

Web Development

C# and .Net

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Introduction to Web Development

* ASP .NET provides followed frameworks :

ASP.NET MVC

ASP.NET Web API

ASP.NET Web Pages

ASP .NET Web Pages

It combines the code of html, css, javascript & server code in c#. "Server code" typically refers to the programming code that runs on a server to handle various tasks, processes, and requests from clients. In the context of web development, server code is responsible for processing and responding to requests sent by users' browsers.

It is single page application.

ASP .NET MVC

It is a .NET framework which provides facility of html, css, javascript with mvc architecture, where mvc stands for ..

M – Model (Application’s data and business logic)

V – View (Presenting data to the user & receiving user input)

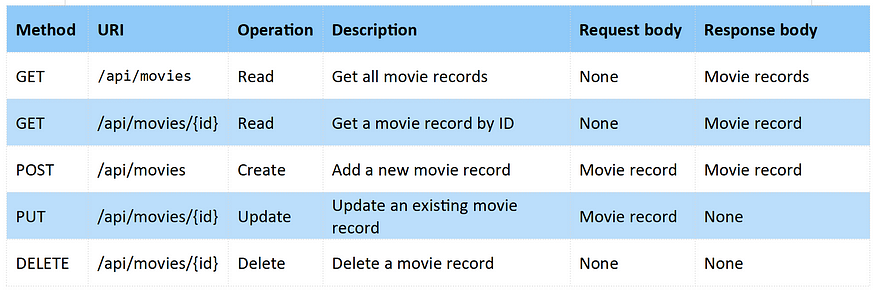
C – Controller (intermediatory between Model and View)

ASP .NET Web API

ASP .NET Web API is a framework for building HTTP services that can be accessed from any client including browsers and mobile devices.

It develops RESTful (Representational State Transfer) applications.

Building Web API Project with HTTP Action Methods



* HTTP consists following methods which are implemented in demo for Student API..

GET

* Get Method is used for the purpose of viewing / getting / extracting in the database.
* In the project, It is implemented for getting all objects as well as any particular object by specific id ( e.g. Aadhar Number, Enrollment ID, etc .)

POST

* Post method is used for the purpose of addition in the database.

PUT

* Put method is used for the updation within the dtabase.
* Any database record can be updated by using put method.
* Here, updation means we have to provide all details of the object, PUT method is not capable to make changes on specific fields, if we want to update only one field in record still we have to provide other all fields too.

DELETE

* Delete method is used for the deletion of the record in database

PATCH

* Patch method is used for the updation within the dtabase.
* Any database record can be updated by using patch method.
* Here, updation means we have to provide only details of the object which we want to update, other details will be as it is as before.

HTTP Action Method Status Codes

HTTP method uses different types of status codes for different business logic which are explained below :

1xx

Informational Response

100 – Continue

2xx

Successful, It means request is successful.

200 – Ok

201 – New resource created.

204 – No Content

3xx

Redirection, when resource pages or files are moved to another location.

301 – Moved permanently resource which is asked

302 – Moved temporarily resource which is asked

4xx

Client errors, denotes error within the request.

400 – Bad Request

401 – Unauthorized ( Invalid authentication )

403 – Authentication is success but authorization has error.

404 – Requested resource is not available or found.

405 – Not Supported

5xx

Error from server side.

500 – Internal server error

503 – Service Unavailable

504 – Gateway Timeout

Security

CORS

“Cross Origin Resource Sharing” – CORS is a HTTP protocol which allows web applications to access their rosources from the different origin, here origin means same host & same port as well as same protocol, if only path differs then it is same origin.

CORS is required due to Same Origin Policy of Web, <https://developer.mozilla.org/en-US/docs/Web/Security/Same-origin_policy>

Example of urls from different origin.

* http://www.stackhawk.com
* https://www.stackhawk.com
* https://stackhawk.com/why-stackhawk/

Enable CORS

* First Parameter : Allows requests from any origin
* Second Parameter : Allows all HTTP Methods ( GET, POST, PUT , DELETE, etc.)
* Third Parameter : ALlowed Headers

var cors = new EnableCorsAttribute("\*", "\*", "\*");

config.EnableCors(cors);

Authentication

Authentication is all about knowing identity of the user. Suppose Sachin Tendulkar is trying to access the web api.

* Using Host
* Using HTTP Message Handlers

Authorization

Authorization is deciding whether user is allowed to perform action or not. Suppose Sachin Tendulkar is trying to add student in api, but it’s not allowed as he is student and that right is given only to HOD.

Demo : StudentAPI consists the demonstration of

* HTTP Action Methods
* Status Codes
* CORS
* Authentication
* Authorization

Exception

Mostly all unsolved exception in ASP.NET shows 500 – Internal Sever Error, still if we want to add Exception Handling in ASP .NET web API can be done by several following methods :

HttpResponseException

This approach allows to return specified status code with specified message too.

var resp = new HttpResponseMessage(HttpStatusCode.NotFound)

{

Content = new StringContent(string.Format("No product with ID = {0}", id)),

ReasonPhrase = "Product ID Not Found"

};

throw new HttpResponseException(resp);

Filter Exception

Exception filter is a approach of customized exception in ASP .NET we API. Suppose we want specific exception on specific condition, this exception is used.

e.g. Method implementation is pending then we can add our own NotImplementedException when user tries to access that method.

That is demonstrated in WebAPI > StudentAPI demo > NotImplementedException

We have to create ExceptionNameExceptionFilterAttribute class which inherits the class ExceptionFilterAttribute & override the method GetException() by adding details such as statusCode, responseMessage, Content, ReasonPhrase etc.

We can add that exception in controller at

* Specific Method
* Top of the Controller (For all methods within the controller)
* Global.config (For all controllers)

HttpError

HttpError provides Error to the specified logic or method.

var message = String.Format($"There is no student in the database with the enrollment : {enrollment}");

return (IHttpActionResult)Request.CreateErrorResponse(HttpStatusCode.NotFound, message);

JWT Token



JWT token is used to improve the time complexity of the client -server transactions. When user is authenticated once, JWT Token is generated & provided to client then after client sends the request with the token and if token is valid then server does not go for userId and password again .

Install-Package Microsoft.Owin.Security.OAuth

Install-Package Microsoft.Owin.Cors

Install-Package System.IdentityModel.Tokens.Jwt

Caching

Caching is a technique of storing frequently used data or information in a local memory, for a certain time period. So, next time, when the client requests the same information, instead of retrieving the information from the database, it will give the information from the local memory. The main advantage of caching is that it improves the performance by reducing the processing burden.

It is implemented by using CacheFilter, it responses cache in cache control response header as “ Yes ” for the given time limit.

That is implemented in project WebAPI > StudentAPI > Caching