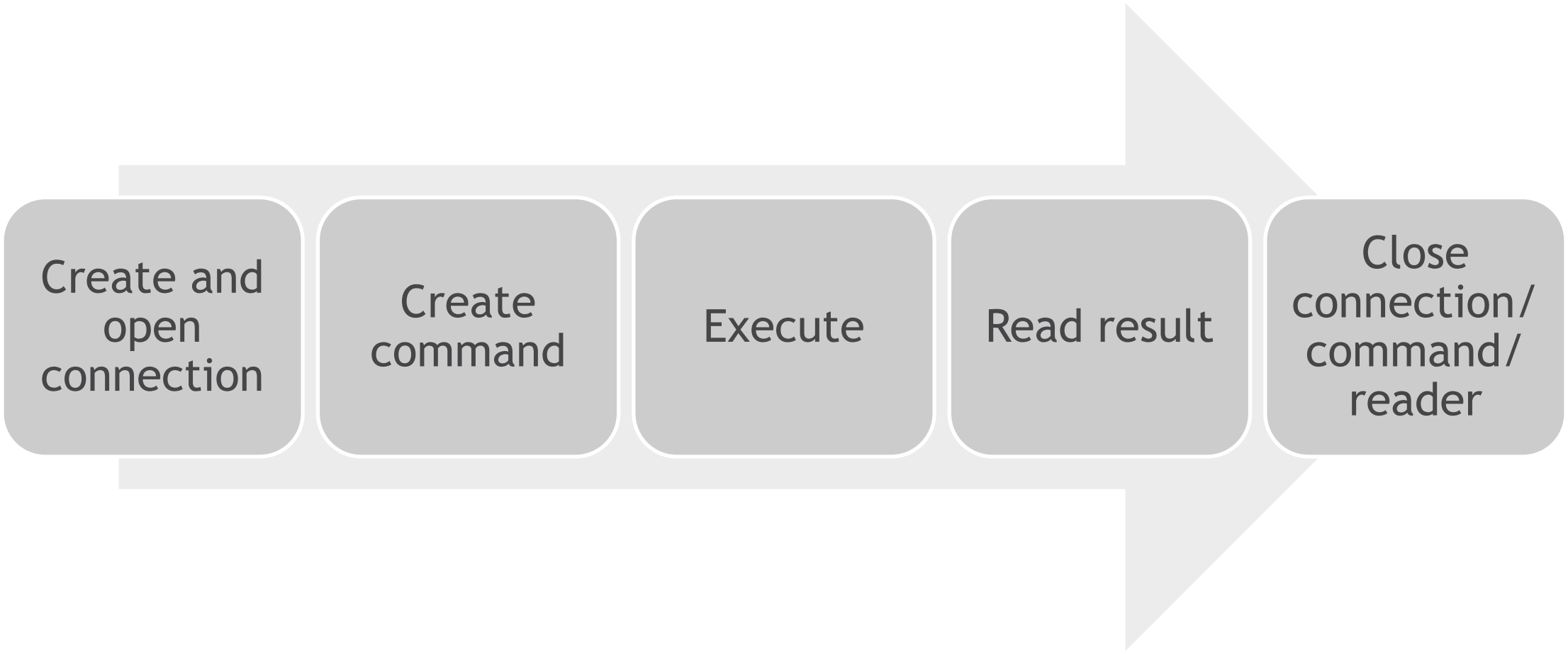
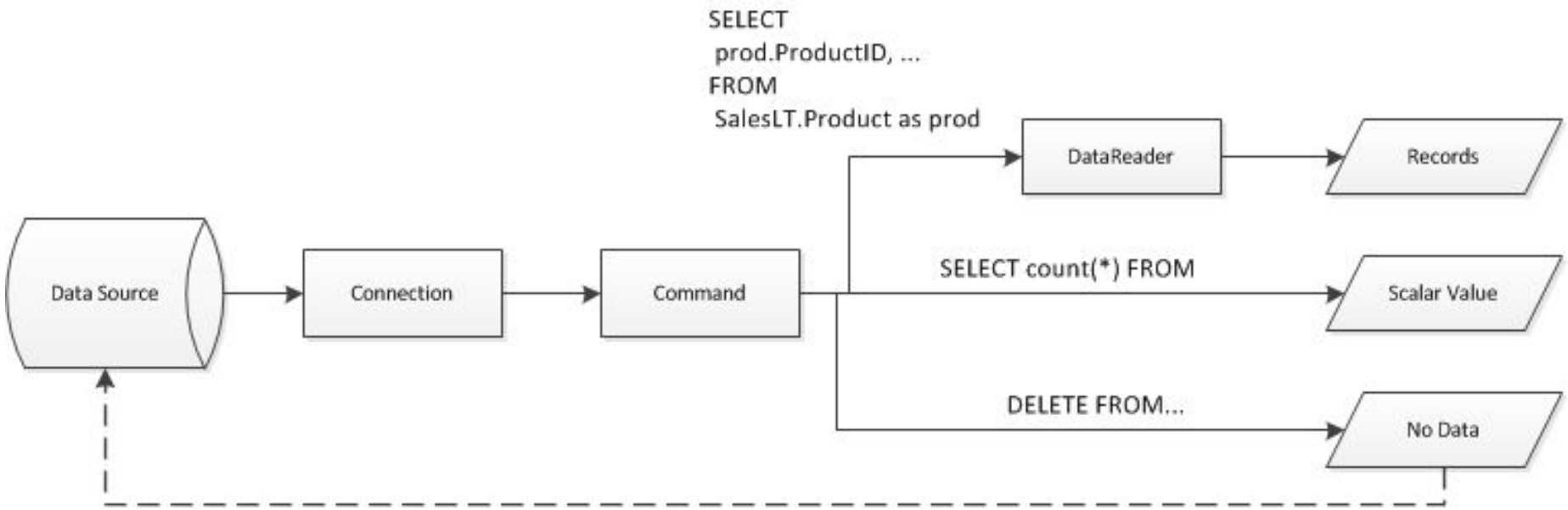
ADO.NET CONNECTED MODEL

- Connection
- Command
- DataReader
- Transactions


Create and open connection
Create command
Execute
Read result
Close connection/ command/ reader

КОМПОНЕНТЫ **CONNECTED MODEL**



- Connection
- Command
- DataReader

CONNECTION

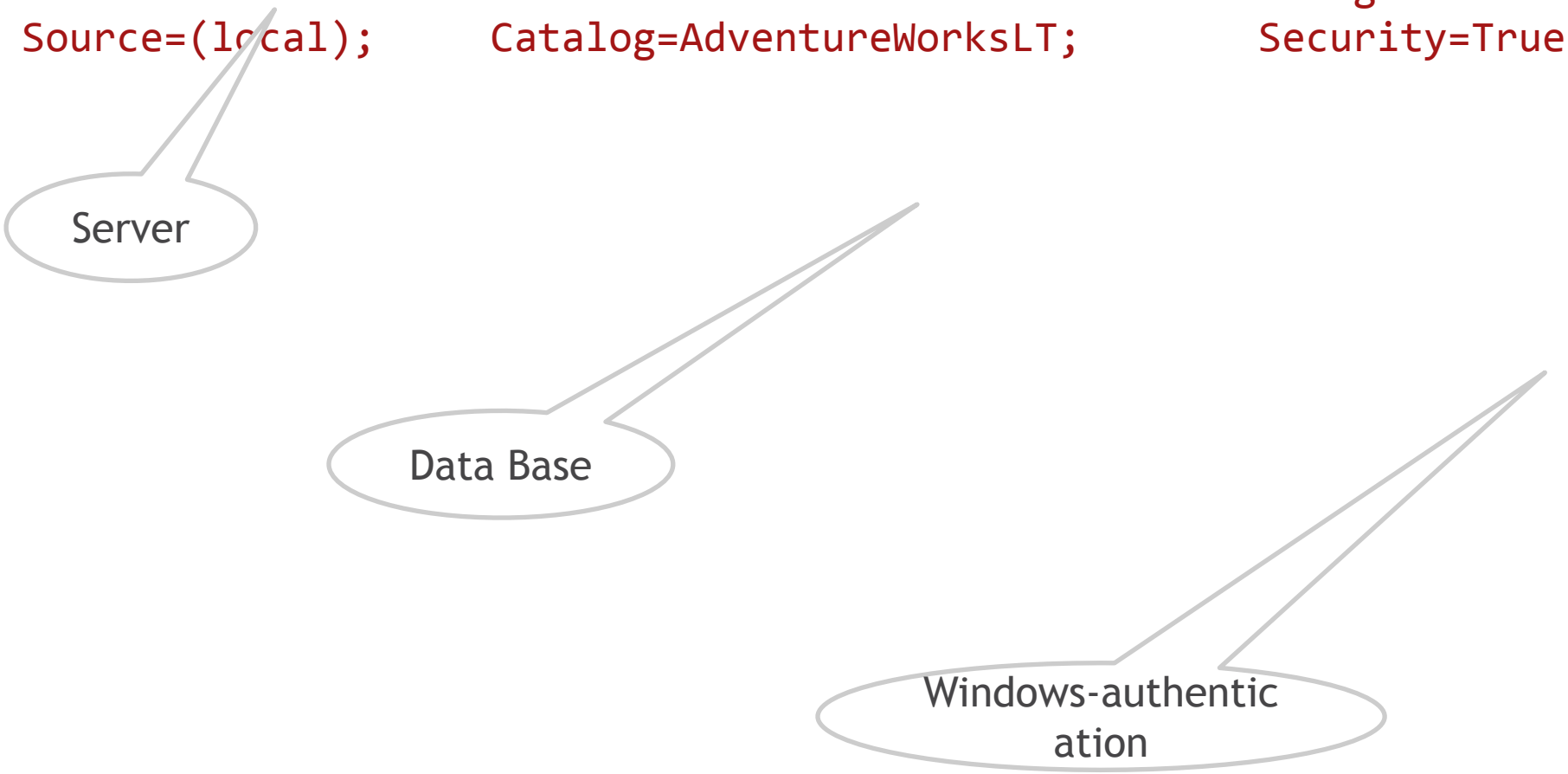
СОЗДАНИЕ **CONNECTION**

```
var conn = new SqlConnection(
    "Data Source=(local);Initial Catalog=AdventureWorksLT;Integrated Security=True");

conn.Open();

// ...

conn.Close();
```

```
using (var conn = new SqlConnection(
    "Data Source=(local);Initial Catalog=AdventureWorksLT;Integrated Security=True"))
{
    conn.Open();

    // ...
}
```

CONNECTION STRINGS

```
Data Source=(local);    Initial Catalog=AdventureWorksLT;    Integrated Security=True
```



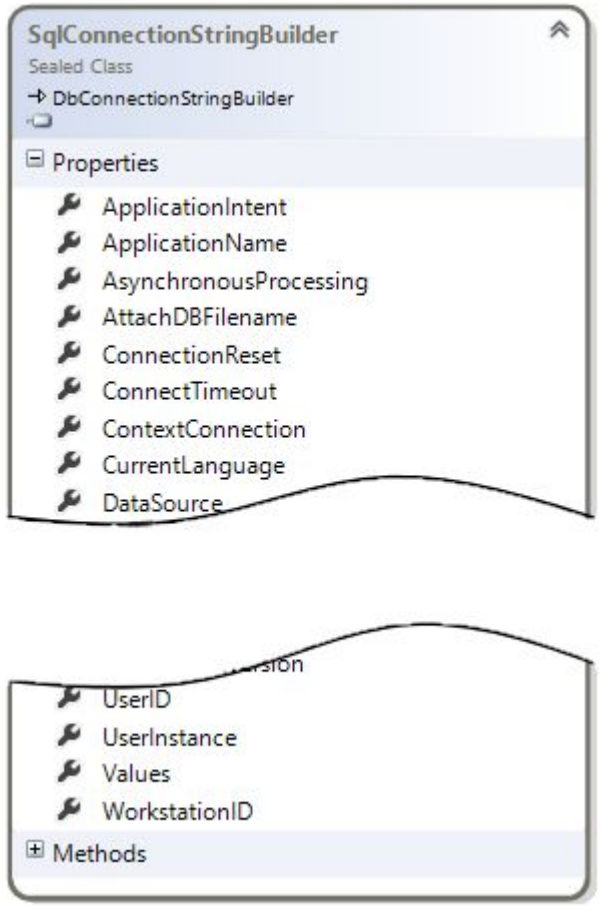
- Общая структура
  param1=value; param2=value; …
- Свои элементы

SQL Client	"Persist Security Info=False;Integrated Security=true;Initial Catalog=Northwind;server=(local)"
OleDb (MS Access)	"Provider=Microsoft.Jet.OLEDB.4.0; Data Source=c:\bin\LocalAccess40.mdb"
ODBC (Excel)	"Driver={Microsoft Excel Driver (*.xls)};DBQ=c:\bin\book1.xls"

Connection Strings (ADO.NET)
https://docs.microsoft.com/en-us/dotnet/framework/data/adonet/connection-strings
http://www.connectionstrings.com

CONNECTION STRING BUILDER ПРИМЕР

```
var connectionStringBuilder = new SqlConnectionStringBuilder
{
    DataSource = "(local)",
    InitialCatalog = "Northwind",
    IntegratedSecurity = true
};

using (var connection =
    new SqlConnection(connectionStringBuilder.ConnectionString))
{
    connection.Open();
}
```



COMMON CONNECTION PARAMETERS (SQLCLIENT)

Parameter	Samples
Data Source / Server	(local) np:(local), tcp:(local), lpc:(local) W406811-DB11\PrimaryInstance
Initial Catalog / Database	Northwind
Integrated Security / Trusted_Connection	True
User ID / UID	Ivan_ivanov
Password	123456
AttachDBFilename / Initial File Name	|DataDirectory|\data\YourDB.mdf
Connect Timeout / Timeout	30

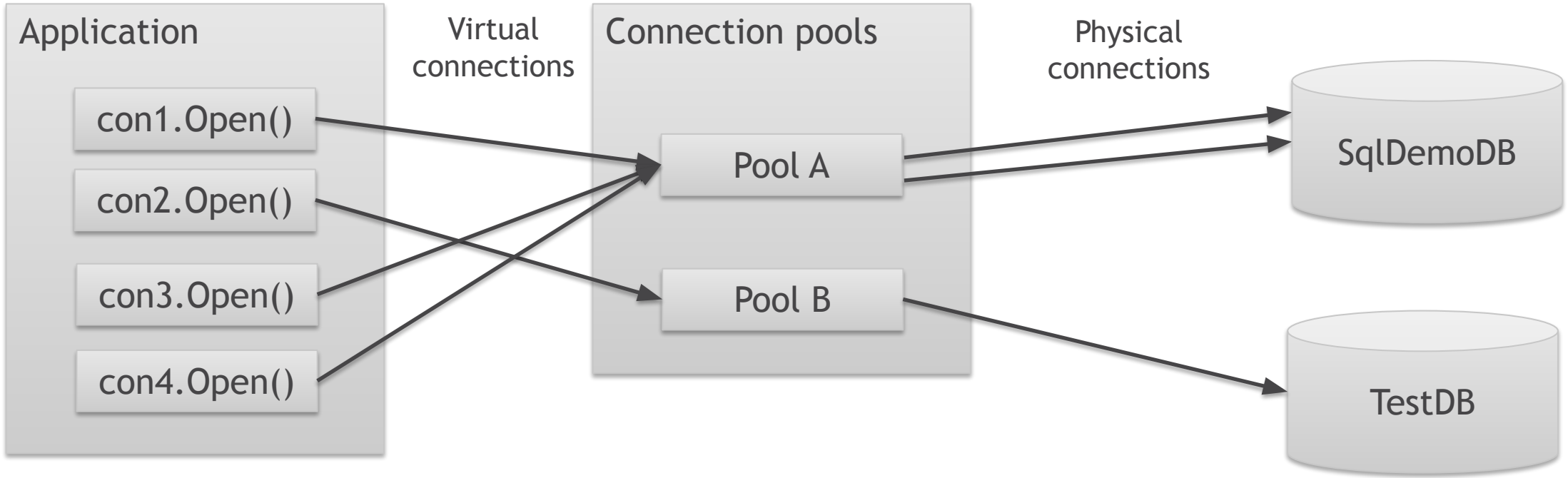
Connection parameters
https://msdn.microsoft.com/en-us/library/system.data.sqlclient.sqlconnection.connectionstring(v=vs.110).aspx

CONNECTION STRING + APP.CONFIG + PROVIDER FACTORIES

```
<configuration>
  <connectionStrings>
    <add name="NorthwindConection"
         providerName="System.Data.SqlClient"
         connectionString="Data Source=(local);Initial Catalog=Northwind;Integrated Security=True"/>
  </connectionStrings>
</configuration>
```

```
var connectionStringItem = ConfigurationManager.ConnectionStrings["NorthwindConection"];
var connectionString = connectionStringItem.ConnectionString;
var providerName = connectionStringItem.ProviderName;

var factory = DbProviderFactories.GetFactory(providerName);

using (var connection =factory.CreateConnection())
{
    connection.ConnectionString = connectionString;
    connection.Open();
}
```

CONNECTION POOLS



~~Data Source=(local);Initial Catalog=**SqlDemoDB**;Integrated Security=True~~

Data Source=(local);Initial Catalog=**TestDB**;Integrated Security=True

Data Source=(local);Initial Catalog=**SqlDemoDB**;Integrated Security=True

Data Source=(local);Initial Catalog=**SqlDemoDB**;Integrated Security=True

[Connection Pooling]

CONNECTION ПРОБЛЕМЫ И BEST PRACTICES

- Держите соединение с источником минимальное кол-во времени
- Всегда закрывайте все созданные вами объекты Connection или DataReader, когда вы завершаете с ними работать

Best Practice

COMMAND

СОЗДАНИЕ **COMMAND**

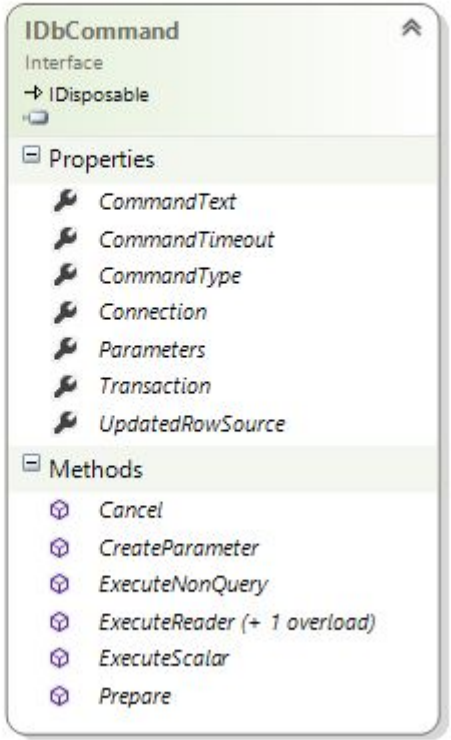
Command should be associated with Connection

```
using (IDbConnection connection = new SqlConnection(ConnectionString))
{
    connection.Open();

    var command = connection.CreateCommand();
}
```

```
using (IDbConnection connection = new SqlConnection(ConnectionString))
{
    connection.Open();

    IDbCommand command = new SqlCommand();
    command.Connection = connection;
}
```

ОБЩИЕ СВОЙСТВА **COMMAND**

```
using (IDbConnection connection = new SqlConnection(ConnectionString))
{
    connection.Open();

    var command = connection.CreateCommand();

    command.CommandText = "select count(*) from Northwind.Customers";
    command.CommandType = CommandType.Text;

    var customersCount = command.ExecuteScalar();
    Console.WriteLine(customersCount);
}
```



COMMAND TYPES

Command Type	Samples / Comments

Text (default)	`command1.CommandText = "SELECT * FROM Northwind.Products";`
	`command1.CommandType = CommandType.Text;`
	
	`command2.CommandText = "exec sp_helpdb";`
	`command2.CommandType = CommandType.Text;`

StoredProcedure	`command3.CommandText = "sp_helpdb";` `command3.CommandType = CommandType.StoredProcedure;`

TableDirect	**Поддерживается только в.NET Framework Data Provider для OLE DB**
	
	`command.CommandText = "Northwind.Customers";`
	`command.CommandType = CommandType.TableDirect;`

COMMAND RESULTS

Result Type	Samples

Row set	`command.CommandText = "SELECT CompanyName FROM Northwind.Customers";`
	
	`SqlDataReader reader = command.ExecuteReader();`

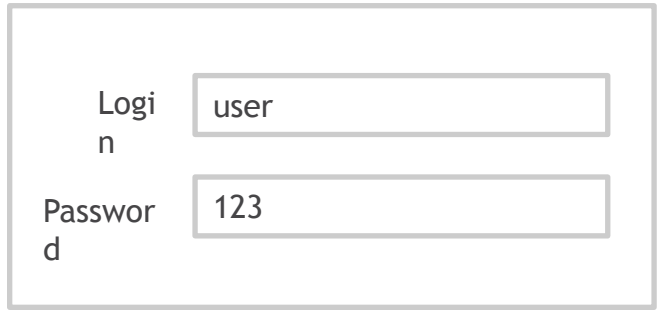
Single value	`command.CommandText = "SELECT count(*) FROM Northwind.Customers";`
	
	`int count = (int)command.ExecuteScalar();`

No result	`command.CommandText = "UPDATE Northwind.Products SET UnitPrice = UnitPrice - 0.0002";`
	
	`int affected = command.ExecuteNonQuery();`

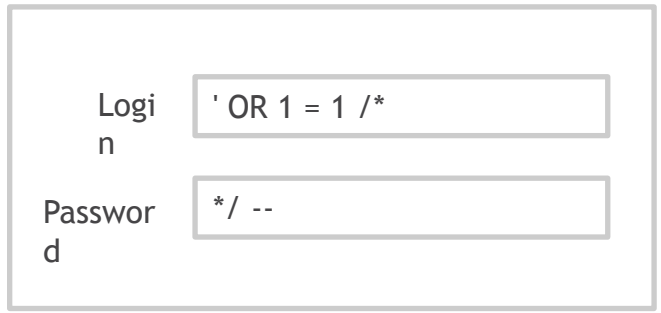
Xml	`command.CommandText = "SELECT * FROM Northwind.Customers FOR XML AUTO, ROOT('Customers')";`
	
	`XmlReader xmlReader = command.ExecuteXmlReader();`

ПАРАМЕТРИЗОВАННЫЕ ЗАПРОСЫ. SQL ИНЪЕКЦИИ

```
string.Format(
    "select top 1 * from dbo.Users where Login = '{0}' and Password = '{1}'", login, password);
```




```
select top 1 * from dbo.Users
where Login = ‘user' and Password = '123'
```




```
select top 1 * from dbo.Users
where Login = '' OR 1 = 1 /*' and Password = '123'*/
--
```

COMMAND PARAMETERS

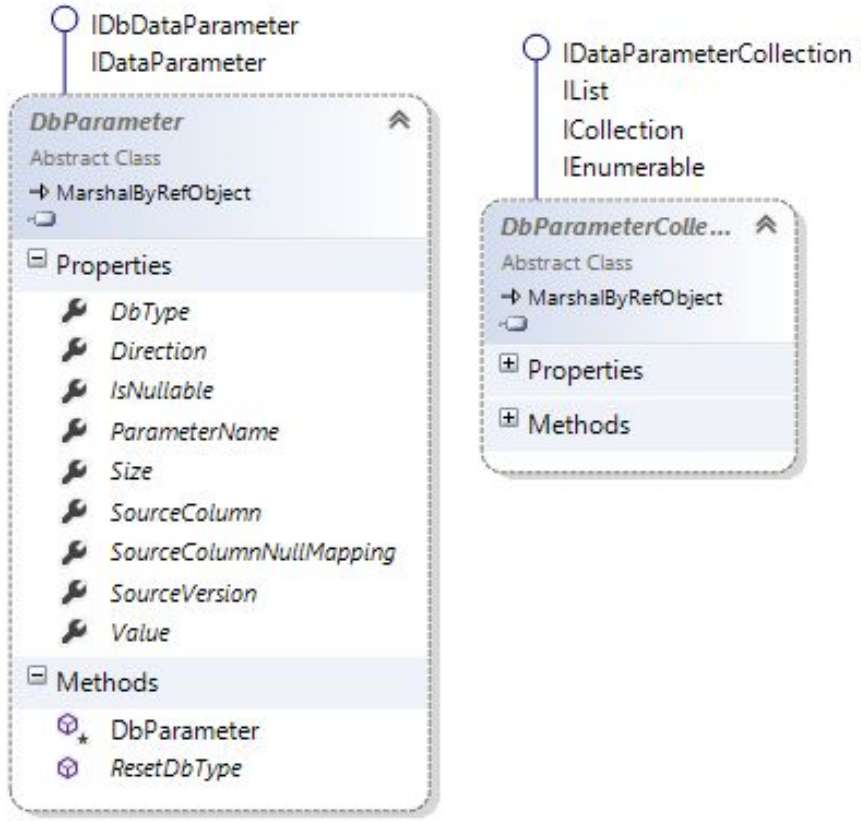
```
command.CommandText =
  "SELECT count(*) FROM Northwind.Products
   WHERE UnitPrice >= @minPrice";
```

IDbCommand

```
var minPrice = command.CreateParameter();
minPrice.ParameterName = "@minPrice";
minPrice.DbType = DbType.Decimal;
minPrice.Value = 50;

command.Parameters.Add(minPrice);
```

SqlCommand

```
command.Parameters.AddWithValue("@minPrice", 50m);
```



ВЫЗОВ **STORED PROCEDURES**

```
CREATE PROCEDURE [Northwind].[CustOrdersStatistic]
    @CustomerID nchar(5),
    @Shipped int OUTPUT,
    @All int OUTPUT
AS
...
```

```
var command = connection.CreateCommand();
command.CommandText = "[Northwind].[CustOrdersStatistic]";
command.CommandType = CommandType.StoredProcedure;

command.Parameters.AddWithValue("@CustomerID", "BONAP");

var all = command.Parameters.Add(
    new SqlParameter()
    {
        ParameterName = "@All",
        DbType = DbType.Int32,
        Direction = ParameterDirection.Output
    });

var shipped = command.Parameters.Add(
    new SqlParameter()
    {
        ParameterName = "@Shipped",
        DbType = DbType.Int32,
        Direction = ParameterDirection.Output
    });

command.ExecuteNonQuery();

Console.WriteLine("{0} {1}", all.Value, shipped.Value);
```

DATAREADER

READ RESULT

```
using (IDbConnection connection =
    new SqlConnection(ConnectionString))
{
    var command = connection.CreateCommand();
    command.CommandText =
    "SELECT CompanyName, City, Region FROM Northwind.Customers";

    connection.Open();

    using (IDataReader reader = command.ExecuteReader())
    {

        while (reader.Read())
        {
            Console.WriteLine("{0} - {1}, {2}",
                reader["CompanyName"],
                reader["City"],
                reader["Region"]);
        }
    }
}
```

- Side-by-side execution can only take place in **different connections**
  - Every readers should be closed before next command start

DATAREADER МЕТОДЫ

- DataReader
  - Navigation
    - Read()
    - NextResult()
    - HasRows
  - Get fields value
    - By field name
      - [“field_name”]
    - By field index
      - GetString(i)
      - GetDateTime(i)
      - GetBoolean(i)
      - …

READ MANY RESULT SETS

```
var command = connection.CreateCommand();
command.CommandText =
    "SELECT * " +
    "FROM Northwind.Orders " +
    "where OrderID = @orderId;" +

    "SELECT p.ProductName, ods.UnitPrice, ods.Quantity " +
    "FROM Northwind.[Order Details] ods " +
    "LEFT JOIN Northwind.Products p ON p.ProductID = ods.ProductID " +
    "WHERE ods.OrderID = @orderId;";

command.Parameters.AddWithValue("@orderId", 10262);

using (var reader = command.ExecuteReader())
{
    reader.Read();
    Console.WriteLine("{0} ({1})", reader["OrderID"], reader["OrderDate"]);

    reader.NextResult();

    while (reader.Read())
        Console.WriteLine("\t{0} - {1}", reader["ProductName"], reader["UnitPrice"]);
}
```

TRANSACTIONS

```
using (IDbConnection connection = new SqlConnection(ConnectionString))
{
    connection.Open();

    using (var transaction = connection.BeginTransaction())
    {
        var command = connection.CreateCommand();
        command.CommandText =
         "delete from Northwind.[Order Details] where OrderID = @orderId;";
        command.CommandText +=
         "delete from Northwind.Orders where OrderID = @orderId;";

        var orderIdParam = command.CreateParameter();
        orderIdParam.ParameterName = "@orderId";
        orderIdParam.Value = orderId;
        command.Parameters.Add(orderIdParam);

        command.Transaction = transaction;

        command.ExecuteNonQuery();

        transaction.Commit();
    }
}
```