Becoming an Azure SQL DBA

PASS24
Data Community Summit

Learning pathway session

② Security, Compliance, Threats, Connectivity

November 6 | 2:00 PM–3:00 PM | 345–346

Microsoft Azure Data

Learning Pathway: Becoming an Azure SQL DBA
Advancing the Role of the On-Premises SQL Server DBA

Wednesday Nov 6th

① **High Availability and BCDR**

11:15am – 12:15pm

Room 345-346

② **Security, Compliance, Threats, Connectivity**

2:00pm – 3:00pm

Room 345-346

Thursday Nov. 7th

③ **Performance Monitoring, Tuning and Alerting**

11:30am – 12:30pm

Room 345-346

④ **New Opportunities from Basics to Microsoft Copilot**

2:00pm – 3:00pm

Room 345-346

Niko Neugebauer

Product Manager
Microsoft

Niko is a Senior Product Manager at Microsoft working on building Azure SQL platform features.

In his previous roles for over 20 years he helped customers successfully build, migrate and optimize Microsoft Data solutions in OLTP & OLAP markets.

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aka.ms/sqlmi-videos

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Pam Lahoud

Principal PM Manager
Microsoft

Pam Lahoud is a Principal PM Manager in Azure Data, based in Redmond, WA, USA. She has been with Microsoft since 2006 and currently leads the Databases in Fabric CAT team. She is passionate about SQL Server performance and has focused on performance tuning and optimization, particularly from the developer perspective, throughout her career. She is a SQL 2008 MCM with over 25 years of experience working with SQL Server, and co-author of the book “Learn T-SQL Querying”.

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Dr. Dani Ljepava

Product Manager
Microsoft

Dani is a Senior Product Manager at Microsoft working on building Azure SQL platform features.

Experience in SQL team includes hybrid environments, data mobility, high availability, backup and restore, monitoring, intelligent performance features, and development of data mobility features for SQL Server 2016-2022. Involved with building Azure SQL Managed Instance since the service launch in 2018.

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Erin Stellato

Principal Product Manager
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Erin Stellato is a Principal Program Manager on the SQL Experiences team, helping advance tools that customers use daily with Azure SQL. She is passionate about data and chocolate, but not always in that order. She previously worked as a consultant and was a Data Platform MVP and has been an active member of the SQL Server community as both a volunteer and speaker.

@erinstellato

https://www.sqlskills.com/about/erin-stellato/

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Azure SQL

The family of SQL cloud databases

SQL Server on Azure Virtual Machines

Azure SQL Managed Instance

Azure SQL Database

Migration

Innovation

Best for: *Migrating ("lift and shift") 3rd party apps* to customer-managed Azure virtual machines.

Best for: *Migrating custom apps at-scale* to a Microsoft-managed, SQL Server-compatible instance.

Best for: *Developing highly-scalable, AI-ready applications* with SQL's reliability and security at commercial open-source database costs.

Azure SQL enabled by Azure Arc

Run Azure SQL on premises and in multicloud environments

Your first step on the journey to Azure.

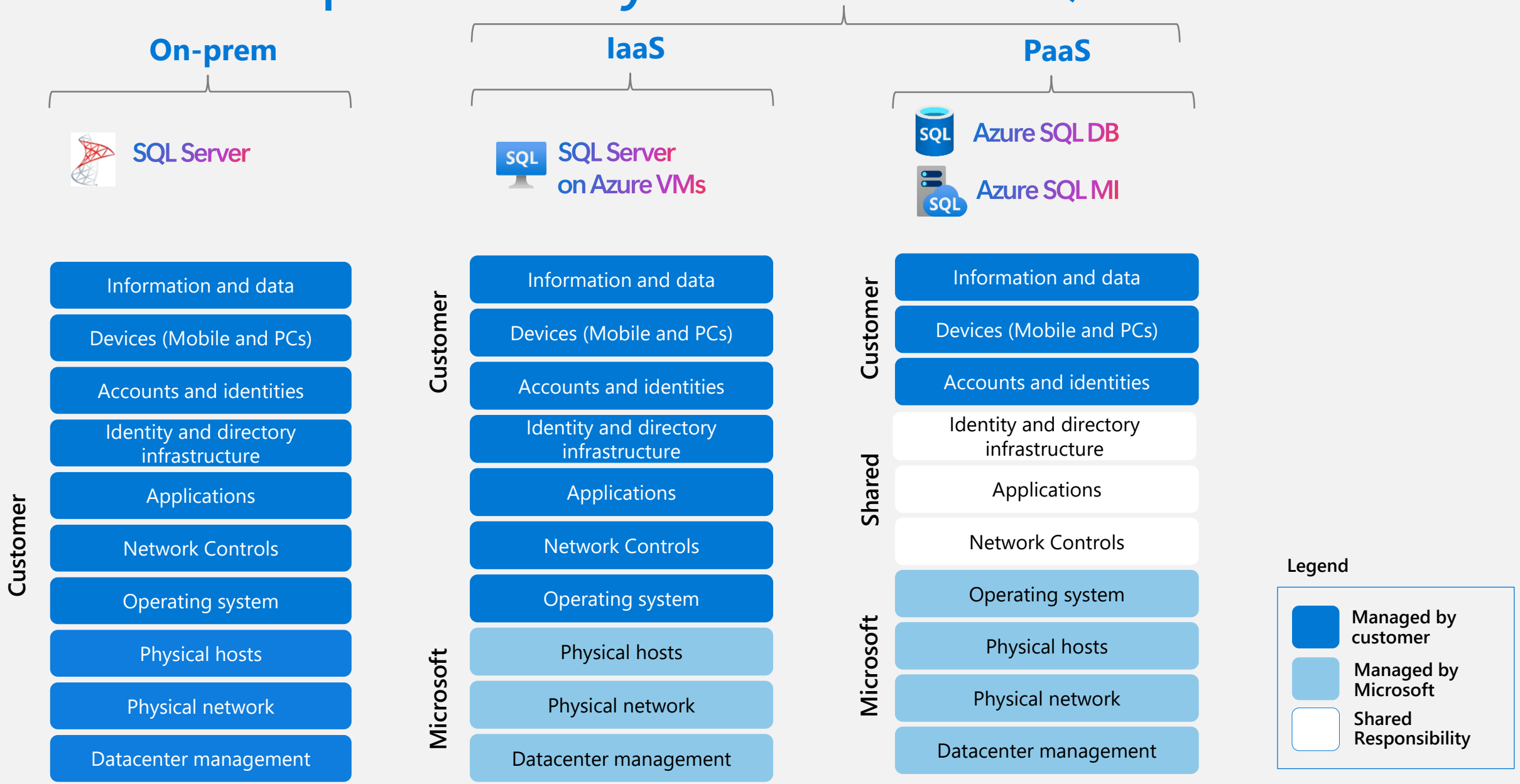
Azure is the cloud that knows SQL Server best

Microsoft Azure

In Azure SQL we have a shared responsibility model

Azure SQL DBA working together with Microsoft

Shared responsibility on Azure SQL

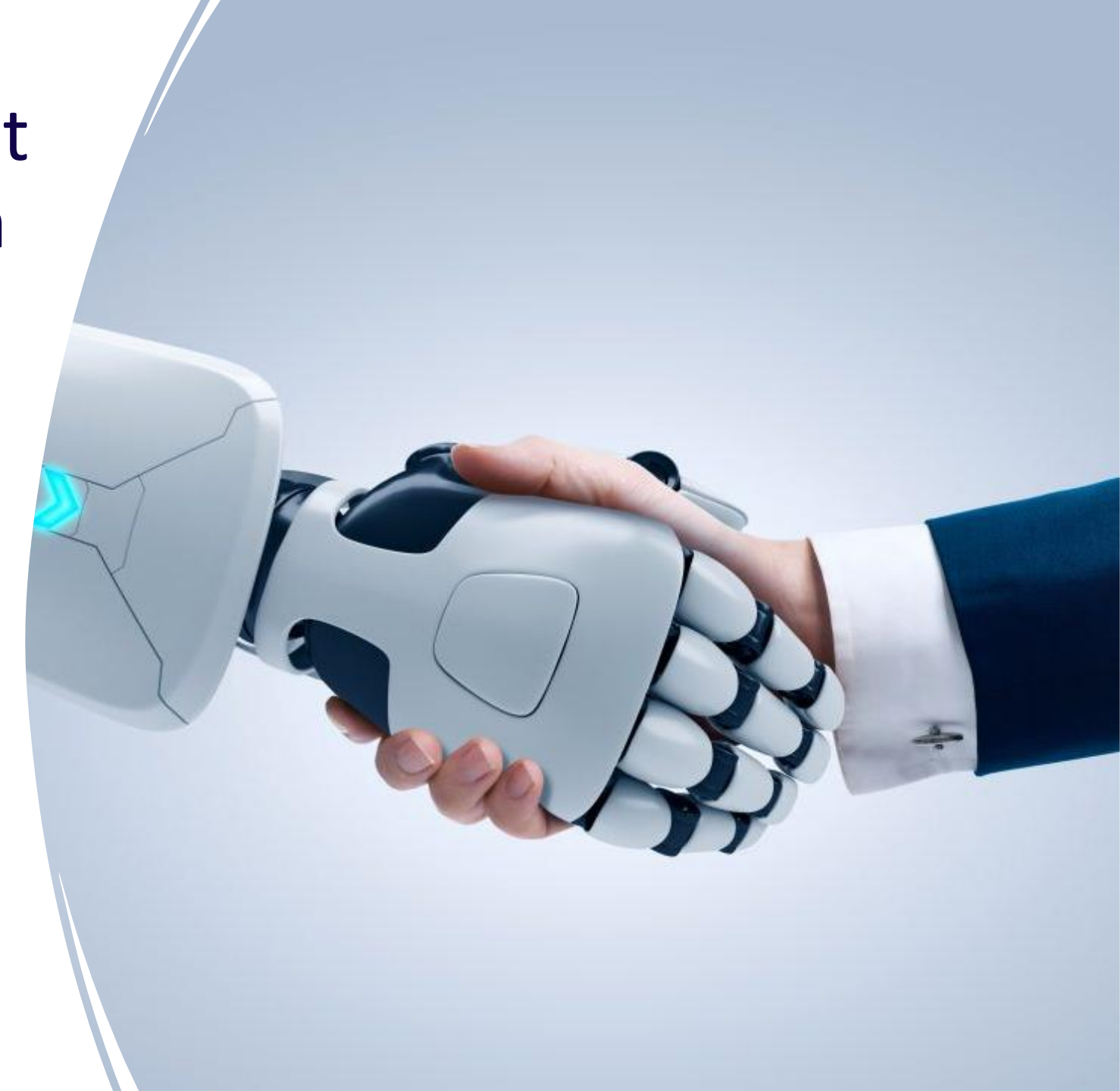


The checklists are still relevant as ever!

- Trip Planning
- Exterior Inspection
- Cockpit Preparation
- Engine Start-up
- System Checks
- Disaster Recovery Planning
- Final Checks

Some of the tasks that DBA and the Platform need to do together

- Networking
- Security and Compliance



Azure SQL DBAs responsibilities

Security

Managing Access (Identity, Login, Roles, Permissions)

Client and server-side security

Network traffic protection

Monitoring the access (choose and configure monitoring software, configure alerts)

Compliance

Ensuring database and apps are compliant

Selecting the right technology

Setting up & Running the Audit

SMK or CMK

Implementing company-specific protocols

Shared Responsibility: Networking

DBA responsibility

- Implementing security best practices and company policies regarding networking, firewall rules, encryption, access control
- Using Network Security Groups, Azure Firewalls

Azure responsibility

- Ensuring platform security and compliance certifications
- Adding new security protocols, solutions & services

Shared Responsibility: Security & Compliance

DBA responsibility

- Implementing security best practices and company policies regarding networking, encryption, access control
- Making choices for TDE (SMK vs CMK)
- Creating and updating Logins, Users
- Managing Groups & permissions
- Configuring & running Audit
- Reporting on SLA

Azure responsibility

- Ensuring platform security and compliance certifications
- Innovating with new security options and services

Reminder: Authorization is not a shared responsibility

Direction

- Scenario-oriented roles
  - Performance Monitoring
  - Security Auditing
  - Database documentation
  - Server configuration
- Granular permissions
  - DMVs, CVs, DMFs
- Aligned with policies and RBAC

User accounts

- Created in SQL metadata
- Logins
  - Server-level principal
  - Local or external (i.e., Azure AD mapped)
- Users
  - Database-level principal
  - Linked to logins or contained

Roles

- Server or database level

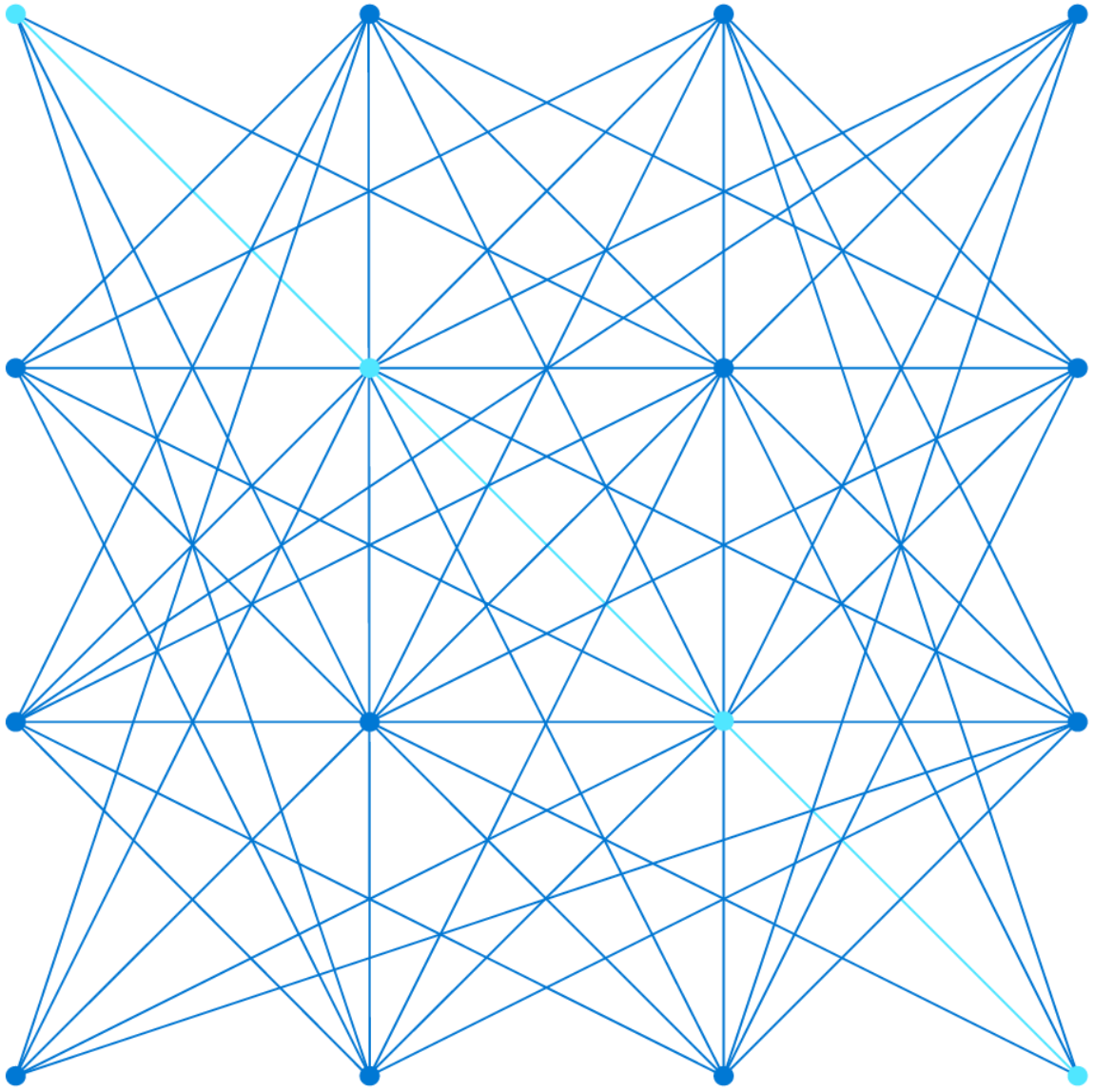
Permissions

- Assigned directly
- Assigned with roles (Preferable)

Microsoft Azure

Essential Azure Services

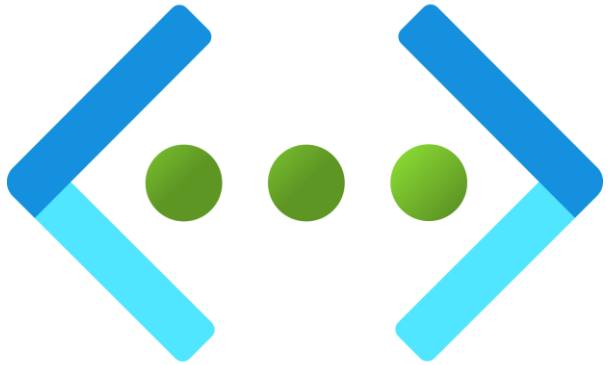
Azure Virtual Network (vNet)
Azure Subnet
Azure Blob Storage
Azure Key Vault
Azure Entra



Virtual network (VNets)

Applies to Azure SQL VM & Azure SQL MI only

Basic building block of Azure networking
Has an assigned IP address space; can be partitioned into subnets



Connectivity
Devices in a VNet can communicate with each other by default
Inbound connectivity via public IP address, public load balancer
Outbound connectivity open by default

Domain Name resolution
Azure-provided domain name resolution
Can also use custom domain name servers

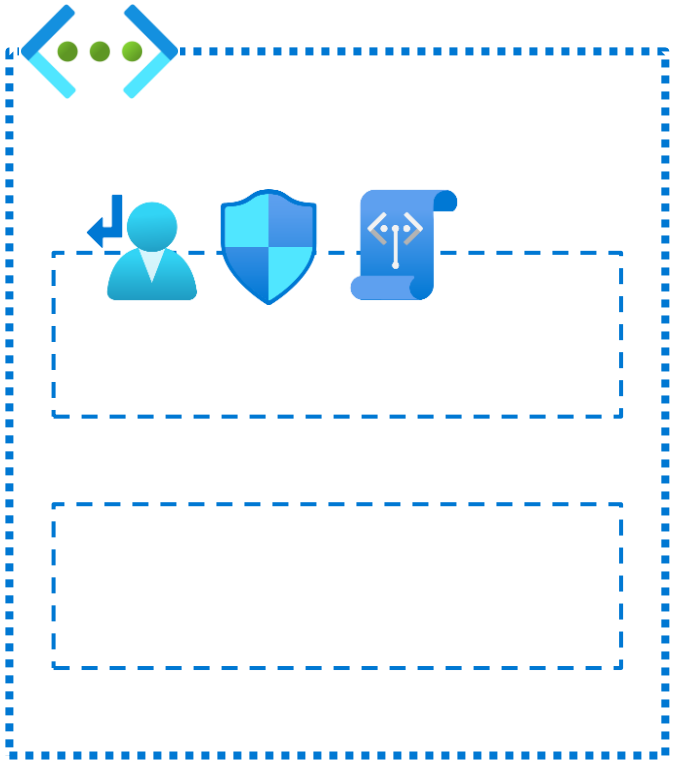
Virtual networks: Subnets

Applies to Azure SQL VM & Azure SQL MI only

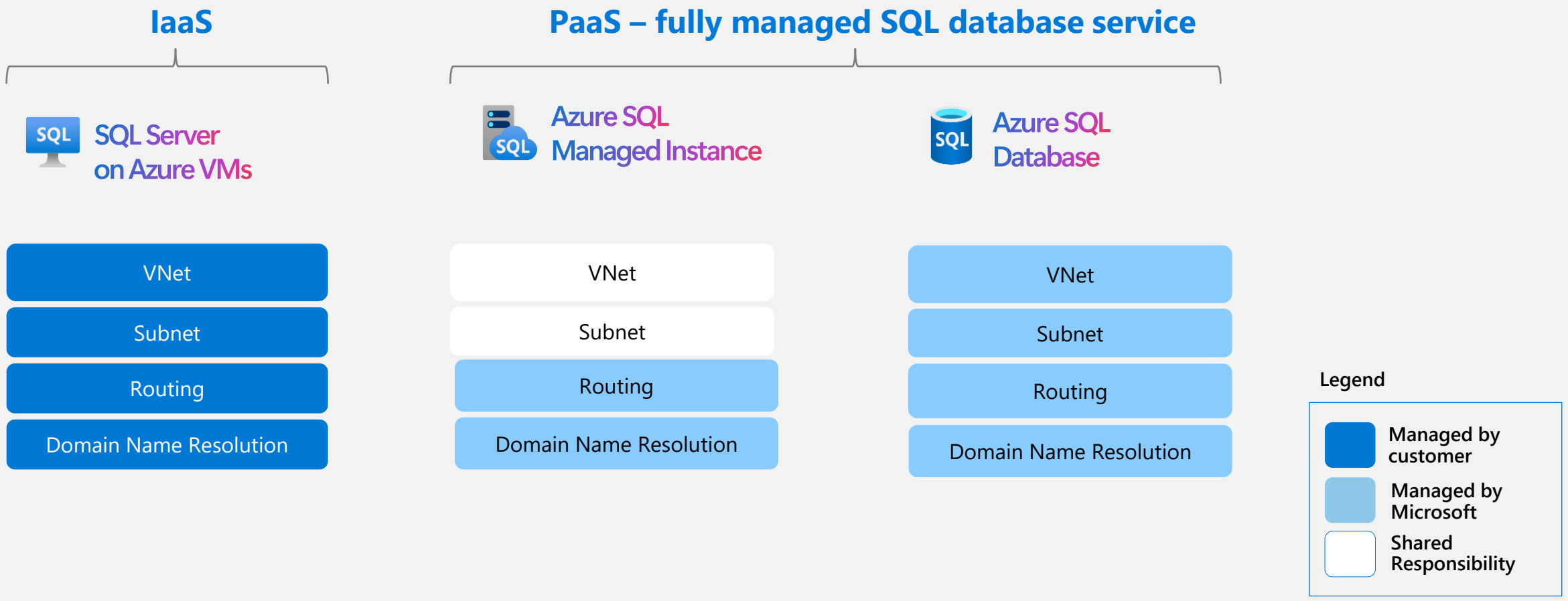
Subnets are subsets of virtual network's address space, with configurable traffic routing and security rules

Traffic routing
Routing table
Service endpoints

Traffic filtering
Network security groups (NSGs), allow/deny rules
Network virtual appliances
Service endpoint policies



Shared responsibility for Network Management



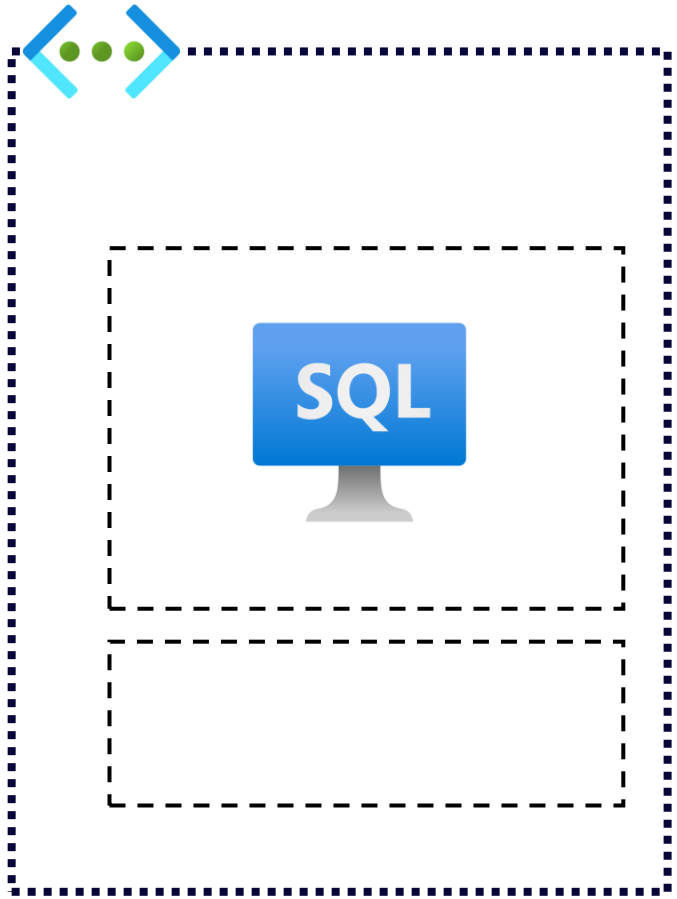
How SQL Server on Azure VM integrates into your virtual network

SQL Server on Azure VM is placed in the subnet of your choice under your specific needs and definitions, just like you would do that on-premises.

Similar deployment process as when doing that on-premises, customer can place as many different Azure SQL VMs in the same subnet as they desire and as subnetwork can place with the given networking ip configuration.

You can move your VM where you need to.

Consider it to be a **basic building block of your solution**.



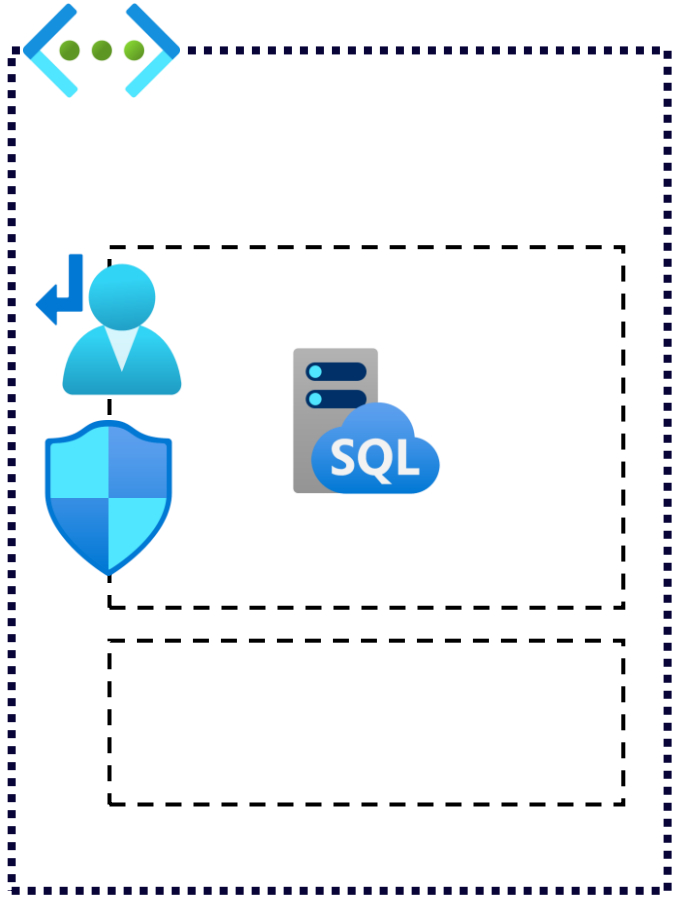
How Azure SQL Managed Instance integrates into your virtual network

SQL Managed Instance deploys in a dedicated subnet

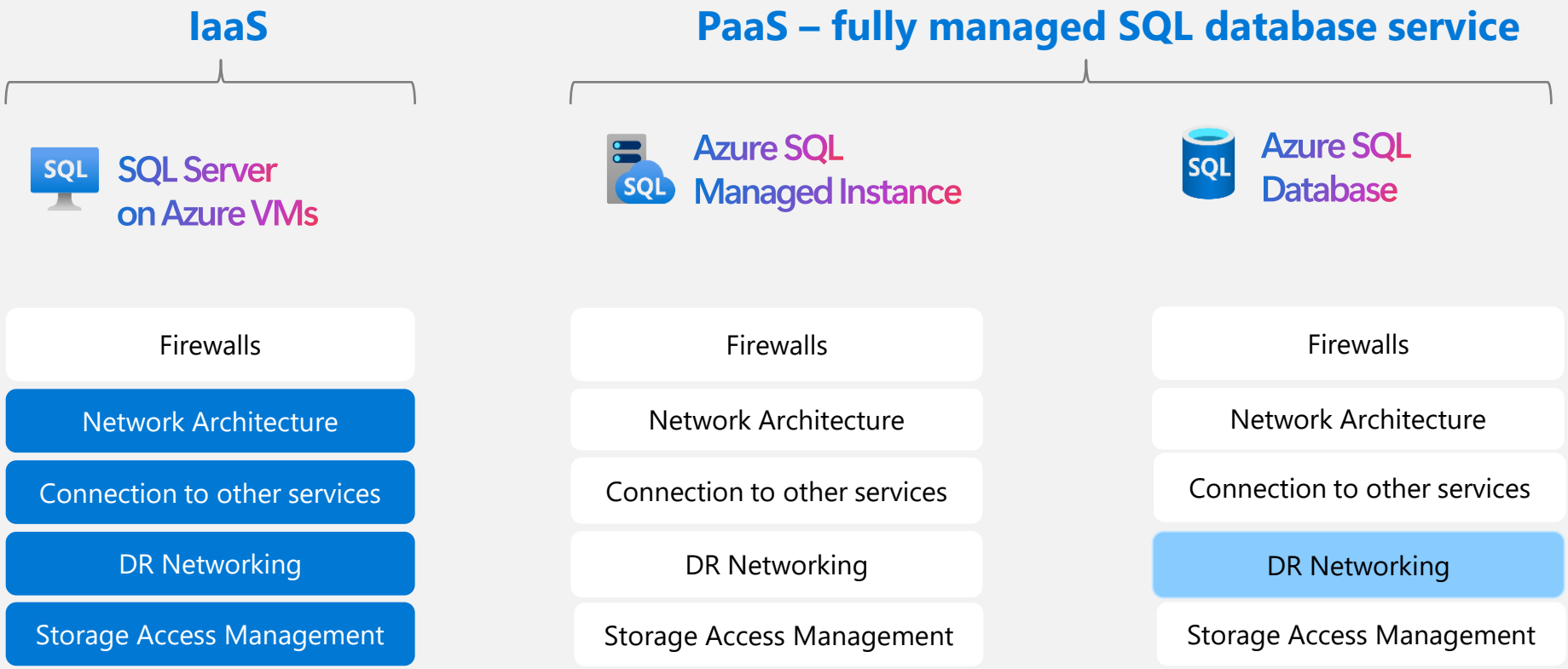
- **Filtering rules** installed on the subnet's NSG.
  Some are configured by default; customer can add additional ones later.
- **Routes** configured on the subnet's route table
- NSG and route table **protected** against disruption of service
- **IP addresses** consumed from the subnet's range

When deployed:

- This subnet is **reserved** for SQL MI only (one or more instances)
- Customer can still deploy resources in other subnets
- Azure SQL Managed Instance's subnet range cannot be changed.
- Instance can still be moved from one subnet to another.



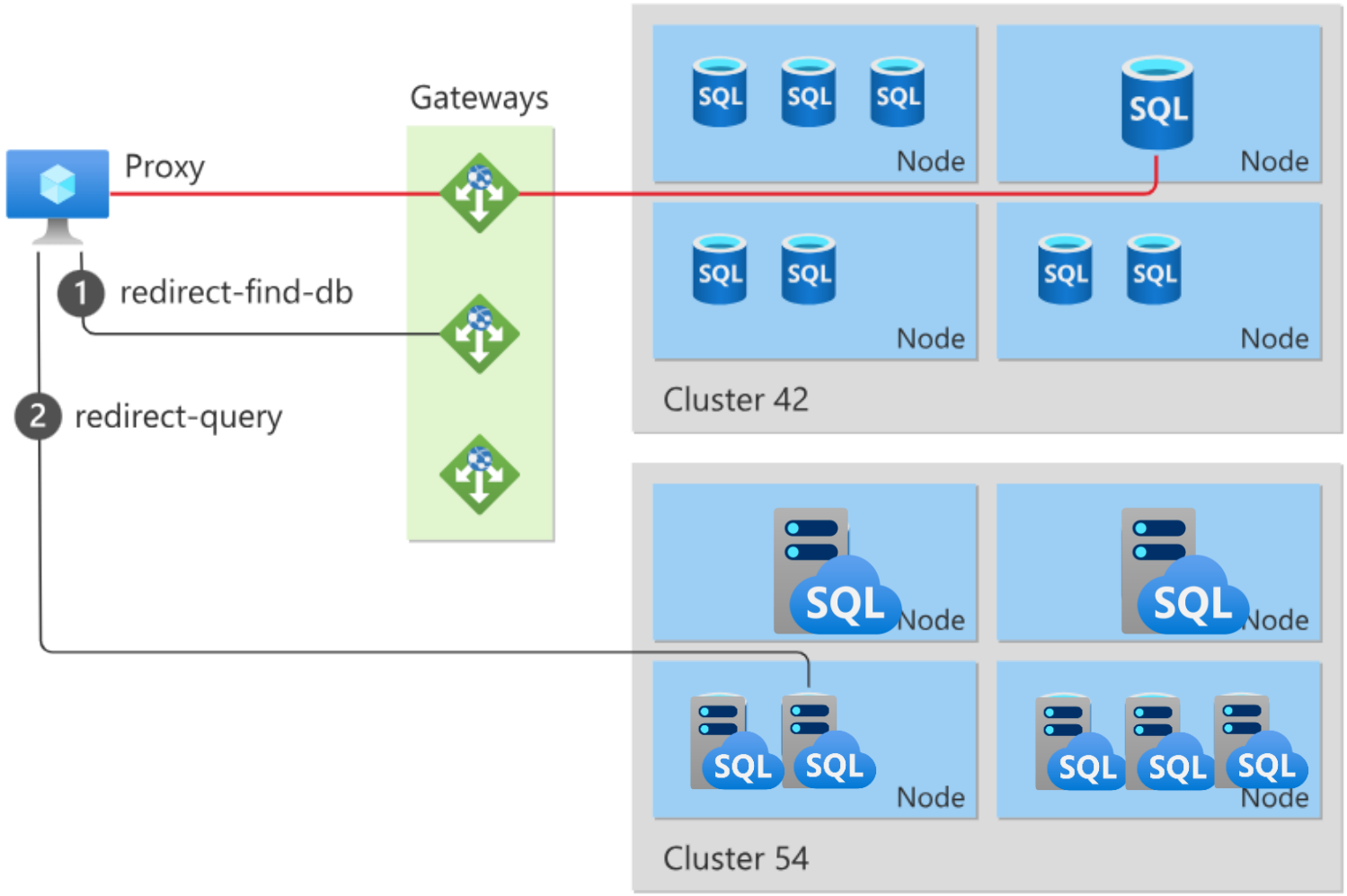
Shared responsibility for Networking & Security



Architecture of Connectivity: Inbound & Outbound

for Azure SQL DBA

Redirect & Proxy connection types/policies explained:



Architecture of Connectivity: Inbound and Outbound

SQL Server on Azure Virtual Machines

For **SQL Server on Azure VMs**, the connection policies possibilities are endless – you just need to build and maintain them.

Azure SQL Database

For **Azure SQL Database** the possible connection types(aka policies) are:

- Default (uses Proxy or Redirect, depending on location)
- Proxy
- Redirect

Azure SQL Managed Instance

On **Azure SQL Managed Instance** you have the following connection types:

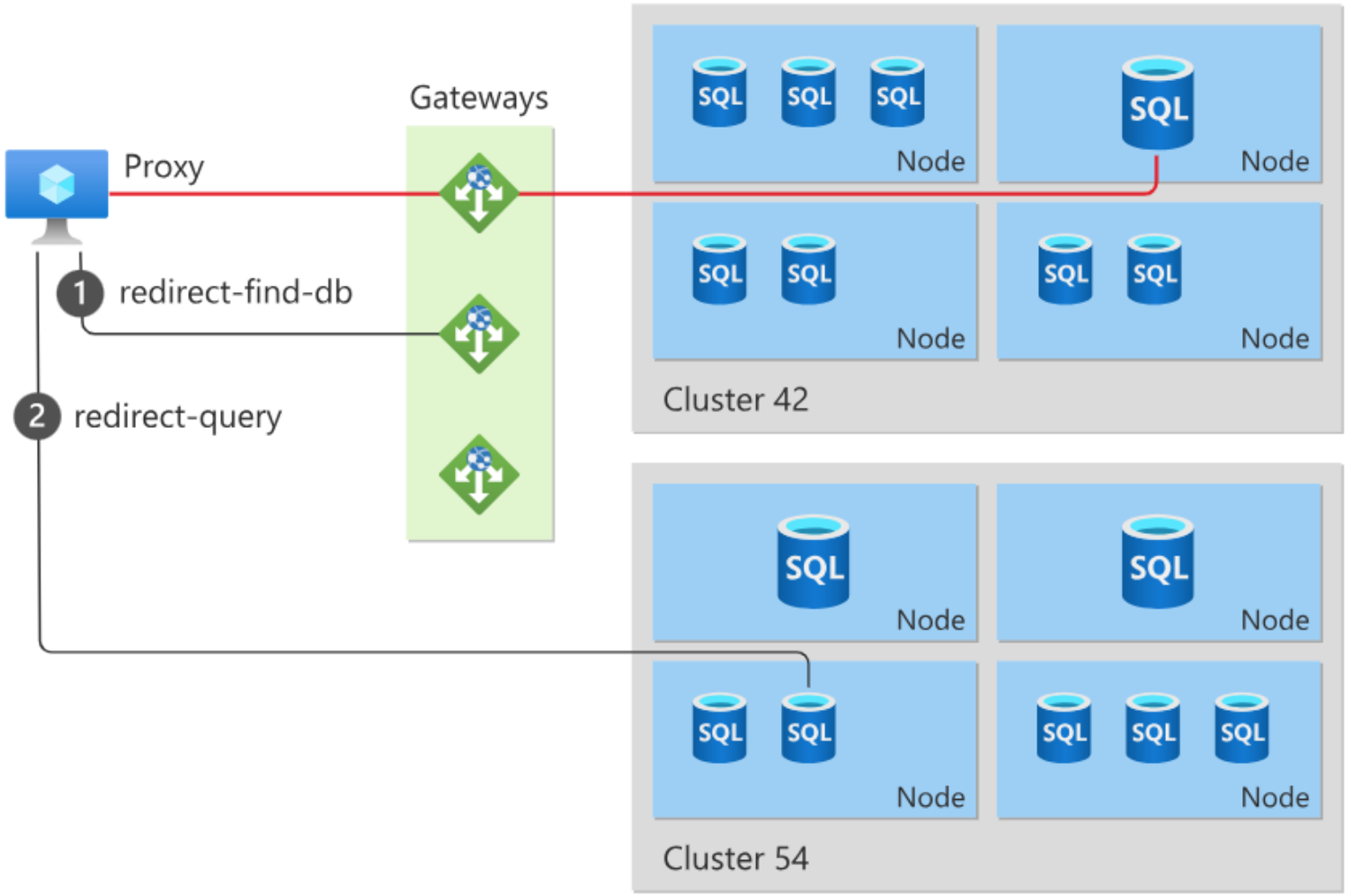
- Proxy (default)
- Redirect

Connecting to Azure SQL DB:

Connecting **within Azure**, use **Redirect** policy by default.

Connecting **outside of Azure**, Your connection will have policy of **Proxy** be default.

Connection types available:
Public endpoint
Private endpoints



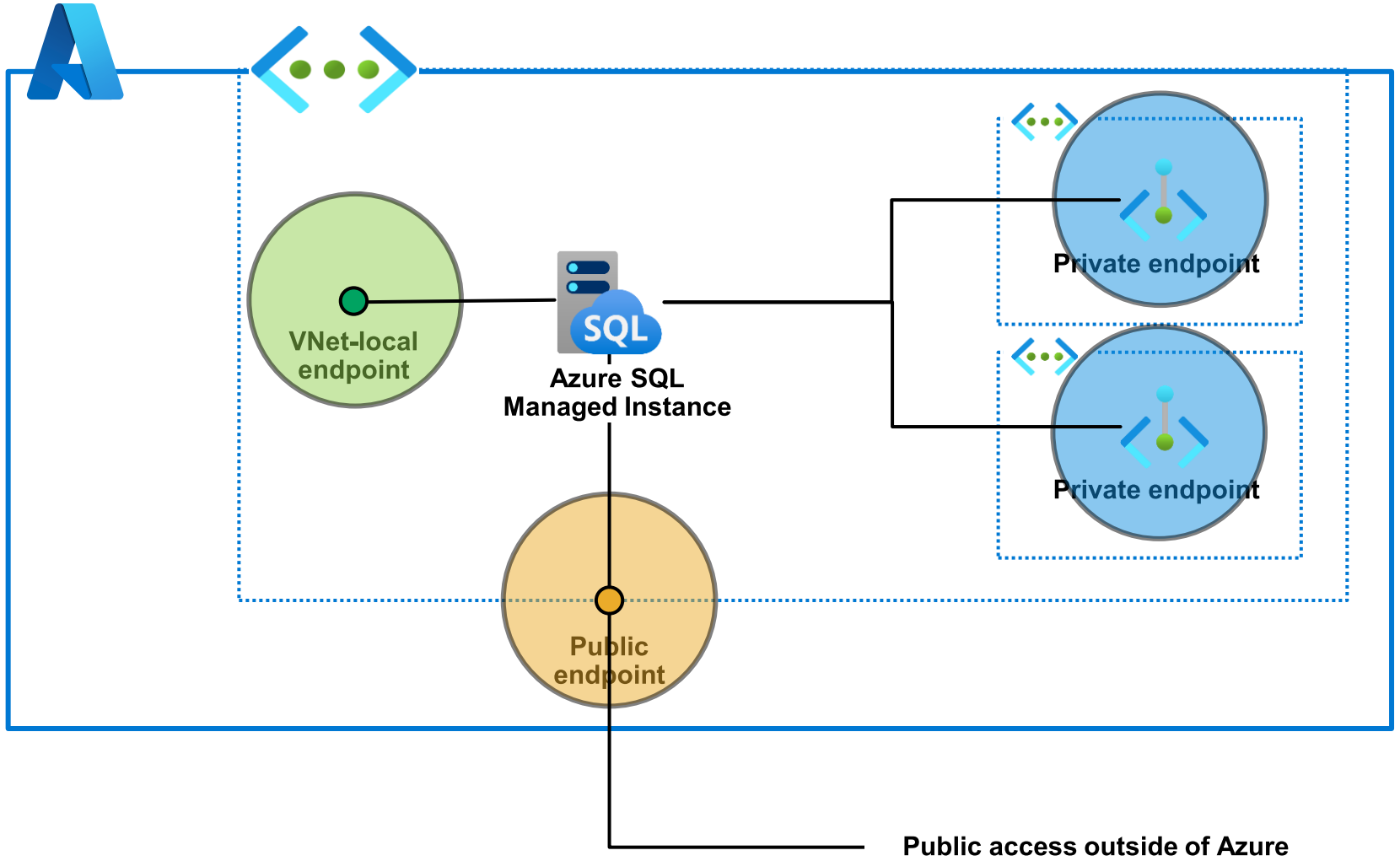
Connecting to Azure SQL Managed Instance

There are 3 connection endpoints configurable:

- VNet-local endpoint
- Public endpoint
- Private endpoints

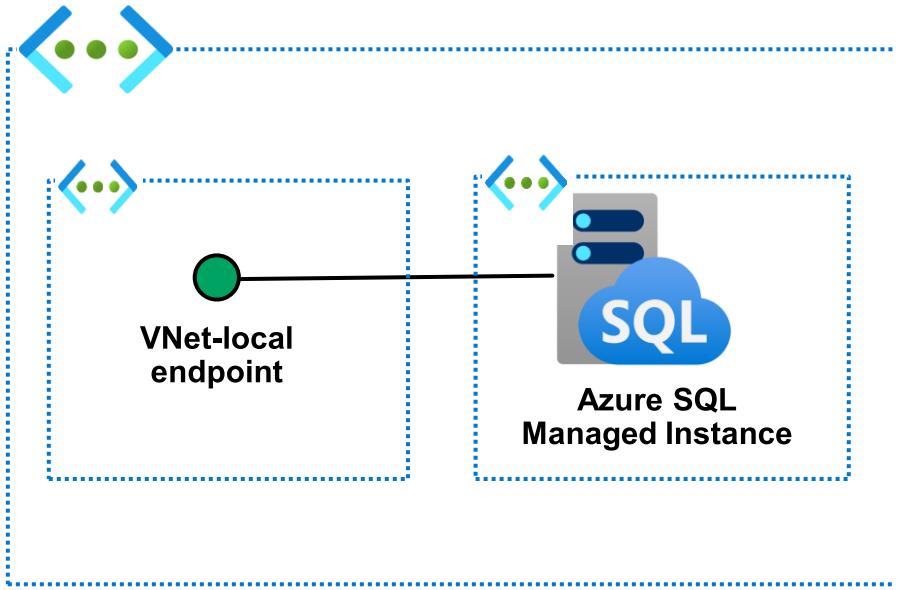
Connection types supported:

- Proxy: all
- Redirect: only **vNet local endpoint**

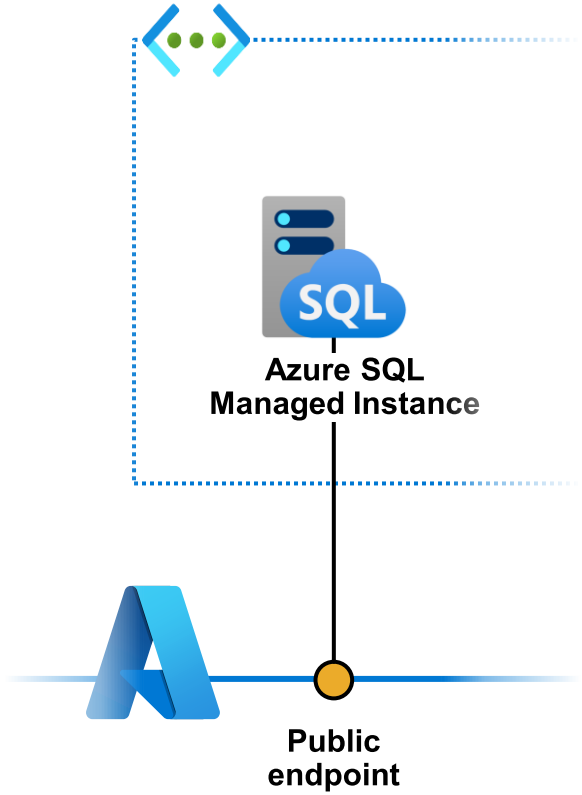


Connecting to Azure SQL Managed Instance

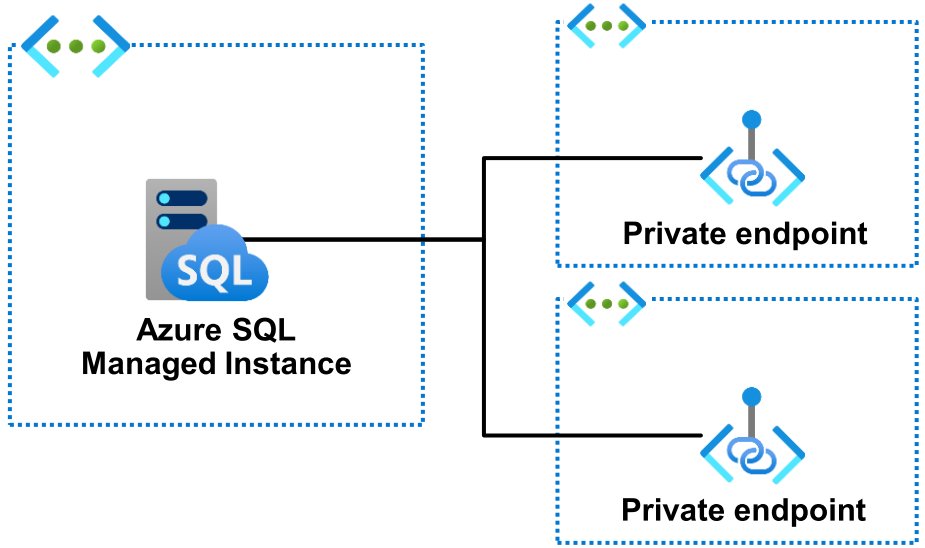
VNet-local endpoint



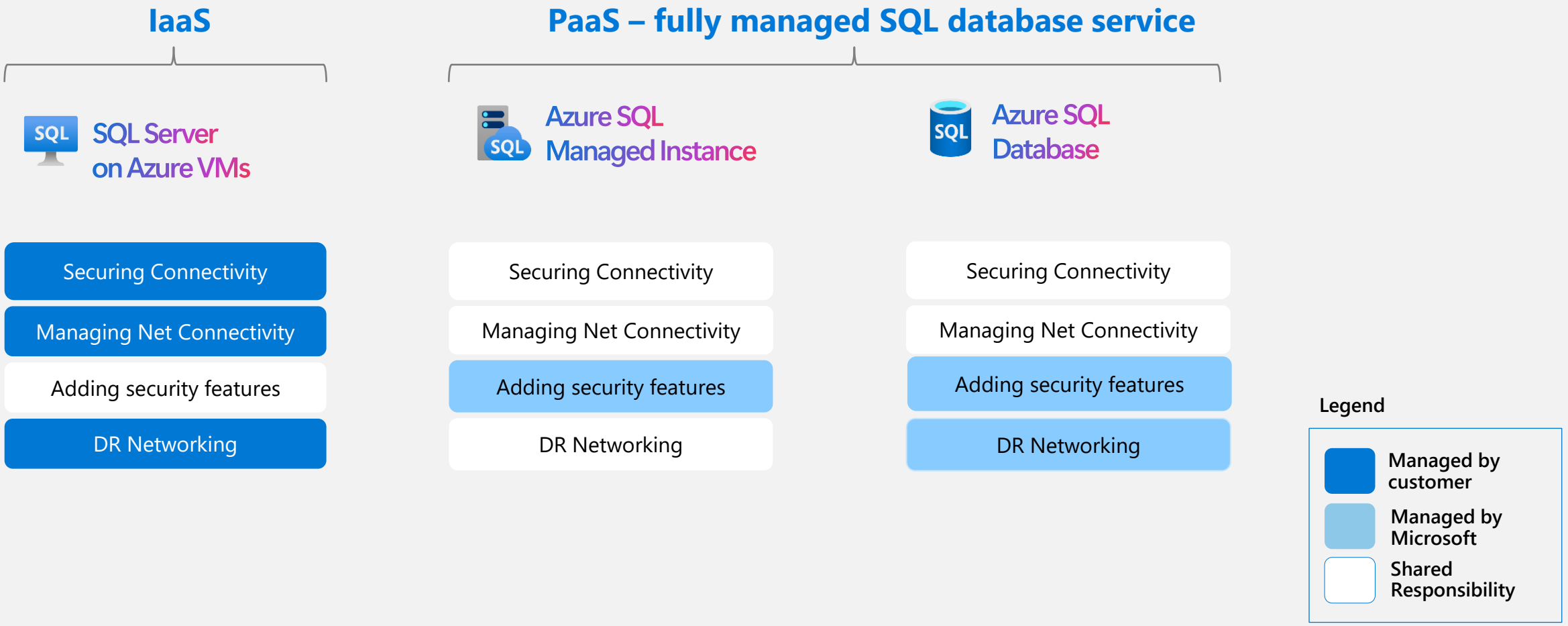
Public endpoint



Private endpoint



Shared responsibility for Networking & Security



Outbound Connectivity

for Azure SQL DBA

Outbound connectivity tools for Azure SQL Database

The connectivity for Azure SQL DB has several opportunities to achieve the needed goal

By using a combination of

- **Restrict outbound networking**
- **Managed Identities (System-managed or User-managed)**
- **Federated Identity**
- **Azure Firewall**
- **Private Link (Private Endpoints)**

Customer can configure secure outbound connections to the desired destination.

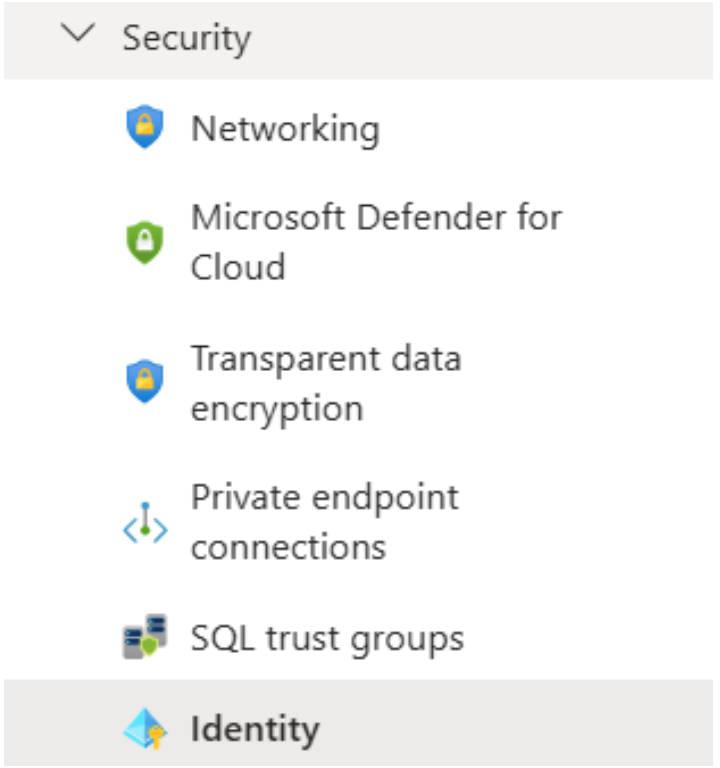
Outbound connectivity tools for Azure SQL Managed Instance

The connectivity for Azure SQL MI has several opportunities.

By using a combination of

- **Managed Identities (System-managed or User-managed)**
- **SQL Trust Groups**
- **Firewalls**
- **Private Endpoints**
- **Network Peering**

Customer can configure secure outbound connections to the desired destination.



Managed Identity for Azure SQL PaaS

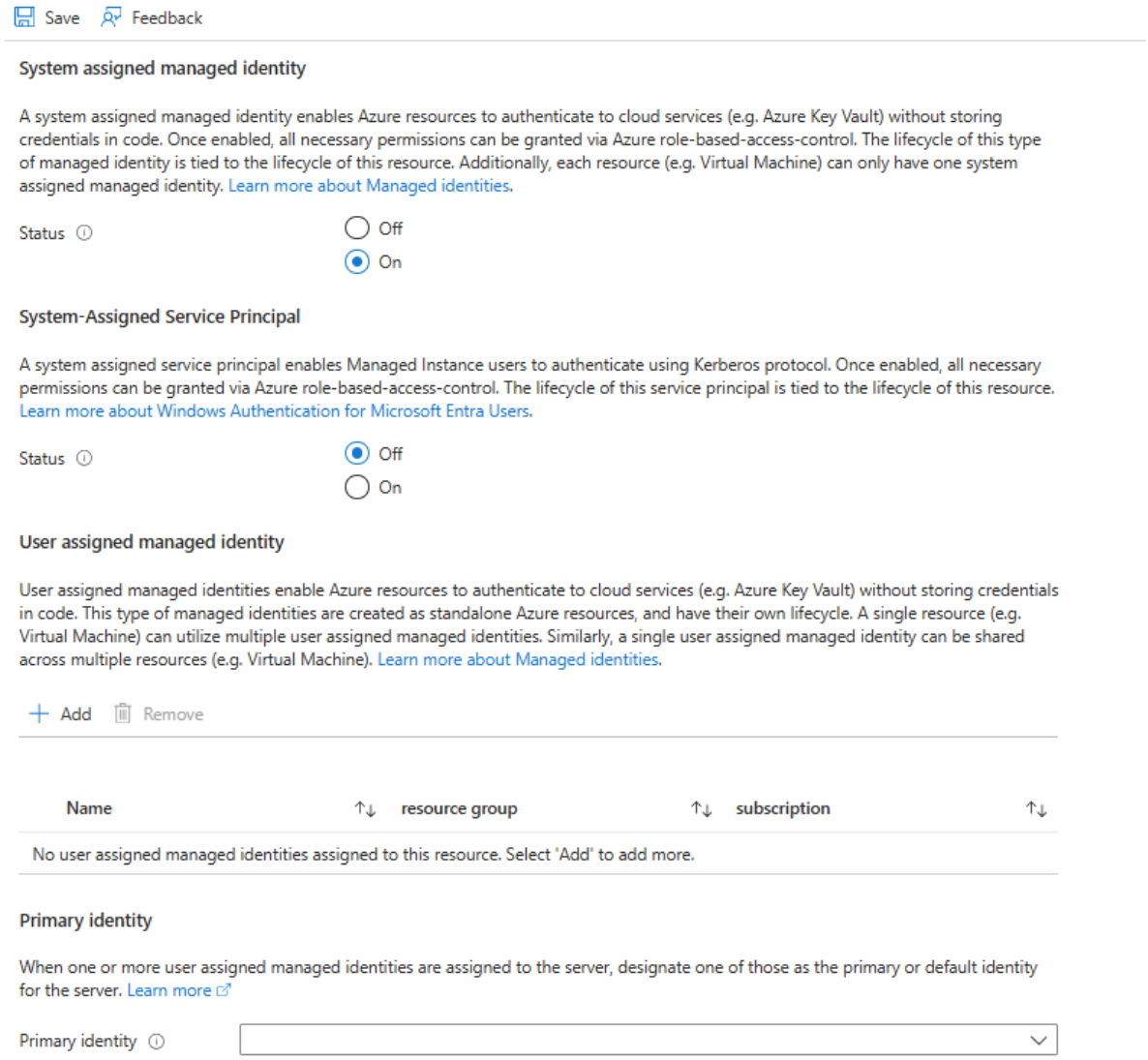
Used for authenticating Azure SQL to other resources

Common scenarios

- [AKV | Managed HSM] TDE with Customer-Managed Key (CMK)
- [Storage] Auditing, BULK INSERT / OPENROWSET
- [Azure AD] Authentication – Retrieving user and group information

SQL MI specific scenarios

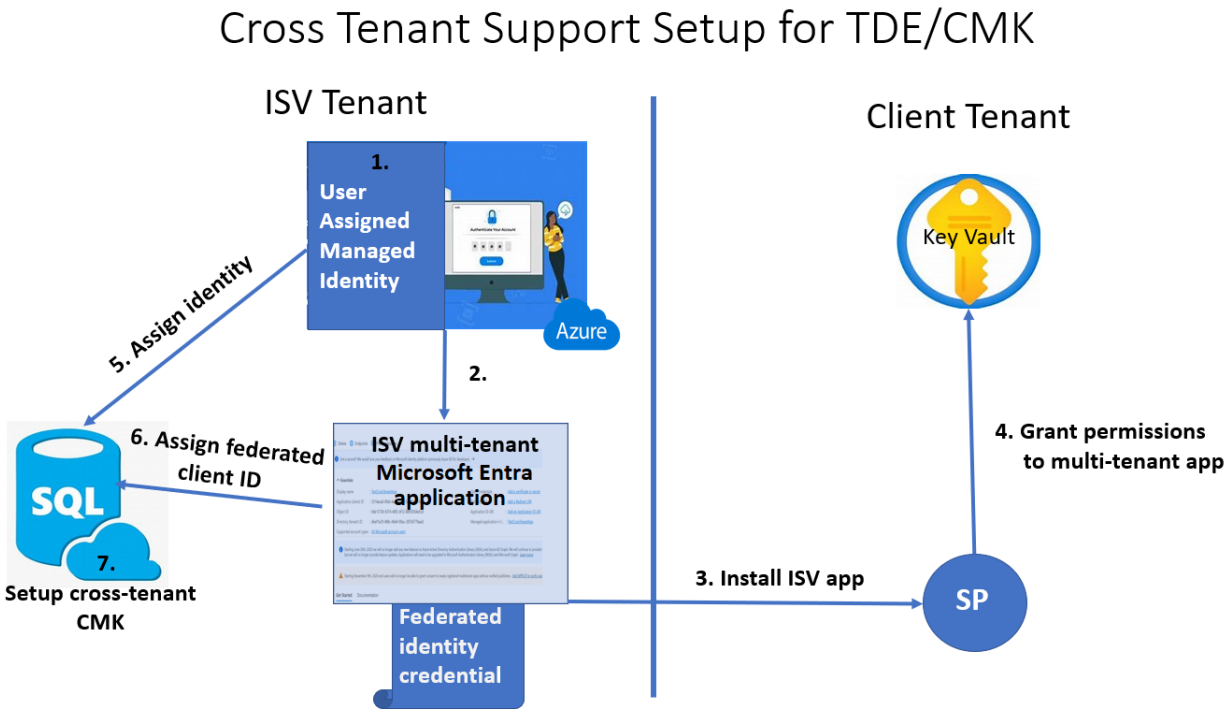
- [Storage] BACKUP / RESTORE
- [SQL] Linked server



Federated Identity for Azure SQL Database

For cross-tenant resource access, such as using a customer-managed key from a key vault in another Microsoft Entra tenant, you may select a federated client identity to use with the selected managed identity.

You can configure TDE with CMK for Azure SQL Database for keys stored in key vaults that are configured in different Microsoft Entra tenants. Microsoft Entra ID introduces a feature called workload identity federation, and it allows Azure resources from one Microsoft Entra tenant the capability to access resources in another Microsoft Entra tenant.



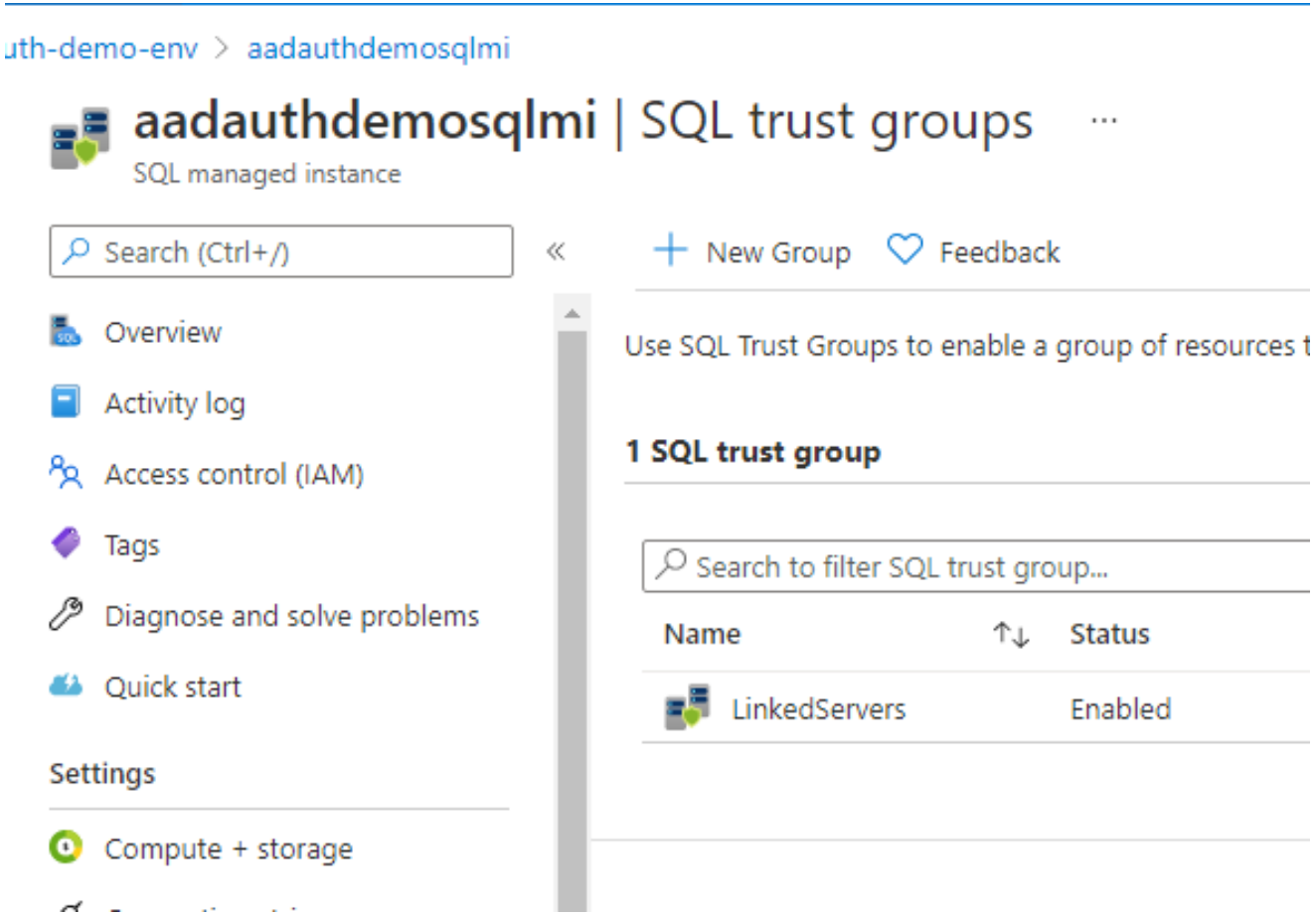
Server trust groups (aka SQL trust groups)

Est. trust among SQL instances

Based on certificate exchange

Cross-instance use cases

- Distributed transactions
- Service broker
- Linked servers Entra Id Authentication



Common Azure SQL MI connectivity scenarios

- Backup to and restore from Azure Storage

Private endpoint to your storage account in another subnet; or
Connect directly to Azure Storage account, using a service endpoint policy to block others

- Hybrid connectivity via Managed Instance Link

Peer networks and allow inbound and outbound on ports 5022, 11xxx

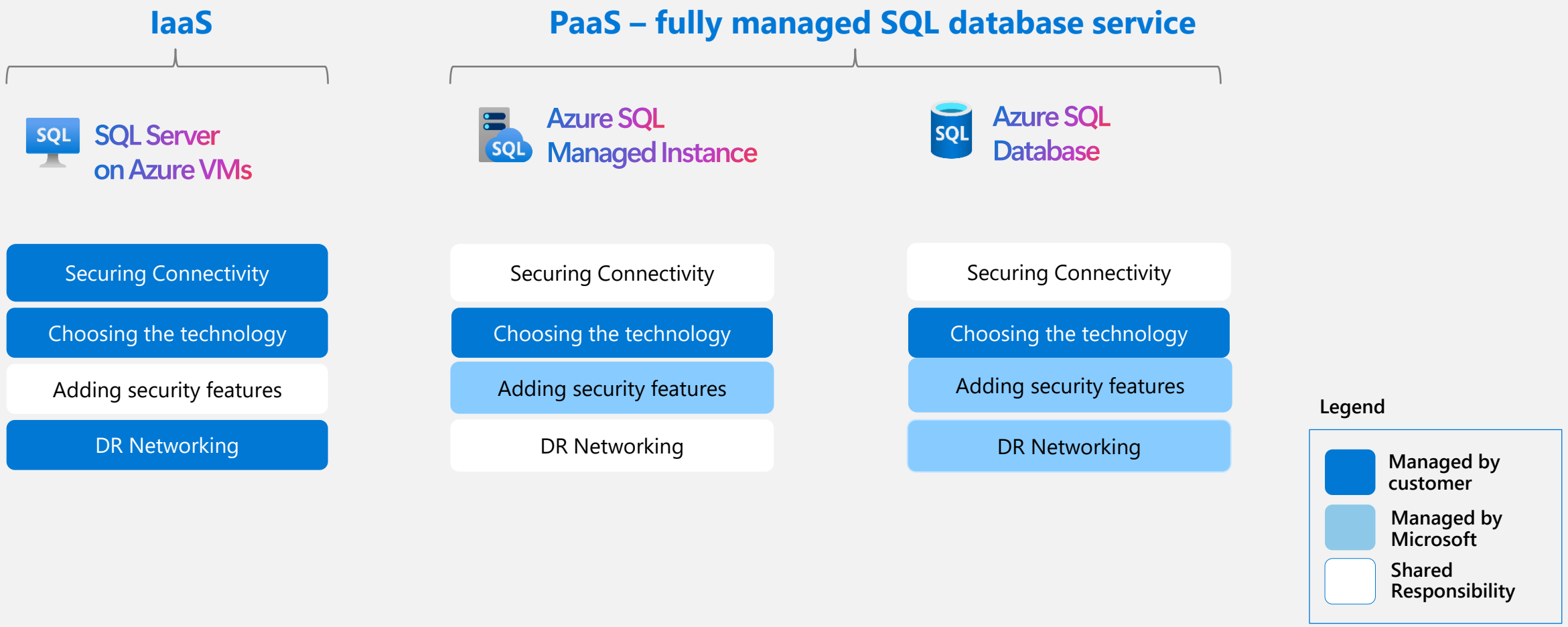
- Failover groups

Configure SQL Managed Instance as a member of a failover group during creation
Peer networks and allow inbound from other, outbound to other on ports 5022, 11xxx

- Distributed transactions

Set up a Server Trust Group
Peer networks and allow inbound and outbound on ports 5024, 11xxx

Shared responsibility for Outbound Connectivity



Restricting Network Access

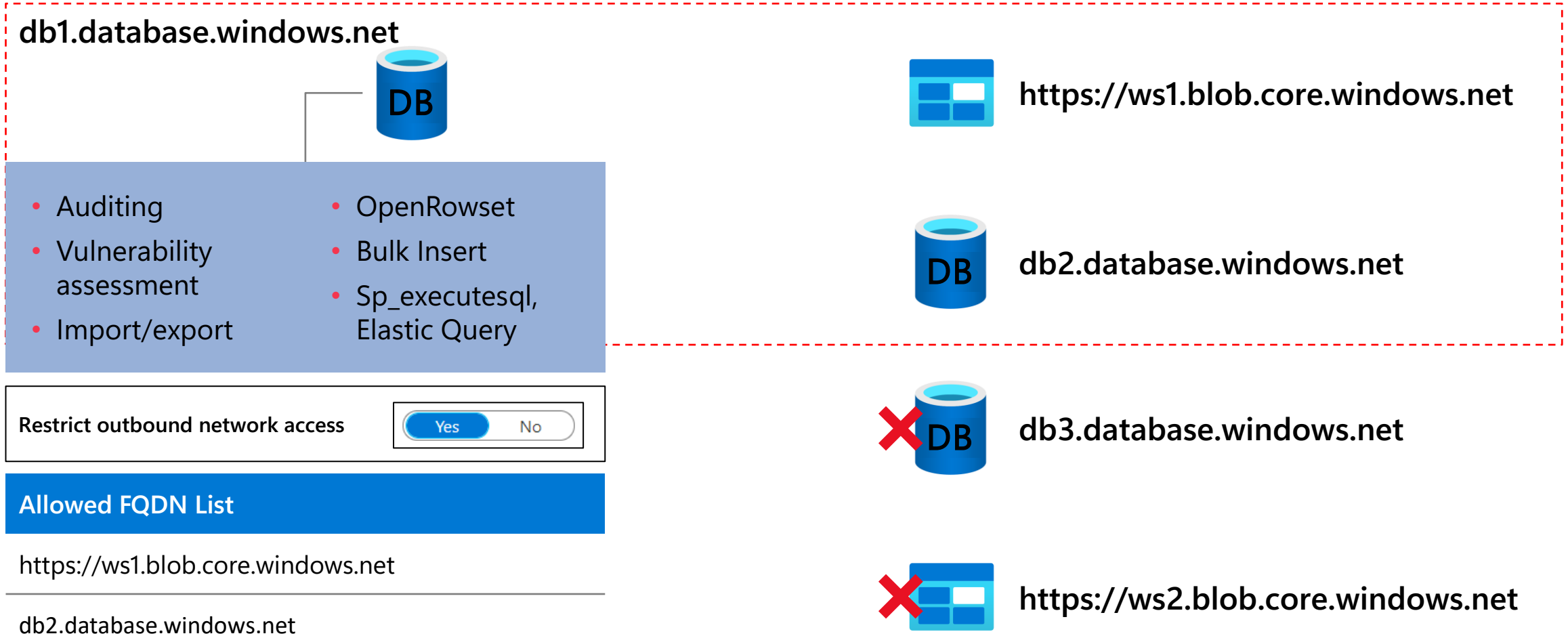
for Azure SQL DBA

Restricting networking access on Azure SQL

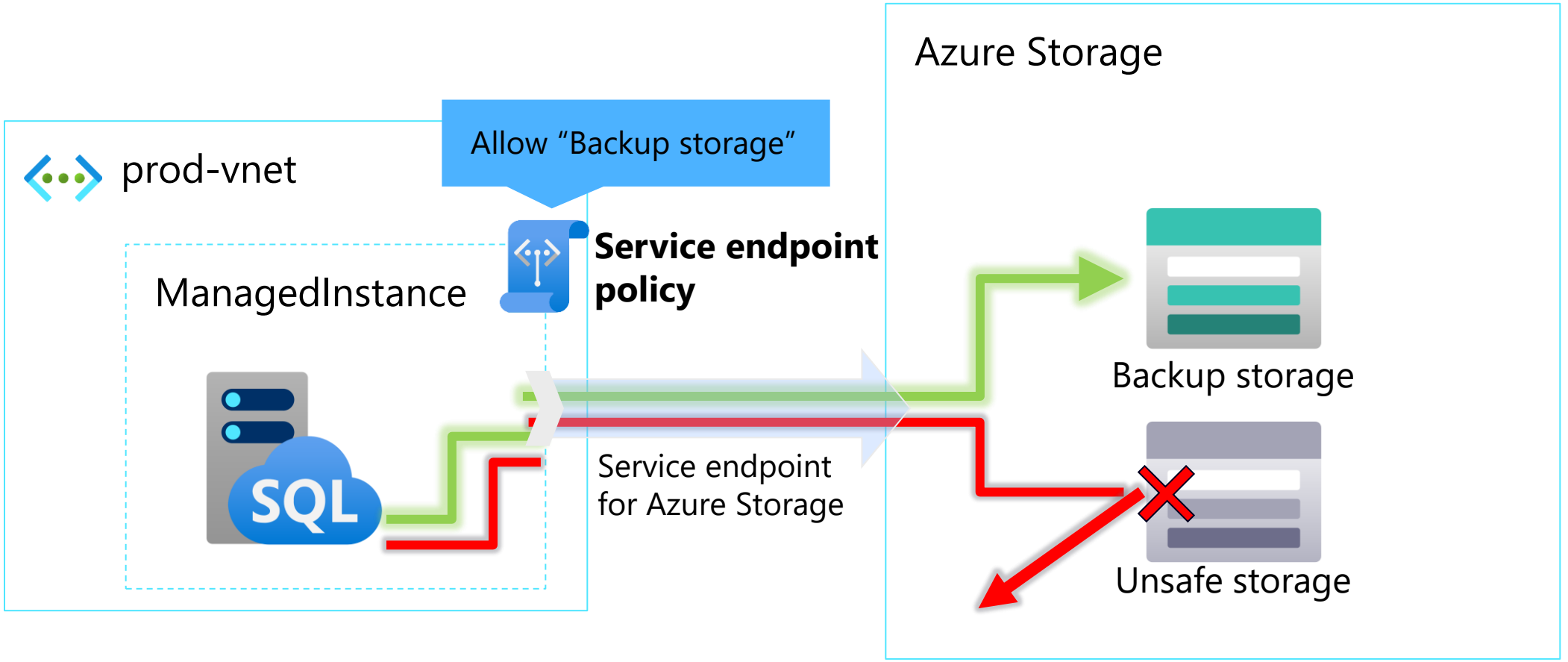
Let’s take a dive into available solutions for restricting networking access on Azure SQL

- Azure SQL DB Firewall Rules
- Service Endpoint Policies
- Network Security Groups
- Azure Firewall
- Azure Virtual Network Manager
- Other Network Configurations (proxy, appliances, etc)

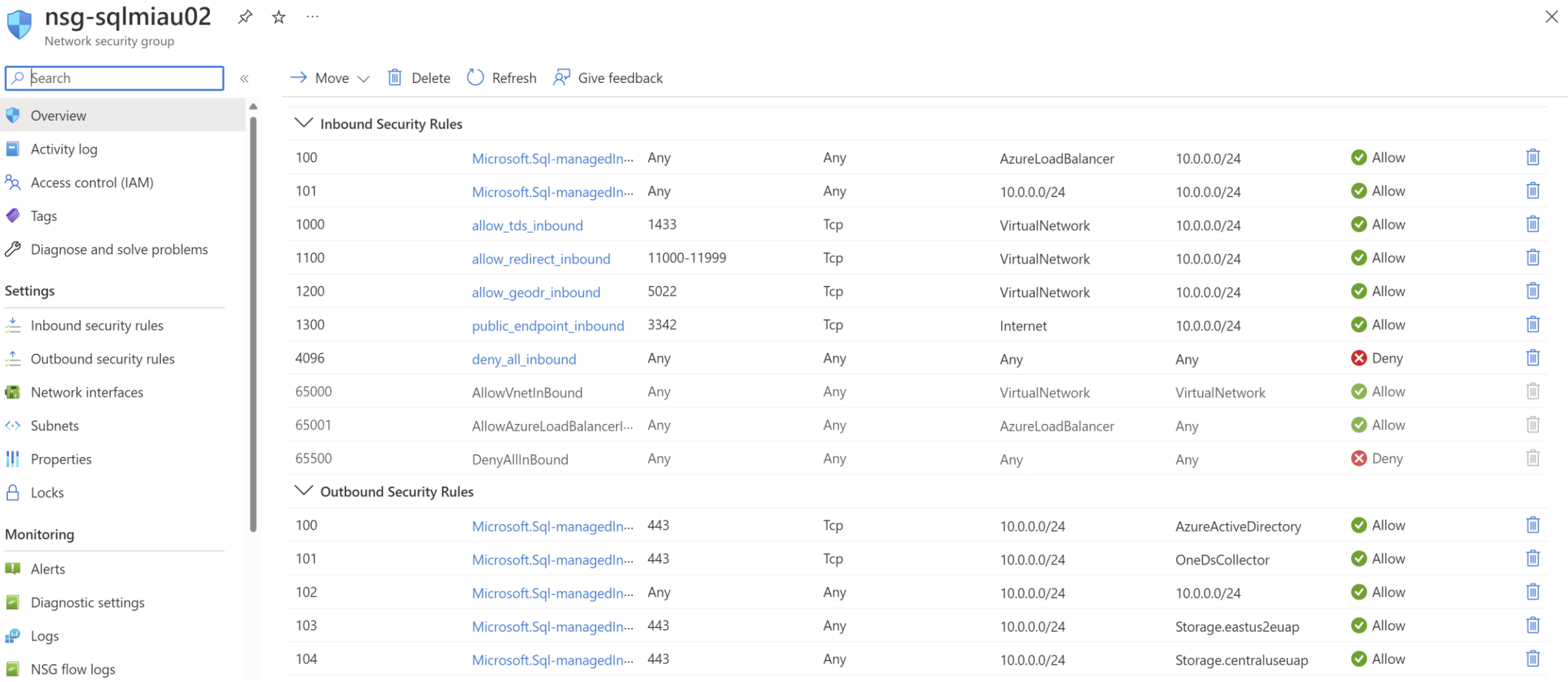
Outbound firewall rules for Azure SQL DB



Service endpoint policies control traffic to Azure (Preview)

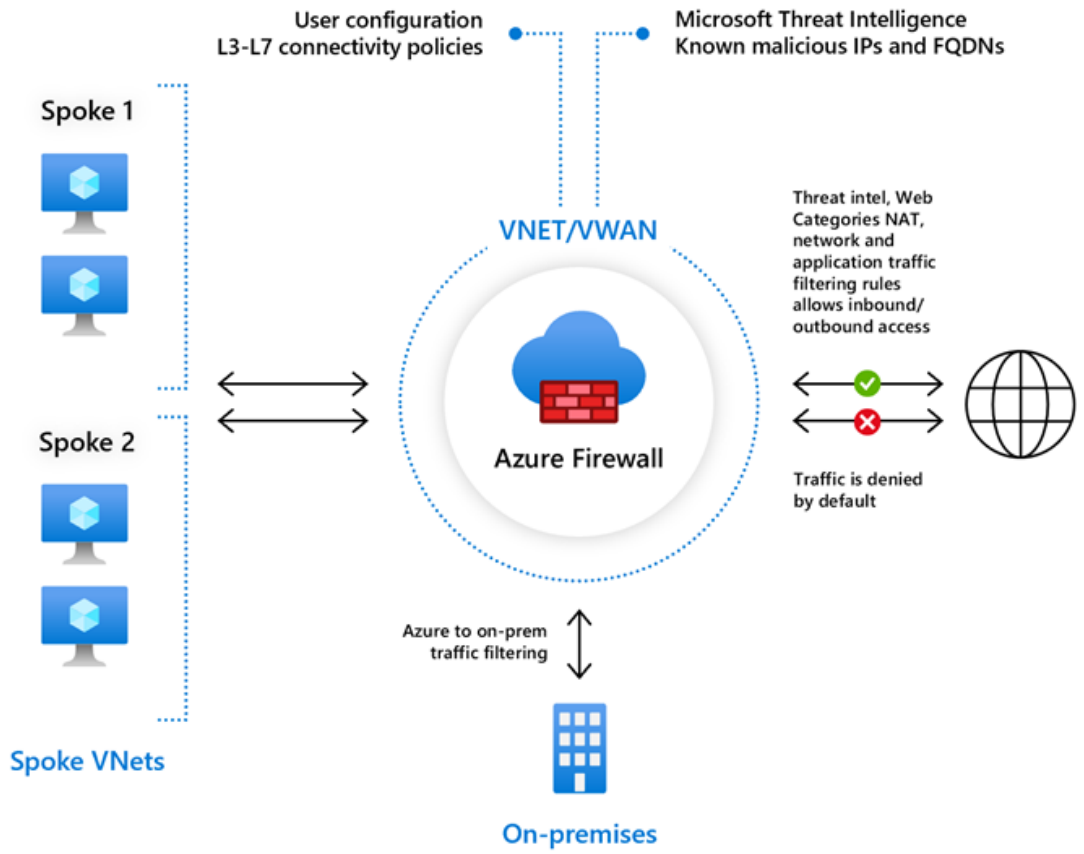


Network Security Group (NSG)



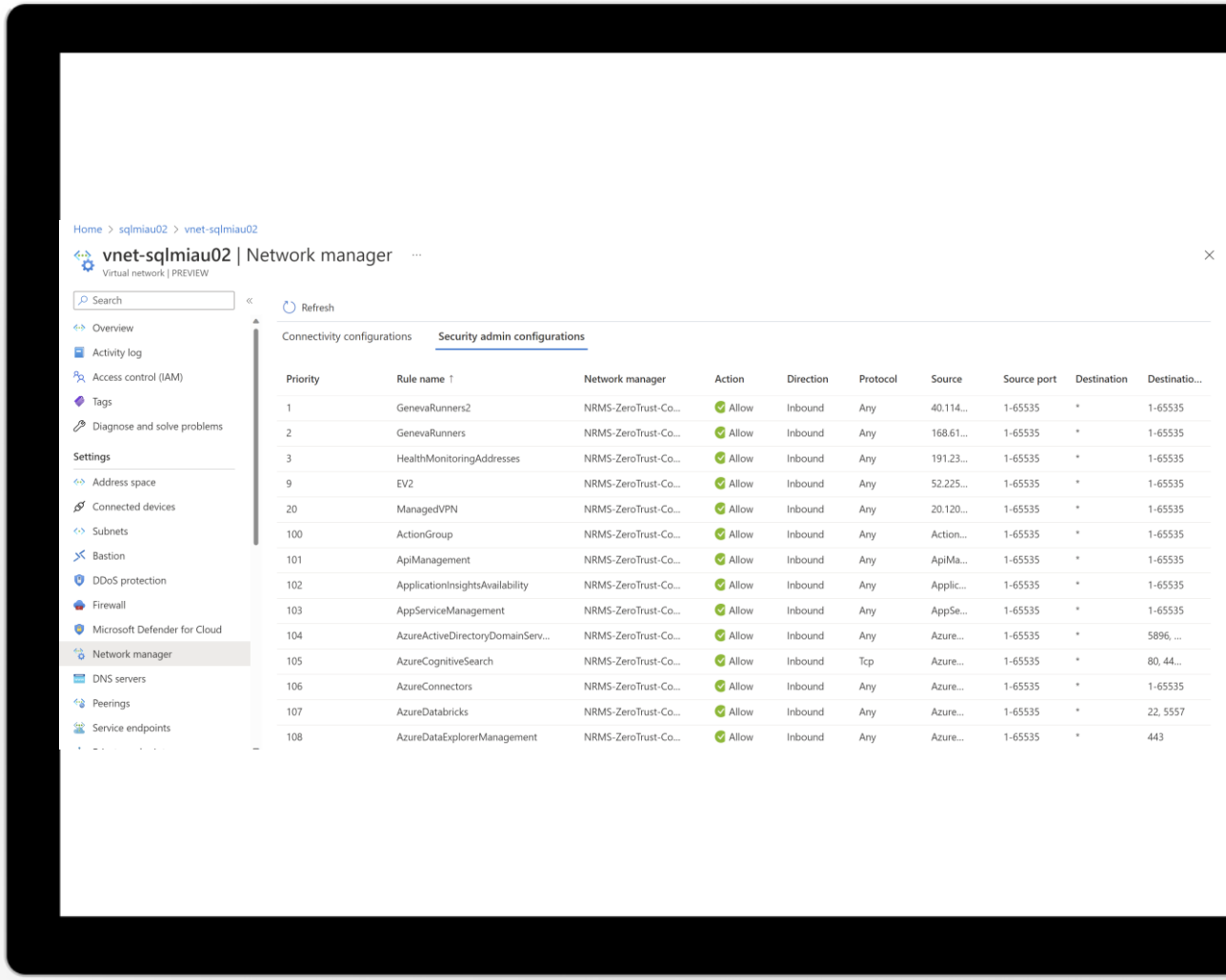
Azure Firewall

- Network and application-level filtering
- Threat intelligence feeds directly from Microsoft Cyber Security: alert and deny known malicious traffic
- Built-in HA
- SNAT and DNAT
- FQDN based filtering when set as a DNS proxy

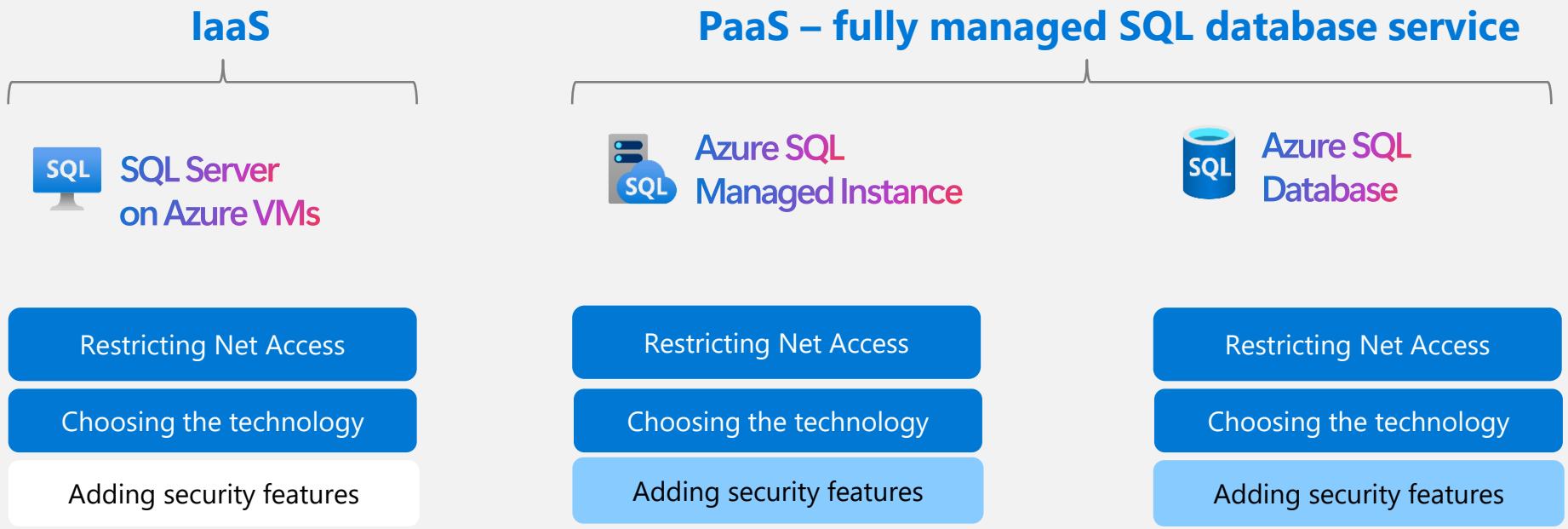


Azure Virtual Network Manager

- Management service to group, deploy, manage virtual networks globally across subscriptions
- Define network groups to logically segment (zone) your architecture
- Define connectivity configurations to establish mesh or hub-and-spoke topologies
- Define security admin rules to specify inbound/outbound rules at the global level
- Can be configured to not apply “deny” rules on Azure SQL Managed Instance VNets



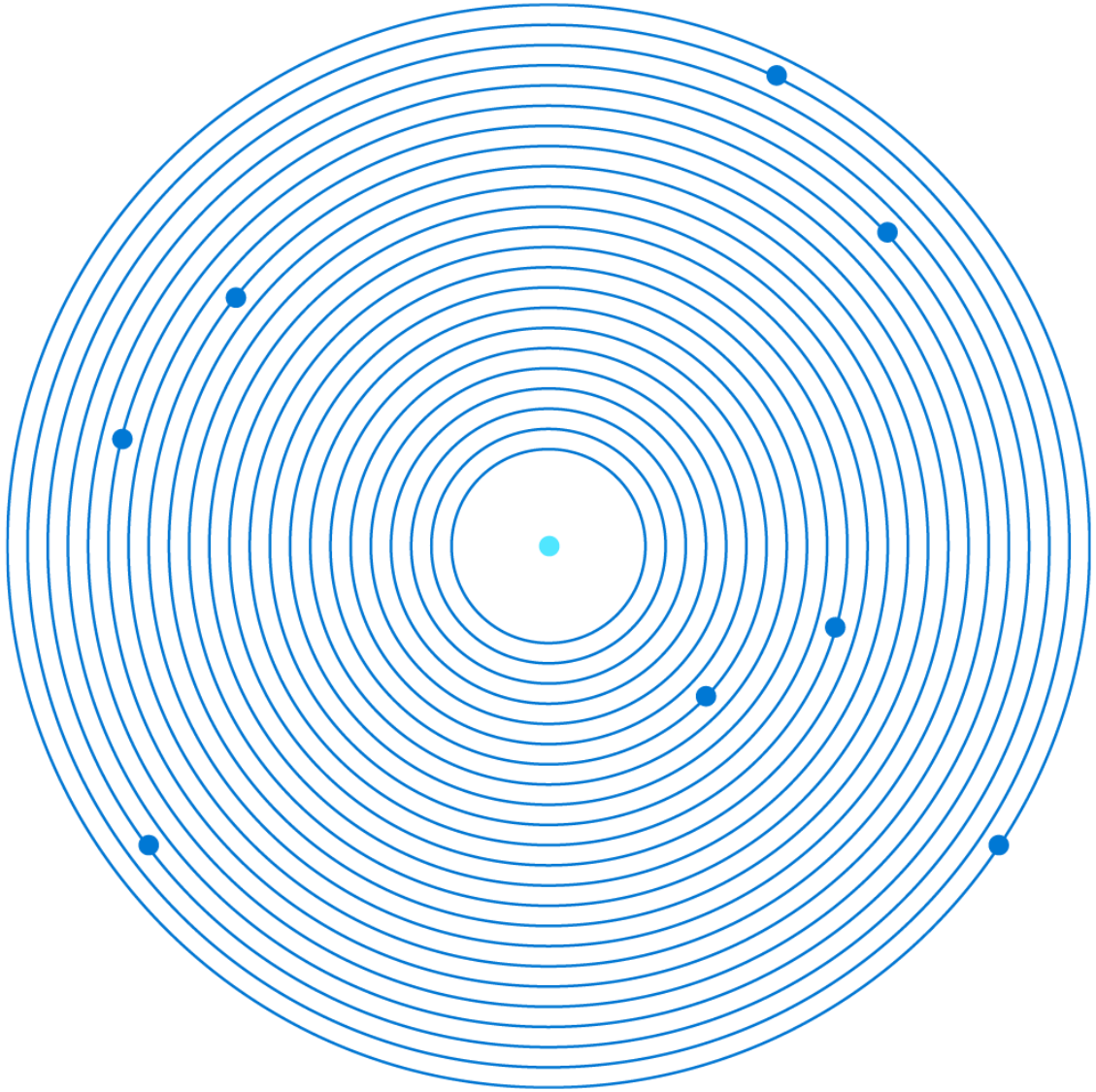
Shared responsibility for Restricting Network Access



Microsoft Azure

Azure SQL Authentication

what is required to securely connect to, and access, your Azure SQL resources



Transport Layer Security -TLS

Secure data in motion being sent over the network between a client and server.

It protects data between the client and server against snooping and man-in-the-middle attacks

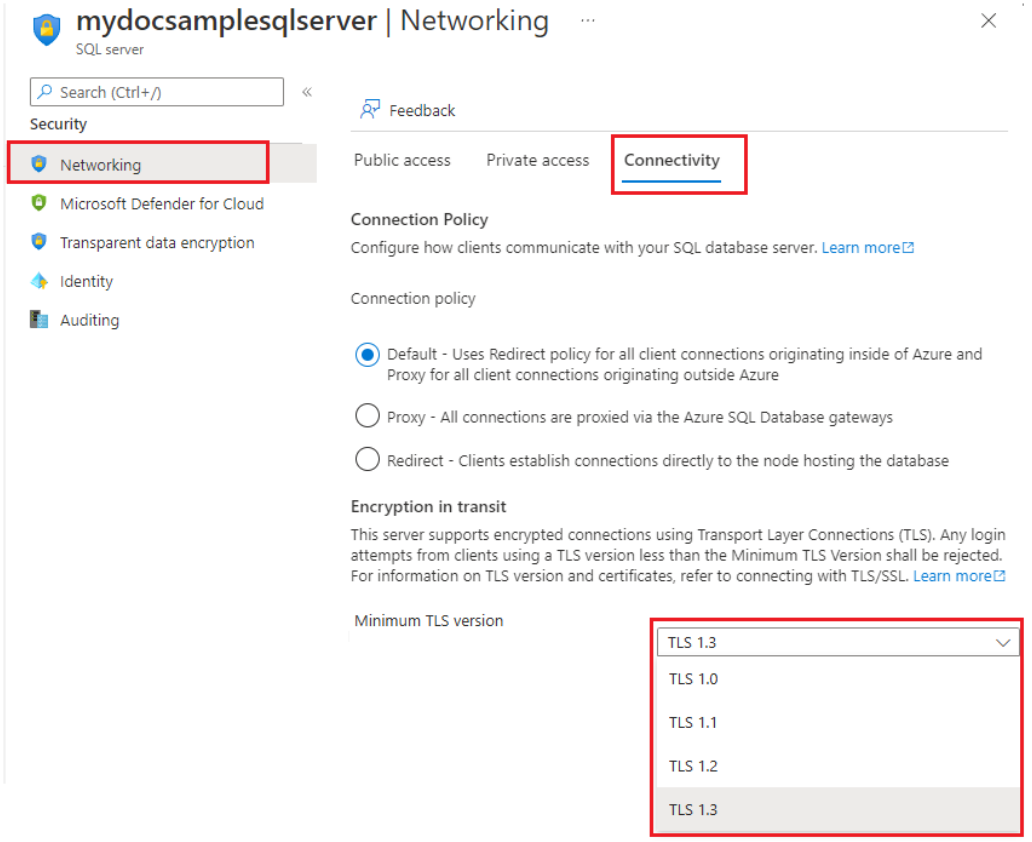
For cloud databases it always enforces encryption for connections regardless of connection string setting.

The minimal TLS version setting allows customers to choose which version of TLS their SQL database uses. The latest TLS version is 1.3

TLS in Azure SQL Database

TLS is REQUIRED

From the 31st of August 2025, you won't be able to set Azure SQL Database TLS connectivity minimum version below 1.2



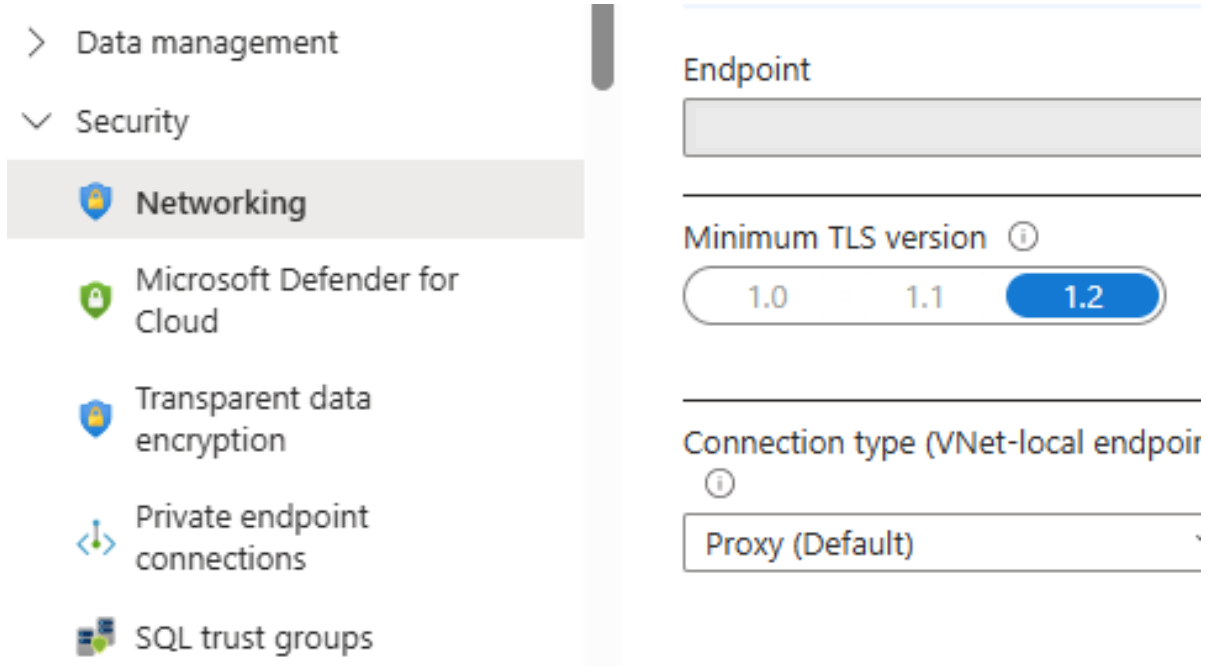
TLS in Azure SQL Managed Instance

TLS is REQUIRED

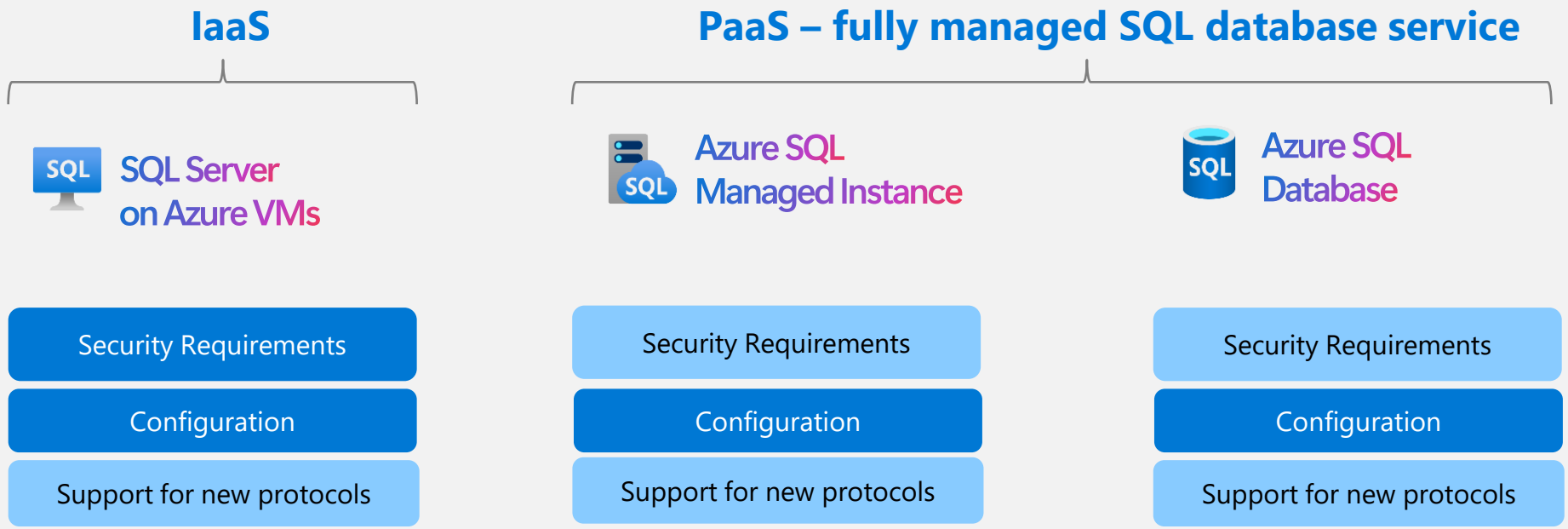
TLS 1.2 is enforced on outbound connections since Jan 2020

TLS 1.3 is not yet supported on Azure SQL MI, but we are working on it.

From the 31st of August 2025, you won't be able to set Azure SQL Database TLS connectivity minimum version below 1.2



Shared responsibility for Communication protocol



Authentication Modes

for Azure SQL DBA

Azure SQL Authentication Modes

- SQL Authentication (supported in all Azure SQL, NOT RECOMMENDED)
- Windows Authentication
- Mixed Authentication Mode
- Microsoft Entra
  (supported in Azure SQL PaaS, SQL Server 2022+ on Azure VMs)
- Windows Authentication for Entra on Azure SQL Managed Instance

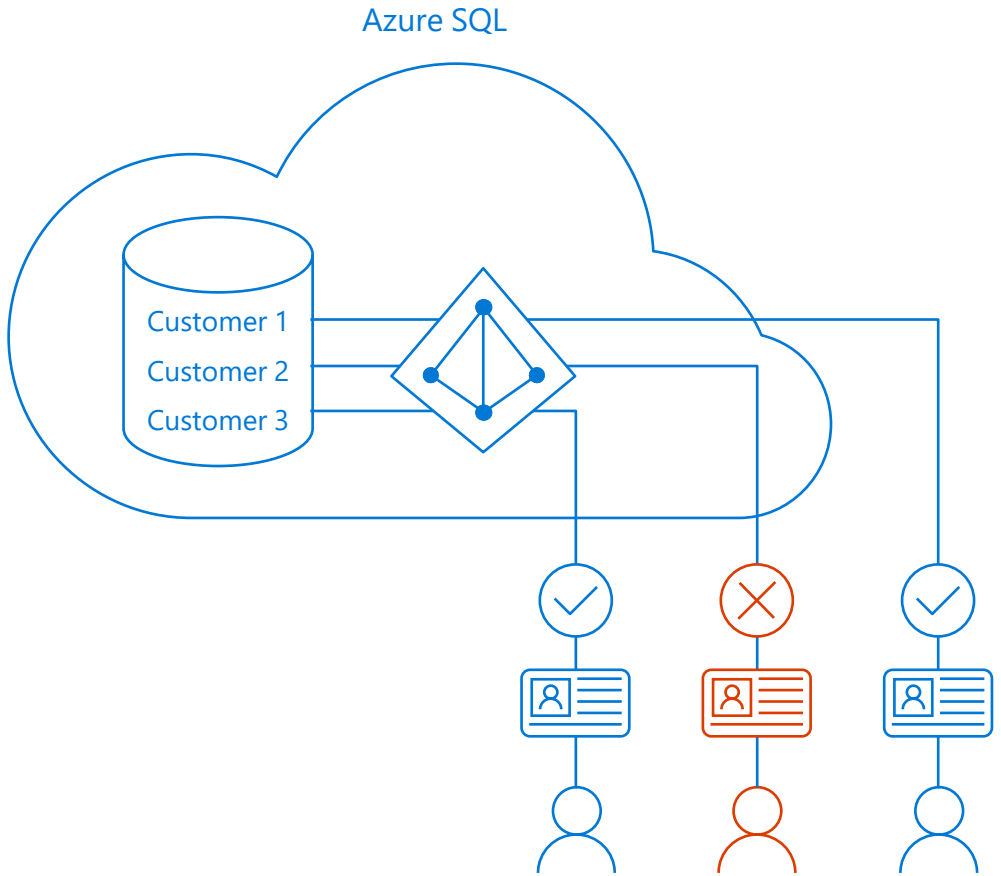
Overall, customers are highly recommended to use either Entra or Windows Authentication, avoiding SQL Authentication wherever possible.

Strengthen Your Security with Microsoft Entra Authentication

- Secure your data from unauthorized access
- Ensure the highest level of identity protection
- Centrally manage identities of database users and other Microsoft services in one central location

Microsoft Entra Authentication with Azure SQL

- Overview
  - Manage user identities in one location
  - Enable access to Azure SQL and other Microsoft services with Microsoft Entra Authentication user identities and groups
- Benefits
  - Limits proliferation of user identities across databases
  - Allows password rotation in a single place
  - Enables management of database permissions by using external Microsoft Entra ID groups
  - Eliminates the need to store passwords



Entra ID Only Authentication for Azure SQL DB & Azure SQL MI

- Disables SQL Authentication
- Including built-in Server Admin account
- Blocks changing Server Admin password
- Can be set at creation-time
- Could be enforced with Azure Policy

Windows Authentication for Entra ID

Windows Authentication is additional Single-Sign-On authentication option for Entra ID users.

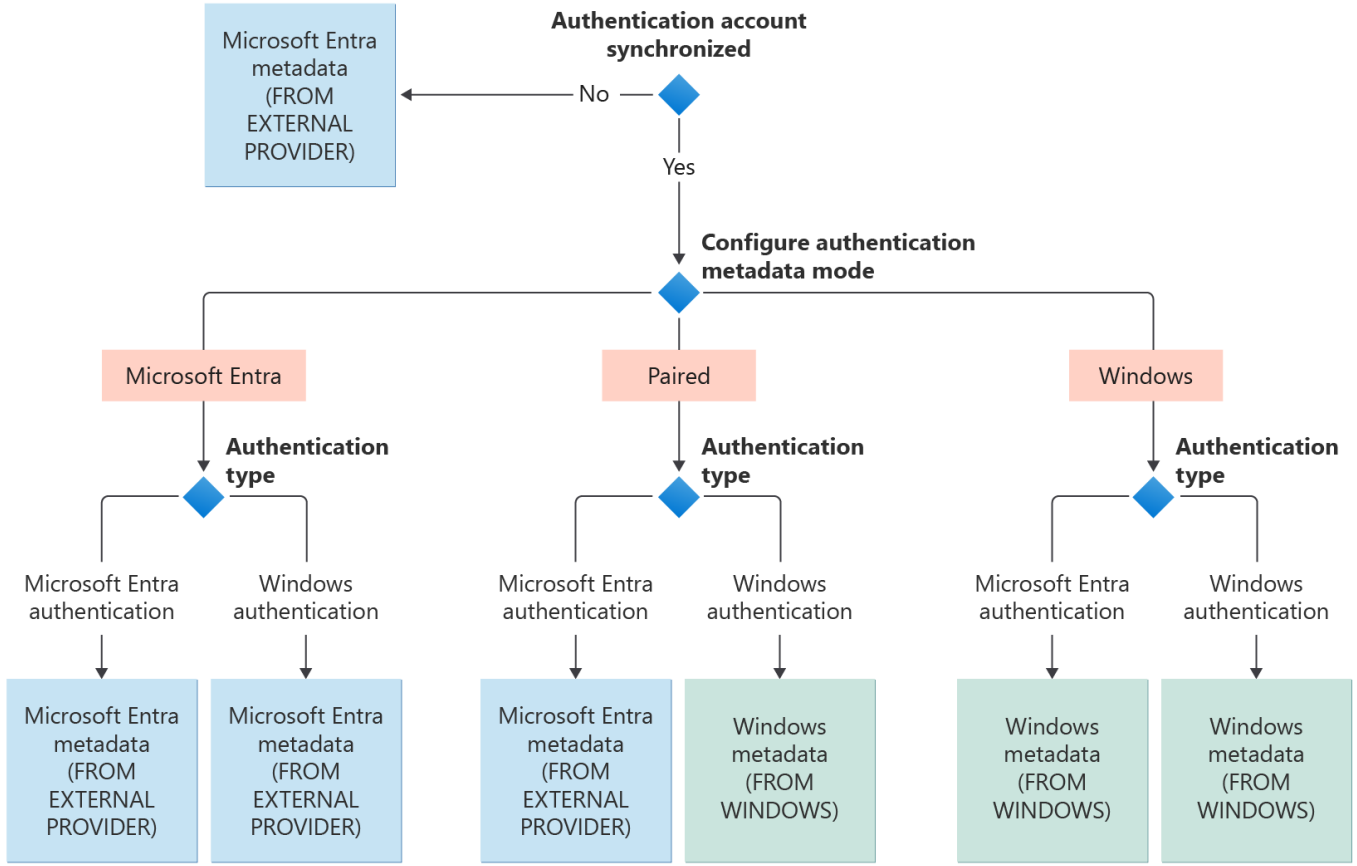
Compared to the previous options, it brings the following benefits:

- Works with legacy drivers, that don't have built-in Entra ID support
- Works on both Domain Joined, and Entra Directory Joined machines
- Works in double hop scenarios (i.e., IIS impersonation)
- Support for MFA and Conditional Access in making

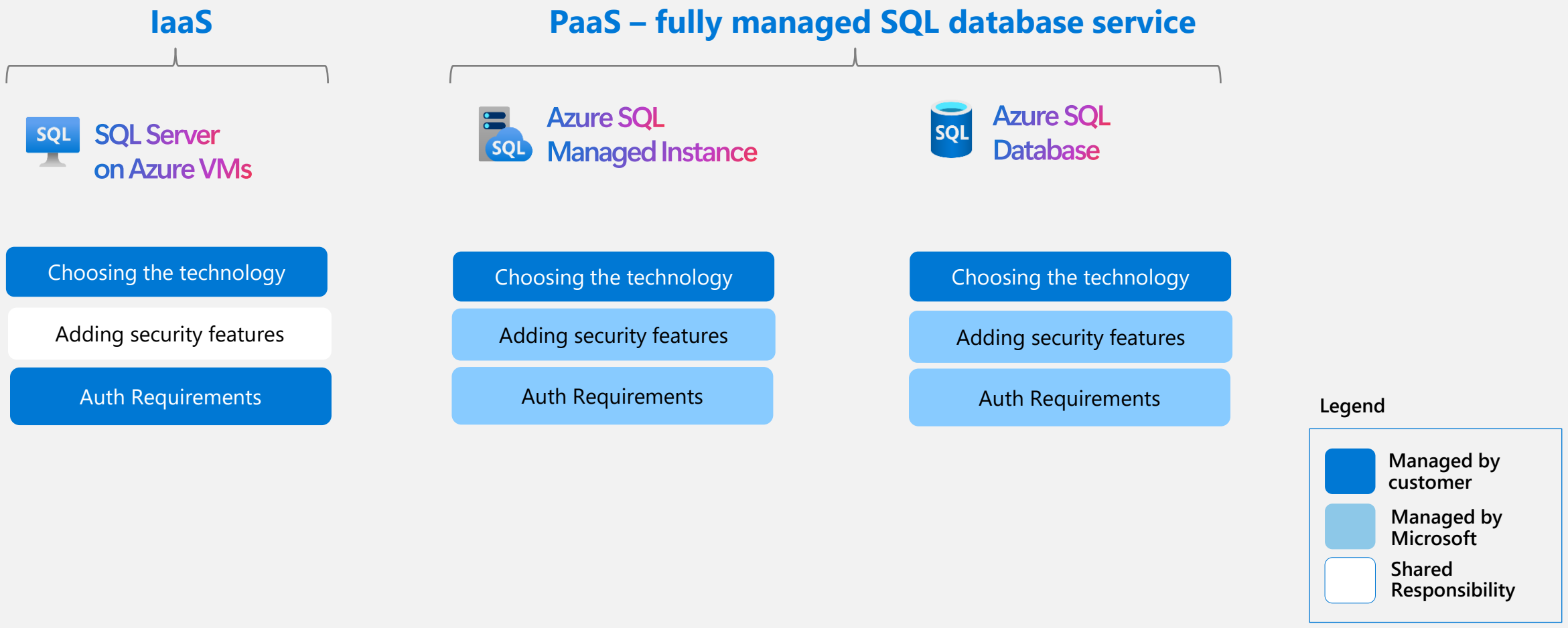
Native Window principals for Azure SQL Managed Instance (Preview)

- The **Windows authentication metadata mode** is a new mode that allows users to use Windows authentication or Microsoft Entra authentication (using a Windows principal metadata) with Azure SQL Managed Instance.

- This mode is available for SQL Managed Instance only. The Windows authentication metadata mode isn't available for Azure SQL Database.

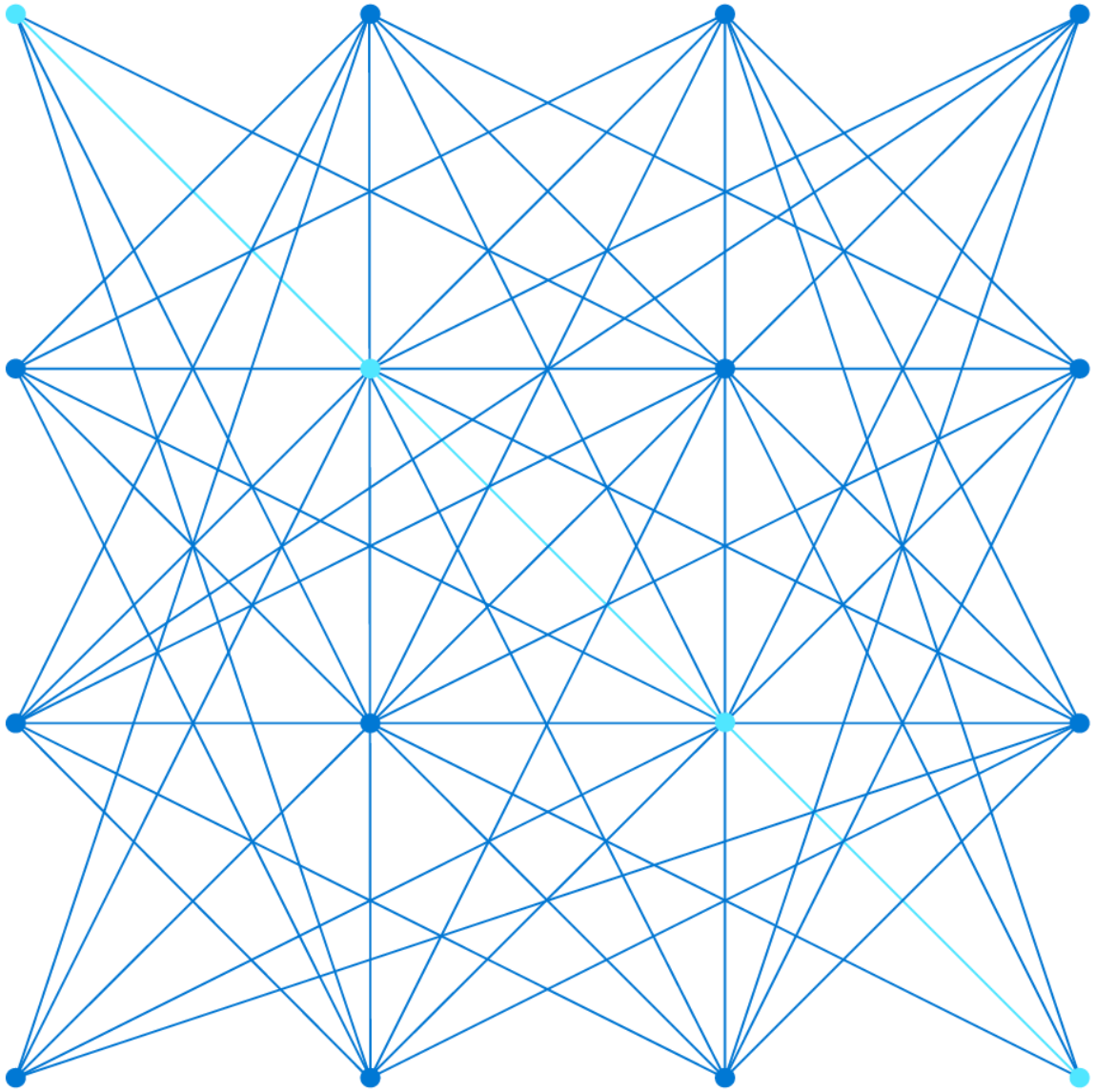


Shared responsibility for Authentication



Microsoft Azure

Compliance and Security in Azure SQL



Azure - Compliance Offerings

The details for the public cloud as well as for the Government cloud can be found in our Service Trust Portal.

Azure Service	CSA STAR Certification	CSA STAR Attestation	ISO 27001, 27018	ISO 27017	ISO 27701	ISO 9001, 22301, 9001	SOC 1, 2, 3	GSMA SAS-SM	HIPAA BAA	HITRUST	K-ISMS	PCI 3DS	PCI DSS	Australia IRAP	Germany C5	Singapore MTCS Level 3	Spain ENS High	Singapore OSPAR
Azure Site Recovery	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Azure Spring Apps	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Azure Sphere	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓		✓
Azure SQL Database	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Regulatory Compliance in Azure Policy (preview)

Regulatory Compliance in Azure Policy provides built-in initiative definitions to view a list of the **controls** and **compliance domains** based on responsibility (*Customer*, *Microsoft*, *Shared*).

For Microsoft-responsible controls, we provide additional details of our audit results based on third-party attestation and our implementation details to achieve that compliance

Regulatory Compliance in initiative definitions - Azure Policy

Azure Policy Regulatory Compliance controls for Azure SQL Database & SQL Managed Instance

The list of the available policies can be found at [Azure Policy Regulatory Compliance controls - Azure SQL]

PCI DSS v4.0

To review how the available Azure Policy built-ins for all Azure services map to this compliance standard, see Azure Policy Regulatory Compliance details for PCI DSS v4.0. For more information about this compliance standard, see PCI DSS v4.0.

Expand table

Domain	Control ID	Control title	Policy (Azure portal)	Policy version (GitHub)
Requirement 10: Log and Monitor All Access to System Components and Cardholder Data	10.2.2	Audit logs are implemented to support the detection of anomalies and suspicious activity, and the forensic analysis of events	Auditing on SQL server should be enabled	2.0.0
Requirement 10: Log and Monitor All Access to System Components and Cardholder Data	10.3.3	Audit logs are protected from destruction and unauthorized modifications	Auditing on SQL server should be enabled	2.0.0
Requirement 11: Test Security of Systems and Networks Regularly	11.3.1	External and internal vulnerabilities are regularly identified, prioritized, and addressed	SQL databases should have vulnerability findings resolved	4.1.0
Requirement 03: Protect Stored Account Data	3.3.3	Sensitive authentication data (SAD) is not stored after authorization	An Azure Active Directory administrator should be provisioned for SQL servers	1.0.0
Requirement 03: Protect Stored Account Data	3.5.1	Primary account number (PAN) is secured wherever it is stored	Transparent Data Encryption on SQL databases should be enabled	2.0.0
Requirement 05: Protect All Systems and Networks from	5.2.1	Malicious software (malware) is prevented, or detected and addressed	SQL databases should have vulnerability findings resolved	4.1.0

HIPAA HITRUST 9.2

To review how the available Azure Policy built-ins for all Azure services map to this compliance standard, see Azure Policy Regulatory Compliance - HIPAA HITRUST 9.2. For more information about this compliance standard, see HIPAA HITRUST 9.2.

Expand table

Domain	Control ID	Control title	Policy (Azure portal)	Policy version (GitHub)
03 Portable Media Security	0301.09o1Organizational.123-09.o	0301.09o1Organizational.123-09.o 09.07 Media Handling	Transparent Data Encryption on SQL databases should be enabled	2.0.0
03 Portable Media Security	0304.09o3Organizational.1-09.o	0304.09o3Organizational.1-09.o 09.07 Media Handling	SQL managed instances should use customer-managed keys to encrypt data at rest	2.0.0
03 Portable Media Security	0304.09o3Organizational.1-09.o	0304.09o3Organizational.1-09.o 09.07 Media Handling	SQL servers should use customer-managed keys to encrypt data at rest	2.0.1
07 Vulnerability Management	0709.10m1Organizational.1-10.m	0709.10m1Organizational.1-10.m 10.06 Technical Vulnerability Management	SQL databases should have vulnerability findings resolved	4.1.0
07 Vulnerability Management	0709.10m1Organizational.1-10.m	0709.10m1Organizational.1-10.m 10.06 Technical Vulnerability Management	Vulnerability assessment should be enabled on SQL Managed Instance	1.0.1
07 Vulnerability	0709.10m1Organizational.1-10.m	0709.10m1Organizational.1-10.m 10.06	Vulnerability assessment	3.0.0

Azure Policy & RBAC

for Azure SQL DBA

Azure Policy and Azure RBAC

RBAC

- Azure RBAC focuses on managing user actions at different scopes.
- If control of an action is required, then Azure RBAC is the correct tool to use.

- Even if an individual has access to perform an action, if the result is a non-compliant resource, Azure Policy still blocks the create or update.

Azure Policy

- Azure Policy evaluates state by examining properties on resources that are represented in Resource Manager and properties of some Resource Providers.

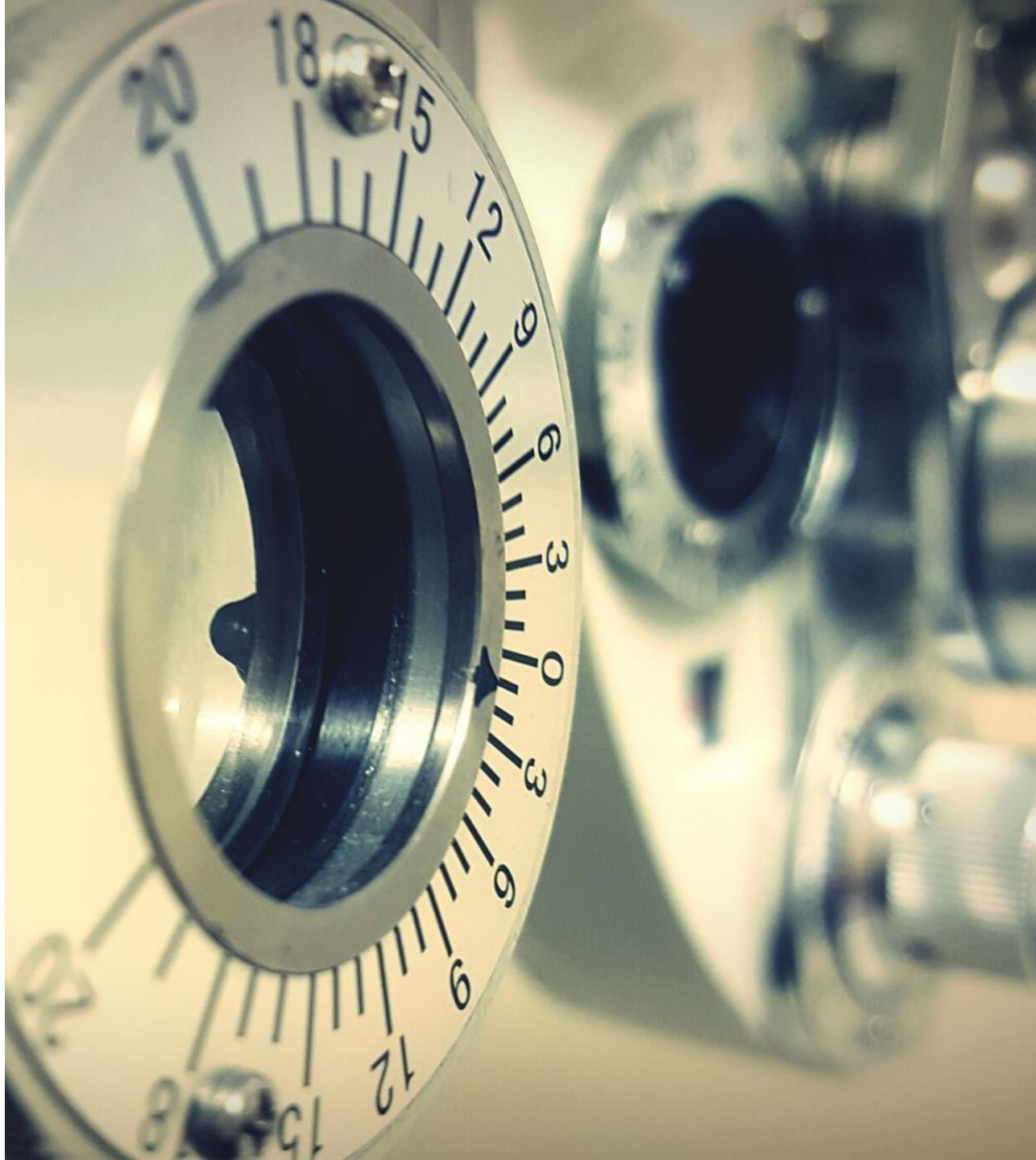
The combination of Azure RBAC and Azure Policy provides full scope control in Azure.

Transparent Data Encryption

for Azure SQL DBA

The benefits of Transparent Data Encryption (TDE)

- Protects data-at-rest
- Entire database is encrypted on disk (not in memory)
- Enabled by default
- No application or schema changes are required
- Backups, data, and log files are unusable without the encryption key
- Supports both service-managed and customer-managed keys



Transparent data encryption (TDE)

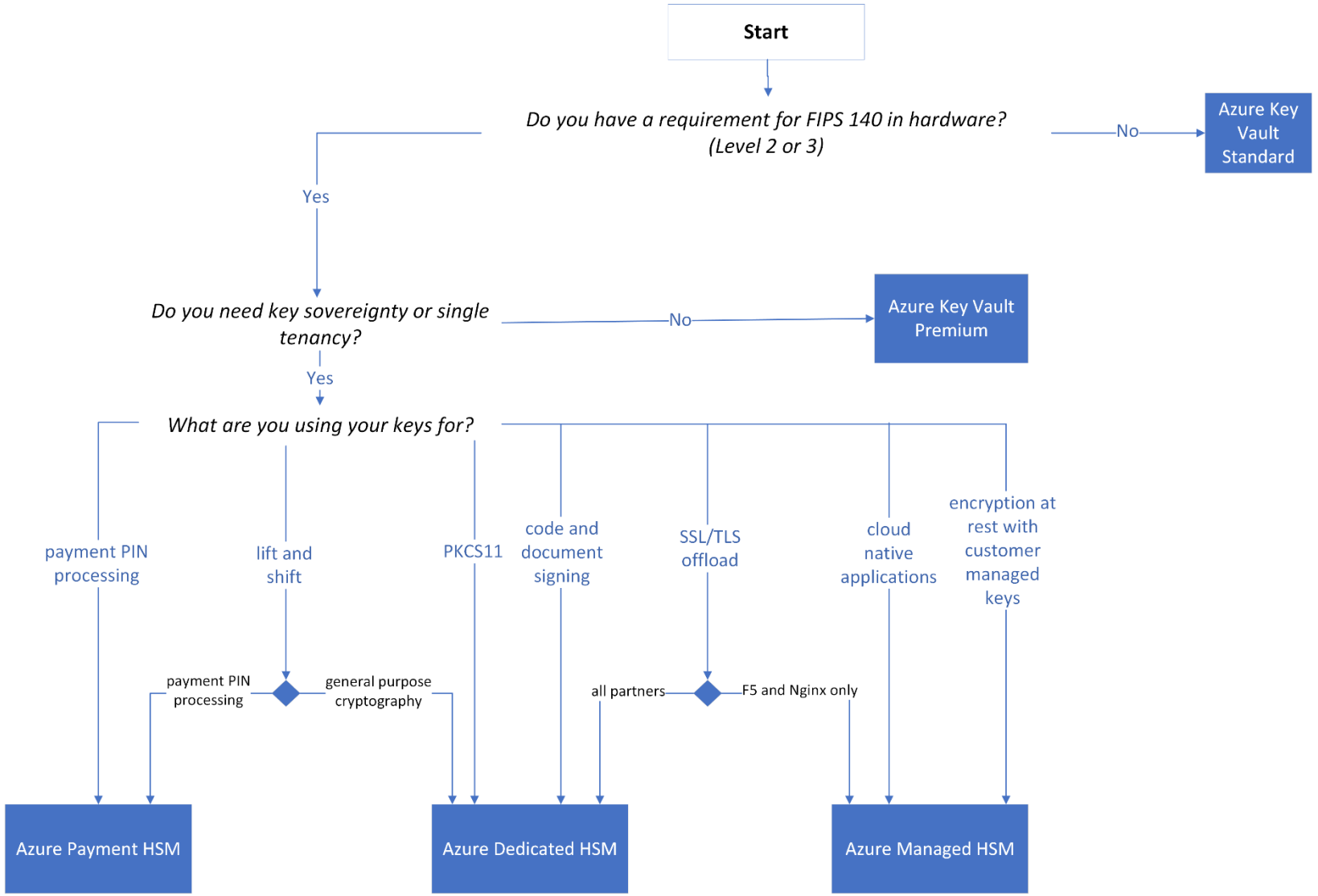
- Azure SQL Managed Instance, Azure SQL DB, SQL Server on IaaS, and SQL Server on-premises all support Transparent Data Encryption (TDE) to protect data at rest (data, transaction log, and backup files).
- When enabling TDE at the database level, there is a protector key which will be stored in **Azure Key Vault** or **Managed HSM** that is used to encrypt the database level encryption key (DEK).

- For PaaS, encryption at rest is available by using
  - Service Managed Key
  - Customer Managed Key
    - Support for Azure Key Vault Managed HSM (Hardware Security Module)

Azure SQL PaaS vs Azure SQL IaaS TDE

- Azure SQL PaaS fully supports auto-key rotation
- SQL Server requires the customer to perform the key rotation pieces that are contained within SQL (credential etc.) to complete the key rotation
- SQL Server (IaaS) requires installation of the latest version of the EKM connector
- SQL Server has a slight difference in the credential creation syntax between AKV and managed HSM
- Managed HSM requires including the full path to the managed HSM whereas AKV requires only the name of the vault

Choosing Managed HSM Over Azure Key Vault

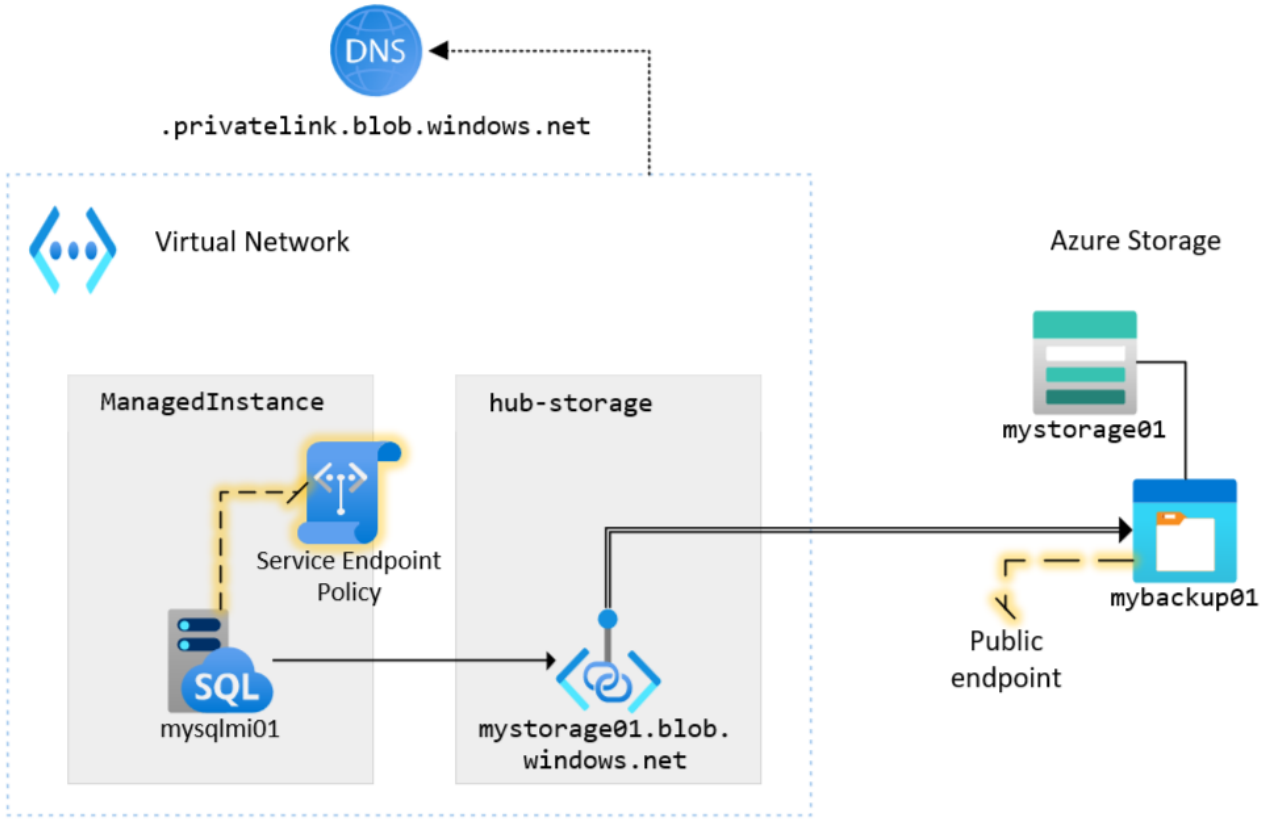


Securing backups

for Azure SQL DBA

Steps for secure customer backups on Azure SQL MI

- Use Managed Identity to authorize your Azure SQL Managed Instance to write to the blob storage.
- Set up a private endpoint to establish connectivity from Azure SQL Managed Instance to blob storage.
- Close off public access on the blob storage account.
- Apply a service endpoint policy on the Azure SQL Managed Instance's subnet to prevent data exfiltration.
- Consider encrypting backup for ensuring additional level of protection



Microsoft Azure

Microsoft Purview

For Azure SQL DBAs

Discover and govern Azure SQL in Microsoft Purview

When you're scanning Azure SQL Database, Microsoft Purview supports extracting technical metadata from these sources:

- Server
- Database
- Schemas
- Tables, including columns
- Views, including columns (with lineage extraction enabled, as part of scanning)
- Stored procedures (with lineage extraction enabled)
- Stored procedure runs (with lineage extraction enabled)

Azure SQL Database

Metadata Extraction	Full Scan	Incremental Scan	Scoped Scan	Classification	Labeling	Access Policy	Lineage	Data Sharing	Live view
Yes	Yes	Yes	Yes	Yes	Yes	Yes (preview)	Yes (preview)	No	Yes

Azure SQL Managed Instance

Metadata Extraction	Full Scan	Incremental Scan	Scoped Scan	Classification	Labeling	Access Policy	Lineage	Data Sharing	Live view
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Limited**	No	No

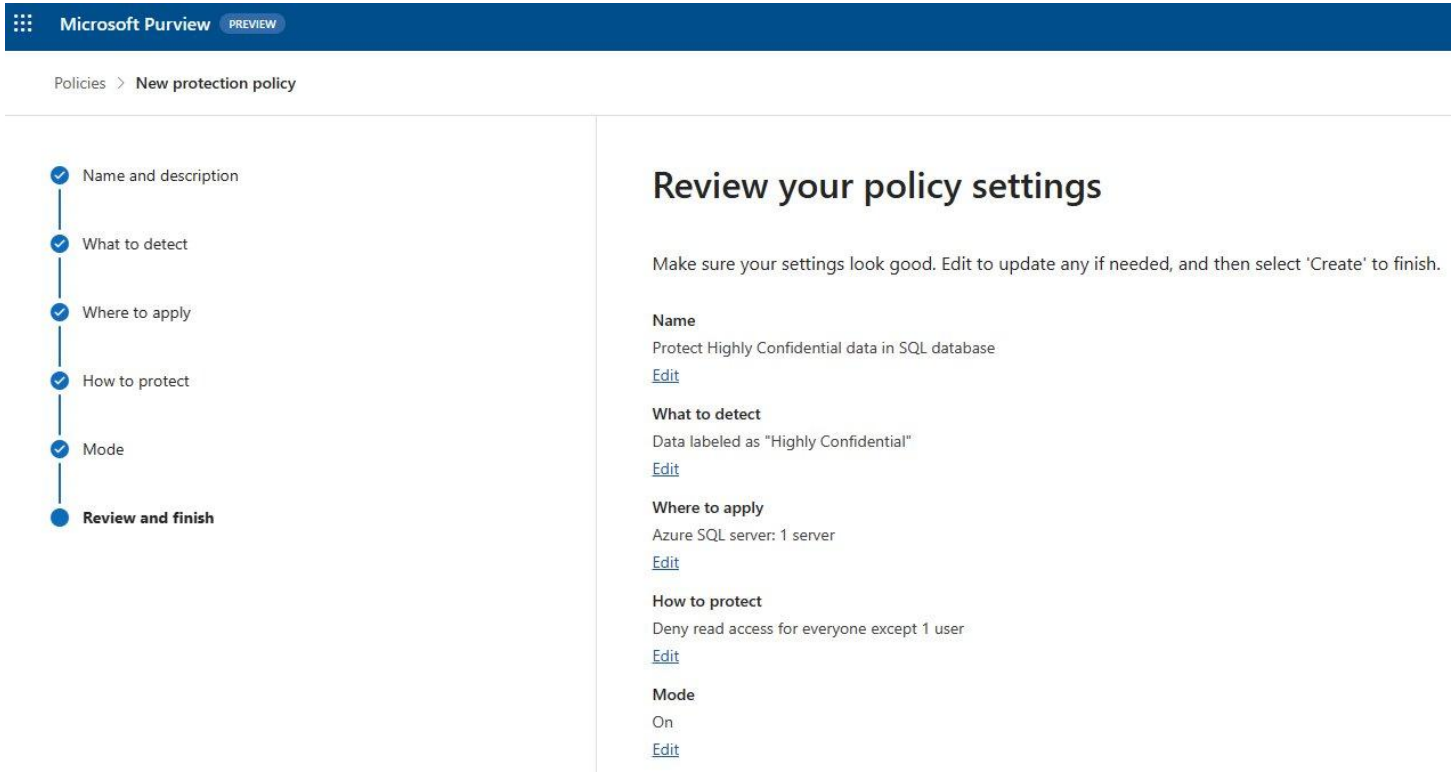
Label-based access control using Purview policies *(preview)*

Provision protection policies in Purview to restrict access to sensitive data in Azure SQL

Enterprise admins can authorize data access for a particular sensitivity label to specific users/groups

Access control is automatically imposed whenever sensitive information is accessed by users

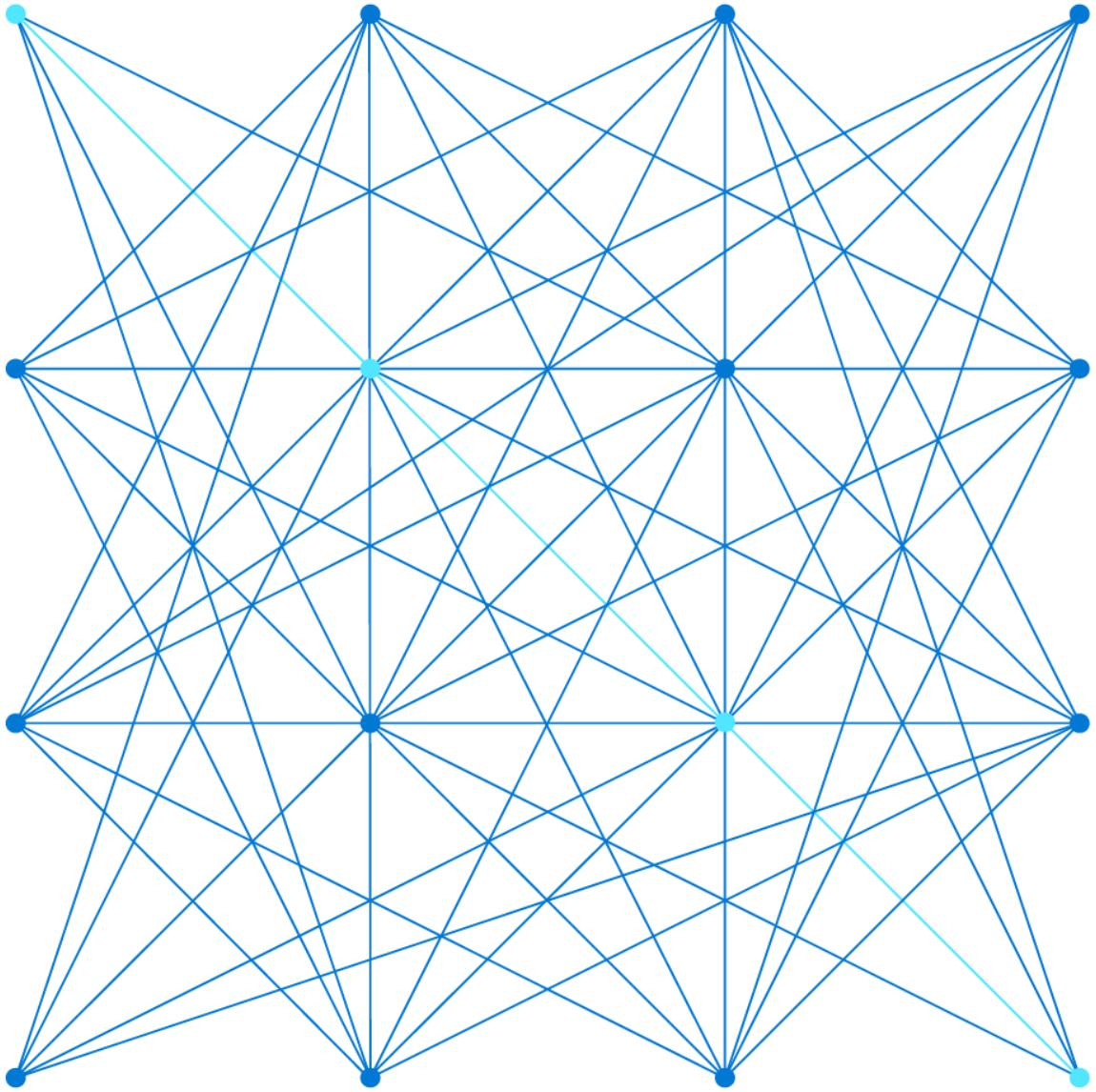
Getting started with the preview: https://aka.ms/sql-purview-protection-preview-docs



Microsoft Azure

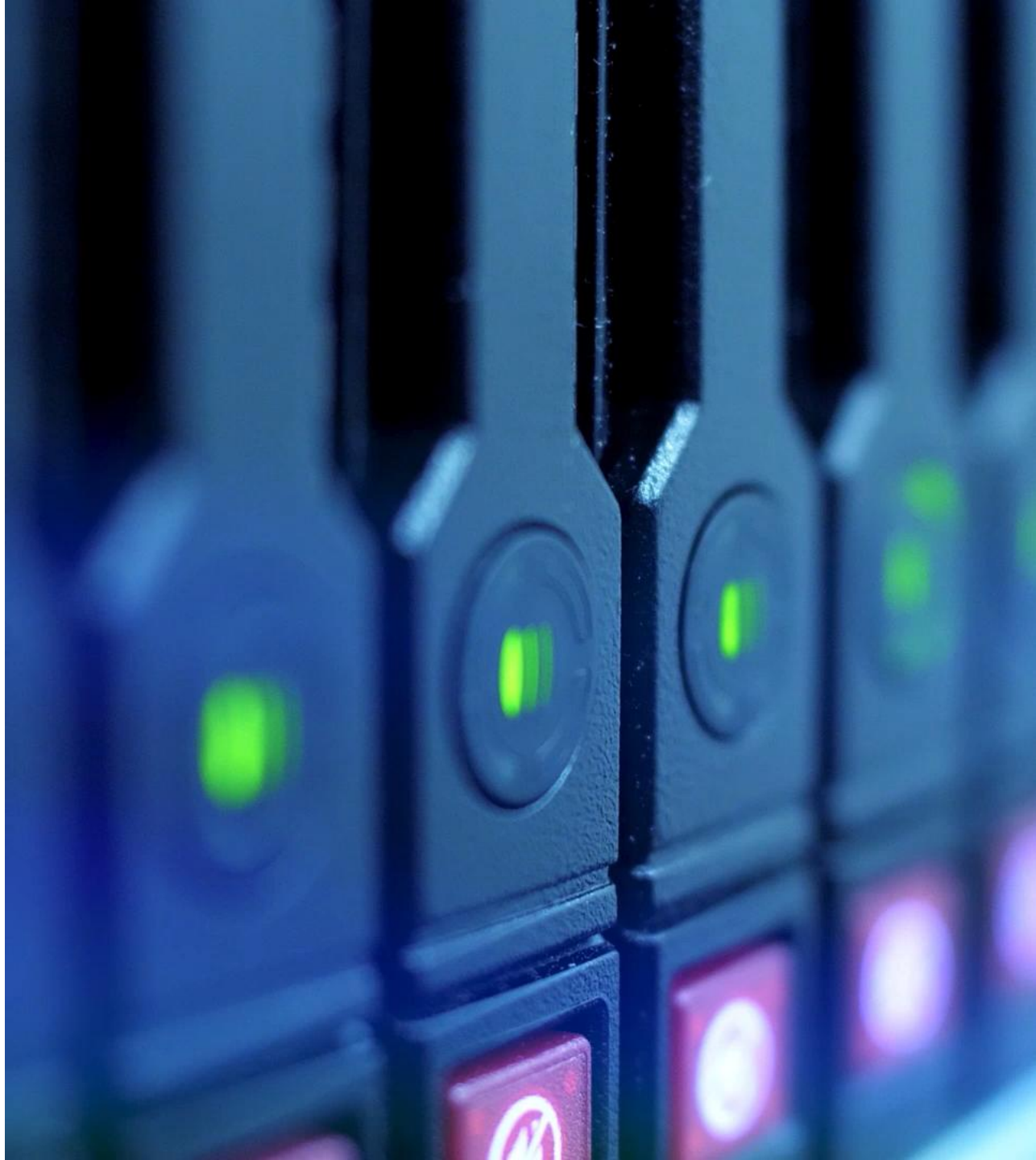
Discovering Threats

For Azure SQL DBAs



Do not rest too much your watchful eye:

- Be observant, do not limit your focus just on usual SQL Server sources of information – go beyond just SQL Server DMVs, Extended Events, Error Logs, DBCCs, etc
- Use good monitoring software with alerting
- Consider acquiring SIEM (Security information and event management)
- Follow the Well Architected Framework principles.
- Take advantage of the Azure recommendations (Policy, Advisor, etc)



For more details on observability, attend session **“Becoming an Azure SQL DBA – Performance Monitoring, Tuning and Alerting”**
on Thu, 7th of Nov 2024
at 11:30 AM – 12:30 PM in Rooms 345-346

Azure SQL platform observability sources

- Azure Service Health
- Resource Health
- Activity Log
- Azure Monitor
- Diagnostic Settings (Logs)
- Azure SQL Audit
- Azure Advisor
- Microsoft Entra reports

Value proposition of SQL Auditing

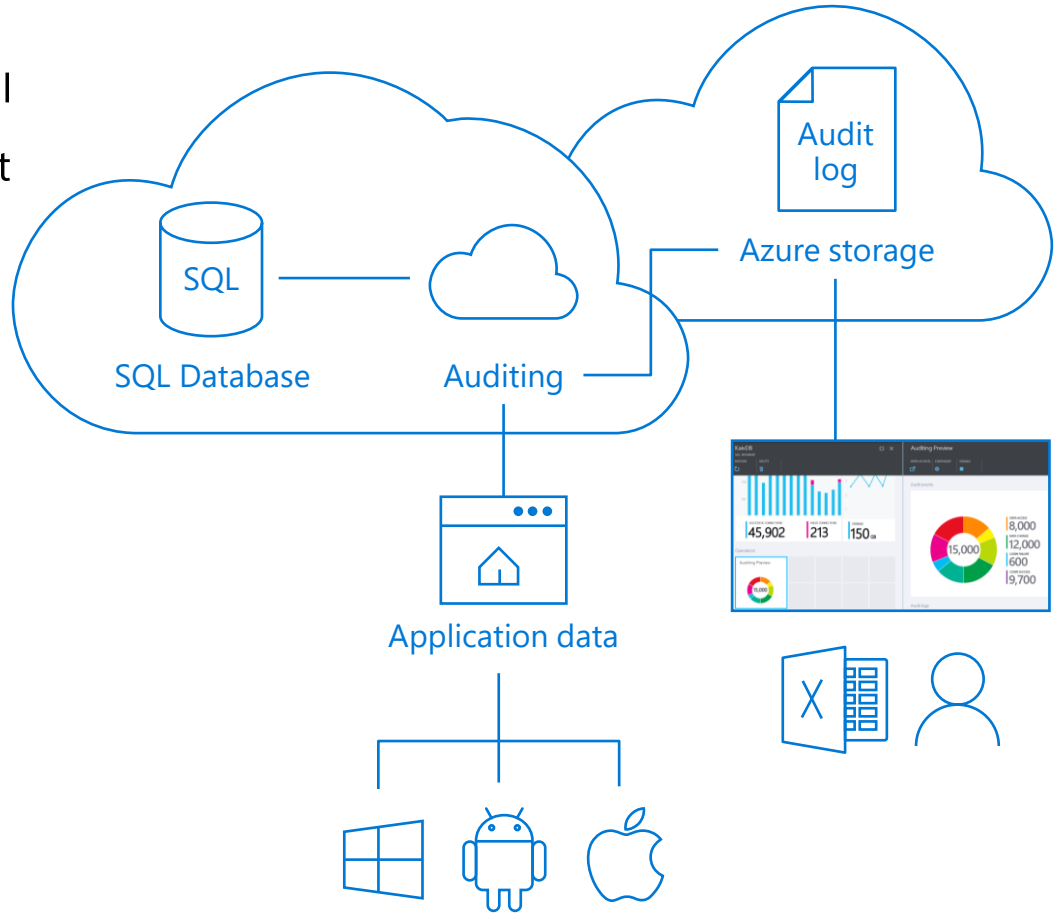
Gain insight into database events and streamline compliance-related tasks

Helps you to understand database activity and gain insight into discrepancies and anomalies that could indicate business concerns or suspected security violations.

Azure SQL Database & Azure SQL MI Auditing

Gain insight into database events and streamline compliance-related tasks

- ✓ Configurable audit policy via the Azure portal and standard API
- ✓ Audit logs reside in your Azure Storage account, or can be sent directly to Log Analytics or Event Hub
- ✓ Azure portal viewer and SSMS for analysis of audit log
- ✓ Compatible with SQL Server box auditing, including high granularity in defining audit policy



Benefits:

- Transparency into workforce activities.
- Anomaly detection.
- Trend visualization.
- Data loss prevention.

Microsoft Defender for Databases

for Azure SQL DBA

Value proposition of Microsoft Defender for SQL

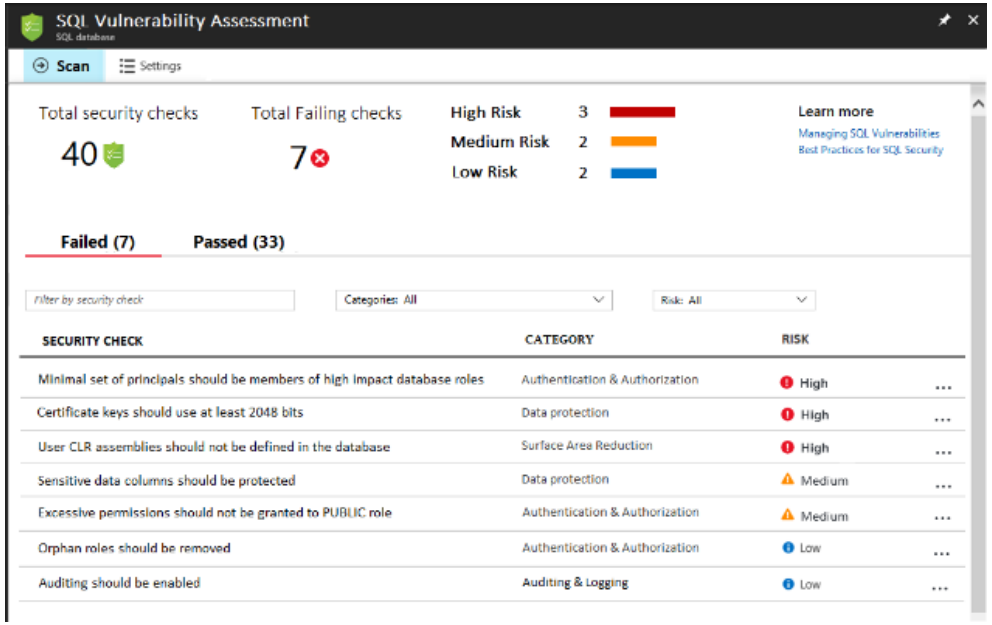
Discover and mitigate potential database vulnerabilities

Advanced threat protection

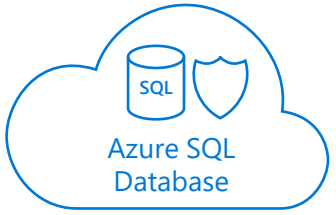
Alerts you to anomalous activities that might be an indication of a threat to your databases.

Vulnerability Assessment

- Get visibility
  - Discover sensitive data and potential security holes
- Remediate
  - Actionable remediation and security hardening steps
- Customize
  - Baseline policy tuned to your environment, allowing you to focus on deviations
- Report
  - Pass internal or external audits to facilitate compliance



Azure SQL Database

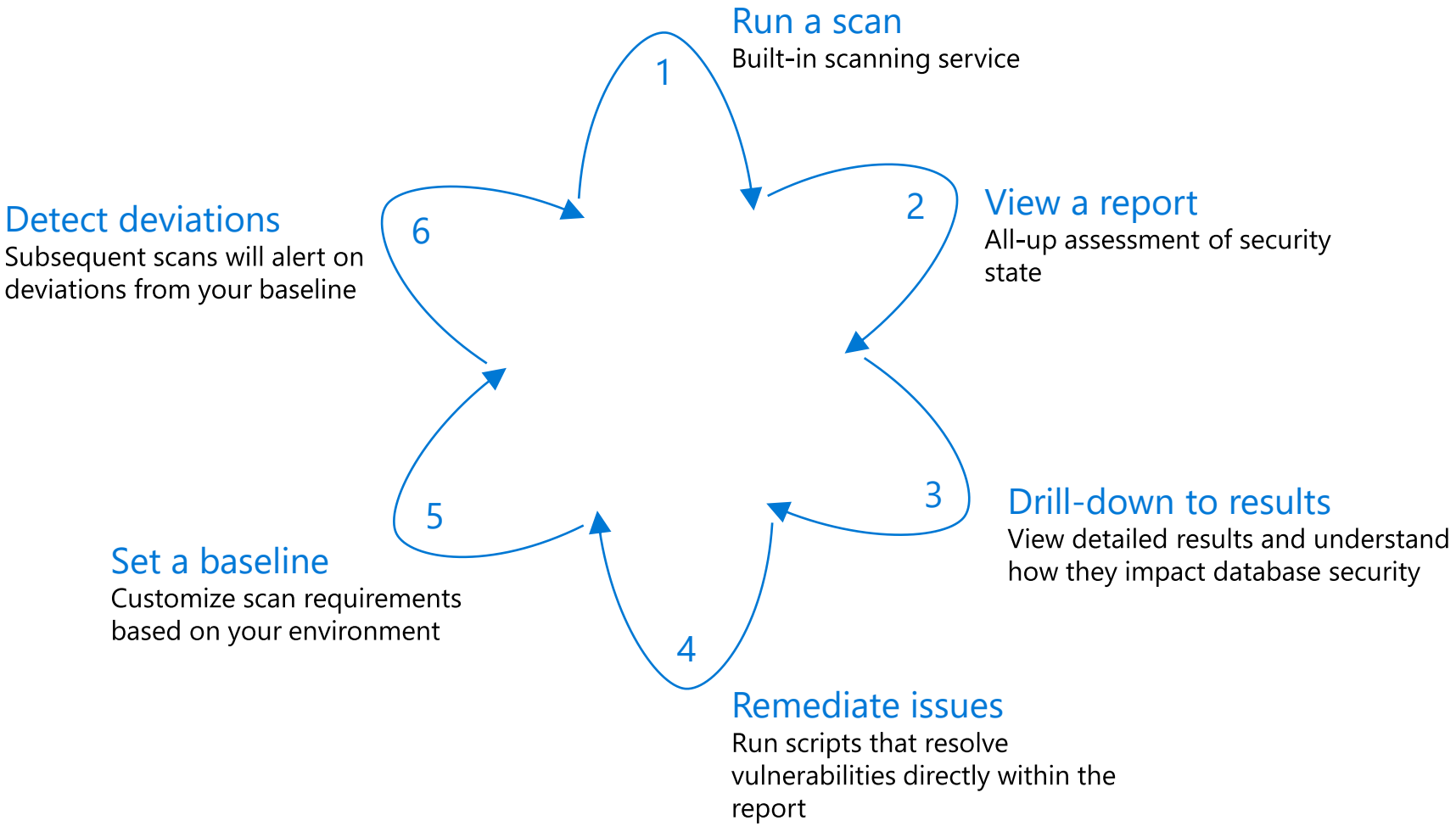


Vulnerability Assessment

Identifies, tracks, and resolves SQL security vulnerabilities

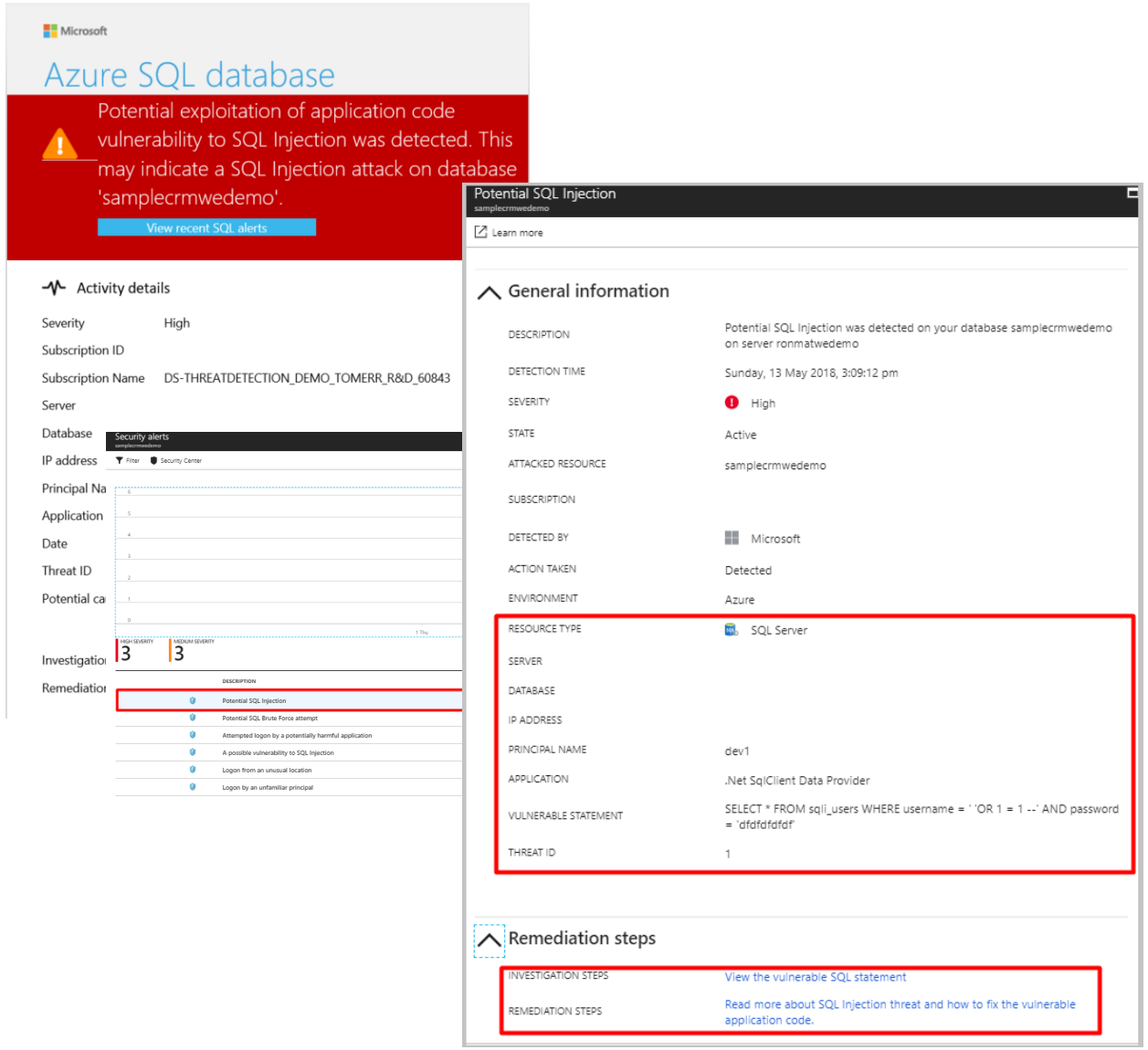
Developer/DBA

Using Vulnerability Assessment

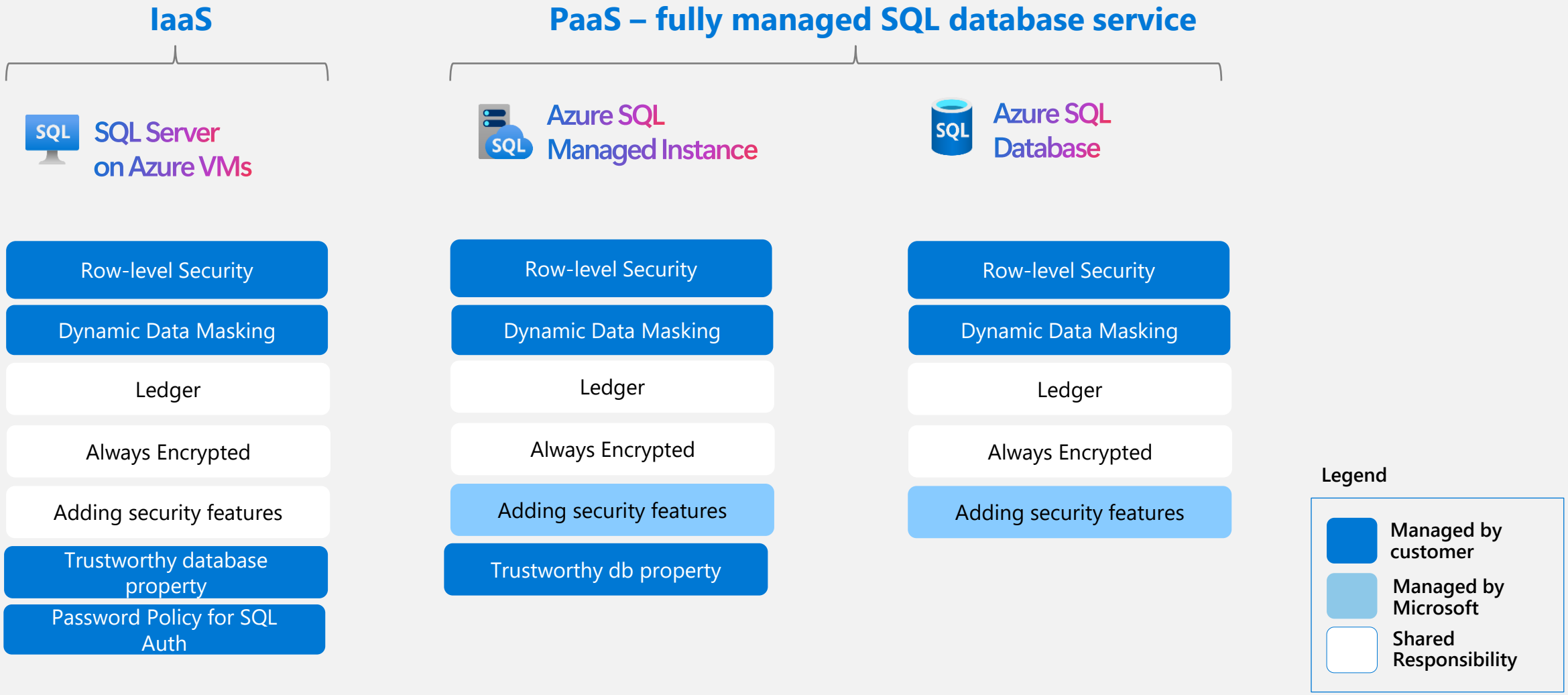


SQL Advanced Threat Protection

- Receive an alert
  - Suspicious database activities
  - Potential vulnerabilities
  - SQL injection attacks
  - Anomalous database access and queries patterns
- Details of suspicious activity
  - Recommend action on how to investigate and mitigate the threat
- Recommended to enable auditing

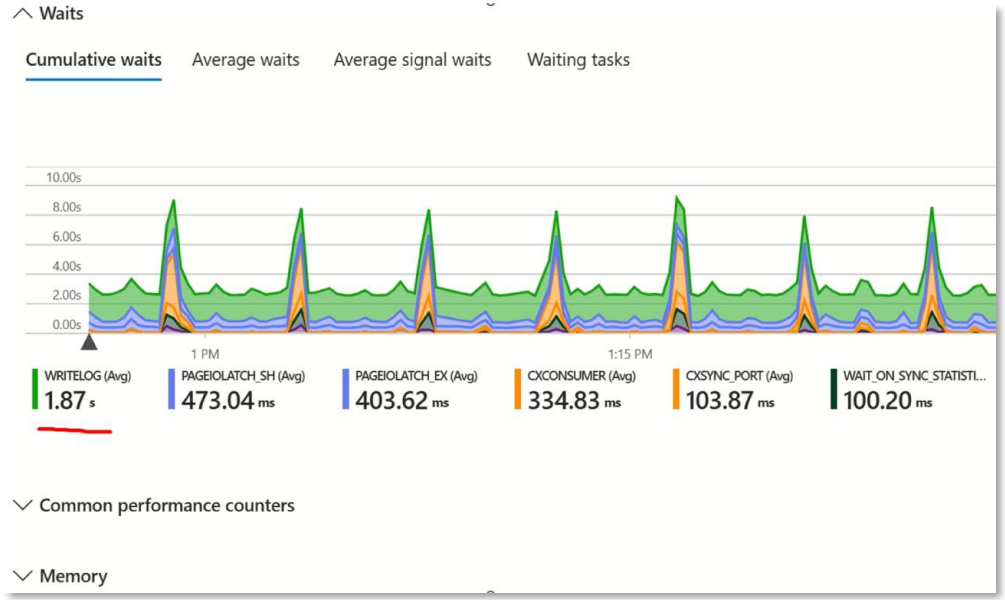


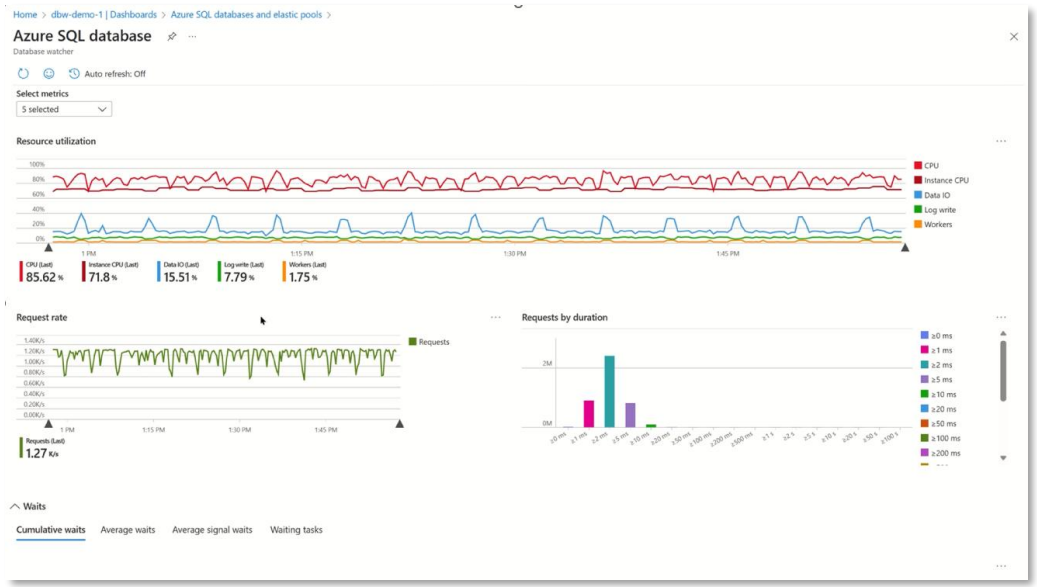
Other Security technologies

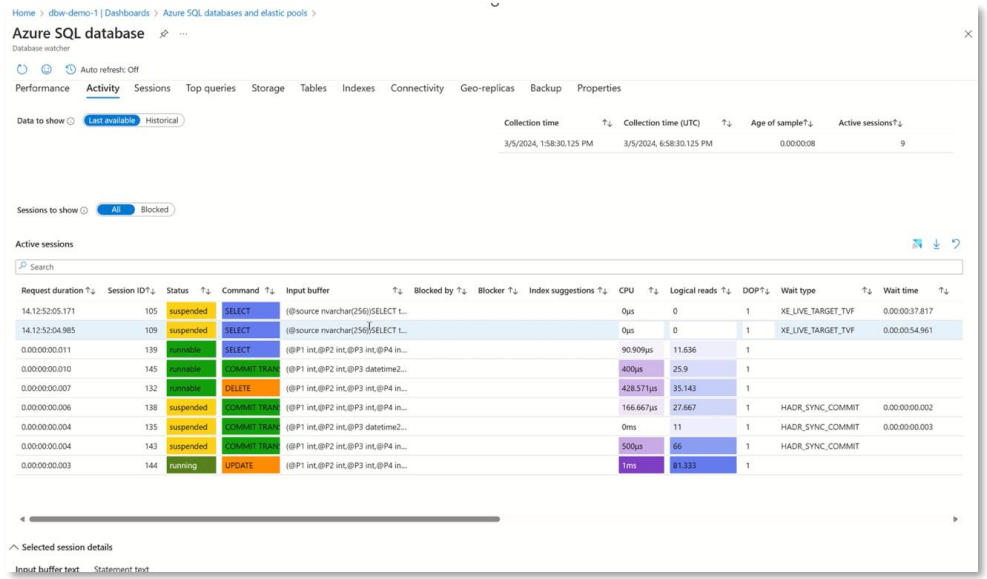


Database Watcher (Preview)

- **New tool to help you manage SQL resources in Azure**
- **Built-in native Azure monitoring solution for SQL resources**







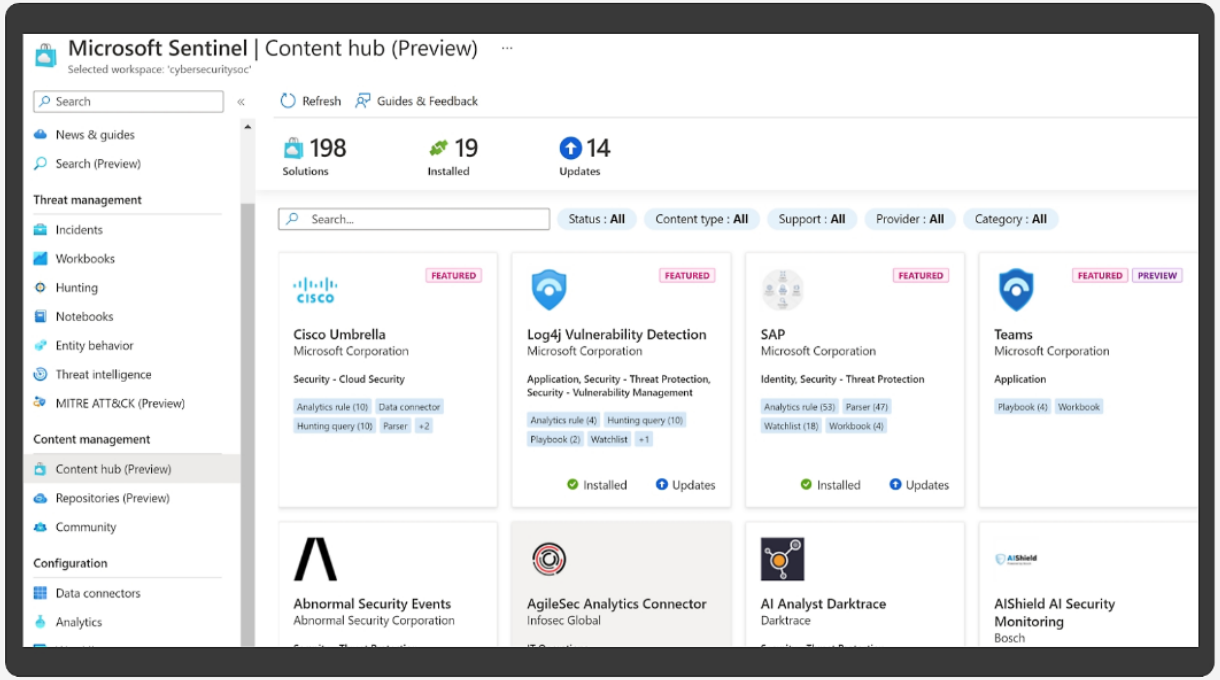
Microsoft Sentinel

Collect data at cloud scale

Stay ahead of cyberthreats

Streamline investigation with incident insights

Accelerate response and save time by automating common tasks

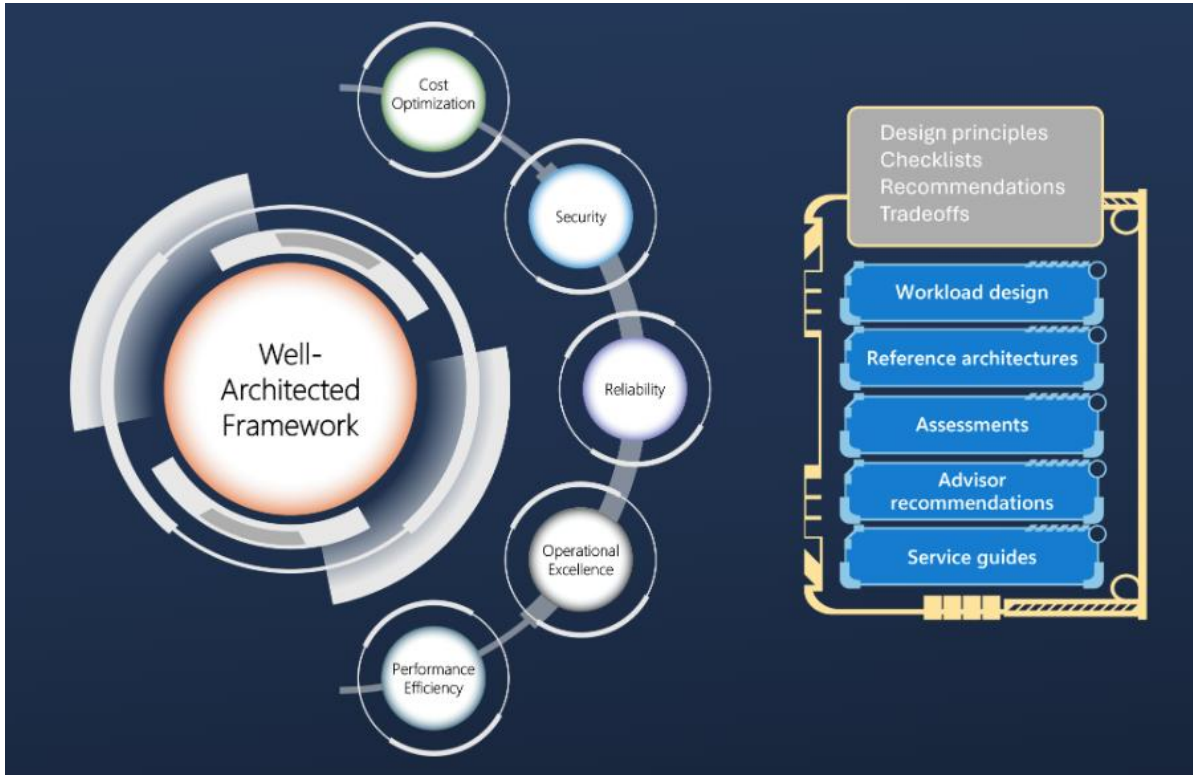


Well Architected Framework

The Azure Well-Architected Framework is a set of quality-driven tenets, architectural decision points, and review tools intended to help solution architects build a technical foundation for their workloads.

The Azure Well-Architected Framework is a design framework that can improve the quality of a workload by helping it to:

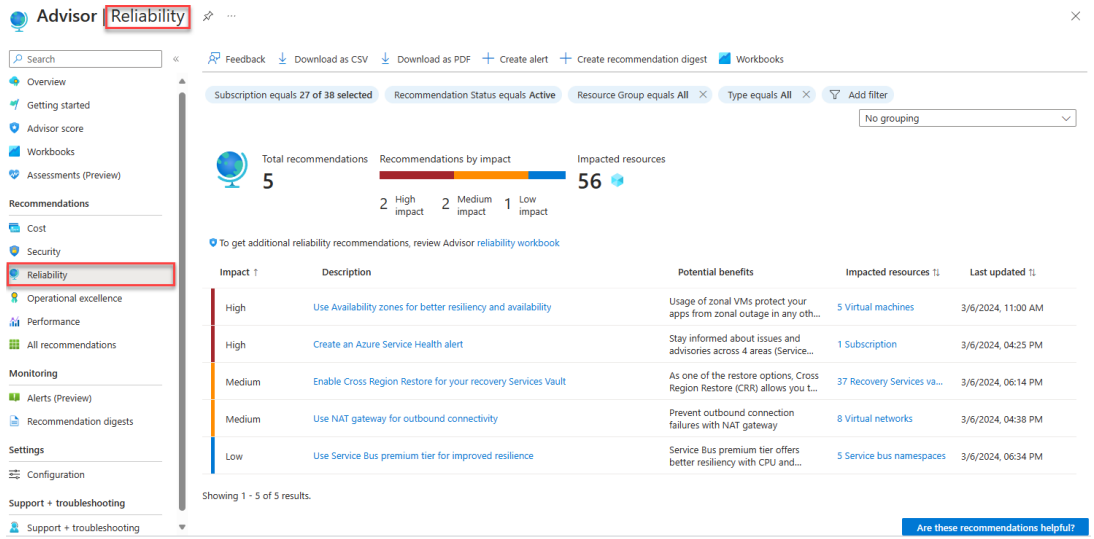
- **Be resilient, available, and recoverable.**
- **Be as secure as you need it to be.**
- **Deliver a sufficient return on investment.**
- **Support responsible development and operations.**
- **Accomplish its purpose within acceptable timeframes.**

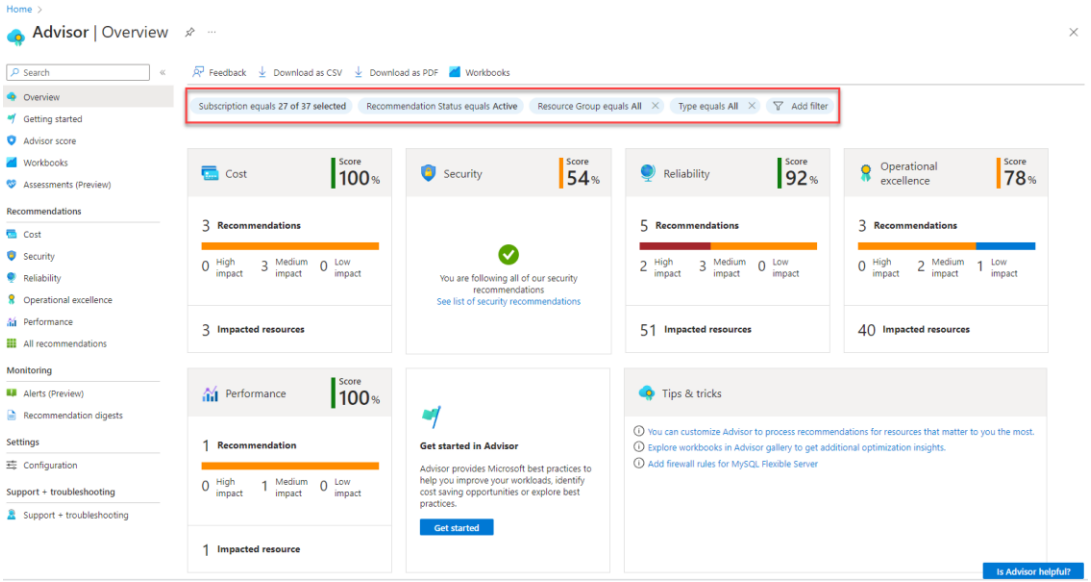


Azure Advisor

Advisor is a digital cloud assistant that helps you follow best practices to optimize your Azure deployments. It analyzes your resource configuration and usage telemetry and then recommends solutions that can help you improve the cost effectiveness, performance, reliability, and security of your Azure resources.

- **Reliability**: To ensure and improve the continuity of your business-critical applications.
- **Security**: To detect threats and vulnerabilities that might lead to security breaches.
- **Performance**: To improve the speed of your applications.
- **Cost**: To optimize and reduce your overall Azure spending
- **Operational excellence**: To help you achieve process and workflow efficiency, resource manageability, and deployment best practices.





Requirements for Azure SQL DBAs in the security space:

- Be up-to-date with the latest in Azure frameworks and services
- Ensuring solution's compliance
- Having network control proficiency is a must for securing your data
- Proactively monitor and react on the potential threats

We give you the tools

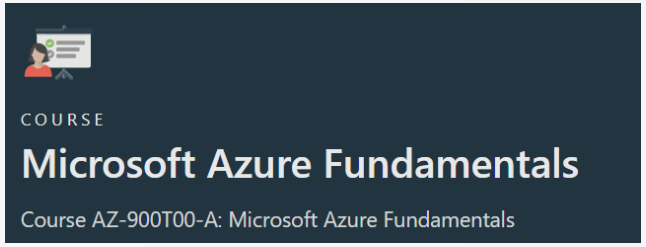
But it is YOU who need to

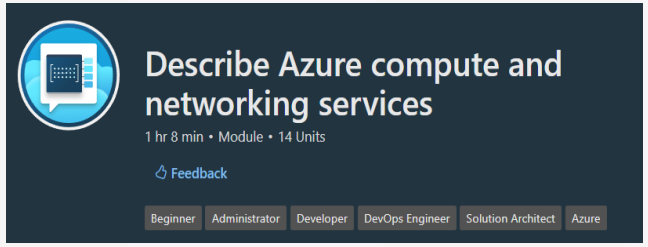
- Select the destination
- Make a good plan
- Prepare the alternatives
- Ensure that it every piece of the solution is communicating well and is secure

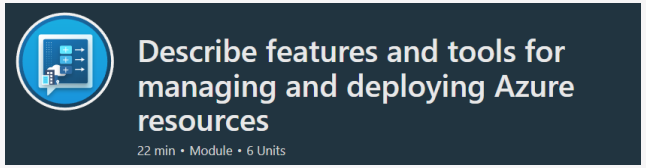
Additional Resources

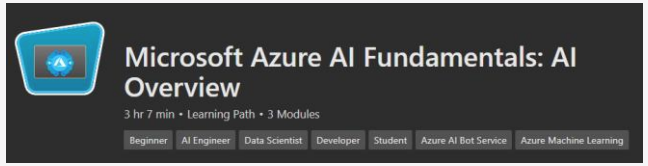
Azure free online courses

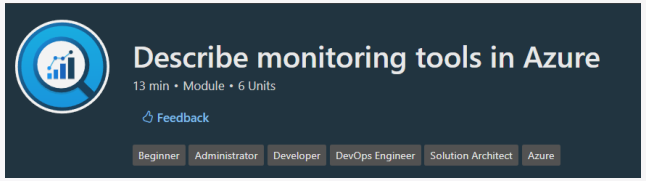
https://learn.microsoft.com/training/browse/

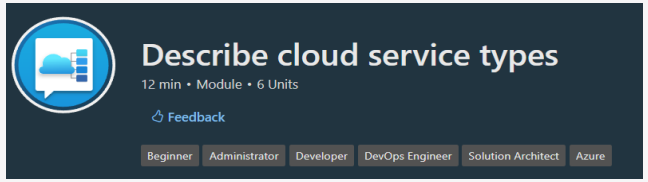


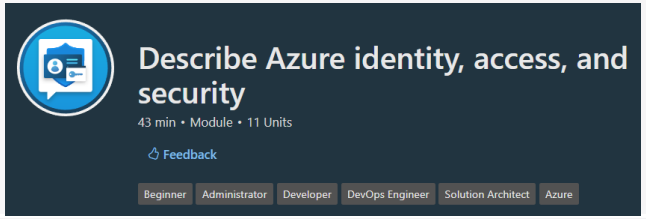


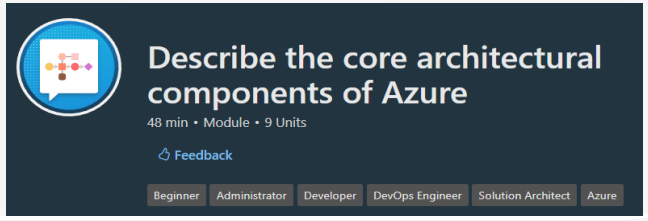












Experience Azure SQL for free

Azure SQL Managed Instance

aka.ms/freesqlMI

What's included

- **1 instance** per Azure subscription
- **4 or 8 vCores** of GP compute
- **750 vCore hours** per month
- **64 GB data** storage
- **64 GB backup** storage

Use it for 12 months

Use this free offer to support your migration proof of concepts for **12 months.**

You're in control

- Optimize your monthly available vCore hours by **stopping** and **starting** the instance when necessary.

Azure SQL Database

aka.ms/SQLfreeoffer

What's included

- **1 Azure SQL Database** per Azure subscription
- **100,000 vCore seconds** per month.
- **32 GB data** storage
- **32 GB backup** storage

No time limits

- Apply this free offer for the **life** of your **subscription**.

Need more? No problem.

- Stick with the default **auto-pause** option or continue usage for additional charges.

Your feedback is important to us

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Thank you

Please Freel free to reach out to us.

- Niko Neugebauer nneugebauer@microsoft.com
- Dani Ljepava danil@microsoft.com
- Erin Stellato erinstellato@microsoft.com
- Pam Lahoud pamela@microsoft.com

Other Azure services that are important and relevant for Azure SQL DBAs

Microsoft Entra Id 

Azure Blob Storage 

Azure Key Vault 

Azure Key Vault HSM 

Azure Key Vault and Managed HSM

Azure Key Vault (AKV)

- Azure Key Vault is one of several key management solutions in Azure, and helps solve the following problems:
- **Secrets Management** - Azure Key Vault can be used to Securely store and tightly control access to tokens, passwords, certificates, API keys, and other secrets
- **Key Management** - Azure Key Vault can be used as a Key Management solution. Azure Key Vault makes it easy to create and control the encryption keys used to encrypt your data.
- **Certificate Management** - Azure Key Vault lets you easily provision, manage, and deploy public and private Transport Layer Security/Secure Sockets Layer (TLS/SSL) certificates for use with Azure and your internal connected resources.

AKV Managed HSM

Azure Key Vault Managed HSM (**Hardware Security Module**) is a fully managed, highly available, single-tenant, standards-compliant cloud service that enables you to safeguard cryptographic keys for your cloud applications, using **FIPS 140-2 Level 3 validated HSMs**.
It is one of several key management solutions in Azure.

Generate (or import using BYOK) keys and use them to encrypt your data at rest in Azure services such as Azure Storage, Azure SQL, etc.

Supports cross region replication of key material without service failover.