



# SQL Server on Azure VM

## What is SQL Server on an Azure VM?

SQL Server on an Azure Virtual Machine (VM) is a cloud-based deployment of Microsoft SQL Server running on an Azure virtual machine. It provides a full SQL Server instance within an Infrastructure-as-a-Service (IaaS) environment, giving users complete control over database management, configurations, and performance tuning.

Unlike **Azure SQL Database**, which is a fully managed Platform-as-a-Service (PaaS) offering, **SQL Server on an Azure VM** is a self-managed solution where users are responsible for database maintenance, patching, backups, and scaling.

## Benefits of SQL Server on Azure VM

### 1. Full SQL Server Control

- Complete access to SQL Server configurations, instances, and OS-level settings.
- Ability to install custom extensions and third-party applications.

### 2. Easy Migration from On-Premises

- Lift and shift existing SQL Server workloads with minimal changes.
- Supports older SQL Server versions, reducing compatibility issues.

### 3. High Performance and Scalability

- Supports **Azure premium disks, memory-optimized VMs, and high IOPS** storage options.
- Can scale vertically (upgrade VM size) or horizontally (add more VMs in a cluster).

### 4. Built-in Licensing Flexibility

- **Azure Hybrid Benefit** allows users with existing SQL Server licenses to save costs.
- Options for **pay-as-you-go** or **Bring Your Own License (BYOL)** models.

### 5. High Availability and Disaster Recovery

- Can be configured with **Always On Availability Groups** for failover clustering.
- Supports **automatic backups to Azure Blob Storage**.

### 6. Security and Compliance

- **Azure Security Center** integration for threat protection.
- **Transparent Data Encryption (TDE)** and **Advanced Threat Protection (ATP)** support.

## Use Cases for SQL Server on Azure VM

### 1. Lift-and-Shift Migration

- Organizations moving legacy SQL Server workloads from on-prem to Azure without modifying the application.

## 2. Custom SQL Server Configurations

- Businesses needing fine-grained control over database tuning, configurations, and OS-level settings.

## 3. High-Performance Applications

- Enterprise applications that require **low-latency, high-IOPS storage, and memory-intensive processing**.

## 4. Disaster Recovery & Backup

- Running a **standby SQL Server VM** in Azure for quick failover during outages.
- Using **Azure Site Recovery (ASR)** to replicate on-prem databases for business continuity.

## 5. Dev/Test Environments

- Temporary SQL Server instances for software testing before deployment.
- Cost-efficient solution using **auto-shutdown and pay-as-you-go** pricing.

## 6. Hybrid Cloud Deployments

- Extending on-prem SQL Server workloads to Azure using **VPN or ExpressRoute**.
- Using **Azure Arc** to manage both on-prem and cloud databases centrally.

### When to Use SQL Server on Azure VM vs. Azure SQL Database?

Feature	SQL Server on Azure VM	Azure SQL Database
<b>Control</b>	Full control over OS, SQL Server settings	Limited (managed by Microsoft)
<b>Migration</b>	Best for lift-and-shift	Requires some rearchitecting
<b>Performance</b>	High-performance workloads supported	Optimized for managed workloads
<b>Scalability</b>	Scale VM size, manual configuration	Automatic scaling
<b>Maintenance</b>	User-managed backups, patching	Fully managed by Azure
<b>Cost</b>	Pay for VM & SQL Server license	Pay per database, no VM costs

If you need **full SQL Server control and on-prem compatibility**, go with **SQL Server on Azure VM**.

If you prefer **a managed service with minimal maintenance**, use **Azure SQL Database**.

## Conclusion

SQL Server on an Azure VM is a powerful choice for businesses needing a **lift-and-shift migration, full SQL Server control, and high performance** in the cloud. It offers the flexibility of **custom configurations, hybrid deployments, and enterprise-grade security** while leveraging Azure's scalability and reliability. However, it requires **manual maintenance** compared to fully managed alternatives like Azure SQL Database.

**In this lab, we create an Azure Virtual Machine (VM) with SQL Server 2022 pre-installed. First, search for Virtual Machine in the Azure Marketplace, select a resource group, name the VM, choose a region, and set availability options. Select the SQL Server 2022 Windows image, configure VM size, set up login credentials, enable SQL authentication, and create the VM. Once launched, connect using Azure Data Studio or SSMS via the public IP. This setup provides a full-fledged SQL Server with replication and high availability features. After testing queries, delete resources to optimize costs.**

### End Goal:

**To set up and connect to a fully functional SQL Server on an Azure VM, providing complete control over configurations, availability, and management.**

## To begin with the Lab:

1. In this lab, we will create a virtual machine with SQL Server installed on it by the time of its creation.
2. So, search for Virtual Machine from the marketplace and move to the creation page. Choose your resource group and give a name to your VM then choose your region, for availability options choose no infrastructure required.

**Basics**   Disks   Networking   Management   Monitoring   Advanced   Tags   Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ MSDN Platforms Subscription ▼

Resource group \* ⓘ NewRG ▼

[Create new](#)

### Instance details

Virtual machine name \* ⓘ SqlVM ✓

Region \* ⓘ (Europe) North Europe ▼

Availability options ⓘ No infrastructure redundancy required ▼

Security type ⓘ Trusted launch virtual machines ▼

[Configure security features](#)

- Now for the image click on the sell all images options then search for SQL Server and choose free SQL Server 2022 windows image. For size choose the same shown in snapshot.

Image \* ⓘ Free SQL Server License: SQL Server 2022 Developer on Windows Server 2019 ▼

[See all images](#) | [Configure VM generation](#)

VM architecture ⓘ

☐ Arm64

☒ x64

**i** Arm64 is not supported with the selected image.

Run with Azure Spot discount ⓘ ☐

Size \* ⓘ Standard\_DS1\_v2 - 1 vcpu, 3.5 GiB memory (₹4,008.32/month) ▼

[See all sizes](#)

Enable Hibernation ⓘ ☐

**i** Hibernate is not supported by the image and size that you have selected. Choose an image and size that is compatible with Hibernation to enable this feature. [Learn more](#)

- Then give a username and password to your VM and move to SQL Server setting option.

### Administrator account

Username *	<input type="text" value="sqladmin"/>	✓
Password *	<input type="password" value="....."/>	✓
Confirm password *	<input type="password" value="....."/>	✓

### Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.



Public inbound ports *	<input type="radio"/> None <input checked="" type="radio"/> Allow selected ports
Select inbound ports *	<input type="text" value="RDP (3389)"/>

5. On the SQL Server settings you have to choose public for the SQL connectivity and enable the SQL authentication. It will pick up the username and password itself. This is the same username and password as the VM login.

Basics	Disks	Networking	Management	Monitoring	Advanced	<b>SQL Server settings</b>	Tags	Review + create
<b>Security &amp; Networking</b>								
SQL connectivity *		<input type="text" value="Public (Internet)"/>						
Port *		<input type="text" value="1433"/>						
<b>SQL Authentication</b>								
SQL Authentication ⓘ		<input type="button" value="Disable"/> <input checked="" type="button" value="Enable"/>						
Login name *		<input type="text" value="sqladmin"/>						
Password *		<input type="password" value="....."/>						
Azure Key Vault integration ⓘ		<input checked="" type="button" value="Disable"/> <input type="button" value="Enable"/>						

6. Then move to review and create page to create your virtual machine. It might take some time to launch the VM.

## ✓ Your deployment is complete

	Deployment name: CreateVm-microsoftsqlserver.sql2022-ws2022-s...	Start time: 1/3/2025, 12:32:47 pm
	Subscription: <a href="#">MSDN Platforms Subscription</a>	Correlation ID: 8fdb20f1-9d09-4fe5-9083-c5ccb513f7e1 
	Resource group: <a href="#">NewRG</a>	

### Deployment details

### Next steps

- [Setup auto-shutdown](#) Recommended
- [Monitor VM health, performance and network dependencies](#) Recommended
- [Run a script inside the virtual machine](#) Recommended

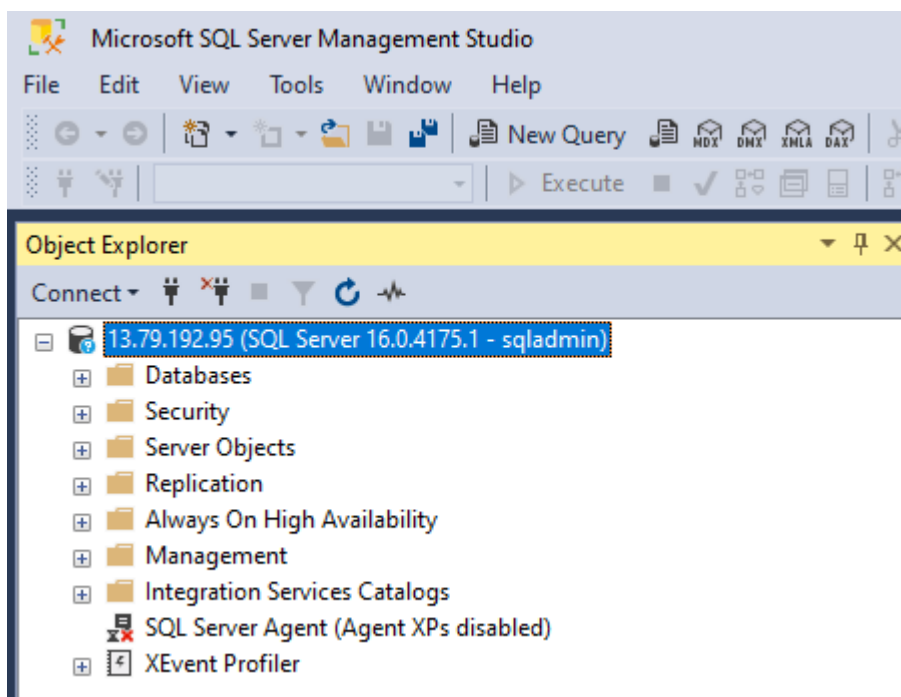
[Go to resource](#)[Create another VM](#)

7. Once the VM is launched copy its public IP address and open Azure Data Studio or SQL Server Management Studio based on your preference.
8. Then enter in the Server write the Pubic ID address of your VM and in the authentication type choose SQL Login. Enter the username and password click on Connect.

### Connection Details

Connection type	Microsoft SQL Server
Input type	<input checked="" type="radio"/> Parameters <input type="radio"/> Connection String
Server *	13.79.192.95
Authentication type	SQL Login
User name *	sqladmin
Password	.....

9. Once your SQL Server is connected you will see these objects in the explorer.
10. Now, one thing that you will note is that since we are using Microsoft SQL Server as an installation and not the platform as a service, you will see options such as Replication, Always on High Availability Management, and Integration Services. So, all of this is coming because this is a full-fledged version of Microsoft SQL Server.
11. You can use this SQL Server and fire up some queries.



12. Once you are done then you can delete your resources.

