

.NET Framework: Developing Modern Web Apps with ASP.NET MVC

WorkshopPlus

< Engineer Name >

Premier Field Engineer

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How to View This Presentation

Switch to Notes Page view:

Click **View** on the ribbon and select **Notes Page**

Use page up or page down to navigate

Zoom in or out as needed

In the Notes Page view you can:

Read any supporting text, now or after the delivery

Add your own notes

Take the presentation files home with you

Module 6: Client-Side Development

Module Overview

- MVC 6 support for client-side development
 - Client-side files in MVC 6 project templates
 - Bower, Gulpjs/Gruntjs
- Introduction to Bootstrap
- Primer on JavaScript, JQuery and AJAX
- Single Page Application explained (knockoutjs/angularjs)

Module 6: Client-Side Development

Section 1: Support

Lesson: MVC and JavaScript

Why using JavaScript in ASP.NET MVC?

- Combining 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 via multithreading model
 - Industry standard for modern web development
 - And many more

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 places 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 Visual Studio to augment IntelliSense support for JavaScript
 - The autosync flag set to true:
 - JavaScript files are automatically be added.
 - Automatic update when a referenced file is moved.
 - Manual update is possible via right clicking on the file.
- `Bootstrap.js` and `bootstrap.min.js`
 - HTML, CSS and JavaScript-based design templates for creating responsive web sites.
- Note! Always use the `.min` version of a JavaScript file to improve load time.

Project Template – JavaScript Libraries Part 2

- Bootstrap-touch-carousel & 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

- 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

Module 6: Client-Side Development

Section 1: Support

Lesson: Bower and Gulp

Why using 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.
- Leverage 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 automates 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).
- MVC 6 uses Gulp or Grunt to achieve bundling and minification.

Demo: Bower and Gulp

Module 6: Client-Side Development

Section 2: Techniques

Lesson: Styling with Bootstrap

Intro to Bootstrap



Bootstrap is the most popular HTML, CSS, and JS framework for developing responsive, mobile first projects on the web.

[Download Bootstrap](#)

Why use it?

- CSS is can be tricky
- Cross browser support can be a challenge
- Solves basic tasks (e.g. page layout without tables)
- Bootstrap 3 makes it easier

Browser Support

Support the latest version of browsers on the following systems:

	Chrome	Firefox	Internet Explorer	Opera	Safari
Android	✔ Supported	✔ Supported	N/A	✘ Not Supported	N/A
iOS	✔ Supported	N/A		✘ Not Supported	✔ Supported
Mac OS X	✔ Supported	✔ Supported		✔ Supported	✔ Supported
Windows	✔ Supported	✔ Supported	✔ Supported	✔ Supported	✘ Not Supported

Bootstrap Features

- Theme Support
- Responsive
- Grid
- Components
 - Pagination
 - Buttons
 - Modal
- Great Visual Studio support

Theme Support (Default)

ASP.NET 5 | Windows Linux OSX

Learn how to build ASP.NET apps that can run anywhere. [Learn More](#)

This application consists of:

- Sample pages showing basic nav
- Theming using [Bootstrap](#)

Customize app

- [Add Controllers and Views](#)
- [Add Data using EntityFramework](#)
- [Add Authentication using Identity](#)
- [Add real time support using SignalR](#)
- [Add Class library](#)
- [Add client packages using Bower](#)
- [Manage client packages using Grunt](#)
- [Develop on different platforms](#)

Run & Deploy

- [Run your app locally](#)
- [Run your app on ASP.NET Core 5](#)
- [Run commands defined in your project.json](#)
- [Publish to Microsoft Azure Web Sites](#)

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Easy Theme Support (Custom)

The screenshot shows a web browser window with the URL `http://localhost:30202/` and the page title `Home Page - MVC6`. The browser's address bar and navigation buttons are visible. The page content includes a navigation menu with `MVC6`, `Home`, `About`, and `Contact` links, and `Register` and `Log in` buttons. The main content area has a blue background with the text `ASP.NET 5`, `Windows`, `Linux`, and `OSX`. Below this is a call to action: `Learn how to build ASP.NET apps that can run anywhere.` with a `Learn More` button. The footer is dark blue and contains three columns of text: `This application consists of:`, `Customize app`, and `Run & Deploy`. The footer also includes a copyright notice: `© 2015 - MVC6`.

MVC6 Home About Contact Register Log in

ASP.NET 5 | Windows Linux OSX

Learn how to build ASP.NET apps that can run anywhere. [Learn More](#)

This application consists of:

- Sample pages showing basic nav
- Theming using `Bootstrap`

Customize app

- Add Controllers and Views
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- Develop on different platforms

Run & Deploy

- Run your app locally
- Run your app on ASP.NET Core 5
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- Publish to Microsoft Azure Web Sites

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Responsive Layout



One framework, every device.

Bootstrap easily and efficiently scales your project with one code base, from phones to tablets to desktops.

Responsive Layout

Grid System

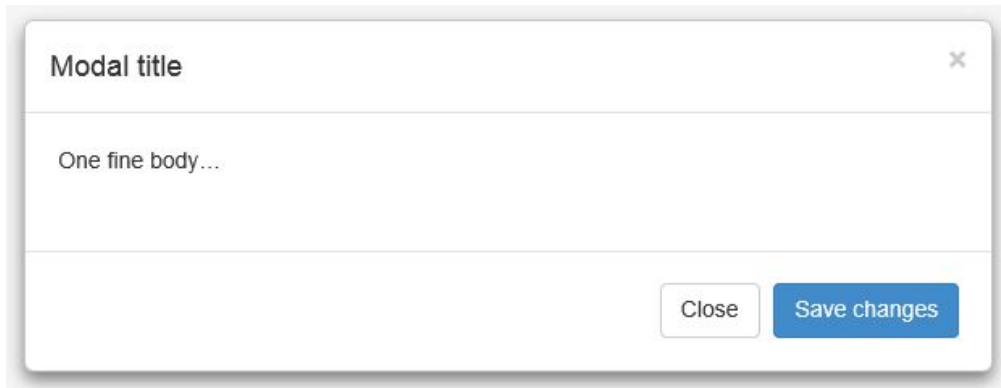
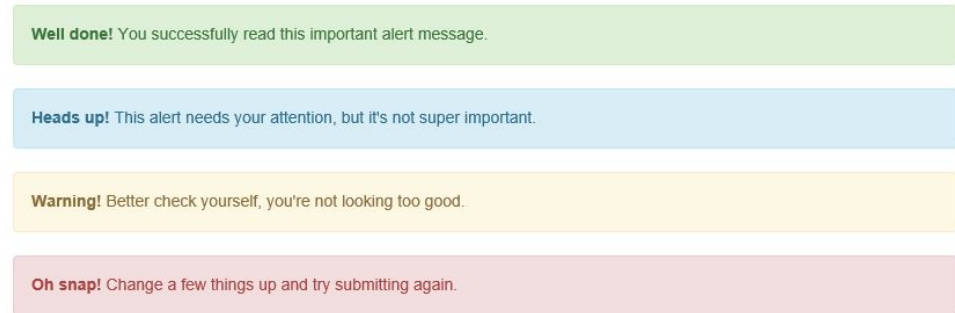
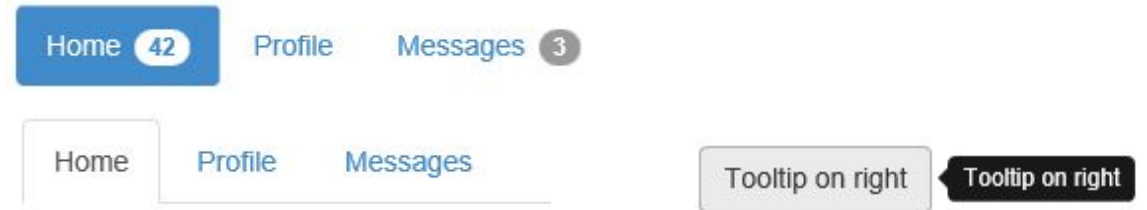
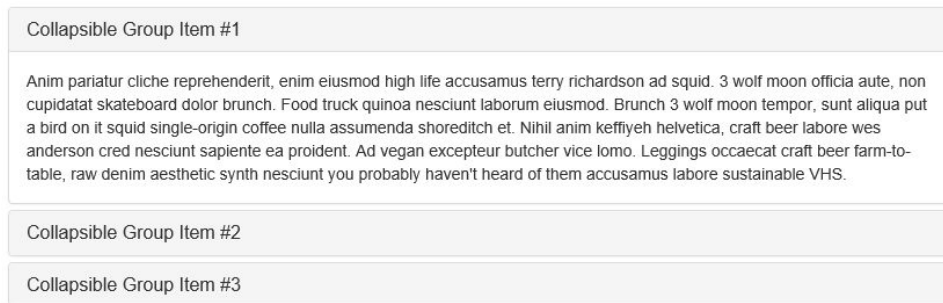
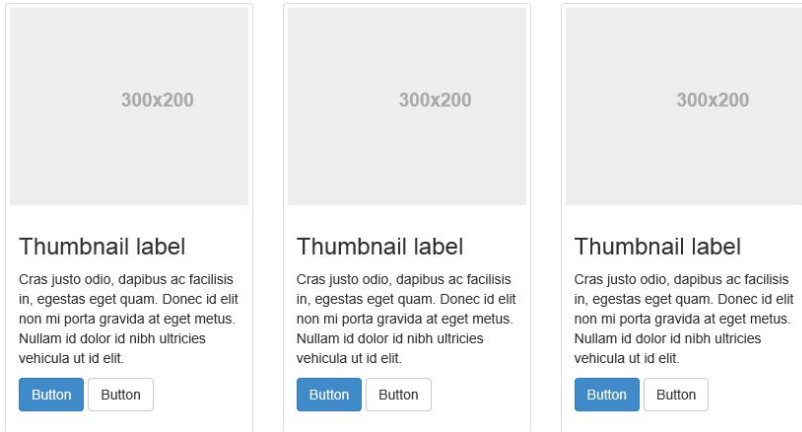
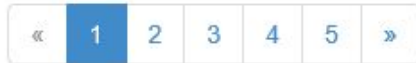
	Extra small devices Phones (<768px)	Small devices Tablets (≥768px)	Medium devices Desktops (≥992px)	Large devices Desktops (≥1200px)
Grid behavior	Horizontal at all times	Collapsed to start, horizontal above breakpoints		
Container width	None (auto)	750px	970px	1170px
Class prefix	.col-xs-	.col-sm-	.col-md-	.col-lg-
# of columns	12			
Column width	Auto	60px	78px	95px
Gutter width	30px (15px on each side of a column)			

Grid System

.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1
.col-md-8								.col-md-4			
.col-md-4			.col-md-4					.col-md-4			
.col-md-6						.col-md-6					

Components

- Reusable components built to provide navigation, alerts, progress bars, pagination and many more.



Visual Studio – Class Intellisense

```
<div class="row">
```

```
<div class="col-md-"
```

- col-md-1
- col-md-10
- col-md-11
- col-md-12
- col-md-2
- col-md-3
- col-md-4
- col-md-5
- col-md-6

Visual Studio – Missing Class Detection

```
<div class="col-md-4">
```

```
<div class="btn-primary"></div>
```

When using "btn-primary", you must also specify the class "btn".

Module 6: Client-Side Development

Section 2: Techniques

Lesson: JavaScript and jQuery

Using JavaScript in MVC 6

- 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 leverage 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 e.g.: `$("#main")`
 - Based on cascading style sheets (CSS) e.g.: `$(".header")`
 - Based on element tags e.g.: `$("div")`
 - Based on element attributes e.g.: `$("[type = 'button']")`
- Build more complex selectors through combination
 - `$("#main p.quote")` \Leftrightarrow Select paragraphs with a "quote" CSS class located inside elements with IDs equal to "main"
- `$(this)` operator

jQuery: Selectors (continue)

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

jQuery: Methods

- Class/Style Methods
 - Use 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 e.g.: `.click()`
 - Use `.on()` e.g.: `.on("click", ...)`
 - Use `.bind()` e.g.: `.bind("click", ...)`
 - Use `.live()` e.g.: `.live("click, ...)`

Unobtrusive JavaScript

- Traditional use of JavaScript
 - `<input type="button" value="Click me" onclick="handleClick()" />`
- For cleaner HTML page, remove inline JavaScript references.
- jQuery makes it easy 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>
```

Module 6: Client-Side Development

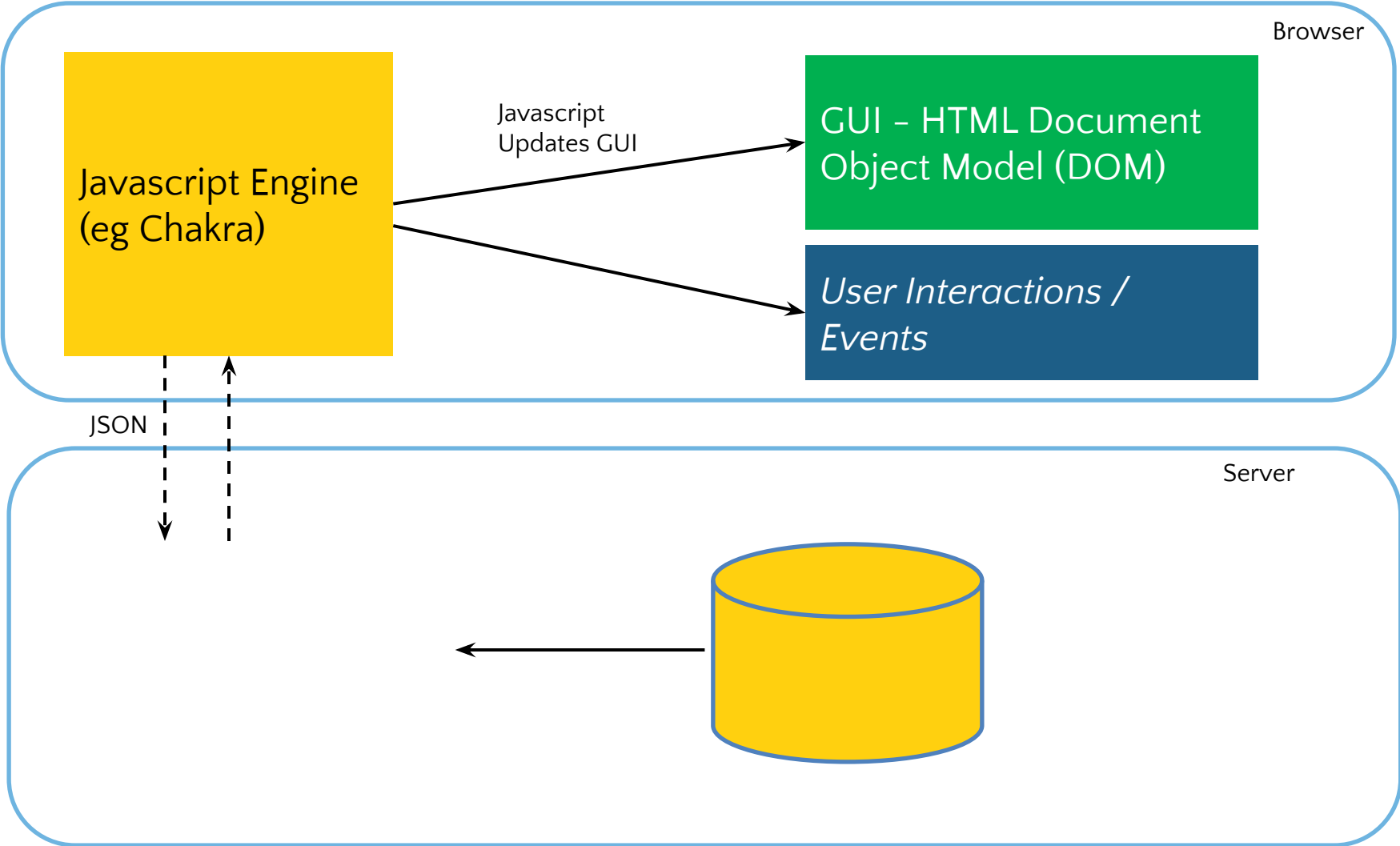
Section 2: Techniques

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
- Downgrade challenges for mobile devices that don't support JavaScript.
- Webcrawlers don't index pages created via Ajax
- Does not work across domains by default

AJAX Engine

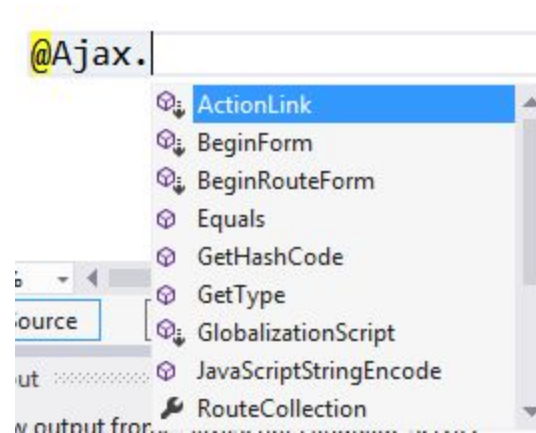


AJAX in JQuery

- Simplifies AJAX implementation in JavaScript.
- The full-feature `.ajax()` method Perform an asynchronous HTTP (Ajax) request.
- Shortcuts: `.get()`, `.getScript()`, `.getJSON()`, `.post()`, `.load()`.
- `$.ajaxSetup()` method specifies settings for an Ajax call.

MVC's AJAX Helpers

- Methods providing and simplifying client-side functionality implementation in MVC.
 - Asynchronous forms and rendering links
- Methods and extensions are called using the Ajax property of the view.
- Use `Request.IsAjaxRequest()` for checking Ajax requests



Ajax in Actions – Get Request

- Either enable Get requests in code like this:

```
public ActionResult Details(int id)
{
    var employee = _repository.FindEmployee(id);
    if (Request.IsAjaxRequest())
    {
        return Json(employee,
            JsonRequestBehavior.AllowGet);
    }
    return View(employee);
}
```

Ajax in Actions

- Or 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);
}
```


Module 6: Client-Side Development

Section 3: Single Page Application

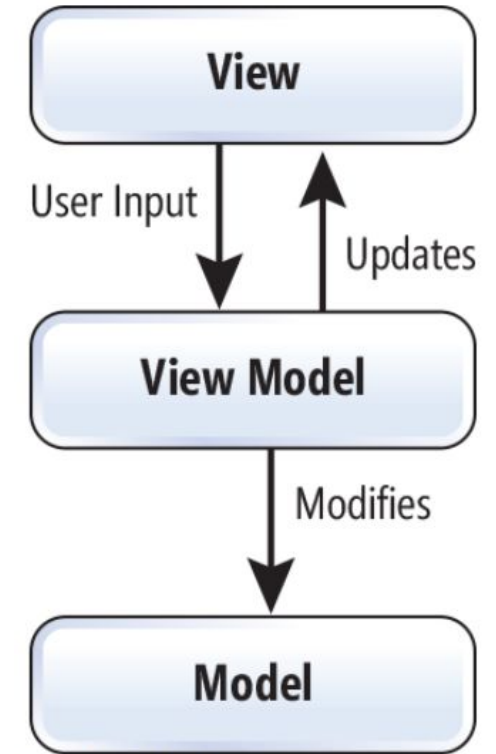
Lesson: Fundamentals

Single Page Application (SPA)

- In traditional web application, the server responds to new page requests.
- In SPA, the full page is loaded at initial request.
- Subsequent interactions take place through Ajax requests without full page reload.
- Better user experience
- Some SPA frameworks
 - AngularJS
 - KnockoutJS
 - Backbone
 - EmberJS
 - DurandalJS
 - Hot Towel

SPA – Design

- Model View View Model (MVVM) model
- Variance of MVC
- View faces the user
- Commands within the ViewModel are triggered by the View
- Changes in the ViewModel cause events that make the View update itself
- If a new View is required, the ViewModel communicates this with the application to redirect the user
- Model is the same



MVVM in general

- Main point in MVVM is the binding of data in the Model automatically to the View
 - MVVM is widely used with Silverlight and WPF projects (where data binding is “built-in”)
 - When MVVM is used with ASP.NET, view-model resides in client side (JavaScript)
- Best choice for a “modern application”
 - No postbacks and less page loads
 - More asynchronous operations that don’t “freeze” the browser
 - Brings application look and feel to “web pages”

MVVM advantages

- Provides same separation benefits as MVC pattern
 - Separation of responsibilities between development teams
 - Separation of concerns between business logic and presentation
- Model is not directly exposed to client like MVC
- Works best with
 - Silverlight and WPF applications
 - Single-page web applications
 - Web applications with wizards or processes

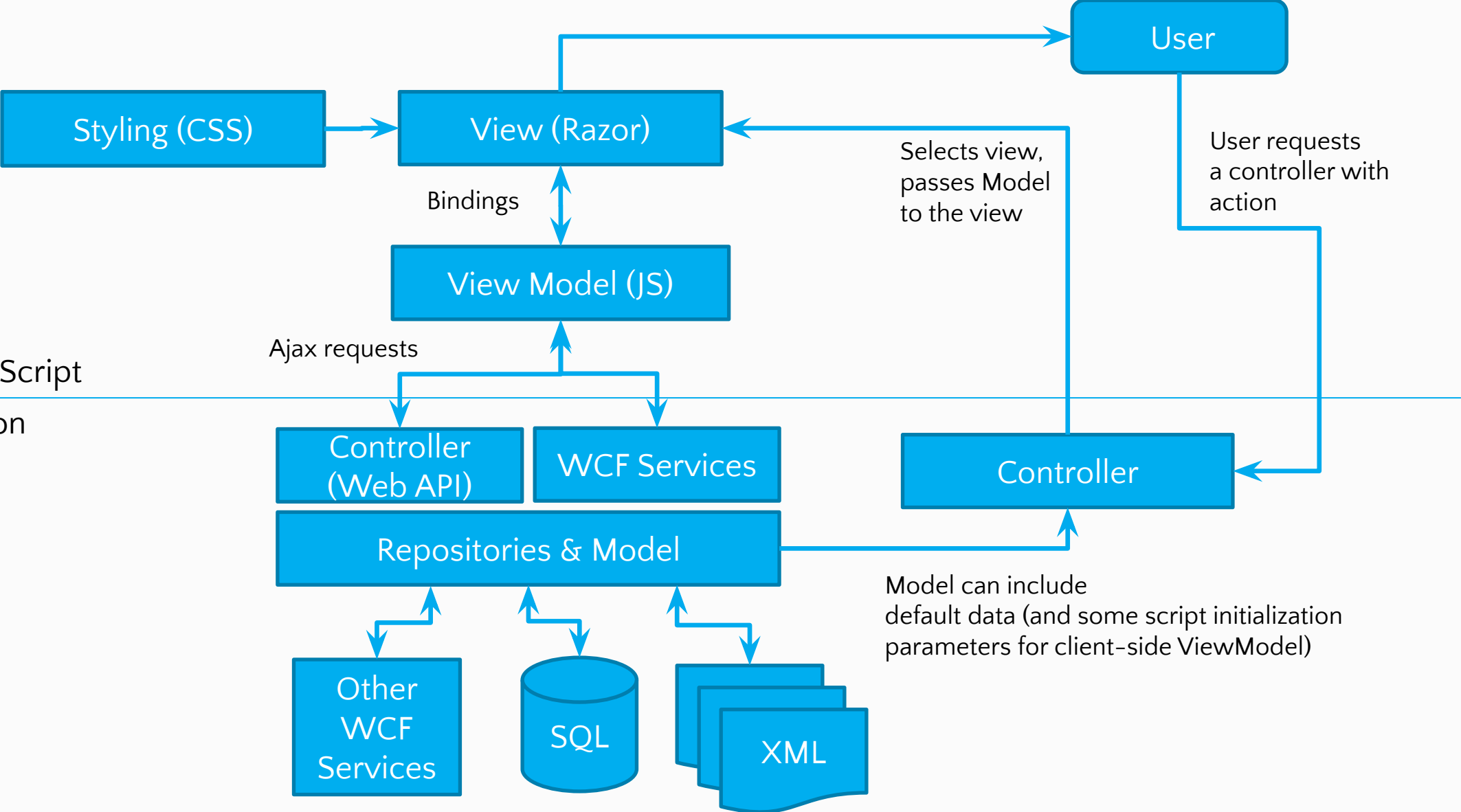
MVVM disadvantages

- Data-bindings are harder to debug
- ViewModel can be hard to design up front
 - But while using agile development methods this shouldn't be a problem
- With Large development teams, ViewModel can be easily “polluted” with duplicated code
 - Don't allow everyone in the team to make changes to ViewModel
- Data-binding to custom or 3rd party components can be complex or sometimes even impossible

Bringing MVVM to ASP.NET MVC

- You don't need to have multiple views per controller, changing the UI will be controlled by the ViewModel
 - One view can have several div-elements and their visibility is controlled by the ViewModel
- Think the server side as “initializer” and data provider
 - After 1st page load is completed, everything happens on client side
 - Except when UI needs updated data from server and executes an AJAX request
- You can use all ASP.NET MVC features the way you have used them before
- But you need to code a lot more in JavaScript

How it works



Using 3rd party MVVM-libraries

- There is no point in building scripts required for automatic binding from scratch
- ASP.NET MVC 6 is fully integrated with 3rd party libraries like:
 - knockoutJS (<http://knckoutjs.com>)
 - angularJS (<https://angularjs.org/>)
- Remember to use Bower and Grunt/Gulp to install 3rd party libraries

KnockoutJS example: Model to View

```
<div>
  <p>First name: <input data-bind="value:firstName, valueUpdate: 'keyup'" /></p>
  <p>Last name: <input data-bind="value:lastName, valueUpdate: 'keyup'" /></p>
  <p data-bind="text:fullName"></p>
</div>
<script type="text/javascript">
  var viewModel = function(){
    this.firstName= ko.observable('John');
    this.lastName = ko.observable('Doe');

    this.fullName = ko.computed(function(){
      return this.firstName() + ' ' + this.lastName();
    },this);
  };
  ko.applyBindings(new viewModel());
</script>
```

View
Mode
|

Mode

KnockoutJS automatically binds
(or "injects") the data into HTML

← When this gets
executed...

KnockoutJS example: View to Model

```
<div>
  <p>First name: <input data-bind="value:firstName, valueUpdate: 'keyup'" /></p>
  <p>Last name: <input data-bind="value:lastName, valueUpdate: 'keyup'" /></p>
  <p data-bind="text:fullName"></p>
</div>
<script type="text/javascript">
  var viewModel = function(){
    this.firstName= ko.observable('John');
    this.lastName = ko.observable('Doe');

    this.fullName = ko.computed(function(){
      return this.firstName() + ' ' + this.lastName();
    },this);
  };
  ko.applyBindings(new viewModel());
</script>
```

View
Mode
|

Mode

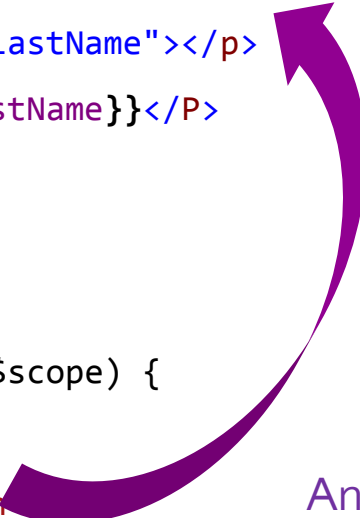
KnockoutJS automatically binds (or "updates") the data back into the model

AngularJS example: Model to View

```
<div ng-app="myapp">
  <div ng-controller="MyController">
    <p>First name: <input ng-model="viewModel.firstName"></p>
    <p>Last name: <input ng-model="viewModel.lastName"></p>
    <p>{{viewModel.firstName}} {{viewModel.lastName}}</P>
  </div>
  <script>
    angular.module("myapp", [])
      .controller("MyController", function($scope) {
        $scope.viewModel = {};
        $scope.viewModel.firstName = "John";
        $scope.viewModel.lastName = "Doe";
      });
  </script>
</div>
```

View
Mode

Mode



AngularJS automatically binds (or "injects") the data into HTML

First contact with Angular.js

MV* framework

For **S**ingle **P**age **A**pplication

```
<script src="angular.min.js"></script>
```

Latest version here:

<http://code.angularjs.org/>

New constructs

- Data binding, as in `{{}}`
- DOM control structures for repeating/hiding DOM fragments
- Support for forms and form validation
- Attaching code-behind to DOM elements
- Grouping of HTML into reusable components

Concepts

Concept	Description
Template	HTML with additional markup
Directives	extend HTML with custom attributes and elements
Model	the data shown to the user in the view and with which the user interacts
Scope	context where the model is stored so that controllers, directives and expressions can access it
Expressions	access variables and functions from the scope
Compiler	parses the template and instantiates directives and expressions
Filter	formats the value of an expression for display to the user
View	what the user sees (the DOM)
Data Binding	sync data between the model and the view
Controller	the business logic behind views
Dependency Injection	Creates and wires objects and functions
Injector	dependency injection container
Module	a container for the different parts of an app including controllers, services, filters, directives which configures the Injector
Service	reusable business logic independent of views

Controllers

What is a Controller?

Controllers

index.html

```
<body ng-controller="cardsListController">
  <div id="cardsList">
    <div ng-repeat="card in cards" class="cardItem">
      Card {{card.id}}
    </div>
  </div>
</body>
```

cardsController.js

```
var cardsControllers = angular.module('cardsControllers', []);

cardsControllers.controller('cardsListController', ['$scope', function ($scope) {
  var cards = [{ id: 10 }, { id: 11 }];

  $scope.cards = cards;
}]);
```

Controllers

What shouldn't a controller do?

Magic the Gathering

1. Open **CA.1**
2. Implement the **cardsListController**
3. It should set **\$scope.cards** to an array of JS objects with an **id** property. (**see index.html**)

Modules

What is a Module?

You can think of a module as a container for the different parts of your app – controllers, services, filters, directives, etc.

Modules

```
var app = angular.module('workshop', []);

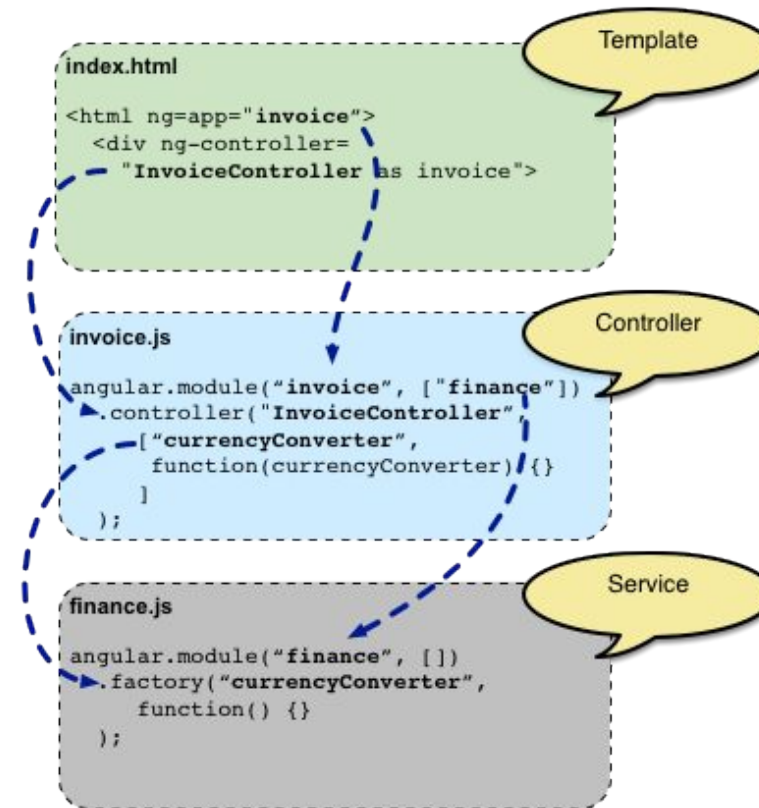
app.controller('workshopController', workshopController);

function workshopController($scope) {
    $scope.name = "Building Single Page Applications with ASP.NET and Angular.js";
    $scope.duration = "9:00 AM - 5:00 PM Tuesday and Wednesday.";

    $scope.getDescription = function () {
        return $scope.name + " - " + $scope.duration;
    }

    Object.defineProperty($scope, 'description', {
        get: function () { return this.getDescription(); }
    });
}
```

Modules



Modules

```
angular.module('myModule', []).  
  config(function (injectables) { // provider-injector  
    // This is an example of config block.  
    // You can have as many of these as you want.  
    // You can only inject Providers (not instances)  
    // into config blocks.  
  }).  
  run(function (injectables) { // instance-injector  
    // This is an example of a run block.  
    // You can have as many of these as you want.  
    // You can only inject instances (not Providers)  
    // into run blocks  
  });
```

Dependency Injection

What is Dependency Injection?

How can a component get ahold of its dependencies?

Dependency Injection

It can...

- create the dependency, typically using the new operator.
- look up the dependency, by referring to a global variable.
- have the dependency passed to it where it is needed.

Dependency Injection

How does the injector locate dependencies?

Implicit location

Dependency Injection

Assume the parameter names are names of services

```
cardsListController = function($scope, shuffler) {  
    var cards = [{ id: 10 }, { id: 11 }];  
  
    $scope.cards = cards;  
    $scope.shuffle = function() { shuffler.shuffle(); }  
};
```

Q: Problems with this method?

Property Annotation

Dependency Injection

The \$inject property is an array of services to inject.

```
(function () {  
    'use strict';  
  
    angular  
        .module('app')  
        .controller('cardsController', cardsController);  
  
    cardsController.$inject = ['$http', '$scope'];  
  
    function cardsController($http, $scope) {  
    }  
})();
```

Q: Thoughts?

Inline Array Annotation

Dependency Injection

Define services inline when creating the controller.

```
angular
  .module('app')
  .controller('cardsController', ['$http', '$scope', function($http, $scope) {
    // implementation
  }]);
```

Q: Thoughts?

Magic the Gathering

1. Open **CA. 2**
2. In **cardsController.js**, create a **cardsController** module. Add **cardsListController** to it.
3. In **app.js**, create a **mainApp** module. Add **cardsController** as a dependency.

Getting data

\$http

\$resources

Filters

Promises

What is a promise?

Filters

Name	Description
<code>filter</code>	Selects a subset of items from <code>array</code> and returns it as a new array.
<code>currency</code>	Formats a number as a currency (ie \$1,234.56). When no currency symbol is provided, default symbol for current locale is used.
<code>number</code>	Formats a number as text.
<code>date</code>	Formats <code>date</code> to a string based on the requested <code>format</code> .
<code>json</code>	Allows you to convert a JavaScript object into JSON string.
<code>lowercase</code>	Converts string to lowercase.
<code>uppercase</code>	Converts string to uppercase.
<code>limitTo</code>	Creates a new array or string containing only a specified number of elements. The elements are taken from either the beginning or the end of the source array, string or number, as specified by the value and sign (positive or negative) of <code>limit</code> . If a number is used as input, it is converted to a string.
<code>orderBy</code>	Orders a specified <code>array</code> by the <code>expression</code> predicate. It is ordered alphabetically for strings and numerically for numbers. Note: if you notice numbers are not being sorted correctly, make sure they are actually being saved as numbers and not strings.

Lab Work

Hands On Lab: Build a Single Page Application (SPA) with ASP.NET Web API and Angular.js

Magic the Gathering

1. Open **CA.3**
2. Modify **cardsListController** to read the data from **all.json**.
3. Push each card from **all.json** onto the **\$scope.cards** array, so it's available in the view.

Routing and views

angular.js

angular-resource.js

angular-animate.js

angular-route.js

SPA uses views to build UI

Angular.js uses routing to define
views

Animations

Module Components

angular.js

angular-route.js

Routing

ngView

```
<body ng-app="mainApp" ng-controller="cardsListController">  
  <div ng-view id="mainView"></div>  
</body>
```

```
<section>  
    
  <div id="detailsPane">  
    <div class="rowHeader">Name:</div>  
    <div class="rowData">{{card.nameEn}}</div>  
    <div class="rowHeader">Type:</div>  
    <div class="rowData">{{card.typeEn}}</div>  
  </div>  
</section>
```

Routing

Route Provider

`$routeProvider` is used for configuring routes.

```
mainApp.config([
  '$routeProvider',
  function ($routeProvider) {
    $routeProvider.
      when('/cards', {
        templateUrl: 'Views/list.html',
        controller: 'cardsListController'
      }).
      otherwise({
        redirectTo: '/cards'
      });
  }
]);
```

Routing

Route Service

`$route` is used for deep-linking URLs to controllers and views.

```
angular.module('ngRouteExample', ['ngRoute'])

.controller('MainController', function ($scope, $route, $routeParams, $location) {
  $scope.$route = $route;
  $scope.$location = $location;
  $scope.$routeParams = $routeParams;
})
```

```
<div>
  <pre>$location.path() = {{$location.path()}}</pre>
  <pre>$route.current.templateUrl = {{$route.current.templateUrl}}</pre>
  <pre>$route.current.params = {{$route.current.params}}</pre>
  <pre>$route.current.scope.name = {{$route.current.scope.name}}</pre>
  <pre>$routeParams = {{$routeParams}}</pre>
</div>
```

Routing

Route Parameters

routeParams

```
cardsControllers.controller('cardDetailController', function ($scope, $routeParams) {  
    var cards = $scope.$parent.cards;  
    for (var index = 0; index < cards.length; index++) {  
        if (cards[index].id == $routeParams.cardId) {  
            $scope.card = cards[index];  
            break;  
        }  
    }  
});
```


ASP.NET +
Angular
Routing

HTML from view – no problem!
HTML file – use an IIS Rewrite rule

/cards.html -> /cards

Magic the Gathering

1. Open **CA.4**
2. Add a filter to **app.js** called **filterAndReduce**. Look at **index.html** to see the parameters it requires.
3. The query parameter is optional, and it filters cards by the **card.nameEn** property.
4. The count property is always used.

Magic the Gathering

1. Open **CA.5**
2. Create a route that responds to the URI **/cards** and displays **views/list.html**. The **cardsListController** should be executed.
3. Create a route that responds to the URI **/cards/10** and displays **views/detail.html**. The **cardDetailController** should be executed.
4. Create a catchall route that redirects to **/cards**

Productivity Tools



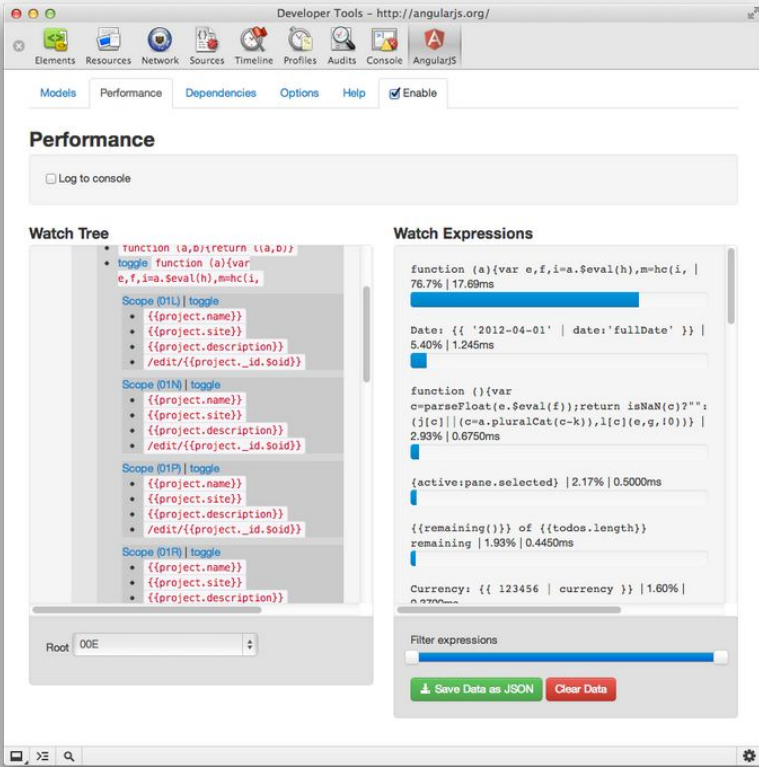
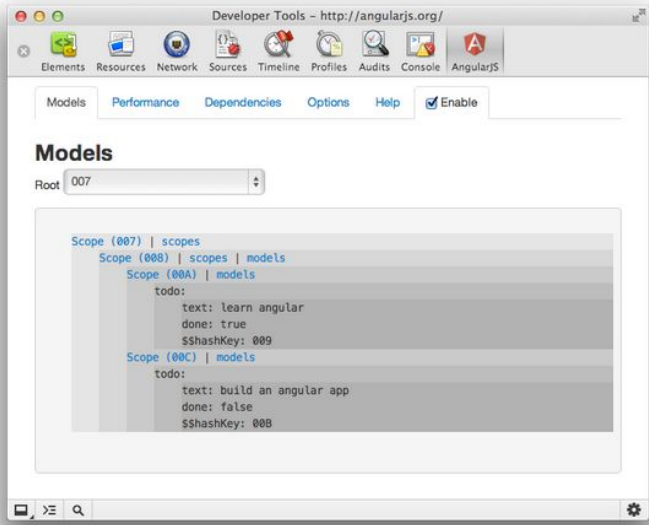
SideWaffle

Templates for Visual Studio 2012/2013

<http://www.sidewaffle.com>

Batarang – Chrome Extension

Productivity Tools



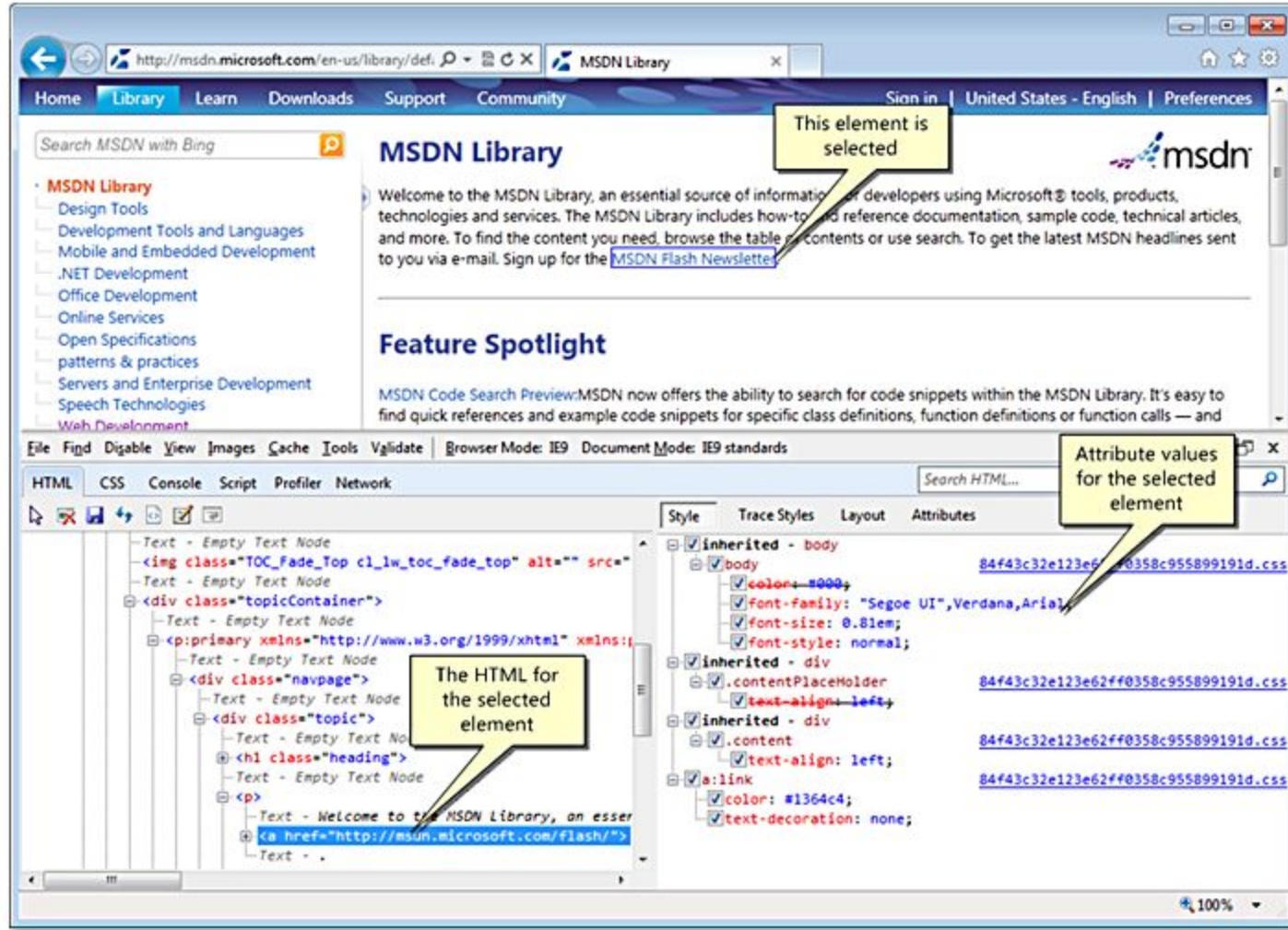
<https://github.com/angular/angularjs-batarang>

Module 6: Client-Side Development

Section 1: Development Tools

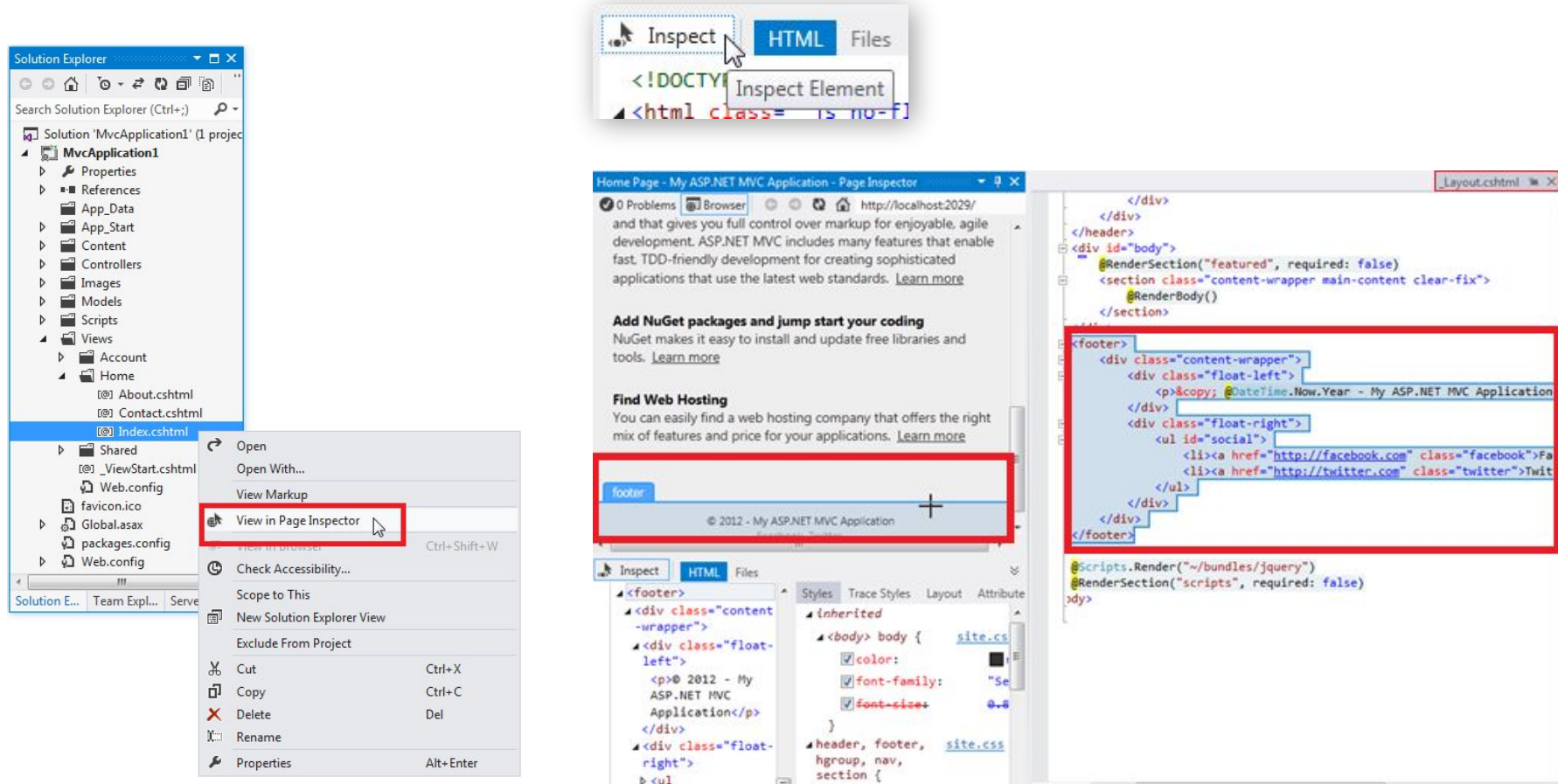
Lesson: Tools

jQuery – Tools / F12



jQuery – in Visual Studio

- Page Inspector



Module Summary

MVC 6 support for client-side through default project template

Bootstrap for UI styling

JavaScript, jQuery and AJAX for scripting

Single Page Application fundamentals and frameworks



Lab: Client-Side Development



