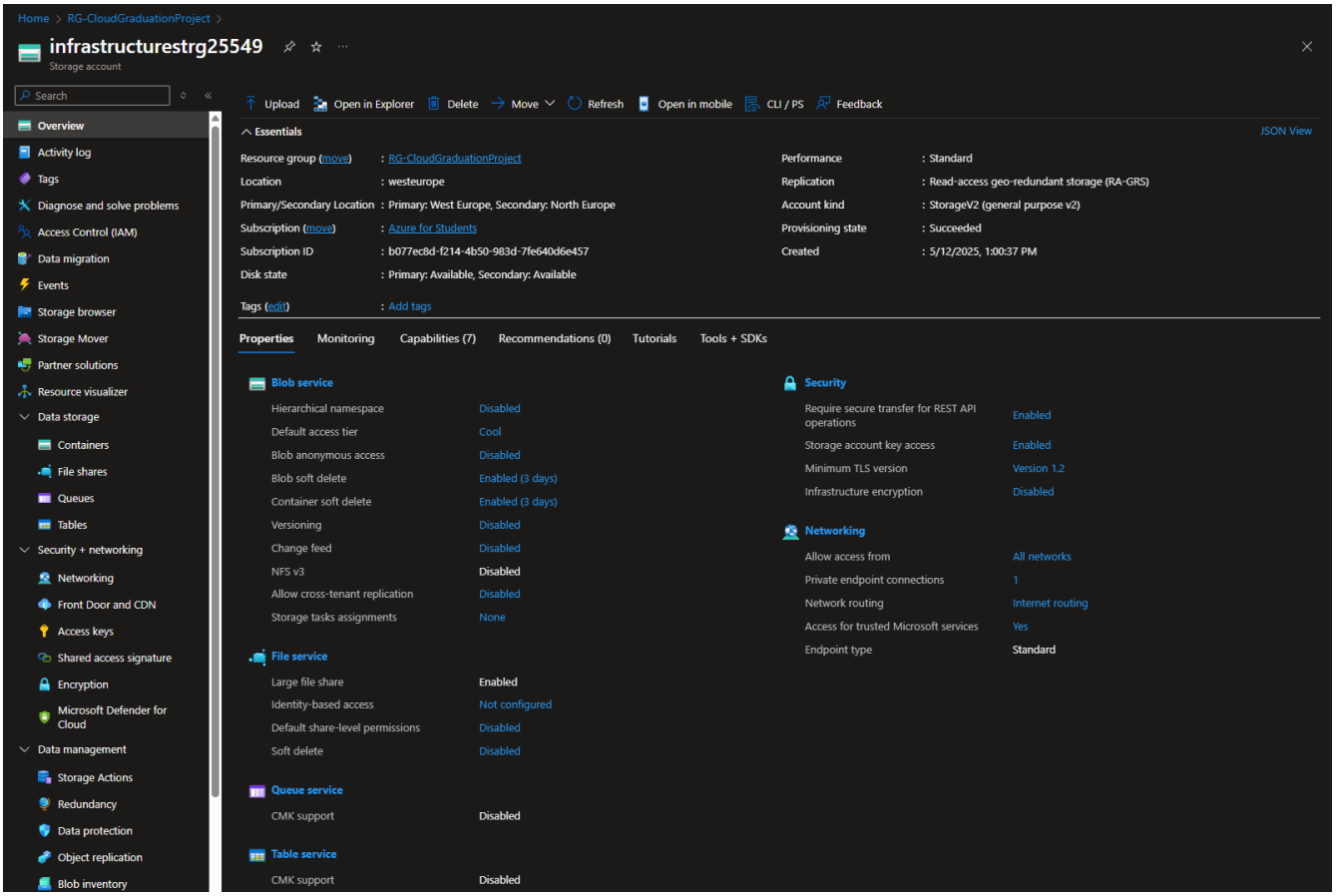
Storage Account & Blob

storage account



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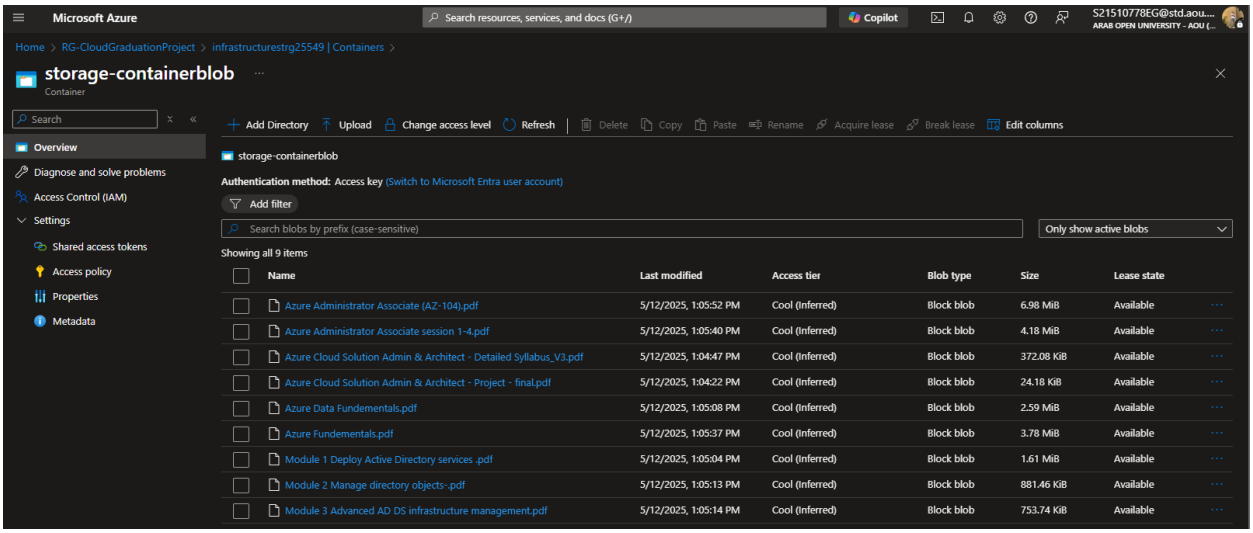
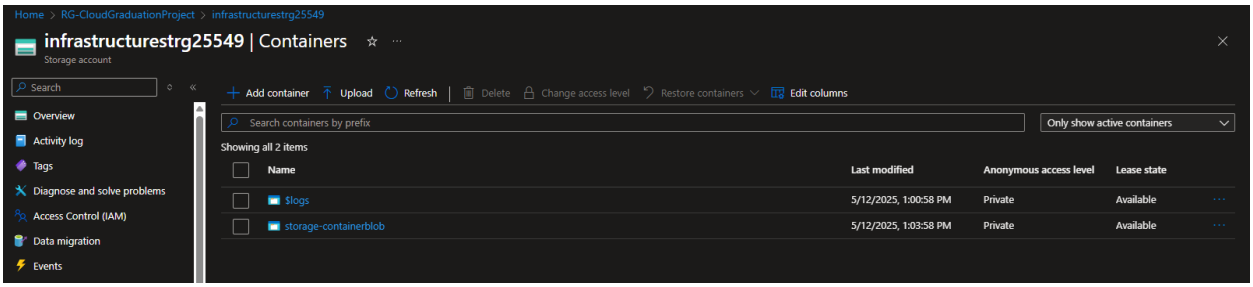
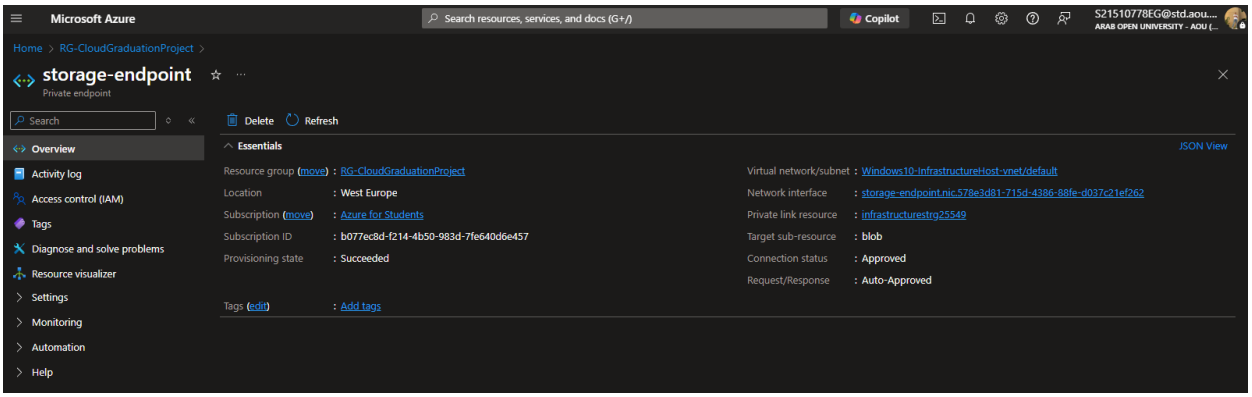
Blob container content



Blob container within the storage account



storage endpoint blb



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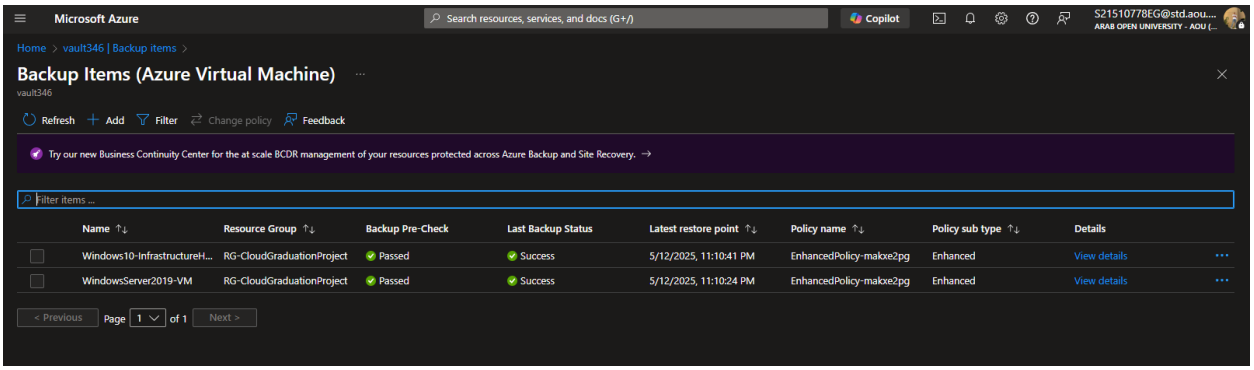
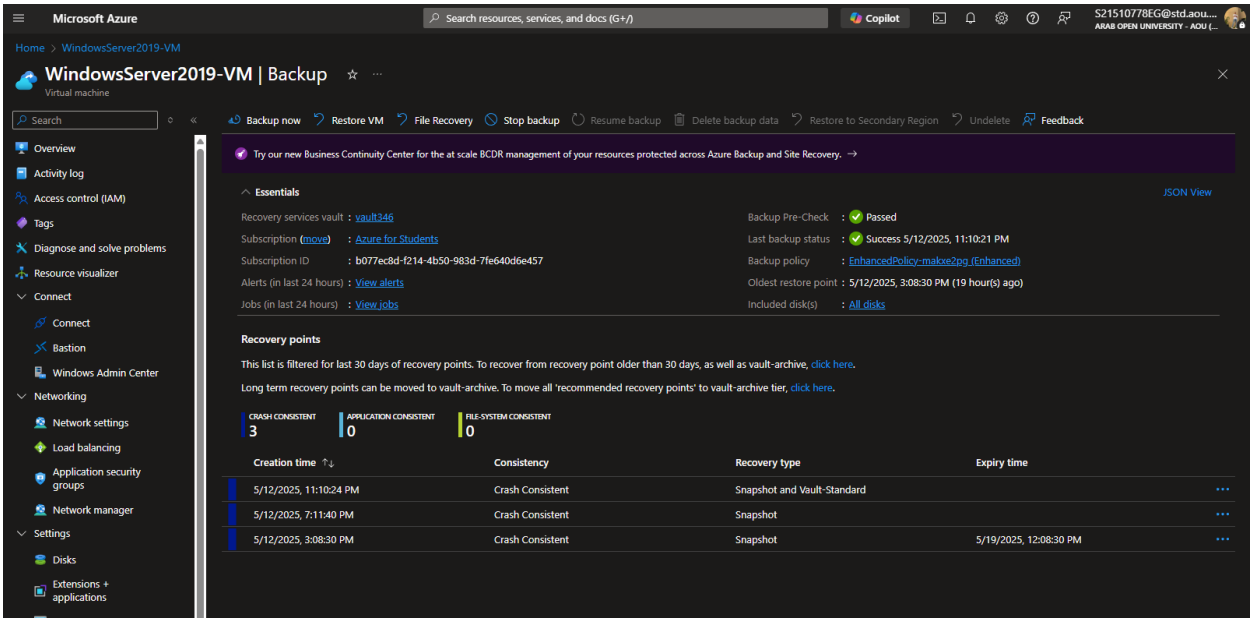
Backup Solutions

Backed up items in backup caul



Server Backup



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Week 4: Final Integration & Testing

Connectivity Verification

- Under each VM's **Networking** blade, verify assigned subnet and NSG.
- Use **Cloud Shell** > **Bash** (in portal) to run `ping <storageaccount>.blob.core.windows.net`.
- In **Azure Monitor**, review **Network Watcher** connectivity checks.

Identity & Access Validation

- Test login with a non-admin user to ensure RBAC works as expected.
- Under **Azure Active Directory** > **Sign-in logs**, validate access patterns.

Backup & Restore Simulations

- In **Recovery Services vault**, select a VM backup > **Restore VM**.
- Follow the restore wizard to recover to a new resource group or overwrite existing.
- Confirm restored VM is operational.

Documentation & Presentation

- Create architecture diagrams in Visio/Draw.io and export as PNG.
- Assemble a PowerPoint summarizing:
    1. Objectives & scope
    2. Architecture overview
    3. Deployment highlights
    4. Testing results
    5. Next steps and recommendations
- Upload all artifacts to a shared repository (e.g., Azure DevOps Wiki).

Appendices

ARM/Bicep Snippets

```
resource rg 'Microsoft.Resources/resourceGroups@2021-04-01' = {
  name: 'prod-rg-webapp-weu'
  location: 'westeurope'
}
```

Glossary

- **VNet**: Virtual Network
- **NSG**: Network Security Group
- **SKU**: Pricing tier of Azure resources

Note:

This Document is made for the Graduation Project from round 2 at DEPI (Digital Egypt Pioneers Initiative)

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End of Document