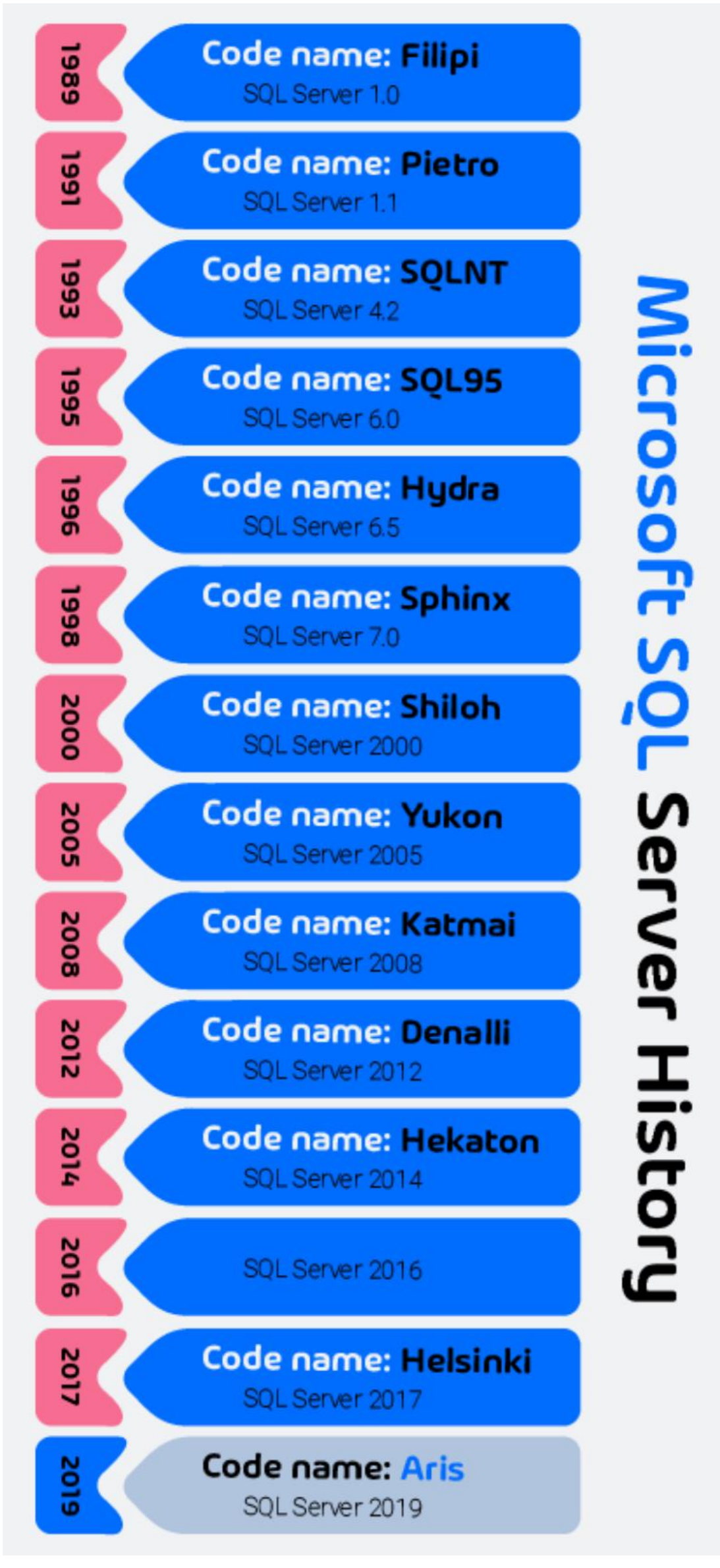
MS SQL Server History

- Microsoft SQL Server is a relational database management system (RDBMS) with a long history and a whole lot of updates introduced over the years. The current version is 16.0 – it's really the 18th version.
- The initial release of MS SQL took place in 1989, so the process of evolution of MS SQL Server has taken 34 years. SQL Server 1.0 was launched in 1989. When you work with MS SQL Server, you communicate with the database using T-SQL (transactional SQL).
- **1970** -- Dr. Edgar F. "Ted" Codd of IBM is known as the father of relational databases. He described a relational model for databases. **(Codd's 12 rules). 1974** -- Structured Query Language appeared.
- **1978** -- IBM worked to develop Codd's ideas and released a product named System/R.
- **1986** -- IBM developed the first prototype of relational database and standardized by ANSI. The first relational database was released by Relational Software and its later becoming Oracle.


Microsoft SQL Server History
1989
Code name: Filipi
SQL Server 1.0
1991
Code name: Pietro
SQL Server 1.1
1993
Code name: SQLNT
SQL Server 4.2
1995
Code name: SQL95
SQL Server 6.0
1996
Code name: Hydra
SQL Server 6.5
1998
Code name: Sphinx
SQL Server 7.0
2000
Code name: Shiloh
SQL Server 2000
2005
Code name: Yukon
SQL Server 2005
2008
Code name: Katmai
SQL Server 2008
2012
Code name: Denalli
SQL Server 2012
2014
Code name: Hekaton
SQL Server 2014
2016
SQL Server 2016
2017
Code name: Helsinki
SQL Server 2017
2019
Code name: Aris
SQL Server 2019

What is SQL

- SQL is Structured Query Language, which is a computer language for storing, manipulating and retrieving data stored in relational database.
- SQL is the standard language for Relation Database System.
- All relational database management systems like MySQL, MS Access, Oracle, Sybase, Informix, Postgress and SQL Server.
- MS SQL Server using T-SQL, Oracle using PL/SQL.
- MS Access version of SQL is called JET SQL (native format) etc.

Why SQL.

- Allows users to access data in relational database management systems.
- Allows users to describe the data. Allows users to define the data in database and manipulate that data.
- Allows to embed within other languages using SQL modules, libraries & pre-compilers.
- Allows users to create and drop databases and tables.
- Allows users to create view, stored procedure, functions in a database.
- Allows users to set permissions on tables, procedures, and views

What is DBMS?

A DBMS is a software program that is used to store, handle and manage data values. The concept of DBMS was introduced in the year the 1960s to manage any real-world data. It uses commands and syntax to load, retrieve or modify existing data from the system.

DBMS system aims to facilitate an overview of the databases and provides a variety of administrative operations such as tuning, performance monitoring, and backup recovery. DBMS allow users to define and load data, update data, retrieve data and it maintains data integrity.

What is RDBMS?

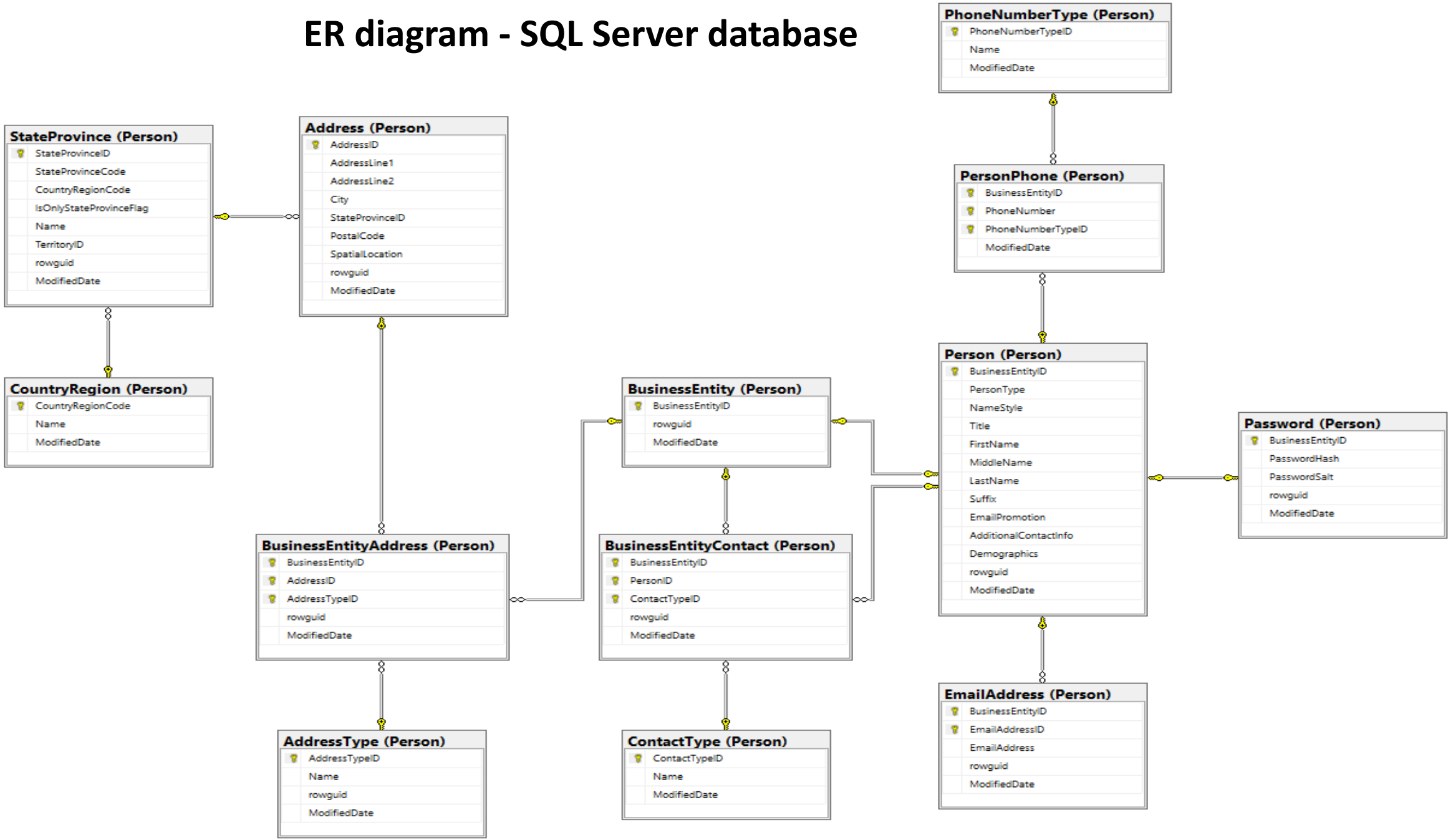
Relational Database Management System is a DBMS specifically configured for a relational database. RDBMS is known as advanced versions of DBMS or subsets of DBMS. The relational databases use a structured table format i.e., row-wise and column-wise to store data. This makes the user easy to access values inside the table structured database. RDBMS is “relational”, so the data values and entries in each table in the database are associated with each other. The tables might as well be interlinked to each other in the database systems and its relational structures help the user to run command queries over many tables at a time.

What is meant by NoSQL?

NoSQL is the non-relational DBMS that doesn’t need a fixed schema, avoids joints and is flexible to scale. The NoSQL is the next-generation database system.

NoSQL database system is used to store distributed data with humongous or same kind of data. Mainly this technology is used in the operation of Big data and real-time web applications. Companies like Facebook, Twitter, Instagram, Google collect terabytes of user’s data every passing day.

ER diagram - SQL Server database



SQL Server Fundamentals

What Is Microsoft SQL Server?

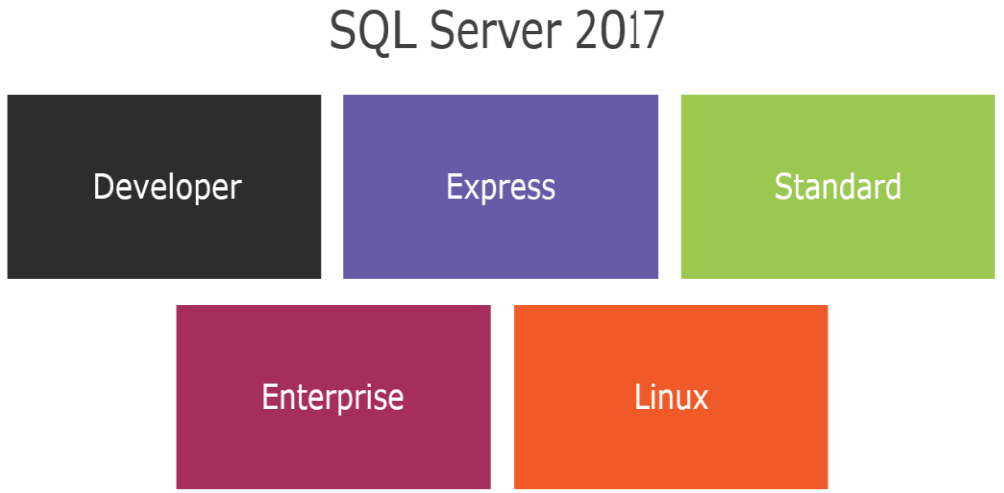
SQL Server is Microsoft's relational database management system. The primary function ofthe software system is storing and retrieving data requested by other applications.

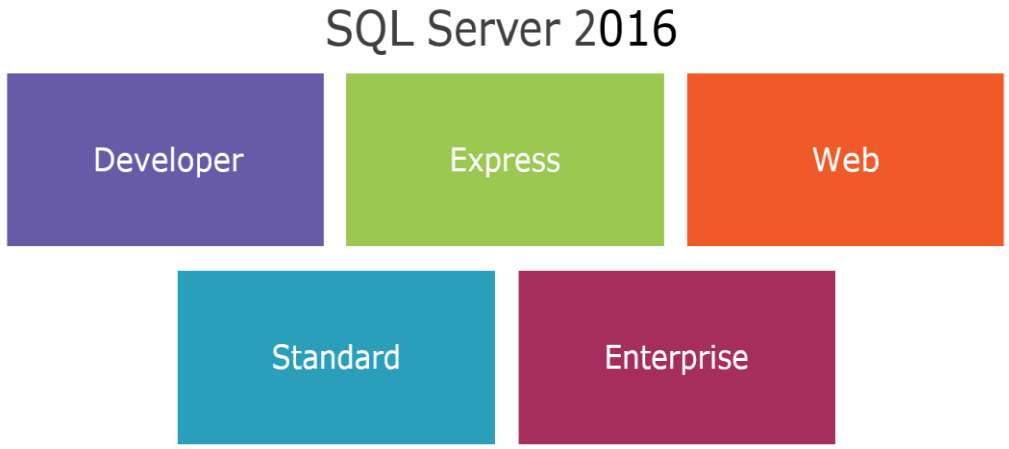
What Is a Database?

A database is an organized collection of data, typically stored and accessed electronically from a computer system or electronic device.

Types of Database.

- Hierarchical (Directory structure)
- Flat file (CSV, Excel, delimited)
- Relational (SQL Server, Oracle, MySQL, and more)





What Are Data Types?

An attribute that specifies the type of data an object can hold, such as date and time, binary strings, monetary data, integer data.

Data Types

- Unicode character strings
- Exact numerics
- Approximate numerics
- Binary strings

Data types

Data Type	Description
BINARY	Hexadecimal data
SMALLINT	-2^15 (-32,768) to 2^15-1 (32,767)
INTEGER	-2^31 (-2,147,483,648) to 2^31-1 (2,147,483,647)
BIGINT	-2^63 (-9,223,372,036,854,775,808) to 2^63-1 (9,223,372,036,854,775,807)
CHARACTER	Can hold N character values – set to N statically
CHARACTER VARYING	Can hold N character values – set to N dynamically – storage can be less than N
Varchar	Variable-length string data nvarchar[(n)] defines the string length in byte-pairs and n = 1 to 4,000 (n x 2 bytes)
BOOLEAN	TRUE or FALSE
DATE	YEAR, MONTH, and DAY in the format YYYY-MM-DD
TIME	HOUR, MINUTE, and SECOND in the format HH:MM:SS[.sF] where F is the fractional part of the
TIMESTAMP	Both DATE and TIME

SQL Commands

The standard SQL commands to interact with relational databases are CREATE, SELECT, INSERT, UPDATE, DELETE and DROP. These commands can be classified into groups based on their nature:

DDL - Data Definition Language:

DML - Data Manipulation Language:

DCL - Data Control Language:

DDL - Data Definition Language:

Command	Description
CREATE	Creates a new table, a view of a table, or other object in database
ALTER	Modifies an existing database object, such as a table.
DROP	Deletes an entire table, a view of a table or other object in the database.

DML - Data Manipulation Language:

Command	Description
SELECT	Retrieves certain records from one or more tables
INSERT	Creates a record
UPDATE	Modifies records
DELETE	Deletes records

DCL - Data Control Language:

Command	Description
GRANT	Gives a privilege to user
REVOKE	Takes back privileges granted from user

TABLES

Tables

Contains all the data in the database in a row-and-column format

A table can have 1,024 columns, and 30,000 columns if using SPARSE

Assign properties to a table and columns and use compression

Data Definition Language (DDL)

DDL statements are used to build and modify the structure of your tables and other objects in the database. When you execute a DDL statement, it takes effect immediately.

Statement	Description
CREATE	Enables creating a item in SQL Server. For example, database, table, view, users, index, and more
ALTER	Enables modifying an existing object. For example, database, table, view, and more
DROP	Drops an existing object
Collations	Defines the collation of a database or table column, or a collation cast operation when applied to a character string expression
USE	Changes the database context to the specified database or database snapshot in SQL Server Does not apply to Azure SQL Database or Azure SQL Data Warehouse
TRUNCATE	Used to remove all rows from a table or specified partitions of a table without logging the individual row deletions

Data Manipulation Language (DML)

DML statements are used to work with the data in tables. When you are connected to most multi-user databases (whether in a client program or by a connection from a Web page script), you are in effect working with a private copy of your tables that can't be seen by anyone else until you are finished (or tell the system that you are finished).

Statement	Description
WRITETEXT	Permits minimally logged, interactive updating of an existing text, ntext, or image column by overwriting any existing data (does not work on views)
READTEXT	Reads text, ntext, or image values from a text, ntext, or image column by starting from a specified offset and reading a specified number of bytes
UPDATETEXT	Updates an existing text, ntext, or image field or a part of a text, ntext, or image column in place

Statement	Description
SELECT	Retrieves rows from database and enables selection of one or many rows or columns from one or many tables
INSERT	Adds one or more rows to a table or view
UPDATE	Changes existing data in a table or view
DELETE	Removes one or more rows from a table or view
MERGE	Performs insert, update, or deletes on a target table based on the results of a join with a source table
BULK INSERT	Imports a data file into a database table or view

Demo