



.NET Core: Developing Cross-Platform Web Apps with ASP.NET Core – Workshop*PLUS*

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v3.0

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Module 6: Client-Side Development

Module Overview

Module 6: Client-Side Development

Section 1: ASP.NET MVC and JavaScript

Lesson: Project Templates

Why Use JavaScript in ASP.NET MVC?

- Combines server-side and client-side processing
- More responsive web applications
- JavaScript comes in many forms:
 - AJAX – Partial page update and refresh
 - JQuery – Elegantly and Efficiently find and manipulate HTML DOM elements
 - MooTools – Modular JavaScript and code reuse
 - Prototype – Simplify development of dynamic web application
 - Node.js – Developing high performance JavaScript using multithreading model
 - Industry standard for modern web development, etc.

Project Template – wwwroot Folder

- All static files should be located in this folder (JavaScripts, CSS, images or HTML files)
- wwwroot folder is the root of the website
 - `http://hostname/` points to wwwroot
 - All static content should be relative to the folder
- Code files should be placed outside of wwwroot (C# or Razor)
- Static files created through compilation or pre-processing should be copied into wwwroot
- Can be renamed by changing “webroot” setting in the *project.json* file

Project Template: JavaScript Libraries Part 1

- `_references.js`
 - Contains JavaScript reference in the form of comments
 - Allows Microsoft Visual Studio to augment IntelliSense support for JavaScript
 - The autosync flag set to true:
 - JavaScript files are automatically added
 - Automatic update when a referenced file is moved
 - Manual update is possible by right-clicking the file
- `Bootstrap.js` and `bootstrap.min.js`
 - HTML, CSS, and JavaScript-based design templates for creating responsive websites

Note: Always use the .min version of a JavaScript file to improve load time

Project Template: JavaScript Libraries Part 2

- Bootstrap-touch-carousel and hammer.js
 - A slideshow component for cycling through elements, like a carousel
 - Enable gestures on touch devices using hammer.js, a JavaScript library for multi-touch gestures

Project Template: JavaScript Libraries Part 3

- Jquery-version.intellisense.js
 - Extending IntelliSense for jQuery library
- Jquery-version.js and jquery-version.min.js
 - Main JQuery version
- Jquery-version.min.map
 - Allows to map to the un-minified version of JQuery for troubleshooting purposes
- Jquery.validate.js (Jquery.validate.min.js)
 - Provide client side validation using jQuery
 - Multilanguage support
- Jquery.validate.unobtrusive.js and jquery.validate.unobtrusive.min.js

Client-Side Development Configuration Files

- `gruntfile.js`
 - JavaScript configuration of Grunt tasks
- `gulpfile.js`
 - JavaScript configuration of Gulp tasks
- `Project.json`
 - Main project file. NuGet package dependencies are listed here
- `Package.json`
 - Lists npm packages
- `Bower.json`
 - Lists Bower packages

Demo: Default JavaScript Libraries

Module 6: Client-Side Development

Section 2: VS Client-side Dev Tooling

Lesson: Bower and Gulp

Why Use Gulp (or Grunt) and Bower?

- Modern web applications incorporate various and rich client-side libraries, such as jQuery, TypeScript, Bootstrap etc.
- Easy management of client-side packages
- Automating build tasks such as scripts compilation, bundling, minification or unit testing
- Use the existing tools from the web development community

What Is Bower?

- “A package manager for the web” (<http://bower.io>)
- Installs and restores client-side libraries
- Keeps track of all the packages in a manifest file, bower.json
- Improves page load

What is Gulp?

- “The JavaScript Task Runner” (<http://gulpjs.com>)
- An application to automate routine client-side development tasks (compilation, bundling, minification, unit testing, etc.)
- gulpfile.js contains Gulp tasks with JavaScript-like configuration
- Grunt is another task runner
 - Gulpfile.js uses JSON-like syntax for configuration

Bundling and Minification

- Bundling reduces the number of requests to the server
 - Combining multiple files into a single file
 - Create CSS, JavaScript and other bundles
 - Use the “Include” or “IncludeDirectory” of the Bundle Class
- Minification reduces the size of the requested assets (CSS and JavaScript)
- ASP.NET Core MVC uses Gulp or Grunt to achieve bundling and minification

Demo: Bower and Gulp

Module 6: Client-Side
Development

Section 3: Development
Techniques

Lesson: JavaScript and jQuery

Using JavaScript in MVC

- JavaScript scripts can be defined inside a View using the html script tag like in a html page
- Use the MVC @section tag to organize JavaScript scripts
 - The @RenderSection is used to inject JavaScript at a desired location inside the View
- For best practices, declare JavaScript scripts inside a .js file
- Use a minification tool in Visual Studio for optimization
- IntelliSense support for JavaScript in Visual Studio

jQuery and Microsoft

- Lightweight open source JavaScript library
- Deprecated Microsoft.Ajax libraries in favor of jQuery
- Distributed jQuery library with Visual Studio projects since 2008
- Extended Microsoft product support for jQuery
 - Enterprises can open jQuery support cases 24x7 with Microsoft Support
- Integrated Client template support
- Default templates use jQuery

jQuery

- Reduces client-side coding
- CSS 3-based syntax for traversing and manipulating DOM
- Concise wrappers for Ajax calls
- Abstracted to eliminate cross-browser differences
- Unobtrusive client validation
- XPath selectors to access elements in the DOM
- Elements are retrieved in the form of jQuery objects
- Start with `jquery()`, `jquery.`, `$()` or `$.` to use jQuery

jQuery: Selectors

- Execute commands on a single or multiple selected DOM elements
- Basic types of selectors:
 - Based on HTML elements IDs. For example, `$("#main")`
 - Based on cascading style sheets (CSS). For example, `$(".header")`
 - Based on element tags. For example, `$("div")`
 - Based on element attributes. For example, `$("[type = 'button']")`
- Build more complex selectors through combination
 - `$("#main p.quote")` ⇔ Select paragraphs with a "quote" CSS class located inside elements with IDs equal to "main"
- `$(this)` operator

jQuery: Selectors (continued)

- Specific operators are used to expand selection options
 - A white space selects all elements that are descendants of the given ancestor. For example, `$("div p")` \Leftrightarrow `$("div").find("p")`
 - The `>` operator selects direct child elements of the given ancestor. For example, `$("div > p")` \Leftrightarrow `$("div").children("p")`
 - The `+` operator selects adjacent elements. For example, `$("div + p")` \Leftrightarrow `$("div").next("p")`
 - The `~` operator selects all siblings elements. For example, `$("div ~ p")` \Leftrightarrow `$("div").nextall("p")`
 - The comma operator selects all the specified elements. For example, `$(div, p, a)`

jQuery: Filters

- Used with Selectors, or alone
 - **Positional filters** :first, :even, :eq(index), :gt(index), :not(selector) etc.
 - **Child filters** :nth-child(expression), :first-child, :only-child
 - **Content filters** :contains(text), has(selector), :parent, :empty
 - **Form filter** :visible, :hidden, :button, :input, :selected
- Can be chained by appending with colon (:) *

* Examples in the notes section:

jQuery: Methods

- Class/Style Methods
 - Used to apply CSS styles to the result of a selector
 - `.addClass()`, `.css()`, `.height()`, `.position()`
- DOM Methods
 - `.before()`, `.insertBefore()`, `.append()`, `.empty()`, `.attr()`

jQuery: Events

- jQuery simplifies events implementation
- Events are triggered by the page or end user's interaction
- Events are often used to attach a callback function
- To bind an event:
 - Use of function to bind a event directly. For example, `.click()`
 - Use `.on()` For example, `.on("click", ...)`
 - Use `.bind()` For example, `.bind("click", ...)`

Unobtrusive JavaScript

- Traditional use of JavaScript
 - `<input type="button" value="Click me" onclick="handleClick()" />`
- For cleaner HTML page, remove inline JavaScript references
- Use jQuery to attach handlers to DOM elements

```
<script type="text/javascript">
    $(document).ready(function () {
        $("button").bind("click", function () {
            alert("Hello World!");
        });
    });
</script>
<div>
    <input type="button" value="Click me" />
</div>
```

Demo: jQuery selectors and events

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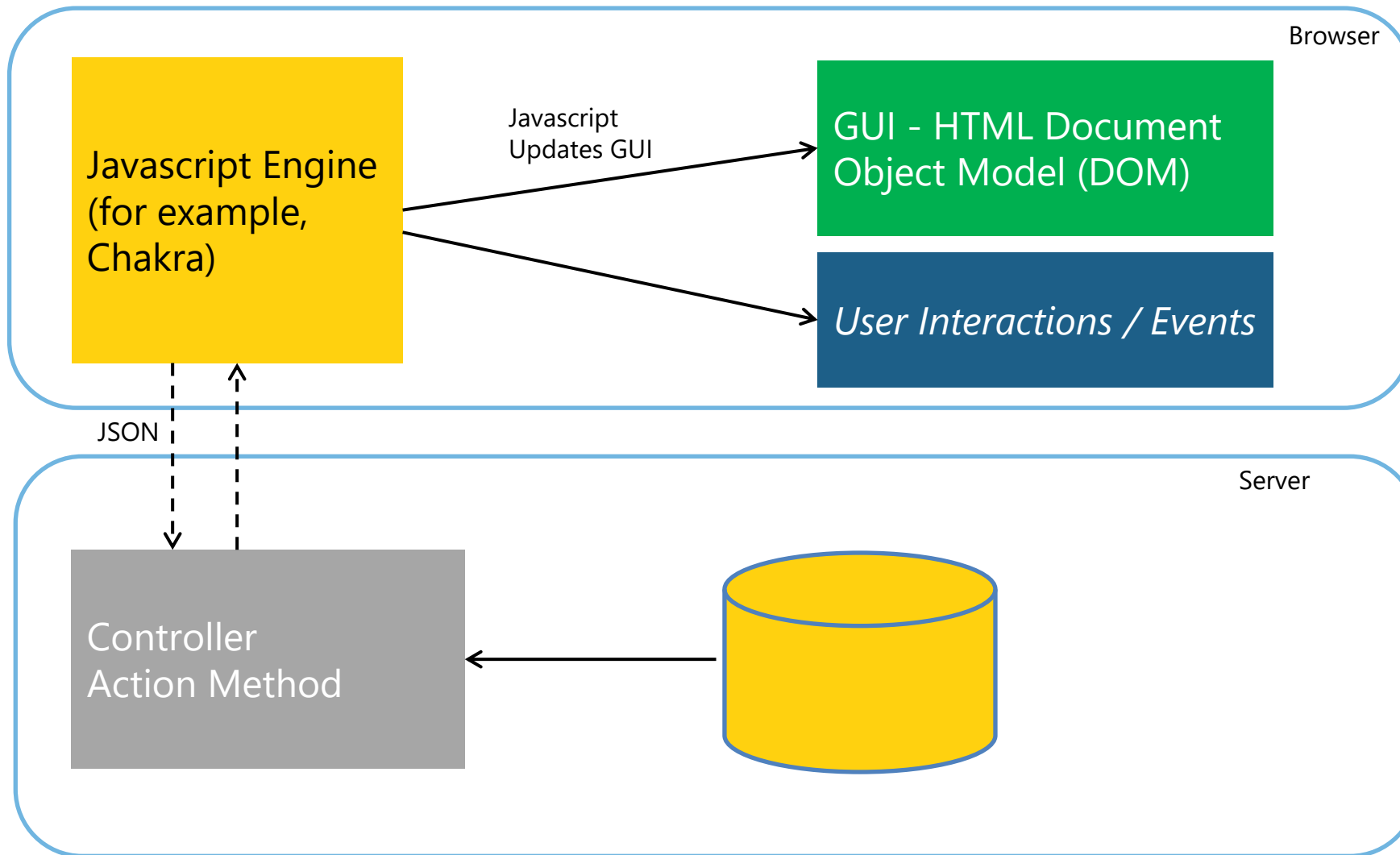
Section 3: Development
Techniques

Lesson: AJAX

AJAX: (Asynchronous JavaScript and XML)

- Send and receive data from a server asynchronously (in the background) – better performance
- Uses XMLHttpRequest object
- JSON typically used instead of XML
- Back button and bookmarking challenges
- Webcrawlers do not index pages created by Ajax
- Does not work across domains by default

AJAX Engine



AJAX in JQuery

- Simplifies Ajax implementation in JavaScript
- The full-feature `.ajax()` method performs an asynchronous HTTP (Ajax) request
- Shortcuts: `.get()`, `.getScript()`, `.getJSON()`, `.post()`, `.load()`

Ajax in Actions

- Create a new ActionMethodSelectorAttribute

```
[AttributeUsage(AttributeTargets.Class | AttributeTargets.Method)]
public class AcceptAjaxAttribute : ActionMethodSelectorAttribute
{
    public override bool IsValidForRequest(
        ControllerContext controllerContext, MethodInfo methodInfo)
    {
        return controllerContext.HttpContext
            .Request.IsAjaxRequest();
    }
}

[AcceptAjax]
public ActionResult Details(int id)
{
    var employee = _repository.FindEmployee(id);
    return View(employee);
}
```

Demo: AJAX

Module Summary

- In this module, you learnt about:
 - ASP.NET Core MVC support for Client-side Technologies
 - Visual Studio Client-side Dev Tooling
 - JavaScript and jQuery
 - AJAX



Lab: Client-Side Development



