Microsoft Azure



Project Report: Azure Hub-and-Spoke Network Topology

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Introduction

Project Title: Azure Hub-and-Spoke Network Topology Deployment

Project Objective: To design, deploy, and document a basic hub-and-spoke cloud network topology on Microsoft Azure, establish VNet peering, and publish a web application within the network, with a focus on cost optimization and core Azure skills.

Project Requirements

Topology: Hub-and-Spoke network model with one Hub VNet and three Spoke VNets (Spoke-1, Spoke-2, Spoke-3).

Connectivity:

VNet peering configured between the Hub VNet and each Spoke VNet.

Traffic forwarding enabled to allow communication between Spoke VNets through the Hub VNet (acting as a central router).

Subnetting: Implementation of subnets within both the Hub and Spoke VNets for organizational purposes.

Web Application Deployment:

Deployment of a simple Azure Web App Service.

Hosting of a basic static website or Azure Starter App.

Configuration for public accessibility via a Public IP address.

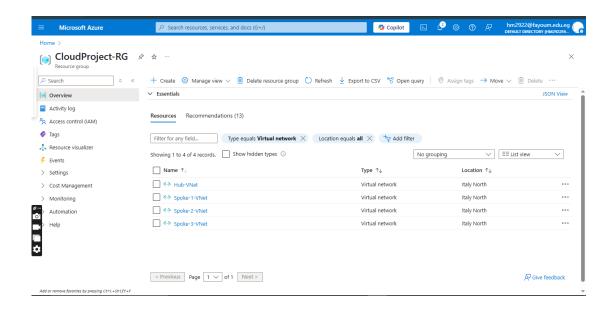
Security: Implementation of Network Security Groups (NSGs) to control inbound and outbound traffic at the VNet and subnet levels, including rules to allow HTTP (port 80) and HTTPS (port 443) traffic.

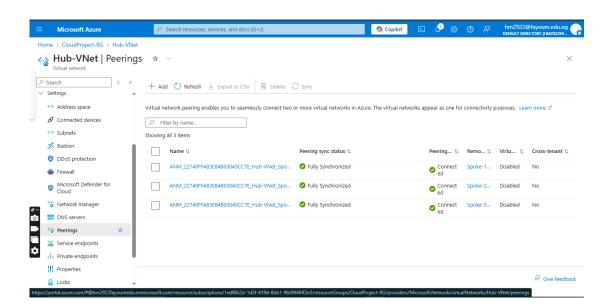
Monitoring: Enabling Azure Monitor or utilizing basic azure

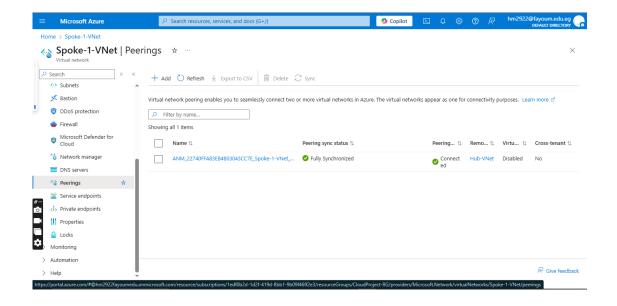
Cost Estimation and Optimization: Analysis of the costs associated with the deployed resources and identification of potential budget optimization strategies (Total Cost of Ownership - TCO).

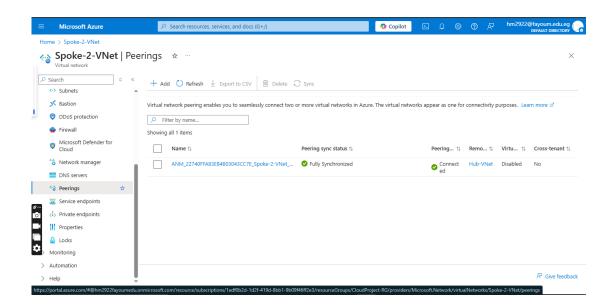
Design and Planning

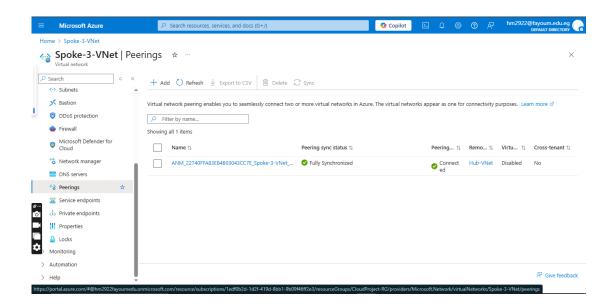
Network Architecture Diagram:



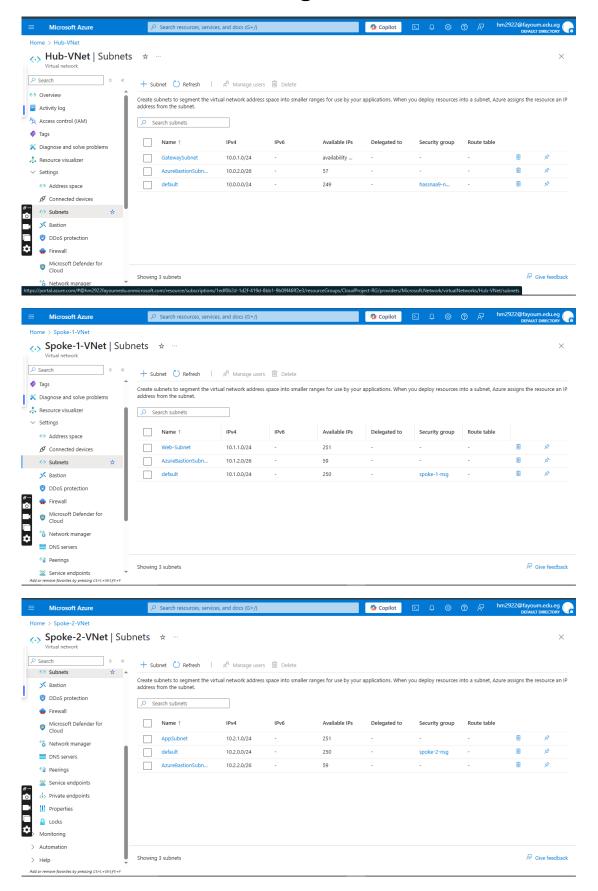


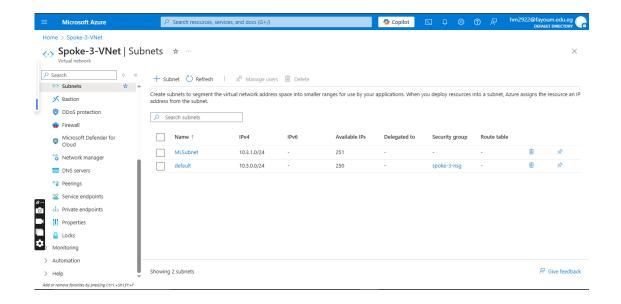




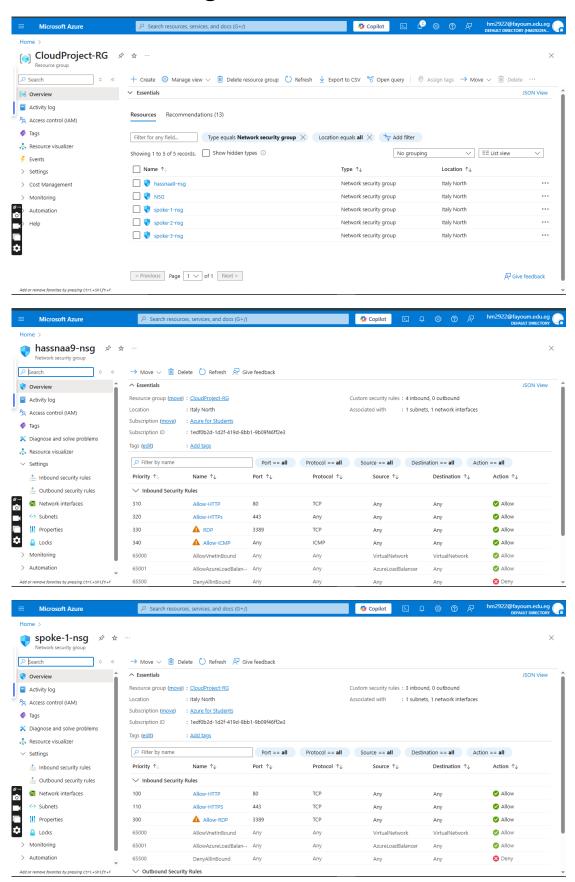


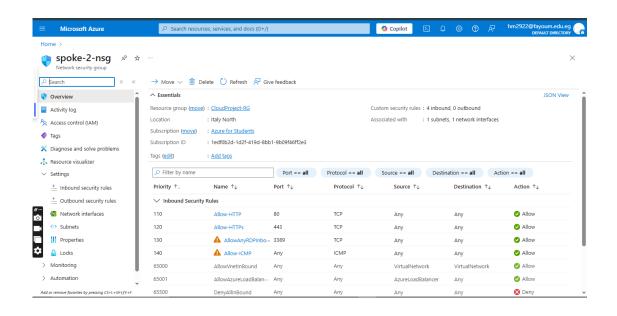
VNet and Subnet Planning

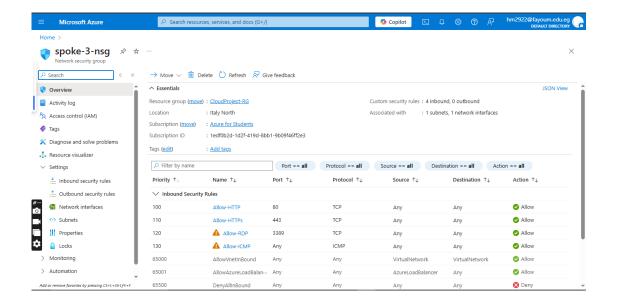




NSG Rule Planning

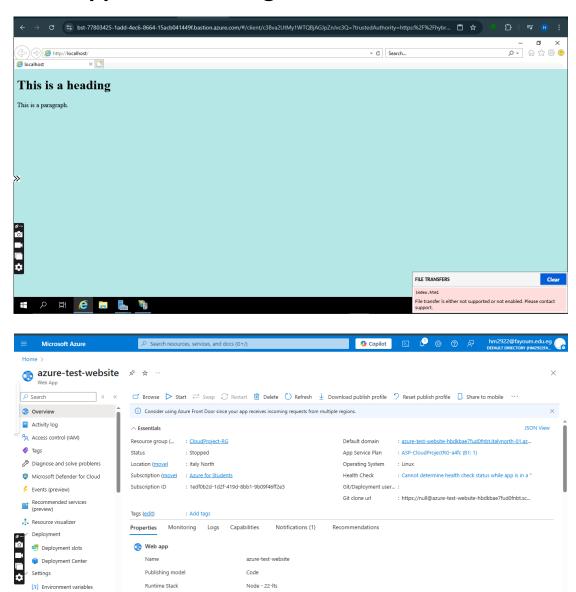


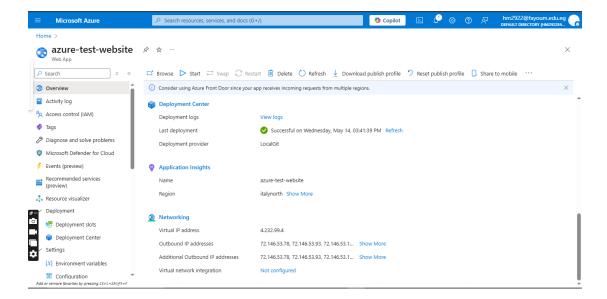




Web Application Configuration

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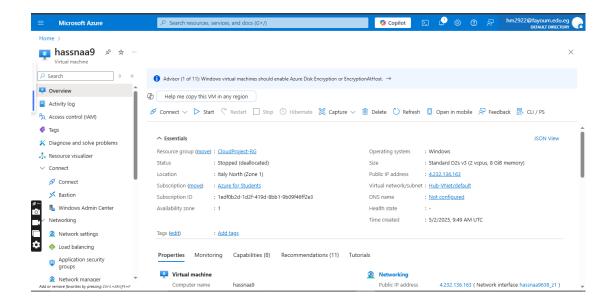


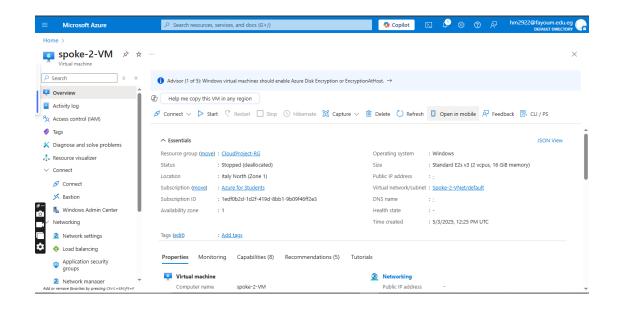


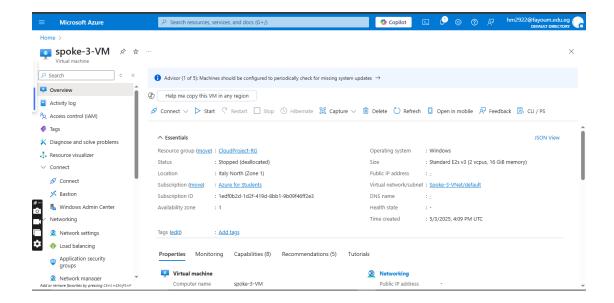
Verifying Network Connectivity (Ping Tests)

This section details the steps taken to ensure proper network connectivity between virtual machines deployed within the Hub VNet and the Spoke VNets. The ping utility is used to test the reachability of VMs across the peered virtual networks.

Deploy a VM in the Hub, Spokes VNet

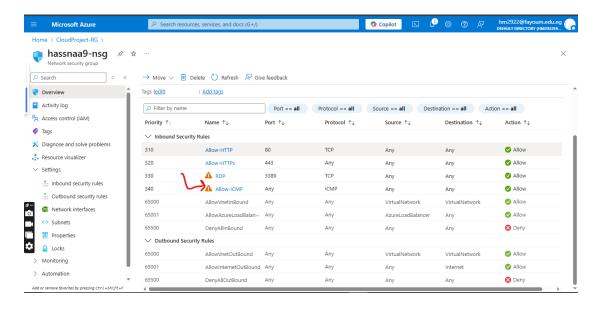






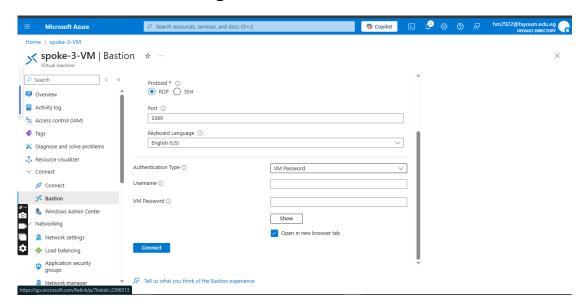
Configuring Network Security Groups for ICMP:

 To allow ping (which uses the Internet Control Message Protocol - ICMP), inbound rules need to be added to the Network Security Groups associated with the subnets where the test VMs are deployed.

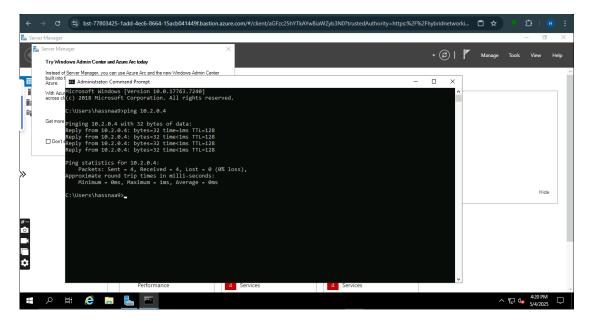


Ping Tests from Hub VM to Spoke VMs:

1-connect to VMs using Bastion

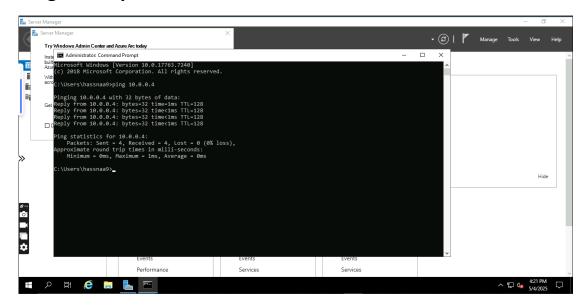


2-Run ping tests from Hub to Spokes

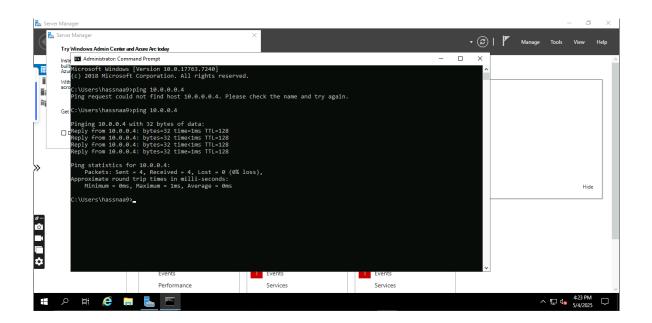




Ping from Spoke-2 VM to Hub VM

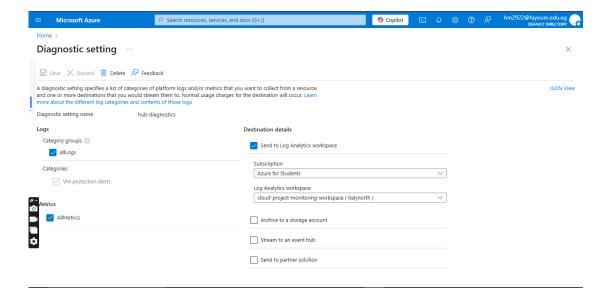


Ping from spoke 3 to spoke 2

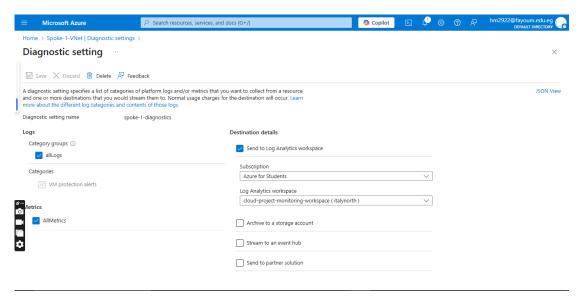


Monitoring and Check Logs

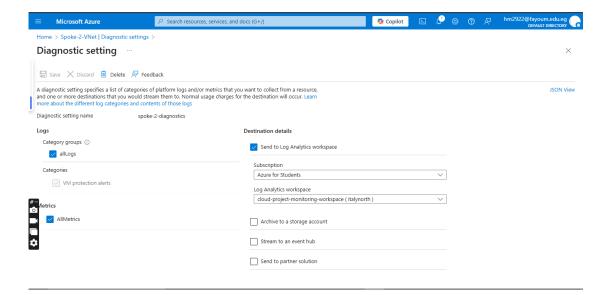
1-add hub diagnostics



2-add spoke 1 diagnostics



3-add spoke 2 diagnostics



4-add spoke 4 diagnostics

