Session 5

Managing and Validating ASP.NET Web Applications

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Session Overview

- Describe state management and its techniques
- List and describe commonly used validation controls in ASP.NET
- Explain how to use LINQ with ASP.NET
- Describe data caching

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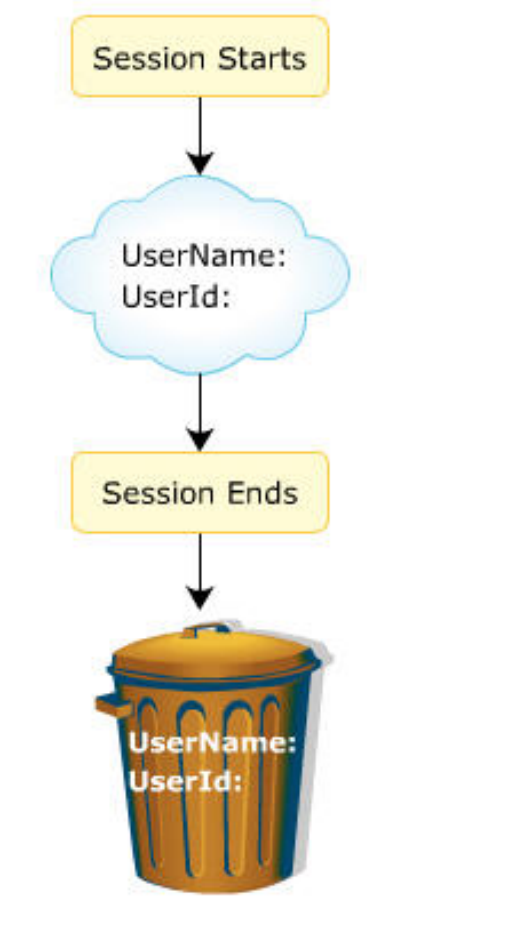
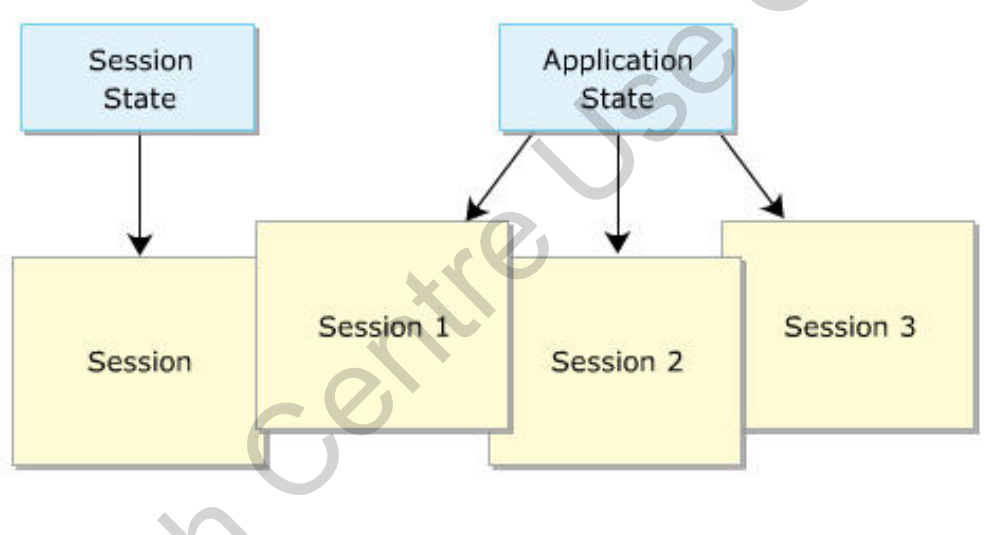
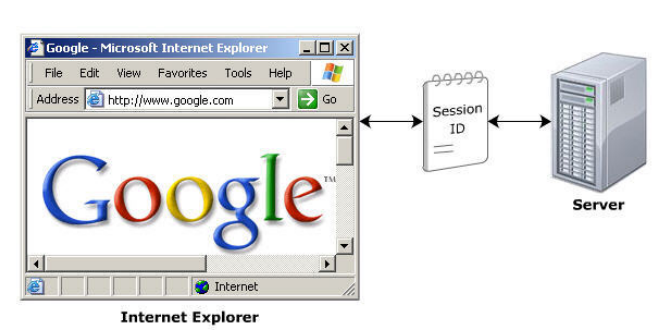
Managing State (1-2)







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Managing State (2-2)

- HTTP protocol is **stateless** as it removes all the resources or references working on a specific request in the past.
- **State management** manages page information and state over various requests for the same or different pages.
- Two methodologies available in ASP.NET: **client-side state management** and **server-side state management**.

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Client-side and Server-side State Management

Client-side State Management

- View State
- Control State
- Hidden Fields
- Query Strings
- Cookies

Server-side State Management

Application State

- Application state information is accessible to all pages, inspite of which user requests a page.

Session State

- Session state information is accessible to all pages accessed by a user during a single visit.

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ViewState

A page-level state management technique

Used for holding data temporarily

- Able to store any type of data
- Property dependent.

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Encryption of ViewState

- To improve security and avoid disruption from hackers and malicious users, developers should enable `ViewState encryption`.
- The default status of `ViewState` is **`active`**.
- It can be disabled by specifying the value of `EnableViewState` property for each Web control as false.

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Control State

Empowering the ViewState property

Describing a custom view

Declaring the ViewState property

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Hidden Fields

- Hidden fields are not displayed on the user browser.
- These fields are stored in a HTML form and available only when the form is processed.

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Query String

Query string is carried in the URL.

They are stored as key-value pair.

Query strings are maintained and passed from one page to second page and from the second page to the third page.

```
Response.Redirect("menu.aspx?
category=vegetarianfood");
```

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Cookies

- Cookies are small files generated in Web browser's memory or on the hard disk.
- Cookies contain a key/value pair
- Cookies can also be disabled or manually deleted by users, which makes them not so effective

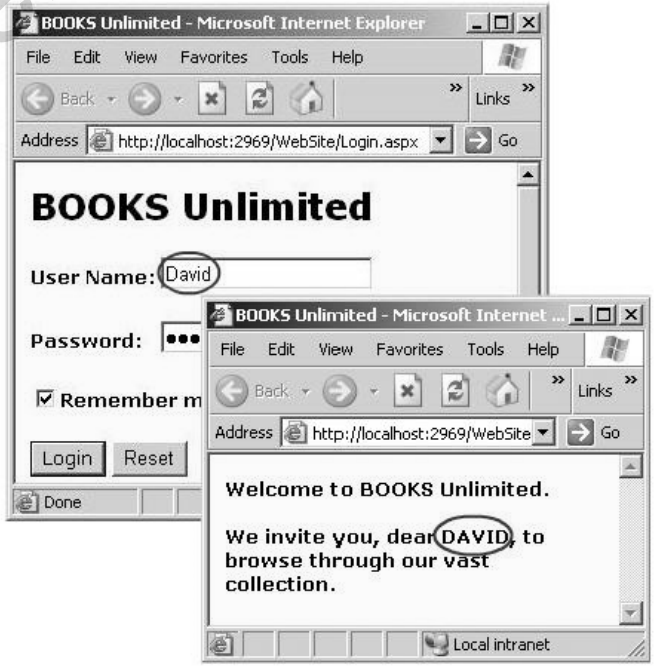
Transient Cookie (memory)

Accessible till the browser runs.

Persistent Cookie (hard disk)

Have expiry time.
When no expiry time is set,
treated as transient cookies.

Example:



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Session State (1-3)

- A new session object is generated whenever a user accesses an ASP.NET Website.
- 120-bit SessionID is used to track the sessions that are identified.

Properties	Description
SessionID	Is the unique session identifier.
Item(name)	HttpSessionState class has this as default property. It enables the session state item value with the specified name.
Count	Enables the number of items in session state collection.
TimeOut	Enables getting and setting the allowed time, in minutes, between requests and prior to the session-state provider terminating the session.

HttpSessionState Properties

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Session State (2-3)

Methods	Description
Add (name, value)	It adds an item to the session state collection.
Clear	Items from session state collection are removed.
Remove(name)	The specified item from the session state collection is removed.
RemoveAll	All keys and values are removed from session-state collection.
RemoveAt	It deletes an item at specified index from the session-state collection.

HttpSessionState Methods

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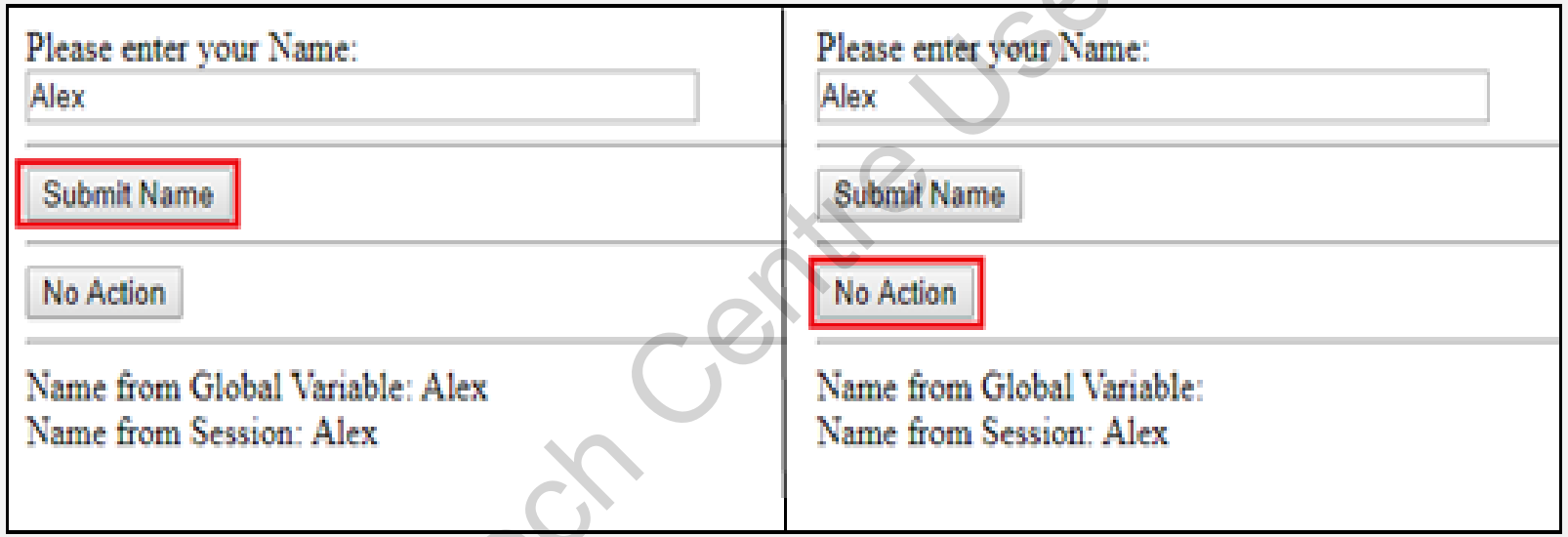
Session State (3-3)



Session State Page Displayed After Button Clicks

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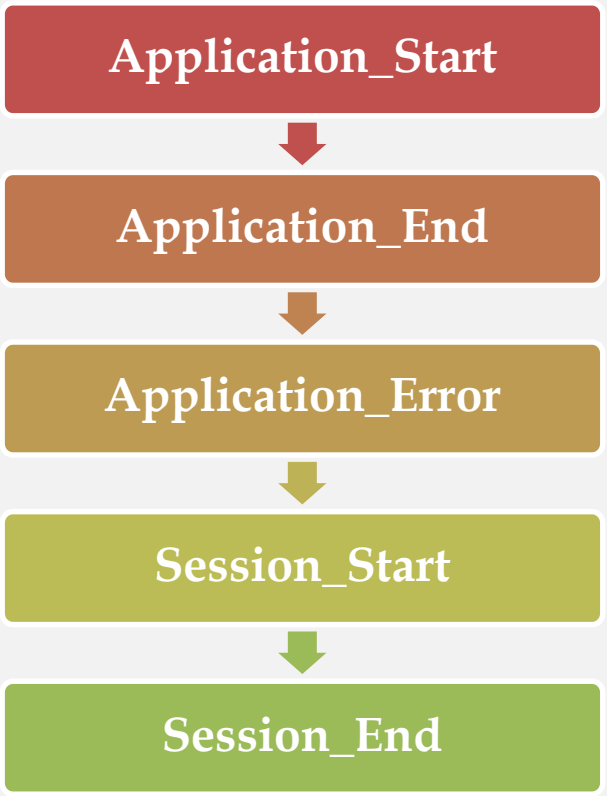
Application State (1-2)

All Web pages, additional files, and code stored on a Web-based server in a single virtual directory together form an ASP.NET application.

ASP.NET generates an application state object from the `HttpApplicationState` class and reserves this object in server memory. This object is represented by `Global.asax`.

Whenever information is embedded in application state, it is available to all the users.

Application state is primarily utilized for purposes such as generating hit counters, statistical data, or discount rate, to keep track of users accessing the Website.



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Application State (2-2)

Properties	Description
Item(name)	Is the default property. It specifies the value of the application state item with the name.
Count	Defines the number of items in the application state collection.

HttpApplicationState Properties

Methods	Description
Add(name, value)	Defines how an item is added to the application state collection.
Clear	Displays how to remove all the items from application state collection.
RemoveAt	Defines how to remove a HttpApplicationState object from a collection by index.
RemoveAll	Specifies how to remove all objects from an HttpApplicationState collection.
Lock()	Specifies how it locks the application state collection so it is available for current user only.
Unlock()	Displays how to unlock the application state collection so that users can access.

HttpApplicationState Methods

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Validation Controls (1-5)

- Data entered in input controls is validated using Validation controls in ASP.NET.

- All error messages are specified as property values of validation controls under `System.UI.WebControls` namespace.

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Validation Controls (2-5)

Validation Controls	Description	Properties
RequiredFieldValidator	When this validator is used against a control, a value is mandatory.	**ControlToValidate**: Allocates the control field for validation such as text box. **Initial Value**: Displays a default value in the control. This property can be used for a drop-down list. **Text**: Specifies the text value for the validation control, such as Name.

Validation Controls	Description	Properties
RangeValidator	Checks if an input control value is within a specified range of values. It can be used with mobile number, age, date of birth, and so on.	**ControlToValidate**: Sets the particular control to validate. **Minimum Value**: Holds the minimum valid range value. **Maximum value**: Holds the maximum valid range value. **Type**: Type properties should be set after the mentioned properties are set, if required. String: For a string data type Integer: For an Integer data type Double: For a double data type Currency: For a currency data type Date: For a date data type

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Validation Controls (3-5)

Validation Controls	Description	Properties
CompareValidator	Compares the values of two fields. The validator shows an error message in case both controls values are not same.	**ControlToValidate**: Sets the particular control to validate. **ControlToCompare**: Compares the value with ControlToValidate. **Operator**: Defines the type of comparison as follows: • Equal: It checks whether the compared values are equal. • Not Equal: Is used to verify that the controls are not equal to each other. • Greater than: Indicates greater than relationship. • GreaterThanEqual: Indicates GreaterThanEqual relationship. • LessThan: Indicates less than relationship. • LessThanEqual: Indicates less than equal relationship.

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Validation Controls (4-5)

Validation Controls	Description	Properties
RegularExpressionValidator	Checks whether the text matches a certain pattern.	\d: [0->9] : It takes value zero to nine \D: It takes a value except [0->9] \w: It takes value [a->z][A->Z][0->9] \s: indicates space \S: it takes other value other than space {Length}: indicates {min ,max} [ ]: indicates choice of given character(one out of them) ( ): indicates group of validator |: OR Special characters that can be used to define the number of times the preceded symbol is used: * : 0 -> indicates more numeric values + : 1 --> indicates more numeric values ? : indicates 0(min) or 1 (max)

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Validation Controls (5-5)

Validation Controls	Description	Properties
CustomValidator	Used for customizing and implementing data validation according to the specific condition and requirement.	ControlToValidate: Utilized to set the control field (text box) for validation. ValidateEmptyText: Utilized to set a Boolean value specifying whether blank text should be validated or not. ClientValidationFunction: Utilized to allocate the name of specified client-side script role used for validation.

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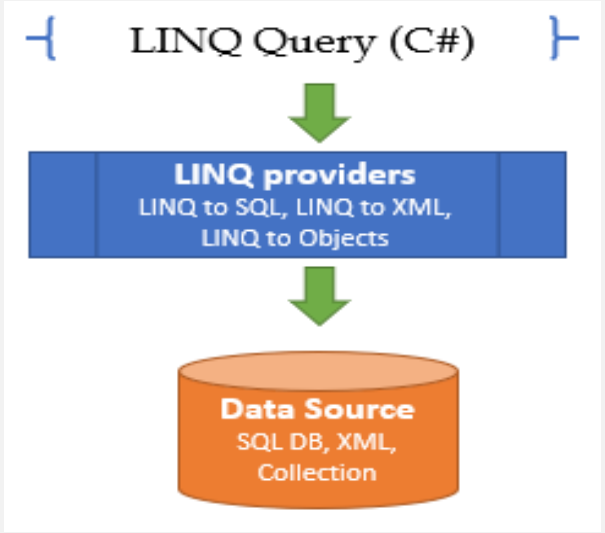
Using LINQ with ASP.NET

LINQ for objects to query in-memory collections

LINQ for SQL to query relational databases

LINQ for XML to query XML data

- LINQ stands for Language Integrated Query.
- It is used to facilitate consistent access to numerous data sources and XML.
- Custom data providers can be created using the extensibility feature of LINQ.



LINQ Providers

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Caching (1-2)

Caching is a process of retaining an in-memory copy of important and mostly used data/information.

The ASP.NET runtime contains a key-value map of CLR objects known as cache.

Cache is accessible through the `HttpContext` and `System.Web.UI.Page`.

Items in the cache can be accessed using an indexer.

Lifetime of objects in the cache can be controlled and links can be set up between the cached objects and their physical sources.

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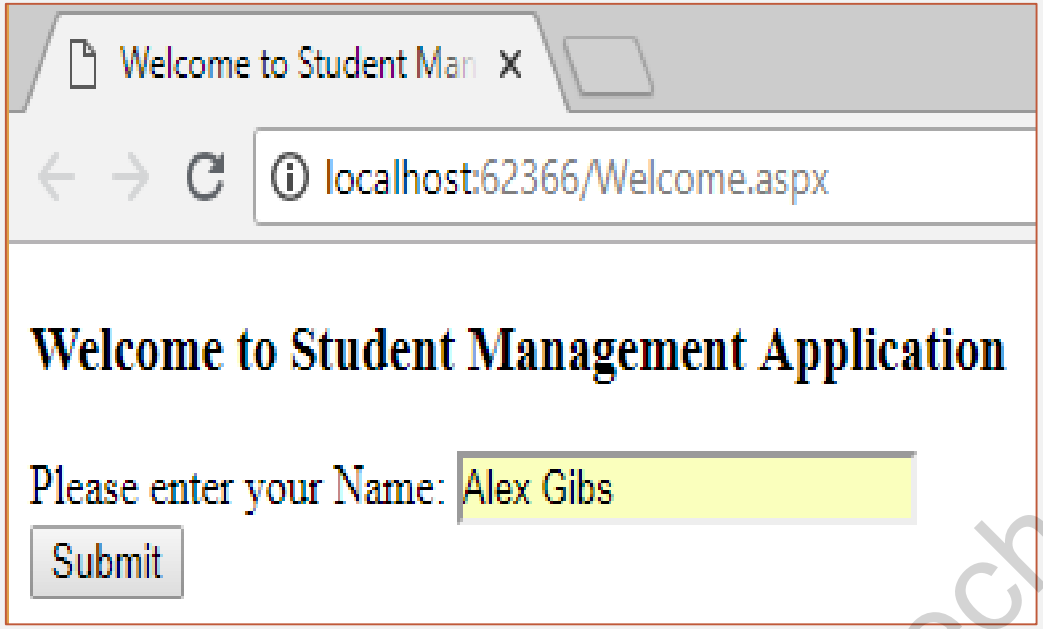
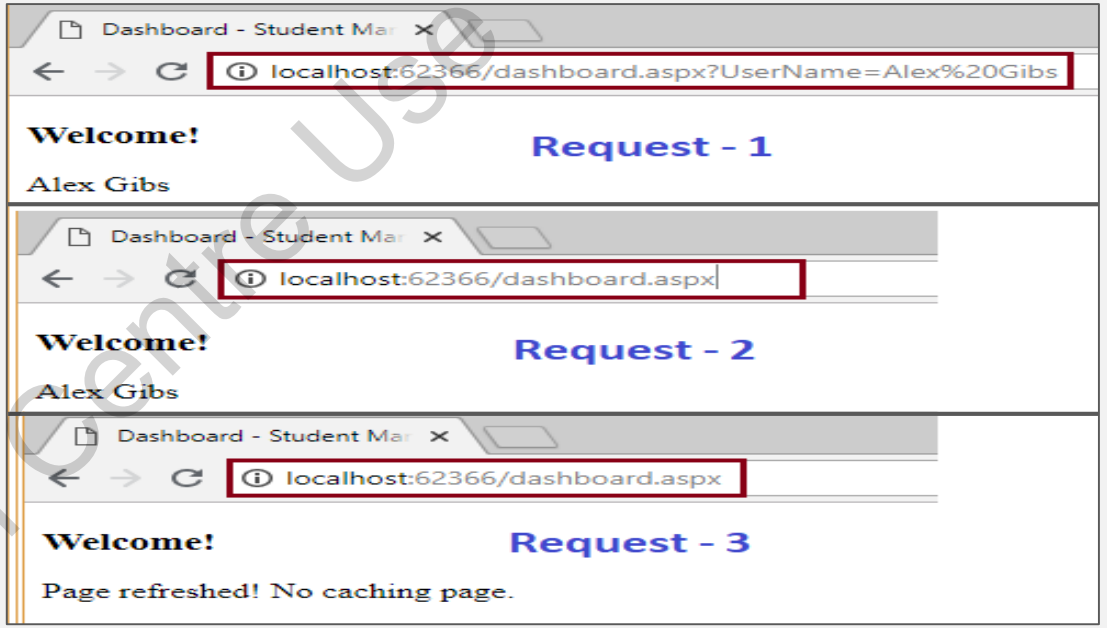
Caching (2-2)



Welcome page



Page Caching Demo

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Types of Caching

Output Caching

Stores a copy of the last published HTML page. When the next request comes for this page, the stored copy of HTML is dispatched.

Data Caching

Stores information such as `DataTable` or `DataSet` fetched from a database. Data caching is server friendly. If cache items become large, they can be deleted from the server memory. It can also be set to expire automatically.

Fragment Caching

Instead of an entire HTML, a portion of it can be cached.

Data Source Caching

Inbuilt data source controls such as `ObjectDataSoure`, `SqlDataSource`, and `XmlDataSource`.

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Output Caching

Attribute	Option	Description
NoStore	true/false	It specifies whether the 'no store' cache control header is passed or not.
VaryByParam	None Param-name	It shows a semicolon-delimited strings list defining query values of strings in a GET request or POST request variable.
VaryByCustom	Browser Custom string	It specifies ASP.NET to differ the output cache by the name of the browser and its version or through a custom string.
Location	Any Client Downstream Server None	Specifies which location to store the Cache.
Duration	Number	It indicates how many seconds the control or page is cached.

OutputCache Attributes

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Data Caching

- Data Caching is the most flexible type of caching.
- Basic principle is to add items that are expensive to create a special built-in collection object (called cache).
- Cache items are removed automatically when expired.

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Summary

- State management is a method that manages page information and state over various requests for the same or different pages.
- There are two state management types; the client-side management and server-side state management.
- The session state object stores and retrieves data from the session state. It is referred to as a name-value pair.
- Application state is primarily used to store statistical data and hit counters, and global application data such as tax and discount rates.
- Validation controls are utilized for validating the data supplied in input controls such as text box.
- LINQ stands for Language Integrated Query. Three main LINQ providers by Microsoft are namely, LINQ to objects, LINQ to SQL, and LINQ to XML.
- Caching refers to a method of saving an in-memory copy of significant and most-used data/information for enhancing the software system performance.
- There are two types of caching: output caching and data caching.

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