2. Data Types

Data Type examples are included in the below table. Supported in SQL Server.

No.	Data Category	Data Type(s)	Example(s)	Used Data Type(s)
1	Integer	TINYINT/ SMALLINT/ INT/ BIGINT	DepartmentId EmployeeId CustomerId OrderID	TINYINT SMALLINT INT BIGINT
2	Text Data	VARCHAR()	Name Address PassportNumber	VARCHAR(100) VARCHAR(200) VARCHAR(20)
3	Unicode Text Data	NVARCHAR()	Name Address	NVARCHAR(100) NVARCHAR(200)
4	Decimal Data	DECIMAL	Salary	DECIMAL(12,4)
5	Money Data	SMALLMONEY/ MONEY	Salary TotalOrderCost	SMALLMONEY MONEY
8	Datetime	DATE/ DATETIME	CreatedDate OrderDate	DATETIME DATE
	Time	TIME	StartTime	TIME(7)
9	Image Data	VARBINARY	ProfilePhoto BackgroundPhoto	VARBINARY VARBINARY
10	Boolean Data	BIT	IsActive IsSuccess	BIT BIT

Table 1. SQL Data Types

Real Data Type Examples

Define Data Type:

```
DepartmentId TINYINT
EmployeeId SMALLINT
```

```
CustomerId INT
OrderID BIGINT
Name VARCHAR(100)
Address VARCHAR(200)
PassportNumber VARCHAR(20)
Name NVARCHAR(100)
Address NVARCHAR(200)
Salary DECIMAL(12,2)
Salary SMALLMONEY
TotalOrderCost MONEY
CreatedDate DATETIME
OrderDate DATE
StartTime TIME(7)
ProfilePhoto VARBINARY(MAX)
BackgroundPhoto VARBINARY(MAX)
IsActive BIT
IsSuccess BIT
```

Script 1. Define Data Types

Length of Data Types

Data Type	From	To
TINYINT	0	255
SMALLINT	-32,768	32,767
INT	-2,147,483,648	2,147,483,647
BIGINT	-9,223,372,036,854,775,808	9,223,372,036,854,775,807

Convert Data Types

We use CONVERT to convert one data type to another.

SQL Script:

```
SELECT CAST ('15:45:10' AS TIME);
SELECT CAST ('2020-03-30' AS DATE);

SELECT CONVERT(TIME, '15:45:10');
SELECT CONVERT(DATE, '2020-03-30');
```

Script 3. Convert Data Types

Outdated Data Types in SQL Server

In this article we are going to learn about how to avoid using older data types like TEXT, NTEXT, IMAGE and how to use similar latest data types like VARCHAR, NVARCHAR, AND VARBINARY in SQL Server.

Allocated Spaces for Above Data Types

Following chart shows space allocation and data capacity for the above data types

Type	Allocated Space	Data Capacity
TEXT	2^31-1 = 2,147,483,647 = 2GB	2^31-1 = 2,147,483,647 = 2GB characters
NTEXT	2^31-1 = 2,147,483,647 = 2GB	2^30-1 = 1,073,741,823 = 1GB characters
IMAGE	2^31-1 = 2,147,483,647 = 2GB	2^31-1 = 2,147,483,647 = 2GB bytes
VARCHAR	2^31-1 = 2,147,483,647 = 2GB	2^31-1 = 2,147,483,647 = 2GB characters
NVARCHAR	2^31-1 = 2,147,483,647 = 2GB	2^30-1 = 1,073,741,823 = 1GB characters
VARBINARY	2^31-1 = 2,147,483,647 = 2GB	2^31-1 = 2,147,483,647 = 2GB bytes

Table 1. Space Allocation

Introduction of Older Data Types

Older data types are described in the following table.

Data Type	Description
TEXT	TEXT is the older data type used in SQL Server for storing text data. It can store up to 2GB characters.

NTEXT	NTEXT is the older data type used in SQL Server for storing Unicode text data. It can store up to 1GB characters. Because Unicode characters take doubled size space.
IMAGE	The IMAGE data type is an older data type used to store variable-length binary data types like images. It can store up to 2GB.

Table 2. Older Data Types

Example 1. Creating a Table using Older Data Types.

The following example shows how the above table can be implemented using older data types. Older data types will not available in the latest SQL Server versions.

SQL Script:

```
CREATE TABLE Employees(
    Id INT NOT NULL,
    Name NTEXT (200) NOT NULL,
    MobilePhoneNo TEXT (15) NULL,
    Photo IMAGE NULL,
    PRIMARY KEY (Id)
);
```

Script 1. Creating a Table using the Older Data Types

Introduction of the Latest Data Types

The latest data types are described in the following table.

Data Type	Description
VARCHAR	VARCHAR is the latest data type used in SQL Server for storing text data. It can store up to 2GB characters. VARCHAR does not support older SQL Server versions. VARCHAR(n) can store 1~8000 characters. VARCHAR(max) can store up to 2GB characters. TEXT data types will be removed in the future. Most of the features are available with VARCHAR data type than a TEXT data type. So VARCHAR is the better data type for storing text data.
NVARCHAR	NVARCHAR is the latest data type used in SQL Server for storing Unicode text data. NVARCHAR does not support older SQL Server versions. It can store up to 2GB characters. VARCHAR(n) can store 1~4000 characters. VARCHAR(max) can store up to 1GB characters. NTEXT data types will be removed in the

	future. Most of the features are available with the NVARCHAR data type than the NTEXT data type. So NVARCHAR is the better data type for storing Unicode text data.
VARBINARY	VARBINARY is the latest data type used to store variable-length binary data types like images. VARBINARY does not support older SQL Server versions. It can store up to 2GB data. VARBINARY (n) can store 1~8000 bytes. VARBINARY(max) can store up to 2GB data. IMAGE data types will be removed in the future. Most of the features are available with VARBINARY data type than an IMAGE data type. So VARBINARY is the better data type for storing binary data.

Table 3. Latest Data Types

Example 2. Creating a Table using the Latest Data Types.

The following example shows how to create a sample table using the latest data types.

SQL Script:

```
CREATE TABLE Employees(
    Id INT NOT NULL,
    Name NVARCHAR (200) NOT NULL,
    MobilePhoneNo VARCHAR(15) NULL,
    Photo VARBINARY(MAX) NULL,
    PRIMARY KEY (Id)
);
```

Script 2. Creating a Table using the Latest Data Types