Azure Solution Architect Training

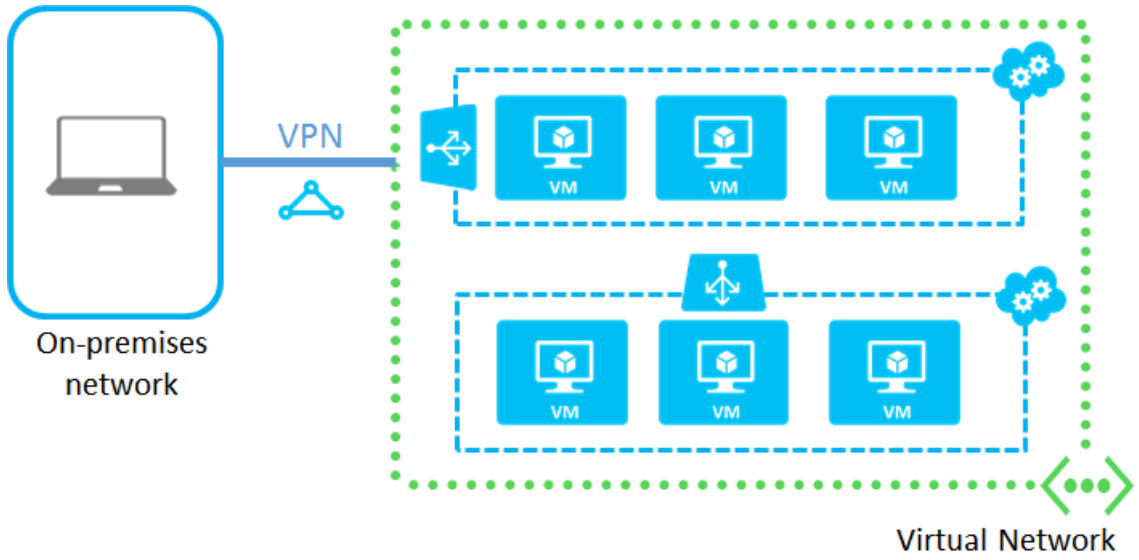
Module 4
Azure Virtual Network

Agenda

- What is Virtual Network
- Azure VNet Features
- Azure Virtual Network
- DHCP
- Subnet
- Routing
- Network Security Groups
- NSG Rule
- Service Endpoints
- IP Address
- Connectivity Options
- VNet Peering

What is Virtual Network

- Azure networking components allow customers create and manage virtual private networks in Azure.
- When you deploy computers in your on-premises environment, you typically connect them to a network to allow them to communicate directly with each other.
- Azure virtual networks serve the same basic purpose. By placing a virtual machine on the same virtual network as other virtual machines, you effectively provide direct IP connectivity between them.
- You also have the option of connecting different virtual networks together.



Azure Virtual Network: Features

- Isolation
- Internet Communication
- Azure Resource Communication
- Virtual network connectivity
- On-premises connectivity
- Traffic filtering
- Routing

Azure Virtual Network: Virtual Network

- An Azure virtual network constitutes a logical boundary defined by a private IP address space.
- You divide this IP address space into one or more subnets.
- After you create a virtual network, you cannot change its associated region.
- you must also specify the scope of the IP addresses that will be automatically assigned to virtual machines that you deploy into that virtual network.
- These IP address spaces are defined by RFC 1918 and include the following:
  - 10.x.x.x
  - 172.16.x.x – 172.31.x.x
  - 192.168.x.x
- You should avoid overlapping address spaces across your Azure virtual networks and your on-premises networks.
- Overlapping address spaces will prevent you from connecting these networks later.

Azure Virtual Network: DHCP

- The Azure platform uses the Dynamic Host Configuration Protocol (DHCP) service to allocate IP addresses from the ranges you assign to virtual network subnets.
- Each IP address lease has an infinite duration, but the lease is released if you *deallocate (stop)* the virtual machine to which the IP address is assigned.
- To avoid IP address changes, configure a static private IP address.

Azure Virtual Network: Subnet

- Every virtual network in Azure consists of one or more subnets.
- Subnets facilitate segmentation of networks.
- Subnets divide your virtual network into smaller IP ranges so that the resources organized within these subnets can be logically separated.
- Each subnet contains a range of IP addresses that constitute a subset of the virtual network address space.
- The use of multiple subnets is common when implementing multi-tier applications, with one subnet per tier.
- If each tier resides on a separate subnet, you can assign a dedicated network security group to each subnet.

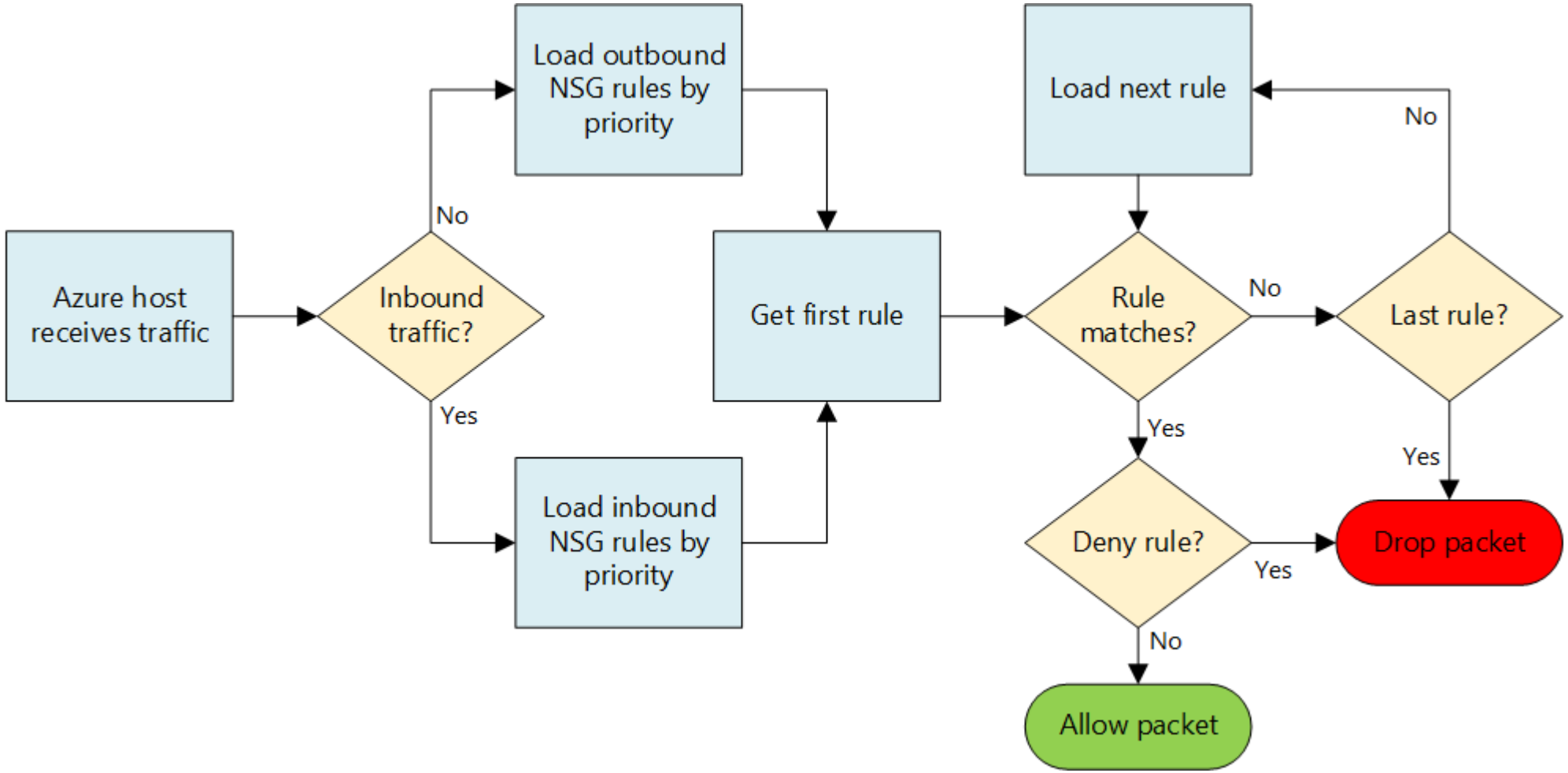
Azure Virtual Network: Routing

- Azure implements a default routing configuration to communicate with other resources.
- You can override some of Azure's system routes with custom routes.
- Azure routes outbound traffic from a subnet based on the routes in a subnet's route table.
- **System Routes**
  - Azure automatically creates system routes and assigns the routes to each subnet in a virtual network.
  - You can't create system routes, nor can you remove system routes, but you can override system routes.
  - Azure creates default system routes for each subnet.
- **Custom Routes**
  - You create custom routes by either creating user-defined routes.

Azure Virtual Network: Network Security Groups

- You can limit network traffic to resources in a VNet using a network security group.
- A network security group contains a list of security rules that allow or deny inbound or outbound network traffic.
- Each network interface or subnet can have zero, or one, associated network security group.
- When applied to a subnet, security rules are applied to all resources in the subnet.

Azure Virtual Network: NSG Rule



Azure Virtual Network: Service Endpoints

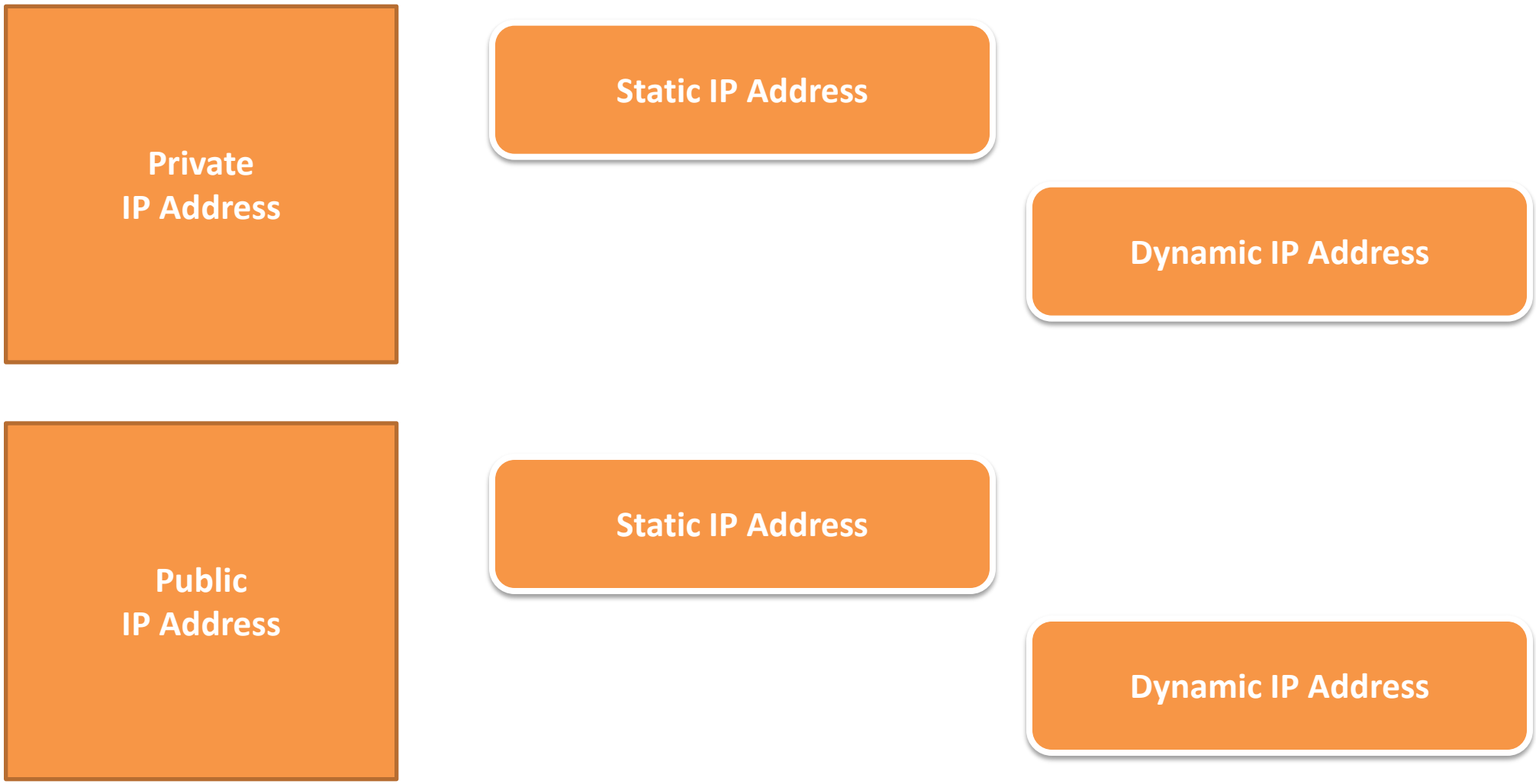
- VNet service endpoints extend your virtual network private address space and the identity of your VNet to the Azure services, over a direct connection.

- Endpoints allow you to secure your critical Azure service resources to only your virtual networks.

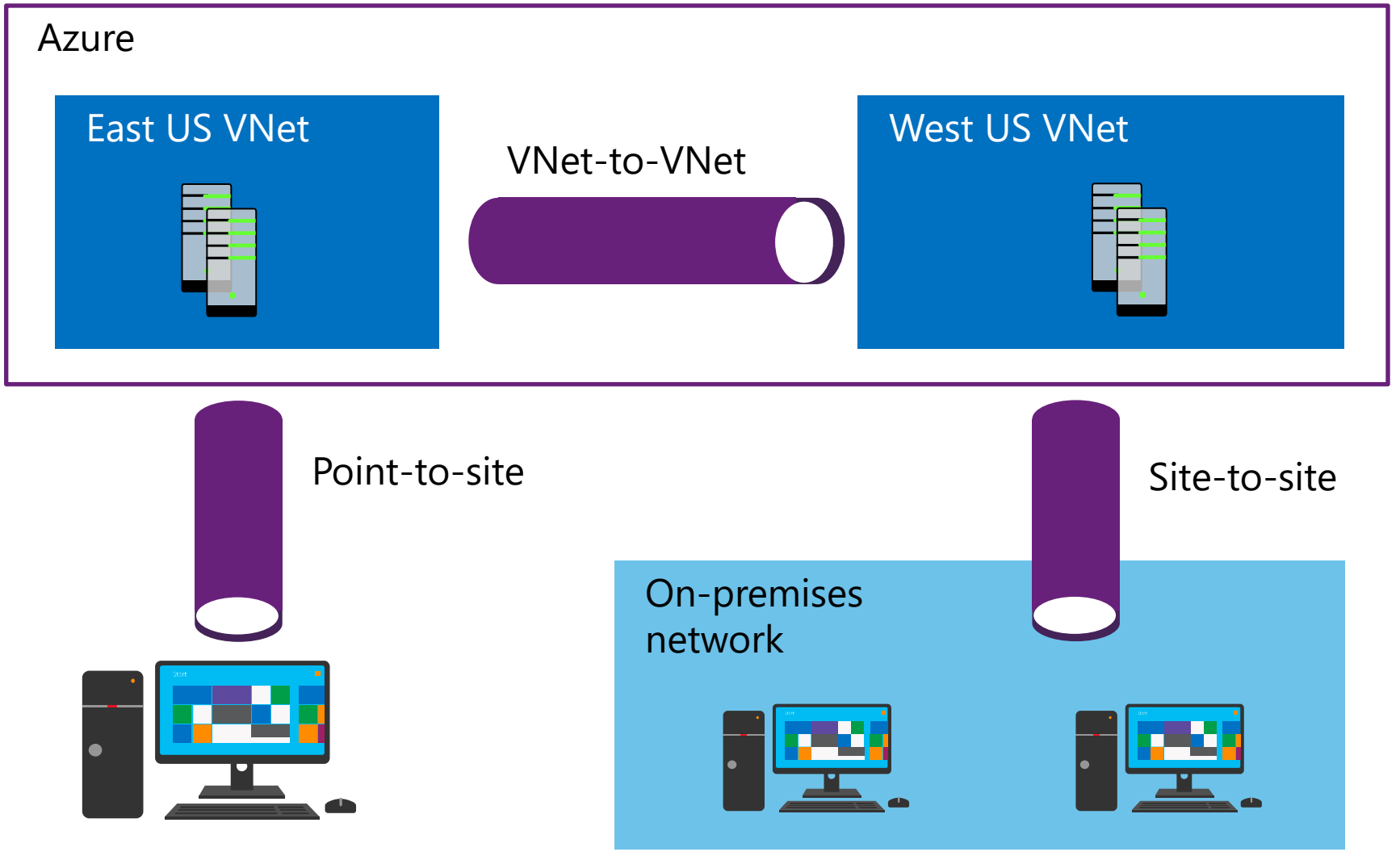
- Traffic from your VNet to the Azure service always remains on the Microsoft Azure backbone network.

- This feature is available in preview for the following Azure services and regions:
  - **Azure Storage**: All regions in the Azure public cloud.
  - **Azure SQL**: All regions in the Azure public cloud.

Azure Virtual Network: IP Address



Azure Virtual Network: Connectivity Options



Azure Virtual Network: Connectivity Options

- Use Connectivity options to allow VMs hosted on an VNet to communicate via Private IP from computers that are not connected directly to the same VNet.

- If these computers reside outside Azure, you can use one of the following methods:
  - **A point-to-site VPN**
  - **A site-to-site VPN**
  - **Azure ExpressRoute**

- If these computers reside on another Azure virtual network, you can use one of the following methods:
  - **VNet peering**
  - **VNet-to-VNet connection**

Azure Virtual Network: VNet Peering

- VNet peering enables you to seamlessly connect two Azure virtual networks.
- VNet peering required both virtual networks reside in the same region.
- Once peered, the virtual networks appear as one, for connectivity purposes.
- The benefits of using virtual network peering include:
  - Network traffic between peered virtual networks is private.
  - Traffic between the virtual networks is kept on the Microsoft backbone network.
  - The ability for resources in one virtual network to communicate with resources in a different virtual network, once the virtual networks are peered.
- VNet peering is nontransitive. This means that if you establish VNet peering between VNet1 and VNet2 and between VNet2 and VNet3, VNet peering capabilities do not apply between VNet1 and VNet3.

Hands-On Lab

Hands-On Lab

- ❑ Create virtual network
- ❑ Create 2 subnet
- ❑ Launch server in both subnet
- ❑ Install web server
- ❑ Configure NSG at subnet level
- ❑ Configure VNet peering

Thank You