ADO.NET

UNIT -4

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Introduction to Ado.Net

- Ado stands for Active Database Object
- Before Ado.net we use Ado to access data from database. Basically Ado has automatic driver detection technique and its has only one drawback that it only provide a connected environment so efficiency system may decrease.
- ADO.NET is a new database technology used by .Net platform (introduced in 2o02).
- In fact it is a set of classes used to communicate between an application front end and a database.
- It support both connected & disconnect mode of data access.

Difference between ADO and ADO.NET

ADO	ADO.NET
It is a COM based library.	It is a CLR based library.
Classic ADO require active connection With the data store.	ADO.NET architecture works while the data store is disconnected.
Locking feature is available.	Locking feature is not available.
Data is stored in Binary format.	Data is stored in XML format.
XML integration is not possible.	XML integration is possible.
It uses the object named Recordset to reference data from the data store.	It uses the Dataset object for data access and representation.
Firewall might prevent execution of classic ADO.	ADO.NET has firewall proof and its execution will never be interrupted.
Classic ADO architecture includes client side cursor and server side cursor.	ADO.NET architecture doesn't include such cursor.

Namespaces used in ADO.Net

- **System.Data**

  It contains the common classes for connecting, fetching data from database. Classes are like as Data Table , Dataset , Dataview etc.

- **System.Data.SqlClient**

  It contain classes for connecting fetching data from Sql server database. Classes are like as SqlDataAdapter , SqlDataReader etc.

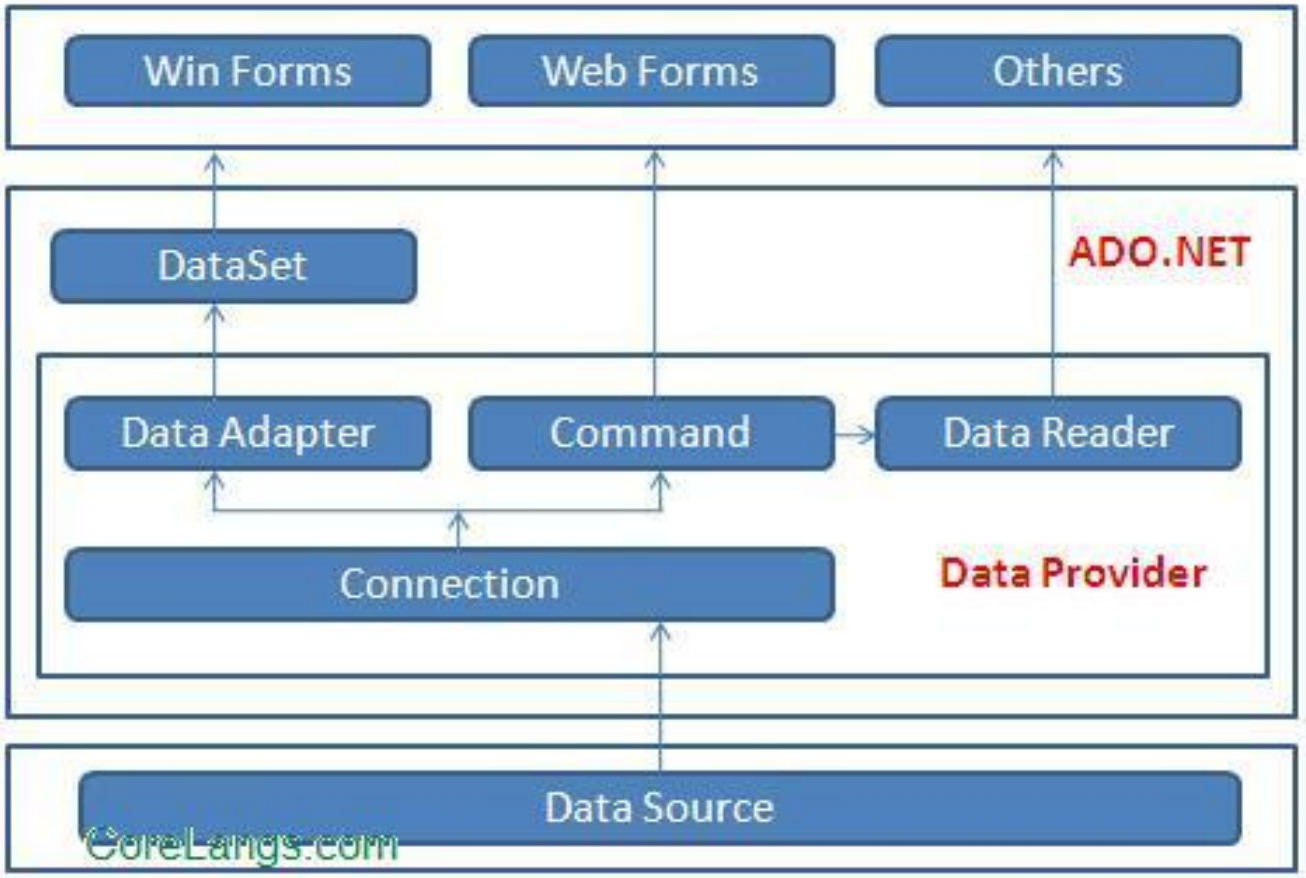
- **System.Data.OracleClient**

  It contain classes for connecting fetching data from Oracle database. Classes are like as OracleDataAdapter , OracleDataReader etc.

- **System.Data.OleDb**

  It contain classes for connecting , fetching data from any database (like Ms Access , db2 , Oracle , Sqlserver , mySql). Classes are like as OleDbDataAdapter , OleDbDataReader , etc.

ADO.NET Architecture



Component of ADO.NET

- The two key components of ADO.NET are
  - **Data Providers**
  - **DataSet**

DataSet

- Basically it is a small Data structure that may contain multiple datatables from multiple sources.
- The information in dataset is created inform of XML and is stored with .xsd extention .
- It support disconnected mode of data access . It has both Scrolling mode means forward and backward scrolling mode(fetching of data).
- DataSet can have multiple Database is able to read only single Database.

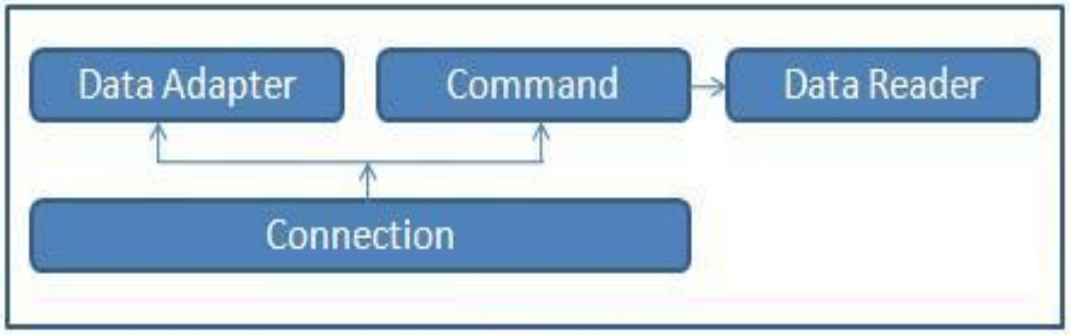
Creating and using a DataSet

- The typing steps in creating and using a Dataset are:
  - **(i) Create a DataSet object.**
  - **(ii) Connect to a database.**
  - **(iii) Fill the DataSet with one or more tables or views.**
  - **(iv) Disconnect from the database.**
  - **(v) Use the DataSet in the application.**

Data Provider

- Data provider is a set of ADO.Net classes that allow us to access a database. Basically, it is a bridge between our application (we can say front-end) and data source. There are following Data provider:
  - **Sqlserver Data Provider :-** It is used to access data from sqlserver database (for version 7.0 or later).
  - **Oracle Data Provider:-** It is used to access data from oracle database (for version 8i or later).
  - **OleDb Data Provider:-** It is used to access data from any database (msaccess , mysql , db2).

Odbc Data Provider:- It is used to access data from any database (msaccess).



- The four objects from the .Net Framework provides the functionality of Data Providers in the ADO.NET.

  They are

  - **connection** Object.
  - **command** Object.
  - **Data Reader** Object.
  - **Data Adapter** Object.

The SQL Connection Object

- The Connection :- The Connection object which provides a connection to the database.

```
Sqlconnection con= new Sqlconnection{
        "Data source=(local);
         Initial Catalog=Emp;
    Integrated seurity=sspi");
```

- There are four connection string Parameter Name:
  - **Data Source** Data source Identifiers the server and it could be local machine domain name, or IP Address.
  - **Initial Catalog** Database name.
  - **Integrated Security** Integrated Security set to SSPI to make connection with user's windows login

- **User ID** Name of user configured in SQL Server.
- **Password** Password matching SQL Server User ID.

The Following shows a connection string the User ID and Password parameter:

```
Sqlconnection conn =new Sqlconnection{
        "Data source=DatabaseServer;
         Initial Catalog=Northwind;
                User ID=YourUserID;
         Password=YourPassword"};
```

Command Object

- The command :- The command object which is used to execute a command.
- It provide three methods which are used to execute commands on the database:
  - **ExecuteNonQuery:** Executes commands that have no return values such as INSERT, UPDATE Or DELETE.
  - **ExecuteScalar:** Returns a single value from a database query.
  - **ExecuteReader:** Return a result set by way of a DataReader object.

Data Adapter Object

- **Data Adapter :** The DataAdapter server as a bridge between a DataSet and data source for retrieving and saving data.
- The DataAdapter provides this bridge by using Fill to load data from the data source into the DataSet and using Update to send changes made in the DataSet back to the data source.
- The data adapter objects connect a command object to a Dataset object.
- They provide the means for the exchange of data between the data store and the tables in the DataSet.
- An OleDataAdapter object is used with an OLE-DB provider a SqlDataAdapter object uses Tabular Data services with MS SQL Server.

Data Reader Object

- **The DataReader:-** The DataReader object which provides a forward-only, read only, connected recordset.
- **Limitations of the DataReader**
  - There is not possible to sort ,filter, or manipulate the data while using a DataReader, since it is read-only and forward-only.

Difference between DataSet and DataReader

DataSet	DataReader
DataSet object can contain multiple rowsets from the same data source as well as from the relationships between them.	DataReader provides forward-only and read-only access to data.
DataSet is a disconnected architecture.	DataReader is connected architecture.
DataSet can persist data.	DataReader can not persist data.
A Data is well suited for data that needs to be retrieved from multiple tables.	It has live connection while reading data.
DataSet is slower than DataReader, Due to overhead.	Speed performance is better in DataReader.