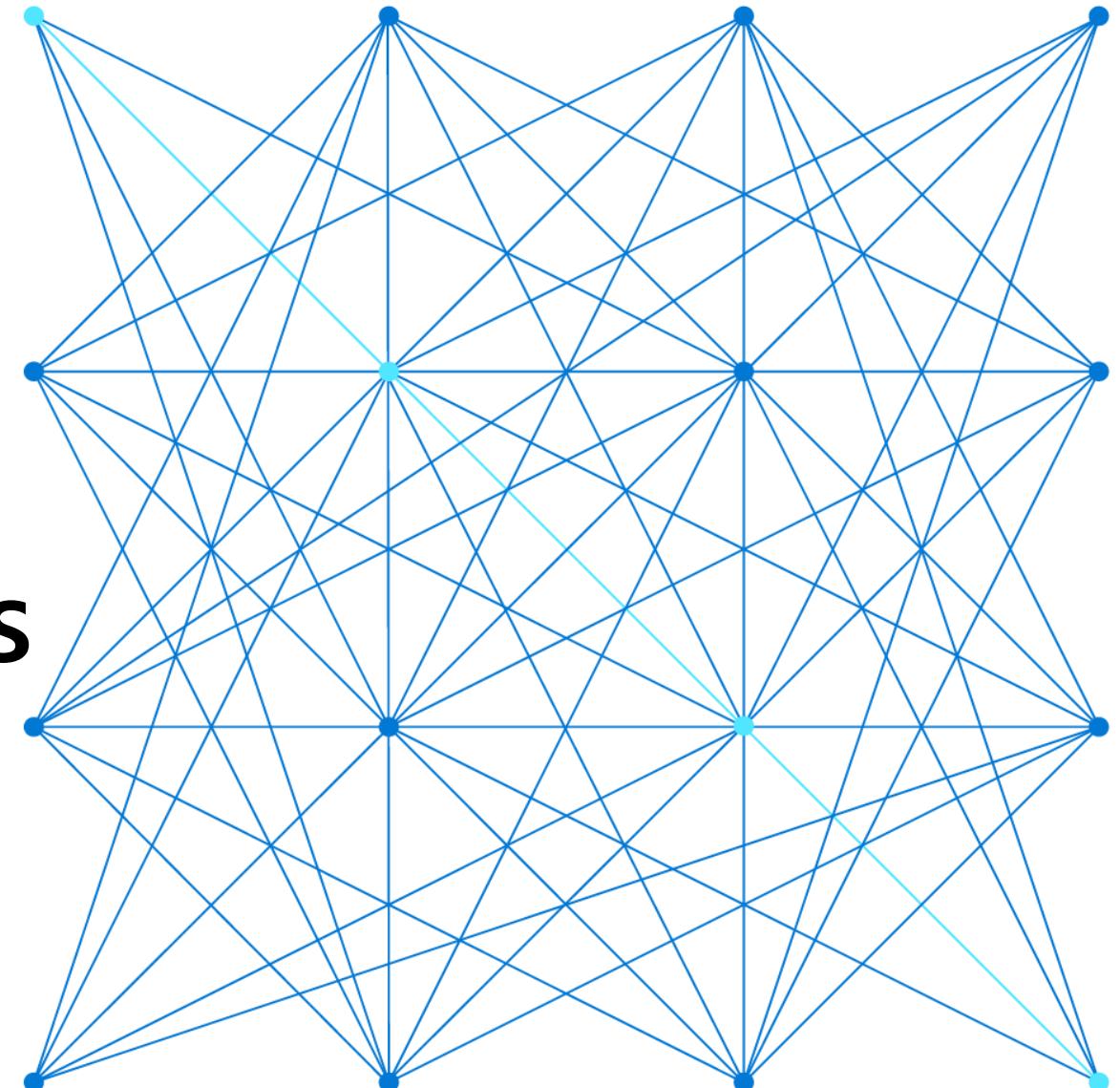


AZ-500

Microsoft Azure Security Technologies



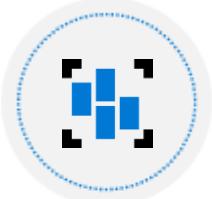
AZ-500 Agenda



Learning Path 1 Identity and Access



Learning Path 2 Implement Platform Protection



Learning Path 3 Data and Application Security



Learning Path 4 Security Operations

Learning Path: Implement Platform Protection



Perimeter Security



Network Security



Host Security



Container Security

ACI

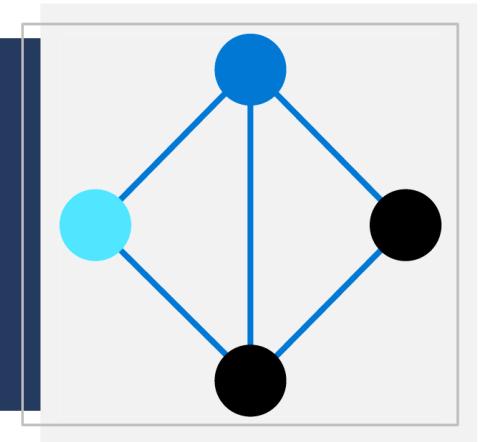
ACR

AKS
Kubernetes



Module Labs

Perimeter Security



Perimeter Security



Defense in Depth

Virtual Network Security

Distributed Denial of Service (DDoS)

DDoS Implementation

Azure Firewall Features

NSG
(ASG)

Azure Firewall Implementation

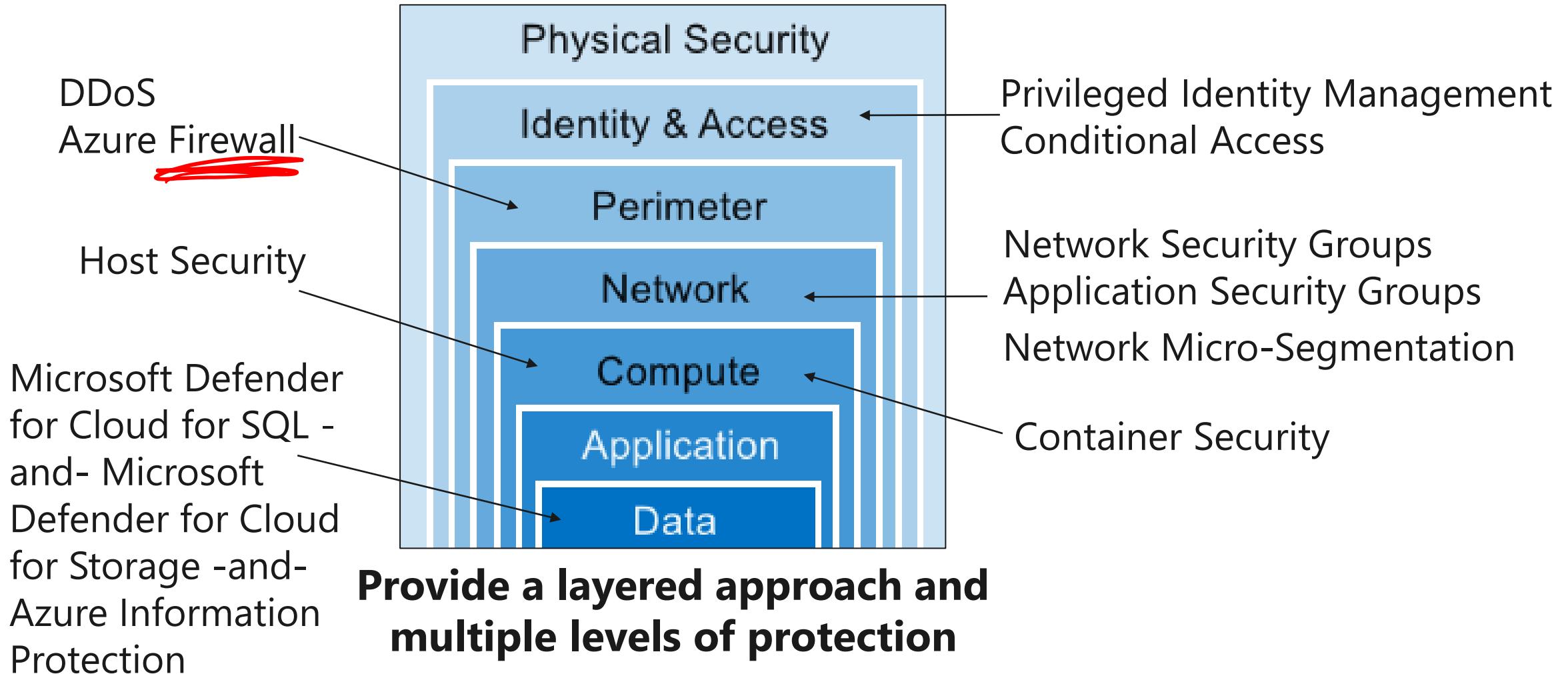
VPN Forced Tunneling

UDRs and NVAs

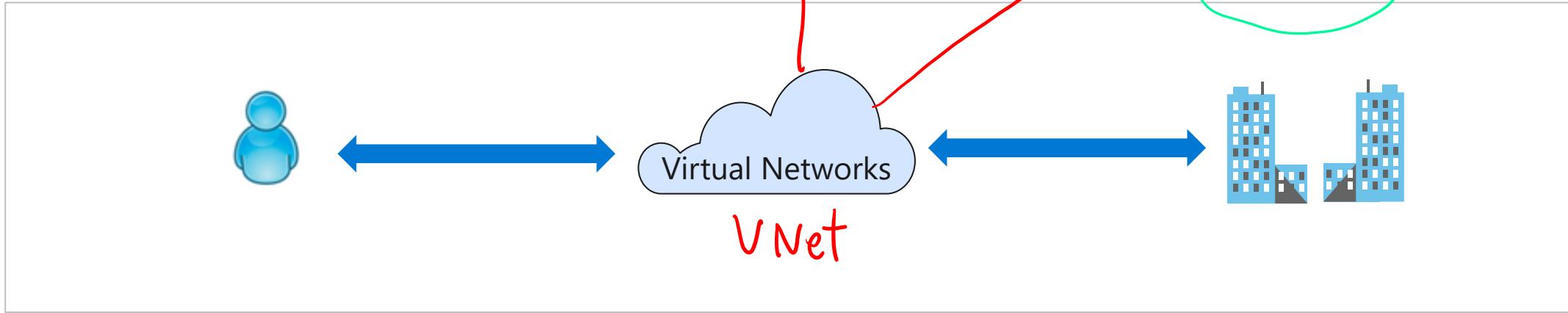
User defined route

Network virtual Appl.

Defense in Depth



Virtual Network Security



- Dynamic and reserved public IP addresses
- Direct virtual machine access
- Load balancing
- DNS hosting
- Traffic management
- DDoS protection

- Bring your own network
- Segment with subnets
- Add network security groups
- Create user defined routes

- Point-to-site for dev/test
- VPN Gateways for site-to-site
- ExpressRoute for private connectivity

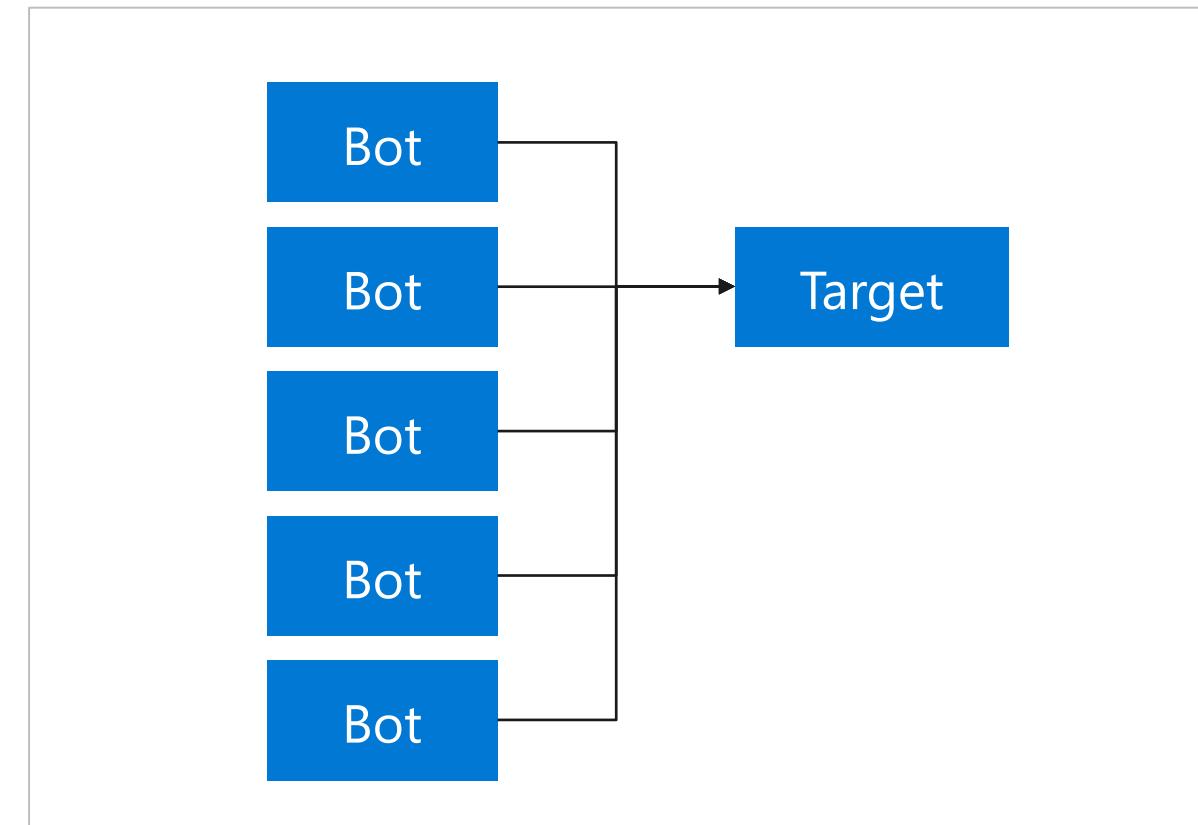
Distributed Denial of Service (DDoS)

The goal of a DoS (Denial of Service) attack is to prevent access to services or systems.

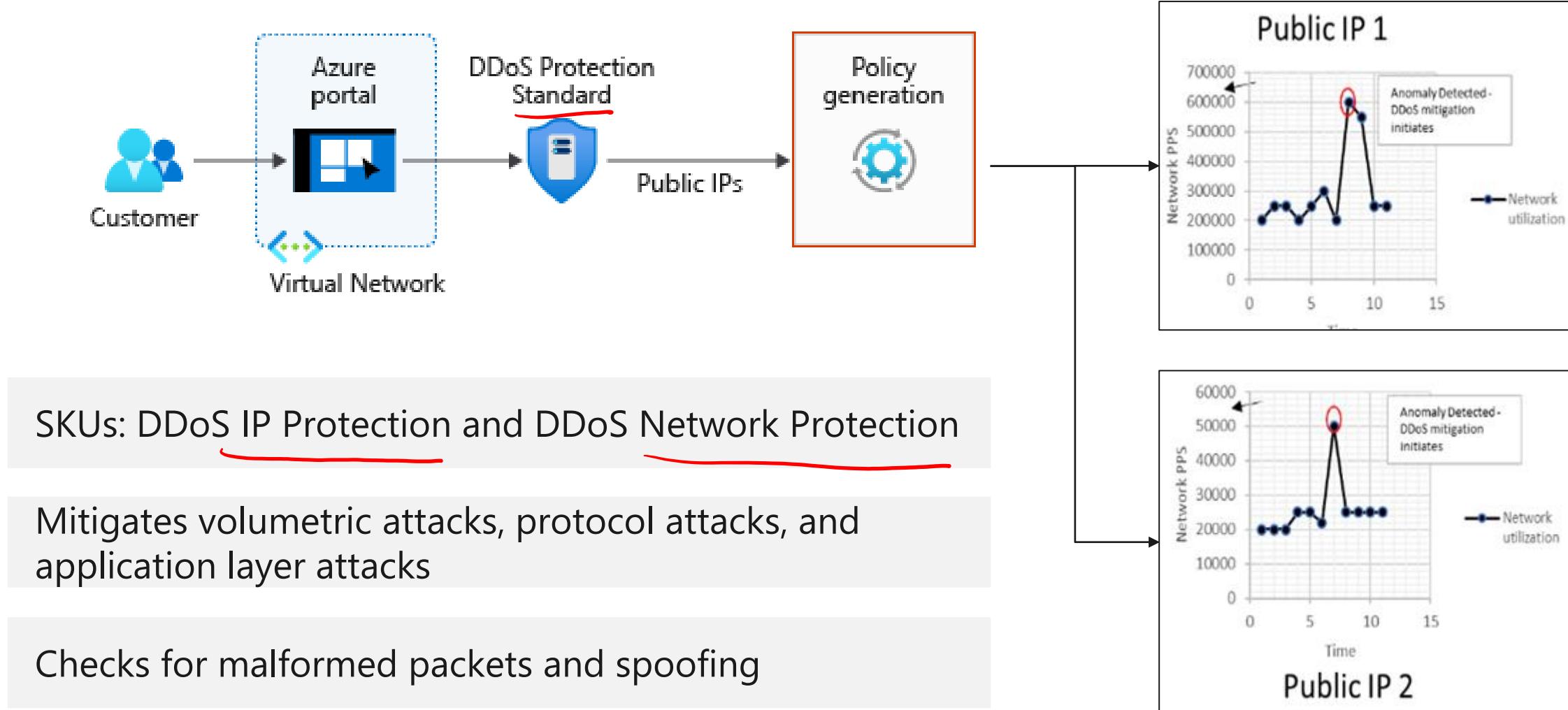
Botnets are collections of internet-connected systems that an individual controls and uses without their owners' knowledge

DDoS is a collection of attack types aimed at disrupting the availability of a target

DDoS involves many systems sending traffic to targets as part of a botnet

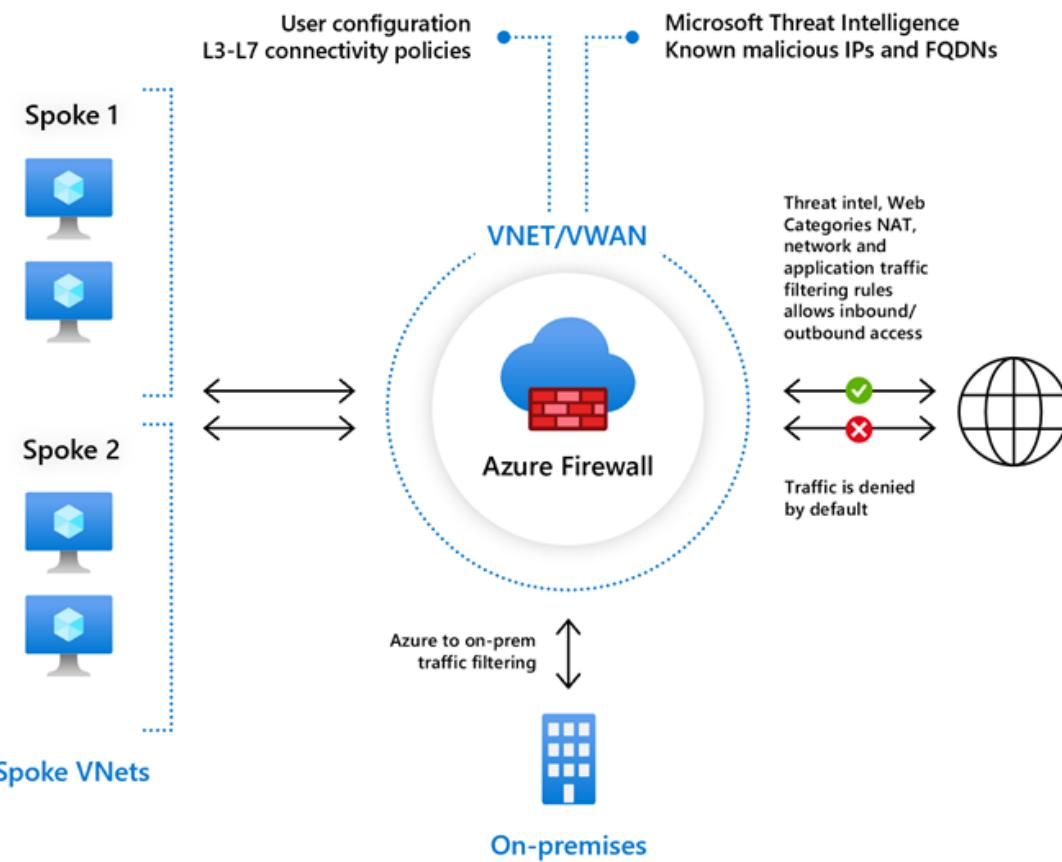


DDoS Implementation

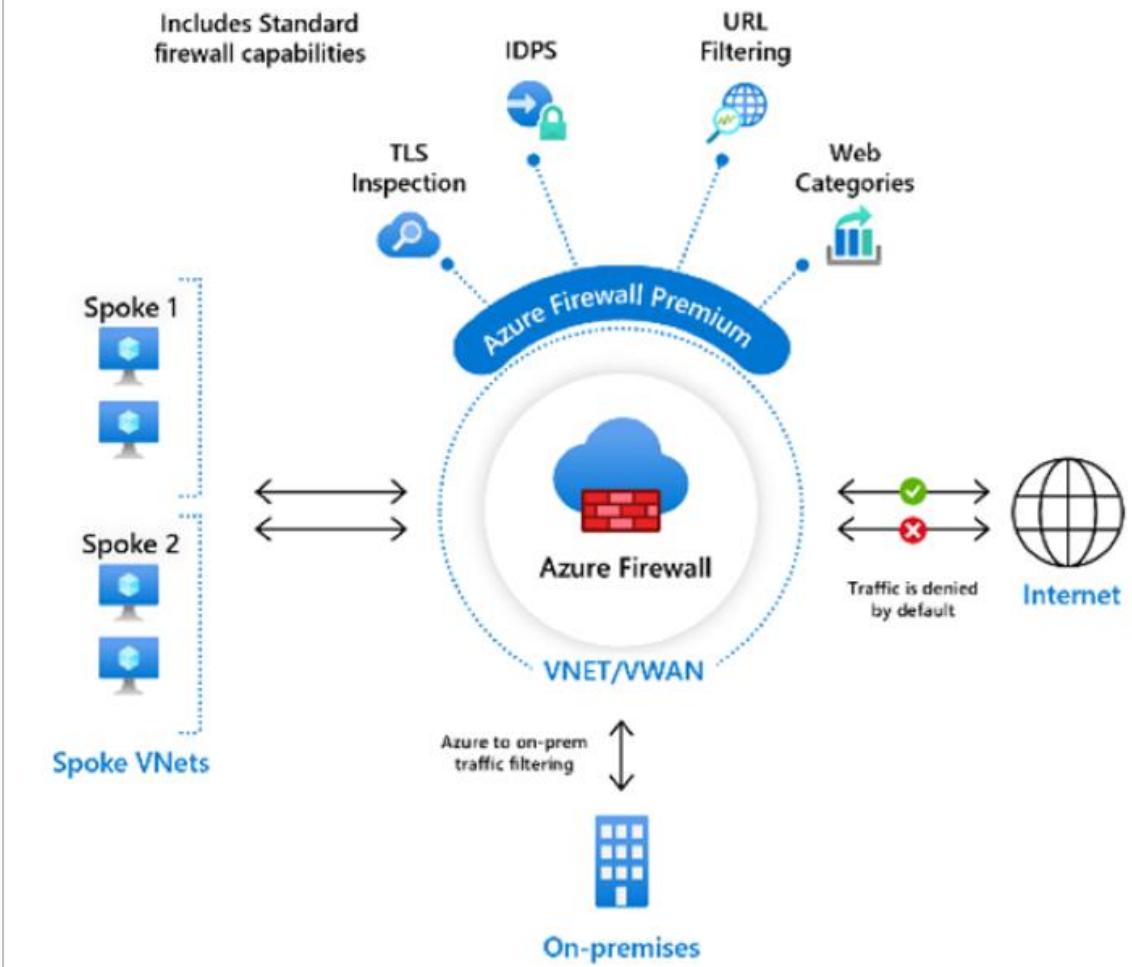


Azure Firewall

Azure Firewall Standard



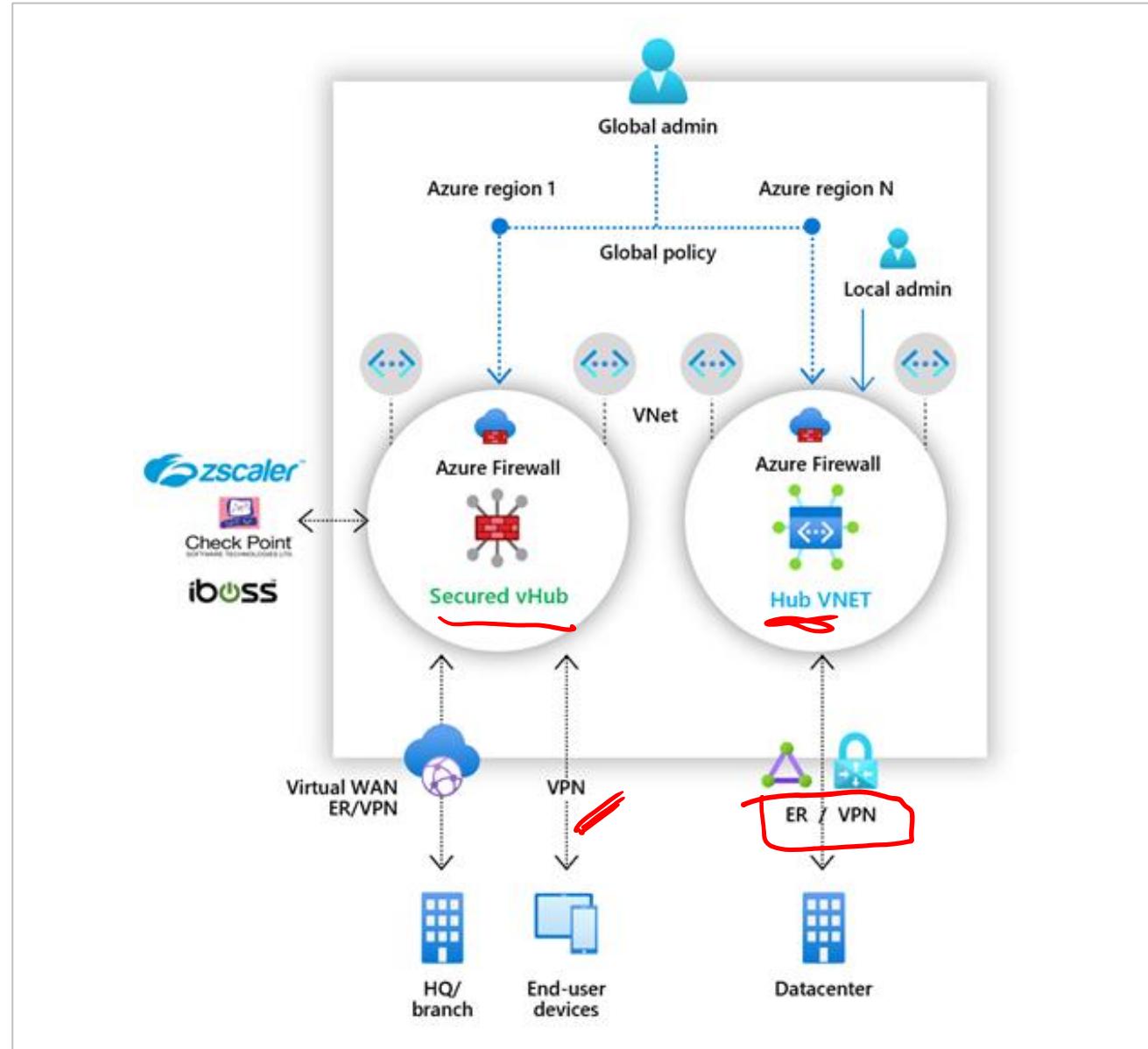
Azure Firewall Premium



Azure Firewall Manager

Azure Virtual Wan

AZ-700



App GW - Region
Front Door - Global
+ CDN

Azure Firewall Implementation

Application FQDN filtering rules

Network traffic filtering rules

FQDN tags

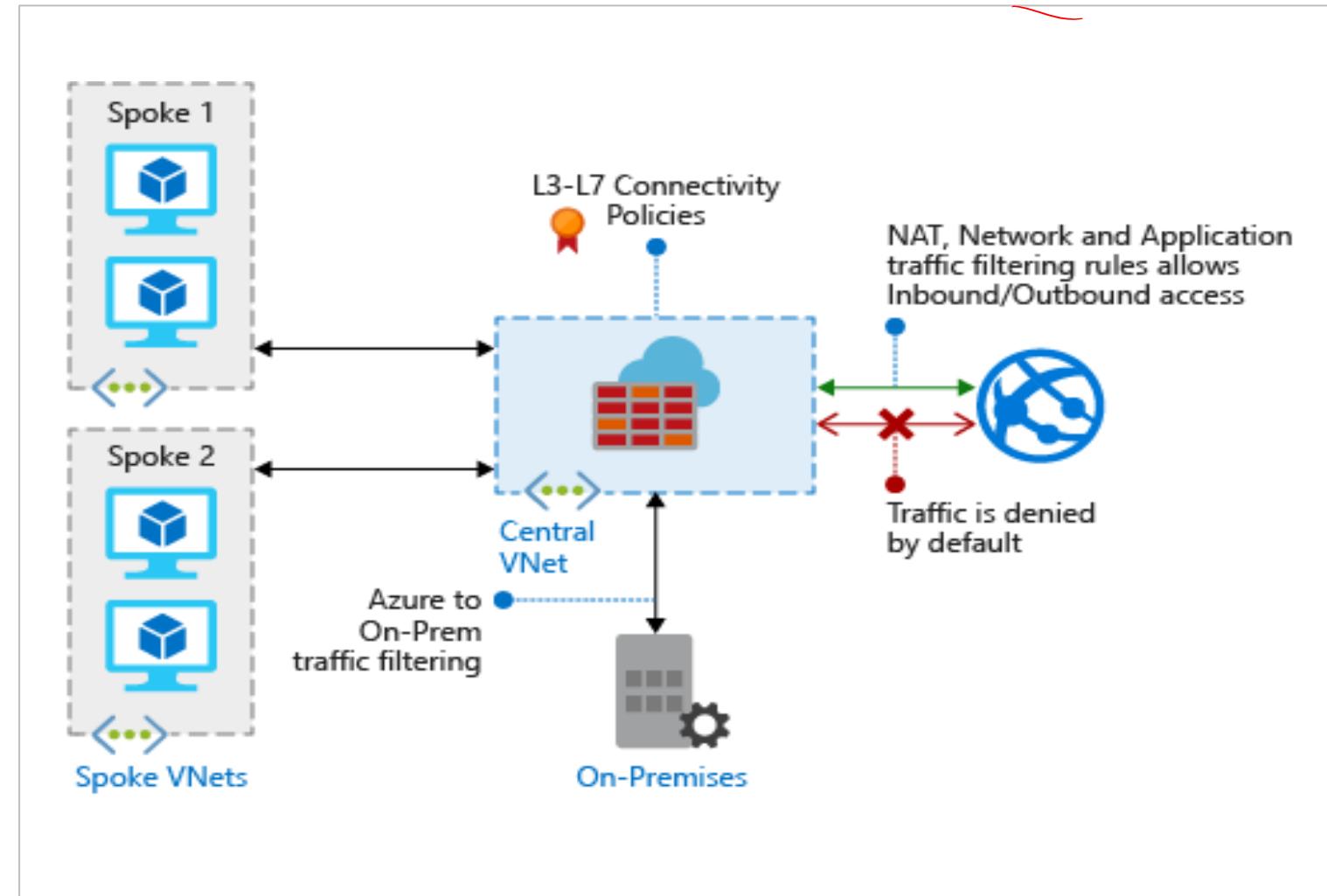
Outbound SNAT

Inbound DNAT support

L3-L7 connectivity policies

Separate firewall subnet

Static public IP address

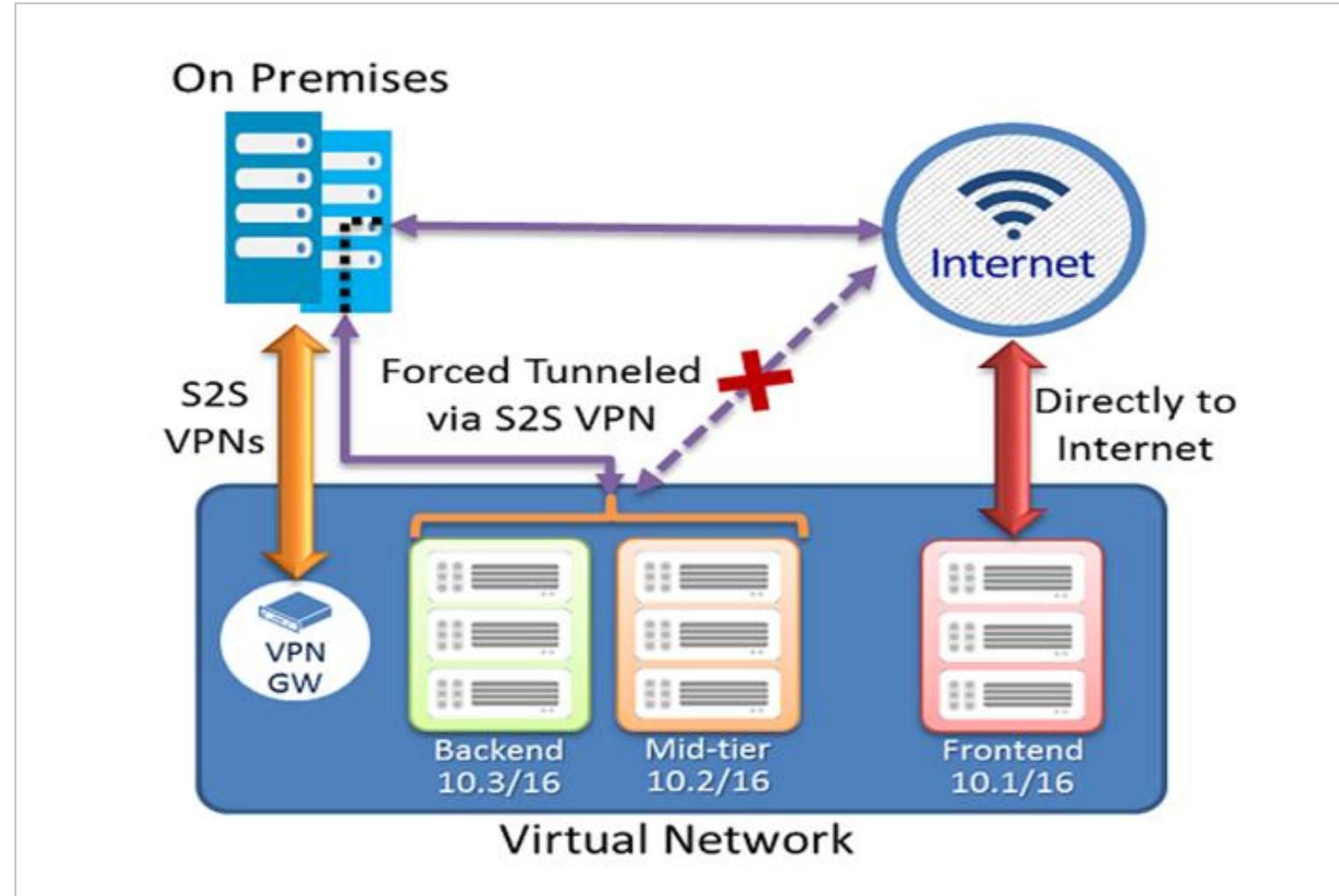


Forced tunnelling – Push all internet traffic for specific next hop (example – on-premises device).

VPN Forced Tunneling

Redirect internet-bound traffic back to the company's on-premises infrastructure for inspection and auditing

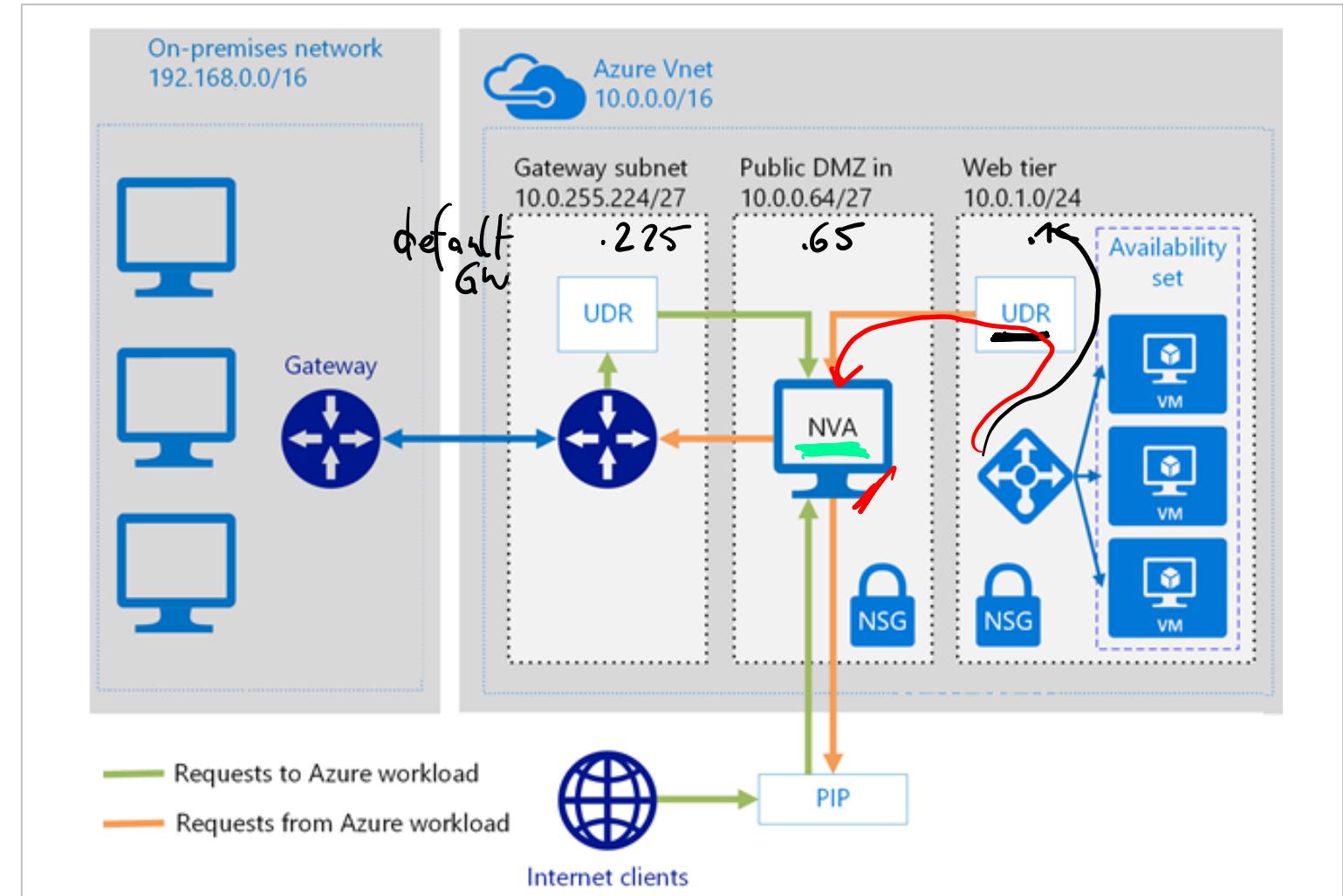
Internet-bound traffic from VMs always traverses from Azure network infrastructure directly out to the internet, without inspection or audit



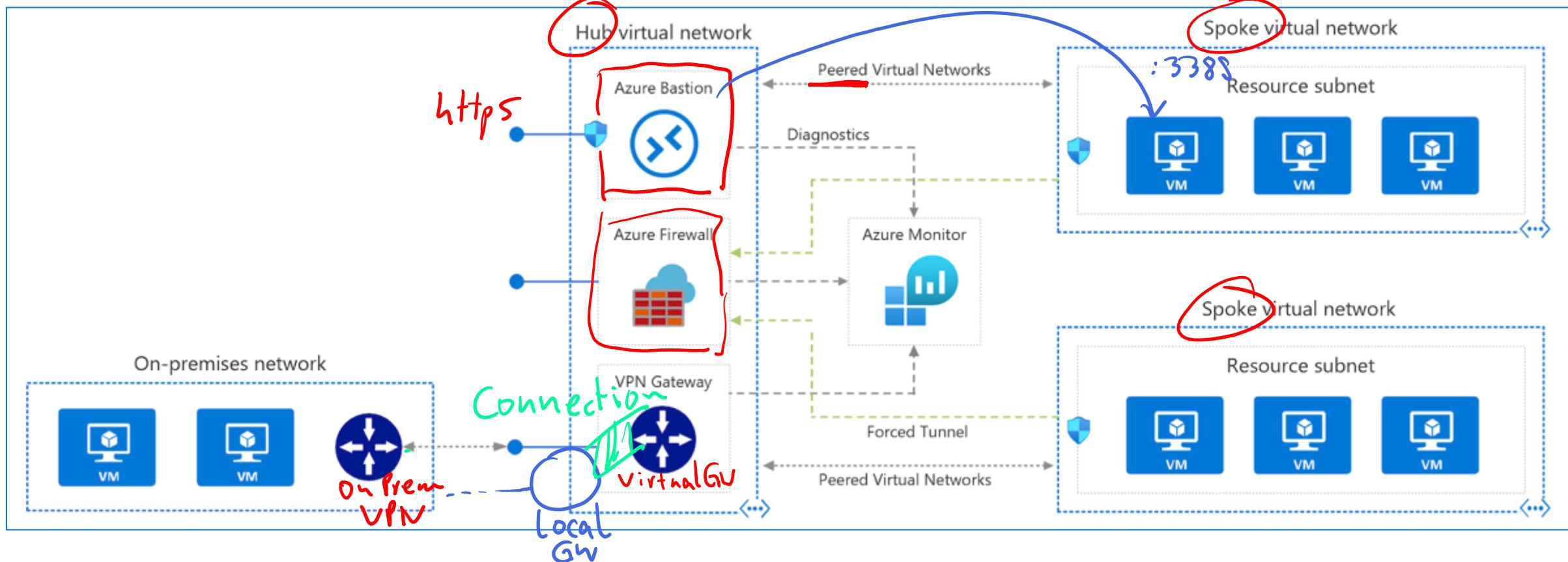
User Defined Routes and Network Virtual Appliances

UDRs override the default system routes and are associated with a subnet

NVAs control the flow of network traffic from one network to another



Hub and Spoke topology with Azure

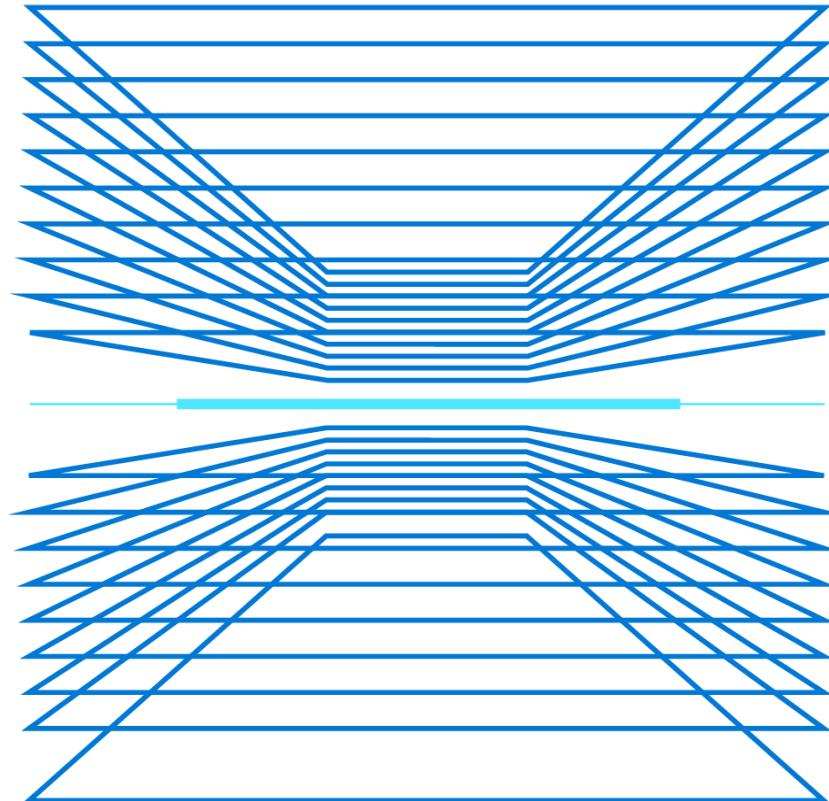


Hub is a virtual network in Azure that acts as a central point of connectivity to your on-premises network.

Spokes are virtual networks that peer with the hub and can be used to isolate workloads.

Demonstration: Perimeter Security

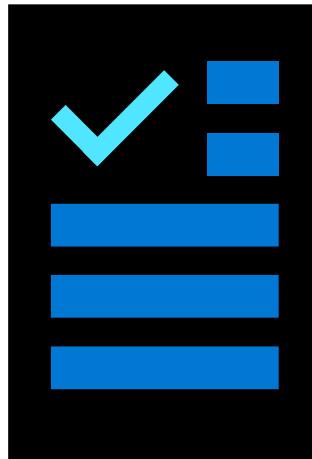
- VNet Peering
- Azure Firewall



Additional Study – Perimeter Security

Module Review Questions

Microsoft Learn Modules (docs.microsoft.com/Learn)



Fundamentals of network security

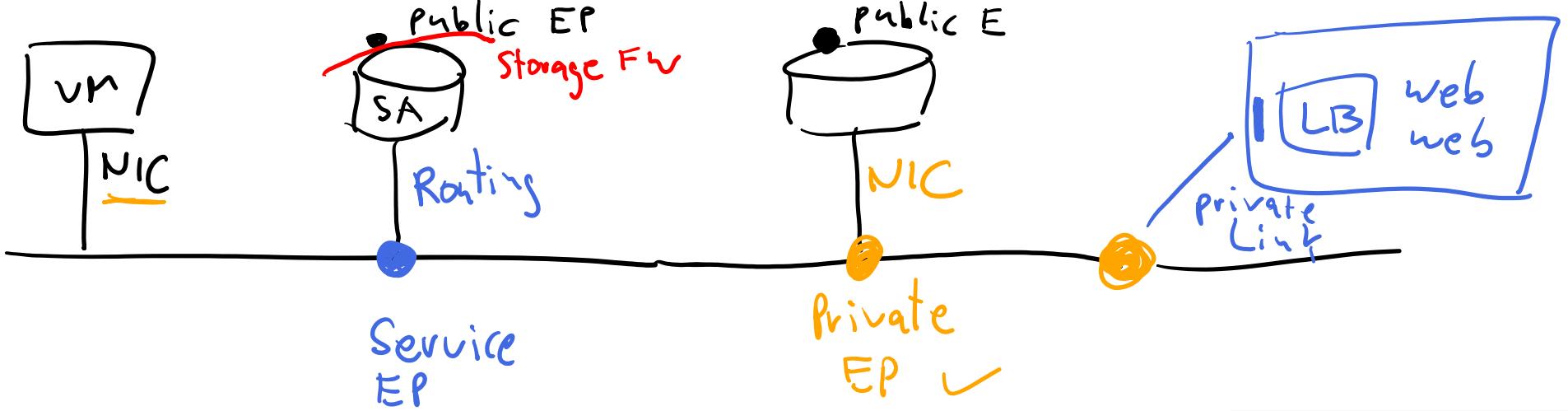
Fundamentals of computer networking

Manage and control traffic flow in your Azure deployment with routes (Exercise)

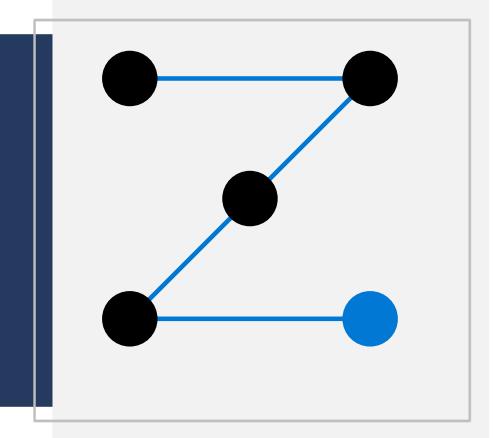
Distribute your services across Azure virtual networks and integrate them by using virtual network peering (Exercise)

Microsoft Azure Well-Architected Framework – Security

Configure the network for your virtual machines (Exercise)



Network Security



Network Security



Network Security Groups (NSG)



NSG Implementation



Application Security Groups



Service Endpoints



Private Endpoints



Azure Application Gateway



Web Application Firewall



Azure Front Door



ExpressRoute

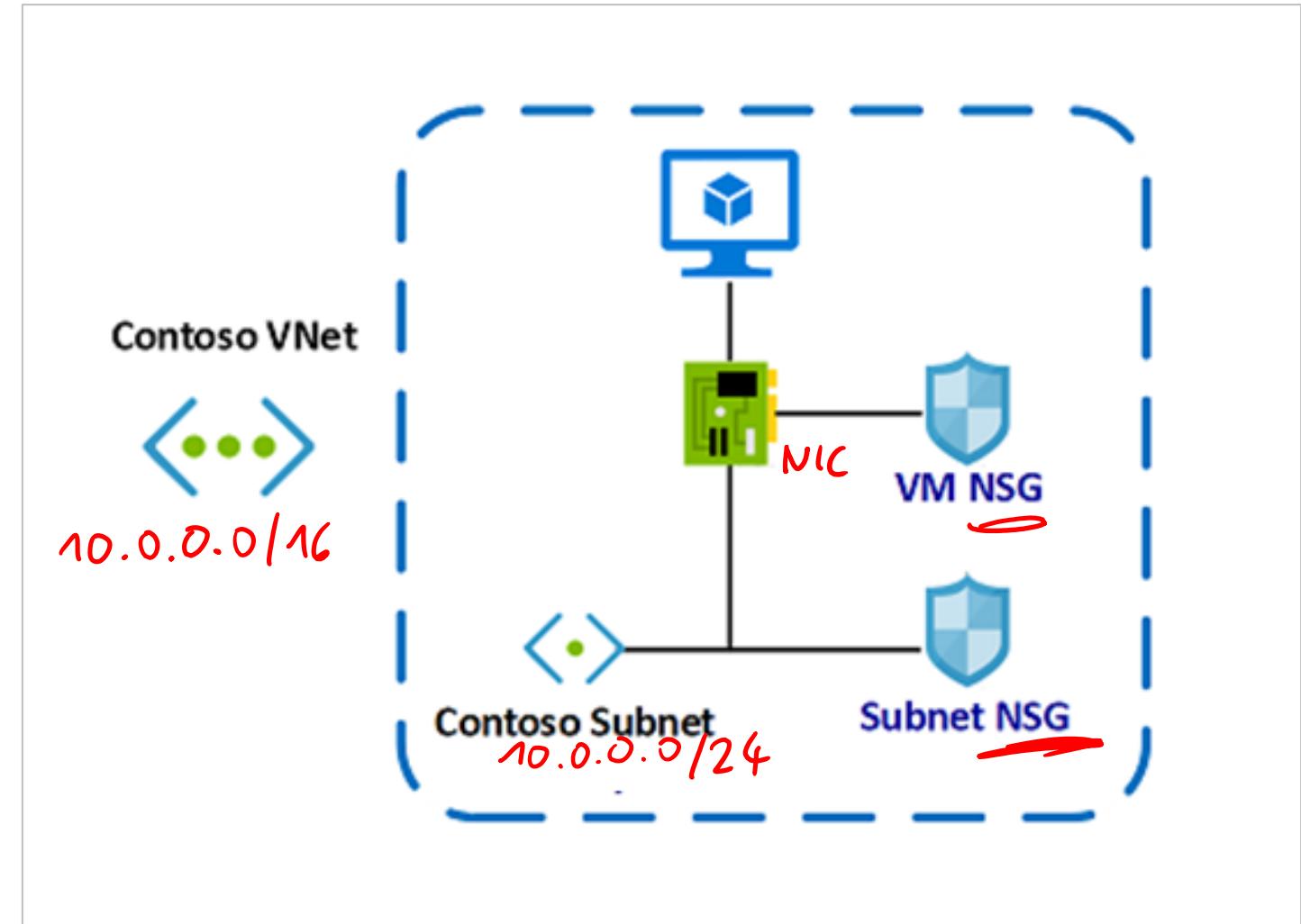
Network Security Groups (NSG)

Limit virtual network traffic

Can be associated to a subnet or a network interface

Uses security rules to allow or deny network traffic

Default inbound and outbound rules allow virtual network and load balancers – all other traffic denied



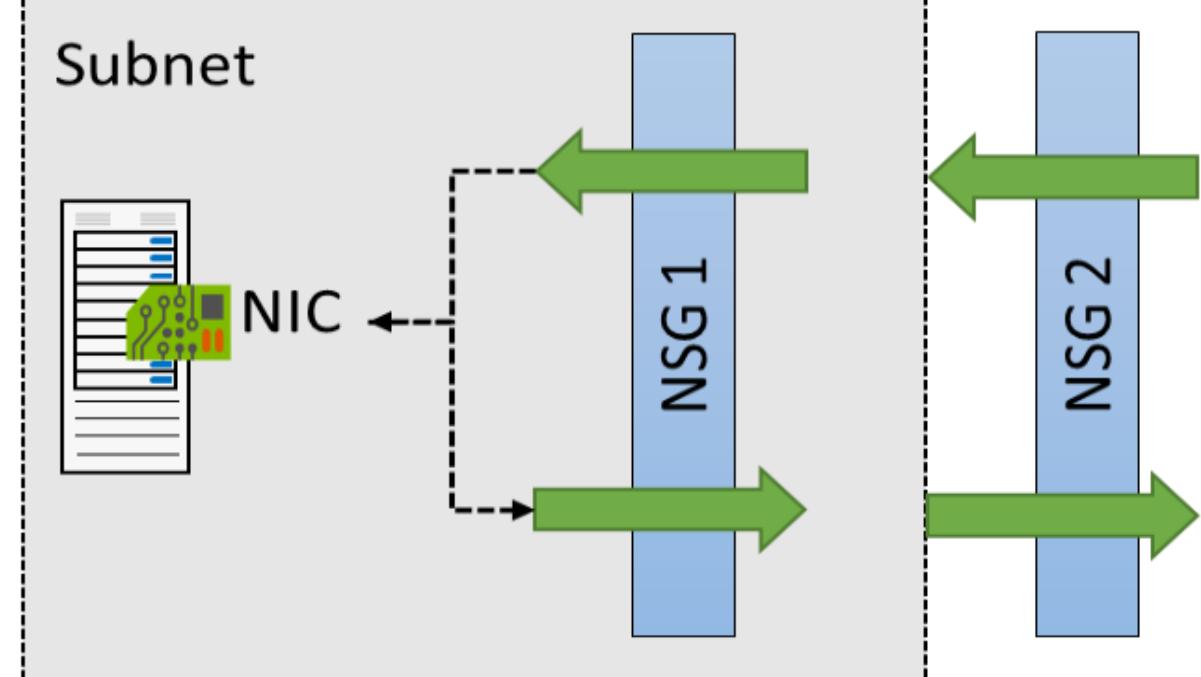
NSG Implementation

NSGs are evaluated independently for the subnet and NIC

An “allow” rule must exist at both levels for traffic to be admitted

You can add more rules – many preconfigured selections (SSH, RDP, FTP...)

Troubleshoot with the Effective Security Rules link



Application Security Groups (ASGs)

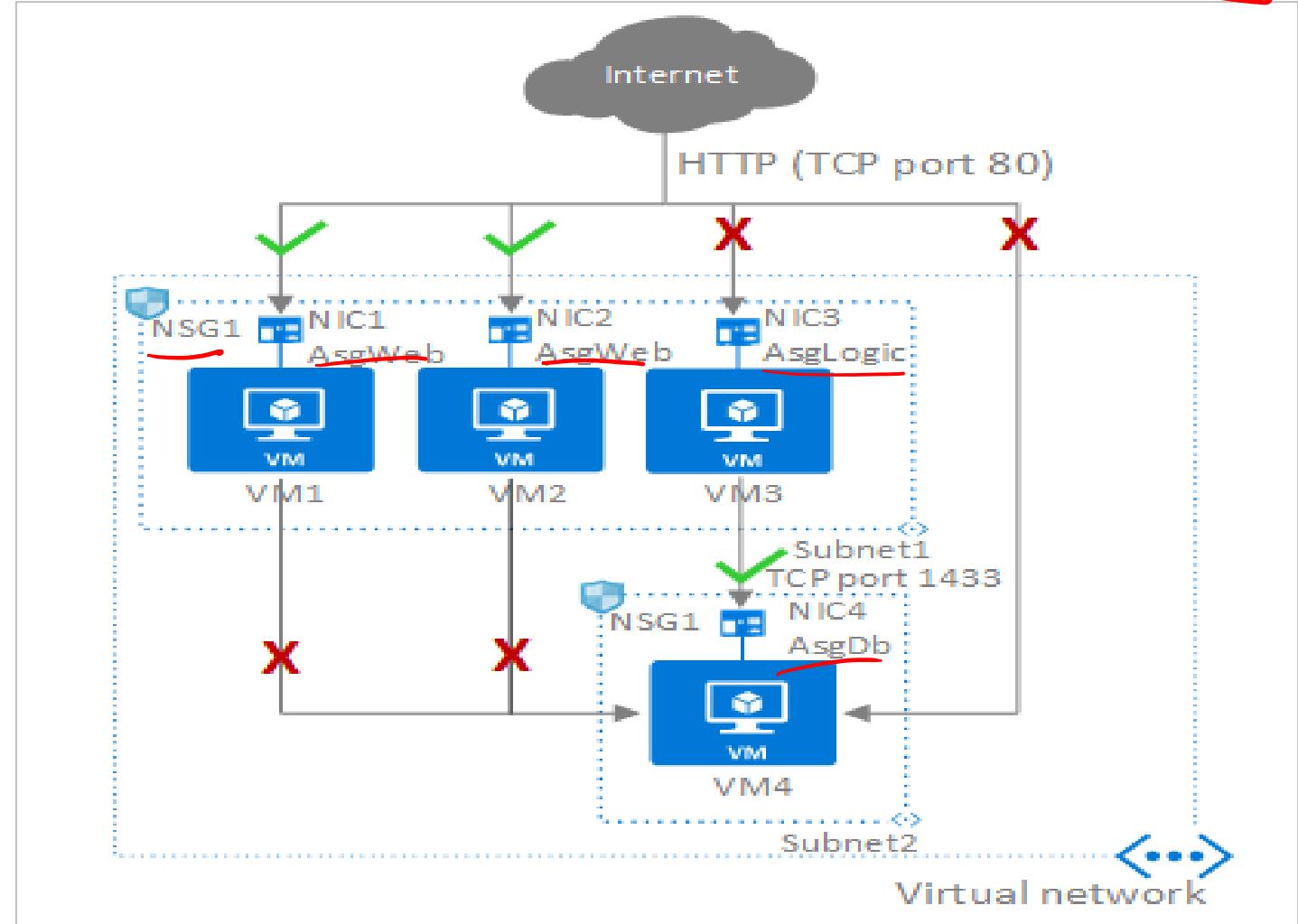
public IP
Basic Standard kann
muss NSG

Extends your application's structure

ASGs logically group virtual machines – web servers, application servers

Define rules to control the traffic flow

Wrap the ASG with an NSG for added security



Service Endpoints

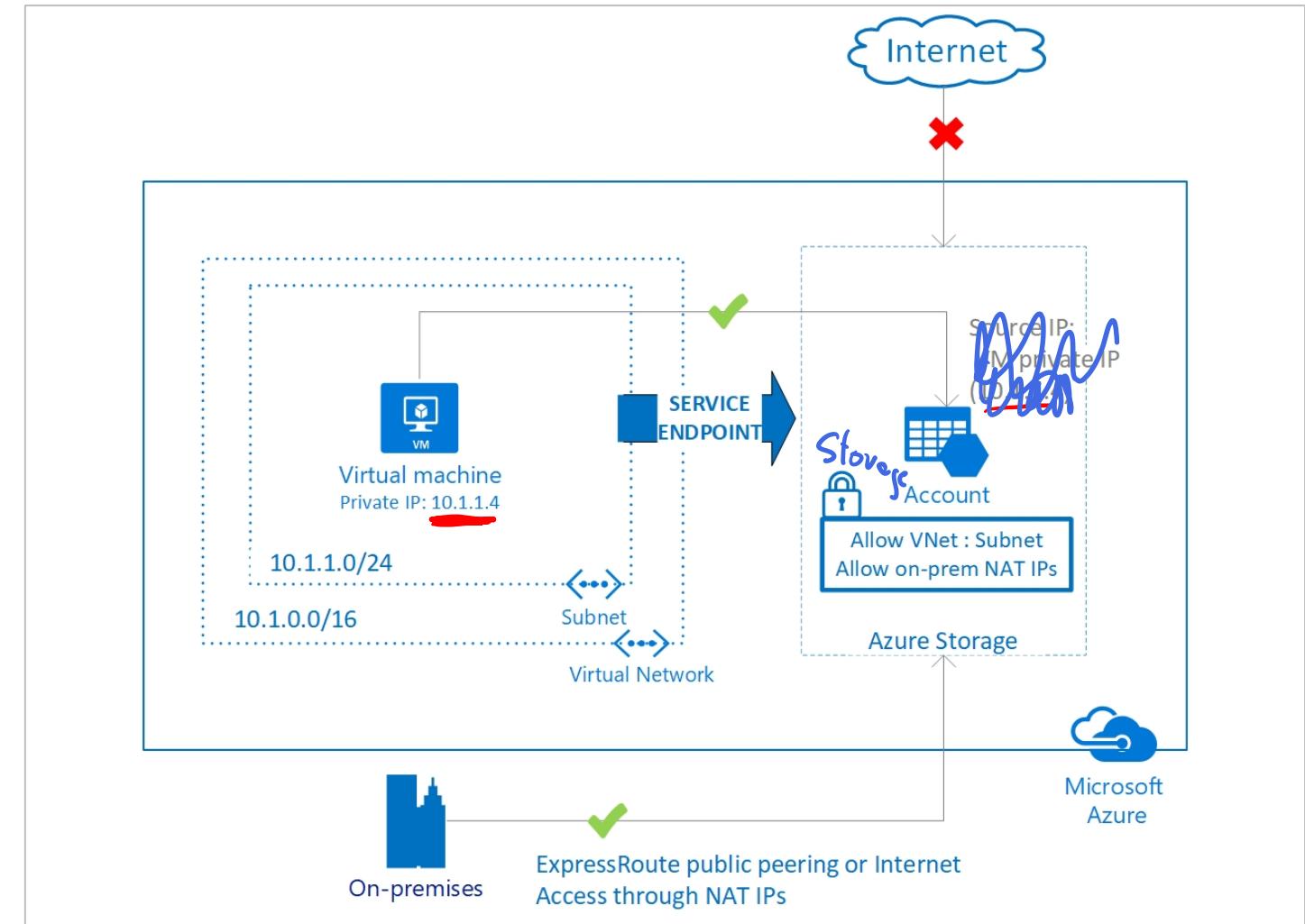
Endpoints limit network access to specific subnets and IP addresses

Improved security for your Azure service resources

Optimal routing for Azure service traffic from your virtual network

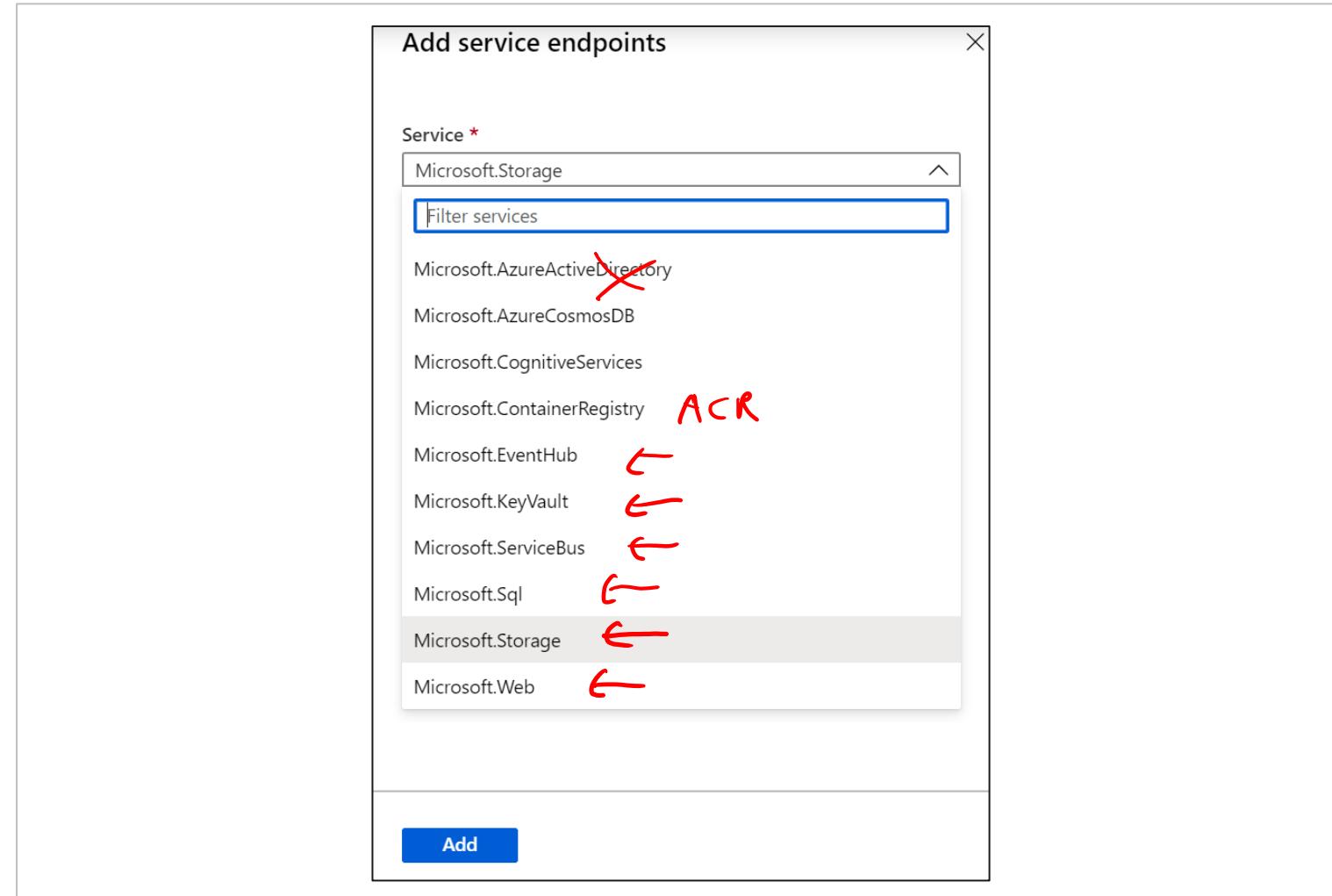
Endpoints use the Microsoft Azure backbone network

Simple to set up with less management overhead

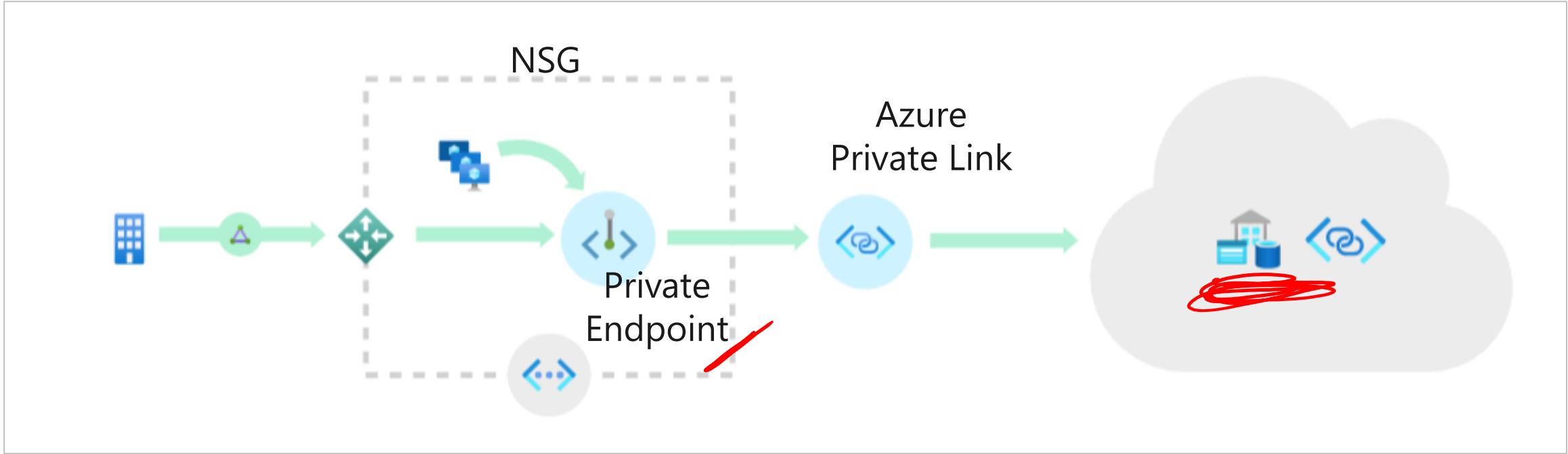


Service Endpoint Services

- ✓ Adding service endpoints can take up to 15 minutes to complete



Private Endpoint



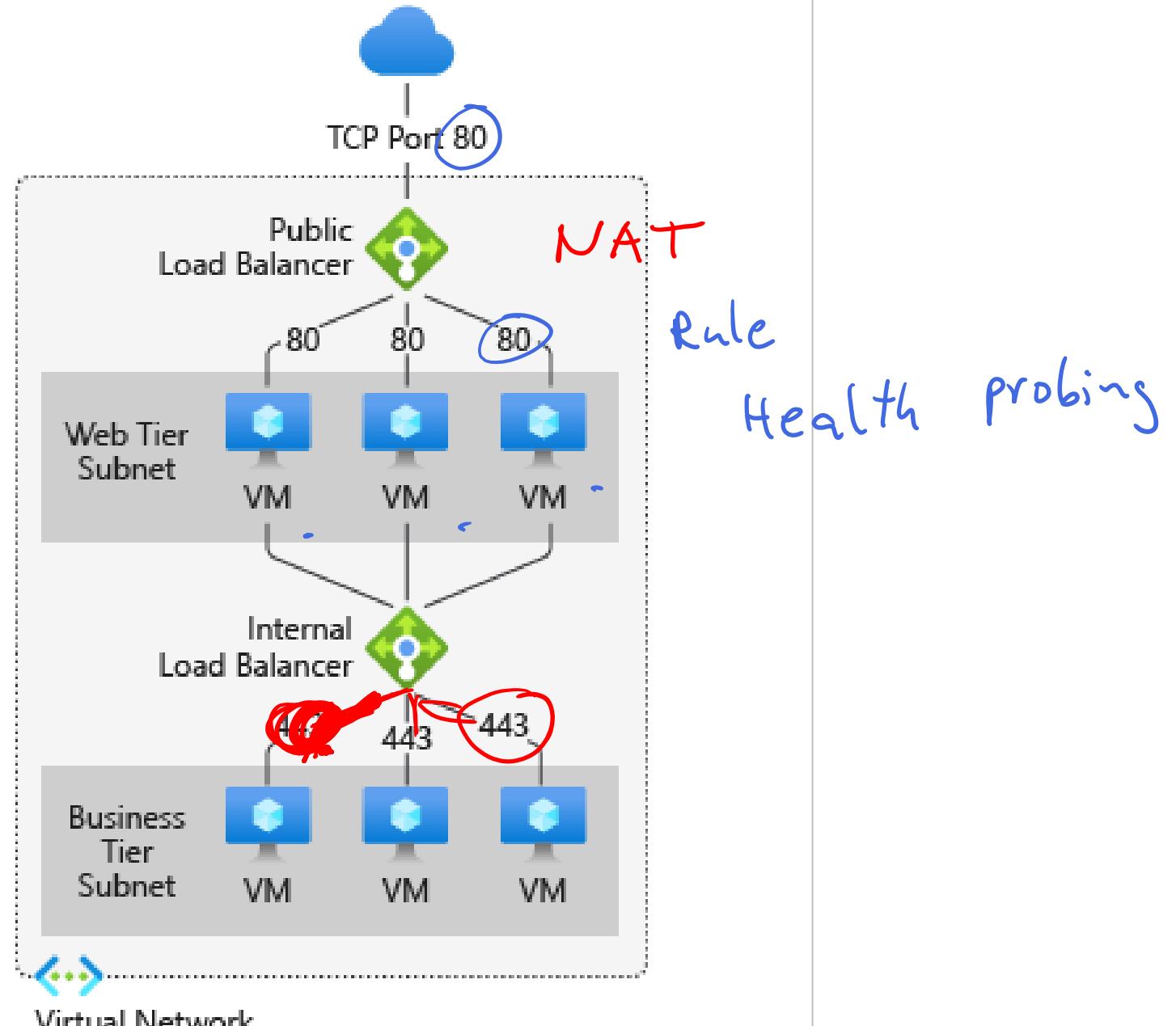
Private connectivity to services on Azure

Integration with on-premises and peered networks

Traffic remains on the Microsoft network,
with no public internet access

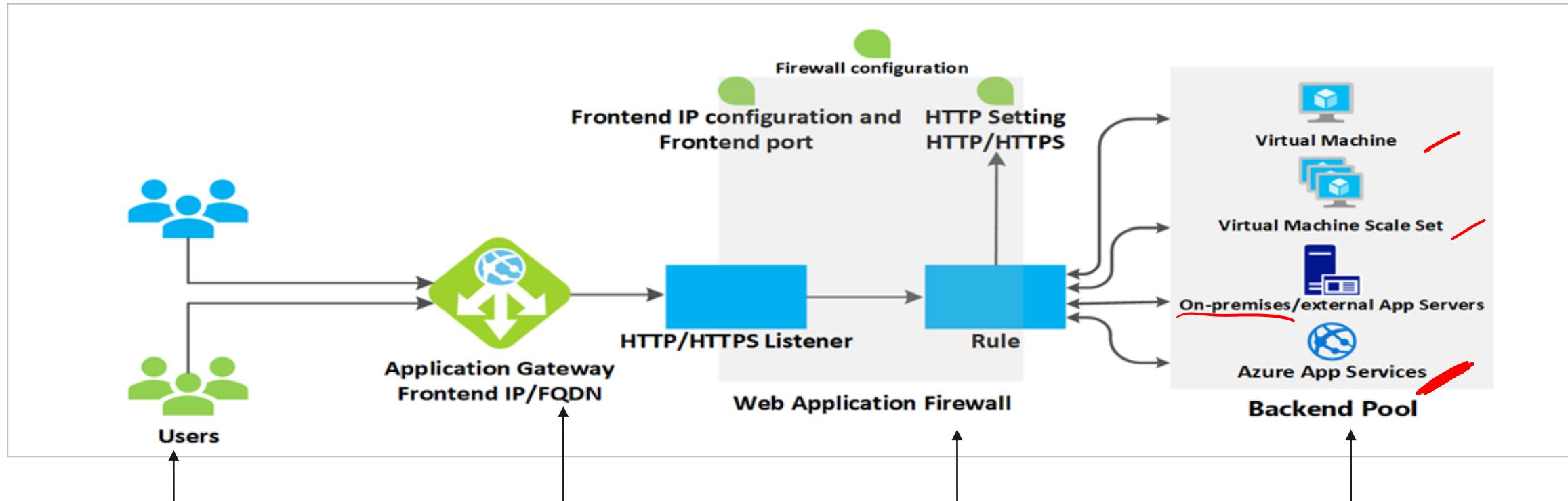
During a security incident within your network,
only the mapped resource would be accessible

Load Balancer



Balancing multi-tier applications by using both **public** and **internal** Load Balancer

Azure Application Gateway



- Websocket and HTTP/2 traffic
- Custom error pages
- Rewrite HTTP headers

- Secure Sockets Layer (SSL/TLS) termination
- Multiple site hosting

- URL based routing
- Path-based redirection
- Session affinity

- Connection draining

Web Application Firewall

App Gw

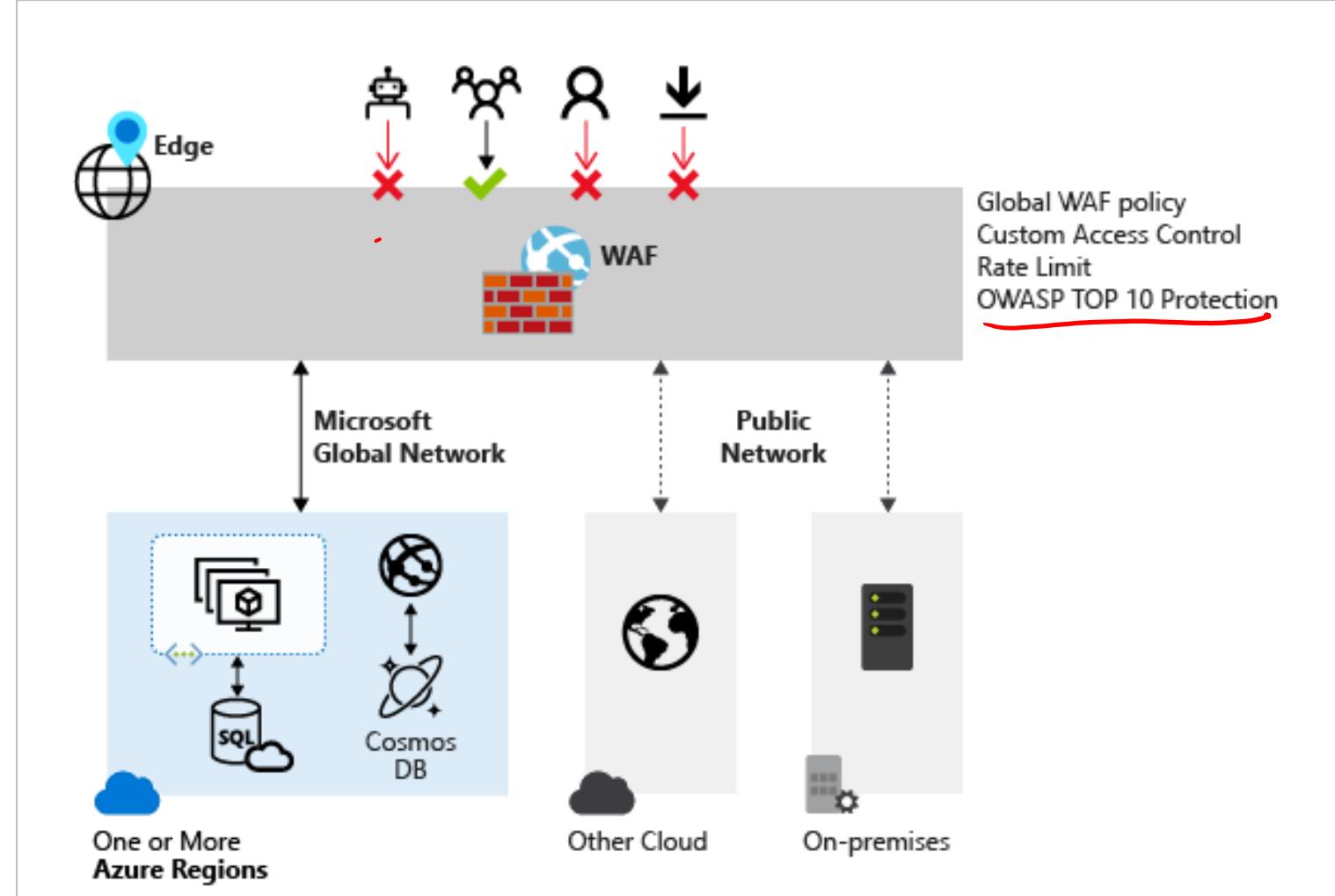
Front Door + CDN

Protects against cross site
scripting and SQL injection

OWASP Core Rule sets 3.1, 3.0,
2.29

Custom access control

Supports Azure Front Door, Azure
Application Gateway, and CDN
(preview)



Azure Front Door

Layer 7 global routing

Accelerate application performance with
anycast and split TCP

URL-based routing and session affinity

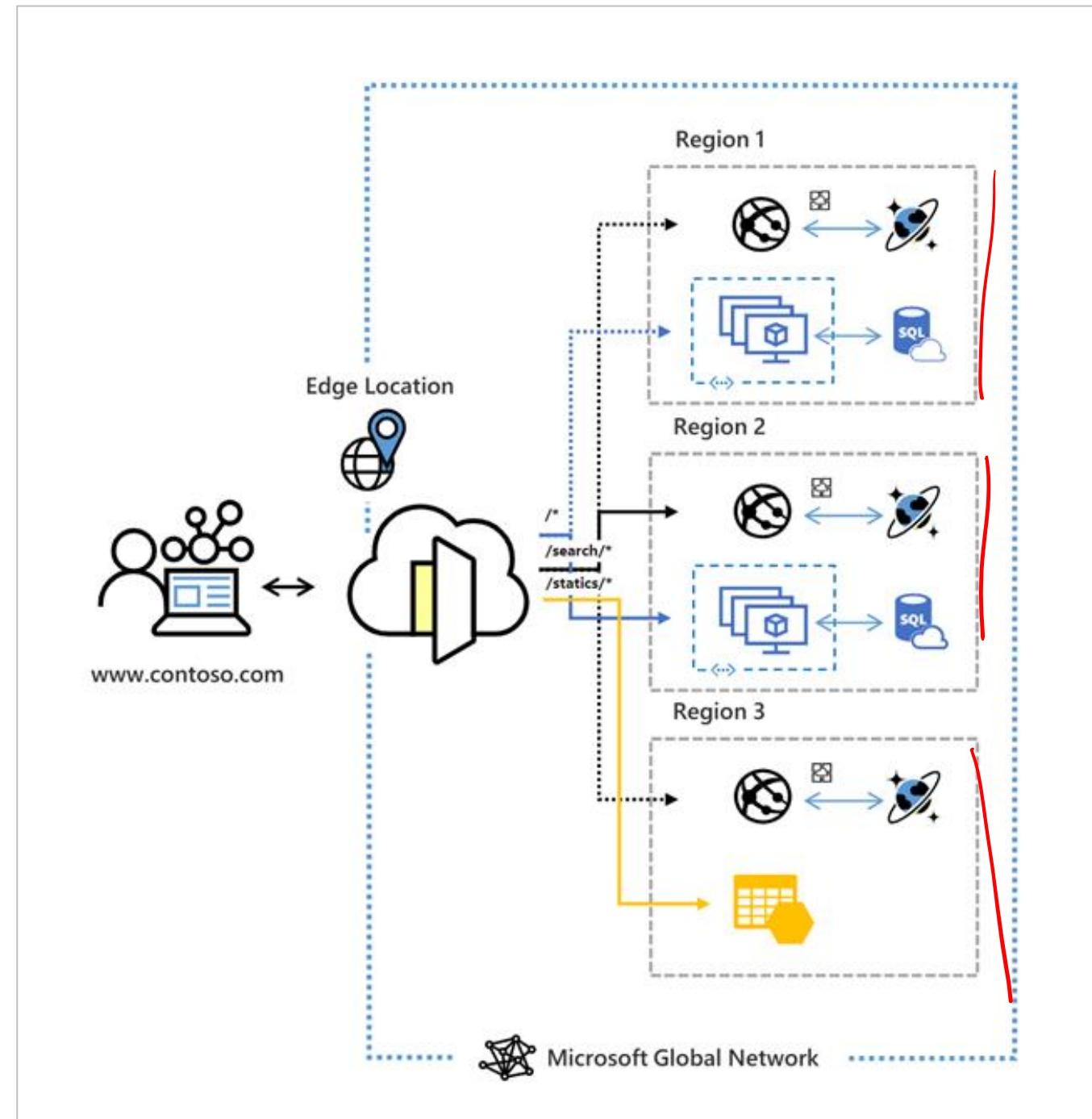
Multi-site hosting

Custom domains and certificate management

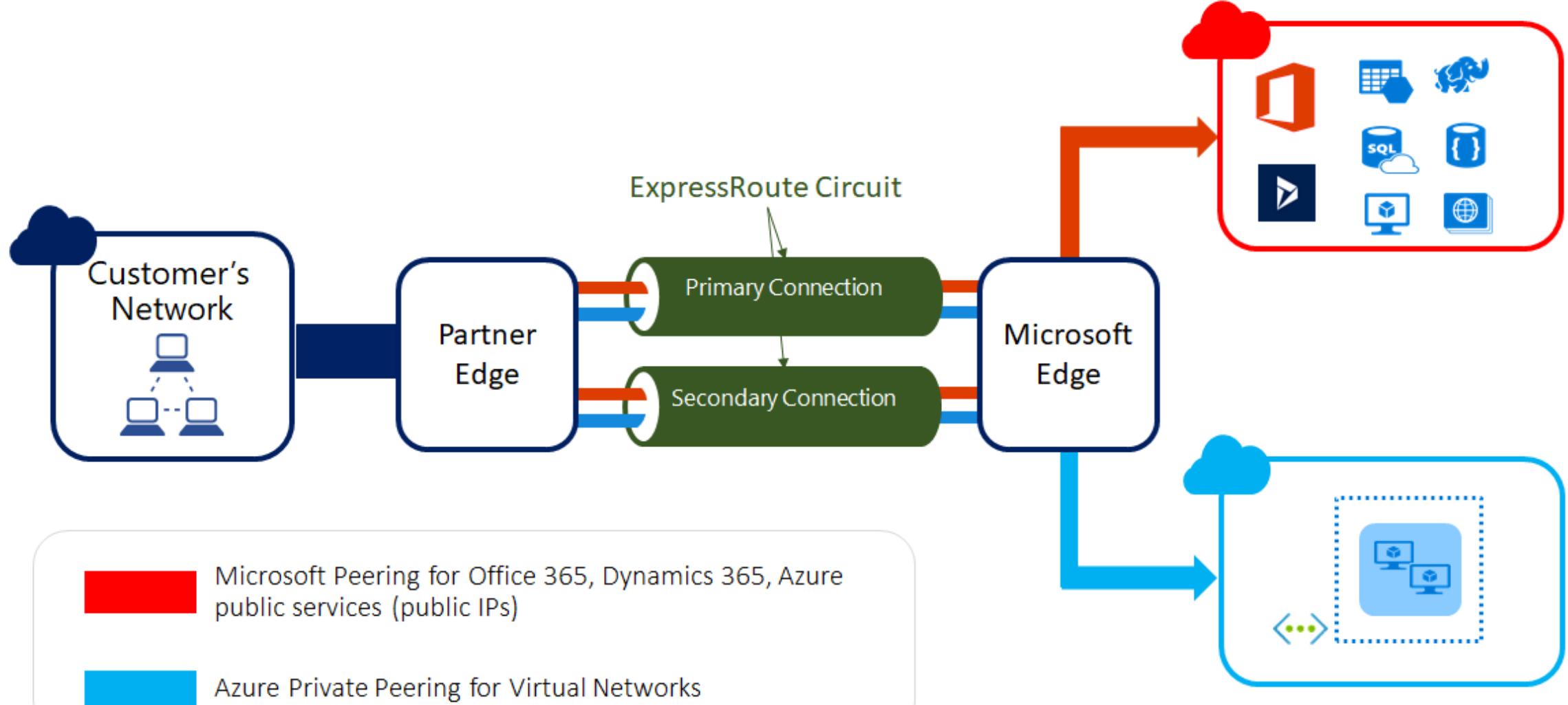
Application layer security - WAF

URL redirection and URL rewrite

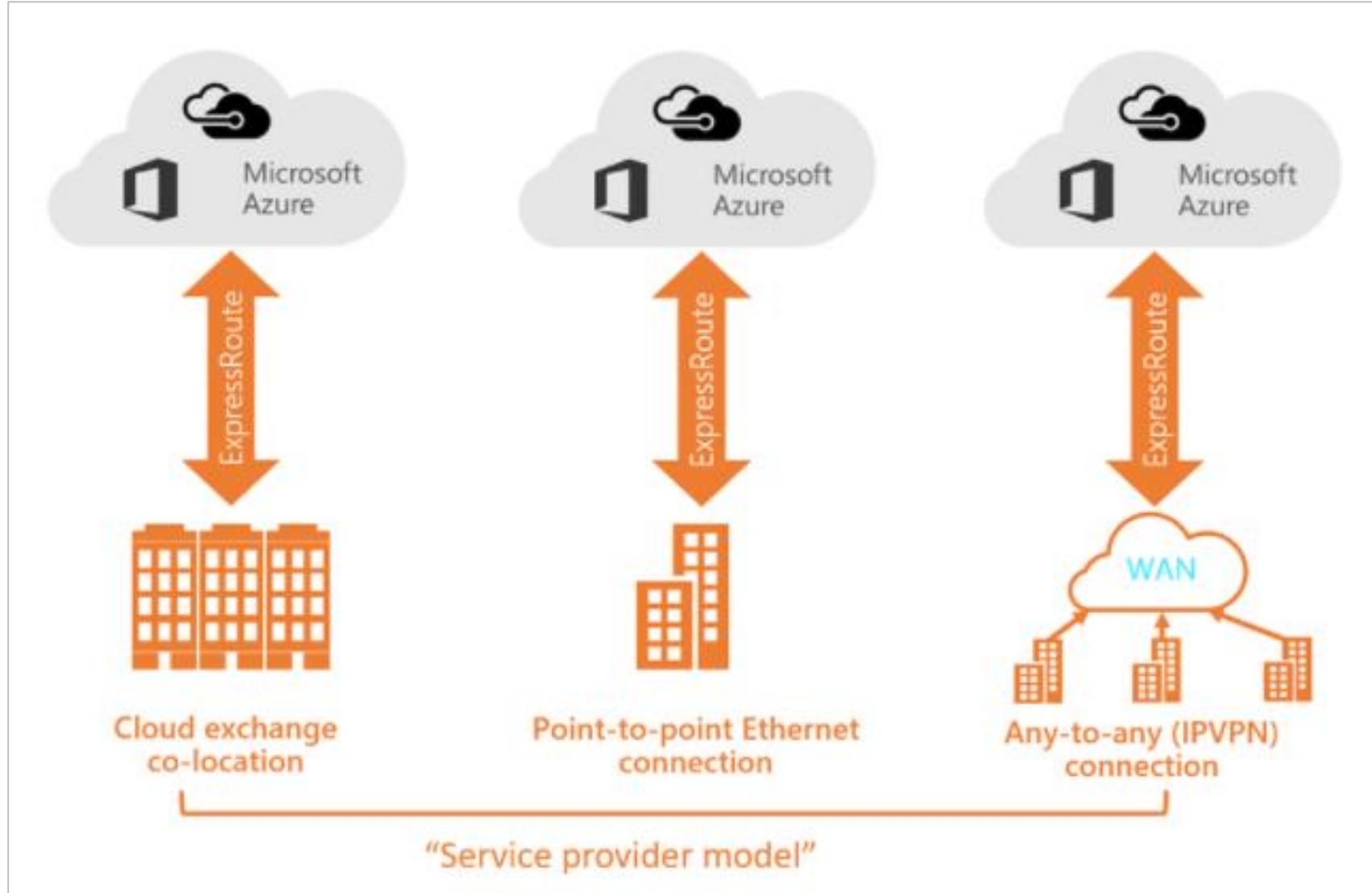
Protocol support – IPv6 and HTTP/2 traffic



ExpressRoute



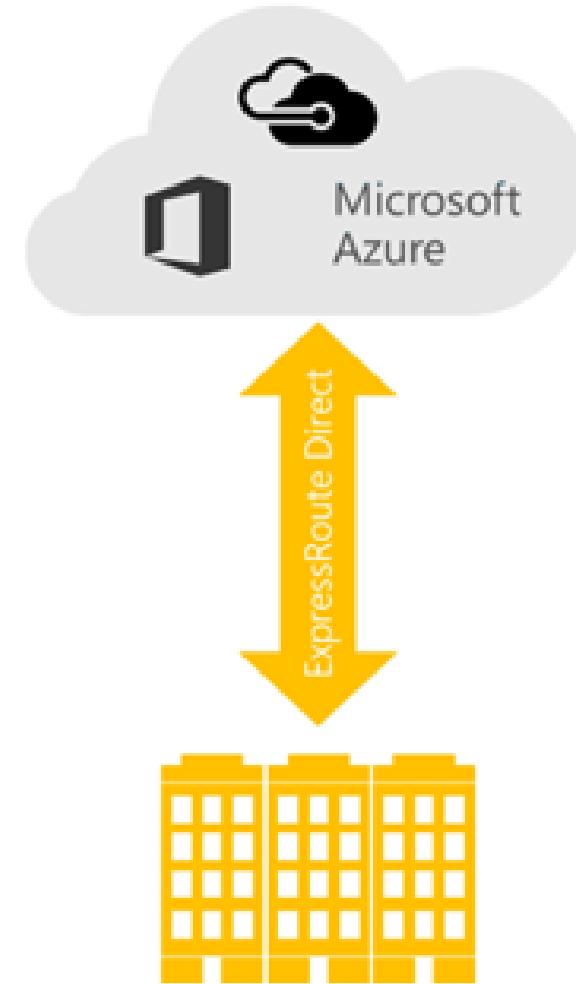
ExpressRoute – Service Provider Model



Note: Connectivity providers may offer one or more connectivity models.

ExpressRoute Direct

You can connect directly into the Microsoft's global network at a peering location strategically distributed across the world.



ExpressRoute site

“Direct model”

ExpressRoute using a service provider vs. ExpressRoute Direct

ExpressRoute Direct	ExpressRoute using a service provider
Requires 100 Gbps/10 Gbps infrastructure and full management of all layers	Uses service providers to enable fast onboarding and connectivity into existing infrastructure
Direct/Dedicated capacity for regulated industries and massive data ingestion	Integrates with hundreds of providers including Ethernet and Multiprotocol Label Switching (MPLS)
Customer may select a combination of the following circuit SKUs on 100-Gbps ExpressRoute Direct: 5 Gbps 10 Gbps 40 Gbps 100 Gbps	Circuits SKUs from 50 Mbps to 10 Gbps
Customer may select a combination of the following circuit SKUs on 10-Gbps ExpressRoute Direct: 1 Gbps 2 Gbps 5 Gbps 10 Gbps	
Optimized for single tenant with multiple business units and multiple work environments	Optimized for single tenant

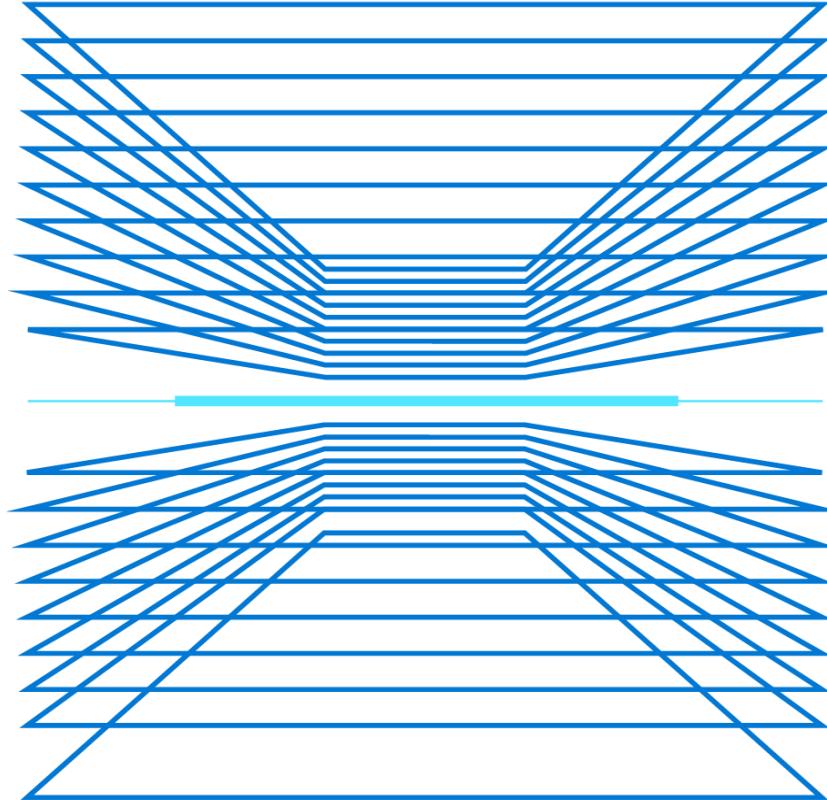
Circuit SKUs

Circuit Sizes	
100-Gbps ExpressRoute Direct	10-Gbps ExpressRoute Direct
Subscribed Bandwidth: 200 Gbps	Subscribed Bandwidth: 20 Gbps
<ul style="list-style-type: none">• 5 Gbps	<ul style="list-style-type: none">• 1 Gbps
<ul style="list-style-type: none">• 10 Gbps	<ul style="list-style-type: none">• 2 Gbps
<ul style="list-style-type: none">• 40 Gbps	<ul style="list-style-type: none">• 5 Gbps
<ul style="list-style-type: none">• 100 Gbps	<ul style="list-style-type: none">• 10 Gbps

Note: The physical port pairs are 100 Gbps or 10 Gbps only and can have multiple virtual circuits

Demonstrations: Network Connectivity

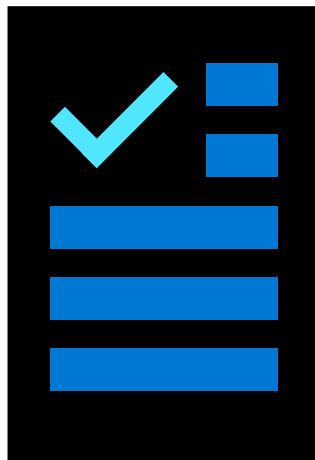
- Network Security Groups
- Application Security Groups



Additional Study – Network Security

Module Review Questions

Microsoft Learn Modules (docs.microsoft.com/Learn)



Encrypt network traffic end to end with Azure Application Gateway (Exercise)

Connect your on-premises network to the Microsoft global network by using ExpressRoute

Design a hybrid network architecture on Azure

Secure and isolate access to Azure resources by using network security groups and service endpoints (Exercise)

Host Security



Host Security



Endpoint Protection



Privileged Access Workstations



Virtual Machine Templates



Remote Access Management



Update Management



Disk Encryption



Microsoft Defender ?

Defender Cloud (ASC)
M365 Defender (ATP)



Microsoft Defender for Cloud Recommendations



Securing Azure Workloads

Endpoint Protection



Microsoft Defender for Endpoint is an enterprise endpoint security platform designed to help enterprise networks **prevent, detect, investigate, and respond** to advanced threats.



Core Defender
Vulnerability
Management



Attack surface
reduction



Next-generation
protection



Endpoint detection
and response



Automated investigation
and remediation

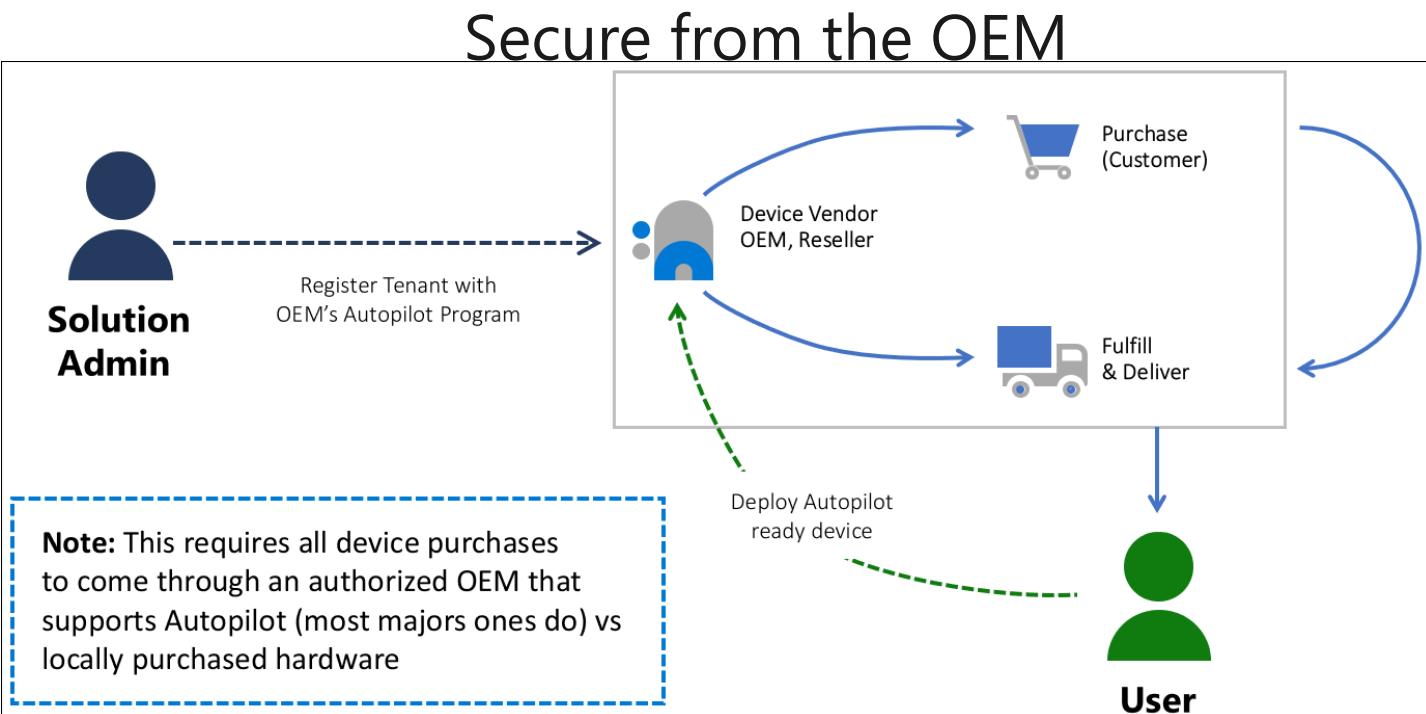


Microsoft
Threat Experts



Microsoft Defender for Endpoint is available in two plans, Defender for Endpoint Plan 1 and Plan 2.

Privileged Access Device Strategy



Hardware Root-of-Trust

- Trusted Platform Module (TPM) 2.0
- BitLocker Drive Encryption
- UEFI Secure Boot
- Drivers and Firmware Distributed through Windows Update
- Virtualization and HVCI Enabled
- Drivers and Apps HVCI-Ready
- Windows Hello
- DMA I/O Protection
- System Guard
- Modern Standby

Privileged Access Workstations



Separate dedicated administrative accounts and workstations.

Protects from Internet attacks and threat vectors phishing attacks, application and OS vulnerabilities, and credential theft attack

Appropriate for accounts with access to high value assets -Administrators and High Sensitivity Information Workers

Virtual Machine Templates

Improves consistency

Express complex deployments

Reduce manual, error prone tasks

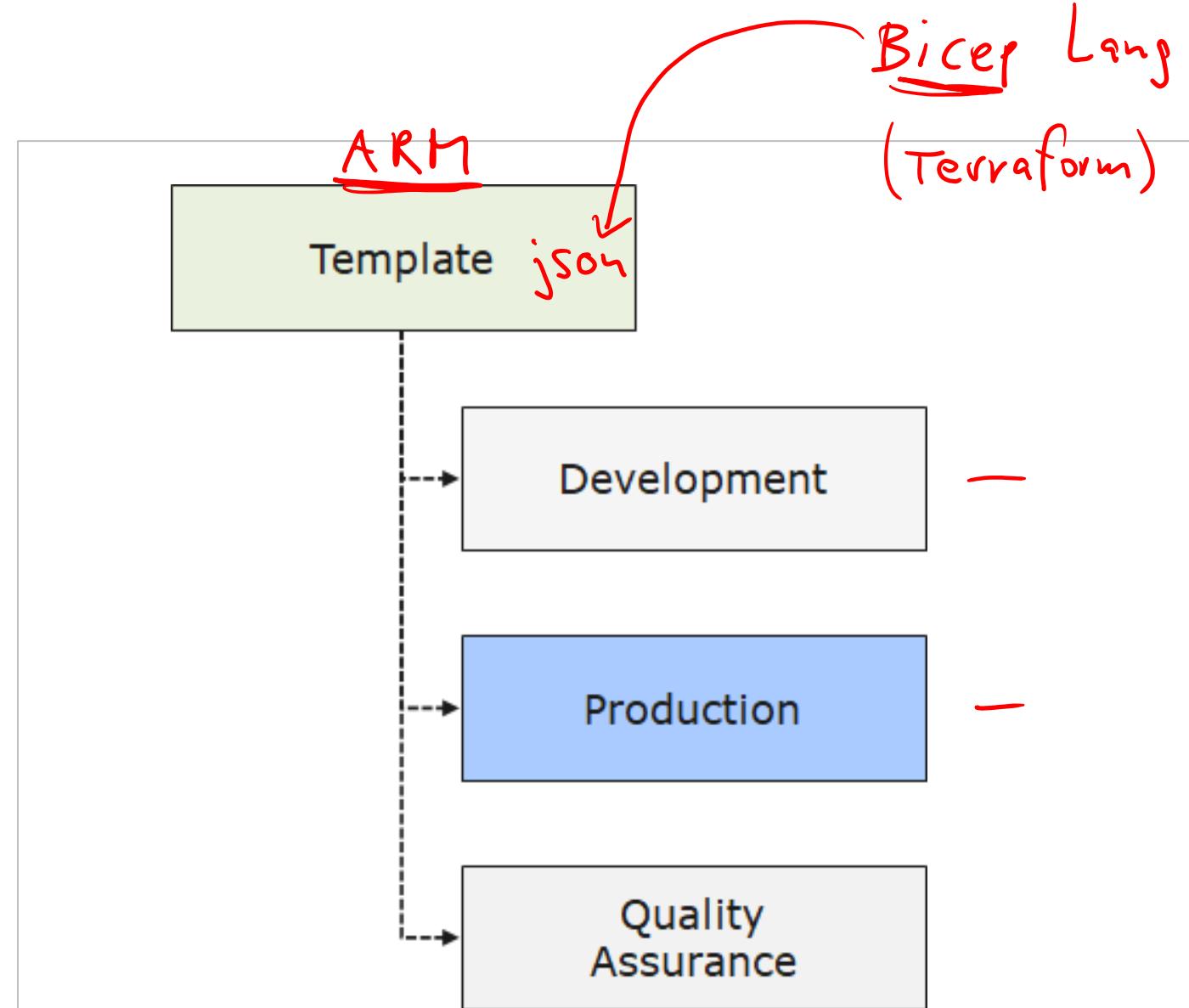
Express requirements through code

Promotes reuse

Modular and can be linked

Simplifies orchestration

Enforces security concerns

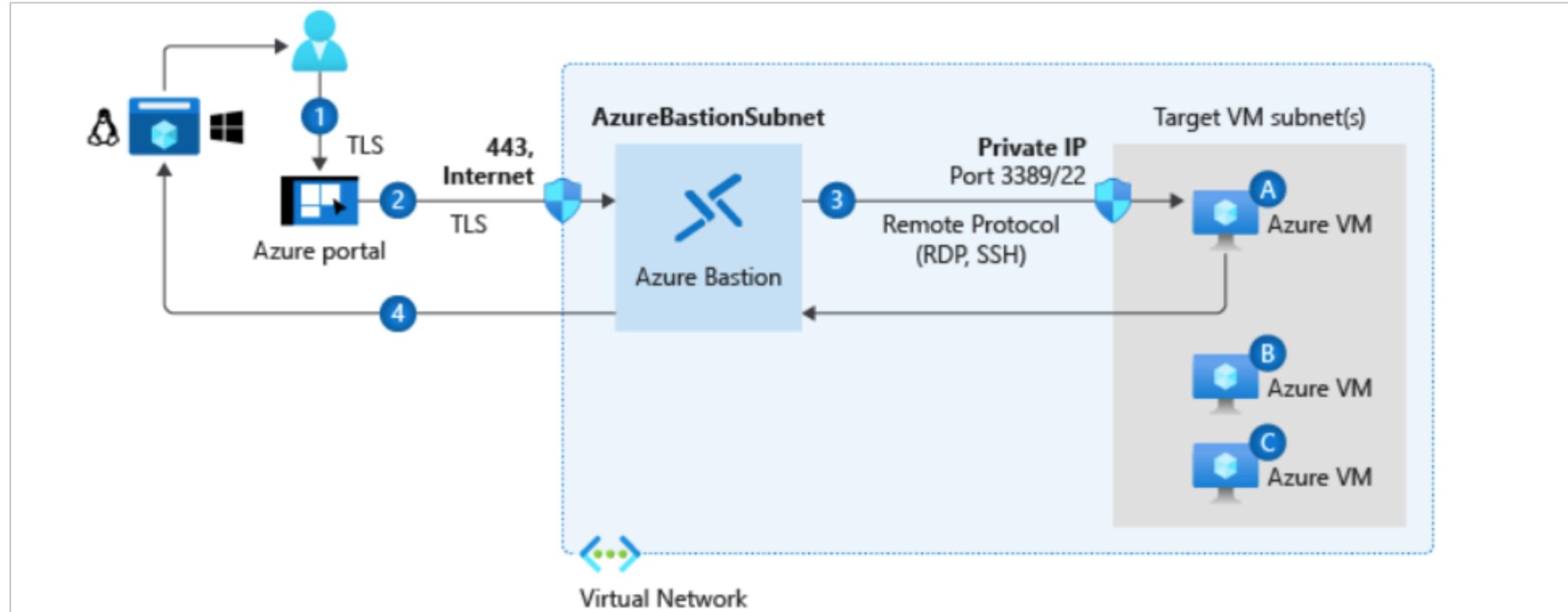


Remote Access Management

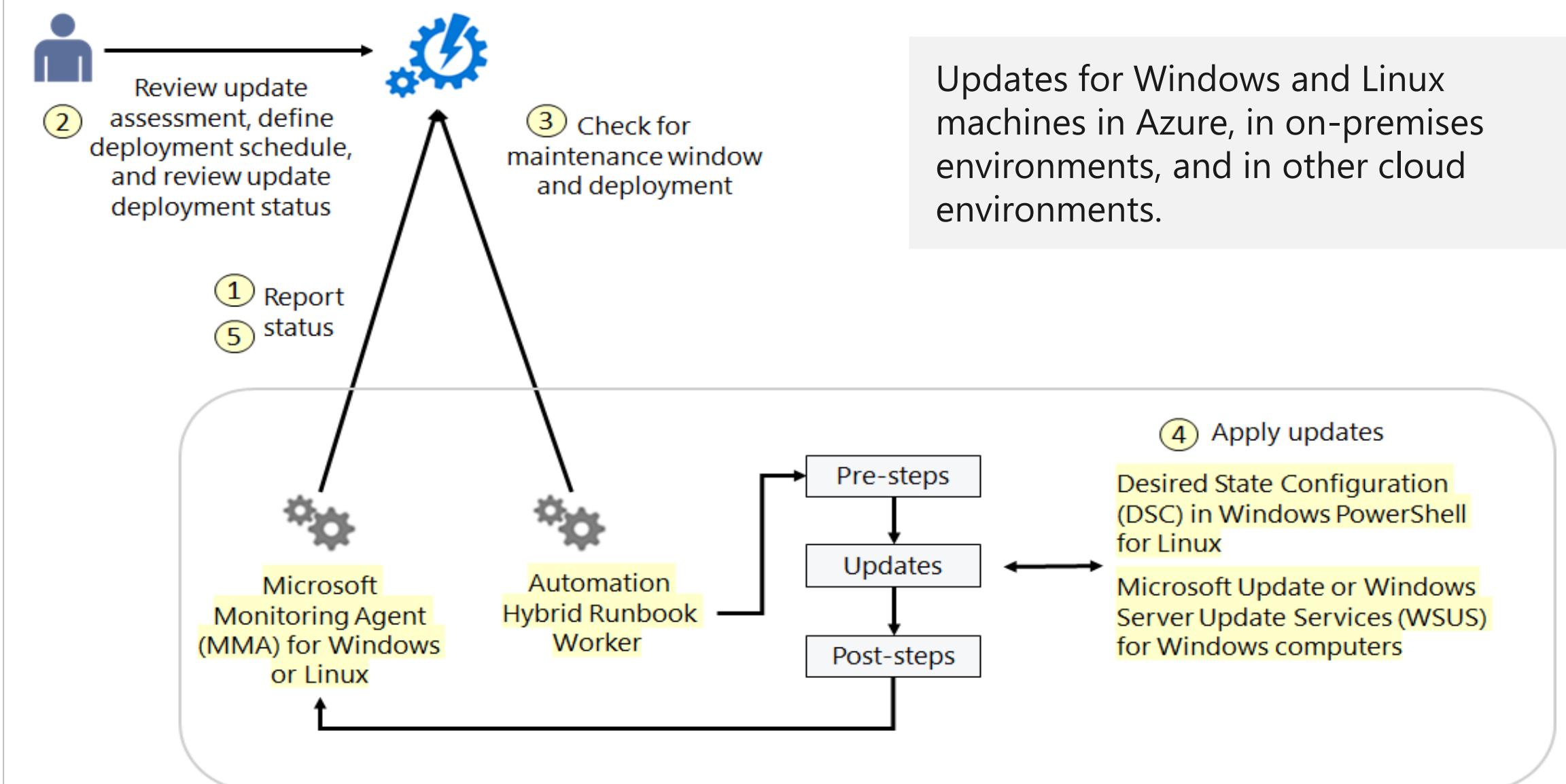
Remote Desktop Protocol (RDP) for Windows-based virtual machines

Secure Shell Protocol (SSH) for Linux based virtual machines

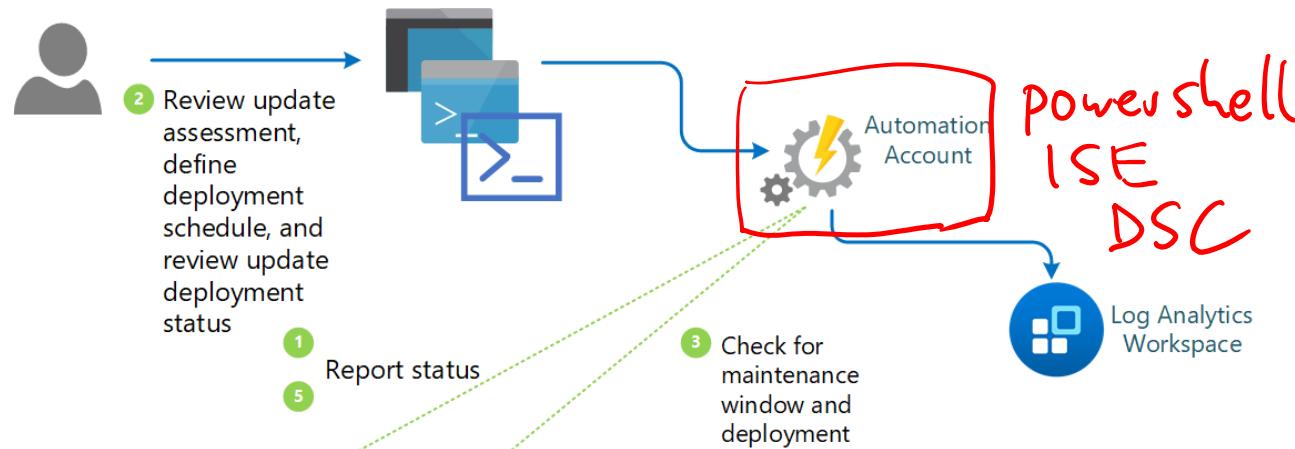
Bastion Subnet for RDP/SSH through the Portal over SSL



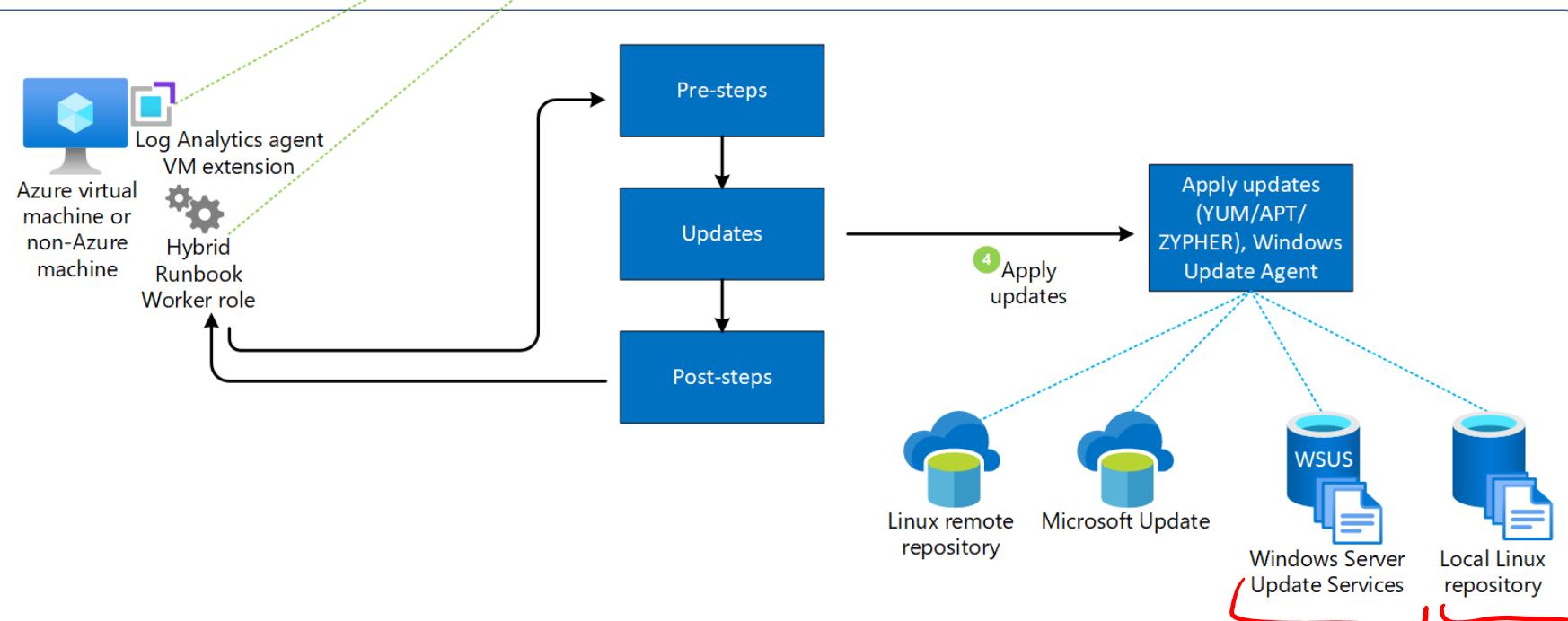
Update Management



Azure Automation Update Management Overview



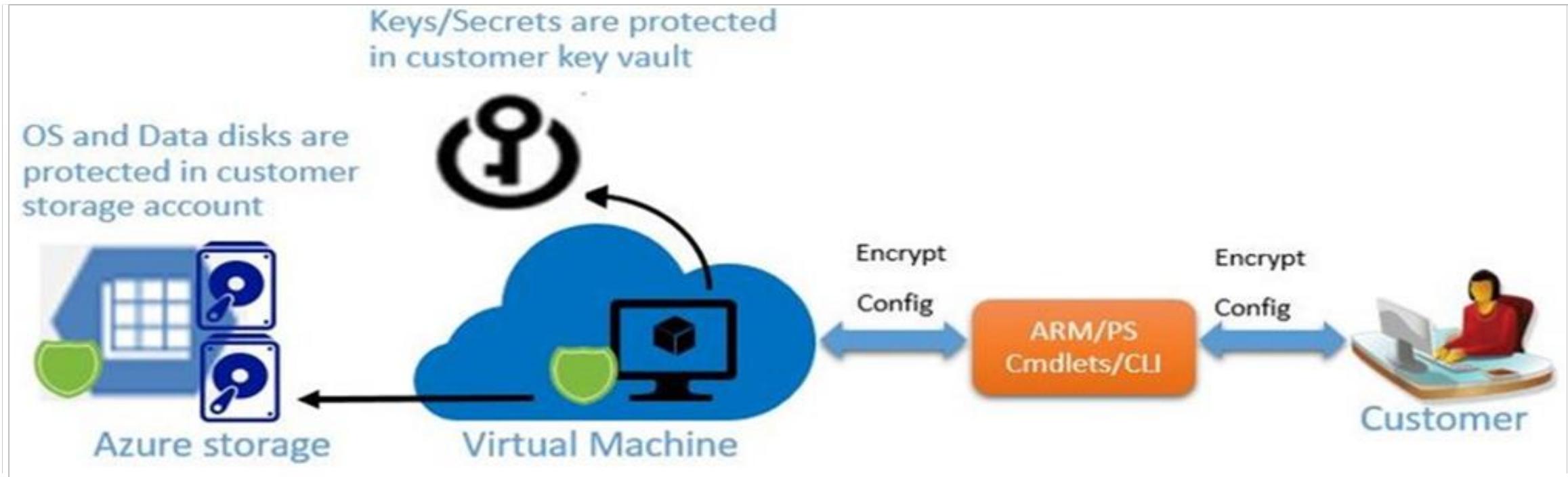
Updates for Windows and Linux machines in Azure, in on-premises environments, and in other cloud environments.



Azure Automation Update Management Overview (cont'd)

Connected source	Supported	Description
Windows	Yes	<p>Update Management collects information about system updates from Windows machines with the Log Analytics agent and installation of required updates.</p> <p>Machines need to report to Microsoft Update or Windows Server Update Services (WSUS).</p>
Linux	Yes	<p>Update Management collects information about system updates from Linux machines with the Log Analytics agent and installation of required updates on supported distributions.</p> <p>Machines need to report to a local or remote repository.</p>
Operations Manager management group	Yes	<p>Update Management collects information about software updates from agents in a connected management group.</p> <p>A direct connection from the Operations Manager agent to Azure Monitor logs isn't required. Log data is forwarded from the management group to the Log Analytics workspace.</p>

Disk Encryption



Provides encryption of the operating system and data disks

Windows VMs (BitLocker) and Linux VMs (DM-Crypt)

Stores encryption keys in a customer-managed key vault

Managed disk Encryption Options

	Encryption at rest (OS and data disks)	Temp disk encryption	Encryption of caches	Data flows encrypted between Compute and Storage	Customer control of keys	Does not use your VM's CPU	Works for custom images	Enhanced Key Protection	Microsoft Defender for Cloud disk encryption status
Azure Disk Storage Server-Side Encryption at rest	✓	✗	✗	✗	✓ When configured with Data Encryption Standard (DES)		✗	✗	Unhealthy not applicable if exempt
Azure Disk Encryption	✓	✓	✓	✓	✓	✗	✗	✗	Healthy
Encryption at Host	✓	✓							Unhealthy not applicable if exempt
Confidential disk encryption	✓ For the OS disk only	✗	✓ For the OS disk only	✓ For the OS disk only	✓ For the OS disk only	✗	✓	✓	Unhealthy not applicable if exempt



For **Encryption at host** and **Confidential disk encryption**, Microsoft Defender for Cloud does not detect the encryption state. We are in the process of updating Microsoft Defender.

Microsoft Defender for Endpoint – Supported Operating Systems

Supported Windows versions	
Windows 11	Enterprise, Education, Pro, Pro Education
Windows 10	Enterprise, Enterprise LTSC: 2016 (or later), Enterprise IoT, Enterprise Education, Windows 10 Pro, Windows 10 Pro Education
Windows 8.1	Enterprise, and Pro
Windows 7 SP1	Enterprise (Requires ESU for support.), and Pro (Requires ESU for support.)
Windows Server	2008 R2 SP1 (Requires ESU for support), 2012 R2, 2016, version 1803 or later, 2019 and later, 2019 core edition, and 2022
Windows	Virtual Desktop
Windows	365
Other Operating Systems	
macOS	
Linux	
Android	
iOS	

Microsoft cloud security benchmark in Defender for Cloud

- The Microsoft cloud security benchmark (MCSB) provides best practices and recommendations, with input from a set of holistic Microsoft and industry security guidance that includes:



Cloud Adoption Framework: Guidance on security, including strategy, roles and responsibilities, Azure Top 10 Security Best Practices, and reference implementation.



Azure Well-Architected Framework: Guidance on securing your workloads on Azure.



The Chief Information Security Officer (CISO) Workshop: Program guidance and reference strategies to accelerate security modernization using Zero Trust principles.



Other industry and cloud service providers security best practice standards and framework: Examples include the Amazon Web Services, Center for Internet Security (CIS) Controls, National Institute of Standards and Technology, and the Payment Card Industry Data Security Standard.

Regulatory compliance dashboard

Microsoft Defender for Cloud streamlines the process for meeting regulatory compliance requirements, using the regulatory compliance dashboard.

The compliance dashboard gives you a view of your overall compliance standing.

Security for non-Azure platforms follows the same cloud-neutral security principles as Azure.

The screenshot shows the Microsoft Defender for Cloud Regulatory Compliance Dashboard. At the top, there are navigation links: Download report, Manage compliance policies, Open query, Compliance over time workbook, Audit reports, and Compliance offerings. A message indicates that users can now fully customize the standards tracked in the dashboard by selecting 'Manage compliance policies'.

Microsoft cloud security benchmark: 52 of 62 passed controls. A progress bar shows 52 blue segments out of 62 total.

Lowest compliance regulatory standards: A list of four standards with their respective scores and counts:

Standard	Score
SOC TSP	1/13
PCI DSS 3.2.1	13/43
ISO 27001	9/20
Azure CIS 1.4.0	94/109

Question: Is the regulatory compliance experience clear to you? Yes No

Microsoft cloud security benchmark: ISO 27001, PCI DSS 3.2.1, SOC TSP, Azure CIS 1.4.0

Recommendations from Microsoft Defender for Cloud - Regulatory Compliance should not be interpreted as a guarantee of compliance. It is up to you to evaluate a environment. These services are subject to the terms and conditions in the [licensing terms](#).

Microsoft cloud security benchmark is applied to the subscription MCAPS-Hybrid-REQ-48118-2022-serlingdavis

Expand all compliance controls

NS. Network Security (Red X)

IM. Identity Management (Green Checkmark)

PA. Privileged Access (Red X)

Recommendations

Using the policies, Defender for Cloud periodically analyzes the compliance status of your resources to identify potential security misconfigurations and weaknesses.

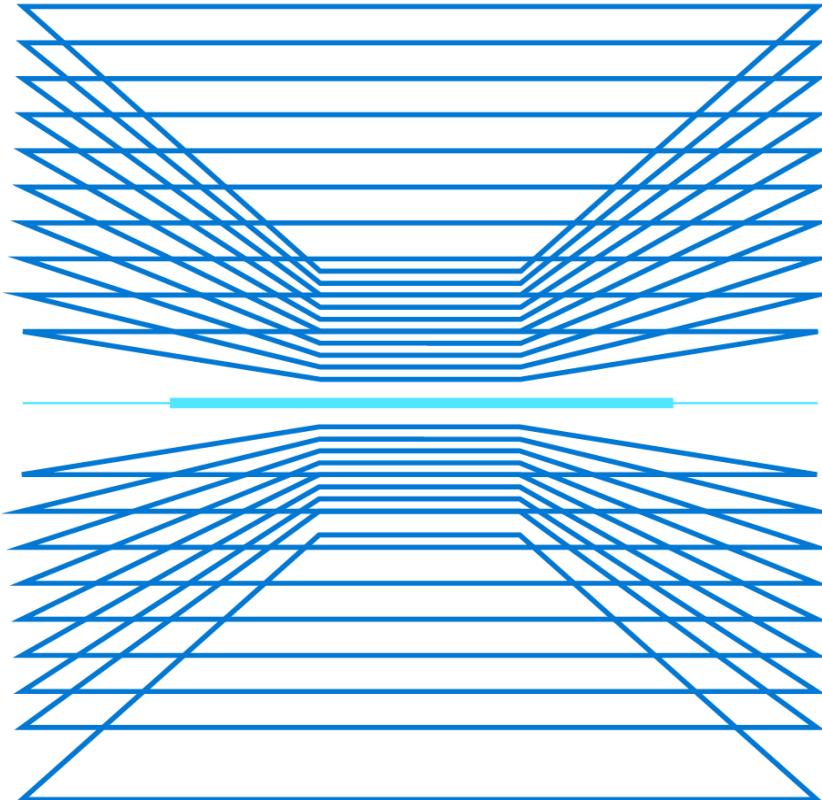
It then provides you with recommendations on how to remediate those issues.

Recommendations result from assessing your resources against the relevant policies and identifying resources that aren't meeting your defined requirements.

Secure score recommendations		All recommendations
 77%	Secure score ⓘ	 7/38 Active recommendations
<input type="text"/> Search recommendations		Recommendation status == None ×
 ⓘ Name ↑		Max score ↓
 > Enable MFA		10
 > Secure management ports		8
 > Remediate vulnerabilities		6
 > Apply system updates		6
 > Encrypt data in transit		4
 > Manage access and permissions		4
 > Enable encryption at rest		4
 > Remediate security configurations		4
 > Restrict unauthorized network access		4

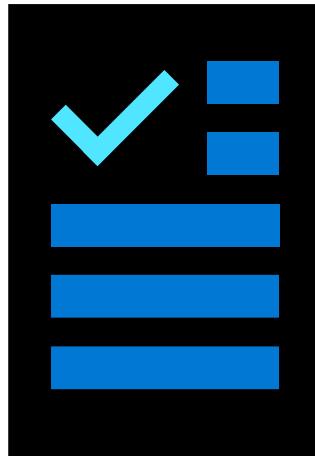
Demonstrations: Host Security

- Bastion connections
- Virtual machine updates
- Virtual machine extensions
- Disk encryption
- RDP to Windows VMs (optional)
- SSH to Linux VMs (optional)



Additional Study – Host Security

Module Review Questions



Microsoft Learn Modules (docs.microsoft.com/Learn)

Build Azure Resource Manager templates (Exercise)

Secure your Azure virtual machine disks (Exercise)

Protect against threats with Microsoft Defender for Endpoint

Introduction to Azure virtual machines (Exercise)

Keep your virtual machines updated (Exercise)

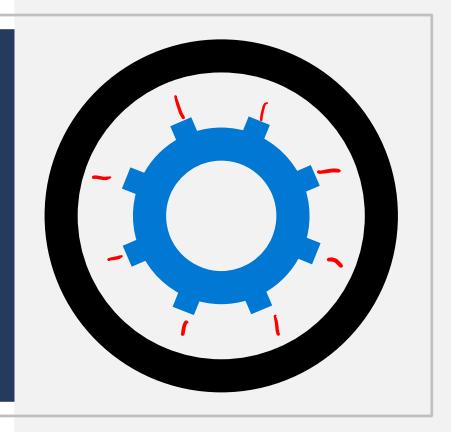
Create a Windows virtual machine in Azure (Exercise)

Create a Linux virtual machine in Azure (Exercise)

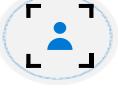
Security baselines

Brendan Burns — Kubernetes

Container Security

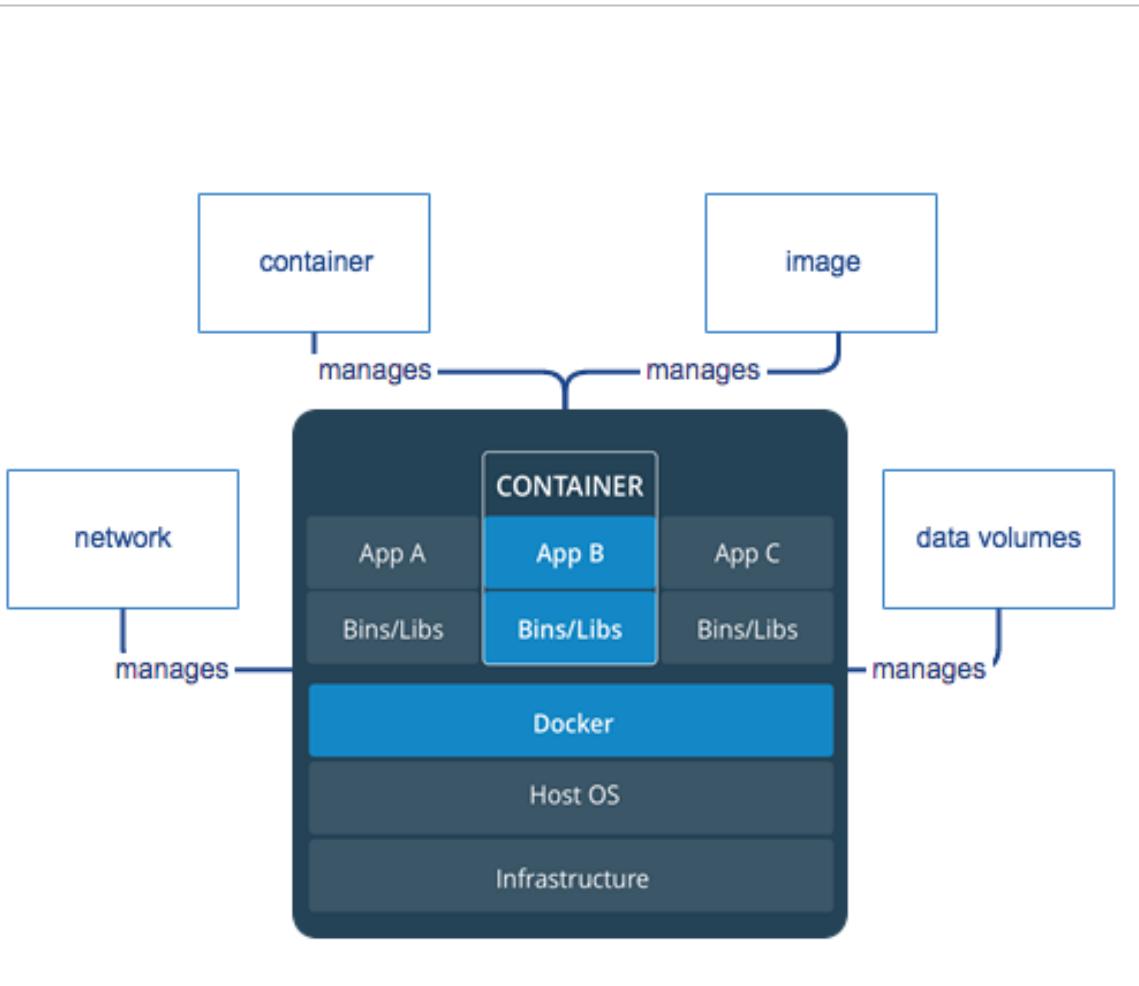


Container Security

-  Containers
-  ACI Security
-  Azure Container Instances (ACI)
-  Azure Container Registry (ACR)
-  ACR Authentication
-  Azure Kubernetes Service (AKS)
-  AKS Terminology
-  AKS Architecture
-  AKS Networking
-  AKS Storage
-  AKS and Active Directory

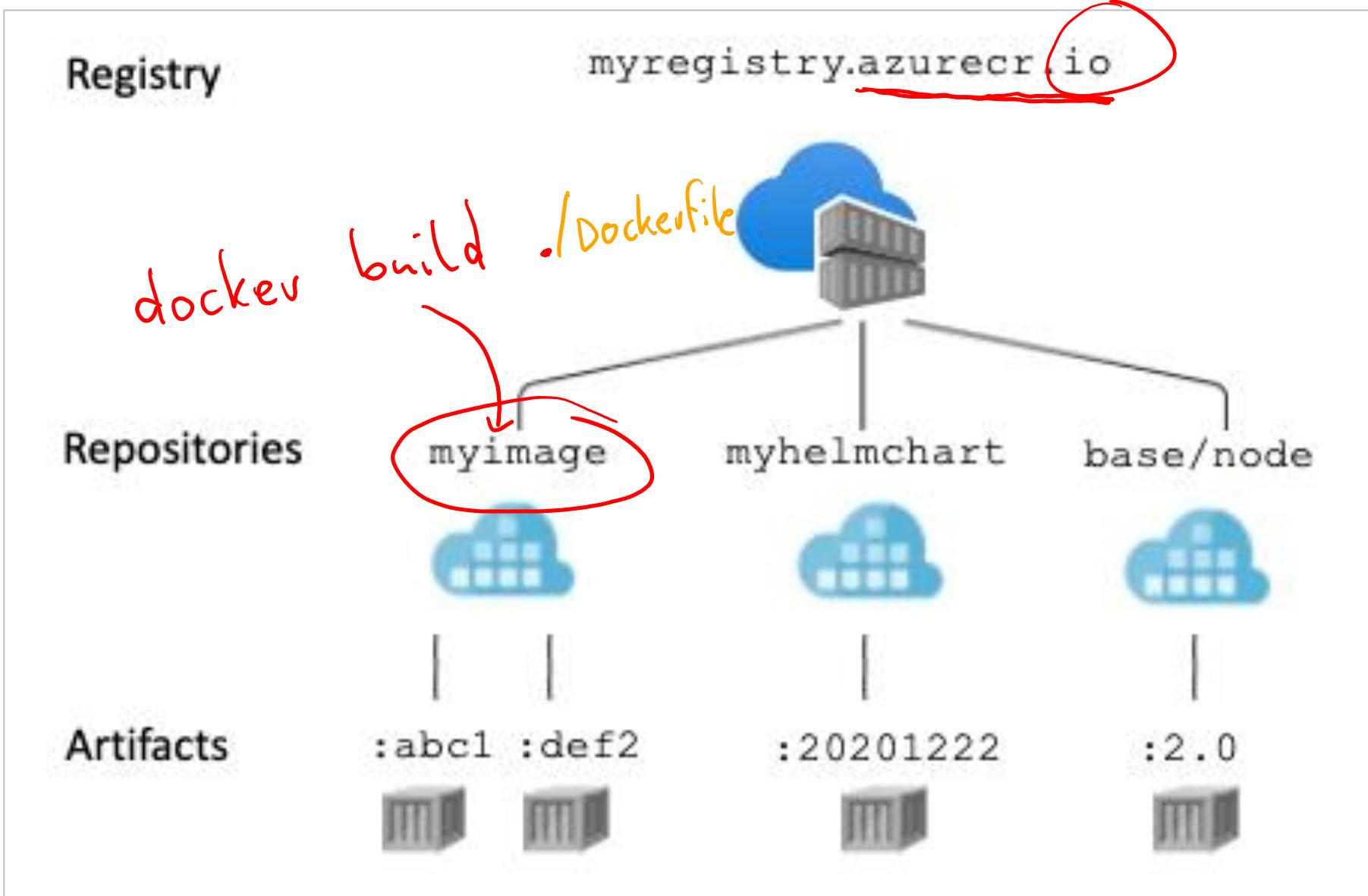
Containers

Docker Desktop



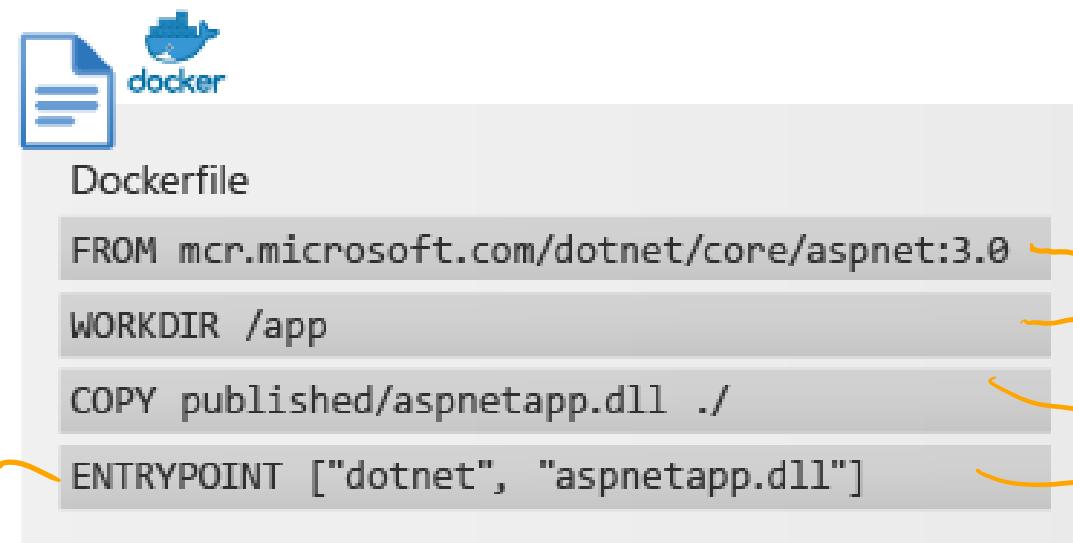
Feature	Containers
Isolation	Typically provides lightweight isolation from the host and other containers but doesn't provide as strong a security boundary as a virtual machine.
Operating system	Runs the user mode portion of an operating system and can be tailored to contain just the needed services for your app, using fewer system resources.
Deployment	Deploy individual containers by using Docker via command line; deploy multiple containers by using an orchestrator such as Azure Kubernetes Service.
Persistent storage	Use Azure Disks for local storage for a single node, or Azure Files (SMB shares) for storage shared by multiple nodes or servers.
Fault tolerance	If a cluster node fails, any containers running on it are rapidly recreated by the orchestrator on another cluster node.

Container Registry



Container Registry (cont'd)

docker build .
az acr build .

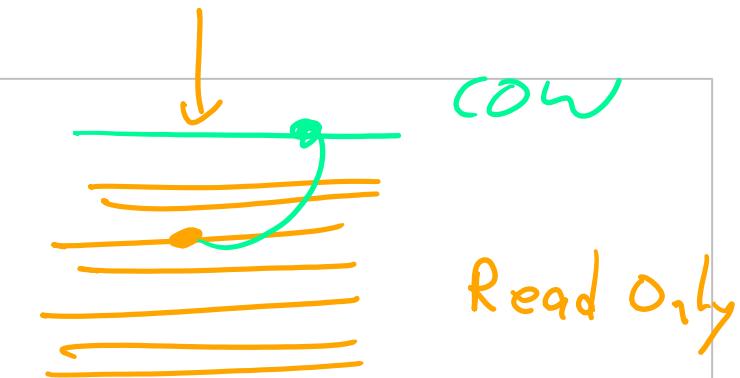


Docker build command



LAYER ID

sha256:cf4ecb49238476635f551fe11987ae4c3
sha256:e41864ee12411ff073f0a58417cf7e160
sha256:85bef57c324acc96f7067488d35b7e3c1
sha256:1d57d886885835cbc52c2d85fe0ce008f



Azure Container Registry (ACR)

Docker registry service

Private and hosted in Azure

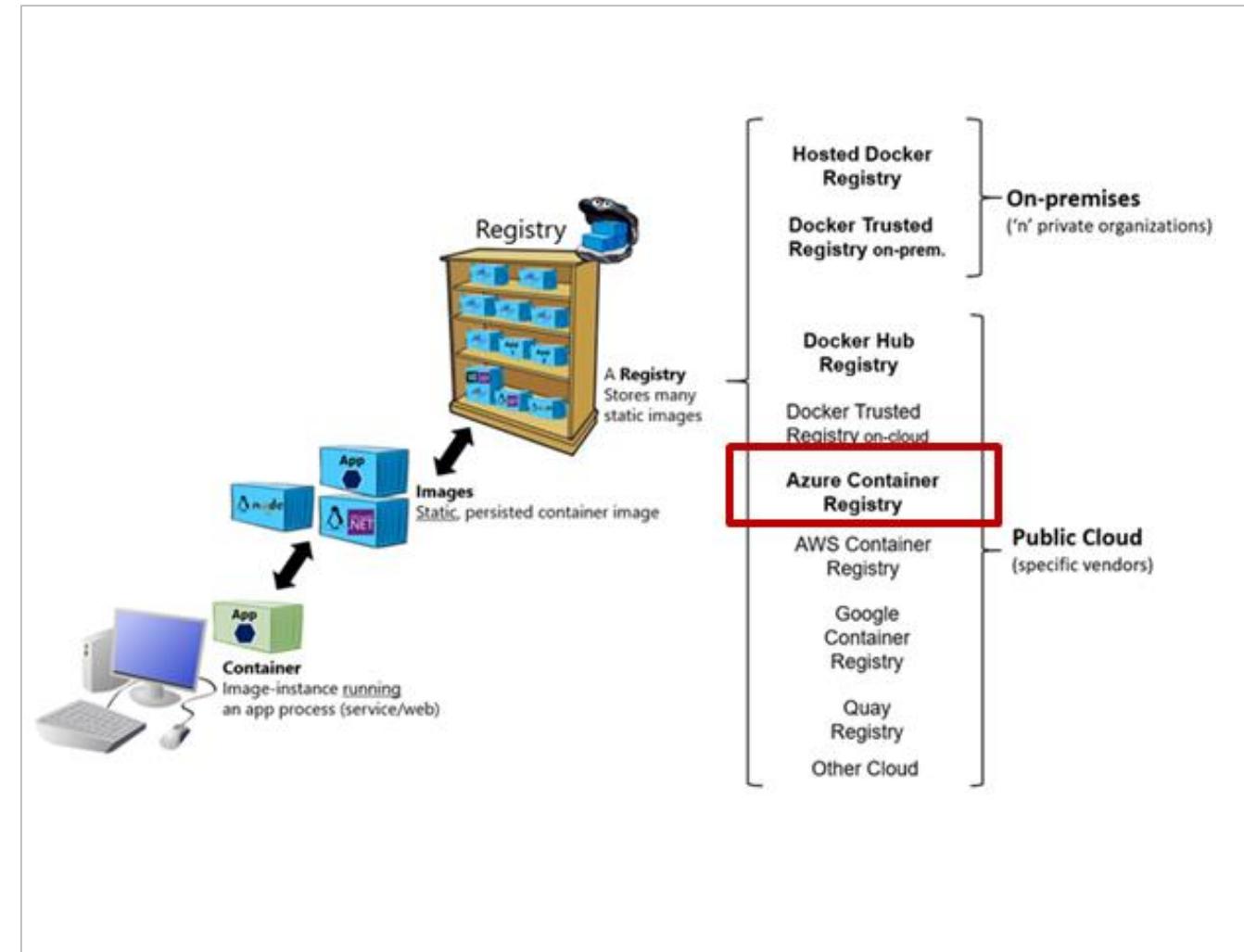
Build, store, and manage images

Push and pull with the Docker CLI or the Azure CLI

Access with Azure AD

RBAC to assign permissions

Automate using DevOps



Azure Container Registry - Key Features

- *Registry service tiers* - Create one or more container registries in your Azure subscription.
- *Security and access* - You log in to a registry using the Azure CLI or the standard docker login command.
- *Supported images and artifacts* - Grouped in a repository, each image is a read-only snapshot of a Docker-compatible container.
- *Automated image builds* - Use Azure Container Registry Tasks (ACR Tasks) to streamline building, testing, pushing, and deploying images in Azure.

Azure Container Registry - Service Tiers

Tier	Description
Basic	A cost-optimized entry point for developers learning about Azure Container Registry. Basic registries have the same programmatic capabilities as Standard and Premium (such as Azure Active Directory authentication integration, image deletion, and webhooks). However, the included storage and image throughput are most appropriate for lower usage scenarios.
Standard	Standard registries offer the same capabilities as Basic, with increased included storage and image throughput. Standard registries should satisfy the needs of most production scenarios.
Premium	Premium registries provide the highest amount of included storage and concurrent operations, enabling high-volume scenarios. In addition to higher image throughput, Premium adds features such as geo-replication for managing a single registry across multiple regions, content trust for image tag signing, private link with private endpoints to restrict access to the registry.

Azure Container Instances (ACI)

PaaS Service

Custom sizes - fast startup times

Public IP connectivity and DNS name

Hypervisor-level security

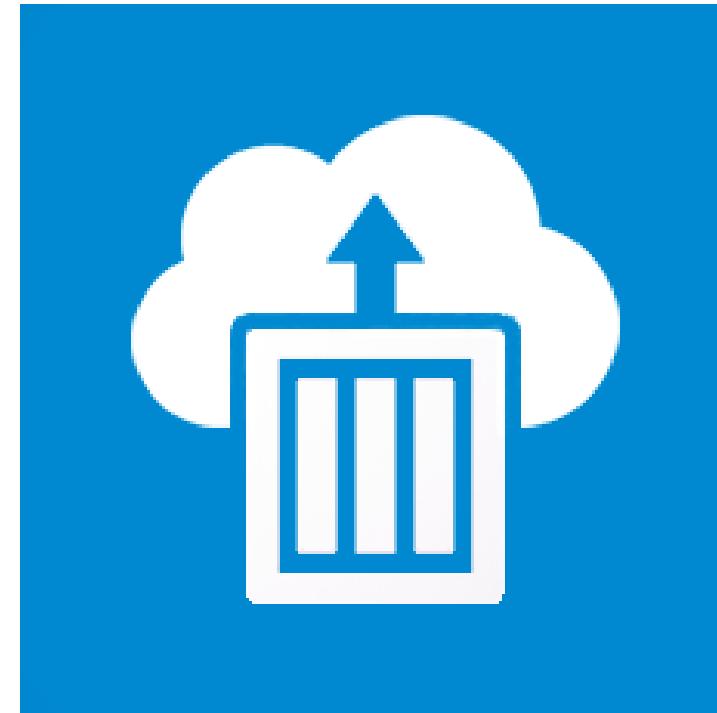
Isolation features

Co-scheduled groups

Persistent storage

Linux and Windows containers

Virtual network deployments



Gain the security of virtual machines for your container workloads, while preserving the efficiency of lightweight containers. ACI provides hypervisor isolation for each container group to ensure containers run in isolation without sharing a kernel.

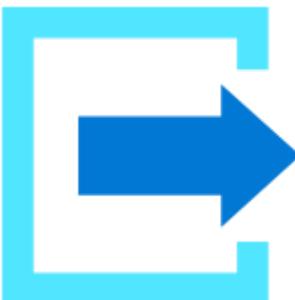
Azure Container Instances (ACI)



Run containers without managing servers

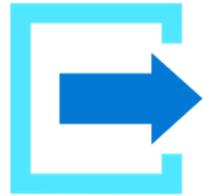


Increase agility with containers on demand



Secure applications with hypervisor isolation

Compliant Deployments



Hypervisor-level security



Customer data



Custom sizes



Co-scheduled groups

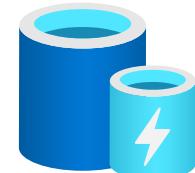


Virtual Networks



Linux
and

Windows containers



Persistent storage

Virtual network deployment

ACI Security

Continuously scan registry images

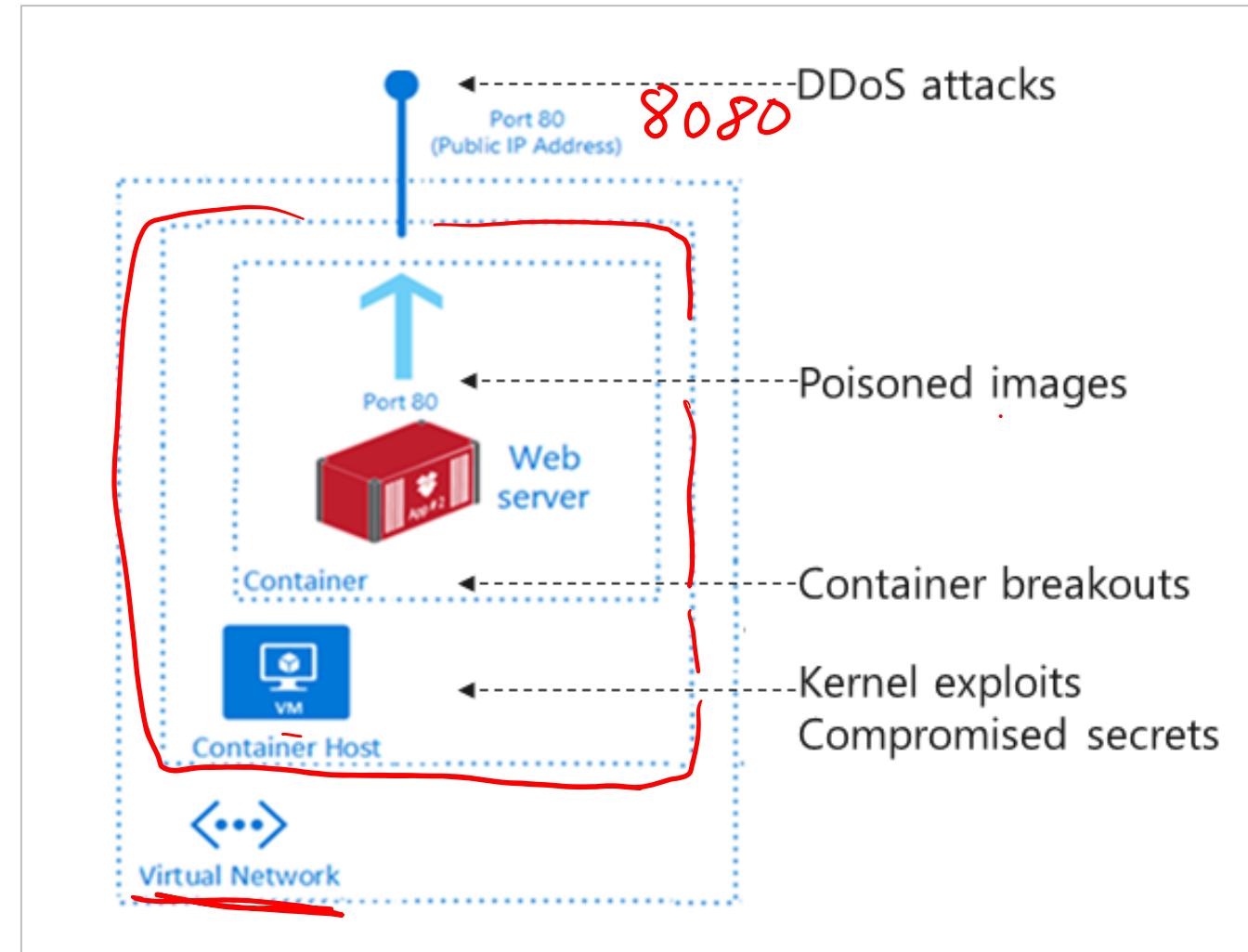
Use approved images – chain of custody, signing

Run with least privileges

"Allow List" files the container can access

Maintain network segmentation

Monitor and log activities



ACR Authentication

Method	How to authenticate	Scenarios	Azure role-based access control (Azure RBAC)	Limitations
Individual AD identity	<code>az acr login</code> in Azure CLI <code>Connect-AzContainerRegistry</code> in Azure PowerShell	Interactive push/pull by developers, testers	Yes	AD token must be renewed every 3 hours
AD service principal	<code>docker login</code> <code>az acr login</code> in Azure CLI <code>Connect-AzContainerRegistry</code> in Azure PowerShell Registry login settings in APIs or tooling Kubernetes pull secret	Unattended push from CI/CD pipeline Unattended pull to Azure or external services	Yes	SP password default expiry is 1 year
Managed identity for Azure resources	<code>docker login</code> <code>az acr login</code> in Azure CLI <code>Connect-AzContainerRegistry</code> in Azure PowerShell	Unattended push from Azure CI/CD pipeline Unattended pull to Azure service	Yes	Use only from select Azure services that support managed identities for Azure resources

Note: Require authentication for all operations – unauthenticated access is not supported.

ACR Authentication – Cont'd

Method	How to authenticate	Scenarios	Azure role-based access control (Azure RBAC)	Limitations
AKS cluster managed identity	Attach registry when AKS cluster created or updated	Unattended pull to AKS cluster in the same or a different subscription	No, pull access only	Only available with AKS cluster Can't be used for cross-tenant authentication
AKS cluster service principal	Enable when AKS cluster created or updated	Unattended pull to AKS cluster from registry in another AD tenant	No, pull access only	Only available with AKS cluster
Admin user	docker login	Interactive push/pull to repository by individual developer or tester Unattended pull from repository by individual system or external device	Yes	Single account per registry, not recommended for multiple users
Repository-scoped access token	docker login az acr login in Azure CLI Connect-AzContainerRegistry in Azure PowerShell Kubernetes pull secret	Interactive push/pull to repository by individual developer or tester Unattended pull from repository by individual system or external device	Yes	Not currently integrated with AD identity

Note: Require authentication for all operations – unauthenticated access is not supported.

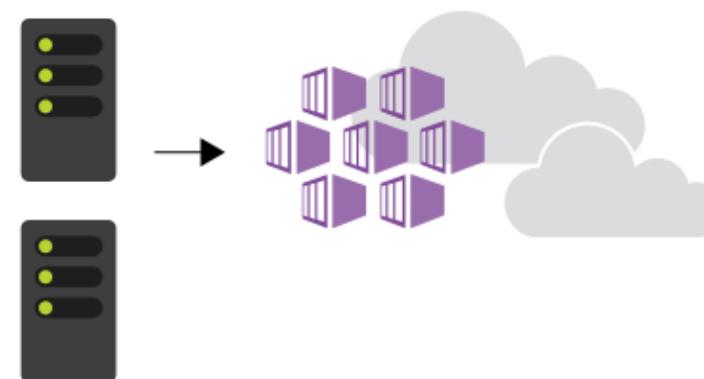
Azure Kubernetes Service (AKS)

Portable, extensible open-source platform for automating deployment, scaling, and the management of containerized workloads.

Fully managed

Public IP and FQDN (Private IP option)

Accessed with RBAC or Azure AD



Dynamic scale containers

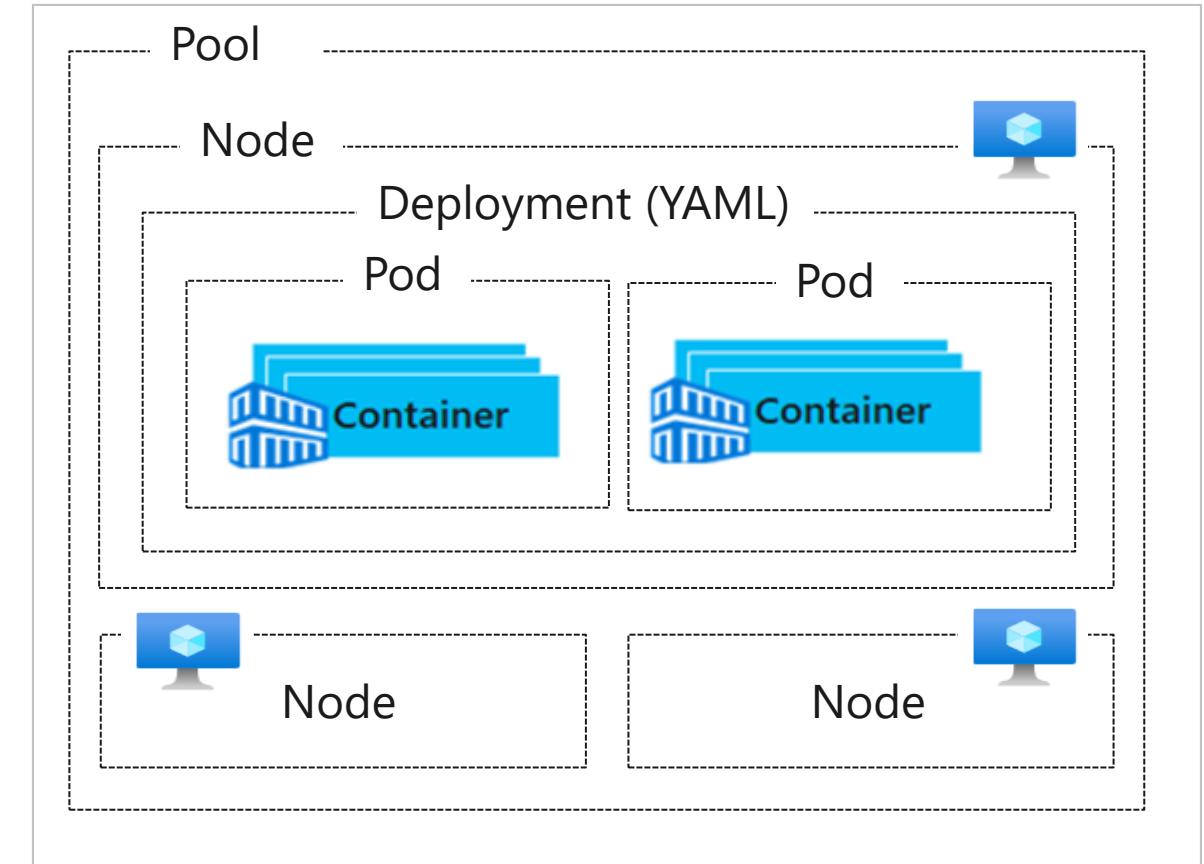
Automation of rolling updates and rollbacks of containers

Management of storage, network traffic, and sensitive information

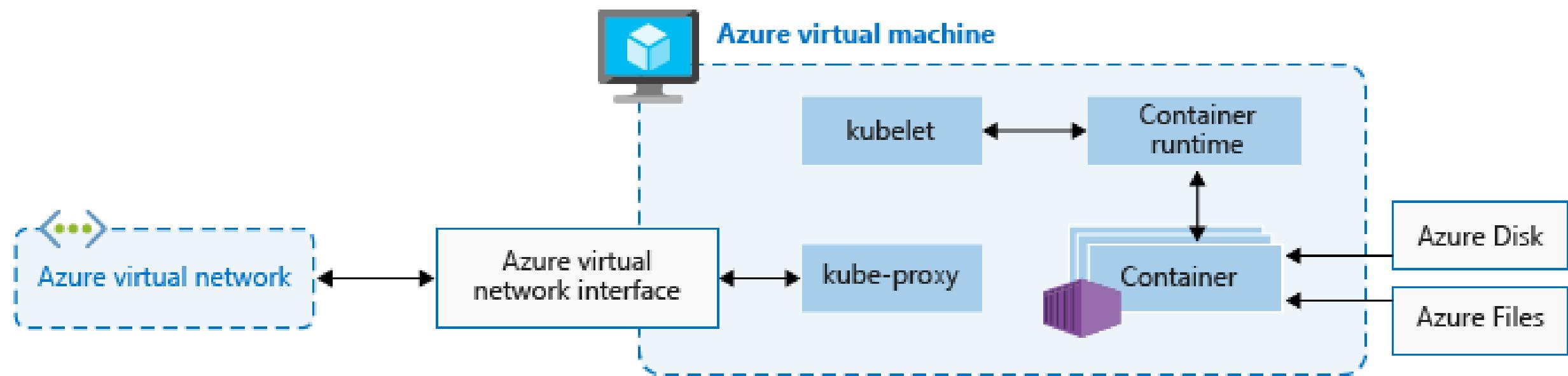
AKS Terminology

kubectl get nodes

Term	Description
Pools	Groups of nodes with identical configurations.
<u>Nodes</u>	Individual VM running containerized applications.
<u>Pods</u>	Single instance of an application. A pod can contain multiple containers.
<u>Deployment</u>	One or more identical pods managed by Kubernetes.
Manifest	YAML file describing a deployment

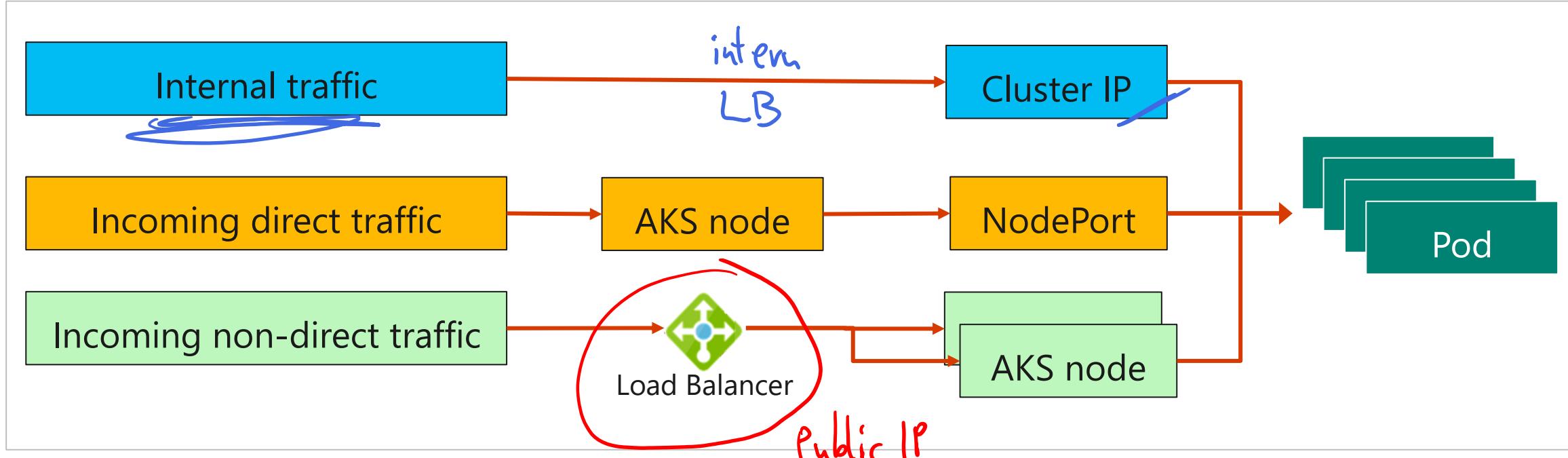


AKS Architecture



AKS Networking

k get Service Deployment Pods



Pods run an instance of your application

Services group pods together to provide network connectivity

Cluster IP provides internal traffic access

NodePort provides mapping for incoming direct traffic

Load balancer has external IP address for incoming non-direct traffic

AKS Storage

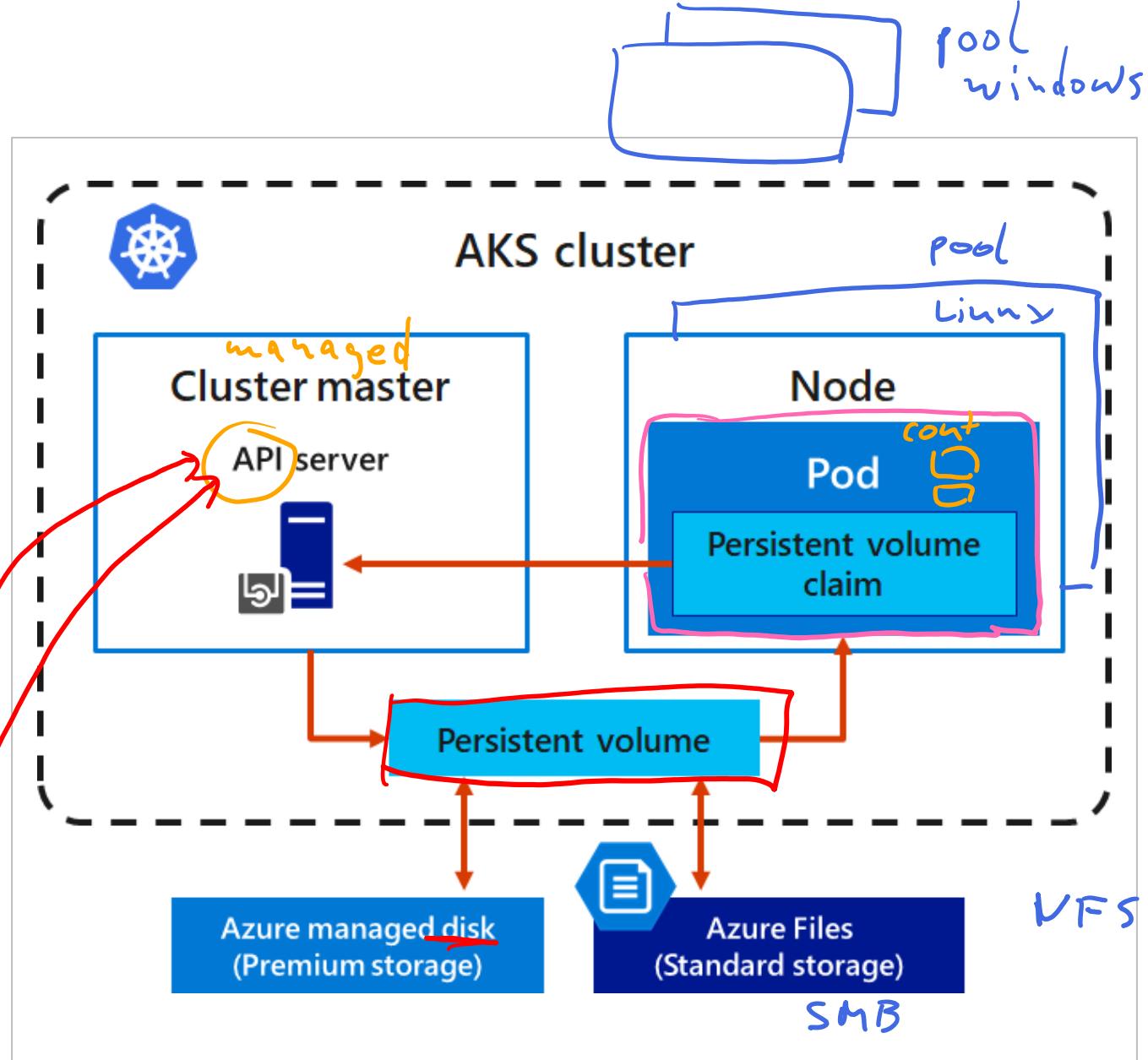
Local storage on the node is fast and simple to use

Local storage might not be available after the pod is deleted

Multiple pods may share data volumes

Storage could potentially be reattached to another pod

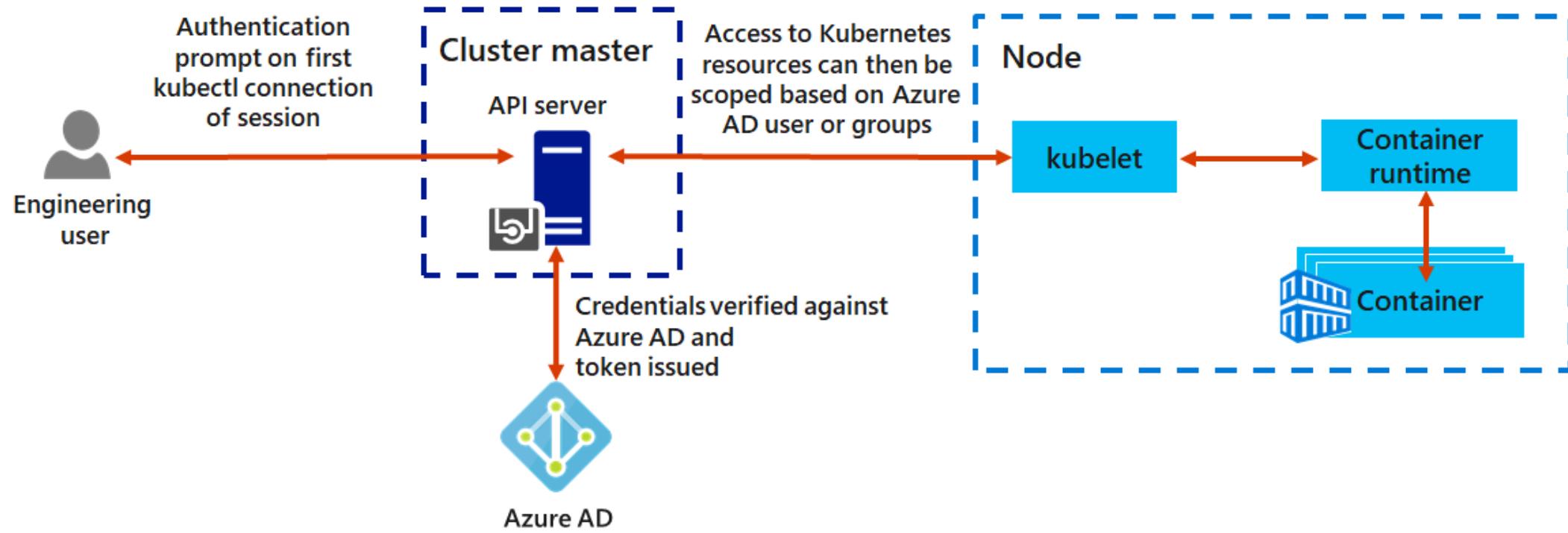
Tools
az
kubectl
yaml
portal



AKS security capabilities

Authentication and authorization		Network security
<ul style="list-style-type: none">• Azure AD integration with Azure Kubernetes Service• Azure RBAC, Kubernetes RBAC• Headless services and applications use Service Principals / Managed Identities		<ul style="list-style-type: none">• Deploy private AKS cluster – API server only has private IP addresses• NSG, Firewall to control the traffic to/from AKS nodes• Use Kubernetes Network Policy to secure traffic between pods• Protect data – Least privilege RBAC, Azure Key Vault

AKS and Azure Active Directory

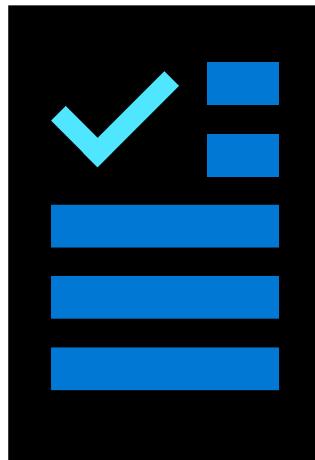


Use Azure AD as an integrated identity solution

Use service accounts, user accounts, and role-based access control

Additional Study – Container Security

Module Review Questions



Microsoft Learn Modules (docs.microsoft.com/Learn)

Core Cloud Services - Azure compute options

Build and store container images with Azure Container Registry (Exercise)

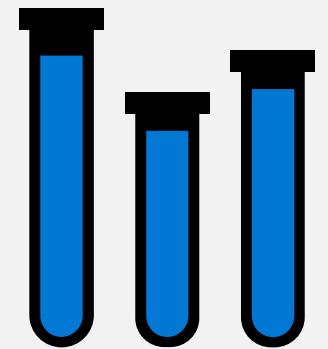
Build a containerized web application with Docker (Exercise)

Introduction to Docker containers

Run Docker containers with Azure Container Instances (Exercise)

Azure Kubernetes Service Workshop (Exercise)

Module Labs



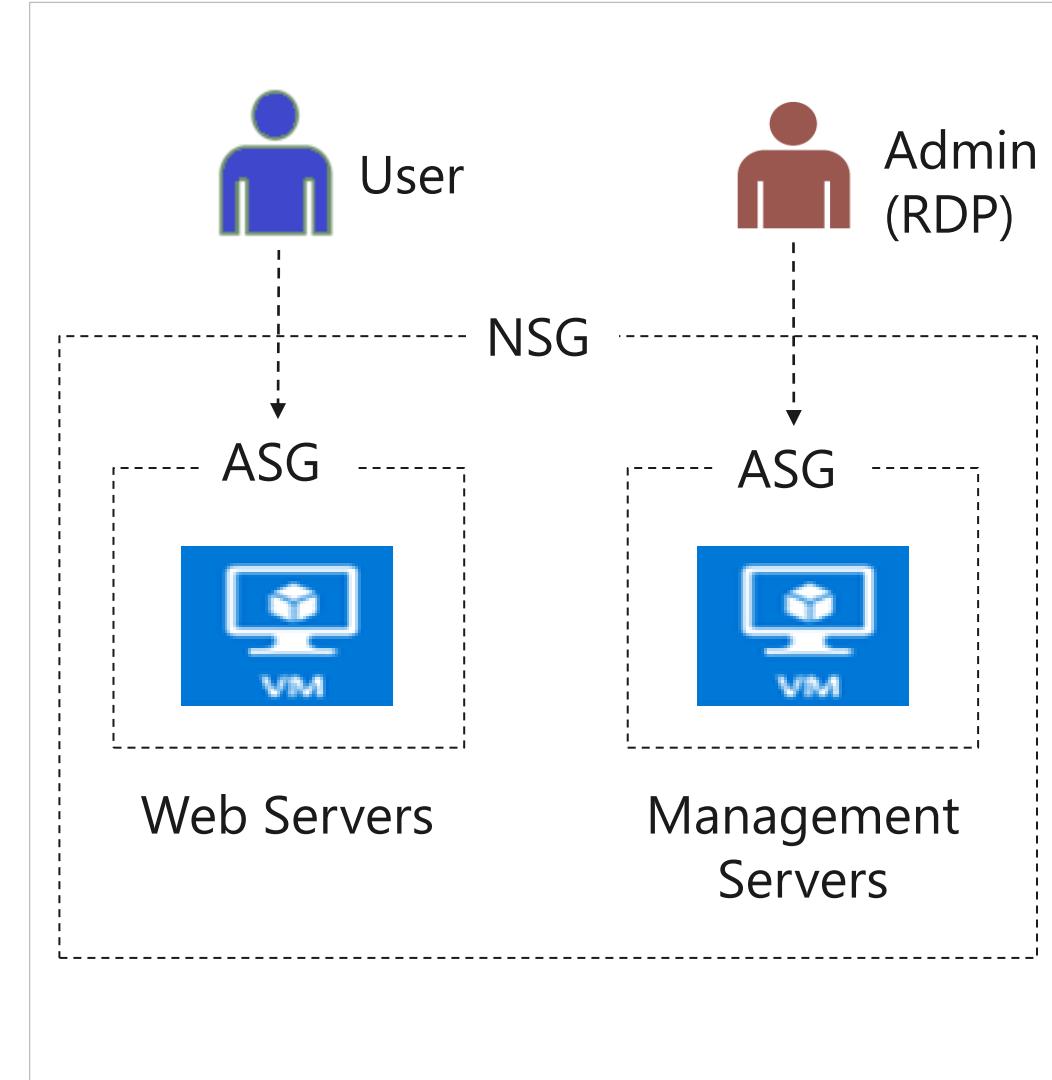
Lab 07 – Network and Application Security Groups

Create application security groups

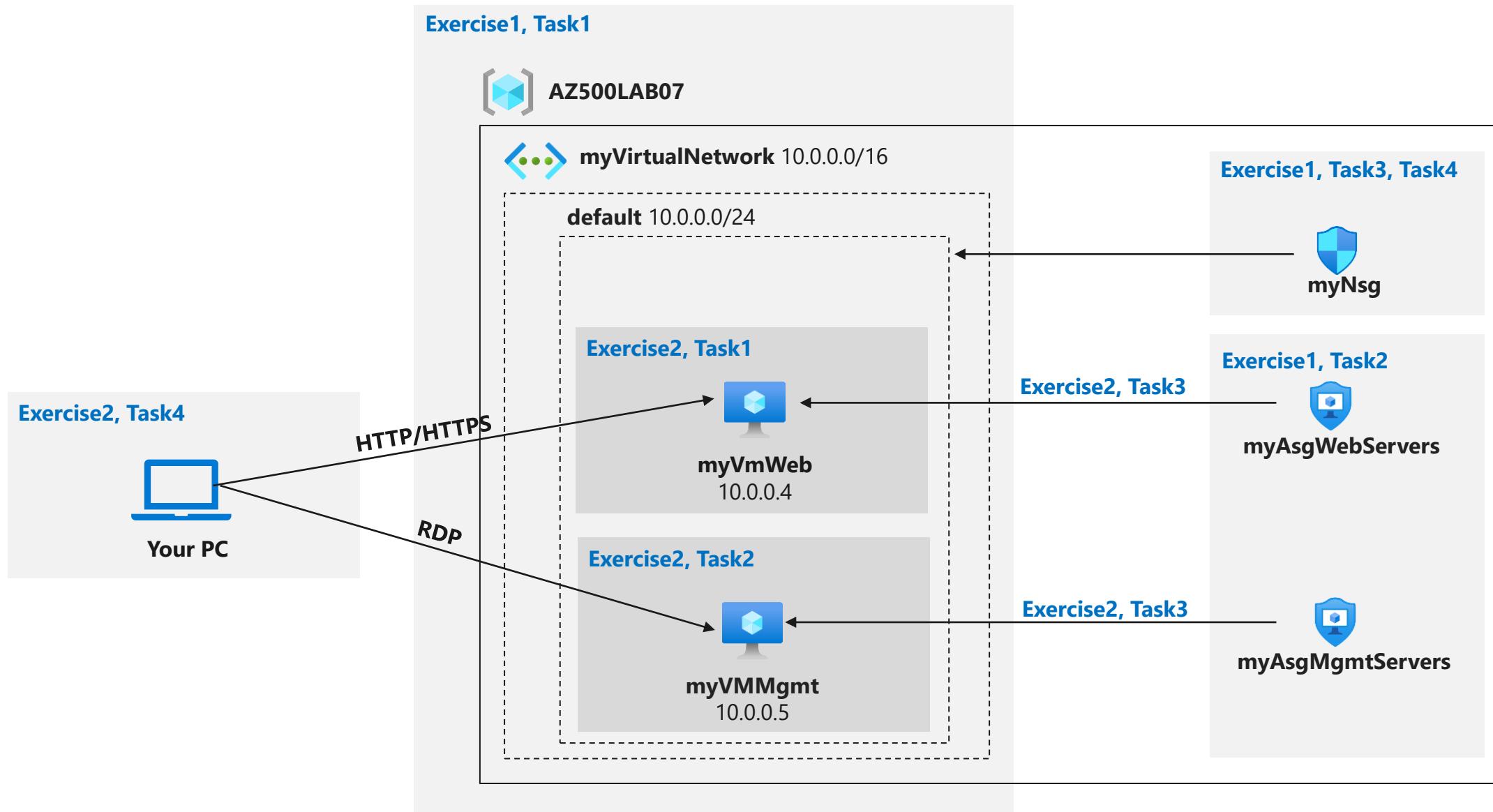
Wrap the ASGs with a Network Security Group (NSG)

Use NSG rules to route traffic:

- Admins can RDP to the management servers but not the web servers
- Users can access the web servers and see the default IIS page



Lab 07 – Network and Application Security Groups



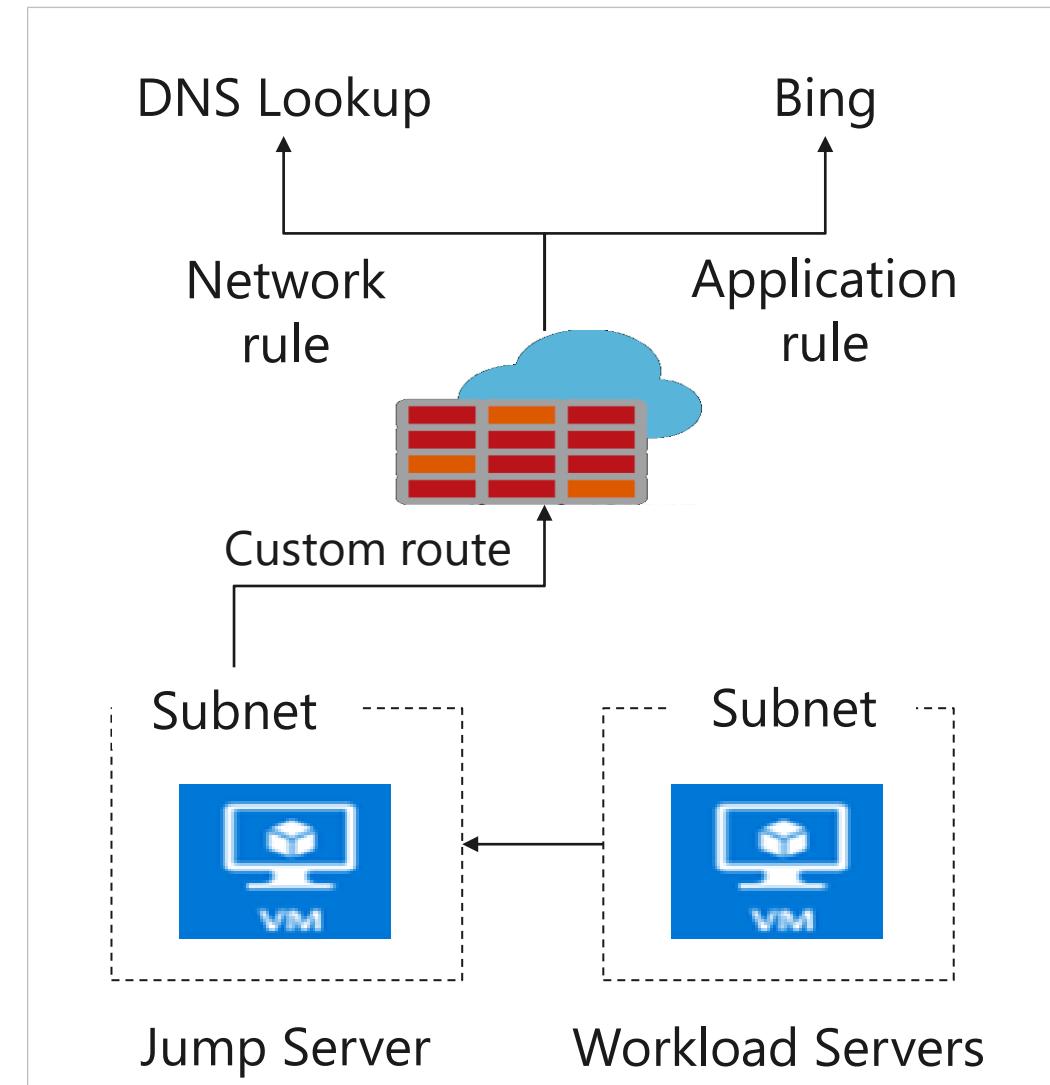
Lab 08 – Azure Firewall

Create a Workload subnet and Jump subnet each with a virtual machine

Create a custom route to ensure outbound traffic from the workload subnet goes to the firewall

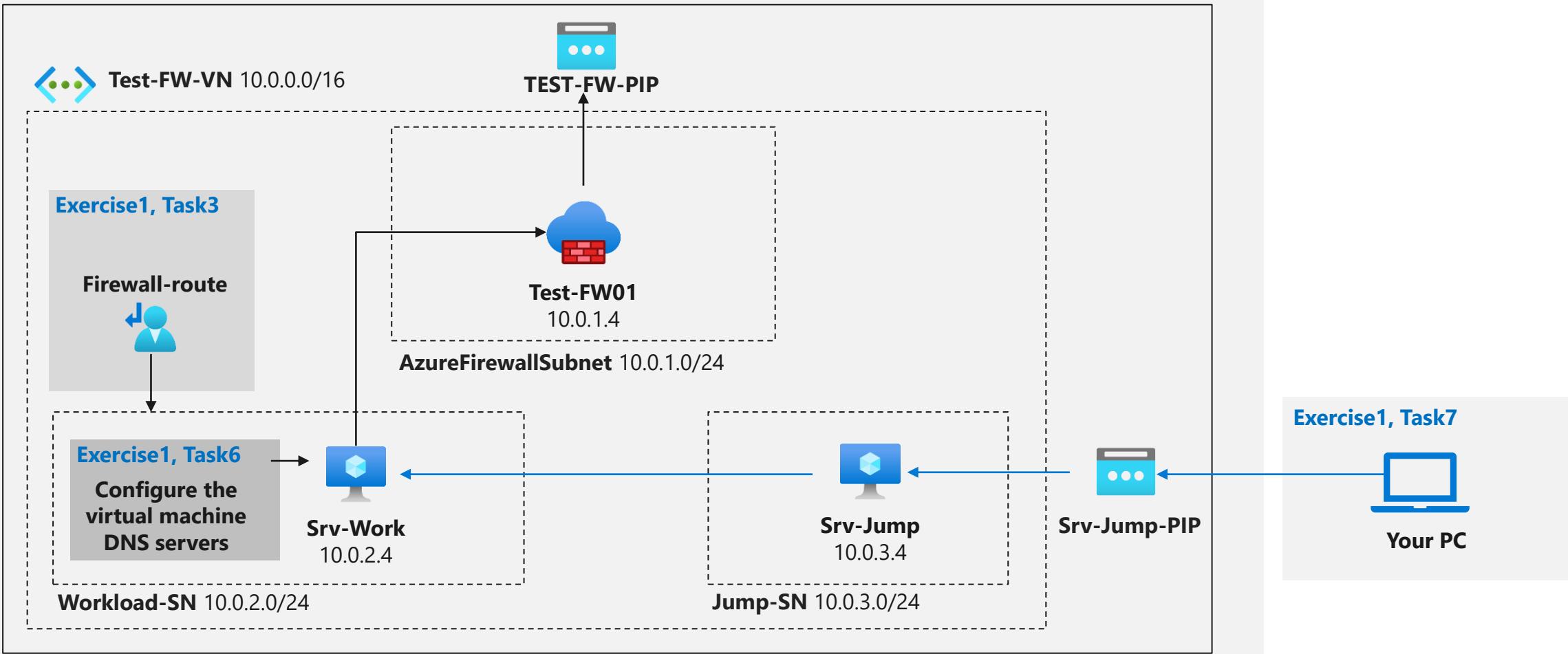
Create firewall application rules to allow traffic to Bing

Create firewall network rules to allow traffic to DNS lookup servers



Lab 08 – Azure Firewall

Exercise1, Task1



Lab 09 – Configuring and Securing ACR and AKS

Create an Azure Container Registry

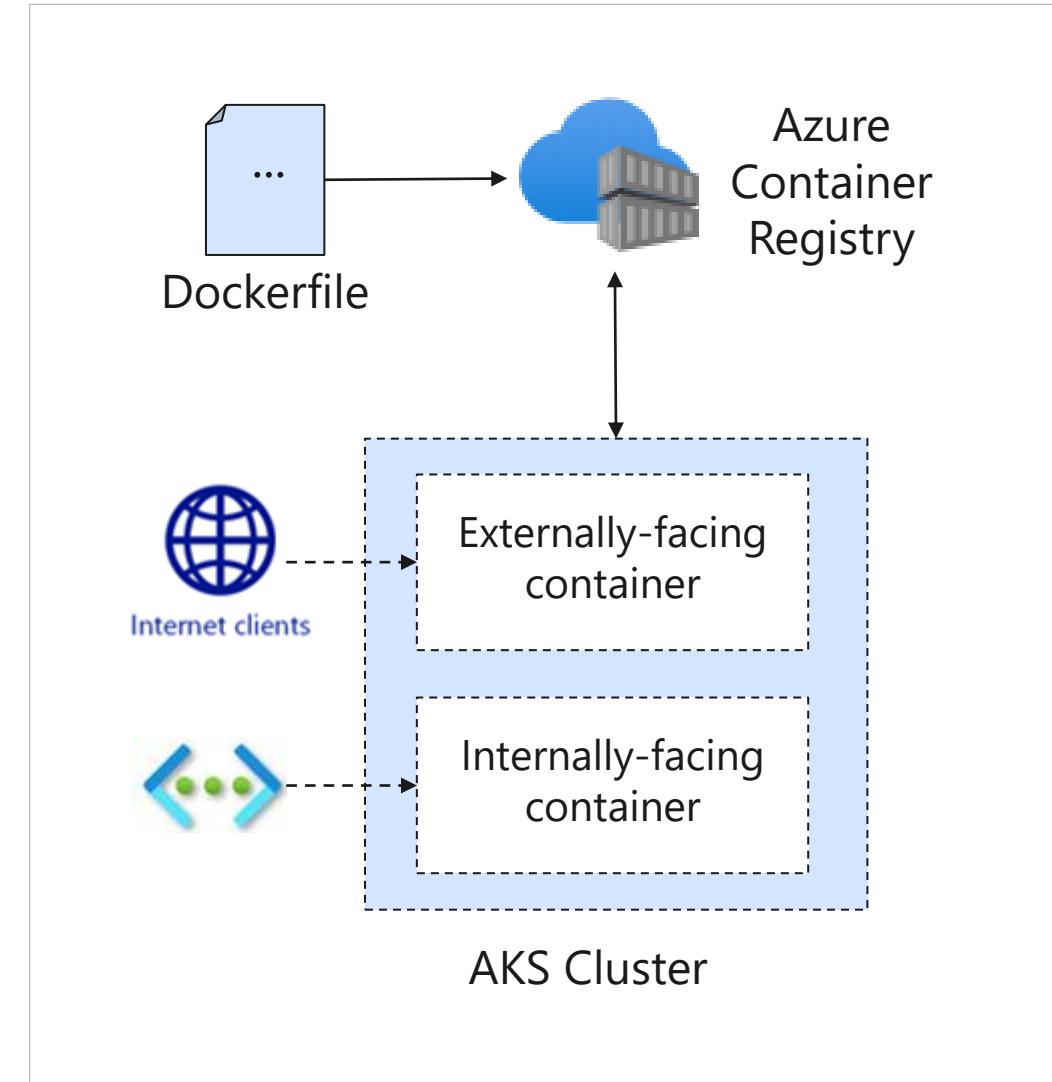
Create a Dockerfile, build a container and push it to ACR

Create an Azure Kubernetes Service

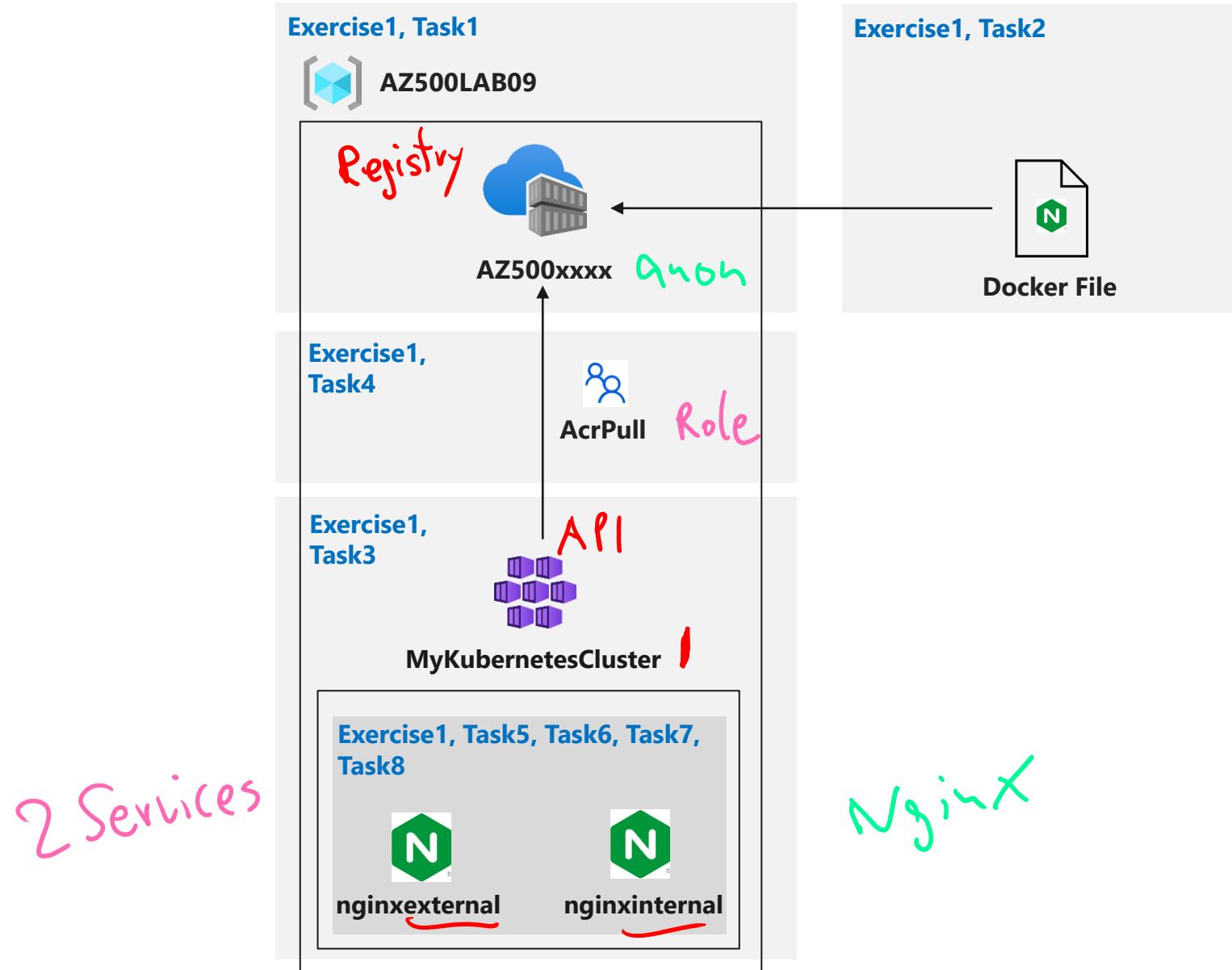
Give AKS permission to access the ACR

Deploy an external facing container and test

Deploy an internal facing container and test



Lab 09 – Configuring and Securing ACR and AKS



End of presentation