

Unit - 1

What is ASP.NET?

ASP.NET stands for **active server pages Network Enabled Technologies.....**

ASP.NET is an **open source web framework**, **created by Microsoft**, for building modern **web apps and services** that run on macOS, Linux, Windows.



ASP.NET is an open-source, server-side web-application framework designed for web development to produce dynamic web pages.

It was developed by Microsoft to allow programmers to build dynamic web sites, applications and services.

It was **first released in January 2002 with version 1.0** of the **.NET Framework** and is the successor to Microsoft's **Active Server Pages (ASP)** technology.

ASP.NET is built on the **Common Language Runtime (CLR)**, allowing programmers to write ASP.NET code using any supported **.NET language.**

ASP.NET Versions History

The following table shows the versions and features included in ASP.NET.

| Date | Version | Features |
|-------------------|---------|--|
| January 16, 2002 | 1.0 | Object-oriented Web application development supporting inheritance, polymorphism and other standard OOP features. |
| April 24, 2003 | 1.1 | Mobile controls and Automatic input validation. |
| November 7, 2005 | 2.0 | New data controls (GridView, FormView, DetailsView) New technique for declarative data access (SqlDataSource, ObjectDataSource, XmlDataSource controls) Navigation controls Master pages Login controls Themes Skins Web parts Personalization services Full pre-compilation New localization technique Support for 64-bit processors Provider class model |
| November 21, 2006 | 3.0 | Windows Communication Foundation, which can use ASP.NET to host services |
| November 19, 2007 | 3.5 | New data controls (ListView, DataPager) ASP.NET AJAX included as part of the framework |

| | | |
|------------------|-------|---|
| April 12, 2010 | 4.0 | The two new properties added in the Page class are MetaKeyword and MetaDescription. |
| October 17, 2013 | 4.5.1 | Bootstrap 3.0 |
| May 5, 2014 | 4.5.2 | Higher reliability HTTP header inspection and modification methods |
| July 20, 2015 | 4.6 | HTTP support when running on Windows 10 |

ASP.NET pages have the **extension .aspx** and are **normally written in C# (C sharp)**.

ASP.NET 4.6 is the latest official version of ASP.NET.

Advantages of ASP.NET

- **It uses .NET Framework**

As you all know that ASP.NET is a part of .NET Framework. So, it has all the advantages of .NET Framework like using Base Class Library (Namespaces), CLR etc.

- **It is Compiled not Interpreted**

If your page is interpreted, it is processed every time when the page is requested. This was getting slow performance in previous tools. As ASP.NET is compiled every time.

As you are aware about .Net Framework, you might know that in .NET your program is executed in two steps. First the code is converted into IL (Intermediate Language) / MSIL (Microsoft Intermediate Language) / CIL (Common Intermediate Language) and then later MSIL / IL / CIL is converted into native code using JIT (Just In Time) compiler.

- **It uses Multilanguage**

You can use many languages with .NET which intern of course application to ASP.NET also.You can use Managed Code and Unmanaged Code in ASP.NET which gives better functionality for many web sites.

- **It uses Object Oriented Features**

.Net is fully supported with a feature of Object Oriented Programming.So ASP.NET can have advantages of Object Oriented Feature.All object oriented features like create class,inheritance,overloading,overriding,encapsulation,etc.features can give an added advantage to your web application.

- **Store Presentation Logic and Application Logic differently**

This is one of the biggest advantages of using ASP.NET.In previous web development tools(ASP)used to store presentation logic and application logic in a single file.Where as ASP.NET stores presentation logic and application logic differently.

- **It gives Multi Browser Facility**

One of the most facing problems for any web developer is which browser can support his/her web application.ASP.NET application is supported by the majority of the browsers.

- **It gives Multi Device Facility**

Most of the web sites today can also be accessed via mobiles or other electronic devices.ASP.NET helps to create such web applications.

- **Facility of Caching**

This is the new concept which has taken place in ASP.NET.It gives you the facility to cache the data or content which helps in faster response to clients.So,now web sites can work much more faster.

- **New concept of ADO.NET with Good data formatting**

ADO.NET gives features of Connected Architecture and Disconnected Architecture.

- **Inbuilt Validation Controls**

This is one of the great relief for any of the Web Developer.ASP.NET gives inbuilt validation controls like RegularExpression Validator,Range Validator,RequiredField Validator,Compare Validator,etc.to do client validation.

- **Strong and easy configuration for web site**

ASP.NET web site has a very important file called **web.config** which is used for all types of configuration for your website in an easy manner.

- **Master Page and Theme Concept**

ASP.NET has introduced a very interesting and useful concept called Master Pages and Themes. Master Pages can be used to maintain the look and feel of your web site throughout all the web pages.

- **It is easy to Deploy and Configure**

ASP.NET web applications can be deployed and configured easily on web servers.

- **Give facility to create Web Service**

Web Services are one of the biggest advantages of ASP.NET. Web Services are a group of Web Methods which are kept on the Web Server to get some common functionality over the web.

ASP.NET Framework

ASP.NET is a free web framework for building great websites and web applications using HTML, CSS, and JavaScript.

ASP.NET works on top of the **HTTP protocol**, and uses the HTTP commands and policies to set a browser-to-server bilateral communication and cooperation.

This framework contains a large number of class libraries known as **Framework Class Library (FCL)**.

The software programs written in .NET are executed in the execution environment, which is called **CLR (Common Language Runtime)**. These are the core and essential parts of the .NET framework.

This framework provides various services like **memory management, networking, security, memory management, and type-safety**.

The .Net Framework supports more than **60 programming languages** such as **C#, F#, VB.NET, J#, VC++, JScript.NET, APL, COBOL, Perl, Oberon, ML, Pascal, Eiffel, Smalltalk, Python, Cobra, ADA**, etc.

The .NET Framework is composed of four main components:

1. Common Language Runtime (CLR)
2. Framework Class Library (FCL),
3. Core Languages (WinForms, ASP.NET, and ADO.NET), and
4. Other Modules (WCF, WPF, WF, Card Space, LINQ, Entity Framework, Parallel LINQ, Task Parallel Library, etc.)

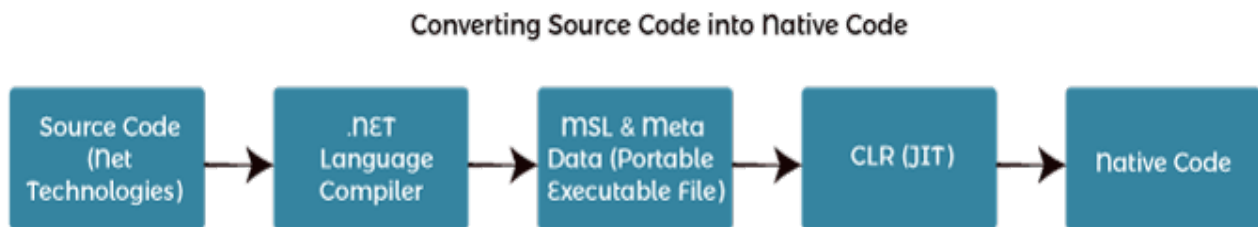
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|------------------------------|---------|------------------------|------------|----------------------------|
| .NET APIs for Store/UWP apps | | Task-Based Async Model | | 4.5 2012 |
| Parallel LINQ | | Task Parallel Library | | 4.0 2010 |
| LINQ | | Entity Framework | | 3.5 2007 |
| WPF | WCF | WF | Card Space | 3.0 2006 |
| WinForms | ASP.NET | ADO.NET | | .NET Framework 2.0 2005 |
| Framework Class Library | | | | |
| Common Language Runtime | | | | |

CLR (Common Language Runtime)

It is **a program execution engine** that loads and executes the program.

It converts the program into native code. It acts as an interface between the framework and operating system.

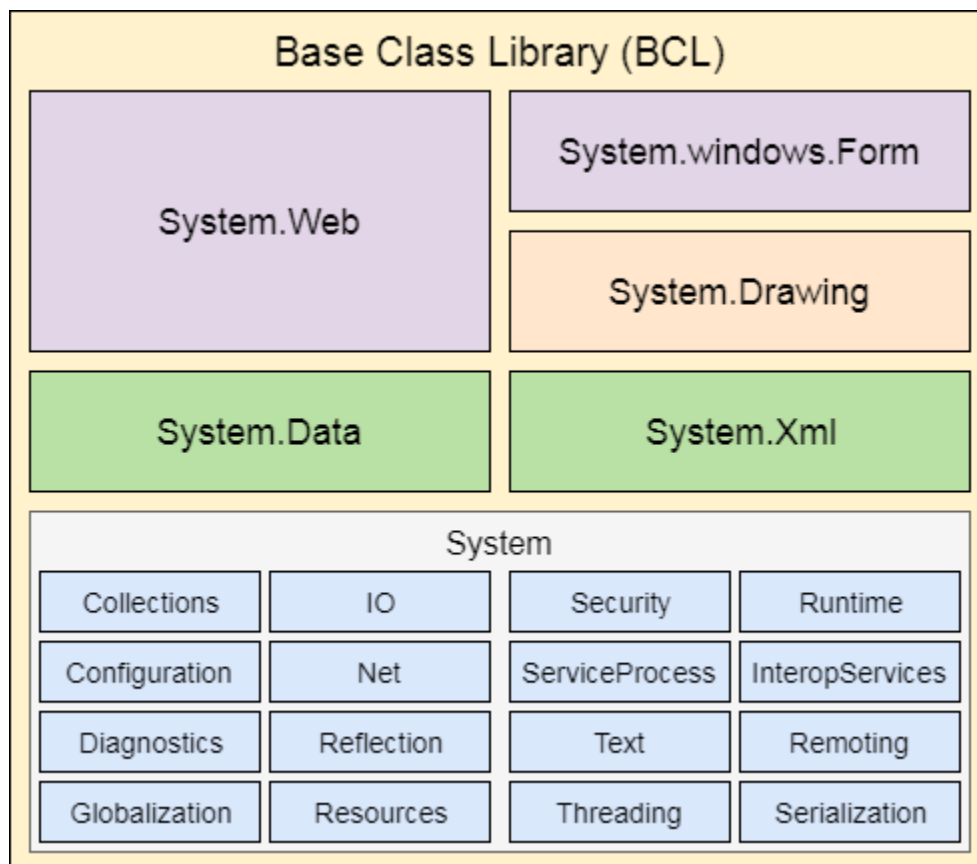
It does **exception handling, memory management, and garbage collection.** Moreover, it provides **security, type-safety, interoperability, and portability.**



FCL (Framework Class Library)

It is a standard library that is a collection of thousands of classes and used to build an application.

The **BCL (Base Class Library)** is the core of the FCL and provides basic functionalities.



CLS(Common Language Specification)

It contains the specifications for the .Net supported languages and implementation of language integration.

It is responsible for converting the different .NET programming language syntactical rules and regulations into CLR understandable format. Basically, it provides Language Interoperability.

CTS(Common Type System)

It provides guidelines for declaring, using, and managing types at runtime, and cross-language communication.

Every programming language has its own data type system, so CTS is responsible for understanding all the data types of the system.

Windows Forms

Windows Forms contain the graphical representation of any window displayed in the application.

ASP.NET

ASP.NET is a web framework designed and developed by Microsoft. It is used to develop websites, web applications, and web services.

It provides a fantastic integration of HTML, CSS, and JavaScript. It was first released in January 2002.

ADO.NET

ADO.NET is a module of .Net Framework, which is used to establish a connection between application and data sources. Data sources can be such as SQL Server and XML.

ADO .NET consists of classes that can be used to connect, retrieve, insert, and delete data.

WPF (Windows Presentation Foundation)

Windows Presentation Foundation (WPF) is a graphical subsystem by Microsoft for rendering user interfaces in Windows-based applications.

WCF (Windows Communication Foundation)

It is a framework for building service-oriented applications. Using WCF, you can send data as asynchronous messages from one service endpoint to another.

WF (Workflow Foundation)

Windows Workflow Foundation (WF) is a Microsoft technology that provides an API, an in-process workflow engine, and a rehostable designer to implement long-running processes as workflows within .NET applications.

LINQ (Language Integrated Query)

It is a query language, introduced in .NET 3.5 framework. It is used to make the query for data sources with C# or Visual Basics programming languages.

Entity Framework

It is an ORM based open source framework which is used to work with a database using .NET objects. It eliminates a lot of developers' effort to handle the database. It is Microsoft's recommended technology to deal with the database.

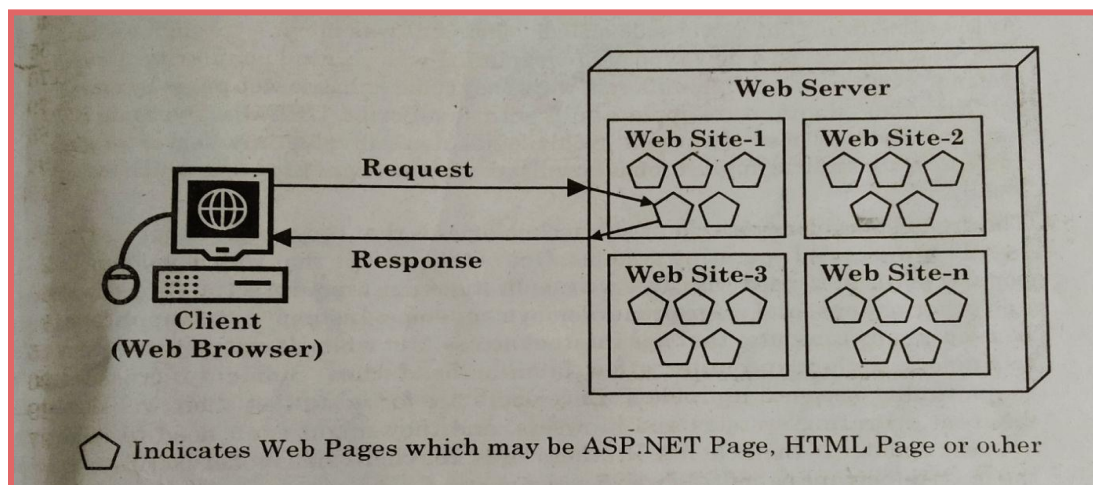
Windows CardSpace

It provides safety for accessing resources and sharing personal information on the internet.

Client Server Architecture

Client - Used in home and corporate networks, a client is **any computer hardware or software device that requests access to a service provided by a server**. Clients are typically seen as the requesting program or user in a client-server architecture.

Server - A server is **a computer program or device that provides a service to another computer program and its user, also known as the client**.



Following steps shows the whole process from the client gives request and gets response from the web server.

- 1) Request goes using `HttpRequest` from client(Web Browser) to related Web Server. This is obtained using `http` and the web server is found DNS(Domain Name Server) which keeps the physical address of web sites.
- 2) Web Server may contain no. of web sites. So now request searches particular website which was requested. Web site is stored in some folder.
- 3) After reaching a particular web site folder, it searches a particular web page (asp.net page, HTML page, script page, etc.) which was requested.

- 4) Web server processes that page and generates output in HTML form which is transferred back to the same IP from where request was arrived.
- 5) Finally, the response which was sent by Web Server is displayed on the Client PC which is Browser.

File Types Used In ASP.NET

1) .aspx(Web Form)

An ASP.NET Web forms file (page) that can contain Web controls and presentation.

These are ASP.NET web pages. They contain the user interface. Users request or navigation directly to one of these pages to start your web application.

2) .ascx

A Web user control file that defines a custom, reusable control.

These are ASP.NET user controls. User controls are similar to web pages except that they can't be accessed directly. Instead, they must be hosted inside an ASP.NET web page. User controls allow you to develop a small piece of user interface and reuse it in as many web forms as you want without repetitive code.

3) .asmx

An XML Web services file that contains classes and methods that are available to other Web applications by way of SOAP.

These are ASP.NET web services. Web services work differently than web pages, but they still share the same application resources, configuration settings, and memory.

4) .ashx

A generic handler file that contains code that implements the interface.

Sometimes you need to do some process within one .aspx page and display the processed output. **Handler files(.aspx) are used for this concept.**

5) .Web.Config

This is the **XML-based configuration file for your ASP.NET application.**

It includes settings for customizing security, state management, memory management, and much more.

6) .global.asax

This is the **global application file.** You can use this file to define global variables (variables that can be accessed from any web page in the web application) and react to global events (such as when a web application first starts).

7) .cs/.vb/.js (Code Behind Files)

These are code behind files **that contain C# code, VB code or J# code.** They allow you to separate the application from the user interface of a web page.