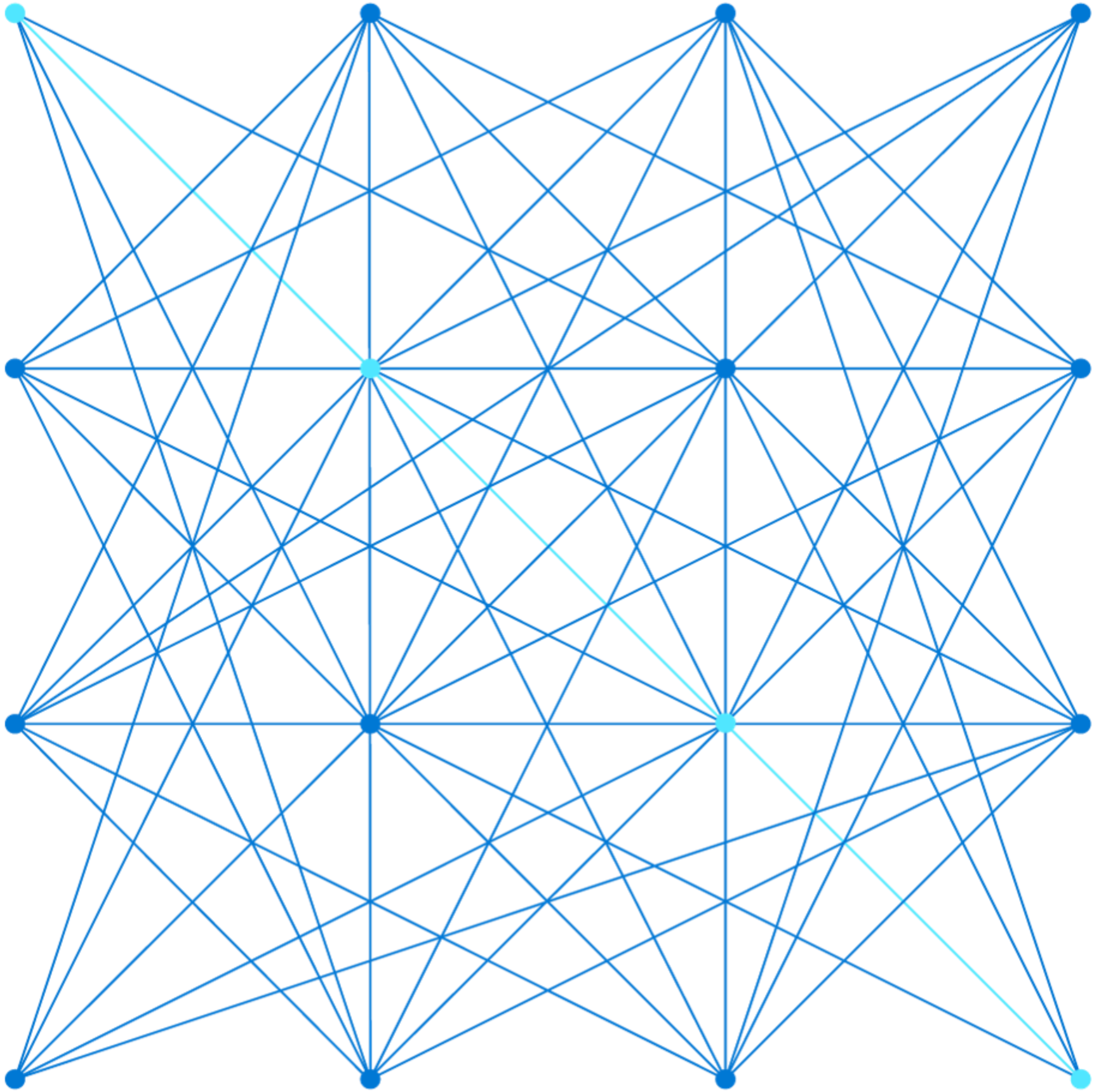
Microsoft Azure

AZ-700

Design and Implement Network Security



Course Agenda

Module 01: Introduction to Azure Virtual Networks

Module 02: Designing and Implementing Hybrid Networking

Module 03: Designing and Implementing Azure ExpressRoute

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

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

Module 06: Design and Implement Network Security

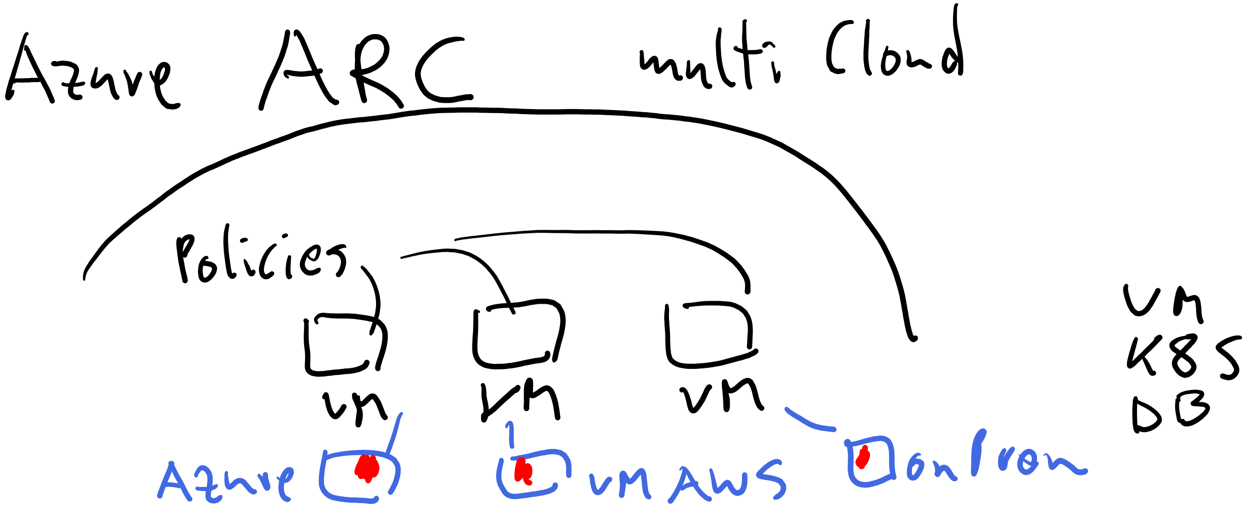
Module 07: Design and Implement private access to Azure Services

Module 08: Design and Implement Network Monitoring

Module Overview

- Get network security recommendations with Microsoft Defender for Cloud 42 98%
- Deploy Azure DDoS Protection by using the Azure portal
- Exercise - Configure DDoS Protection on a virtual network
- Deploy and configure Network Security Groups NSG
- Design and implement Azure Bastion

- Design and implement Azure Firewall
- Exercise - Deploy and configure Azure Firewall using the Azure portal
- Working with Azure Firewall Manager
- Exercise - Secure your virtual hub using Azure Firewall Manager
- Implement a Web Application Firewall WAF



Get network security recommendations with Microsoft Defender for Cloud

Def M365 Endpoint Point MEM
Intune

Def Cloud ID

Def Cloud Apps

Def IoT

Secure your virtual networks in the Azure portal overview

- Network Security Controls
- Microsoft cloud security benchmark
- Using Microsoft Defender for Cloud for regulatory compliance
- Alerts in Microsoft Defender for Cloud
- Review

Network Security Controls

NS-1: Establish network segmentation boundaries

NS-2: Secure cloud services with network controls

NS-3: Deploy firewall at the edge of enterprise network

NS-4: Deploy intrusion detection/intrusion prevention systems (IDS/IPS)

NS-5: Deploy DDOS protection

NS-6: Deploy web application firewall

NS-7: Simplify network security configuration

NS-8: Detect and disable insecure services and protocols

NS-9: Connect on-premises or cloud network privately

NS-10: Ensure Domain Name System (DNS) security

Microsoft cloud security benchmark

The Microsoft cloud security benchmark (MCSB) includes a collection of high-impact security recommendations you can use to help secure your cloud services in a single or multi-cloud environment

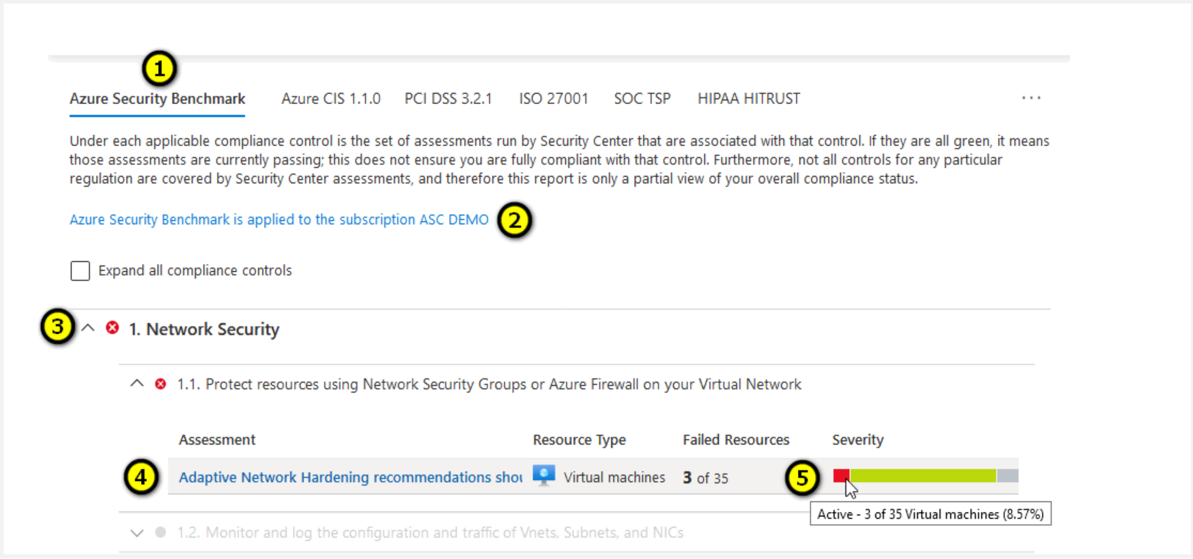
Security controls: These recommendations are generally applicable across your cloud workloads. Each recommendation identifies a list of stakeholders that are typically involved in planning, approval, or implementation of the benchmark.

Service baselines: These apply the controls to individual cloud services to provide recommendations on that service's security configuration.

Term	Description	Example
Control	A control is a high-level description of a feature or activity that needs to be addressed and is not specific to a technology or implementation.	Data Protection is one of the security controls. This control contains specific actions that must be addressed to help ensure data is protected.
Baseline	A baseline is the implementation of the control on the individual Azure services. Each organization dictates a benchmark recommendation and corresponding configurations are needed in Azure. Note: Today we have service baselines available only for Azure.	The Contoso company looks to enable Azure SQL security features by following the configuration recommended in the Azure SQL security baseline.

Using Microsoft Defender for Cloud for regulatory compliance

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



Azure Security Benchmark | Azure CIS 1.1.0 | PCI DSS 3.2.1 | ISO 27001 | SOC TSP | HIPAA HITRUST | ···

Under each applicable compliance control is the set of assessments run by Security Center that are associated with that control. If they are all green, it means those assessments are currently passing; this does not ensure you are fully compliant with that control. Furthermore, not all controls for any particular regulation are covered by Security Center assessments, and therefore this report is only a partial view of your overall compliance status.

Azure Security Benchmark is applied to the subscription ASC DEMO

□ Expand all compliance controls

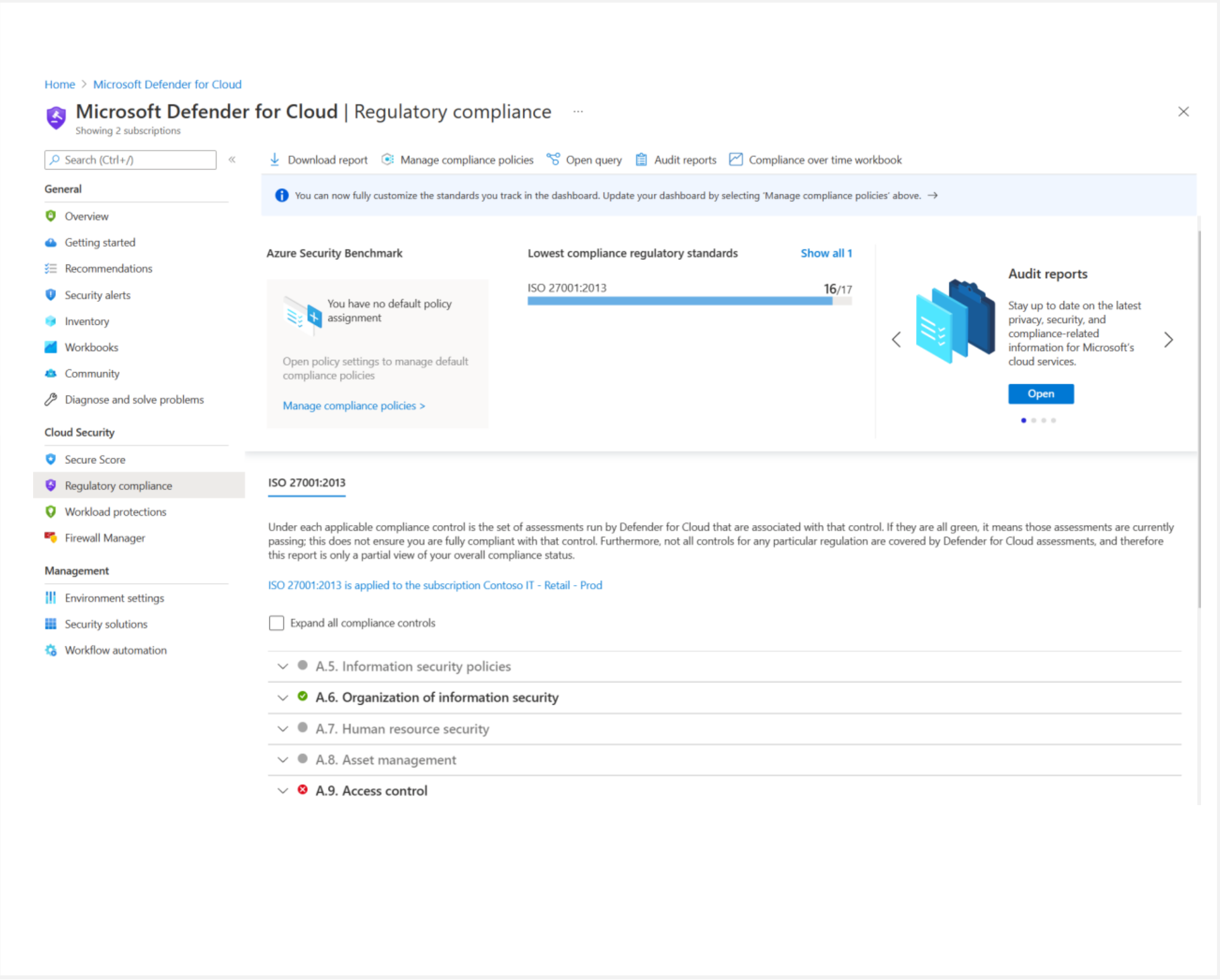
^ ⊗ 1. Network Security

^ ⊗ 1.1. Protect resources using Network Security Groups or Azure Firewall on your Virtual Network

Assessment	Resource Type	Failed Resources	Severity
Adaptive Network Hardening recommendations shoı	Virtual machines	3 of 35	🟥🟩

Active - 3 of 35 Virtual machines (8.57%)

˅ ● 1.2. Monitor and log the configuration and traffic of Vnets, Subnets, and NICs



Home > Microsoft Defender for Cloud

Microsoft Defender for Cloud | Regulatory compliance ···

Showing 2 subscriptions

You can now fully customize the standards you track in the dashboard. Update your dashboard by selecting 'Manage compliance policies' above. →

Azure Security Benchmark

You have no default policy assignment

Open policy settings to manage default compliance policies

Manage compliance policies >

Lowest compliance regulatory standards — Show all 1

ISO 27001:2013 — 16/17

Audit reports

Stay up to date on the latest privacy, security, and compliance-related information for Microsoft's cloud services.

Open

ISO 27001:2013

Under each applicable compliance control is the set of assessments run by Defender for Cloud that are associated with that control. If they are all green, it means those assessments are currently passing; this does not ensure you are fully compliant with that control. Furthermore, not all controls for any particular regulation are covered by Defender for Cloud assessments, and therefore this report is only a partial view of your overall compliance status.

ISO 27001:2013 is applied to the subscription Contoso IT - Retail - Prod

□ Expand all compliance controls

˅ ● A.5. Information security policies

˅ ✓ A.6. Organization of information security

˅ ● A.7. Human resource security

˅ ● A.8. Asset management

˅ ⊗ A.9. Access control

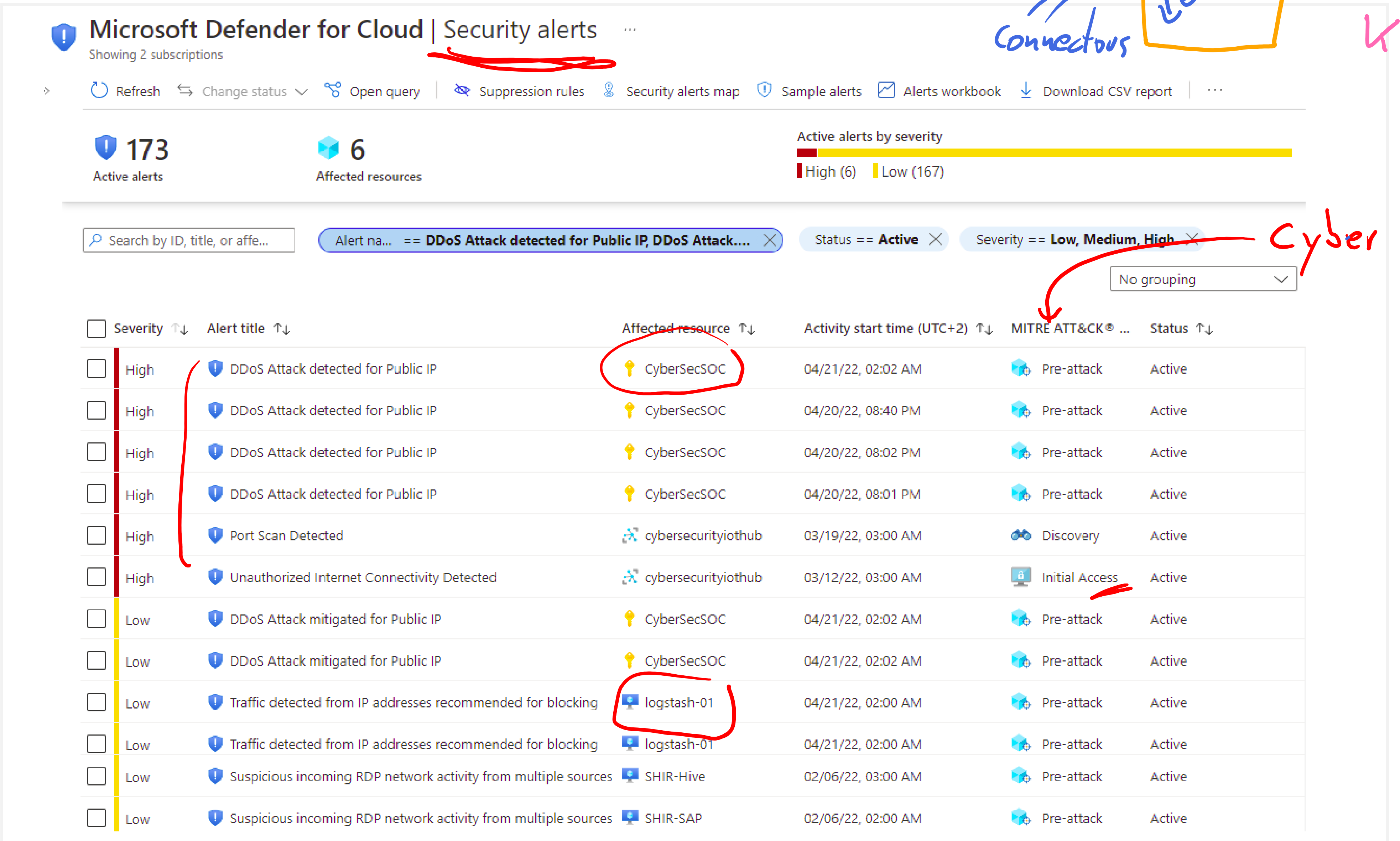
Alerts in Microsoft Defender for Cloud

Microsoft Sentinel

LA

Connectors

Kusto QL



Microsoft Defender for Cloud | Security alerts

Showing 2 subscriptions

173 Active alerts

6 Affected resources

Active alerts by severity

High (6) Low (167)

Search by ID, title, or affe...

Alert na... == DDoS Attack detected for Public IP, DDoS Attack....

Status == Active

Severity == Low, Medium, High

No grouping

Cyber kill chain

□ Severity	Alert title	Affected resource	Activity start time (UTC+2)	MITRE ATT&CK® ...	Status
□ High	DDoS Attack detected for Public IP	CyberSecSOC	04/21/22, 02:02 AM	Pre-attack	Active
□ High	DDoS Attack detected for Public IP	CyberSecSOC	04/20/22, 08:40 PM	Pre-attack	Active
□ High	DDoS Attack detected for Public IP	CyberSecSOC	04/20/22, 08:02 PM	Pre-attack	Active
□ High	DDoS Attack detected for Public IP	CyberSecSOC	04/20/22, 08:01 PM	Pre-attack	Active
□ High	Port Scan Detected	cybersecurityiothub	03/19/22, 03:00 AM	Discovery	Active
□ High	Unauthorized Internet Connectivity Detected	cybersecurityiothub	03/12/22, 03:00 AM	Initial Access	Active
□ Low	DDoS Attack mitigated for Public IP	CyberSecSOC	04/21/22, 02:02 AM	Pre-attack	Active
□ Low	DDoS Attack mitigated for Public IP	CyberSecSOC	04/21/22, 02:02 AM	Pre-attack	Active
□ Low	Traffic detected from IP addresses recommended for blocking	logstash-01	04/21/22, 02:00 AM	Pre-attack	Active
□ Low	Traffic detected from IP addresses recommended for blocking	logstash-01	04/21/22, 02:00 AM	Pre-attack	Active
□ Low	Suspicious incoming RDP network activity from multiple sources	SHIR-Hive	02/06/22, 03:00 AM	Pre-attack	Active
□ Low	Suspicious incoming RDP network activity from multiple sources	SHIR-SAP	02/06/22, 02:00 AM	Pre-attack	Active

Summary – Understand the basics of securing your virtual networks

Check your knowledge

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

Network security concepts and requirements in Azure | Microsoft Docs

Azure network architecture | Microsoft Docs

Deploy Azure DDoS Protection by using the Azure portal

Deploy Azure DDoS Protection by using the Azure portal overview

- Distributed Denial of Service (DDoS)
- Azure DDoS protection Standard
- Types of DDoS attacks
- Azure DDoS protection features
- Deploying a DDoS protection plan
- Demonstration
- Review

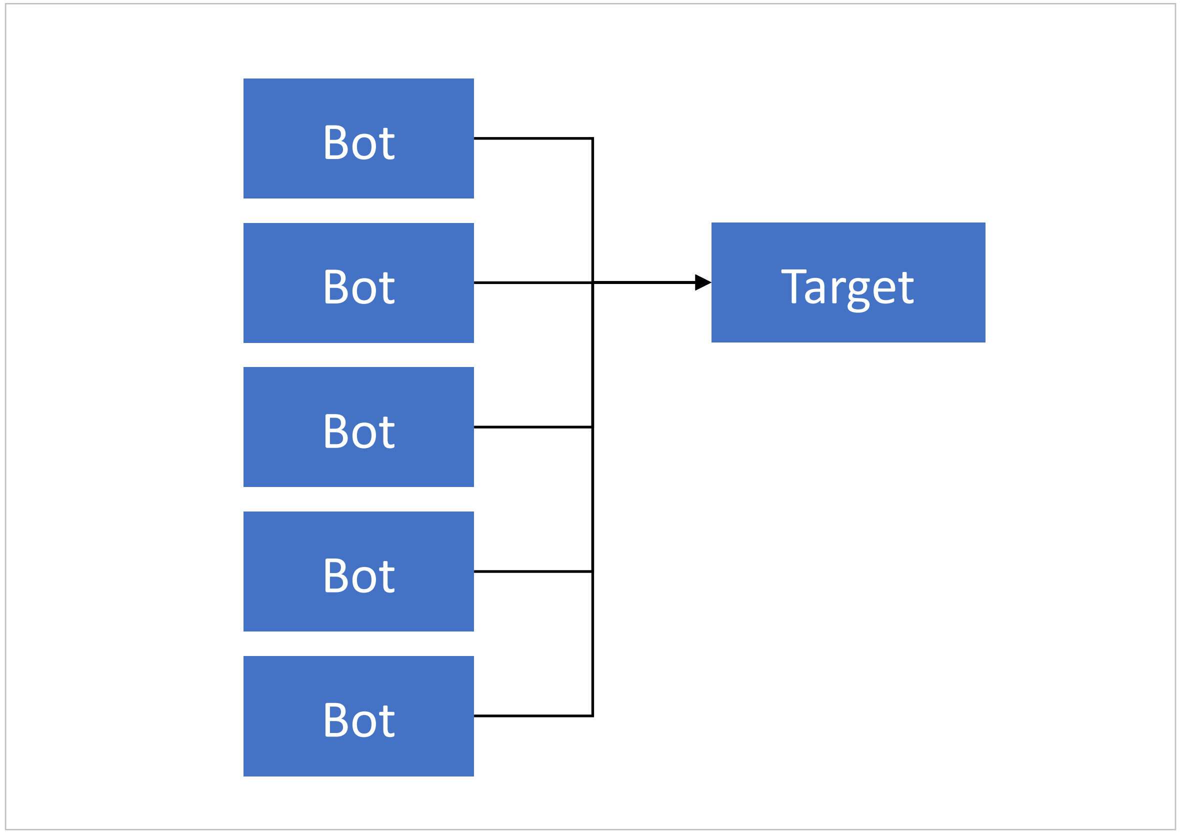
Distributed Denial of Service (DDoS)

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



Types of DDoS attacks

Volumetric attacks

These attacks flood the network layer with a substantial amount of seemingly legitimate traffic. They include UDP floods, amplification floods, and other spoofed-packet floods. DDoS Protection Standard mitigates these potential multi-gigabyte attacks by absorbing and scrubbing them, with Azure's global network scale, automatically.

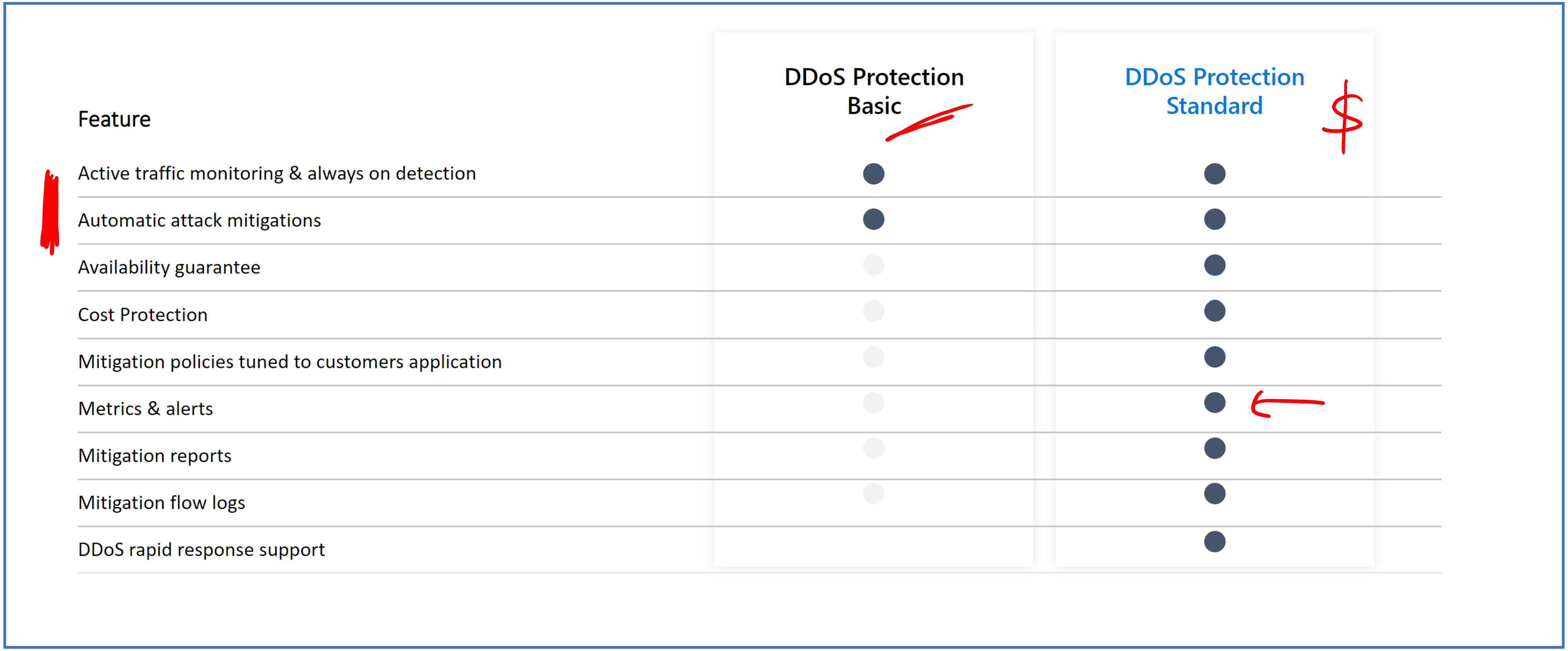
Protocol attacks

These attacks render a target inaccessible, by exploiting a weakness in the layer 3 and layer 4 protocol stack. They include SYN flood attacks, reflection attacks, and other protocol attacks. DDoS Protection Standard mitigates these attacks, differentiating between malicious and legitimate traffic, by interacting with the client, and blocking malicious traffic.

Resource (application) layer attacks

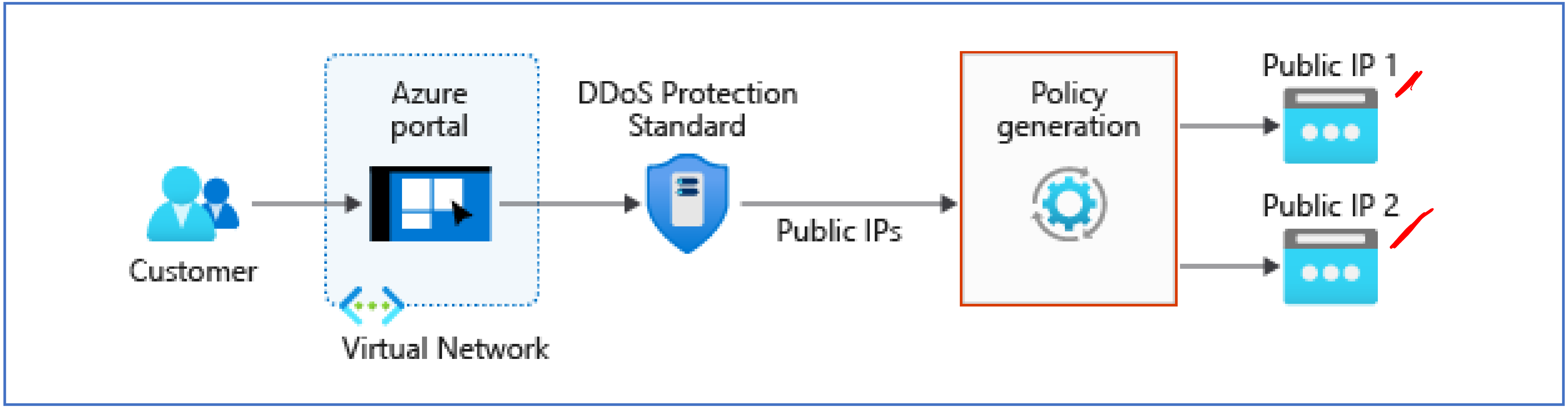
These attacks target web application packets, to disrupt the transmission of data between hosts. They include HTTP protocol violations, SQL injection, cross-site scripting, and other layer 7 attacks. Use a Web Application Firewall, such as the Azure Application Gateway web application firewall, as well as DDoS Protection Standard to provide defense against these attacks. There are also third-party web application firewall offerings available in the Azure Marketplace.

Azure DDoS protection Standard



Feature	DDoS Protection Basic	DDoS Protection Standard $
Active traffic monitoring & always on detection	●	●
Automatic attack mitigations	●	●
Availability guarantee	○	●
Cost Protection	○	●
Mitigation policies tuned to customers application	○	●
Metrics & alerts	○	●
Mitigation reports	○	●
Mitigation flow logs	○	●
DDoS rapid response support		●

Azure DDoS protection features



Basic and Standard (multiple subscriptions) service tiers

Mitigates volumetric attacks, protocol attacks, and application layer attacks

Checks for malformed packets and spoofing

Deploying a DDoS protection plan

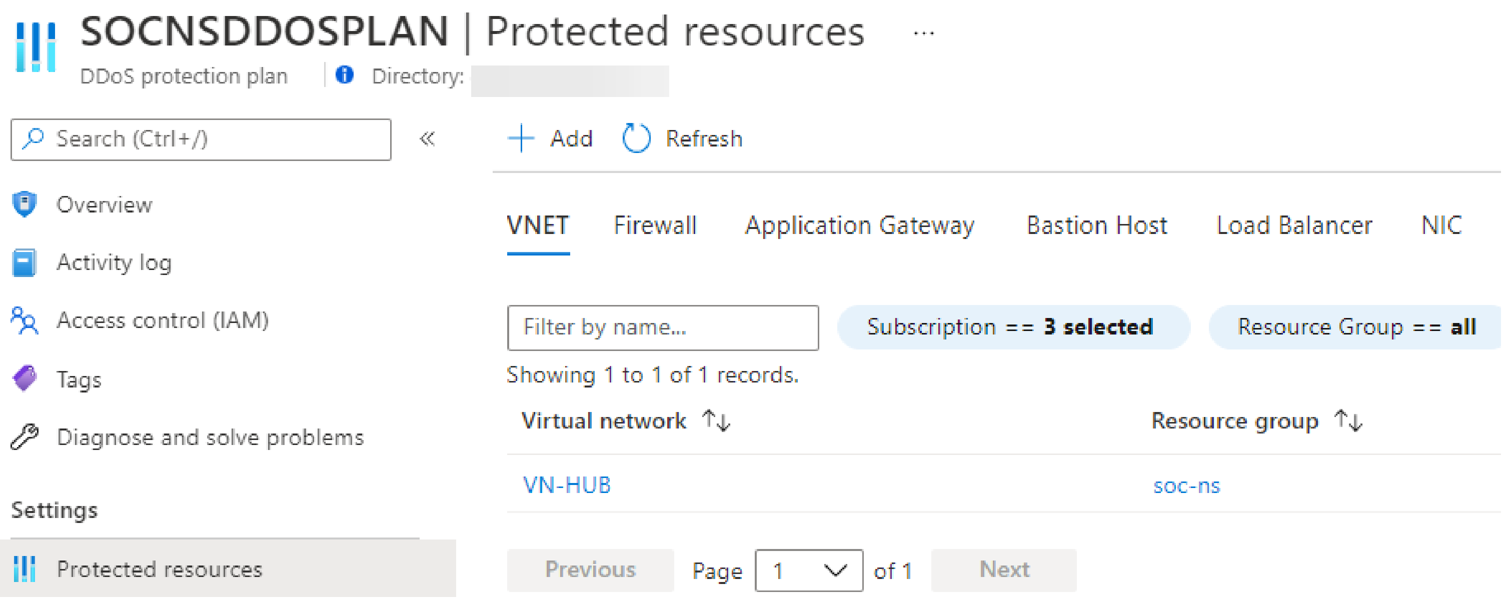
Create a DDoS protection plan

Enable DDoS protection on a new or existing VNet

Configure DDoS telemetry

Configure DDoS diagnostic logs and alerts

Run a test DDoS attack and monitor the results



SOCNSDDOSPLAN | Protected resources ···

DDoS protection plan | Directory: [redacted]

Search (Ctrl+/)

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems

Settings

- Protected resources

+ Add | Refresh

VNET | Firewall | Application Gateway | Bastion Host | Load Balancer | NIC

Filter by name... | Subscription == **3 selected** | Resource Group == **all**

Showing 1 to 1 of 1 records.

Virtual network ↑↓	Resource group ↑↓
VN-HUB	soc-ns

Previous | Page 1 of 1 | Next

Demonstration - Create and configure Azure DDoS Protection Standard

Create a DDoS protection plan

link it to a virtual network

Summary – Deploy Azure DDoS Protection by using the Azure portal

Check your knowledge

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

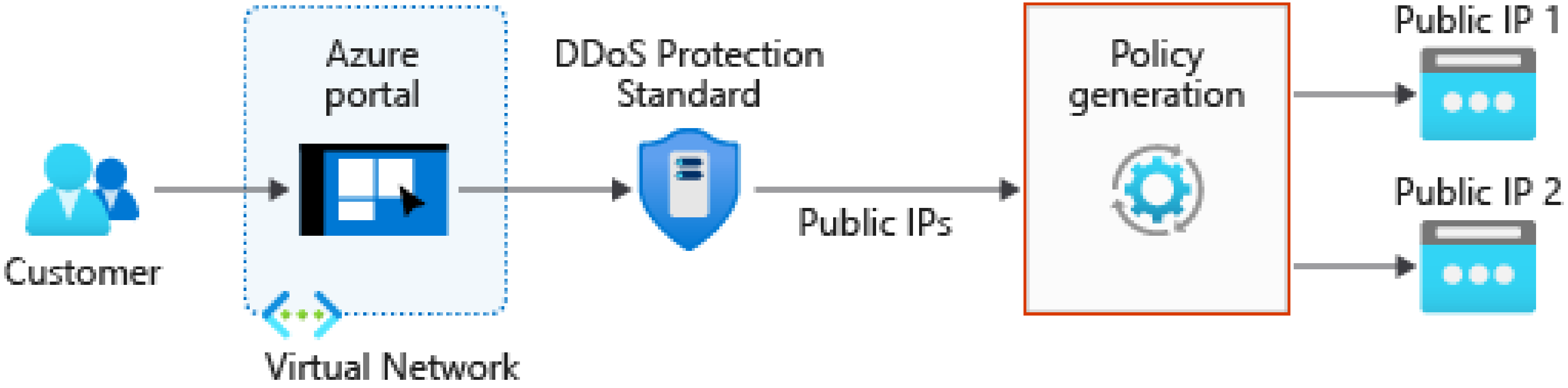
[Azure DDoS Protection Standard documentation | Microsoft Docs]

[Manage Azure DDoS Protection Standard using the Azure portal | Microsoft Docs]

Exercise: Configure DDoS Protection on a virtual network using the Azure portal

Configure DDoS Protection on a virtual network using the Azure portal

Task 1: Create a resource group
Task 2: Create a DDoS Protection plan
Task 3: Enable DDoS Protection on a new virtual network
Task 4: Configure DDoS telemetry
Task 5: Configure DDoS diagnostic logs
Task 6: Configure DDoS alerts
Task 7: Submit a DDoS service request to run a DDoS attack



Summary –Exercise: Configure DDoS Protection on a virtual network using the Azure portal

Check your knowledge

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

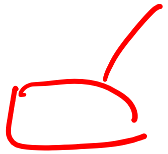
[Azure DDoS Protection Standard documentation | Microsoft Docs]()

Deploy and configure Network Security Groups

NSG in web-server 443 Allow

ASG "Web-Server"

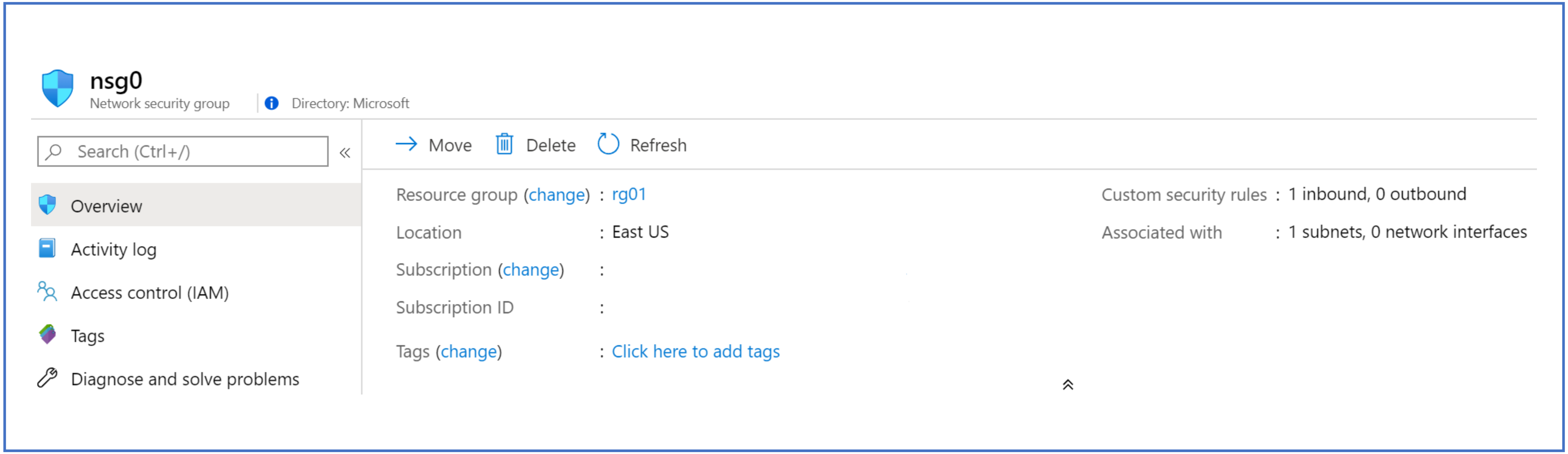
VM



Deploy and configure Network Security Groups overview

- Network Security Groups
- Default NSG Rules
- NSG Effective Rules
- Creating NSG rules
- Use Service Tags to define network access controls
- Application Security Groups
- Demonstration
- Review

Network Security Groups



Resource group (change) : rg01

Location : East US

Subscription (change) :

Subscription ID :

Tags (change) : Click here to add tags

Custom security rules : 1 inbound, 0 outbound

Associated with : 1 subnets, 0 network interfaces

Limits network traffic to resources in a virtual network

Lists the security rules that allow or deny inbound or outbound network traffic

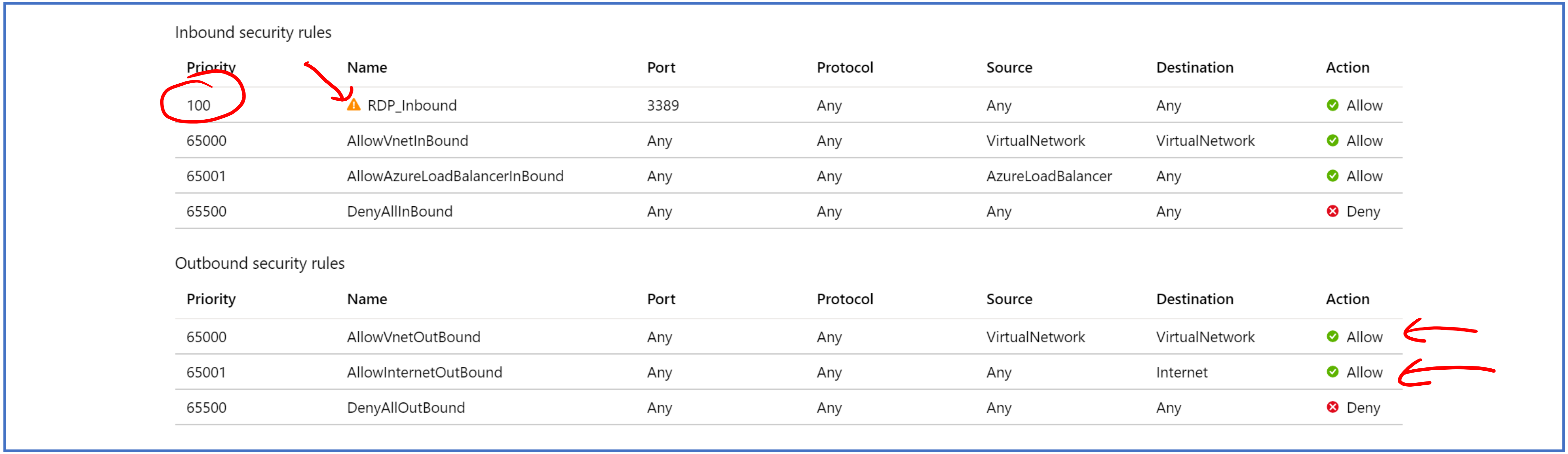
Associated to a subnet or a network interface

Can be associated multiple times

NSG Rules

~~nic~~ vn

sub



Inbound security rules

Priority	Name	Port	Protocol	Source	Destination	Action
100	⚠ RDP_Inbound	3389	Any	Any	Any	✓ Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	✓ Allow
65500	DenyAllInBound	Any	Any	Any	Any	✗ Deny

Outbound security rules

Priority	Name	Port	Protocol	Source	Destination	Action
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	✓ Allow
65500	DenyAllOutBound	Any	Any	Any	Any	✗ Deny

Security rules in NSGs enable you to filter network traffic that can flow in and out of virtual network subnets and network interfaces

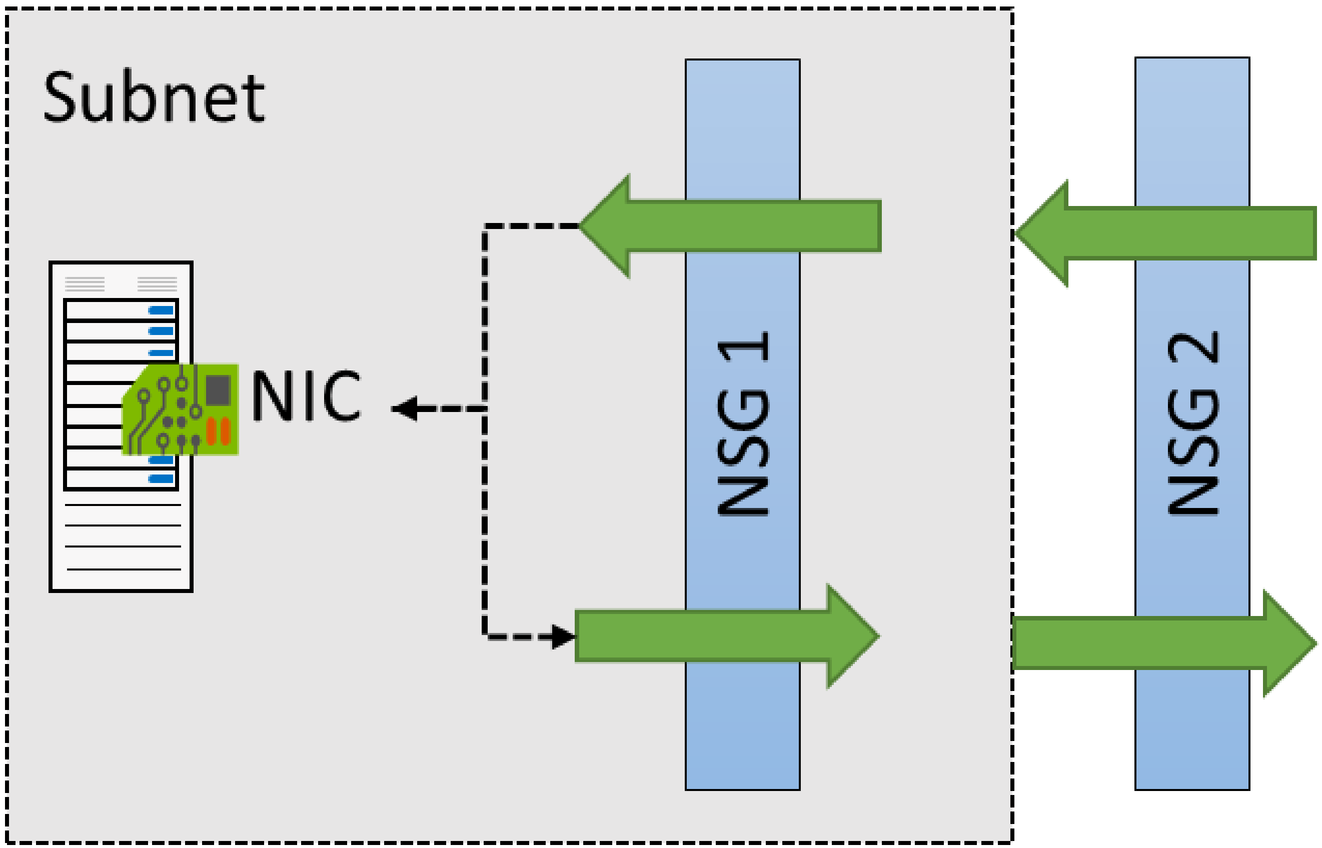
There are default security rules. You cannot delete the default rules, but you can add other rules with a higher priority

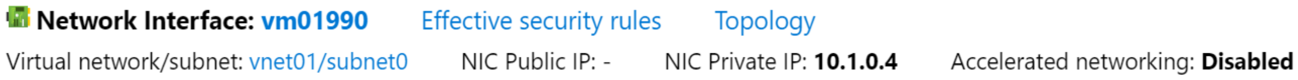
NSG Effective Rules

NSGs are evaluated independently for the subnet and NIC

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

Use the Effective Rules link if you are not sure which security rules are being applied





Network Interface: vm01990 Effective security rules Topology

Virtual network/subnet: vnet01/subnet0 NIC Public IP: - NIC Private IP: **10.1.0.4** Accelerated networking: **Disabled**

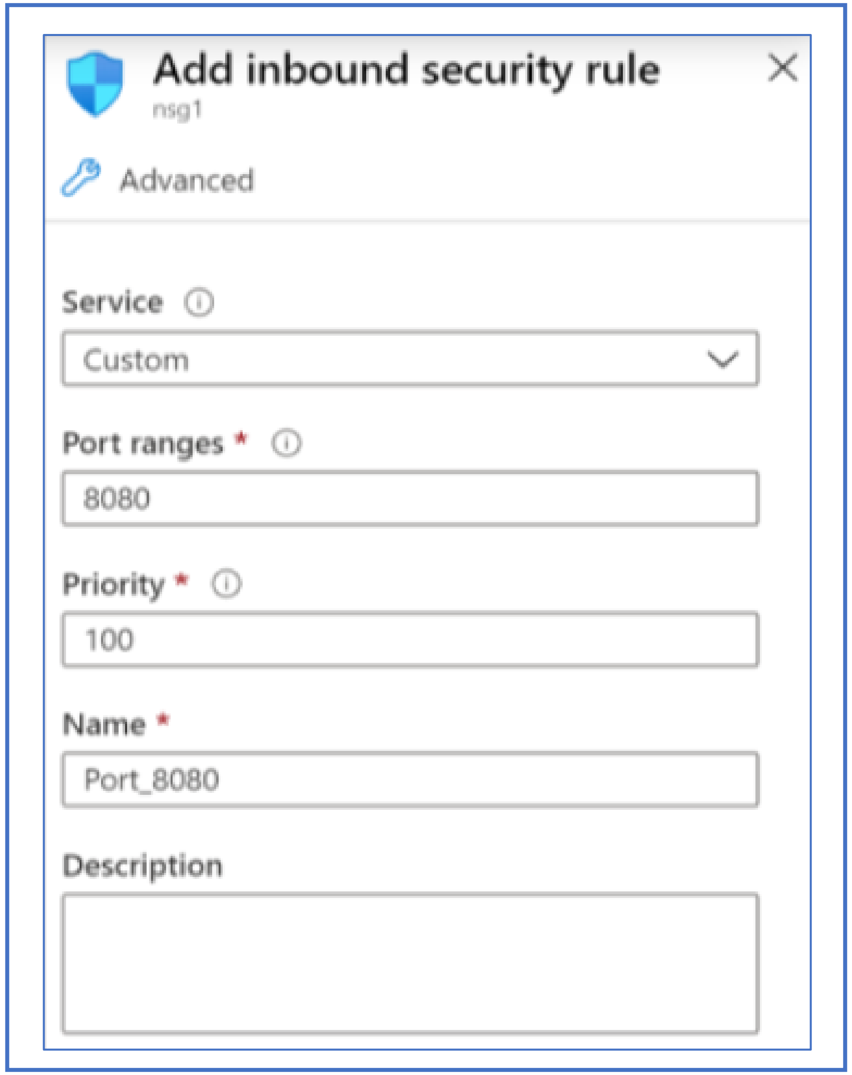
Creating NSG rules

Select from a large variety of services

Service – The destination protocol and port range for this rule

Port ranges – Single port or multiple ports

Priority – The lower the number, the higher the priority



Add inbound security rule

nsg1

Service: Custom

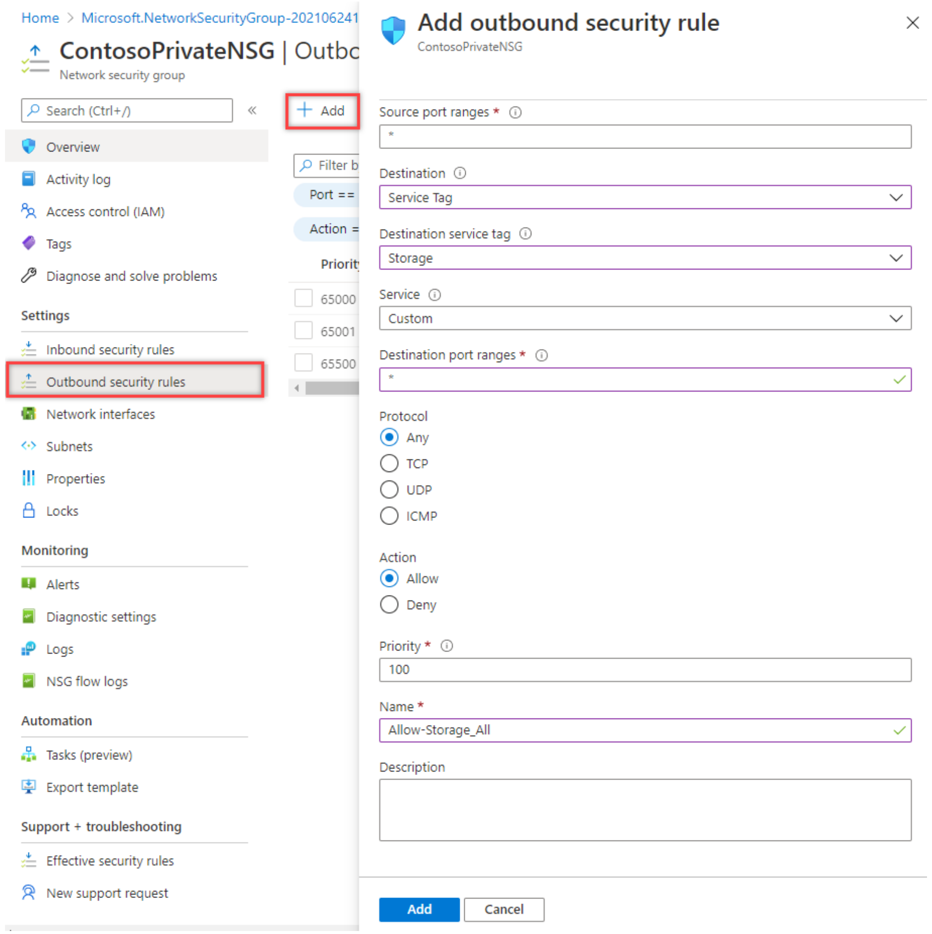
Port ranges *: 8080

Priority *: 100

Name *: Port_8080

Description:

Use Service Tags to define network access controls



Add outbound security rule

ContosoPrivateNSG

Source port ranges * : *

Destination: Service Tag

Destination service tag: Storage

Service: Custom

Destination port ranges * : *

Protocol
● Any
○ TCP
○ UDP
○ ICMP

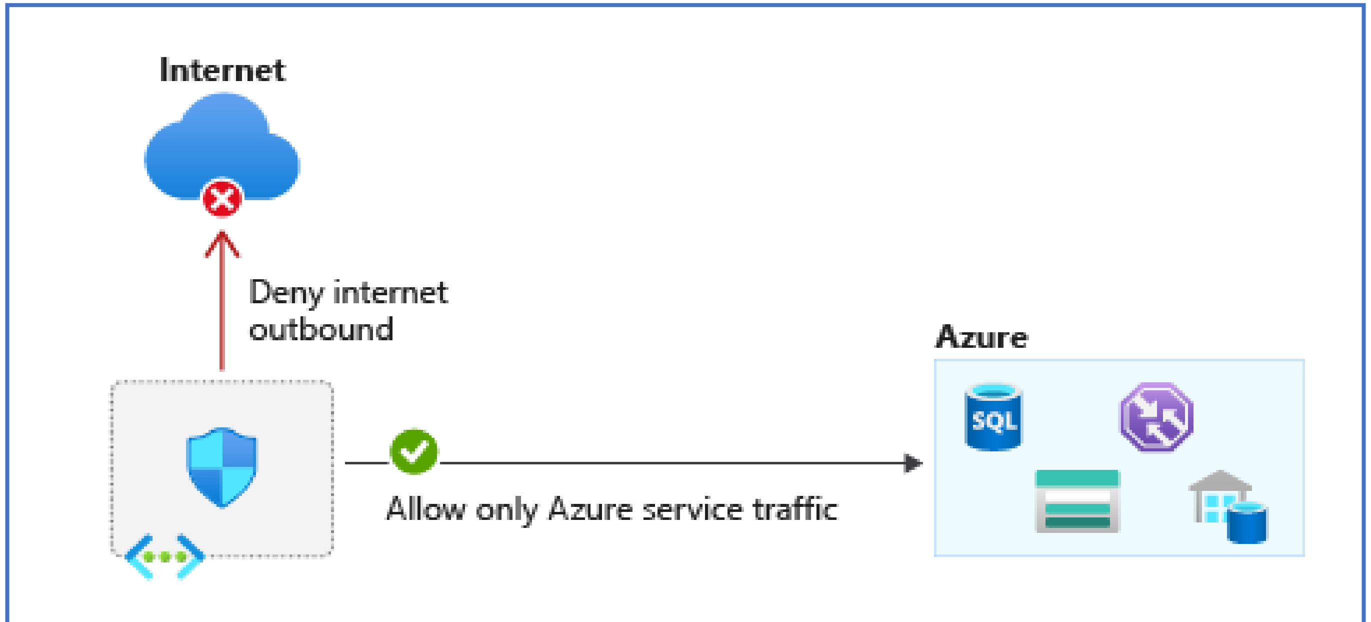
Action
● Allow
○ Deny

Priority * : 100

Name * : Allow-Storage_All

Description:

Add | Cancel



Network Security Group (NSG)

Action	Name	Source	Destination	Port
✓ Allow	AllowStorage	VirtualNetwork	Storage	Any
✓ Allow	AllowSQL	VirtualNetwork	Sql.EastUS	Any
✗ Deny	DenyAllOutBound	Any	Any	Any

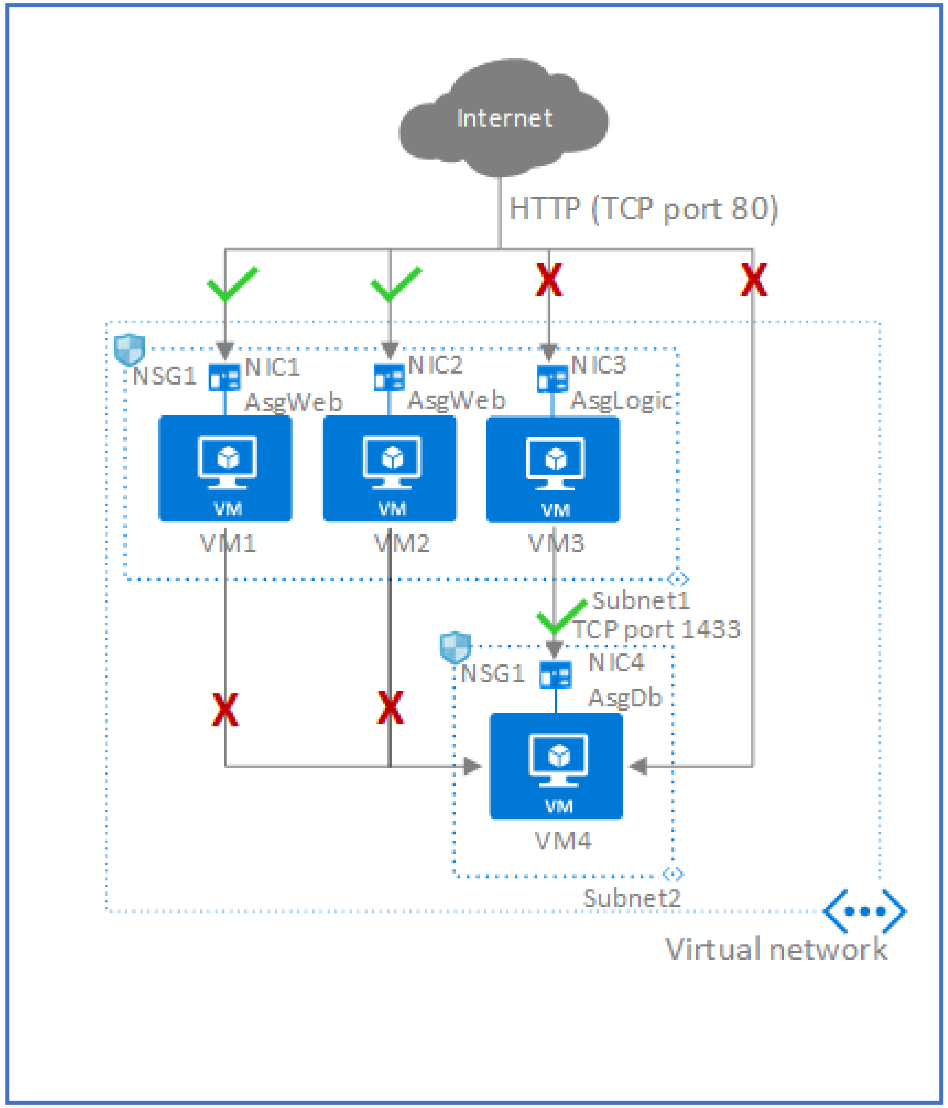
Application Security Groups (ASG)

Configure ASG as a natural extension of an application's structure

ASG can be the source and destination in a security rule

All NIC assigned to an ASG must exist in the same virtual network that the first NIC assigned to the ASG is in

If you specify an ASG as the source and destination in a security rule, the NIC in both ASG must exist in the same virtual network



Demonstration – Network Security Rules

Access the NSGs blade

Add a new NSG

Explore inbound and outbound rules

Deploy and configure Network Security Groups - Review

Knowledge Check

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

[Azure network security groups overview | Microsoft Docs]()

[Azure application security groups overview | Microsoft Docs]()

AzureBastionSubnet /26

Standard min 2

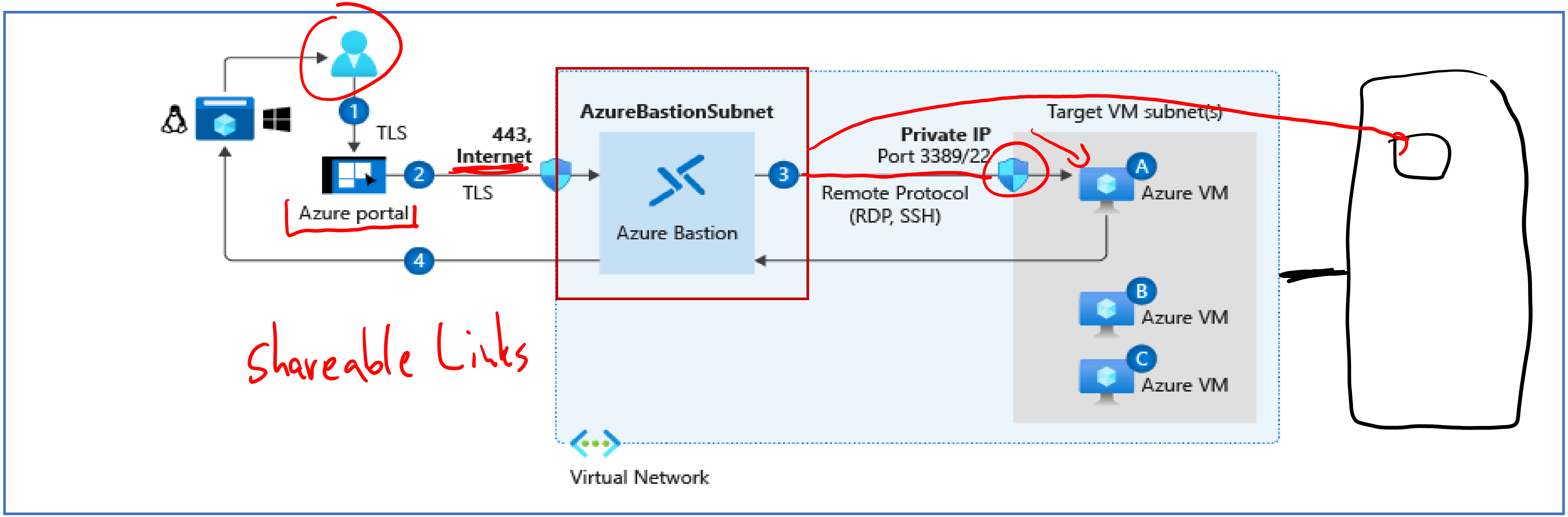
Design and implement Azure Bastion

Design and implement Azure Bastion overview

Connect to virtual machines

Review

Connect to Virtual Machines



Bastion Subnet for RDP/SSH through the Portal over SSL

Remote Desktop Protocol for Windows-based Virtual Machines

Secure Shell Protocol for Linux based Virtual Machines

Design and implement Azure Bastion - Review

Knowledge Check

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

Introduction to Azure Bastion - Training | Microsoft Learn

QuickStart: Deploy Bastion with default settings - Azure Bastion | Microsoft Learn

Design and implement Azure Firewall

Design and implement Azure Firewall overview

- Azure Firewall features
- Rule processing in Azure Firewall
- Deploying Azure Firewall in the Azure portal
- Deploying Azure Firewall in a Hub-Spoke network topology
- Compare Azure Firewall to NSGs
- Review

Bicep

RBAC

Policies

Landing Zone

✓

✓

Azure Firewall features

Stateful firewall as a service

Built-in high availability with unrestricted cloud scalability

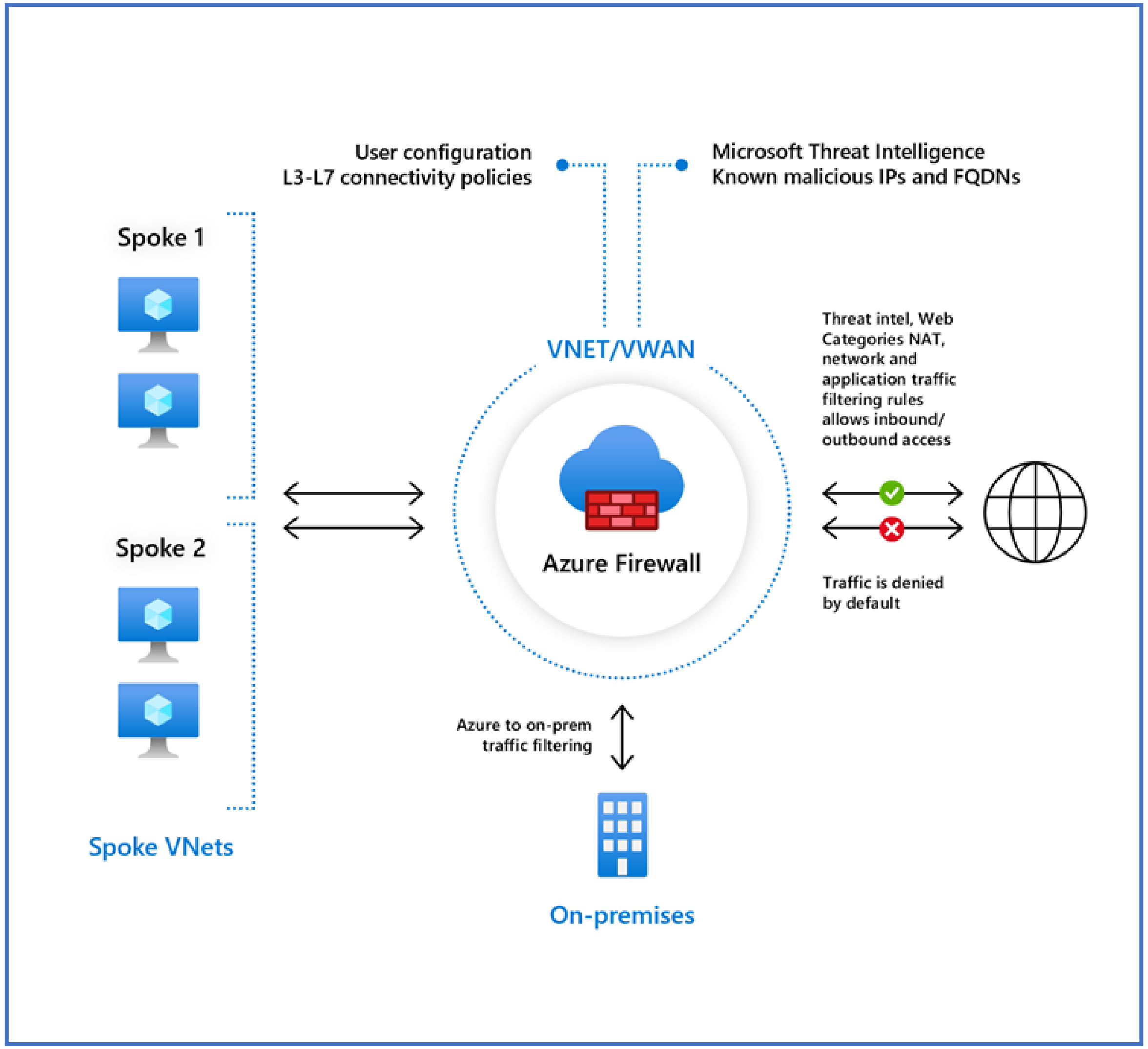
Create, enforce, and log application and network connectivity policies

Threat intelligence-based filtering for L3-L7

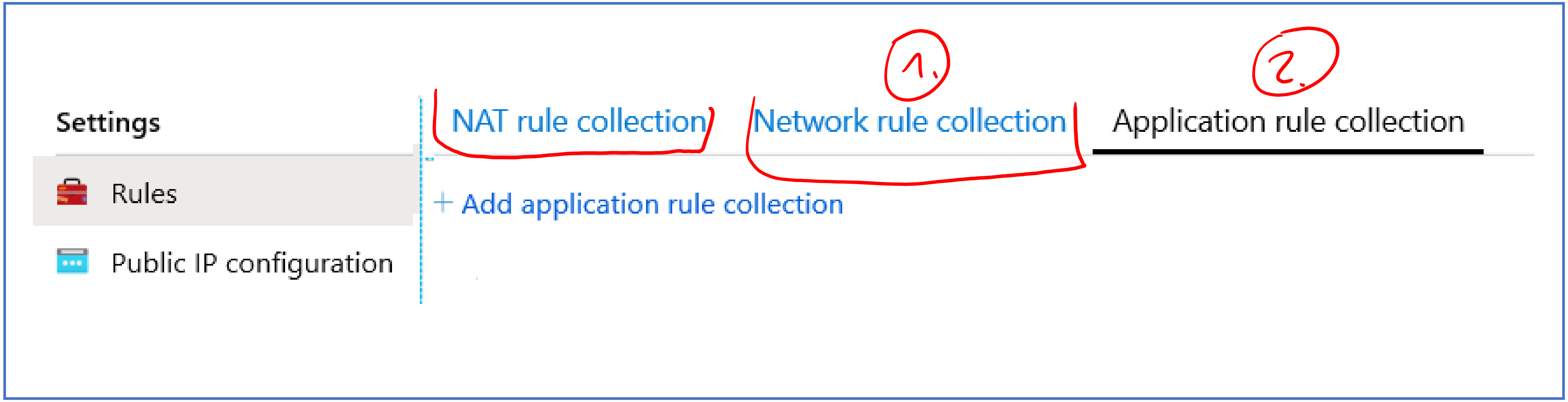
Fully integrated with Azure Monitor for logging and analytics

Support for hybrid connectivity through deployment behind VPN and ExpressRoute Gateways

Standard and Premium SKUs


User configuration
L3-L7 connectivity policies
Microsoft Threat Intelligence
Known malicious IPs and FQDNs
Spoke 1
Spoke 2
Spoke VNets
VNET/VWAN
Azure Firewall
Threat intel, Web Categories NAT, network and application traffic filtering rules allows inbound/ outbound access
Traffic is denied by default
Azure to on-prem traffic filtering
On-premises

Rule processing in Azure Firewall



Settings

Rules

Public IP configuration

NAT rule collection

Network rule collection

Application rule collection

+ Add application rule collection

1.

2.

NAT rules. Configure DNAT rules to allow incoming connections

Network rules. Configure rules that contain source addresses, protocols, destination ports, and destination addresses

Application rules. Configure fully qualified domain names (FQDNs) that can be accessed from a subnet

Deploying Azure Firewall in the Azure portal

On the Create a Firewall page enter the following:

Subscription

Resource Group

Instance Name, region and Availability Zone if any

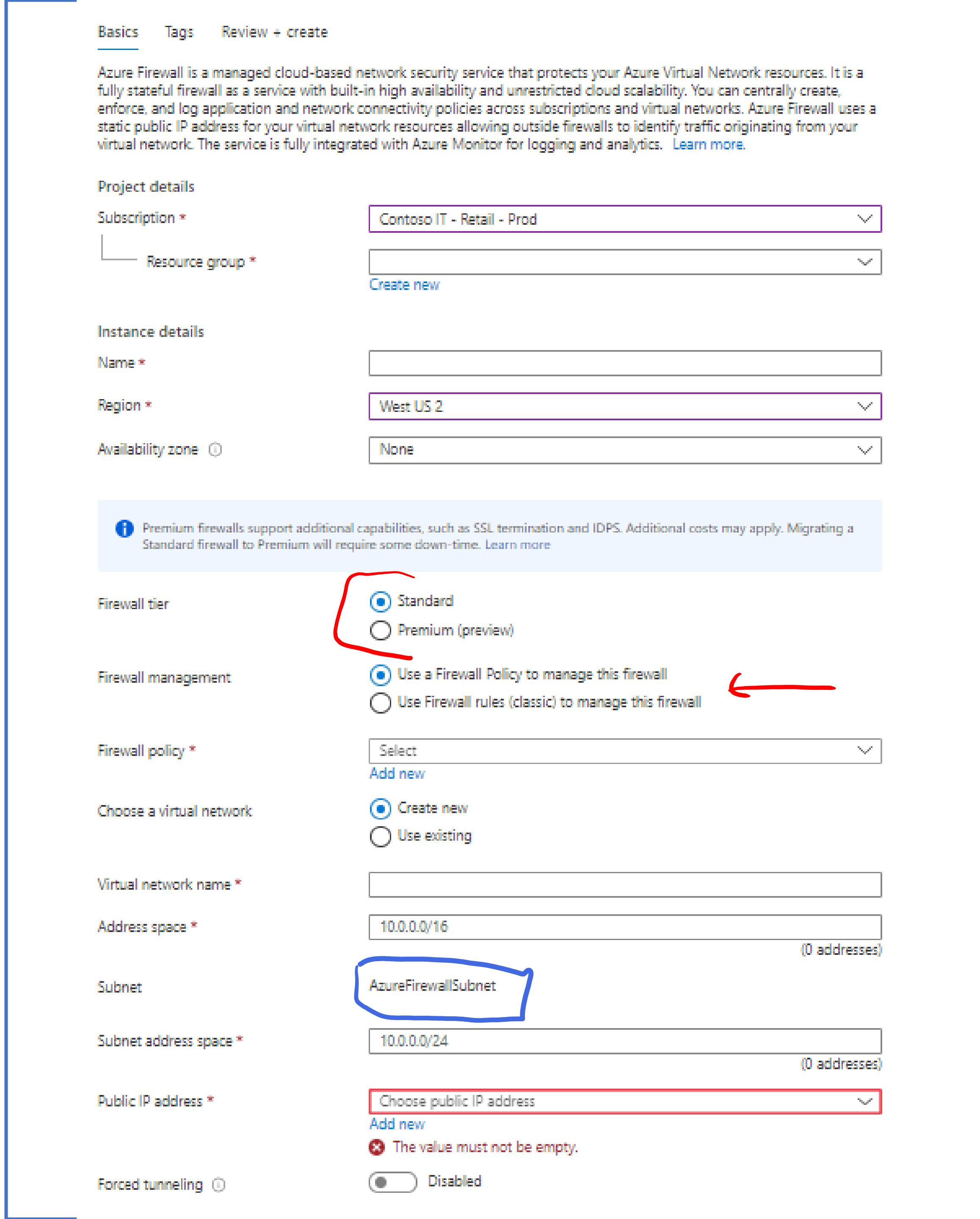
Firewall tier

Firewall management

Firewall Policy

Choose a virtual network

Forced tunneling



Basics Tags Review + create

Azure Firewall is a managed cloud-based network security service that protects your Azure Virtual Network resources. It is a fully stateful firewall as a service with built-in high availability and unrestricted cloud scalability. You can centrally create, enforce, and log application and network connectivity policies across subscriptions and virtual networks. Azure Firewall uses a static public IP address for your virtual network resources allowing outside firewalls to identify traffic originating from your virtual network. The service is fully integrated with Azure Monitor for logging and analytics. Learn more.

Project details

Subscription *: Contoso IT - Retail - Prod

Resource group *:
Create new

Instance details

Name *:

Region *: West US 2

Availability zone: None

Premium firewalls support additional capabilities, such as SSL termination and IDPS. Additional costs may apply. Migrating a Standard firewall to Premium will require some down-time. Learn more

Firewall tier: ● Standard ○ Premium (preview)

Firewall management: ● Use a Firewall Policy to manage this firewall ○ Use Firewall rules (classic) to manage this firewall

Firewall policy *: Select
Add new

Choose a virtual network: ● Create new ○ Use existing

Virtual network name *:

Address space *: 10.0.0.0/16
(0 addresses)

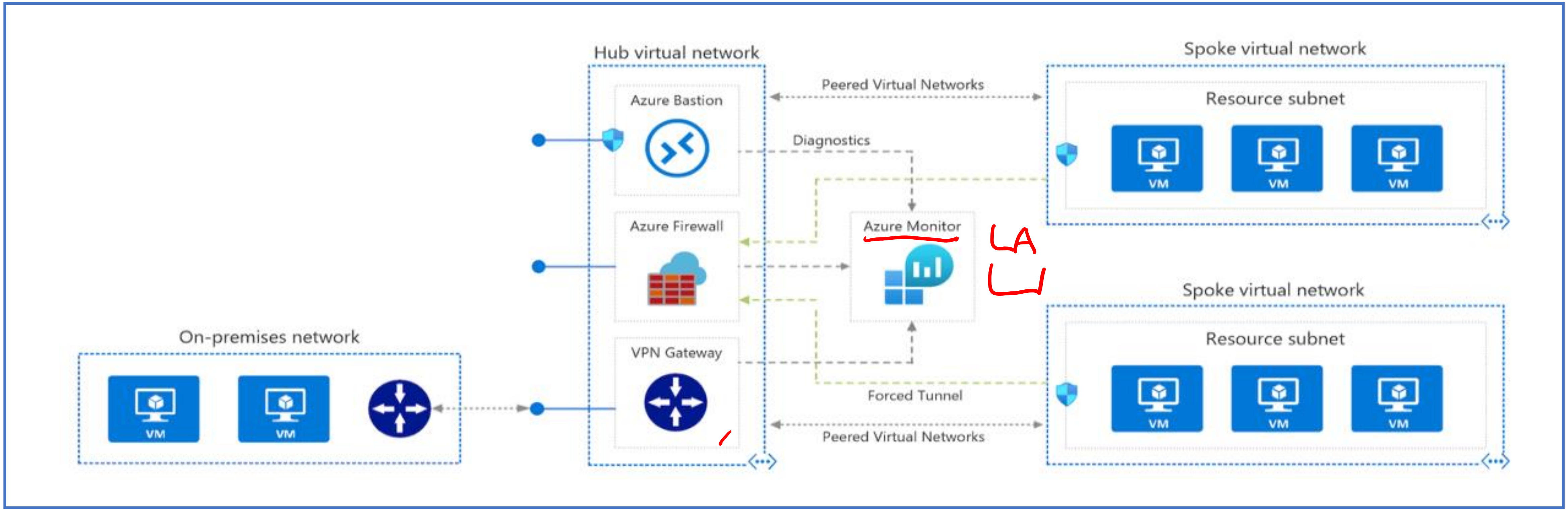
Subnet: AzureFirewallSubnet

Subnet address space *: 10.0.0.0/24
(0 addresses)

Public IP address *: Choose public IP address
Add new
The value must not be empty.

Forced tunneling: Disabled

Deploying Azure Firewall in a Hub-Spoke network topology



A Hub-Spoke network topology is recommended

Shared services are placed in the hub virtual network

Each environment is deployed to a spoke to maintain isolation

Compare Azure Firewall to NSGs

	NSG Packet filter	Azure Firewall
Protocol based traffic filtering	Yes	Yes
Support Service Tags / ASG	Yes ✓	Yes ✓
Support Application FQDN Tags	No	Yes
Integrated with Azure Monitor for diagnostic logging	Yes	Yes
SNAT and DNAT support	No	Yes

Summary – Design and implement Azure Firewall

Check your knowledge

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

What is Azure Firewall? | Microsoft Docs

Azure Firewall features | Microsoft Docs

Exercise - Deploy and configure Azure Firewall using the Azure portal

Deploy and configure Azure Firewall using the Azure portal

Task 1: Create a resource group

Task 2: Create a virtual network and subnets

Task 3: Create a virtual machine

Task 4: Deploy the firewall and firewall policy

Task 5: Create a default route

Task 6: Configure an application rule

Task 7: Configure a network rule

Task 8: Configure a Destination NAT (DNAT) rule

Task 9: Change the primary and secondary DNS address for the server's network interface

Task 10: Test the firewall

Task 11: Clean up resources

Review – Deploy and configure Azure Firewall using the Azure portal

Check your knowledge

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

QuickStart: Create an Azure Firewall and IP Groups - Resource Manager template

Working with Azure Firewall Manager

Working with Azure Firewall Manager overview

- Azure Firewall Manager features
- Azure Firewall Manager policies
- Azure Firewall Manager for Hub Virtual Networks vs Secured Virtual Hubs
- Using Azure Firewall Manager
- Demonstration
- Review

Azure Firewall Manager features

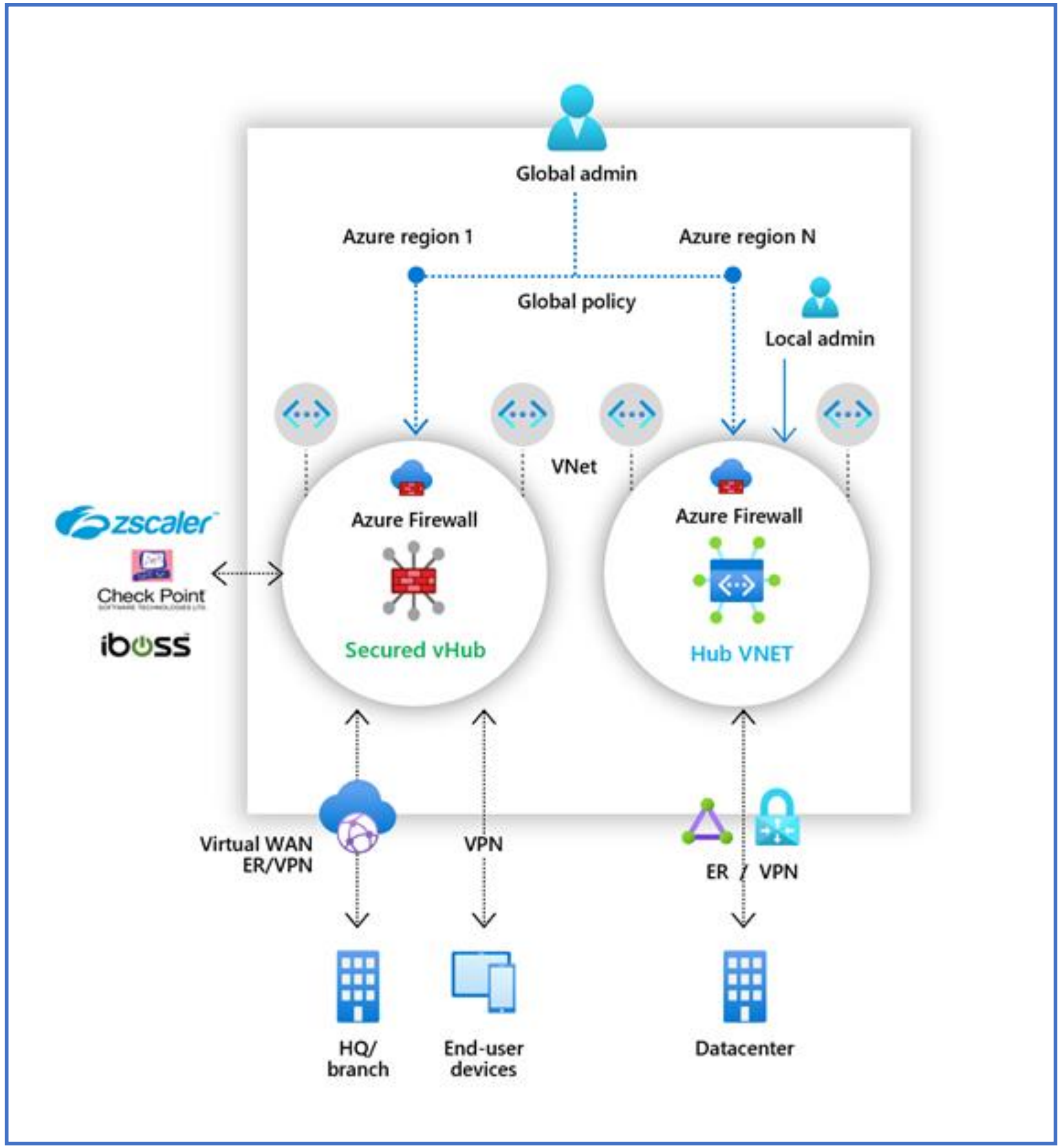
Central Azure Firewall deployment and configuration

Hierarchical policies (global and local)

Integrated with third-party security-as-a-service for advanced security

Centralized route management

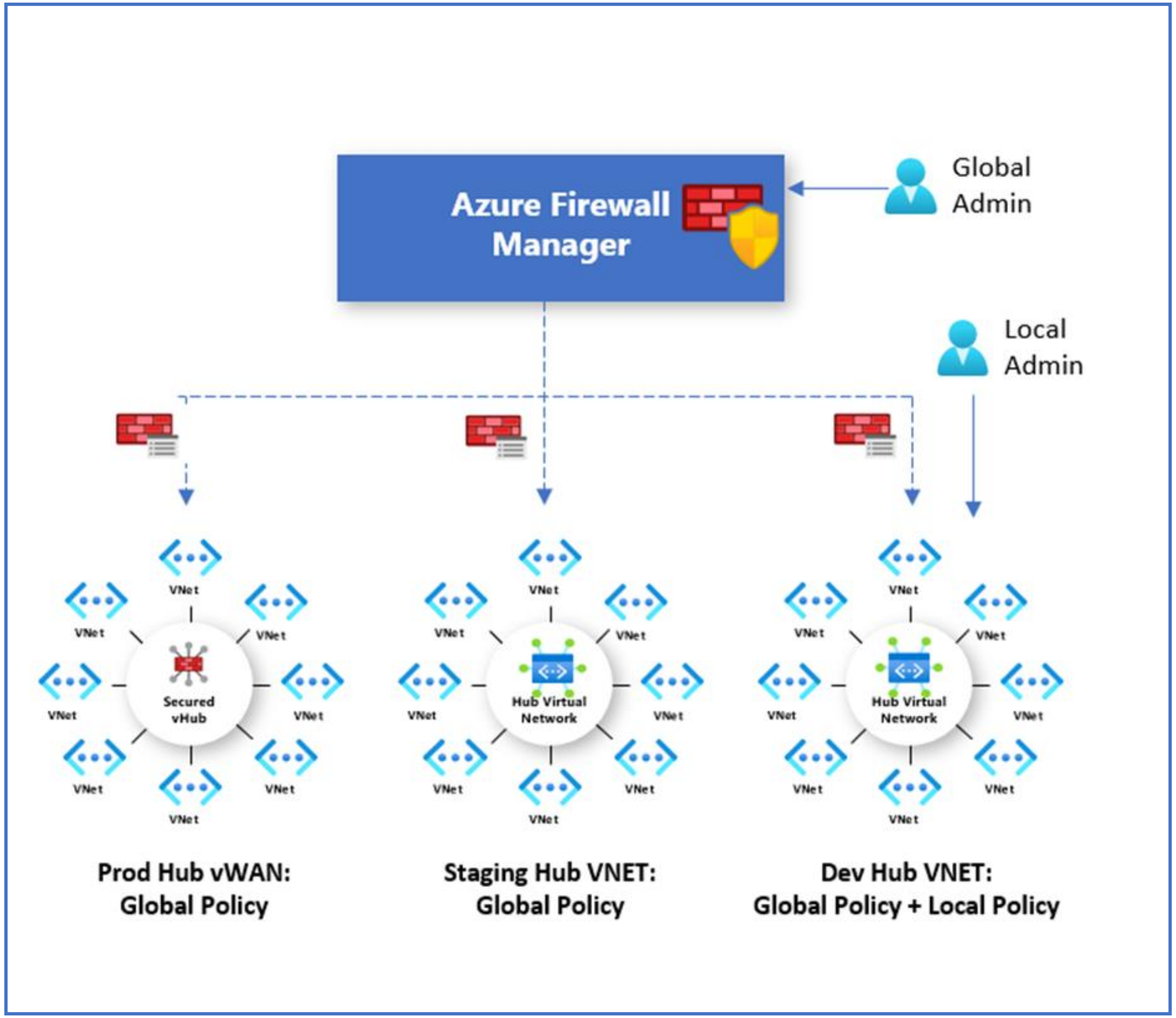
Region availability



Azure Firewall Manager policies

A policy can be created and managed in multiple ways, including the Azure portal, REST API, templates, Azure PowerShell, and CLI.

Policies can be associated with one or more virtual hubs or VNets. The firewall can be in any subscription associated with your account and in any region.


Azure Firewall Manager
Global Admin
Local Admin
VNet
Secured vHub
Hub Virtual Network
Prod Hub vWAN: Global Policy
Staging Hub VNET: Global Policy
Dev Hub VNET: Global Policy + Local Policy

Azure Firewall Manager for Hub Virtual Networks vs Secured Virtual Hubs

	Hub virtual network	Secured virtual hub
Underlying resource	Virtual network	Virtual WAN Hub
Hub & Spoke	Uses Virtual network peering	Automated using hub virtual network connection
On-prem connectivity	VPN Gateway up to 10 Gbps and 30 S2S connections; ExpressRoute	More scalable VPN Gateway up 20 Gbps and 1000 S2S connections; Express Route
Automated branch connectivity using SDWAN	Not supported	Supported
Hubs per region	Multiple Virtual Networks per region	Single Virtual Hub per region. Multiple hubs possible with multiple Virtual WANs
Azure Firewall – multiple public IP addresses	Customer provided	Auto generated

Azure Firewall Manager for Hub Virtual Networks vs Secured Virtual Hubs part 2

	Hub virtual network	Secured virtual hub
Azure Firewall Availability Zones	Supported	Not yet available
Advanced Internet security with third-party Security as a Service partners	Customer established and managed VPN connectivity to partner service of choice	Automated via security partner provider flow and partner management experience
Centralized route management to route traffic to the hub	Customer-managed User Defined Route	Supported using BGP
Multiple security provider support	Supported with manually configured forced tunneling to third-party firewalls	Automated support for two security providers: Azure Firewall for private traffic filtering and third party for Internet filtering
Web Application Firewall on Application Gateway	Supported in Virtual Network	Currently supported in spoke network
Network Virtual Appliance	Supported in Virtual Network	Currently supported in spoke network
Azure DDoS Protection Standard support	Yes	No

Deploying Azure Firewall Manager

Hub virtual networks

1. Create a firewall policy
2. Create your hub and spoke architecture
3. Select security providers and associate firewall policy. Currently, only Azure Firewall is a supported provider.
4. Configure User Define Routes to route traffic to your Hub Virtual Network firewall.

Secured virtual WAN hubs

1. Create your hub and spoke architecture
2. Select security providers
3. Create a firewall policy and associate it with your hub
4. Configure route settings to route traffic to your secured hub

Demonstration

- Create a firewall policy
- Create the virtual networks
- Configure and deploy the firewall
- Create and connect the VPN gateways
- Peer the hub and spoke virtual networks
- Create the routes
- Create the virtual machines
- Test the firewall

Review – Secure your networks with Azure Firewall Manager

Check your knowledge

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

What is Azure Firewall Manager? | Microsoft Docs

Exercise- Secure your virtual hub using Azure Firewall Manager

Secure your virtual hub using Azure Firewall Manager

Task 1: Create two spoke virtual networks and subnets

Task 2: Create the secured virtual hub

Task 3: Connect the hub and spoke virtual networks

Task 4: Deploy the servers

Task 5: Create a firewall policy and secure your hub

Task 6: Associate the firewall policy

Task 7: Route traffic to your hub

Task 8: Test the application rule

Task 9: Test the network rule

Task 10: Clean up resources

Review – Exercise: Deploy and configure Azure Firewall

Check your knowledge

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

Tutorial: Secure your virtual hub using Azure Firewall Manager | Microsoft Docs

Implement a Web Application Firewall

Implement a Web Application Firewall overview

- Web Application Firewall overview
- Web Application Firewall policy modes
- Web Application Firewall Default Rule Set, rule groups, and rules
- Web Application Firewall Custom Rules
- Create a Web Application Firewall policy on Azure Front Door
- Review

Web Application Firewall overview

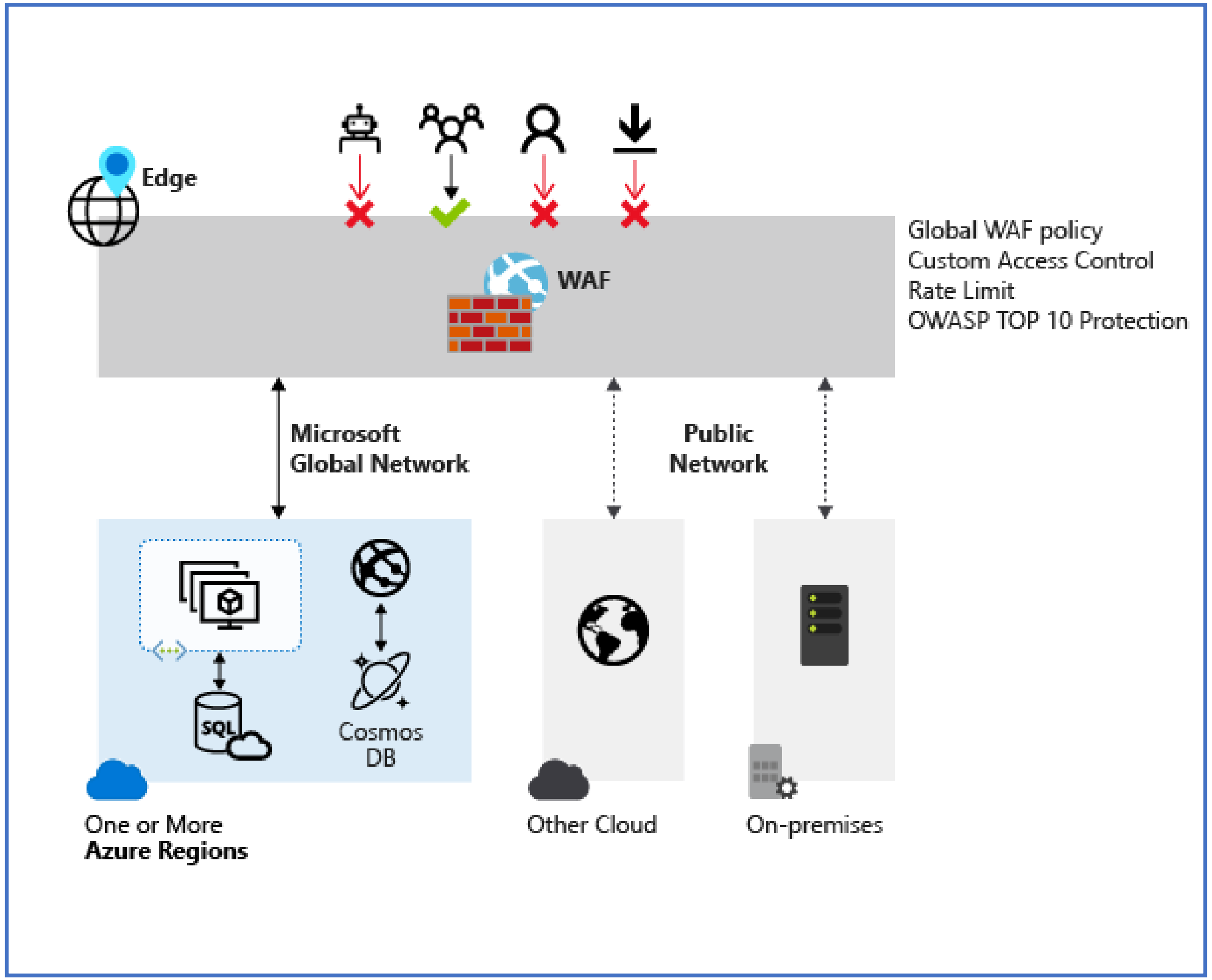
Provides centralized protection of your web applications from common exploits and vulnerabilities

A centralized web application firewall helps make security management much simpler

A WAF also gives application administrators better assurance of protection against threats and intrusions

A WAF solution can react to a security threat faster by centrally patching a known vulnerability, instead of securing each individual web application

Based on OWASP TOP 10 protection



Web Application Firewall with Azure services

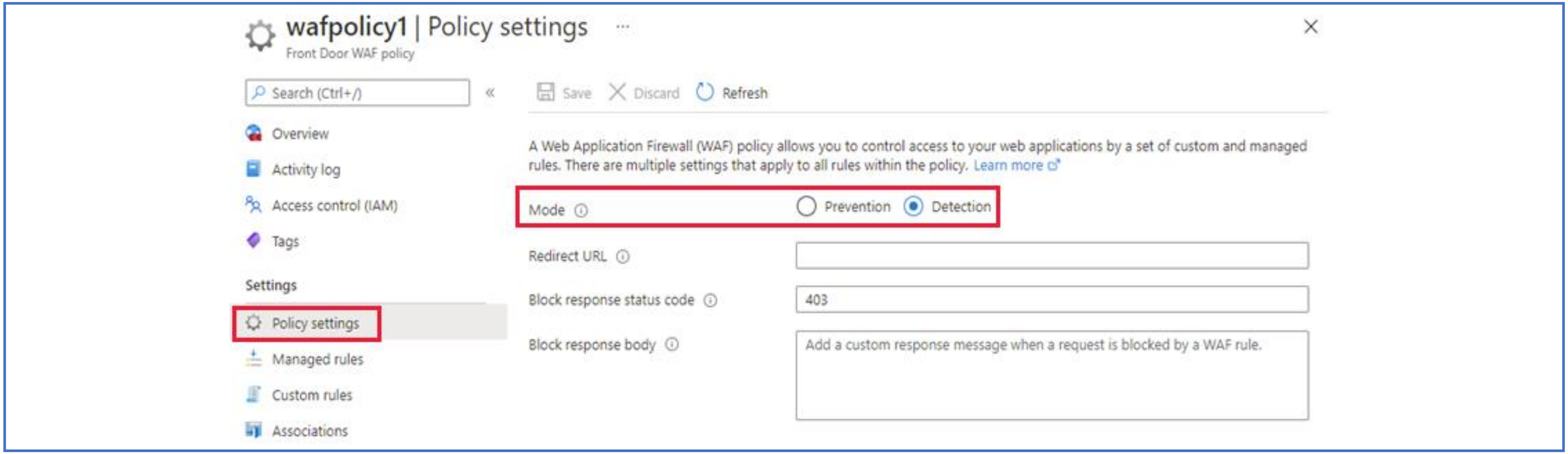
WAF on Azure Application Gateway

- You can create multiple policies, and they can be associated with an Application Gateway, to individual listeners, or to path-based routing rules on an Application Gateway
- Customizable and separate policies for each site behind your Application Gateway if needed
- Monitor attacks

WAF on Azure Front Door

- Global and centralized solution
- WAF enabled web applications inspect every incoming request delivered by Front Door at the network edge
- WAF policy can be associated to one or more Front Door front-ends for protection

Web Application Firewall policy modes



A Web Application Firewall (WAF) policy allows you to control access to your web applications by a set of custom and managed rules. There are multiple settings that apply to all rules within the policy. Learn more

Mode ○ Prevention ● Detection

Redirect URL

Block response status code 403

Block response body: Add a custom response message when a request is blocked by a WAF rule.

by default, the WAF policy is in Detection mode

In Detection mode, WAF does not block any requests; instead, requests matching the WAF rules are logged at WAF logs

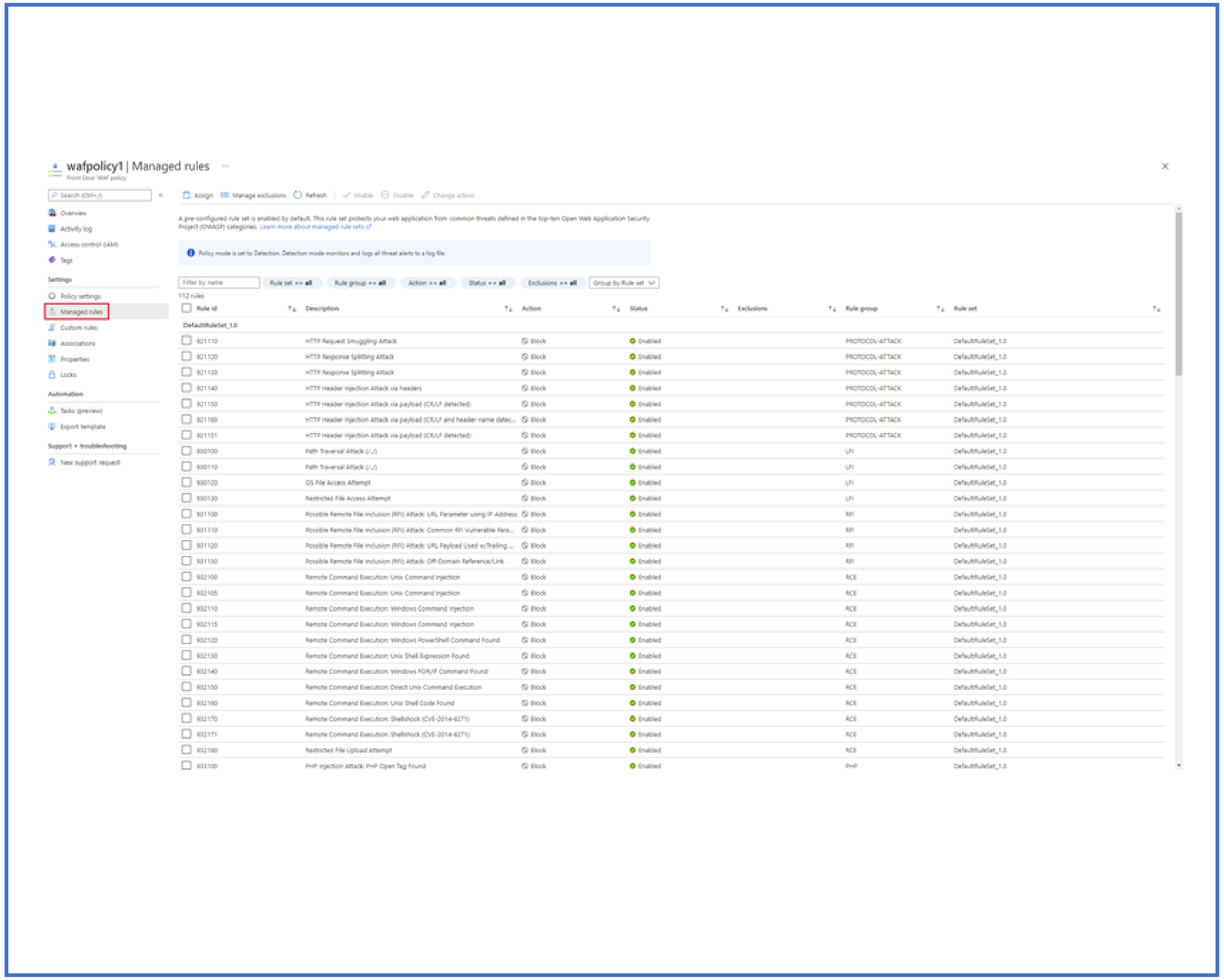
you can change the mode settings from Detection to Prevention

In Prevention mode, requests that match rules that are defined in Default Rule Set (DRS) are blocked and logged at WAF logs

Web Application Firewall Default Rule Set rule groups and rules

Azure-managed Default Rule Set includes rules against the following threat categories:

- Cross-site scripting
- Java attacks
- Local file inclusion
- PHP injection attacks
- Remote command execution
- Remote file inclusion
- Session fixation
- SQL injection protection
- Protocol attackers



A pre-configured rule set is enabled by default. This rule set protects your web application from common threats defined in the top-ten Open Web Application Security Project (OWASP) categories. Learn more about managed rule sets

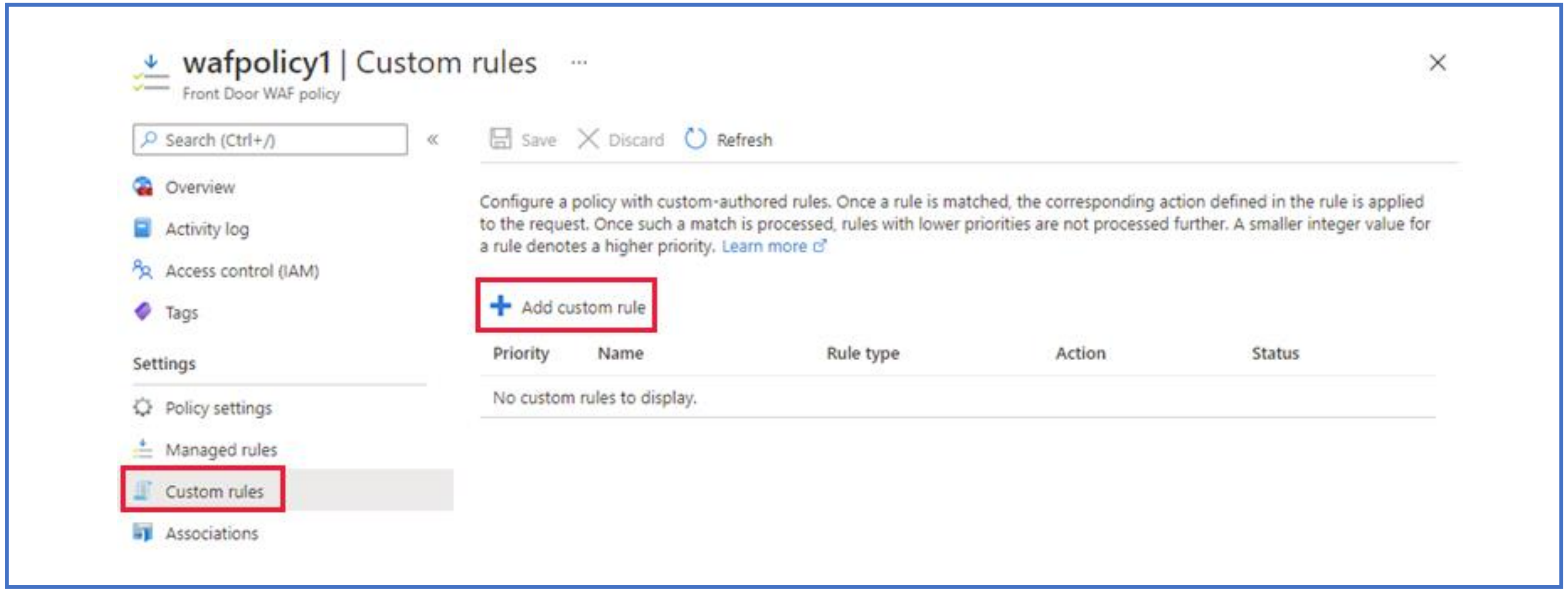
Policy mode is set to Detection. Detection mode monitors and logs all threat alerts to a log file.

112 rules

DefaultRuleSet_1.0

Rule Id	Description	Action	Status	Exclusions	Rule group	Rule set
921110	HTTP Request Smuggling Attack	Block	Enabled		PROTOCOL-ATTACK	DefaultRuleSet_1.0
921120	HTTP Response Splitting Attack	Block	Enabled		PROTOCOL-ATTACK	DefaultRuleSet_1.0
921130	HTTP Response Splitting Attack	Block	Enabled		PROTOCOL-ATTACK	DefaultRuleSet_1.0
921140	HTTP Header Injection Attack via headers	Block	Enabled		PROTOCOL-ATTACK	DefaultRuleSet_1.0
921150	HTTP Header Injection Attack via payload (CR/LF detected)	Block	Enabled		PROTOCOL-ATTACK	DefaultRuleSet_1.0
921160	HTTP Header Injection Attack via payload (CR/LF and header-name detec...	Block	Enabled		PROTOCOL-ATTACK	DefaultRuleSet_1.0
921151	HTTP Header Injection Attack via payload (CR/LF detected)	Block	Enabled		PROTOCOL-ATTACK	DefaultRuleSet_1.0
930100	Path Traversal Attack (/../)	Block	Enabled		LFI	DefaultRuleSet_1.0
930110	Path Traversal Attack (/../)	Block	Enabled		LFI	DefaultRuleSet_1.0
930120	OS File Access Attempt	Block	Enabled		LFI	DefaultRuleSet_1.0
930130	Restricted File Access Attempt	Block	Enabled		LFI	DefaultRuleSet_1.0
931100	Possible Remote File Inclusion (RFI) Attack: URL Parameter using IP Address	Block	Enabled		RFI	DefaultRuleSet_1.0
931110	Possible Remote File Inclusion (RFI) Attack: Common RFI Vulnerable Para...	Block	Enabled		RFI	DefaultRuleSet_1.0
931120	Possible Remote File Inclusion (RFI) Attack: URL Payload Used w/Trailing ...	Block	Enabled		RFI	DefaultRuleSet_1.0
931130	Possible Remote File Inclusion (RFI) Attack: Off-Domain Reference/Link	Block	Enabled		RFI	DefaultRuleSet_1.0
932100	Remote Command Execution: Unix Command Injection	Block	Enabled		RCE	DefaultRuleSet_1.0
932105	Remote Command Execution: Unix Command Injection	Block	Enabled		RCE	DefaultRuleSet_1.0
932110	Remote Command Execution: Windows Command Injection	Block	Enabled		RCE	DefaultRuleSet_1.0
932115	Remote Command Execution: Windows Command Injection	Block	Enabled		RCE	DefaultRuleSet_1.0
932120	Remote Command Execution: Windows PowerShell Command Found	Block	Enabled		RCE	DefaultRuleSet_1.0
932130	Remote Command Execution: Unix Shell Expression Found	Block	Enabled		RCE	DefaultRuleSet_1.0
932140	Remote Command Execution: Windows FOR/IF Command Found	Block	Enabled		RCE	DefaultRuleSet_1.0
932150	Remote Command Execution: Direct Unix Command Execution	Block	Enabled		RCE	DefaultRuleSet_1.0
932160	Remote Command Execution: Unix Shell Code Found	Block	Enabled		RCE	DefaultRuleSet_1.0
932170	Remote Command Execution: Shellshock (CVE-2014-6271)	Block	Enabled		RCE	DefaultRuleSet_1.0
932171	Remote Command Execution: Shellshock (CVE-2014-6271)	Block	Enabled		RCE	DefaultRuleSet_1.0
932180	Restricted File Upload Attempt	Block	Enabled		RCE	DefaultRuleSet_1.0
933100	PHP Injection Attack: PHP Open Tag Found	Block	Enabled		PHP	DefaultRuleSet_1.0

Web Application Firewall Custom Rules



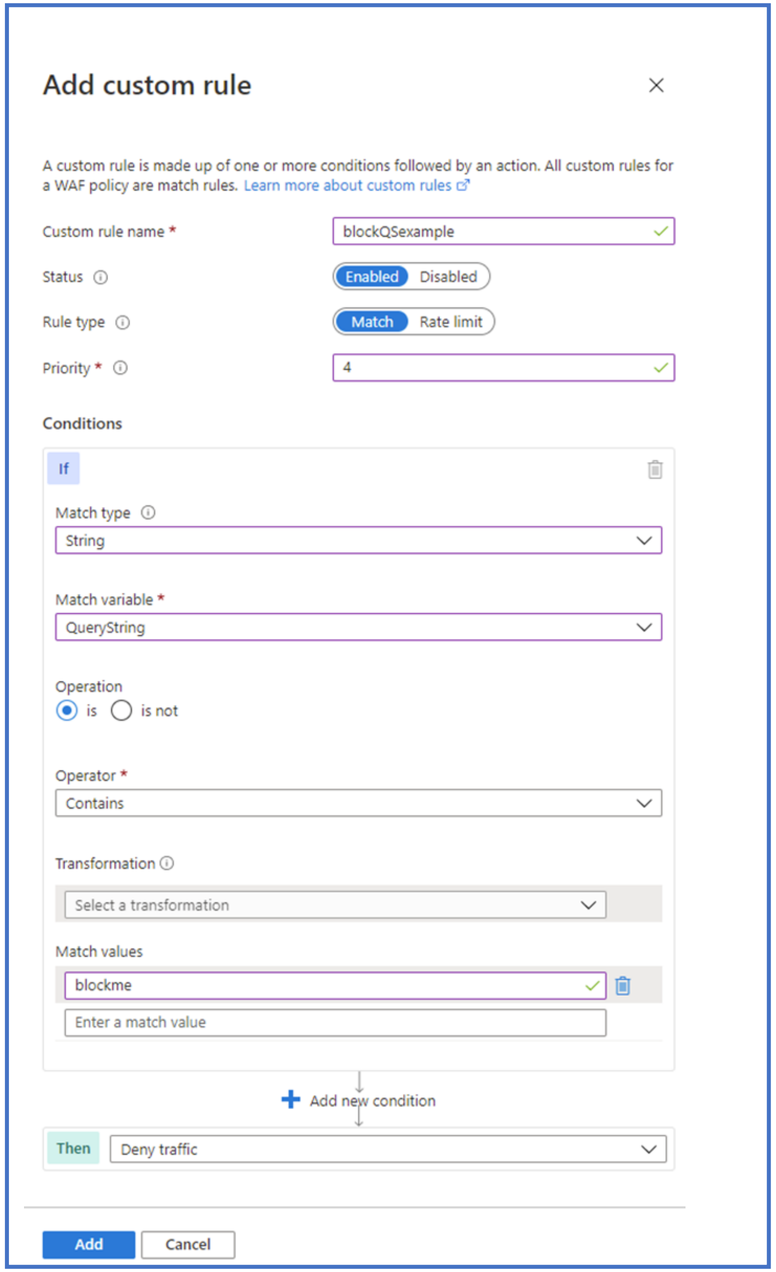
wafpolicy1 | Custom rules ...

Front Door WAF policy

Configure a policy with custom-authored rules. Once a rule is matched, the corresponding action defined in the rule is applied to the request. Once such a match is processed, rules with lower priorities are not processed further. A smaller integer value for a rule denotes a higher priority. Learn more

+ Add custom rule

Priority	Name	Rule type	Action	Status
No custom rules to display.				



Add custom rule

A custom rule is made up of one or more conditions followed by an action. All custom rules for a WAF policy are match rules. Learn more about custom rules

Custom rule name * blockQSexample

Status ⓘ [✓ Enabled] Disabled

Rule type ⓘ [✓ Match] Rate limit

Priority * ⓘ 4

Conditions

If

Match type ⓘ String

Match variable * QueryString

Operation
● is ○ is not

Operator * Contains

Transformation ⓘ Select a transformation

Match values
blockme
Enter a match value

+ Add new condition

Then Deny traffic

A custom WAF rule consists of a priority number, rule type, match conditions, and an action

There are two types of custom rules: a **match rule** controls access based on a set of matching conditions

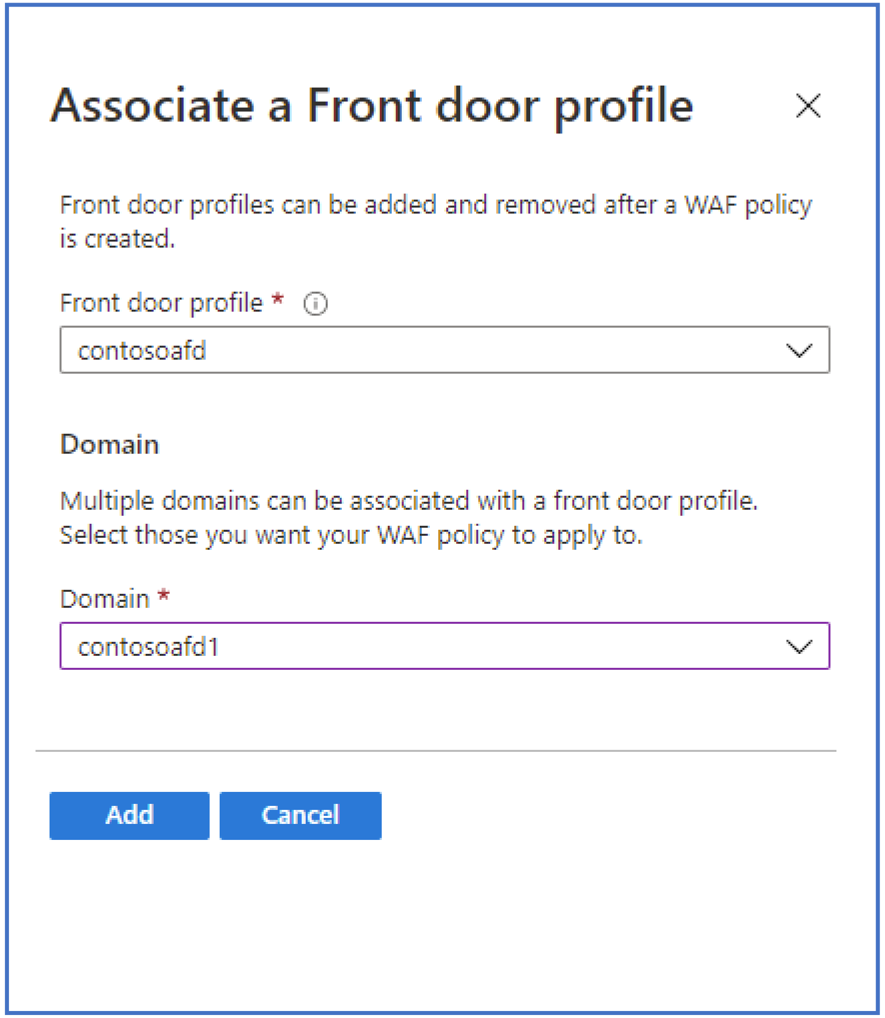
a **rate limit rule** controls access based on matching conditions and the rates of incoming requests

Create a Web Application Firewall policy on Azure Front Door

Create a Web Application Firewall policy - this is where you create a basic WAF policy with managed Default Rule Set (DRS).

Associate the WAF policy with a Front Door profile - this is where you associate the WAF policy created in stage 1 with a Front Door profile. This association can be done during the creation of the WAF policy, or it can be done on a previously created WAF policy. During the association you specify the Front Door profile and the domain/s within the Front Door profile you want the WAF policy to be applied to.

Configure WAF policy settings and rules - this is an optional stage, where you can configure policy settings such as the Mode (Prevention or Detection) and configure managed rules and custom rules.



Associate a Front door profile

Front door profiles can be added and removed after a WAF policy is created.

Front door profile * : contosoafd

Domain

Multiple domains can be associated with a front door profile. Select those you want your WAF policy to apply to.

Domain * : contosoafd1

Implement a Web Application Firewall on Azure Front Door - Review

Knowledge Check

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

[What is Azure web application firewall on Azure Front Door? | Microsoft Docs]

[Azure Web Application Firewall on Azure Front Door Service - frequently asked questions | Microsoft Docs]

End of presentation