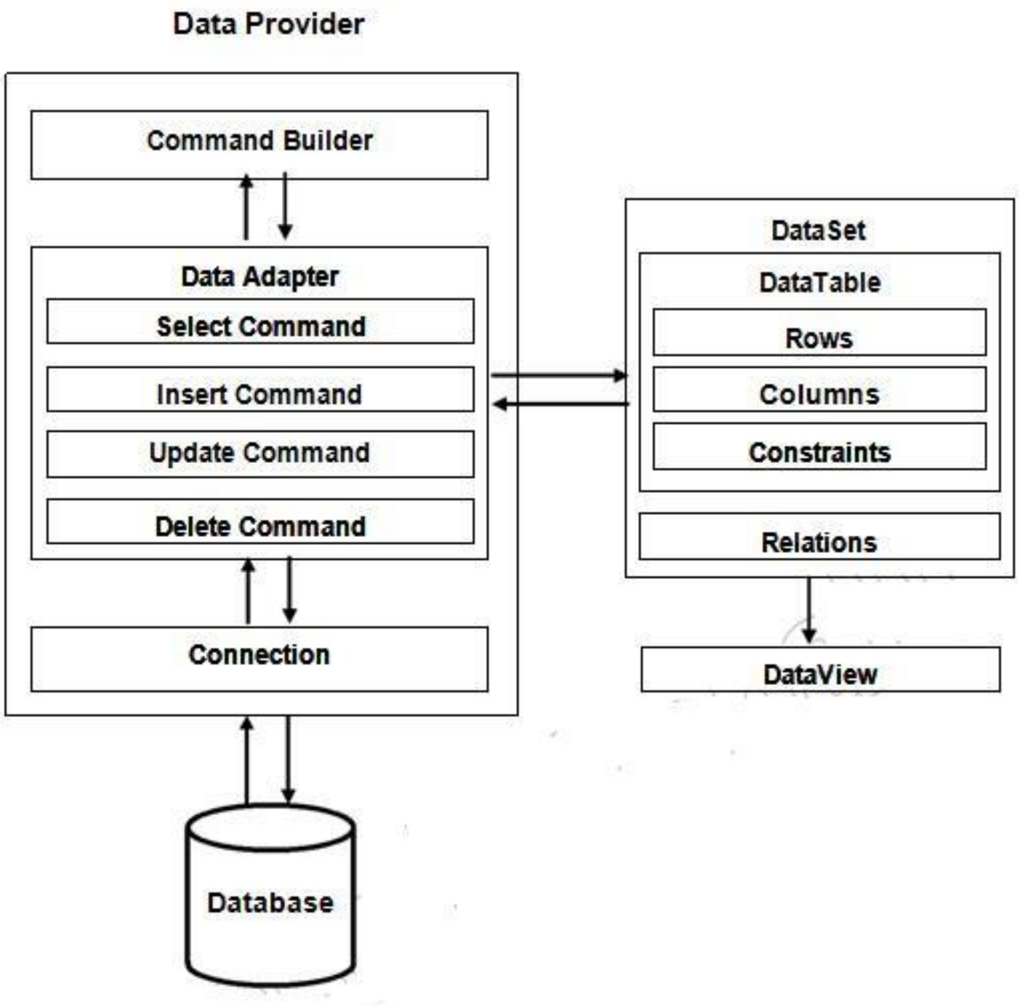
Disconnected Architecture in ADO.NET

The architecture of ADO.net in which data retrieved from database can be accessed even when connection to database was closed is called as disconnected architecture. Disconnected architecture of ADO.net was built on classes connection, dataadapter, commandbuilder and dataset and dataview.



Connection : Connection object is used to establish a connection to database and connectionit self will not transfer any data.

DataAdapter : DataAdapter is used to transfer the data between database and dataset. It has commands like select, insert, update and delete. Select command is used to retrieve data from database and insert, update and delete commands are used to send changes to the data in dataset to database. It needs a connection to transfer the data.

CommandBuilder : by default dataadapter contains only the select command and it doesn'tcontain insert, update and delete commands. To create insert, update and delete commands for the dataadapter, commandbuilder is used. It is used only to create these commands for the dataadapter and has no other purpose.

DataSet : Dataset is used to store the data retrieved from database by dataadapter and make it available for .net application.
To fill data in to dataset **fill()** method of dataadapter is used and has the following syntax.

Da.Fill(Ds,"TableName");

When fill method was called, dataadapter will open a connection to database, executes select command, stores the data retrieved by select command in to dataset and immediately closes the connection.

As connection to database was closed, any changes to the data in dataset will not be directly sent to the database and will be made only in the dataset. To send changes made to data in dataset to the database, **Update()** method of the dataadapter is used that has the following syntax.

Da.Update(Ds,"Tablename");

When Update method was called, dataadapter will again open the connection to database, executes insert, update and delete commands to send changes in dataset to database and immediately closes the connection. As connection is opened only when it is required and will be automatically closed when it was not required, this architecture is called disconnected architecture.

A dataset can contain data in multiple tables.

DataView : DataView is a view of table available in DataSet. It is used to find a record, sort the records and filter the records. By using dataview, you can also perform insert, update and delete as in case of a DataSet.

Command Object in ADO.NET

Command : Command is used to execute almost any SQL command from within the .net application. The SQL command like insert, update, delete, select, create, alter, drop can be executed with command object and you can also call stored procedures with the command object. Command object has the following important properties.

- Connection : used to specify the connection to be used by the command object.
- CommandType : Used to specify the type of SQL command you want to execute. To assign a value to this property, use the enumeration CommandType that has the members Text, StoredProcedure and TableDirect. Text is the default and is set when you want to execute ant SQL command with command object. StoredProcedure is set when you want to call a stored procedure or function and**TableDirect** is set when you want to retrieve data from the table directly by specifying the table name without writing a select statement.
- CommandText : Used to specify the SQL statement you want to execute.
- Transaction : Used to associate a transaction object to the command object so that the changes made to the database with command object can be committed or rollback.

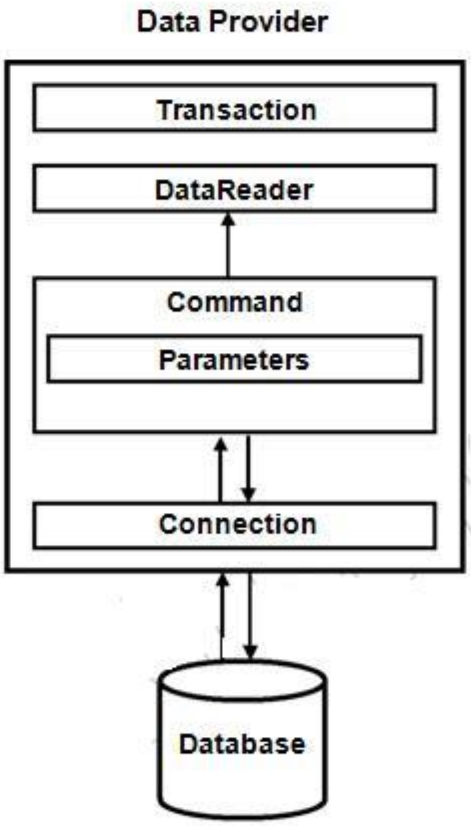
Command object has the following important methods.

- ExecuteNonQuery() : Used to execute an SQL statement that doesn't return any value like insert, update and delete. Return type of this method is int and it returns the no. of rows effected by the given statement.
- ExecuteScalar() : Used to execute an SQL statement and return a single value. When the select statement executed by executescalar() method returns a row and multiple rows, then the method will return the value of first column of first row returned by the query. Return type of this method is object.

- **ExecuteReader() :** Used to execute a select a statement and return the rows returned by the select statement as a DataReader. Return type of this method is **DataReader.**

Connected Architecture of ADO.NET

- The architecture of ADO.net, in which connection must be opened to access the data retrieved from database is called as connected architecture. Connected architecture was built on the classes connection, command, datareader and transaction.



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- **Connection :** in connected architecture also the purpose of connection is to just establish aconnection to database and it self will not transfer any data.
- **DataReader :** DataReader is used to store the data retrieved by command object and make it available for .net application. Data in DataReader is read only and within the DataReader you can navigate only in forward direction and it also only one record at a time.
- To access one by one record from the DataReader, call **Read()** method of the DataReader whose return type is **bool.** When the next record was successfully read, the Read() method will return true and otherwise returns false.

Data providers in .net

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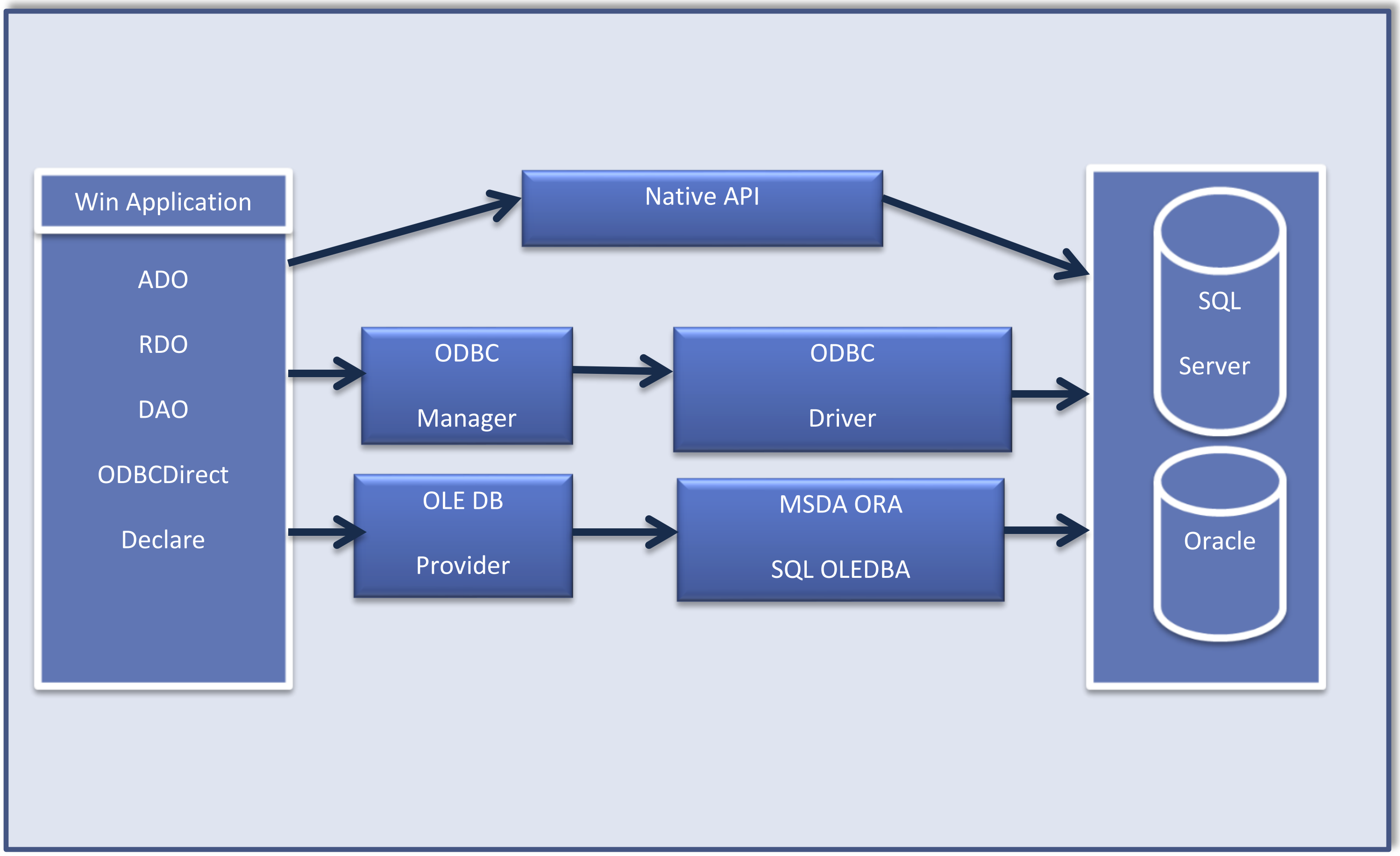
- Different databases will have different storage formats. Different languages will support different data formats, this language formats will not be understandable to databases, this requires a translator between a language application and database. This translator is called driver or provider.

Driver or provider is a software component, this acts like mediator between application and database.

A quick look at Database Technologies provided by Mircosoft

To access data from database like SQL server and oracle, .net framework provides ADO.Net. when we look at database technologies provided by Microsoft, they are as follows.

Database Technology	Description
DAO (Data Access Objects)	○ This works based on JetEngine or DBEngine. ○ It is efficient in accessing desktop databases like MS Access, Foxpro and Excel. ○ It is not efficient in accessing remote databases like SQL Server and Oracle.
RDO (Remote Data Objects)	○ This works based on ODBC(Open DatabaseConnectivity). ○ It is efficient in accessing remote databases. ○ It can not access the databases that don't support ODBC.
ADO (Activex Data Objects)	○ This works based on OLEDB (Object Linking and Embedding DataBase). ○ It can access almost any database that may be desktop database or remote database and that may support ODBC or may not support ODBC. ○ It is efficient than DAO and RDO. ○ It doesn't support pure architecture. ○ It doesn't support XML.
ADO.Net	○ To overcome the drawbacks of ADO, in .net, Microsoft provides ADO.Net. ○ Same as ADO it can access almost any database that may be desktop database or remote database and that may support ODBC or may not support ODBC. ○ It supports pure disconnected architecture and XML.


Win Application
ADO
RDO
DAO
ODBCDirect
Declare
Native API
ODBC
Manager
ODBC
Driver
OLE DB
Provider
MSDA ORA
SQL OLEDBA
SQL
Server
Oracle