

# Azure Network Engineer Associate (AZ-700) Bootcamp

Earn Your Azure Network Engineer Associate  
Badge

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Cloud Consultant and Trainer

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@zaalion





# Microsoft Azure Fundamentals (AZ-900) Certification Course

★★★★★ [1 review](#)

By [Reza Salehi](#)



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TIME TO COMPLETE:

4h 37m

LEVEL:

Beginner

TOPICS:

[Microsoft Azure](#)

PUBLISHED BY:

[O'Reilly Media, Inc.](#)

PUBLICATION DATE:

October 2022

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<https://learning.oreilly.com/videos/microsoft-azure-fundamentals/0636920797234/>

# Azure Cookbook

<https://learning.oreilly.com/library/view/azure-cookbook/9781098135782/>

<https://www.amazon.ca/Azure-Cookbook-Recipes-Maintain-Solutions/dp/1098135792/>

<https://www.amazon.com/Azure-Cookbook-Recipes-Maintain-Solutions/dp/1098135792>

O'REILLY®

# Azure Cookbook

Recipes to Create and Maintain Cloud Solutions in Azure



Reza Salehi



# Course Overview





# Learning Objectives

By the end of this course, you will understand:

- Learning objectives covered in Exam AZ-700: Designing and Implementing Microsoft Azure Networking Solutions
- Core Azure networking infrastructure
- Azure connectivity services
- Azure application delivery services
- Private access to Azure services
- Azure resources network security





# Course Repository

<https://github.com/zaalion/oreilly-az-700>



Congratulations, you passed!

You've renewed your Microsoft Certified: Azure Security Engineer Associate and have extended it by one year.



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Slide deck for December 22



README.md

Initial commit

README.md

# oreilly-az-500



Local

Codespaces New

Clone

HTTPS SSH GitHub CLI

<https://github.com/zaalion/oreilly-az-500.git>

Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop

Open with Visual Studio

Download ZIP



EXAMS

# Exam AZ-700: Designing and Implementing Microsoft Azure Networking Solutions



Candidates for this exam should have subject matter expertise in planning, implementing, and managing Azure networking solutions, including core network infrastructure, hybrid connectivity, application delivery services, private access to Azure services, and network security.

Responsibilities for Azure network engineers include optimizing performance, resiliency, scale, and security of Azure networking solutions. These professionals deploy the solutions by using the Azure portal, the command line, and templates. They proactively monitor network environments to identify issues and minimize risk.

Azure network engineers work with solution architects, cloud administrators, security engineers, application developers, and DevOps engineers to deliver Azure solutions. They also assist Azure support engineers in resolving connectivity issues reported by customers.

## Important

The English language version of this exam will be updated on October 31, 2023. Review the study guide linked in the "Tip" box for details on upcoming changes. If a localized version of this exam is available, it will be updated approximately eight weeks after this date. While Microsoft makes every effort to update localized versions as noted, there may be times when the localized versions of this exam are not updated on this schedule.

Passing score: 700. [Learn more about exam scores.](#)

## Tip

- Watch [AZ-700 exam prep videos on Learn](#)
- Review the [AZ-700 study guide](#) to help you prepare for the exam
- Demo the exam experience by visiting our [exam sandbox](#)

Part of the requirements for: Microsoft Certified: Azure Network Engineer Associate

Related exams: none

[Go to Learn Profile](#)

# Two ways to prepare

Self-paced

Instructor-led

## Items in this collection

### LEARNING PATH

#### AZ-700 Designing and Implementing Microsoft Azure Networking Solutions

8 Modules

Intermediate • Administrator • Application Gateway



[Start >](#)

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# Design and implement core networking infrastructure (20–25%)





# Design and implement core networking infrastructure (20–25%)

- Design and implement private IP addressing for Azure resources
- Design and implement name resolution
- Design and implement VNet connectivity and routing
- Monitor networks





# Design and implement private IP addressing for Azure resources

- Plan and implement [network segmentation](#) and [address spaces](#)
- Create a virtual network (VNet) [see [1](#) [2](#)]
- Plan and configure [subnetting](#) for services, including [VNet gateways](#), [private endpoints](#), [firewalls](#), [application gateways](#), [VNet-integrated platform services](#), and [Azure Bastion](#)
- Plan and configure [subnet delegation](#)
- [Create a prefix for public IP addresses](#)
- [Choose when to use a public IP address prefix](#)
- Plan and implement a [custom public IP address prefix](#) (bring your own IP)
- [Create a new public IP address](#)
- [Associate public IP addresses to resources](#)



# Design and implement name resolution

- Design name resolution inside a VNet
- Configure DNS settings for a VNet
- Design public DNS zones
- Design private DNS zones
- Configure a public or private DNS zone
- Link a private DNS zone to a VNet



# Design and implement VNet connectivity and routing

- Design [service chaining](#), including [gateway transit](#) [also see [1](#) [2](#)]
- Design [virtual private network \(VPN\) connectivity between VNets](#)
- Implement [VNet peering](#)
- Design and implement [user-defined routes \(UDRs\)](#)
- Associate a route table with a subnet
- [Configure forced tunneling](#)
- Diagnose and resolve routing issues [see [1](#) [2](#)]
- [Design and implement Azure Route Server](#)
- Identify appropriate use cases for a [Virtual Network NAT gateway](#)
- [Implement a NAT gateway](#)

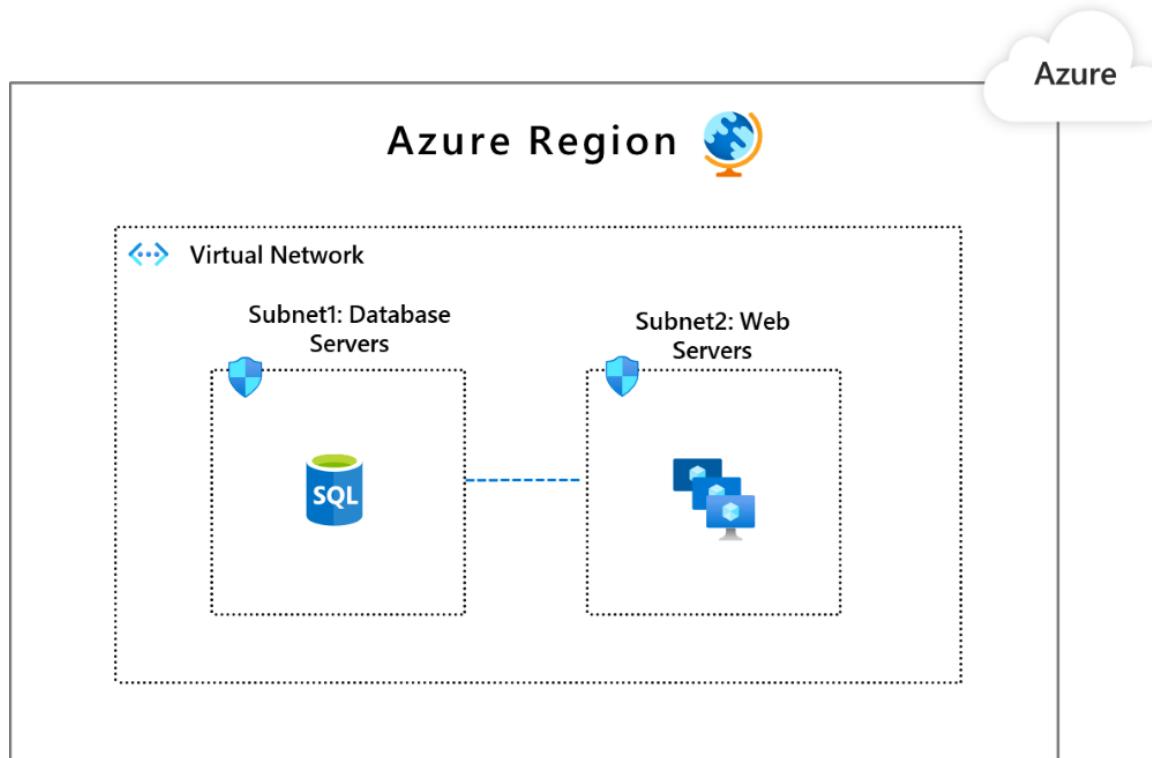


# Monitor networks

- Configure [monitoring, network diagnostics, and logs](#) in [Azure Network Watcher](#)
- Monitor and repair network health by using [Azure Network Watcher](#)
- Activate and monitor distributed denial-of-service ([DDoS](#)) protection
- Activate and monitor [Microsoft Defender for DNS](#)



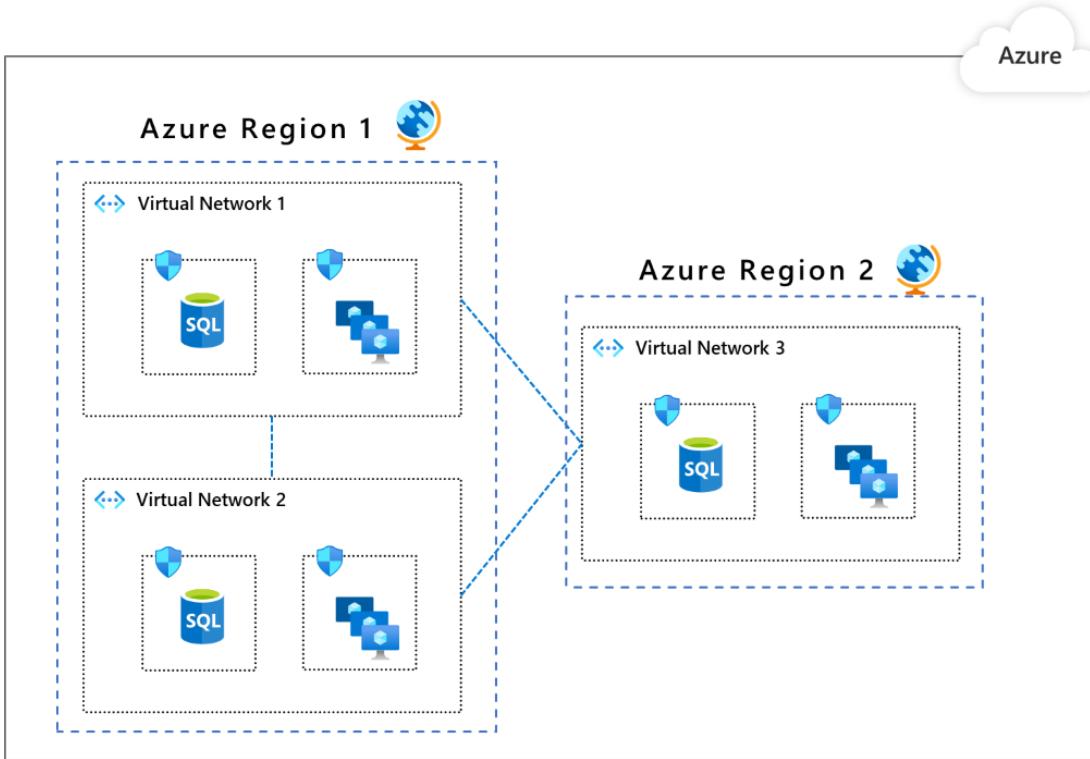
# Network segmentation patterns on Azure



<https://learn.microsoft.com/en-us/azure/well-architected/security/design-network-segmentation#pattern-1-single-vnet>



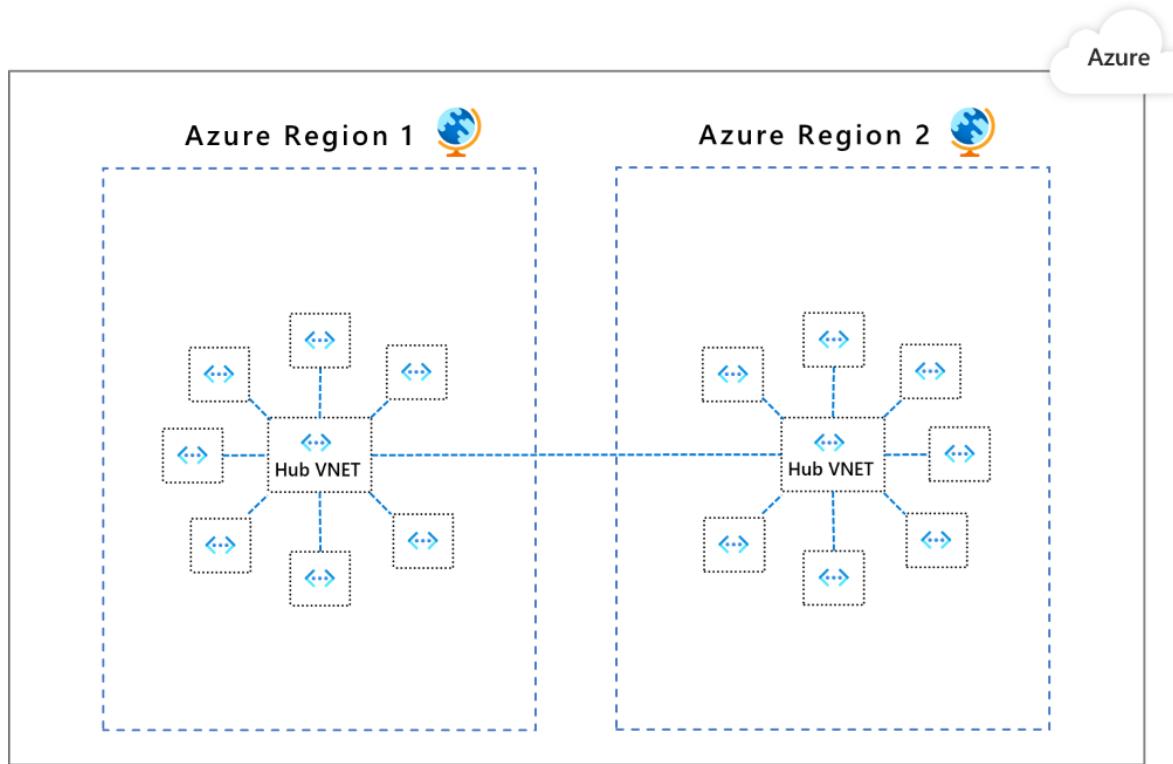
# Network segmentation patterns on Azure



<https://learn.microsoft.com/en-us/azure/well-architected/security/design-network-segmentation#pattern-2-multiple-vnets-that-communicate-through-with-peering>



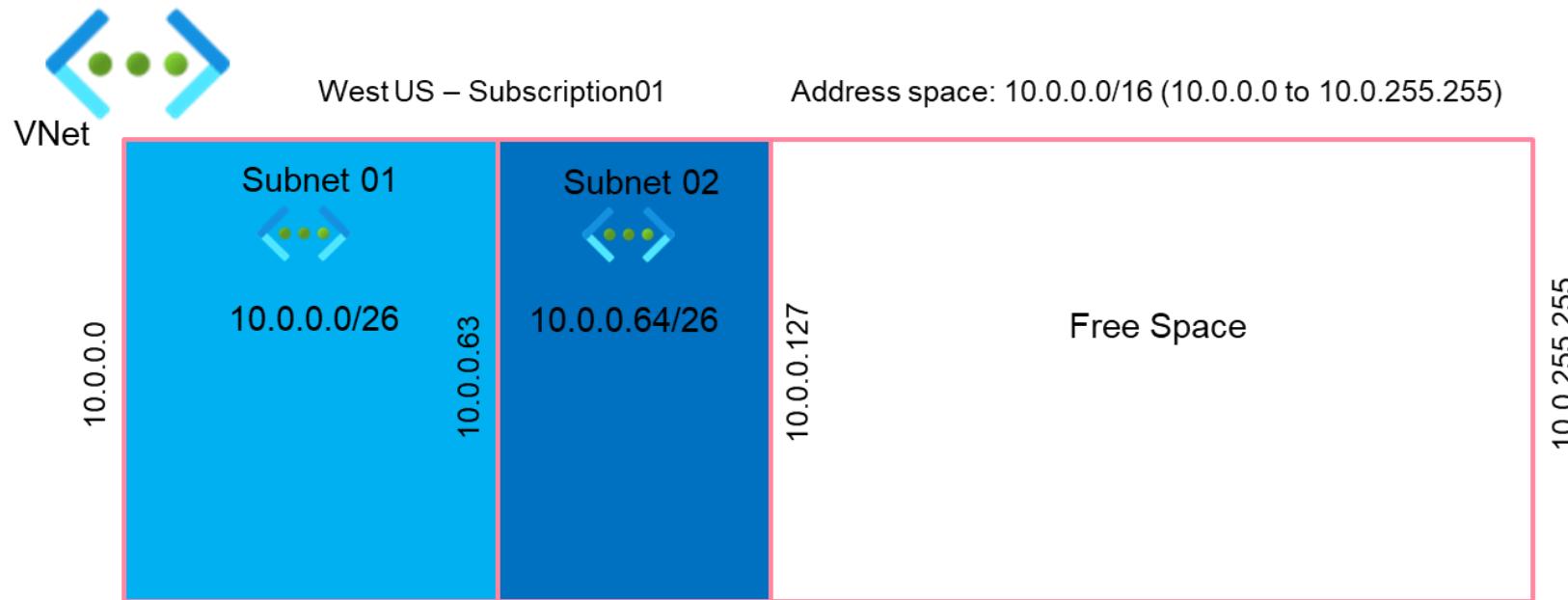
# Network segmentation patterns on Azure



<https://learn.microsoft.com/en-us/azure/well-architected/security/design-network-segmentation#pattern-3-multiple-vnets-in-a-hub-and-spoke-model>



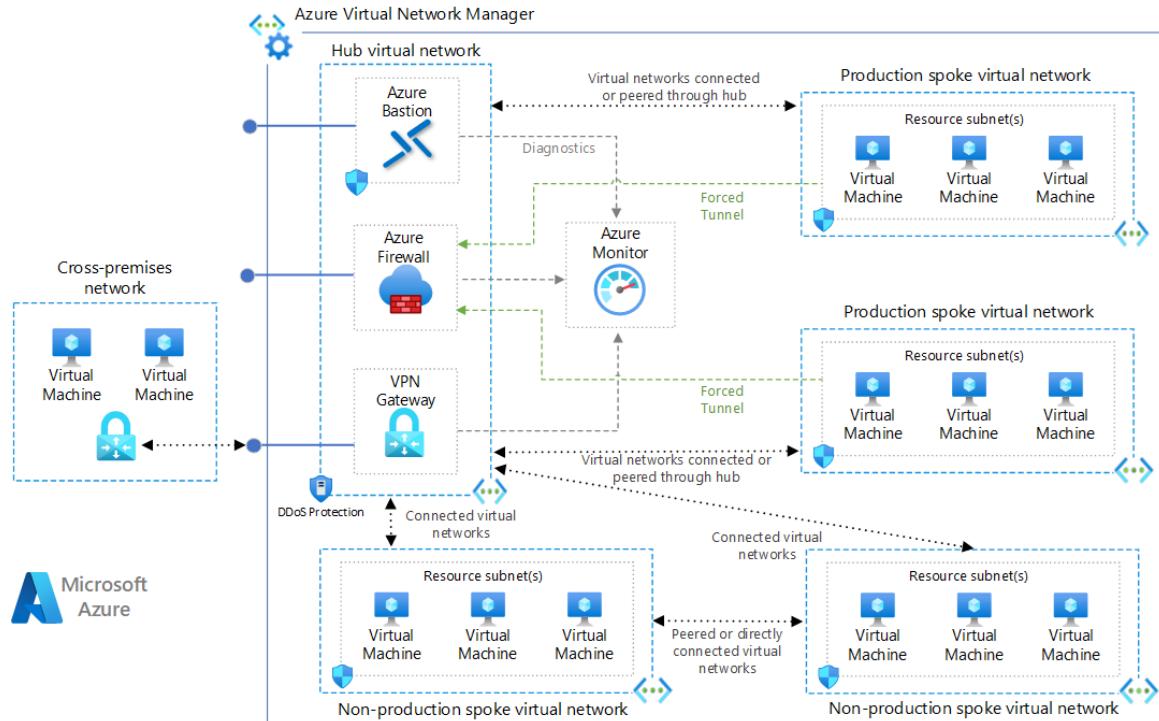
# Network Address Space



<https://docs.microsoft.com/en-us/azure/virtual-network/concepts-and-best-practices>



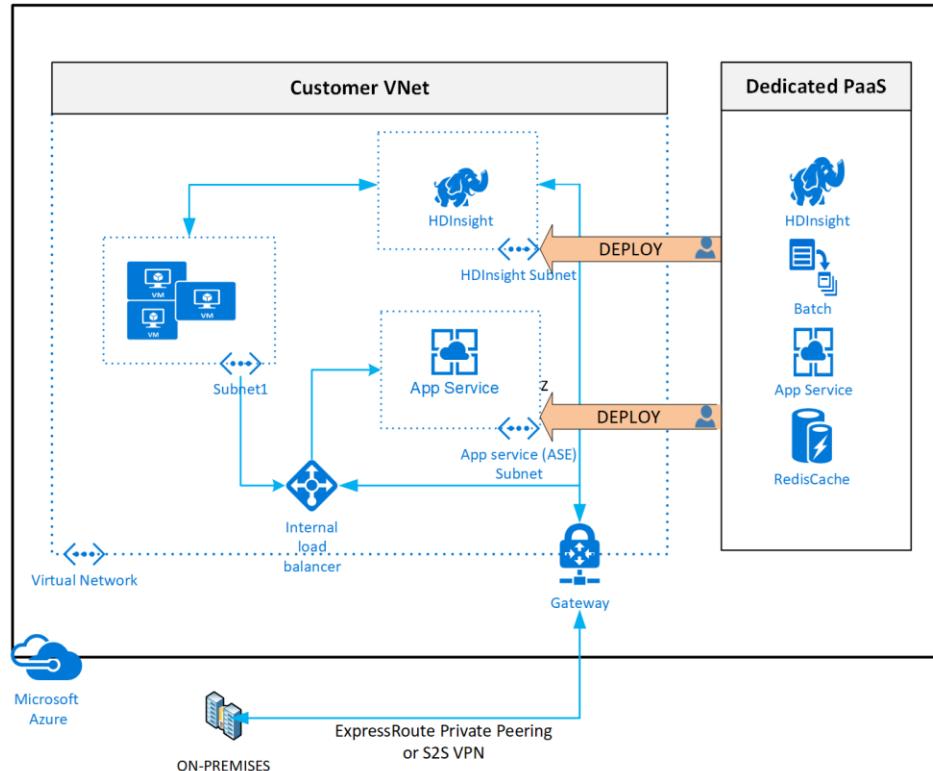
# Some Resources Which Need a Subnet



<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/hybrid-networking/hub-spoke?tabs=cli>



# Azure Subnet Delegation



<https://learn.microsoft.com/en-us/azure/virtual-network/subnet-delegation-overview>  
<https://learn.microsoft.com/en-us/azure/virtual-network/virtual-network-for-azure-services>



# Azure Subnet Delegation

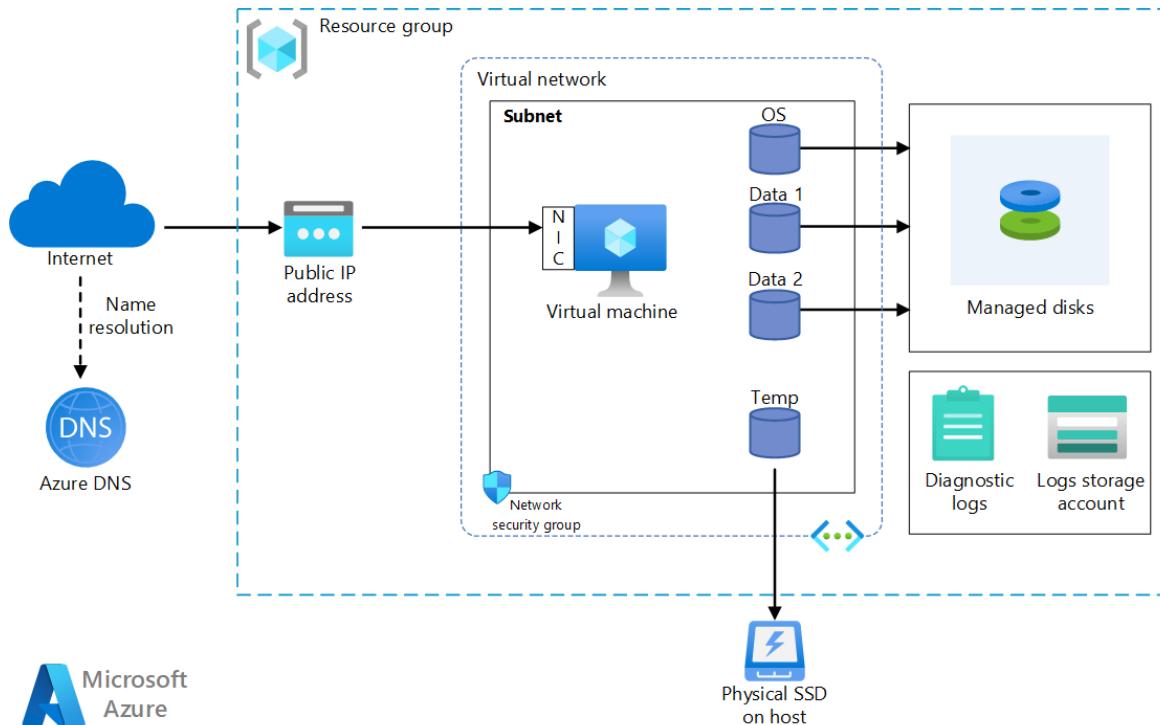
## Services that can be deployed into a virtual network

Category	Service	Dedicated <sup>1</sup> Subnet
Compute	Virtual machines: Linux or Windows	No
	Virtual machine scale sets	No
	Cloud Service: Virtual network (classic) only	No
	Azure Batch	No <sup>2</sup>
Network	Application Gateway - WAF	Yes
	Azure Bastion	Yes
	Azure Firewall	Yes
	Azure Route Server	Yes
	ExpressRoute Gateway	Yes
	Network Virtual Appliances	No
	VPN Gateway	Yes
Data	RedisCache	Yes
	Azure SQL Managed Instance	Yes
	Azure Database for MySQL - Flexible Server	Yes
	Azure Database for PostgreSQL - Flexible Server	Yes
Analytics	Azure HDInsight	No <sup>2</sup>
	Azure Databricks	No <sup>2</sup>
Identity	Azure Active Directory Domain Services	No
Containers	Azure Kubernetes Service (AKS)	No <sup>2</sup>

<https://learn.microsoft.com/en-us/azure/virtual-network/virtual-network-for-azure-services#services-that-can-be-deployed-into-a-virtual-network>



# Azure Public IP



<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/n-tier/linux-vm>



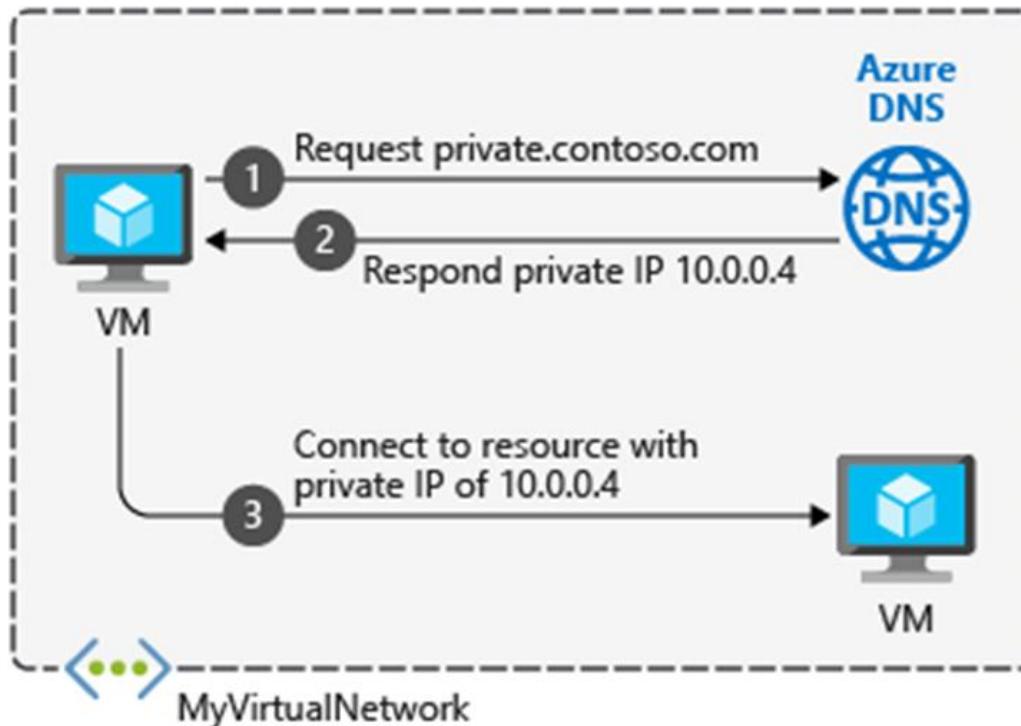
# Azure Public DNS



<https://learn.microsoft.com/en-us/azure/dns/dns-overview>



# Azure Private DNS



<https://docs.microsoft.com/en-us/azure/dns/private-dns-overview>



# Link Private DNS to an Azure VNet

The screenshot shows the 'Add virtual network link' dialog in the Azure portal. The URL in the browser is <https://learn.microsoft.com/en-us/azure/dns/private-dns-getstarted-portal#link-the-virtual-network>. The dialog has the following fields:

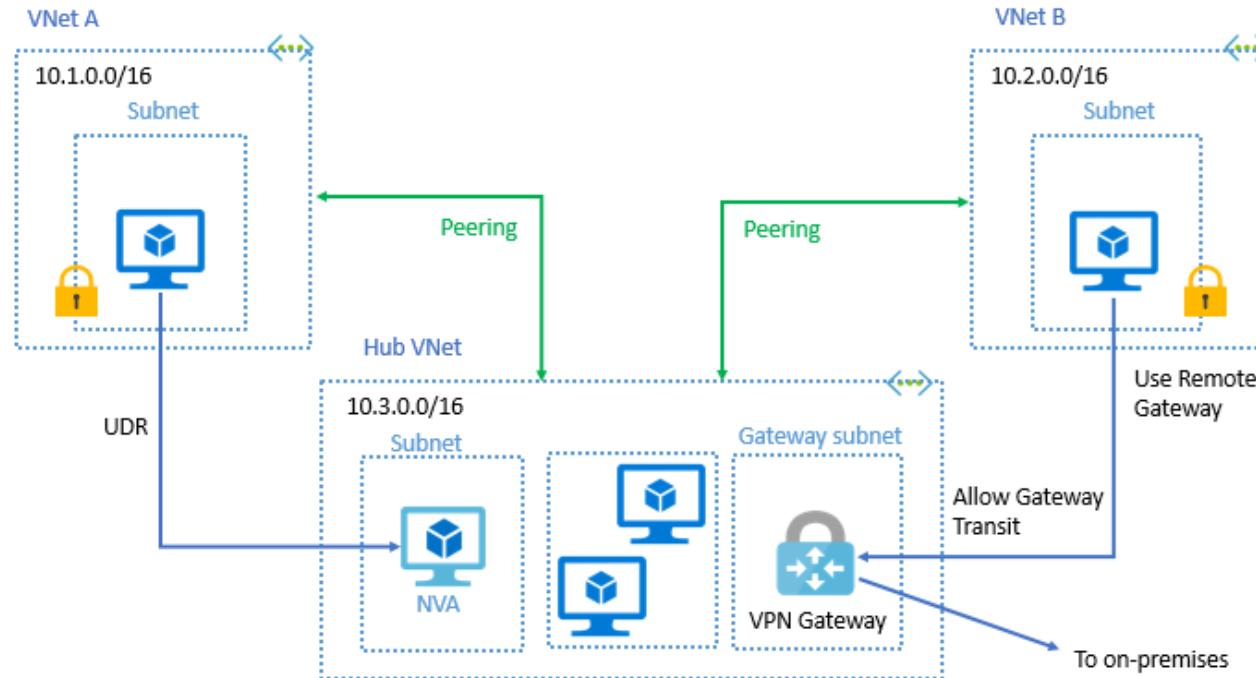
- Link name:** myLink
- Virtual network details:** A note states: "Only virtual networks with Resource Manager deployment model are supported for linking with Private DNS zones. Virtual networks with Classic deployment model are not supported." There is an unchecked checkbox: "I know the resource ID of virtual network".
- Subscription:** VEH Doc Test
- Virtual network:** myAzureVNet (MyAzureResourceGroup)
- Configuration:** A checked checkbox: "Enable auto registration".

At the bottom right of the dialog is a blue 'OK' button.

<https://learn.microsoft.com/en-us/azure/dns/private-dns-getstarted-portal#link-the-virtual-network>



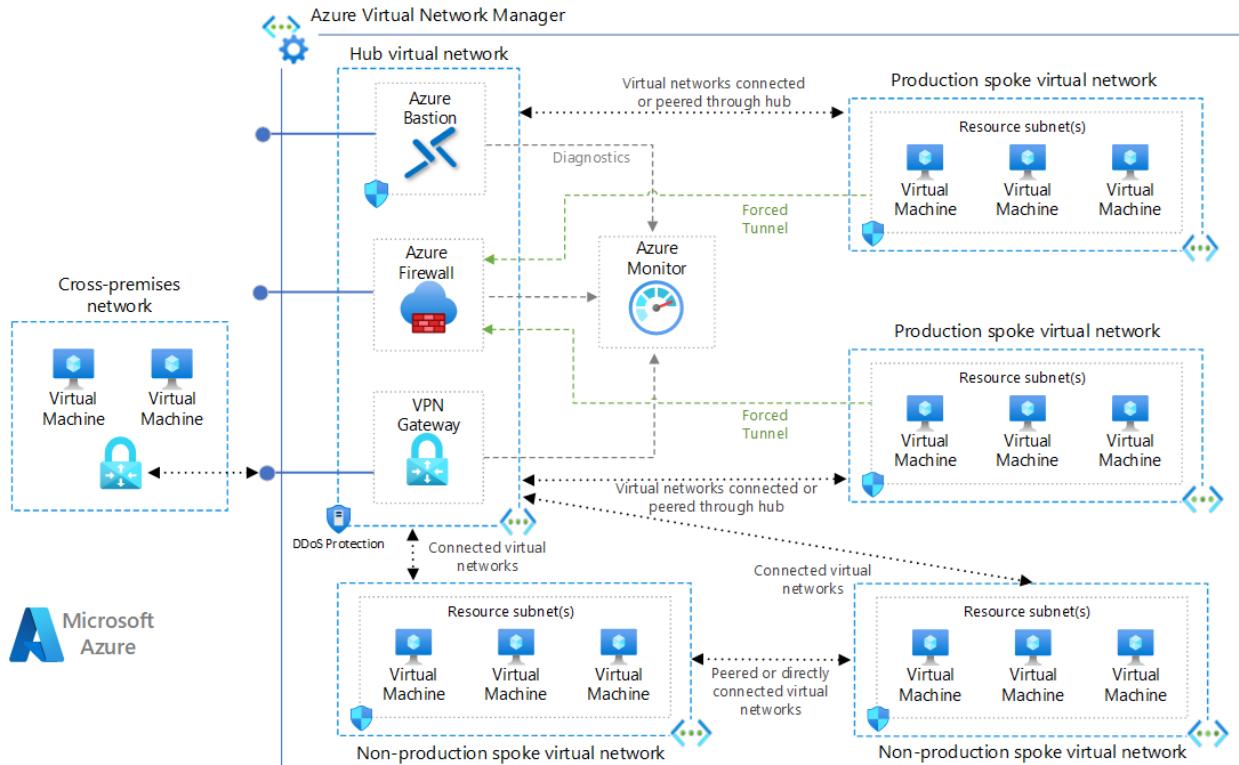
# Service Chaining



<https://learn.microsoft.com/en-us/azure/virtual-network/virtual-network-peering-overview#service-chaining>



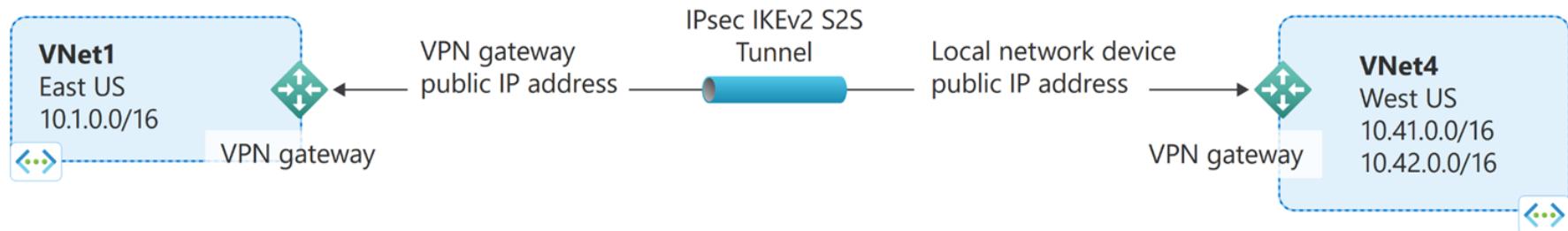
# Hub-spoke Network Topology



<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/hybrid-networking/hub-spoke?tabs=cli>



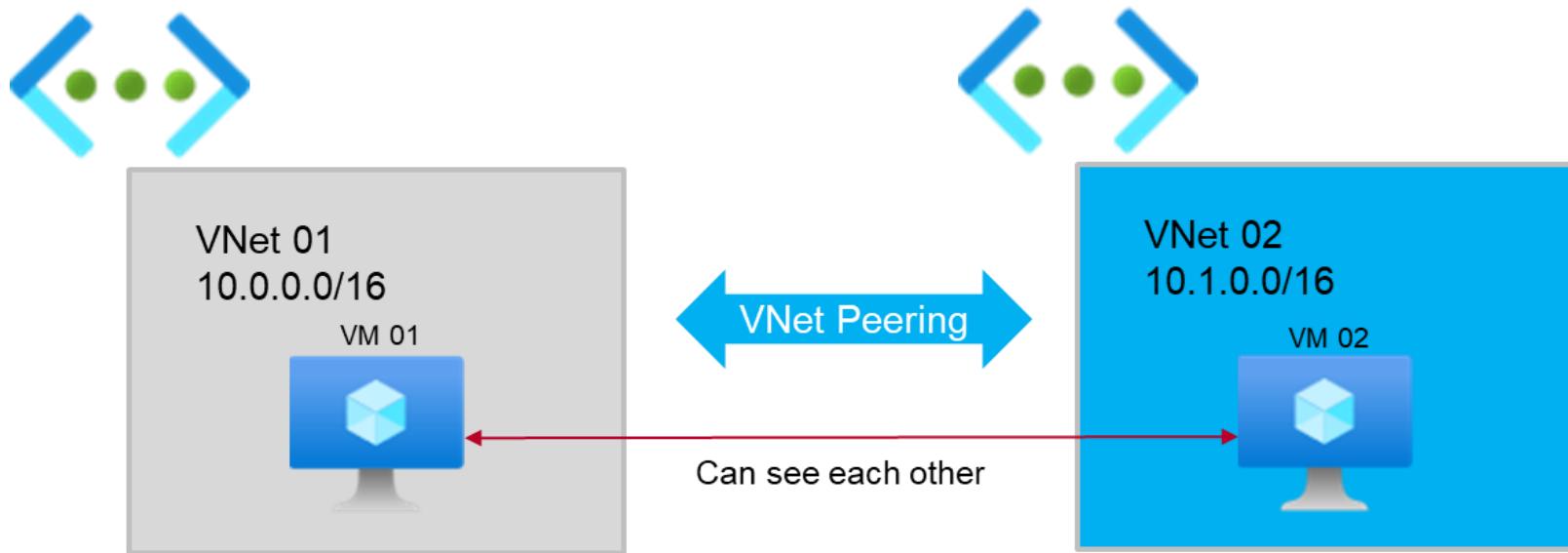
# Configure a VNet-to-VNet VPN Connection



<https://learn.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-howto-vnet-vnet-resource-manager-portal>



# VNet Peering



<https://learn.microsoft.com/en-us/azure/virtual-network/virtual-network-peering-overview>



# UDR (User-defined Routes)

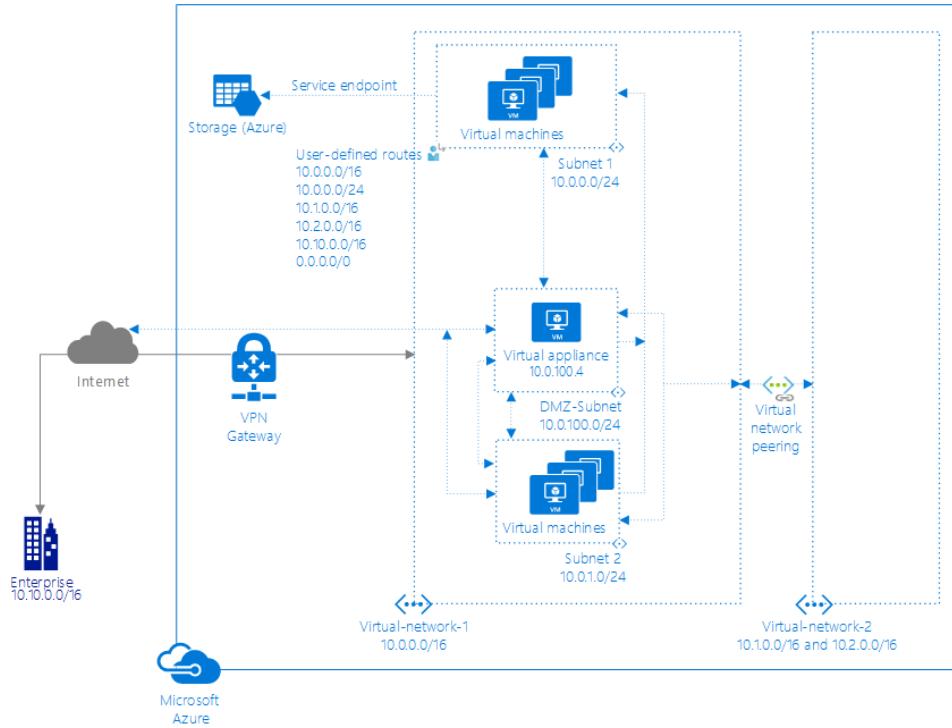
## System routes

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 some system routes with [custom routes](#). Azure creates default system routes for each subnet, and adds more optional default routes to specific subnets, or every subnet, when you use specific Azure capabilities.

## Default

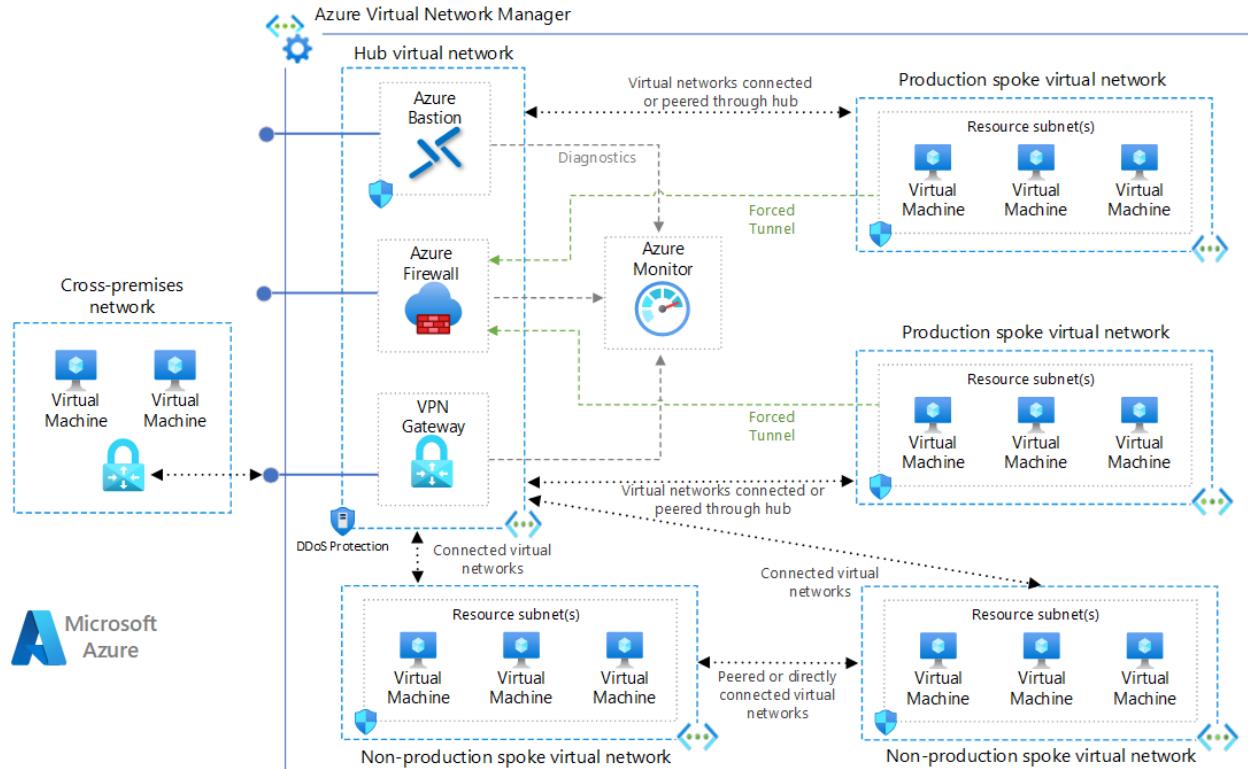
Each route contains an address prefix and next hop type. When traffic leaving a subnet is sent to an IP address within the address prefix of a route, the route that contains the prefix is the route Azure uses. Learn more about [how Azure selects a route](#) when multiple routes contain the same prefixes, or overlapping prefixes. Whenever a virtual network is created, Azure automatically creates the following default system routes for each subnet within the virtual network:

Source	Address prefixes	Next hop type
Default	Unique to the virtual network	Virtual network
Default	0.0.0.0/0	Internet
Default	10.0.0.0/8	None
Default	172.16.0.0/12	None
Default	192.168.0.0/16	None
Default	100.64.0.0/10	None





# Azure Firewall Forced Tunneling

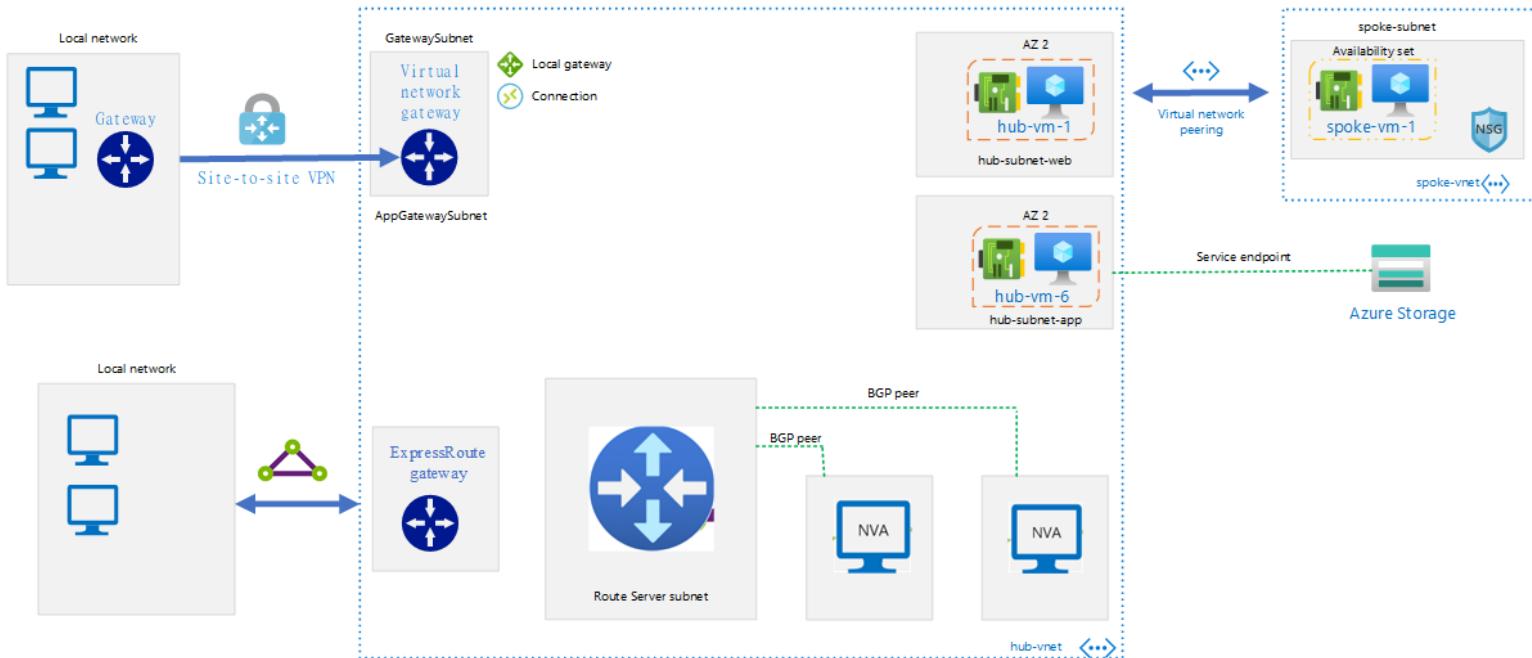


<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/hybrid-networking/hub-spoke?tabs=cli>

<https://learn.microsoft.com/en-us/azure/firewall/forced-tunneling>



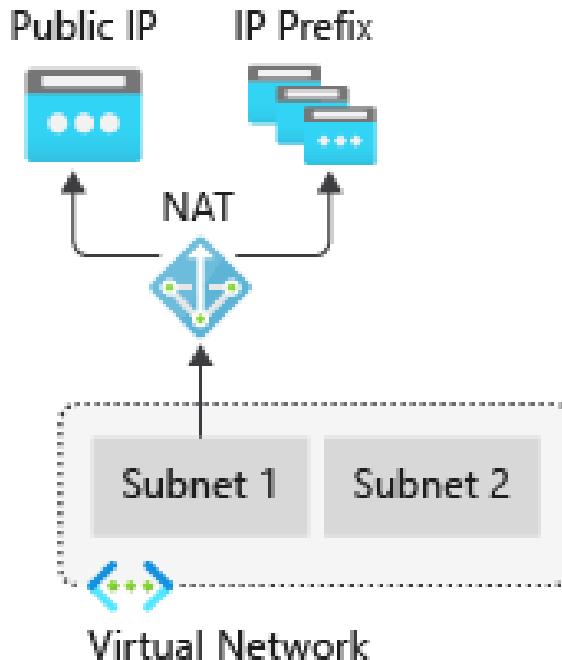
# Azure Route Server



<https://learn.microsoft.com/en-us/azure/architecture/example-scenario/networking/manage-routing-azure-route-server>



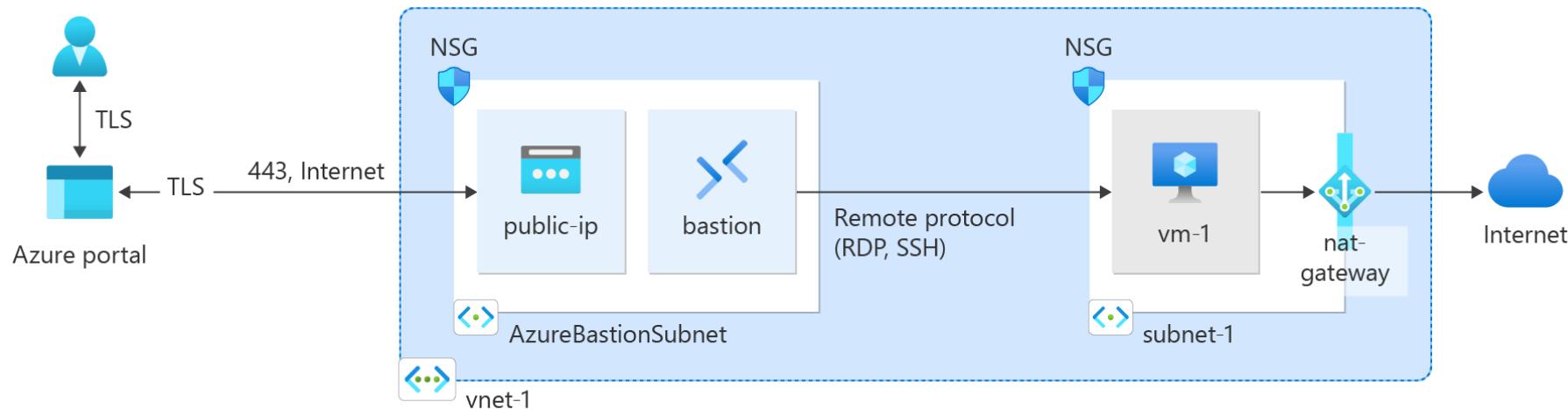
# Azure NAT Gateway



<https://learn.microsoft.com/en-us/azure/nat-gateway/nat-overview>



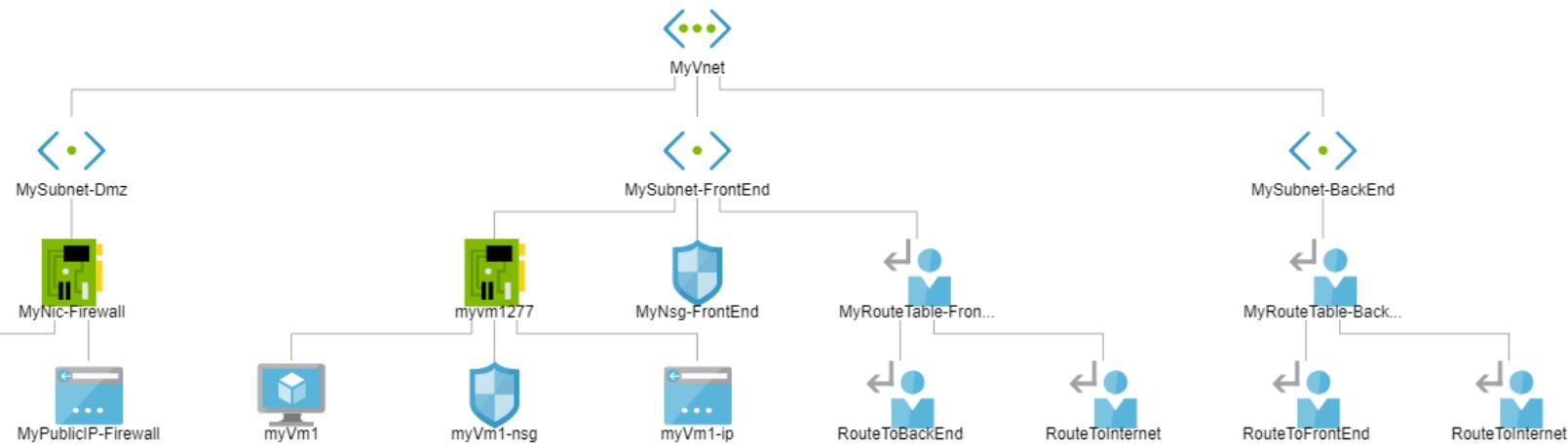
# Azure NAT Gateway



<https://learn.microsoft.com/en-us/azure/nat-gateway/quickstart-create-nat-gateway-portal>



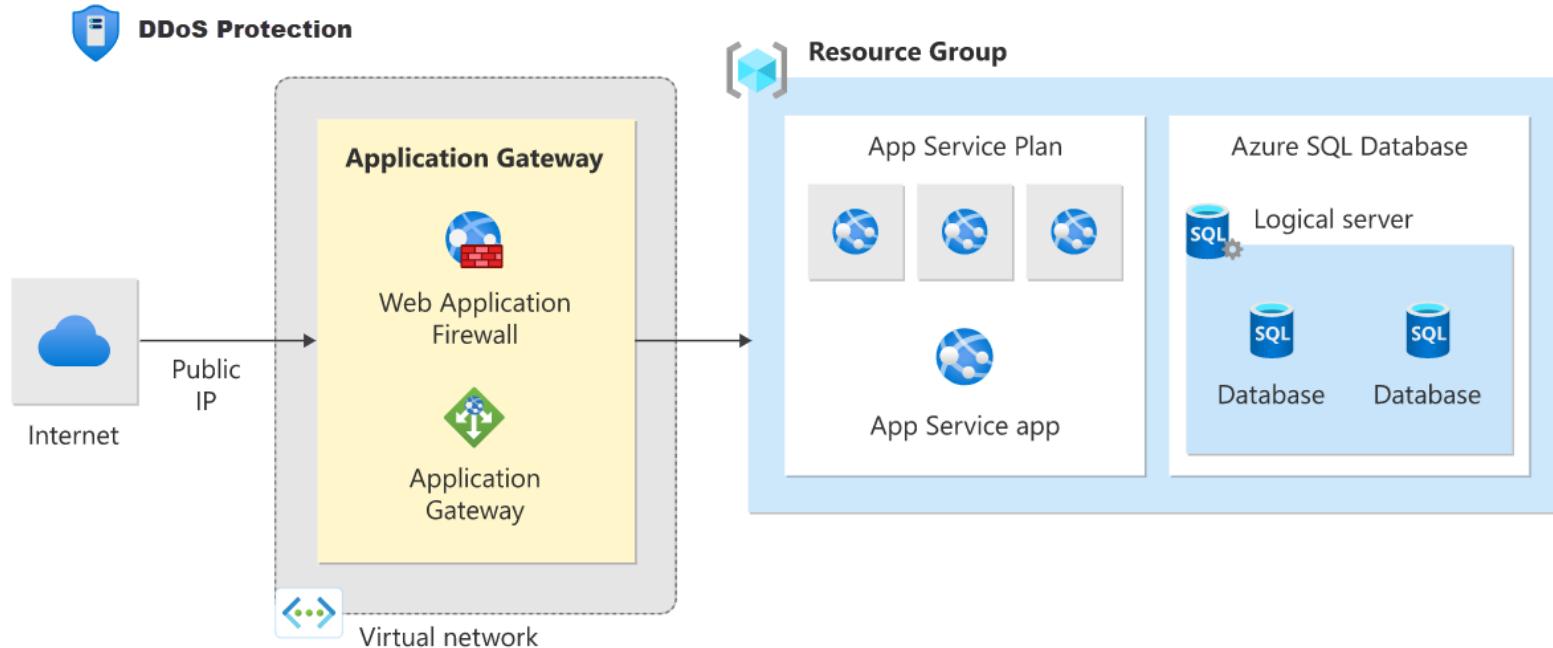
# Azure Network Watcher



<https://learn.microsoft.com/en-us/azure/network-watcher/network-watcher-monitoring-overview>



# Azure DDoS Protection



<https://learn.microsoft.com/en-us/azure/ddos-protection/ddos-protection-overview>

Design,  
implement, and  
manage  
connectivity  
services (20–  
25%)





# Design, implement, and manage connectivity services (20–25%)

- Design, implement, and manage a site-to-site VPN connection
- Design, implement, and manage a point-to-site VPN connection
- Design, implement, and manage Azure ExpressRoute
- Design and implement an Azure Virtual WAN architecture





# Design, implement, and manage a site-to-site VPN connection

- Design a site-to-site VPN connection, including for high availability
- Select an appropriate VNet gateway SKU for site-to-site VPN requirements
- Implement a site-to-site VPN connection
- Identify when to use a policy-based VPN versus a route-based VPN connection
- Create and configure an IPsec/IKE policy [see 1 2 3]
- Diagnose and resolve virtual network gateway connectivity issues [also see 1]
- Implement Azure Extended Network



# Design, implement, and manage a point-to-site VPN connection

- Select an appropriate virtual network gateway SKU for point-to-site VPN requirements
- Select and configure a tunnel type
- Select an appropriate authentication method
- Configure RADIUS authentication
- Configure certificate-based authentication
- Configure authentication by using Azure Active Directory (Azure AD), part of Microsoft Entra
- Implement a VPN client configuration file
- Diagnose and resolve client-side and authentication issues
- Specify Azure requirements for Always On authentication
- Specify Azure requirements for Azure Network Adapter



# Design, implement, and manage ExpressRoute

- Select an ExpressRoute [connectivity model](#)
- Select an appropriate [ExpressRoute SKU](#) and tier
- Design and implement ExpressRoute to meet requirements, including [cross-region connectivity](#), [redundancy](#), and [disaster recovery](#)
- Design and implement ExpressRoute options, including [Global Reach](#), [FastPath](#), and [ExpressRoute Direct](#)
- Choose between [private peering only](#), [Microsoft peering only](#), or both
- [Configure private peering](#)
- [Configure Microsoft peering](#)
- [Create and configure an ExpressRoute gateway](#)
- [Connect a virtual network to an ExpressRoute circuit](#)
- [Recommend a route advertisement configuration](#)
- [Configure encryption over ExpressRoute](#)
- [Implement Bidirectional Forwarding Detection](#)
- [Diagnose and resolve ExpressRoute connection issues](#)

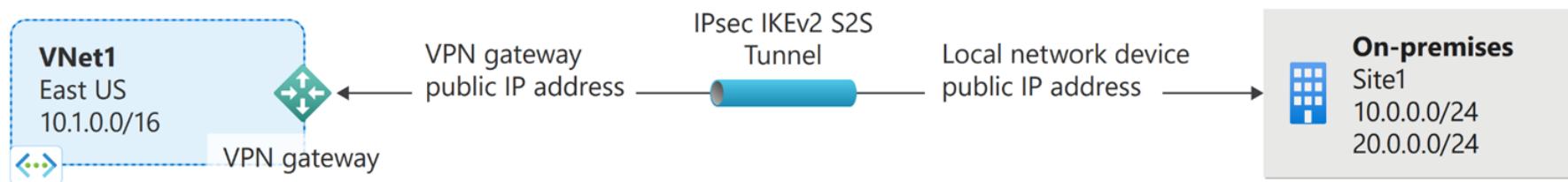


# Design and implement an Azure Virtual WAN architecture

- Select a Virtual WAN SKU
- Design a Virtual WAN architecture, including selecting types and services
- Create a hub in Virtual WAN
- Choose an appropriate scale unit for each gateway type
- Deploy a gateway into a Virtual WAN hub
- Configure virtual hub routing
- Create a network virtual appliance (NVA) in a virtual hub
- Integrate a Virtual WAN hub with a third-party NVA



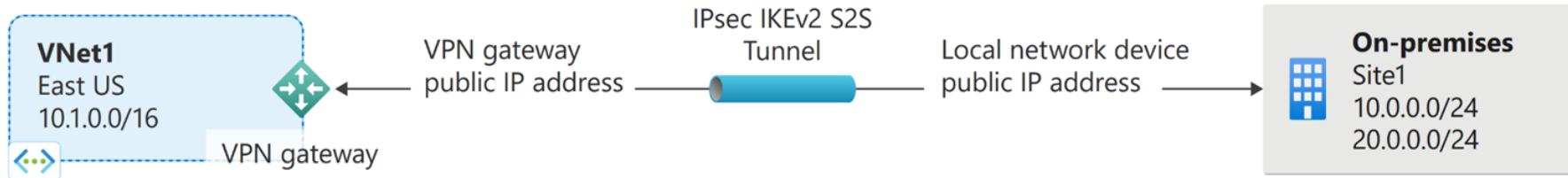
# Azure Site-to-site VPN



<https://learn.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpngateways>



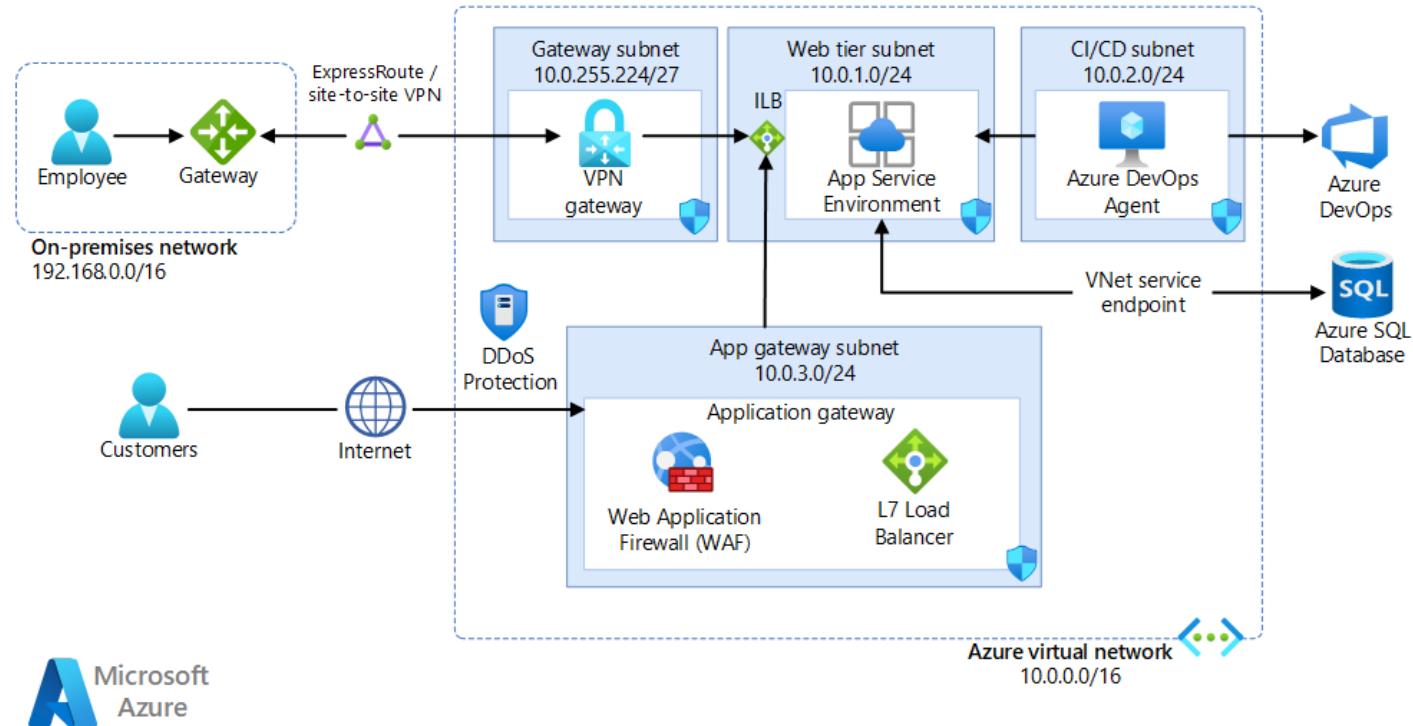
# Azure Site-to-site VPN



<https://learn.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-about-vpngateways>



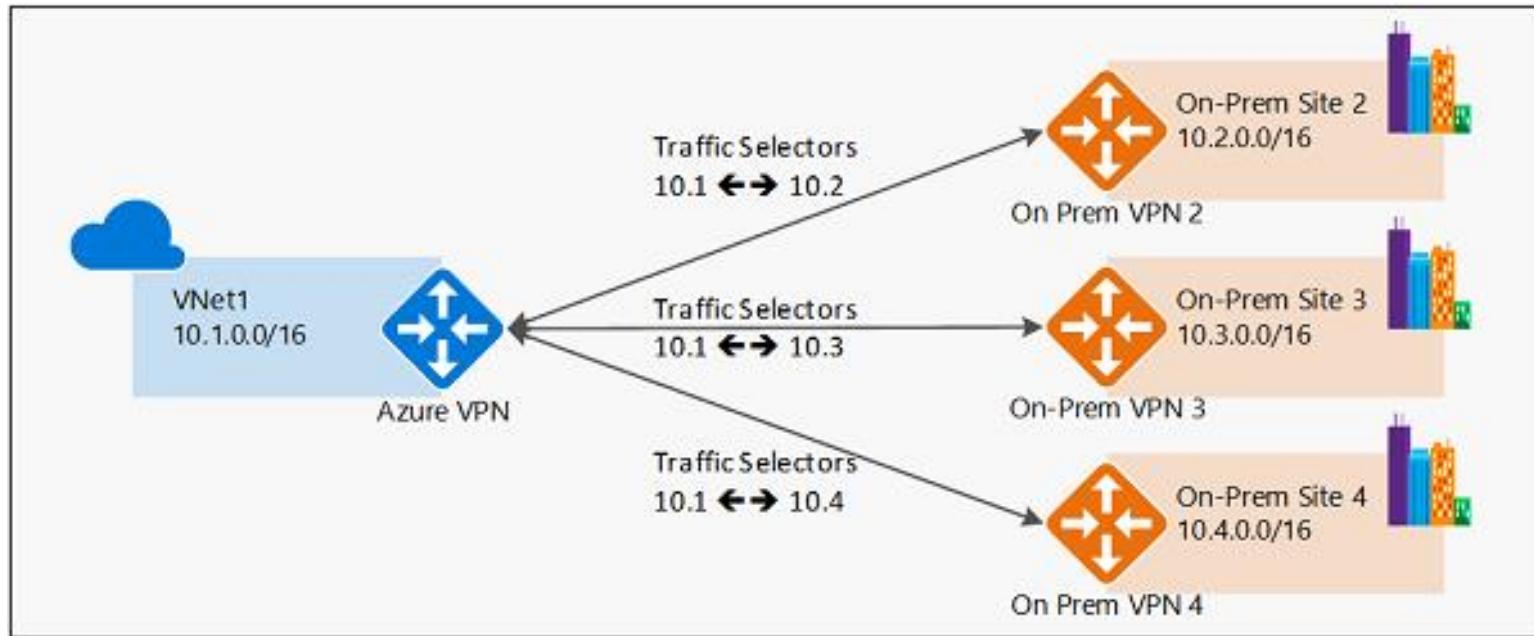
# Azure Site-to-site VPN



<https://learn.microsoft.com/en-us/azure/architecture/example-scenario/apps/fully-managed-secure-apps>



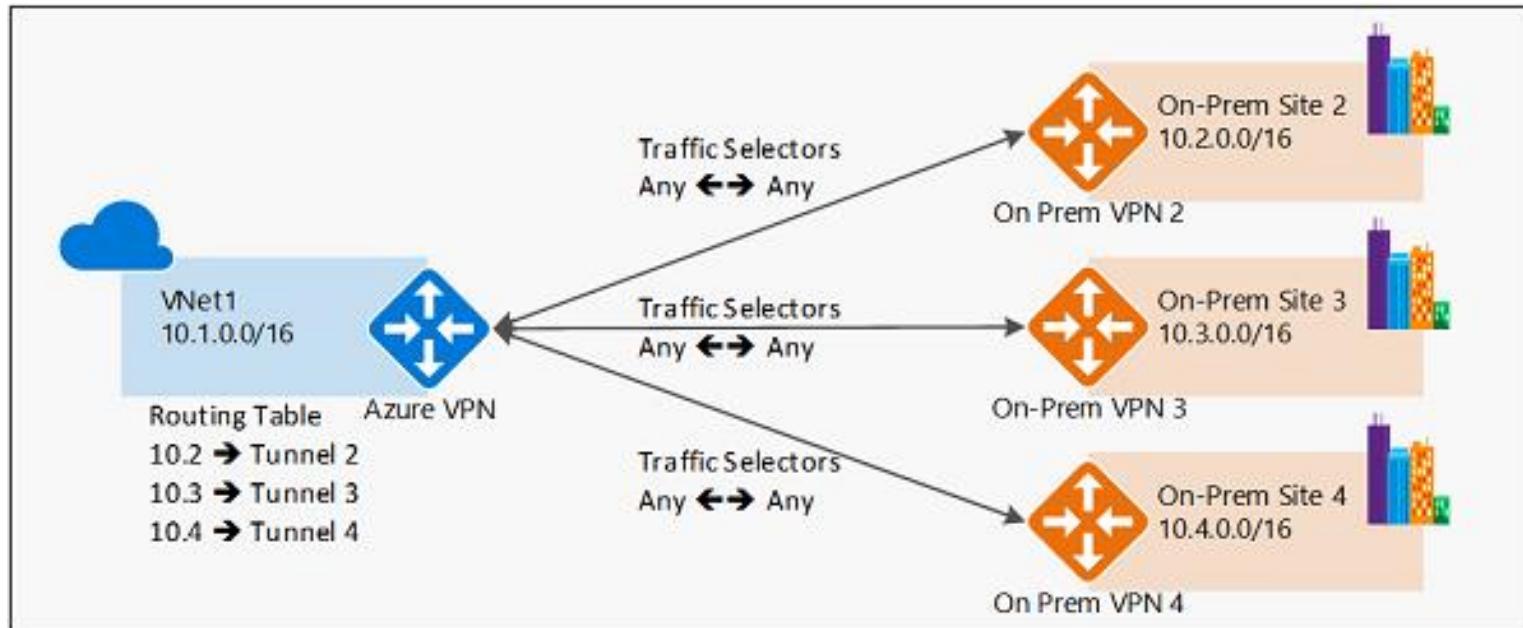
# Azure Policy-based VPN



<https://learn.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-connect-multiple-policybased-rm-ps>



# Azure Route-based VPN



<https://learn.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-connect-multiple-policybased-rm-ps>

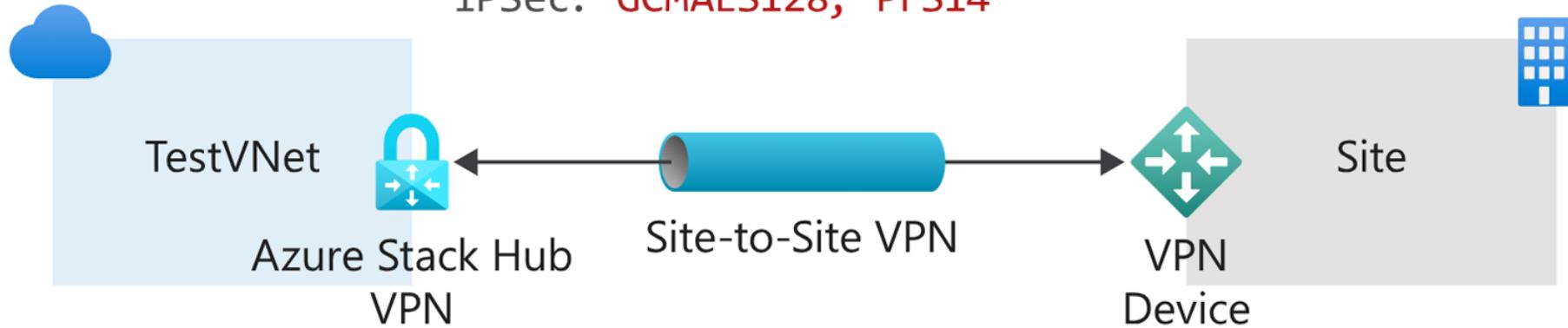


# IPsec/IKE Policy for Site-to-site VPN

Policy

IKEv2: AE128, SHA1, DHGroup14

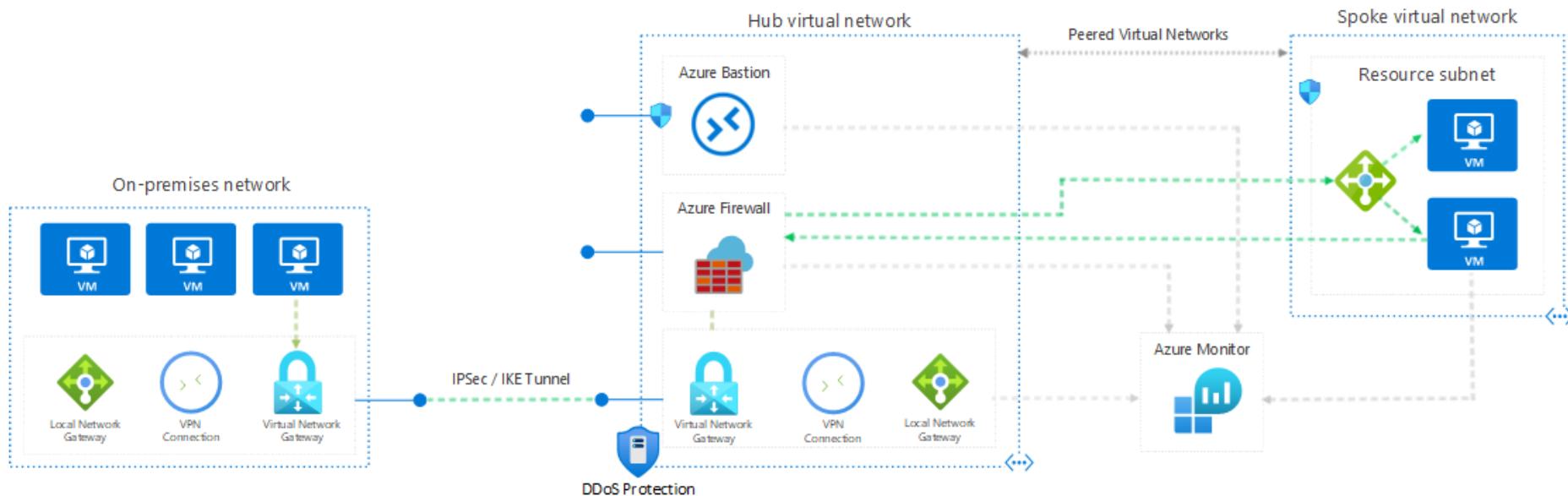
IPSec: GCMAES128, PFS14



<https://learn.microsoft.com/en-us/azure-stack/user/azure-stack-vpn-s2s>



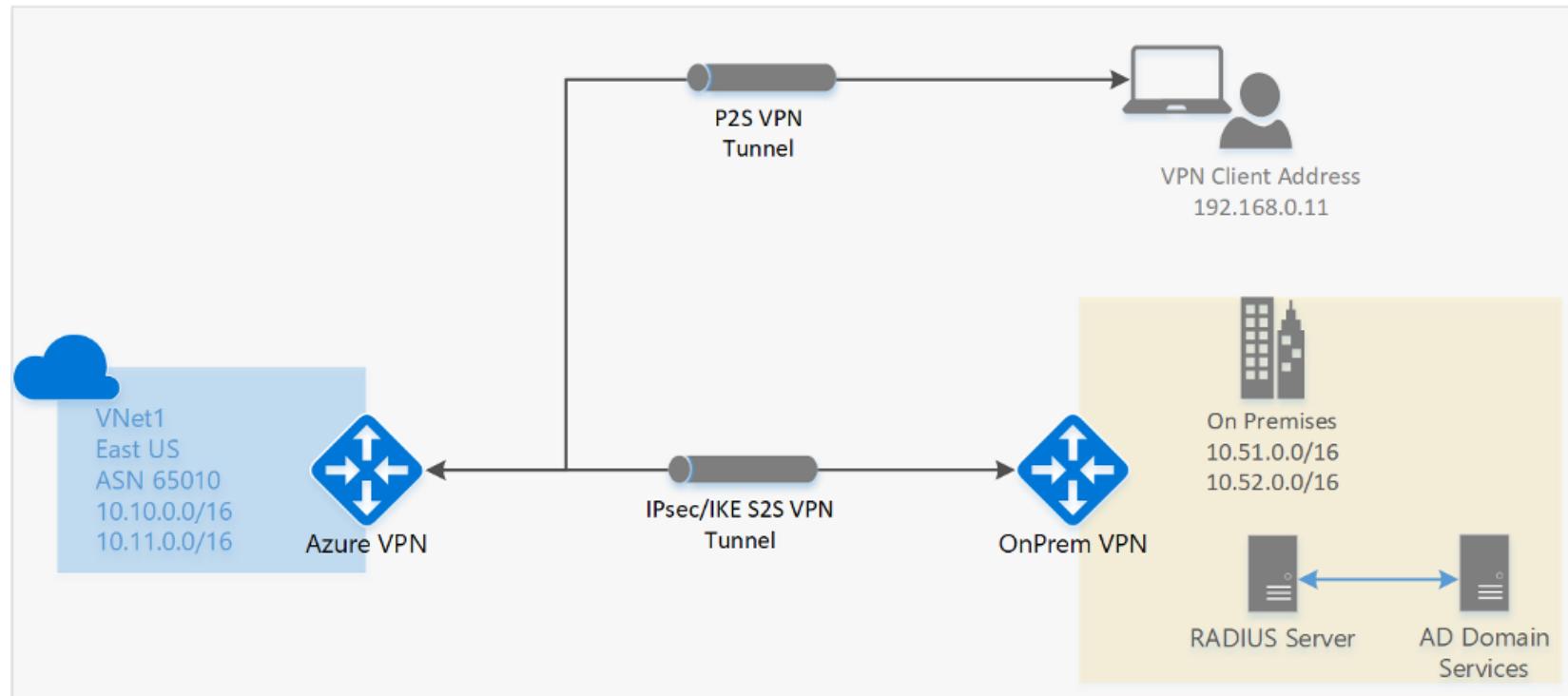
# IPsec/IKE Policy for Site-to-site VPN



<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/dmz/secure-vnet-dmz?tabs=portal>



# Azure Point-to-site VPN



<https://learn.microsoft.com/en-us/azure/vpn-gateway/point-to-site-about>



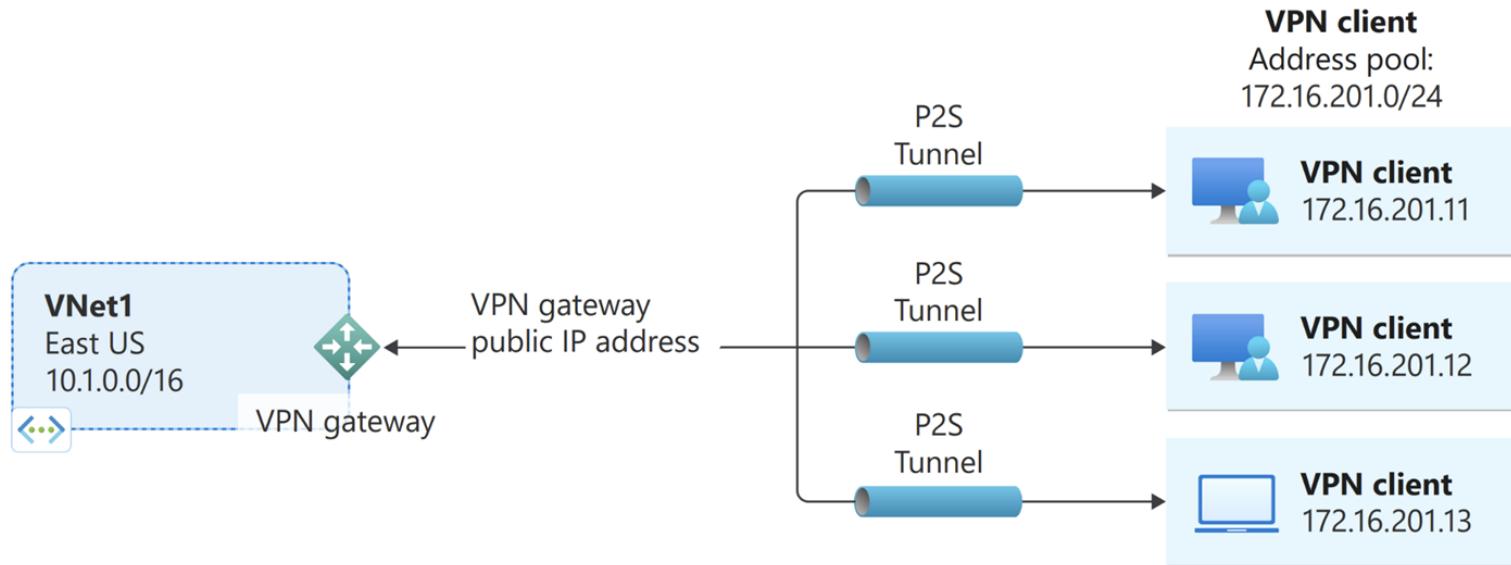
# Azure Point-to-site VPN Authentication

- Certificate-based
- RADIUS
- Azure Active Directory

<https://learn.microsoft.com/en-us/azure/vpn-gateway/point-to-site-about>



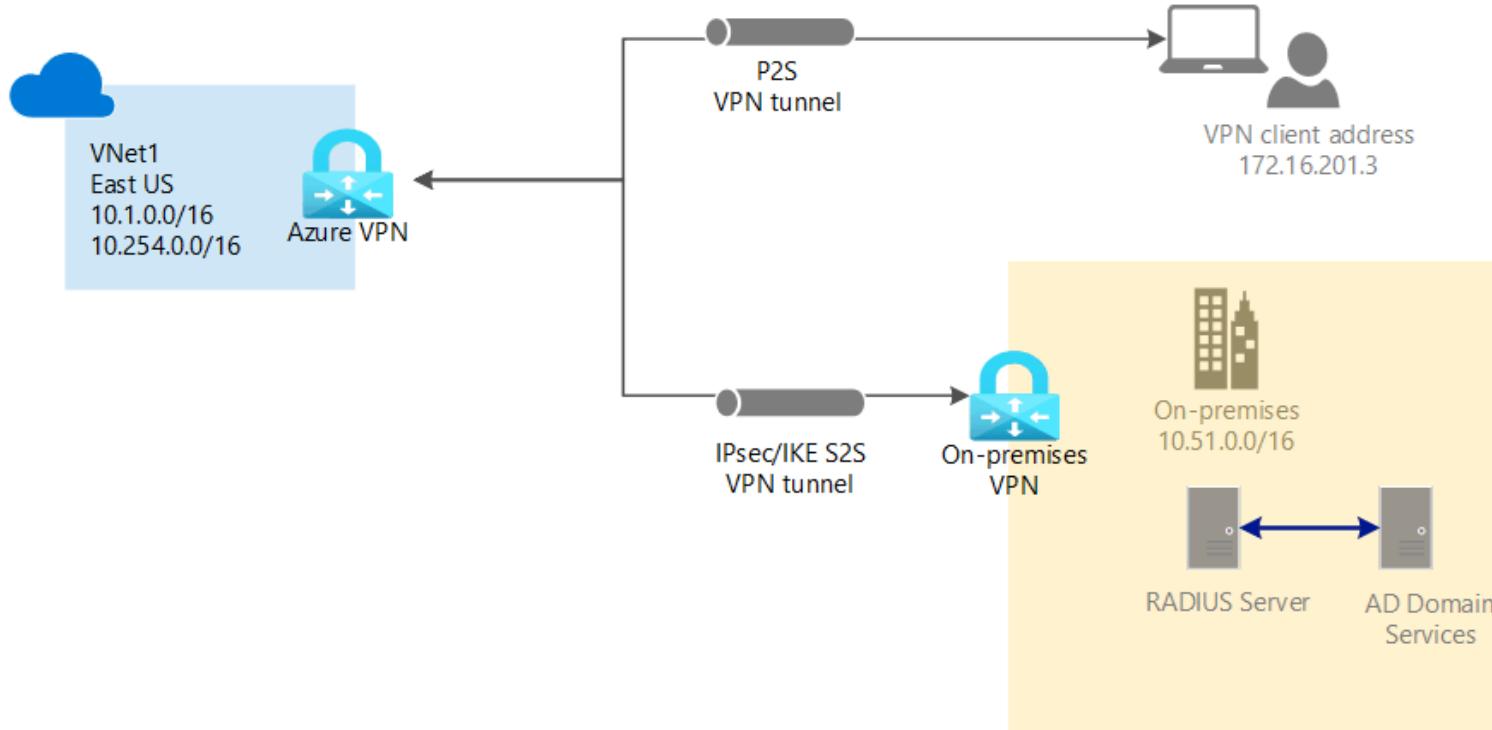
# Azure Point-to-site VPN Authentication: Certificate



<https://learn.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-howto-point-to-site-resource-manager-portal>



# Azure Point-to-site VPN Authentication: RADIUS



<https://learn.microsoft.com/en-us/azure/vpn-gateway/point-to-site-how-to-radius-ps>



# Azure Point-to-site VPN Authentication: Azure AD

Home > VNet1GW

## VNet1GW | Point-to-site configuration

Virtual network gateway

Search (Ctrl+ /) Save Discard Delete Download VPN client

Address pool \*

172.16.201.0/24

Tunnel type

OpenVPN (SSL)

Authentication type

Azure Active Directory

Settings

- Configuration
- Connections
- Point-to-site configuration
- NAT Rules
- Properties
- Locks

Monitoring

- Logs
- Alerts

Azure Active Directory

Tenant \*

https://login.microsoftonline.com/{AzureAD TenantID}/

Audience \*

41b23e61-6c1e-4545-b367-cd054e0ed4b4

Issuer \*

https://sts.windows.net/{AzureAD TenantID}/

https://learn.microsoft.com/en-us/azure/vpn-gateway/openvpn-azure-ad-tenant



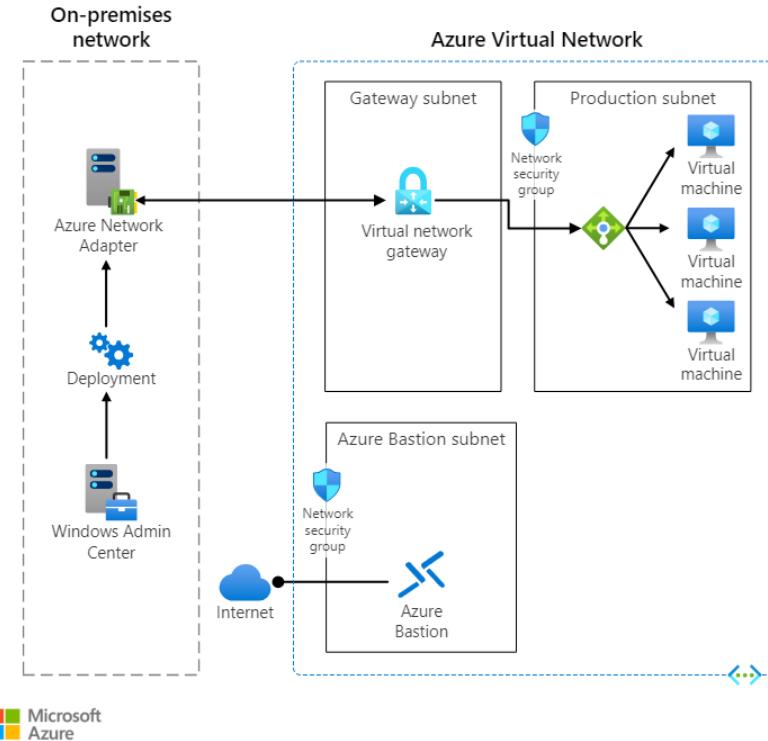
# Always On VPN Tunnel

- Is the ability to maintain a VPN connection.
- With Always On, the active VPN profile can connect automatically and remain connected based on triggers, such as user sign-in, network state change, or device screen active.

<https://learn.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-howto-always-on-device-tunnel>



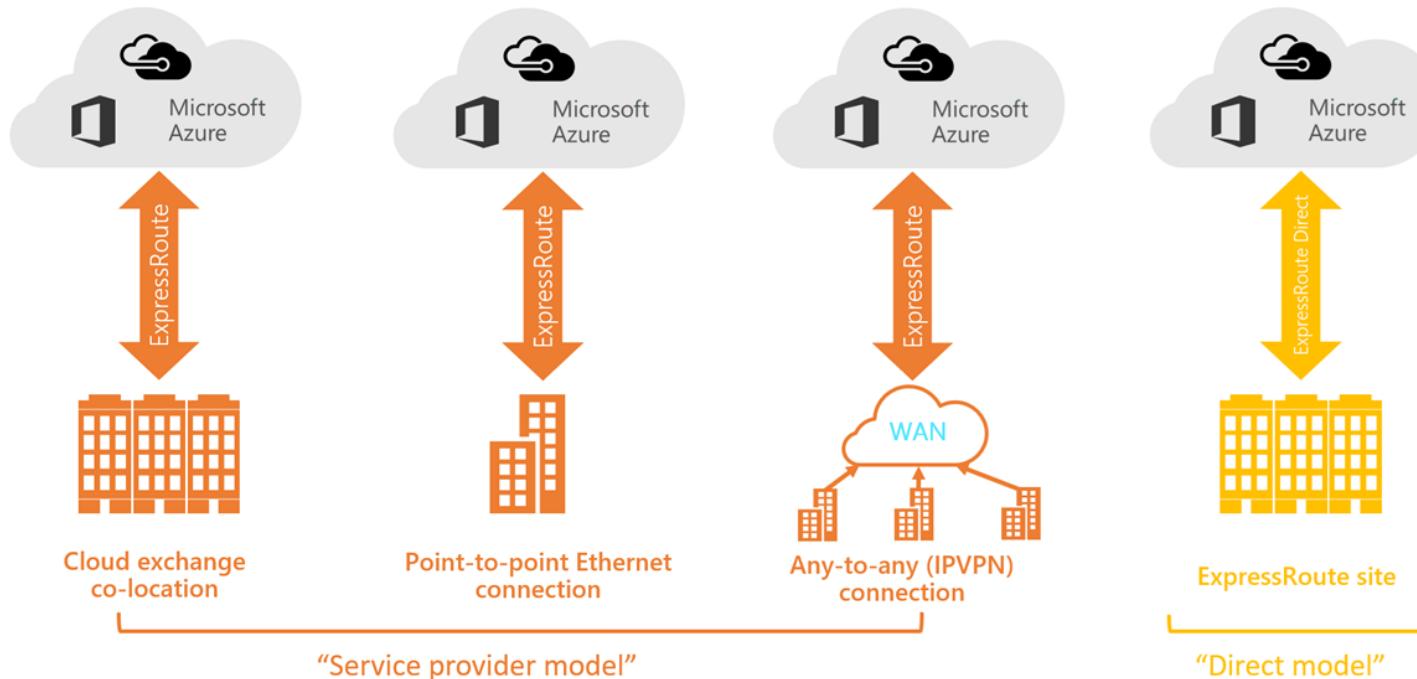
# Azure Network Adapter



<https://learn.microsoft.com/en-us/azure/architecture/hybrid/azure-network-adapter>



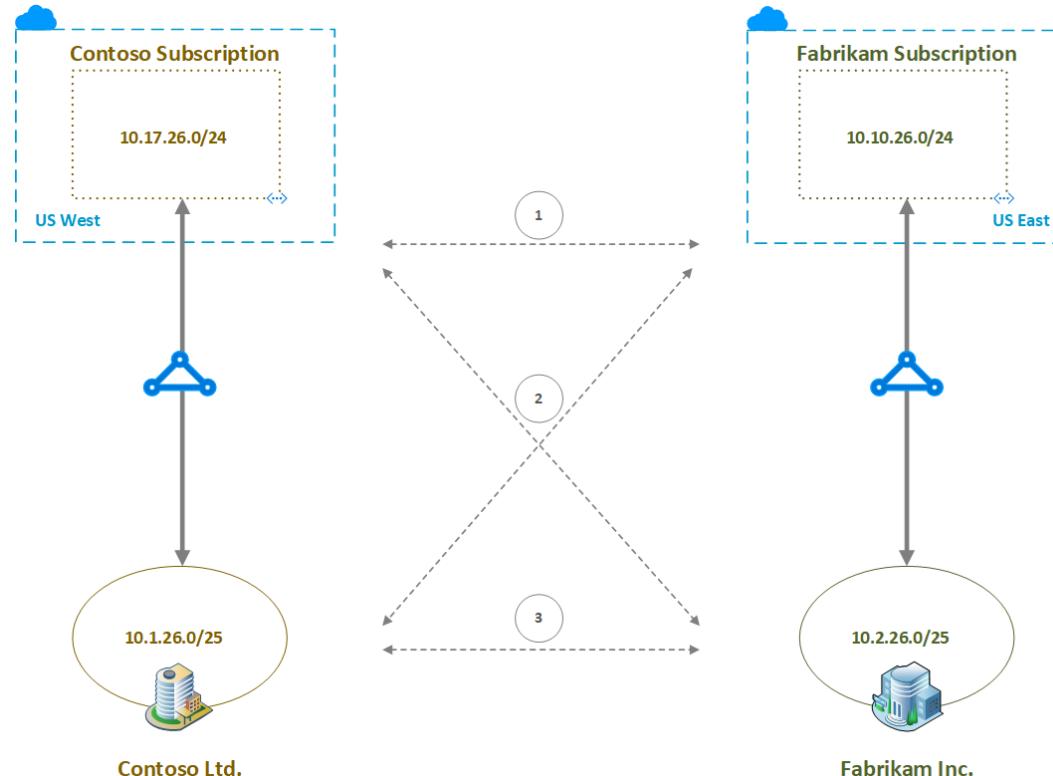
# Azure ExpressRoute Connectivity Models



<https://learn.microsoft.com/en-us/azure/expressroute/expressroute-connectivity-models>



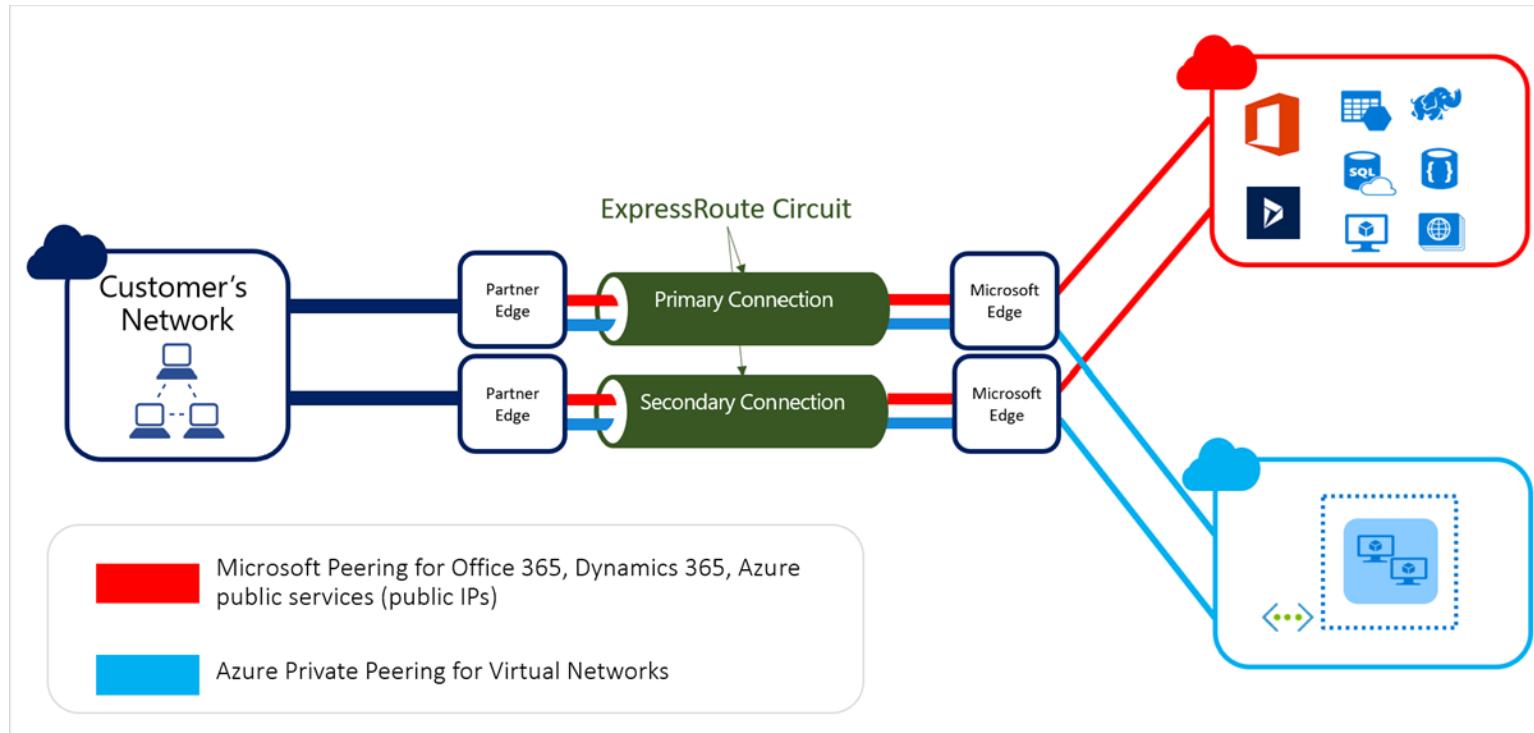
# Azure ExpressRoute Cross-network Connectivity



<https://learn.microsoft.com/en-us/azure/expressroute/cross-network-connectivity>



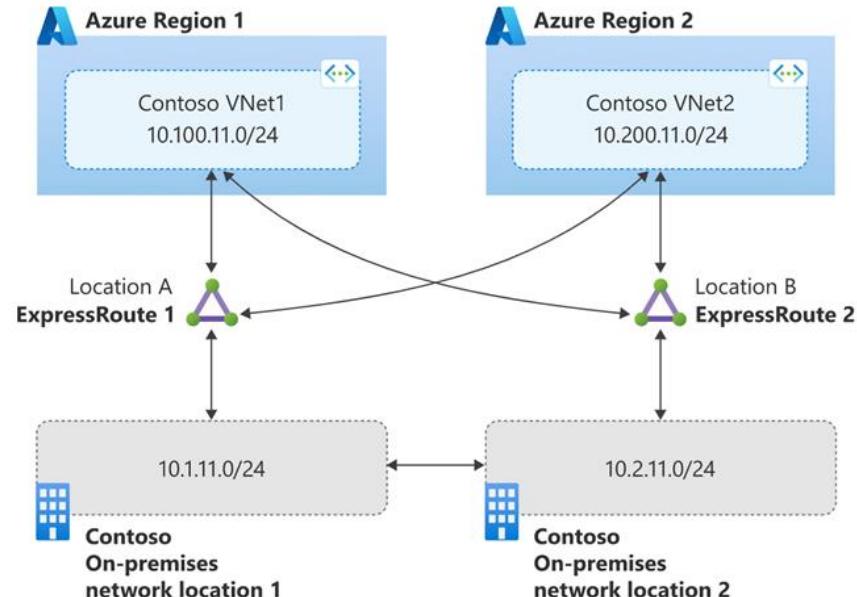
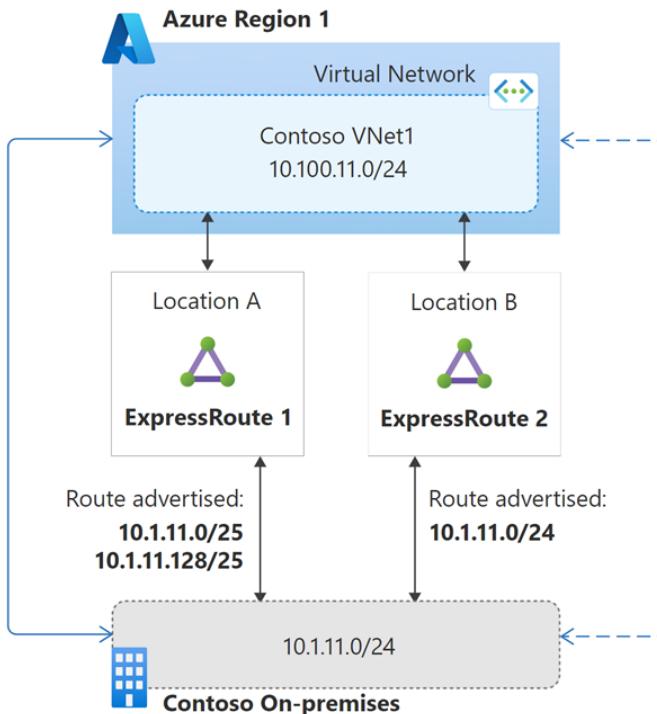
# Azure ExpressRoute High Availability



<https://learn.microsoft.com/en-us/azure/expressroute/designing-for-high-availability-with-expressroute>



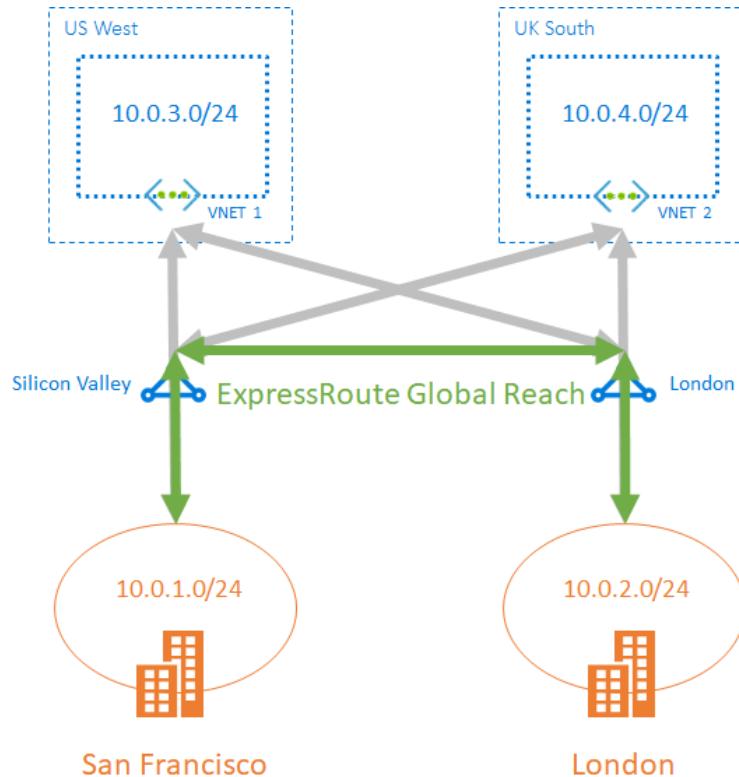
# Azure ExpressRoute Disaster Recovery



<https://learn.microsoft.com/en-us/azure/expressroute/designing-for-disaster-recovery-with-expressroute-privatepeering>



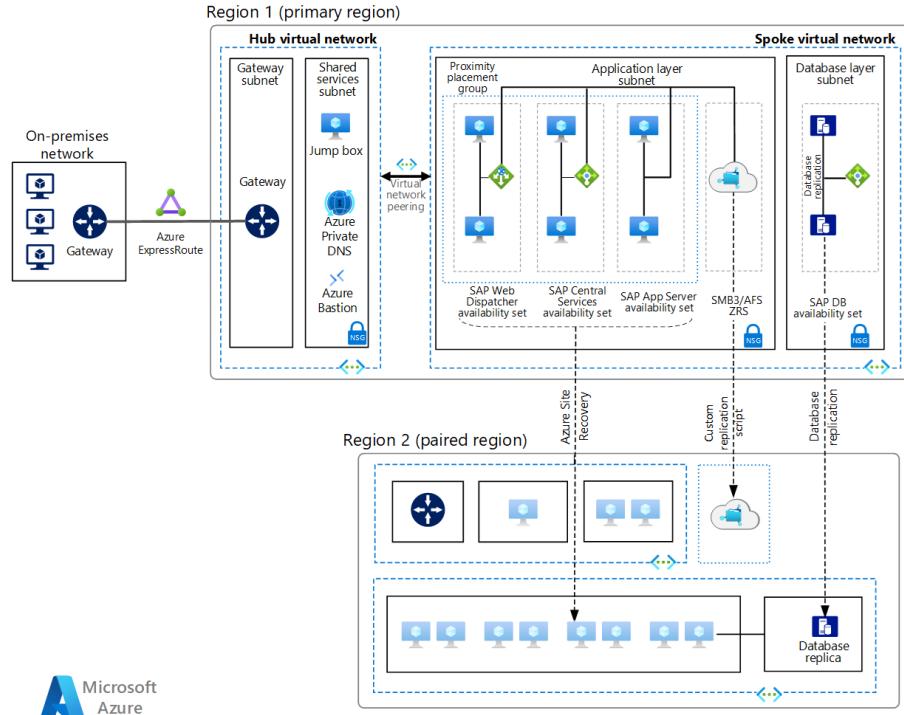
# Azure ExpressRoute Global Reach



<https://learn.microsoft.com/en-us/azure/expressroute/expressroute-global-reach>



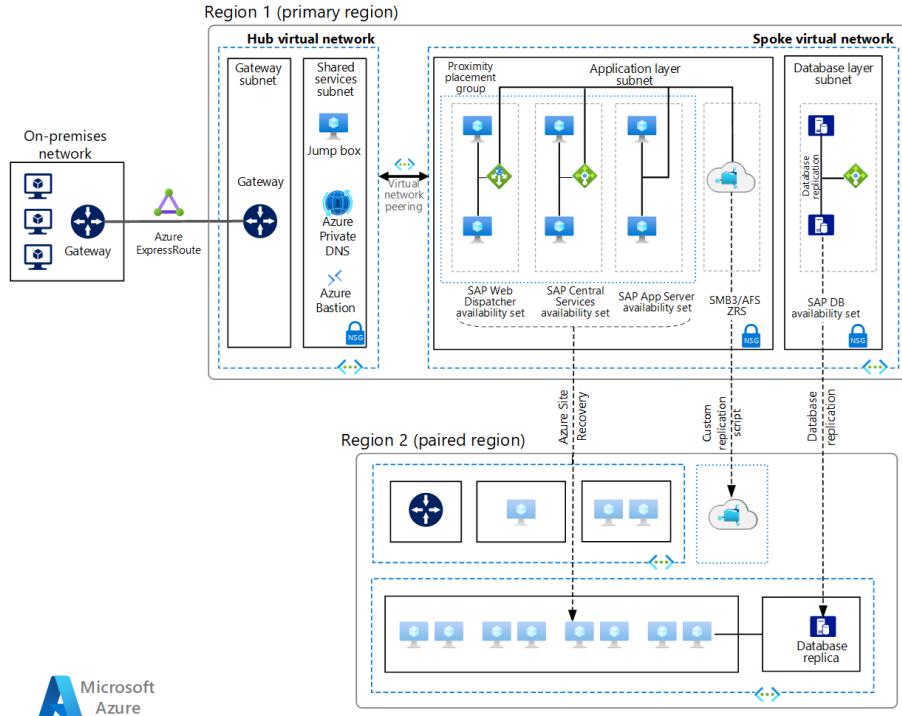
# Azure ExpressRoute FastPath



<https://learn.microsoft.com/en-us/azure/architecture/guide/sap/sap-netweaver>



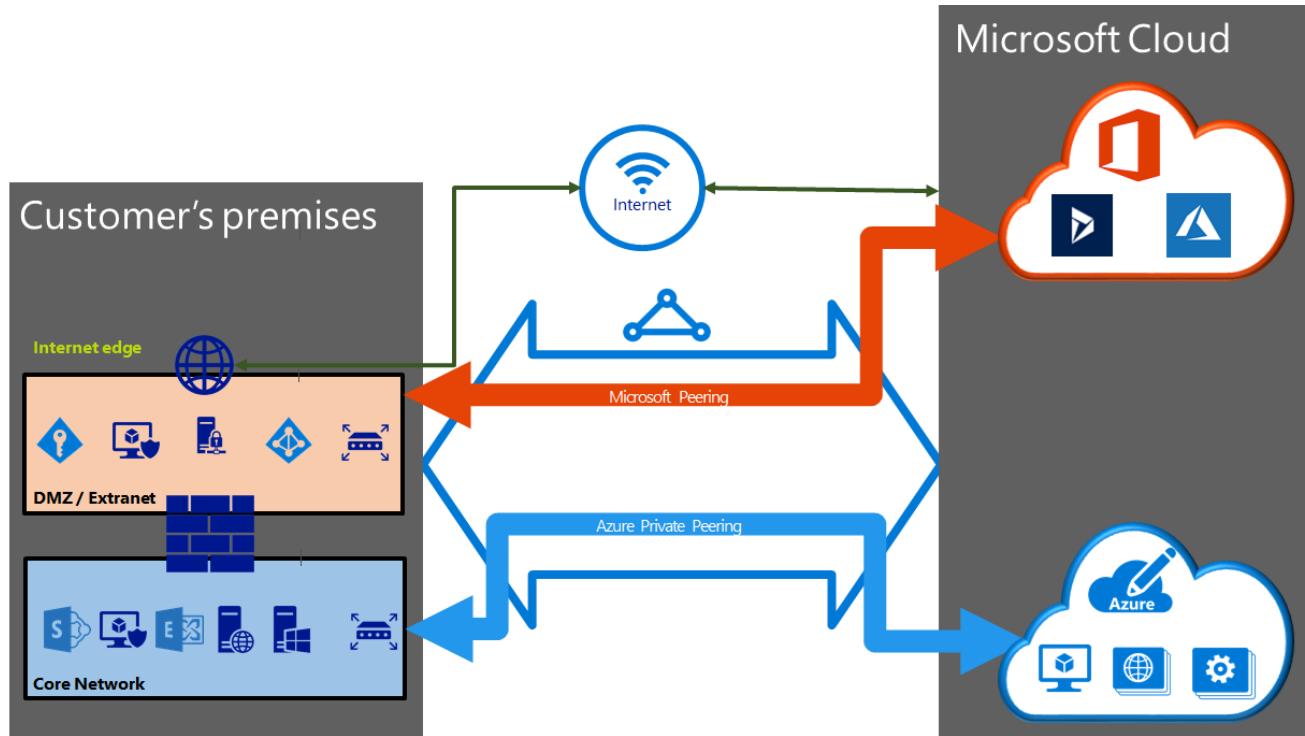
# Azure ExpressRoute FastPath



<https://learn.microsoft.com/en-us/azure/architecture/guide/sap/sap-netweaver>



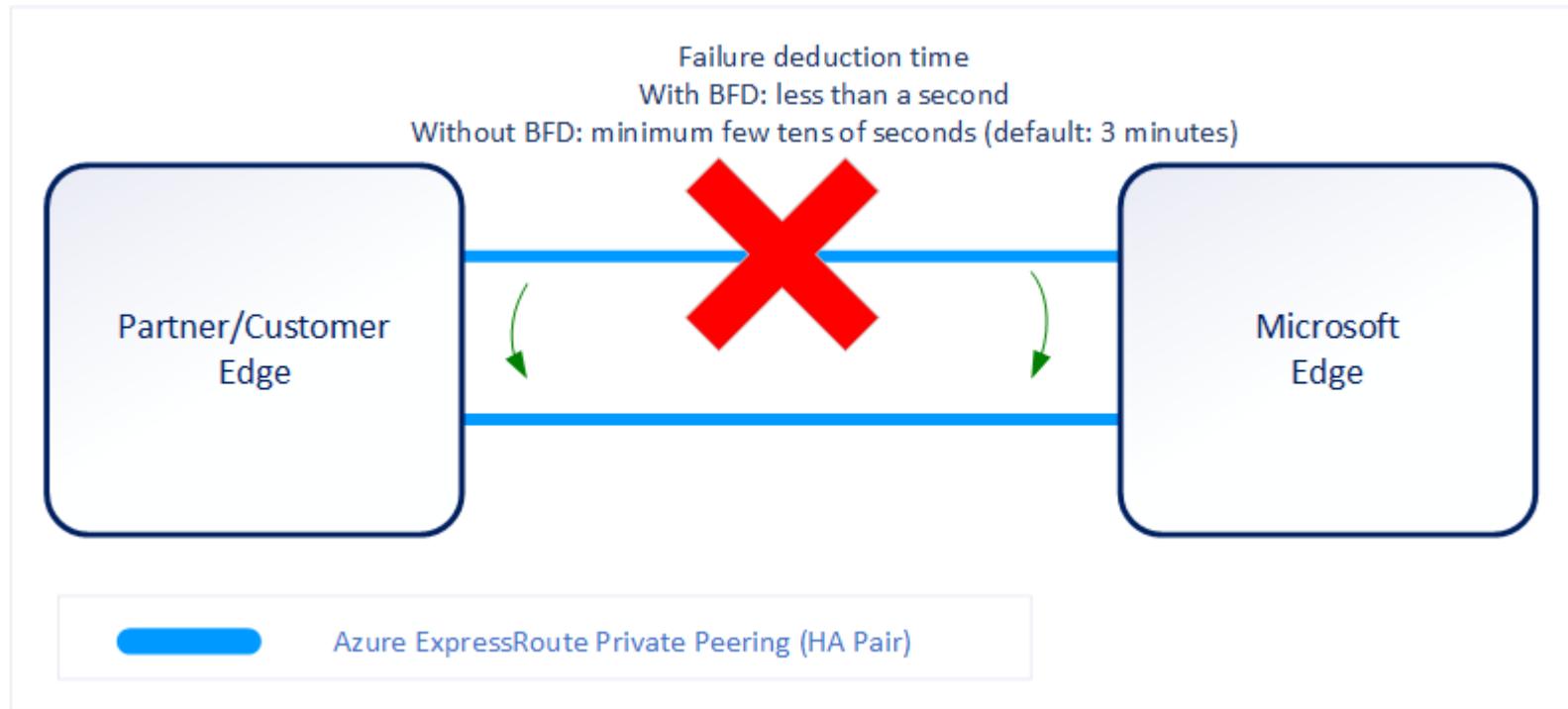
# ExpressRoute Peering (Private vs. Microsoft)



<https://learn.microsoft.com/en-us/azure/expressroute/expressroute-circuit-peerings>



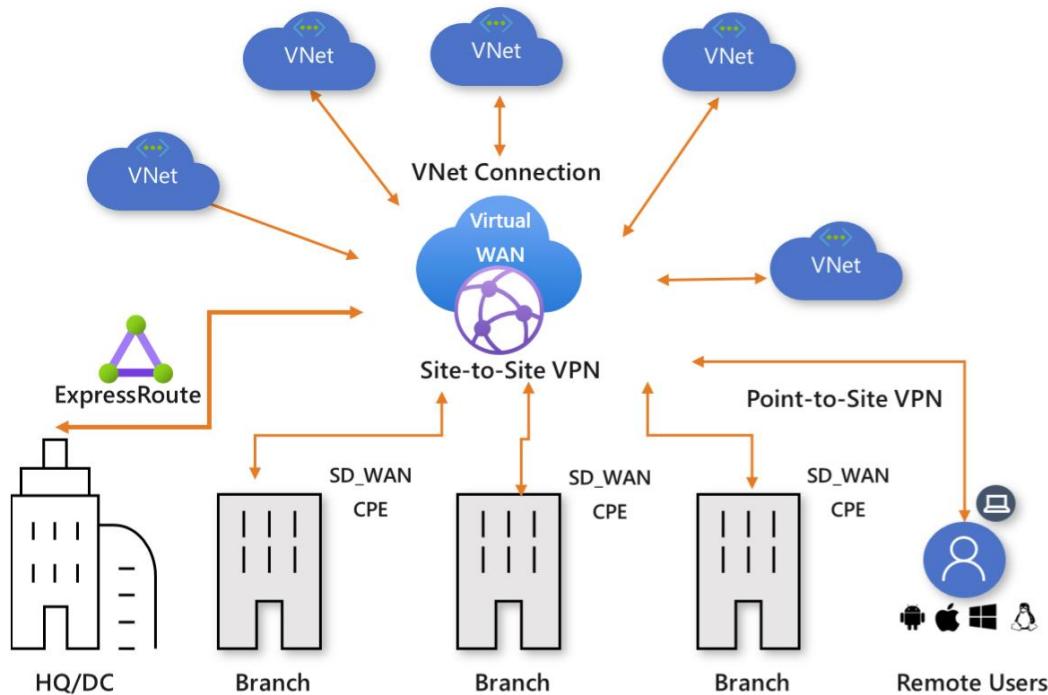
# BFD Over ExpressRoute



<https://learn.microsoft.com/en-us/azure/expressroute/expressroute-bfd>



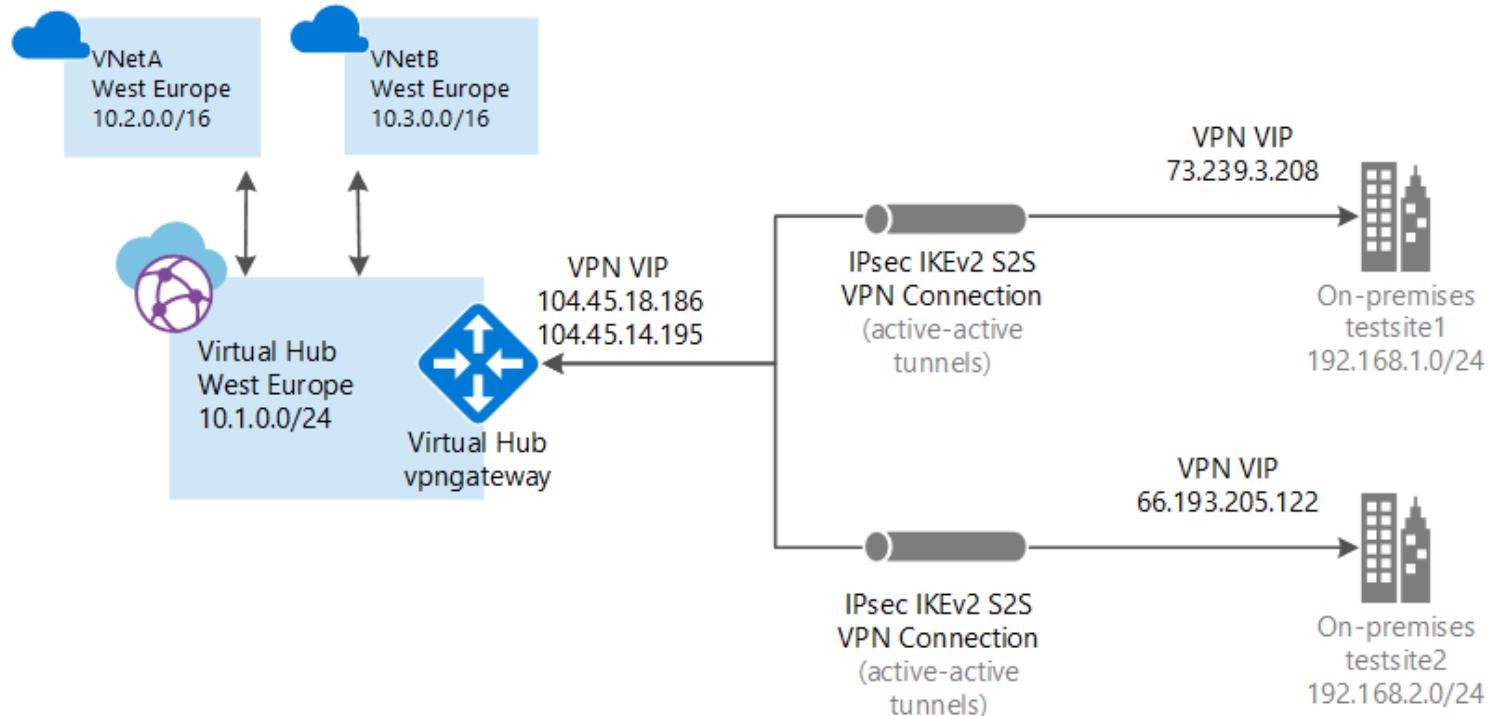
# Azure Virtual WAN



<https://learn.microsoft.com/en-us/azure/virtual-wan/virtual-wan-about>



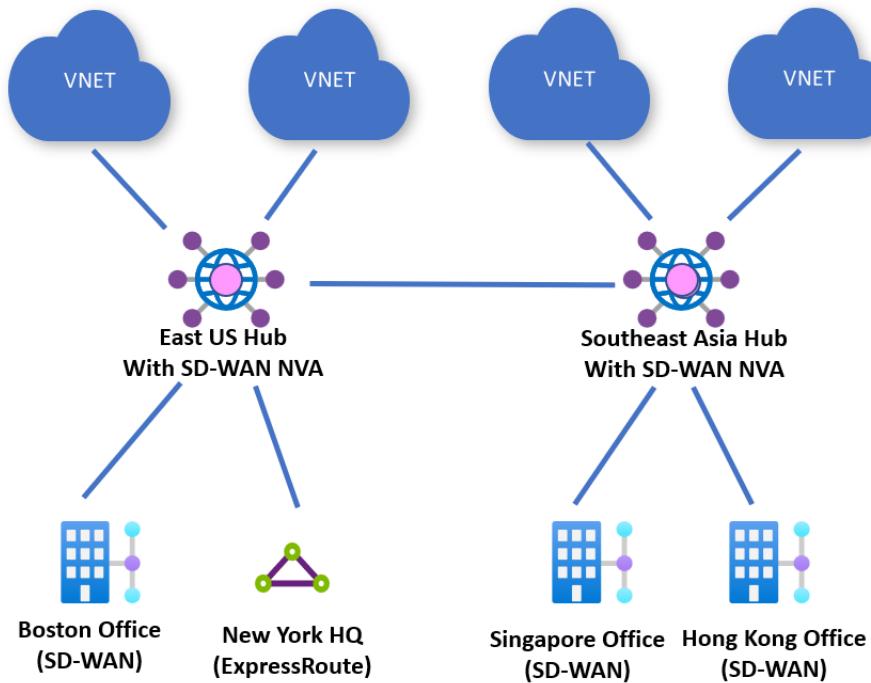
# Create a S2S connection using Azure Virtual WAN



<https://learn.microsoft.com/en-us/azure/virtual-wan/virtual-wan-site-to-site-portal>



# NVAs in a Virtual WAN Hub



<https://learn.microsoft.com/en-us/azure/virtual-wan/about-nva-hub>

# Design and implement application delivery services (20–25%)





# Design and implement application delivery services (20–25%)

- Design and implement an Azure Load Balancer
- Design and implement Azure Application Gateway
- Design and implement Azure Front Door
- Design and implement Azure Traffic Manager





# Design and implement an Azure Load Balancer

- Map requirements to features and capabilities of [Azure Load Balancer](#)
- Identify [appropriate use cases](#) for Azure Load Balancer
- Choose an Azure Load [Balancer SKU](#) and tier
- [Choose between public and internal Azure Load Balancer](#)
- [Create and configure an Azure Load Balancer](#) [see also [1](#)]
- [Implement a load balancing rule](#)
- [Create and configure inbound NAT rules](#)
- Create and [configure explicit outbound rules](#), [including SNAT](#)



# Design and implement Azure Application Gateway

- Map requirements to features and capabilities of Azure Application Gateway
- Identify appropriate use cases for Azure Application Gateway
- Create a back-end pool [also see [1](#)]
- Configure health probes
- Configure listeners
- Configure routing rules
- Configure HTTP settings
- Configure Transport Layer Security (TLS)
- Configure rewrite sets



# Design and implement Azure Front Door

- Map requirements to features and capabilities of Azure Front Door
- Identify appropriate use cases for Azure Front Door
- Choose an appropriate tier
- Configure an Azure Front Door, including routing, origins, and endpoints
- Configure SSL termination and end-to-end SSL encryption
- Configure caching
- Configure traffic acceleration
- Implement rules, URL rewrite, and URL redirect
- Secure an origin by using Azure Private Link in Azure Front Door



# Design and implement Azure Traffic Manager

- Identify appropriate use cases for Azure Traffic Manager
- Configure a routing method
- Configure endpoints



# Load-balancing Options

Service	Global/regional	Recommended traffic
Azure Front Door	Global	HTTP(S)
Traffic Manager	Global	non-HTTP(S)
Application Gateway	Regional	HTTP(S)
Azure Load Balancer	Regional	non-HTTP(S)

<https://learn.microsoft.com/en-us/azure/architecture/guide/technology-choices/load-balancing-overview>



# Load-balancing Options

Load balancing

Search (Ctrl+ /) Give feedback

Overview Help me choose Service comparison Tutorial

Load Balancing Services

- Application Gateway
- Front Door
- Load Balancer
- Traffic Manager

Does your application require Layer 7 load balancing capability?

Yes No

**Application Gateway**

- Internal and public configurations
- Regional layer 7 load balancer
- SSL/TLS offloading

[Create](#) [Show more](#)

**Front Door**

- Global layer 7 load balancer
- Site acceleration
- SSL/TLS offloading

[Create](#) [Show more](#)

**Load Balancer**

- Layer 4 load balancing
- Internal and public configurations
- High availability across zones

[Create](#) [Show more](#)

**Traffic Manager**

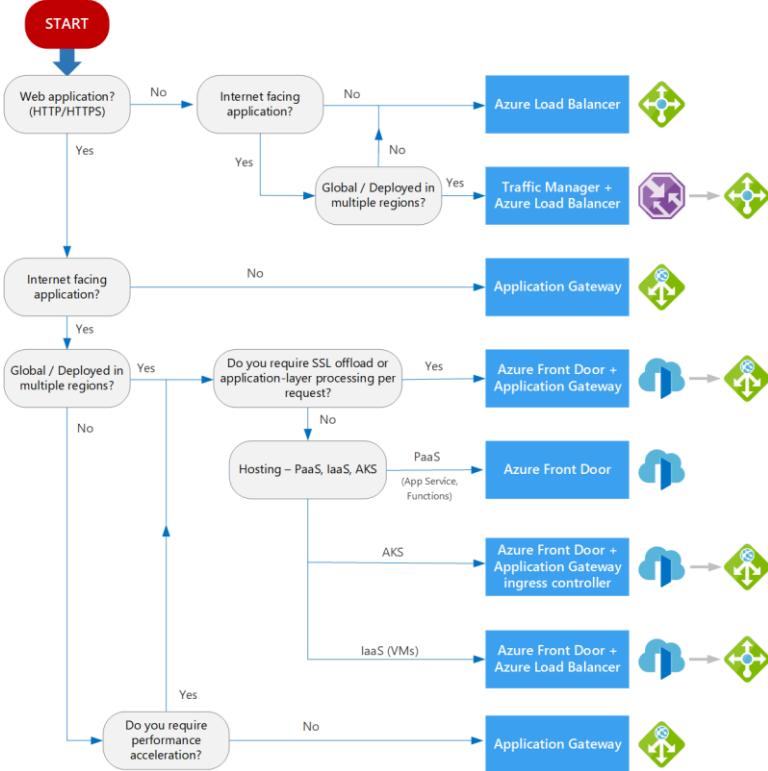
- DNS-based traffic load balancer
- Global across Azure regions
- High availability

[Create](#) [Show more](#)

<https://learn.microsoft.com/en-us/azure/architecture/guide/technology-choices/load-balancing-overview>



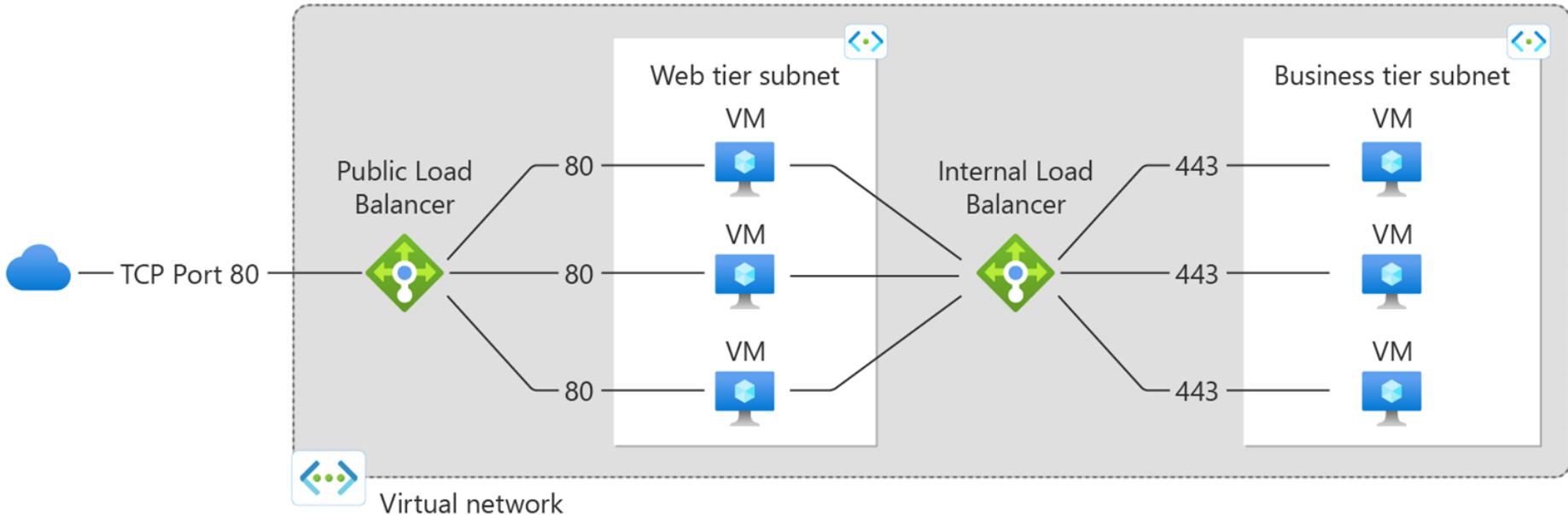
# Load-balancing Options



<https://learn.microsoft.com/en-us/azure/architecture/guide/technology-choices/load-balancing-overview#decision-tree-for-load-balancing-in-azure>



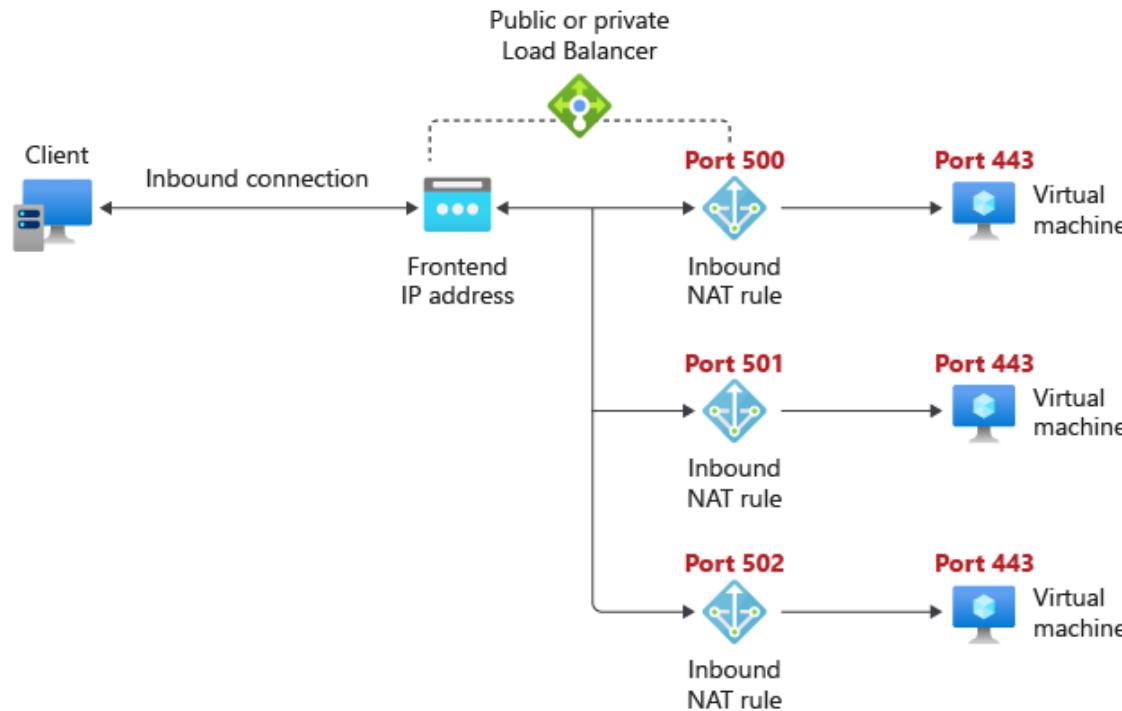
# Azure Load Balancer



<https://learn.microsoft.com/en-us/azure/load-balancer/load-balancer-overview>



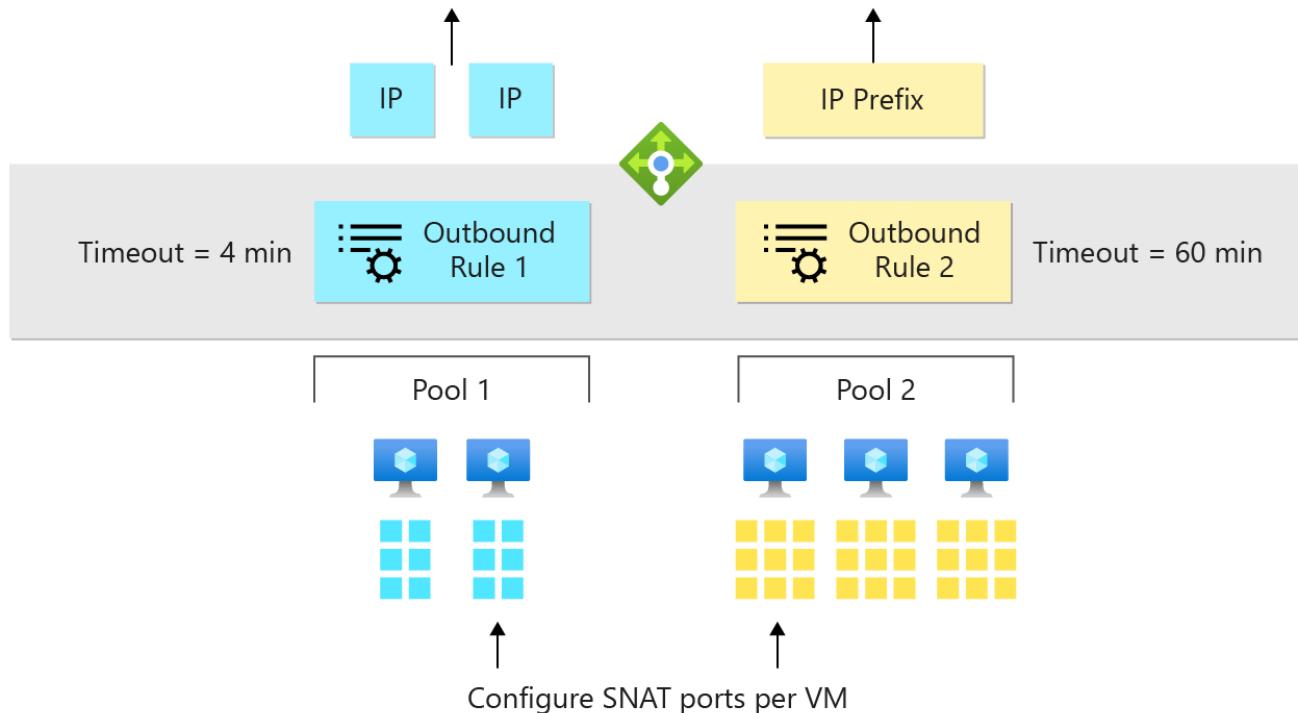
# Azure Load Balancer Inbound NAT Rules



<https://learn.microsoft.com/en-us/azure/load-balancer/inbound-nat-rules>



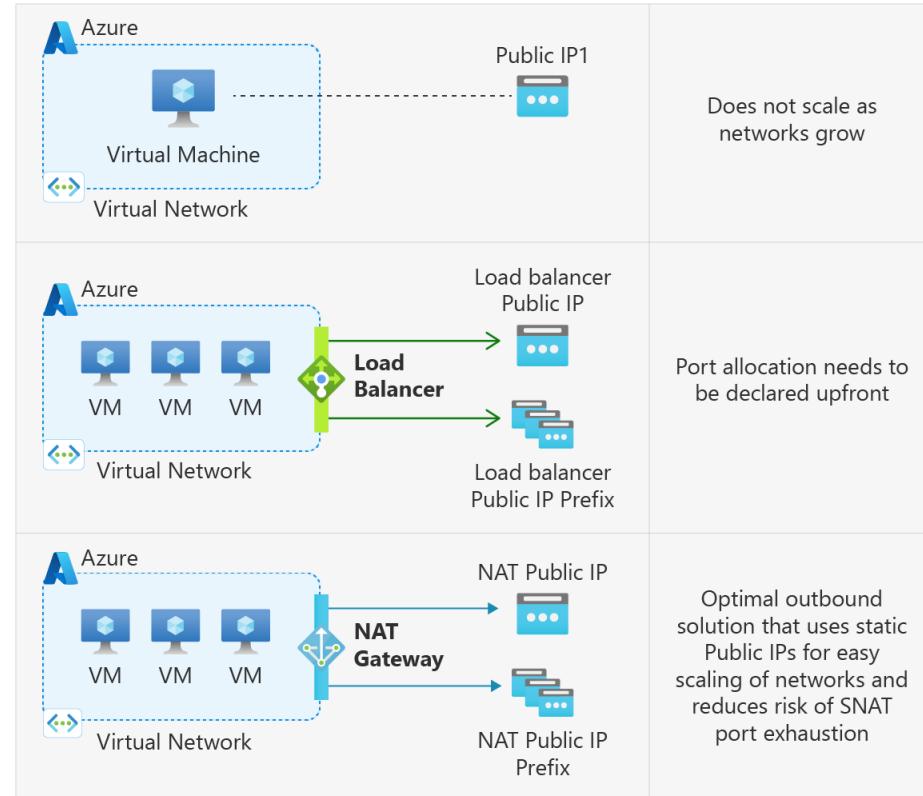
# Azure Load Balancer Outbound Rules



<https://learn.microsoft.com/en-us/azure/load-balancer/outbound-rules>



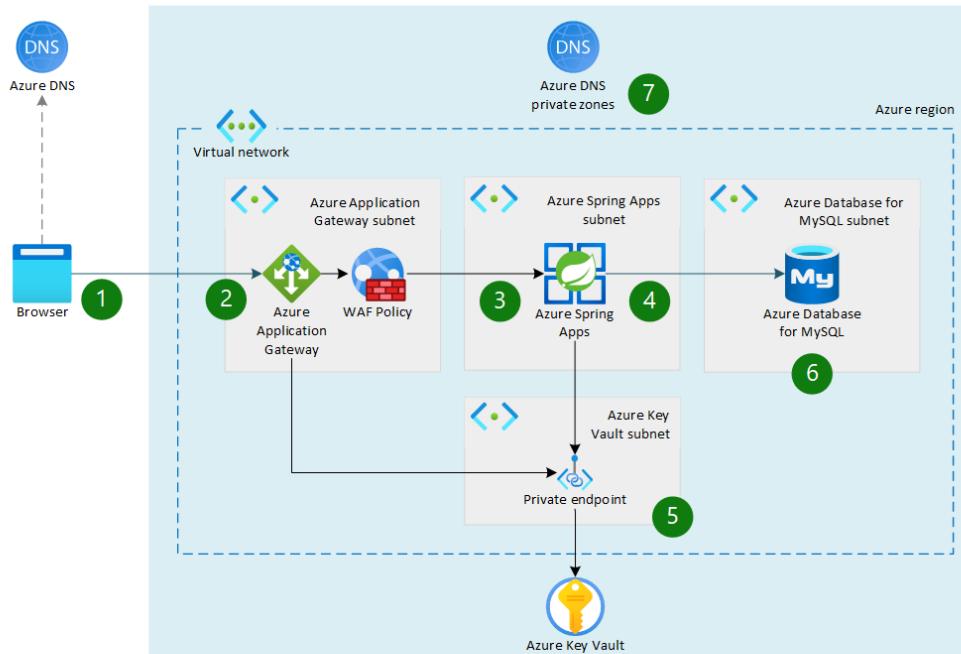
# Azure Load Balancer Source Network Address Translation (SNAT)



<https://learn.microsoft.com/en-us/azure/load-balancer/load-balancer-outbound-connections>



# Azure Application Gateway



<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/microservices/spring-apps-multi-zone>



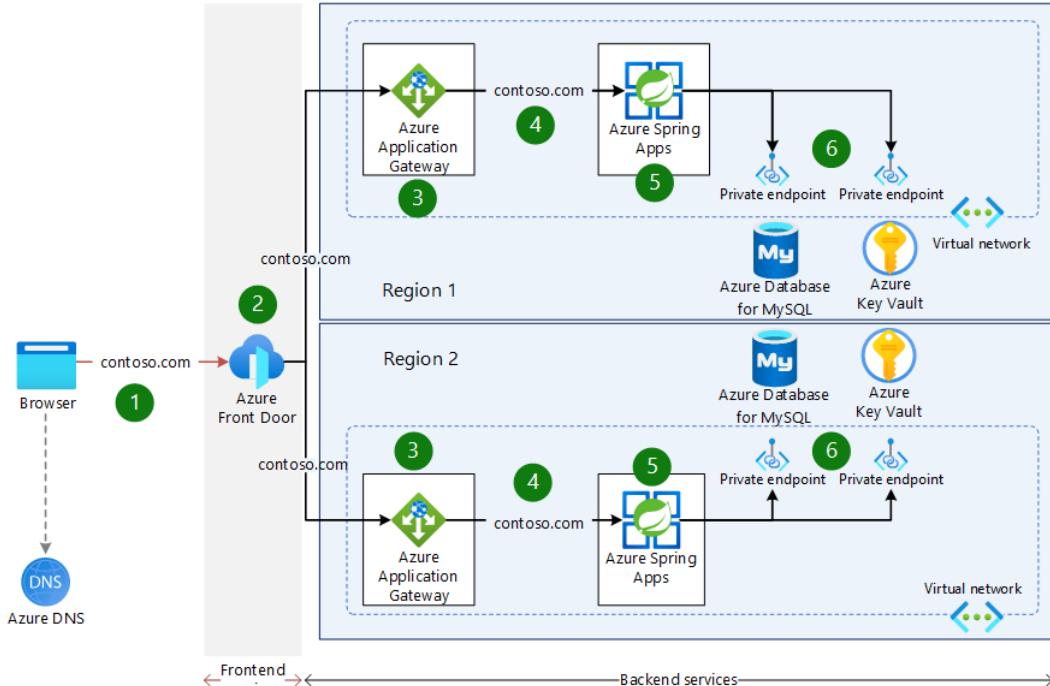
# Configuring Azure Application Gateway

- Create a back-end pool
- Configure health probes
- Configure listeners
- Configure routing rules
- Configure HTTP settings
- Configure Transport Layer Security (TLS)
- Configure rewrite sets

<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/microservices/spring-apps-multi-zone>



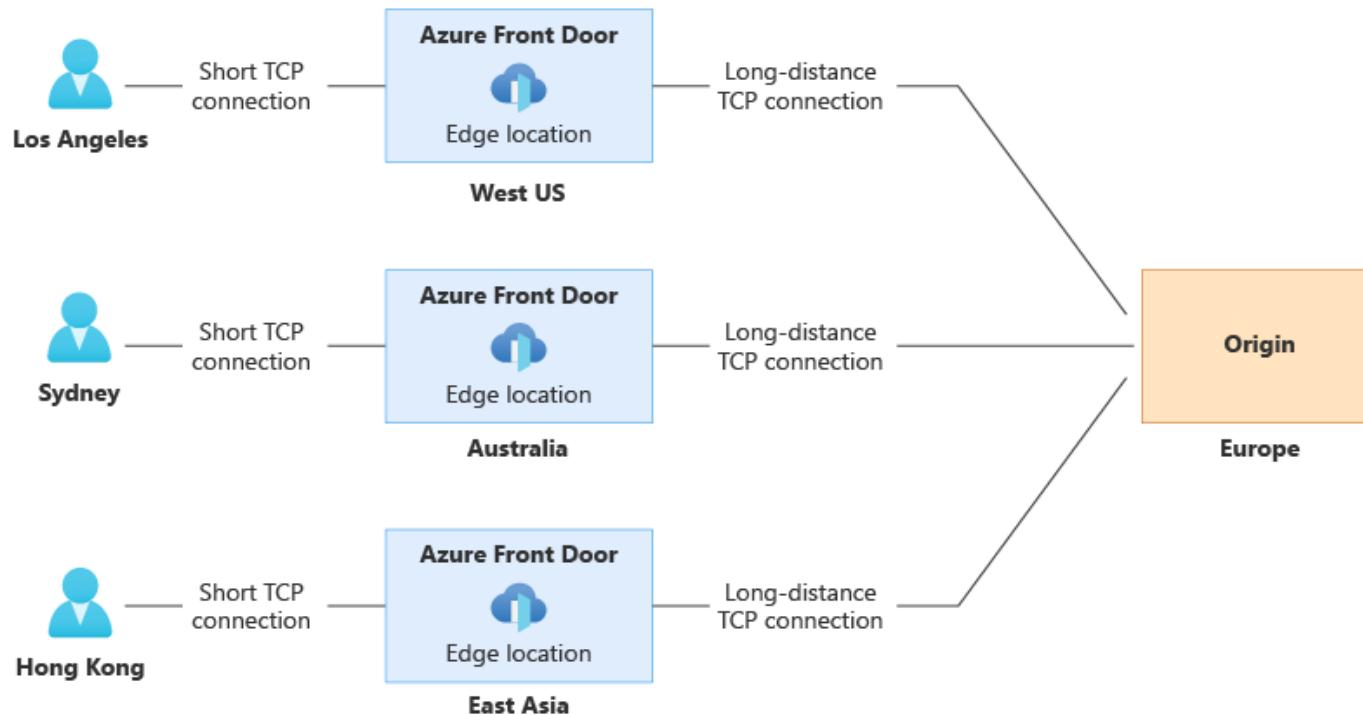
# Azure Front Door



<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/microservices/spring-apps-multi-region>



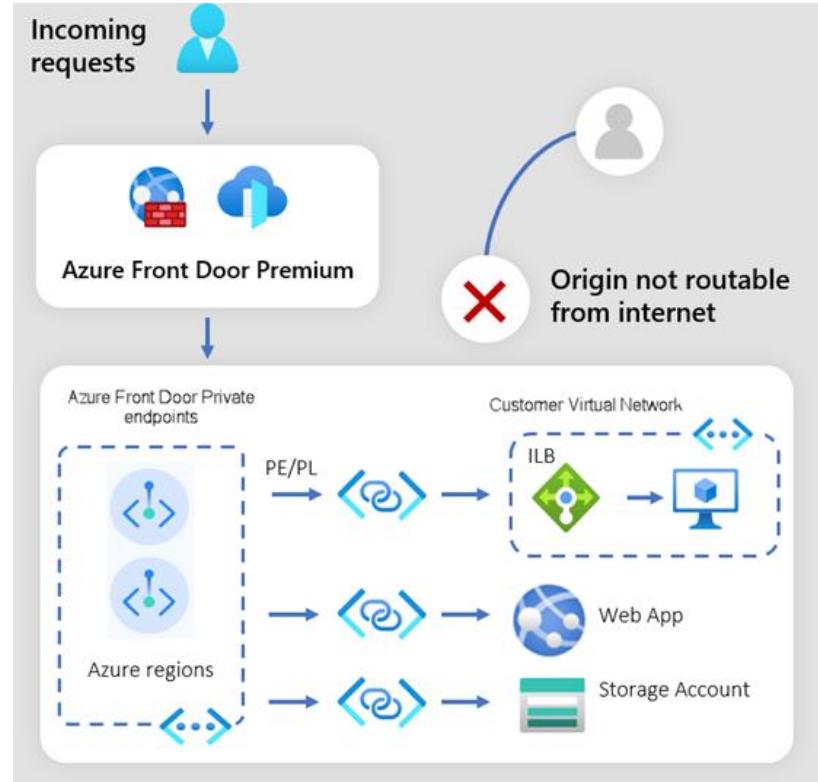
# Azure Front Door Traffic Acceleration



<https://learn.microsoft.com/en-us/azure/frontdoor/front-door-traffic-acceleration?pivots=front-door-standard-premium>



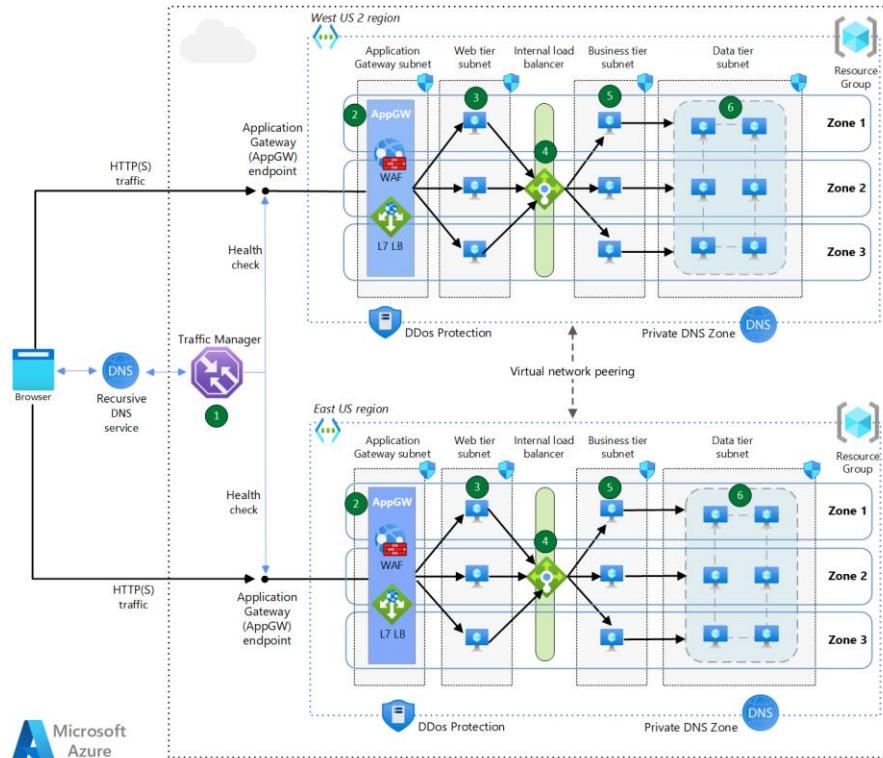
# Private Link in Azure Front Door Premium



<https://learn.microsoft.com/en-us/azure/frontdoor/private-link>



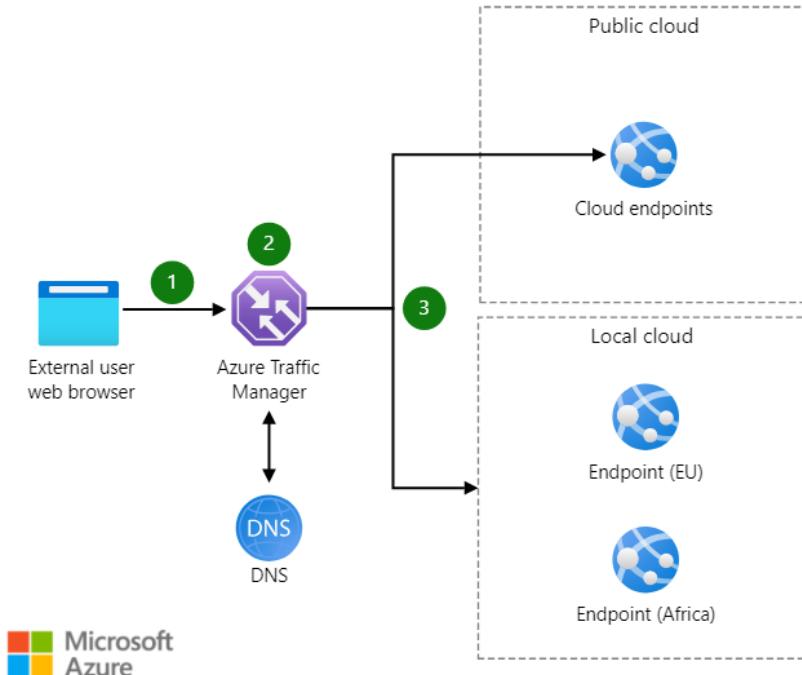
# Azure Traffic Manager



<https://learn.microsoft.com/en-us/azure/architecture/high-availability/reference-architecture-traffic-manager-application-gateway>



# Azure Traffic Manager



<https://learn.microsoft.com/en-us/azure/architecture/example-scenario/hybrid/hybrid-geo-distributed>



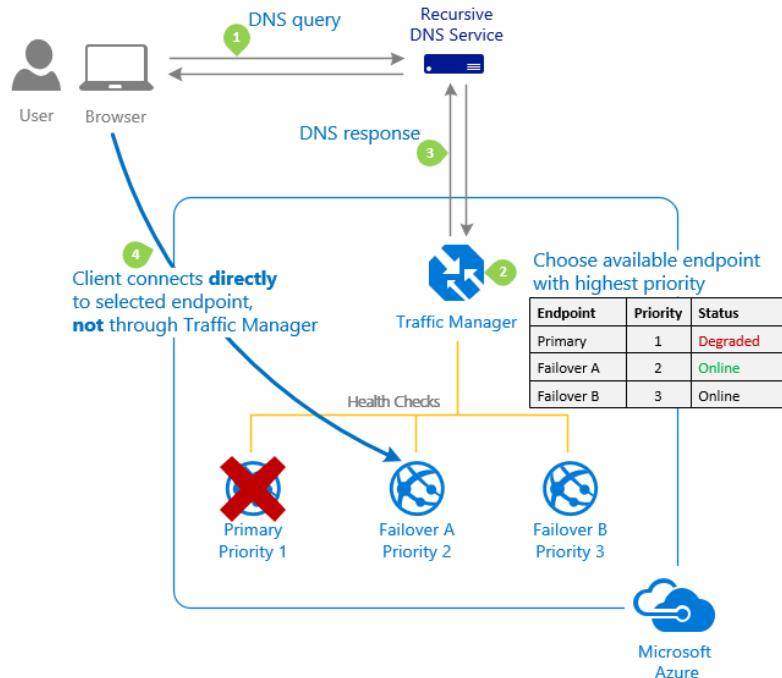
# Azure Traffic Manager Routing Methods

- Priority traffic-routing method
- Weighted traffic-routing method
- Performance traffic-routing method
- Geographic traffic-routing method

<https://learn.microsoft.com/en-us/azure/traffic-manager/traffic-manager-routing-methods>



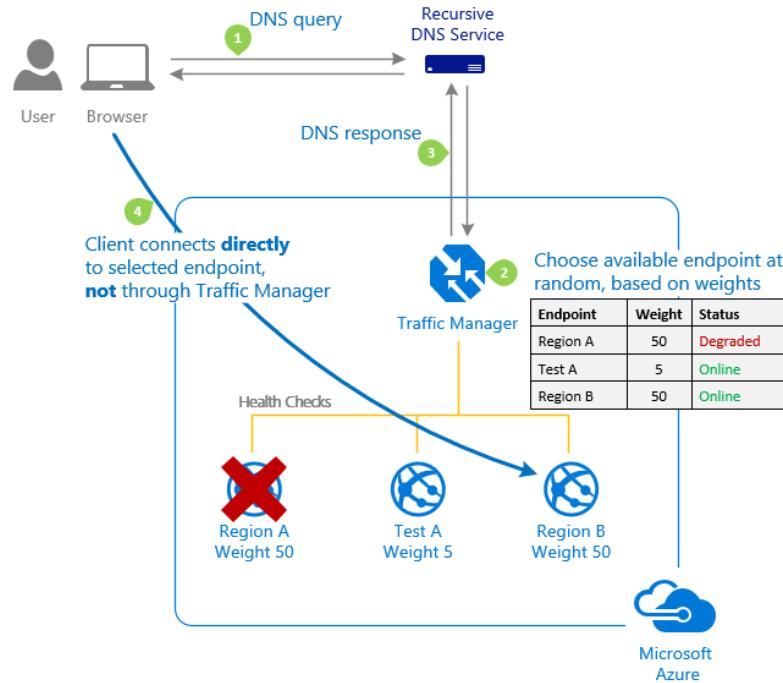
# Azure Traffic Manager Routing Methods: Priority Traffic



<https://learn.microsoft.com/en-us/azure/traffic-manager/traffic-manager-routing-methods>



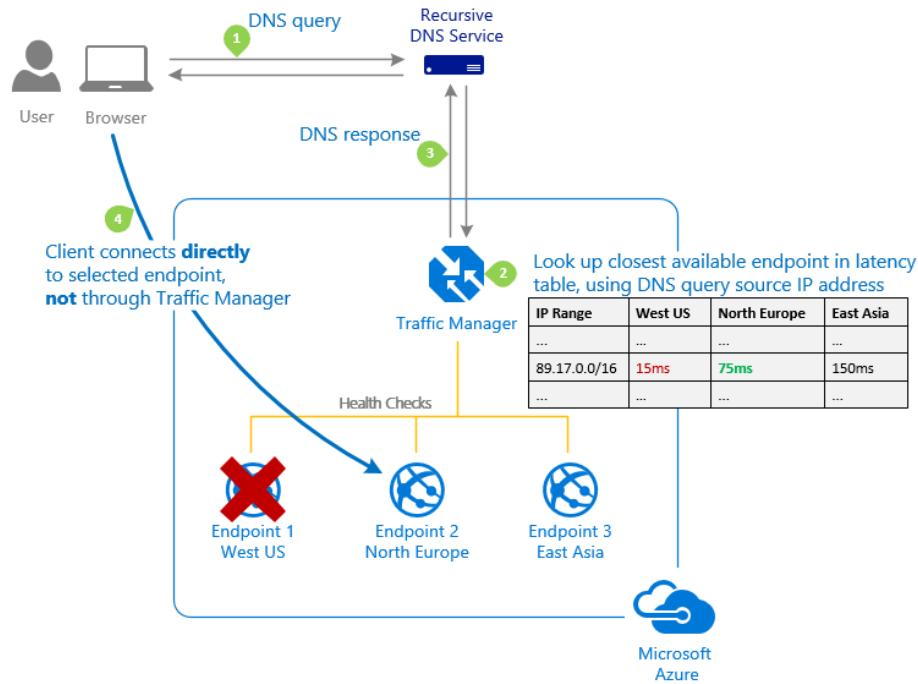
# Azure Traffic Manager Routing Methods: Weighted



<https://learn.microsoft.com/en-us/azure/traffic-manager/traffic-manager-routing-methods>



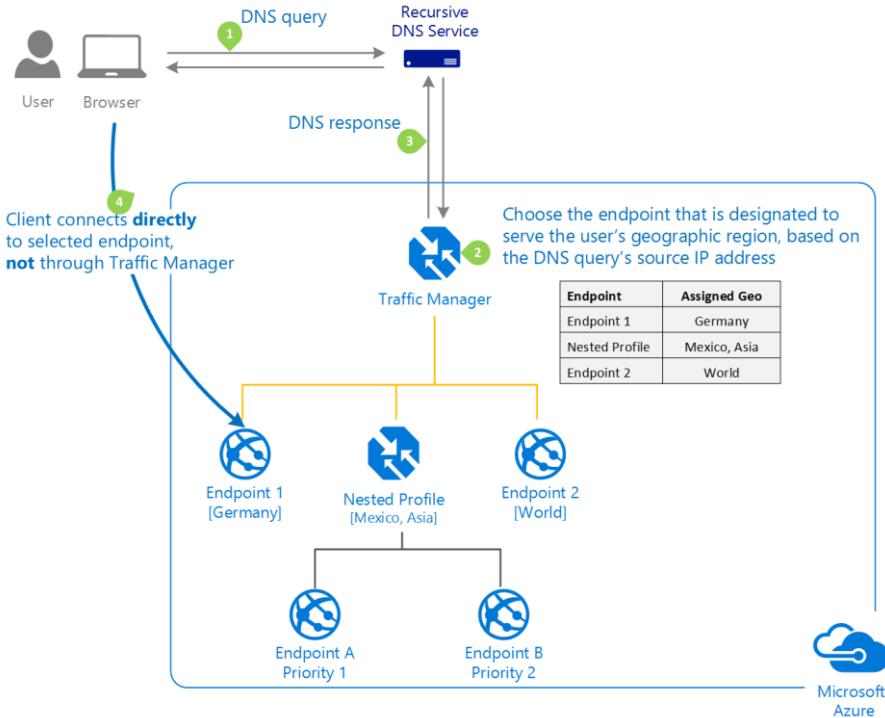
# Azure Traffic Manager Routing Methods: Performance



<https://learn.microsoft.com/en-us/azure/traffic-manager/traffic-manager-routing-methods>



# Azure Traffic Manager Routing Methods: Geographic



<https://learn.microsoft.com/en-us/azure/traffic-manager/traffic-manager-routing-methods>



# Design and implement private access to Azure services (5-10%)





# Design and implement private access to Azure services (5–10%)

- Design and implement Azure Private Link service and Azure private endpoints
- Design and implement service endpoints





# Design and implement Azure Private Link service and Azure private endpoints

- [Plan an Azure Private Link service](#)
- [Create a Private Link service](#)
- [Integrate a Private Link service with DNS](#)
- Plan private endpoints [see [1](#) [2](#)]
- [Create private endpoints](#)
- [Configure access to Azure resources by using private endpoints](#)
- [Connect on-premises clients to a private endpoint](#)
- [Integrate a private endpoint with DNS](#)

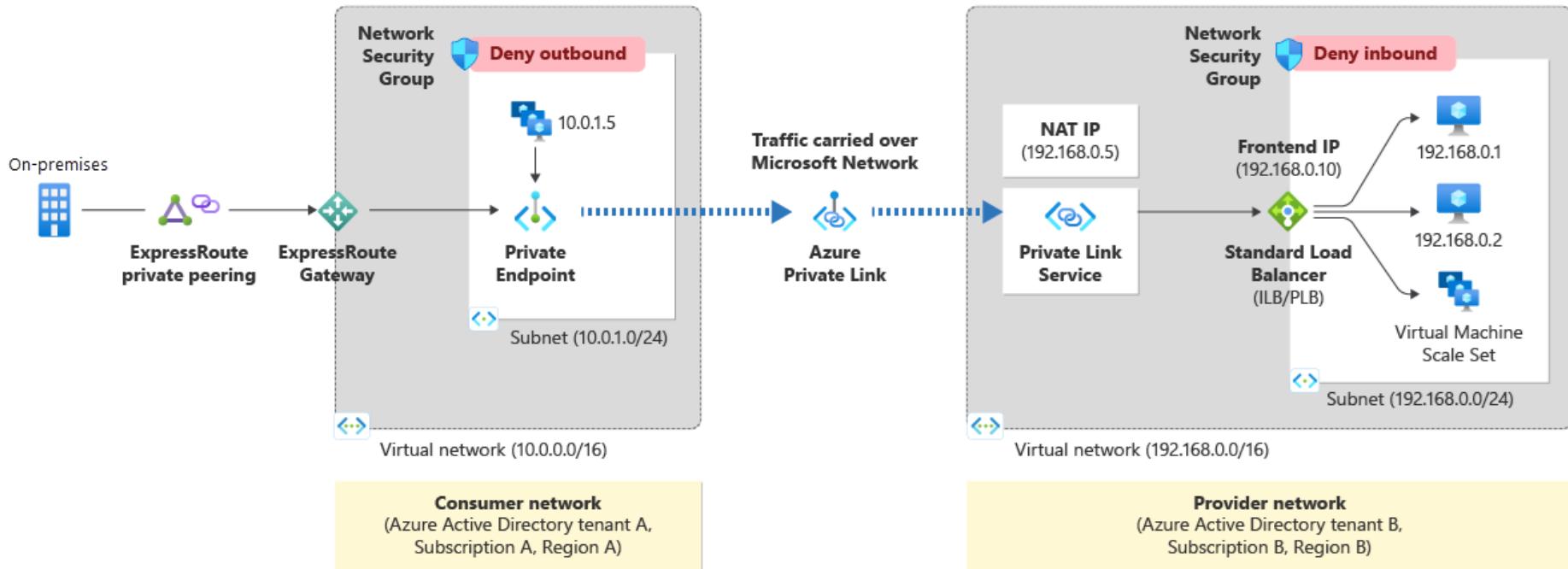


# Design and implement service endpoints

- Choose when to use a [service endpoint](#)
- Create service endpoints [also see [1](#)]
- Configure service endpoint policies
- Configure access to service endpoints



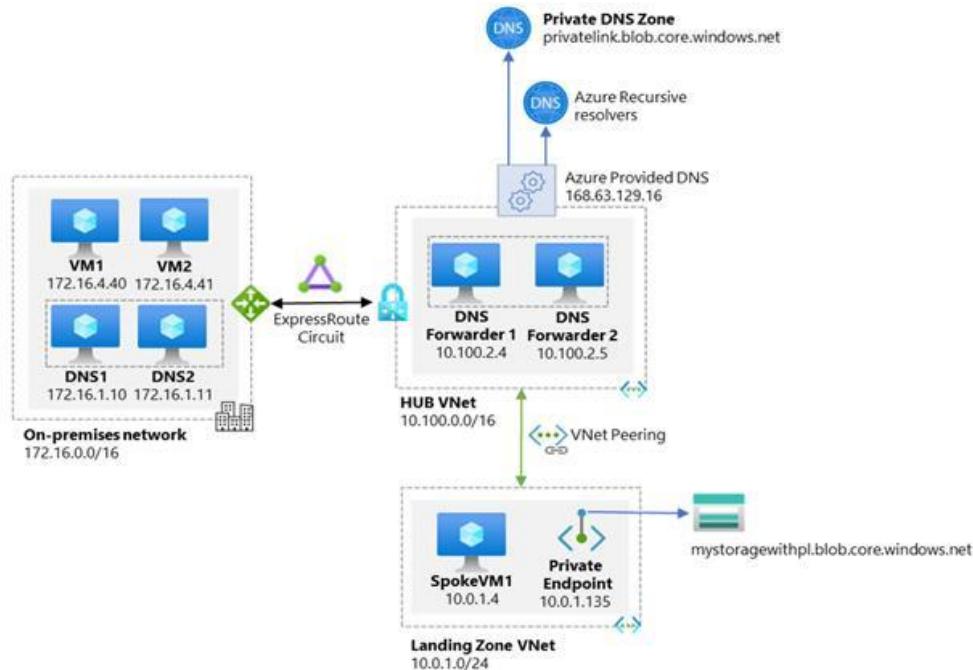
# Azure Private Link



<https://learn.microsoft.com/en-us/azure/private-link/private-link-service-overview>



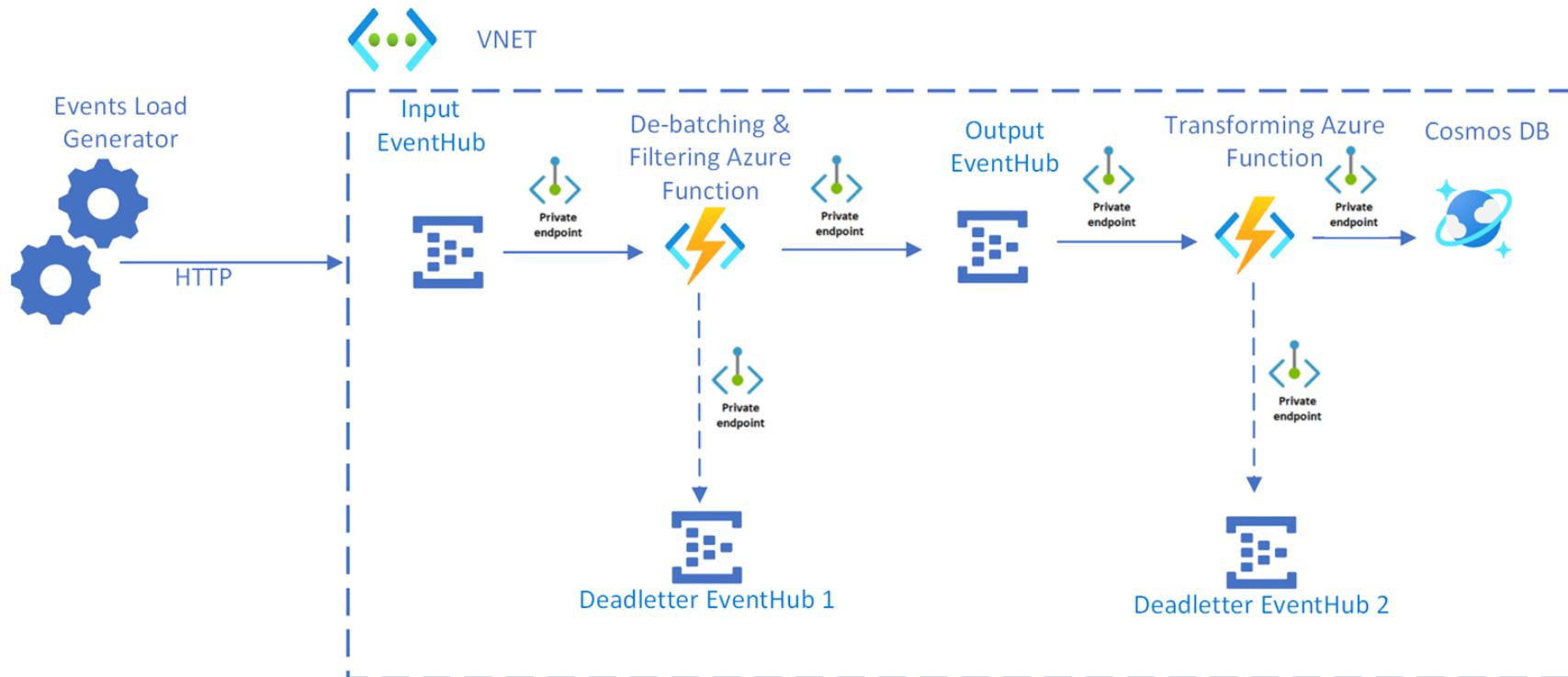
# Azure Private Link and DNS Integration



<https://learn.microsoft.com/en-us/azure/cloud-adoption-framework/ready/azure-best-practices/private-link-and-dns-integration-at-scale>



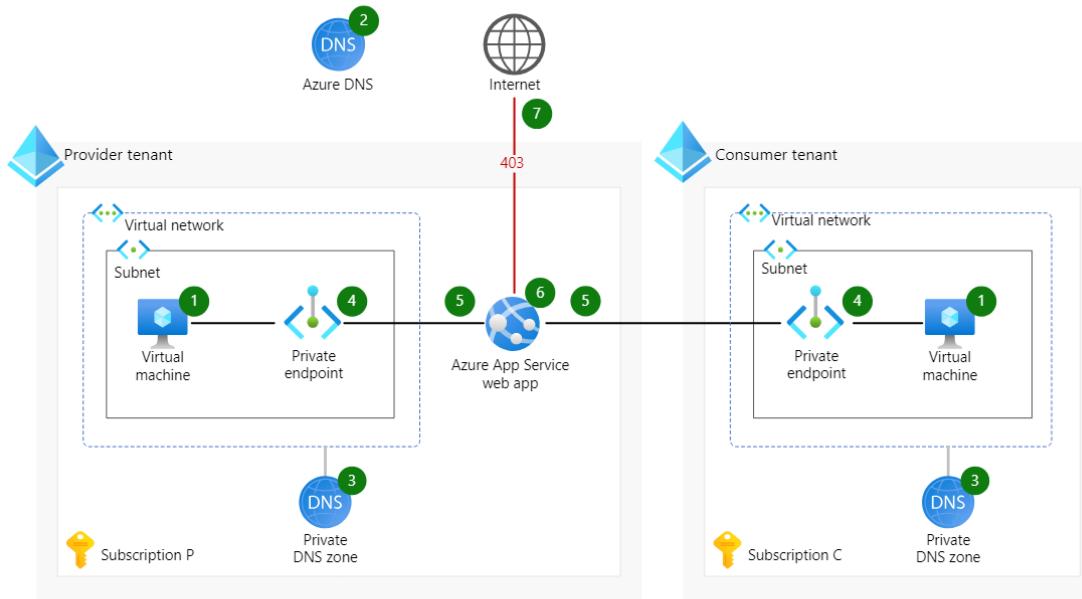
# Azure Private Endpoint



<https://learn.microsoft.com/en-us/azure/architecture/solution-ideas/articles/serverless-event-processing-private-link>



# Azure Private Endpoint



<https://learn.microsoft.com/en-us/azure/architecture/guide/networking/cross-tenant-secure-access-private-endpoints>



# Azure Private Endpoint Support

## Private-link resource

A private-link resource is the destination target of a specified private endpoint. The following table lists the available resources that support a private endpoint:

Private-link resource name	Resource type	Subresources
Azure App Configuration	Microsoft.Appconfiguration/configurationStores	configurationStores
Azure Automation	Microsoft.Automation/automationAccounts	Webhook, DSCAndHybridWorker
Azure Cosmos DB	Microsoft.AzureCosmosDB/databaseAccounts	SQL, MongoDB, Cassandra, Gremlin, Table
Azure Cosmos DB for PostgreSQL	Microsoft.DBforPostgreSQL/serverGroupsV2	coordinator
Azure Batch	Microsoft.Batch/batchAccounts	batchAccount, nodeManagement
Azure Cache for Redis	Microsoft.Cache/Redis	redisCache
Azure Cache for Redis Enterprise	Microsoft.Cache/redisEnterprise	redisEnterprise
Azure Cognitive Services	Microsoft.CognitiveServices/accounts	account

<https://learn.microsoft.com/en-us/azure/private-link/private-endpoint-overview#private-link-resource>



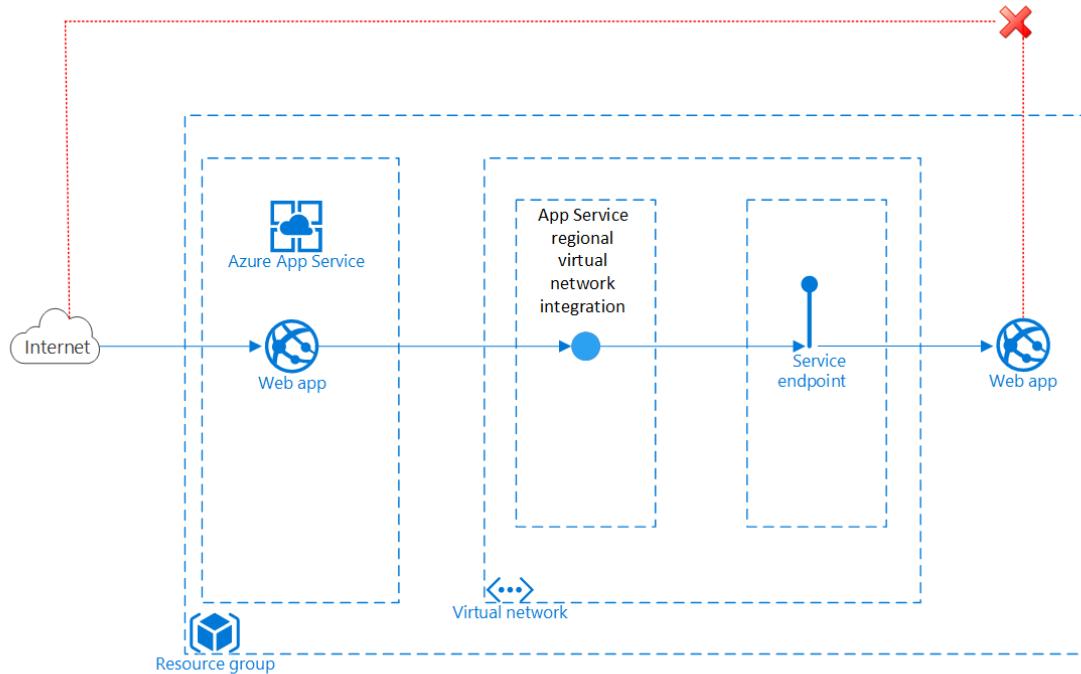
# Azure Virtual Network Service Endpoints

① Note

Microsoft recommends use of Azure Private Link for secure and private access to services hosted on Azure platform. For more information, see [Azure Private Link](#).



# Azure Virtual Network Service Endpoints





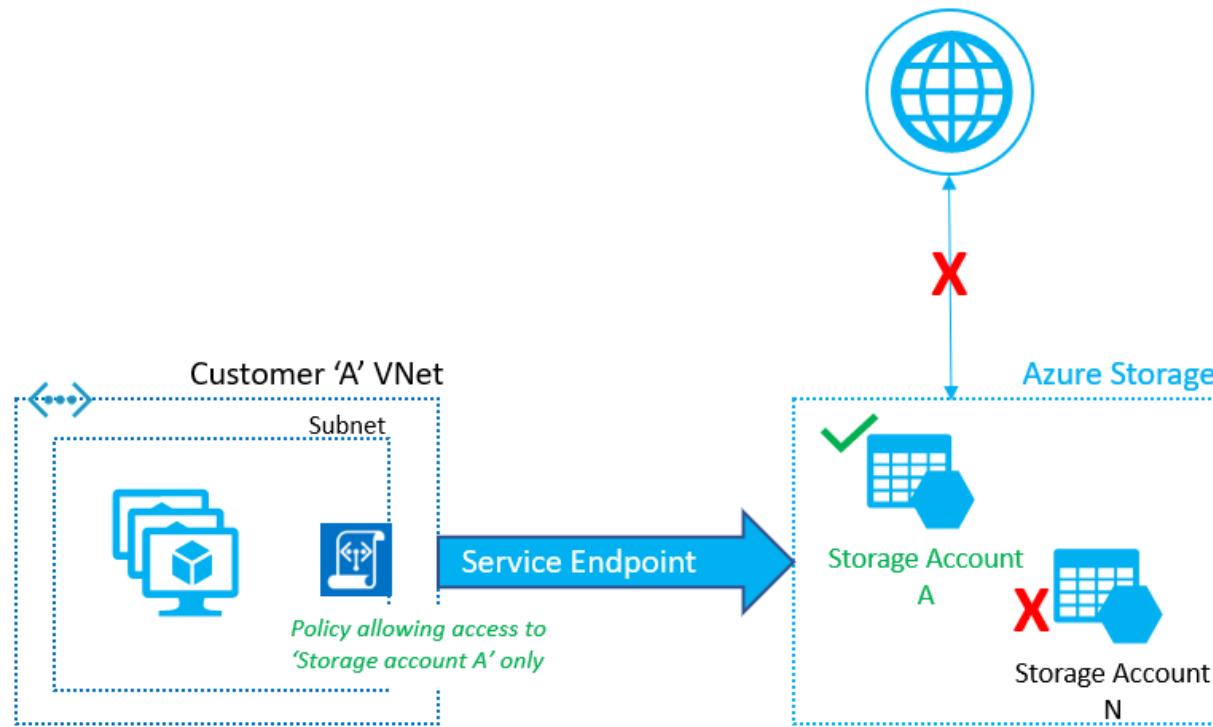
# Azure Virtual Network Service Endpoints

- Azure Storage (Microsoft.Storage)
- Azure Storage cross-region service endpoints (Microsoft.Storage.Global)
- Azure SQL Database (Microsoft.Sql)
- Azure Synapse Analytics (Microsoft.Sql)
- Azure Database for PostgreSQL server (Microsoft.Sql)
- Azure Database for MySQL server (Microsoft.Sql)
- Azure Database for MariaDB (Microsoft.Sql)
- Azure Cosmos DB (Microsoft.AzureCosmosDB)
- Azure Key Vault (Microsoft.KeyVault)
- Azure Service Bus (Microsoft.ServiceBus)
- Azure Event Hubs (Microsoft.EventHub)
- Azure Data Lake Store Gen 1 (Microsoft.AzureActiveDirectory)
- Azure App Service (Microsoft.Web)
- Azure Cognitive Services (Microsoft.CognitiveServices)

<https://learn.microsoft.com/en-us/azure/virtual-network/virtual-network-service-endpoints-overview>



# Azure Virtual Network Service Endpoints Policy





# Secure network connectivity to Azure resources (15–20%)





# Secure network connectivity to Azure resources (15–20%)

- Implement and manage network security groups
- Design and implement Azure Firewall and Azure Firewall Manager
- Design and implement a Web Application Firewall (WAF) deployment





# Implement and manage network security groups

- Create a network security group (NSG)
- Associate an NSG to a resource
- Create an application security group (ASG)
- Associate an ASG to a network interface card (NIC)
- Create and configure NSG rules
- Interpret NSG flow logs [also see 1]
- Validate NSG flow rules
- Verify IP flow
- Configure an NSG for remote server administration, including Azure Bastion



# Design and implement Azure Firewall and Azure Firewall Manager

- Map requirements to features and capabilities of Azure Firewall
- Select an appropriate Azure Firewall SKU
- Design an Azure Firewall deployment
- Create and implement an Azure Firewall deployment
- Configure Azure Firewall rules
- Create and implement Azure Firewall Manager policies
- Create a secure hub by deploying Azure Firewall inside an Azure Virtual WAN hub

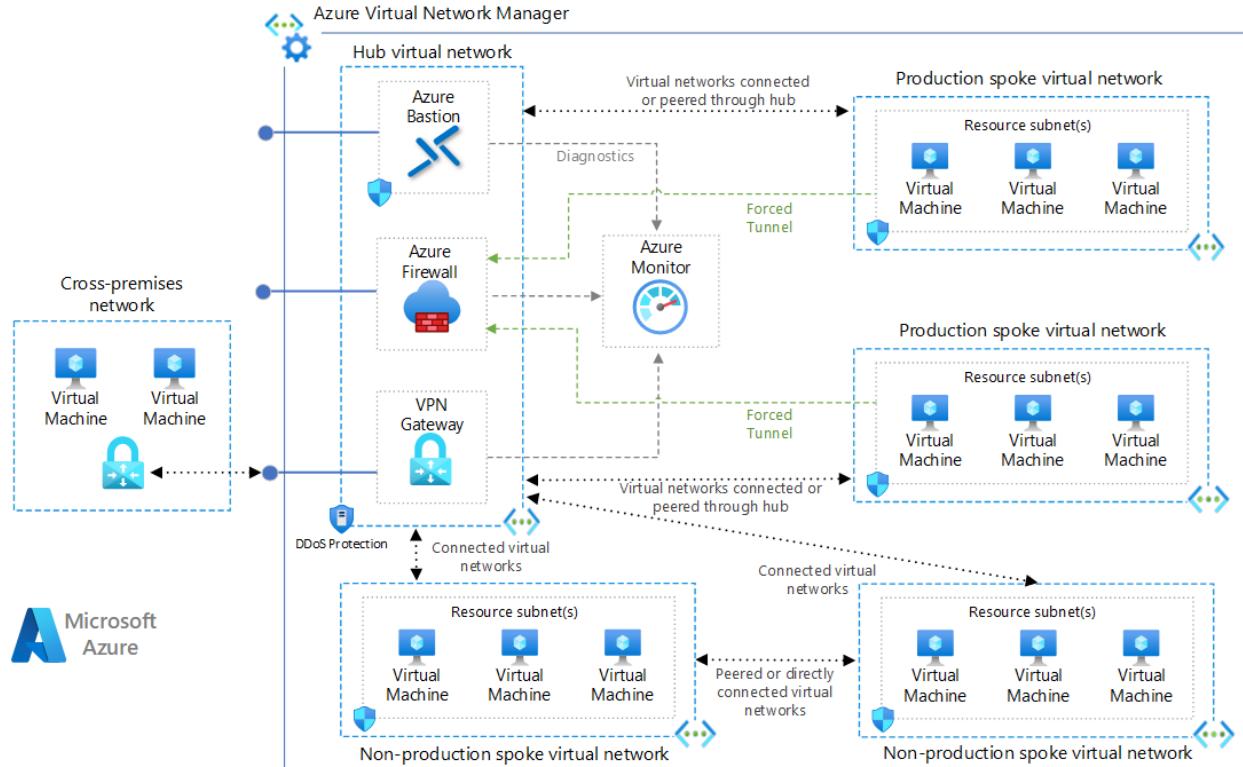


# Design and implement a Web Application Firewall (WAF) deployment

- Map requirements to features and capabilities of WAF
- Design a WAF deployment
- Configure detection or prevention mode
- Configure rule sets for WAF on Azure Front Door
- Configure rule sets for WAF on Application Gateway
- Implement a WAF policy
- Associate a WAF policy [also see 1]



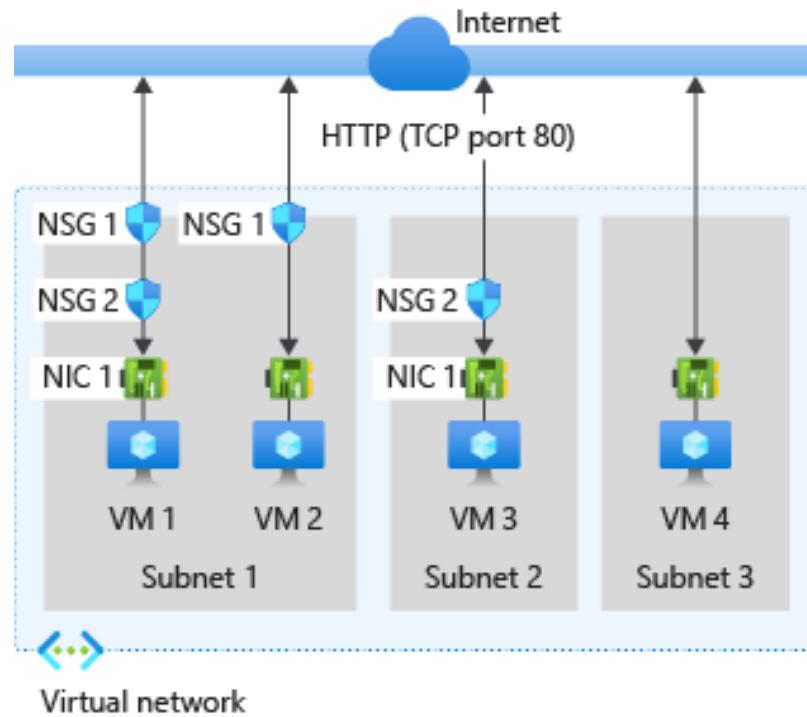
# Azure Network Security Groups (NSGs)



<https://learn.microsoft.com/en-us/azure/architecture/reference-architectures/hybrid-networking/hub-spoke?tabs=cli>



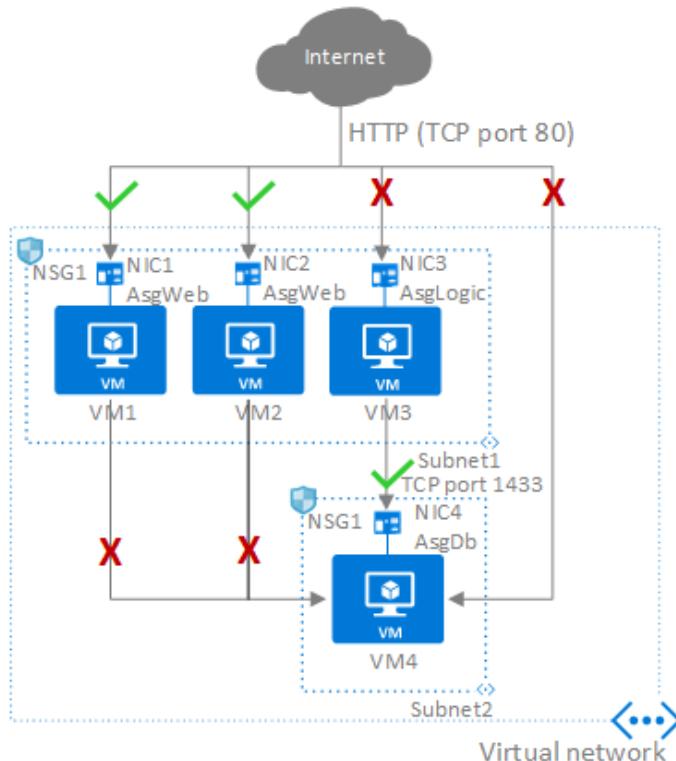
# Azure Network Security Groups (NSGs)



<https://learn.microsoft.com/en-us/azure/virtual-network/network-security-group-how-it-works>



# Azure Application Security Groups (ASGs)



<https://learn.microsoft.com/en-us/azure/virtual-network/application-security-groups>



# Azure Network Security Groups Flow Logs

Network Watcher | NSG flow logs

Microsoft

Search  Create NSG Browse Manage view Refresh Export to CSV Open query Assign tags Enable Disable Delete

Filter for any field... Subscription equals Contoso Subscription Resource group equals networkwatcherrg Add filter More (1)

Showing 1 to 2 of 2 records.

	Name ↑↓	Prov... ↑↓	Resource group ↑↓	Loca... ↑↓	Subscription ↑↓	Status ↑↓	Target res... ↑↓	Storage acco... ↑↓	Traffic a... ↑↓
<input type="checkbox"/>	nsg01-rg-char...	Succeeded	NetworkWatcherRG	East US	Contoso Subscripti...	Enabled	nsg01	nsgflowlogsn...	nsgflowl...
<input type="checkbox"/>	nsg02-rg-char...	Succeeded	NetworkWatcherRG	East US	Contoso Subscripti...	Enabled	nsg02	nsgflowlogsn...	nsgflowl...

No grouping List view

< Previous Page 1 of 1 Next >

Give feedback

NSG flow logs

Diagnostic logs

Traffic Analytics

<https://learn.microsoft.com/en-us/azure/network-watcher/network-watcher-nsg-flow-logging-overview>



# Azure Network Security Groups Flow Logs

Network Watcher - IP flow verify

Microsoft

Search (Ctrl+ /)

Overview

MONITORING

Topology

NETWORK DIAGNOSTIC TOOLS

IP flow verify

Next hop

Security group view

Packet capture

METRICS

Network subscription limit

LOGS

NSG flow logs

Diagnostic logs

Specify a target virtual machine with associated network security groups, then run an inbound or outbound packet to see if access is allowed or denied.

Subscription\* ● Microsoft Azure

Resource group\* ● FabrikamRG

Virtual machine\* ● fabrikmvm1

Network interface\* ● fabrikmvm1161

Packet details

Protocol

TCP  UDP

Direction

Inbound  Outbound

Local IP address\* ● 10.10.4 Local port\* ● 443

Remote IP address\* ● 204.79.197.200 Remote port\* ● 443

Check

Result

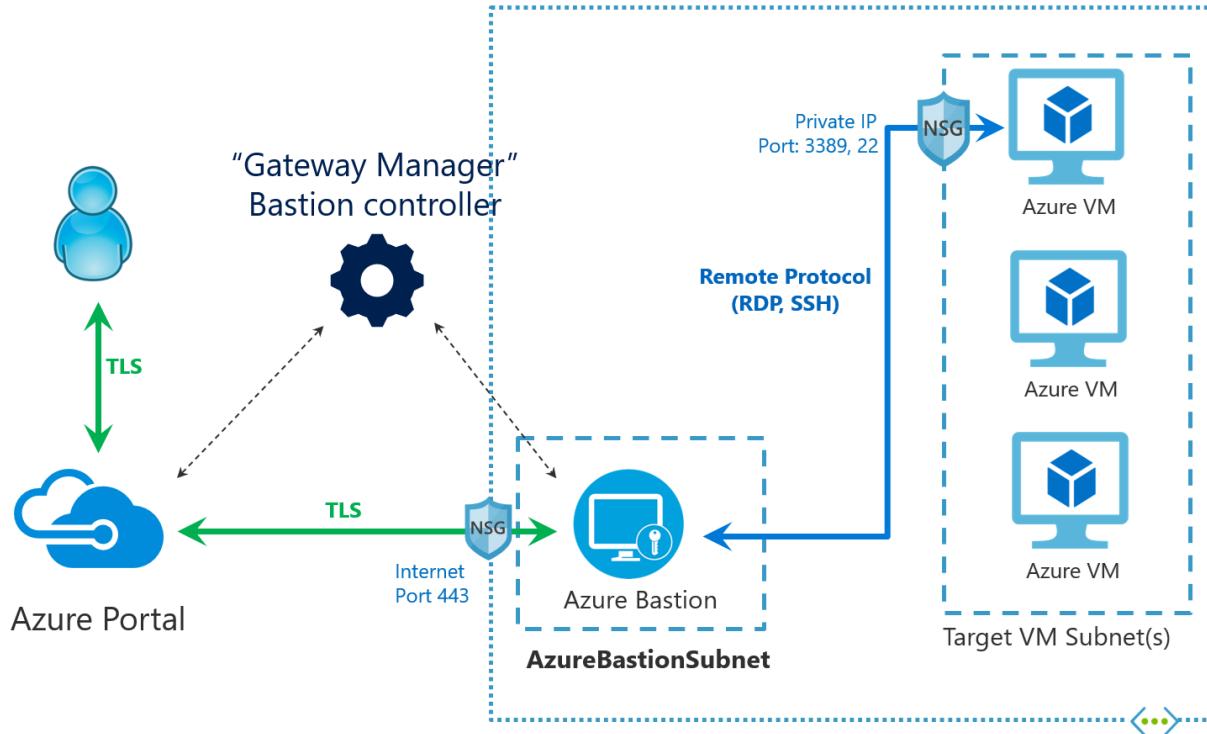
Access allowed

Security rule  
AllowInternetOutBound

<https://learn.microsoft.com/en-us/azure/network-watcher/network-watcher-ip-flow-verify-overview>



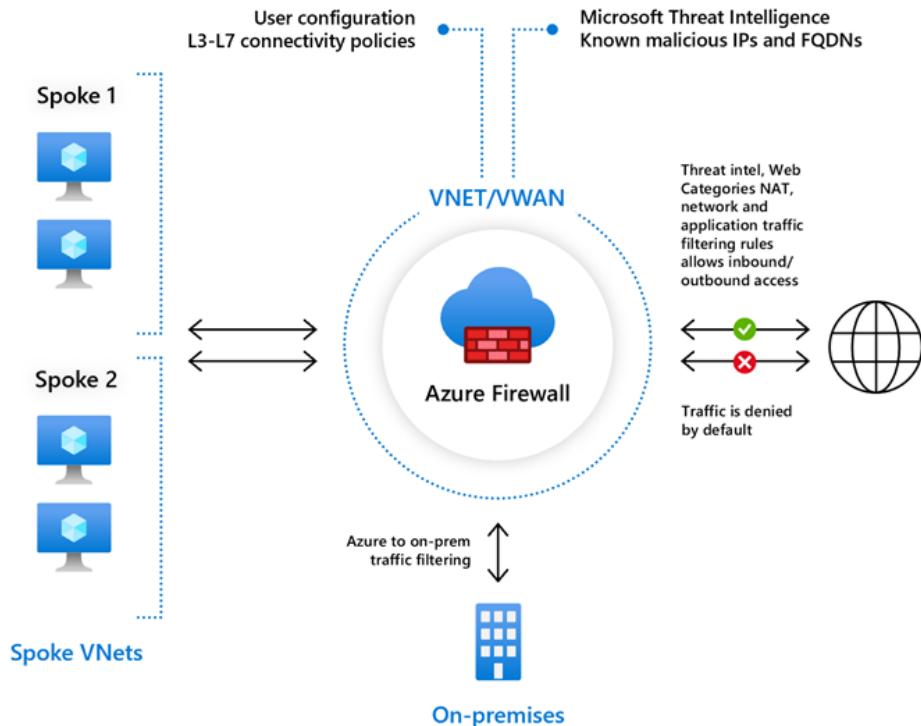
# NSG Access and Azure Bastion



<https://learn.microsoft.com/en-us/azure/bastion/bastion-nsg>



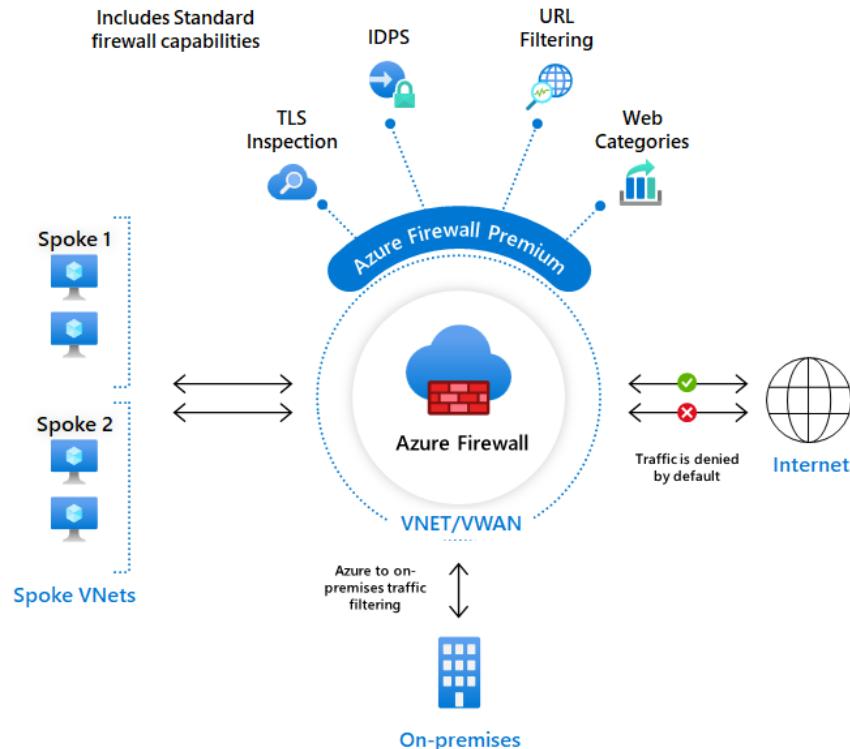
# Azure Firewall



<https://learn.microsoft.com/en-us/azure/firewall/overview>



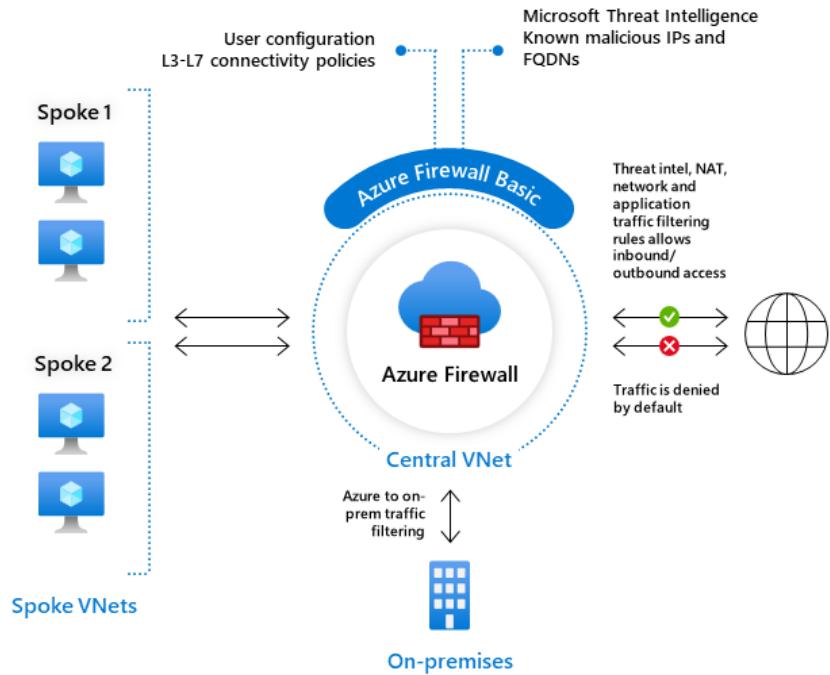
# Azure Firewall Premium



<https://learn.microsoft.com/en-us/azure/firewall/overview>



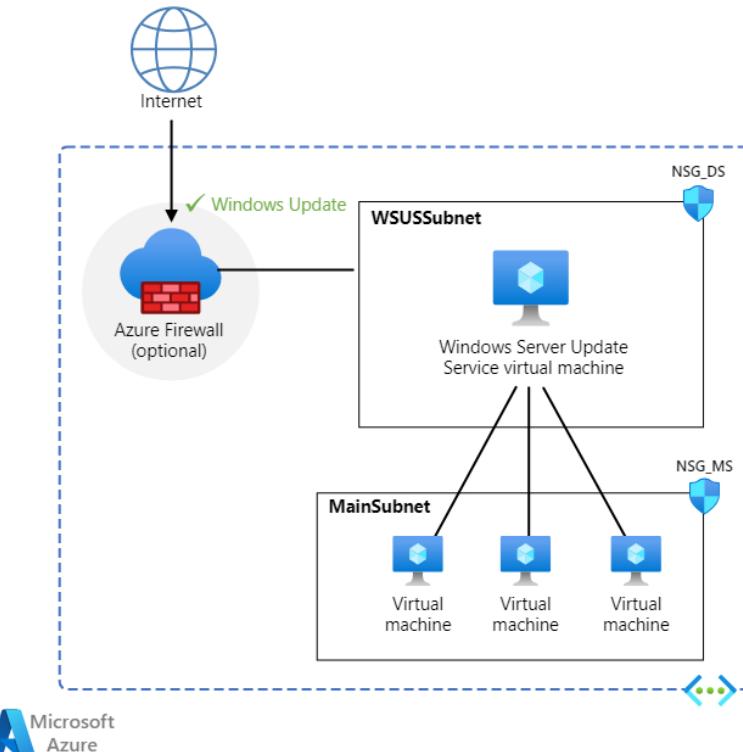
# Azure Firewall Basic



<https://learn.microsoft.com/en-us/azure/firewall/overview>



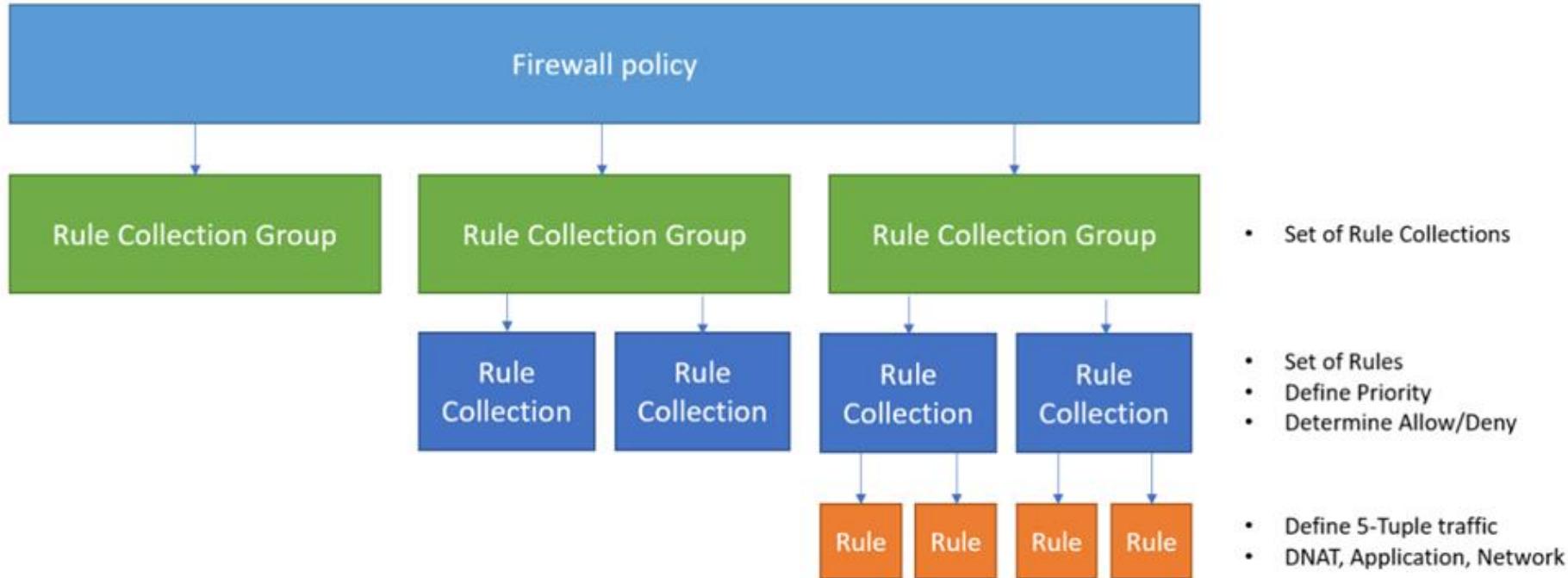
# Azure Firewall



<https://learn.microsoft.com/en-us/azure/architecture/example-scenario/wsus/>



# Azure Firewall Rules



<https://learn.microsoft.com/en-us/azure/firewall/policy-rule-sets>



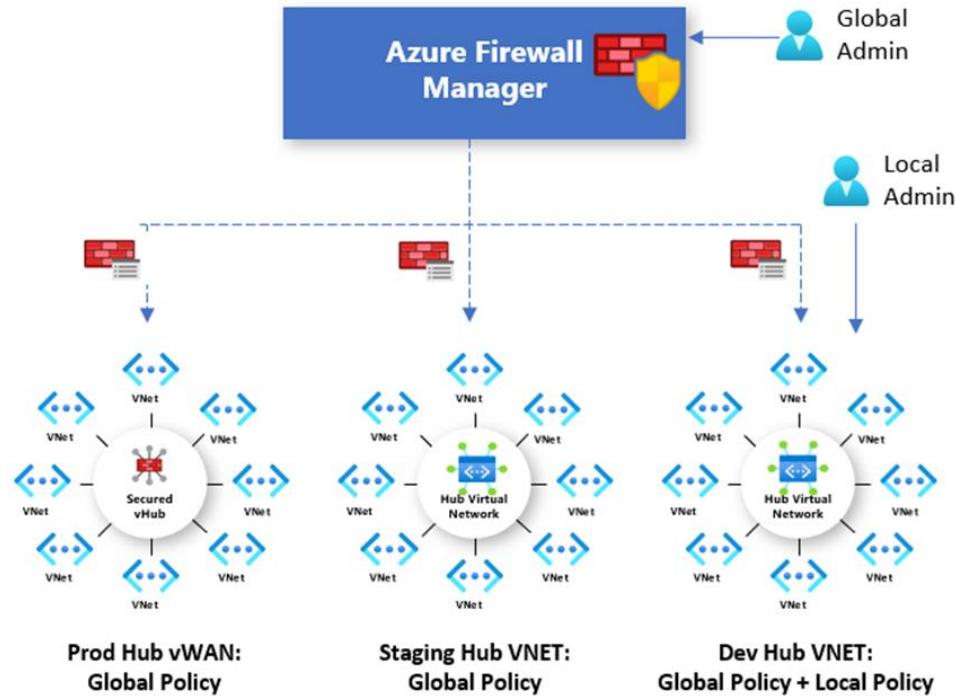
# Azure Firewall Rules

- DNAT
- Network
- Application

<https://learn.microsoft.com/en-us/azure/firewall/policy-rule-sets>



# Azure Firewall (Manager) Policy



<https://learn.microsoft.com/en-us/azure/firewall-manager/policy-overview>



# Azure WAF (Web Application Firewall)



Front Door



Application Gateway

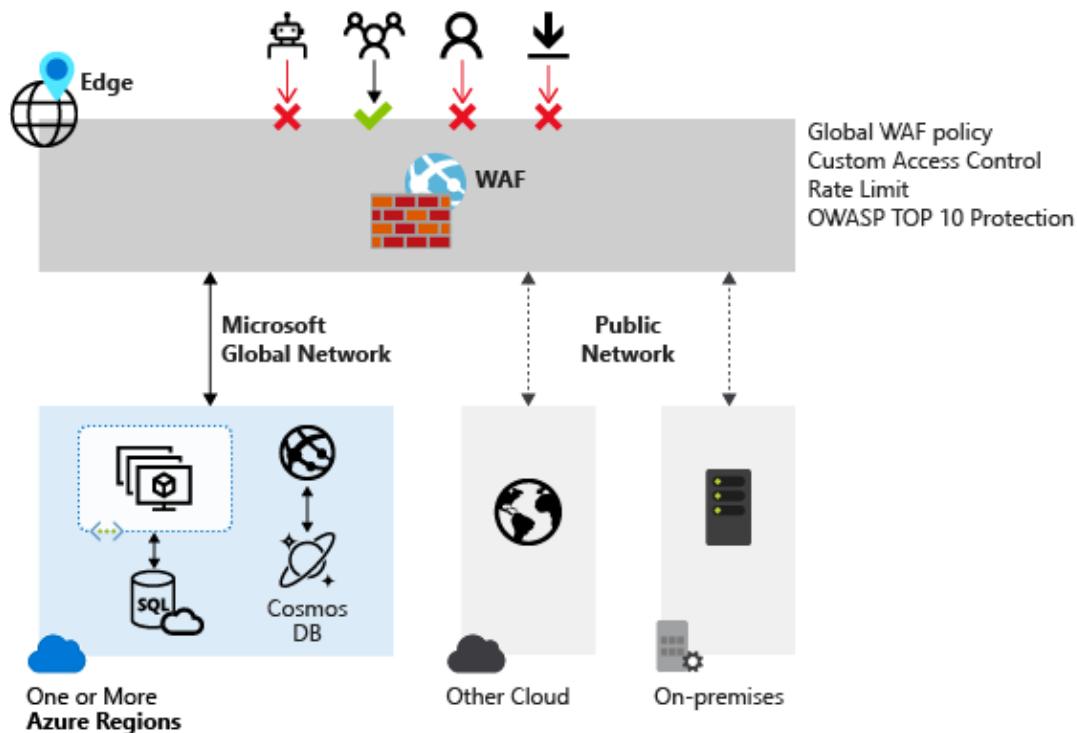


CDN

<https://learn.microsoft.com/en-us/azure/web-application-firewall/overview>



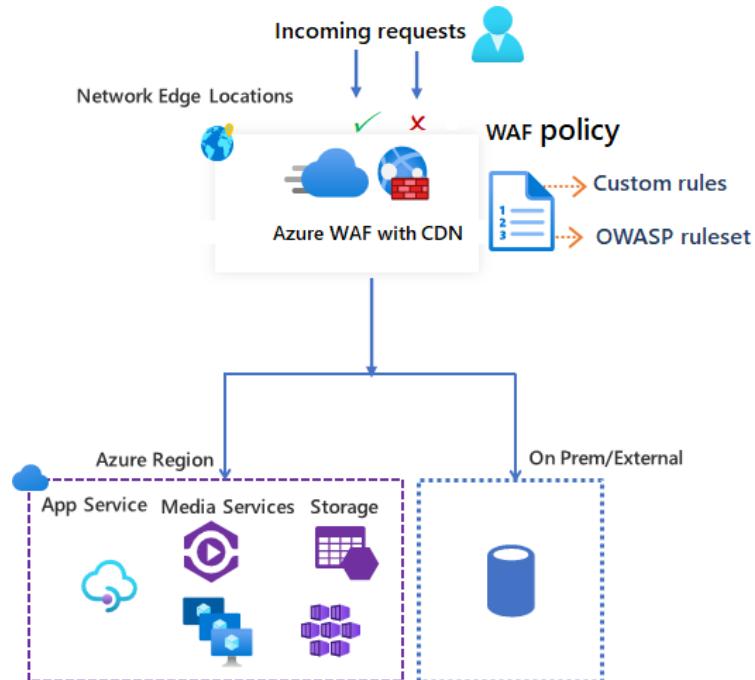
# Azure WAF (Azure Front Door)



<https://learn.microsoft.com/en-us/azure/web-application-firewall/afds/afds-overview>



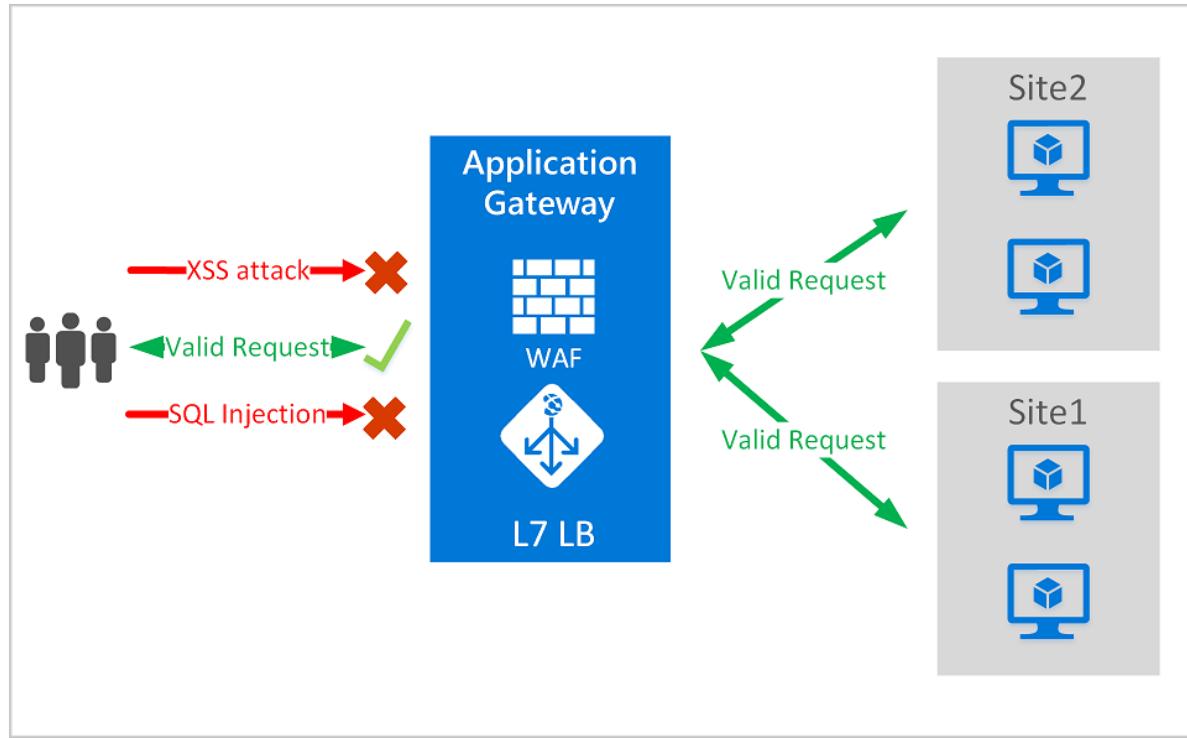
# Azure WAF (Azure CDN)



<https://learn.microsoft.com/en-us/azure/web-application-firewall/cdn/cdn-overview>



# Azure WAF (Azure Application Gateway)



<https://learn.microsoft.com/en-us/azure/web-application-firewall/ag/ag-overview>



# Azure WAF Managed Rules

mywaf | Managed rules

Application Gateway WAF policy

Search (Cmd+ /) Save Discard Refresh

Overview Activity log Access control (IAM) Tags

Settings Policy settings

Managed rules

Custom rules

Associated application gateways

Properties

Locks

Monitoring

Alerts

Automation

Tasks (preview)

Export template

Support + troubleshooting

New Support Request

Managed rule set OWASP\_3.2

OWASP\_3.2

Expand all Enable Disable

Name	Description	Status
<input type="checkbox"/> General		Enabled
<input type="checkbox"/> > REQUEST-911-METHOD-ENFORCEMENT		Enabled
<input type="checkbox"/> > REQUEST-913-SCANNER-DETECTION		Enabled
<input type="checkbox"/> > REQUEST-920-PROTOCOL-ENFORCEMENT		Enabled
<input type="checkbox"/> > REQUEST-921-PROTOCOL-ATTACK		Enabled
<input type="checkbox"/> > REQUEST-930-APPLICATION-ATTACK-LFI		Enabled
<input type="checkbox"/> 930100	Path Traversal Attack (./.)	Enabled
<input checked="" type="checkbox"/> 930110	Path Traversal Attack (./.)	Enabled
<input checked="" type="checkbox"/> 930120	OS File Access Attempt	Enabled
<input type="checkbox"/> 930130	Restricted File Access Attempt	Enabled
<input type="checkbox"/> > REQUEST-931-APPLICATION-ATTACK-RFI		Enabled
<input type="checkbox"/> > REQUEST-932-APPLICATION-ATTACK-RCE		Enabled
<input type="checkbox"/> > REQUEST-933-APPLICATION-ATTACK-PHP		Enabled
<input type="checkbox"/> > REQUEST-941-APPLICATION-ATTACK-XSS		Enabled
<input type="checkbox"/> > REQUEST-942-APPLICATION-ATTACK-SQLI		Enabled
<input type="checkbox"/> > REQUEST-943-APPLICATION-ATTACK-SESSION-FIXATION		Enabled
<input type="checkbox"/> > REQUEST-944-APPLICATION-ATTACK-JAVA		Enabled
<input type="checkbox"/> > Known-CVEs	This Rule Group contains Rules for new and known CVEs	Enabled

<https://learn.microsoft.com/en-us/azure/web-application-firewall/ag/application-gateway-crs-rulegroups-rules?tabs=owasp32>



# Azure WAF Custom Rules

Azure PowerShell

Copy

```
$AllowRule = New-AzApplicationGatewayFirewallCustomRule`  
    -Name example1`  
    -Priority 2`  
    -RuleType MatchRule`  
    -MatchCondition $condition`  
    -Action Allow`  
    -State Enabled`  
  
$BlockRule = New-AzApplicationGatewayFirewallCustomRule`  
    -Name example2`  
    -Priority 2`  
    -RuleType MatchRule`  
    -MatchCondition $condition`  
    -Action Block`  
    -State Enabled`
```

<https://learn.microsoft.com/en-us/azure/web-application-firewall/ag/custom-waf-rules-overview>



# The Exam





# AZ-700 Exam FAQ

- Number of Questions between 40-60 (~45)
- Duration: 120 minutes
- See the exam sandbox
- There ARE hands-on labs
- Passing Score 700 (on a scale of 1-1000)



# AZ-700

- [Exam AZ-700: Designing and Implementing Microsoft Azure Networking Solutions](#)
- [Study guide for Exam AZ-700](#)
- [Sample exam sandbox](#)

# Schedule exam

## Exam AZ-700: Designing and Implementing Microsoft Azure Networking Solutions

**Languages:** German, English, Spanish, French, Italian, Japanese, Korean, Portuguese (Brazil), Chinese (Simplified), Chinese (Traditional)

**Retirement date:** none

This exam measures your ability to accomplish the following technical tasks: design and implement core networking infrastructure; design, implement, and manage connectivity services; design and implement application delivery services; design and implement private access to Azure services; and secure network connectivity to Azure resources.

[Schedule exam >](#)

United States

\$165 USD\*

Price based on the country or region in which the exam is proctored.

MeasureUp practice test for Designing and Implementing Microsoft Azure Networking Solutions  
All objectives of the exam are covered in depth so you'll be ready for any question on the exam.

⊕ Add

## Select exam options

AZ-104: Microsoft Azure Administrator

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Online at my home or office

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Where do you want to take your exam?



At a test center



Online at my home or office

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Prepare for your online exam at your home or office



#### Your computer

Use a personal computer that has a reliable webcam and internet connection.

Run [system test](#).



#### Your testing space

The room should be a distraction-free, private place.

See [acceptable spaces](#) and view permitted [comfort aid list](#).



#### Your photo ID

We'll verify your government-issued identification (ID) when you arrive for your exam.

Review [admission & ID policies](#)



#### What to expect

Check in for your OnVUE exam 30 minutes before your appointment time.

Watch our [short video](#) to get familiar with the process.

#### Questions?

Check out the [OnVUE FAQs](#) and [minimum technical requirements](#).

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[Review and confirm](#) contact information to avoid issues on test day.

Description	Details	Price	Actions
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In addition to scheduling your exam, you might be interested in the following products.



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# It's time to test your system

Order #: 0064-8802-7606

Your appointment is confirmed! An order confirmation containing important exam day information has been sent to: zaalion@gmail.com

## What's next?

[Run a system test](#)

We need to verify that the computer and internet connection you plan to use on exam day meet the [minimum requirements](#) for online testing. It'll just take 5 minutes to run:



Equipment and internet connection checks



Exam simulation

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I confirm that on my exam day I will be using this same testing space, computer, and internet connection.

**Alert!** Work computers generally have more restrictions that may prevent a successful test. Ensure you are not behind a corporate firewall, and shut down any **Virtual Private Networks (VPNs)** or **Virtual Machines**.

### 1. Copy Access Code

Click '[Copy Access Code](#)'.

This code will authorize you to perform a system test.

690-635-235

[Copy Access Code](#)

### 2. Download OnVUE

Click '[Download](#)'.

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### 3. Run OnVUE

Run the OnVUE application from your Downloads folder.



# Course Repository

<https://github.com/zaalion/oreilly-az-700>





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# Azure Cookbook

Recipes to Create and Maintain Cloud Solutions in Azure



Reza Salehi

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