Definition of ASP.NET

ASP.NET is a **server-side web application framework** developed by **Microsoft** for building **dynamic web pages, web services, and web applications**. It runs on the **.NET framework** and allows developers to create **secure, scalable, and high-performance web applications** using **C# or VB.NET**.

Key Features of ASP.NET:

✔ Supports **MVC (Model-View-Controller) architecture**
✔ Provides **built-in authentication & authorization**
✔ Supports **cross-platform development** with ASP.NET Core
✔ Includes **state management** (Session, ViewState, Cookies)
✔ **High performance** using Just-In-Time (JIT) compilation

Phases of ASP.NET Page Lifecycle

ASP.NET processes web pages in different **phases** before rendering them to the browser. Below are **three key phases**:

1️⃣ Page Initialization Phase

▸ What happens?

- The **server initializes controls** (e.g., TextBox, Button).
- Controls are assigned **unique IDs**.
- `IsPostBack` property is checked (**to detect if the page is loaded for the first time**).

▸ Example

```
protected void Page_Init(object sender, EventArgs e) {
    Response.Write("Page Initialization Phase<br>");
}
```

✔ Why Important?
Allows developers to **set default values for controls** before processing user input.

2️⃣ Load Phase

▸ What happens?

- Page **retrieves user inputs** (from ViewState, QueryString, etc.).
- Controls are populated with **postback data**.

▸ Example

```
protected void Page_Load(object sender, EventArgs e) {
    if (!IsPostBack) {
        Response.Write("Page Loading Phase (First Time)<br>");
    } else {
        Response.Write("Page Loading Phase (Postback)<br>");
    }
}
```

✔ Why Important?
Ensures that the **user's previous inputs are retained** and ready for further processing.

3️⃣ Render Phase

▸ What happens?

- The page generates the **final HTML** and sends it to the browser.
- Controls **convert themselves into HTML elements**.

▸ Example

```
protected override void Render(HtmlTextWriter writer) {
    writer.Write("Page Render Phase: HTML is being generated<br>");
    base.Render(writer);
}
```

✔ **Why Important?**
Determines the **final output** that the browser will display.

Summary of ASP.NET Page Lifecycle

Phase	What Happens?	Example Event
Initialization	Assigns IDs, sets up controls	`Page_Init`
Load	Retrieves user input & processes data	`Page_Load`
Render	Converts controls into HTML & sends output	`Render`

Would you like **more details on other lifecycle phases**? ☺