

SQL Server licensing can be complex, and it varies based on several factors, such as the version of SQL Server, the deployment environment (on-premises or cloud), and the usage scenarios (production vs. non-production).

Here's a detailed breakdown of SQL Server licensing:

1. Licensing Models

SQL Server primarily offers 2 licensing models:

a. Per Core Licensing

- **Definition:** This model is based on the number of cores in the server (physical or virtual).
- **Applies to:** SQL Server Enterprise Edition and SQL Server Standard Edition (for larger-scale implementations).
 - **How it works:**
 - You need to license **all the physical cores** on the server.
 - **Core-based licenses** are sold in **packs of two**, so you'll need to buy licenses for every two cores.
 - A **minimum of 4 cores** must be licensed for each physical processor.
 - **When to choose:** Ideal for highly virtualized or cloud-based environments, or when you need the flexibility to scale across multiple cores and virtual machines (VMs).

b. Server + CAL (Client Access License) Licensing

- **Definition:** This model requires purchasing a **server license** and a **Client Access License (CAL)** for each user or device accessing the server.
- **Applies to:** SQL Server Standard Edition (on-premises deployment in smaller environments).
 - **How it works:**
 - You buy a **license for the server** and a **CAL for each user/device** that connects to the server.
 - CALs come in two types:
 1. **User CAL:** Licenses a specific user, allowing them to access the server from any device.
 2. **Device CAL:** Licenses a specific device, allowing any user to access the server from that device.
 - **When to choose:** If you have a limited number of users or devices accessing the server, this model can be more cost-effective.

2. SQL Server Editions and Their Features

There are several editions of SQL Server, each designed for different workloads and usage scenarios.

Key editions include:

a. SQL Server Enterprise Edition

- **Targeted at:** Large-scale enterprises and mission-critical applications.
- **Licensing Model:** Only available through the **Per Core licensing**.
- **Key Features:**
 - Unlimited virtualization (with Software Assurance)
 - Advanced analytics (R, Python)
 - High availability (Always On Availability Groups)
 - Business Intelligence (BI) capabilities (Advanced data warehousing and reporting)
 - Advanced security features (Always Encrypted, Row-Level Security)

b. SQL Server Standard Edition

- **Targeted at:** Mid-sized businesses or departments within large organizations.
- **Licensing Models:** Available via both **Per Core** and **Server + CAL**.
- **Key Features:**
 - Basic database management
 - Business intelligence
 - Reporting services
 - Some high availability features (limited Always On failover clusters)

c. SQL Server Web Edition

- **Targeted at:** Web hosting providers and web-based applications.
- **Licensing Model:** Available through **Service Provider Licensing Agreement (SPLA)** only.
- **Key Features:**
 - Scaled-down version of SQL Server for web workloads.
 - Lower cost but limited in terms of scalability and advanced features.

d. SQL Server Express Edition

- **Targeted at:** Small applications and lightweight database needs (free version).
- **Licensing Model:** Free, no licensing costs.
- **Key Features:**
 - Limited to 1GB of memory and 10GB per database.
 - Lacks advanced features like high availability, analytics, etc.

3. Virtualization and Cloud Deployments

a. Licensing for Virtual Machines (VMs)

If you are deploying SQL Server in a virtualized environment, the licensing rules change slightly.

- **Per Core Licensing:**
 - You need to license the **virtual cores (vCores)** allocated to the VM.
 - A minimum of **4 virtual cores per VM** must be licensed, even if fewer are assigned.

b. Licensing for Containers

For containers (SQL Server deployed in a containerized environment), the rules are similar to VMs:

- You license the **cores assigned to the container**.
- A minimum of **4 virtual cores per container** must be licensed.

c. Azure SQL Database and Azure SQL Managed Instance

- For SQL Server in Microsoft Azure (cloud platform), Microsoft offers **Azure SQL Database** and **Azure SQL Managed Instance**. These are fully managed database services, where licensing is typically included in the service pricing.
 - **Azure Hybrid Benefit:** If you have existing SQL Server licenses with Software Assurance, you can use these in Azure to reduce the cost of running SQL databases in the cloud.

4. Software Assurance (SA)

Software Assurance is an optional program that adds value to your SQL Server license by offering benefits such as:

- **License Mobility:** Allows you to move licenses between on-premises and cloud environments.
- **Unlimited Virtualization:** For SQL Server Enterprise Edition, SA allows you to run unlimited SQL Server instances on a licensed server.
- **Failover Rights:** Provides rights to run passive failover instances of SQL Server in high-availability scenarios without additional licenses.
- **Version Upgrades:** With SA, you get rights to upgrade to newer versions of SQL Server as they are released.

5. SQL Server Licensing in Cloud Environments

When running SQL Server in the cloud (e.g., on Azure, AWS, or Google Cloud):

- **License Included:** You pay for SQL Server licenses bundled with the cloud infrastructure services.
- **Bring Your Own License (BYOL):** You can bring existing licenses to cloud environments if you have **Software Assurance** or through the **Azure Hybrid Benefit**.

6. Key Licensing Considerations

- **Multiplexing:** SQL Server licensing requires a CAL for each user or device that indirectly accesses the server through a multiplexing system (e.g., web applications). You cannot reduce licensing needs by using middleware or proxy services.
- **Failover Servers:** You don't need additional licenses for passive failover servers as long as they are purely for backup and disaster recovery purposes (with Software Assurance).
- **Upgrading SQL Server:** Licenses are version-specific. If you are upgrading from one version of SQL Server to another, you either need to purchase new licenses or have Software Assurance.

7. SQL Server Developer Edition

- **Cost:** Free, but only for development and testing purposes.
- **Features:** Same as SQL Server Enterprise Edition, with all premium features available.
- **Use Case:** For non-production environments like development, testing, and demonstration.

8. Licensing SQL Server for High Availability

- **Active/Passive Failover:** The passive node in a failover cluster doesn't require a separate license if the server is truly passive and used only for failover.
- **Always On Availability Groups:** In active/active configurations where multiple servers process workloads, each server must be fully licensed.

Summary:

1. Licensing SQL Server can vary widely depending on your specific environment and usage needs.
2. The **Per Core** model is better for larger or cloud-deployed environments.
3. **Server + CAL** model can be more cost-effective for smaller on-premises setups with fewer users.
4. **Software Assurance** provides flexibility and added value, especially when dealing with virtualization, failover, or cloud migration.

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<https://www.microsoft.com/en-us/sql-server/sql-server-2019-pricing>

SQL Server 2019 pricing

Editions	Open no level price (US\$)	Licensing model	Channel availability
Enterprise	\$13,748 ^[1]	2 core pack	Volume licensing, hosting
Standard - per core	\$3,586 ^[1]	2 core pack	Volume licensing, hosting
Standard - server	\$899 ^[1]	Server ^[2]	Volume licensing, hosting
Standard - CAL	\$209	CAL	Volume licensing, hosting
Developer	Free	Per user	Free download
Web	See your hosting partner for pricing	Not applicable	Hosting only
Express	Free	Not applicable	Free download

SQL Server 2022 pricing¹

Editions	Open no-level price (US dollar)	Licensing model	Channel availability
Enterprise	\$15,123 ^[2]	2 core pack	Volume licensing, hosting
Standard - per core	\$3,945 ^[2]	2 core pack	Volume licensing, hosting
Standard - server	\$989 ^[2]	Server ^[3]	Volume licensing, hosting
Standard - CAL	\$230	CAL	Volume licensing, hosting
Developer	Free	Per user	Free download
Web	See your hosting partner for pricing	Not applicable	Hosting only
Express	Free	Not applicable	Free download