

Microsoft
ASP.net MVC

Introduction to ASP.NET MVC

The HTTP Protocol

How HTTP Works?





Table of Contents

- ♦ The HTTP Protocol
- ♦ The MVC Pattern
 - Model, View, Controller
 - The MVC Pattern for Web and Examples
- ♦ ASP.NET MVC
 - Comparison with ASP.NET
 - ASP.NET MVC Advantages
- ♦ Creating ASP.NET MVC Project
- ♦ NuGet Package Management



HTTP

- ♦ Hyper Text Transfer Protocol (HTTP)
 - Client-server protocol for transferring Web resources (HTML files, images, styles, etc.)
- ♦ Important properties of HTTP
 - Request-response model
 - Text-based format
 - Relies on a unique resource URLs
 - Provides resource metadata (e.g. encoding)
 - Stateless (cookies can overcome this)

HTTP: Request-Response Protocol

- ♦ Client program
 - Running on end host
 - E.g. Web browser
 - Requests a resource
- ♦ Server program
 - Running at the server
 - E.g. Web server
 - Provides resources



HTTP Response Message

- ♦ Response message sent by the server
 - Status line – protocol version, status code, status phrase
 - Response headers – provide meta data
 - Body – the contents of the response (the

Response Header	Value
(Status-Line)	HTTP/1.1 304 Not Modified
Date	Tue, 17 Mar 2015 14:15:52 GMT
Server	Apache/2
Connection	Keep-Alive
Keep-Alive	timeout=1, max=100
Etag	"b8c1a-2275-5115f173d1e40"
Vary	Accept-Encoding, User-Agent

HTTP Request Message

- ♦ Request message sent by a client consists of
 - Request line – request method (GET, POST, HEAD, ...), resource URI, and protocol version
 - Request headers – additional parameters
 - Body – optional data

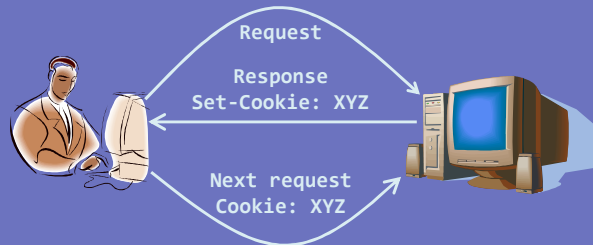
Request Header	Value
(Request-Line)	GET / HTTP/1.1
Host	www.stdio.vn
User-Agent	Mozilla/5.0 (Windows NT 6.3; WOW64; rv:36.0) Gecko/20100101 Firefox/36.0
Accept	text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language	vi-VN,vi;q=0.8,en-US;q=0.5,en;q=0.3
Accept-Encoding	gzip, deflate
Cookie	_ga=GA1.2.529740874.1426574792; PHPSESSID=0e61i2eb0mff46heji7r0kfms2; _gat=1; ci_session=a%3...
Connection	keep-alive

HTTP Response Codes

- ♦ HTTP response code classes
 - 1xx: informational (e.g., "100 Continue")
 - 2xx: success (e.g., "200 OK")
 - 3xx: redirection (e.g., "304 Not Modified", "302 Found")
 - 4xx: client error (e.g., "404 Not Found")
 - 5xx: server error (e.g., "503 Service Unavailable")
- ♦ "302 Found" is used for redirecting the Web browser to another URL

HTTP Cookies

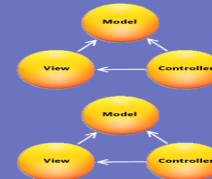
- ♦ Cookie
 - Cookies are small pieces of data stored by the client on behalf of the server
 - Included in all future HTTP requests to the server



9

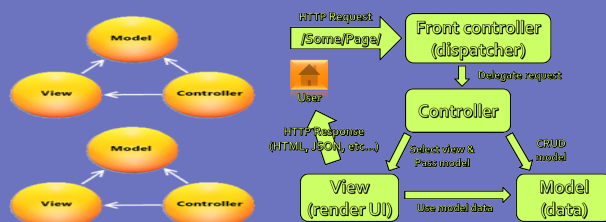
The MVC Pattern

- ♦ Model–view–controller (MVC) is a software architecture pattern
- ♦ Originally formulated in the late 1970s by Trygve Reenskaug as part of the Smalltalk
- ♦ Code reusability and separation of concerns
- ♦ Originally developed for desktop, then adapted for internet applications



11

The MVC Pattern



Model

- ♦ Set of classes that describes the data we are working with as well as the business
- ♦ Rules for how the data can be changed and manipulated
- ♦ May contain data validation rules
- ♦ Often encapsulate data stored in a database as well as code used to manipulate the data
- ♦ Most likely a Data Access Layer of some kind
- ♦ Apart from giving the data objects, it doesn't have significance in the framework

12

View

- ◆ Defines how the application's user interface (UI) will be displayed
- ◆ May support master views (layouts) and sub-views (partial views or controls)
- ◆ Web: Template to dynamically generate HTML



33

MVC Steps

- ◆ Incoming request routed to **Controller**
 - For web: HTTP request
- ◆ **Controller** processes request and creates presentation **Model**
 - Controller also selects appropriate result (view)
- ◆ **Model** is passed to **View**
- ◆ **View** transforms **Model** into appropriate output format (HTML)
- ◆ Response is rendered (HTTP Response)

35

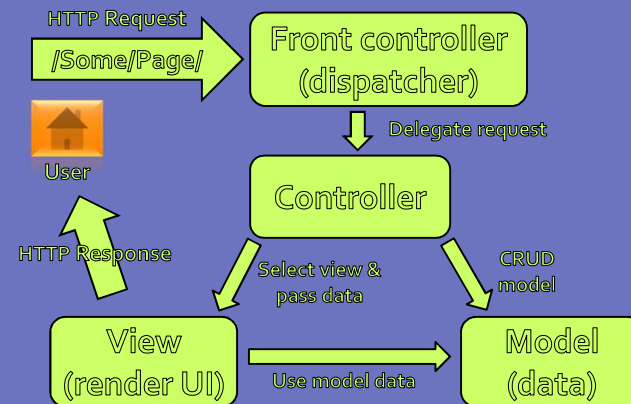
Controller

- ◆ The core MVC component
- ◆ Process the requests with the help of views and models
- ◆ A set of classes that handles
 - Communication from the user
 - Overall application flow
 - Application-specific logic
- ◆ Every controller has one or more "Actions"



34

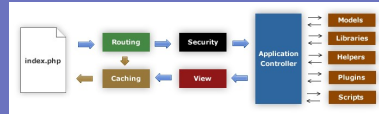
The MVC Pattern for Web



36

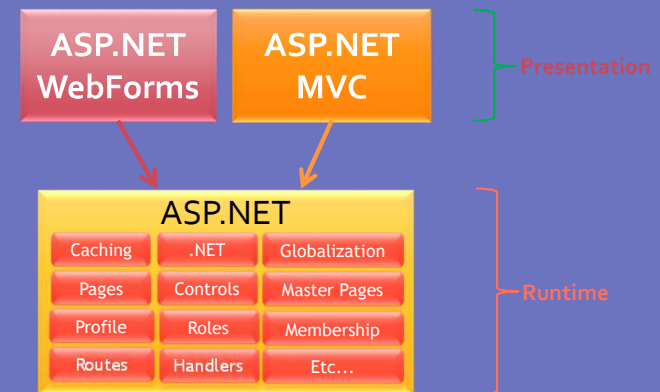
MVC Frameworks

- ♦ [CakePHP](#) (PHP)
- ♦ [CodeIgniter](#) (PHP)
- ♦ [Spring](#) (Java)
- ♦ Perl: Catalyst, Dancer
- ♦ Python: [Django](#), Flask, Grok
- ♦ Ruby: [Ruby on Rails](#), Camping, Nitro, Sinatra
- ♦ JavaScript: [AngularJS](#), [JavaScriptMVC](#), [Spine](#)
- ♦ [ASP.NET MVC](#) (.NET Framework)



37

ASP.NET Core



39



ASP.NET Web Forms

- ♦ Stable and mature, supported by heaps of third party controls and tools
- ♦ Event driven web development
- ♦ Postbacks
- ♦ Viewstate
- ♦ Less control over the HTML
- ♦ Hard to test
- ♦ Rapid development



20

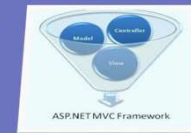
ASP.NET History

- ♦ Classic ASP introduced in late 1990's
- ♦ ASP.NET 1.0 – 2002 (Web Forms)
- ♦ ASP.NET 3.5 – 2008 (First version of MVC)
 - Two more versions in next two years
- ♦ ASP.NET 4 – 2010 (VS 2010, MVC 2.0, Razor)
- ♦ ASP.NET 4.5 (First version of Web API, VS 2012)
- ♦ February 2013 – SignalR
- ♦ Autumn 2013 – VS 2013, One ASP.NET, MVC 5
- ♦ November 2014 – VS 2015, One ASP.NET, MVC 6
- ♦ ASP.NET vNext – 2016, ?

23

ASP.NET MVC

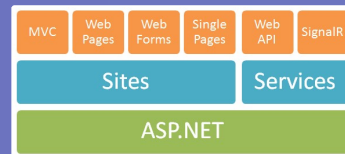
- ♦ Runs on top of ASP.NET
 - Not a replacement for WebForms
 - Leverage the benefits of ASP.NET
- ♦ Embrace the web
 - User/SEO friendly URLs, HTML 5, SPA
 - Adopt REST concepts
- ♦ Uses MVC pattern
 - Conventions and Guidance
 - Separation of concerns



23

One ASP.NET

- ♦ Web Forms
 - Component-based
- ♦ ASP.NET MVC
- ♦ Web Pages
 - Lightweight framework for dynamic content
- ♦ Web API
 - Framework for building RESTful Web services
- ♦ SignalR
 - Real-time client-server communication



23

ASP.NET MVC (2)

- ♦ Tight control over markup
- ♦ Testable
- ♦ Loosely coupled and extensible
- ♦ Convention over configuration
- ♦ Razor view engine
 - One of the greatest view engines
 - With intellisense, integrated in Visual Studio
- ♦ Reuse of current skills (C#, EF, LINQ, JS, etc.)
- ♦ Application-based (not scripts like PHP)

24

The ASP.NET MVC History

- ♦ ASP.NET MVC 1.0
 - In February 2007, Scott Guthrie ("[ScottGu](#)") of Microsoft sketched out the core of ASP.NET MVC
 - Released on 13 March 2009
- ♦ ASP.NET MVC 2.0 (Areas, Async)
 - Released just one year later, on 10 March 2010
- ♦ ASP.NET MVC 3.0 (Razor) – 13 January 2011
- ♦ ASP.NET MVC 4.0 (Web API) – 15 August 2012
- ♦ ASP.NET MVC 5.0 (Identity) – 17 October 2013
- ♦ ASP.NET MVC 6.0 – 6 November 2014

25

Extensible

- ♦ Replace any component of the system
 - Interface-based architecture
- ♦ Almost anything can be replaced or extended
 - Model binders (request data to CLR objects)
 - Action/result filters (e.g. OnActionExecuting)
 - Custom action result types
 - View engine (Razor, WebForms, NHaml, Spark)
 - View helpers (HTML, AJAX, URL, etc.)
 - Custom data providers (ADO.NET), etc.

27

Separation of Concerns

- ♦ Each component has one responsibility
 - SRP – Single Responsibility Principle
 - DRY – Don't Repeat Yourself
- ♦ More easily testable
 - TDD – Test-driven development
- ♦ Helps with concurrent development
 - Performing tasks concurrently
 - One developer works on views
 - Another works on controllers



26

Clean URLs

- ♦ REST-like
 - /products/update
 - /blog/posts/2013/01/28/mvc-is-cool
- ♦ Friendlier to humans
 - /product.aspx?catId=123 or post.php?id=123
 - Becomes /products/chocolate/
- ♦ Friendlier to web crawlers
 - Search engine optimization (SEO)

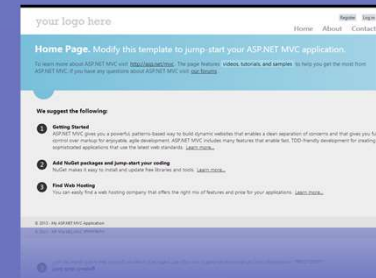
28

Community-based

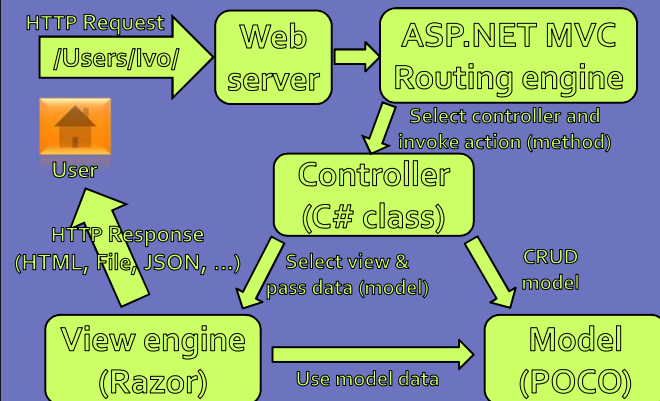
- ◆ ASP.NET MVC, Web API, and Web Pages source code is available in CodePlex
 - <http://aspnetwebstack.codeplex.com/>
- ◆ You can vote for new features in ASP.NET UserVoice site
 - <http://aspnet.uservoice.com/forums/41199-general-asp-net>

29

Creating ASP.NET MVC Project



MVC Pattern in ASP.NET MVC



30

The Tools

- ◆ Tools that we need:
 - IDE: Visual Studio 2013 (2012 is also OK)
 - Framework: .NET Framework 4.5
 - Web server: IIS 8.5 (Express)
 - Data: Microsoft SQL Server (Express or LocalDB)
- ◆ Visual Studio installer will install everything we need
 - <http://www.microsoft.com/visualstudio/eng/zo13-downloads>

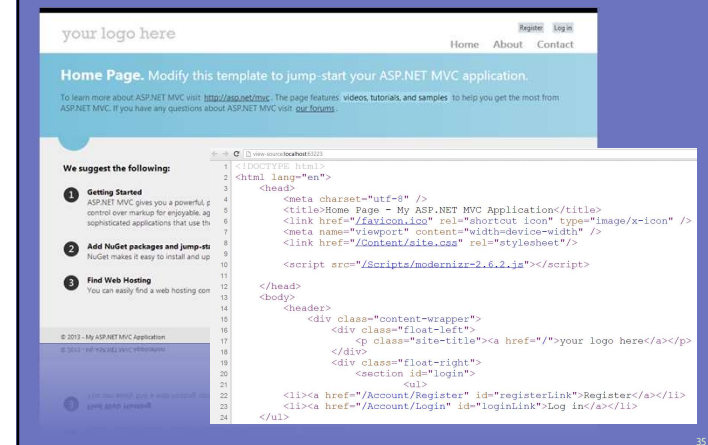
31

The Technologies

- Technologies that ASP.NET MVC uses
 - C# (OOP, unit testing, async, etc.)
 - ASP.NET
 - HTML(5) and CSS
 - JavaScript (jQuery, KendoUI, AngularJS, etc.)
 - AJAX, Single-page apps
 - Databases (MS SQL)
 - ORM (Entity Framework and LINQ)
 - Web and HTTP

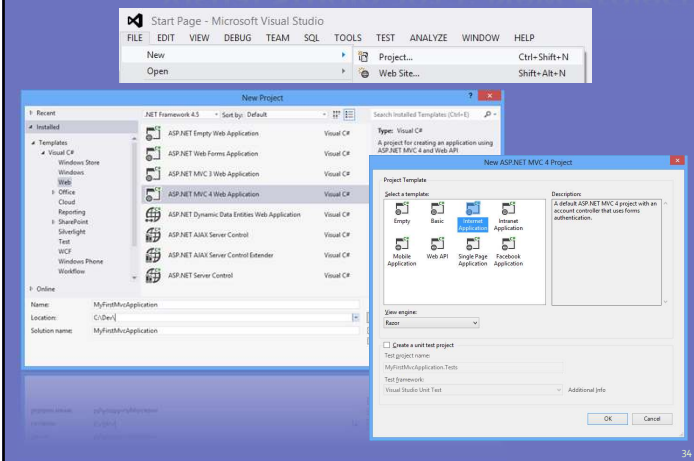
33

VS 2012: Default Layout



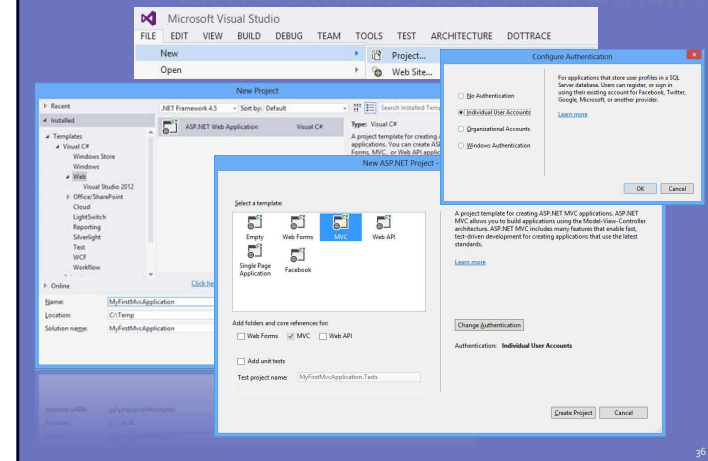
35

Visual Studio 2012: New Project

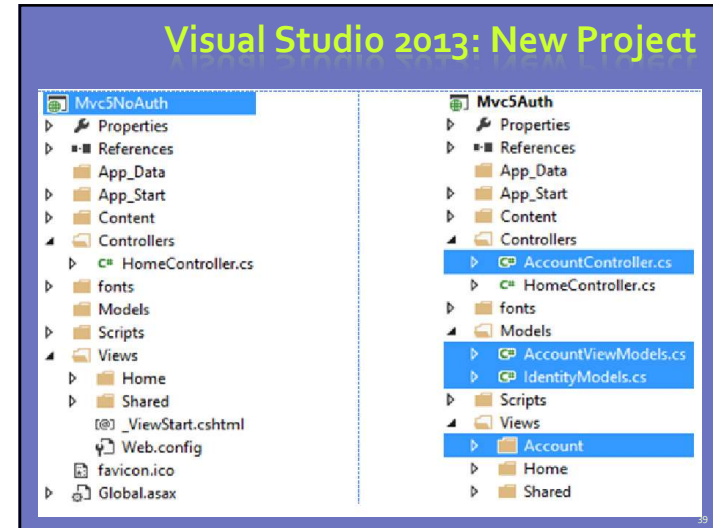
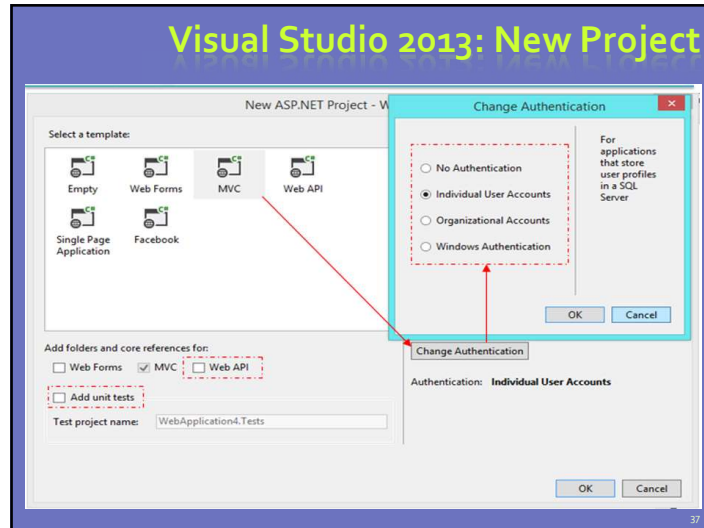


34

Visual Studio 2013: New Project



36



Visual Studio 2013: New Project

- Individual User Accounts:** The project was created the kind of projects including the security Internet
- No Authentication:** The project was created as the project does not include the security Internet.
- Windows Authentication:** The project was created the kind of project the Intranet including the security, but the account is managed on the intranet.
- Organizational Accounts:** The project was created the kind of projects using accounts from cloud computing.

You can choose to add Web API support library building web

VS 2013: Default Layout

The image shows the default layout of a new ASP.NET project in Visual Studio 2013. The 'Solution Explorer' on the left shows the project structure: Properties, References, App_Data, App_Start, Content, Controllers, Home, Models, Scripts, Views, and WebResource. The 'WebResource' folder contains 'WebResource1.aspx'. The 'Views' folder contains 'Home', 'Shared', and 'WebResource'. The 'WebResource' folder contains 'WebResource1.aspx'. The 'WebResource' folder contains 'WebResource1.aspx'.

Internet App Project Files

The diagram shows the file structure of an Internet App Project with the following annotations:

- Database File**: Points to `App_Data`.
- Static files (CSS, Images, etc.)**: Points to `Content`.
- classes are run once when the application starts**: Points to `App_Start`.
- All controllers and actions**: Points to `Controllers`.
- JavaScript files (jQuery, Modernizr, knockout, etc.)**: Points to `Scripts`.
- View templates**: Points to `Views`.
- _Layout.cshtml – master page (main template)**: Points to `_Layout.cshtml` in the `Views/Shared` folder.
- control the lifecycle of Request, Session, Application, ...**: Points to `Web.config`.
- Application_Start() – The entry point of the application**: Points to `Global.asax`.
- Web.config – Configuration file**: Points to `Web.config`.

```

public class HomeController : Controller
{
    public ActionResult Index()
    {
        ViewBag.Message = "Index page.";
        return View();
    }
}

```

Website in mobile

The image shows two mobile device screens displaying a login page. The left screen shows a full-width layout with a header, a login form, and a footer. The right screen shows a narrow-width layout with a hamburger menu on the left and a login form on the right.

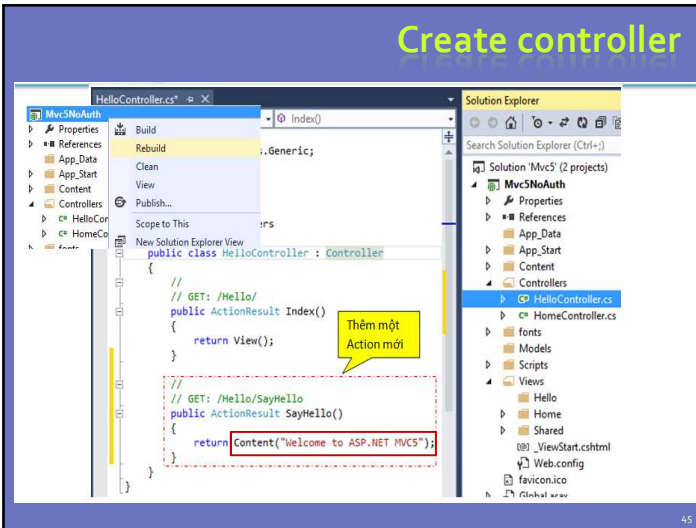
Website in desktop

The image shows a desktop browser window displaying a login page. The page has a header with navigation links, a login form, and a footer. The layout is wider than the mobile version.

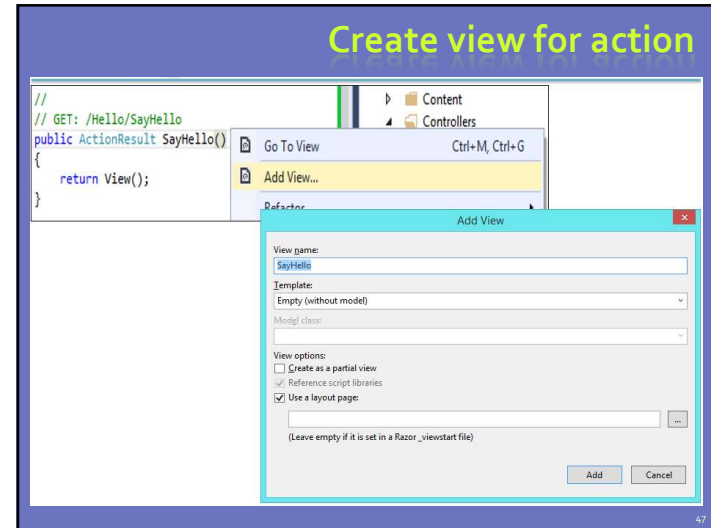
Create controller

The image shows the 'Add Scaffold' dialog in Visual Studio. The 'Controller' category is selected, and the 'MVC 5 Controller - Empty' option is chosen. The 'Add Controller' dialog is also visible, showing the controller name 'HelloController'.

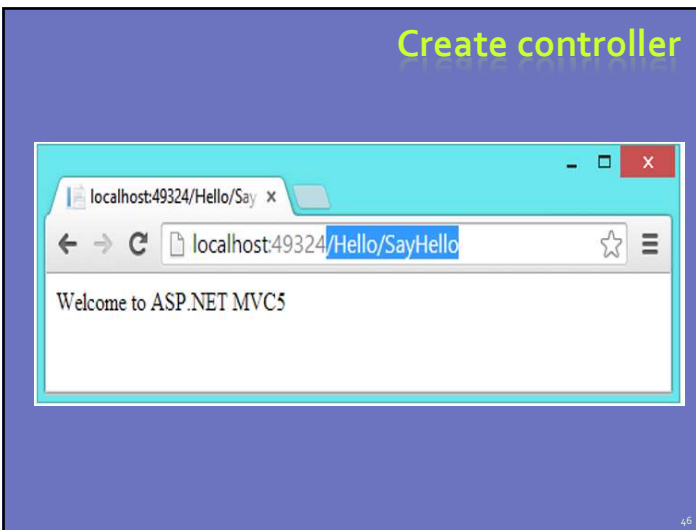
Create controller



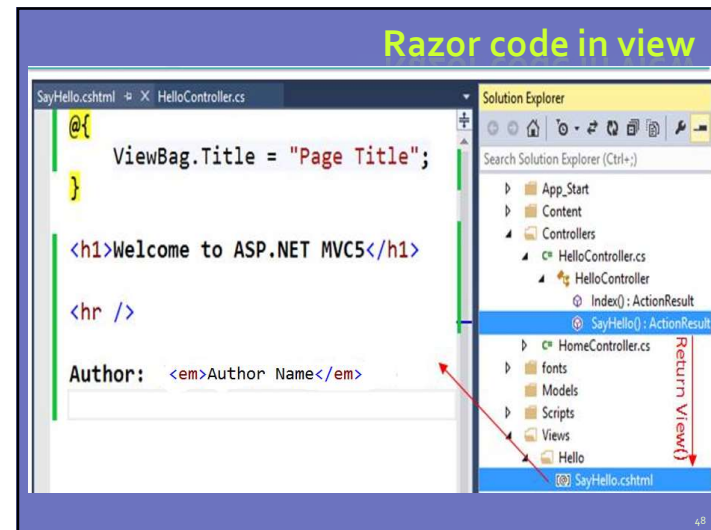
Create view for action



Create controller



Razor code in view



Display in browser

localhost:58683/Hello/SayHello

Application name Home About Contact

Welcome to ASP.NET MVC5

Author: Author Name

© 2015 - My ASP.NET Application

View content

NuGet Package Management

nuget gallery

Installed packages

jQuery

Microsoft.AspNet.Identity.Core

Microsoft.AspNet.Identity.EntityFramework

Microsoft.AspNet.Identity.Owin

Microsoft.AspNet.Mvc

Microsoft.AspNet.Razor

View content

Passing data from Controller to View

◆ Simple:

```

public ActionResult SayHello()
{
    ViewBag.Message = "Welcome to ASP.NET MVC5";
    return View();
}

```

```

@{
    ViewBag.Title = "Page Title";
}
<h1>@ViewBag.Message</h1>
<hr />

```

NuGet package management

- ◆ Free, open source package management
- ◆ Makes it easy to install and update open source libraries and tools
- ◆ Part of Visual Studio 2012/2013
- ◆ Configurable package sources
- ◆ Simple as adding a reference
- ◆ GUI-based package installer
- ◆ Package manager console

Package Manager Console

PM> Install-Package RouteDebugger

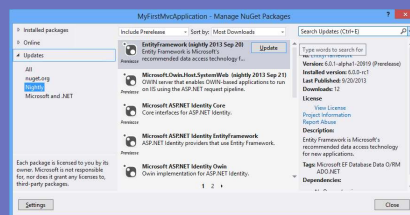
Successfully installed 'RouteDebugger 2.1.4.0'.

Nightly Builds

- ◆ Nightly builds of ASP.NET MVC are available via a private NuGet feed

- In your Package Manager settings add the following package source:

<http://www.myget.org/F/aspnetwebstacknightly/>

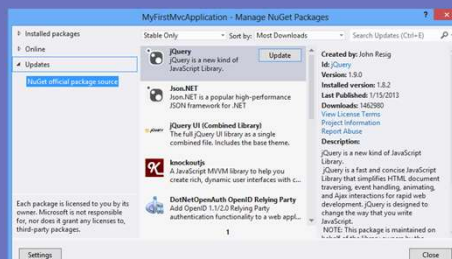


53

Summary

- ◆ HTTP is a client-server protocol for transferring web resources via Internet
- ◆ Model-view-controller (MVC) is a software architecture pattern
- ◆ ASP.NET MVC is a great platform for developing Internet applications
- ◆ Visual Studio is the main development tool for creating ASP.NET MVC applications
 - Almost everything in ASP.NET MVC is a package
- ◆ Glimpse is a tool that helps with debugging

55



Demo: NuGet

Install and update packages as easy as adding a reference

Introduction to ASP.NET MVC

Questions?