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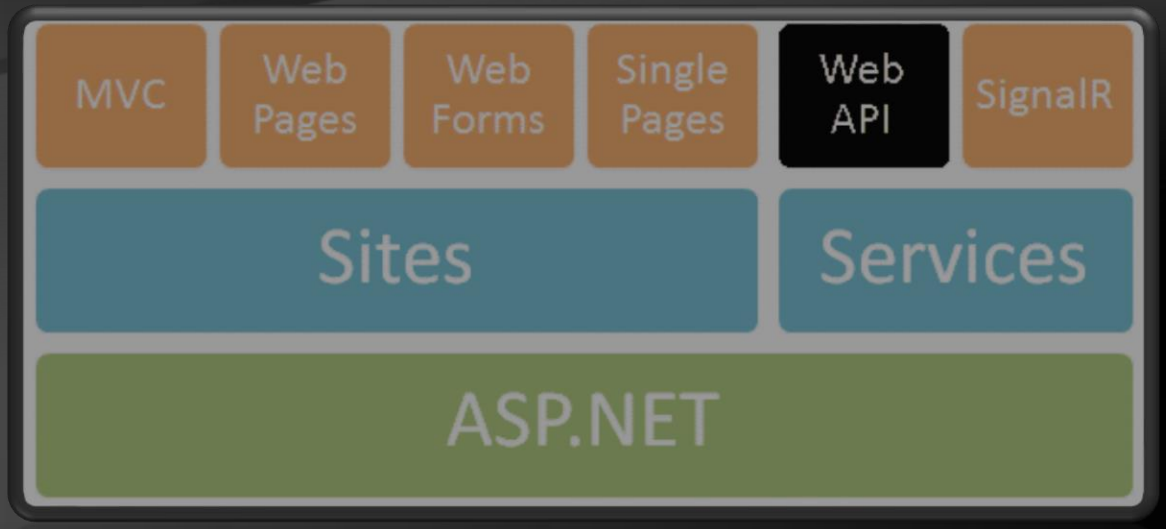

ASP.NET Web API

Web Services and Cloud

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ASP.NET

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Table of Contents

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The HTTP Protocol

How HTTP Works?

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)

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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 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
    - E.g. posted form data, files, etc.

```
<request method> <resource> HTTP/<version>
<headers>
<empty line>
<body>
```

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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 requested resource)

```
HTTP/<version> <status code> <status text>
<headers>
<CRLF>
<response body – the requested resource>
```

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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

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Demo: Postman

Chrome App: Postman

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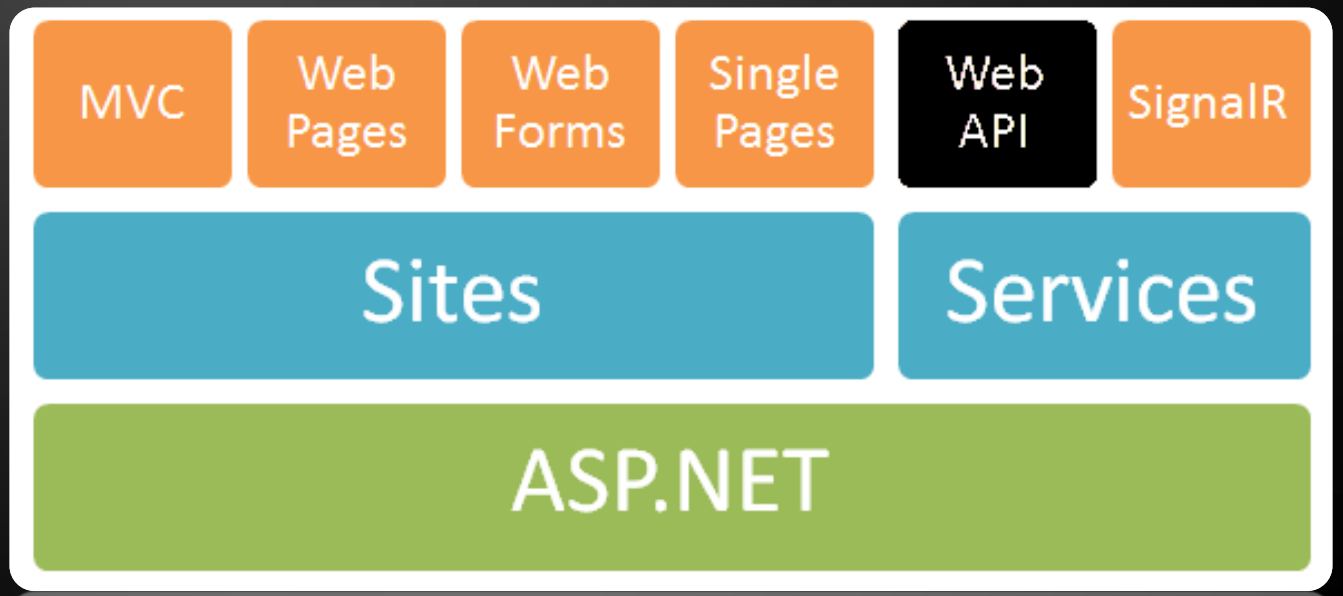
What is ASP.NET Web API?

ASP.NET Web API

- Framework that makes it easy to build HTTP services for browsers and mobile devices
- Platform for building RESTful applications on the .NET Framework using ASP.NET stack



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ASP.NET Web API Role

Data storage

Data Layer (EF)

Models

ASP.NET Web API

XML

XML

HTTP GET

JSON

JSON

HTTP PUT, POST, DELETE

Web API Features

- Modern HTTP programming model
  - Access to strongly typed HTTP object model
  - HttpClient API – same programming model
- Content negotiation
  - Client and server work together to determine the right format for data
  - Provide default support for JSON, XML and Form URL-encoded formats
  - We can add own formats and change content negotiation strategy

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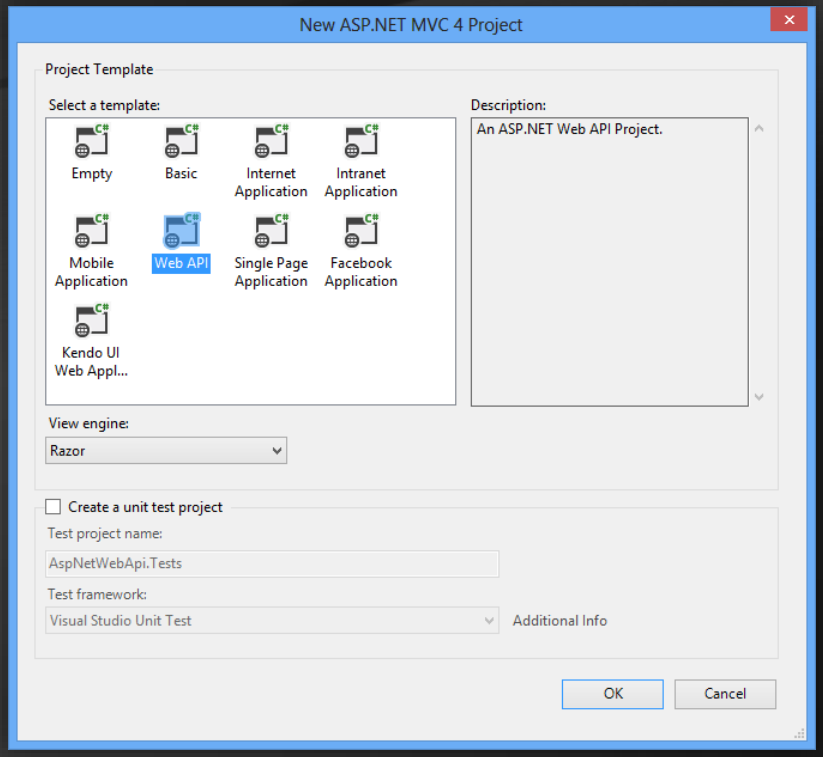

Demo: Creating ASP.NET Core Web API Project

Default ASP.NET Web API project template

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Web API Controllers

ApiControllers

- The core component
- All the controllers should be available in a folder by name Controllers
- Controller naming standard should be "nameController" (convention)
- Every controller should inherit ControllerBase class
- Routers instantiate controllers in every request
  - All requests are mapped to a specific action

Actions

- Actions are the ultimate request destination
  - Public controller methods
  - Non-static
- Actions typically return an IActionResult

```
public ActionResult<Product> Get(int id)
{
    if (!_repository.TryGetProduct(id, out var product))
    {
        return Ok(product);
    }
    else
    {
        return NotFound();
    }
}
```

Web API Controllers

- A *controller* is an object that handles HTTP requests
  - All API controllers derive from ControllerBase
- By default ASP.NET Core Web API will map HTTP requests to specific methods called

Action	HTTP method	Relative URI	Method
Get a list of all posts	GET	/api/posts	Get()
Get a post by ID	GET	/api/posts/*id*	Get(int id)
Create a new post	POST	/api/posts	Post(PostModel value)
Update a post	PUT	/api/posts/*id*	Put(int id, PostModel value)
Delete a post	DELETE	/api/posts/*id*	Delete(int id)
Get a post by category	GET	/api/posts?category =*category*	Get(string category)

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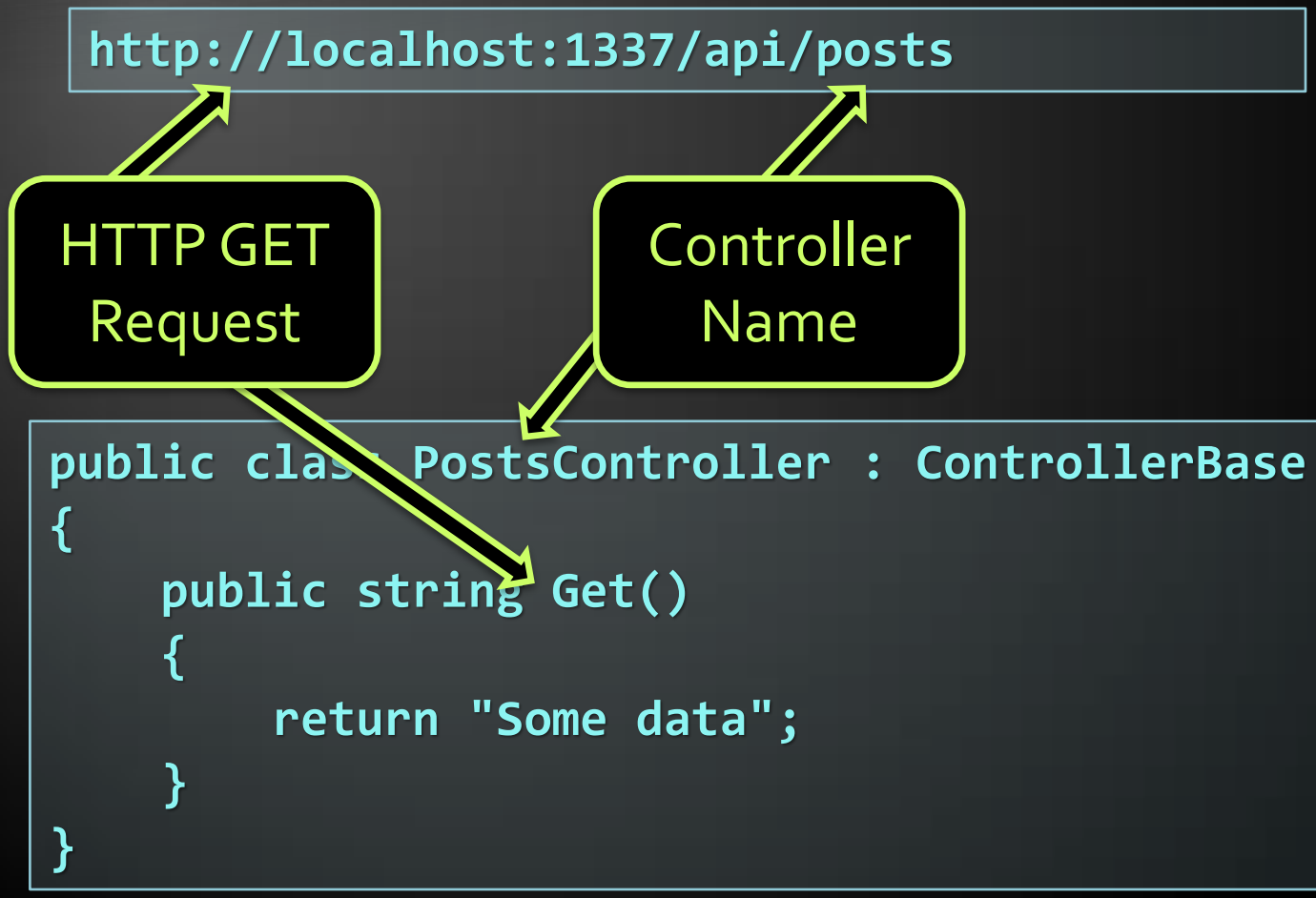
Web API Default Behavior

1. Web Request
2. Match a Route
3. API Controller Responds



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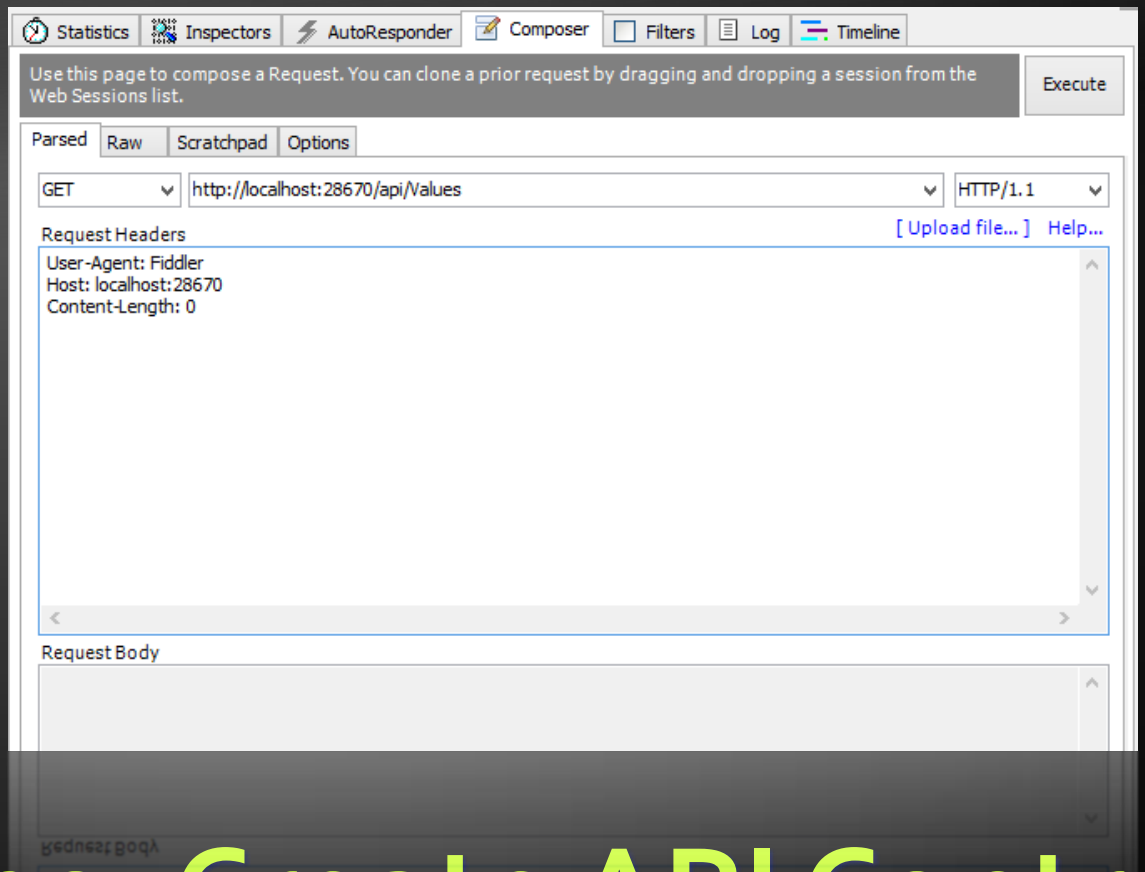

Demo: Create API Controller

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Web API Clients

HttpClient Model

- HttpClient is a modern HTTP client for .NET
  - Flexible and extensible API for accessing HTTP
- Has the same programming model as the ASP.NET Web API server side
  - HttpRequestMessage / HttpResponseMessage

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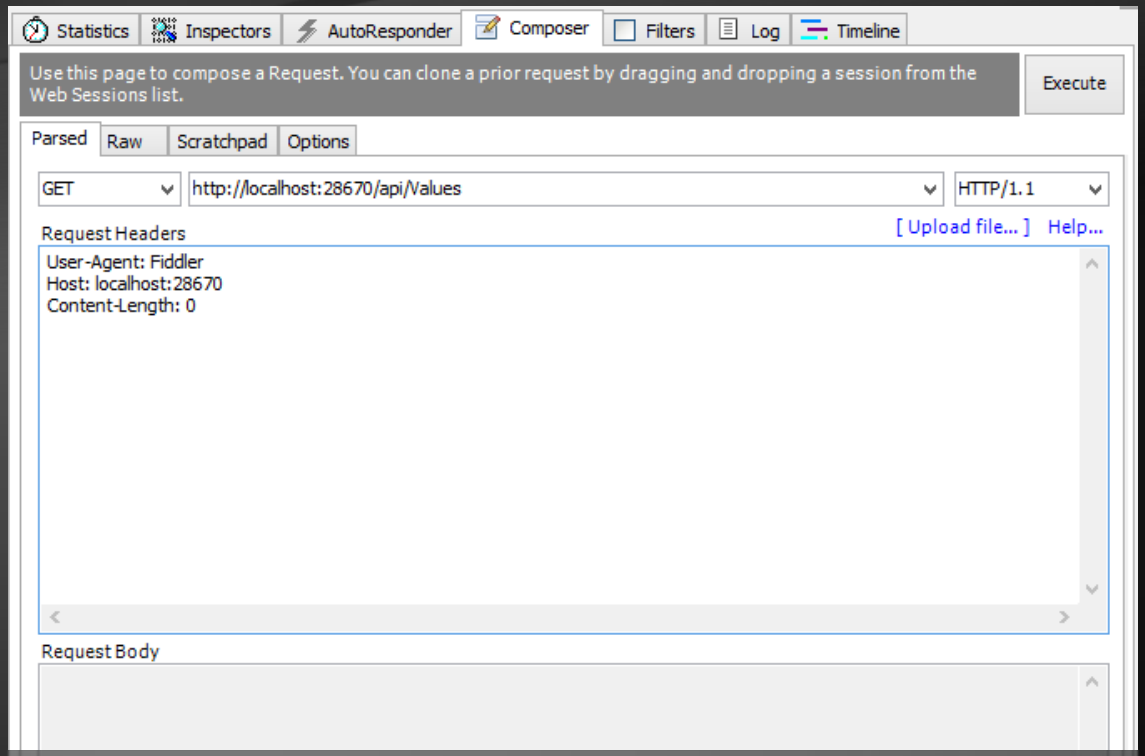

Demo: Consume Web API from Console Application

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Consuming Web API from JS

- Web APIs can be consumed using JavaScript via HTTP AJAX request
  - Example with jQuery:

```
<ol id="posts"></ol>
<script>
   $.ajax({
      url: '/api/posts',
      success: function (posts) {
         var list = $('#posts');
         for (var i = 0; i < posts.length; i++) {
            var post = posts[i];
            list.append('<li>' + post.title + '</li>');
         }
      }
   });
</script>
```

Should be encoded

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