Microsoft

AZ-700

Module 02

Design and Implement Hybrid Networking

AZ-700 Agenda

Module 01: Introduction to Azure Virtual Networks

Module 02: Designing and Implementing Hybrid Networking

Module 03: Designing and Implementing Azure ExpressRoute

Module 04: Load balance non-HTTP(S) traffic in Azure

Module 05: Load balance HTTP(S) traffic in Azure

Module 06: Design and Implement Network Security

Module 07: Design and Implement private access to Azure Services

Module 08: Design and Implement Network Monitoring

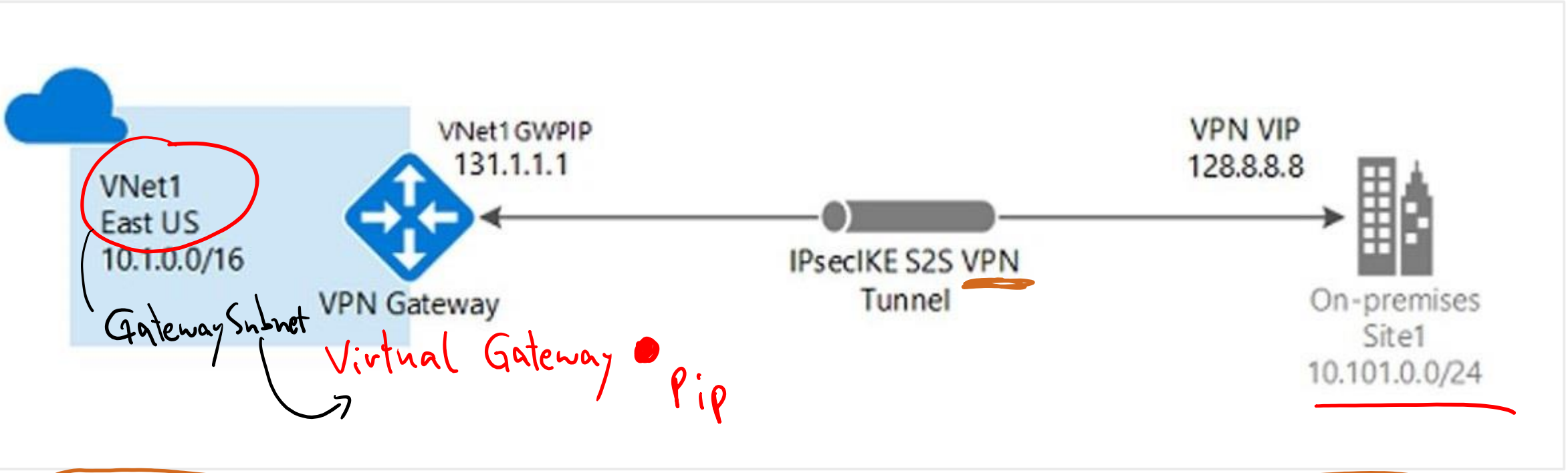
Module Overview

- Design and implement Azure VPN Gateway
- Exercise – Create and configure a Virtual Network Gateway
- Connect networks with Site-to-site VPN connections
- Connect devices to networks with Point-to-site VPN connections
- Connect remote resources by using Azure Virtual WANs
- Exercise – Create a Virtual WAN by using the Azure Portal
- Create a network virtual appliance (NVA) in a virtual hub

Design and implement Azure VPN gateway

→ Express Route

Plan a VPN Gateway



Site-to-site connections connect on-premises datacenters to Azure virtual networks

VNet-to-VNet connections connect Azure virtual networks to each other

verschlüsselt

Peering: unverschlüsselt

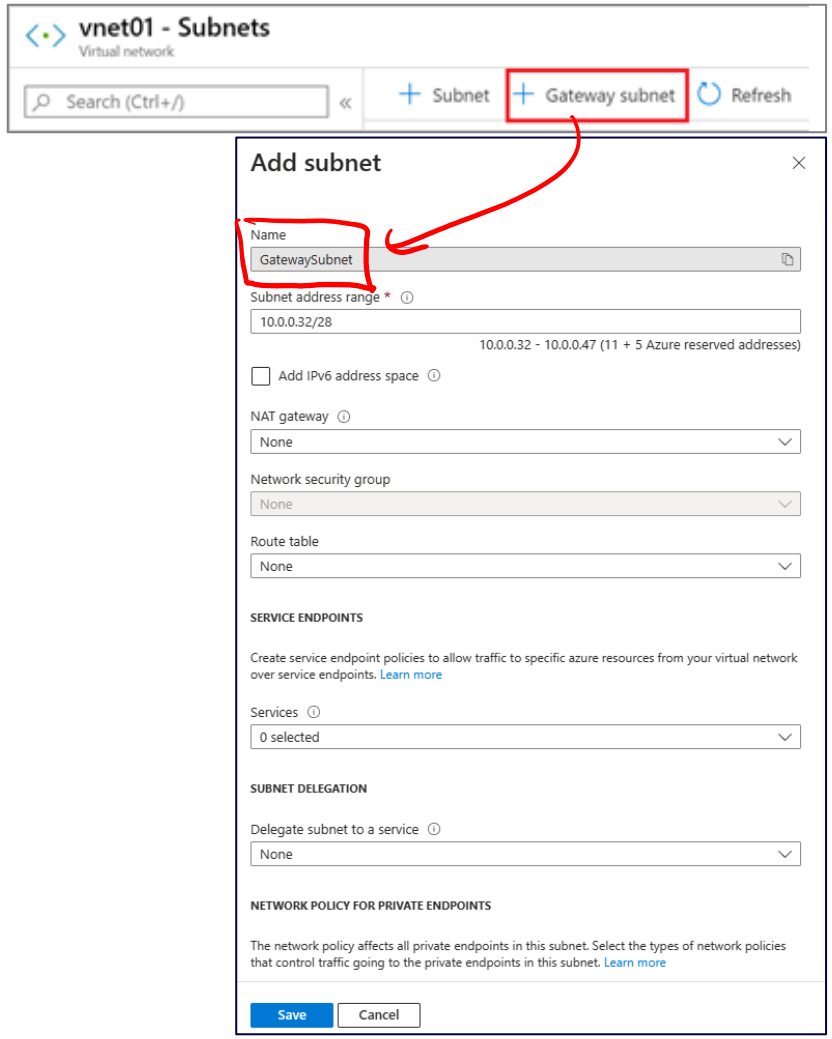
Point-to-site (User VPN) connections connect individual devices to Azure virtual networks

Create the Gateway Subnet

The gateway subnet contains the IP addresses; if possible, use a CIDR block of /28 or /27

When you create your gateway subnet, gateway VMs are deployed to the gateway subnet and configured with the required VPN gateway settings

Never deploy other resources
(for example, additional VMs) to the gateway subnet



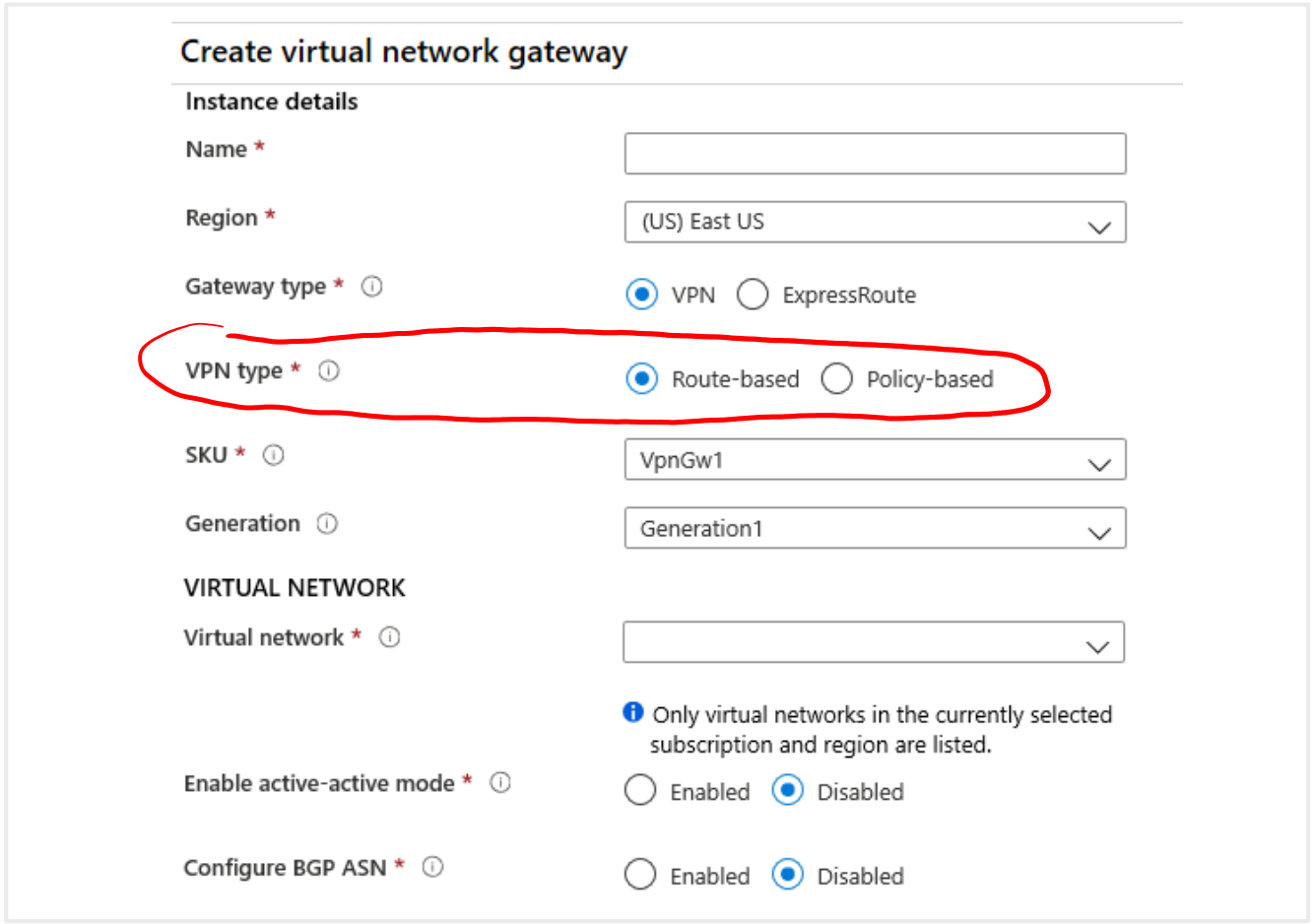
VPN Gateway Configuration requirements

Most VPN types are Route-based

Your choice of gateway SKU affects the number of connections you can have and the aggregate throughput benchmark

Associate a virtual network that includes the gateway subnet

The gateway needs a public IP address



✓ It can take up to 45 minutes to provision the VPN gateway

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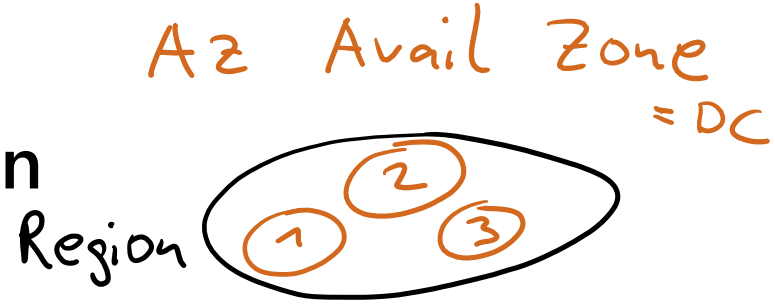
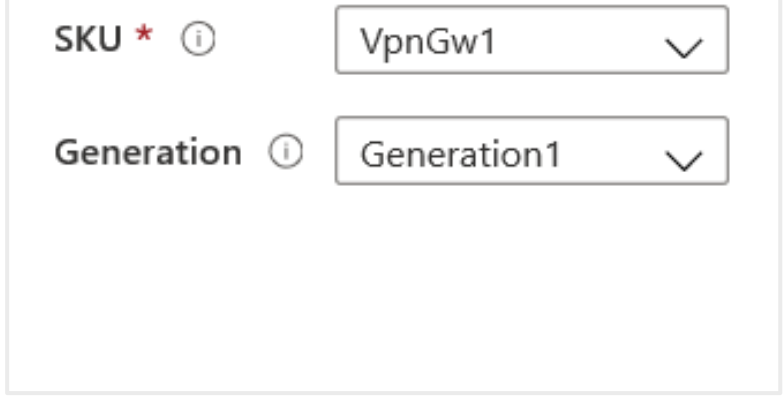
Choose the appropriate Gateway SKU and Generation





Sampling of available SKUs

Gen	SKU	S2S/VNet-to-VNet Tunnels	P2S IKEv2 Connections	Throughput Benchmark
1	**VpnGw1Az**	Max. 30	Max. 250	650 Mbps
1	**VpnGw2Az**	Max. 30	Max. 500	1.0 Gbps
2	**VpnGw2Az**	Max. 30	Max. 500	1.25 Gbps
1	**VpnGw3Az**	Max. 30	Max. 1000	1.25 Gbps
2	**VpnGw3Az**	Max. 30	Max. 1000	2.5 Gbps
2	**VpnGw4Az**	Max. 100	Max. 5000	5.0 Gbps

The Gateway SKU affects the connections and the throughput

Resizing is allowed within the generation

The Basic SKU (not shown) is legacy and should not be used

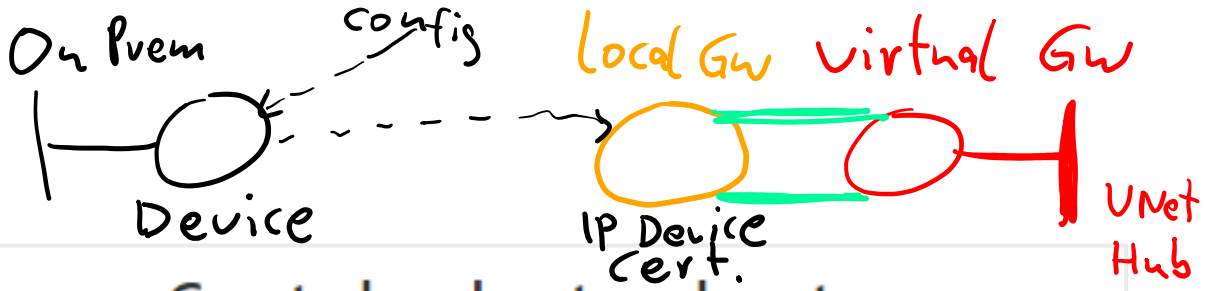
Create the Local Network Gateway

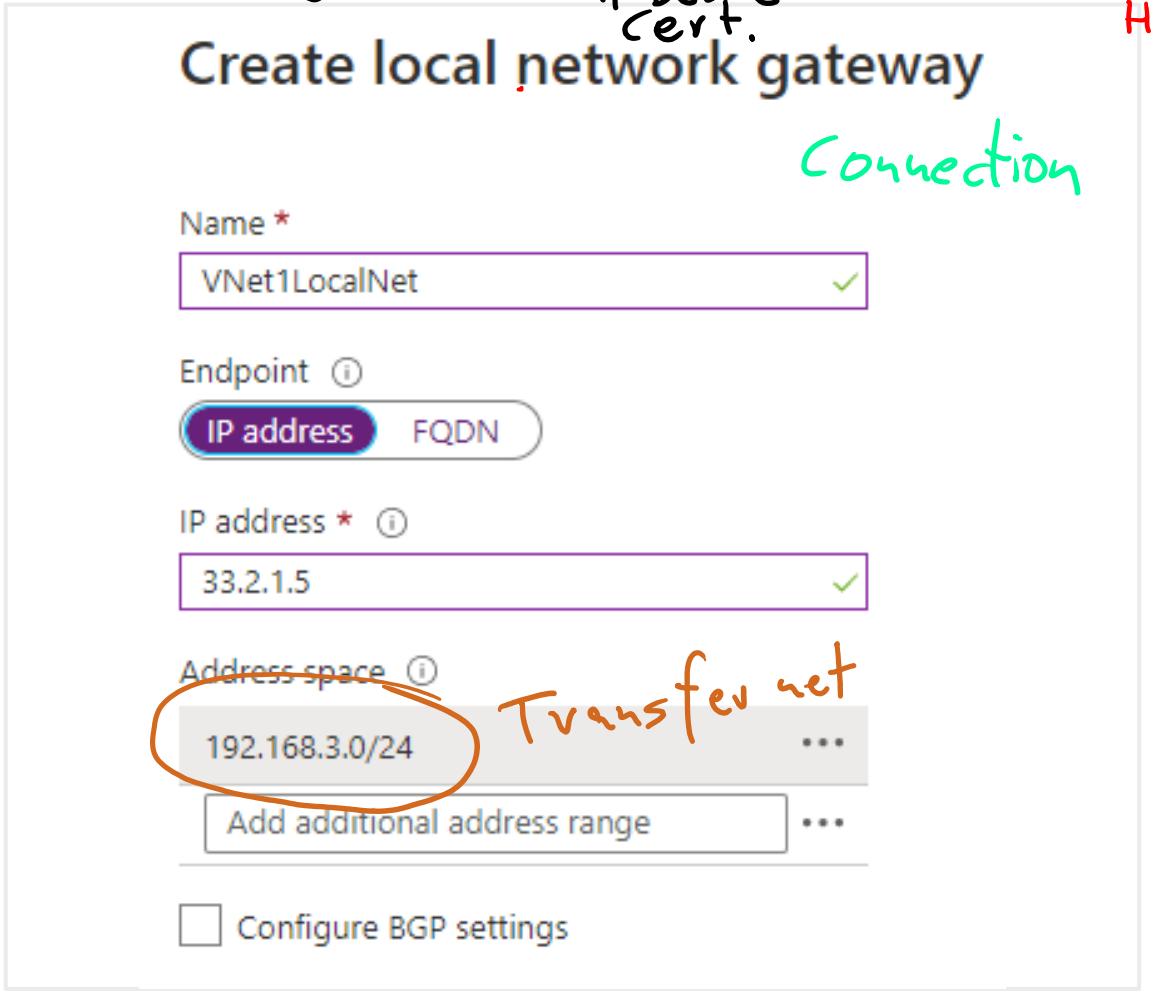
Reflects the on-premises network configuration and enables Azure to route to your on-premises network

Give the site a name by which Azure can refer to it

Use a public IP address or FQDN for Local Network Gateway Endpoint

Specify the IP address prefixes that will be routed through the gateway to the VPN device





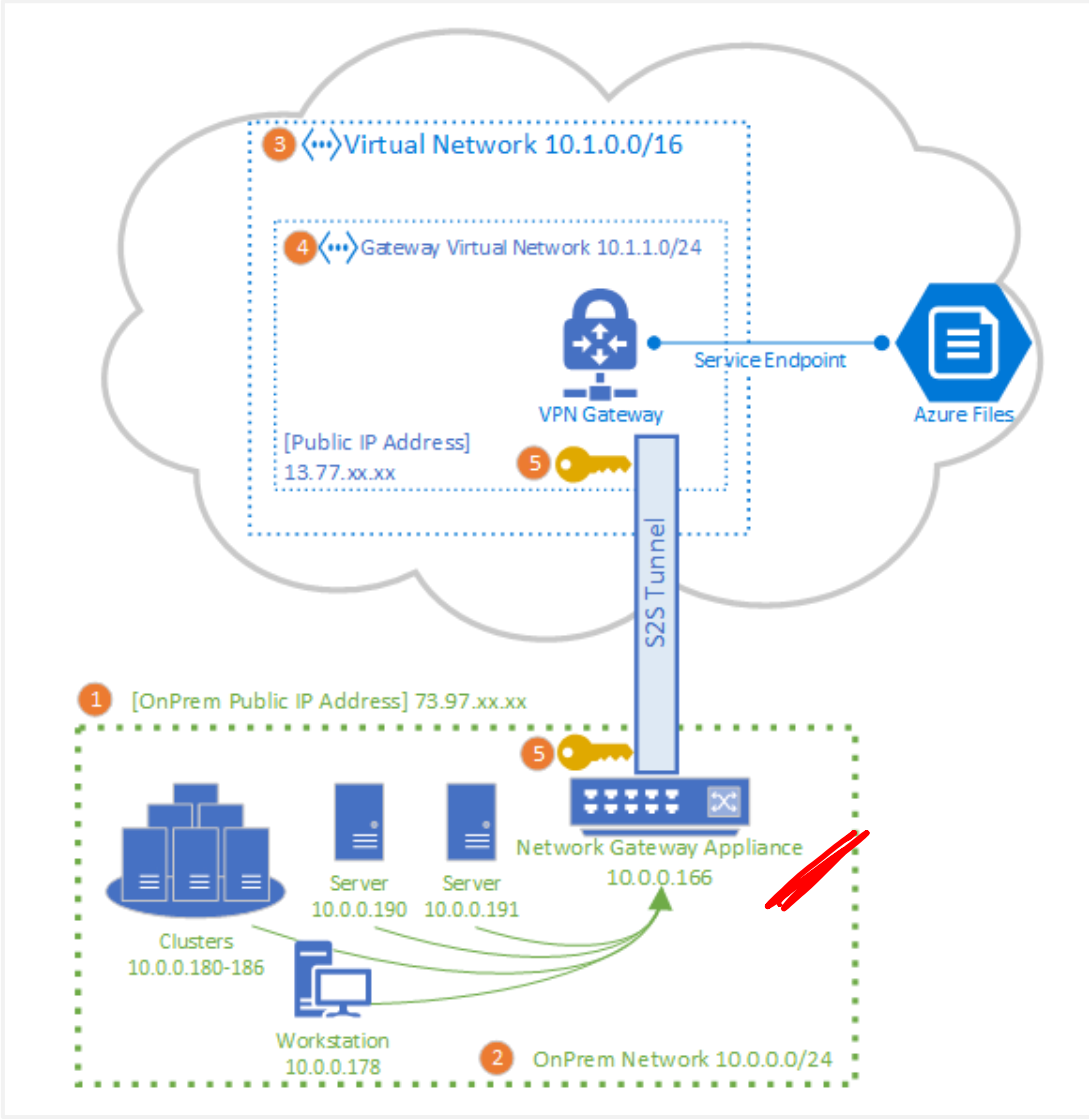
Configure the On-premises VPN Device

Remember the shared key for the Azure connection (next step)

Consult the list of supported VPN devices (Cisco, Juniper, Ubiquiti, Barracuda Networks)

Specify the public IP address (previous step)

A VPN device configuration script may be available



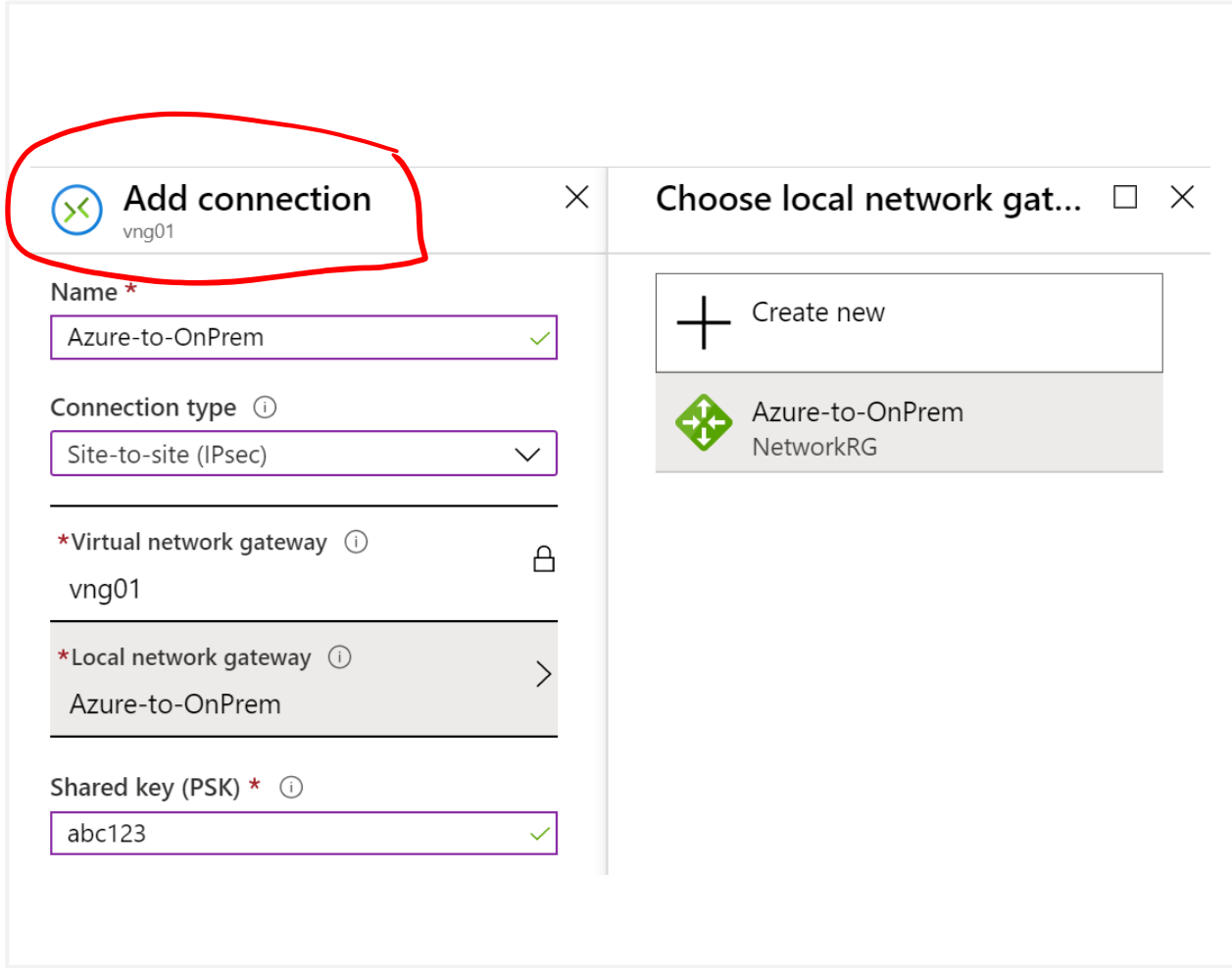
Create the VPN Connection

Once your VPN gateways is created and the on-premises device is configured, create a connection object

Configure a name for the connection and specify the type as Site-to-site (IPsec)

Select the VPN gateway and the Local Network Gateway

Enter the Pre-Shared key for the connection



Verify and troubleshoot the VPN connection

Validate VPN throughput to a VNet

Utilize Network Watcher

Troubleshoot Azure VPN Gateway using diagnostic logs

Check UDR and NSGs on the gateway subnet

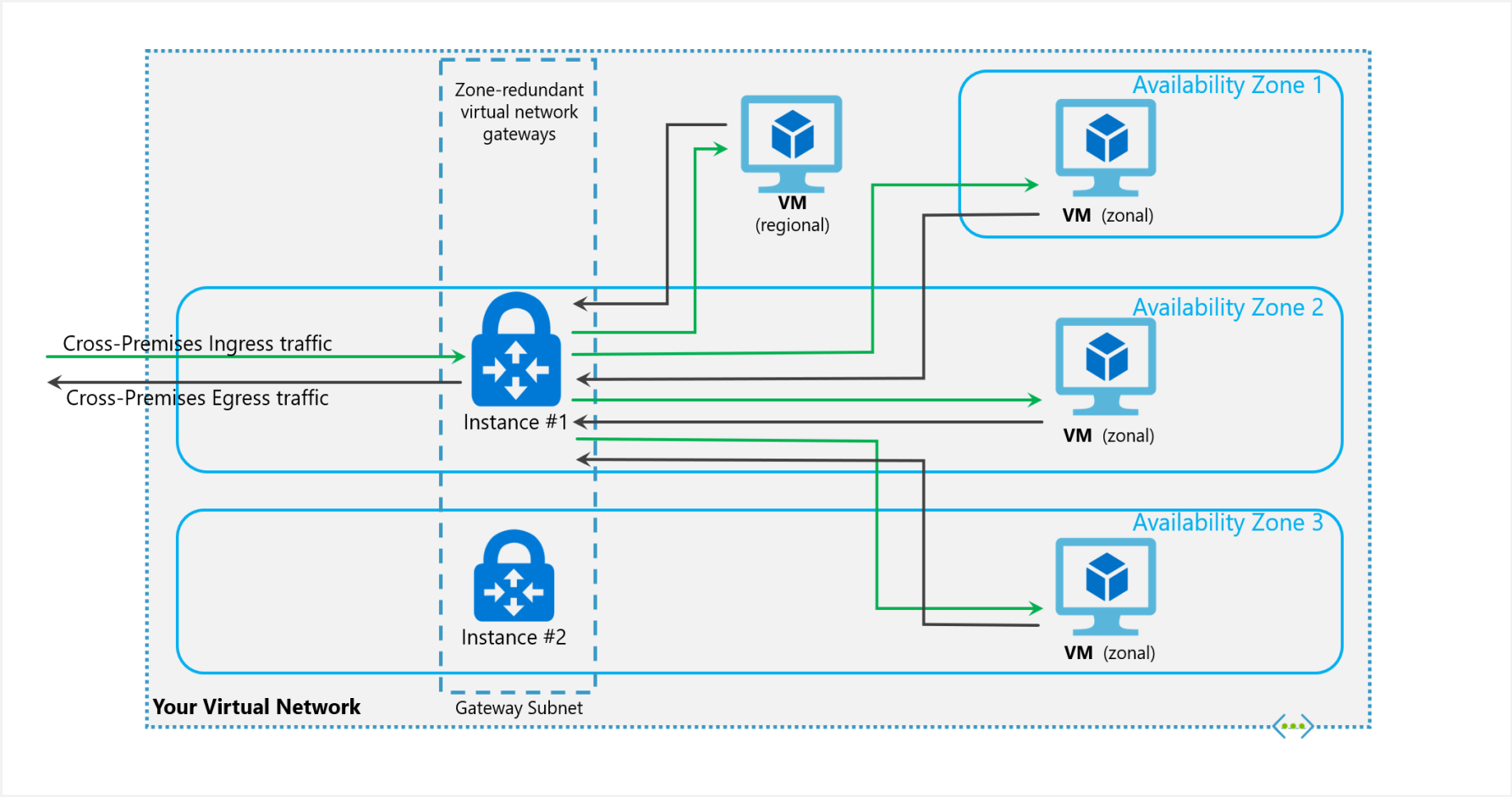
Check whether the on-premises VPN device is validated

Verify the Azure gateway health probe

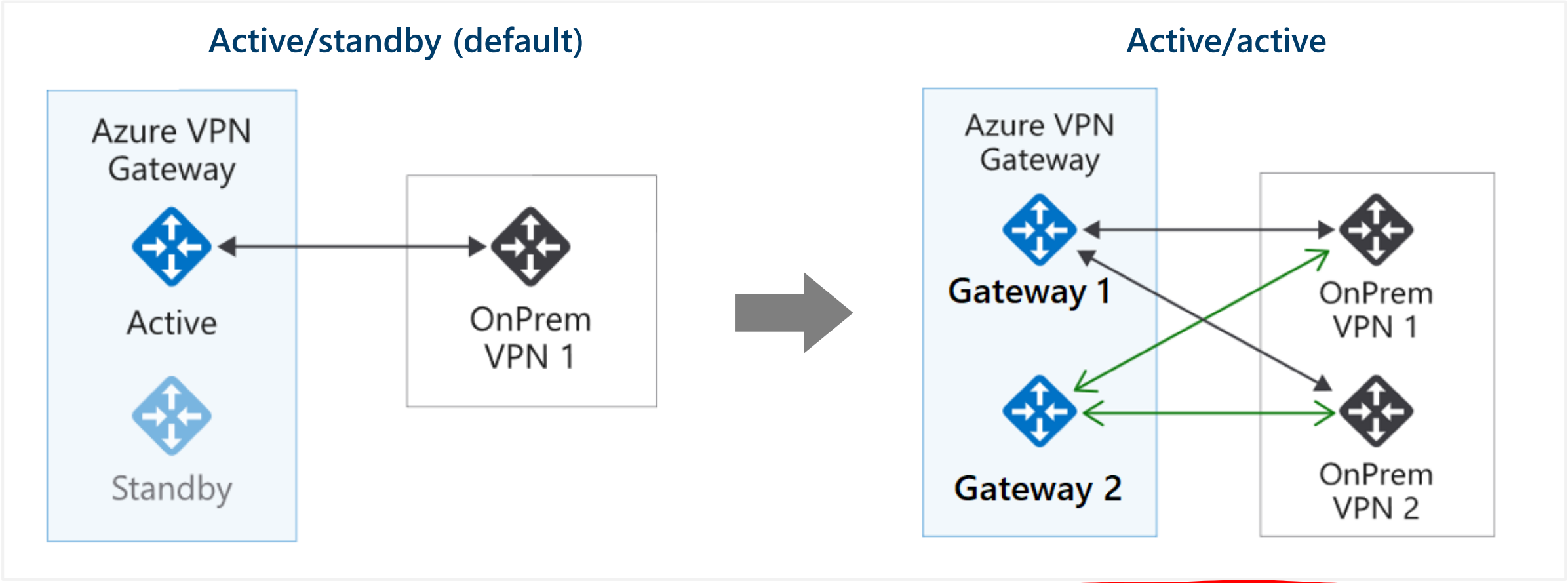
Verify the shared key and the VPN peer IPs

Check whether the on-premises VPN device has the perfect forward secrecy feature enabled

Create a zone redundant VNET gateway in Azure Availability zones



High availability options for VPN connections

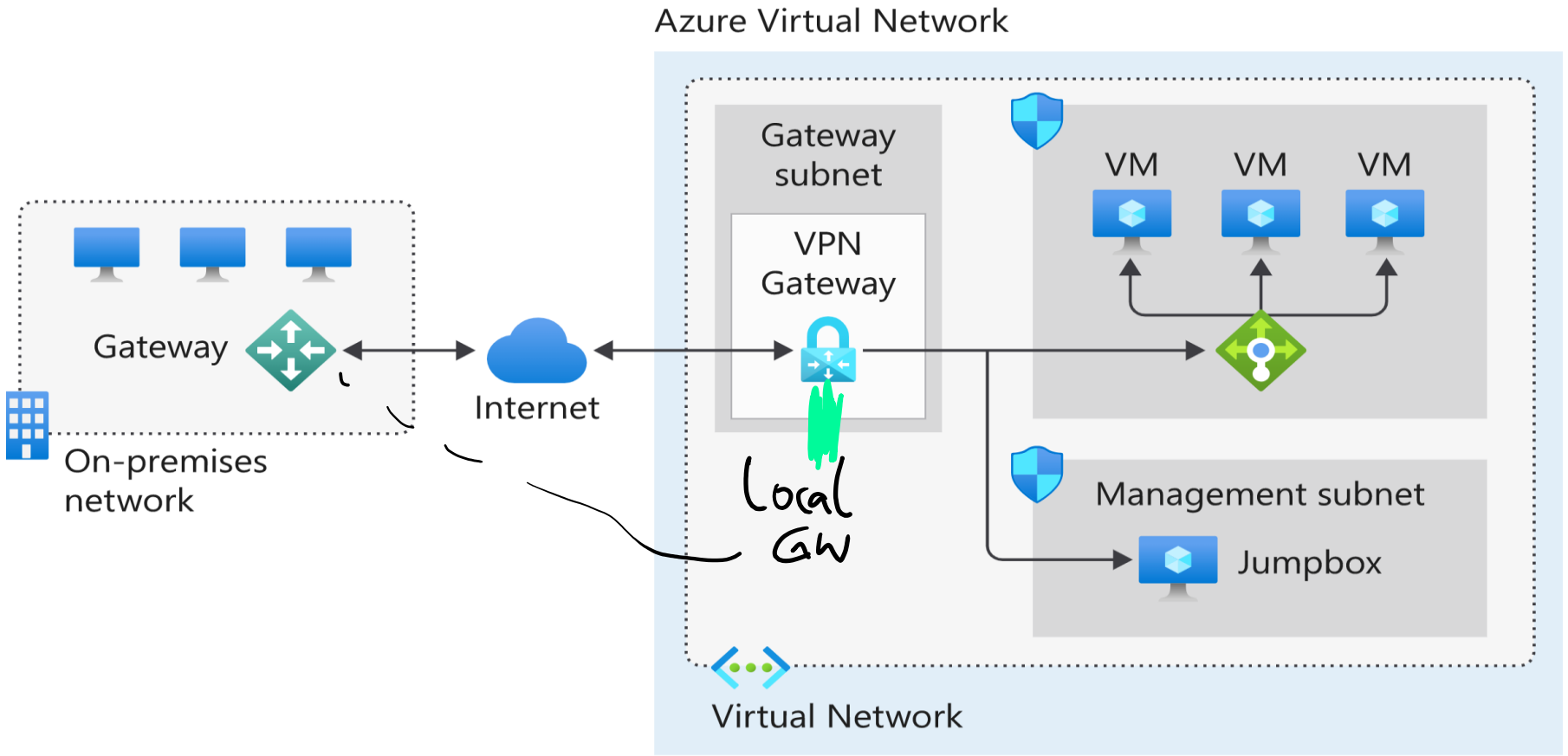


VPN gateways are deployed as two instances

Enable **active/active mode** for higher availability

Connect Networks with Site-to-site VPN Connections

Site-to-site VPN connections



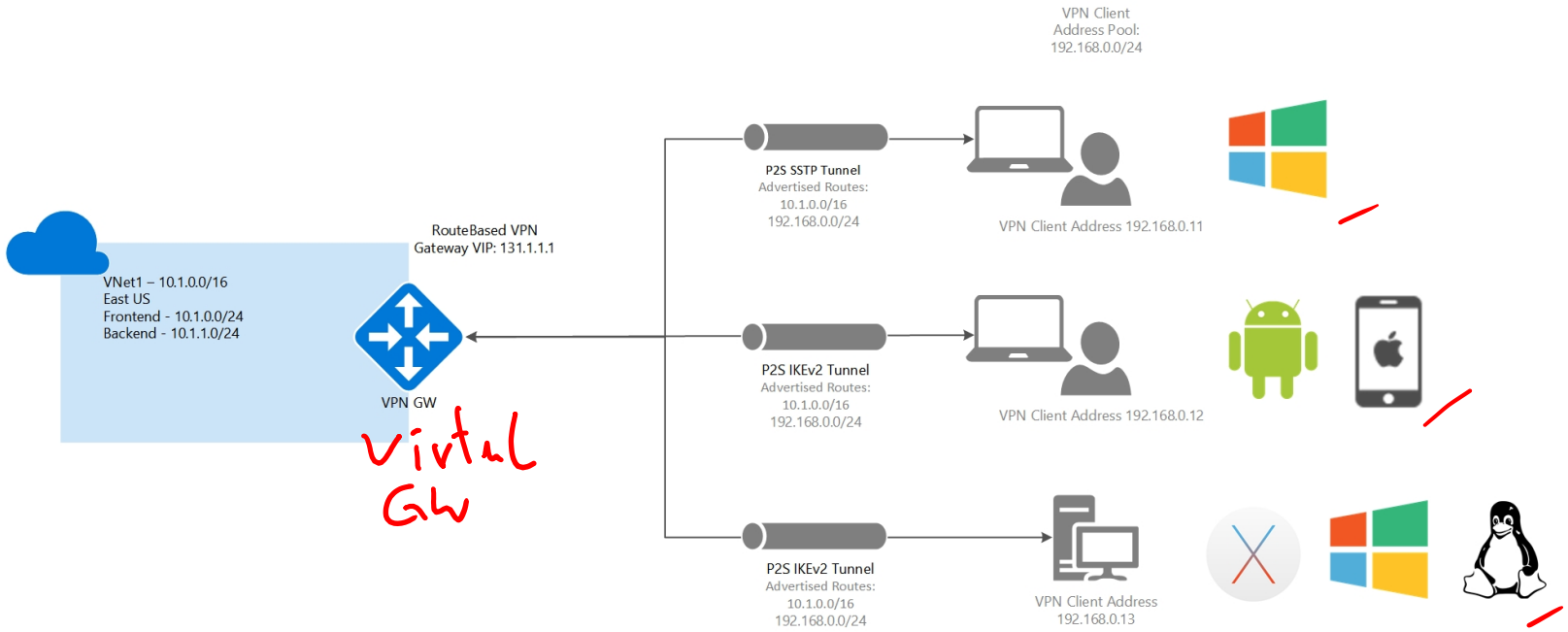
Connect devices to networks with Point-to-site VPN connections

Point-to-site protocols

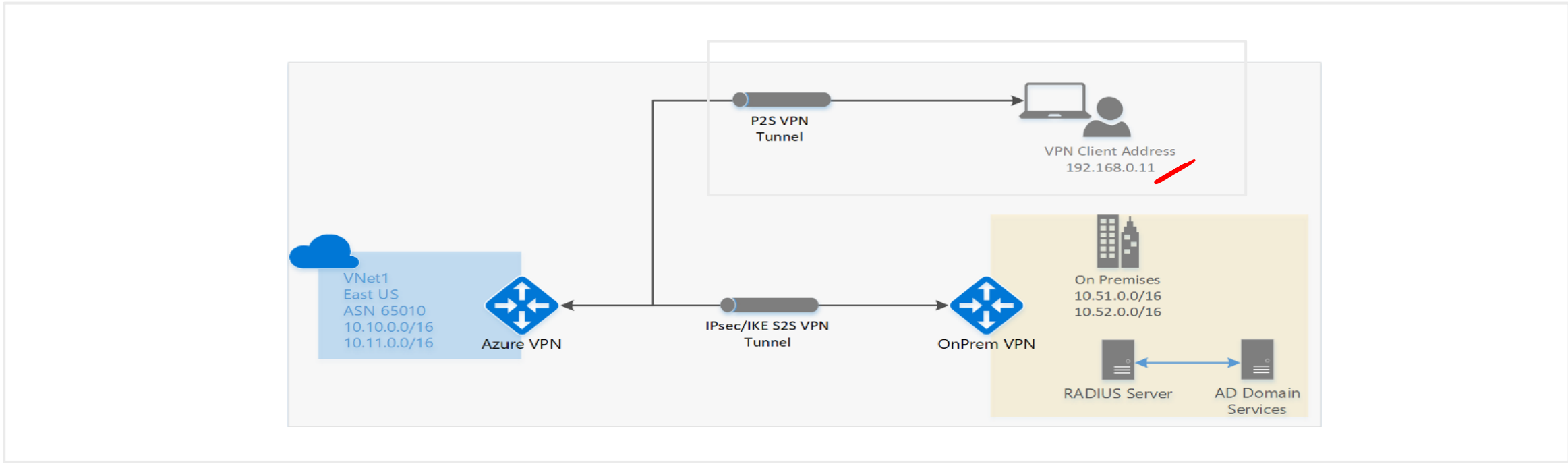
OpenVPN® Protocol

Secure Socket Tunneling Protocol (SSTP)

IKEv2 VPN



Point-to-site authentication methods



Azure certificate authentication

Native Azure Active Directory authentication

Active Directory (AD) Domain Server

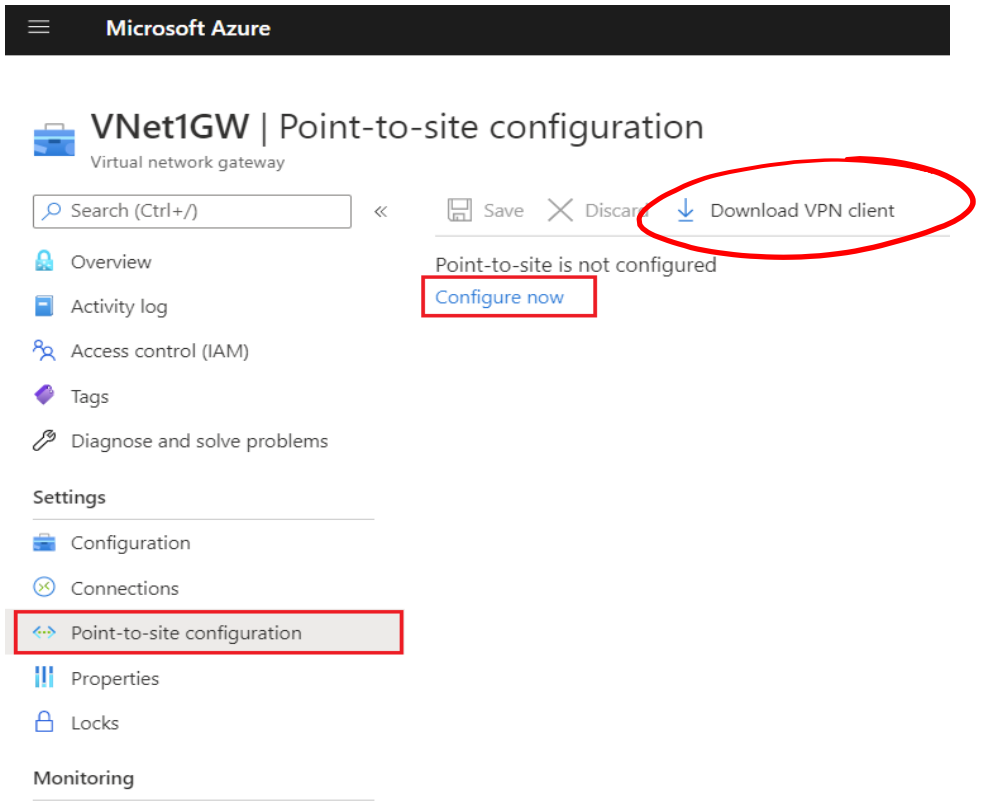
Prepare Point-to-site configuration in Azure

Navigate to the **Settings** section of the virtual network gateway page

Select **Point-to-site configuration**.
Select **Configure now** to open the configuration page

On the **Point-to-site configuration** page, in the **Address pool** box, add the private IP address range that you want to use

VPN clients dynamically receive an IP address from the range that you specify. The minimum subnet mask is 29 bit for active/passive and 28 bit for active/active configuration.



Connect remote resources by using Azure Virtual WANs

+ Firewal Policy Manager

What is Azure Virtual WAN?

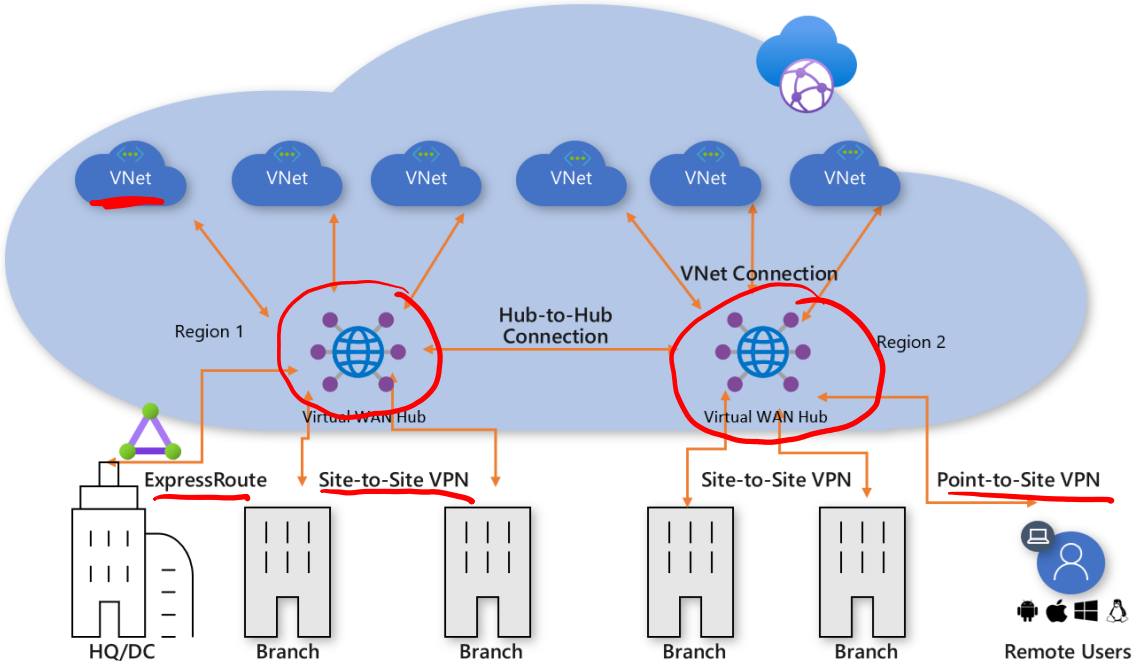
Brings together S2S, P2S, and ExpressRoute

Integrated connectivity using a hub-and-spoke connectivity model

Connect virtual networks and workloads to the Azure hub automatically

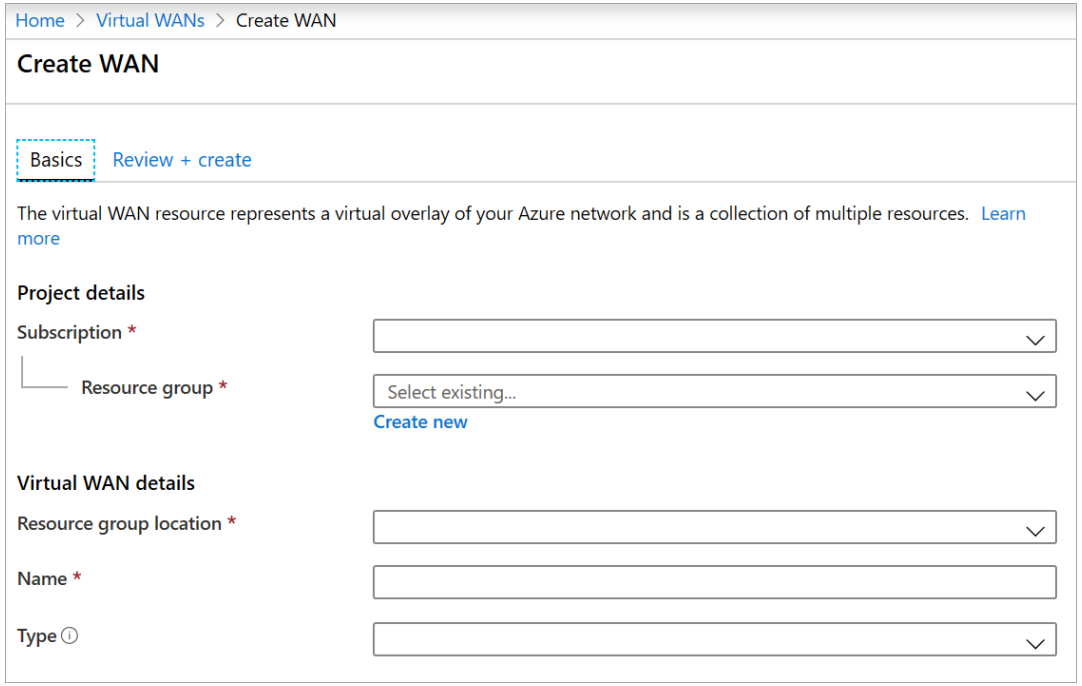
Visualize the end-to-end flow within Azure

Two types: Basic and Standard



Choose Virtual WAN SKU

Virtual WAN type	Hub type	Available configuration
Basic	Basic	Site-to-site VPN only
Standard	Standard	ExpressRoute User VPN (P2S) VPN (Site-to-site) Inter-hub and VNet-to-VNet transiting through the virtual hub



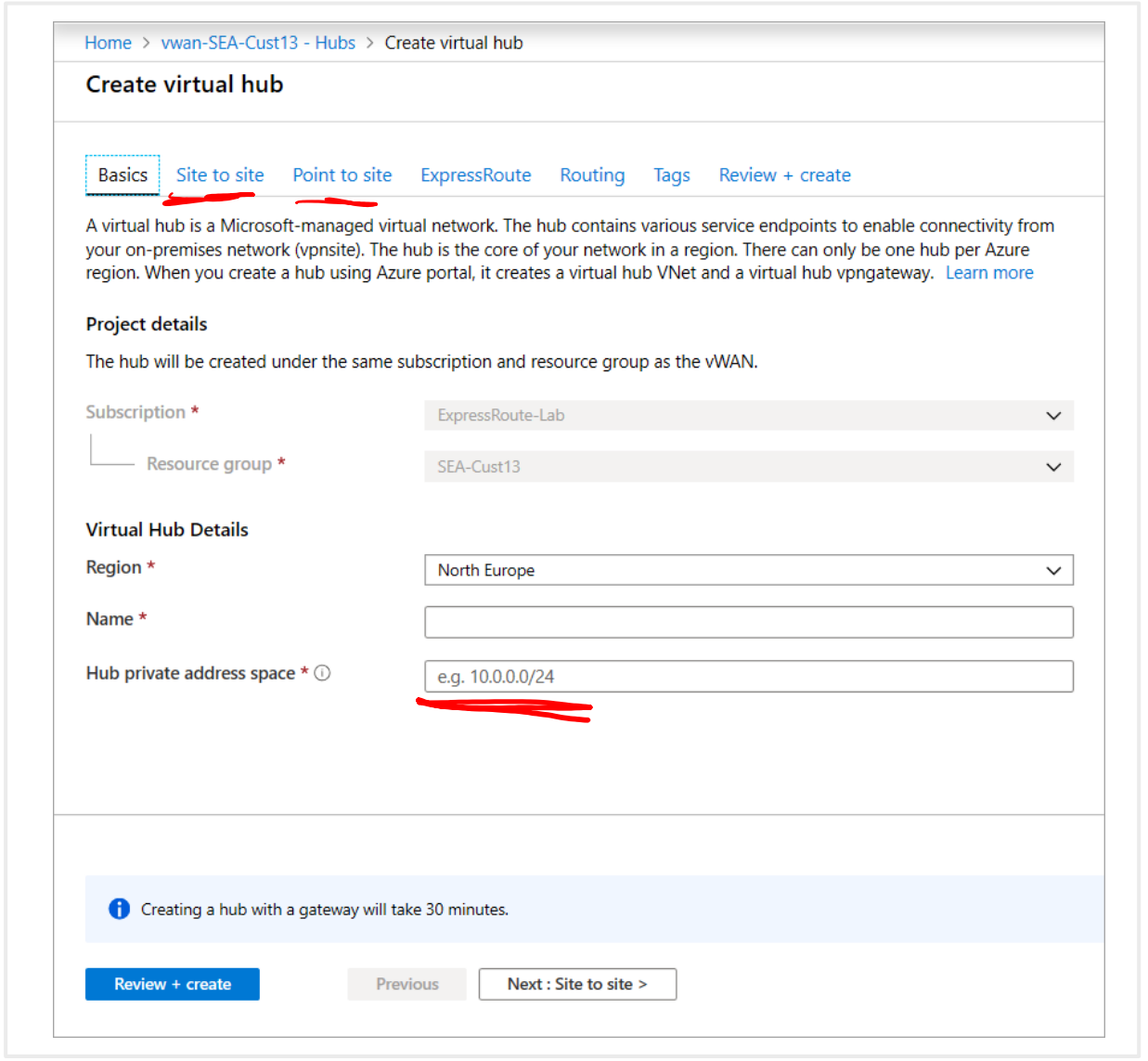
Hub private address space

Minimum address space is /24 to create a hub

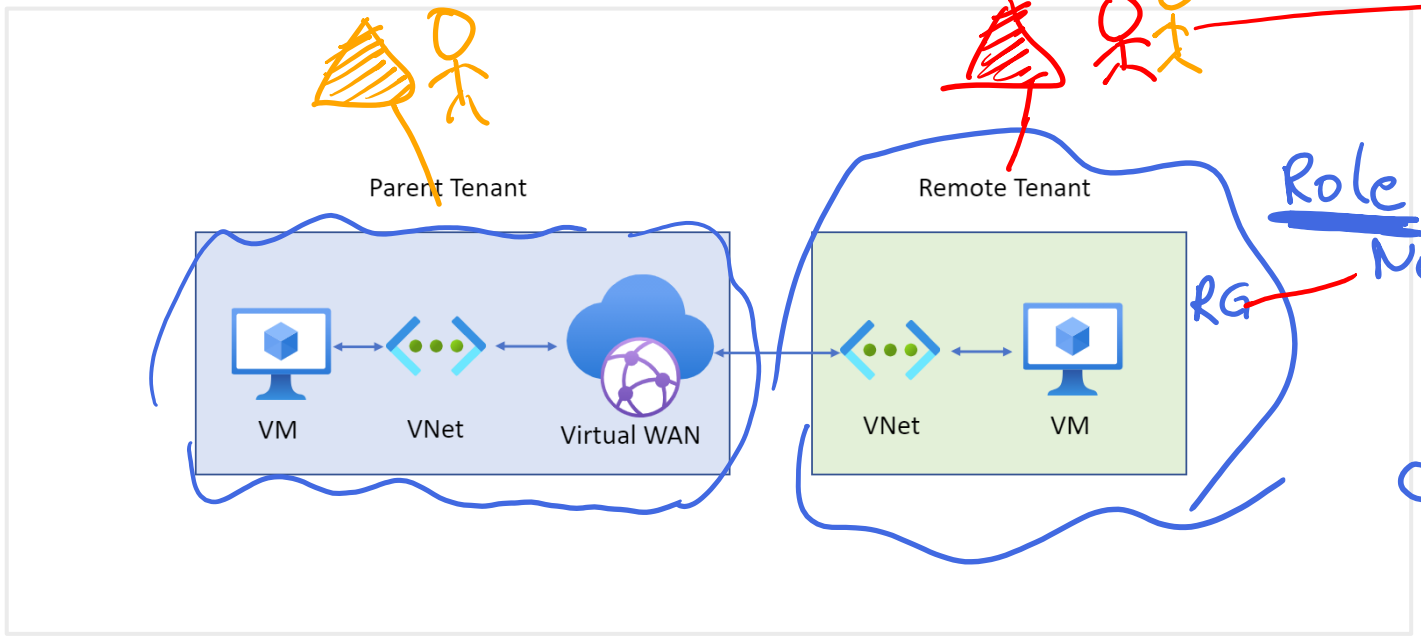
No need to explicitly plan the subnet address space for the services in the virtual hub

Azure Virtual WAN is a managed service, it creates the appropriate subnets in the virtual hub for the different gateways/services

For example, VPN gateways, ExpressRoute gateways, User VPN Point-to-site gateways, Firewall, routing, etc.



Connect cross-tenant VNets to a Virtual WAN hub



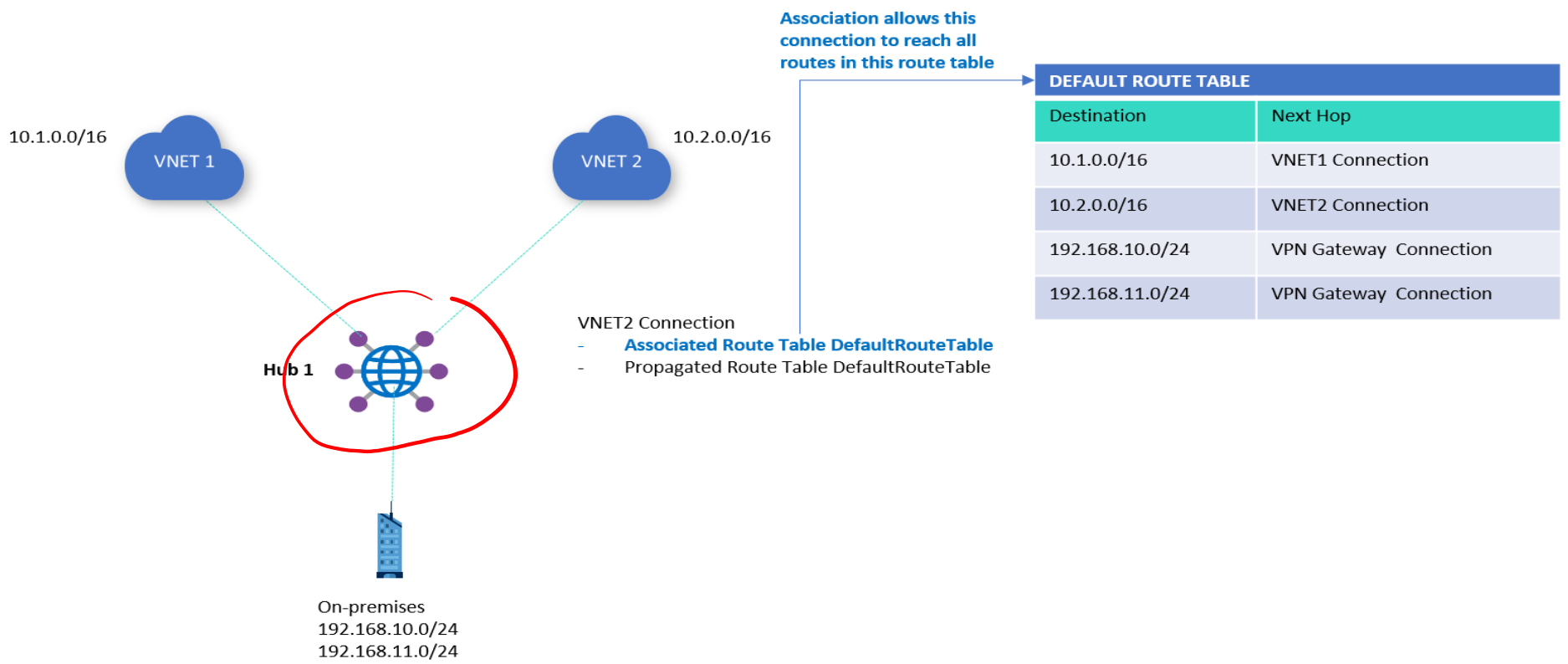
A Virtual WAN and virtual hub in the parent subscription

A virtual network configured in a subscription in the remote tenant

Non-overlapping address spaces in the remote tenant and address spaces within any other VNets already connected to the parent virtual hub

Virtual Hub Routing

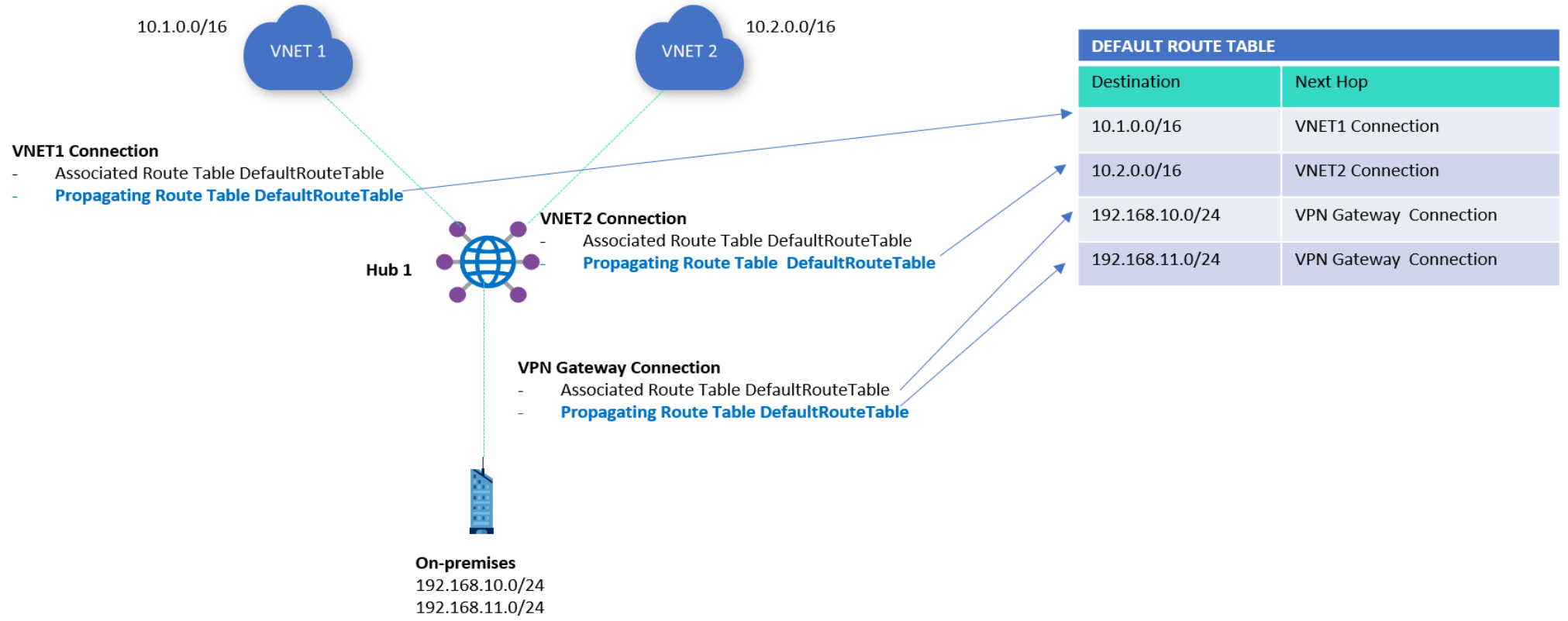
- Hub route table
- Connections
- Association
- Propagation
- Labels
- Static routes

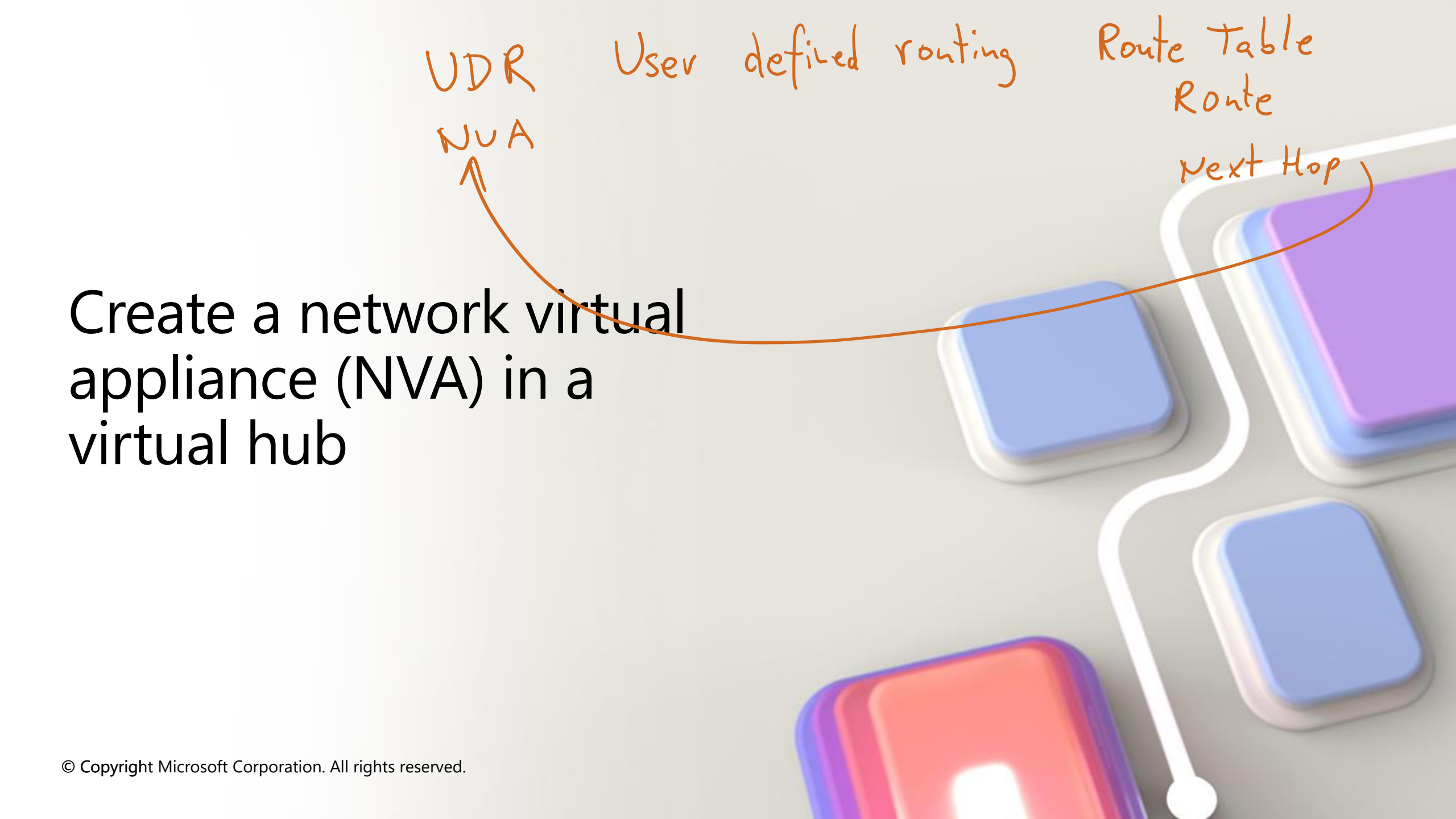


DEFAULT ROUTE TABLE

Destination	Next Hop
10.1.0.0/16	VNET1 Connection
10.2.0.0/16	VNET2 Connection
192.168.10.0/24	VPN Gateway Connection
192.168.11.0/24	VPN Gateway Connection

Virtual Hub Routing – continued

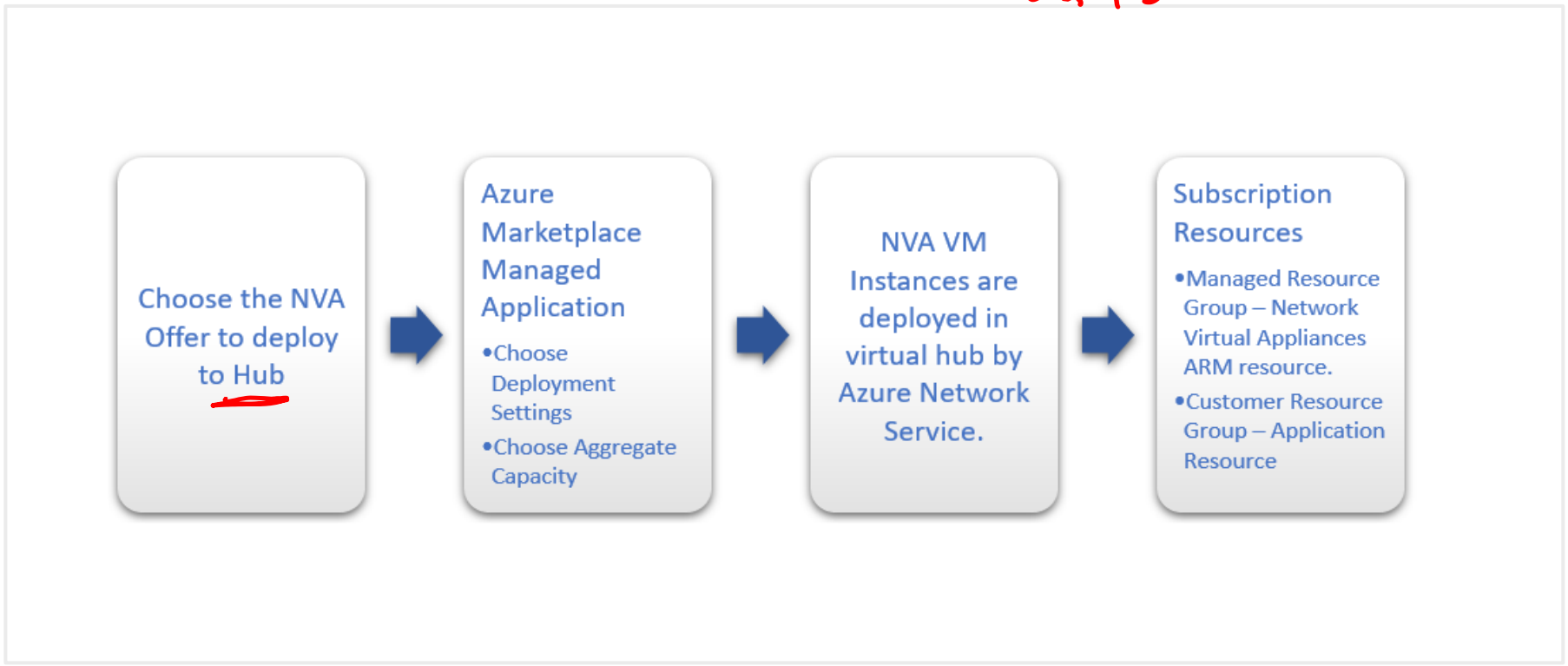




Create a network virtual appliance (NVA) in a virtual hub

Manage an NVA in a Virtual Hub

IaaS
PaaS
SaaS
CaaS

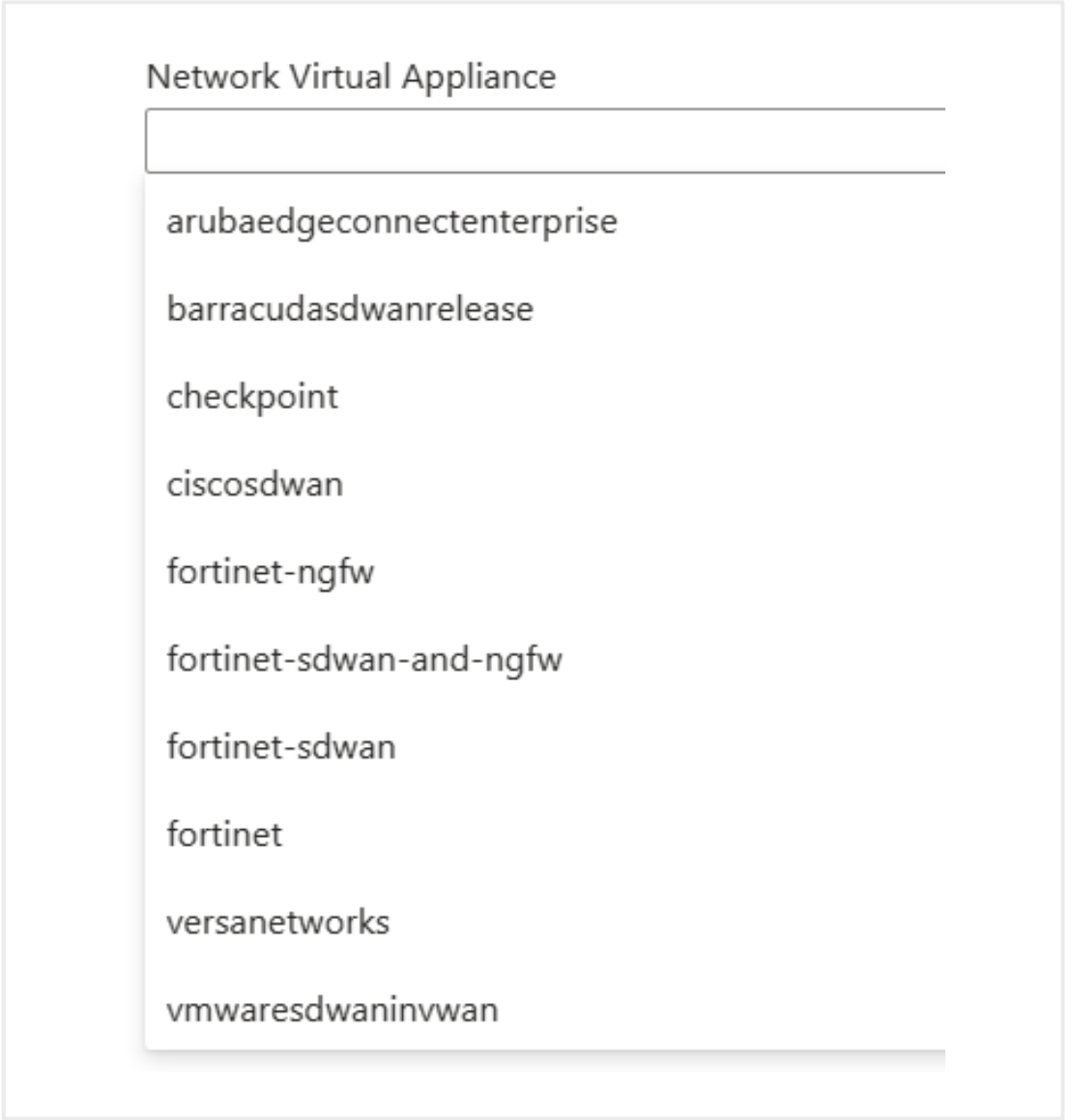


Deploy an NVA in your Virtual Hub

Locate the Virtual WAN hub you created in the previous step and open it

Find the Network Virtual Appliances tile and select the Create link.

On the **Network Virtual Appliance** blade, select your preferred provider based on available selections, then select the **Create** button

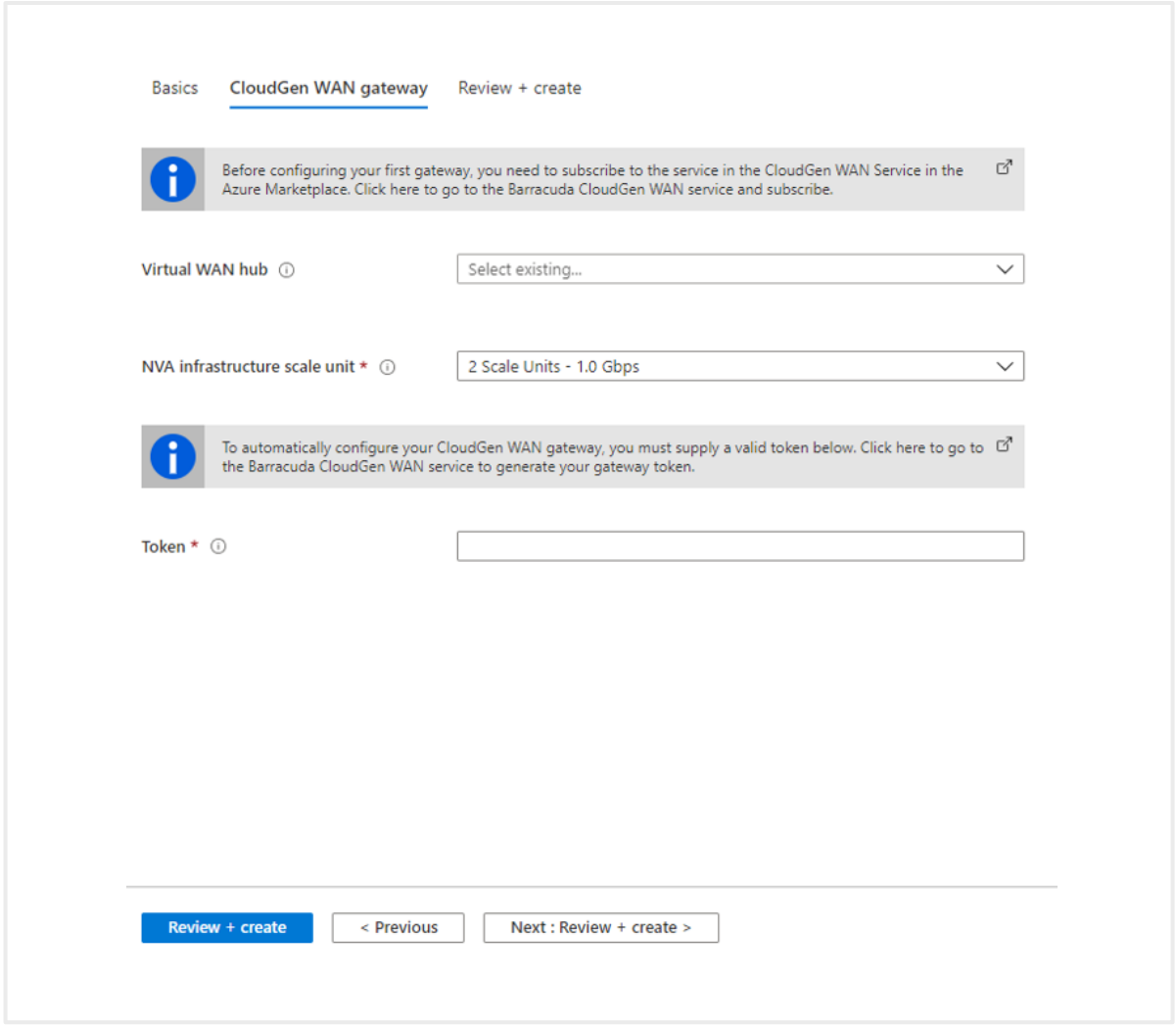


Deploy an NVA in your Virtual Hub Cont.

Virtual WAN Hub - The Virtual WAN hub you want to deploy this NVA into

NVA Infrastructure Units - Indicate the number of NVA Infrastructure Units you want to deploy this NVA with. Choose the amount of aggregate bandwidth capacity you want to provide across all the branch sites that will be connecting to this hub through this NVA.

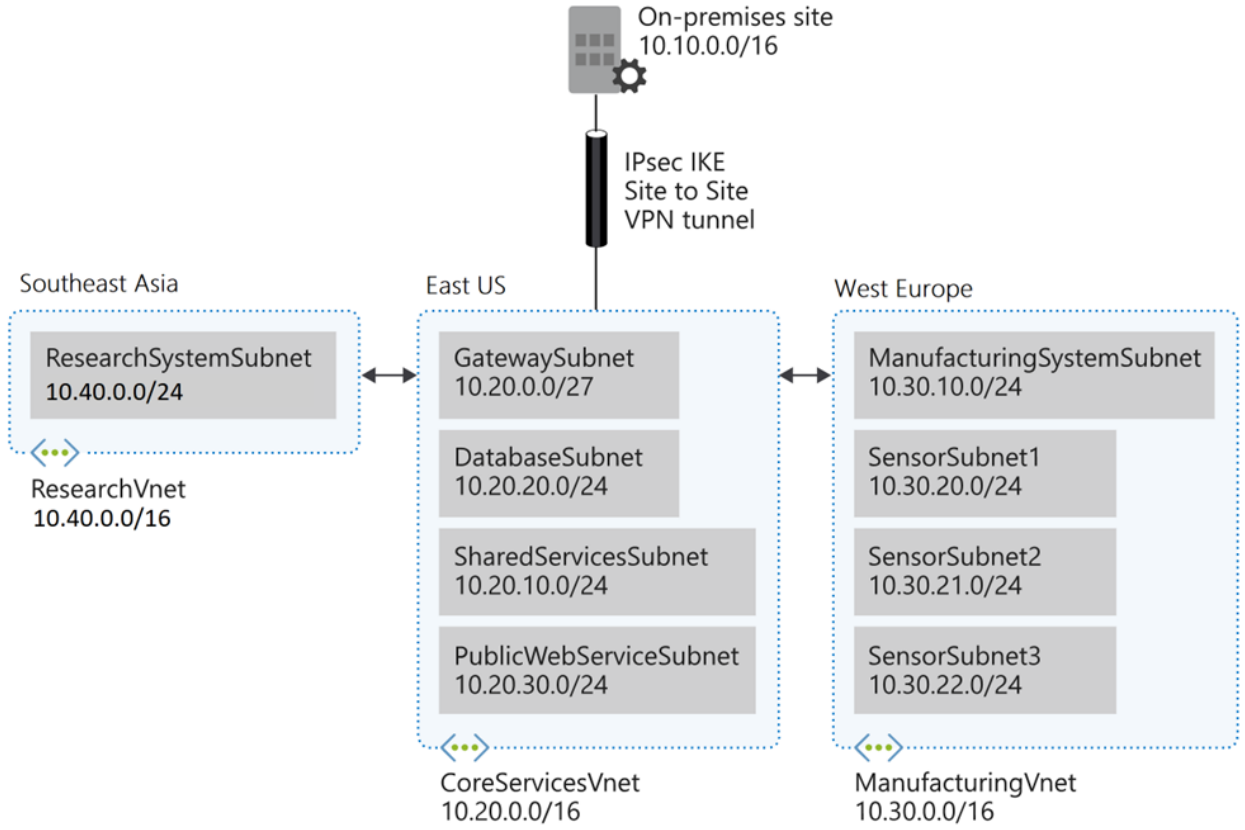
Token - Barracuda requires that you provide an authentication token here in order to identify yourself as a registered user of this product. You'll need to obtain this from Barracuda.



Lab – Create and configure a Virtual Network Gateway

Exercise – Create and Configure a Virtual Network Gateway

Configure a virtual network gateway to connect the Contoso Core Services VNet and Manufacturing VNet



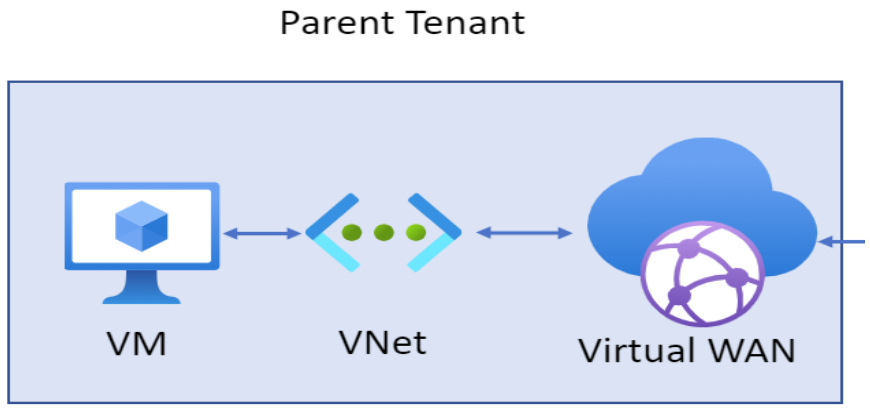
Lab – Create a virtual WAN by using the Azure portal

Exercise – Create a Virtual WAN by Using Azure Portal

Task 1: Create a Virtual WAN

Task 2: Create a hub

Task 3: Connect a VNet to the Virtual Hub



End of presentation