

DATABASES ON CLOUD VIRTUAL MACHINES **VS** MANAGED CLOUD DATABASES

PROBLEM STATEMENT

You'll need to make a couple of major decisions right off the bat if you want to move your SQL Server database to the cloud. First of all, you need to select a cloud platform, with Microsoft Azure and Amazon Web Services (AWS) being the two leading choices at this time. Next, you'll need to decide if you want to run your own SQL Server database on the platform's cloud-based virtual machines (VMs) or use the platform's managed SQL Server database.

These two choices result in the following four options:

- Azure VM
- Azure SQL Database
- Amazon EC2
- Amazon RDS for SQL Server



AZURE VM

Running SQL Server on a VM in Azure is similar to using a local server, except the VM is in the Cloud. You'll need to perform your own OS and DBA tasks, just as you would for a local machine. If you're already doing these things locally, then the installation and administration of SQL Server on Azure should be similar. The primary differences stem from the fact that the cloud VM resides outside your organization's firewall.

The portal for the cloud VM will also be different from the control panel for an on-premises VM. You can access the VM in Azure from any Remote Desktop Protocol (RDP) client, typically a machine with a Windows OS installed on it. You can use any machine with RDP installed on it, although configuring RDP in a non-Windows environment will be more challenging.

Azure VMs are more secure than the Azure SQL Database because you can configure and restrict their access by IP address. Furthermore, the OS's own security protects the passwords for Azure VMs. The storage capacity of Azure VMs is highly variable, depending on the specific VM.

Azure VMs integrate with Microsoft products like SQL Server more easily than AWS. Furthermore, Azure is better for hybrid Clouds that combine the features of public and private Clouds.

AZURE SQL DATABASE

Azure SQL Database is a managed cloud database included in Azure that Microsoft delivers as a Platform-as-a-Service (PaaS). You can administer it with the Azure portal or other tools such as SQL Server Management Studio (SSMS) and PowerShell. Azure SQL is easier to administrate than VMs because Azure handles most of these tasks. By the same token, this loss of control also means that Azure SQL isn't as configurable as Azure VMs. However, you can administrate Azure SQL databases from any device with an internet browser, including a smartphone. Azure SQL Database supports a maximum database size of 1 TB.

SSMS 17.2 allows SQL Database users to authenticate themselves with Multi-Factor Authentication (MFA), which is more secure than the SQL Database default of single-factor authentication. This option eliminates the need for third-party security solutions or SSL certificates, both of which are more secure but more complex than MFA.

SQL Database is native to the Cloud, while Amazon RDS is only Cloud-capable. This difference suggests that SQL Azure is better able to utilize cloud resources.

AMAZON EC2

Elastic Compute Cloud (EC2) is AWS's version of VMs in the Cloud. Users can configure EC2 VMs that are pre-installed with various versions and editions of SQL Server via Amazon Machine Images (AMIs). As with Azure, you have greater control when using your AWS VMs as opposed to using a managed database.

For example, you can make EC2 highly scalable by creating your own custom AMI from an existing EC2 VM and using that AMI to create another instance of the VM. Bear in mind that scaling cloud VMs is a static process rather than a dynamic one, meaning you can only specify the resources the VM will use when you create it. Once a VM is running, changing its resource allocation requires you to create a new VM with the new configuration, often by cloning the original VM.

You can also replace an existing VM with one that has greater vertical scaling, typically for the purpose of improving load balance. The new VM will behave correctly because the computer name remains unchanged. Backups are also easier with EC2 since you can just take an image of the entire server. You can use this capability to configure a server by creating an image at a certain checkpoint, which you can fall back to when necessary.

The biggest advantage of EC2 over an Azure VM is that you can provision an EC2 instance for each AWS account, allowing you to create varied instances of MySQL. In contrast, SQL Azure only allows you to provision a VM for a particular SQL Server database.

AMAZON RDS FOR SQL SERVER

Amazon Relational Database Service (RDS) is a distributed RDS for AWS delivered as a Database -as-a-Service (DaaS). The RDS dashboard allows users to configure options like authentication mode, backup settings, port number and license model.

RDS users have no access to the SQL Server's OS, which has some consequences when migrating databases. For example, you can't use native backups, so you'll need to use Amazon S3 instead. This technique involves backing up the database to a bucket and then restoring it to an RDS instance. Another consideration when using RDS is that shell access isn't available, which restricts administrative privileges for the databases on that RDS instance. That means the master user that's configured when the instance is created has db_owner privileges for all databases on the instance.

Amazon RDS provides complete support for SQL Server, whereas SQL Database only supports a subset of SQL Server's features. Your applications should, therefore, work flawlessly on RDS if you're already using SQL Server.

CONCLUSION

Running your database on cloud VMs has greater flexibility on configuration, but it also requires more expertise to administer. On the other hand, a managed cloud database may be a better choice if you don't have the resources for a dedicated DBA, especially if you're developing a new database rather than migrating an existing one.

Azure generally has more features than AWS, especially for deploying and scaling databases. However, AWS is more favorable for open-source development, which is often the deciding factor for Linux shops. Cost and performance are more difficult to compare due to the variety of packages available for both Azure and AWS.

