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ASP.NET MVC 5. Part 1

Overview. Controllers. Views.

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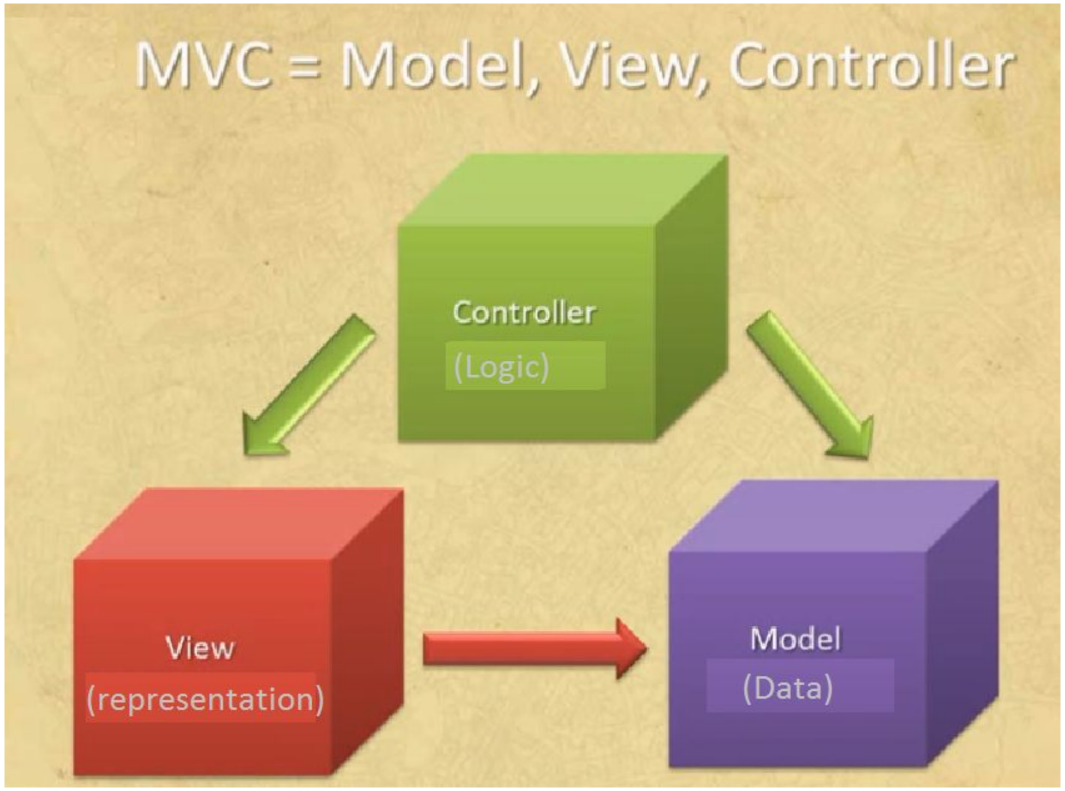
Reviewed by O. Konovalenko

Agenda

- ASP.NET Architecture
- ASP.NET MVC 3, 4, 5
- Controllers
- Views

MVC Pattern



- **Controller** – application logic. Communicate with user. It receives and handles user queries, interrupts with Model, and returns results by View objects
- **Model** – contains classes that represent data, performs operations with data-bases and organizes relations between data-classes.
- **View** – performs UI representation. Works with model.

ASP.NET Architecture

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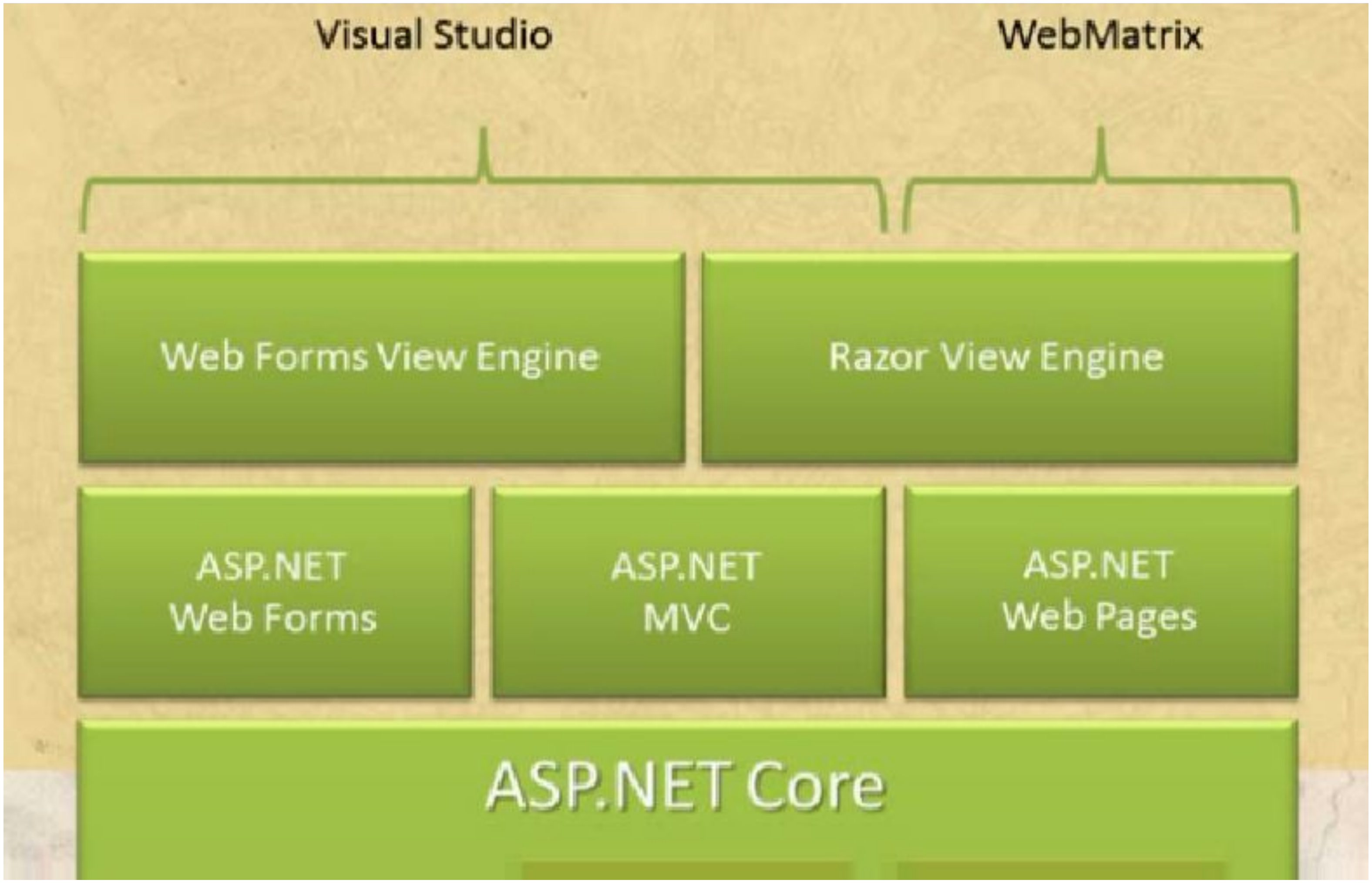
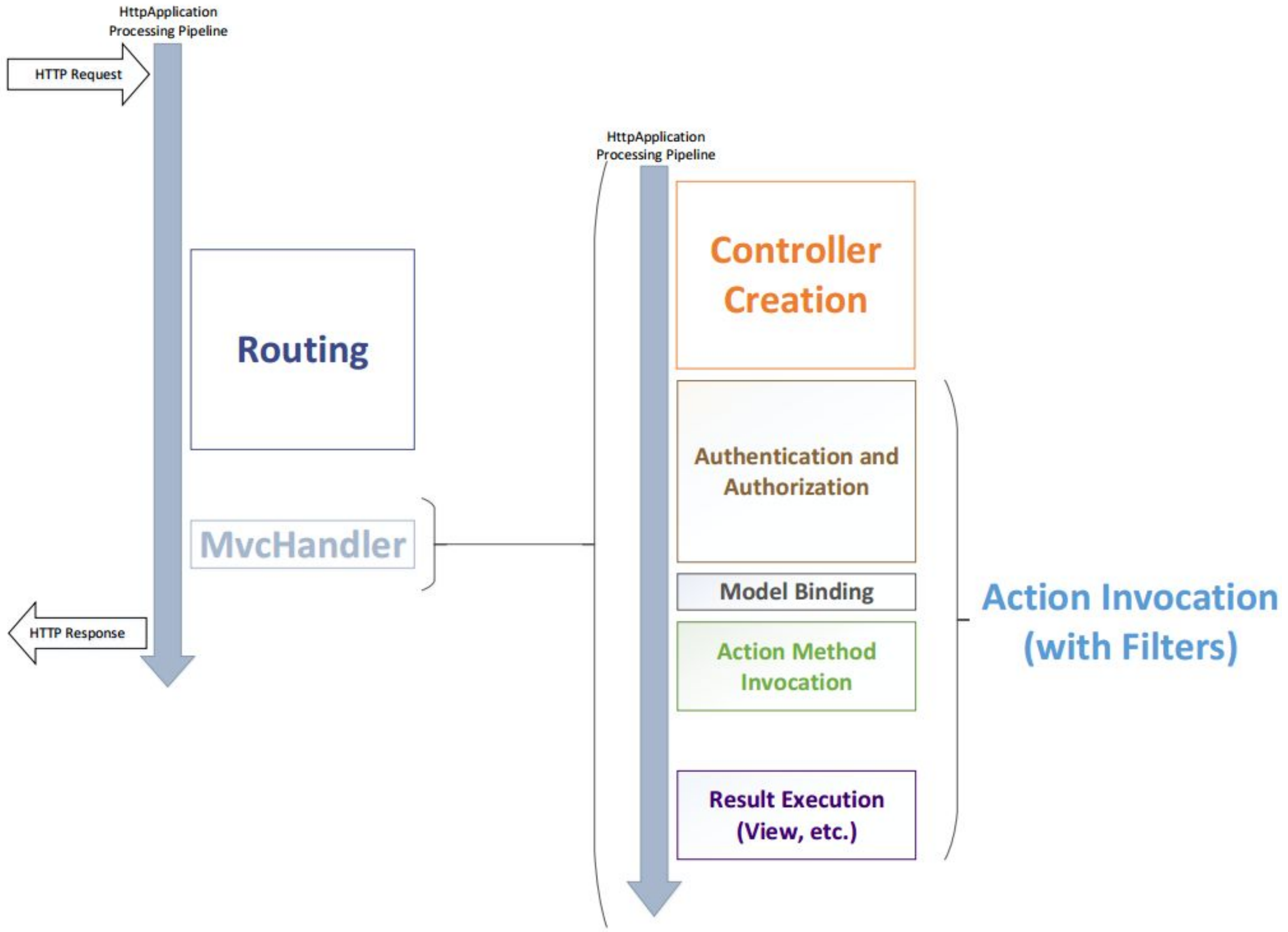


Lifecycle of an ASP.NET MVC 5 Application


HttpApplication Processing Pipeline
HTTP Request
Routing
MvcHandler
HTTP Response
HttpApplication Processing Pipeline
Controller Creation
Authentication and Authorization
Model Binding
Action Method Invocation
Result Execution (View, etc.)
Action Invocation (with Filters)

Benefits of ASP.NET MVC

- Higher quality requirements
  - Test Driven Development
- Cross platforms support
  - Windows, PDA, IPhone, …
- HTML code control
- Clear ULR navigation
  - http://musica.ua/groups/metallica
- Maintainable code and command work

What’s new in ASP.NET MVC 3

- Extensible Scaffolding with MvcScaffold integration
- HTML 5 enabled project templates
- The Razor View Engine
- Support for Multiple View Engines
- Controller Improvements
- JavaScript and Ajax
- Model Validation Improvements
- Dependency Injection Improvements

What’s new in ASP.NET MVC 4

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- ASP.NET Web API
- Enhancements to Default Project Templates
- Mobile Project Template and Empty Project Template
- jQuery Mobile, the View Switcher, and Browser Overriding
- Task Support for Asynchronous Controllers
- Azure SDK
- Database Migrations
- Add Controller to any project folder
- Bundling and Minification
- Enabling Logins from Facebook and Other Sites Using OAuth and OpenID

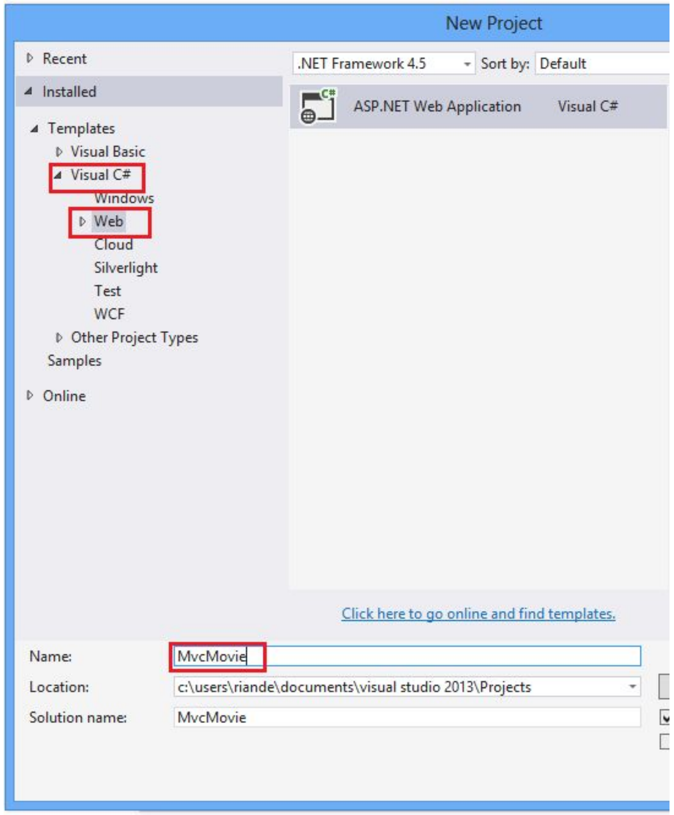
What's new in ASP.NET MVC 5

- One ASP.NET project template
- ASP.NET Identity
- Bootstrap
- Authentication filters
- Filter overrides
- Attribute routing

What’s new in ASP.NET MVC 5.1 & 5.2

- New Features in ASP.NET MVC 5.1
  - Attribute routing improvements
  - Bootstrap support for editor templates
  - Enum support in views
  - Unobtrusive validation for MinLength/MaxLength Attributes
  - Supporting the ‘this’ context in Unobtrusive Ajax
- New Features in ASP.NET MVC 5.2
  - Attribute routing improvements

Create ASP.NET MVC 5 Application



New Project

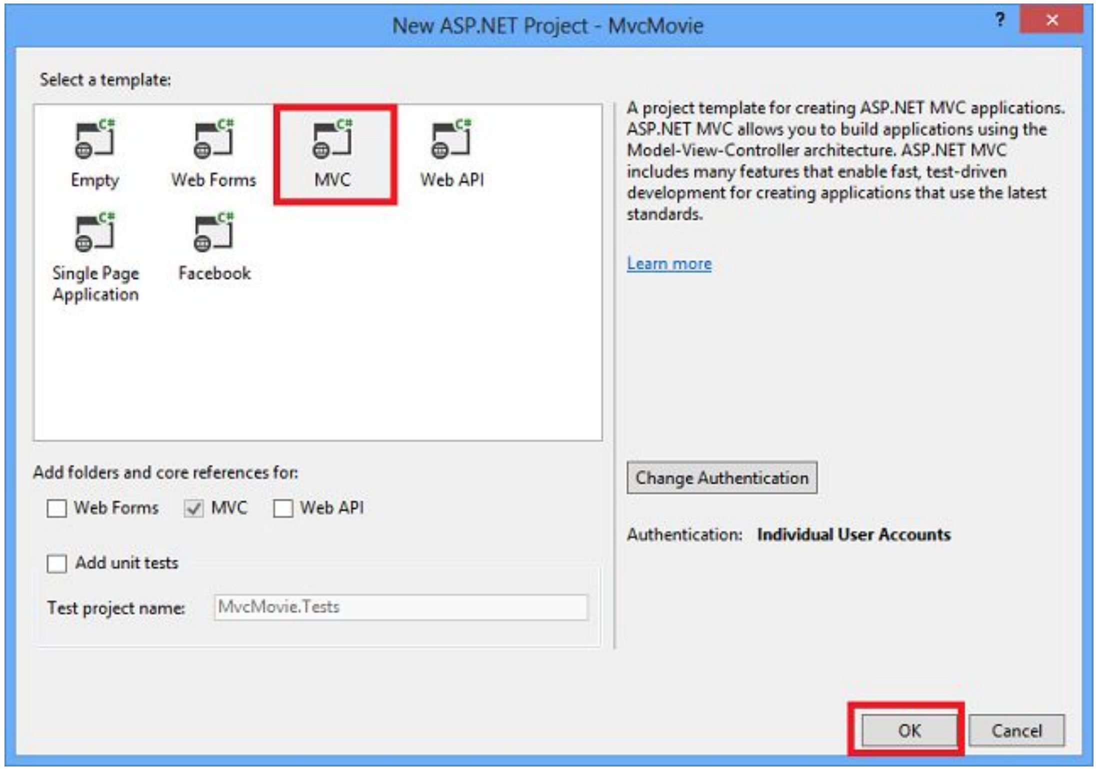
- Recent
- Installed
  - Templates
    - Visual Basic
    - Visual C#
      - Windows
      - Web
      - Cloud
      - Silverlight
      - Test
      - WCF
    - Other Project Types
  - Samples
- Online

.NET Framework 4.5 | Sort by: Default

ASP.NET Web Application — Visual C#

Click here to go online and find templates.

Name: MvcMovie
Location: c:\users\riande\documents\visual studio 2013\Projects
Solution name: MvcMovie



New ASP.NET Project - MvcMovie

Select a template:

Empty, Web Forms, MVC, Web API, Single Page Application, Facebook

A project template for creating ASP.NET MVC applications. ASP.NET MVC allows you to build applications using the Model-View-Controller architecture. ASP.NET MVC includes many features that enable fast, test-driven development for creating applications that use the latest standards.

Learn more

Add folders and core references for:

☐ Web Forms [✓ MVC] ☐ Web API

☐ Add unit tests

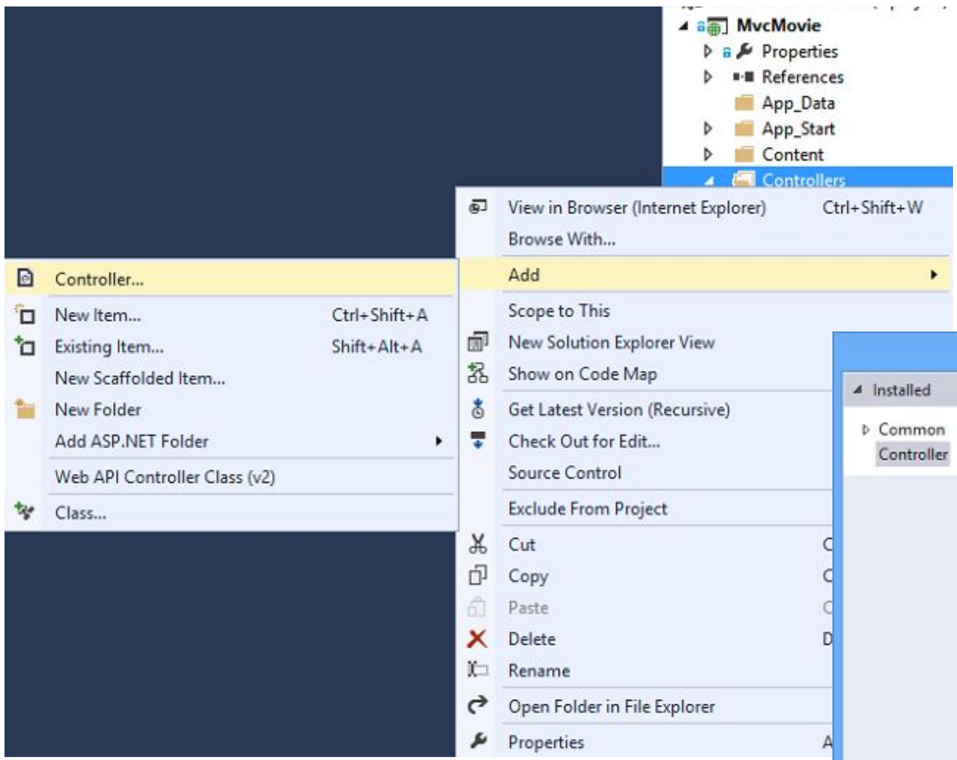
Test project name: MvcMovie.Tests

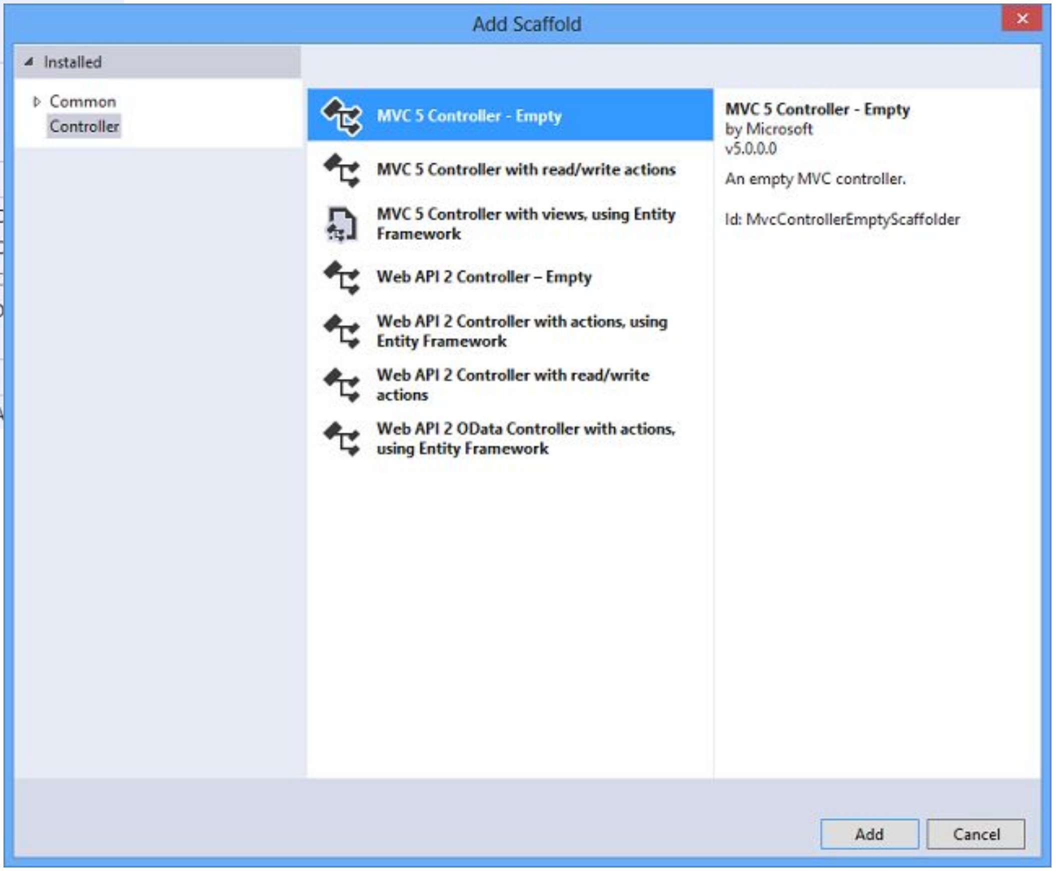
Change Authentication

Authentication: **Individual User Accounts**

OK | Cancel

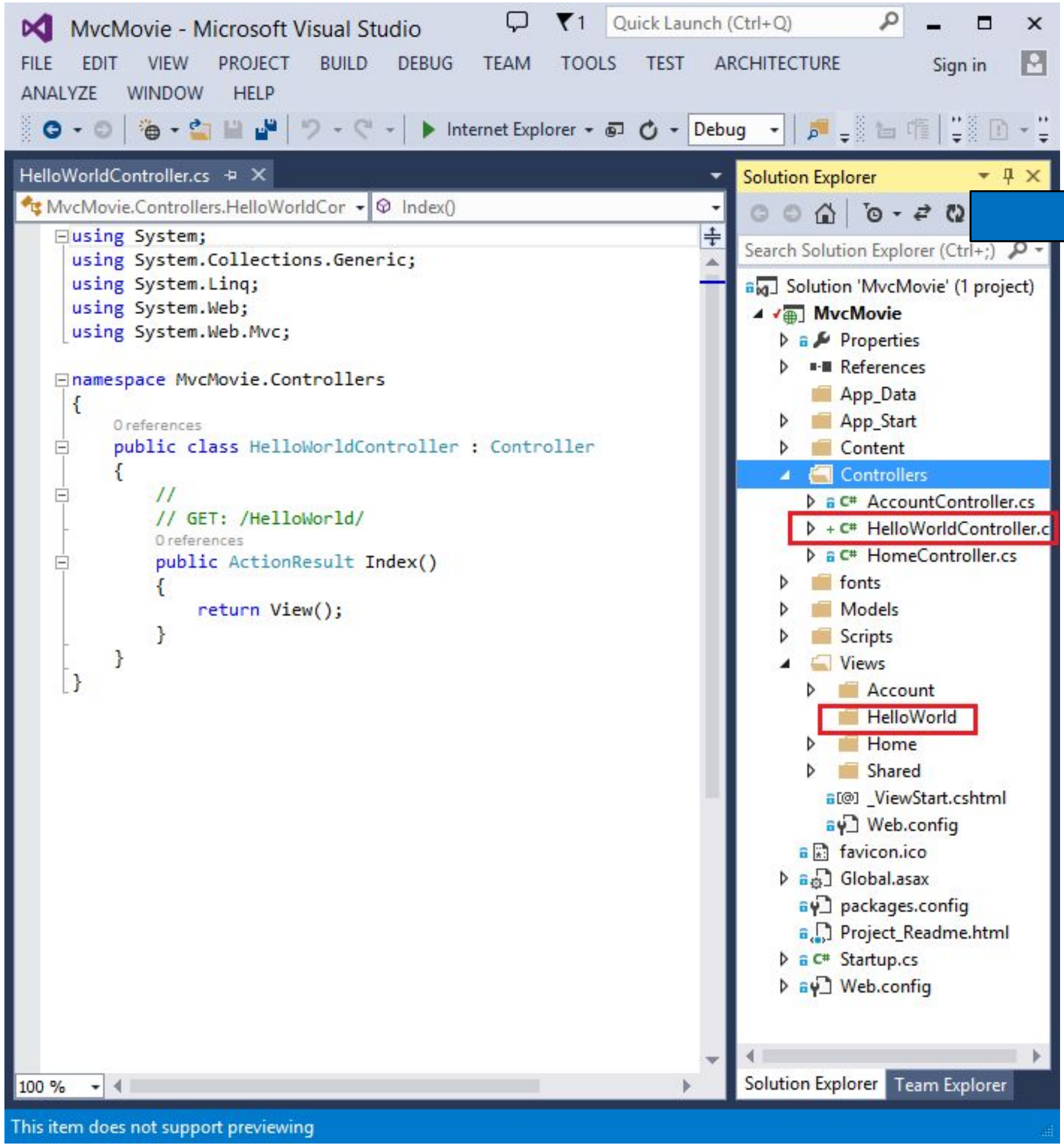
Adding a Controller




Add Scaffold
Installed
Common
Controller
MVC 5 Controller - Empty
MVC 5 Controller with read/write actions
MVC 5 Controller with views, using Entity Framework
Web API 2 Controller – Empty
Web API 2 Controller with actions, using Entity Framework
Web API 2 Controller with read/write actions
Web API 2 OData Controller with actions, using Entity Framework
Add
Cancel

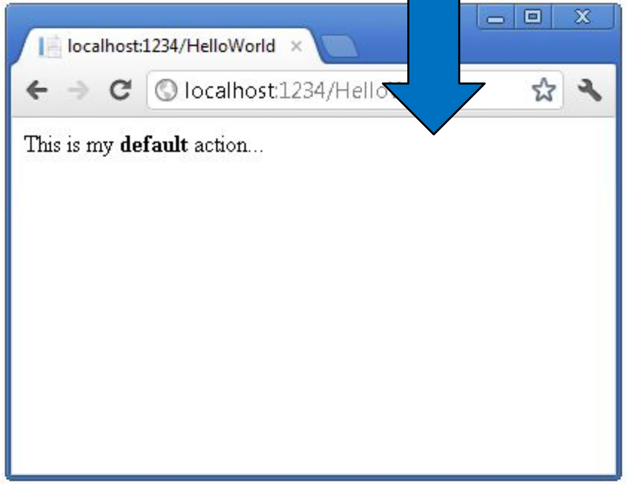
MVC 5 Controller - Empty
by Microsoft
v5.0.0.0
An empty MVC controller.
Id: MvcControllerEmptyScaffolder

Our New HelloWorldController



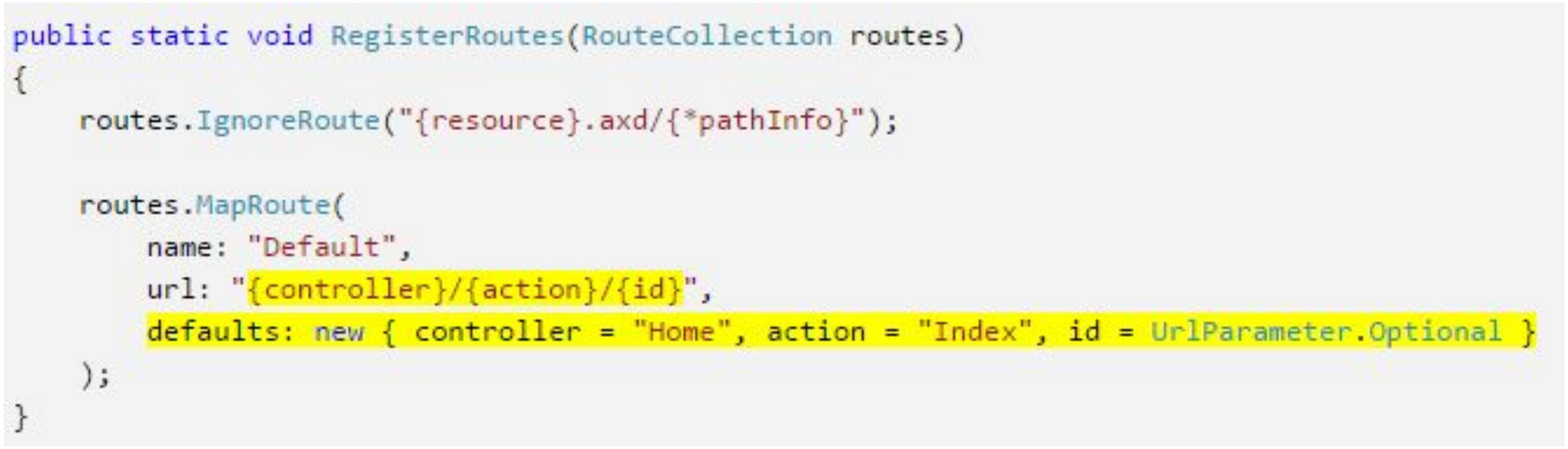
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.Mvc;

namespace MvcMovie.Controllers
{
    0 references
    public class HelloWorldController : Controller
    {
        //
        // GET: /HelloWorld/
        0 references
        public ActionResult Index()
        {
            return View();
        }
    }
}
```

```
using System.Web;
using System.Web.Mvc;

namespace MvcMovie.Controllers
{
    public class HelloWorldController : Controller
    {
        //
        // GET: /HelloWorld/

        public string Index()
        {
            return "This is my <b>default</b> action...";
        }

        //
        // GET: /HelloWorld/Welcome/

        public string Welcome()
        {
            return "This is the Welcome action method...";
        }
    }
}
```



This is my **default** action...

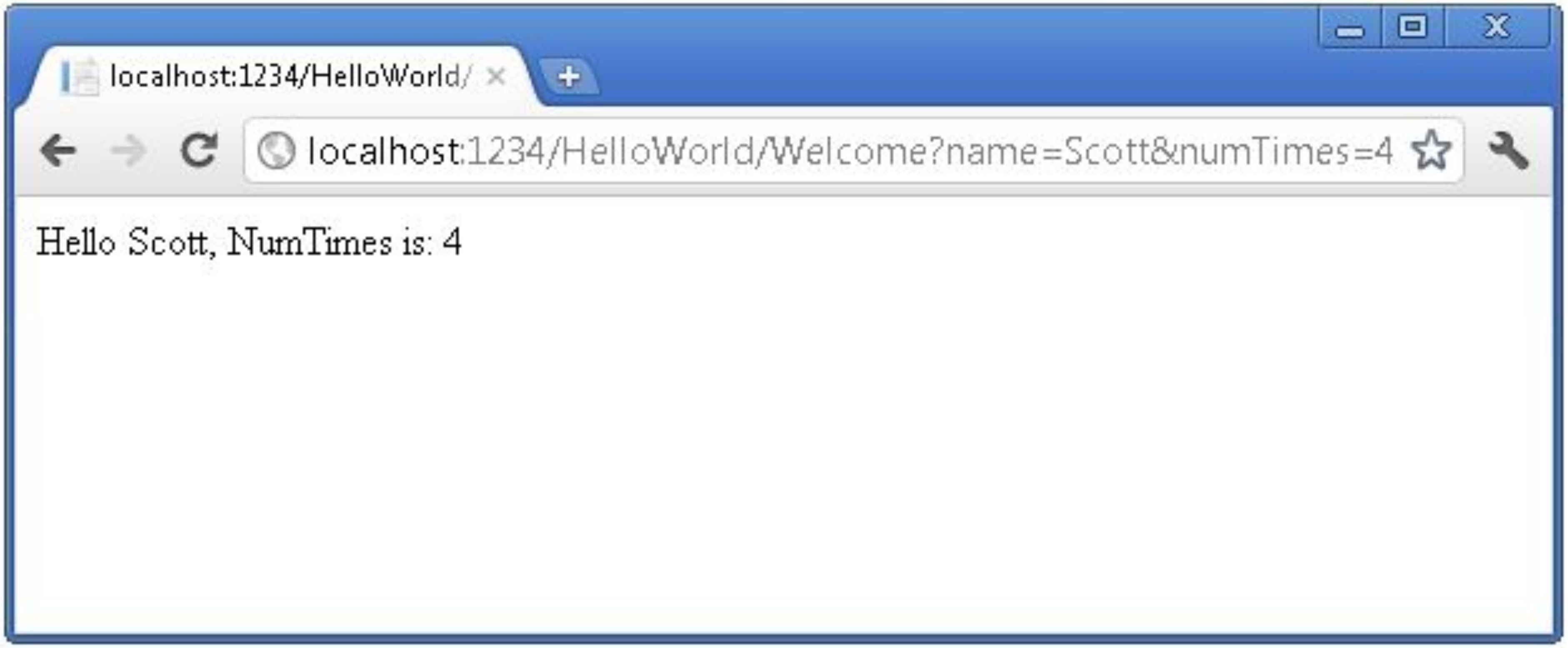
The App_Start/RouteConfig.cs File



```
public static void RegisterRoutes(RouteCollection routes)
{
    routes.IgnoreRoute("{resource}.axd/{*pathInfo}");

    routes.MapRoute(
        name: "Default",
        url: "{controller}/{action}/{id}",
        defaults: new { controller = "Home", action = "Index", id = UrlParameter.Optional }
    );
}
```

Welcome Method with Parameters

```
public string Welcome(string name, int numTimes = 1) {
     return HttpUtility.HtmlEncode("Hello " + name + ", NumTimes is: " + numTimes);
}
```

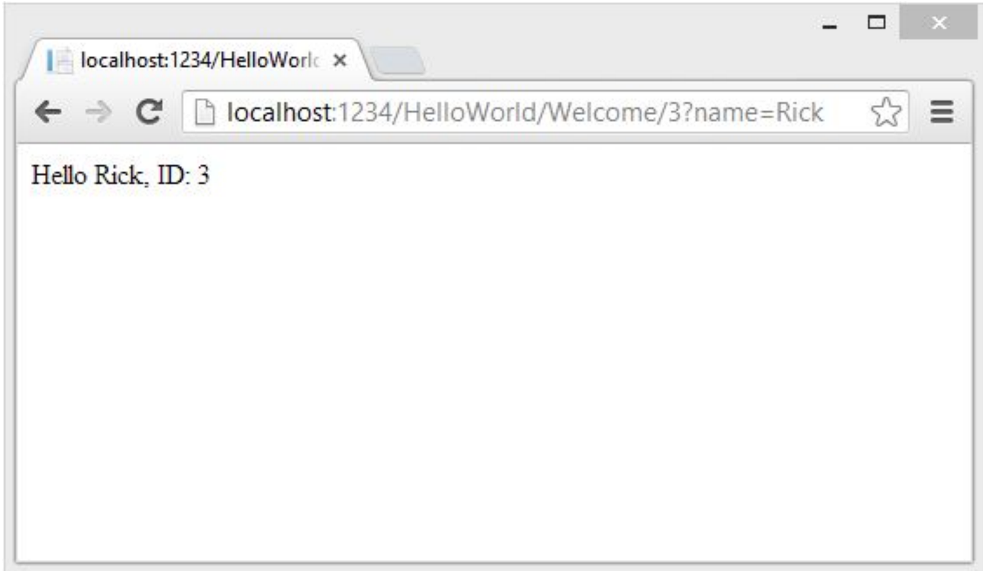

localhost:1234/HelloWorld/
localhost:1234/HelloWorld/Welcome?name=Scott&numTimes=4

Hello Scott, NumTimes is: 4

Matching the Route Parameter

```
public static void RegisterRoutes(RouteCollection routes)
{
    routes.IgnoreRoute("{resource}.axd/{*pathInfo}");

    routes.MapRoute(
        name: "Default",
        url: "{controller}/{action}/{id}",
        defaults: new { controller = "Home", action = "Index", id = UrlParameter.Optional }
    );
}
```

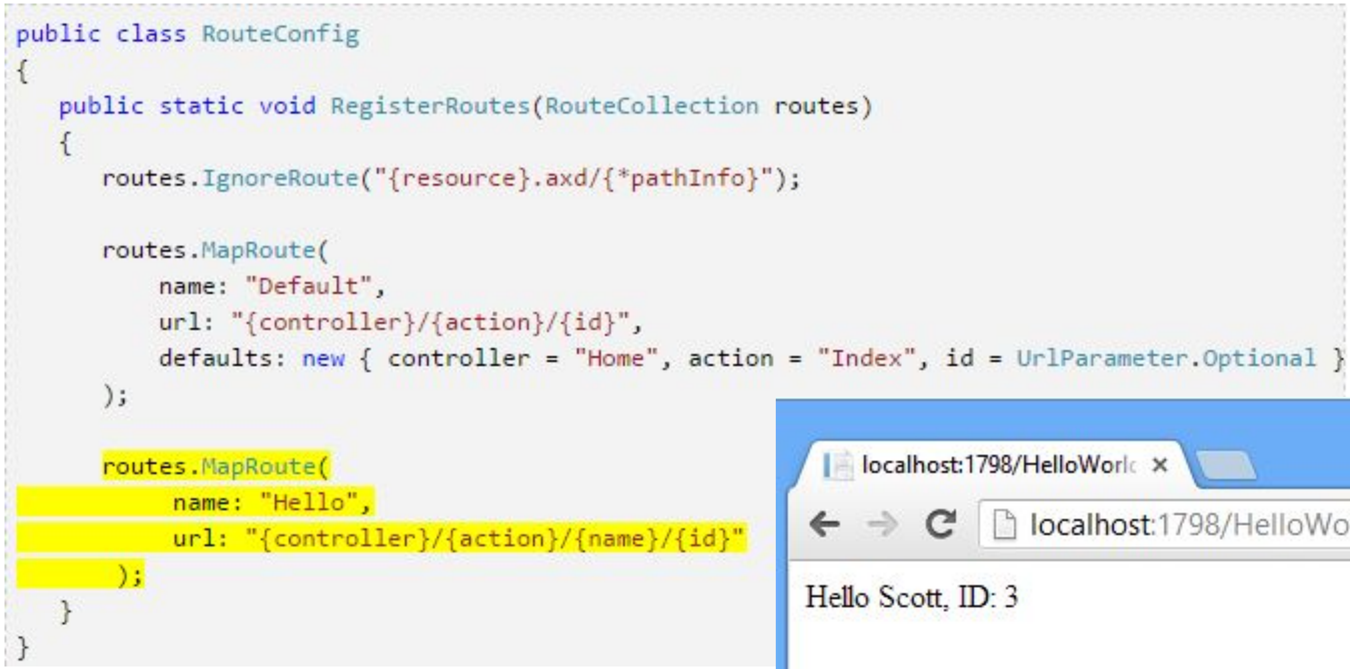
```
public string Welcome(string name, int ID = 1)
{
    return HttpUtility.HtmlEncode("Hello " + name + ", ID: " + ID);
}
```


localhost:1234/HelloWorld
localhost:1234/HelloWorld/Welcome/3?name=Rick

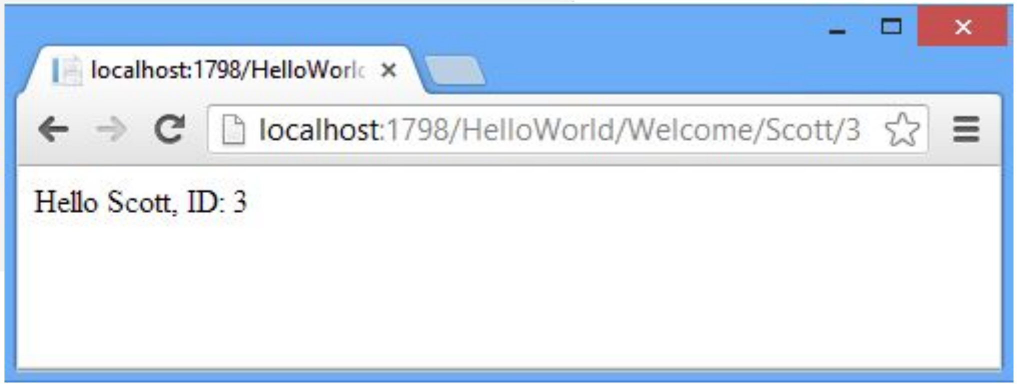
```
Hello Rick, ID: 3
```

Passing Parameters As Route Data

- In ASP.NET MVC applications, it's more typical to pass in parameters as route data than passing them as query strings



```
public class RouteConfig
{
    public static void RegisterRoutes(RouteCollection routes)
    {
        routes.IgnoreRoute("{resource}.axd/{*pathInfo}");

        routes.MapRoute(
            name: "Default",
            url: "{controller}/{action}/{id}",
            defaults: new { controller = "Home", action = "Index", id = UrlParameter.Optional }
        );

        routes.MapRoute(
             name: "Hello",
             url: "{controller}/{action}/{name}/{id}"
           );
    }
}
```



localhost:1798/HelloWorld
localhost:1798/HelloWorld/Welcome/Scott/3

```
Hello Scott, ID: 3
```

URL Route Mapping Features

- You can include "-", ".", ";" or any other characters you want as part of your route rules
  - This would pass appropriate "language", "locale", and "category" parameters to a ProductsController:

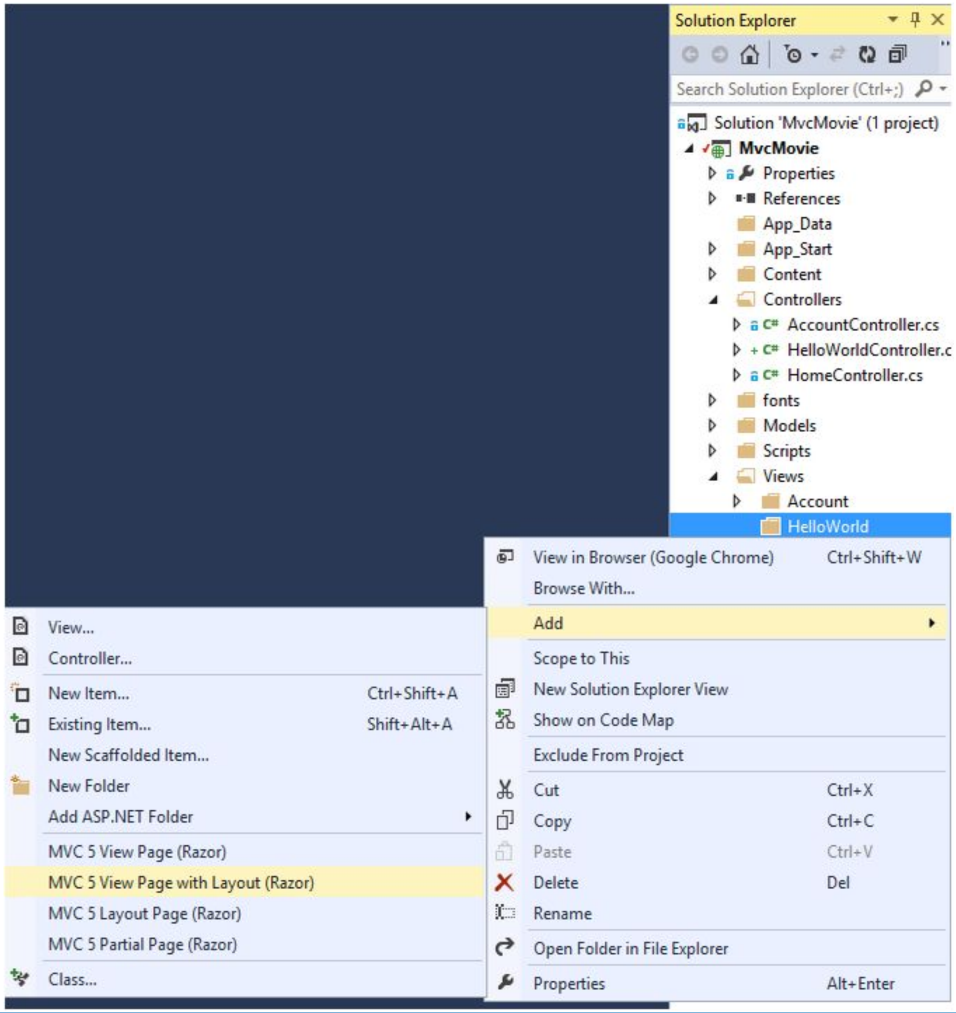
    ```
    {language}-{locale}/products/browse/{category}
    /en-us/products/browse/food
    language=en, locale=us, category=food
    ```

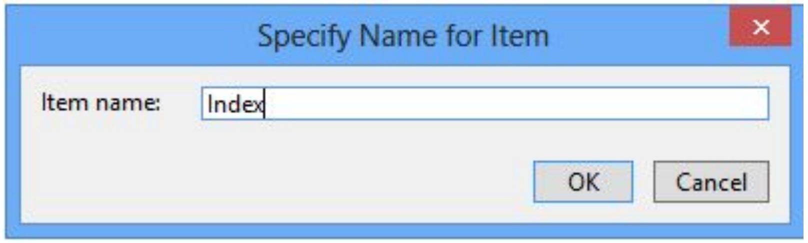
  - You can use the "." file extension type at the end of a URL to determine whether to render back the result in either a XML or HTML format

    ```
    products/browse/{category}.{format}
    /products/browse/food.xml category=food, format=xml
    /products/browse/food.html category=food, format=html
    ```

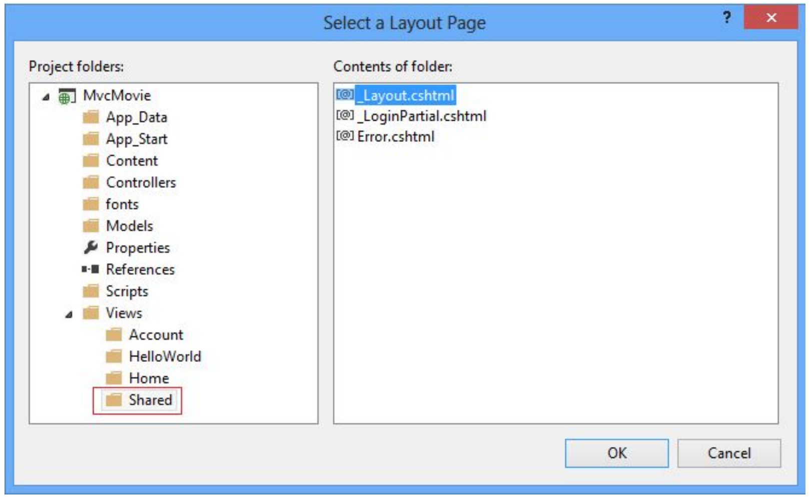
Adding a View

```
public ActionResult Index()
{
    return View();
}
```

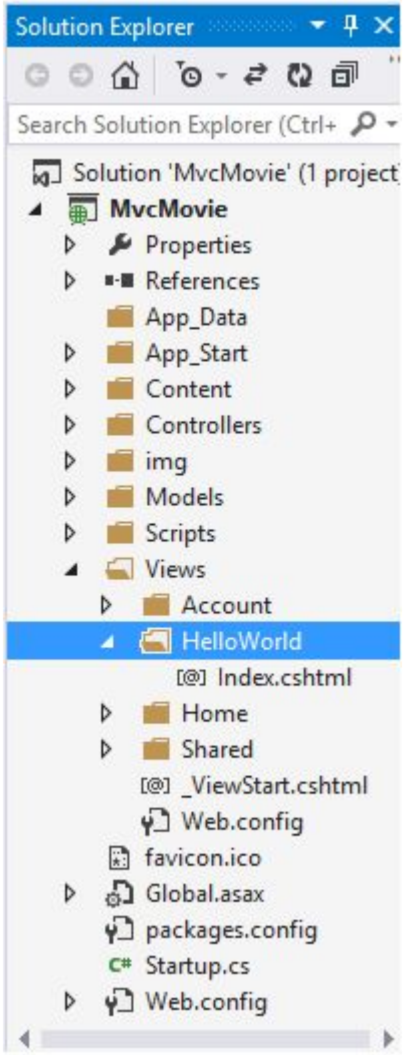


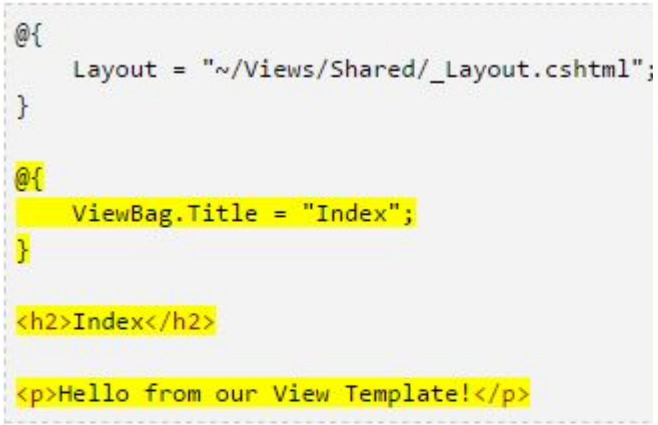

Specify Name for Item

Item name: Index

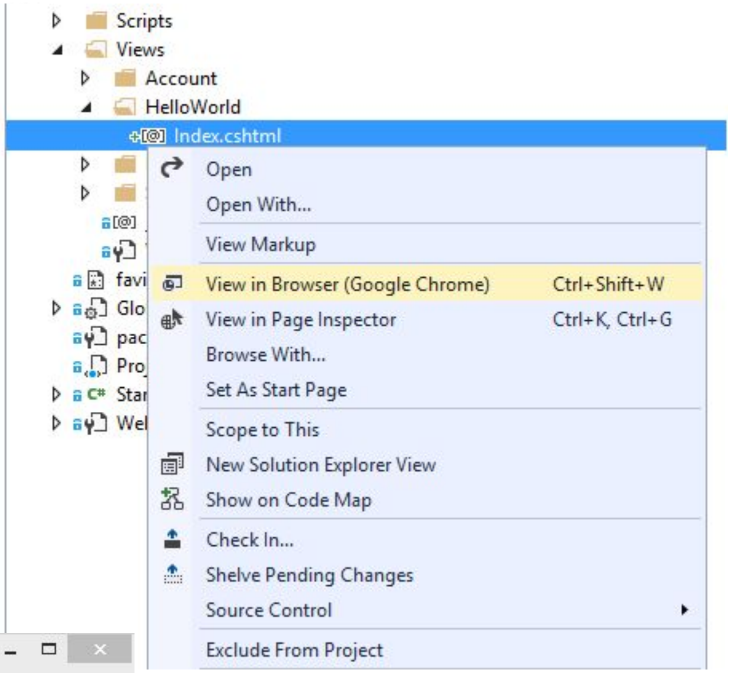


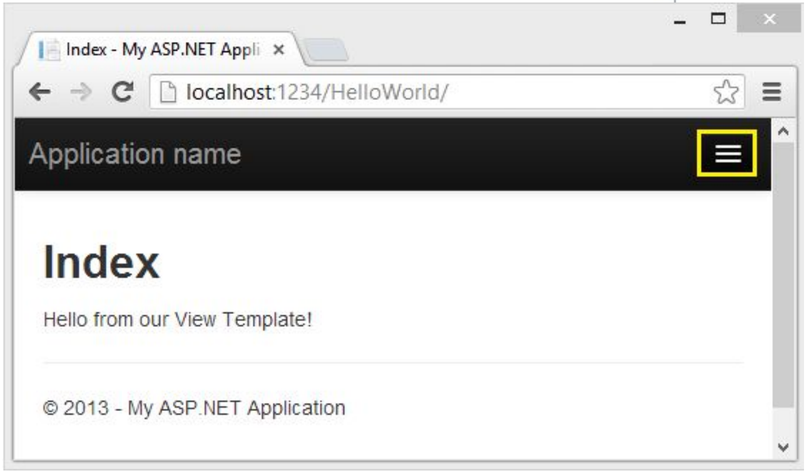
The View





```
@{
    Layout = "~/Views/Shared/_Layout.cshtml";
}

@{
    ViewBag.Title = "Index";
}

<h2>Index</h2>

<p>Hello from our View Template!</p>
```





Index

Hello from our View Template!

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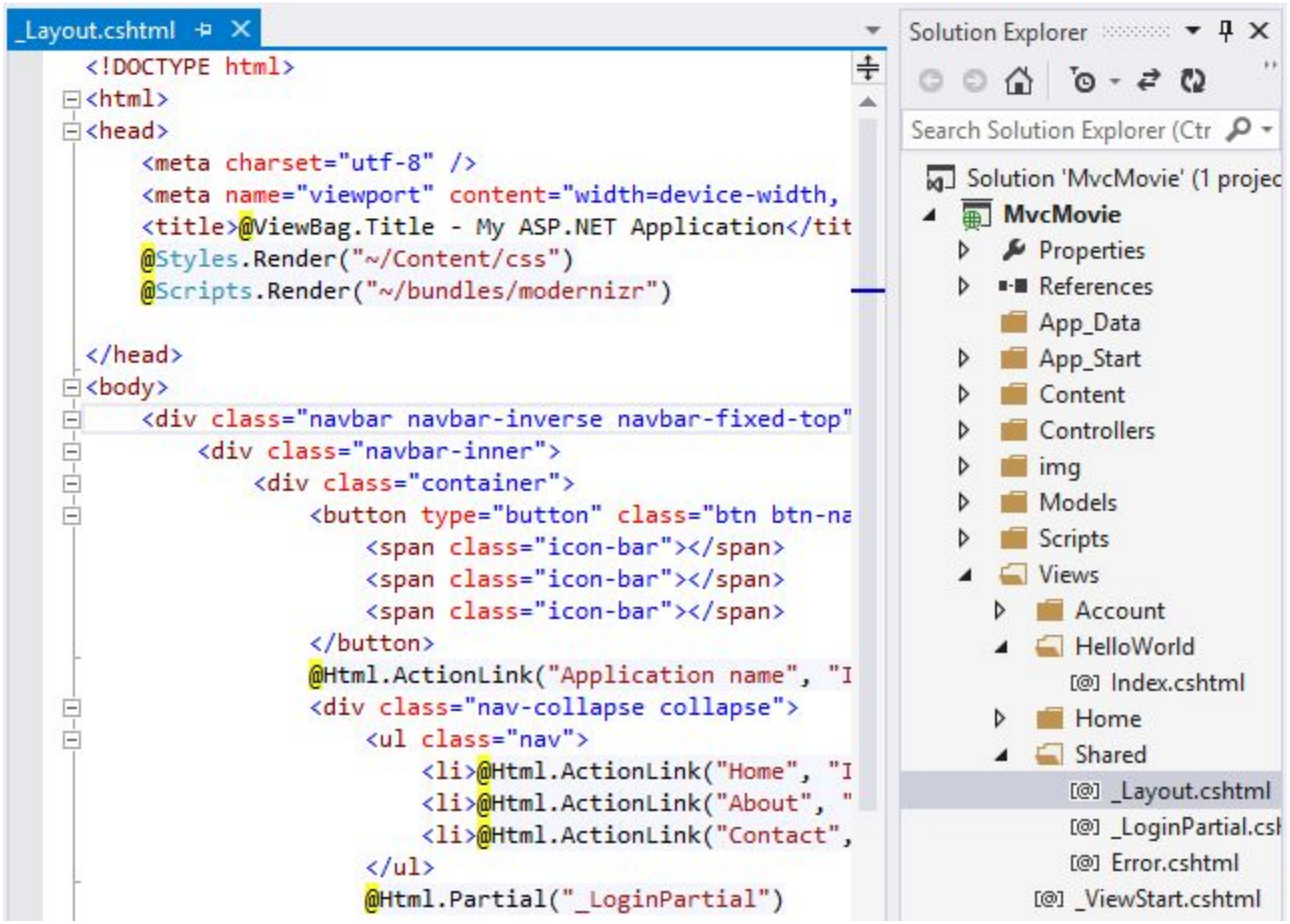
Layout Page



```
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8" />
    <meta name="viewport" content="width=device-width,
    <title>@ViewBag.Title - My ASP.NET Application</tit
    @Styles.Render("~/Content/css")
    @Scripts.Render("~/bundles/modernizr")

</head>
<body>
    <div class="navbar navbar-inverse navbar-fixed-top"
        <div class="navbar-inner">
            <div class="container">
                <button type="button" class="btn btn-na
                    <span class="icon-bar"></span>
                    <span class="icon-bar"></span>
                    <span class="icon-bar"></span>
                </button>
                @Html.ActionLink("Application name", "I
                <div class="nav-collapse collapse">
                    <ul class="nav">
                        <li>@Html.ActionLink("Home", "I
                        <li>@Html.ActionLink("About", "
                        <li>@Html.ActionLink("Contact",
                    </ul>
                    @Html.Partial("_LoginPartial")
```

```
Solution 'MvcMovie' (1 projec
  MvcMovie
    Properties
    References
    App_Data
    App_Start
    Content
    Controllers
    img
    Models
    Scripts
    Views
      Account
      HelloWorld
        Index.cshtml
      Home
      Shared
        _Layout.cshtml
        _LoginPartial.csl
        Error.cshtml
      _ViewStart.cshtml
```

Layout Page

- The layout has access to the same properties the Razor view has, including:
  - AjaxHelper (through the Ajax property)
  - HtmlHelper (through the Html property)
  - ViewData and model
  - UrlHelper (through the Url property)
  - TempData and ViewContext
- To specify a layout inside a view, we can specify the layout to use with the Layout property:

```
@{
    Layout = "~/Views/Shared/_Layout.cshtml";
}
```

Razor View Engine

- an alternative to the Web Forms view engine
- is responsible for rendering views in the Razor format (either .cshtml files or .vbhtml files)
  - The Web Form view engine is used to support the older-format Web Form views (.aspx and .ascx files)

Web Forms view engine example:

```
<%@ Page Language="C#"
Inherits="System.Web.Mvc.ViewPage<Product[]>" %>
<ul>
<% foreach(var product in Model) { %>
   <li><%: product.Name %></li>
<% } %>
</ul>
```

Razor view engine example

```
@model Product[]
<ul>
@foreach(var product in Model) {
   <li>@product.Name</li>
}
</ul>
```

The Fundamentals of the Razor Syntax

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- ‘@’ is the magic character that precedes code instructions in the following contexts
  - ‘@’ For a single code line/values

```
<p>
   Current time is: @DateTime.Now
</p>
```

  - ‘@{ … }’ For code blocks with multiple lines

```
@{
     var name = “John”;
     var nameMessage = "Hello, my name is " + name + " Smith";
}
```

  - ‘@:’ For single plain text to be rendered in the page

```
@{
     @:The day is: @DateTime.Now.DayOfWeek. It is a <b>great</b> day!
}
```

The Fundamentals of the Razor Syntax

- HTML markup lines can be included at any part of the code:

```
@if(IsPost){
   <p>Hello, the time is @DateTime.Now and this
   page is a postback!</p>
} else {
  <p>Hello, today is: </p> @DateTime.Now
}
```

- Razor uses code syntax to infer indent:

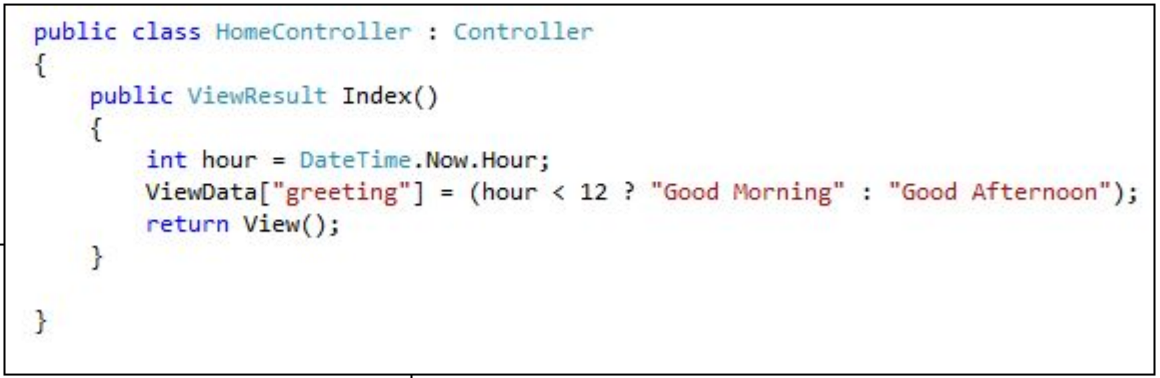
```
// This won't work in Razor. Content has to be
// wrapped between { }
if( i < 1 ) int myVar=0;
```

Passing Data to the View

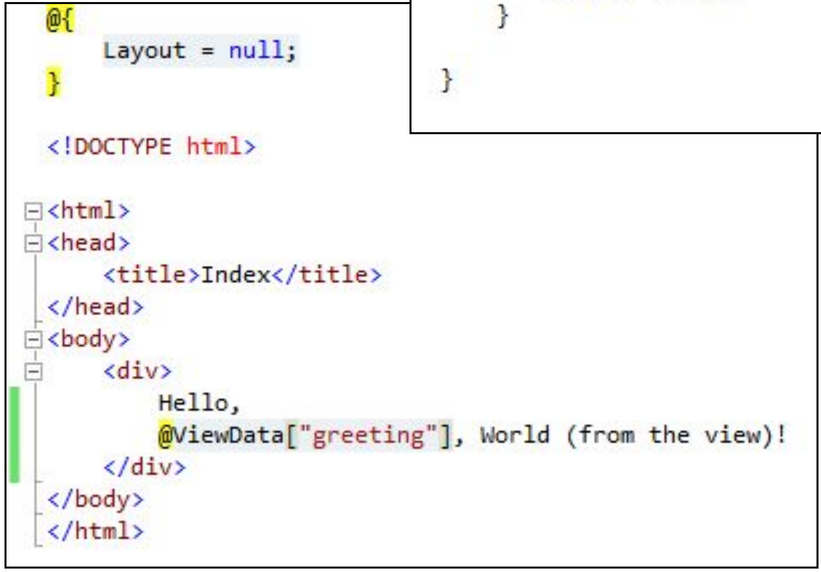
- There are three different ways to pass data to a view:
  - by using the ViewDataDictionary,
  - by using the ViewBag,
  - by using strongly typed views.

ViewDataDictionary

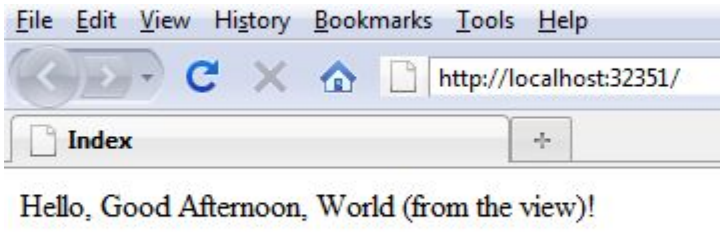
- It isn’t recommended to use ViewDataDictionary
  - You have to perform type casts whenever you want to retrieve something from the dictionary.



```
public class HomeController : Controller
{
    public ViewResult Index()
    {
        int hour = DateTime.Now.Hour;
        ViewData["greeting"] = (hour < 12 ? "Good Morning" : "Good Afternoon");
        return View();
    }

}
```



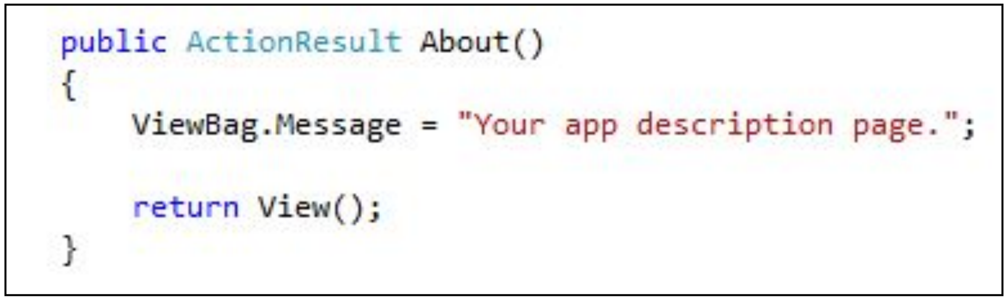
```
@{
    Layout = null;
}

<!DOCTYPE html>

<html>
<head>
    <title>Index</title>
</head>
<body>
    <div>
        Hello,
        @ViewData["greeting"], World (from the view)!
    </div>
</body>
</html>
```



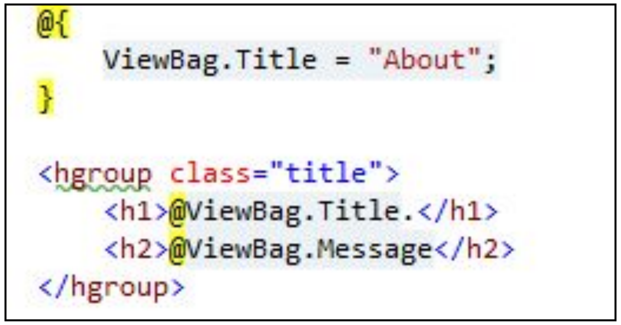
Hello, Good Afternoon, World (from the view)!

ViewBag

- It isn’t recommended to use ViewBag
- The ViewBag provides a way to pass data from the controller to the view
    - It makes use of the dynamic language features of C# 4
- Set properties on the dynamic ViewBag property within your controller:
- A ViewBag property is also available in the view:



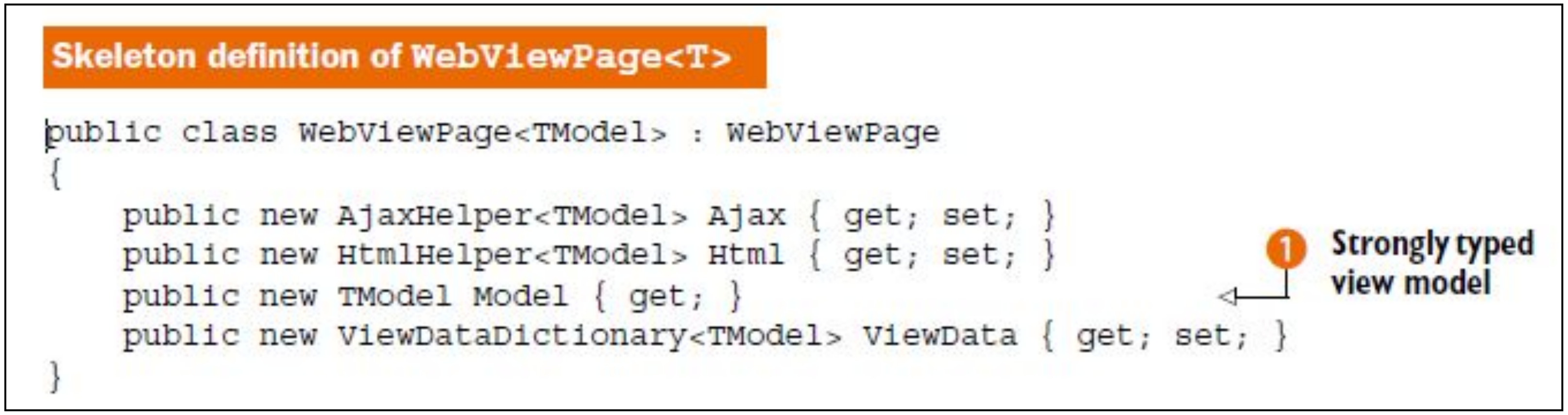
```
public ActionResult About()
{
    ViewBag.Message = "Your app description page.";

    return View();
}
```



```
@{
    ViewBag.Title = "About";
}

<hgroup class="title">
    <h1>@ViewBag.Title.</h1>
    <h2>@ViewBag.Message</h2>
</hgroup>
```

Strongly Typed Views

- Views can inherit from two types by default:
  - System.Web.Mvc.WebViewPage or
  - System.Web.Mvc.WebViewPage<T>
- Class WebViewPage<T> provides a strongly typed wrapper over ViewData.Model through the Model property and provides access to strongly typed versions of the associated view helper objects - AjaxHelper and HtmlHelper

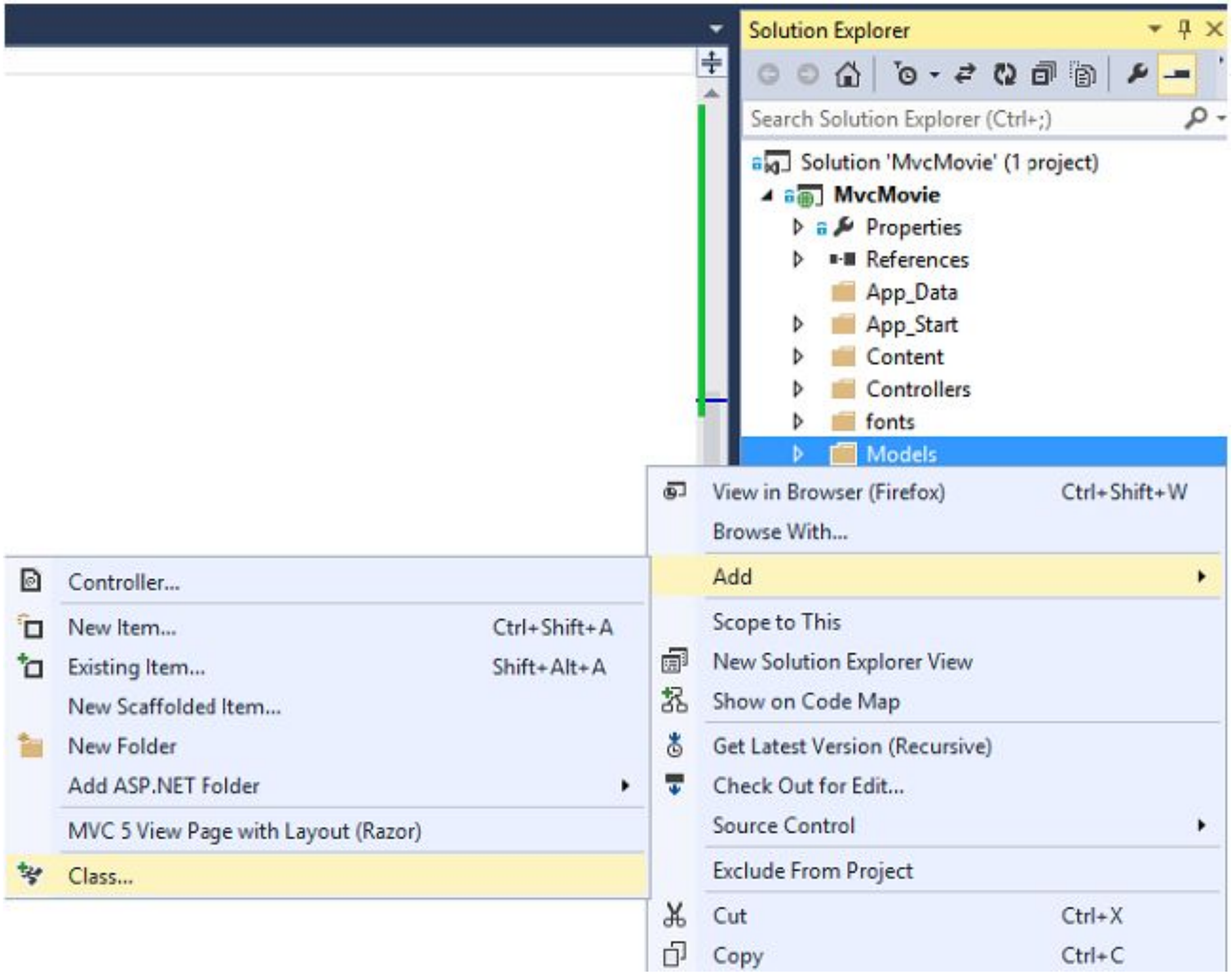


Skeleton definition of WebViewPage<T>

```
public class WebViewPage<TModel> : WebViewPage
{
    public new AjaxHelper<TModel> Ajax { get; set; }
    public new HtmlHelper<TModel> Html { get; set; }
    public new TModel Model { get; }
    public new ViewDataDictionary<TModel> ViewData { get; set; }
}
```

1 Strongly typed view model

Adding a Model



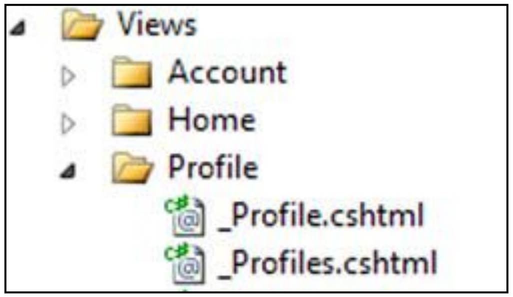
Passing Model to the View

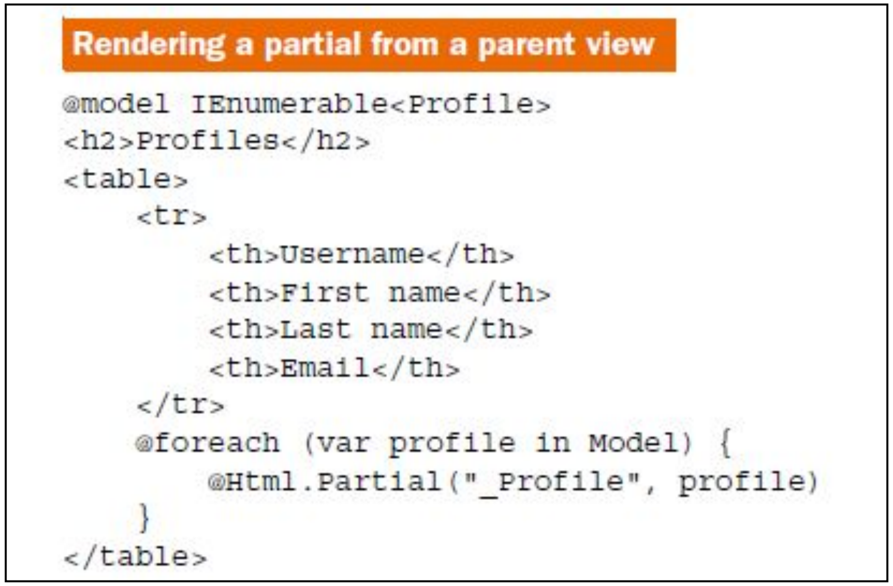
- By specifying the model type using the @model keyword, view will inherit from WebViewPage<T> instead of WebViewPage, and we will have a strongly typed view

```
public ActionResult Index()
{
     //…
     SomeModel model = new SomeModel();
     return View(model);
}
```

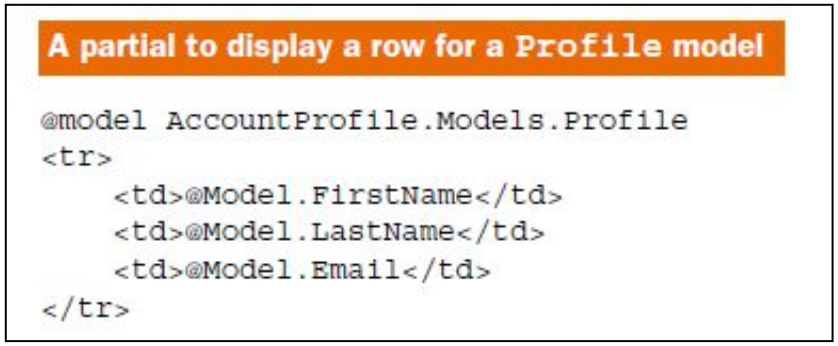
```
<dl>
<dt>Name:</dt>
<dd>@Model.Name</dd>
<dt>Date Added:</dt>
<dd>@Model.DateAdded</dd>
<dt>Message:</dt>
<dd>@Model.Message</dd>
</dl>
```

- Partials are intended to render snippets of content
- If you find yourself copying and pasting one snippet of HTML from one view to the next, that snippet is a great candidate for a partial
- To render a partial we can use the RenderPartial method or the Partial method in a parent view




Rendering a partial from a parent view

```
@model IEnumerable<Profile>
<h2>Profiles</h2>
<table>
    <tr>
        <th>Username</th>
        <th>First name</th>
        <th>Last name</th>
        <th>Email</th>
    </tr>
    @foreach (var profile in Model) {
        @Html.Partial("_Profile", profile)
    }
</table>
```


A partial to display a row for a `Profile` model

```
@model AccountProfile.Models.Profile
<tr>
    <td>@Model.FirstName</td>
    <td>@Model.LastName</td>
    <td>@Model.Email</td>
</tr>
```

Partial Views

- The partial name is used to locate the partial markup in the locations:
    - <Area>\<Controller>\<PartialName>.cshtml
    - <Area>\Shared\<PartialName>.cshtml
    - \<Controller>\<PartialName>.cshtml
    - \Shared\<PartialName>.cshtml
- In order to prevent accidentally using a partial view from an action, we prefix the view name with an underscore
- Html.RenderPartial(...) renders the partial immediately to the response stream
- Html.Partial(...) returns a string
    - In Razor, Html.RenderPartial must be in a code block

Questions ?

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?