## SQL Server Data Types

**SQL Server data types grouped by their categories:**

**1. Numeric Data Types**

1. bit: Integer that can take a value of 1, 0, or NULL.
2. tinyint: Integer data from 0 to 255.
3. smallint: Integer data from -32,768 to 32,767.
4. int: Integer data from -2,147,483,648 to 2,147,483,647.
5. bigint: Integer data from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807.
6. decimal(p,s) or numeric(p,s): Fixed precision and scale numbers.

p = precision (total number of digits), s = scale (number of digits to the right of the decimal point).

1. smallmoney: Monetary data from -214,748.3648 to 214,748.3647.
2. money: Monetary data from -922,337,203,685,477.5808 to 922,337,203,685,477.5807.
3. float(n): Floating point number with a binary precision of n (from 1 to 53).
4. real: Floating point number, equivalent to float(24).

**2. Date and Time Data Types**

1. date: Date values from January 1, 0001, to December 31, 9999.
2. time: Time values ranging from 00:00:00.0000000 to 23:59:59.9999999.
3. datetime: Date and time from January 1, 1753, to December 31, 9999, with an accuracy of 3.33 milliseconds.
4. smalldatetime: Date and time from January 1, 1900, to June 6, 2079, with an accuracy of 1 minute.
5. datetime2: Date and time from January 1, 0001, to December 31, 9999, with an accuracy of 100 nanoseconds.
6. datetimeoffset: Date and time including a time zone offset, ranging from January 1, 0001, to December 31, 9999.
7. timestamp (or rowversion): Automatically generated binary number unique within a database.

**3. Character Strings Data Types**

1. char(n): Fixed-length non-Unicode string, where n defines the length (1 to 8,000 characters).
2. varchar(n): Variable-length non-Unicode string, where n defines the maximum length (1 to 8,000 characters).
3. varchar(max): Variable-length non-Unicode string that can store up to 2^31-1 characters.
4. text: Variable-length non-Unicode data with a maximum length of 2^31-1 characters (deprecated).

**4. Unicode Strings Data Types**

1. nchar(n): Fixed-length Unicode string, where n defines the length (1 to 4,000 characters).
2. nvarchar(n): Variable-length Unicode string, where n defines the maximum length (1 to 4,000 characters).
3. nvarchar(max): Variable-length Unicode string that can store up to 2^31-1 characters.
4. ntext: Variable-length Unicode data with a maximum length of 2^31-1 characters (deprecated).

**5. Binary Data Types**

1. binary(n): Fixed-length binary data with a length of n bytes (1 to 8,000 bytes).
2. varbinary(n): Variable-length binary data with a maximum length of n bytes (1 to 8,000 bytes).
3. varbinary(max): Variable-length binary data with a maximum storage size of 2^31-1 bytes.
4. image: Variable-length binary data with a maximum length of 2^31-1 bytes (deprecated).

**6. Other Data Types**

1. uniqueidentifier: Stores globally unique identifiers (GUIDs).
2. xml: Stores XML data.
3. cursor: A reference to a cursor for database operations.
4. table: A special data type that stores a result set for later processing.
5. sql\_variant: Stores values of various SQL Server-supported data types.

These are the major SQL Server data types, categorized for better understanding. Some data types like text, ntext, and image are deprecated and should be avoided in favor of newer types like varchar(max) and varbinary(max).