COLLEGE OF CREATIVE INNOVATION

Programme

Diploma in Cloud Computing and Cyber Security
(120 Credits)

Course

CCC601: Public Cloud Administration
(Level 6, 30 Credits, Version 1.1)

Assessment Title

# Azure Theoretical and Practical Concepts Evaluation

## CCC601 | Assessment-2

Weighting within the course

**50%**

## Objective:

## Course Learning Outcomes (LOs) covered:

**LO3:** Configure cloud-based virtual infrastructure that enhance efficiency and align with business requirements by applying best-practice technique.

**LO4:** Execute Active Directory migration in a cloud-ready environment for improved security and efficiency.

## Qualification Graduate Profile Outcomes (GPOs) covered:

**GPO8:** Implement and monitor a range of resilient and secure systems and network services, including identity management and directory services, to meet organisational requirements

## Assessment Tasks to Learning Outcome and GPOs Mapping:

| LO | GPO | Task | Task Component | Weighting |
|---|---|---|---|---|
| **LO3.** Configure cloud-based virtual infrastructure that enhance efficiency and align with business requirements by applying best-practice technique.<br><br>**LO4.**<br>Execute Active Directory migration in a cloud-ready environment for improved security and efficiency. | **GPO8.**<br><br>Implement and monitor a range of resilient and secure systems and network services, including identity management and directory services, to meet organisational requirements. | **Task1:(LO3)**:<br>Cloud Infrastructure Planning and Cost Optimization | Task 1:<br>Theoretical Evaluation | 25% |
| | | **Task 2: (LO4)**<br>Active Directory Migration to Azure | Task 2:Theoretical and Practical Evaluation | 25% |
| | | **Task 3: (LO3)**<br>High Availability with Load Balancer | Task 3:Theoretical and Practical Implementation: | 25% |
| | | **Task 4: (LO4)** File Share System for Multi-User Access | Task 4: Theoretical and Practical Evaluation: | 25% |
| | | | | |
| | | | Total | 100% |

## Recommended Tasks Completion Timeline:

| Full Time Week | Part Time Week | Progress | Submission |
|---|---|---|---|
| Week 5 | Week 9,10 | Start working on Assessment | |
| Week 6 | Week 11,12 | Complete Task 1 | |
| Week 7 | Week 13,14 | Complete Task 2, Task 3 | |
| Week 8 | Week 15,16 | Complete Task 4 and submit | Assessment due by Week-8 (Full Time)<br>Assessment due by Week-16 (Part Time) |

This assessment measures your ability to **design, deploy, and secure** a cloud-based infrastructure using **Microsoft Azure**. Through **hands-on practical tasks**, you will showcase expertise in **cloud architecture, Active Directory migration, disaster recovery, and security monitoring** to enhance Yoobee College's operations. It aligns with the **learning outcomes (LO3 and LO4)** and **Graduate Profile Outcome (GPO8)** by demonstrating your proficiency in **configuring virtual cloud environments, implementing security best practices, and executing a seamless Active Directory migration** to support organizational efficiency and business continuity.

## Grading:

The final grade will be determined by the score achieved in this assessment based on the following table. Should a second or third attempt be required, the maximum contribution toward the overall mark for the tasks that required a second or third assessment attempt is 50%. **A late submission is considered a second attempt, so the contribution will be capped at 50%.**

**To pass this assessment, you must meet the requirements of each of the learning outcomes (irrespective of the numerical grade awarded).**

| Grade | Range |
|---|---|
| **A** | Meet all course requirements, range (80—100%) |
| **B** | Meet all course requirements, range (65—79%) |
| **C** | Meet all course requirements, range (50—64%) |
| **D** | Did not meet all course requirements, range (40—49%) |
| **E** | Did not meet all course requirements, mark range (0—39%) |

## Candidate's Assessment Instructions:

- This assessment is an **open-book activity**, you can use your course and review notes, and offline or online resources, such as textbooks or online journals.
- You can always ask your online tutor if you need further explanation if the instructions are unclear.
- Your work should not be plagiarised. Plagiarism includes copying material without acknowledging it, copying from another student, getting another person to help you with your assessment, using material from commercial essays or assignment services, or using AI to create the answers.
- The purpose of this assessment is to assess your knowledge. In the event Yoobee suspects collusion, this will be addressed. For more information on plagiarism, please refer to the Student Handbook.
- Submit your completed assessment online in the correct space provided.
- Marks and feedback will be returned within 15 days of the submission date.
- By completing and submitting an assessment you are authenticating that the work is original and does not violate plagiarism or copyright law. Authenticity is checked where any breaches of academic integrity are suspected. Please refer to the Student Handbook for further information.

## Submission Instructions:

Submit **one PDF report** document to the LMS by the specified due date.

Your report should:

- Include your name and ID number
- Include the Azure account login details, a cover page, and a report index for verification purposes in your report.
- Use a standard citation format if, external sources are referenced
- Clearly label tasks and subtasks and Diagrams must be clear and labeled properly.
- Include screenshots of each practical step in sequence, naming and numbering the screenshots. Screenshots must display the relevant settings or outputs for each step.
- Include your answers to the assessment questions for each task, describing choices, configurations, and learned insights with an appropriate practical and theoretical understanding.
- **Submission must be in PDF format only because other formats may cause issues with accessing screenshots.**

# Assessment Tasks: Azure Theoretical and Practical Concepts Evaluation

## Scenario: Yoobee College of Creative Innovation Cloud Infrastructure Upgrade.

Yoobee College of Creative Innovation is expanding its operations and requires a secure, cost-effective, and scalable cloud-based infrastructure. The college is migrating its Active Directory (AD) services to Microsoft Azure to improve security, resilience, and accessibility for students and staff. Additionally, they need to implement a high-availability architecture, set up a file-sharing system, and ensure disaster recovery mechanisms are in place.

As a Cloud Engineer, your role is to design and implement a solution that meets the college's needs while ensuring security, high availability, and cost efficiency.

## Task 1: Theoretical Evaluation: Cloud Infrastructure Planning and Cost Optimization.

1. Research and evaluate Azure Virtual Machines (VMs), Azure Storage, and Azure Networking to support the college's cloud infrastructure.
2. Compare different Azure pricing models (Pay-as-you-go, Reserved Instances, Spot Instances) and recommend the most cost-effective plan.
3. Justify the Azure services chosen and how they align with Yoobee College's business and security requirements.

## Deliverables:

- Azure service comparison report (VMs, Storage, and Networking)
- Azure pricing model analysis with recommendations
- Justification report **(200 words +/- 10% allowed)**

## Task 2: Theoretical and Practical Evaluation: Active Directory Migration to Azure

Yoobee College of Creative Innovation currently operates an on-premises Active Directory to manage user authentication and access control. To reduce IT costs and improve security, the IT Manager has recommended migrating the Active Directory to Azure AD. You have been assigned the role of moving the on-premises AD to Azure Active Directory (AAD). Your IT Manager has requested that you synchronize the data, test authentication, and document the migration process.

**Task Description:**

1. Create an **Azure Virtual Machine (VM)** and install **Active Directory Domain Services (ADDS)**.
2. Add **two users** <StudentID_1> and <StudentID_2> in the on-premises AD.
3. Create a **security group** <StudentID_Group> and add both users to it.
4. Set up Microsoft **Entra Connect to sync the on-premises Active Directory** with the Microsoft Azure–based identity service
5. Create two more users <StudentID_3> and <StudentID_4> in **Azure Entra Connect service.**
6. Create a new user <StudentID_5> at **Azure Entra Connect service** and assign **Global Administrator**.
7. Verify successful **Active Directory synchronization** and authentication.

## Deliverables:

- Step-by-step implementation report as shown in below **Appendix-1**
- Screenshots of AD setup, user creation, AD sync, and Azure AD verification
- Prepare a **200-word (+/- 10% Allowed) report** explaining the **migration process and benefits** to the organization.

**Note:** Azure AD Connect replace by Microsoft Entra Connect in 2025.

**(To Sync On-Premises identities use Microsoft Entra Connect for above task-2)**

## Appendix-1 Screen Shots

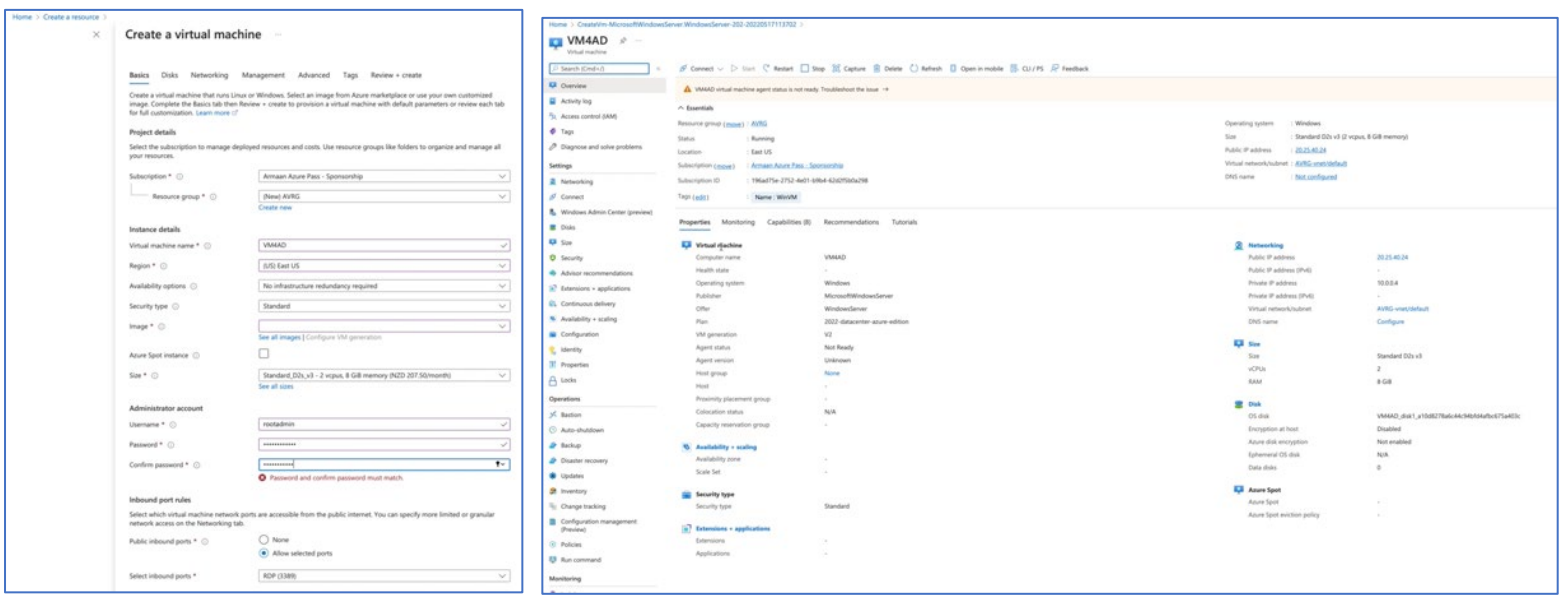



**Image 2.1 a, b Left to Right (Create Windows VM)**

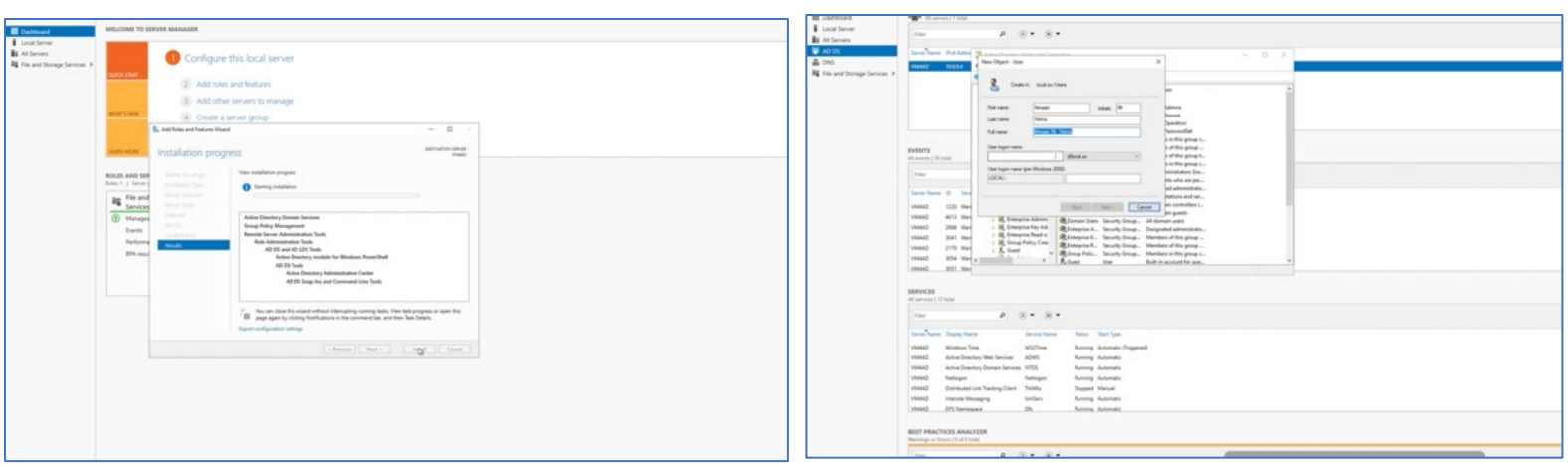



**Image 2.2 a, b Left to Right (Create ADDS, Users and Groups)**

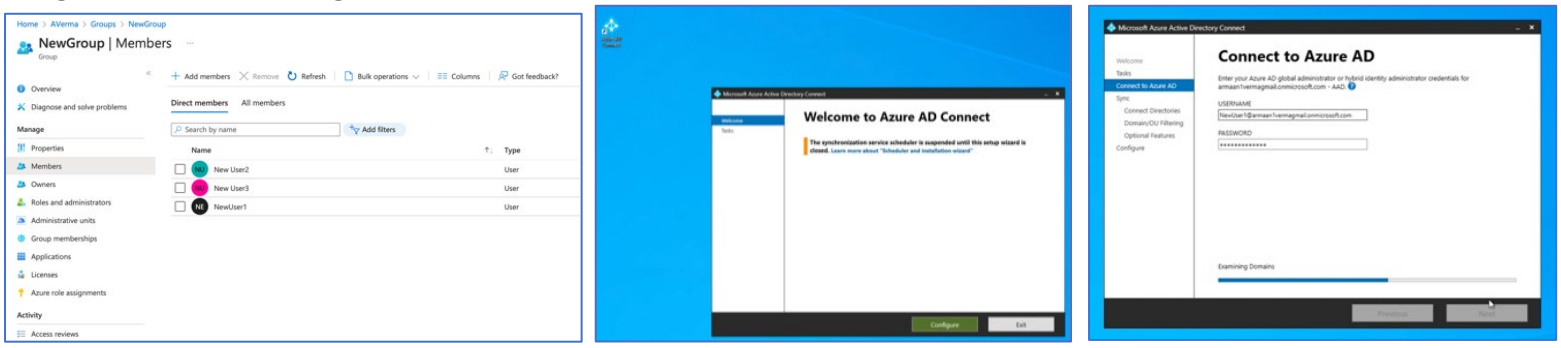



**Image 2.3 a, b, and c Left to Right (Create Users and Groups on the Azure Cloud, AD), (Launch Azure AD Connect and Run Express Settings)**

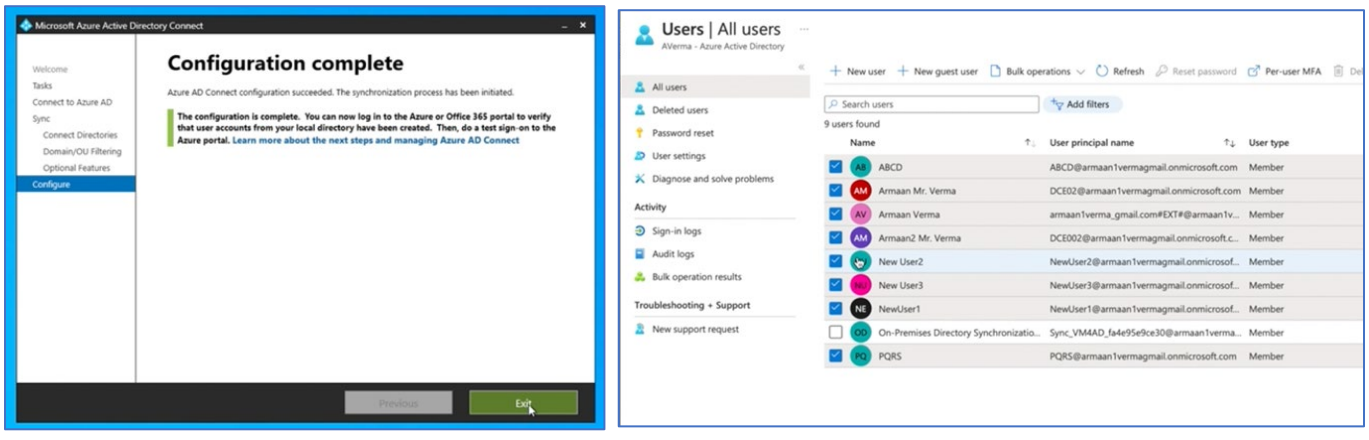



**Image 2.4 a, b Left to Right (ADDS and AAD Sync complete)**

**Delete all resources after completion**

## Task 3: Theoretical and Practical Implementation: High Availability with Load Balancer

Yoobee College of Creative Innovation has expanded its eCommerce platform from on-premises (OTC sales) to online retail sales. With the rapid increase in global traffic, the IT Manager has requested that you deploy infrastructure VMs behind a Load Balancer to handle growing web traffic efficiently. Your task is to set up and configure a Load Balancer to distribute traffic and ensure high availability.

**Task Description:**

1. Create **two Virtual Machines (VMs)** (WinVM for Windows Server, UbuntuVM for Linux) with **public IPs enabled**.
2. Configure both **VMs as web servers**:
    - **Ubuntu:** Create a sample webpage showing your <Student ID> - Ubuntu Web Server.
    - **Windows:** Modify the **IIS homepage** to display <Student ID> - Windows Web Server.
3. Deploy an **Azure Load Balancer (<StudentID>LB)**.
4. Configure:
    - **Frontend IP** and **Backend Pool** (with both VMs).
    - **Health Probe** to check VM availability.
5. Access **Load Balancer Public IP** and confirm **traffic distribution between both VMs**.

## Deliverables:

- Screenshots of VM creation, web server configuration, and Load Balancer setup as shown in step-by-step implementation below **Appendix-2**
- Screenshots of Load Balancer IP serving content from both VMs
- Write a **200-word (+/- 10% Allowed) report** on the **advantages of using Load Balancing in a cloud environment**.

## Appendix-2 Screen Shots

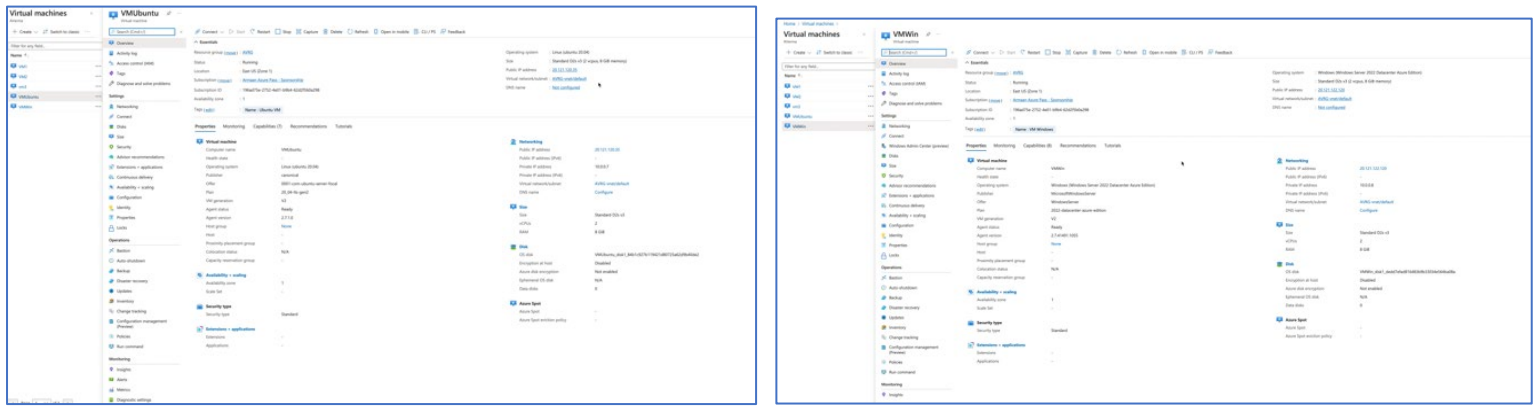



**Image 3.1 a, b Left to Right (Create Ubuntu and Windows machine with Public IPs)**

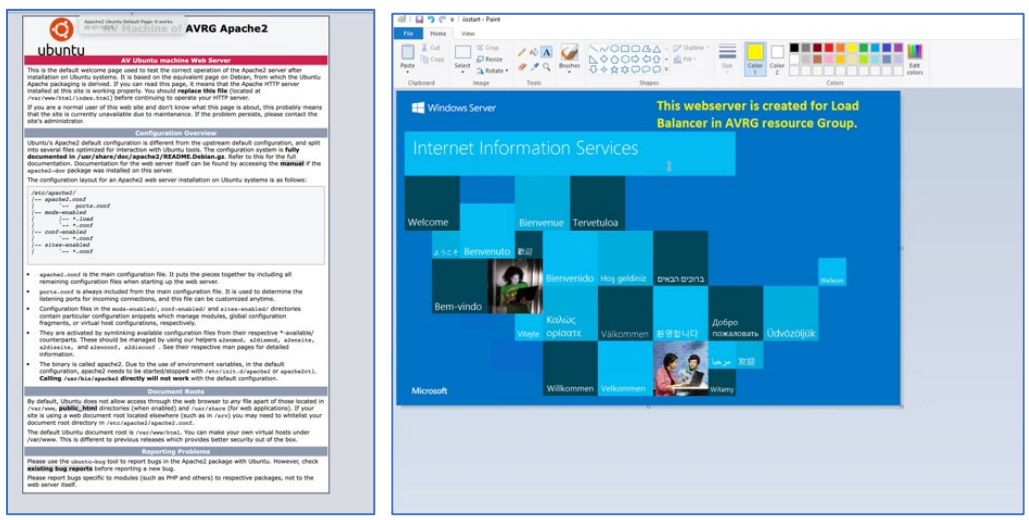



**Image 3.2 a, b Left to Right (Convert the two VMs to web servers)**

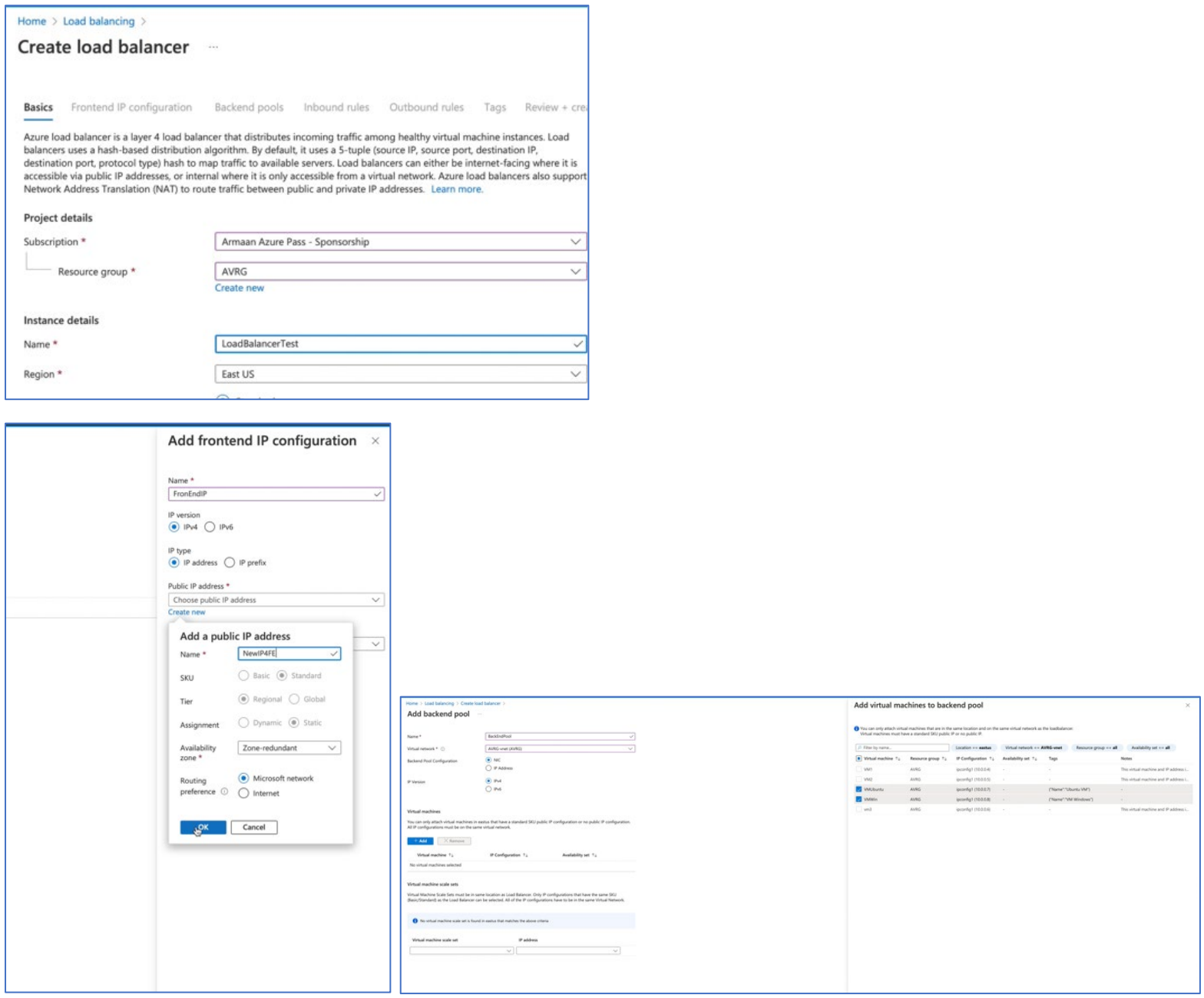



**Image 3.3 a, b, and c Left to Right (Create Load Balancer, Front End IP, and Back End IP)**

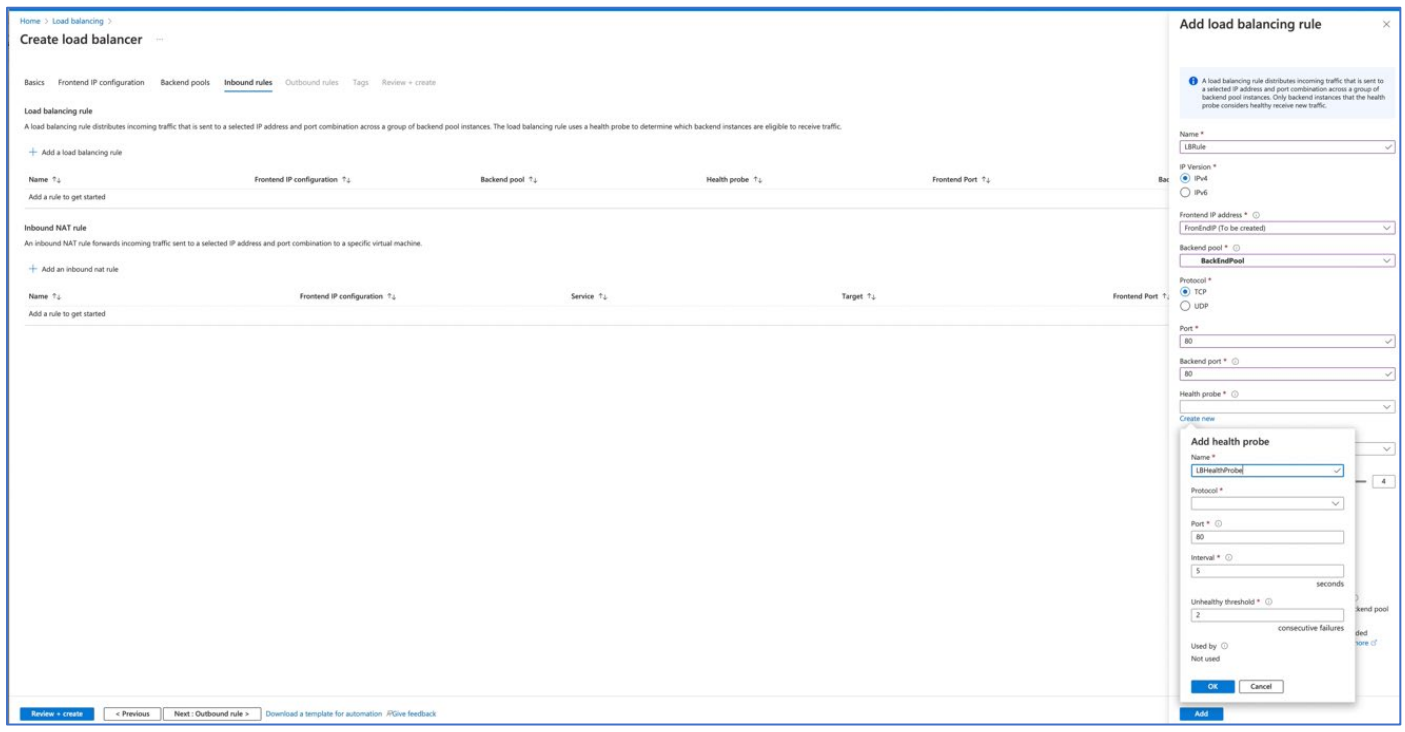



**Image 3.4 (Add Health Probe)**

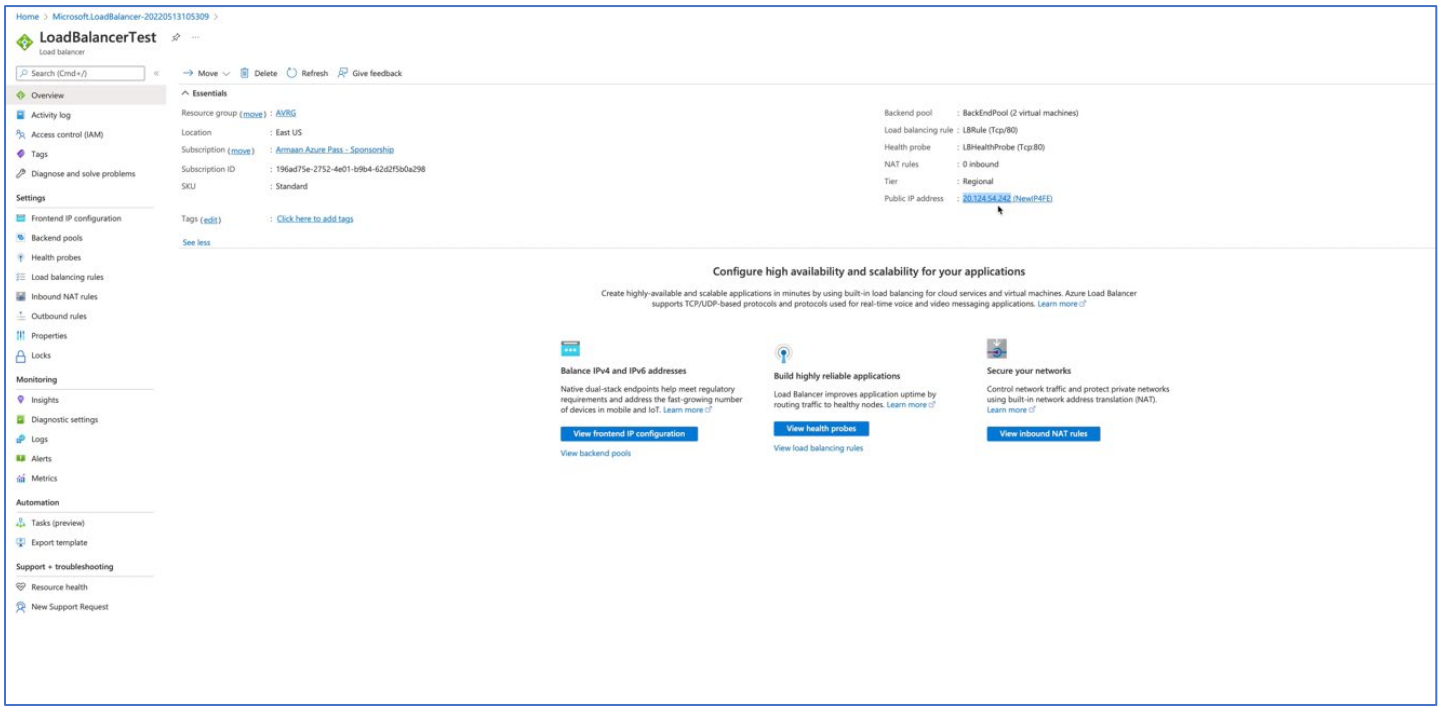
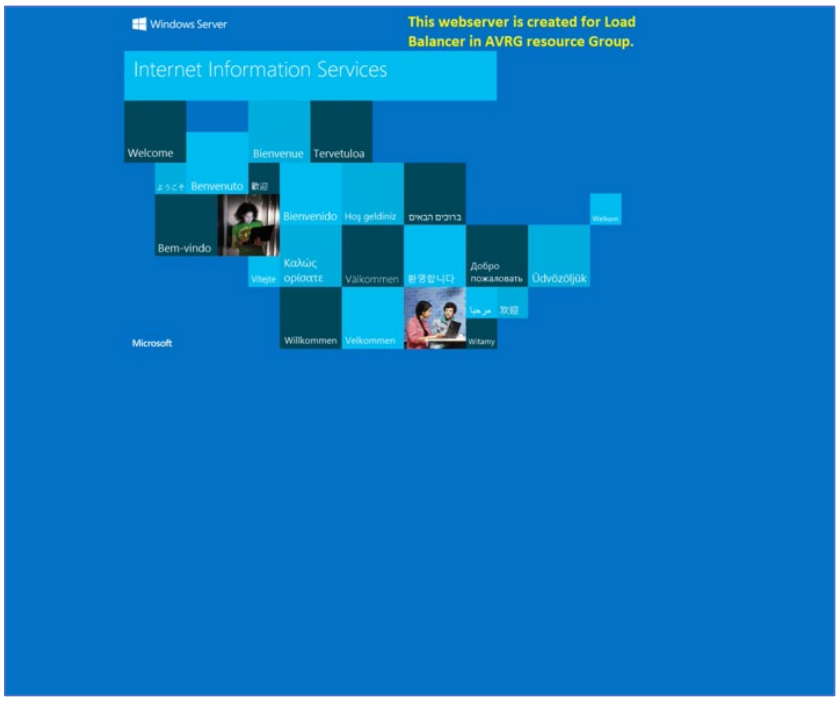



**Image 3.5 (Run Load Balancer from the Public IP)**



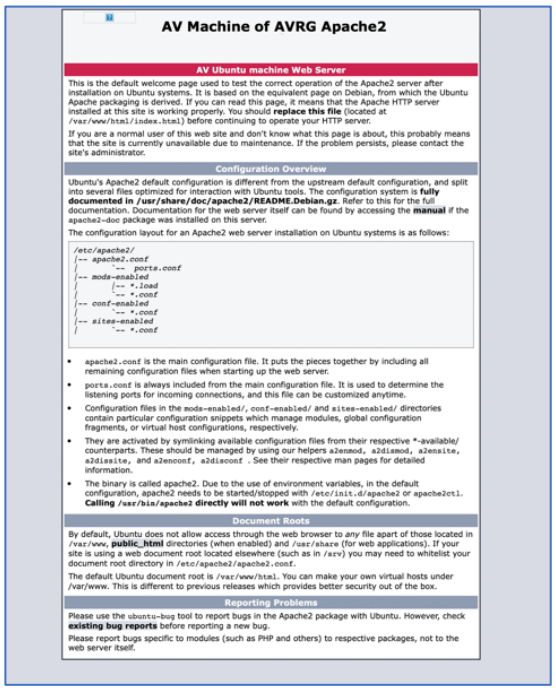




**Image 3.6 a, b Left to Right (The Load Balancer should shuffle between the two web servers – must be displayed with the LB Public IP in the browser) Delete all resources after completion**

## Task 4: Theoretical and Practical Evaluation: File Share System for Multi-User Access.

Yoobee College of Creative Innovation operates as a data center where multiple users need access to shared files. The IT Manager has assigned you to set up a cloud-based file-sharing system that allows read/write access from both Windows and Linux VMs. Your task is to deploy an Azure File Share and configure it for secure multi-user access.

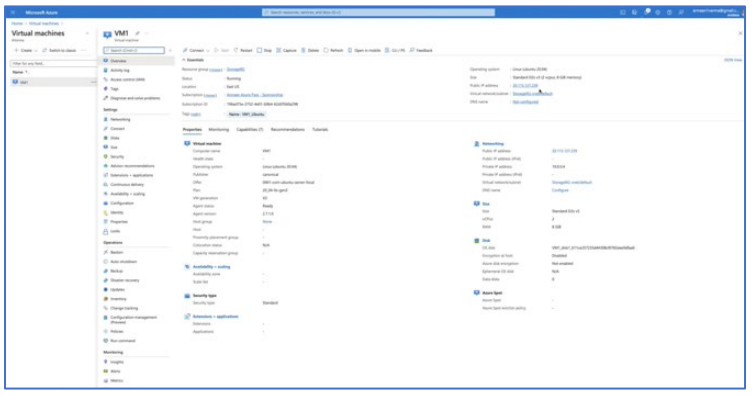
**Task Description:**

1. Create an **Azure Storage Account** (<StudentID>Storage).
2. Set up an **Azure File Share** (<StudentID>fs) and upload **two test files**.
3. Launch **two VMs** (one **Windows**, one **Ubuntu Linux**).
4. **Mount the file share**:
    - On **Windows**, use PowerShell to map the file share as a network drive.
    - On **Linux**, use the mount command to connect the file share.
5. Verify that both VMs can **read and write files** to the shared directory.

## Deliverables:

- Screenshots of storage creation, file upload, and mounting on both OS as shown in below Appendix-3.
- Validation of shared access with file modification from both VMs
- Write a **200-word (+/- 10% Allowed) report** on how **Azure File Share improves multi-user collaboration**.

## Appendix-4 Screen Shots



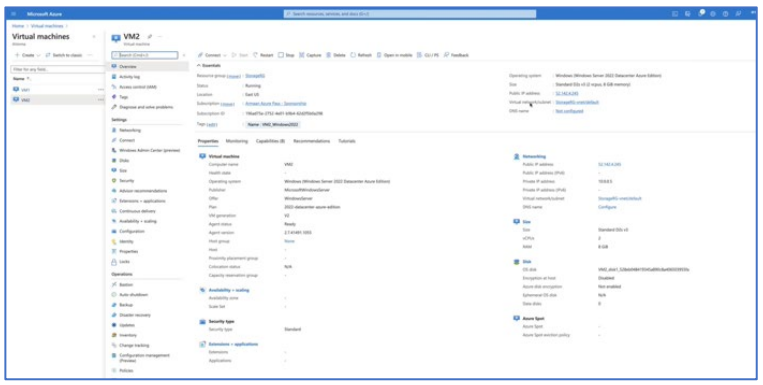


**Image 4.1 a, b Left to Right (Create two VMs – Linux Ubuntu and Windows and log in to using their public IP addresses)**

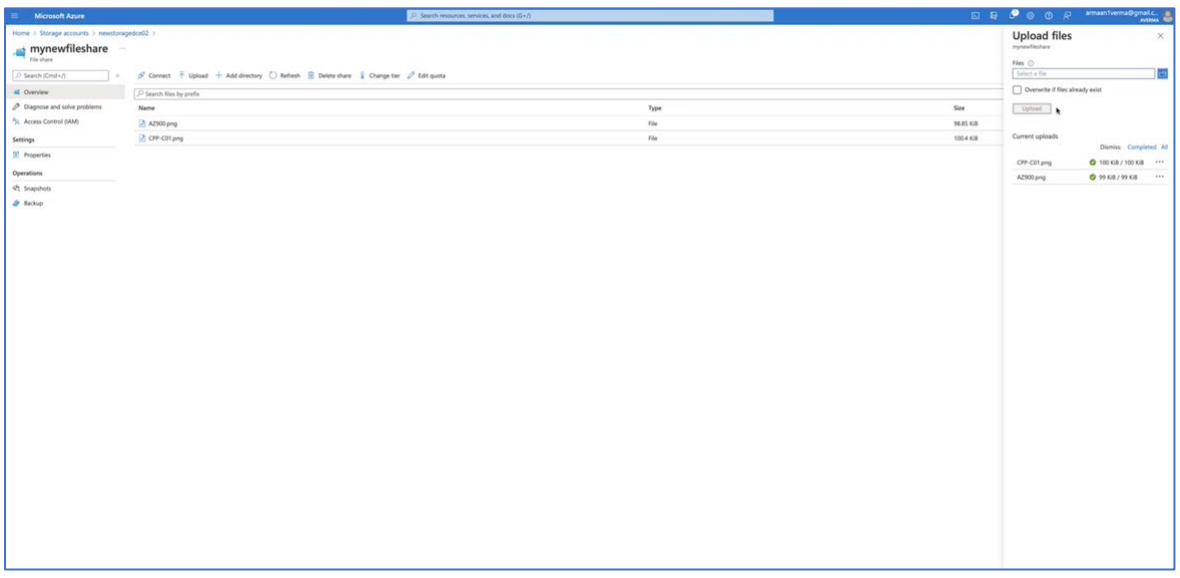
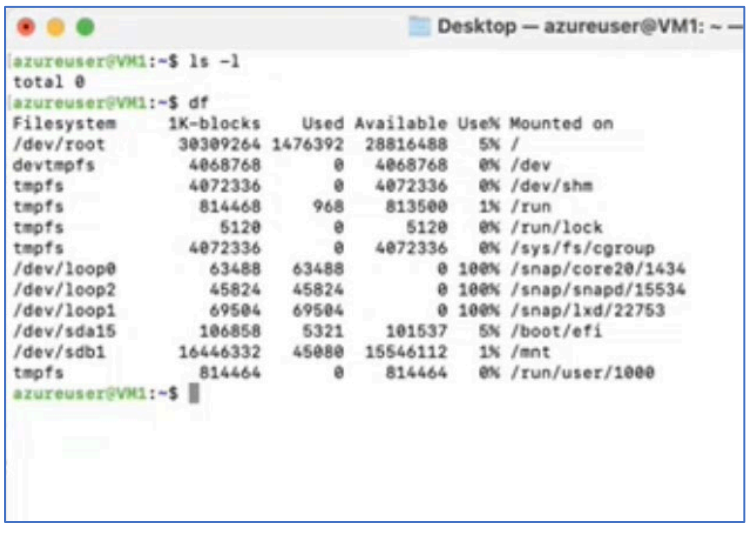



**Image 4.2 (Create a new Azure storage with the name of mynewfileshare and upload two files into the storage)**



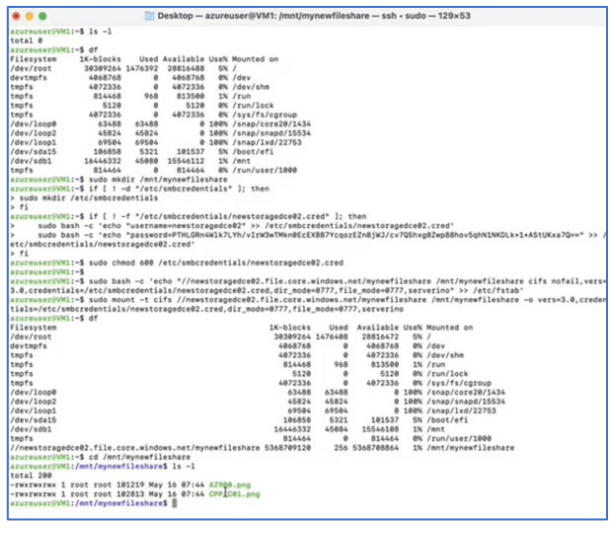




**Image 4.3 a, b Left to Right (Run df to see the mounted file system, now execute the commands from the Azure and mount the newfileshare, run sf command again and user will see the new file system is mounted, log in to the mounted drive to view the files)**

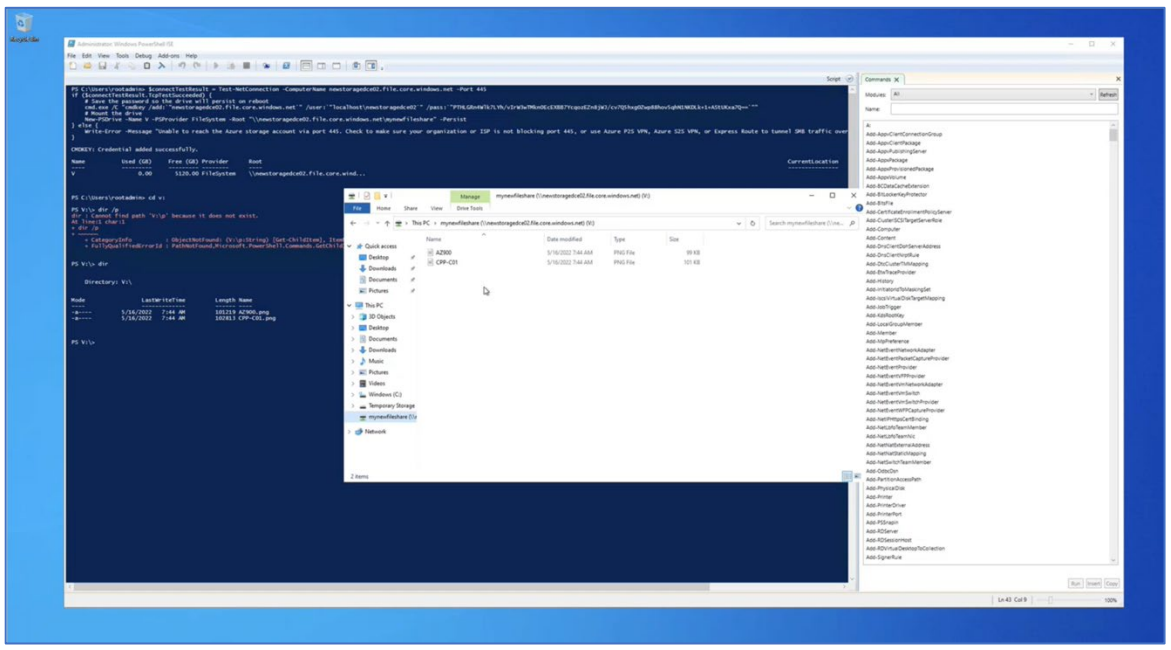


**Image 4.4 (Run the Power Shell commands to mount the file system, go to the drive, and list the files, the user can also preview in the file explorer)**

**Delete all resources after completion**

# Marking Rubric

**To pass this assessment, you must meet the requirements of each of the learning outcomes (irrespective of the numerical grade awarded).**

| Criterion | Evidence | | | | |
|---|---|---|---|---|---|
| **Task and Weightage** | **A (80-100%)** | **B (65-79%)** | **C (50-64%)** | **D (40-49%)** | **E (0-39%** |
| **Task 1: (25%)**<br><br>**Task 1:**<br>**Theoretical Evaluation: Cloud Infrastructure Planning and Cost Optimization.** (LO3) | Comprehensive and insightful analysis of Azure services (VMs, Storage, Networking) with a clear, accurate comparison of pricing models. Well-reasoned justification aligned with Yoobee College's business and security needs. Professionally presented, well-organized, clear formatting with no spelling/grammar errors | Thorough evaluation and pricing comparison with a good justification. Some minor details or comparisons may be missing. Well-organized with minor errors in formatting or language. | Adequate research and evaluation, basic comparison of pricing models, and a general justification. Some aspects lack depth, with noticeable errors in presentation. | Limited research, superficial pricing analysis, and unclear or incomplete justification. Significant errors in formatting, language, or presentation. | Incomplete or inaccurate analysis with missing or incorrect pricing models and justification. Poor presentation with major language and formatting issues. |
| **Task 2: (25%)**<br>**Task 2: Theoretical and Practical Evaluation: Active Directory Migration to Azure.** (LO4) | Successful implementation of all steps: Azure VM setup, ADDS installation, user creation in both on-premises and Azure AD, security group setup, synchronization, role assignment, and verification. Clear documentation with relevant screenshots for all processes. Well-written 200-word report on the migration process and benefits. Professionally formatted with no spelling/grammar errors. | Good implementation of most steps with clear documentation and screenshots. Some minor errors or missing details. 200-word report explains the migration process but may lack depth or clarity. Well-organized and properly formatted with minor language/formatting issues. | Adequate completion of most steps with basic documentation. Missing some details or screenshots. The 200-word report is present but lacks depth or misses key points. Some language or formatting issues in the documentation. | Incomplete or flawed implementation of key steps, missing or incorrect documentation, and/or missing screenshots. The 200-word report is vague or unclear. Significant formatting or language errors in the report. | Major issues with implementation, missing several steps, or incorrect setup. No meaningful documentation or missing key elements (screenshots, explanations, etc.). No report or completely irrelevant/incorrect explanation of the migration process. |
| **Task 3:(25%)**<br>**Task 3: Theoretical and Practical Implementation: High Availability with Load Balancer.** (LO3) | Successful implementation of all steps: creation of Windows and Ubuntu VMs with public IPs, configuration of web servers, deployment of Azure Load Balancer, and setup of frontend IP, backend pool, and health probe. Clear documentation with relevant screenshots, including Load Balancer IP verification and traffic distribution. Well-written 200-word report on Load Balancing advantages in cloud environments. Professionally formatted with no spelling/grammar errors. | Good implementation of most steps with clear documentation and screenshots. Some minor errors or missing details. 200-word report explains Load Balancing benefits but may lack depth or clarity. Well-organized and properly formatted with minor language/formatting issues. | Adequate completion of most steps with basic documentation. Missing some details or screenshots. The 200-word report is present but lacks depth or misses key points. Some language or formatting issues in the documentation. | Incomplete or flawed implementation of key steps, missing or incorrect documentation, and/or missing screenshots. The 200-word report is vague or unclear. Significant formatting or language errors in the report. | Major implementation issues, missing several steps, or incorrect setup. No meaningful documentation or missing key elements (screenshots, explanations, etc.). No report or completely irrelevant/incorrect explanation of Load Balancing. |

| Criterion | Evidence | | | | |
|---|---|---|---|---|---|
| **Task and Weightage** | **A (80-100%)** | **B (65-79%)** | **C (50-64%)** | **D (40-49%)** | **E (0-39%** |
| **Task 4: (25%)**<br>**Task 4: Theoretical and Practical Evaluation: File Share System for Multi-User Access. (LO4)** | Successful setup of Azure Storage Account and Azure File Share, with two test files uploaded. Both Windows and Ubuntu VMs created, and file share was mounted on each OS (via PowerShell on Windows and mount command on Linux). Full verification of read/write access from both VMs. Clear documentation with relevant screenshots for all steps. Well-written 200-word report on how Azure File Share improves multi-user collaboration. Professionally formatted, clear, and well-organized with no spelling/grammar errors. | Good implementation of most steps with minor errors or missing details. Azure Storage and File Share are correctly set up, but some minor aspects or screenshots are missing. 200-word report is clear but may lack depth. Well-organized with minor formatting or language issues. | Adequate implementation of the task but missing some key details or screenshots. The report is written but lacks a sufficient explanation of multi-user collaboration. Some formatting or language issues are present. | Incomplete or flawed implementation with several missing steps or errors. Documentation is unclear or missing, and verification of file access may be inadequate. The 200-word report is vague or unclear. Significant formatting or language errors. | Major issues in implementation, missing key steps, or incorrect setup. No meaningful documentation or screenshots. No report or completely irrelevant/incorrect explanation of Azure File Share. |