

Azure Point-to-Site (P2S) VPN Gateway – Proof of Concept (POC)

1.1 Purpose of this Document

This document explains the step-by-step implementation of an **Azure Point-to-Site (P2S) VPN Gateway** using **two authentication methods: Certificate-based authentication and Microsoft Entra ID authentication**. Each step includes **what configuration was done and why it was required**, making this document suitable for freshers and interview discussions.

1.2 Scope of the POC

- Configure Azure infrastructure required for P2S VPN
- Enable secure remote user connectivity
- Implement and test two authentication mechanisms
- Understand security and design considerations

2. Overview of Point-to-Site VPN

A Point-to-Site VPN allows individual client devices to securely connect to an Azure Virtual Network over the internet. This is commonly used for:

- Remote employees
- Developers and administrators
- Temporary or mobile access scenarios

Unlike Site-to-Site VPN, P2S does not require on-premises VPN devices.

3. Architecture Overview

Components Used:

- Resource Group
- Azure Virtual Network (VNet)
- Gateway Subnet
- Azure VPN Gateway
- Point-to-Site Configuration

- Certificate Authority (Root & Client Certificates)
- Microsoft Entra ID

The VPN Gateway acts as the secure entry point into the Azure Virtual Network.

4. Step-by-Step Implementation

Step 1: Create Resource Group

What was done: A new resource group was created to hold all VPN-related resources.

Why this is required:

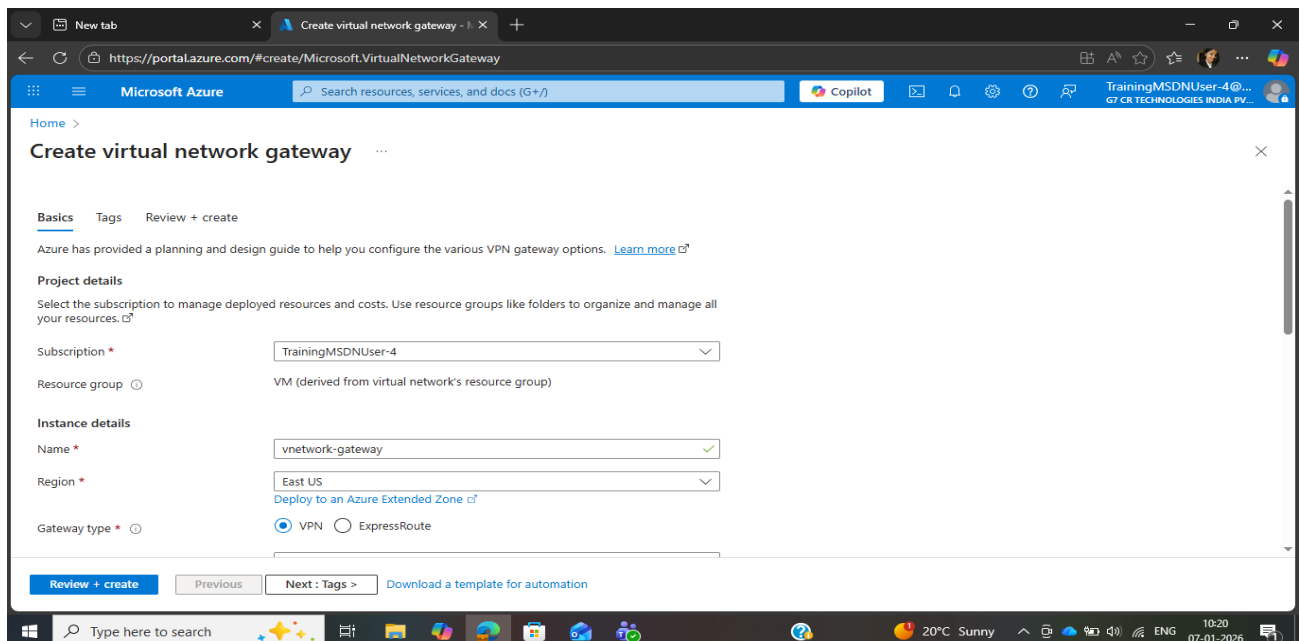
- Provides logical grouping of resources
- Simplifies management, monitoring, and deletion
- Helps with cost tracking and governance

Step 2: Create Virtual Network (VNet)

What was done: A virtual network with a private IP address range was created.

Why this is required:

- VNet provides isolated private networking in Azure
- VPN users need a network to connect to
- Enables secure communication with Azure resources



The screenshot shows the 'Create virtual network gateway' wizard in the Azure portal, specifically the 'Basics' tab. The page title is 'Create virtual network gateway'. Below the title are tabs for 'Basics', 'Tags', and 'Review + create'. A link to 'Learn more' is provided. The 'Project details' section instructs the user to select a subscription and resource group. The 'Subscription' is set to 'TrainingMSDNUser-4'. The 'Resource group' is set to 'VM (derived from virtual network's resource group)'. The 'Instance details' section includes 'Name' (vnetwork-gateway), 'Region' (East US), and 'Gateway type' (VPN selected, ExpressRoute unselected). A link to 'Deploy to an Azure Extended Zone' is also present. At the bottom, there are buttons for 'Review + create', 'Previous', 'Next: Tags >', and a link to 'Download a template for automation'. The Windows taskbar at the bottom shows the date as 07-01-2026 and time as 10:20.

Microsoft Azure

Create virtual network gateway

Gateway type ☒ VPN ☐ ExpressRoute

SKU

Generation

Enable Advanced Connectivity ☐ Enabled ☒ Disabled

Virtual network
[Create virtual network](#)

Subnet

Only virtual networks in the currently selected subscription and region are listed.

Public IP address

Public IP address ☒ Create new ☐ Use existing

Public IP address name

Public IP address SKU

[Review + create](#) [Previous](#) [Next: Tags >](#) [Download a template for automation](#)

Microsoft Azure

Create virtual network gateway

Enable active-active mode ☒ Enabled ☐ Disabled

SECOND PUBLIC IP ADDRESS

SECOND PUBLIC IP ADDRESS ☒ Create new ☐ Use existing

Public IP address name

Public IP address SKU

Configure BGP ☒ Enabled ☐ Disabled

Autonomous system number (ASN)

Custom Azure APIPA BGP IP address

Peer Address

Second Custom Azure APIPA BGP IP address

Peer Address

[Review + create](#) [Previous](#) [Next: Tags >](#) [Download a template for automation](#)

Create virtual network gateway

Public IP address SKU

Standard

Configure BGP

☒ Enabled ☐ Disabled

Autonomous system number (ASN)

65515

Custom Azure APIPA BGP IP address

Peer Address

Second Custom Azure APIPA BGP IP address

Peer Address

Authentication Information (Preview)

Enable Key Vault Access

☐ Enabled ☒ Disabled

Azure recommends using a validated VPN device with your virtual network gateway. To view a list of validated devices and instructions for configuration, refer to Azure's [documentation](#) regarding validated VPN devices.

Review + create

Previous

Next: Tags >

Download a template for automation

Create virtual network gateway

Basics

Subscription	TrainingMSDNUser-4
Resource group	VM
Name	vnetwork-gateway
Region	East US
SKU	VpnGw2AZ
Generation	Generation2
Virtual network	VMpt-vnet
Subnet	GatewaySubnet (10.0.1.0/24)
Gateway type	Vpn
VPN type	RouteBased
Enable active-active mode	Disabled
Enable Advanced Connectivity	Disabled
Configure BGP	Disabled
Public IP address	public-ip

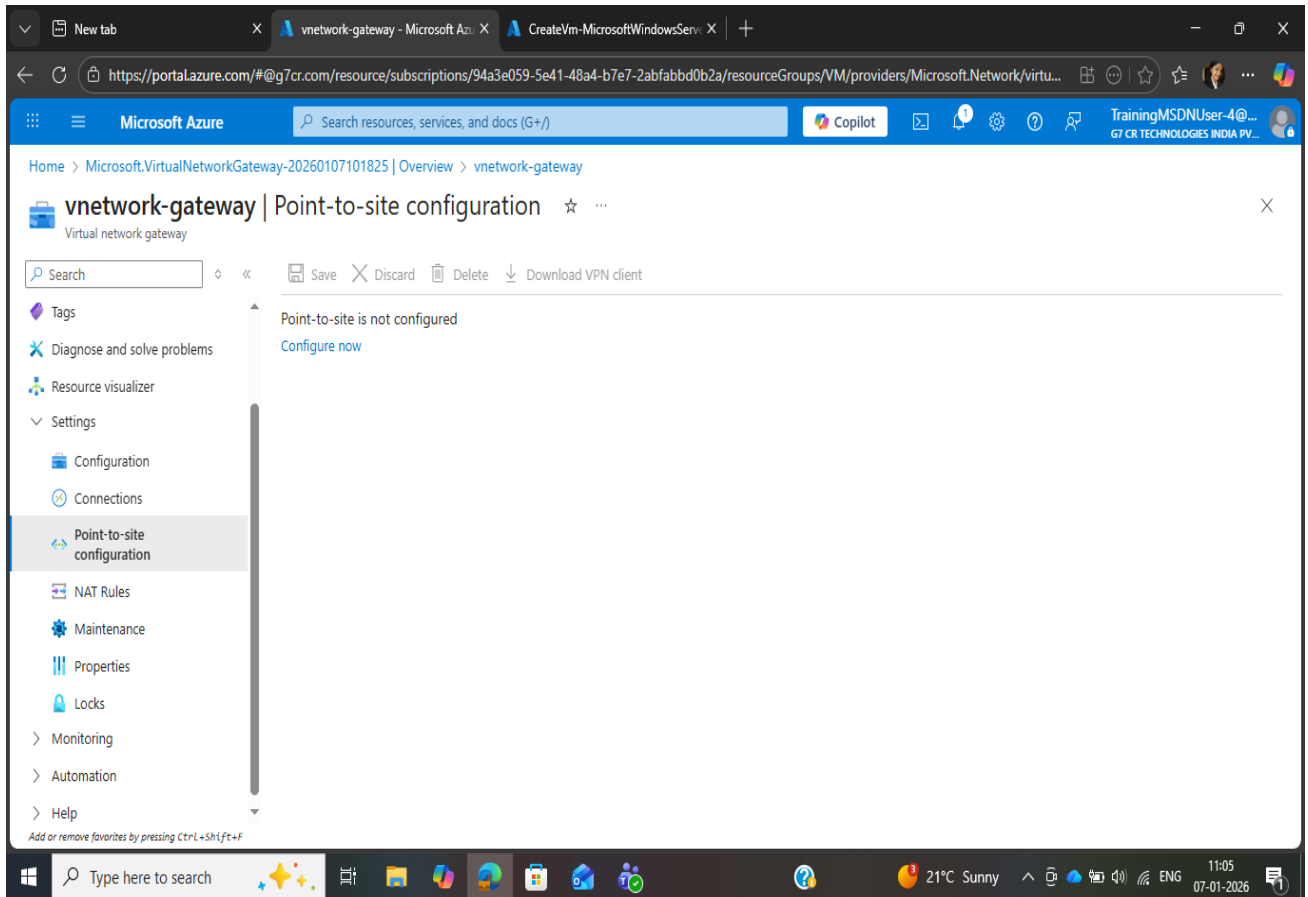
Tags

Create

Previous

Next

Download a template for automation



Step 3: Create Gateway Subnet

What was done: A subnet named **GatewaySubnet** was created within the VNet.

Why this is required:

- Azure VPN Gateway must reside in a subnet named GatewaySubnet
- This subnet is reserved for VPN infrastructure
- Separates gateway components from application workloads

Step 4: Create Azure VPN Gateway

What was done: A route-based VPN Gateway was created with a public IP address.

Why this is required:

- VPN Gateway is the core component that enables VPN connectivity
- Route-based gateways support Point-to-Site connections

- Public IP allows secure connections over the internet

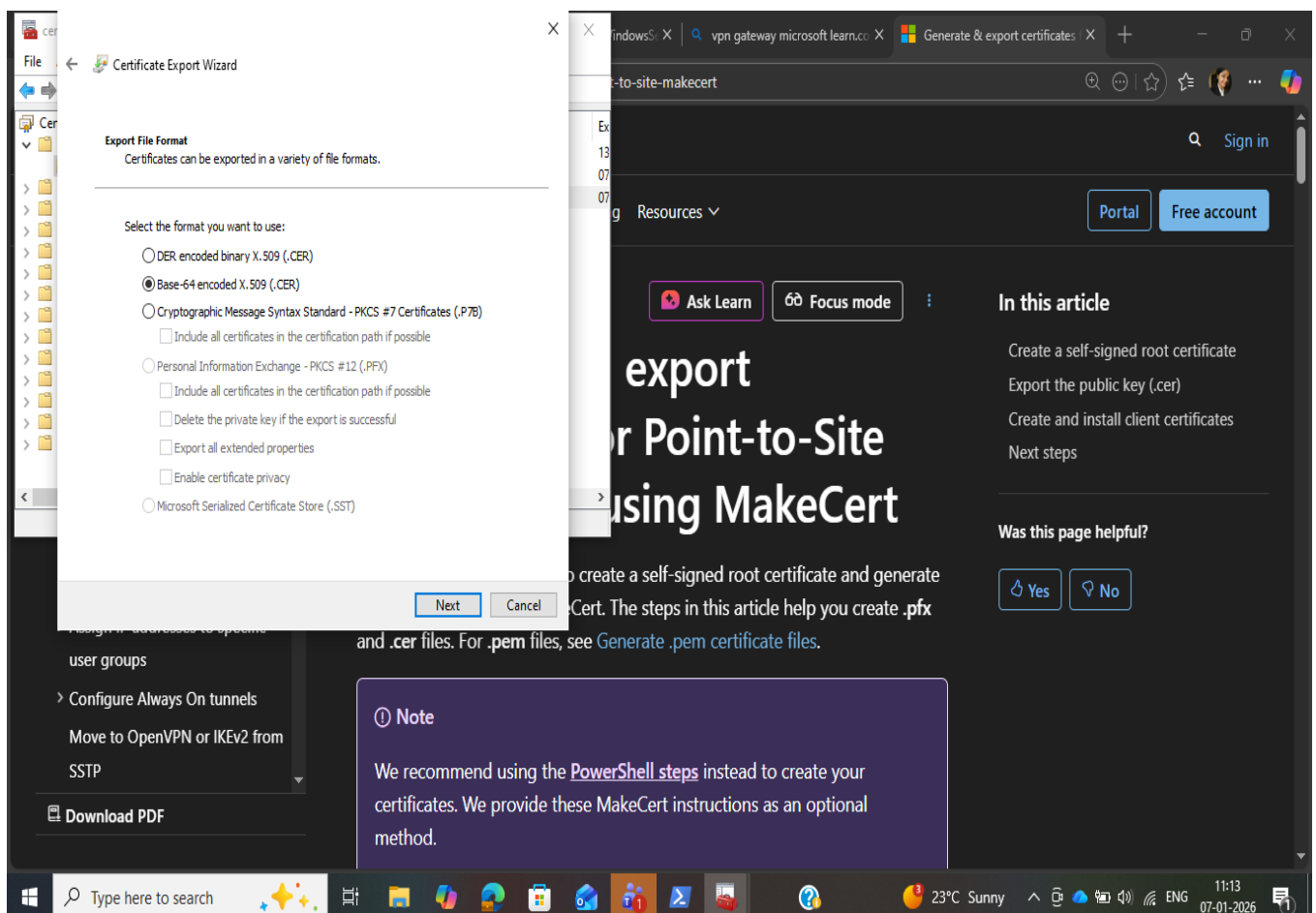
5. Authentication Method 1: Certificate-Based Authentication

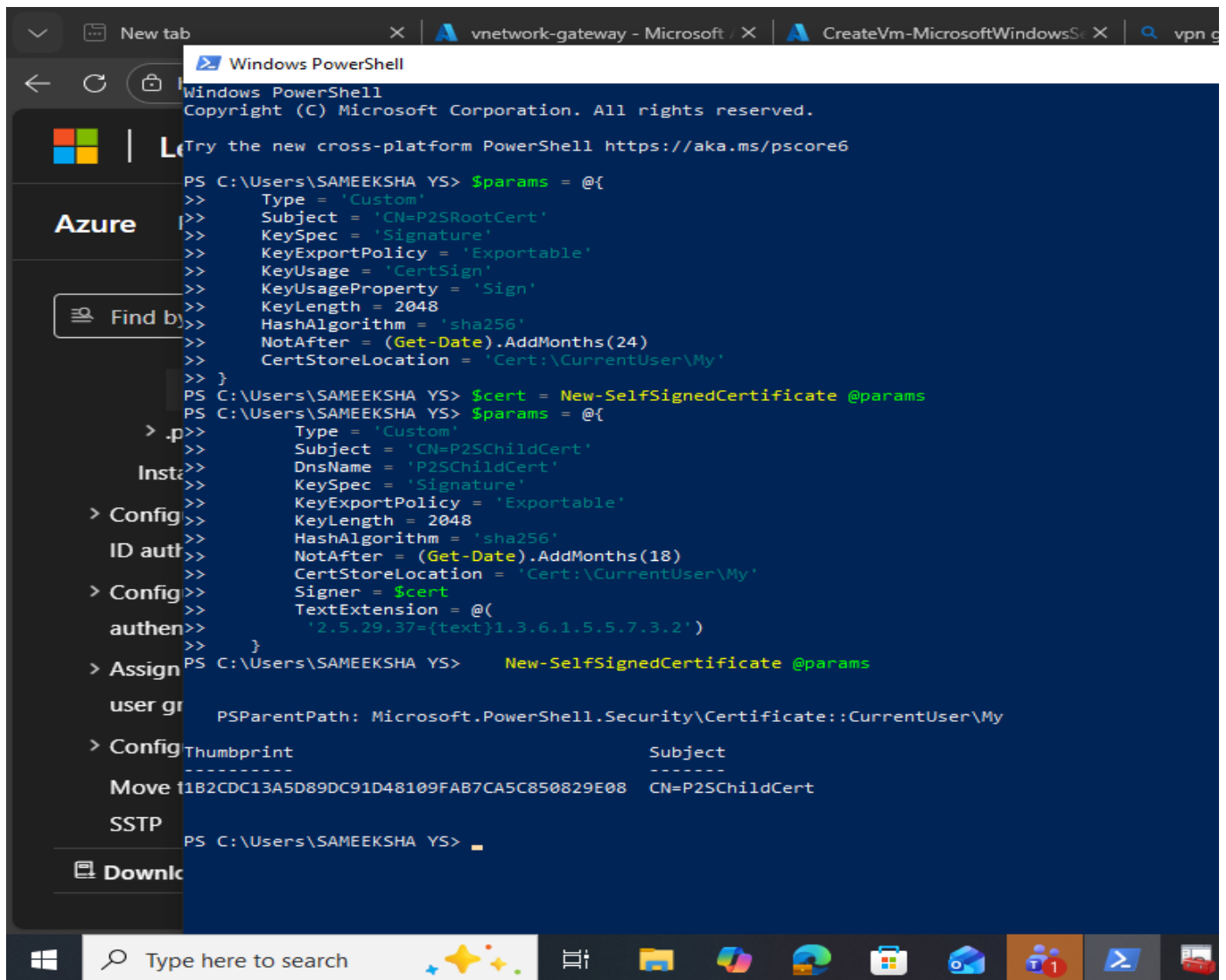
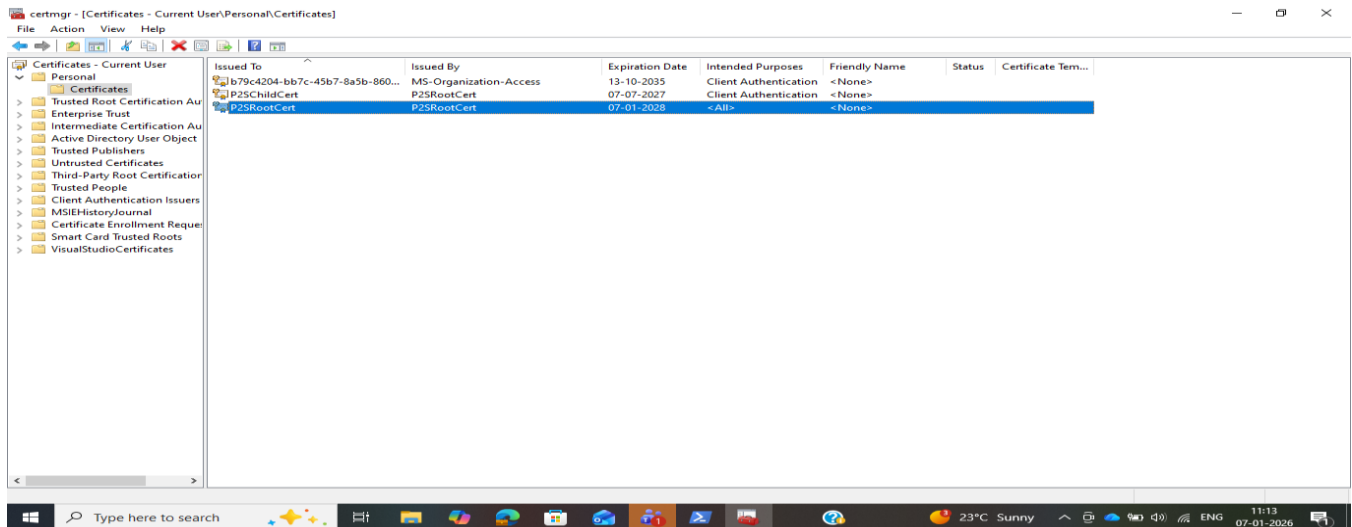
Step 5: Generate Root and Client Certificates

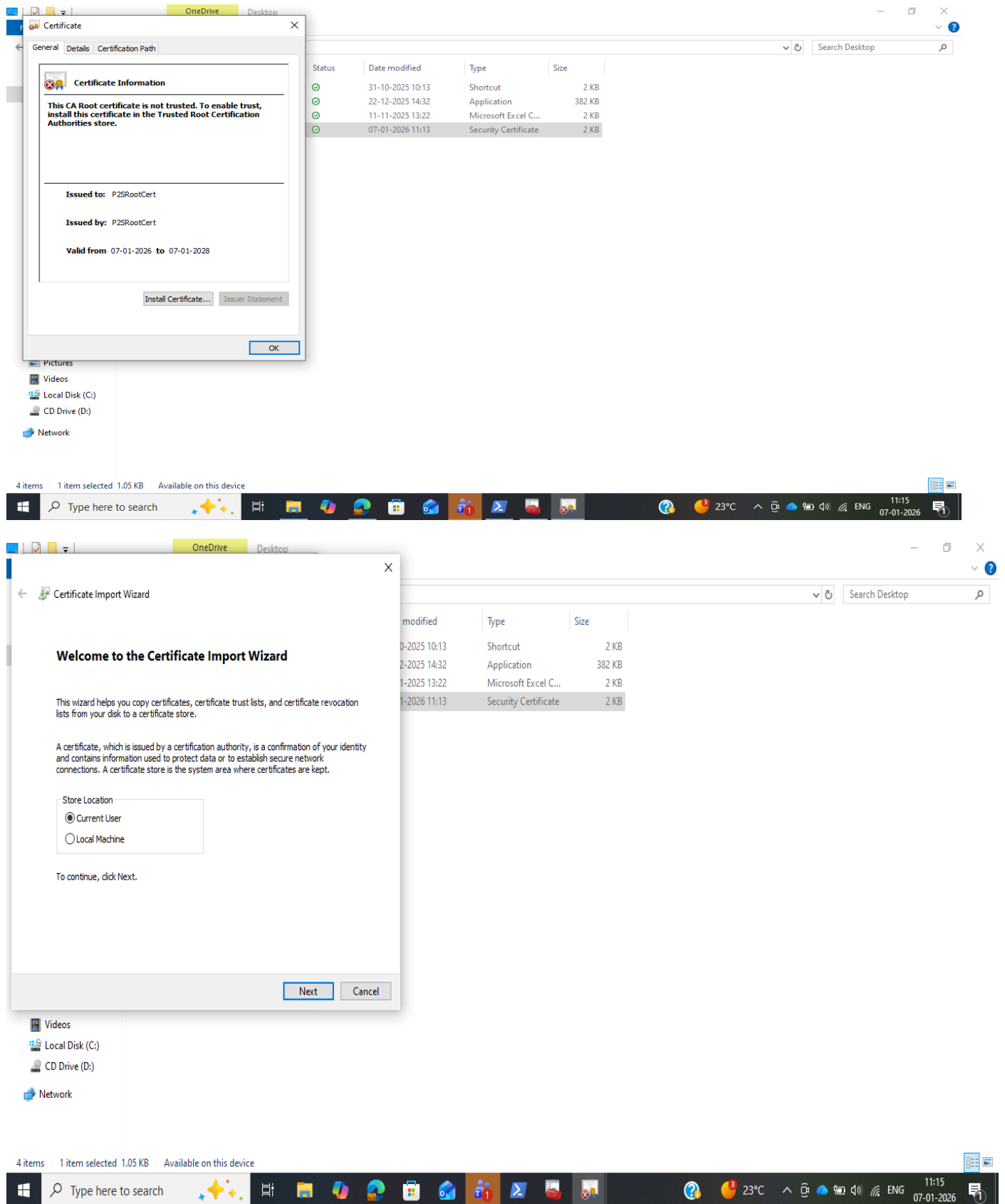
What was done: Root and client certificates were generated using a trusted certificate authority.

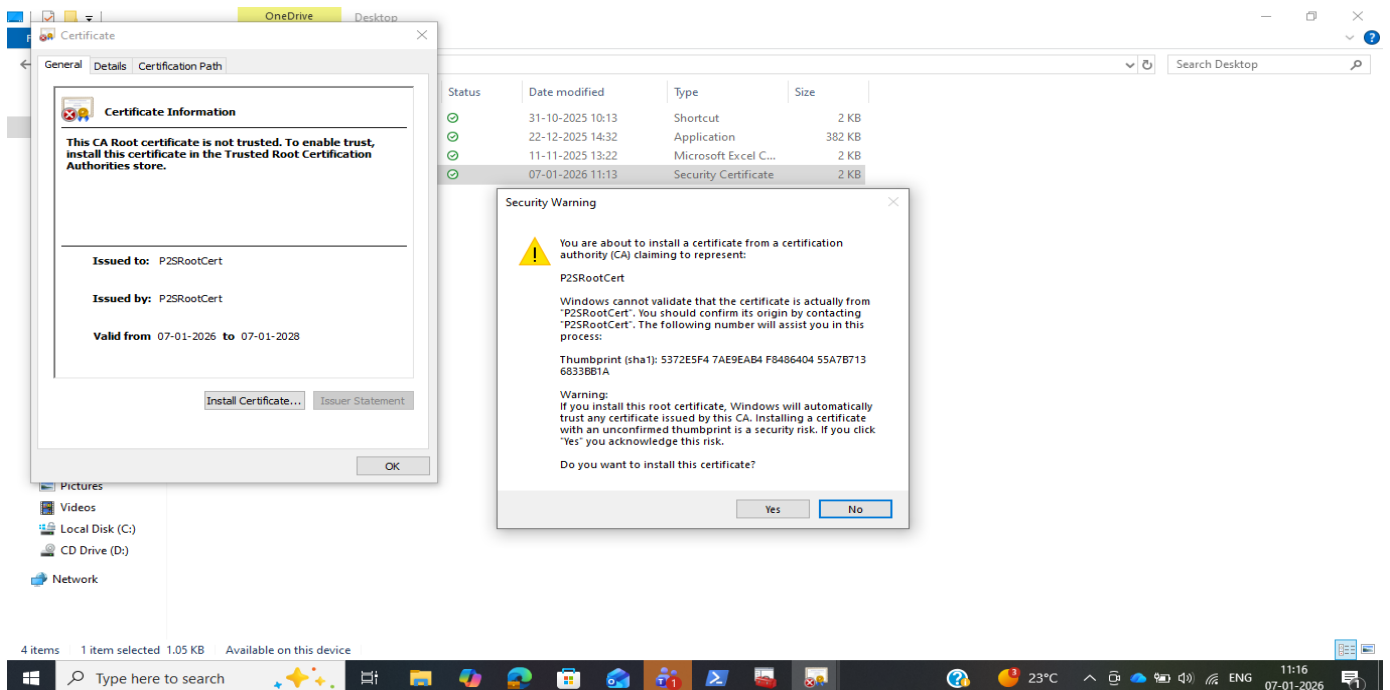
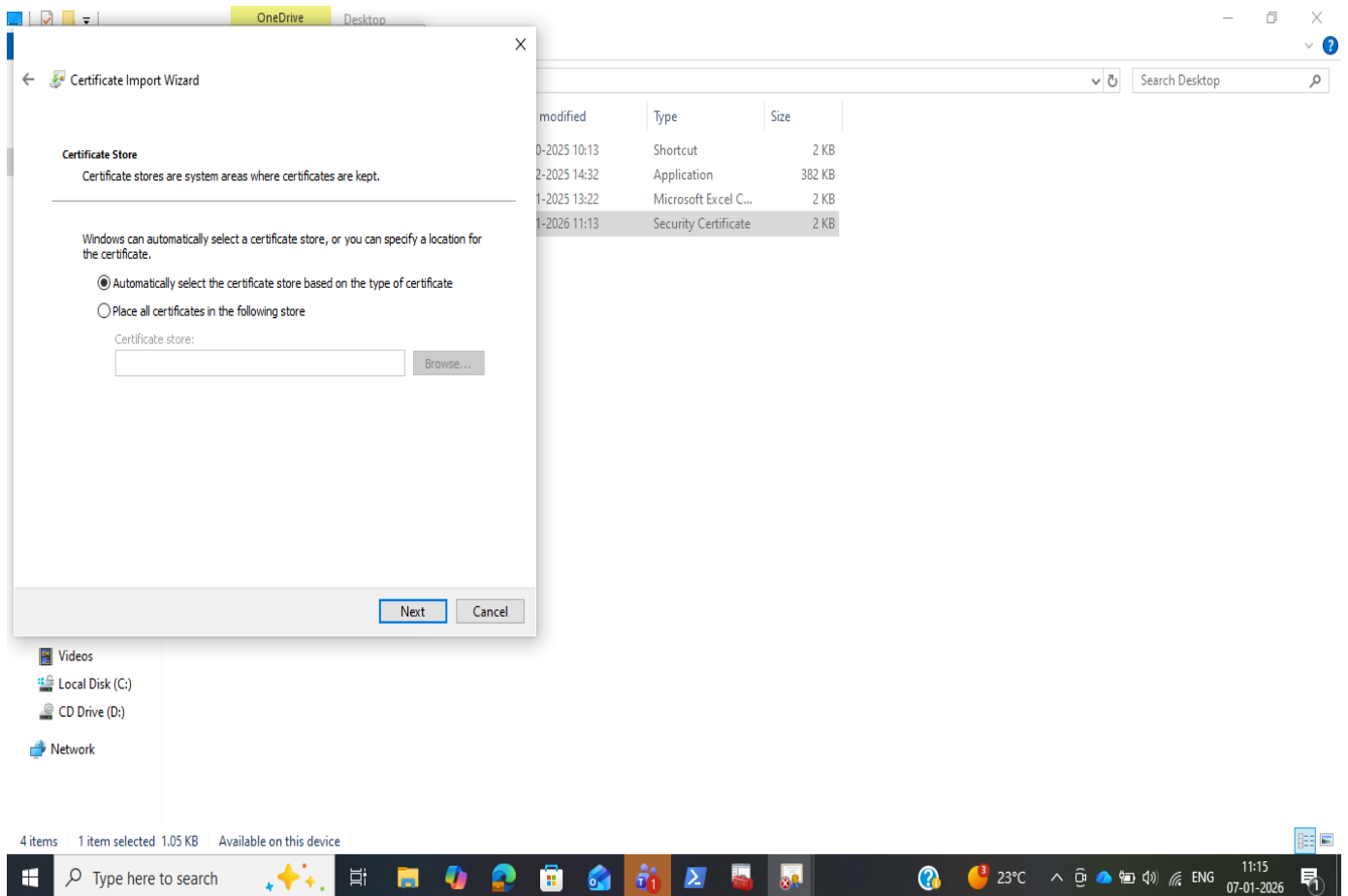
Why this is required:

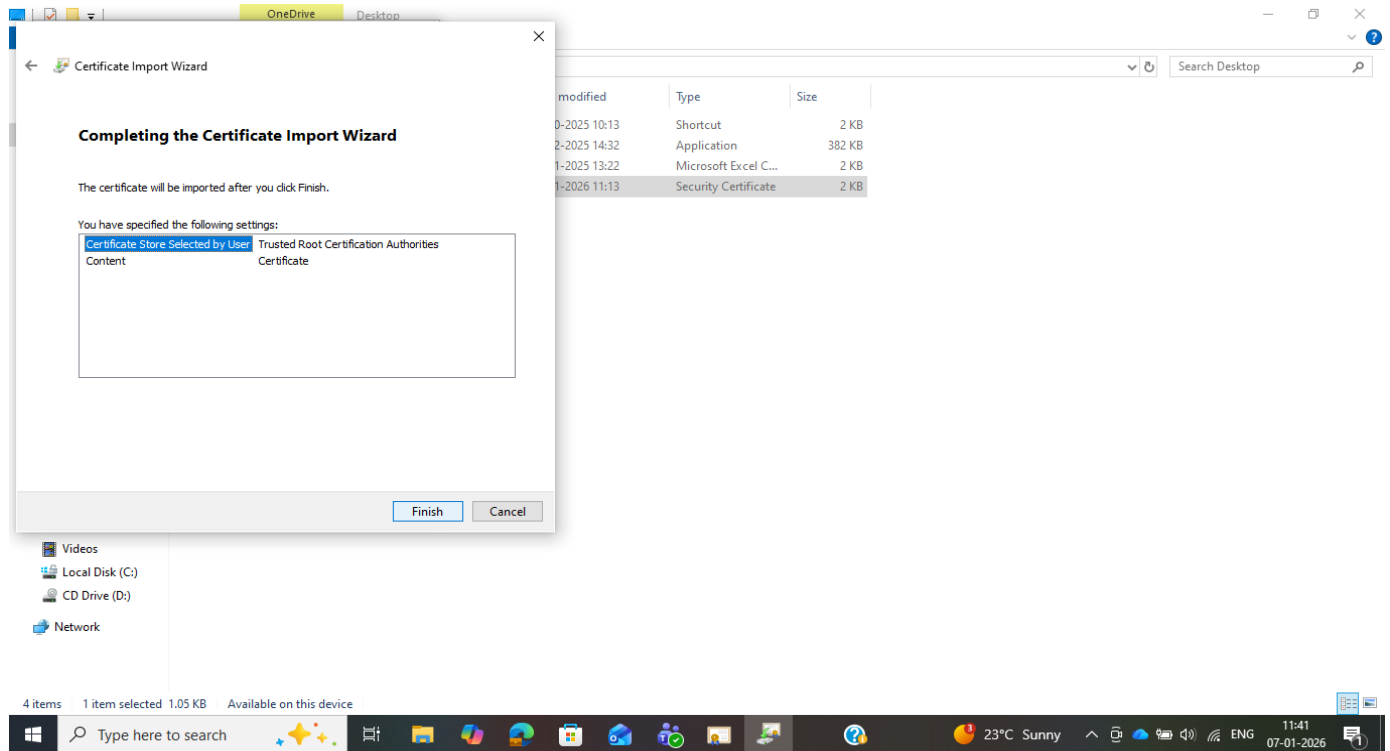
- Root certificate establishes trust with Azure
- Client certificate verifies user or device identity
- Enables secure authentication without password









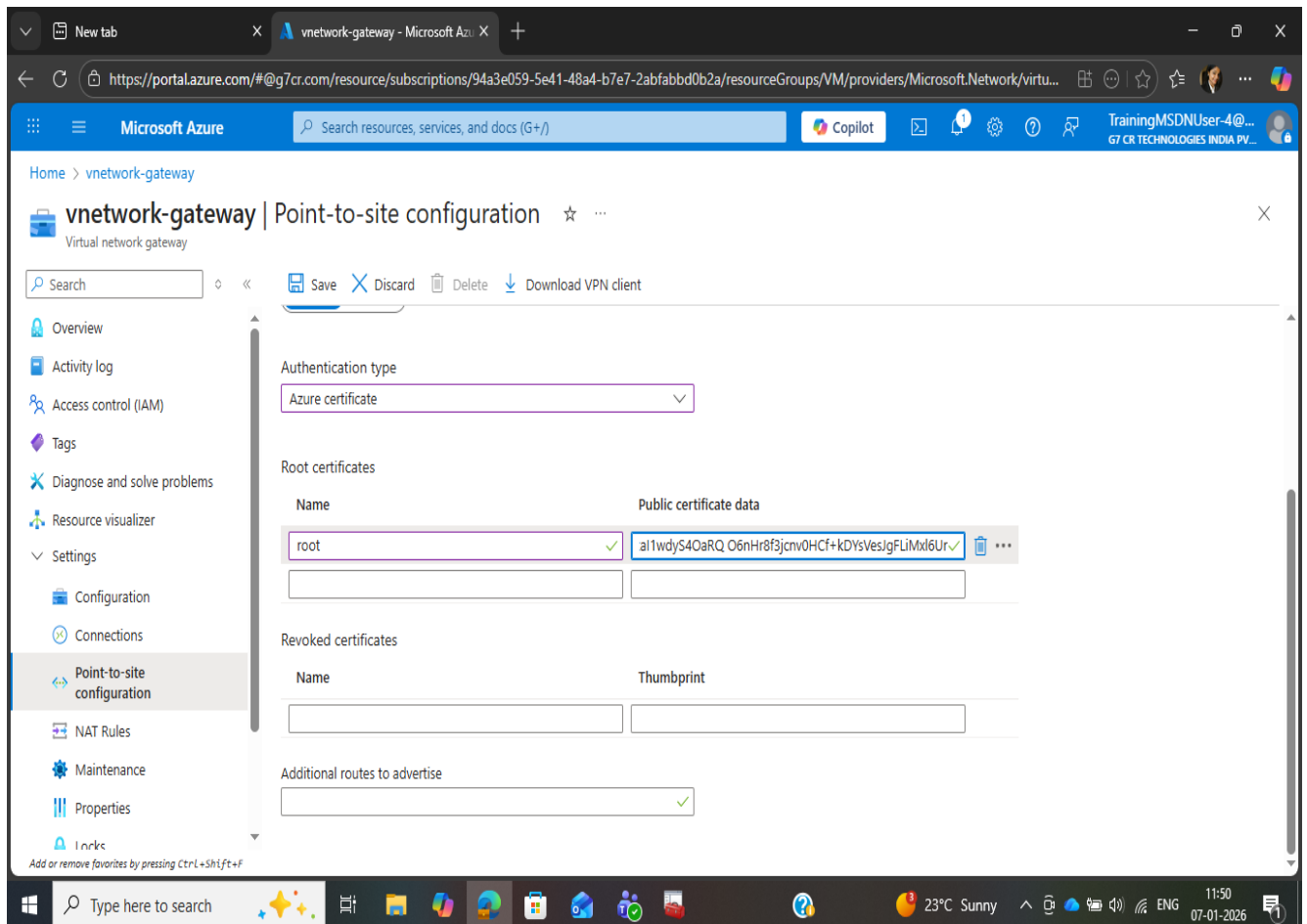
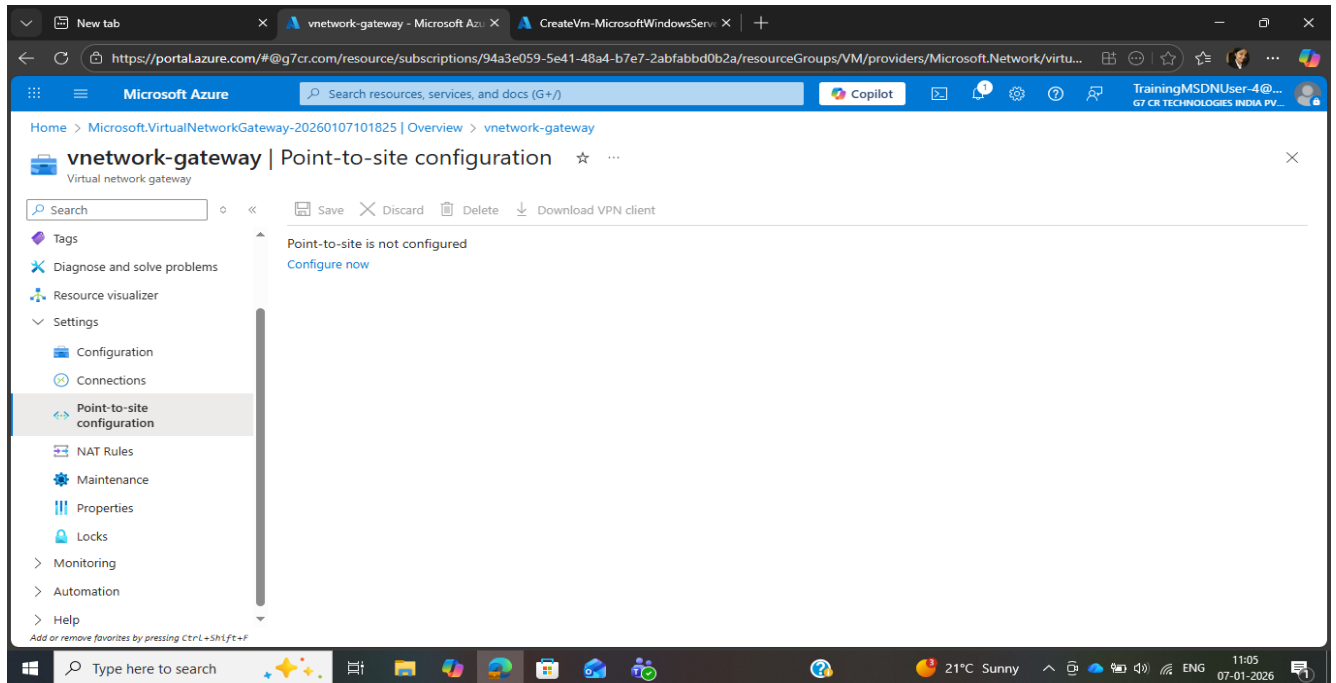


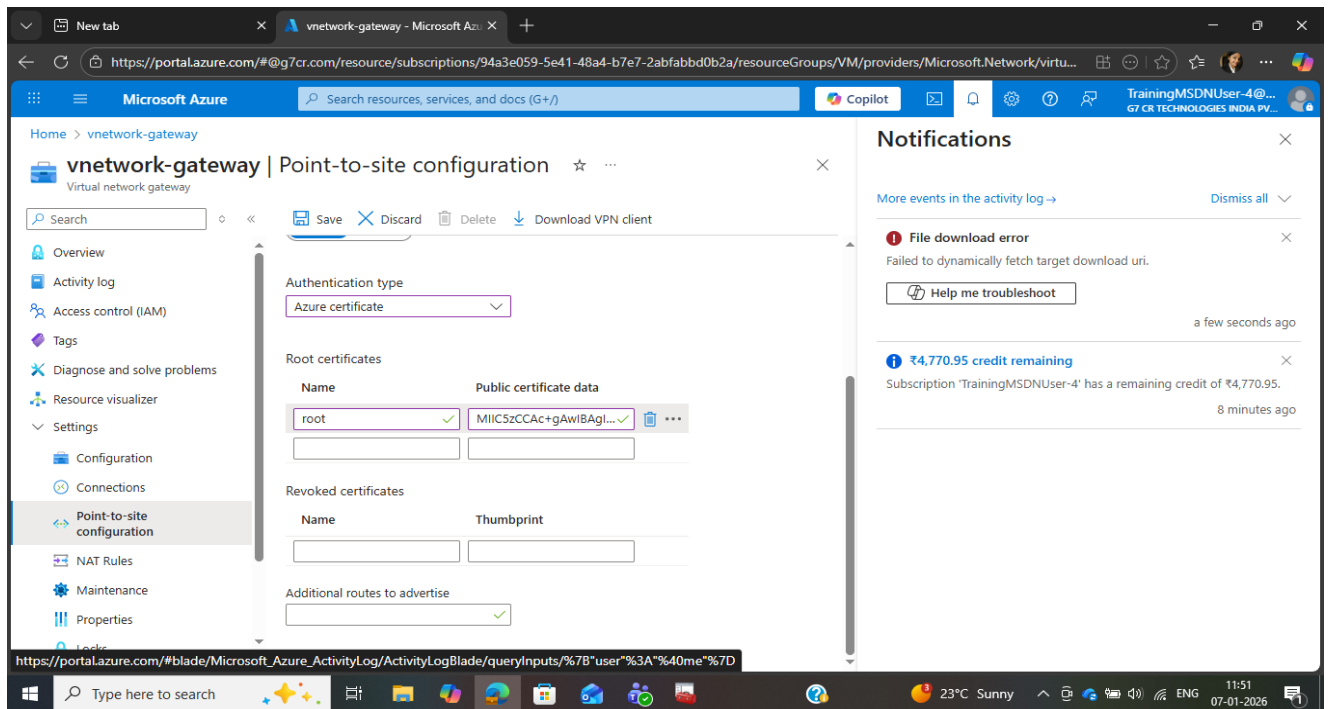
Step 6: Configure P2S VPN with Certificate Authentication

What was done: The root certificate was uploaded to the VPN Gateway and a P2S address pool was configured.

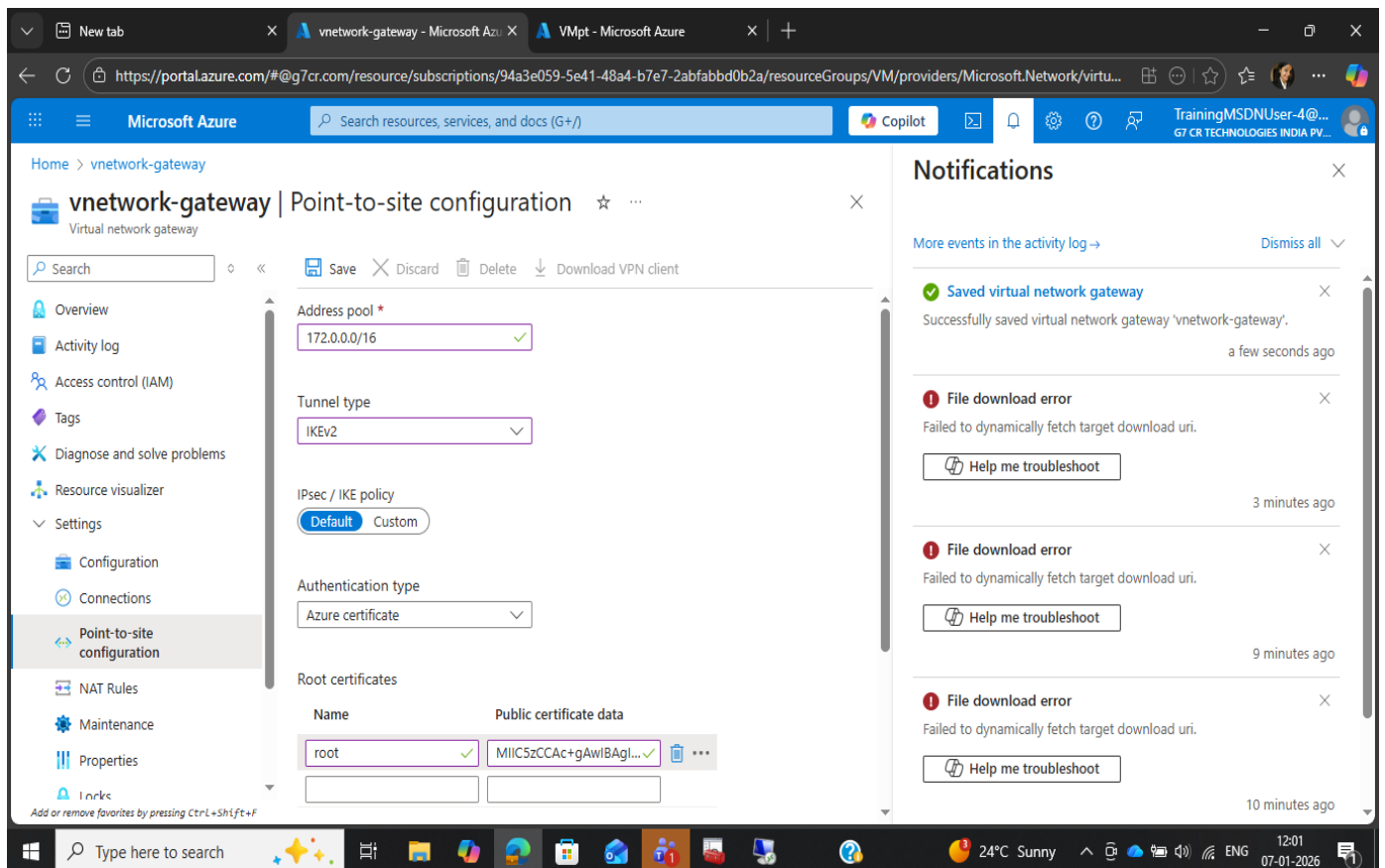
Why this is required:

- Address pool assigns private IPs to VPN users
- Root certificate allows Azure to trust client certificates
- Ensures encrypted and authenticated connections





You need to save it after entering the details otherwise u will get the above error

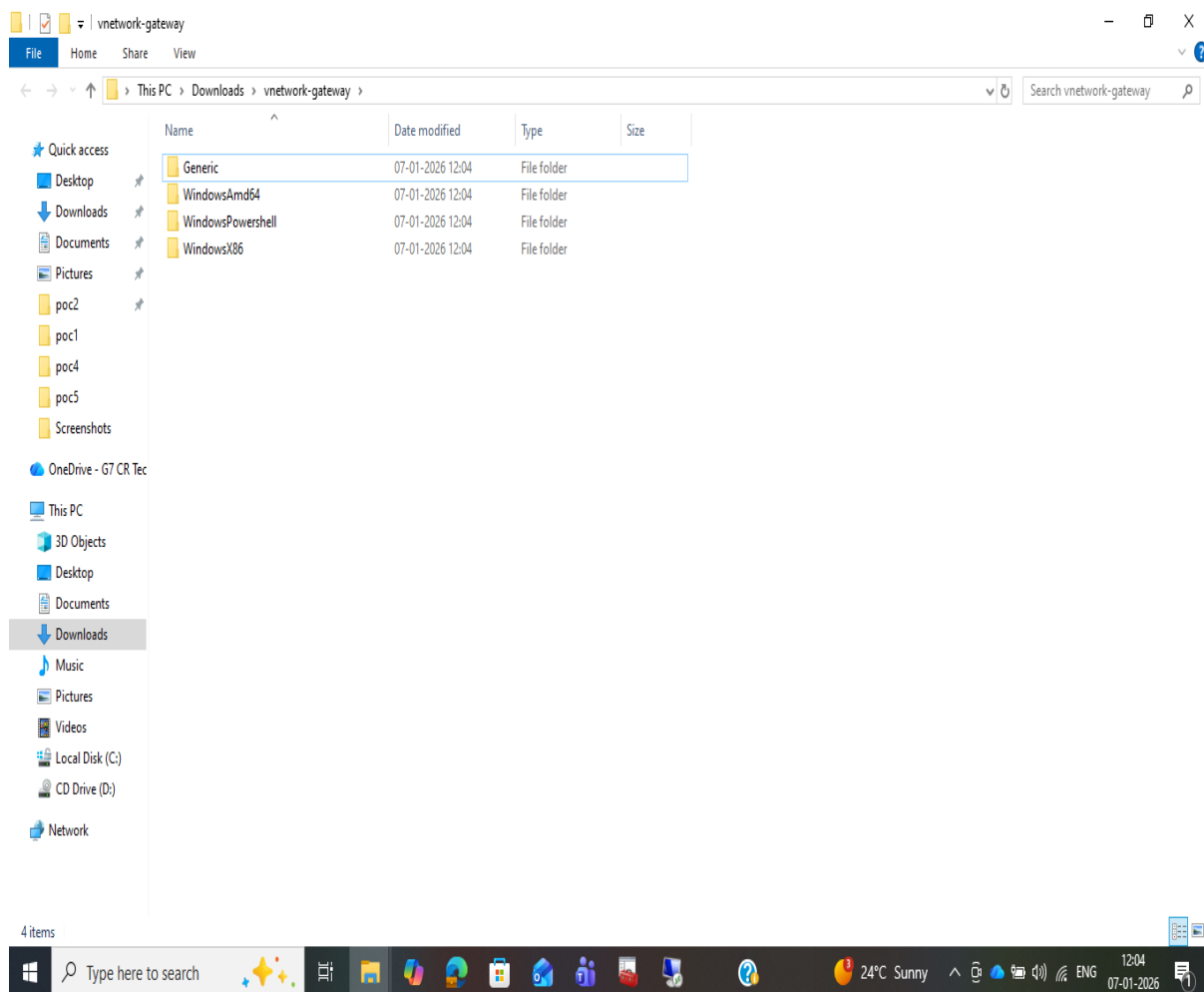


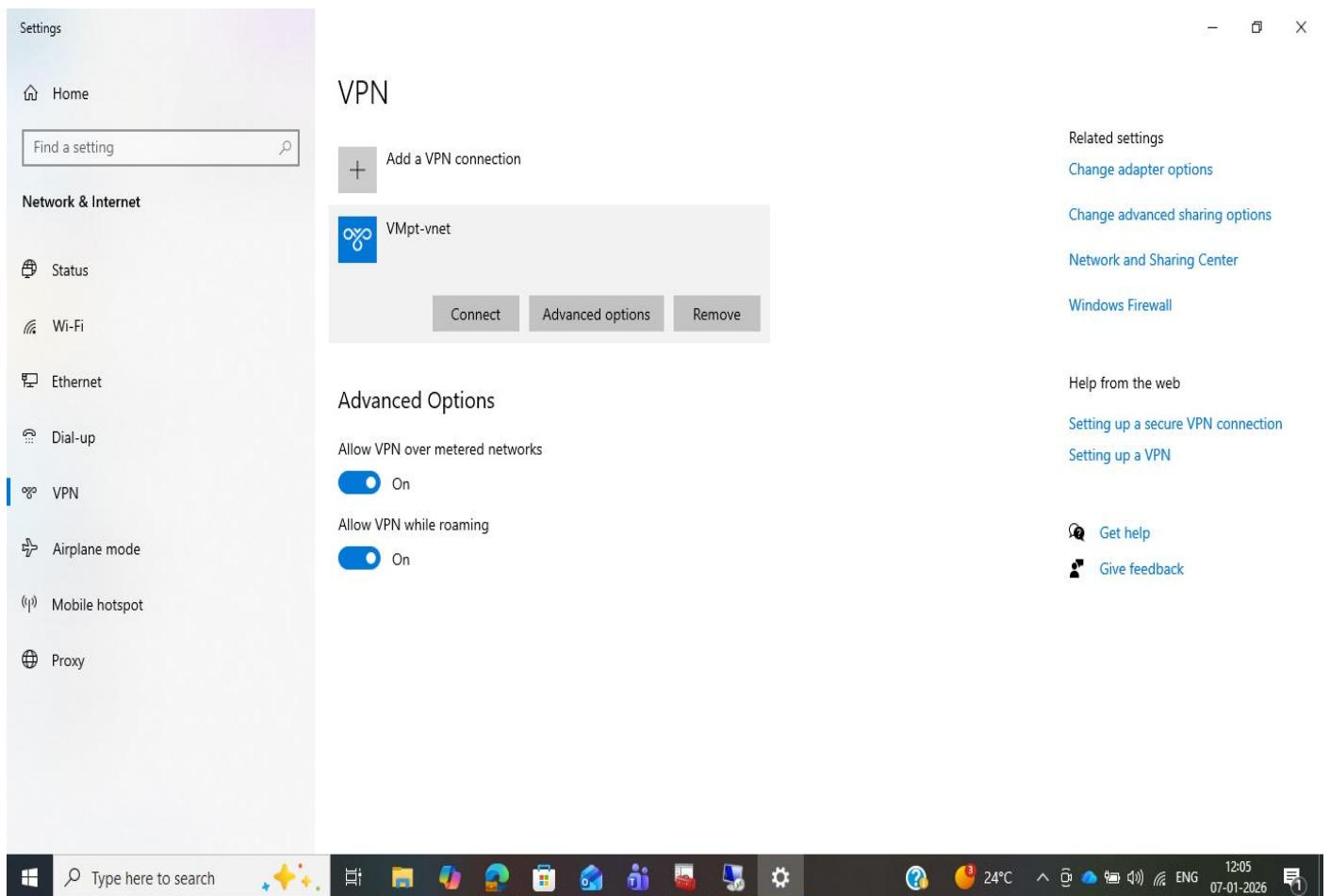
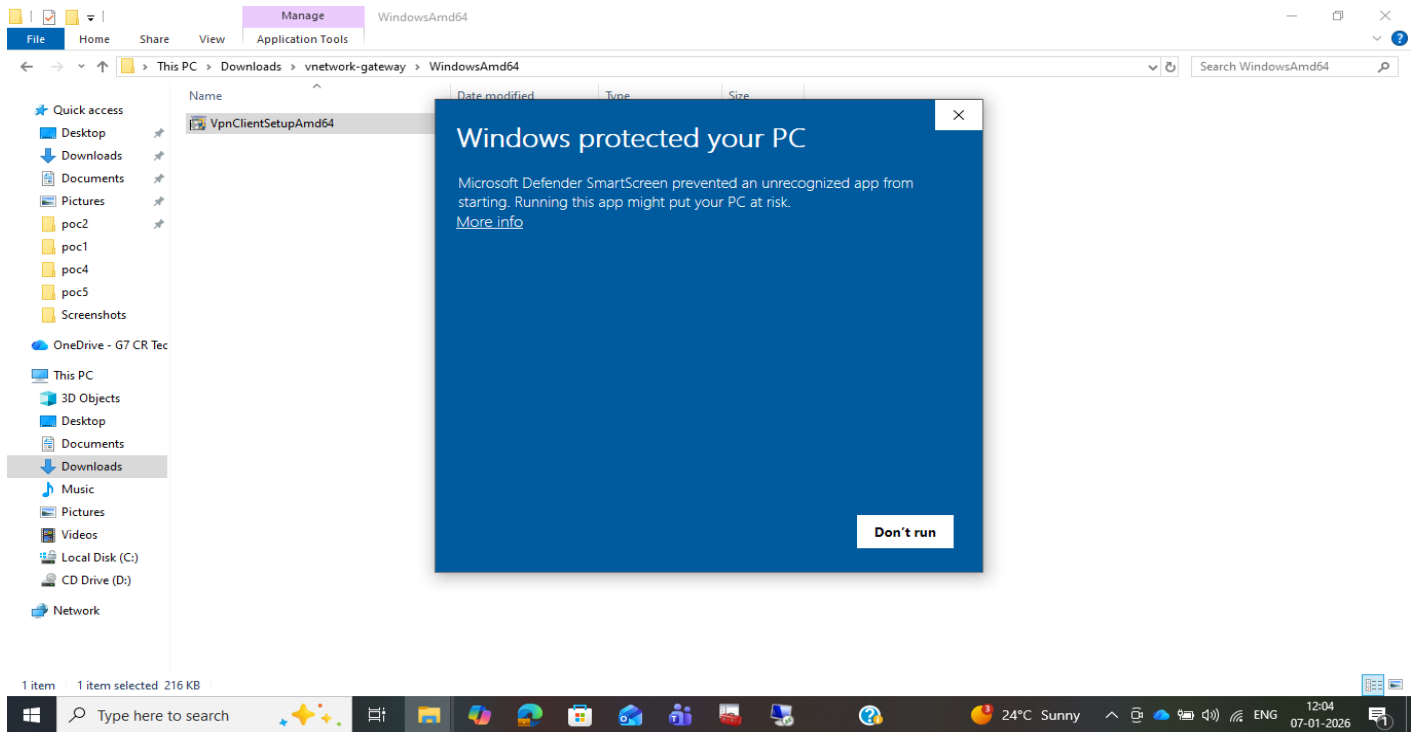
Step 7: Install and Test VPN Client

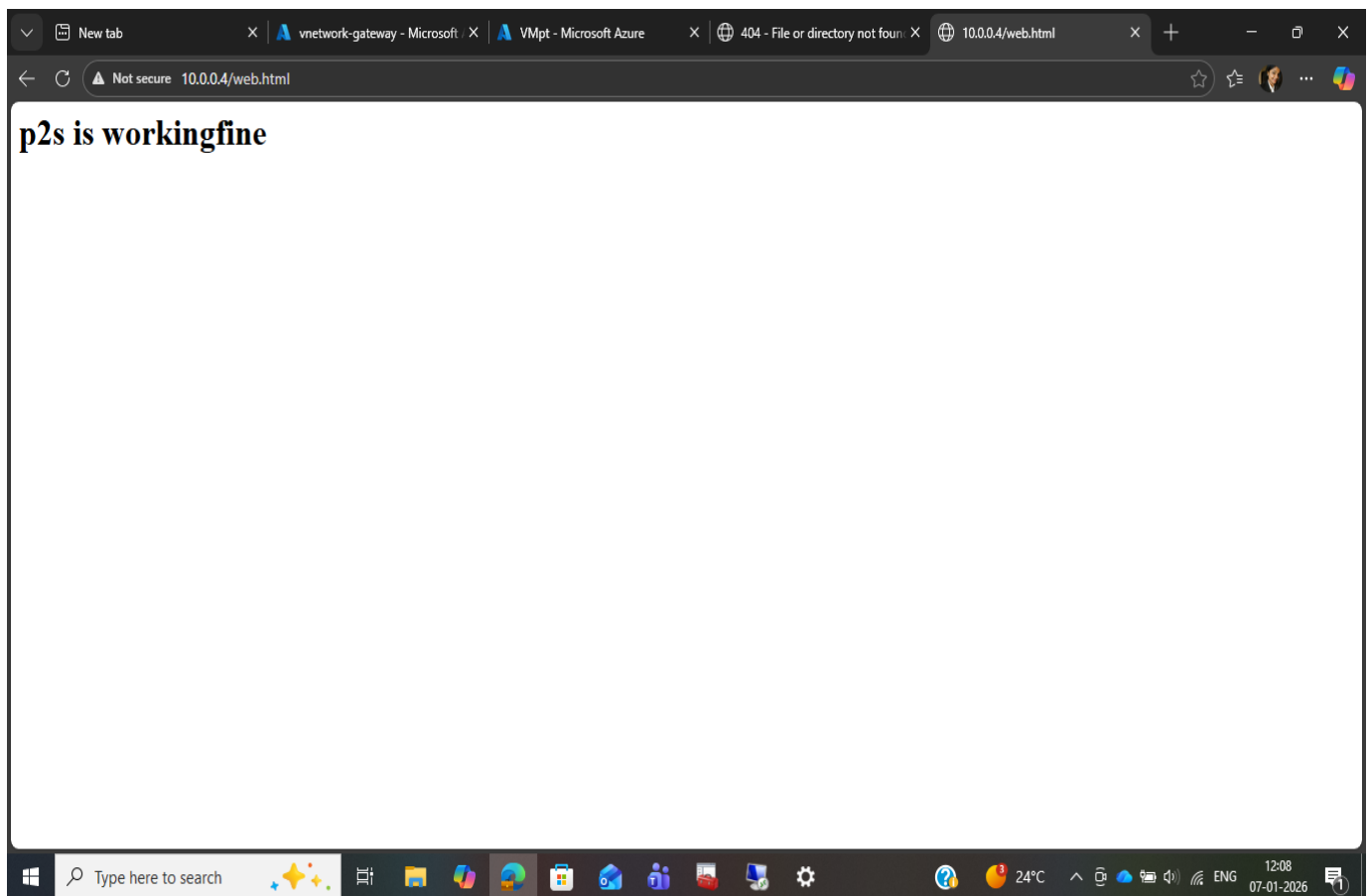
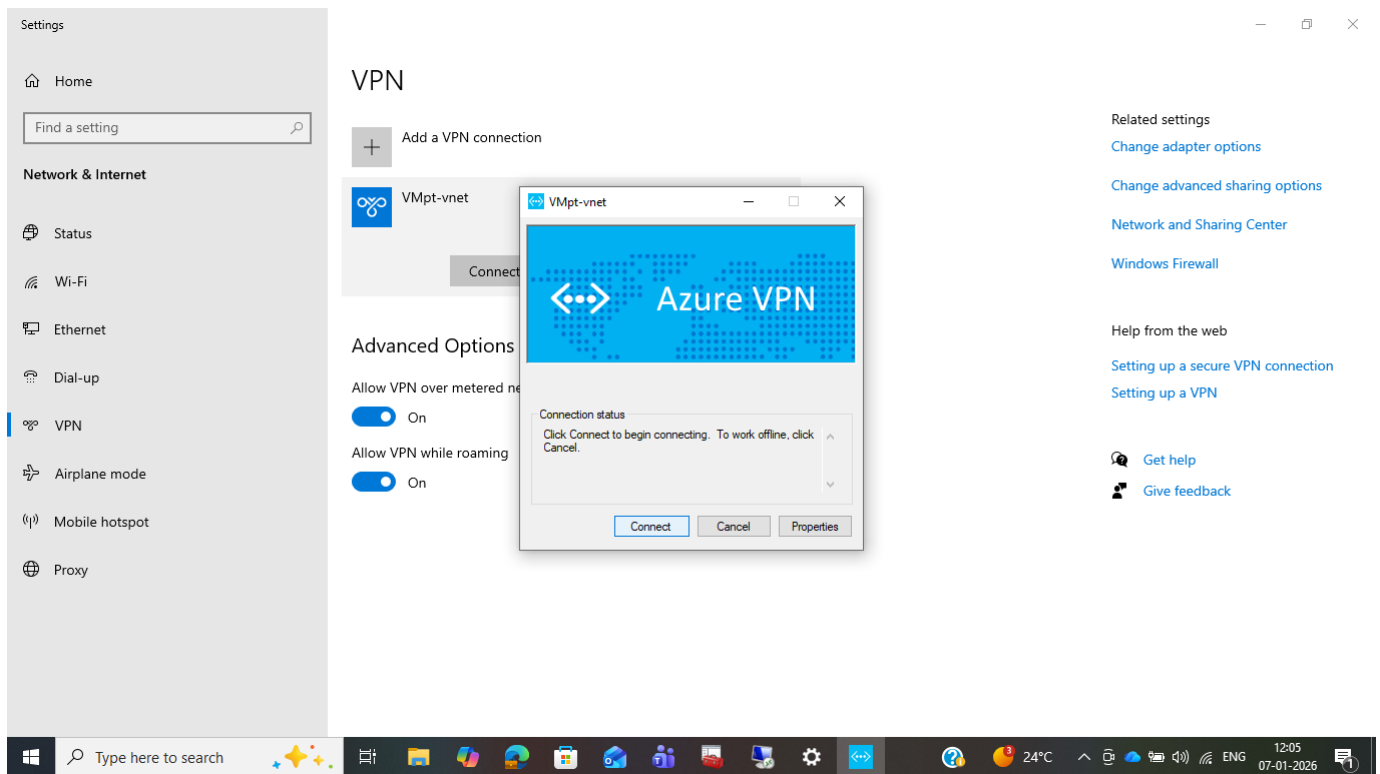
What was done: The VPN client package was downloaded and installed on the user machine.

Why this is required:

- VPN client establishes the tunnel between user and Azure
- Client certificate enables authentication
- Confirms end-to-end connectivity







6. Authentication Method 2: Microsoft Entra ID Authentication

Step 8: Register Azure VPN Application

What was done: An application was registered in Microsoft Entra ID for VPN authentication.

Why this is required:

- Enables identity-based authentication
- Integrates VPN with Azure AD users and groups
- Supports enterprise security features like MFA

The screenshot displays the Microsoft Azure portal interface for configuring a virtual network gateway. The main pane shows the 'Point-to-site configuration' for a 'vnetwork-gateway'. The configuration details are as follows:

- Address pool:** 172.0.0.0/16
- Tunnel type:** OpenVPN (SSL)
- Authentication URL:** https://login.microsoftonline.com/...
- Audience:** 41b23e61-6c1e-4545-b367-cd054...
- Issuer:** https://sts.windows.net/380a88f6-...

A 'Save your password?' dialog is overlaid on the right side of the screen, prompting the user to save their password for the next time. The dialog shows the username '172.0.0.0/16' and a masked password. Below the dialog, there are two 'File download error' messages indicating a failure to dynamically fetch the target download URI. At the bottom, a notification shows a remaining credit of ₹4,770.95 for the 'TrainingMSDNUser-4' subscription.

Microsoft Azure portal showing the configuration of a virtual network gateway (vnet-gateway) for point-to-site configuration. The configuration includes:

- Address pool: 172.0.0.0/16
- Tunnel type: OpenVPN (SSL)
- Authentication type: Azure Active Directory
- Azure Active Directory Tenant: https://login.microsoftonline.com/...
- Audience: 41b23e61-6c1e-4545-b367-cd054...
- Issuer: https://sts.windows.net/380a88f6-...

The right sidebar shows notifications, including "Saved virtual network gateway" and "File download error".

Microsoft Learn article titled "Configure Azure VPN gateway for OpenVPN-Azure AD tenant". The article provides instructions for configuring the VPN gateway, including prerequisites and steps for authentication.

Prerequisites:

- Create Microsoft Entra tenant users
- Authorize the Azure VPN application

Configure the VPN gateway:

- Download the Azure VPN Client profile configuration package

Next steps:

- Locate the tenant ID of the directory that you want to use for authentication. It's listed in the properties section of the Active Directory page. For help with finding your tenant ID, see [How to find your Microsoft Entra tenant ID](#).
- If you don't already have a functioning point-to-site environment, follow

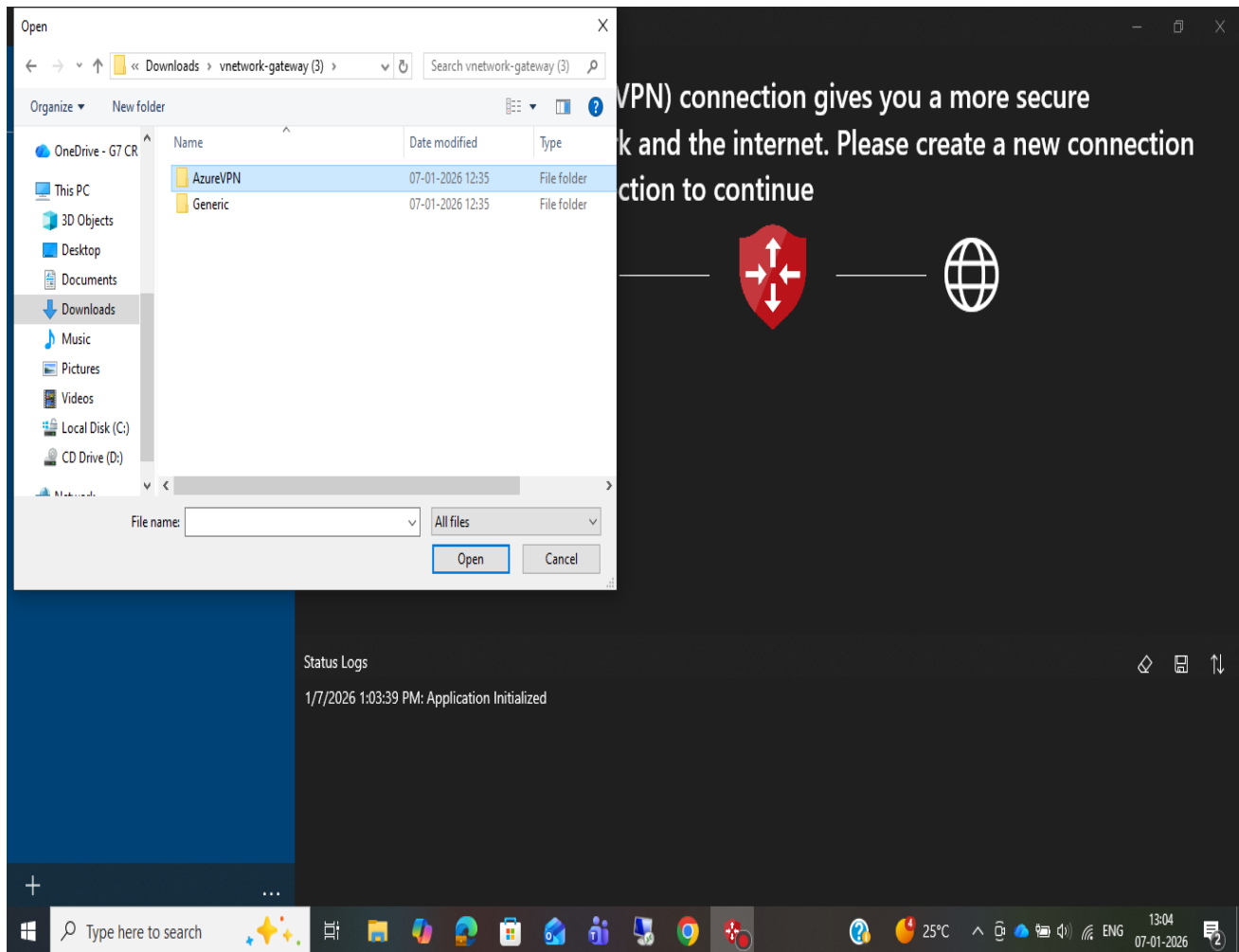
The article also includes a "Was this page helpful?" section with "Yes" and "No" buttons.

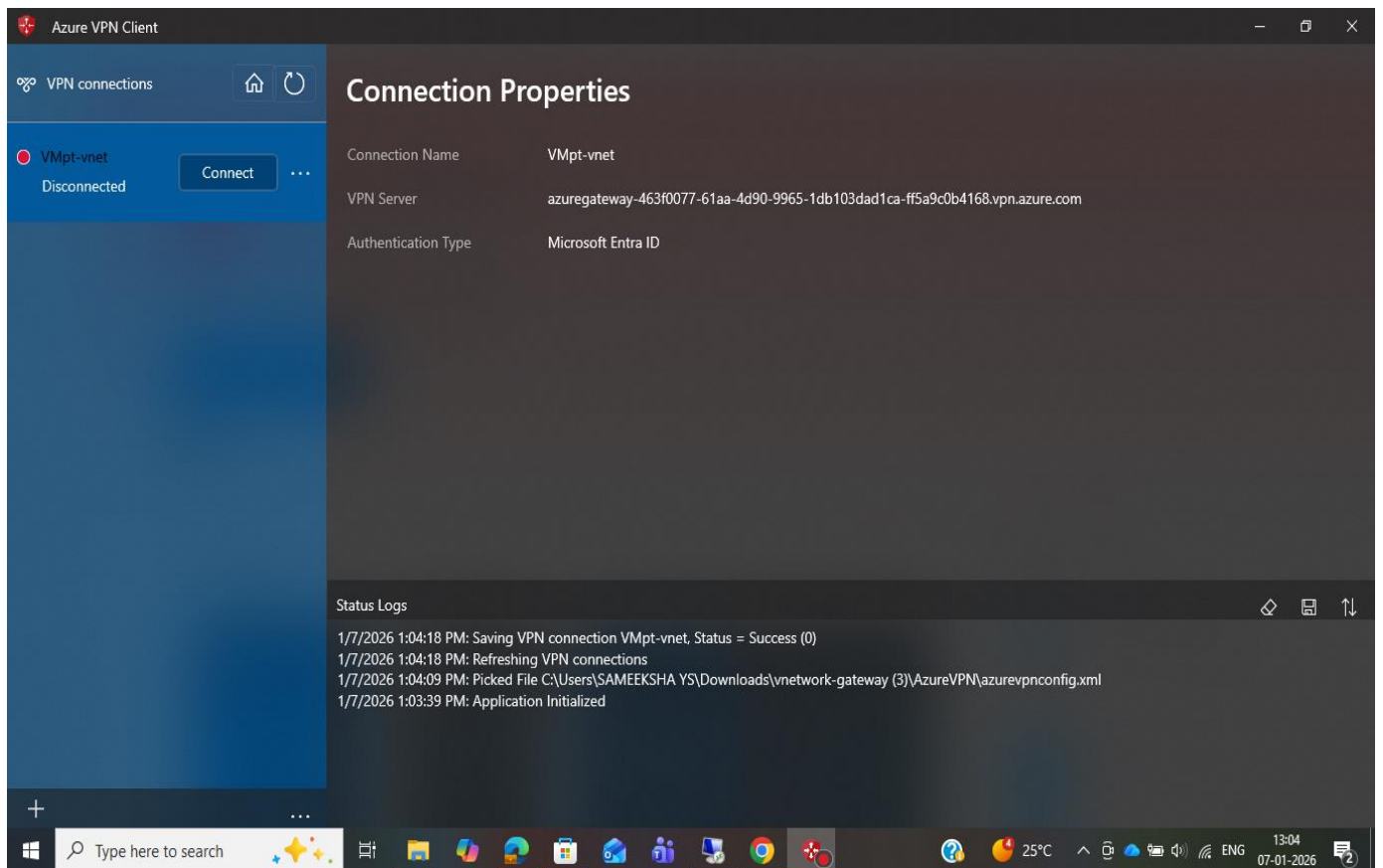
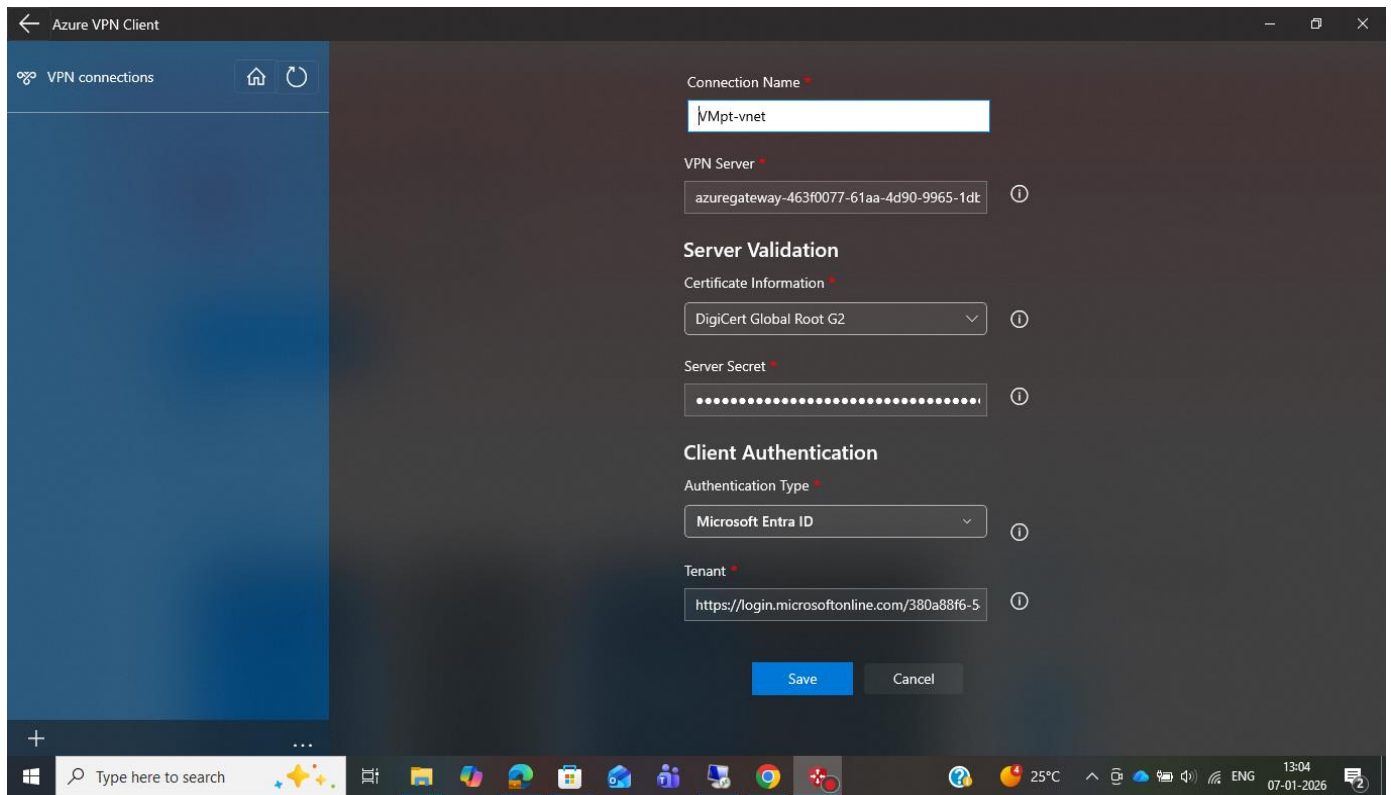
Step 9: Configure VPN Gateway for Entra ID

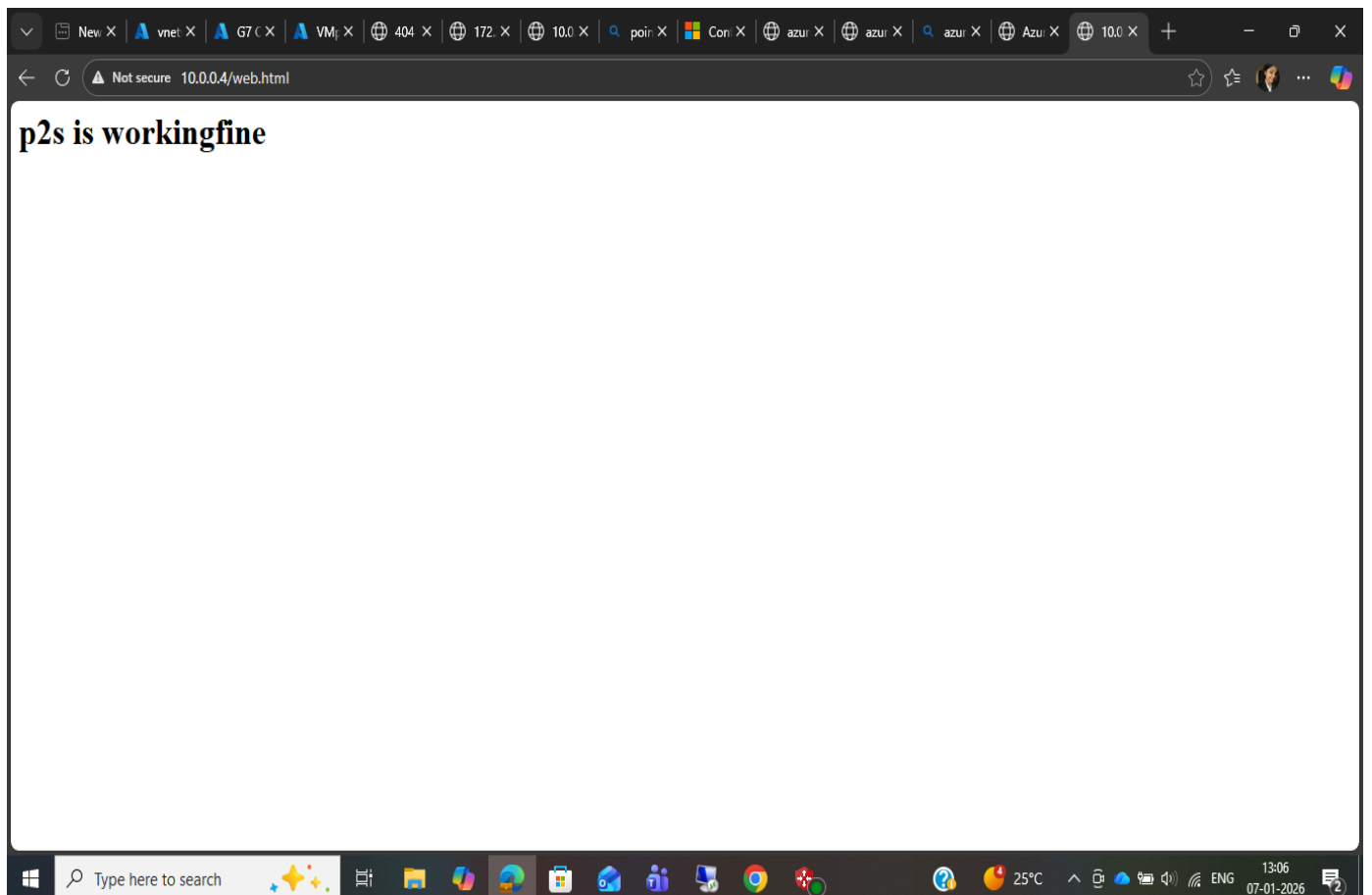
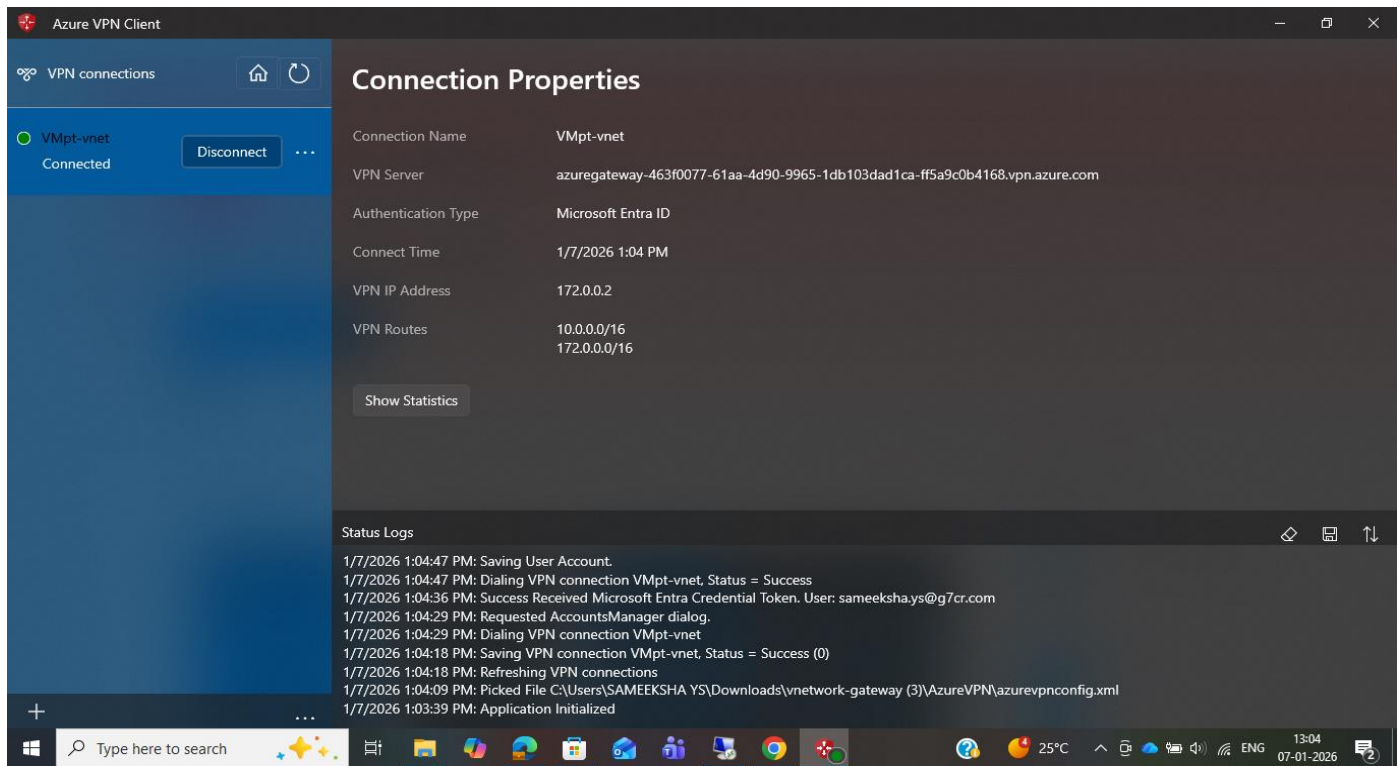
What was done: The VPN Gateway was updated with Entra ID tenant, issuer, and audience details.

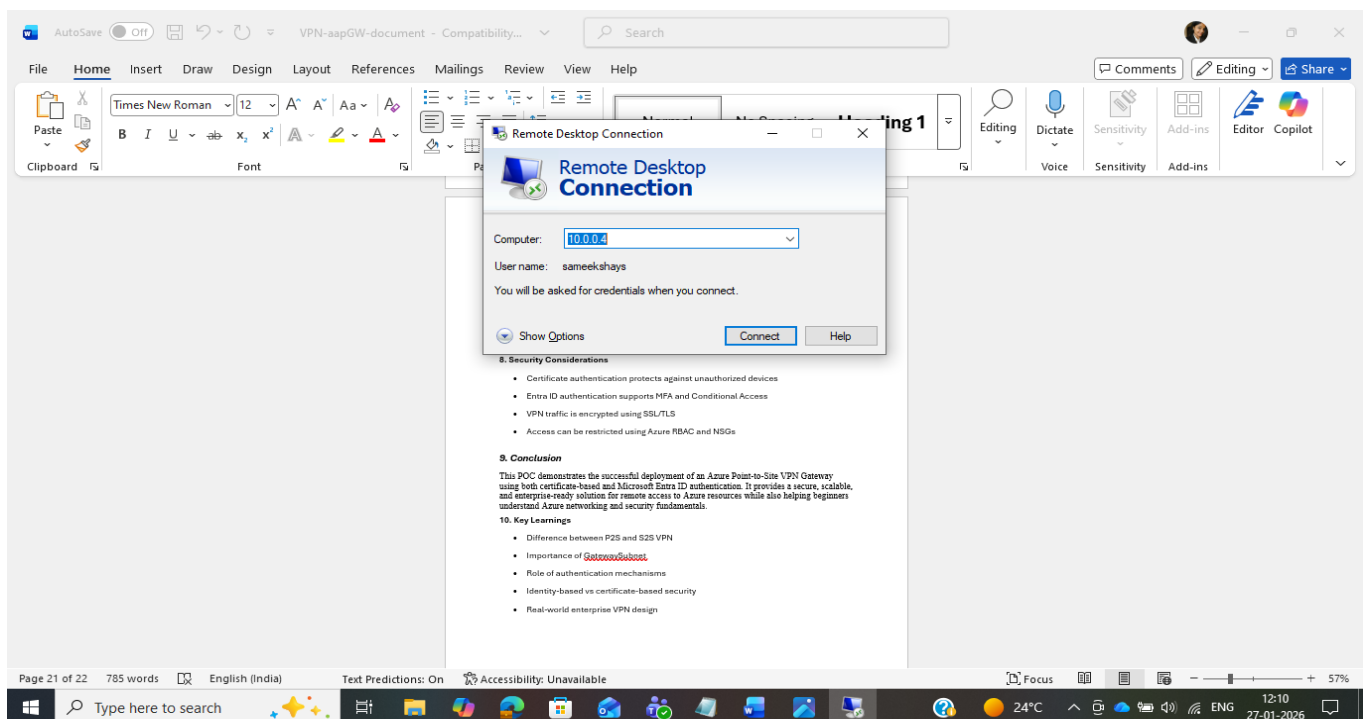
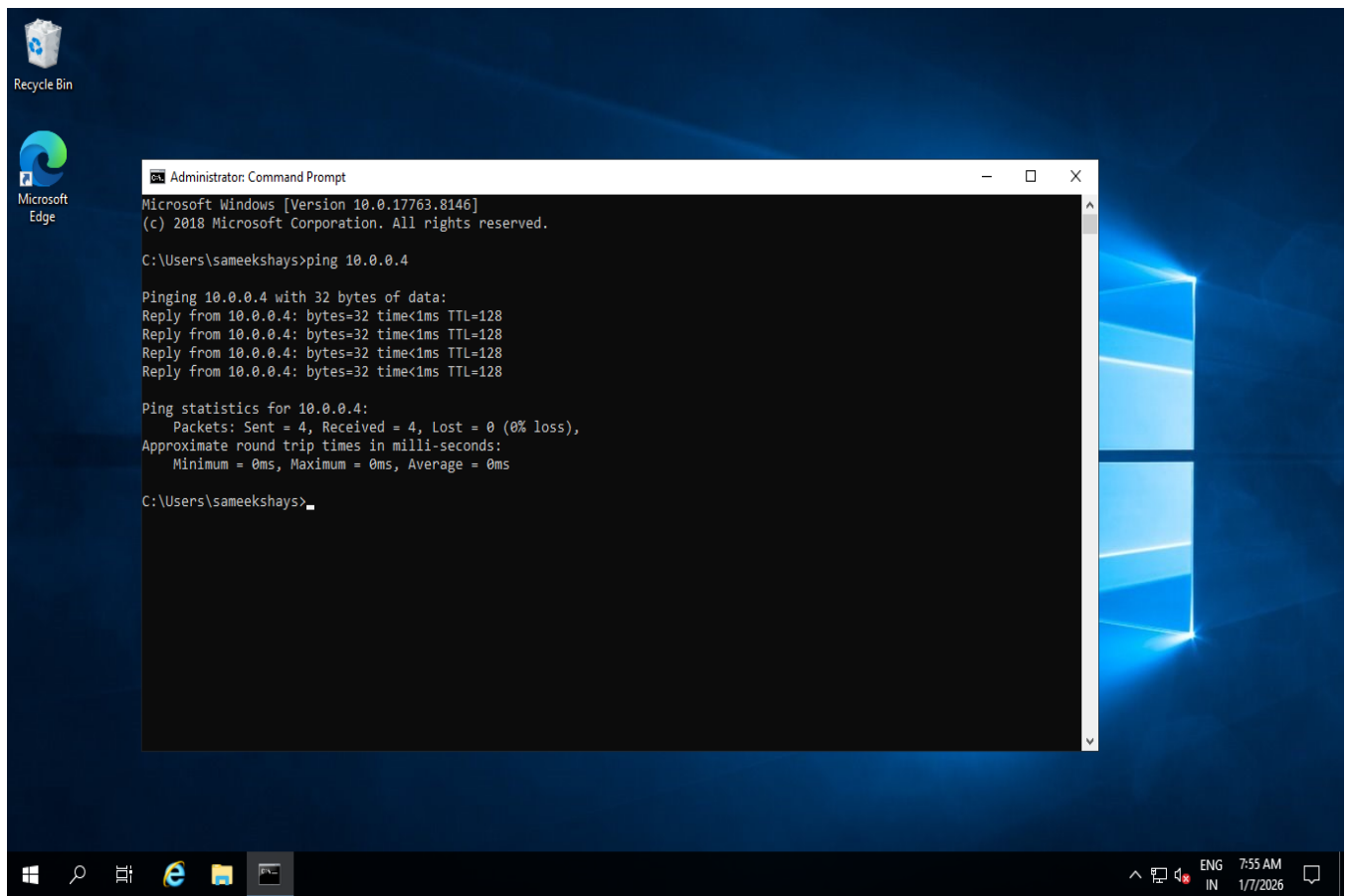
Why this is required:

- Links VPN authentication to Entra ID
- Ensures only authorized users can connect
- Enables centralized identity management









Step 10: Assign Users to VPN Application

What was done: Users or groups were assigned access to the VPN enterprise application.

Why this is required:

- Controls who can access the VPN
- Follows principle of least privilege
- Improves security and compliance

7. Validation and Testing

Validation Performed:

- Connected using certificate-based authentication
- Connected using Entra ID credentials
- Verified IP allocation from P2S pool
- Confirmed access to Azure resources

Purpose: To ensure the VPN setup works securely and as expected.

8. Security Considerations

- Certificate authentication protects against unauthorized devices
- Entra ID authentication supports MFA and Conditional Access
- VPN traffic is encrypted using SSL/TLS
- Access can be restricted using Azure RBAC and NSGs

9. Conclusion

This POC demonstrates the successful deployment of an Azure Point-to-Site VPN Gateway using both certificate-based and Microsoft Entra ID authentication. It provides a secure, scalable, and enterprise-ready solution for remote access to Azure resources while also helping beginners understand Azure networking and security fundamentals.

10. Key Learnings

- Difference between P2S and S2S VPN
- Importance of GatewaySubnet
- Role of authentication mechanisms

- Identity-based vs certificate-based security
- Real-world enterprise VPN design