



# SPOKE AND HUB

Create Hub and Spoke network Establish Spoke to Spoke connectivity

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## 1. Introduction

The Hub and Spoke network topology is a common architecture pattern used in Azure to manage communication, security, and routing for large-scale deployments. This topology is particularly effective in scenarios where multiple workloads or environments need to communicate with each other efficiently while maintaining centralized control over network traffic.

In this document, we will delve into the process of creating a Hub and Spoke network topology in Azure, followed by steps to establish connectivity between Spoke virtual networks (VNETs). This setup not only enhances network manageability and scalability but also ensures that the communication between different parts of the network is secure and efficient.

We will begin with an overview of the Hub and Spoke topology, its benefits, and common use cases. Then, we will provide a detailed, step-by-step guide on setting up the network in Azure, configuring peering connections, and ensuring proper routing between the Spokes. Finally, we will cover advanced configuration options, best practices for maintaining network security, and tips for monitoring and troubleshooting the network.

## 2. Overview of Hub and Spoke Network Topology

### Definition

The Hub and Spoke topology involves a central Hub network connected to multiple Spoke networks. The Hub often hosts shared services, such as firewalls and VPN gateways, while Spokes are used for isolated workloads.

### Benefits

- **Centralized Management:** Simplifies management by centralizing common services.
- **Isolation:** Enhances security by isolating workloads.
- **Scalability:** Easily scales to accommodate growing network needs.
- **Cost Efficiency:** Reduces costs by centralizing resources.

### Use Cases

- **Large Enterprise Networks:** Ideal for organizations with complex networking requirements.
- **Multi-Tier Applications:** Suitable for applications requiring isolation between different tiers.
- **Shared Services:** Useful for scenarios where services like DNS or AD DS need to be shared across multiple VNETs.

### 3. Setting Up the Hub and Spoke Network in Azure

#### Prerequisites

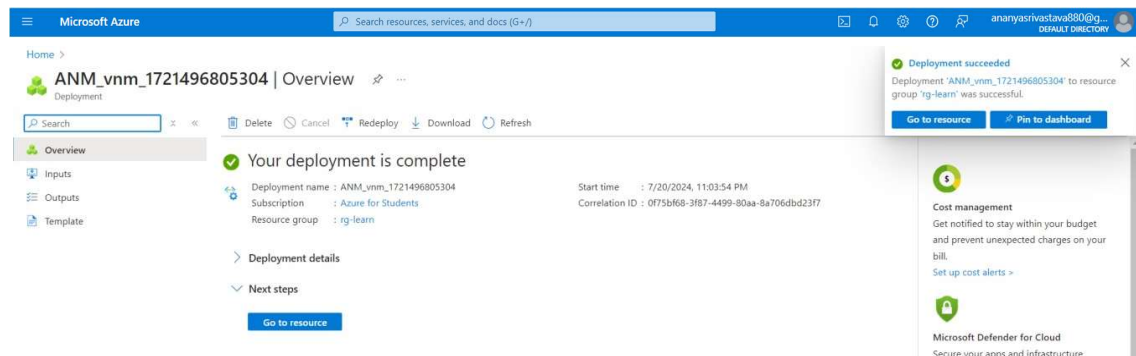
- Active Azure subscription.
- Basic knowledge of Azure Networking.
- Permissions to create and manage VNets and resources.

#### Step-by-Step

##### Create a Network Group

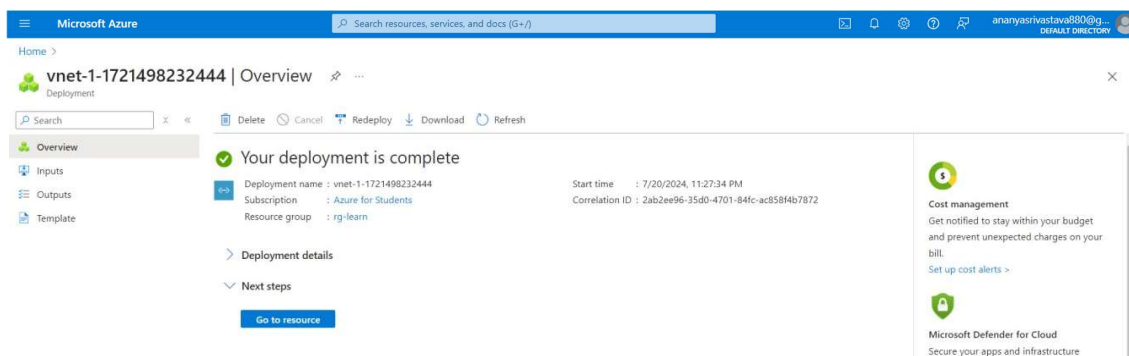
##### Create a Network Manager

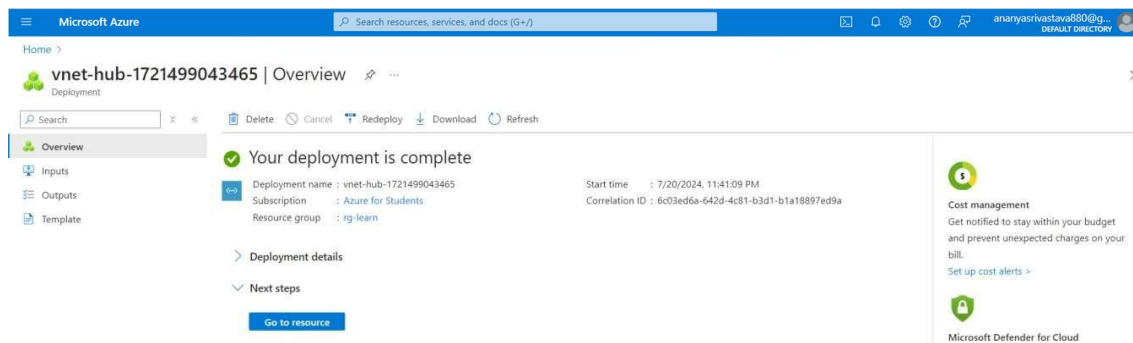
1. Navigate to the Azure portal.
2. Search for "Network Manager" in the search bar.
3. Click on "Create network manager."
4. Fill in the necessary details like subscription, resource group, region, and name for the network manager.
5. Review and create the network manager.



##### Create Virtual Networks (Prod and Hub)

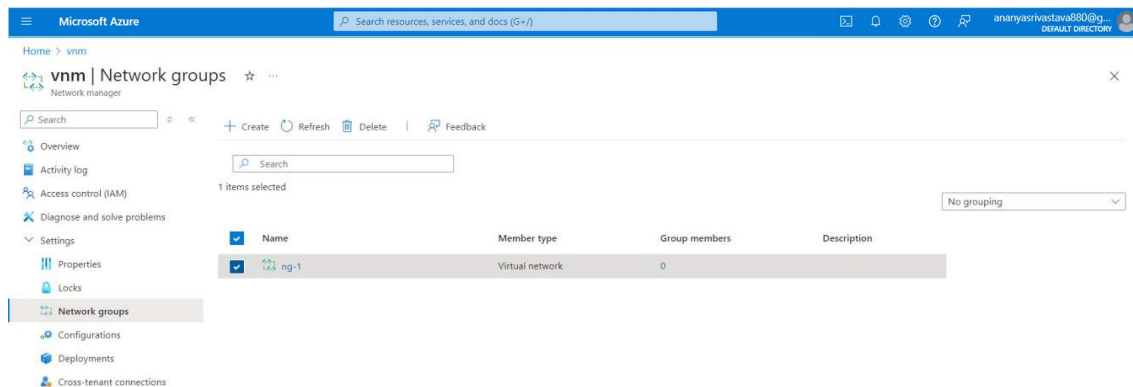
1. In the Azure portal, search for "Virtual Networks."
2. Click on "Create."
3. Choose your subscription and resource group.
4. Provide a name for the virtual network
5. Configure the address space and subnets as required.
6. Repeat the process to create both the hub and production virtual networks.





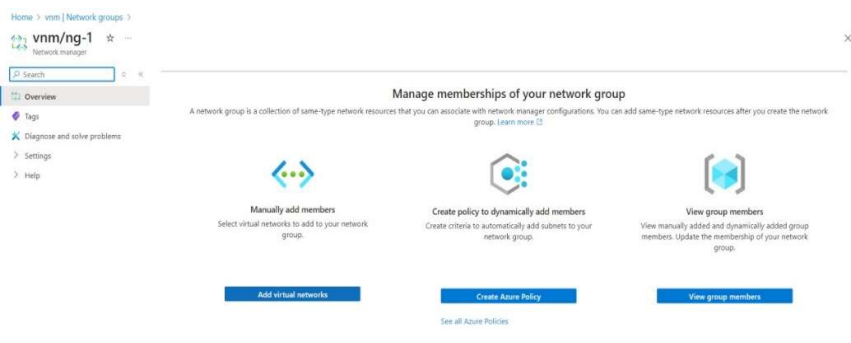
## Create Network Groups

1. Within the Network Manager, navigate to the "Network Groups" section.
2. Click on "Add network group."
3. Provide a name for the network group and select the region.
4. Add the virtual networks to this network group.
5. Save the network group configuration.



## Manually Adding Virtual Networks

1. If needed, navigate to the "Virtual Networks" section under the Network Manager.
2. Select "Add" to manually add any virtual networks that are not already included in the network groups.



Microsoft Azure

Search resources, services, and docs (G+I)

Home > vnm | Network groups > vnm/ng-1

vnm/ng-1 | Group members

Overview

Tags

Diagnose and solve problems

Settings

Properties

Locks

Group members

Policies

Help

Search

No items selected

No grouping

Name	Source	Subscription	Resource group	Location	Tenant id
vnet-2	Manually added	41484552-b951-4d3e-a03e-bc45...	NetworkWa...	eastus	40b6d737-0ec1
vnet-1	Manually added	41484552-b951-4d3e-a03e-bc45...	rg-learn	eastus	40b6d737-0ec1

## Create a Hub and Spoke Connectivity Configuration

1. In the Network Manager, go to the "Connectivity" section.
2. Click on "Add connectivity configuration."
3. Provide a name for the connectivity configuration.
4. Choose the hub virtual network as the central hub.
5. Select the spoke virtual networks to connect to the hub.
6. Configure any necessary routing and security settings.
7. Save the connectivity configuration.

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Home > vnm | Configurations >

Create a connectivity configuration

Basics Topology Visualization Review + create

Topology \*

Mesh

Hub and spoke

Hub \*

Delete existing peerings

Spoke network groups

Select a hub

Choose a network resource that is not in any network group to serve as a hub.

Search

Tenant: Default Directory

1 item selected

No grouping

Name	Has gateway	Subscription	Resource group	Location
vnet-2	No	41484552-b951-4d3e-a03e-bc459ce76...	networkwatcherrg	eastus
vnet-1	No	41484552-b951-4d3e-a03e-bc459ce76...	rg-learn	eastus
vnet-hub	No	41484552-b951-4d3e-a03e-bc459ce76...	rg-learn	eastus

Home >

Create a connectivity configuration

Basics Topology Visualization Review + create

Topology \*

Mesh

Hub and spoke

Hub \*

Delete existing peerings

Spoke network groups

Add network groups

Select network groups to apply this configuration.

Search

Network groups

Group members

ng-1

1

Select

Cancel

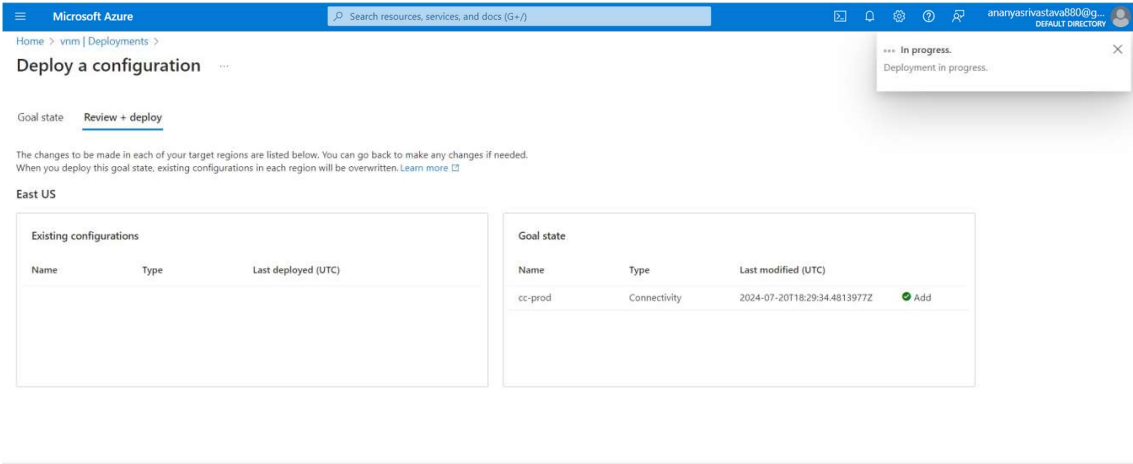
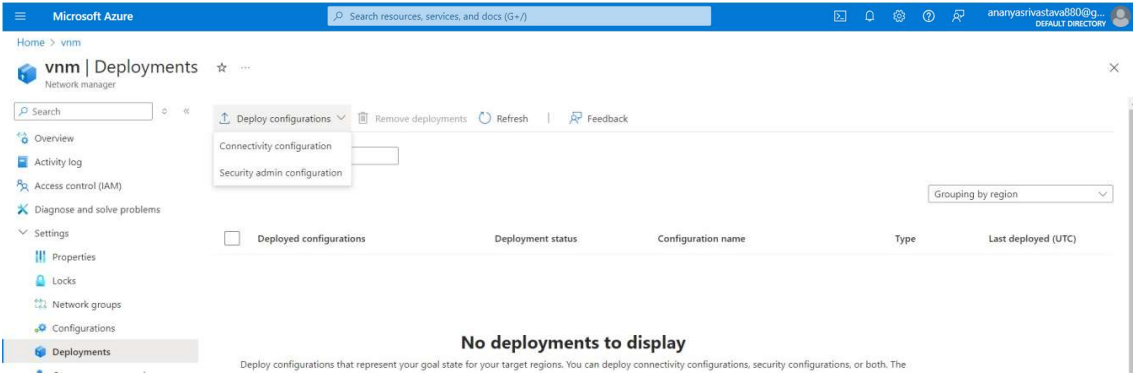
Review + create

Previous

Next: Visualization >

# Deploy the Hub and Spoke Configuration

1. Once the connectivity configuration is saved, navigate to the "Deployments" section.
2. Click on "Deploy connectivity configuration."
3. Select the configuration you created.
4. Review the settings and deploy the configuration.



# View Deployed Configuration

1. After deployment, go to the "Deployments" section in the Network Manager.

2. Select the deployed configuration to view details.
3. Verify the virtual networks are connected as per the hub and spoke topology.
4. Check the connectivity and ensure that all routing and security policies are working as expected.
- 5.



## 4 Advanced Configuration and Best Practices

### Traffic Flow Optimization

- **Utilize Network Virtual Appliances (NVAs)** for advanced traffic management.
- **Optimize Routing** to minimize latency and improve performance.

### Network Security Best Practices

- **Implement NSGs and Azure Firewall** to control and monitor traffic.
- **Regularly Audit Security Rules** to ensure compliance and mitigate risks.

### Monitoring and Troubleshooting

- **Use Azure Monitor and Network Watcher** for network performance monitoring.
- **Analyze Logs and Metrics** to identify and resolve connectivity issues.

## 5. Conclusion

The Hub and Spoke topology in Azure offers a robust, scalable, and secure networking solution for complex environments. By following the steps outlined in this document, you can efficiently set up and manage a Hub and Spoke network, ensuring seamless connectivity between Spoke networks while maintaining centralized control and security.

## 6. References

- Azure Virtual Network Documentation - <https://learn.microsoft.com/en-us/azure/architecture/networking/architecture/hub-spoke?tabs=cli>
- VNet Peering - <https://learn.microsoft.com/en-us/azure/virtual-network/virtual-network-peering-overview>
- Azure Network Security Groups - <https://learn.microsoft.com/en-us/azure/virtual-network/network-security-groups-overview>