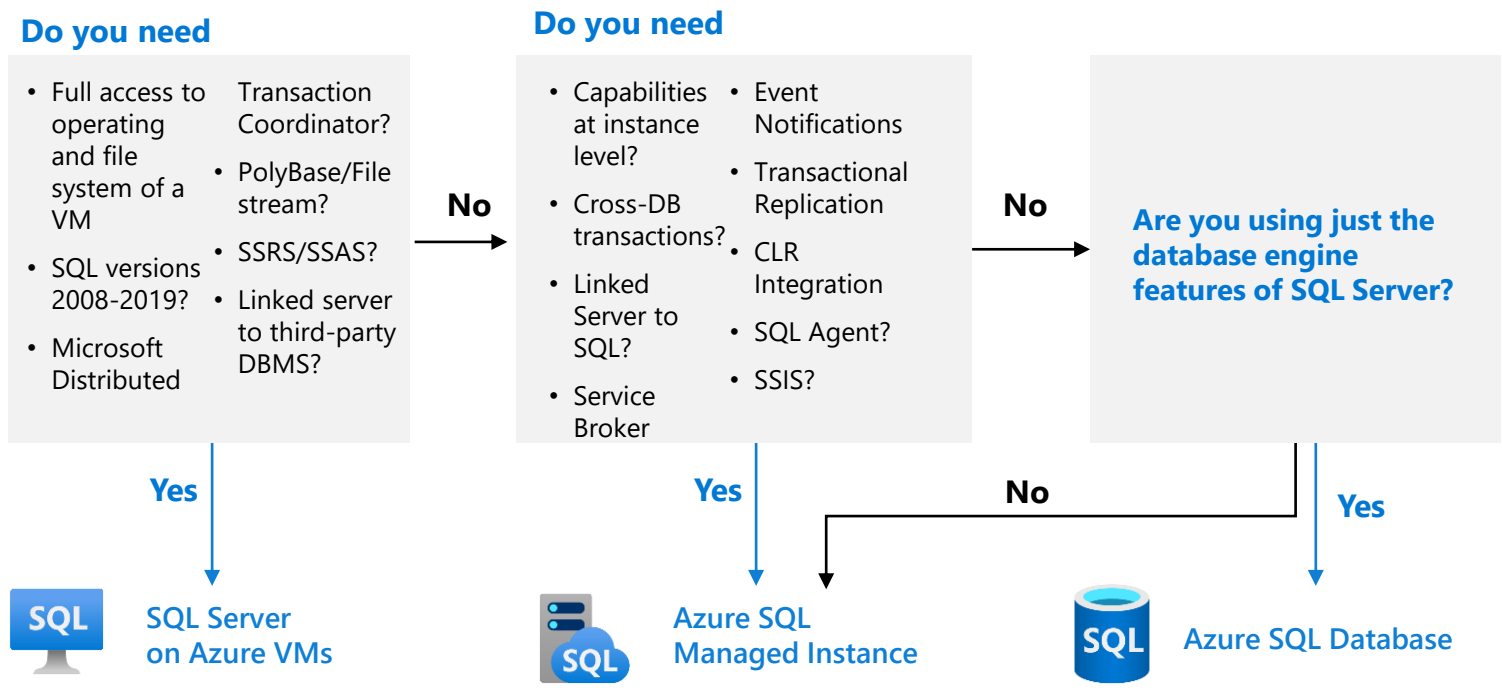# Comparing SQL on Azure

Whether you're looking to migrate to IaaS or PaaS or deploy on a hybrid platform, Azure SQL has you covered. Azure SQL offers three core deployment options for moving your SQL Server workloads to the cloud. The following diagram outlines which option will best meet your needs and summarizes key differences in manageability.

Do you need

- Full access to operating and file system of a VM
- SQL versions 2008-2019?
- Microsoft Distributed
- Transaction Coordinator?
- PolyBase/File stream?
- SSRS/SSAS?
- Linked server to third-party DBMS?

No →

Do you need

- Capabilities at instance level?
- Cross-DB transactions?
- Linked Server to SQL?
- Service Broker
- Event Notifications
- Transactional Replication
- CLR Integration
- SQL Agent?
- SSIS?

No →

Are you using just the database engine features of SQL Server?

Yes ↓

SQL Server on Azure VMs

Yes ↓ **No** →

Azure SQL Managed Instance

Yes ↓

Azure SQL Database

SQL Server on Azure VMs	Azure SQL Managed Instance	Azure SQL Database
	Intelligent performance/security	Intelligent performance/security
Applications	Applications	Applications
Data	Data	Data
Database	Database	Database
SQL instance-level features	SQL instance-level features	
High Availability /DR/ Backups	High Availability/ DR/ Backups	High Availability/ DR/ Backups
Database provision/ Patch/ Scaling	Database provision/ Patch/ Scaling	Database provision/ Patch/ Scaling
Operating system	Operating system	Operating system
Virtualization	Virtualization	Virtualization
Hardware	Hardware	Hardware
Datacenter management	Datacenter management	Datacenter management

■ Managed by customer   ■ Managed by Microsoft   ■ Machine learning capability

Comparing features across offerings*

All deployment options are built on the industry-leading SQL Server engine, and accessed through a centralized management and monitoring portal, but differences in features remain. Learn about the core difference between specific features below.

	SQL Server on Azure VMs	**Azure SQL Managed Instance**	**Azure SQL Database**
Deployment	• Choose Azure VM compute and storage sizes • Portal or CLI gallery images • Full SQL Server Setup • Bring your own image or self-install from Volume Licensing Center with active SA • Images with full SQL Server or Database only setup	• Dedicated instance or instance pools • vCore-based resources • Portal or CLI instance deployment • Native VNet integration	• Provisioned and serverless compute options • Multi-tenancy with elastic pools • Hyperscale for 100TB+ databases • DTU or vCore-based resources • Portal or CLI database deployment
Manageability	• Automated backups • Automated security updates • Manual patching and version upgrades • Dynamic VM sizing • Backup and Restore with Azure Blob Storage • Full SQL Server Engine features • Full access to OS	• Automated and user-initiated backups • Point-in-time Restore • Automated patching and version upgrades • Dynamic scaling • Full Dynamic Management Views • Extended Events • Query Store • Database Mail • Resource Governor • SQL Server Agent • Azure Resource Health	• System-initiated automatic backups • Long-term backup retention • Create new database based on point-in-time restore • Automated patching and version upgrades • Dynamic scaling • Auto-scale with serverless • Azure Resource Health • Subset of Dynamic Management Views • Extended Events • Query Store
Security	• Integrated Security Authentication with Domain joined VM • Full SQL Server Engine Security Features • Azure Threat Protection and vulnerability assessments • Azure Security Center and Policies for infrastructure	• Azure Active Directory Authentication • Transparent Data Encryption (TDE) with BYOK • Always Encrypted • SQL Server Audit • Row Level Security and Dynamic Data Masking • Advanced Threat Protection	• Azure Active Directory Authentication • Transparent Data Encryption (TDE) with BYOK • Always Encrypted • SQL Server Audit • Row Level Security and Dynamic Data Masking • Advanced Threat Protection
Business Continuity	• Full Always On Availability Groups (AG) • Always On Failover Cluster Instance • SQL Server replication • Change Data Capture • Log Shipping • Database Snapshots • Accelerated Database Recovery • Tempdb Optimized Metadata	• Built in Azure HA/DR • Built-in readable secondary using geo-replication • Auto Failover Groups • SQL Server Replication • Change Data Capture • Accelerated Database Recovery on by default	• Built in Azure HA/DR • Built-in readable secondary using geo-replication • Availability Zones • Active geo-replication • SQL Data Sync • Accelerated Database Recovery on by default
Performance	• Automatic Plan Correction • Full SQL Server engine performance features • Azure Blob cache • High performance ultra disks	• Intelligent Query Processing • Columnstore Indexes • Memory Optimized Tables • Automatic Plan Correction	• Intelligent Query Processing • Columnstore Indexes • Memory Optimized Tables • Automated Tuning including Indexes and Plan Correction

*This comparison is intended as a guide and subject to change without notice. SQL Server on Azure VM feature availability may be limited to specific SQL Server versions. For detailed comparisons, please see our documentation at aka.ms/AzureSQL_documentation

	SQL Server on Azure VMs	**Azure SQL Managed Instance**	**Azure SQL Database**
Programmability	• All major programming interfaces • Server-level collations • UTF-8 • T-SQL JSON integration • Graph database • Common Language Runtime • Native cross database queries • PolyBase external tables with Hadoop • New Polybase connectors • Java language extension • Distributed transactions • FileStream • Full T-SQL surface area	• All major programming interfaces • Server-level collations • UTF-8 • T-SQL JSON integration • Graph database • Common Language Runtime • Native cross database queries • Linked Servers • Service broker	• All major programming interfaces • Database-level collations • UTF-8 • T-SQL JSON integration • Graph database
Networking	• Public Endpoint with Network Security Group (NSG) • Private Endpoint with Native Azure Vnet	• Public Endpoint with Network Security Group (NSG) • Private Endpoint with Native Azure Vnet	• IP Firewall for Public Endpoint • Virtual Network Firewall within Azure • Private Endpoint with PrivateLink (preview)
Analytics and BI	• SQL Server Integration Services (SSIS) • SQL Server Reporting Services (SSRS) • SQL Server Analysis Services (SSAS) • Machine Learning Server (standalone) • Machine Learning Services and language extensions • Full-text and semantic extractions for search	• Machine Learning Services with R and Python Compatible with: • Azure Data Factory SSIS integration runtime • Migrate SSRS to Power BI paginated reports • Azure Analysis Services	Compatible with: • Azure Data Factory SSIS integration runtime • Migrate SSRS to Power BI paginated reports • Azure Analysis Services
Storage limits	Instances up to 256 TB	Instances up to 8 TB	Databases up to 4 TB (100 TB with Hyperscale)
SLA	SLA varies based on tier level. Max 99.99% HA SLA when distributed between AZ	99.99% availability SLA at instance level	Up to 99.995% availability SLA at database level

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Learn more about Azure SQL at aka.ms/azure_sql