Database Design & Applications

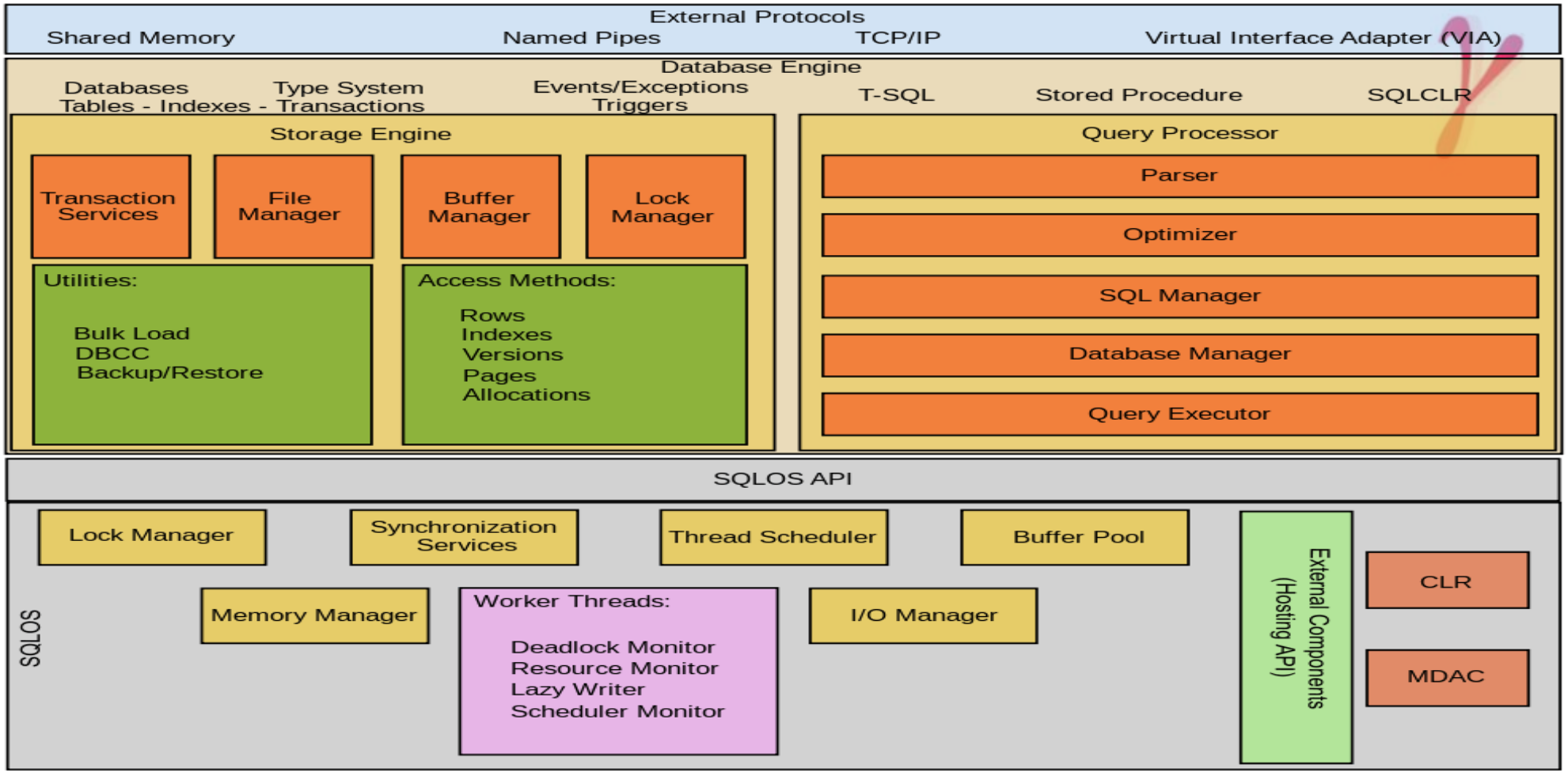
The Database Language - SQL

Introduction to SQLServer

Objectives

- At the end of this module, you will be able to understand:
  - SQLServer Architecture
  - SQL Server Services and Tools
  - Different Editions of SQL Server 2019
  - Connecting to SQL Server
  - Introduction to SQL Language

SQLServer Architecture



SQLServer Architecture

- SQL Server consists of two main components:
  - **Database Engine**
  - **SQLOS**

- **Database Engine:** The Database Engine consists two main components:
  - **Query Processor**
    - The Query Processor contains the components that determine the best way to execute a query
  - **Storage Engine**
    - The Query Processor requests data from the storage engine based on the input query and processed the results.
- **SQLOS:**
  - SQLOS provides many operating system services such as:
    - Memory management
    - I/O management
    - Exception handling
    - Synchronization services.

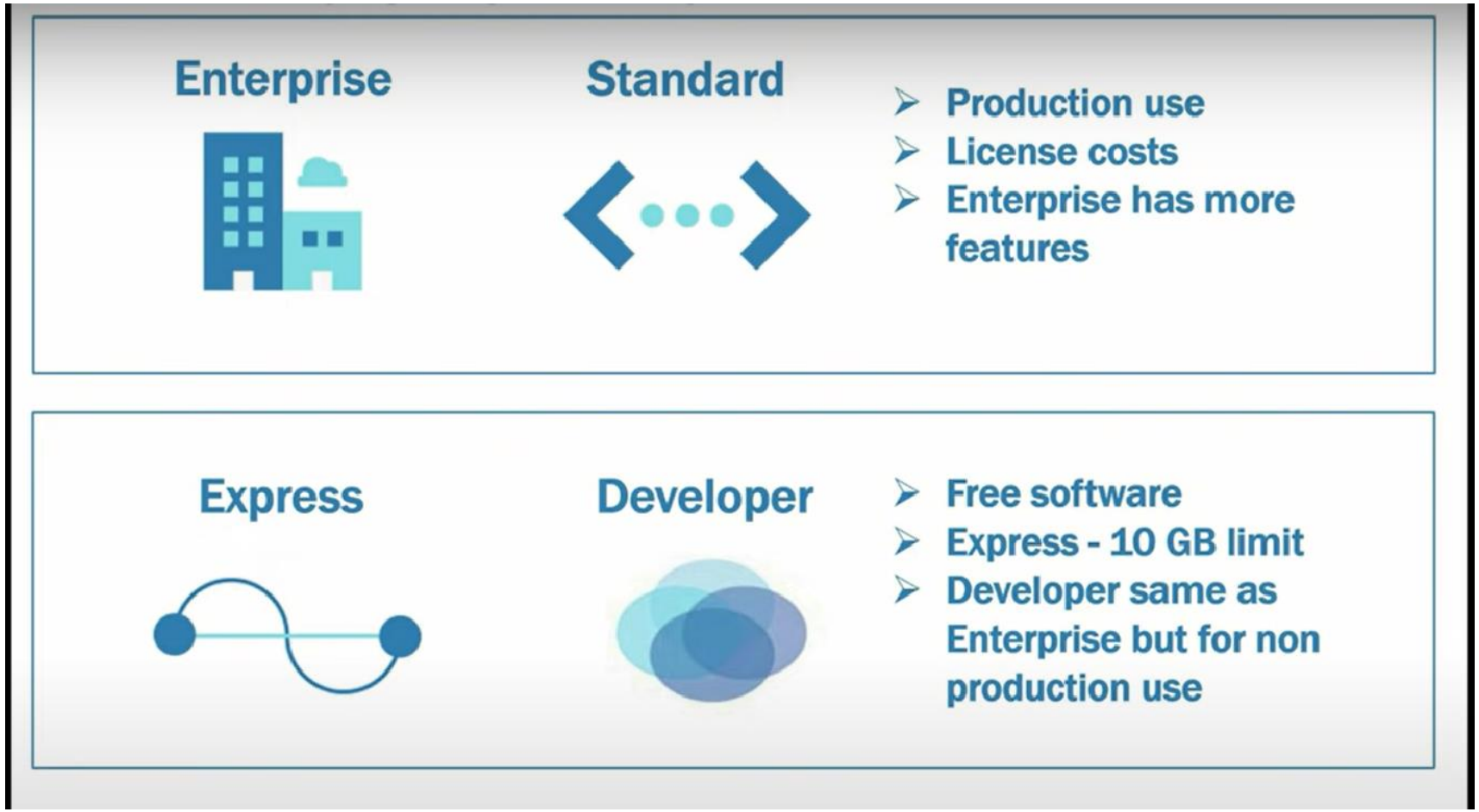
SQLServer Architecture

- **Query Processor**
  - The Query Processor contains the components that determine the best way to execute a query
  - Some tasks of query processor include:
    - querying processing
    - memory management
    - thread and task management
    - buffer management,
    - distributed query processing
  - The database objects such as stored procedures, views, and triggers are also created and executed by the Query Processors Engine.
- **Storage Engine**
  - The Query Processor requests data from the storage engine based on the input query and processed the results.
  - Storage engine that manages database files, pages, indexes, etc.

SQL Server Services and Tools

- **Using SQL Server Microsoft provides two types services:**
  - Data Management : data management, SQL Server includes
    - SQL Server Integration Services (SSIS)
    - SQL Server Data Quality Services,
    - SQL Server Master Data Services.
  - To develop databases, SQL Server provides SQL Server Data tools; and to manage, deploy, and monitor databases SQL Server has SQL Server Management Studio (SSMS).
  - Business Intelligence (BI) tools and services
    - For data analysis, SQL Server offers SQL Server Analysis Services (SSAS). SQL Server Reporting Services (SSRS) provides reports and visualization of data.
    - The Machine Learning Services technology appeared first in SQL Server 2016 which was renamed from the R Services.

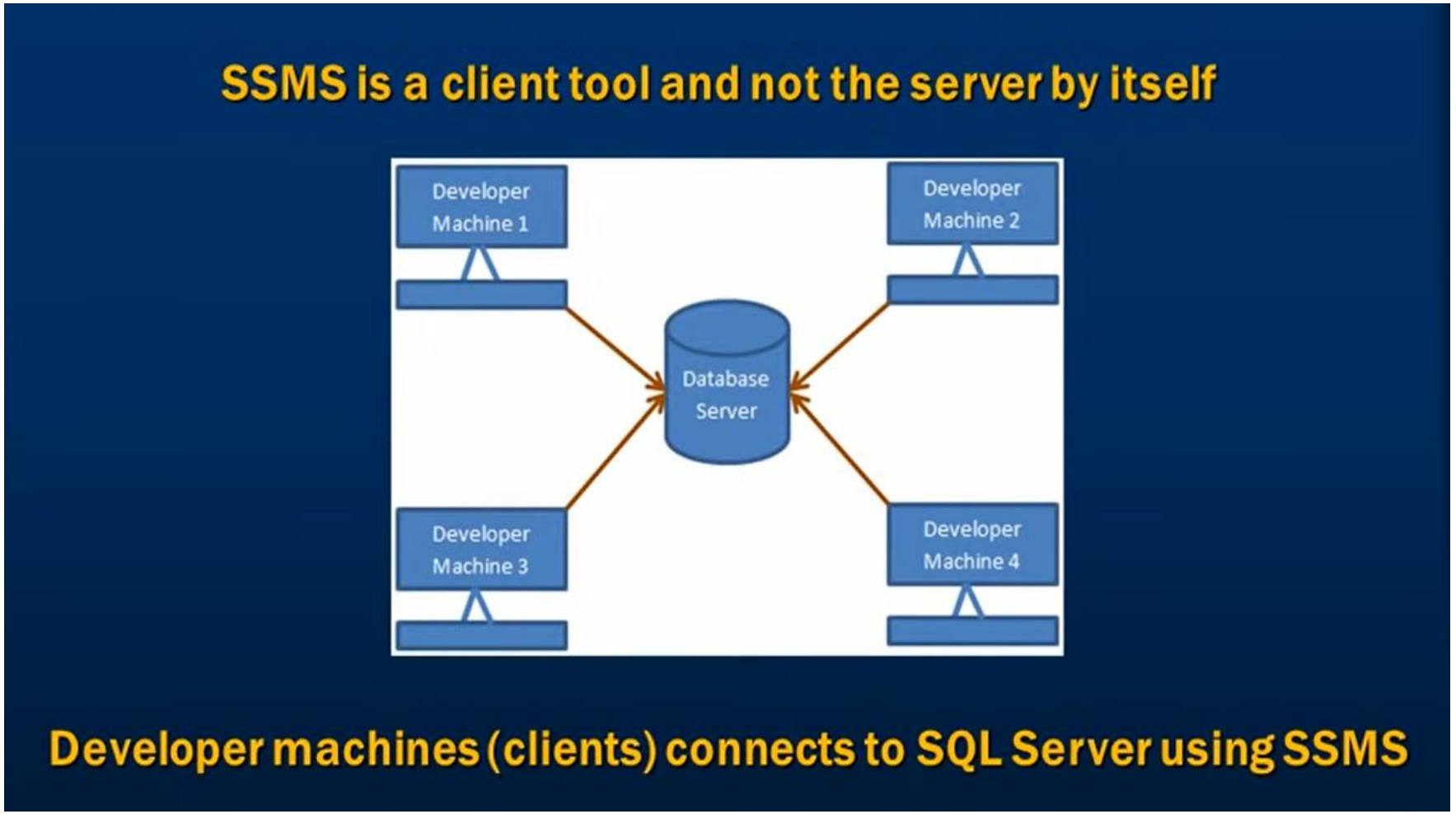
Different Editions of SQL Server 2019



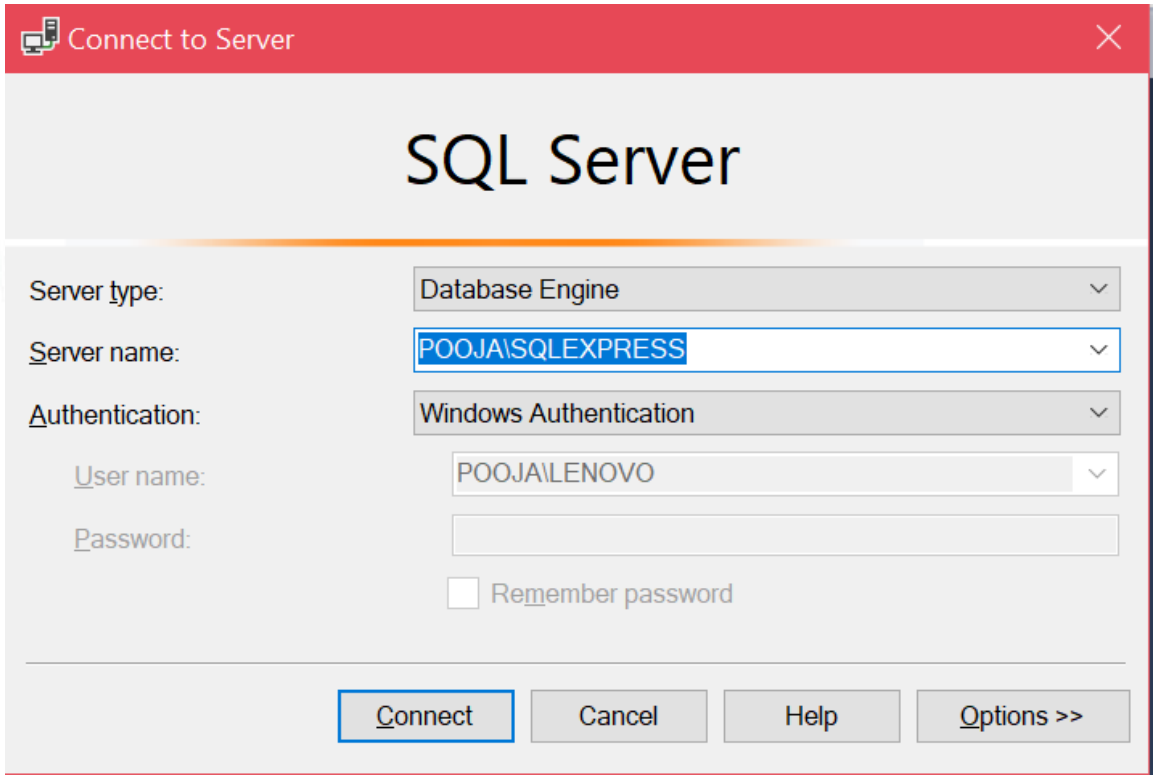
Different Editions of SQL Server 2019

- SQL Server has four primary editions that have different bundled services and tools. Two editions are available free of charge:
  - SQL Server Developer edition for use in database development and testing.
  - SQL Server Express Edition for small databases with the size of up to 10 GB of disk storage capacity.
- For larger and more critical applications, SQL Server offers the Enterprise edition that includes all SQL Server's features.
- SQL Server Standard Edition has partial feature sets of the Enterprise Edition and limits on the Server regarding the numbers of processor core and memory that can be configured.

SQLServer Management Studio (SSMS)



Connecting to SQL Server



Server Type = Database Engine

Server Name = (local) or . or 127.0.0.1

Authentication = Windows or SQL Server

If SQL Server Authentication
- Login
- Password

RDBMS Properties

- **A relational database:**
  - Can be accessed and modified by executing structured query language (SQL) statements
  - Contains a collection of tables with no physical pointers
  - Uses a set of operators

Structured Query Language (SQL)

- **Structured query language (SQL) is:**
  - The ANSI standard language for operating relational databases
  - Efficient, easy to learn, and use
  - Functionally complete (With SQL, you can define, retrieve, and manipulate data in the tables.)

SQL Statements

SELECT	Data retrieval
INSERT UPDATE DELETE MERGE	Data manipulation language (DML)
CREATE ALTER DROP RENAME TRUNCATE	Data definition language (DDL)
COMMIT ROLLBACK SAVEPOINT	Transaction control
GRANT REVOKE	Data control language (DCL)

Creating Database

- **A SQL Server database can be created, altered and dropped**
    1. Graphically using SQL Server Management Studio (SSMS)
    2. Using Query
- **To create a database using query**

```
Create database DatabaseName
```

- **When you create a database following two files gets generated**
    - **.MDF File – Data File (Contains actual data)**
    - **.LDF File – Transaction Log File (Used to recover database)**

Altering /Drop Database

Altering database :

- Alter a database using query

```
Alter database databaseName Modify Name= NewDatabaseName
```

- Alternatively you can use system stored procedure

```
Execute sp_renamedb 'OldDatabaseName' , 'NewDatabaseName'
```

Delete or Drop Database

- To drop a database using query

```
Drop  database DatabaseName
```

- Dropping a database, deletes the LDF and MDF files.
- You cannot drop a database that is currently in use.

THANK YOU!