



It's Just SQL Server on Azure Right?

Overview

Moving SQL Server to Azure provides an organization more flexibility, greater operational ease, and improved security. Moving to Azure will change an organization's model for data and will change (but not eliminate) a DBA's job.

Microsoft offers three primary options for migrating existing SQL Server workloads to its Azure cloud. These are:

1. **Azure SQL Database – Managed Instance**
2. **Azure SQL Database – Single Database**
3. **SQL Server on Azure VMs**

The first two options (Azure SQL Database – Managed Instance and Azure SQL Database – Single Database) are Platform as a Service (PaaS) offerings. The third option (SQL Server on Azure VMs) leverages virtual machines (VMs) to offer a cloud-based environment similar to an on-premise solution.

Every organization should evaluate the best option for its environment, based on its unique situation and requirements. Based on Pragmatic Works' experience, there are four key considerations:

4 Top Considerations			
Operational Ease	Secure Environment	Functional Equivalence	Migration Options

Consideration #1: Operational ease for maintaining the system

One reason that businesses move workloads to the cloud is to reduce the amount of system maintenance work their IT team or DBAs are doing. With the Azure SQL Database solutions, the patch and update process, backups, and disaster recovery and high availability become easier to manage, while overhead on the SQL Server on VM offering remains similar to on-premise.

PATCHES AND UPDATES

Microsoft automatically applies SQL Server and Windows patches and updates seamlessly for both Azure SQL Database solutions. Because PaaS is versionless, Microsoft allows customers to turn on compatibility models for new features to ensure that their existing implementations continue to work, regardless of what is installed as part of the new patches and updates.

Azure SQL Database - Managed Instance



Azure SQL Database - Single Database



SQL Server on Azure VMs



Still, even though these patches and updates are automated, they can cause issues. DBAs and IT teams should be aware of what changes are happening; Microsoft blogs often provide this information.

SQL Server on VM customers are still required to manage their own patches and updates, just as they did with the on-premise implementation.

AUTOMATED BACKUPS

Both versions of the Azure SQL Database offer automated backups with a minimum of a seven-day point-in-time recovery period. If a system issue occurs, whether it's a system-down scenario or a user deleting a table, the PaaS solutions make it easy to restore the database to a point in time. In addition to the automated backups, Managed Instance allows customers to run a command to create additional backups, as needed.

SQL Server on VM backups are managed by the customer, just as they were on-premise.

DISASTER RECOVERY (DR) AND HIGH AVAILABILITY (HA)

HA is built into both Azure SQL Database offerings, providing customers with automatic failover managed by Microsoft. HA is not automatic on SQL Server on VM; the customer needs to set up additional VMs and failover on their own.

DR requires more setup and configuration for both Azure SQL Database and SQL Server on VM. These implementations use data solutions within the Azure framework for DR, including Microsoft's paired regional data centers that offer a high level of performance for both HA and DR scenarios.

Consideration #2: The security of the environment

Security is a hot topic for every company today. When moving workloads to SQL Server on Azure, it is important to understand and even rethink access.

AZURE ACTIVE DIRECTORY VS. SQL LOGINS VS. ACTIVE DIRECTORY

All SQL Server on Azure businesses—including those using the VM solution—should consider moving from the traditional Active Directory access model to a full implementation of Azure Active Directory. SQL Logins are also supported but will require changes to support Azure Active Directory.

While VM still supports Active Directory, moving to Azure Active Directory makes it easier for businesses to shift to the cloud in the future, since access is already defined.

“In any scenario, let automation happen with a grain of salt. Some of those updates and patches still cause issues.”

Steve Hughes, Director of Consulting, Pragmatic Works

ENDPOINTS

One key difference between the PaaS solutions is around endpoints.

- **Single Database uses a public endpoint**, which is out-of-the-box secure using firewall settings so that only accounts granted access can get to the system.
- **Managed Instance is virtual network (VNet) secured** so that only accounts with access to the network or VNet within Azure can access the system. Because the default is full lockdown, it requires networking expertise to set it up properly.
- **Virtual Machine differs** in that it is an Infrastructure as a Service (IaaS) rather than a PaaS. Customers are responsible for the security, just as they are with on-premise solutions.

Consideration #3: Functional equivalence with existing SQL Server implementations

There are some key differences between on-premise SQL Server and SQL Server for Azure, including changes to or limitations to how the product works in Azure. While Microsoft offers detailed information on the differences with [Azure SQL Database](#), a high-level overview of key differences is shown in the table below.

Table 1: Functional Equivalence and Additional Features in Azure SQL Server Database

SQL Server on Azure version	Differences
Single Database	<ul style="list-style-type: none"> • Most T-SQL covered; some limitations • Automatic tuning • Temporal tables • Row-level security • HA • Numerous additional features
Managed Instance	<ul style="list-style-type: none"> • BACKUP command • Change data capture • CLR has no file system access because there is none; most custom functions just work • Cross-database functionality; query across multiple databases • DBMail • Service Broker; limited functionality • SQL Server Agent
SQL on VM	<ul style="list-style-type: none"> • All functionality available in on-premise SQL Server is available • FILESTREAM available; not in PaaS offerings • Attach a database • Extended Stored Procedures • Polybase

COMPLIANCE

Microsoft builds platforms that allow businesses to be compliant with laws and industry regulations. For more information on how Microsoft supports compliance across its data platform, visit the [Microsoft Trust Center](#).

Consideration #4: Easiest and best migration options

Microsoft provides free tools that simplify migration to all three SQL Server for Azure solutions.

- **Azure Data Migration Assistant** assesses existing SQL Server workloads and advises whether they are best suited for Single Database, Managed Instance, or SQL on VM. It will also identify anything in the existing implementation that will not work on these offerings.
- **Azure Data Migration Service** supports both online and offline migrations. Online migrations allow for an incremental migration to Azure, whereas offline supports one-at-a time or all-at-once migrations.

Migrating to the Azure SQL Database: Managed Instance is the same as SQL Server. Backup and restore are supported, offering a quick and easy migration. Data Migration Service (DMS) is supported for both Managed Instance and Single Database.

Migrating to SQL Server on VM is also easy. The migration supports both backup and restore as well as detach and attach.

Making the Choice: Understanding the impact of considerations and pricing

Generally, Pragmatic Works recommends Azure SQL Database: Managed Instance whenever possible. For many migrations, the solution provides the best functional equivalence, operational ease, and security for the price.

However, because all workloads and business needs are different, each organization needs to evaluate and decide upon the best choice for its environment.

Pragmatic Works can help assess and identify the best solution.

The table below summarizes the four considerations as well as basic pricing information as of August 2019. Pricing is based on a one terabyte (TB) database per month in the West US region for a general purpose (not mission-critical) eight-core solution with backup storage. *(Note: pricing is for initial comparison purposes only; it will differ per company based on an organization's actual environment, specifications, and discounts.)*

“You have options when migrating to Azure. It’s really important to look at the right option for whatever your use case is.”

Steve Hughes, Director of Consulting, Pragmatic Works

Table 2: Summary of considerations and pricing for SQL Server on Azure

	Single Database	Managed Instance	Virtual Machine
Operational Ease	Easy	Moderate	On your own
Security	External endpoint	VNet secured	Self-managed
Functionality	Most key functionality	High level of compatibility	Same functionality
Migration	More difficult; best for greenfield implementations	Easy; uses backup/restore	Easy, uses backup/restore and detach/attach
Server	Completely managed by Microsoft, single database management	Completely managed by Microsoft, multiple databases on instance with cross-database functionality	Self-managed, multiple instances, multiple databases
Price (1TB/month)	\$1,819 (1TB retention)	\$1,702	\$5,723 (two VMs with Enterprise SQL included)

Need help migrating your company's data from on-premise to Azure? Pragmatic Works can help!

To start your Azure journey, visit our website

<https://pragmaticworks.com>

or contact

sales@pragmaticworks.com

Conclusion

There are multiple advantages of moving SQL Server to Azure including flexibility, operational ease, security, and more. With three solutions to choose from, organizations should understand their own requirements and determine which solution will work best for their environment.

Pragmatic Works has expertise and extensive experience helping organizations assess their options, decide which solution is most appropriate, and implement this solution.