

What is ADO.NET?

ADO.NET (ActiveX Data Objects for .NET) is a **data access technology** from the .NET Framework that allows you to connect to databases, execute commands, and manage data using .NET languages like C# or VB.NET.

It's part of the **System.Data** namespace and provides a bridge between your application and a data source (like SQL Server, Oracle, or even XML).

Core Components of ADO.NET

Component	Description
Connection	Establishes a connection to a specific data source.
Command	Executes a query or stored procedure against a database.
DataReader	Reads a forward-only stream of data from the database (fast & read-only).
DataAdapter	Acts as a bridge between a DataSet and the database for retrieving and saving data.
DataSet	In-memory representation of data (can contain multiple tables).
DataTable	Represents a single table in a DataSet.
Transaction	Supports executing multiple commands as part of a transaction (commit or rollback).

ADO.NET Architecture

There are two primary data access models:

- 1. Connected Model**
 - Uses `Connection` and `DataReader`.
 - Ideal for fast, forward-only data access.
 - Keeps the connection open during data read.
- 2. Disconnected Model**
 - Uses `DataSet` and `DataAdapter`.
 - Connection is only open while fetching or saving data.
 - Good for scalability and working offline.

When to Use ADO.NET?

- When you want low-level control over database operations.
- When you don't want the overhead of an ORM like Entity Framework.
- When performance and fine-tuned SQL control matter.

ADO.NET Advantages

- Fine-grained control over queries and performance.
- Good for high-performance and batch processing applications.
- Works with multiple types of databases (SQL Server, Oracle, etc.).