T-SQL, or **Transact-SQL**, is an extended and proprietary version of SQL (Structured Query Language) developed by Microsoft for use with its SQL Server. T-SQL enhances standard SQL with additional features that provide greater functionality for interacting with and managing data. It is specifically designed for **Microsoft SQL Server** and **Azure SQL Database**.

**Key Features of T-SQL:**

1. **Procedural Programming Constructs**:
   * Includes features like loops (WHILE), conditionals (IF...ELSE), and error handling (TRY...CATCH).
   * Supports local variables to store data and perform calculations.
2. **Functions**:
   * Built-in functions such as GETDATE() for retrieving the current date and time, and string manipulation functions like SUBSTRING() and LEN().
   * User-defined functions can also be created for specific needs.
3. **Stored Procedures**:
   * Allows the creation of reusable, precompiled SQL code blocks that can be executed multiple times.
4. **Triggers**:
   * Enables the automatic execution of specified T-SQL statements when certain events occur in the database, such as INSERT, UPDATE, or DELETE.
5. **Transactions and Error Handling**:
   * Supports transaction control (BEGIN TRANSACTION, COMMIT, ROLLBACK) for ensuring data integrity.
   * Includes error handling mechanisms using TRY...CATCH.
6. **Cursors**:
   * Allows row-by-row processing of query results, which can be useful for complex tasks that cannot be handled with standard SQL operations.
7. **Advanced Querying Capabilities**:
   * Provides extensions like TOP, ROW\_NUMBER(), OFFSET-FETCH, and PIVOT for complex query requirements.
   * Offers Common Table Expressions (CTEs) for improved readability and organization of queries.
8. **Integration with SQL Server**:
   * Tightly integrated with SQL Server, allowing access to database metadata, system objects, and advanced features like Full-Text Search.

**Example of T-SQL:**

-- Declare a variable

DECLARE @EmployeeCount INT;

-- Assign a value to the variable

SELECT @EmployeeCount = COUNT(\*)

FROM Employees

WHERE Department = 'IT';

-- Conditional logic

IF @EmployeeCount > 10

PRINT 'The IT department has more than 10 employees.'

ELSE

PRINT 'The IT department has 10 or fewer employees.';

**Comparison with Standard SQL:**

While T-SQL is built on the foundation of standard SQL, its extensions make it more powerful and suitable for enterprise-level applications. However, T-SQL scripts and procedures are typically not portable to non-Microsoft databases like MySQL or PostgreSQL, which may use their own extensions.

T-SQL is essential for database developers and administrators working with Microsoft SQL Server, as it provides the tools to efficiently manage, manipulate, and retrieve data.