

ASP.NET MVC

Telerik Academy

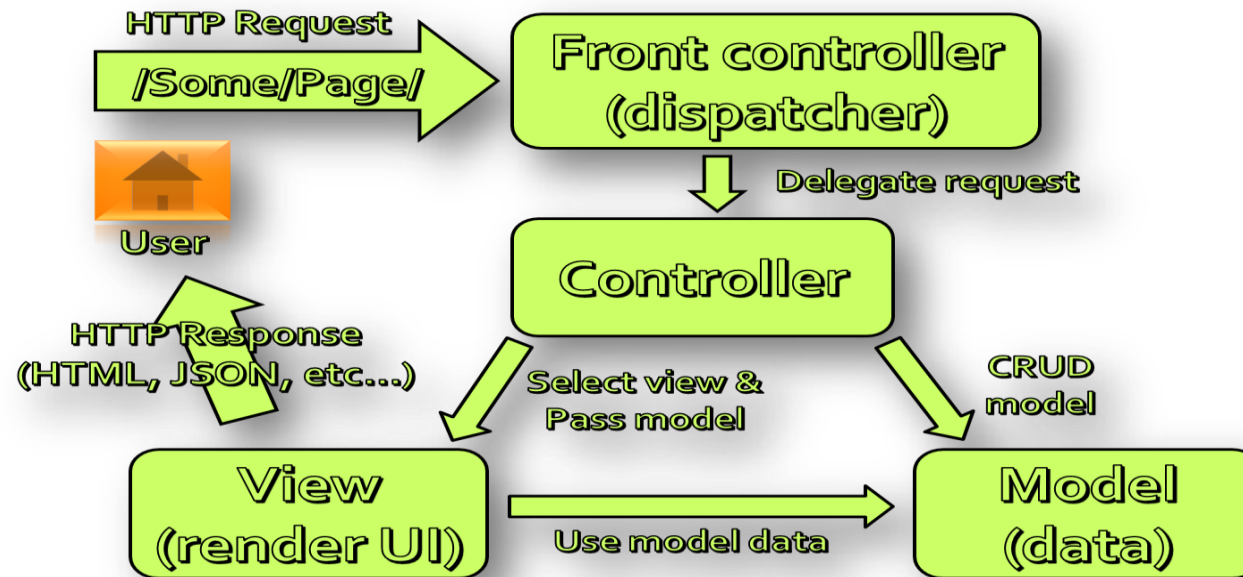
<http://academy.telerik.com>

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The MVC Pattern



The MVC Pattern

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

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

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

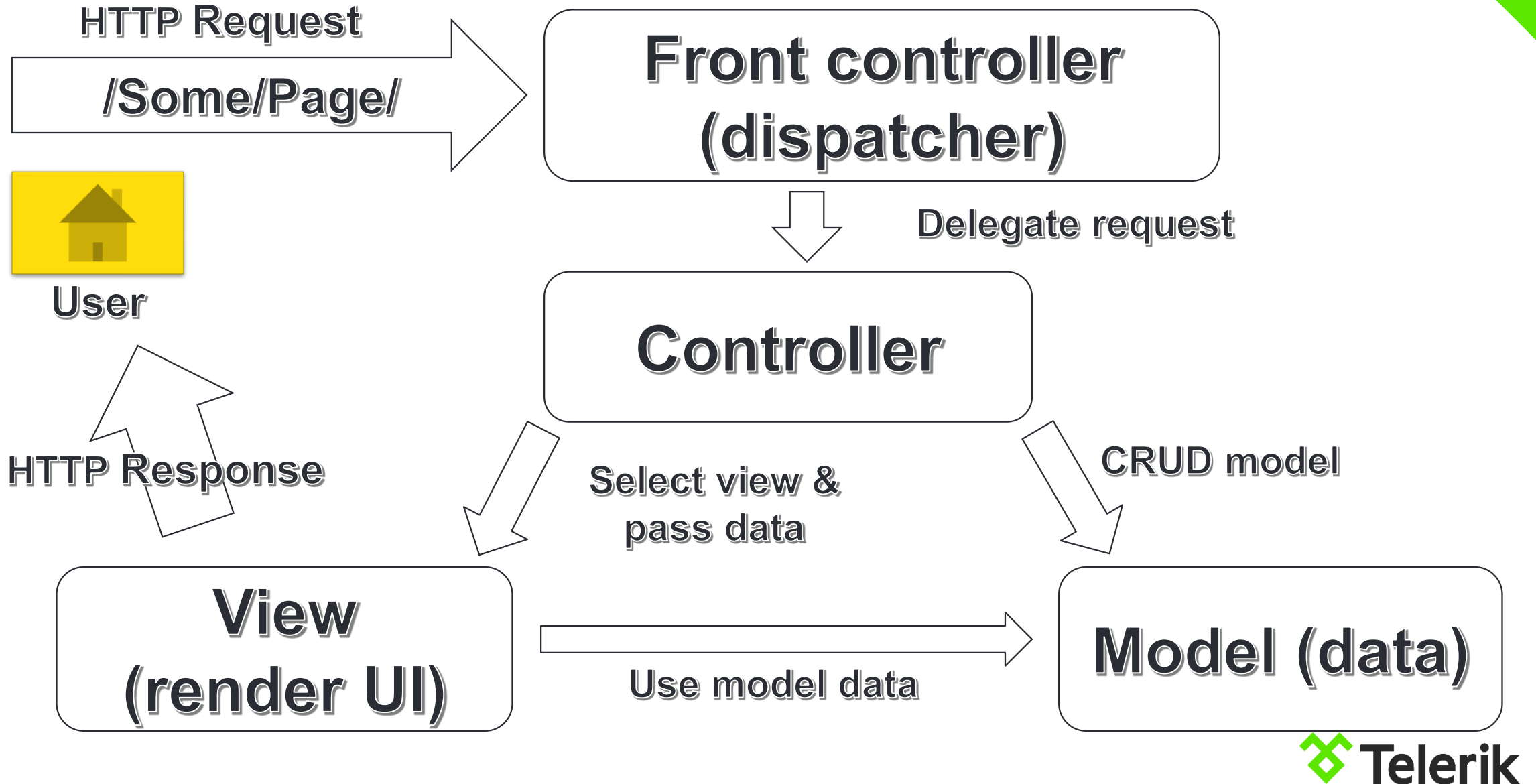
Controller

- 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"

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)

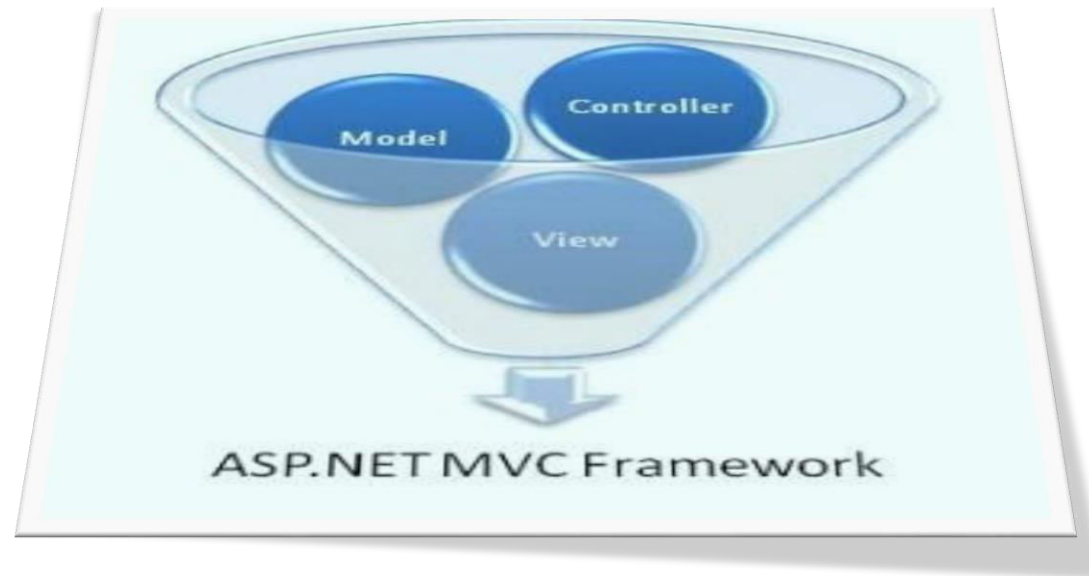
The MVC Pattern for Web



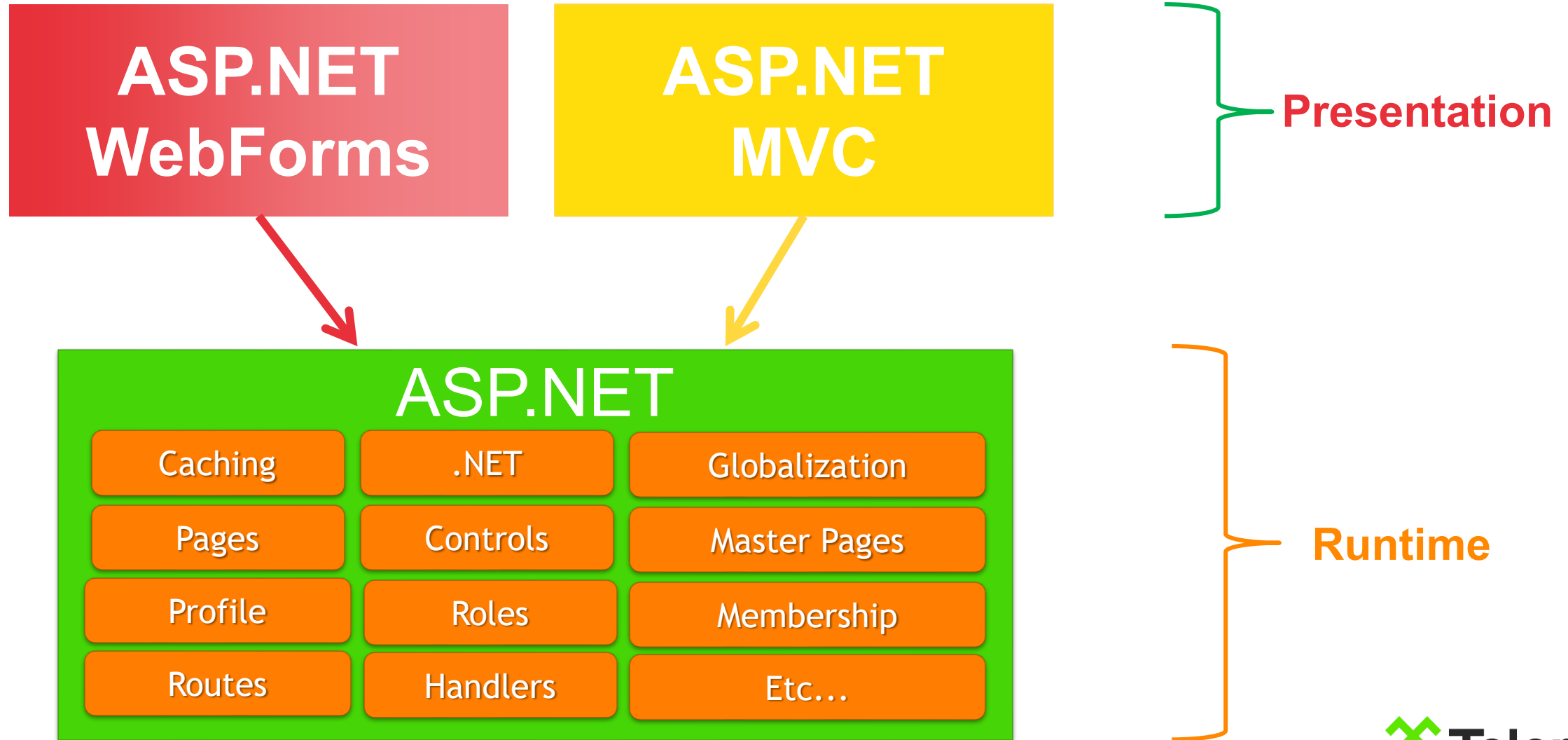
MVC Frameworks

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

ASP.NET MVC



ASP.NET Core



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

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

ASP.NET MVC

- 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)

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

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.

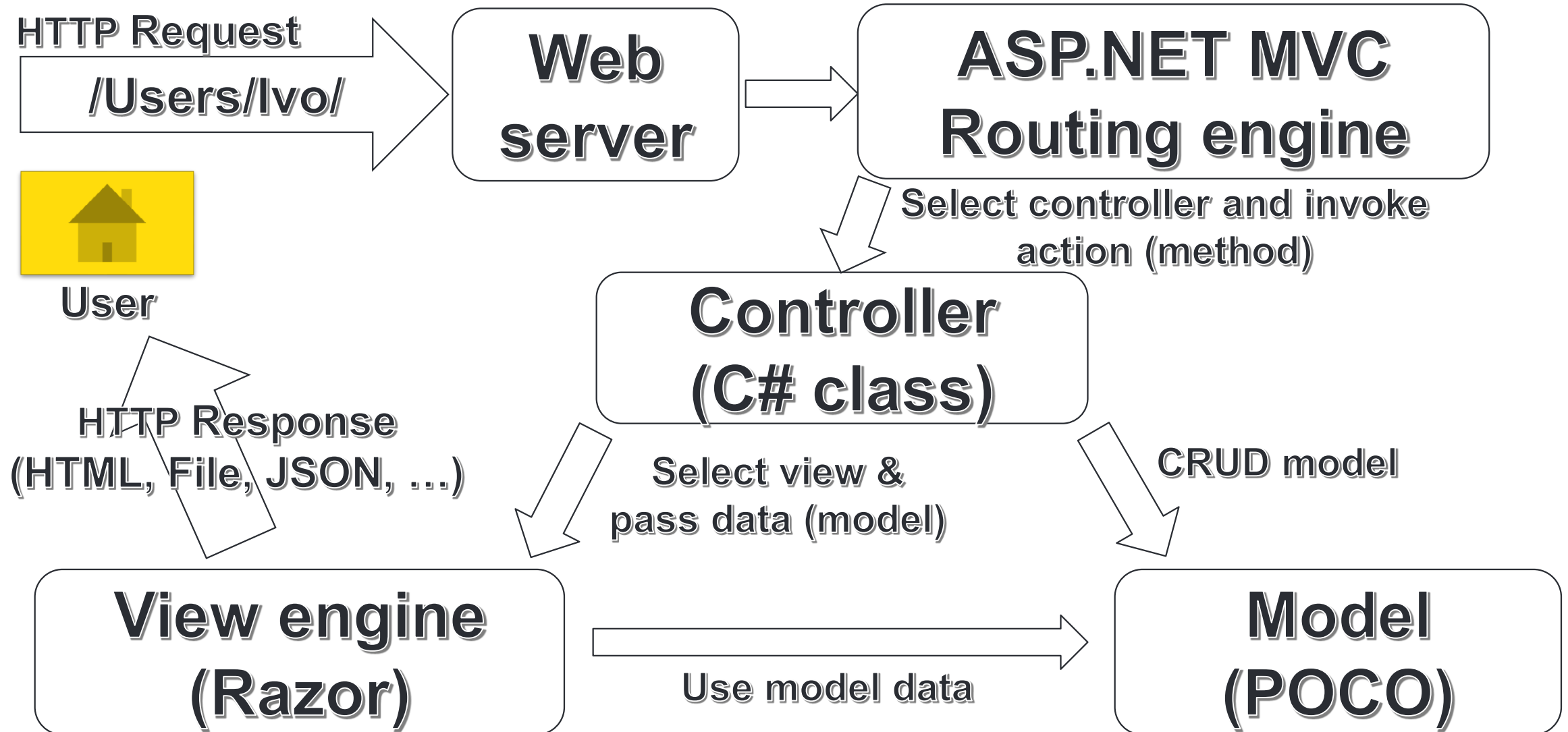
Clean URLs

- **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)

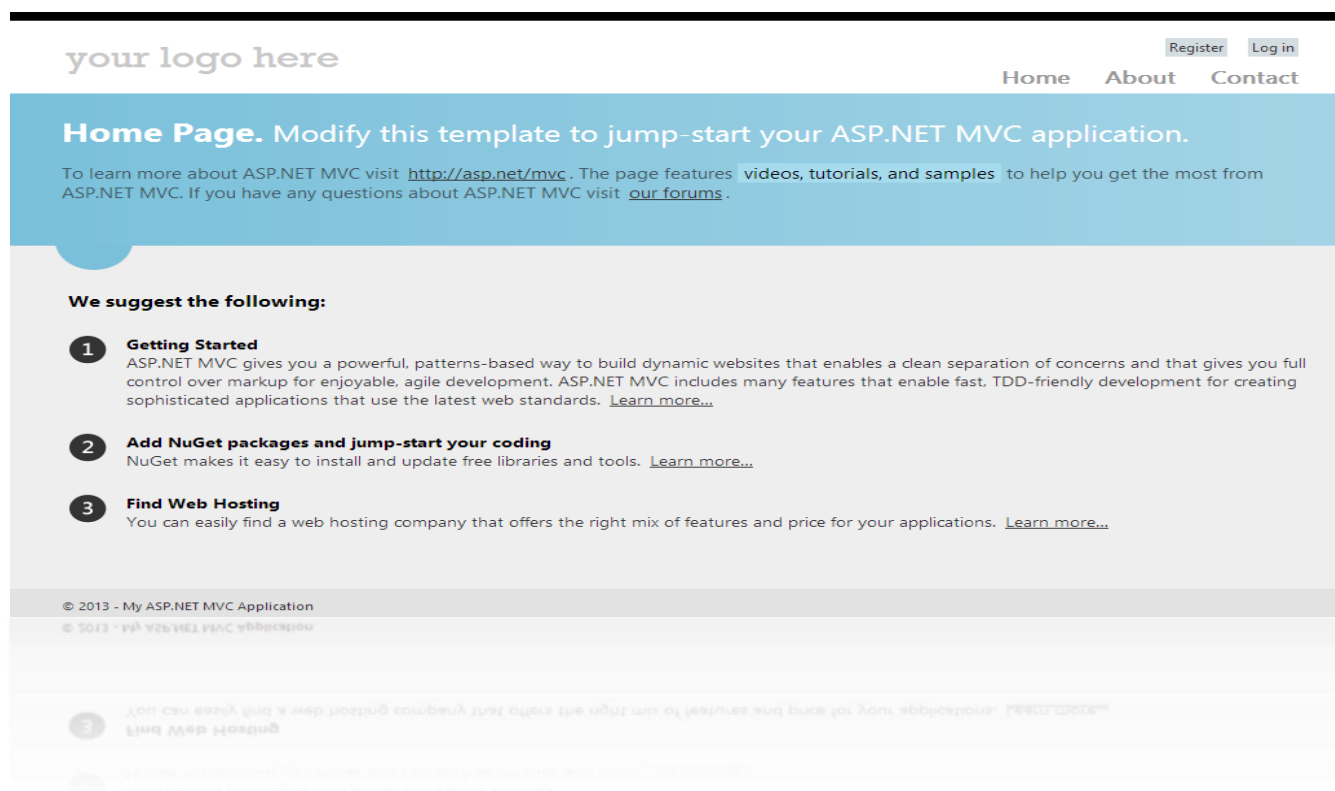
Community-based

- 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>
- vNext is on GitHub
 - <https://github.com/aspnet>

MVC Pattern in ASP.NET MVC



Creating ASP.NET MVC Project



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 Sever (Express or LocalDB)
- Visual Studio installer will install everything we need
 - <http://www.microsoft.com/visualstudio/eng/2013-downloads>

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

Visual Studio 2012: New Project

The image shows the Visual Studio 2012 interface. The 'Start Page - Microsoft Visual Studio' window is open, displaying the 'FILE' menu with 'New' and 'Project...' options. The 'New Project' dialog is open, showing a list of project templates under the 'Visual C#' category. The 'ASP.NET MVC 4 Web Application' template is selected. The 'New ASP.NET MVC 4 Project' sub-dialog is also open, showing the 'Internet Application' template selected. The 'View engine' is set to 'Razor'. The 'Create a unit test project' checkbox is checked, and the 'Test project name' is 'MyFirstMvcApplication.Tests'. The 'Test framework' is set to 'Visual Studio Unit Test'. The 'Solution name' is 'MyFirstMvcApplication' and the 'Location' is 'C:\Dev\'. The 'Telerik' logo is visible in the bottom right corner.

Start Page - Microsoft Visual Studio

FILE EDIT VIEW DEBUG TEAM SQL TOOLS TEST ANALYZE WINDOW HELP

New Project... Ctrl+Shift+N
Shift+Alt+N

New Project

.NET Framework 4.5 Sort by: Default

Recent

Installed

Visual C#

Windows Store

Windows

Web

Office

Cloud

Reporting

SharePoint

Silverlight

Test

WCF

Windows Phone

Workflow

Online

Name: MyFirstMvcApplication

Location: C:\Dev\

Solution name: MyFirstMvcApplication

ASP.NET Empty Web Application Visual C#

ASP.NET Web Forms Application Visual C#

ASP.NET MVC 3 Web Application Visual C#

ASP.NET MVC 4 Web Application Visual C#

ASP.NET Dynamic Data Entities Web Application Visual C#

ASP.NET AJAX Server Control Visual C#

ASP.NET AJAX Server Control Extender Visual C#

ASP.NET Server Control Visual C#

New ASP.NET MVC 4 Project

Project Template

Select a template:

Empty Basic Internet Application Intranet Application

Mobile Application Web API Single Page Application Facebook Application

Description: A default ASP.NET MVC 4 project with an account controller that uses forms authentication.

View engine: Razor

☒ Create a unit test project

Test project name: MyFirstMvcApplication.Tests

Test framework: Visual Studio Unit Test Additional Info

OK Cancel

Telerik

VS 2012: Default Layout

your logo here

Register Log in

Home About Contact

Home Page.

Modify this template to jump-start your ASP.NET MVC application.

To learn more about ASP.NET MVC visit <http://asp.net/mvc>. The page features videos, tutorials, and samples to help you get the most from ASP.NET MVC. If you have any questions about ASP.NET MVC visit [our forums](#).

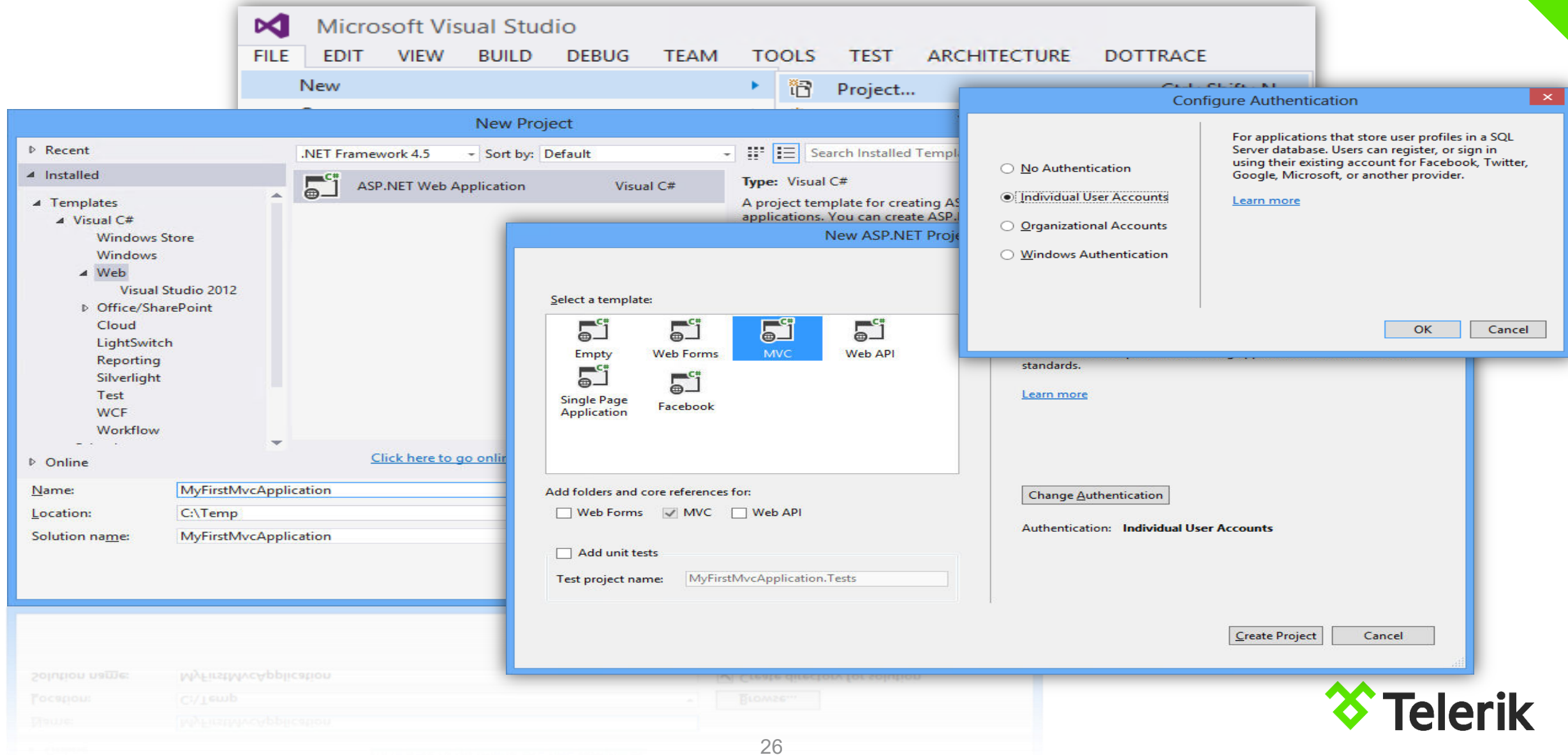
We suggest the following:

- 1 Getting Started**
ASP.NET MVC gives you a powerful, precise control over markup for enjoyable, agile applications that use the power of the .NET framework.
- 2 Add NuGet packages and jump-start your development**
NuGet makes it easy to install and update the latest packages from the community.
- 3 Find Web Hosting**
You can easily find a web hosting company that fits the needs of your application.

© 2013 - My ASP.NET MVC Application

```
1 <!DOCTYPE html>
2 <html lang="en">
3   <head>
4     <meta charset="utf-8" />
5     <title>Home Page - My ASP.NET MVC Application</title>
6     <link href="/favicon.ico" rel="shortcut icon" type="image/x-icon" />
7     <meta name="viewport" content="width=device-width" />
8     <link href="/Content/site.css" rel="stylesheet"/>
9
10    <script src="/Scripts/modernizr-2.6.2.js"></script>
11
12  </head>
13  <body>
14    <header>
15      <div class="content-wrapper">
16        <div class="float-left">
17          <p class="site-title"><a href="/">your logo here</a></p>
18        </div>
19        <div class="float-right">
20          <section id="login">
21            <ul>
22              <li><a href="/Account/Register" id="registerLink">Register</a></li>
23              <li><a href="/Account/Login" id="loginLink">Log in</a></li>
24            </ul>
25          </section>
26        </div>
27      </div>
28    </header>
29  </body>
30</html>
```

Visual Studio 2013: New Project



VS 2013: Default Layout

Application name

HomeAboutContact

RegisterLog in

ASP.NET

ASP.NET is a free web framework for building great Web sites and Web applications using HTML, CSS and JavaScript.

[Learn more »](#)

Getting started

ASP.NET MVC gives you a powerful, patterns-based way to build dynamic websites that enables a clean separation of concerns and gives you full control over markup for enjoyable, agile development.

[Learn more »](#)

Get more

NuGet is a free Visual Studio extension that makes it easy to add, remove, and update libraries and tools in Visual Studio projects.

[Learn more »](#)

Application name

ASP.NET

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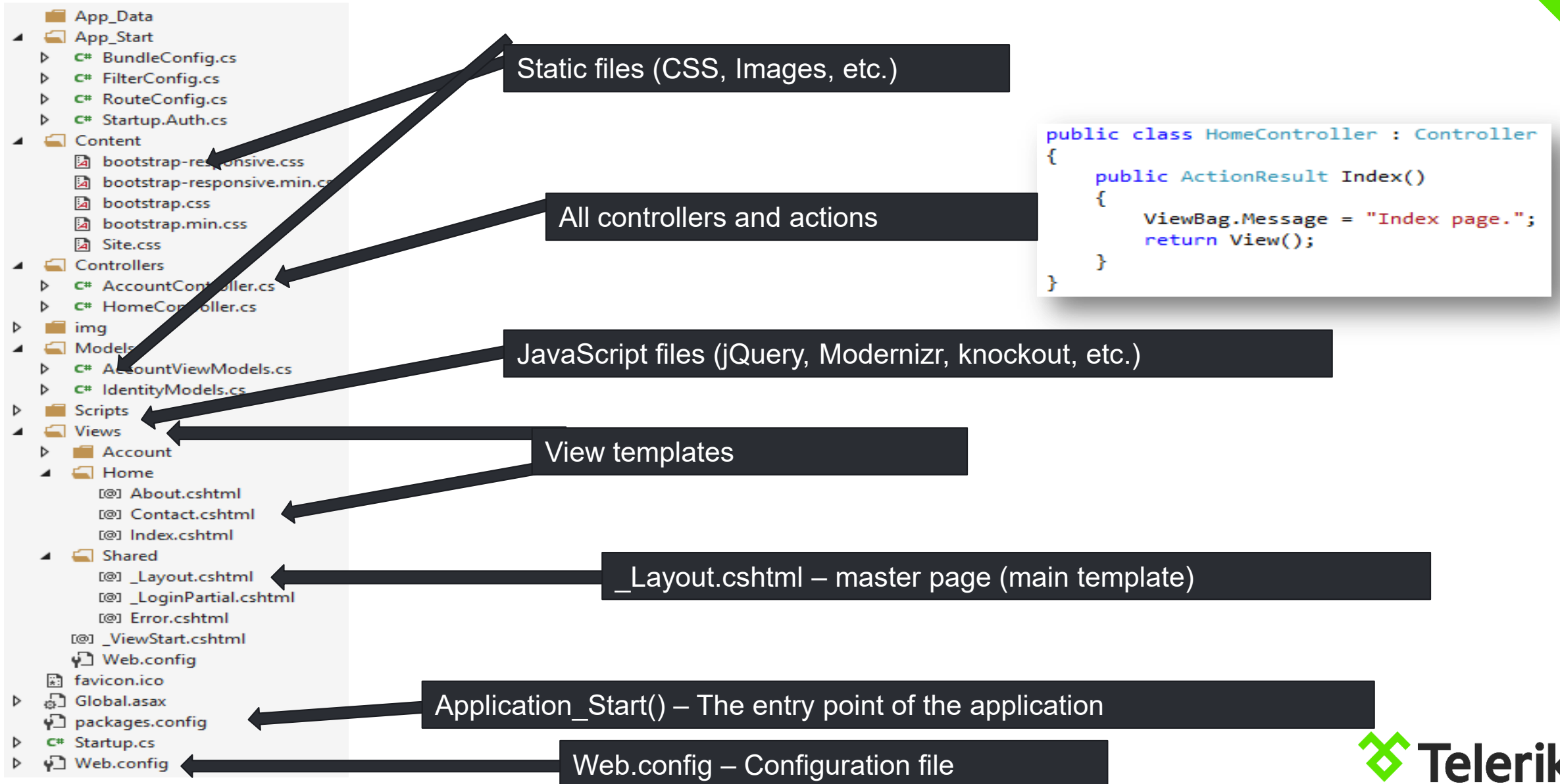
[Learn more »](#)

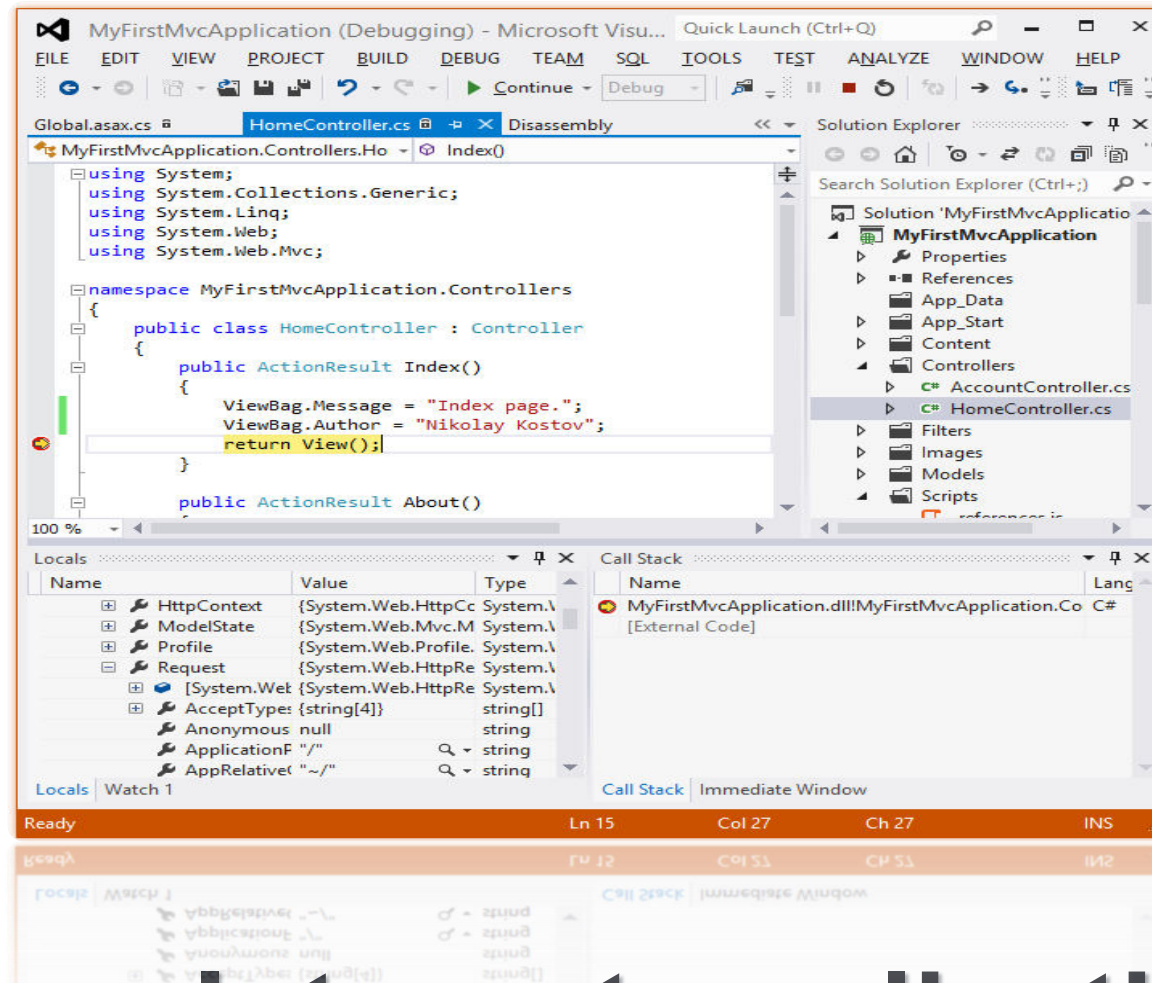
Get more libraries

NuGet is a free Visual Studio extension that makes it easy to add, remove, and update libraries and tools in Visual Studio projects.

[Learn more »](#)

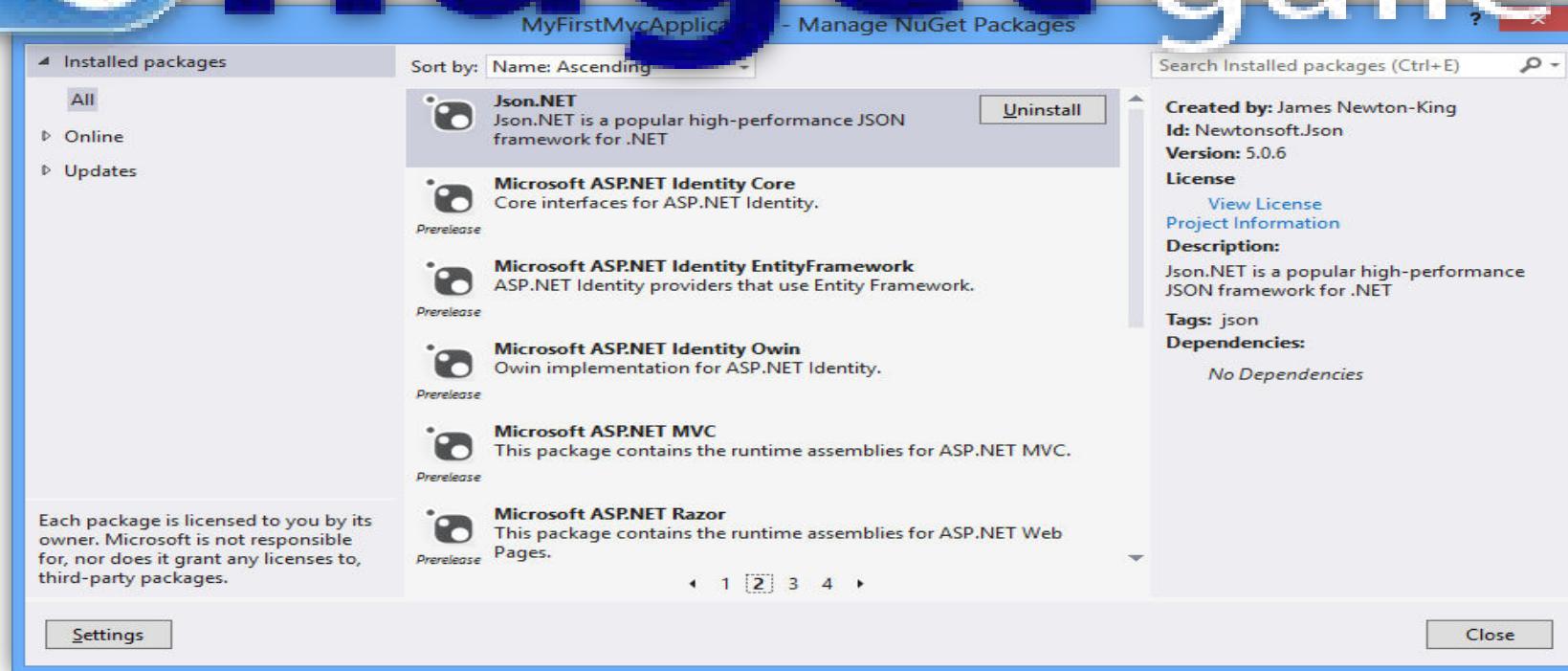
Internet App Project Files





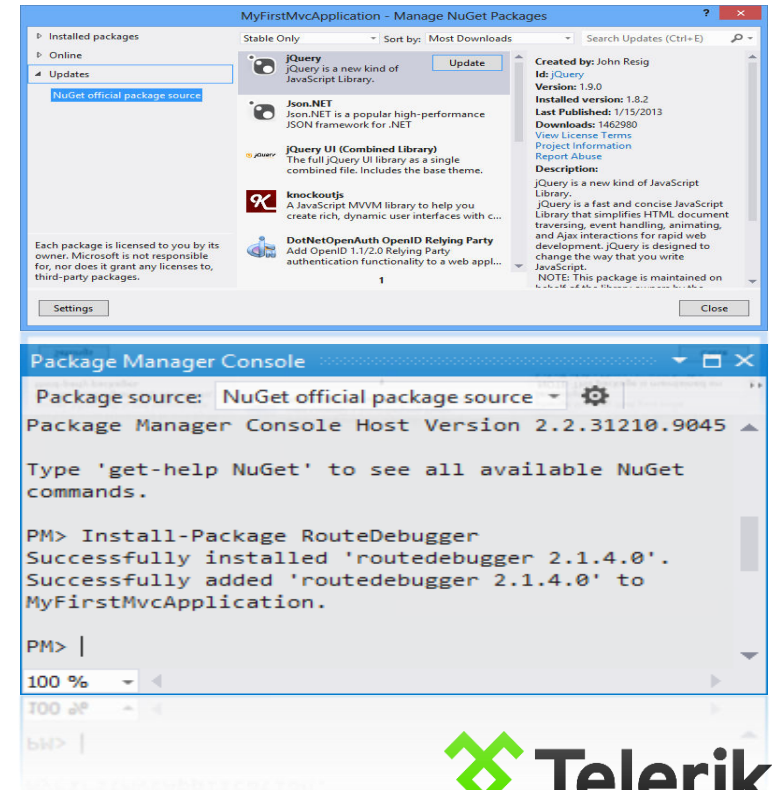
Demo: Internet application

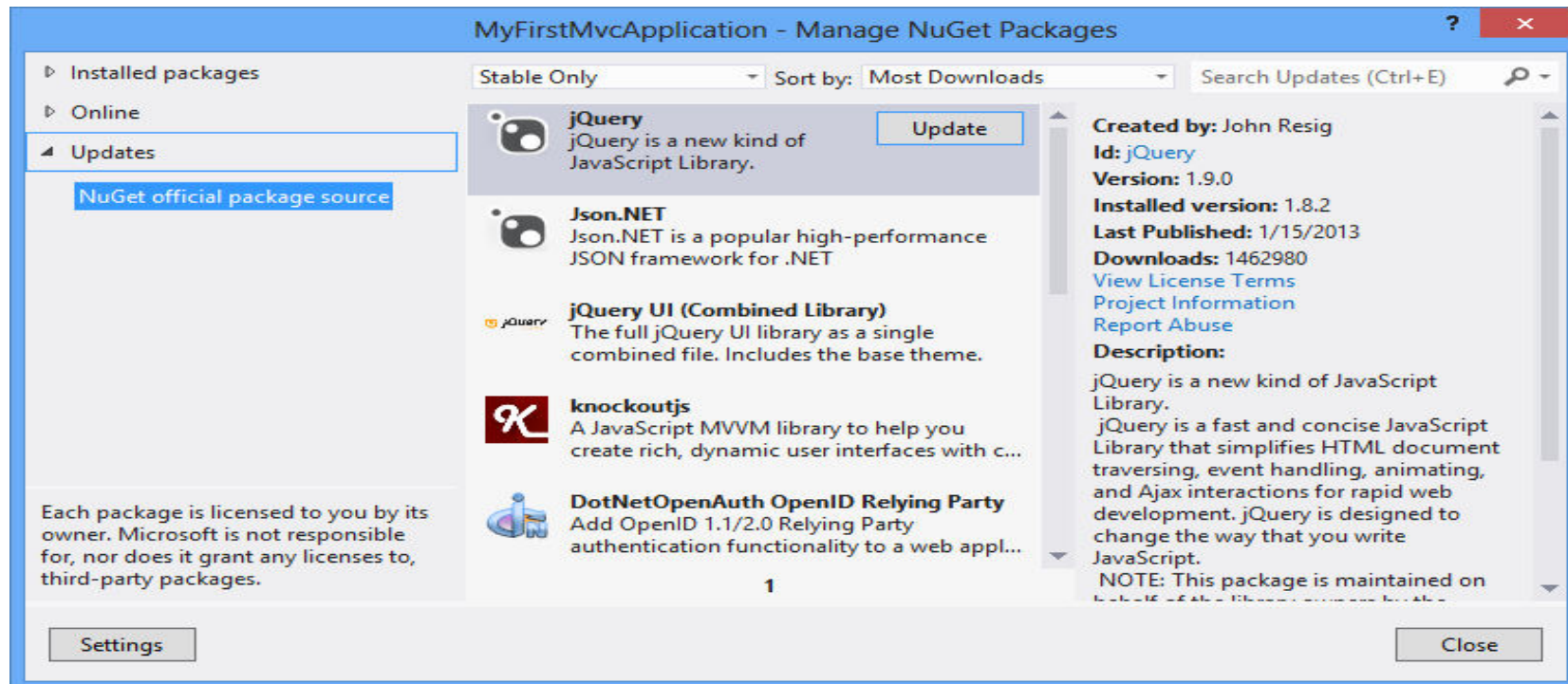
NuGet Package Management



NuGet package management

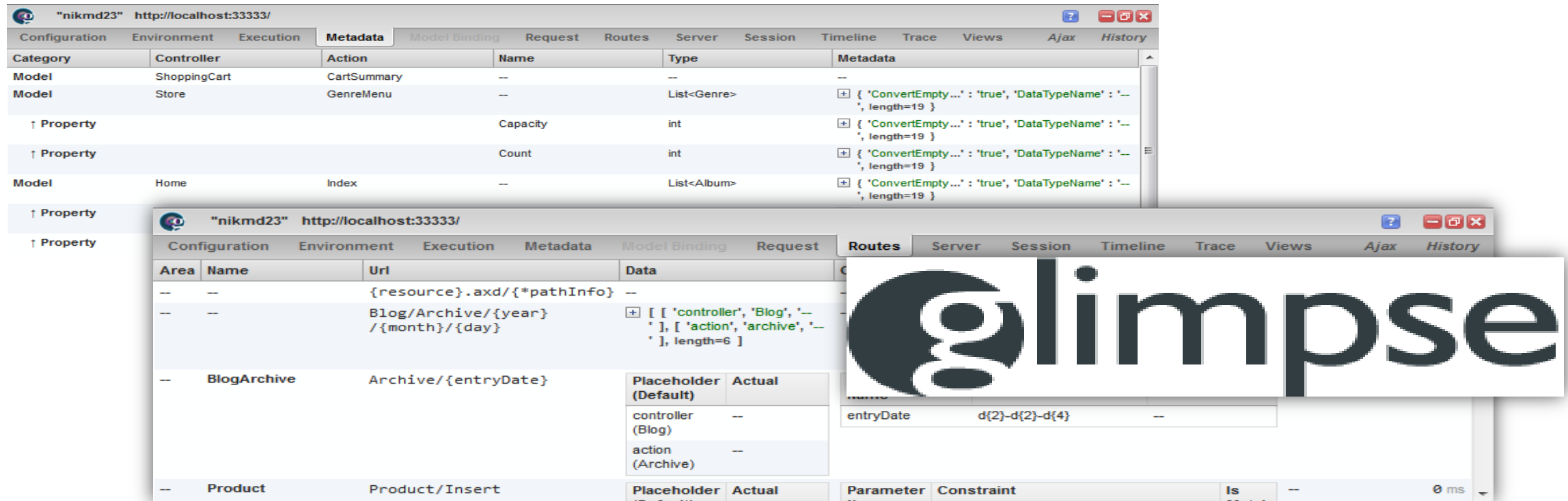
- Free, open source package management
- Makes it easy to install and update open source libraries and tools
- Part of **Visual Studio 2012/2013**
- Configurable package sources
- Simple as adding a reference
- GUI-based package installer
- Package manager console





Demo: NuGet

Server Information with Glimpse



The image displays two overlapping screenshots of the Glimpse web server monitoring tool. The top screenshot shows the 'Metadata' panel, which lists various data types and their associated controllers and actions. The bottom screenshot shows the 'Routes' panel, which lists the application's routes and their parameters.

Metadata Panel (Top Screenshot):

Category	Controller	Action	Name	Type	Metadata
Model	ShoppingCart	CartSummary	--	--	--
Model	Store	GenreMenu	--	List<Genre>	{ 'ConvertEmpty...' : 'true', 'DataTypeName' : '--', length=19 }
↑ Property			Capacity	int	{ 'ConvertEmpty...' : 'true', 'DataTypeName' : '--', length=19 }
↑ Property			Count	int	{ 'ConvertEmpty...' : 'true', 'DataTypeName' : '--', length=19 }
Model	Home	Index	--	List<Album>	{ 'ConvertEmpty...' : 'true', 'DataTypeName' : '--', length=19 }
↑ Property					
↑ Property					

Routes Panel (Bottom Screenshot):

Area	Name	Url	Data						
--	--	{resource}.axd/{*pathInfo}	--						
--	--	Blog/Archive/{year}/{month}/{day}	[['controller', 'Blog', '--'], ['action', 'archive', '--'], length=6]						
--	BlogArchive	Archive/{entryDate}	<table border="1"><thead><tr><th>Placeholder (Default)</th><th>Actual</th></tr></thead><tbody><tr><td>controller (Blog)</td><td>--</td></tr><tr><td>action (Archive)</td><td>--</td></tr></tbody></table>	Placeholder (Default)	Actual	controller (Blog)	--	action (Archive)	--
Placeholder (Default)	Actual								
controller (Blog)	--								
action (Archive)	--								
--	Product	Product/Insert	<table border="1"><thead><tr><th>Placeholder</th><th>Actual</th></tr></thead><tbody><tr><td>entryDate</td><td>d{2}-d{2}-d{4}</td></tr></tbody></table>	Placeholder	Actual	entryDate	d{2}-d{2}-d{4}		
Placeholder	Actual								
entryDate	d{2}-d{2}-d{4}								

Routes Panel (Bottom Screenshot):

Parameter	Constraint	Is
entryDate	d{2}-d{2}-d{4}	--

Server Info with Glimpse

- Glimpse shows execution timings, server configuration, request data and more
 - Showed inside browser (like FireBug)
 - With no changes to the application code
 - Supports ASP.NET MVC, WebForms and EF

Chrome 92.0" http://localhost:52726/

Configuration

Environment

Execution

Metadata

Model Binding

Request

Routes

SQL

Server

Session

Timeline

Ajax

History

Commands per Connection

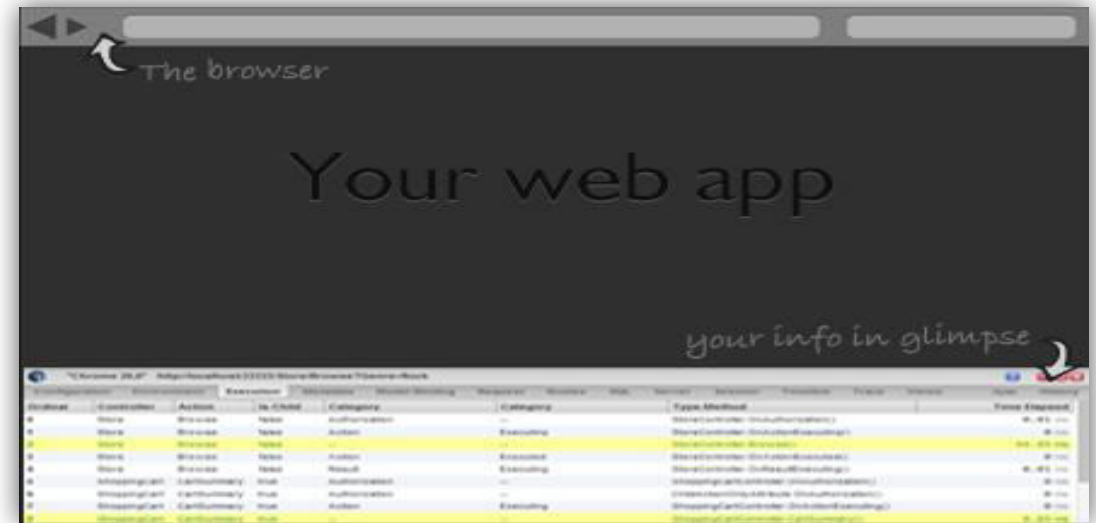
Duration

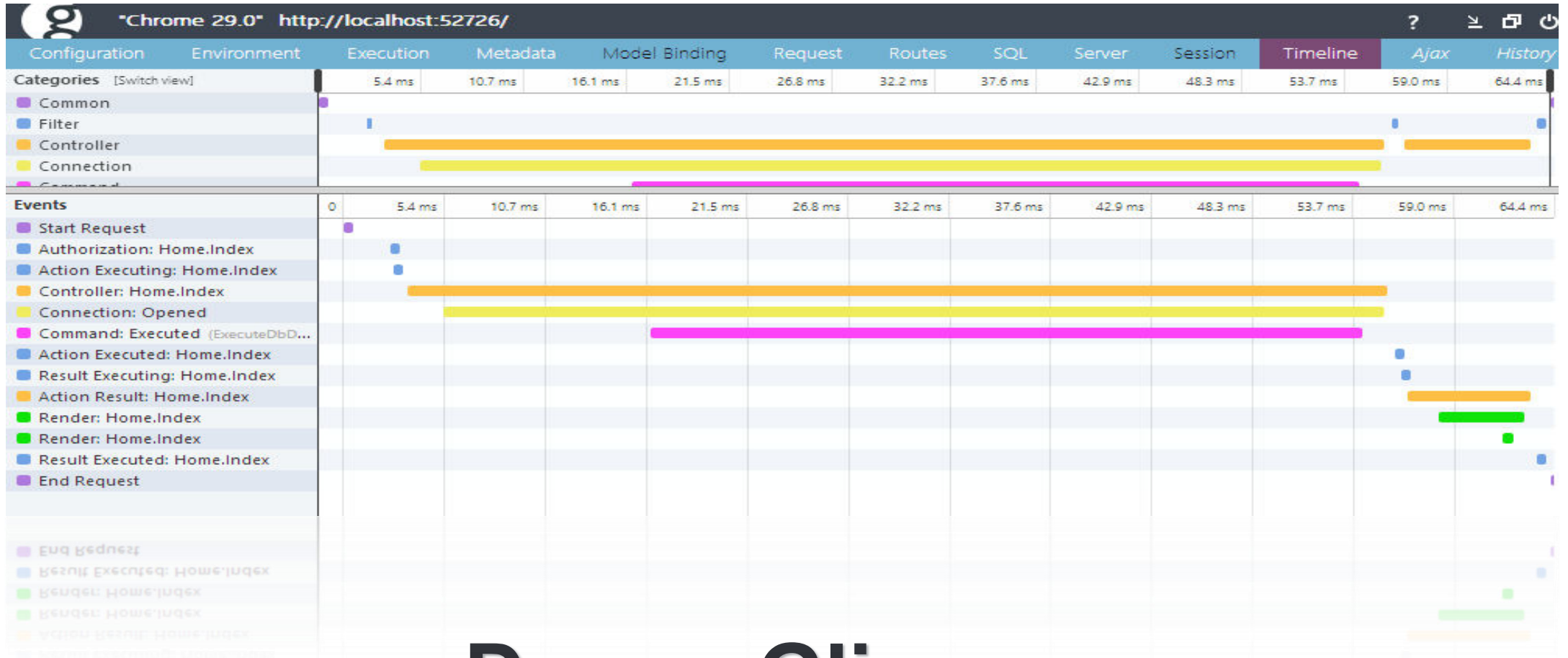
Ordinal	Command	Parameters				Records	Duration	Offset
▼ Transaction - Started								
Isolation Level - ReadCommitted								
1	INSERT [dbo].[Posts]([Name]) VALUES ('test' /* @0 */) SELECT [Id] FROM [dbo].[Posts] WHERE @@ROWCOUNT > 0 AND [Id] = scope_identity()	Name	Value	Type	Size	1	37.96 ms	T+ 16.4 ms
		@0	test	String	-1			
▲ Transaction - Finished								
Status - Committed								

50.24 ms

Install Glimpse

1. Install NuGet packages:
 - Glimpse.Mvc5
 - Glimpse.EF6
2. Run the project
3. Configure it:
 - <http://localhost:port/Glimpse.axd>





Demo: Glimpse

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