

T-SQL - Data Types

SQL Server data type is an attribute that specifies types of data of any object. Each column, variable and expression has related data type in SQL Server. These data types can be used while creating tables. You can choose a particular data type for a table column based on your requirement.

SQL Server offers seven categories including other category of data types for use.

Exact Numeric Types

Type	From	To
bigint	-9,223,372,036,854,775,808	9,223,372,036,854,775,807
int	-2,147,483,648	2,147,483,647
smallint	-32,768	32,767
tinyint	0	255
bit	0	1
decimal	$-10^{38} + 1$	$10^{38} - 1$
numeric	$-10^{38} + 1$	$10^{38} - 1$
money	-922,337,203,685,477.5808	+922,337,203,685,477.5807
smallmoney	-214,748.3648	+214,748.3647

Numeric and decimal are Fixed precision and scale data types and are functionally equivalent.

Approximate Numeric Types

Type	From	To
Float	$-1.79E + 308$	$1.79E + 308$
Real	$-3.40E + 38$	$3.40E + 38$

Date and Time Types

Type	From	To
datetime (3.33 milliseconds accuracy)	Jan 1, 1753	Dec 31, 9999
smalldatetime (1 minute accuracy)	Jan 1, 1900	Jun 6, 2079
date (1 day accuracy. Introduced in SQL Server 2008)	Jan 1, 0001	Dec 31, 9999
datetimeoffset (100 nanoseconds accuracy. Introduced in SQL Server 2008)	Jan 1, 0001	Dec 31, 9999
datetime2 (100 nanoseconds accuracy. Introduced in SQL Server 2008)	Jan 1, 0001	Dec 31, 9999
time (100 nanoseconds accuracy. Introduced in SQL Server 2008)	00:00:00.0000000	23:59:59.9999999

Character Strings

Sr.No	Type & Description
1	char Fixed-length non-Unicode character data with a maximum length of 8,000 characters.
2	varchar Variable-length non-Unicode data with a maximum of 8,000 characters.
3	Varchar (max) Variable-length non-Unicode data with a maximum length of 231 characters (Introduced in SQL Server 2005).
4	text Variable-length non-Unicode data with a maximum length of 2,147,483,647 characters

Unicode Character Strings

Sr.No	Type & Description
1	nchar Fixed-length Unicode data with a maximum length of 4,000 characters.
2	nvarchar Variable-length Unicode data with a maximum length of 4,000 characters.
3	Nvarchar (max) Variable-length Unicode data with a maximum length of 2^{30} characters (Introduced in SQL Server 2005).
4	ntext Variable-length Unicode data with a maximum length of 1,073,741,823 characters.

Binary Strings

Sr.No	Type & Description
1	binary Fixed-length binary data with a maximum length of 8,000 bytes.
2	varbinary Variable-length binary data with a maximum length of 8,000 bytes.
3	varbinary(max) Variable-length binary data with a maximum length of 2^{31} bytes (Introduced in SQL Server 2005).
4	image Variable-length binary data with a maximum length of 2,147,483,647 bytes.

Other Data Types

- **sql_variant** – Stores values of various SQL Server-supported data types, except text, ntext, and timestamp.
- **timestamp** – Stores a database-wide unique number that gets updated every time a row gets updated.
- **uniqueidentifier** – Stores a globally unique identifier (GUID).
- **xml** – Stores XML data. You can store XML instances in a column or a variable (Introduced in SQL Server 2005).
- **cursor** – A reference to a cursor.
- **table** – Stores a result set for later processing.
- **hierarchyid** – A variable length, system data type used to represent position in a hierarchy (Introduced in SQL Server 2008).