ASP.NET WEB API

Introduction to Asp. Net Web Api

Lesson Objectives

- In this lesson we will cover the following
  - Web API Features
  - SOAP- based Web Services
  - Web API Introduction
  - Web API Routing
  - Web API Parameter Biding
  - Content Negotiation

Overview

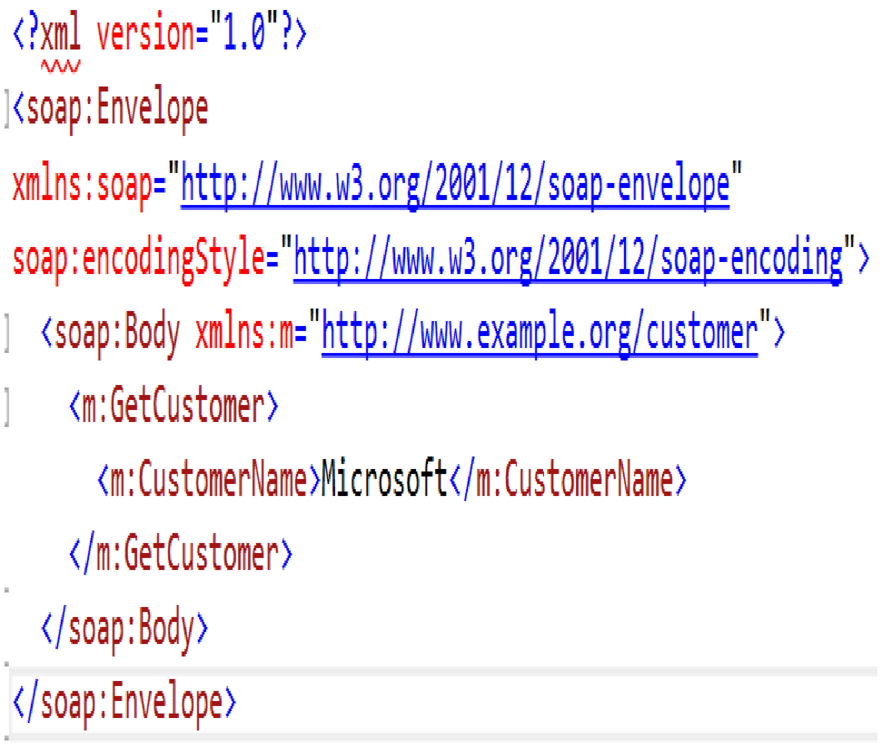
- The ASP.NET Web API makes it easy to create a set of web services that can respond to browser requests by using simple HTTP verbs such as GET, POST, and DELETE
- Using the Web API, you can build the back-end web services that a client-specific web application can call
- Building Web application by using client specific HTML Pages and the WEB API is an alternative to using ASP.NET MVC

SOAP-based Web Services

- SOAP Stands for “ Simple Object Access Protocol ”
- It is a specification for exchanging structured data i.e. XML using web services built on top of the HTTP Protocol
- As it relies on HTTP, it also follows the request and response model, where both request and response are represented by XML documents called messages

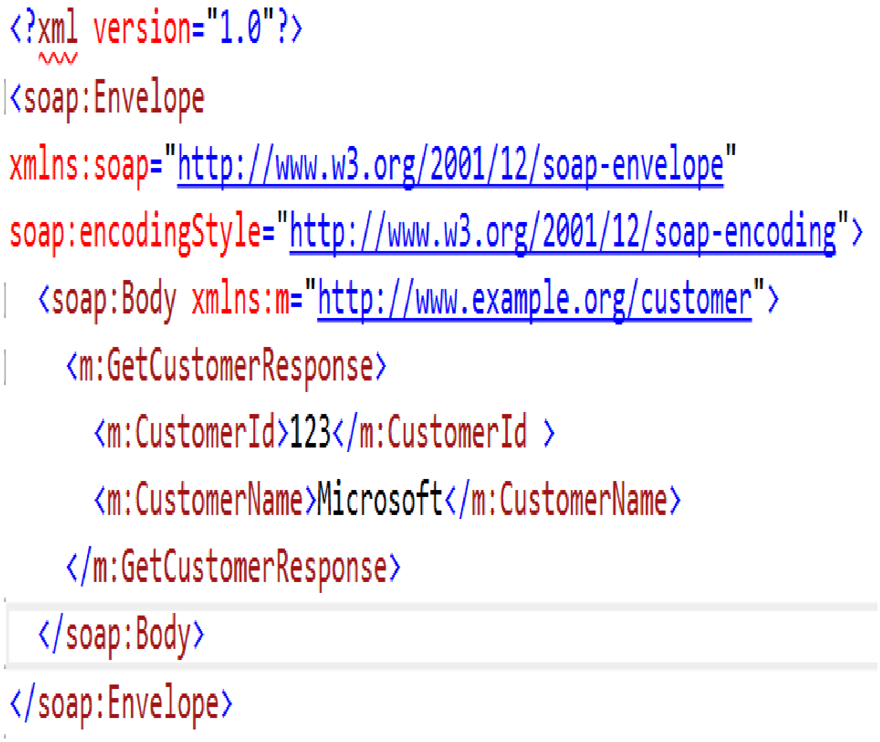
SOAP- based Web Service

SOAP Request Message



```
<?xml version="1.0"?>
<soap:Envelope
xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">
  <soap:Body xmlns:m="http://www.example.org/customer">
    <m:GetCustomer>
      <m:CustomerName>Microsoft</m:CustomerName>
    </m:GetCustomer>
  </soap:Body>
</soap:Envelope>
```

SOAP Response Message



```
<?xml version="1.0"?>
<soap:Envelope
xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">
  <soap:Body xmlns:m="http://www.example.org/customer">
    <m:GetCustomerResponse>
      <m:CustomerId>123</m:CustomerId >
      <m:CustomerName>Microsoft</m:CustomerName>
    </m:GetCustomerResponse>
  </soap:Body>
</soap:Envelope>
```

HTTP Web Services

- HTTP is a flexible protocol that works very well on the internet where most us communicate.
- HTTP messages can be cached and travel through firewalls.
- They’re lightweight which can be processed by processors on mobile devices.
- They can be encrypted and best of all nearly every programming environment in the world offers some capability to send and receive HTTP Messages.
- SOAP-based web services generally required a tool kit and more processing power where as HTTP is everywhere, it’s lightweight and we can use it to exchange information with big servers as well as small device like mobile phones.

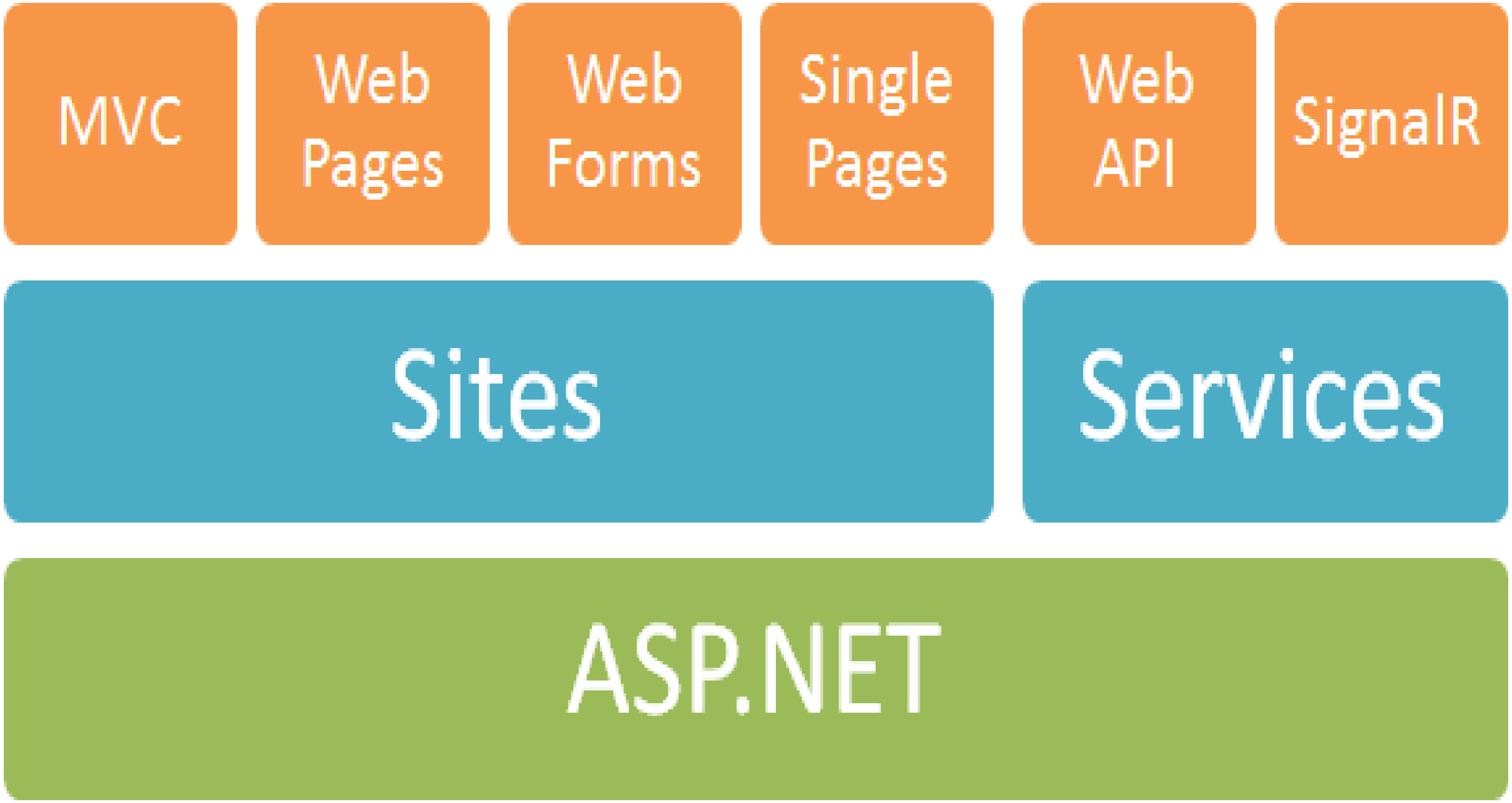
Introduction to WEB API

- Web API is a framework that is part of ASP.NET MVC that enables you to build Representational State Transfer(REST) –enabled web services.
- REST enabled APIs help external systems use the business logic implemented in your application to increase the reusability of the application logic.
- Web API facilitates two way communication between client system and the server through task as
  - Instructing an application to perform a specific task
  - Reading data values
  - Updating data values

Introduction to WEB API Contd…

- Web API enable developers to obtain business information by using REST , without creating complicated XML request such as SOAP
- Web API uses url in requests and obtains results in the JSON format

Asp.Net Stack



MVC

Web Pages

Web Forms

Single Pages

Web API

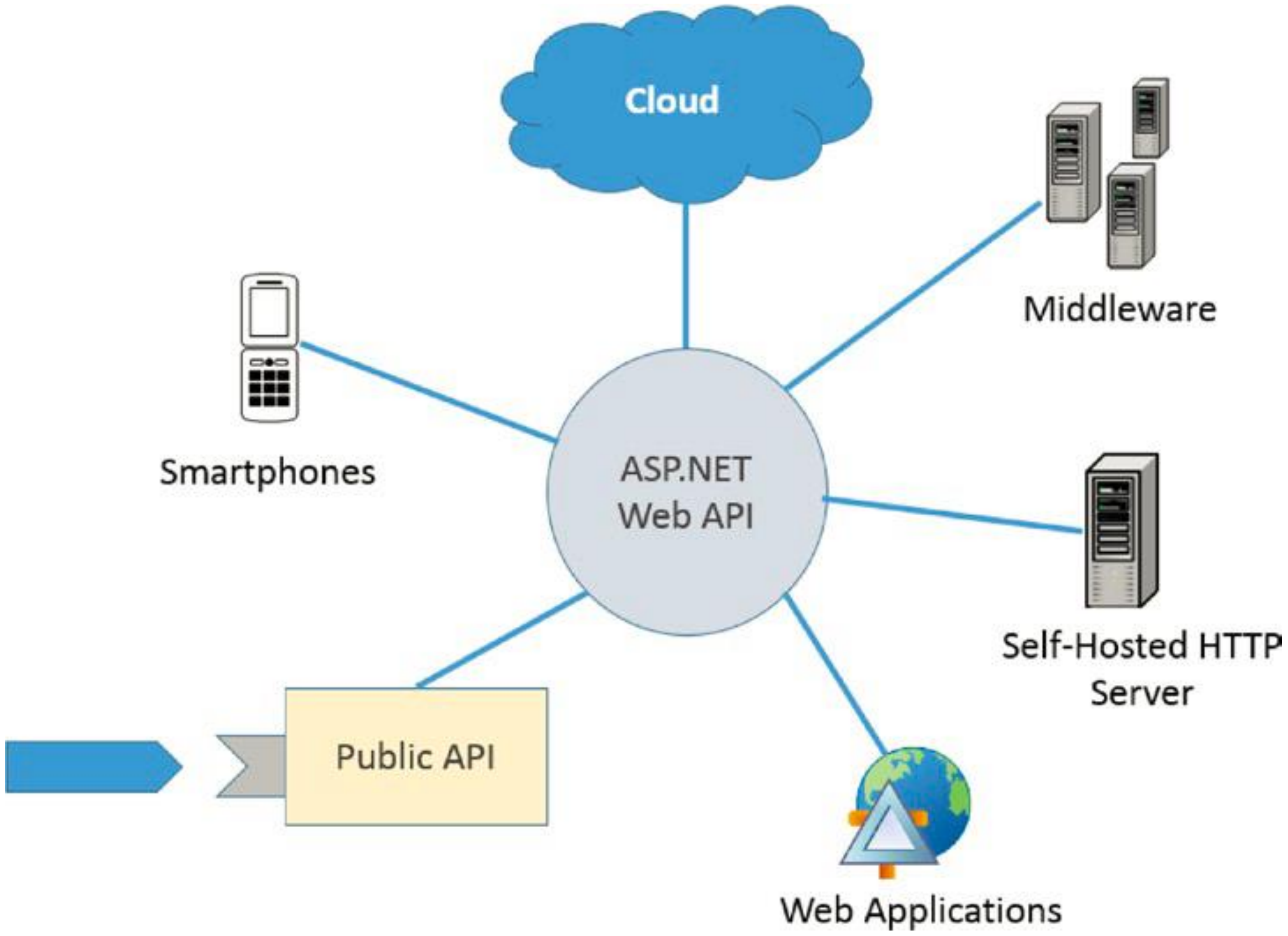
SignalR

Sites

Services

ASP.NET

Architecture of Web API



Web Service v/s WCF v/s Web API

- Web Service
  - It is based on SOAP and return data in XML form.
  - It support only HTTP protocol.
  - It is not open source but can be consumed by any client that understands xml.
  - It can be hosted only on IIS.
- WCF
  - It is also based on SOAP and return data in XML form.
  - It is the evolution of the web service(ASMX) and support various protocols like TCP, HTTP, HTTPS, Named Pipes, MSMQ.
  - The main issue with WCF is, its tedious and extensive configuration.
  - It is not open source but can be consumed by any client that understands xml.
  - It can be hosted with in the applicaion or on IIS or using window service.

Web Service v/s WCF v/s Web API

- Web API
  - This is the new framework for building HTTP services with easy and simple way.
  - Web API is open source an ideal platform for building REST-ful services over the .NET Framework.
  - Unlike WCF Rest service, it use the full featues of HTTP (like URIs, request/response headers, caching, versioning, various content formats)
  - It also supports the MVC features such as routing, controllers, action results, filter, model binders, IOC container or dependency injection, unit testing that makes it more simple and robust.
  - It can be hosted with in the application or on IIS.
  - It is light weight architecture and good for devices which have limited bandwidth like smart phones.
  - Responses are formatted by Web API's MediaTypeFormatter into JSON, XML or whatever format you want to add as a MediaTypeFormatter.

Demo

- Demo :- Implementing a Simple WEB API Example

Consuming ASP.NET Web API

- Asp. Net API can be consumed from a variety of ways
- It can be consumed from any .NET Application using HttpClient class which is available in System.Net.Http Namespace
- To consumed an Web API from technologies like Javascript and Jquery we have to use XMLHttpRequest

X.X: [Topic]

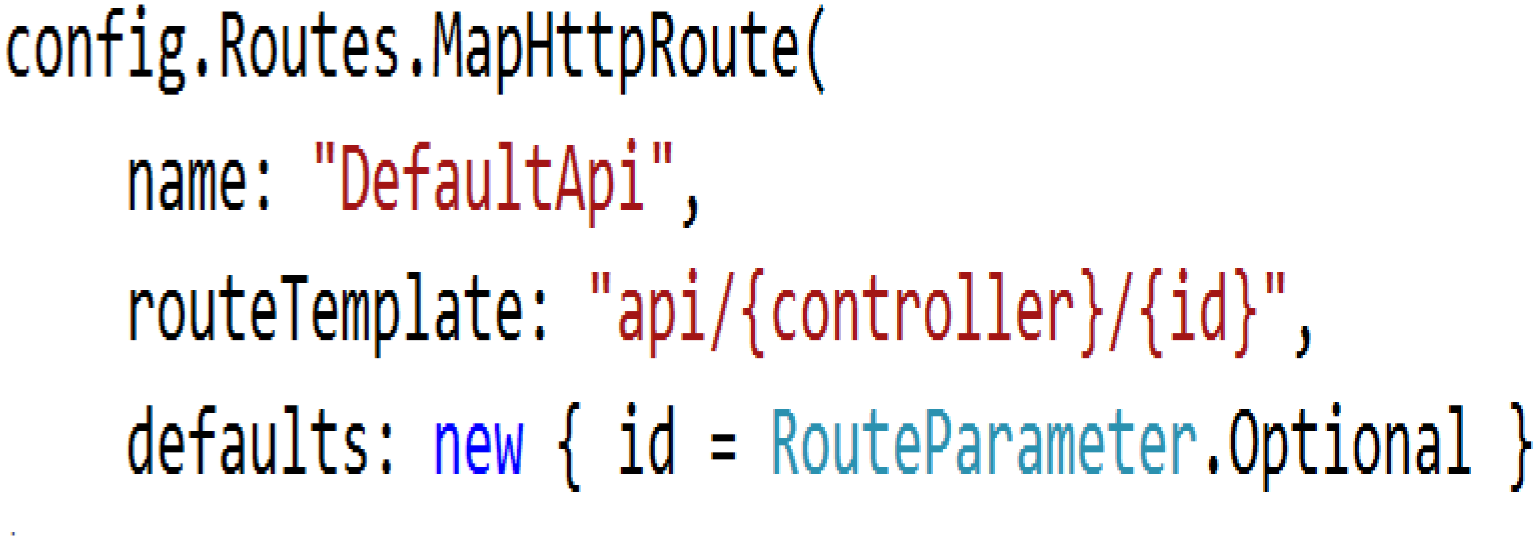
Demo

- Demo :- Consuming an WEB API

Web API Routing

- Routing helps to map HTTP request to the Web API controllers and actions by using HTTP verbs and the request URL
- By default , routing rule in Web API is similarly to the routing rule in ASP.NET MVC
- We can make use of the naming convention to map request to actions or we can control the behavior of mapping by using annotations on action methods.
- Web API 2 support two types of Routing
  - Convention based Routing
  - Attribute Routing

Default Route API



```
config.Routes.MapHttpRoute(
    name: "DefaultApi",
    routeTemplate: "api/{controller}/{id}",
    defaults: new { id = RouteParameter.Optional }
```

Demo

- Demo :- Implementing Routing in Asp,Net Web API

Web API Parameter Binding

- Parameter Binding provides a mechanism to get values from the URI and from the message body
- It allows to bind values to parameters when a controller are called
- The rules for binding the parameters depend upon the following types
  - Simple Types eg:- int ,bool, double,Datetime ,etc
  - Complex Type eg :- instance of a class

Action Filters

- ActionName Attribute
  - Represents an attribute that is used for the name of an action.
- NoNAction Attribute
  - Represents an attribute that is used to indicate that a controller method is not an action method.

Web API Parameter Binding Contd..

- Following attributes helps in Parameter Binding
  - FromUriAttribute
    - Specifies that an action parameter comes from URI of the incoming Http Request
  - FromBodyAttribute
    - Specifies that an action parameter comes only from the entity body of the incoming Http Request

X.X: [Topic]

Demo

- Demo:- Implementing Parameter Binding in Asp.NET Web API

Content Negotiation

- Content Negotiation is “the process of selecting the best representation for a given response when there are multiple representation is available”
- The primary mechanism for content negotiation in HTTP are these request headers which is as follows
  - Accept
  - Accept-Charset
  - Accept-Encoding
  - Accept-Language

How Content Negotiation Works

- First, the pipeline gets the **IContentNegotiator** service from the **HttpConfiguration** object. It also gets the list of media formatters from the**HttpConfiguration.Formatters** collection.
- Next, the pipeline calls **IContentNegotiatior.Negotiate**, passing in:
  - The type of object to serialize
  - The collection of media formatters
  - The HTTP request
- The **Negotiate** method returns two pieces of information:
  - Which formatter to use
  - The media type for the response
- If no formatter is found, the **Negotiate** method returns **null**, and the client recevies HTTP error 406 (Not Acceptable).

How Content Negotiation Works

DefaultContentNegotiator Class

- The components that govern the negotiation process in Web API is the called DefaultContentNegotiator Class
- The default implementation of IContentNegotiator, which is used to select a MediaTypeFormatter for an HttpRequestMessage or HttpResponseMessage.
- IContentNegotiator performs Content Negotiaition .

Demo

- Demo:- Implementing Content Negotiaition in Web API

Securing Web API

- Security is a very important concern for every application.
- In case of a Web Application it is very important and crucial concern for developer.
- Implementing Security is a very complex concept.
- In Asp.Net Web API security can be implement using Authentication and Authorization
  - Authentication helps to Authenticate a user against the application
  - Authorization help to check whether a Authenticated user is have rights or permission to perform specific action.

Securing Web API

- Types of Authentication in Web API
  - Forms Authentication
  - Basic Authentication

X.X: [Topic]

Lab

- Lab Topic

Summary

- In this lesson you have learnt about:
  - Web API Features
  - SOAP-based Web Services
  - HTTP Web Services
  - Web API Introduction
  - Web API Routing
  - Web API Parameter Binding
  - Content Negotiation

Review Question

- SOAP Stands for _______________
  - Service Oriented Application Protocol
  - Simple Object Application Protocol
  - Simple Object Access Protocol

- Web API uses SOAP for Communication
  - True
  - False

Review Question

- Which of the following are the type of Binding in Web API?
  - Simple Binding
  - Convention Based Binding
  - Attribute Binding
  - Complex Binding