

- 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



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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



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Home Tools ASP.NET WEB API -... x

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X.1: Breadcrumb

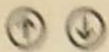
SOAP-based Web Services

- 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

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The image is a photograph of a computer screen displaying a presentation slide. The slide is titled 'SOAP-based Web Services' and is part of a presentation on 'ASP.NET WEB API'. The slide content includes a breadcrumb 'X.1: Breadcrumb' and a list of three bullet points explaining SOAP. The presentation software interface is visible, showing a menu bar (File, Edit, View, Window, Help), a toolbar with various icons, and a status bar at the bottom with the Capgemini logo and copyright information. The Windows taskbar is also visible at the very bottom of the screen.



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>
```

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X.1: Breadcrumb

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.

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X.1: Breadcrumb

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





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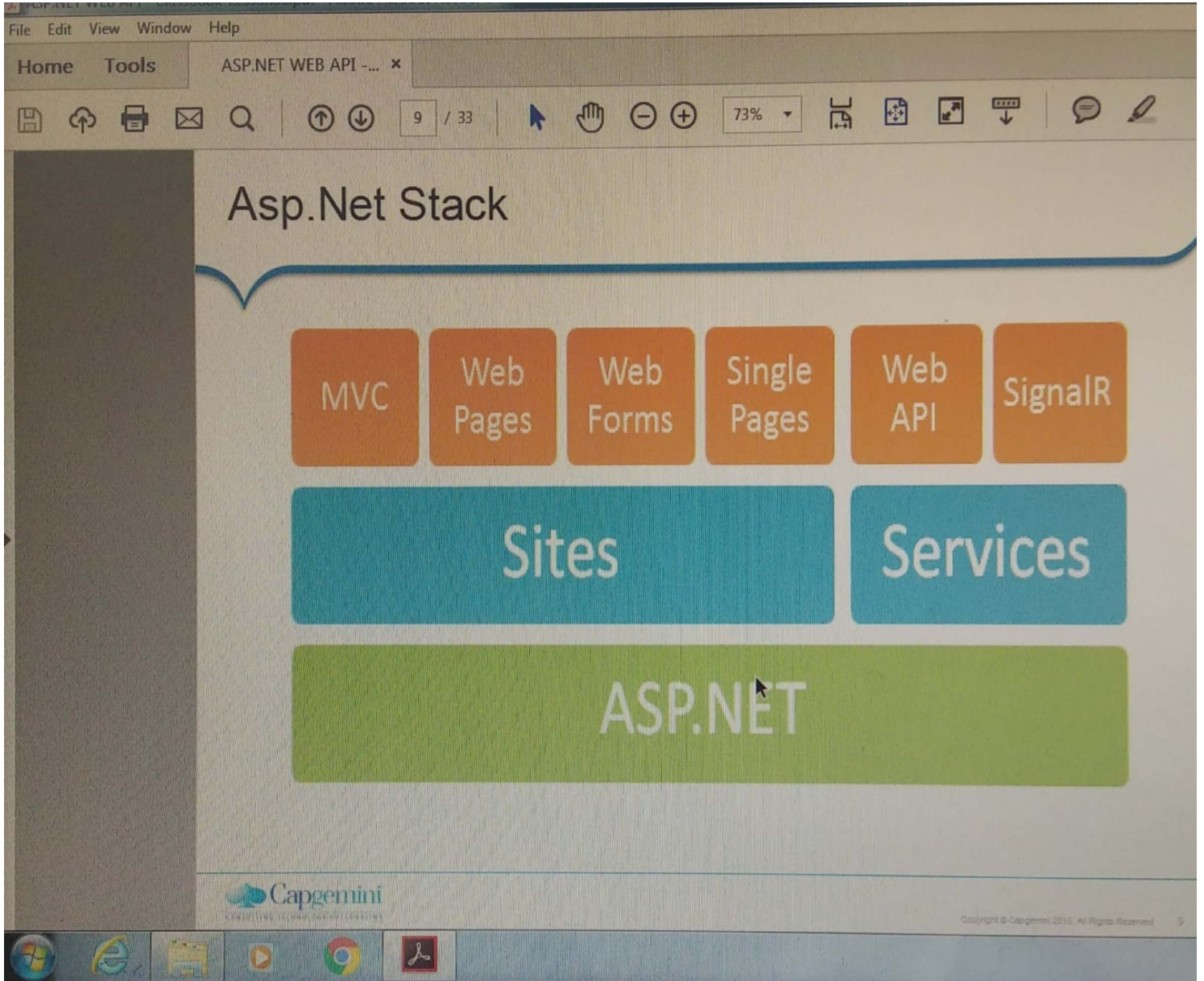
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X.2: Breadcumb

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





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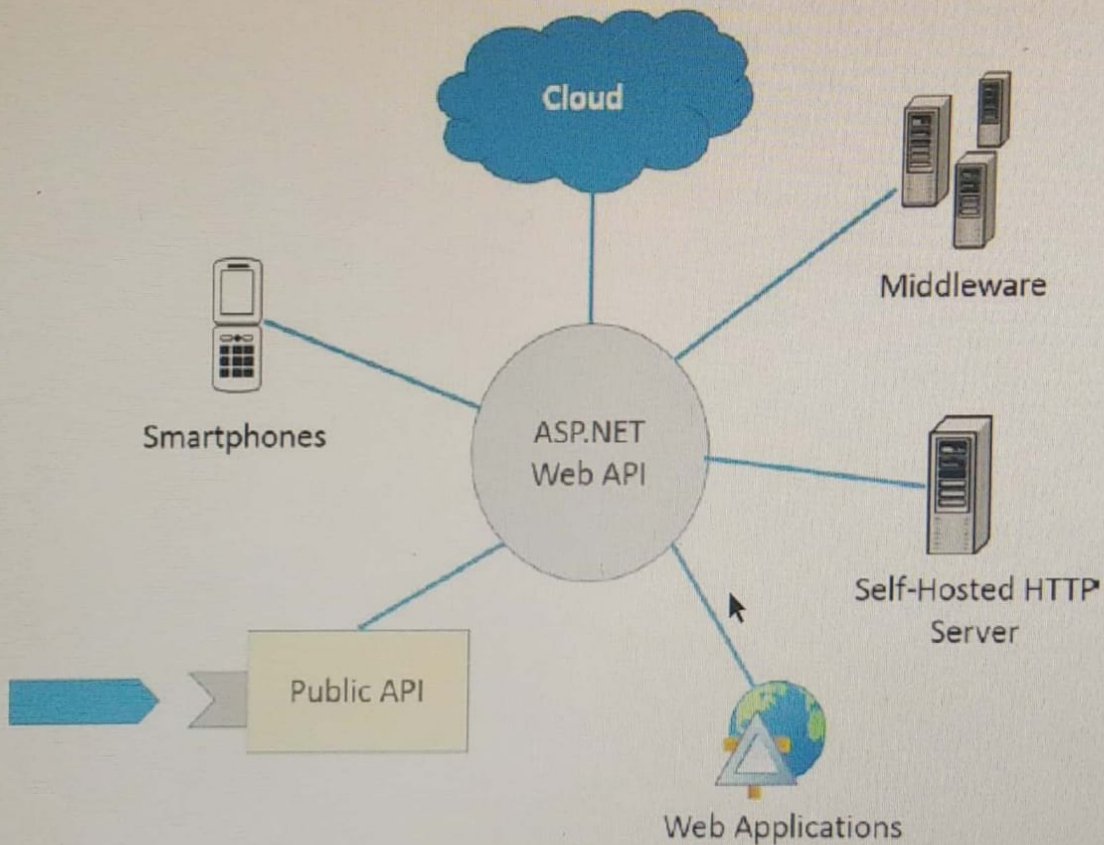
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Architecture of Web API



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 feates 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.

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X.3: Breadcrumb

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

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The image is a screenshot of a presentation slide displayed within a software application window. The window has a menu bar with 'File', 'Edit', 'View', 'Window', and 'Help'. Below the menu bar is a toolbar with various icons for file operations and navigation. The presentation slide itself has a title bar that says 'ASP.NET WEB API -... x'. The slide content includes a breadcrumb 'X.3: Breadcrumb' and a main title 'Consuming ASP.NET Web API'. Below the title is a bulleted list with three items. At the bottom of the slide, there is a Capgemini logo and tagline, and a footer with copyright information and the slide number '14'. The Windows taskbar is visible at the very bottom of the image.

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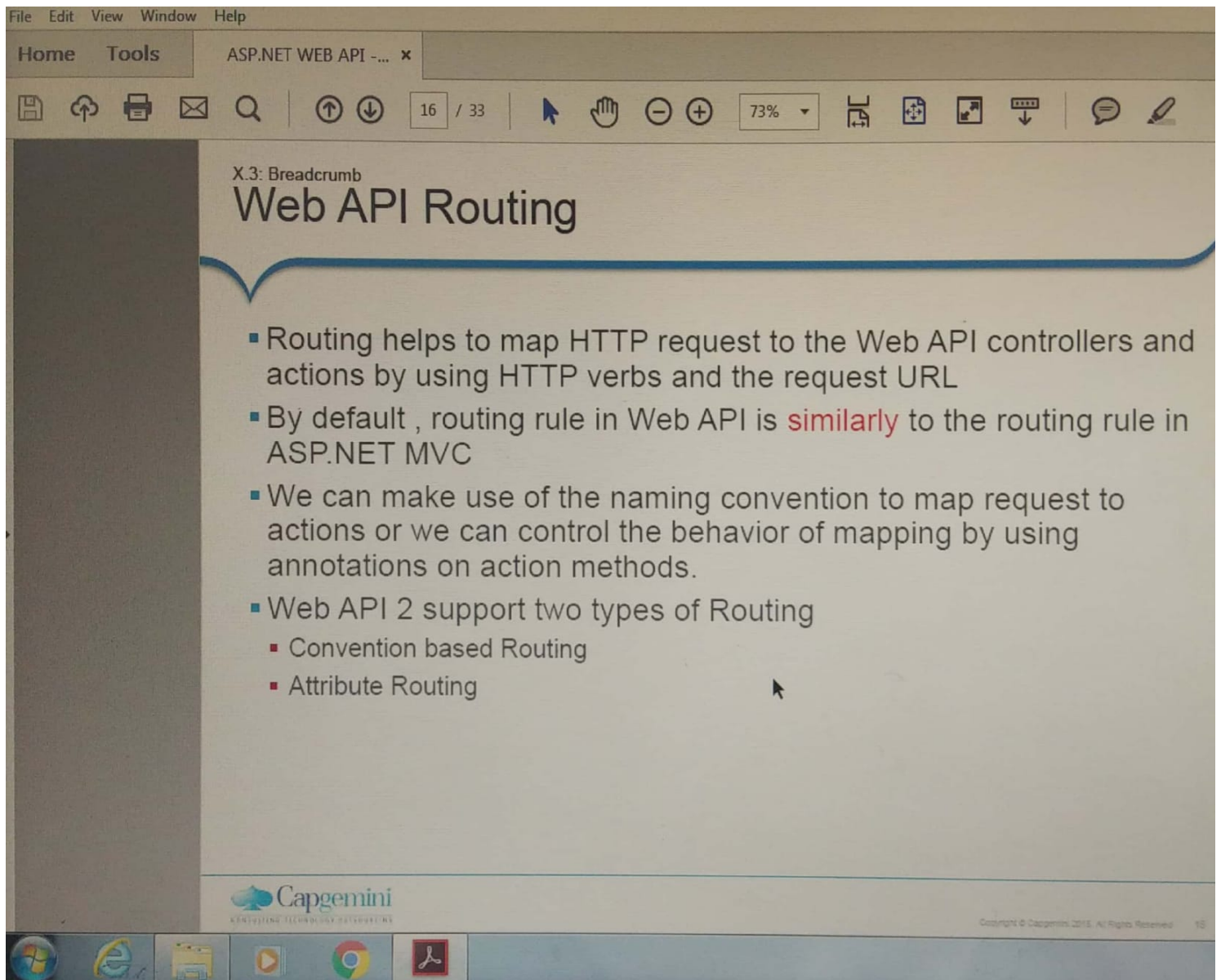
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X.3: Breadcrumb Web API Routing

- 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

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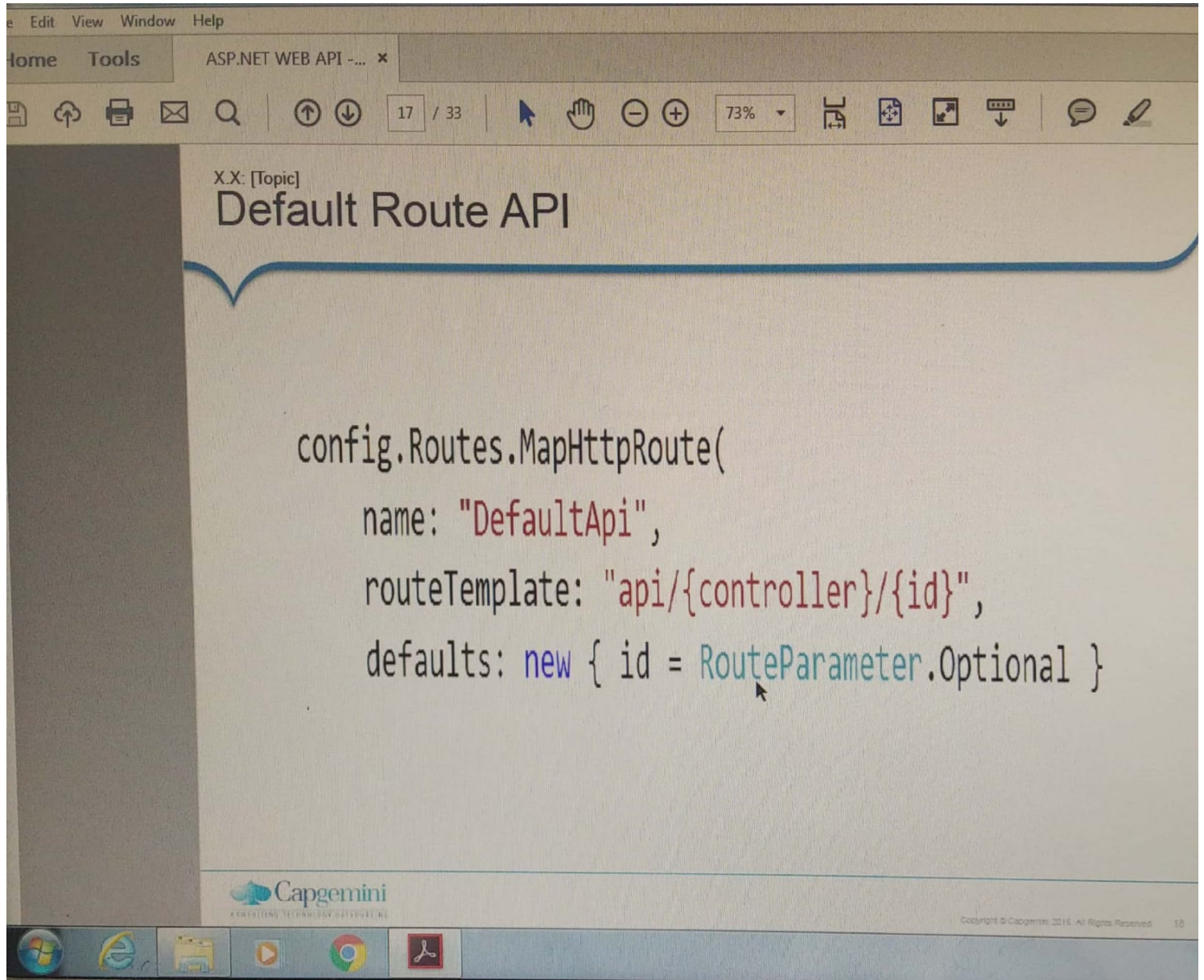
X.X: [Topic]

Default Route API

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

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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.
- NoAction 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

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ASP.NET WEB API -... x

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X.X: [Topic]

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

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X.X: [Topic]

How Content Negotiation Works

- First, the pipeline gets the **ContentNegotiator** service from the **HttpConfiguration** object. It also gets the list of media formatters from the **HttpConfiguration.Formatters** collection.
- Next, the pipeline calls **ContentNegotiator.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 receives HTTP error 406 (Not Acceptable).

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X.X: [Topic] 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 .

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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