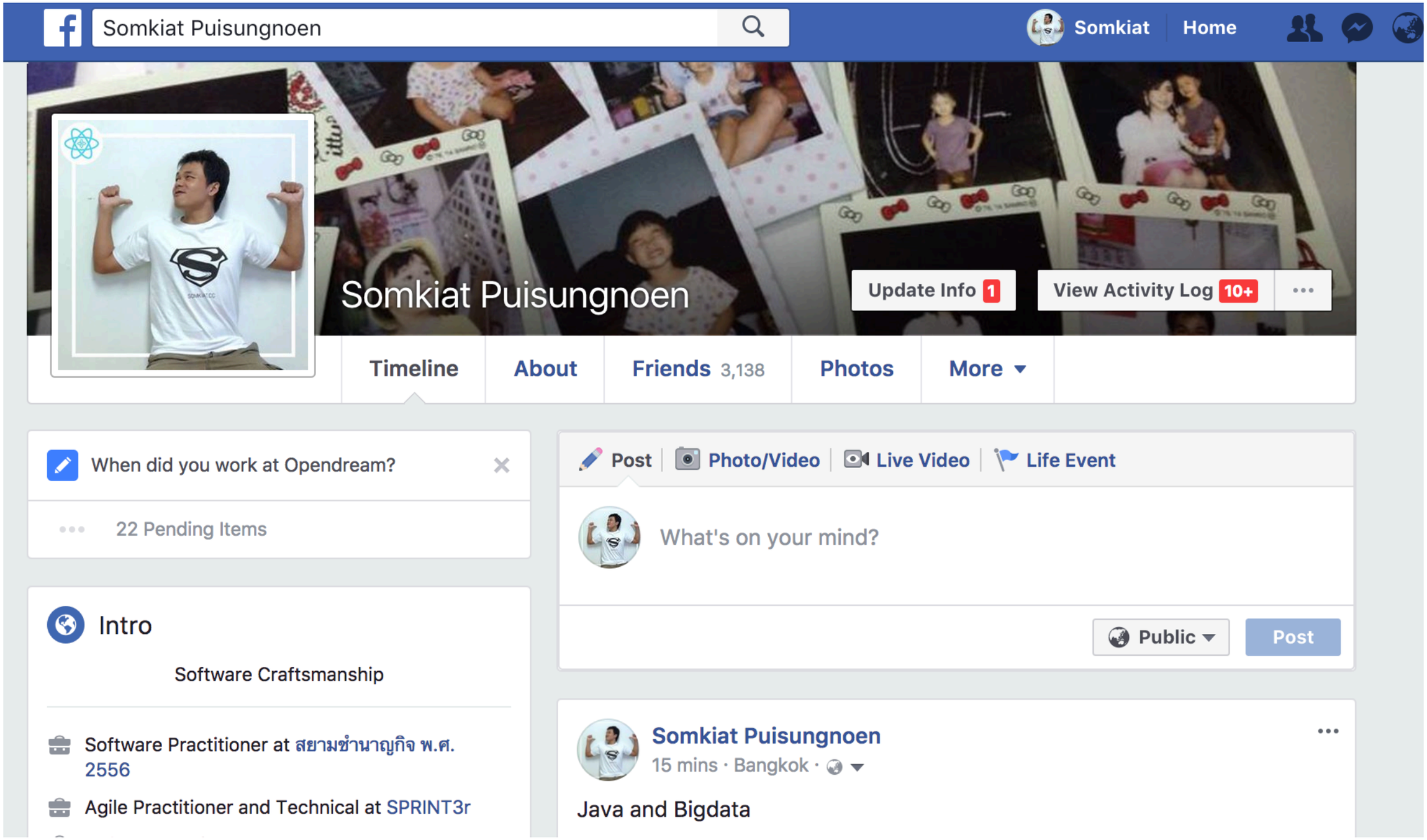
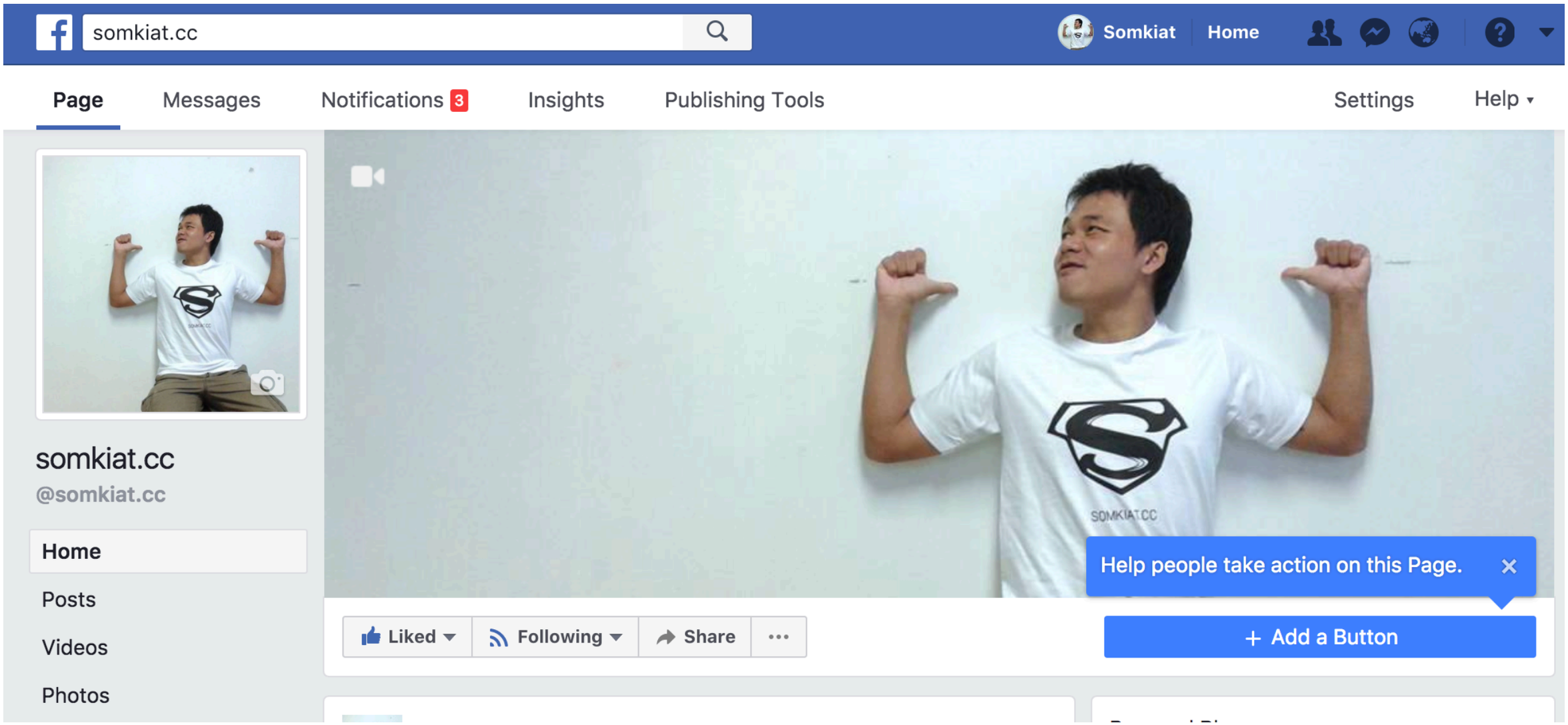
สยามชำนาญกิจ
SIAM CHAMNAN KIT

Workshop





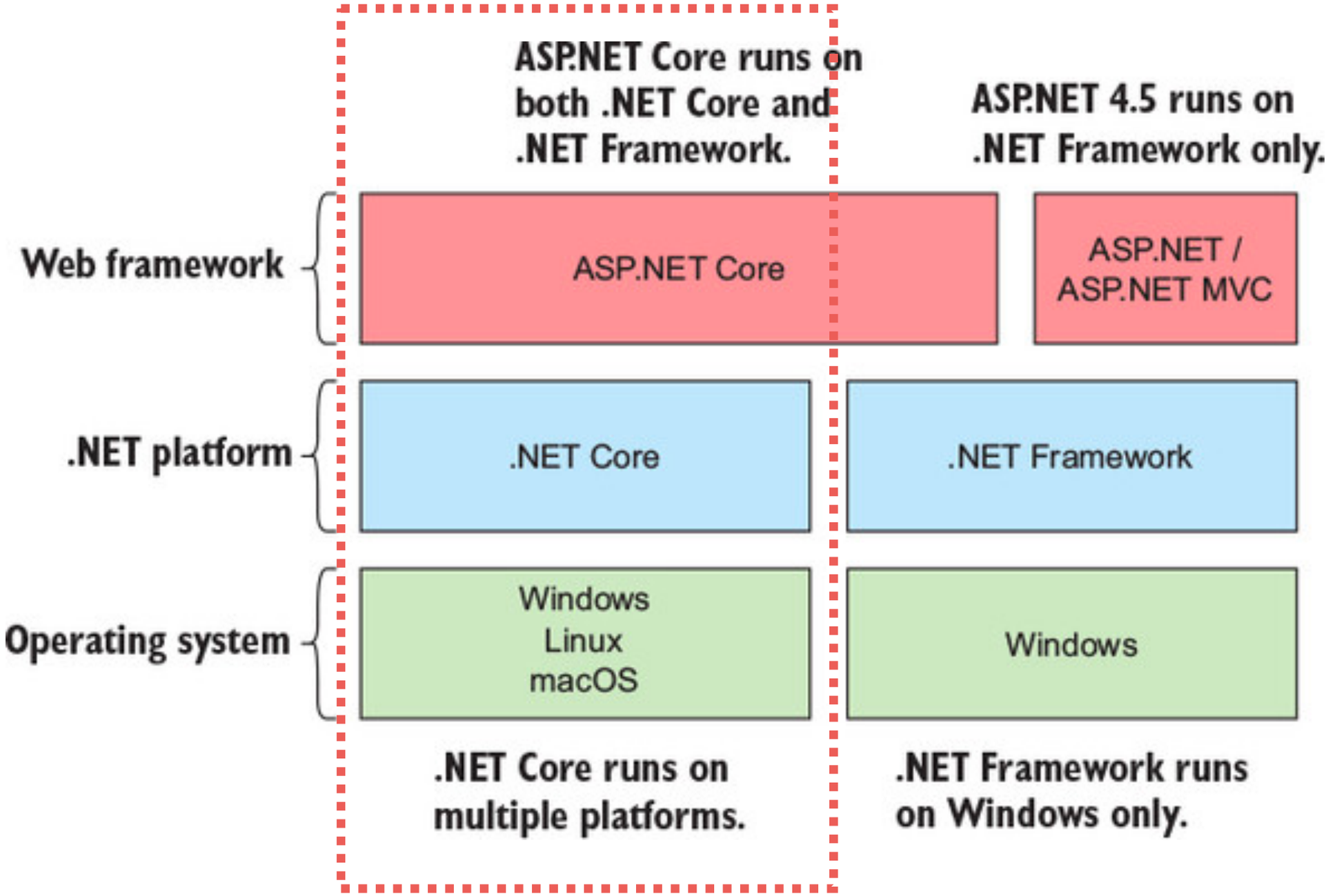
ASP.NET

ASP.NET
ASP.NET Core

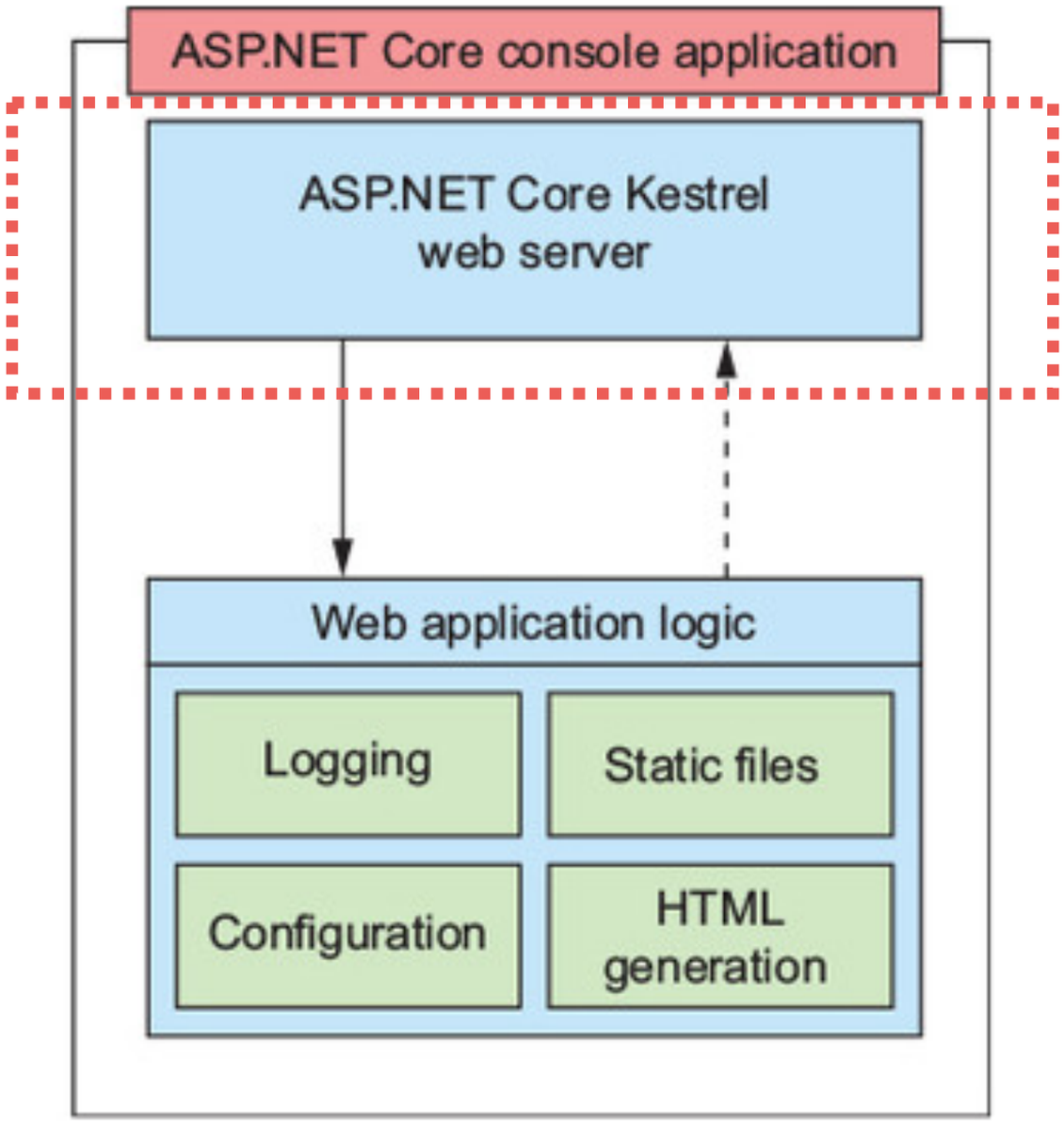
.NET Core

.NET 5 (next)

.Net Core



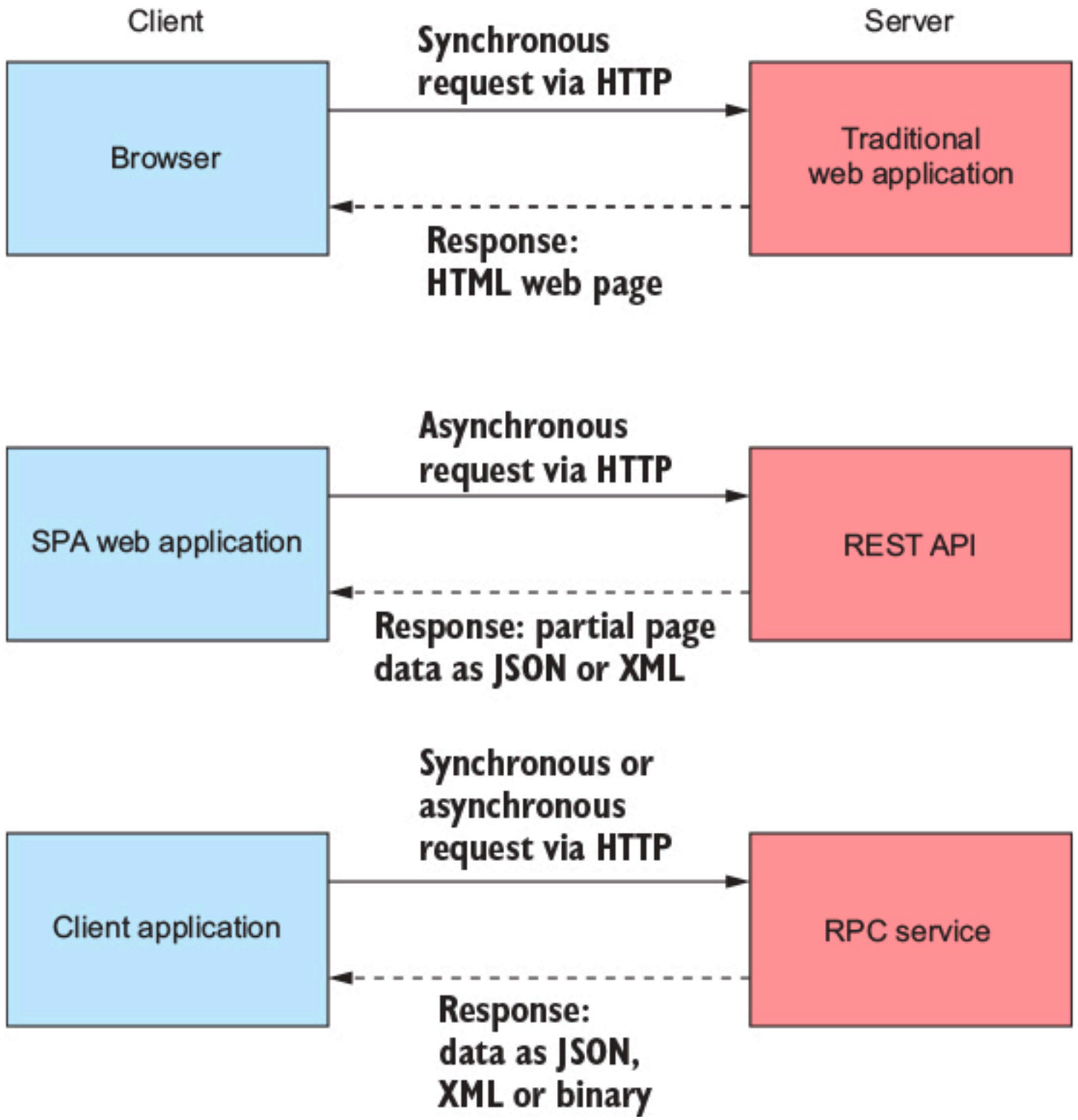
Provide cross-platform web server



.Net Core project types

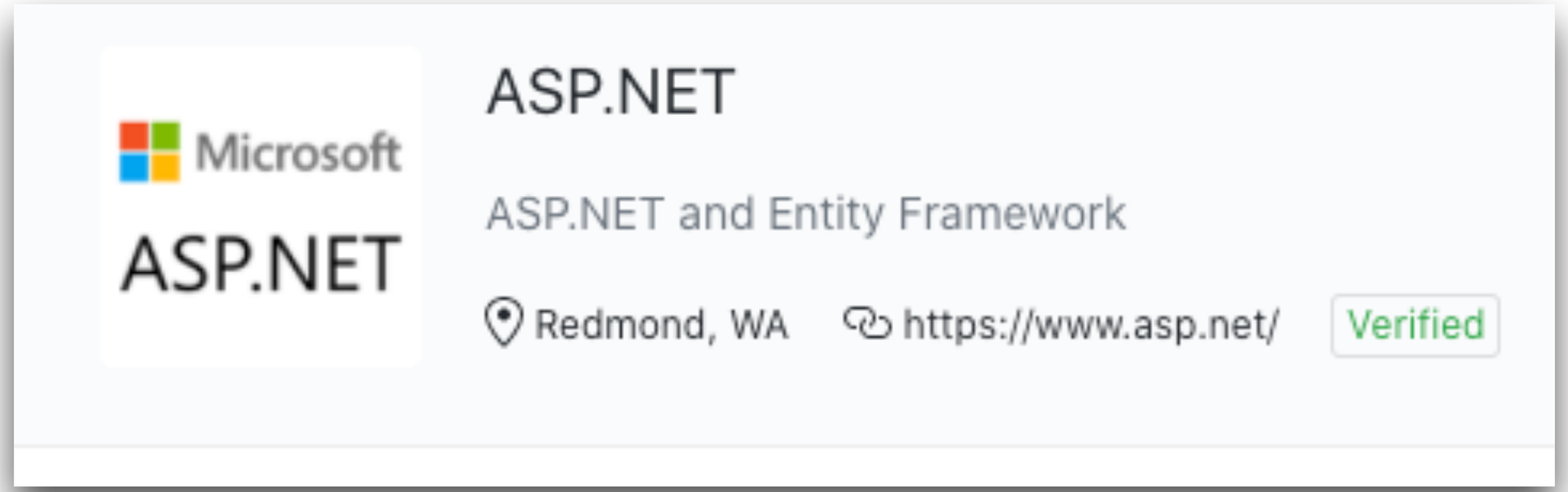
Console
Worker (background task)
Web application
Web + MVC
Web API (RESTful)
etc

.Net Core project types



Library of .Net core

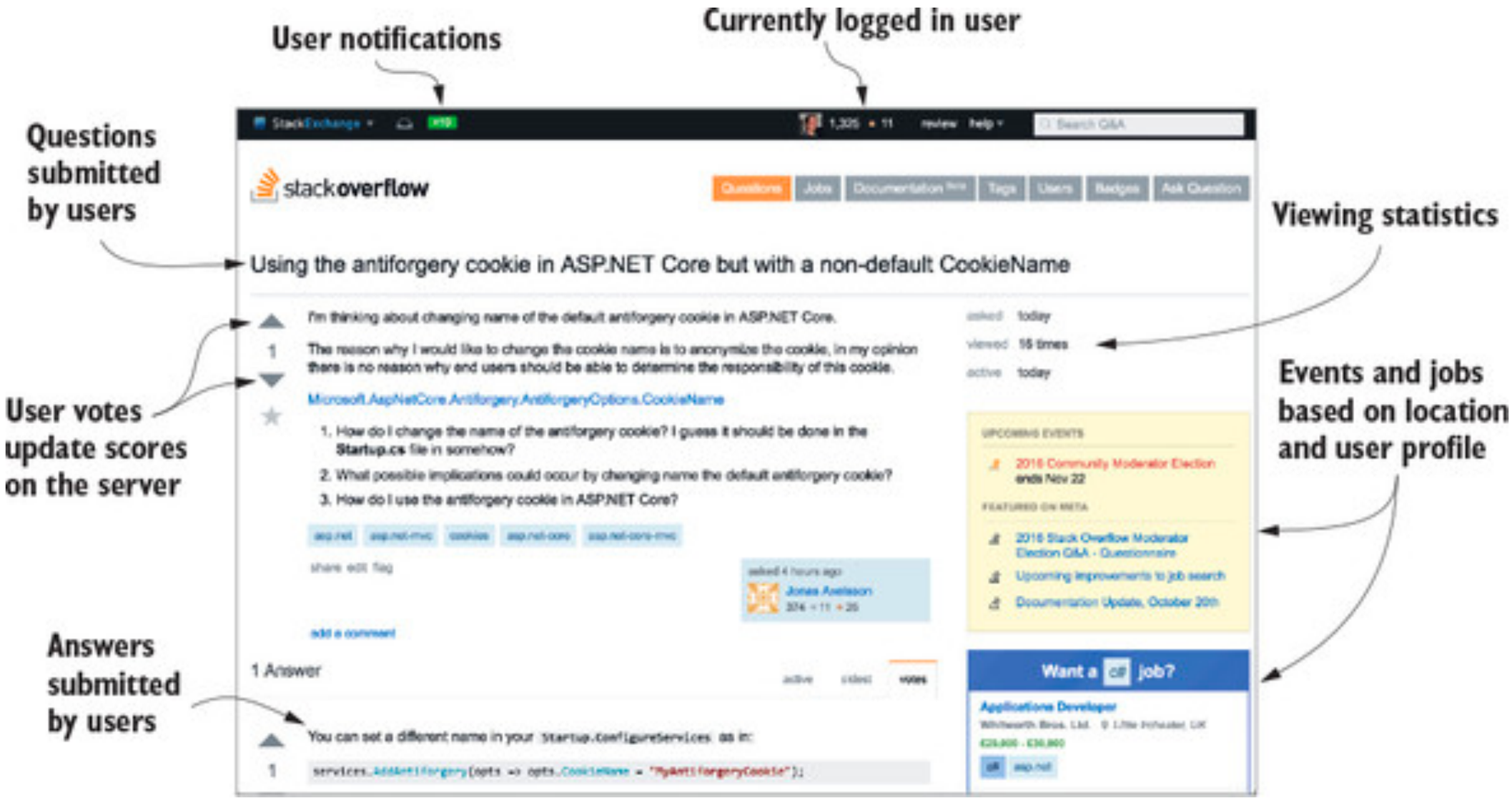
https://github.com/aspnet



Core Kestrel web servere

Logging Authentication Authorization

Who use .Net Core ?



https://stackoverflow.com/

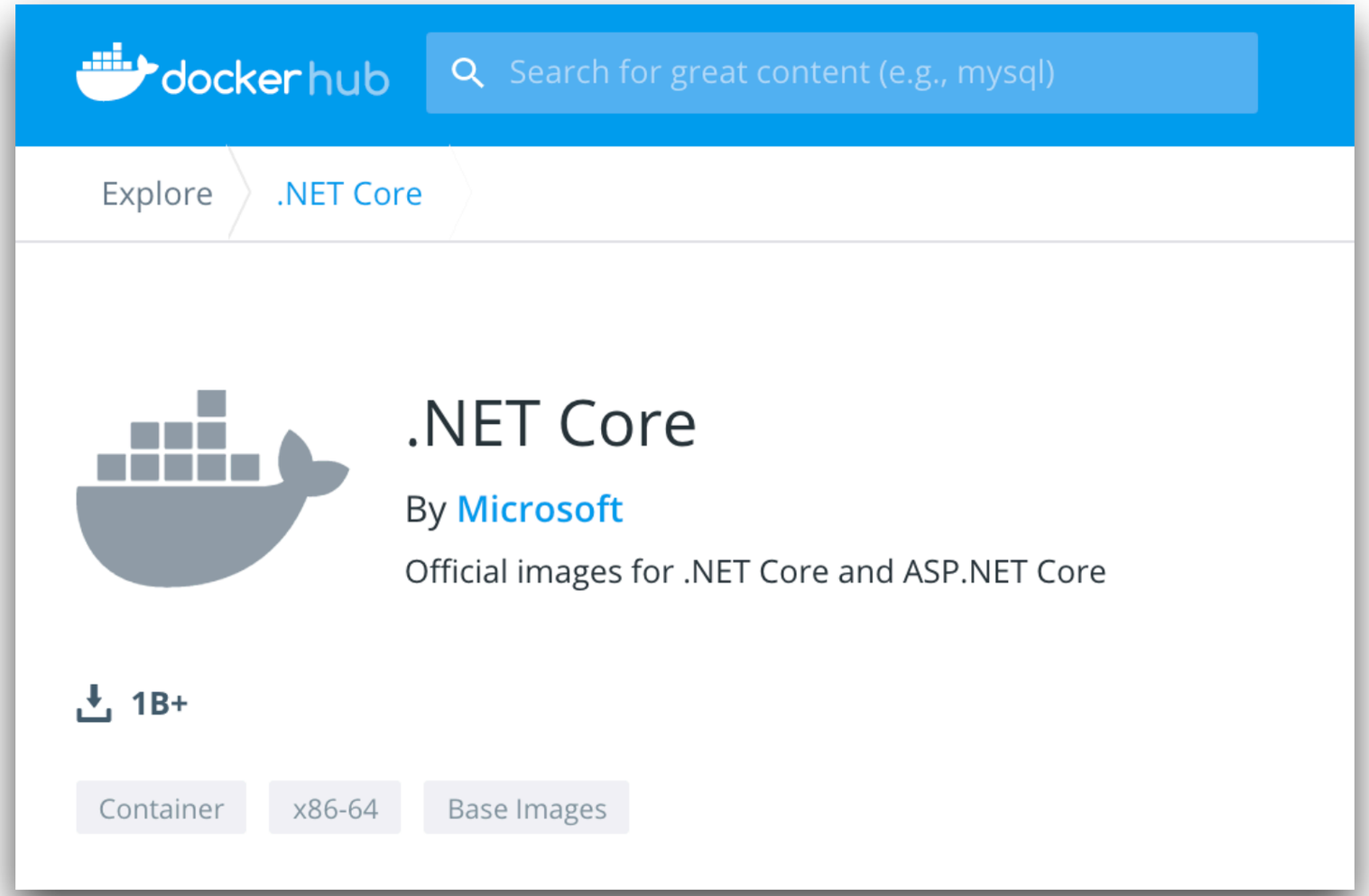
Provide command-line

$dotnet

```
Usage: dotnet [options]
Usage: dotnet [path-to-application]

Options:
  -h|--help         Display help.
  --info            Display .NET Core information.
  --list-sdks       Display the installed SDKs.
  --list-runtimes   Display the installed runtimes.

path-to-application:
  The path to an application .dll file to execute.
```

https://docs.microsoft.com/en-us/dotnet/core/tools/

Build and deploy with containers

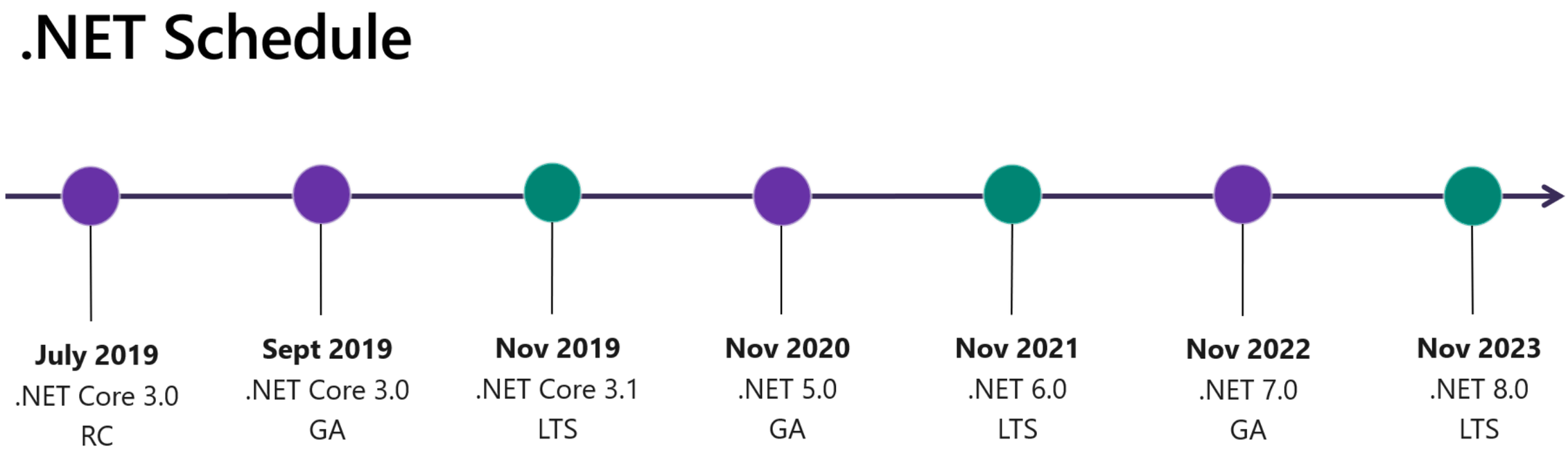


https://hub.docker.com/_/microsoft-dotnet-core

Benefits of .Net Core

Cross platform development and deploy
Open source
Focus on performance as a feature
Simplified hosting model
Short release cycle
Modular feature

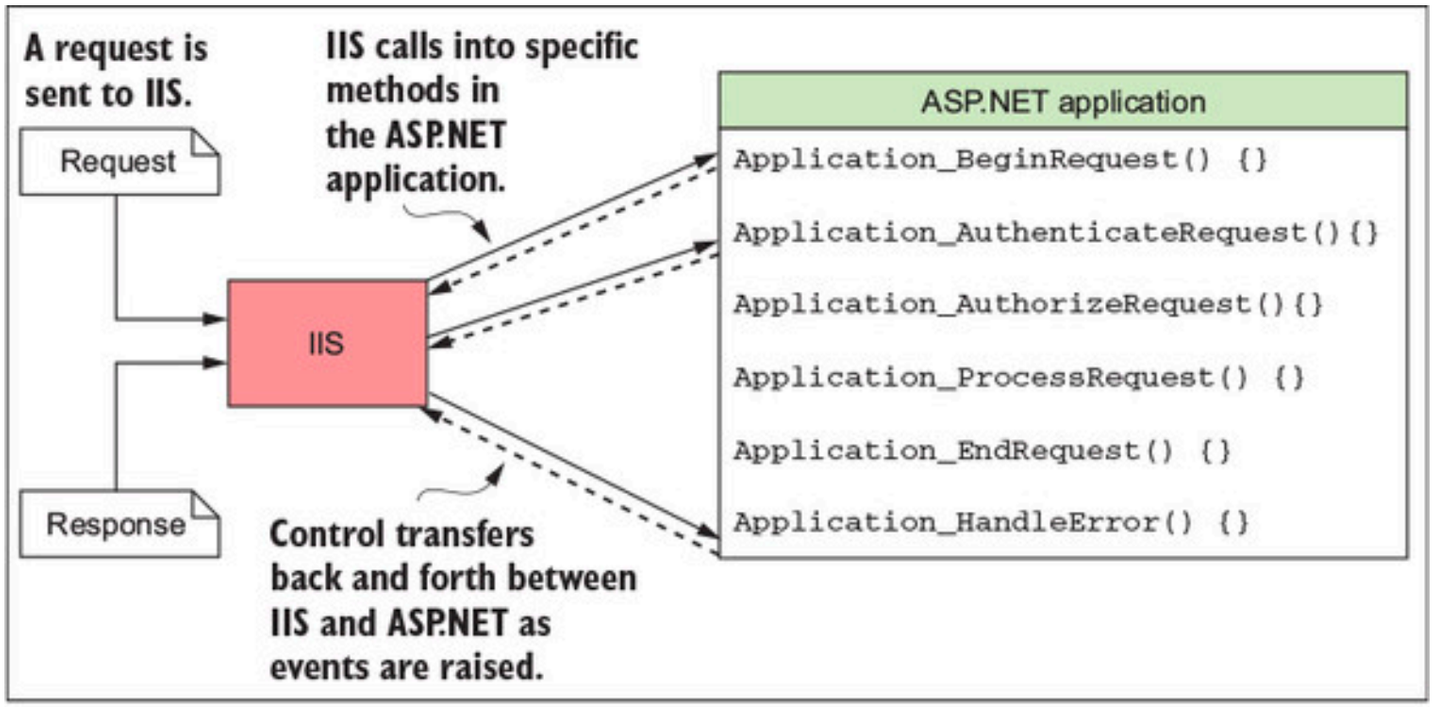
Release schedule

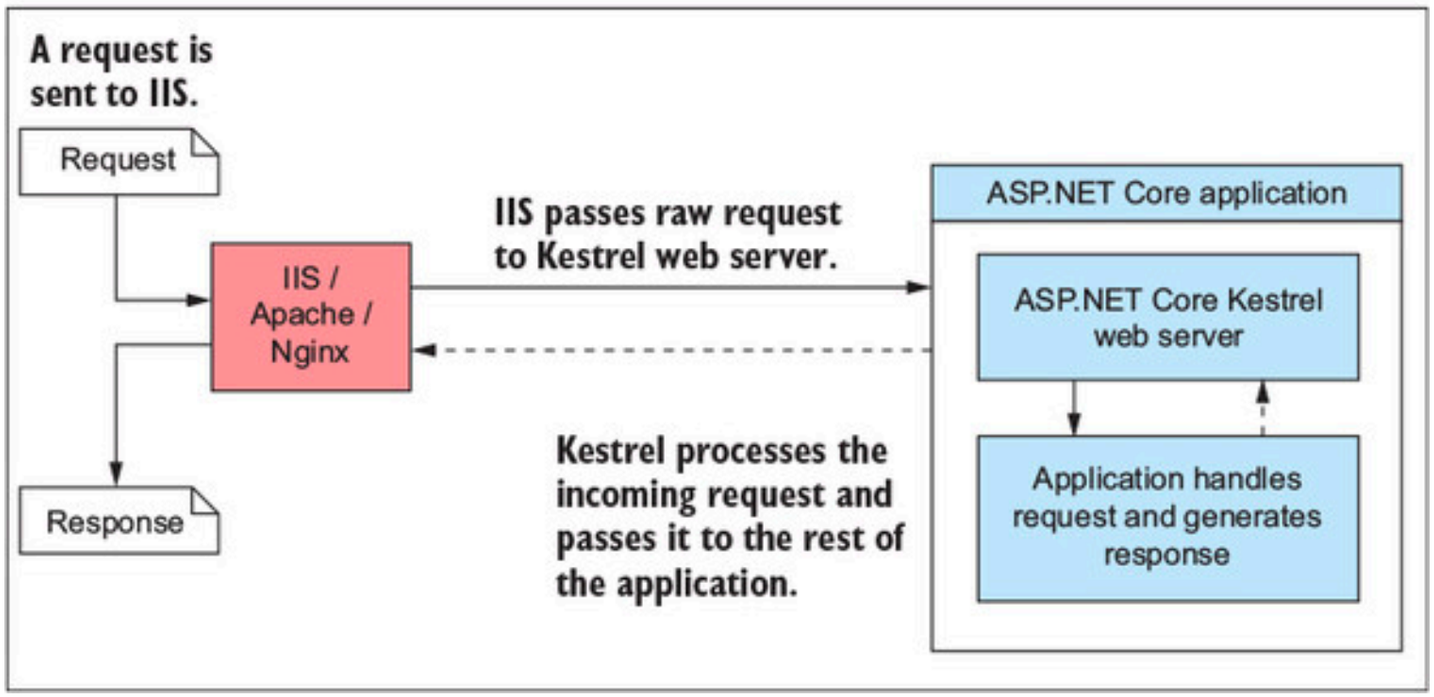


- .NET Core 3.0 release in September
- .NET Core 3.1 = Long Term Support (LTS)
- .NET 5.0 release in November 2020
- Major releases every year, LTS for even numbered releases
- Predictable schedule, minor releases if needed

https://dotnet.microsoft.com/platform/support/policy/dotnet-core

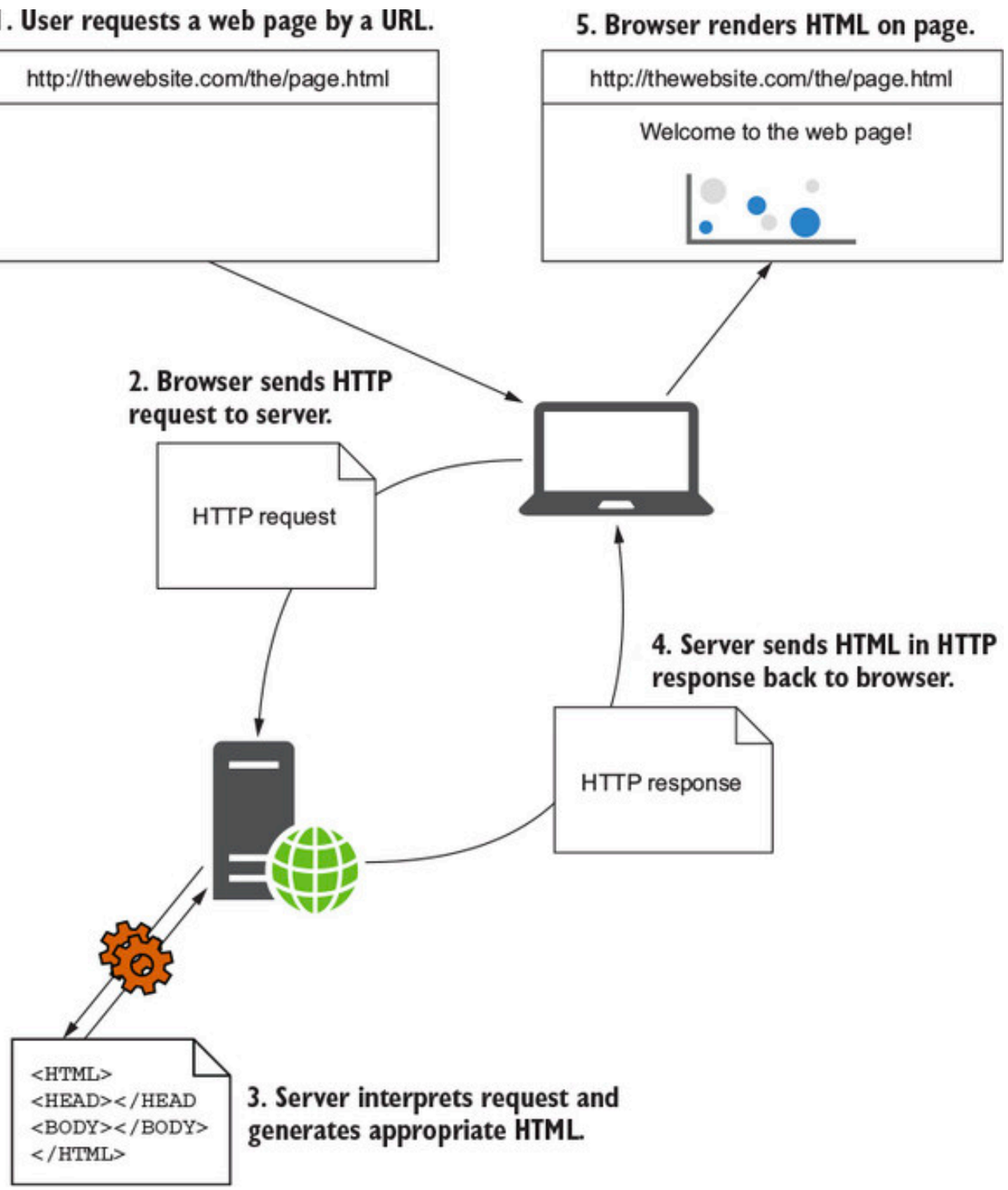
Deployment (IIS is optional)



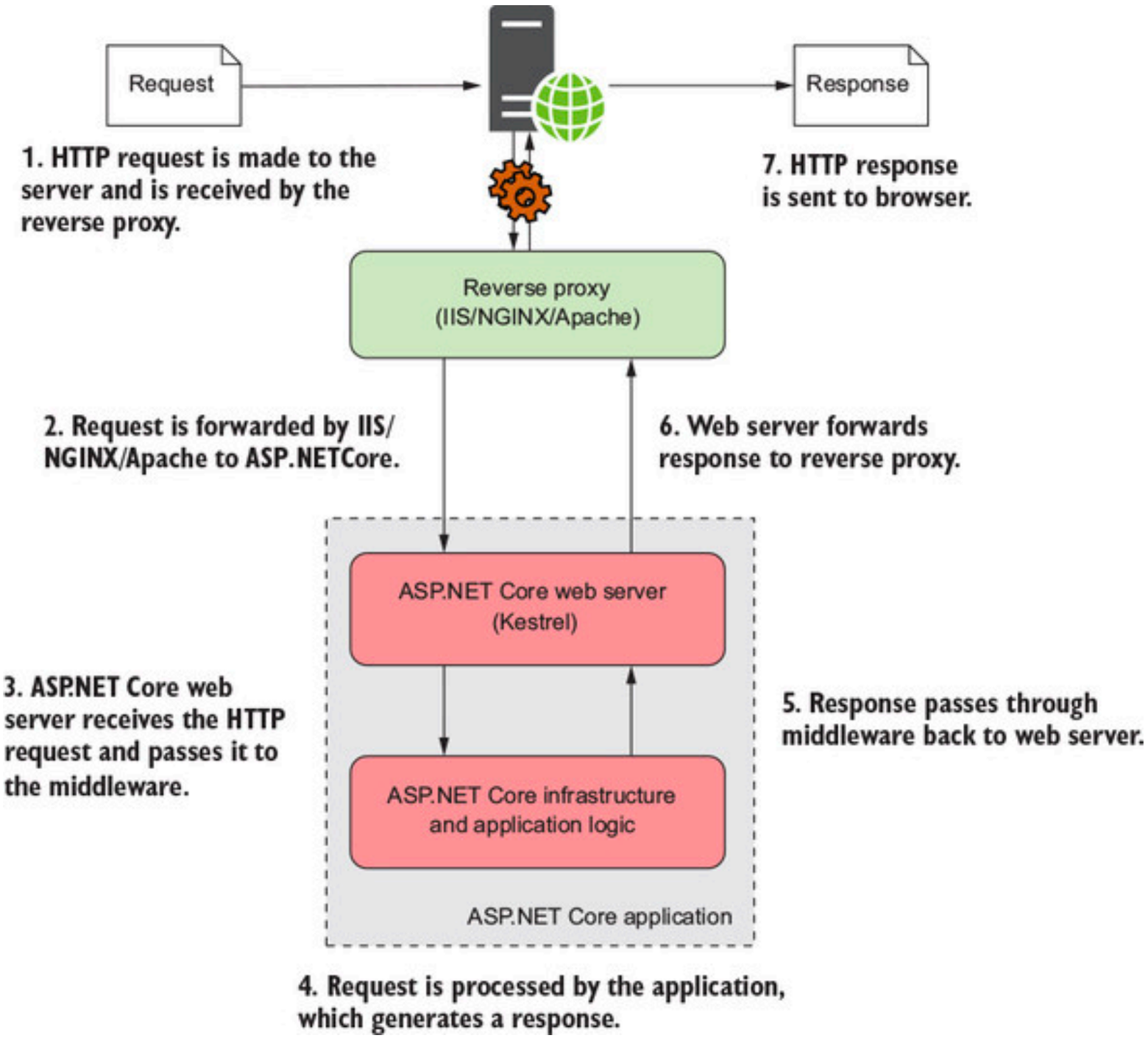


Develop web MVC project

Web :: request and response



.Net Core process



Topics

Create web project
Running application
Understanding the component of application
Using command-line tools

Create web application

1. Generate

Create the application from template

2. Restore

Restore all packages and dependencies with **NuGet**

3. Build

Compile the application and generate all the assets

4. Run

Run the compiled application

Command-line tools

$dotnet new

$dotnet restore

$dotnet build

$dotnet run

Create web project

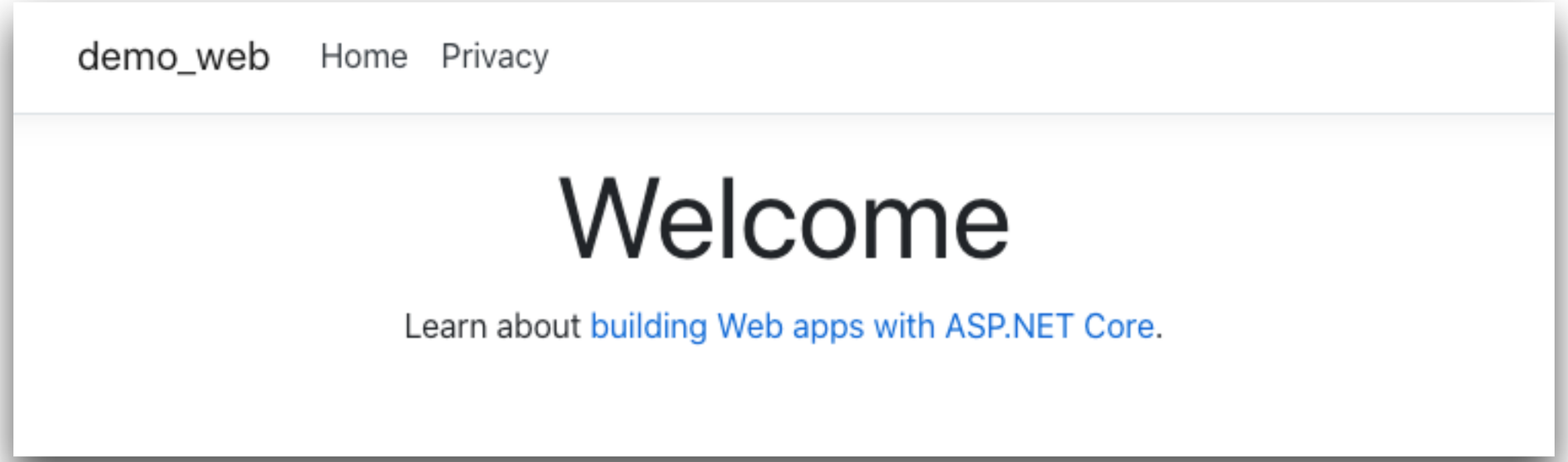
Choose .Net Core => Web application

With No-authentication

Uncheck Enable Docker support (if not need)

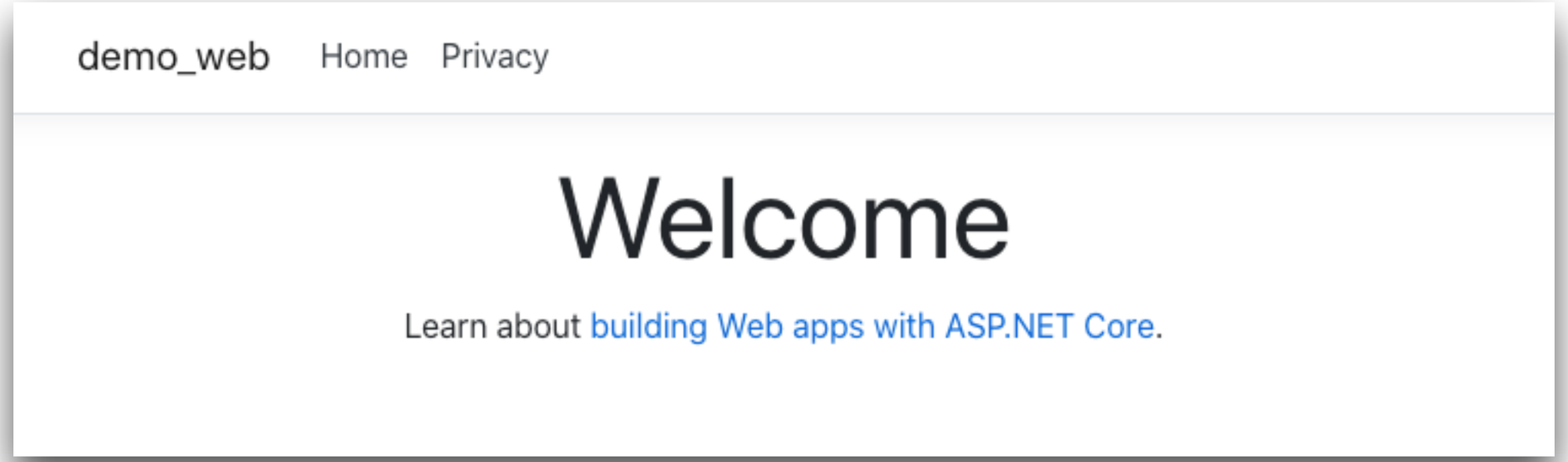
Run application

https://localhost:5001/



Run in command-line

$dotnet run -p <project file.csproj>



Problem

Certificate problem when run project !!!

$dotnet dev-certs https

Application flow

Program.cs

Program.cs

Start point of application

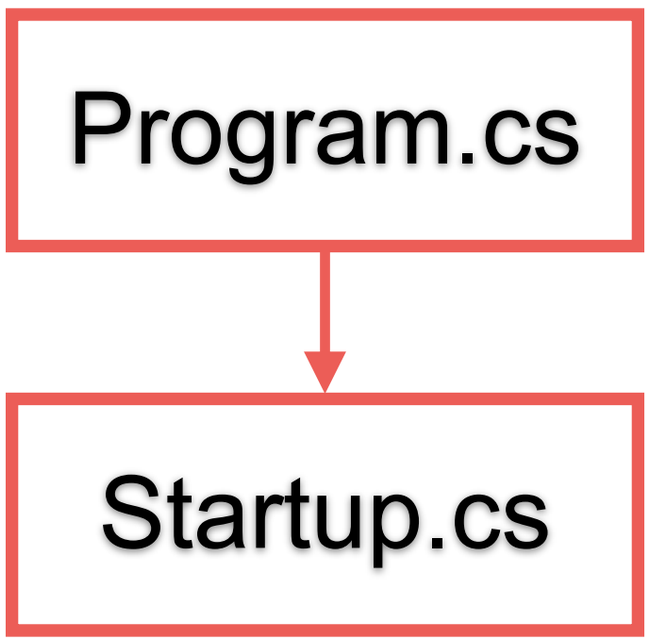
```
public class Program
{
    public static void Main(string[] args)
    {
        CreateHostBuilder(args).Build().Run();
    }

    public static IHostBuilder CreateHostBuilder(string[]
        Host.CreateDefaultBuilder(args)
            .ConfigureWebHostDefaults(webBuilder =>
            {
                webBuilder.UseStartup<Startup>();
            });
}
```

Program.cs

```
public class Program
{
    public static void Main(string[] args)
    {
        CreateHostBuilder(args).Build().Run();
    }

    public static IHostBuilder CreateHostBuilder(string[]
        Host.CreateDefaultBuilder(args)
            .ConfigureWebHostDefaults(webBuilder =>
            {
                webBuilder.UseStartup<Startup>();
            });
}
```

Contain host config and Kestrel server

Application flow

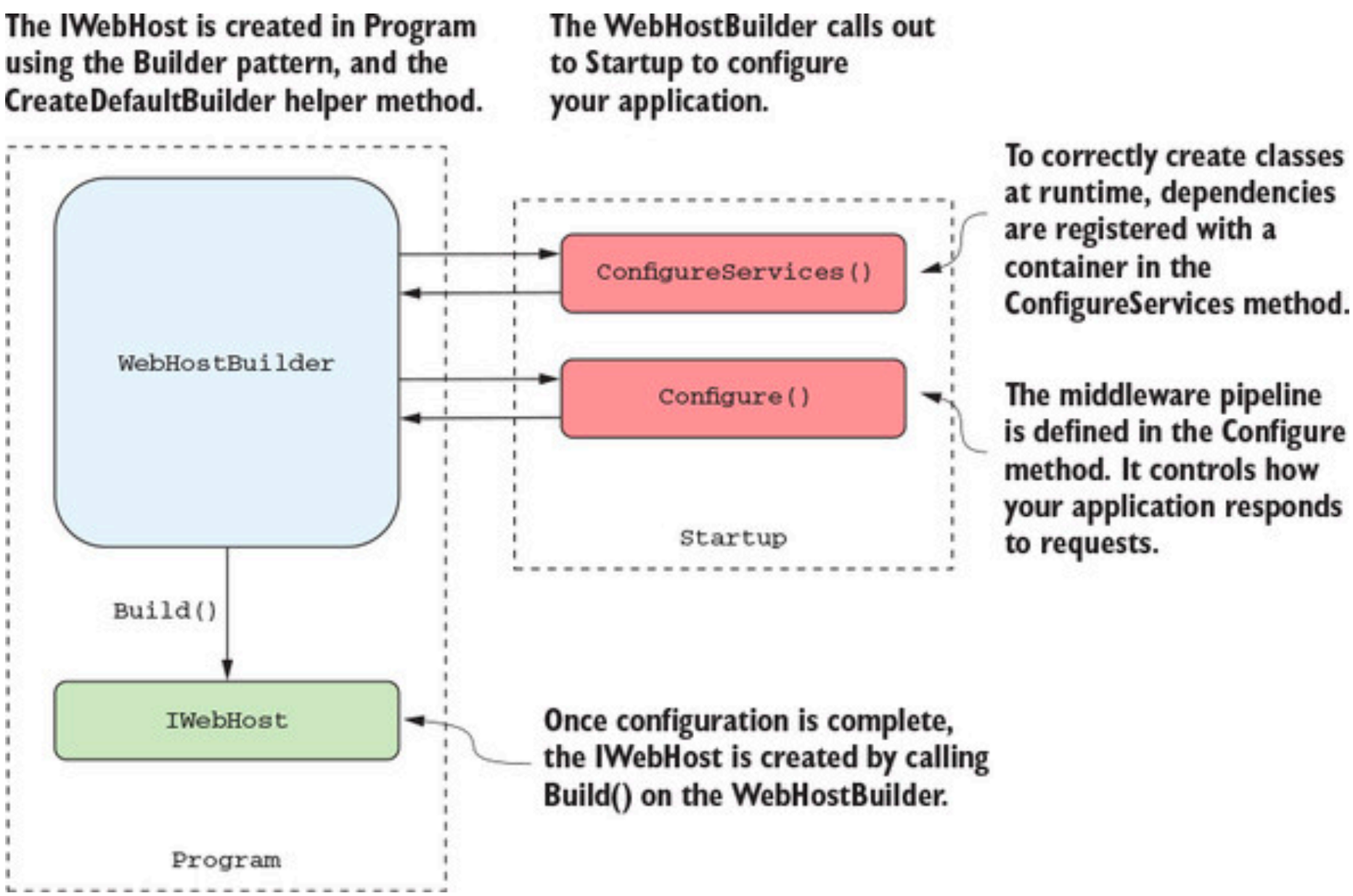


Startup.cs

Config app's **services**

Define **middleware** pipeline

Process flow



Program.cs vs Startup.cs

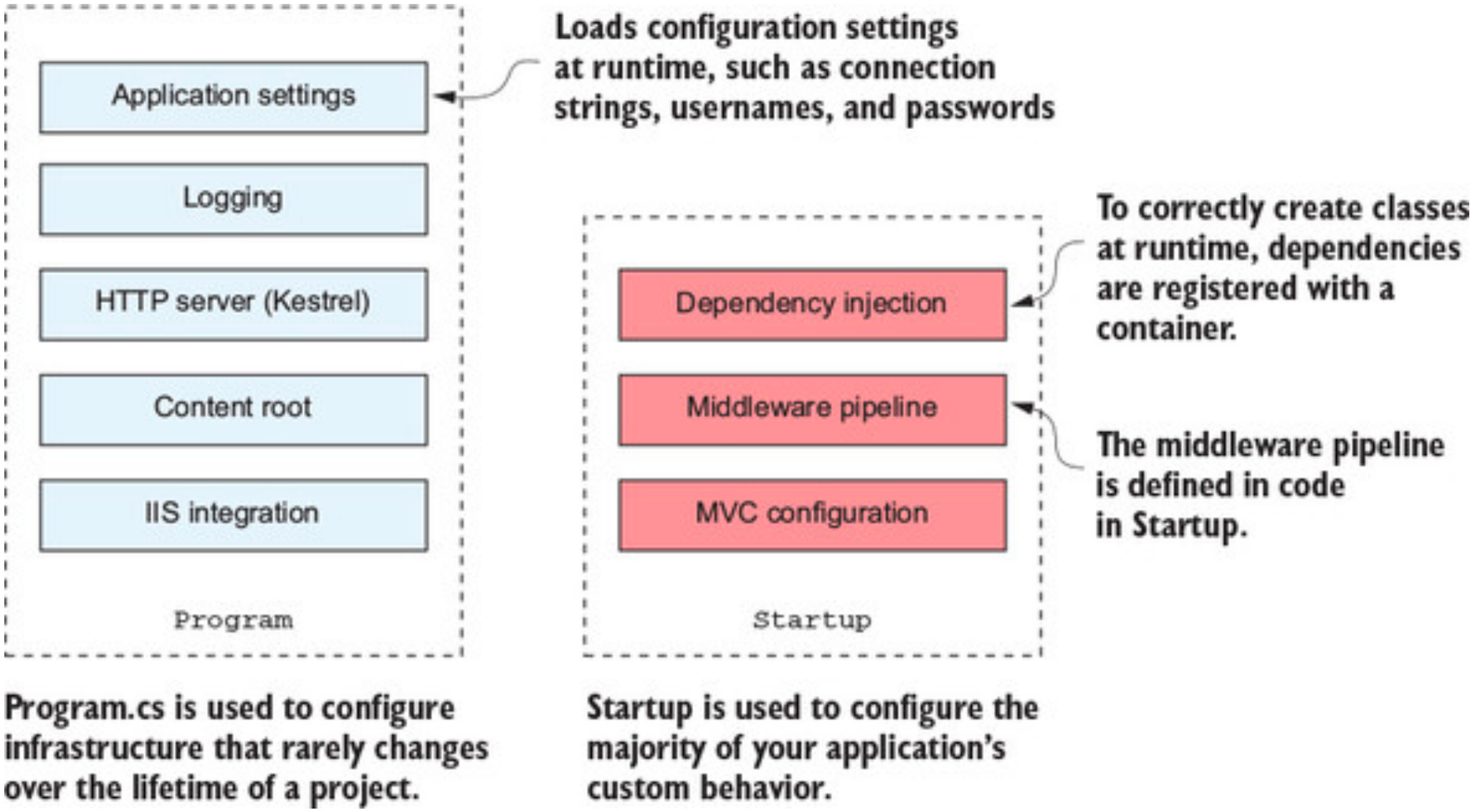
Program.cs

Config infrastructure of app such as HTTP server
Integration with IIS and configuration sources

Startup.cs

Define components and features your app uses and middleware pipeline

Program.cs vs Startup.cs



Program.cs is used to configure infrastructure that rarely changes over the lifetime of a project.

Startup is used to configure the majority of your application's custom behavior.

Startup.cs

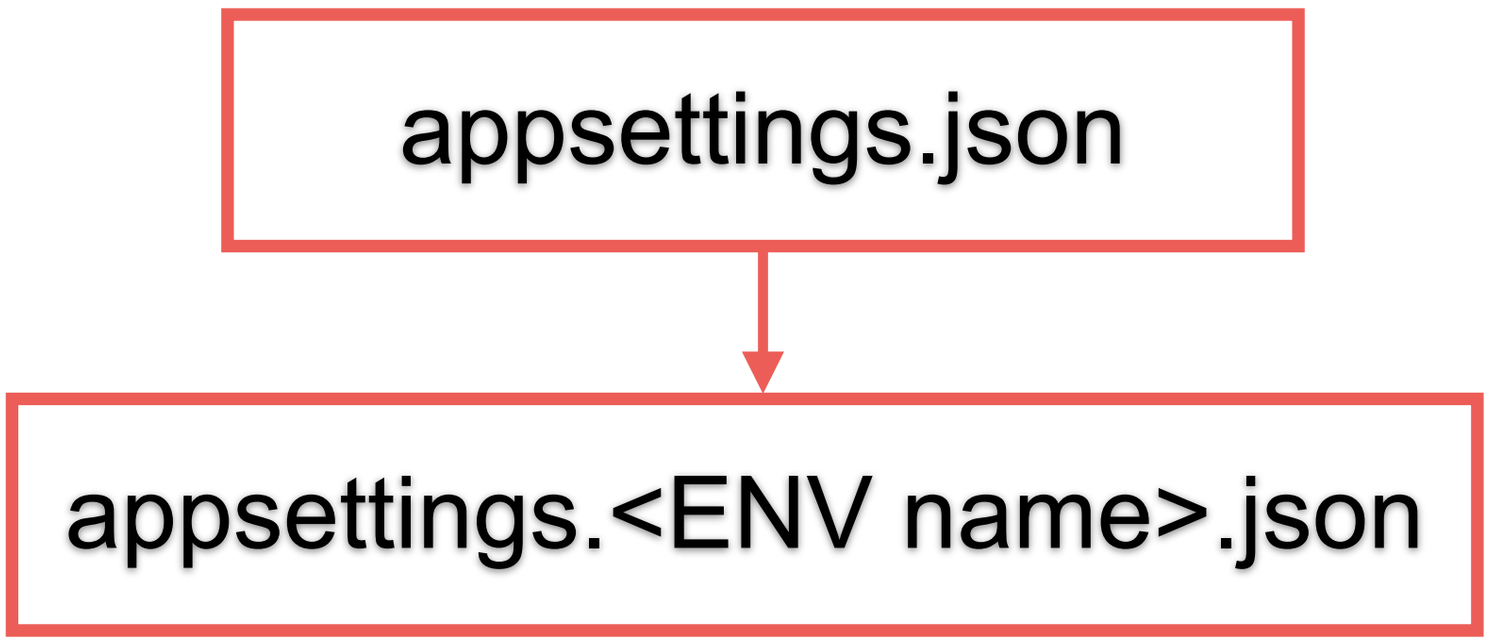
Load app's configuration
Read from file **appsettings.json**
Read from **environment variables**

https://docs.microsoft.com/en-us/aspnet/core/fundamentals/configuration

Config for multiple env

appsettings.**<ENV name>**.json
appsettings.**Production**.json
appsettings.**Development**.json

Step to read config file



Read config in Startup.cs

appsettings.Development.json

```
{
  "Person": {
    "Name": "Somkiat",
    "Title": "Developer"
  },
  "Logging": {
    "LogLevel": {
      "Default": "Information",
      "Microsoft": "Warning",
      "Microsoft.Hosting.Lifetime": "Information"
    }
  }
}
```

Person.cs

```
public class Person
{
    public string Name { get; set; }
    public string Title { get; set; }
}
```

Read config in Startup.cs

```
public void ConfigureServices(IServiceCollection services)
{
    // Load configuration
    var person = Configuration.GetSection("Person").Get<Person>();
    Console.Write(person.Name + "\n");
    Console.Write(person.Title + "\n");

    services.AddControllers();
}
```

Startup.cs

Config app's **services**

```
public void ConfigureServices(IServiceCollection services)
{
    services.AddControllersWithViews();
}
```

You can add the new service

1. Create TestService.cs

```
public class TestService
{
    private readonly ILogger<TestService> logger;

    public TestService(ILogger<TestService> logger)
    {
        this.logger = logger;
    }

    public void Test()
    {
        logger.LogWarning("I'm writing a message");
    }
}
```

2. Register service in Startup.cs

```
public void ConfigureServices(IServiceCollection services)
{
    services.AddControllersWithViews();
    services.AddScoped<TestService>();
}
```

3. Use in controller class

Dependency Injection

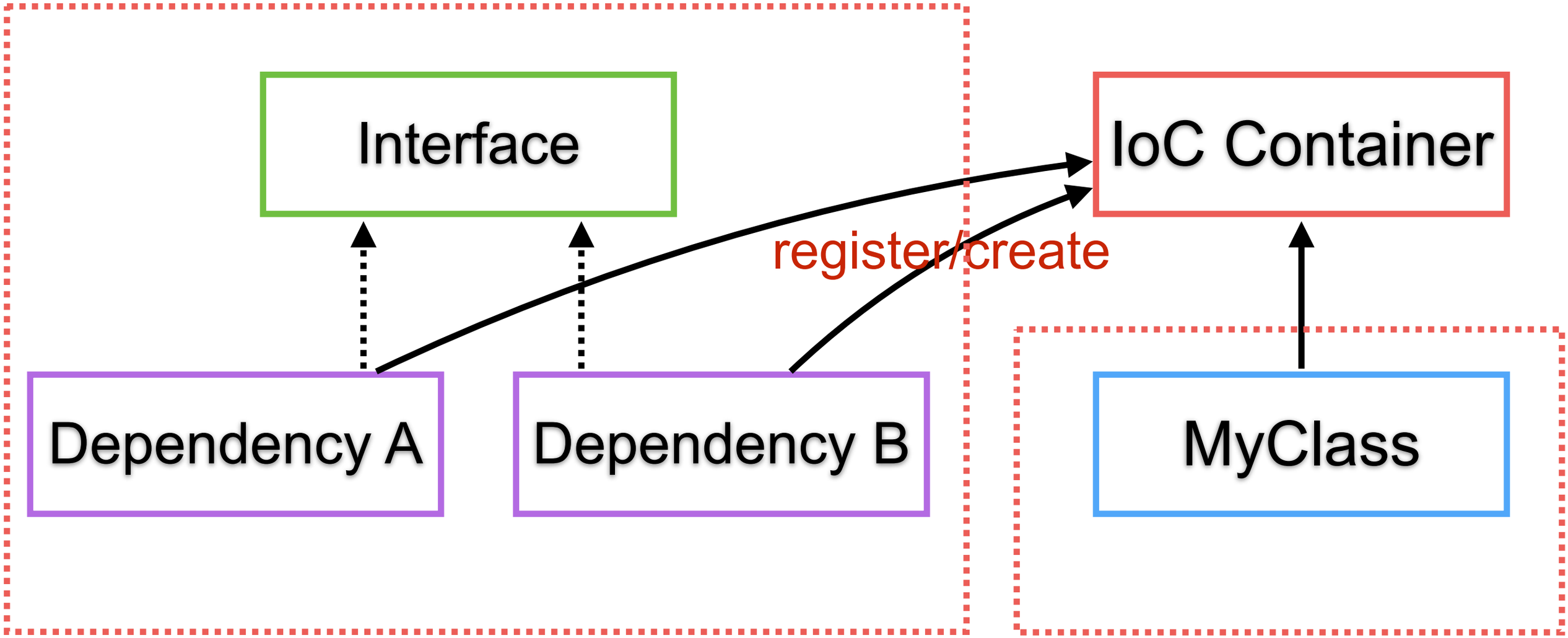
```
public class HomeController : Controller
{
    private readonly ILogger<HomeController> _logger;

    private readonly TestService service;
    private readonly ILogger<HomeController> logger;
    public HomeController(TestService service, ILogger<HomeController> logger)
    {
        this.logger = logger;
        this.service = service;

    }

    public IActionResult Index()
    {
        service.Test();
        return View();
    }
```

3. Use in controller class

```
public class HomeController : Controller
{
    private readonly ILogger<HomeController> _logger;

    private readonly TestService service;
    private readonly ILogger<HomeController> logger;
    public HomeController(TestService service, ILogger<HomeController> logger)
    {
        this.logger = logger;
        this.service = service;

    }

    public IActionResult Index()
    {
        service.Test();
        return View();
    }
```

Call service

Inversion of Control



"Loose coupling"

Startup.cs

Define **middleware** pipeline

```
public void Configure(IApplicationBuilder app, IWebHostEnvironment env)
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }
    else
    {
        app.UseExceptionHandler("/Home/Error");
        // The default HSTS value is 30 days. You may want to change th
        app.UseHsts();
    }
    app.UseHttpsRedirection();
    app.UseStaticFiles();

    app.UseRouting();

    app.UseAuthorization();

    app.UseEndpoints(endpoints =>
    {
        endpoints.MapControllerRoute(
            name: "default",
            pattern: "{controller=Home}/{action=Index}/{id?}");
    });
}
```

Startup.cs => Configure

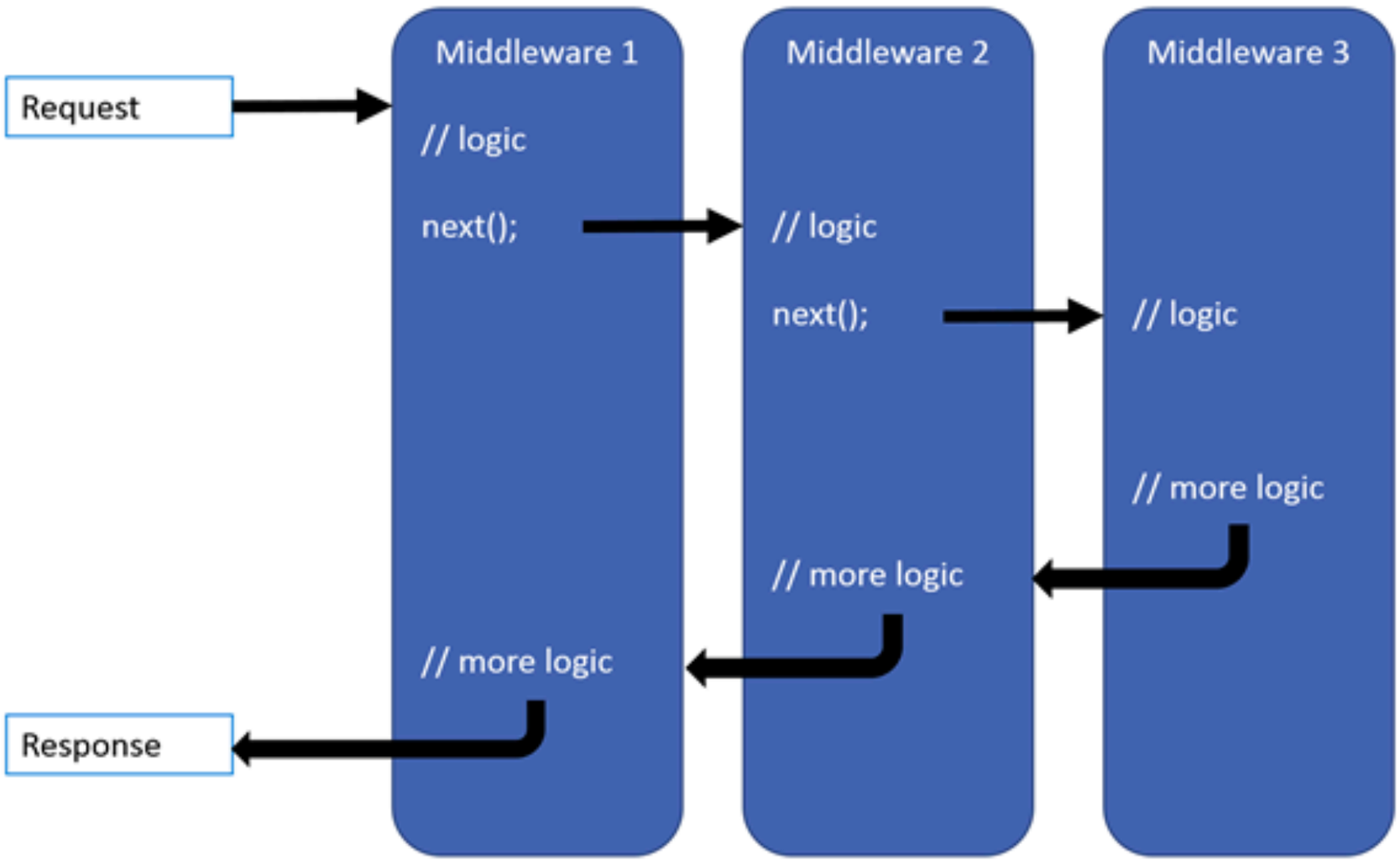
IApplicationBuilder

Define ordered of middleware

IwebHostEnvironment

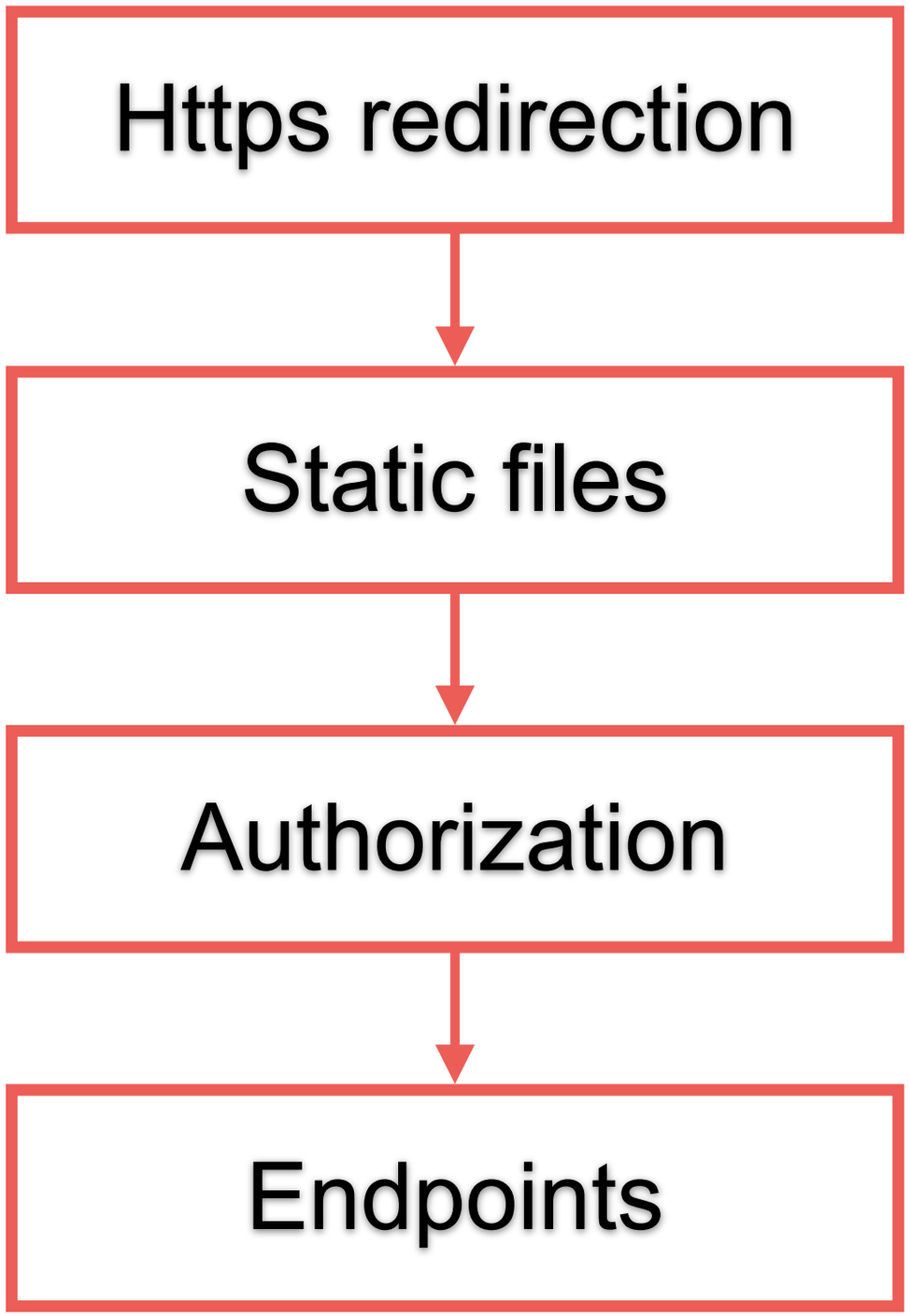
EnvironmentName
ContentRootPath
WebRootPath

Middleware



https://docs.microsoft.com/en-us/aspnet/core/fundamentals/middleware

Middleware



https://docs.microsoft.com/en-us/aspnet/core/security/enforcing-ssl

Static File Middleware

HTML, CSS, JavaScript, Image
Default path in folder **wwwroot**
Change with **UseWebRoot()**

```
public static IHostBuilder CreateHostBuilder(string
    Host.CreateDefaultBuilder(args)
        .ConfigureWebHostDefaults(webBuilder =>
        {
            webBuilder.UseWebRoot("myroot");
            webBuilder.UseStartup<Startup>();
        });
```

https://docs.microsoft.com/en-us/aspnet/core/fundamentals/static-files

Static File Middleware

Manage HTTP response header
Manage authorisation
Enable directory browsing
UseFileServer

Routing middleware

To match the URLs of incoming requests and map to actions

Must to use **UseRouting** and **UseEndpoints**

```
app.UseRouting();

app.UseAuthorization();

app.UseEndpoints(endpoints =>
{
    endpoints.MapControllerRoute(
        name: "default",
        pattern: "{controller=Home}/{action=Index}/{id?}");
});
```

https://docs.microsoft.com/en-us/aspnet/core/mvc/controllers/routing

Routing and Endpoints

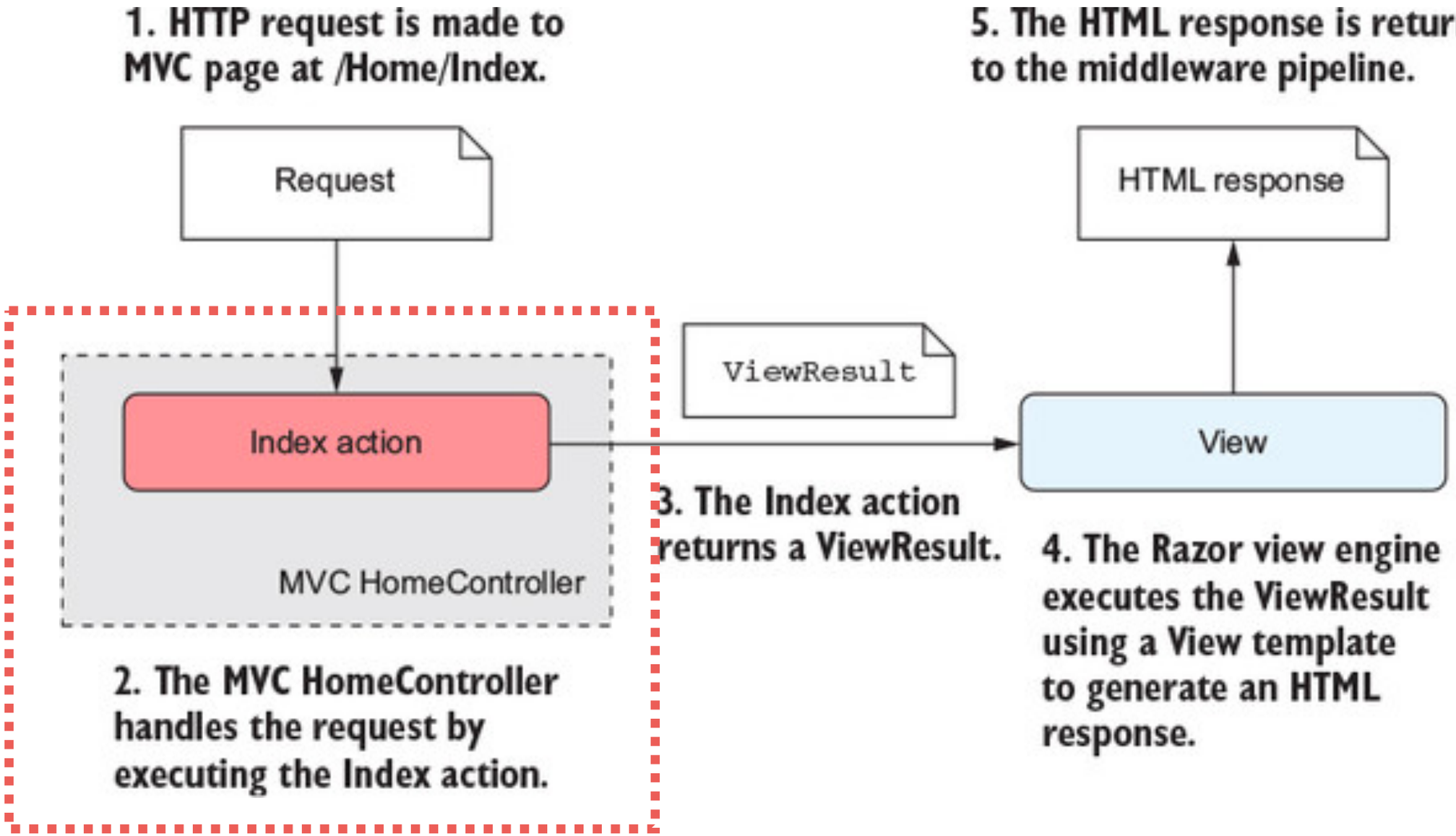
```
app.UseRouting();

app.UseAuthorization();

app.UseEndpoints(endpoints =>
{
    endpoints.MapControllerRoute(
        name: "default",
        pattern: "{controller=Home}/{action=Index}/{id?}");
});
```

Controller default = **Home**

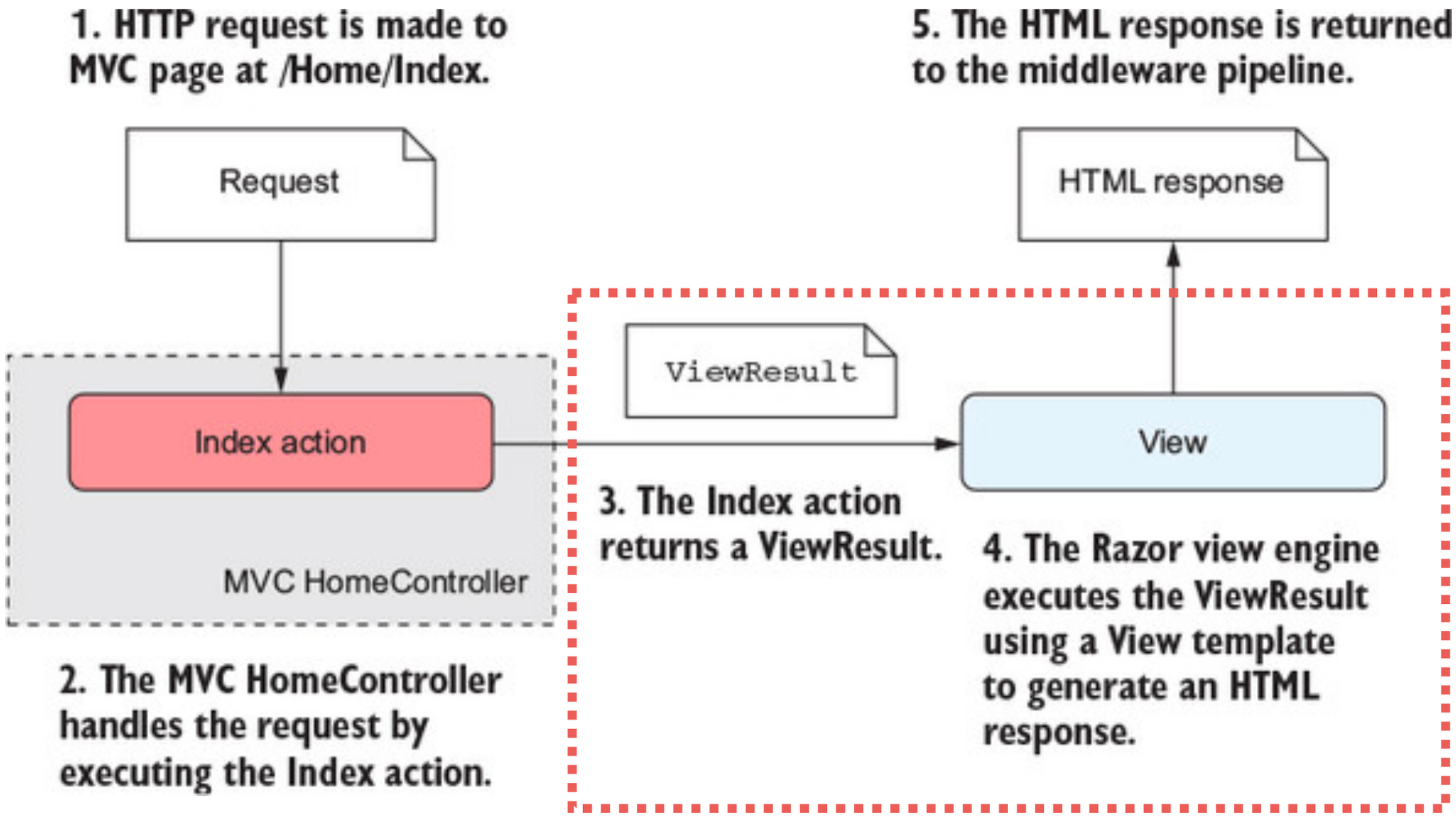
Action default = **Index**

https://docs.microsoft.com/en-us/aspnet/core/mvc/controllers/routing

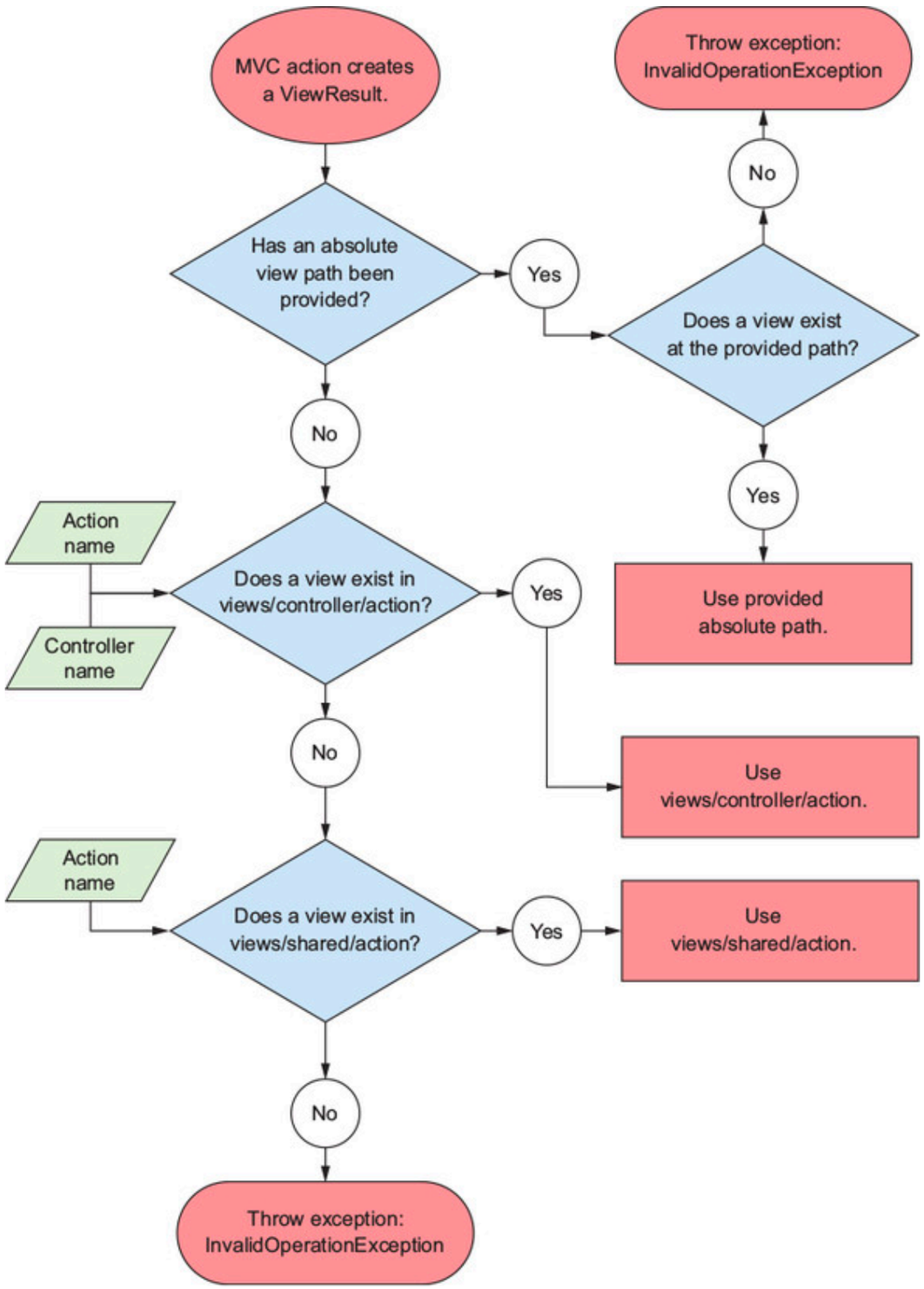
Route request to MVC controller



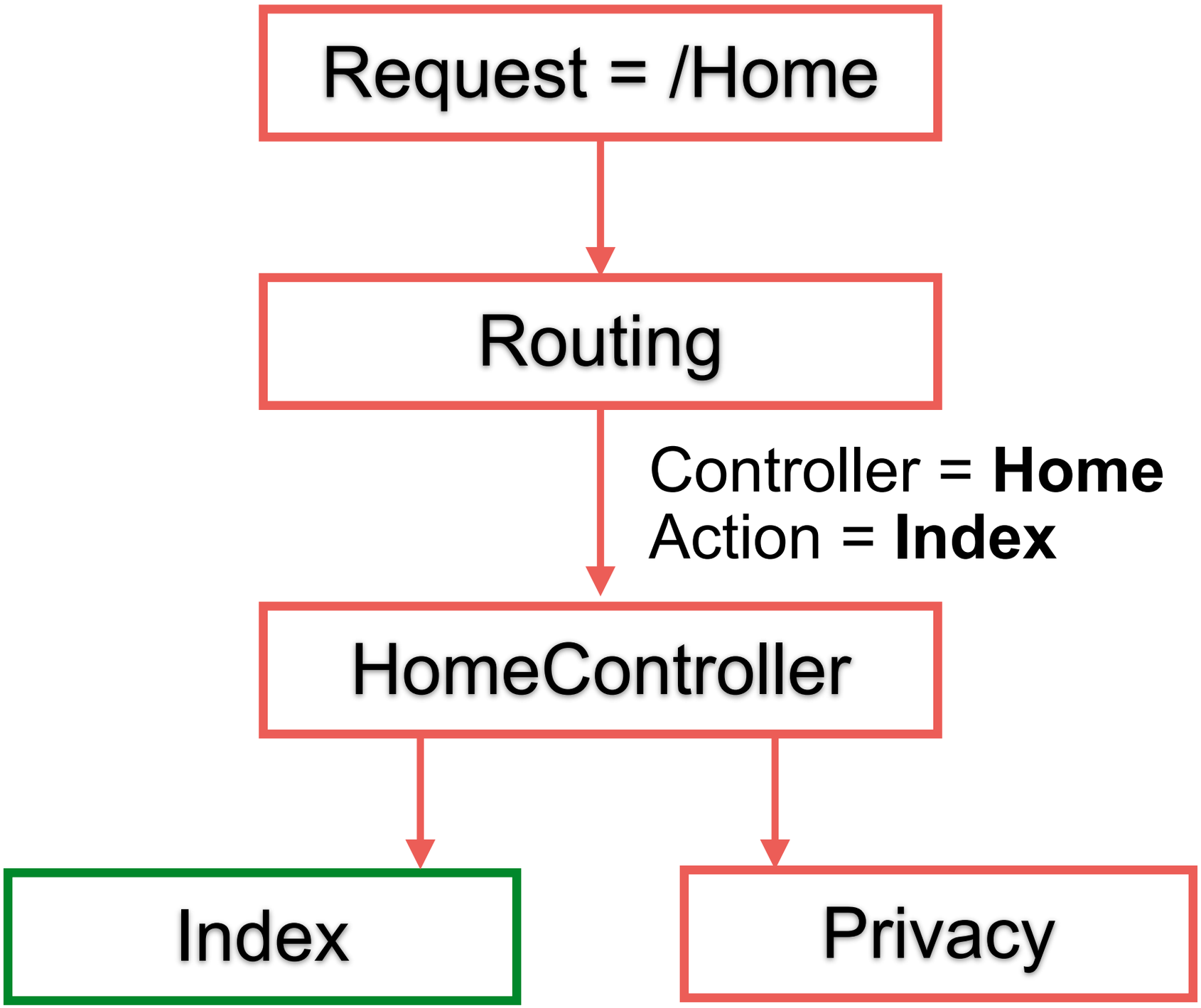
Map Controller action to view



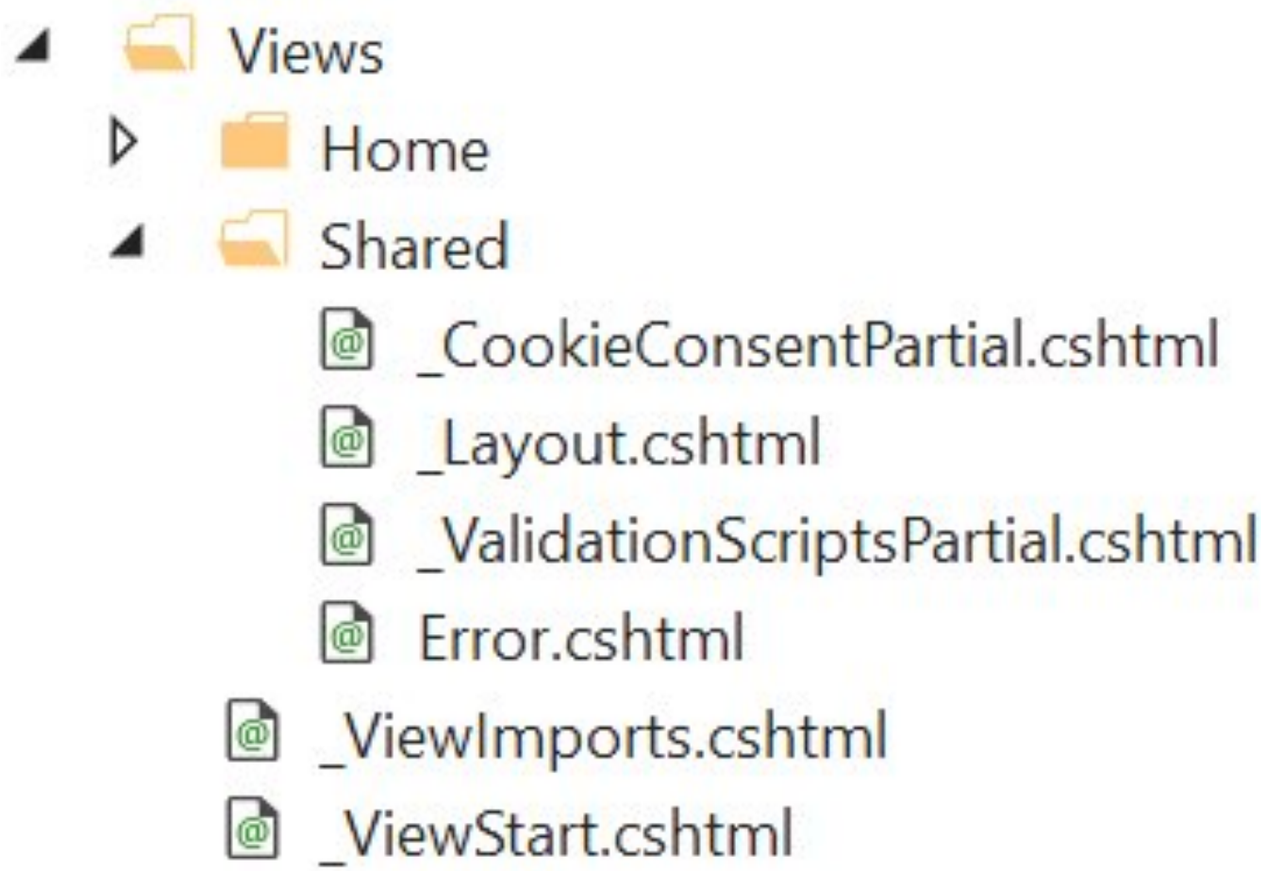
Map Controller action to view



Map Controller action to view



Views in .Net Core MVC



Views as Razor templates

Views are **.cshtml**

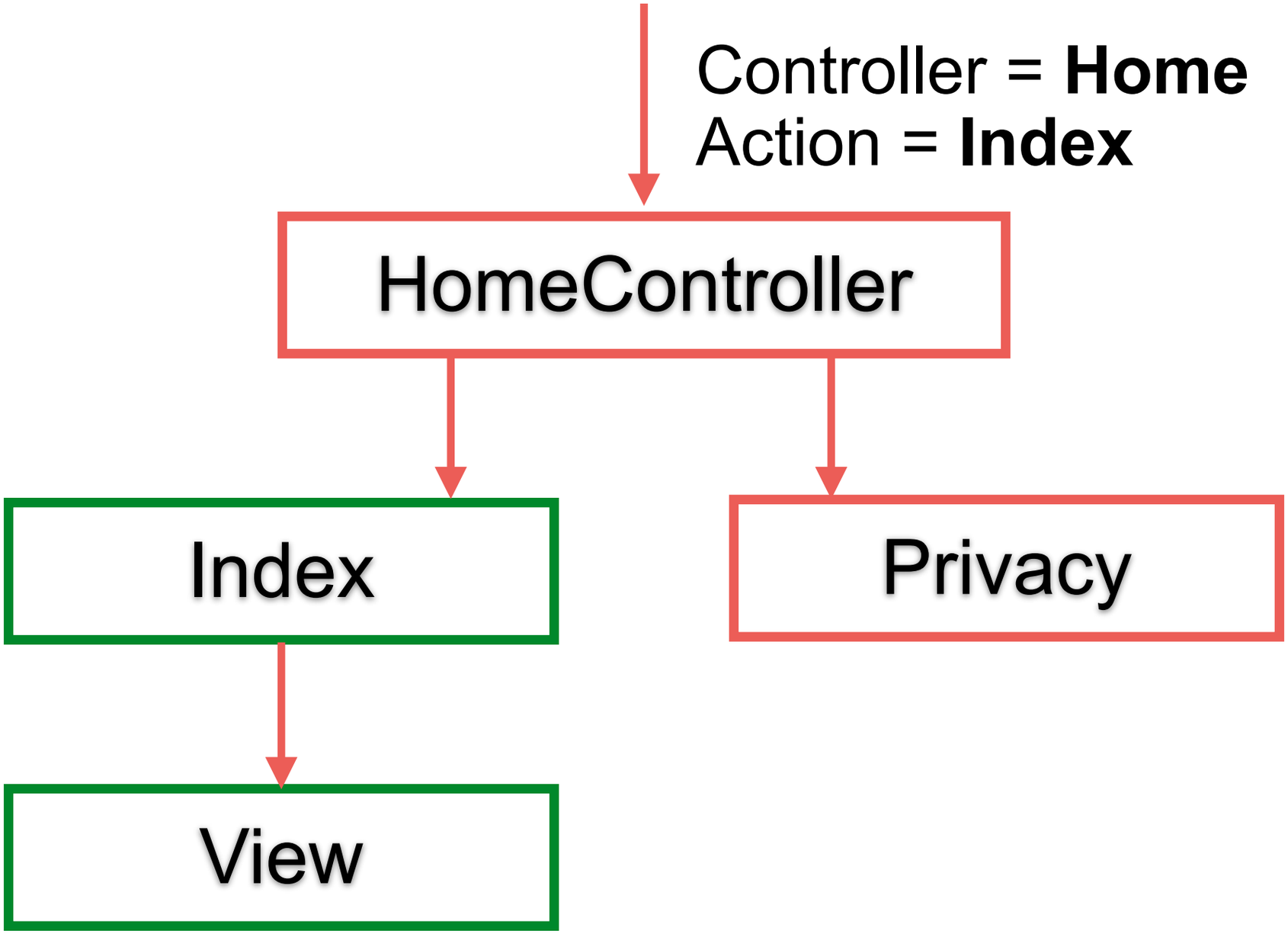
Can use C# code in Razor markup

In folder /Views/<controller name>

- <Controller action name 1>.cshtml
- <Controller action name 2>.cshtml
- <Controller action name 3>.cshtml

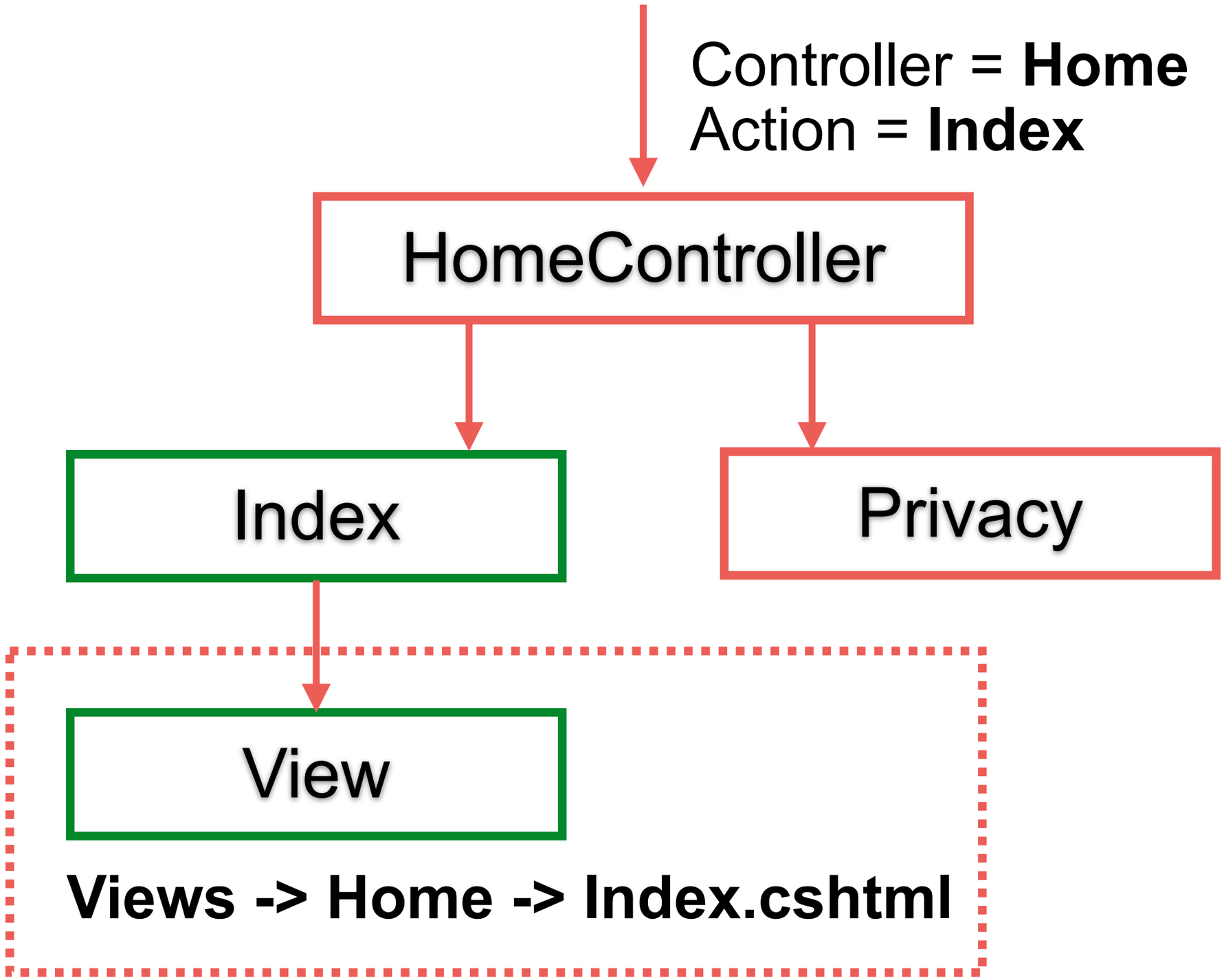
https://docs.microsoft.com/en-us/aspnet/core/mvc/views/overview

Map Controller action to view



Views -> Home -> Index.cshtml

How to load view ?

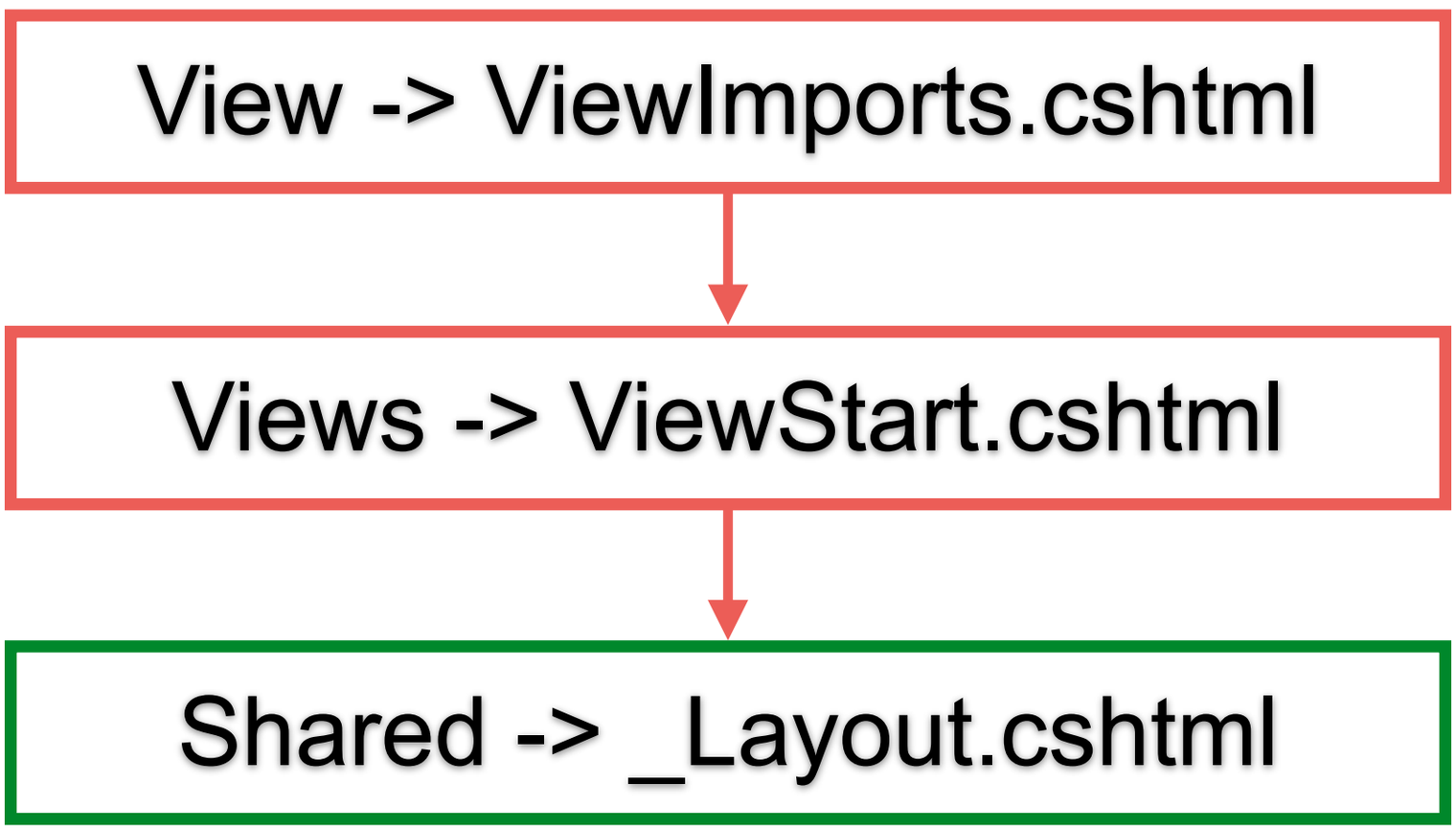


Index.cshtml

Razor template with C# code

```
@{
    ViewData["Title"] = "Home Page";
}

<div class="text-center">
    <h1 class="display-4">Welcome</h1>
    <p>Learn about <a href="https://docs.microc
</div>
```

Flow of view



https://docs.microsoft.com/en-us/aspnet/core/mvc/views/layout

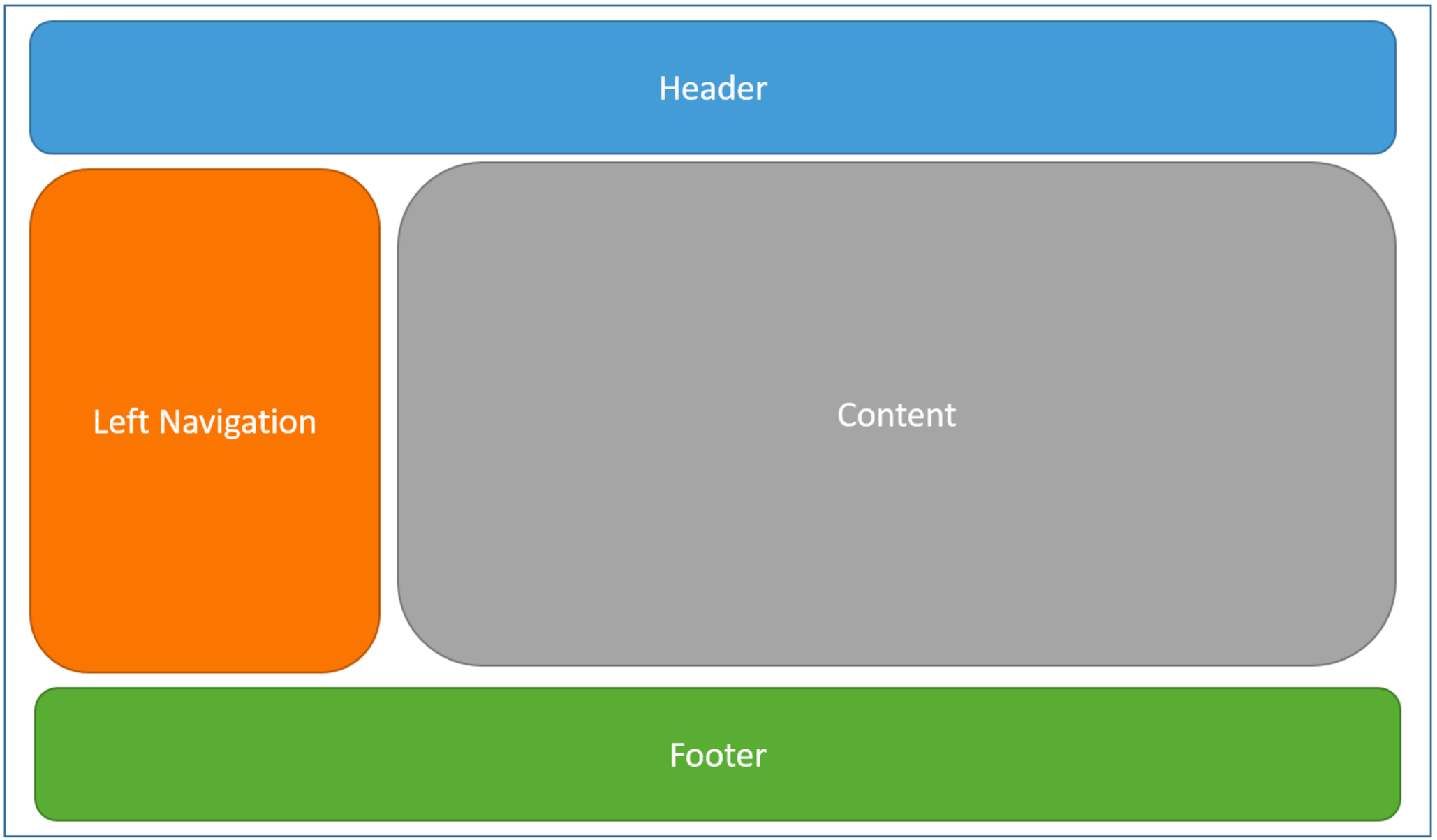
ViewStart.cshtml

```
@{
    Layout = "_Layout";
}
```

The layout specified can use a **full** and **partial** path

Views/Shared/_Layout.cshtml
Pages/Shared/_Layout.cshtml

Layout

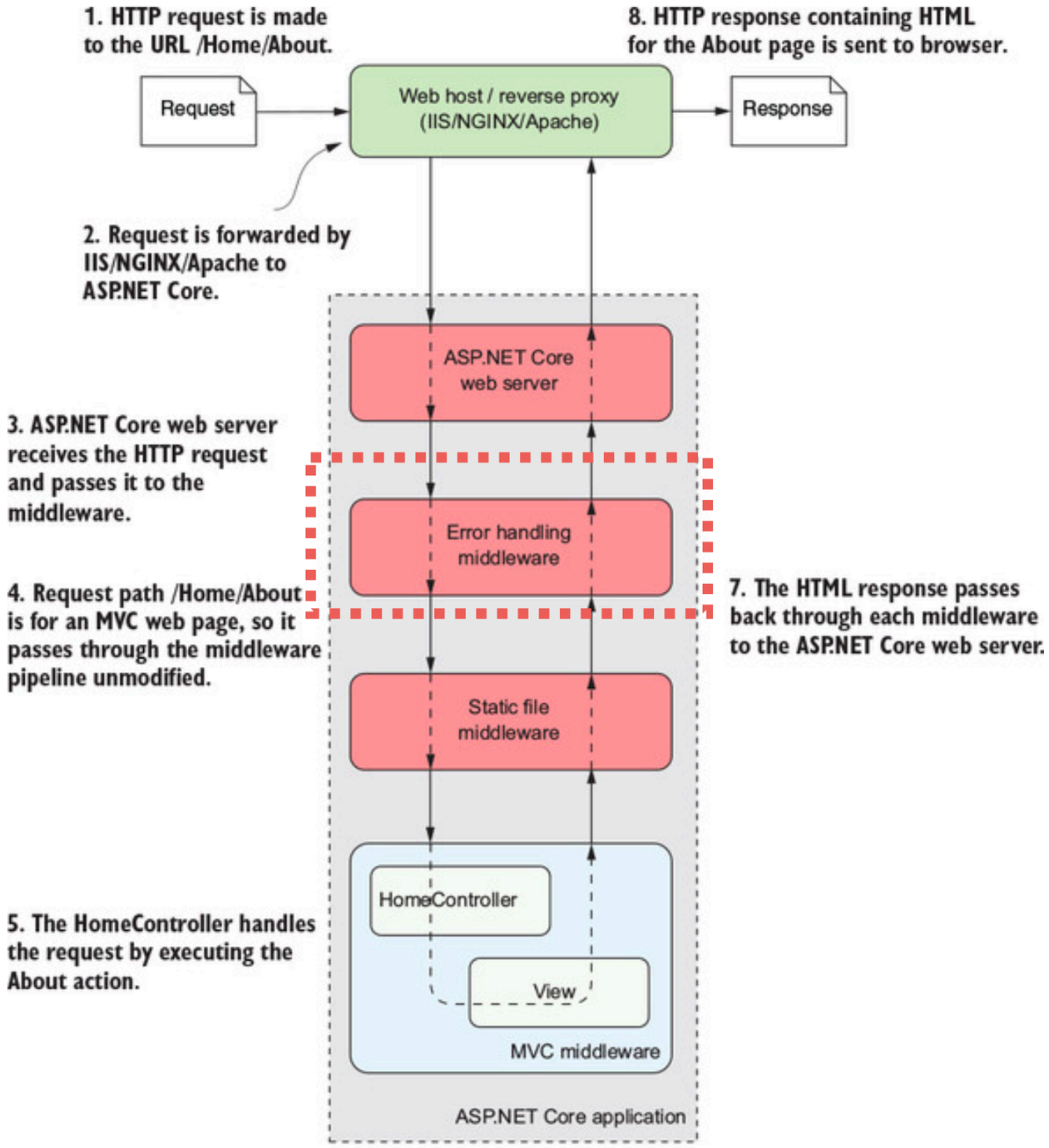


https://docs.microsoft.com/en-us/aspnet/core/mvc/views/layout

@RenderBody()

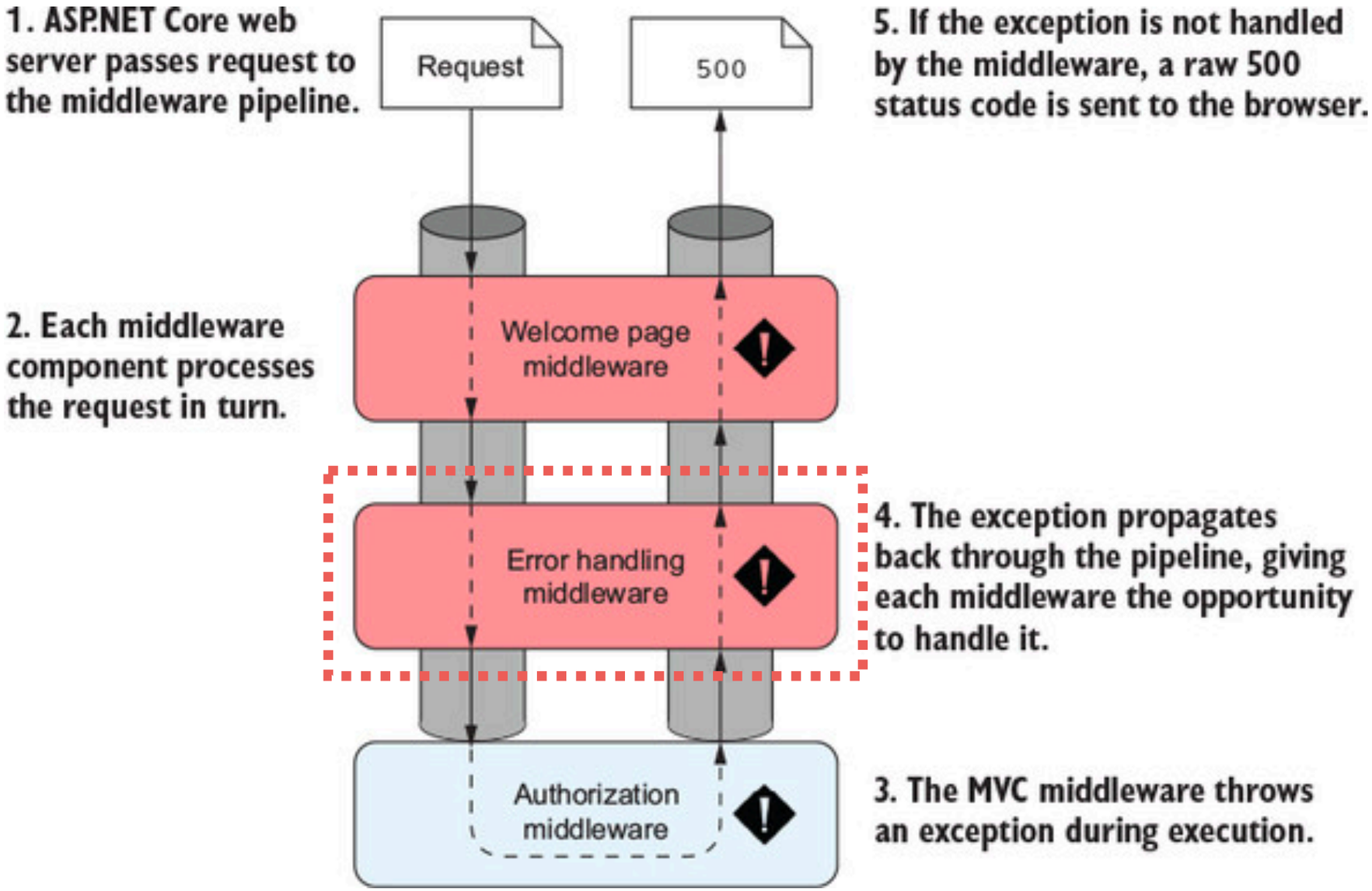
```
            </div>
        </nav>
    </header>
    <div class="container">
        <main role="main" class="pb-3">
            @RenderBody()
        </main>
    </div>

    <footer class="border-top footer text-muted">
        <div class="container">
```

Summary request to HomeController



Error handling

Using middleware to handle an error



Error handling

UseStatusCodePages
UseStatusCodePagesWithRedistect
UseStatusCodePagesWithReExecute

Declare before Static of MVC middleware

https://docs.microsoft.com/en-us/aspnet/core/fundamentals/error-handling

Error handling

Development mode
Production mode

Config exception handling

```
public void Configure(IApplicationBuilder app, IWebHostEnvironment env)
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }
    else
    {
        app.UseExceptionHandler("/Home/Error");
        // The default HSTS value is 30 days. You may want to change thi
        app.UseHsts();
    }
```

Config exception handling

```
public void Configure(IApplicationBuilder app, IWebHostEnvironment env)
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }
    else
    {
        app.UseExceptionHandler("/Home/Error");
        // The default HSTS value is 30 days. You may want to change thi
        app.UseHsts();
    }
```

Development env

Config exception handling

```
public void Configure(IApplicationBuilder app, IWebHostEnvironment env)
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }
    else
    {
        app.UseExceptionHandler("/Home/Error");
        // The default HSTS value is 30 days. You may want to change thi
        app.UseHsts();
    }
```

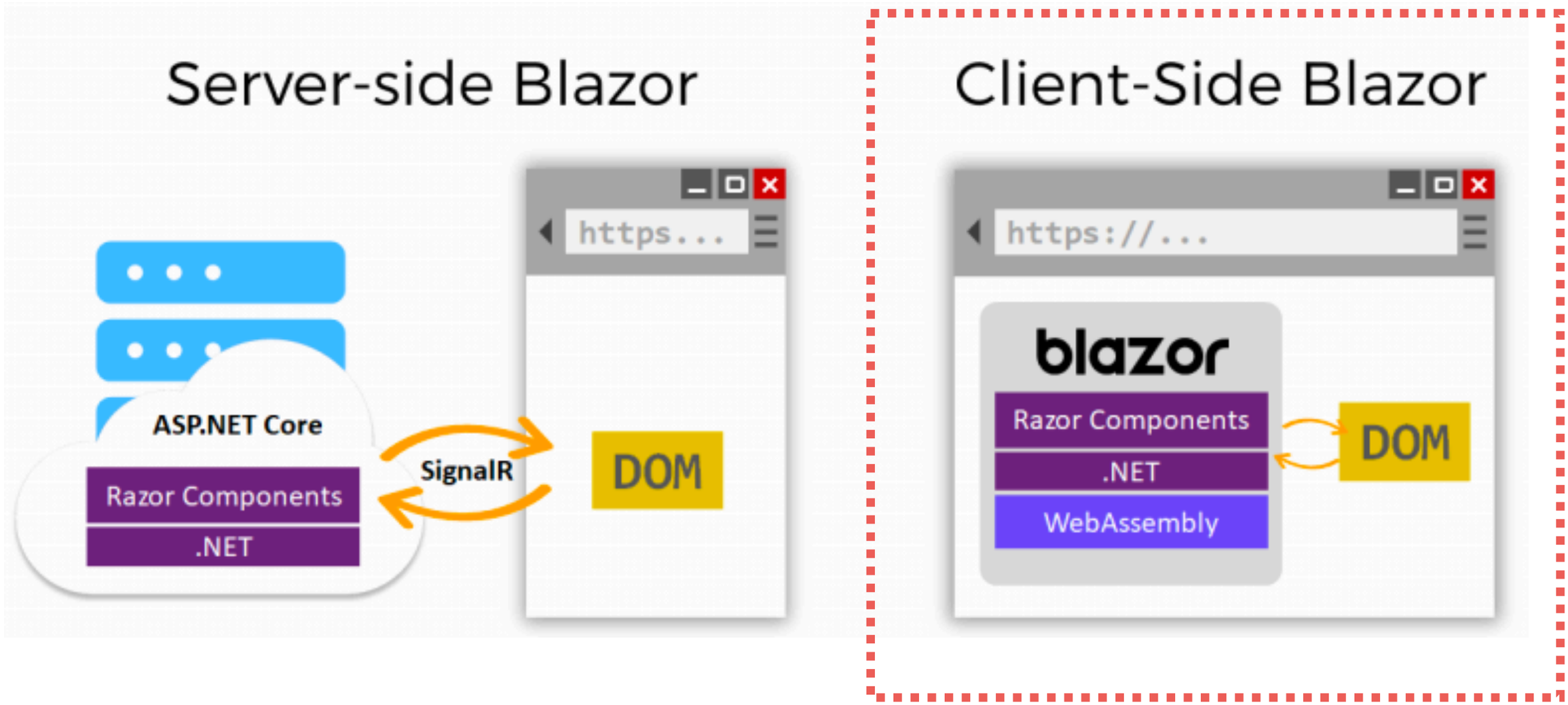
Production env

HTTP response status code

Code	Description
1xx	Information
2xx	Success
3xx	Redirection
4xx	Client error
5xx	Server error

Blazor in .Net Core 3.1

Blazor in .Net Core 3.1



https://dotnet.microsoft.com/apps/aspnet/web-apps/blazor

.Net Core Blazor

Create UI using C# instead of JavaScript
Share server and client side app logics
Render UI as HTML and CSS in any devices
Interops with JavaScript

https://docs.microsoft.com/en-us/aspnet/core/blazor

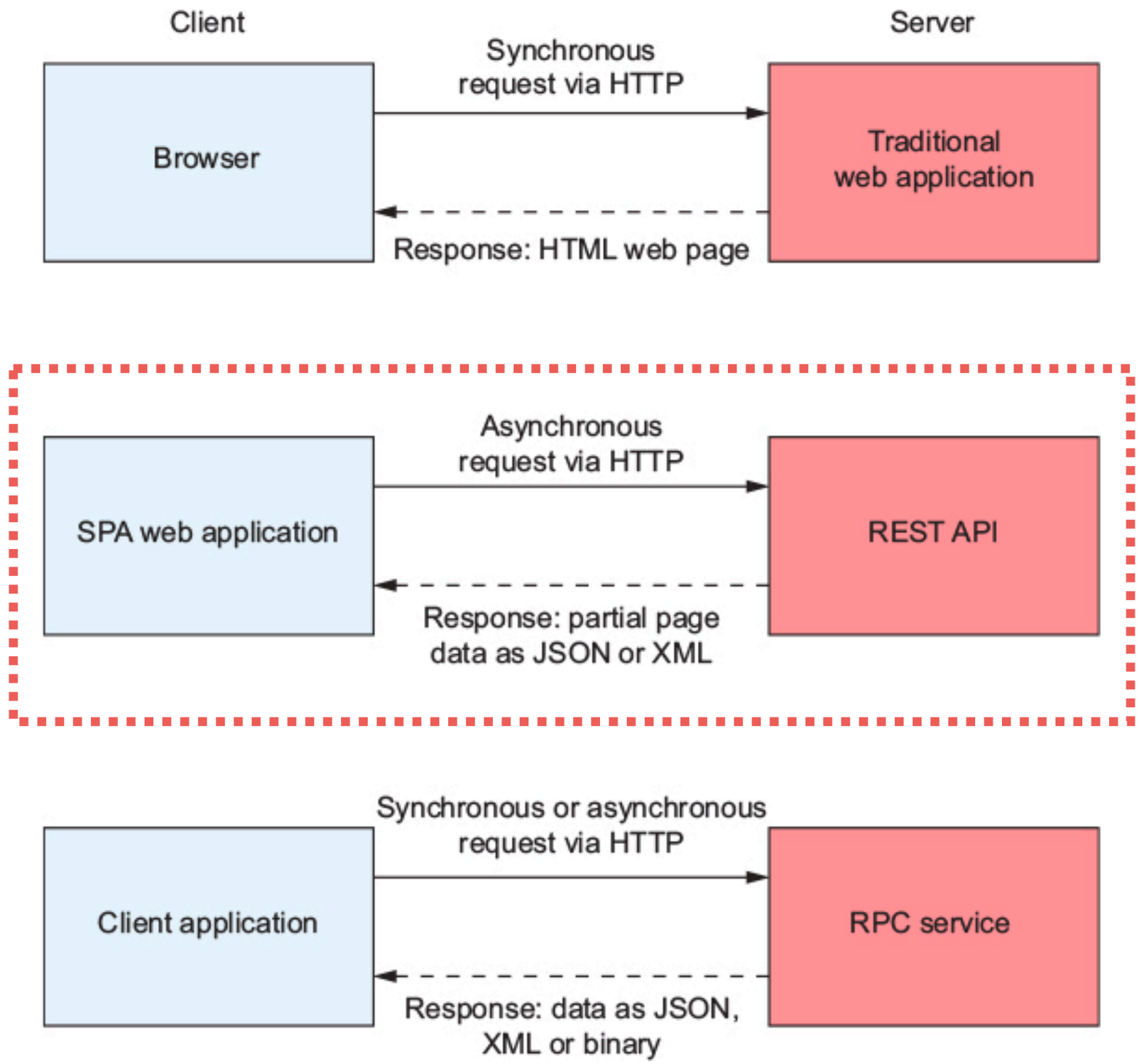
Create and Publish Blazor

```
$dotnet new blazorwasm -o BlazorApp1
$cd BlazorApp1
$dotnet publish -c Release
```

Develop Web APIs

Develop Web APIs

Development



Startup.cs

Inject the **controllers** to services

```
public void ConfigureServices(IServiceCollection services)
{
    services.AddControllers();
}
```

Startup.cs

Config all middleware

```
public void Configure(IApplicationBuilder app, IWebHostEnvironment env)
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }

    app.UseHttpsRedirection();

    app.UseRouting();

    app.UseCors();

    app.UseAuthorization();

    app.UseEndpoints(endpoints =>
    {
        endpoints.MapControllers();
    });
}
```

ControllerBase class

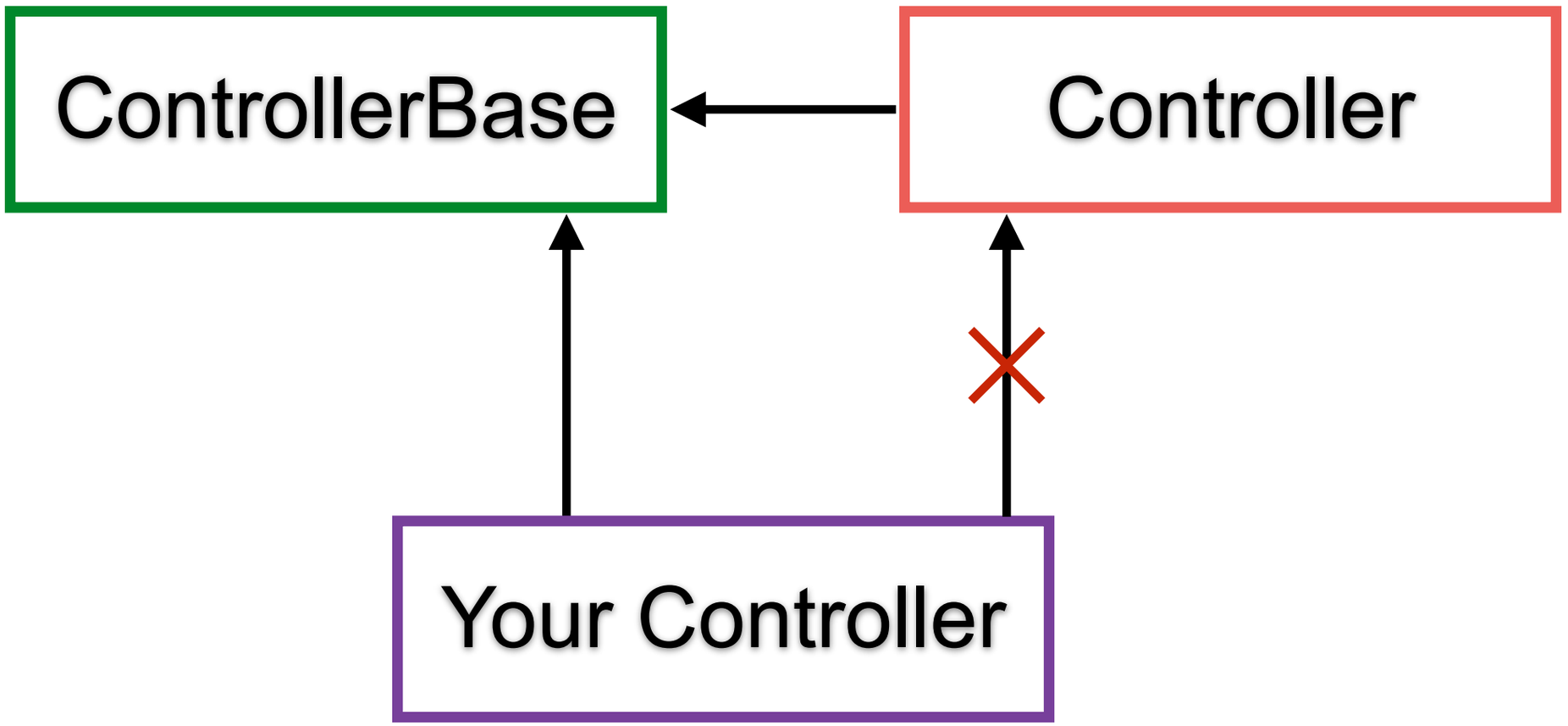
All controllers are derive from this class
Starter controller of API project

```
[ApiController]
[Route("[controller]")]
public class WeatherForecastController : ControllerBase
{
```

https://docs.microsoft.com/en-us/aspnet/core/web-api

All controllers

Don’t derive from Controller class (For web)



Action return types of Controller

Specific type
IActionResult
ActionResult<T>

https://docs.microsoft.com/en-us/aspnet/core/web-api/action-return-types

Specific type

List<T>

```
[HttpGet]
[Route("/type1")]
public List<WeatherForecast> GetWithSpecificType()
{
    var rng = new Random();
    return Enumerable.Range(1, 5).Select(index => new Weather
    {
        Date = DateTime.Now.AddDays(index),
        TemperatureC = rng.Next(-20, 55),
        Summary = Summaries[rng.Next(Summaries.Length)]
    })
    .ToList();
}
```

Specific type

IEnumerable<T>

```
[HttpGet]
public IEnumerable<WeatherForecast> Get()
{
    var rng = new Random();
    return Enumerable.Range(1, 5).Select(index => new Weather
    {
        Date = DateTime.Now.AddDays(index),
        TemperatureC = rng.Next(-20, 55),
        Summary = Summaries[rng.Next(Summaries.Length)]
    })
    .ToArray();
}
```

Specific type

I**Async**Enumerable<T>

```
[HttpGet("async")]
public async IAsyncEnumerable<WeatherForecast> GetWithAsync()
{
    var rng = new Random();
    var results = Enumerable.Range(1, 5).Select(index => new WeatherForecast
    {
        Date = DateTime.Now.AddDays(index),
        TemperatureC = rng.Next(-20, 55),
        Summary = Summaries[rng.Next(Summaries.Length)]
    }).ToList();

    foreach(var item in results)
    {
        yield return item;
    }
}
```

IActionResult type

Represent HTTP status code

Code	Class name
200	OkObjectResult
400	BadRequestResult
404	NotFooundResult

https://docs.microsoft.com/en-us/dotnet/api/microsoft.aspnetcore.mvc.iactionresult

IActionResult type

Support both Sync and Async

```
[HttpGet("action/result")]
[ProducesResponseType(StatusCodes.Status200OK)]
[ProducesResponseType(StatusCodes.Status404NotFound)]
public IActionResult GetData()
{
    var rng = new Random();
    if(rng.Next(-5, 5) > 0)
    {
        var results = Enumerable.Range(1, 3).Select(index =>
        {
            Date = DateTime.Now.AddDays(index),
            TemperatureC = rng.Next(-20, 55),
            Summary = Summaries[rng.Next(Summaries.Length)]
        }).ToList();

        return Ok(results);
    }
    return NotFound();
}
```

IActionResult type

Return HTTP Code = 404


```
{
  "type": "https://tools.ietf.org/html/rfc7231#section-6.5.4",
  "title": "Not Found",
  "status": 404,
  "traceId": "|379e284f-4c225bd0f80199ab."
}
```


ActionResult<T> type

Introduce in .Net Core 2.1
Improvement of IActionResult
Support both Sync and Async

ActionResult<T> type

Introduce in .Net Core 2.1

```
[HttpGet("action/result2")]
[ProducesResponseType(StatusCodes.Status200OK)]
[ProducesResponseType(StatusCodes.Status404NotFound)]
public ActionResult<IEnumerable<WeatherForecast>> GetData2()
{
    var rng = new Random();
    if (rng.Next(-5, 5) > 0)
    {
        var results = Enumerable.Range(1, 3).Select(index => new WeatherFore
        {
            Date = DateTime.Now.AddDays(index),
            TemperatureC = rng.Next(-20, 55),
            Summary = Summaries[rng.Next(Summaries.Length)]
        }).ToList();

        return results;
    }
    return NotFound();
}
```

Don’t need Ok()

Testing APIs with HTTP REPL

https://docs.microsoft.com/en-us/aspnet/core/web-api/http-repl

HTTP REPL

Lightweight and cross-platform CLI tool
Use for making HTTP requests to test APIs

Install HTTP REPL

$dotnet tool install -g Microsoft.dotnet-httprepl

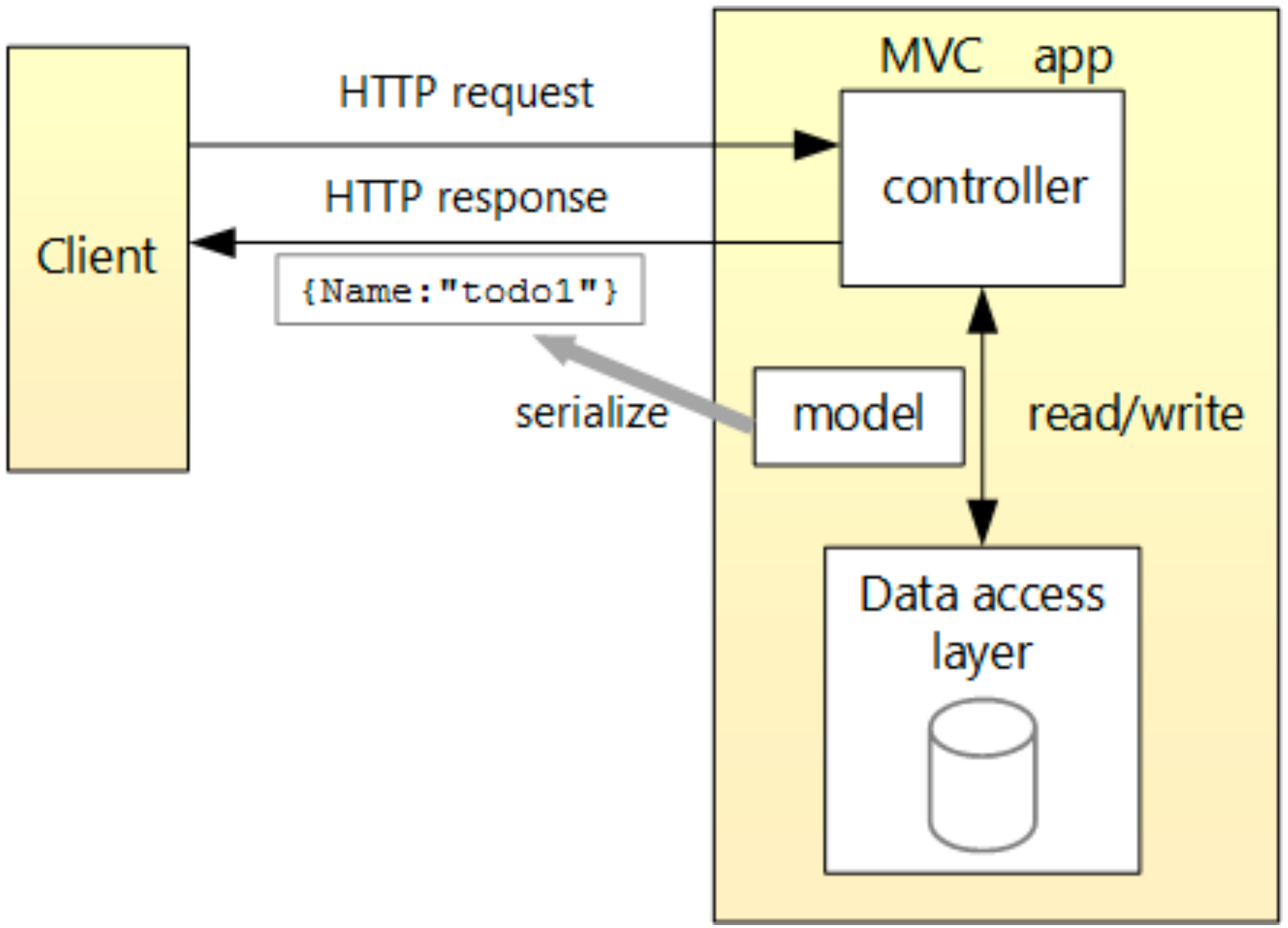
$httprepl -h

Testing with Postman

https://www.postman.com/

API Workshop

API Workshop



https://docs.microsoft.com/en-us/aspnet/core/tutorials/first-web-api

Steps

Design your APIs
Develop
Testing
Deploy

Design your APIs

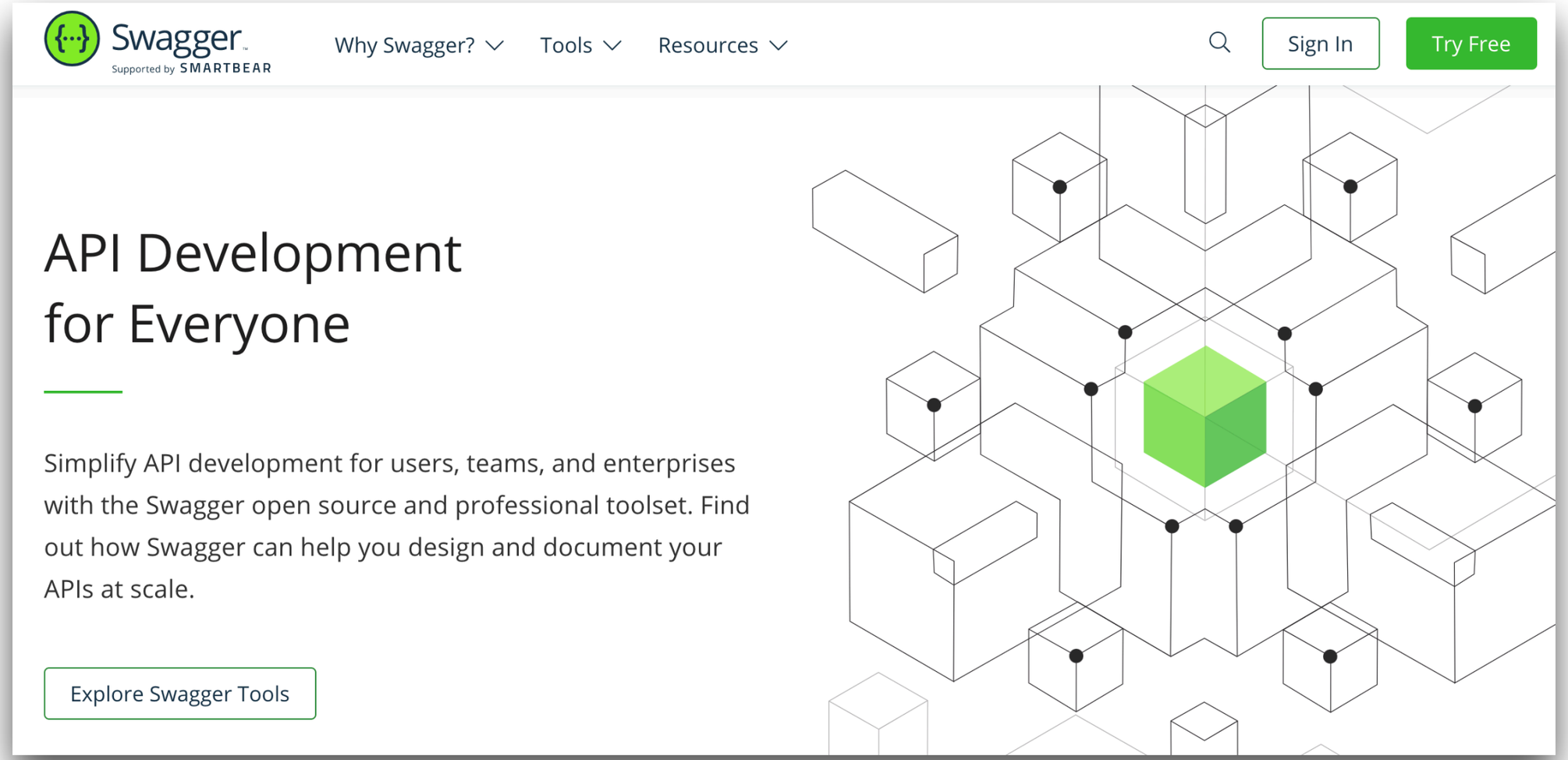
Add new item
Get an item by ID
Get all items
Update an existing item
Delete an item

Design your APIs

API	Description	Request body	Response body
GET /api/item	Get all items	None	List of item
GET /api/item/{id}	Get an item by ID	None	Item
POST /api/item	Add a new item	Item	Item
PUT /api/item/{id}	Update an existing item	Item	None
DELETE /api/item/{id}	Delete an item	None	None

Try to create API Document

Using swagger



https://swagger.io/

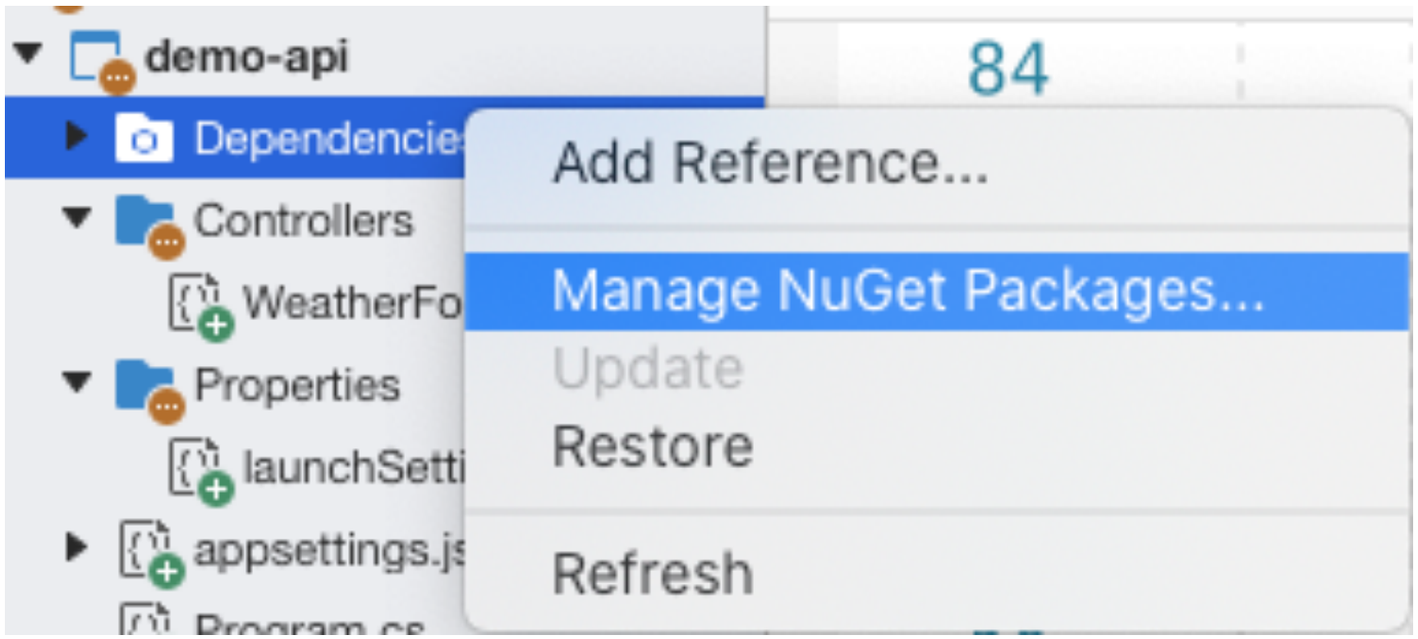
Swagger in .Net Core

Swashbuckle

NSwag

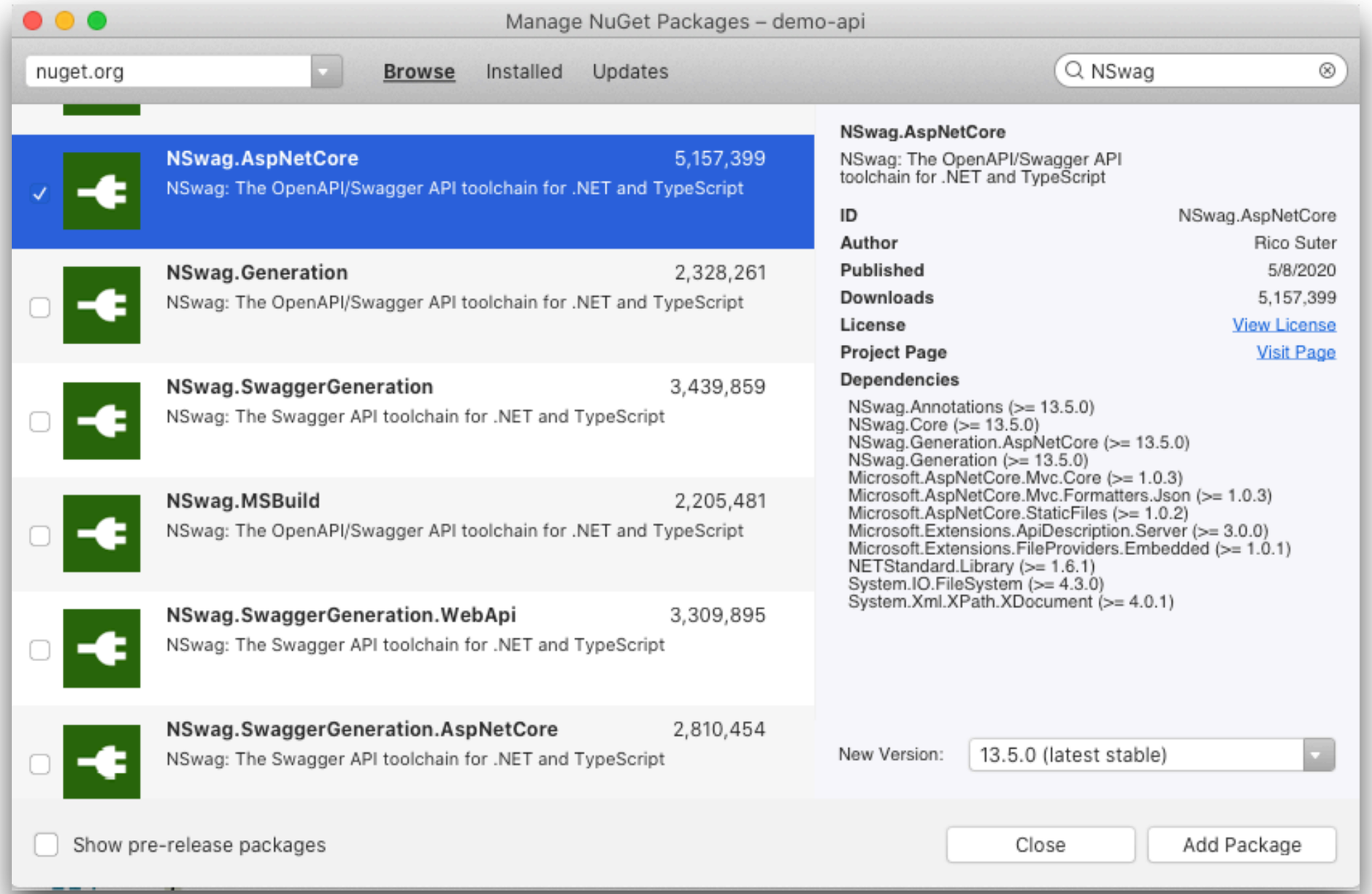
Install NSwag

Go to Package Manager Console
Or Manage NuGet Package



Install NSwag

Manage NuGet Package



Config swagger middleware

Startup.cs

```
public void ConfigureServices(IServiceCollection services)
{
    services.AddControllers();
    services.AddSwaggerDocument();
}
```

```
public void Configure(IApplicationBuilder app, IWebHostEnvirc
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }

    app.UseOpenApi();
    app.UseSwaggerUi3();
```

Swagger UI

https://localhost:5001/swagger

Swagger
Supported by SMARTBEAR

Select a definition v1

My Title 1.0.0

[Base URL: localhost:5001]
/swagger/v1/swagger.json

Schemes
HTTPS

WeatherForecast

GET /WeatherForecast

GET /WeatherForecast/async

GET /type1

GET /WeatherForecast/action/result

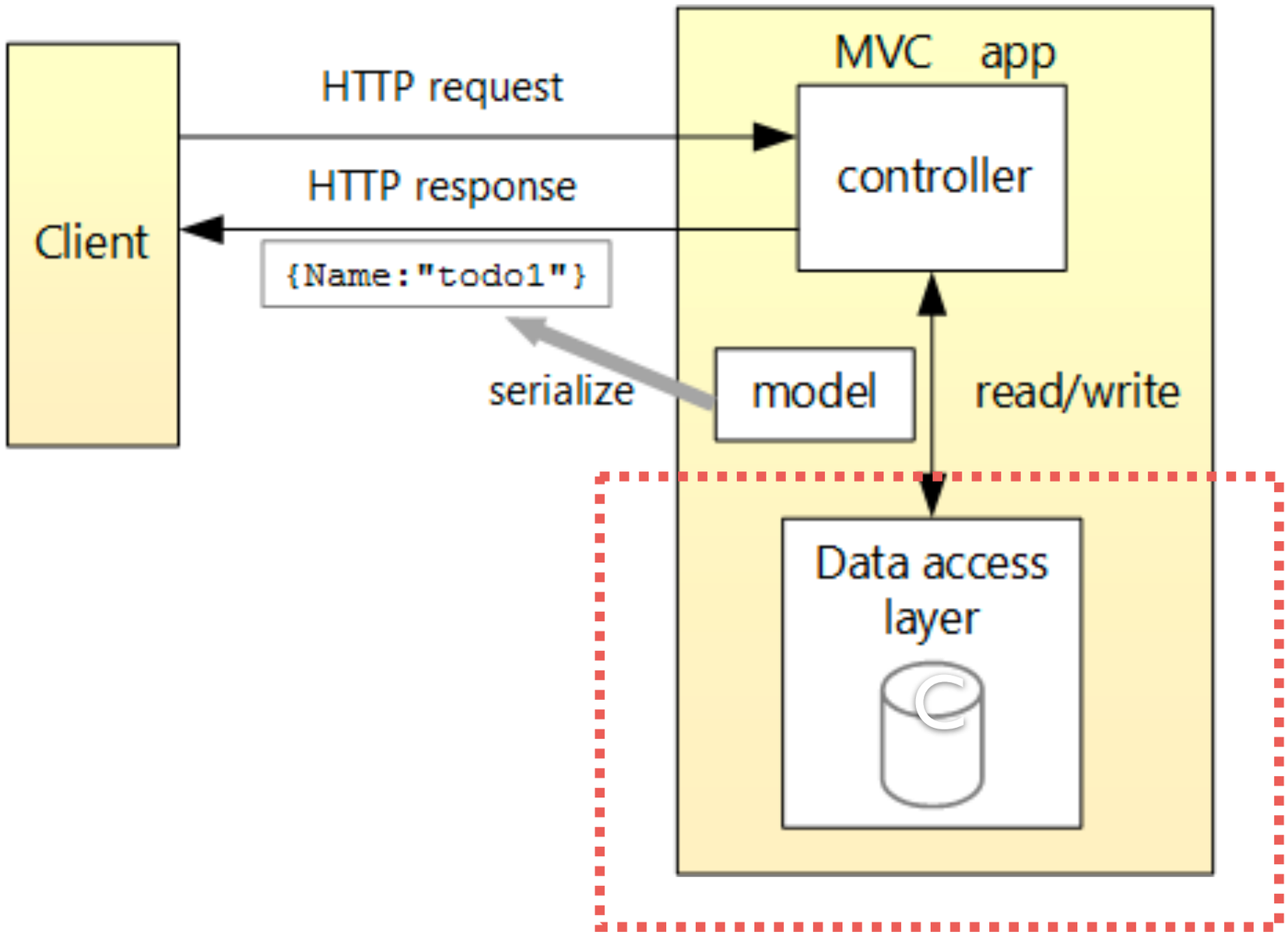
GET /WeatherForecast/action/result2

Swagger specification

https://localhost:5001/swagger/v1/swagger.json

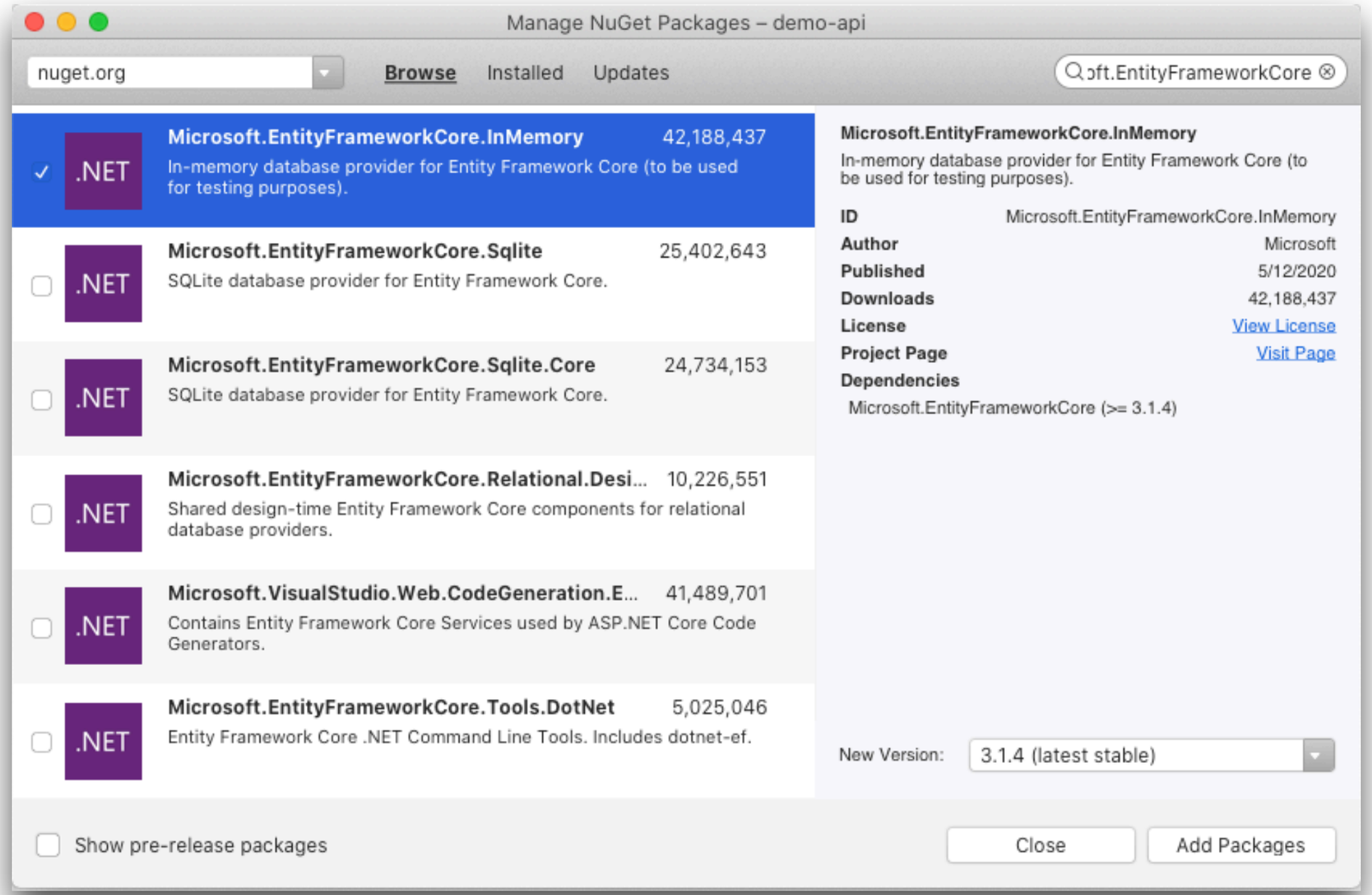

```
{
  "x-generator": "NSwag v13.5.0.0 (NJsonSchema v10.1.15.0 (Newtonsoft.Json v9.0.0.0))"
  "swagger": "2.0",
  "info": {
    "title": "My Title",
    "version": "1.0.0"
  },
  "host": "localhost:5001",
  "schemes": [
    "https"
  ],
  "produces": [
    "text/plain",
    "application/json",
    "text/json"
  ],
  "paths": {
    "/WeatherForecast": {
      "get": {
        "tags": [
          "WeatherForecast"
        ],
```


Develop you APIs



Install Microsoft.EntityFrameworkCore

Use In-memory database



Access data from Database

Model class of Table in database
Config database context to project
Generate controller

Table Item

Create class **Item.cs**

```
public class Item
{
    public long Id { get; set; }
    public string Name { get; set; }
    public bool IsComplete { get; set; }
}
```

Create database context

Create class **ItemContext.cs**

```
public class ItemContext : DbContext
{
    public ItemContext(DbContextOptions<ItemContext> options)
        : base(options)
    {
    }

    public DbSet<Item> Items { get; set; }
}
```

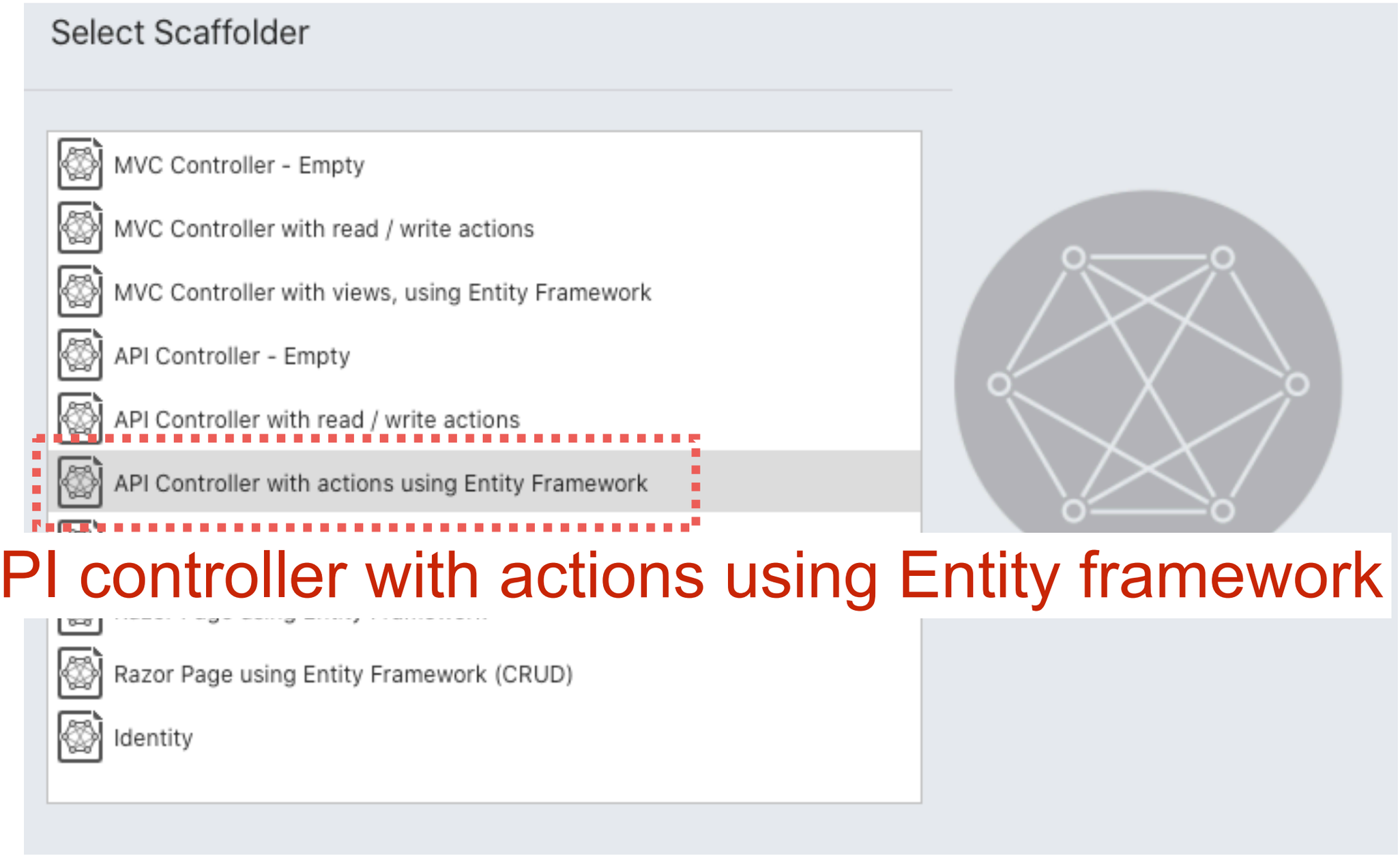
Config database context

In class Startup.cs

```
using Microsoft.Extensions.Hosting;
using Microsoft.EntityFrameworkCore;

namespace demo_api
{
    public class Startup
    {
        public Startup(IConfiguration configuration)...

        public IConfiguration Configuration { get; }

        public void ConfigureServices(IServiceCollection services)
        {
            services.AddDbContext<ItemContext>(opt =>
                opt.UseInMemoryDatabase("DemoProject"));

            services.AddControllers();
            services.AddSwaggerDocument();
        }
```

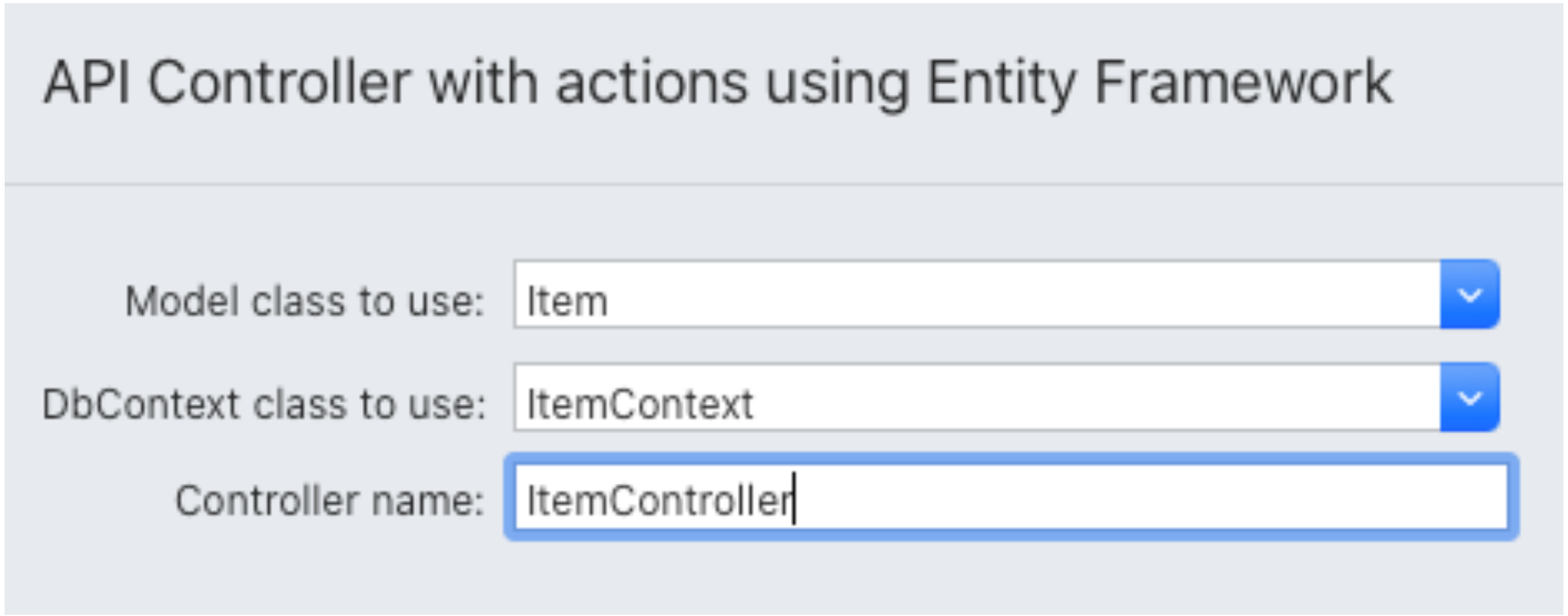
Generate controller

Select Add -> New Scaffold



API controller with actions using Entity framework

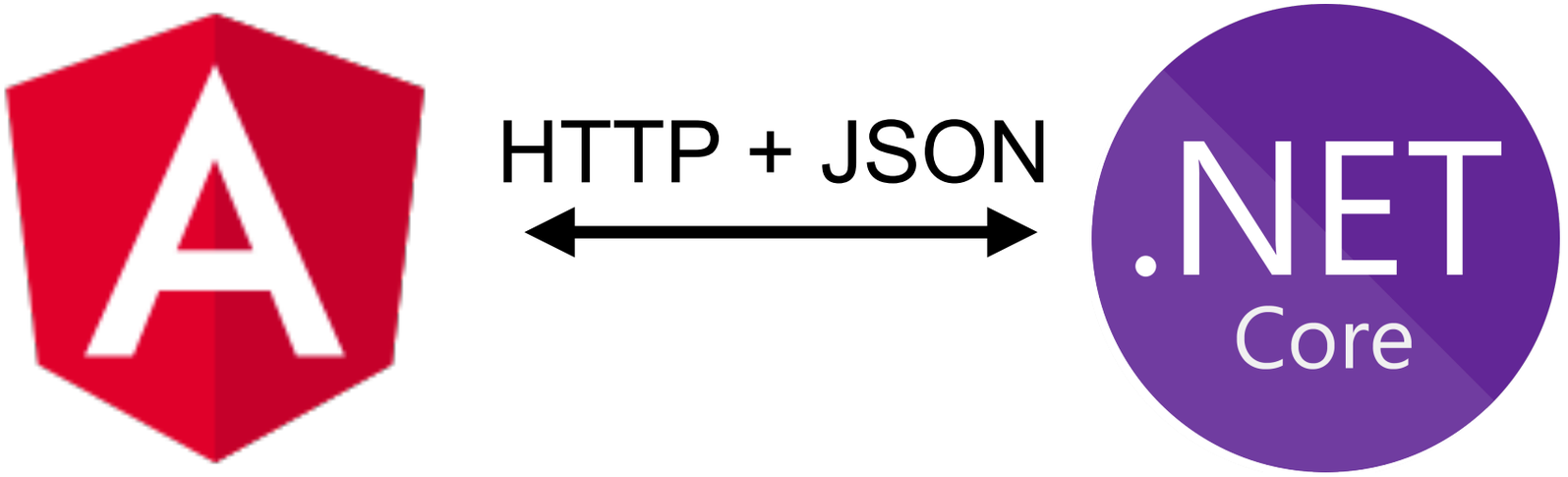
Generate controller



Testing with Postman

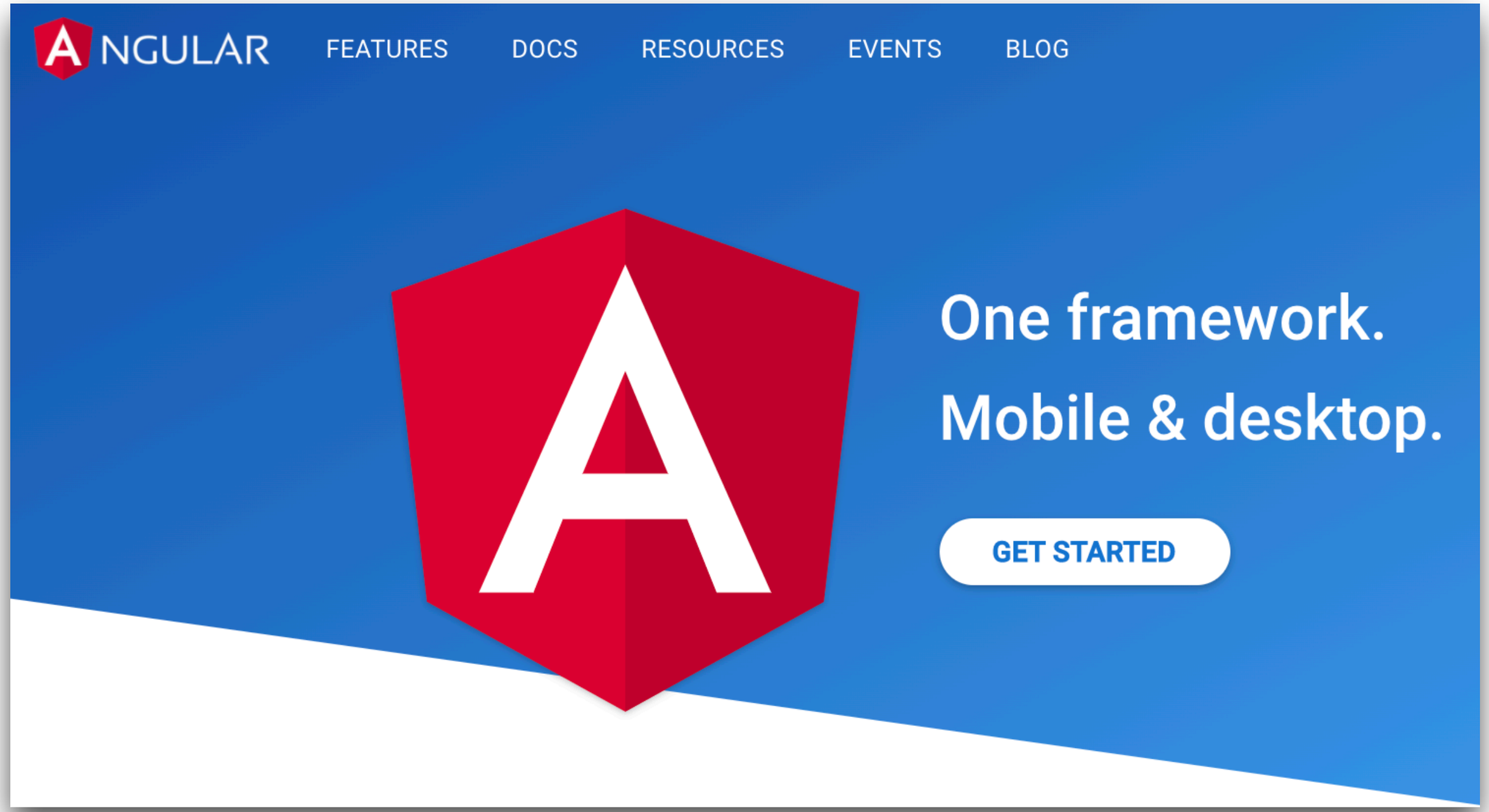
https://www.postman.com/

Web + API



Working with Angular 9

Angular



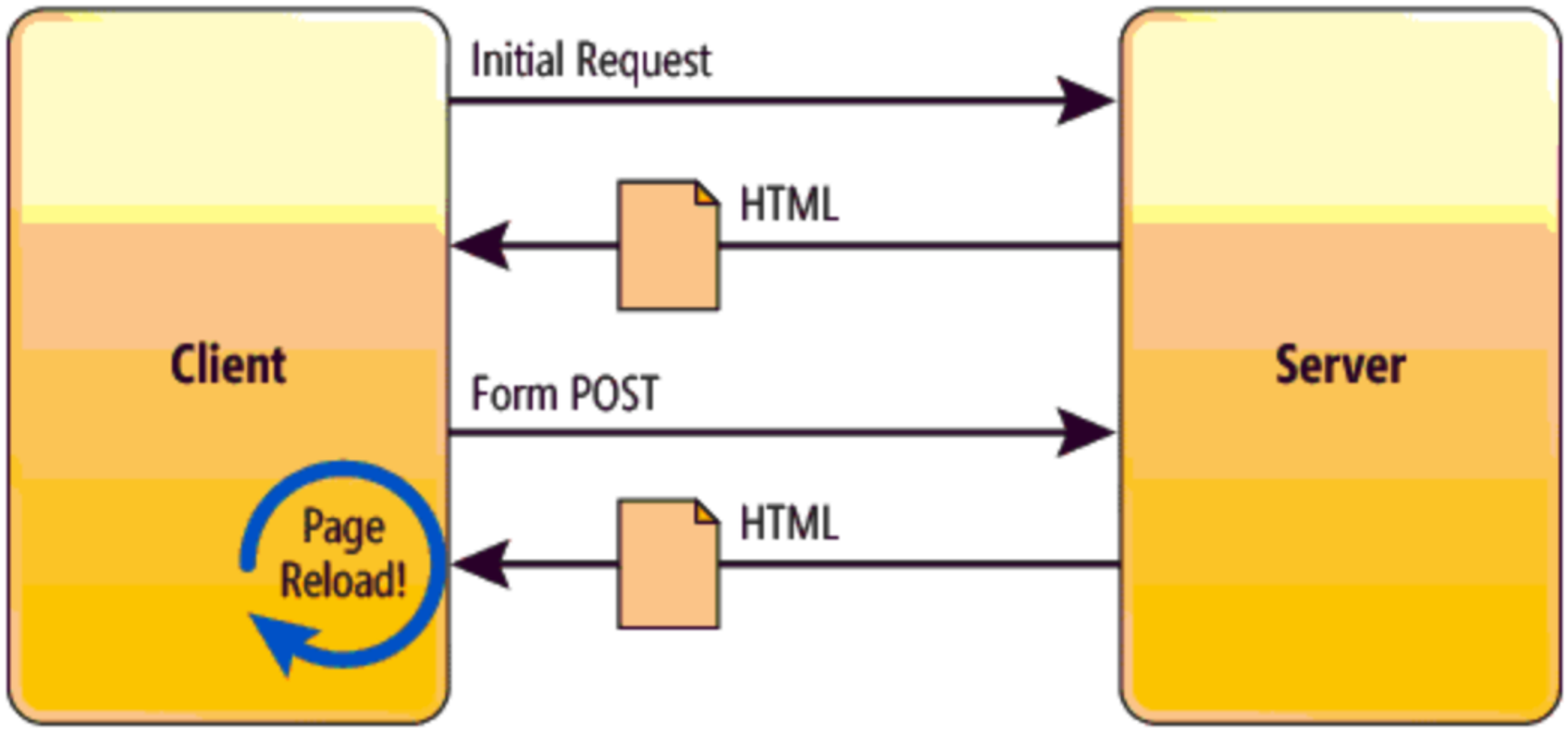
https://angular.io/

Angular

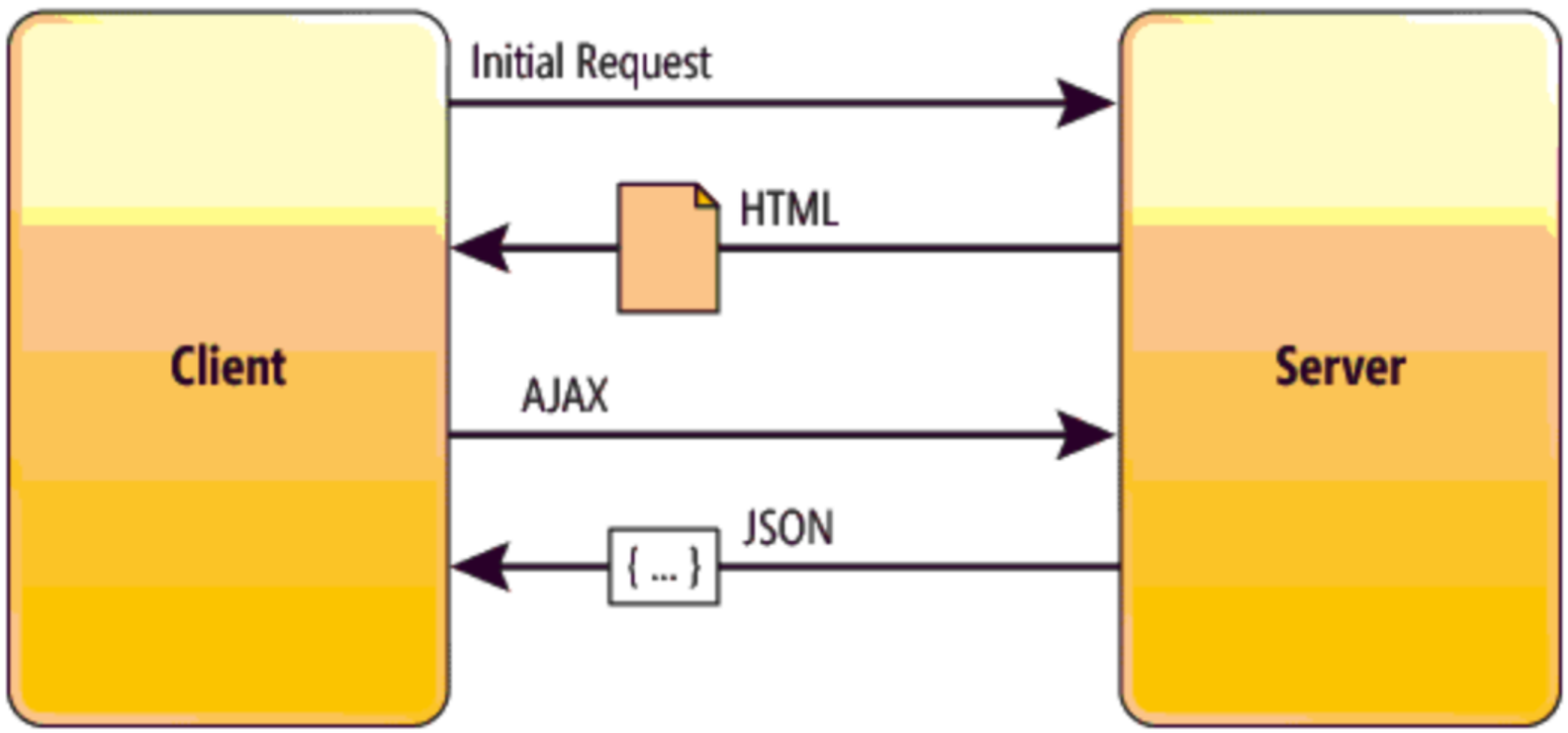
JavaScript framework with allows us to create reactive **Single Page Application** (SPA)

https://angular.io/

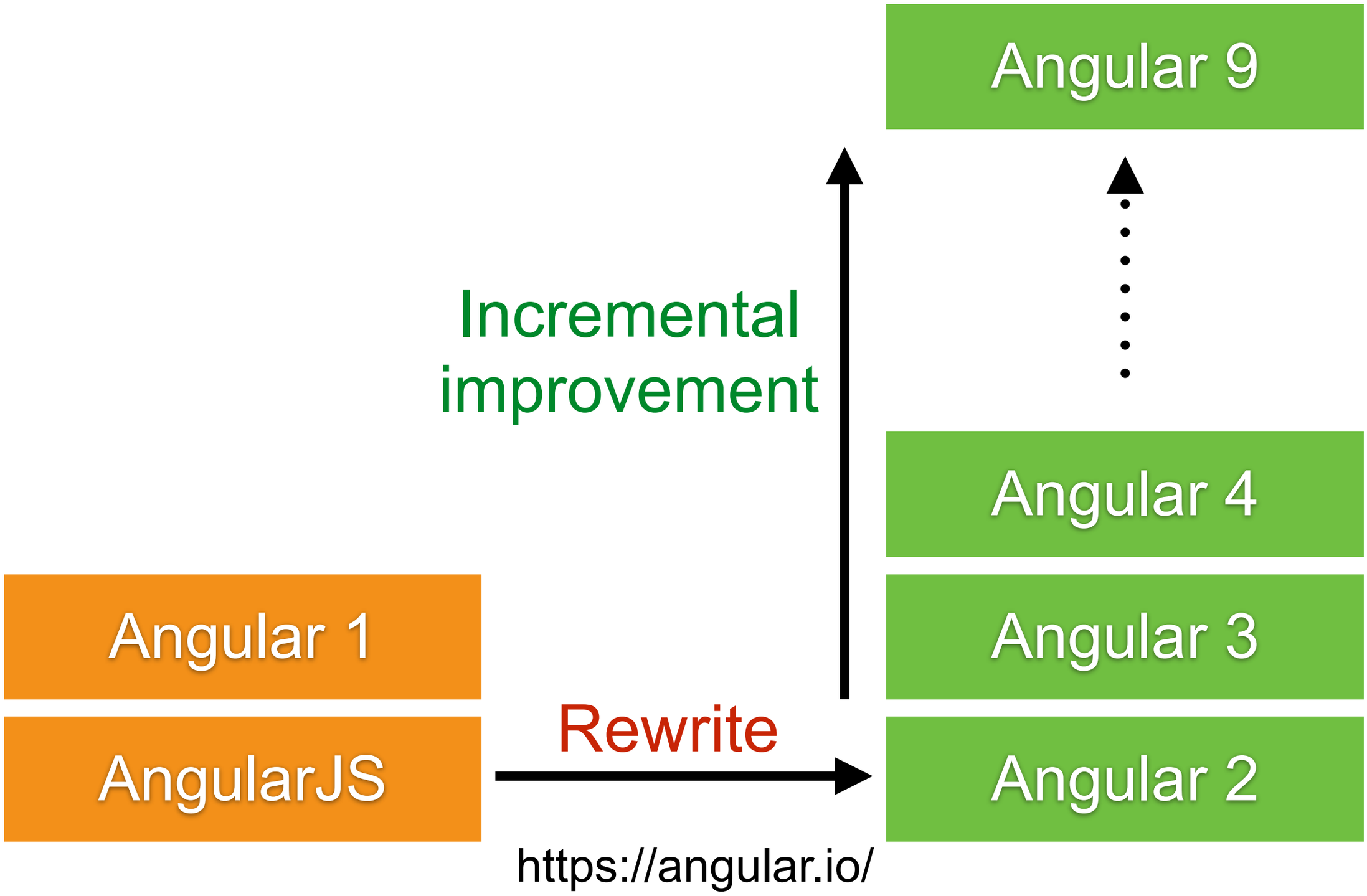
Traditional



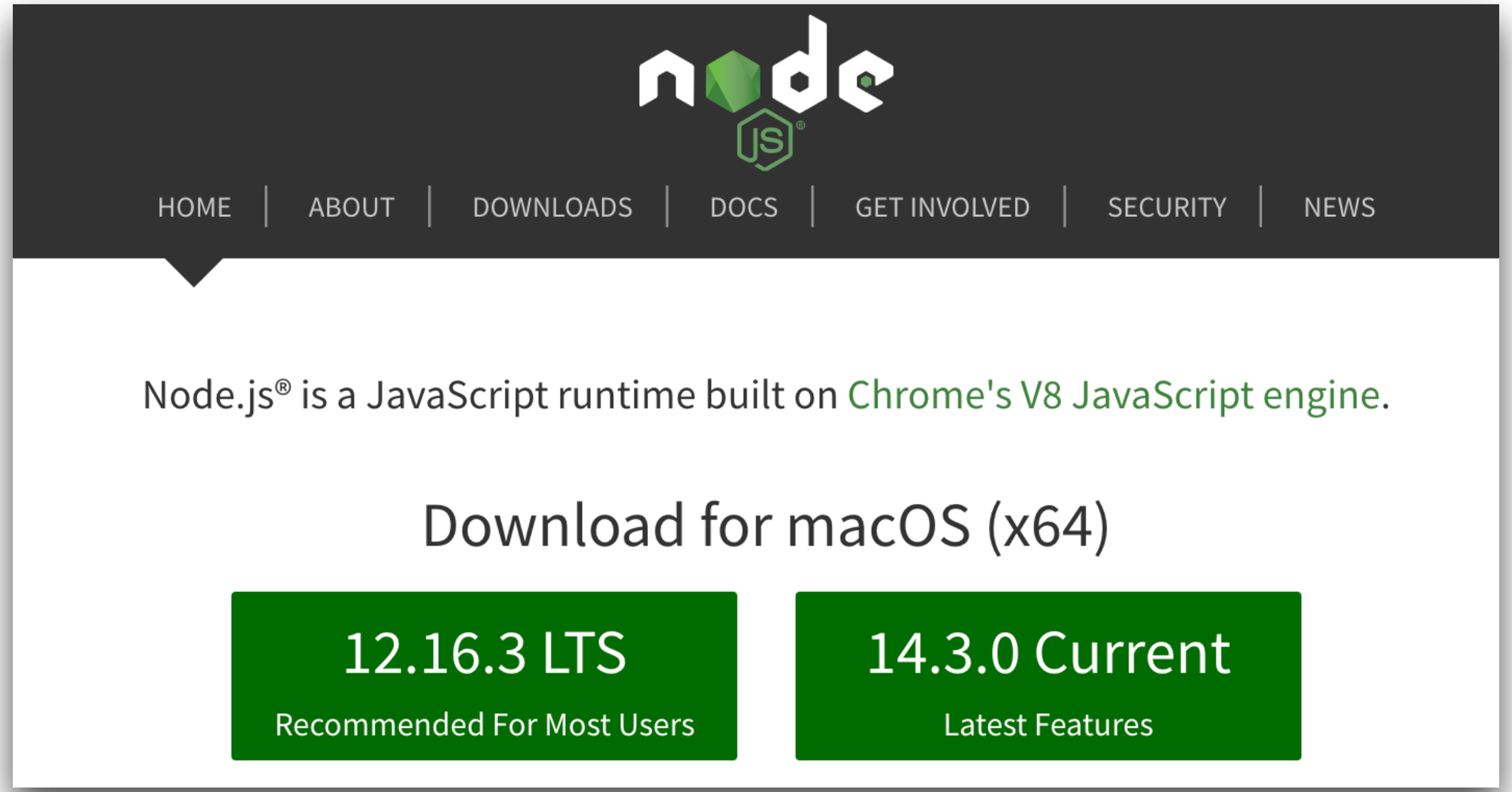
Single Page Application



History of Angular

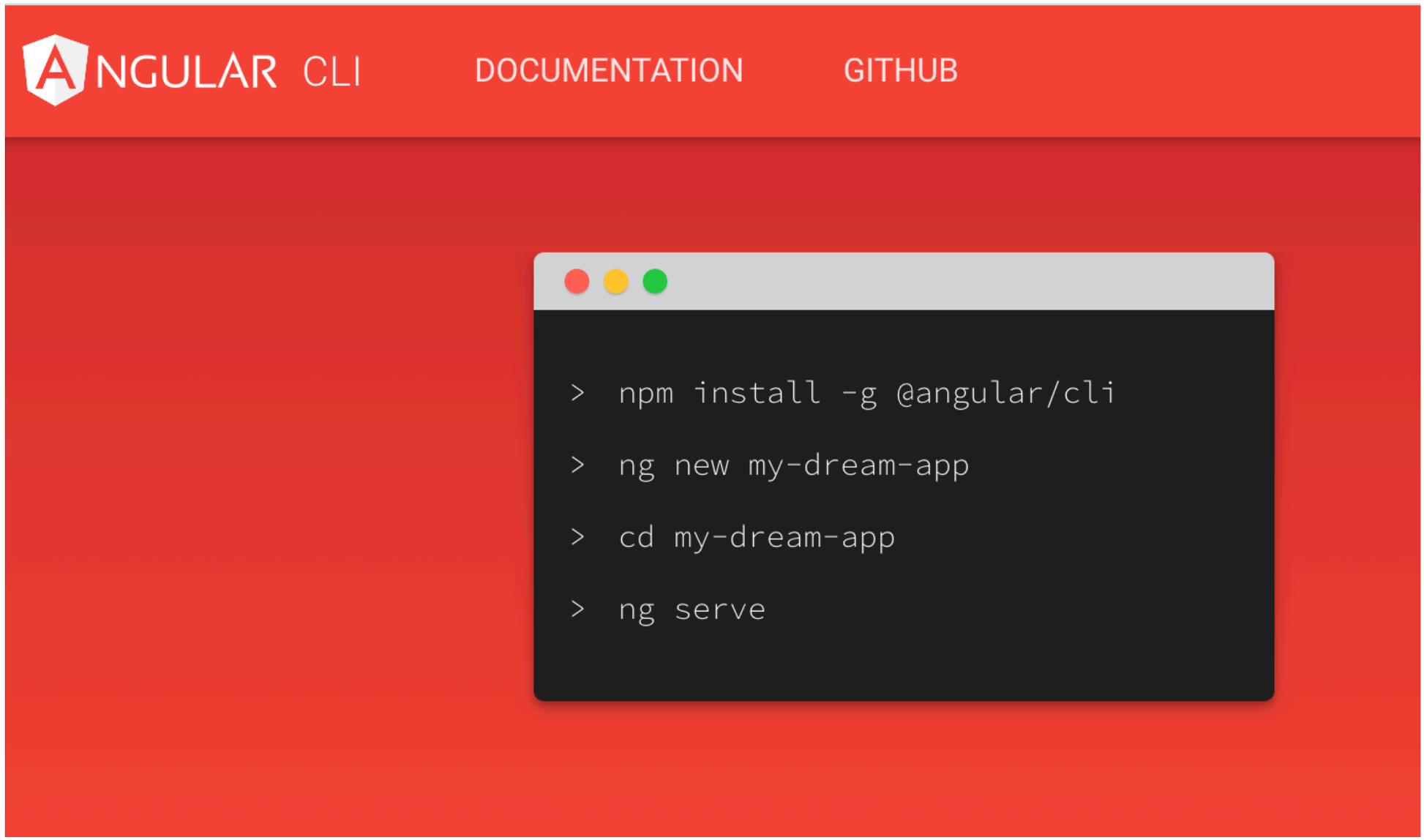


Software requirement



https://nodejs.org/en/

Create project with Angular CLI



https://cli.angular.io/

Create new project

$ng new hello-app

```
CREATE hello-app/README.md (1025 bytes)
CREATE hello-app/angular.json (3575 bytes)
CREATE hello-app/package.json (1313 bytes)
CREATE hello-app/tsconfig.json (384 bytes)
CREATE hello-app/tslint.json (2805 bytes)
CREATE hello-app/.editorconfig (245 bytes)
CREATE hello-app/.gitignore (503 bytes)
CREATE hello-app/src/environments/environment.prod.ts (51 bytes)
CREATE hello-app/src/environments/environment.ts (631 bytes)
CREATE hello-app/src/favicon.ico (5430 bytes)
CREATE hello-app/src/index.html (295 bytes)
```

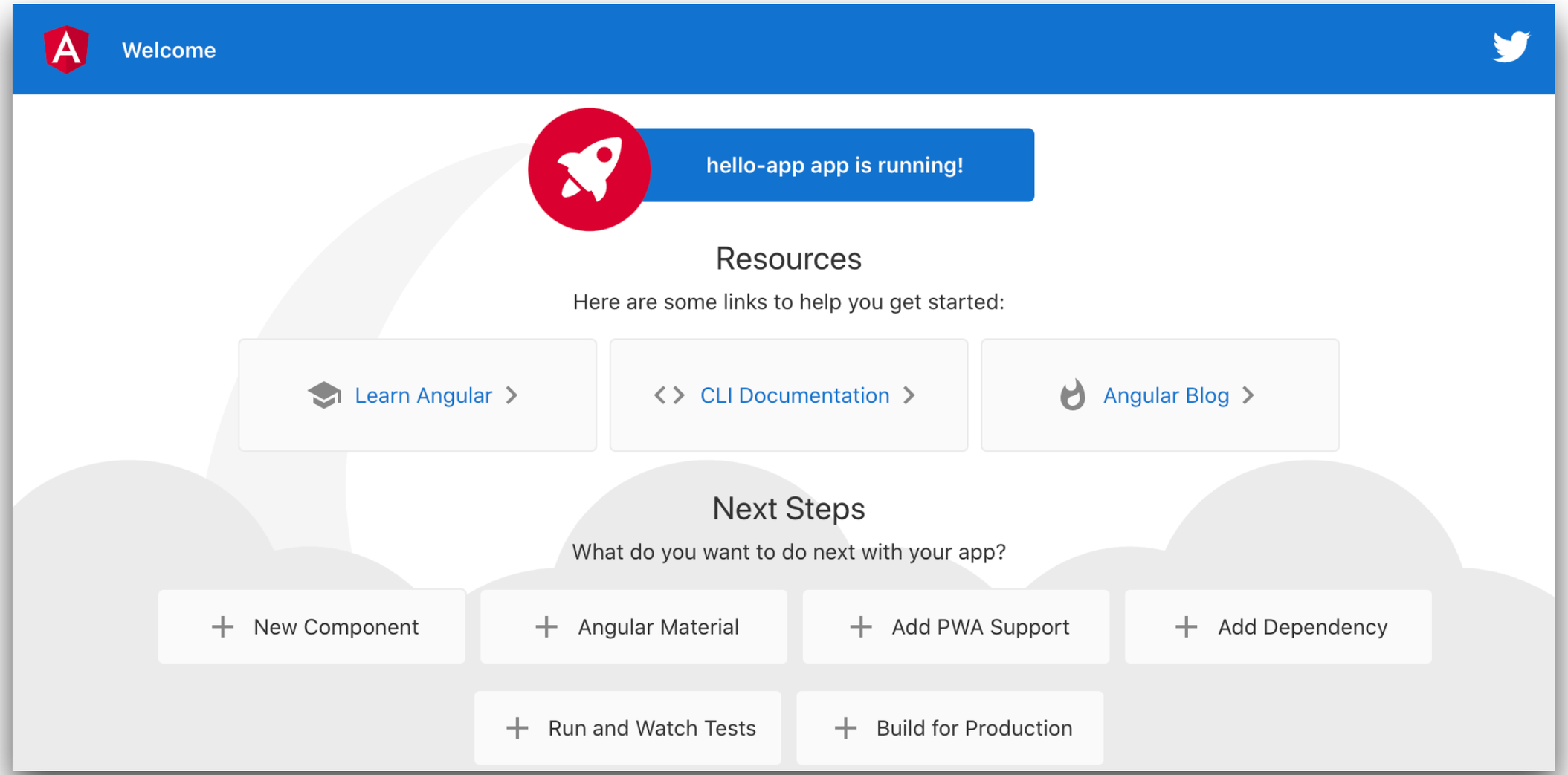
Run project

$cd hello-app
$ng serve

```
** Angular Live Development Server is listening on localhost:4200, open your bro

Date: 2018-07-19T17:42:59.617Z
Hash: cf107798cf25722bc556
Time: 22285ms
chunk {main} main.js, main.js.map (main) 10.7 kB [initial] [rendered]
chunk {polyfills} polyfills.js, polyfills.js.map (polyfills) 227 kB [initial] [r
chunk {runtime} runtime.js, runtime.js.map (runtime) 5.22 kB [entry] [rendered]
chunk {styles} styles.js, styles.js.map (styles) 15.6 kB [initial] [rendered]
chunk {vendor} vendor.js, vendor.js.map (vendor) 3.06 MB [initial] [rendered]
i ｢wdm｣: Compiled successfully.
```

Open in browser

http://localhost:4200/



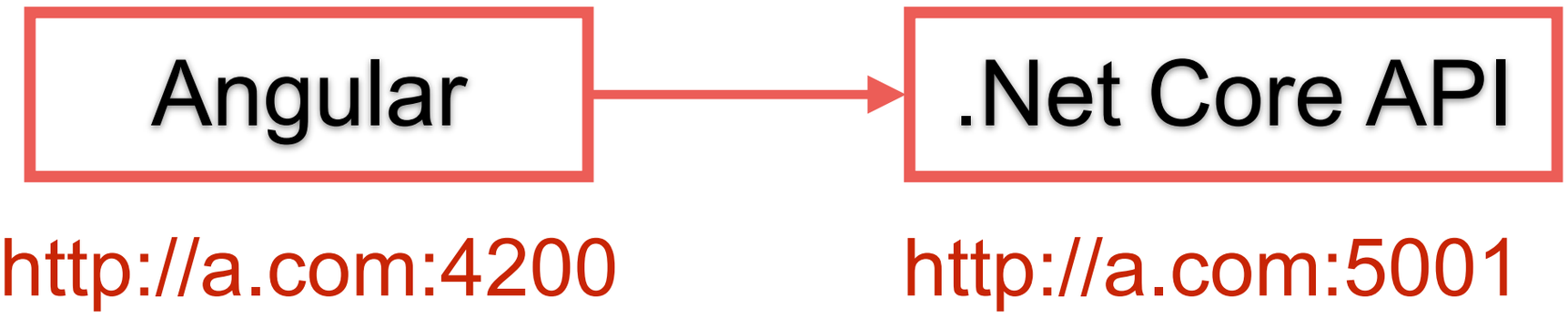
Call .Net Core API with service

Create APIService.ts

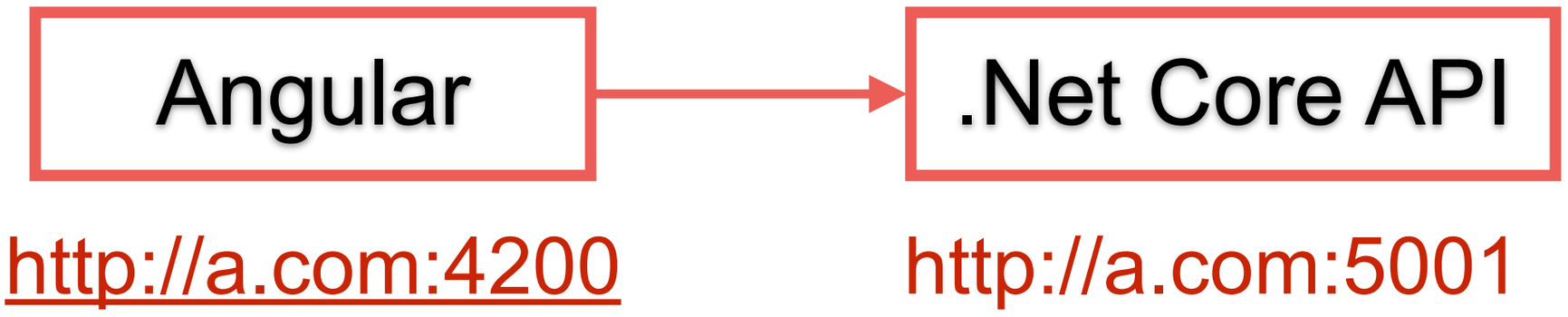
```
constructor(private http: HttpClient) { }

httpOptions = {
  headers: new HttpHeaders({
    'Content-Type': 'application/json'
  })
};

GetAll(): Observable<Weather> {
  return this.http.get<Weather>(this.baseurl + '/weatherforecast')
  .pipe(
    retry(1),
    catchError(this.errorHandler)
  );
}
```

https://github.com/up1/demo-angular-9-http

Call .Net Core API



Call .Net Core API

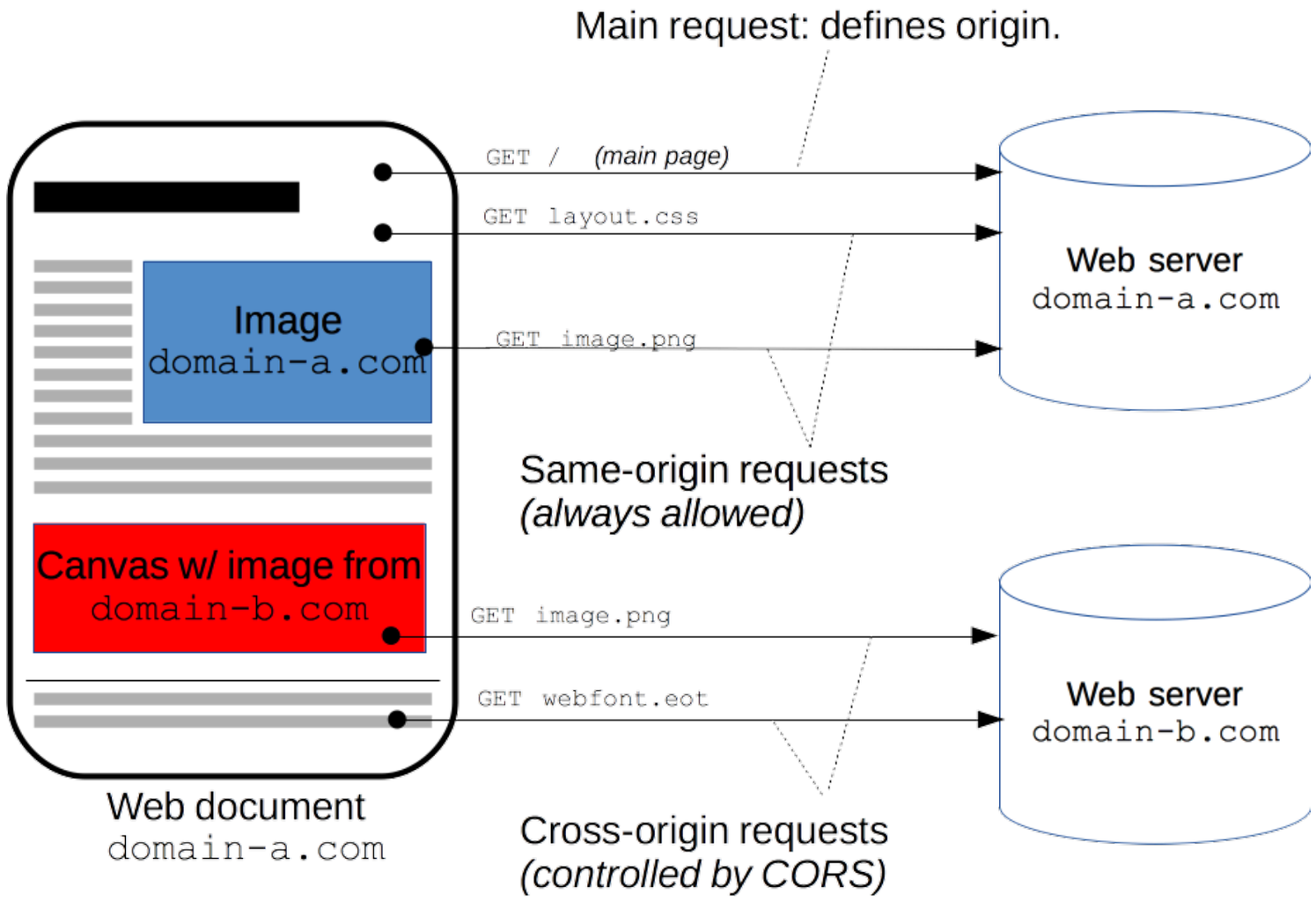



```
Access to XMLHttpRequest at 'https://localhost:5001/weatherfo localhost/:1
recast' from origin 'http://localhost:4200' has been blocked by CORS
policy: No 'Access-Control-Allow-Origin' header is present on the
requested resource.
```

https://docs.microsoft.com/en-us/aspnet/core/security/cors

CORS

Cross-Origin Resource Sharing



https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS

Using reverse proxy

Enable CORS in .Net Core

Middleware
Endpoint routing
EnableCors attribute

https://docs.microsoft.com/en-us/aspnet/core/security/cors

Add CORS middleware

In Startup.cs

Allow only from specified source

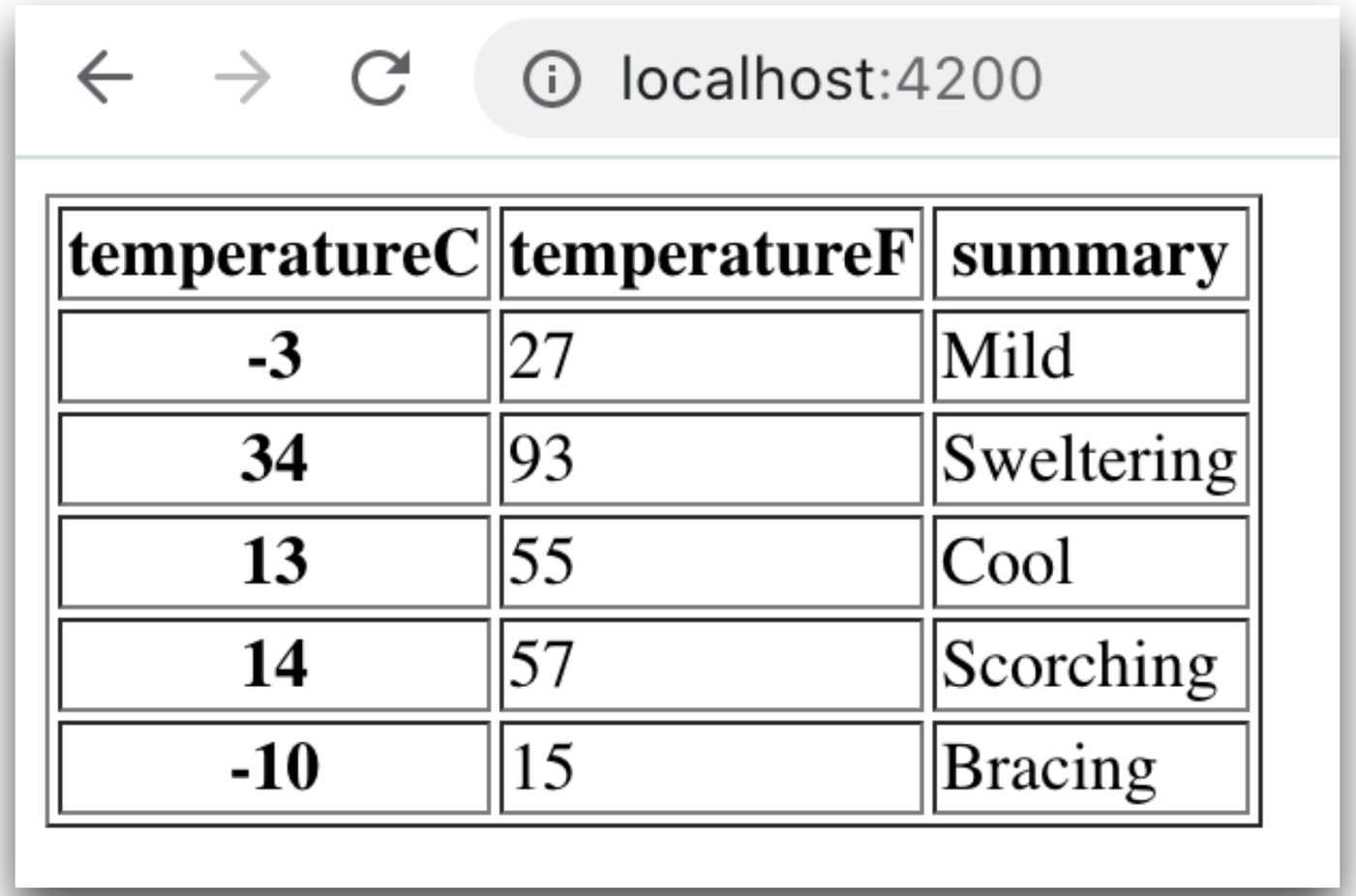
```
public void ConfigureServices(IServiceCollection services)
{
    services.AddCors(options =>
    {
        options.AddDefaultPolicy(
            builder =>
            {
                builder.WithOrigins("http://localhost:4200");
            });
    });

    services.AddControllers();
}
```

Add CORS middleware

In Startup.cs

```
public void Configure(IApplicationBuilder app, IWebHostEnvironment env)
{
    if (env.IsDevelopment())
    {
        app.UseDeveloperExceptionPage();
    }

    app.UseHttpsRedirection();

    app.UseRouting();

    app.UseCors();

    app.UseAuthorization();

    app.UseEndpoints(endpoints =>
    {
        endpoints.MapControllers();
    });
}
```

Restart API and see result



https://github.com/up1/demo-angular-9-http

Workshop JWT with .Net Core API

JWT

JSON Web **Token**

Every JWT Token has 3 parts

Header, Payload and Signature

https://jwt.io/

JWT

JSON Web Token

HEADER

ALGORITHM
& TOKEN TYPE

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

+

PAYLOAD

DATA

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "admin": true
}
```

+

SIGNATURE

VERIFICATION

```
HMACSHA256(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),secretKey)
```

NORDICAPIS.COM

1. Header

Algorithm use for signing the token
Type = JWT

2. Payload

Contains claims which required by application

3. Signature

Encode of header
Encode of payload
Secret
Algorithm in header

Make sure that token was not changed along the way in header

Every parts are **Based64** URL encoded

ALGORITHM HS256

Encoded PASTE A TOKEN HERE

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJ
zdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4
gRG9lIiwiaWF0IjoxNTE2MjM5MDIyfQ.SflKxwRJ
SMeKKF2QT4fwpMeJf36POk6yJV_adQssw5c
```

Separate by dot (.)

Decoded EDIT THE PAYLOAD AND SECRET

HEADER: ALGORITHM & TOKEN TYPE

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

PAYLOAD: DATA

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "iat": 1516239022
}
```

VERIFY SIGNATURE

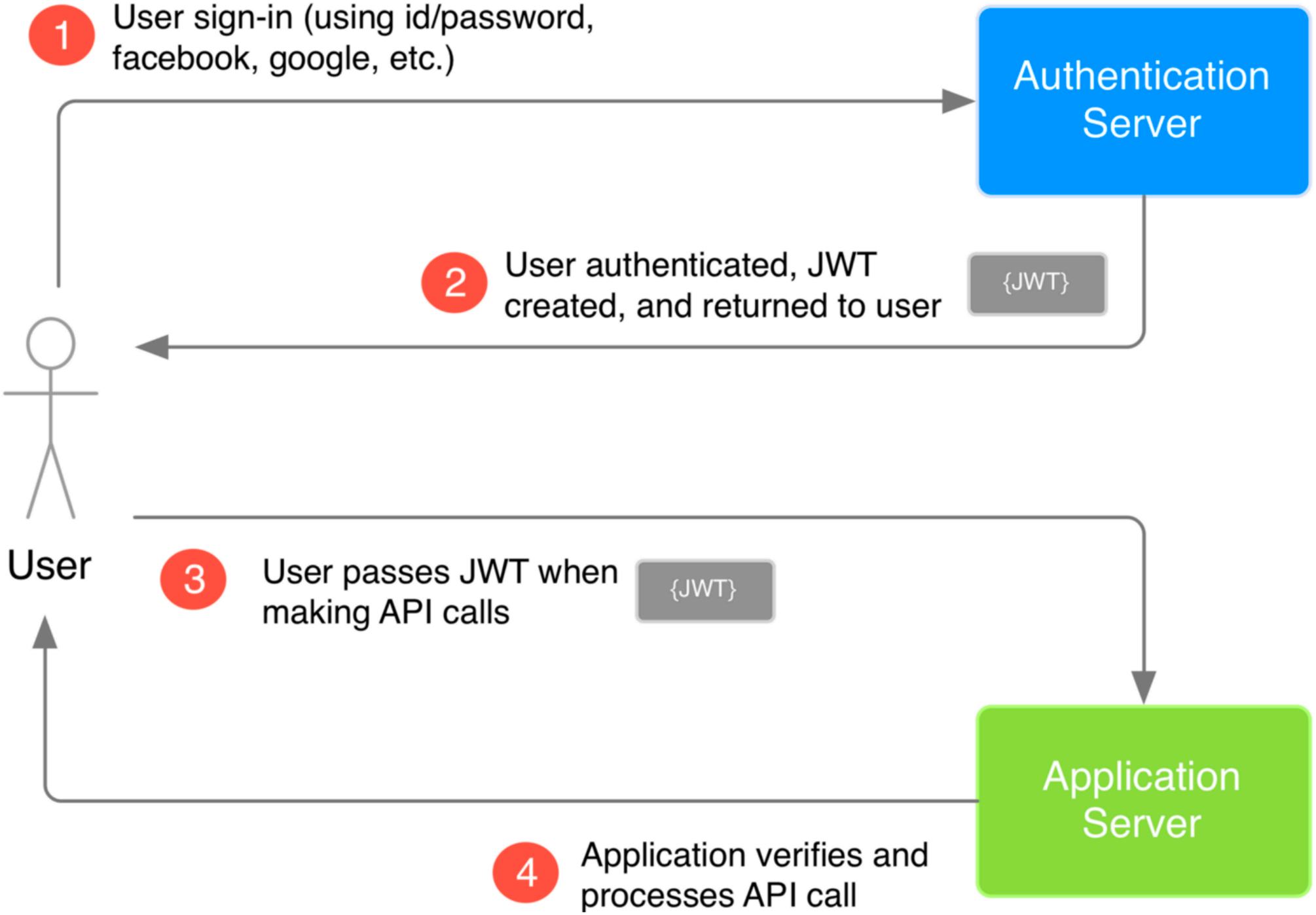
```
HMACSHA256(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),
  your-256-bit-secret
) secret base64 encoded
```

Signature Verified

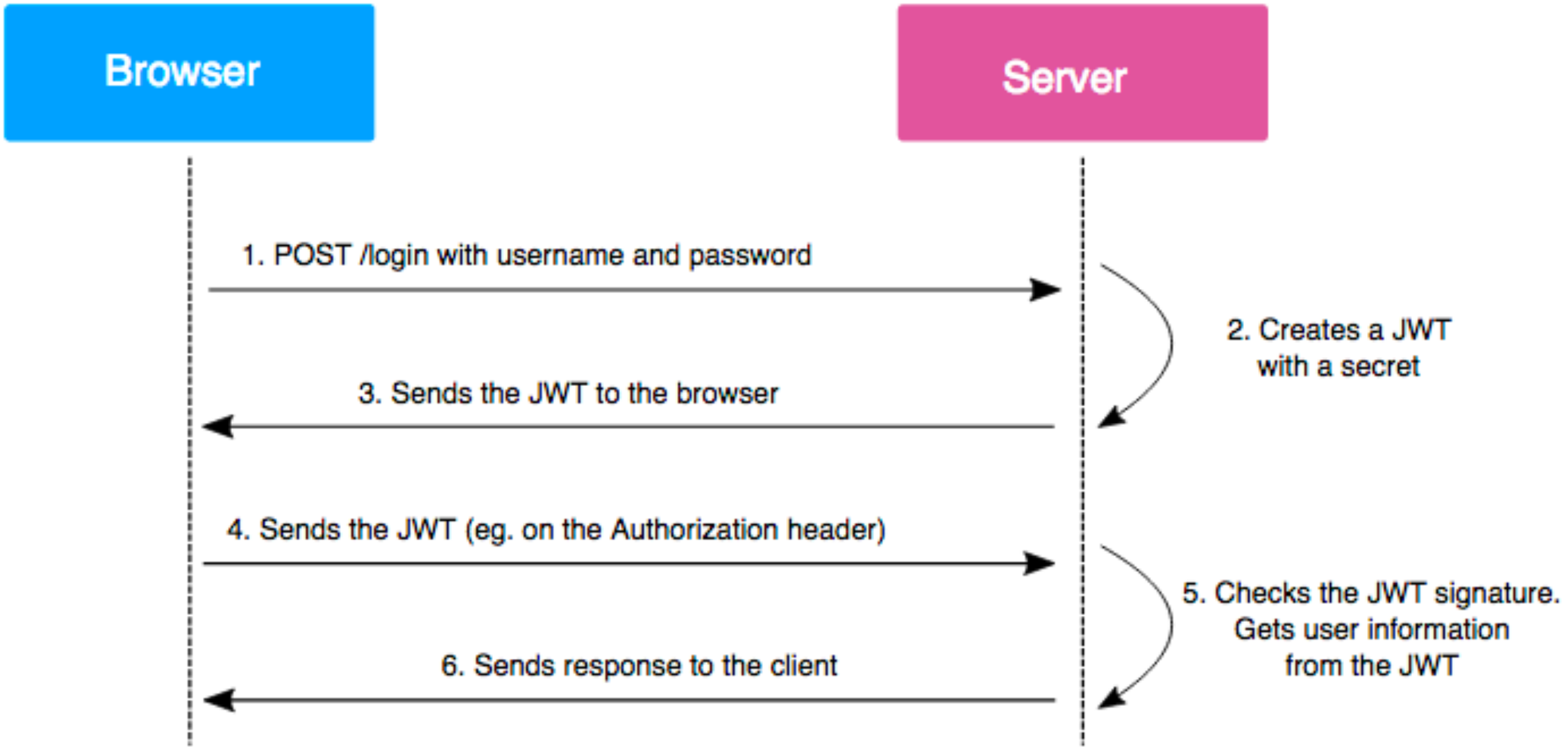
SHARE JWT

https://jwt.io/

Flow of JWT

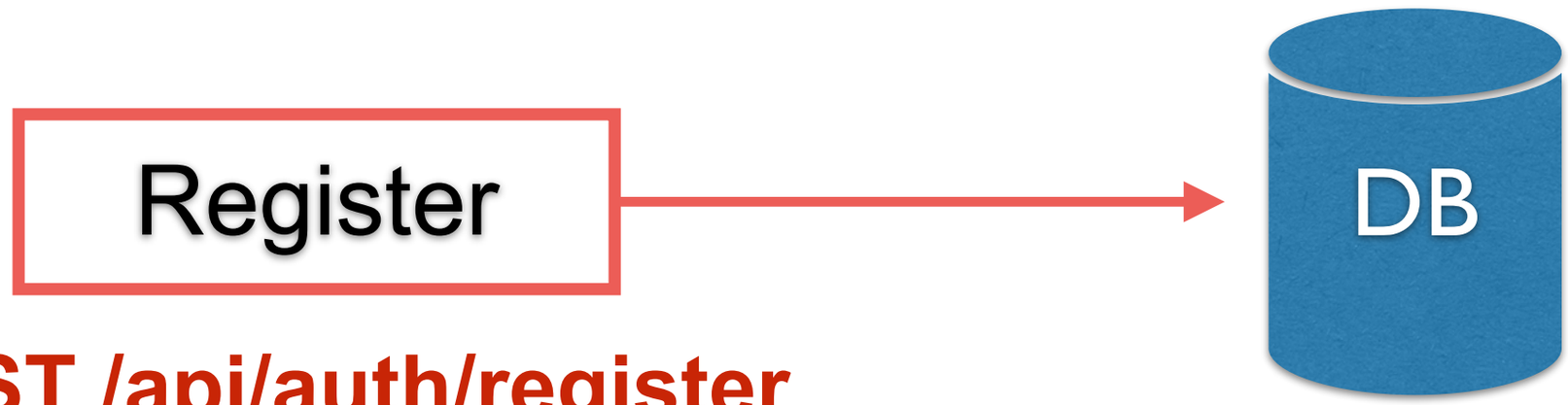


Flow of JWT



Step 1

Create/register new user with user and password



POST /api/auth/register

name=demo

password=pass

In-memory database

Table = AppUser

name

password

Add Package from NuGet

Microsoft.EntityFrameworkCore
Microsoft.EntityFrameworkCore.InMemory
Microsoft.AspNetCore.Identity.EntityFrameworkCore
System.IdentityModel.Tokens.Jwt
Microsoft.AspNetCore.Authentication.JwtBearer

Models/AppUser.cs

```
public class AppUser : IdentityUser
{
    public string Name { get; set; }
    public string Password { get; set; }
}
```

Data/ApplicationDbContext.cs

```
public class ApplicationDbContext : IdentityDbContext<AppUser>
{
    public ApplicationDbContext(
        DbContextOptions<ApplicationDbContext> options)
        : base(options)
    {
    }
}
```

Startup.cs

Using In-memory database

```
public void ConfigureServices(IServiceCollection services)
{
    // Use In-memory database
    services.AddDbContext<ApplicationDbContext>(config =>
    {
        config.UseInMemoryDatabase("MemoryBaseDataBase");
    });
```

Startup.cs

Add **Identity** and configuration

```
// Add Identity
services.AddIdentity<AppUser, IdentityRole>(config =>
{
    // User defined password policy settings.
    config.Password.RequiredLength = 4;
    config.Password.RequireDigit = false;
    config.Password.RequireNonAlphanumeric = false;
    config.Password.RequireUppercase = false;
})
    .AddEntityFrameworkStores<ApplicationDbContext>()
    .AddDefaultTokenProviders();
```

https://docs.microsoft.com/en-us/aspnet/core/security/authentication/identity

Startup.cs

Add JWT configuration

```
// Add JWT token
var jwtSection = Configuration.GetSection("JwtBearerTokenSettings");
services.Configure<JwtBearerTokenSettings>(jwtSection);
var jwtBearerTokenSettings = jwtSection.Get<JwtBearerTokenSettings>();
var key = Encoding.ASCII.GetBytes(jwtBearerTokenSettings.SecretKey);

services.AddAuthentication(options =>
{
    options.DefaultAuthenticateScheme = JwtBearerDefaults.AuthenticationScheme;
    options.DefaultChallengeScheme = JwtBearerDefaults.AuthenticationScheme;
})
.AddJwtBearer(options =>
{
    options.RequireHttpsMetadata = false;
    options.SaveToken = true;
    options.TokenValidationParameters = new TokenValidationParameters()
    {
        ValidIssuer = jwtBearerTokenSettings.Issuer,
        ValidAudience = jwtBearerTokenSettings.Audience,
        IssuerSigningKey = new SymmetricSecurityKey(key),
    };
});
```

Generated tables from Identity

Roles
RolesClaims
UserClaims
UserRoles
UserTokens

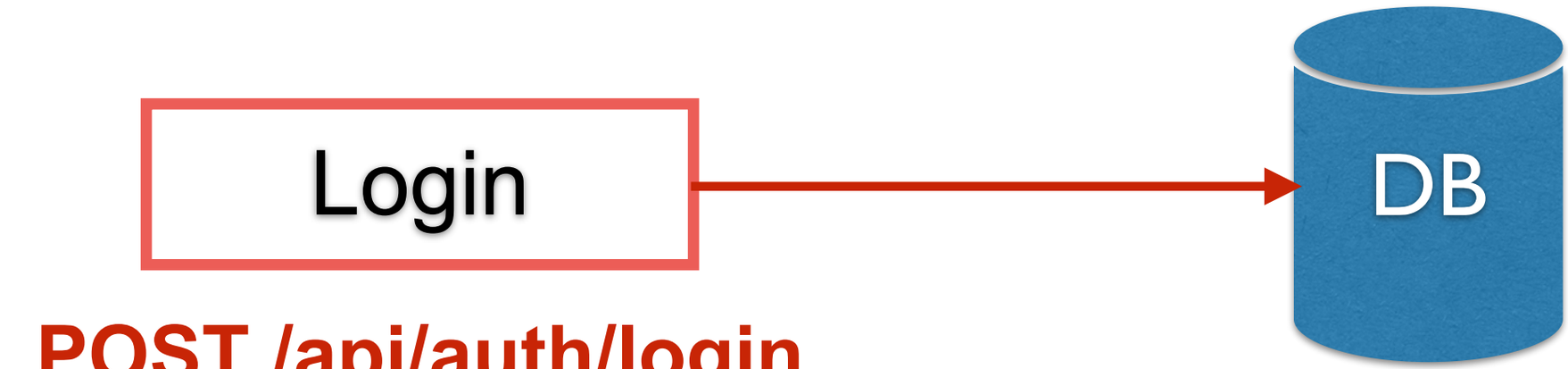
AuthController.cs

Register new user

```
[HttpPost]
[Route("register")]
public async Task<IActionResult> Register([FromBody] AppUser appUser)
{
    if (appUser == null)
    {
        return new BadRequestObjectResult(new { Message = "User validation failed" });
    }
    var newUser = new AppUser
    {
        Id = new Random().Next(1, 100).ToString(),
        Name = appUser.Name,
        UserName = appUser.Name,
        Password = appUser.Password,
        Email = appUser.Email
    };

    var result = await userManager.CreateAsync(newUser, appUser.Password);
    if(!result.Succeeded)
    {
        var dictionary = new ModelStateDictionary();
        foreach (IdentityError error in result.Errors)
```

Step 2

Login with user and password



POST /api/auth/login

name=demo

password=pass

Return JWT Token

In-memory database

Table = AppUser

name

password

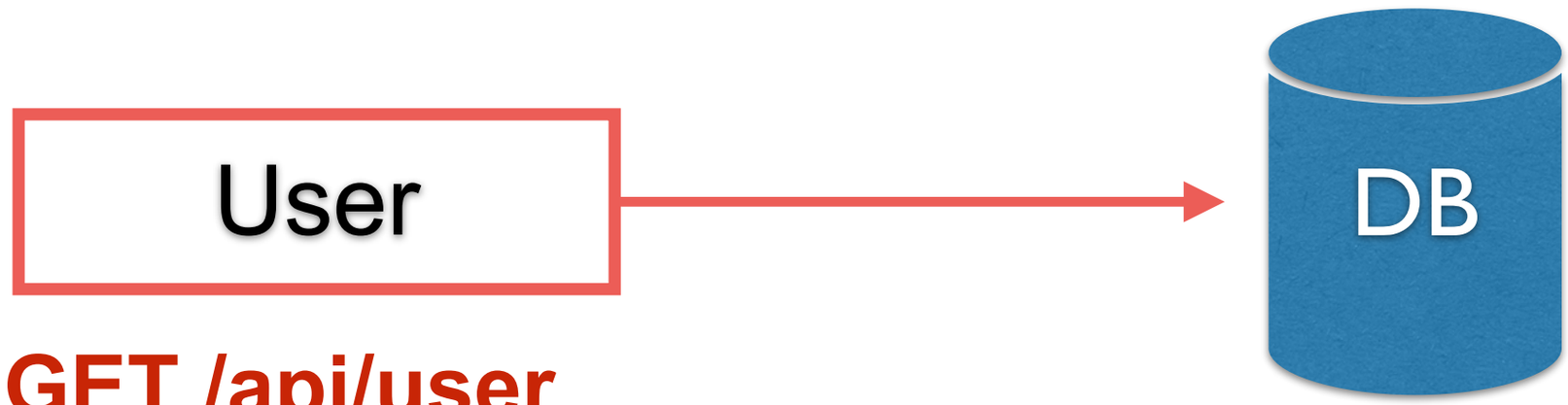
AuthController.cs

Login with user and password

```
[HttpPost]
[Route("login")]
public async Task<IActionResult> Login([FromBody] AppUser appUser)
{
    if (appUser == null)
    {
        return new BadRequestObjectResult(new { Message = "Login validate failed" });
    }

    var identityUser = await userManager.FindByNameAsync(appUser.Name);
    if(identityUser == null)
    {
        return new BadRequestObjectResult(new { Message = "User not found" });
    }

    var result = userManager.PasswordHasher.VerifyHashedPassword(identityUser, identityUser
    if(result == PasswordVerificationResult.Failed)
    {
        return new BadRequestObjectResult(new { Message = "Password incorrect" });
    }

    var token = GenerateToken(identityUser);
    return Ok(new { Token = token, Message = "Success" });
}
```

Step 3

Access to API with Token



GET /api/user

name=demo

password=pass

In-memory database

Table = AppUser

name

password

Call API with Token

3. Call service with token after login

Comments 0 | Examples 0

GET | https://localhost:5001/api/user | Send | Save

Params | Authorization | Headers (9) | Body | Pre-request Script | Tests | Settings | Cookies | Code

TYPE

Bearer Token

The authorization header will be automatically generated when you send the request. Learn more about authorization

Token {{data}}

Body | Cookies | Headers (4) | Test Results | Status: 200 OK | Time: 7 ms | Size: 177 B | Save Response

Pretty | Raw | Preview | Visualize | JSON

```
1 {
2     "message": "Pass authorized"
3 }
```

OAuth 2