.Net Core Fundamentals

Rookies Program for MS
04/2024

Agenda

- Introduction
- .NET Core Overview
- .NET Core Components
- .NET Standard
- ASP.NET Core Fundamentals
- Demo
- Dependency Injection

Problems of .NET

- Windows only
- Closed
- All or nothing monolithic framework
- 20 years old

.NET Core - The Future

- A general purpose development platform
- Cross-platform, supporting Windows, macOS and Linux
- Can be used in device, cloud, and embedded/IoT.

.NET Core Components

- A .NET Runtime – CoreCLR
- A set of Framework Libraries – CoreFX
- .NET Core SDK
- The ‘dotnet’ app host

ASP.NET vs ASP.NET Core – Main Differences

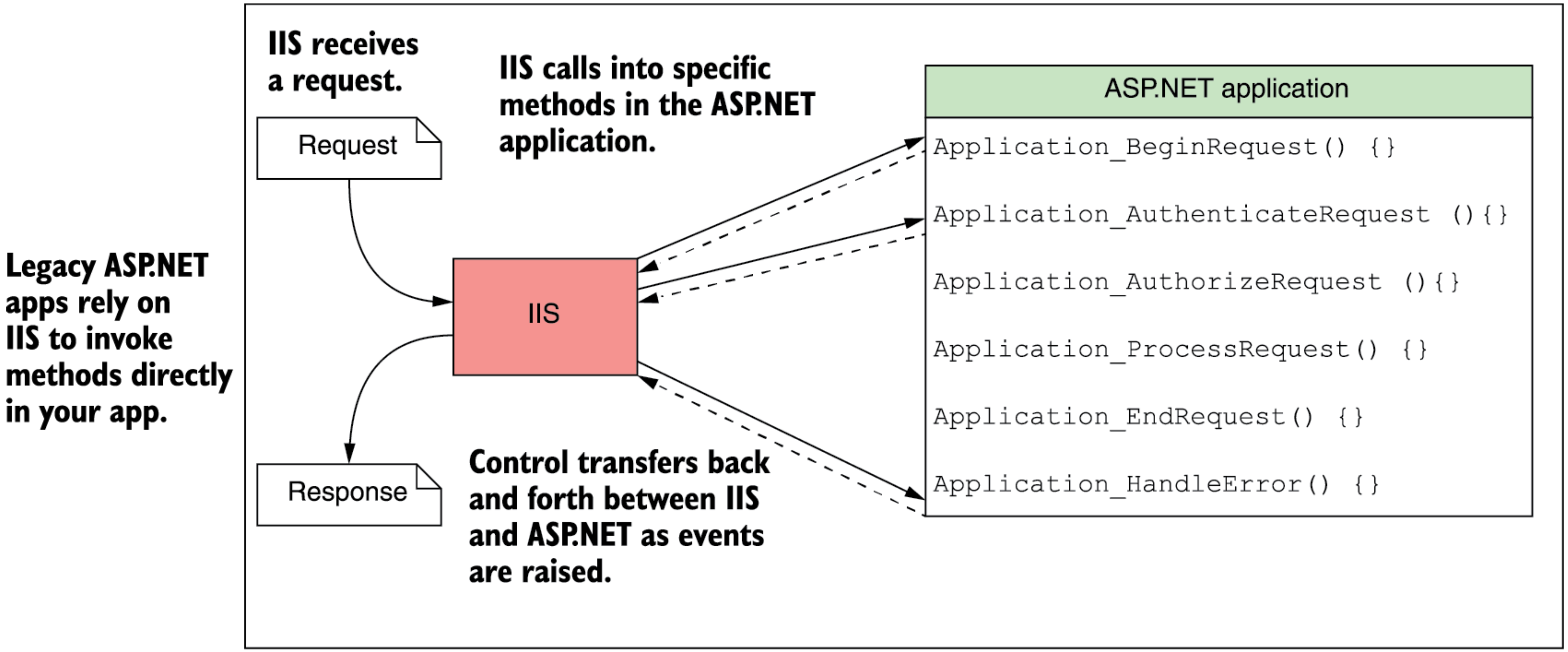
ASP.NET

- IIS, Windows only
- System.Web, Included all by default
- HTTP Modules, HTTP Handlers
- MVC + Web API + Web Pages
- Web.config

ASP.NET CORE

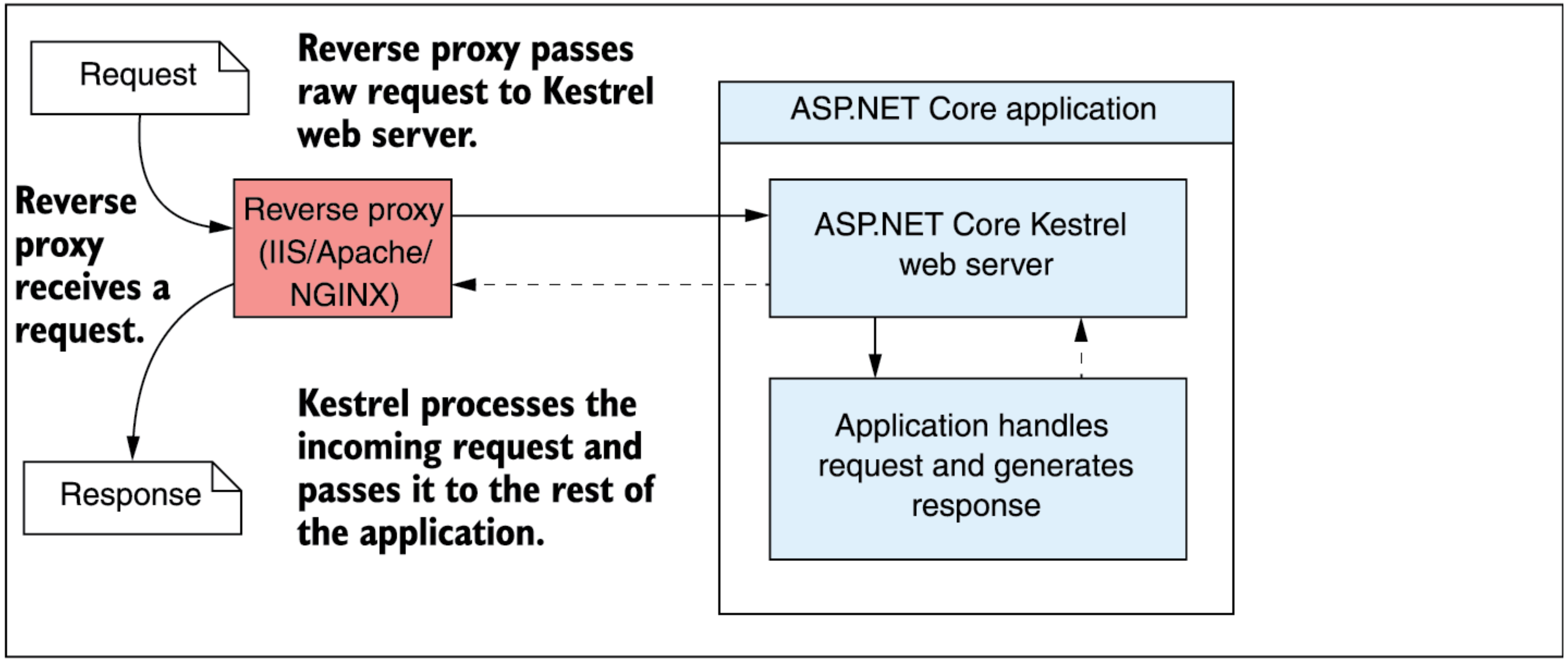
- Kestrel, Cross-platform
- No System.Web, Everything is Nuget packages. There is no dll by default
- Middlewares
- ASP.NET Core MVC
- .json, .ini, environment variables, .etc

ASP.NET vs ASP.NET Core


IIS receives a request.
Request
IIS calls into specific methods in the ASP.NET application.
ASP.NET application
Application_BeginRequest() {}
Application_AuthenticateRequest (){}
Application_AuthorizeRequest (){}
Application_ProcessRequest() {}
Application_EndRequest() {}
Application_HandleError() {}
Legacy ASP.NET apps rely on IIS to invoke methods directly in your app.
IIS
Response
Control transfers back and forth between IIS and ASP.NET as events are raised.

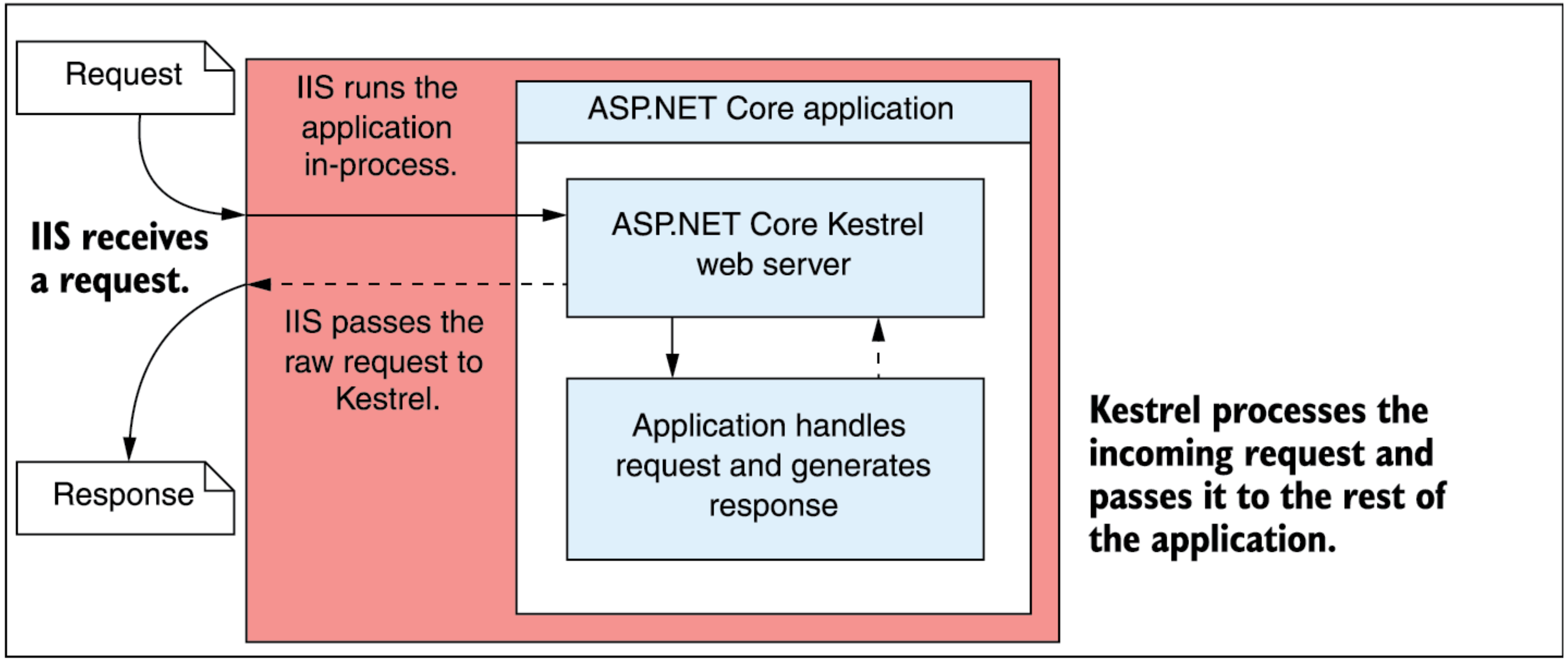
ASP.NET vs ASP.NET Core

ASP.NET Core apps run independently of IIS and other proxies.


Request
Reverse proxy passes raw request to Kestrel web server.
Reverse proxy receives a request.
Reverse proxy (IIS/Apache/ NGINX)
ASP.NET Core application
ASP.NET Core Kestrel web server
Application handles request and generates response
Kestrel processes the incoming request and passes it to the rest of the application.
Response

ASP.NET vs ASP.NET Core

ASP.NET Core apps can also run in-process inside IIS.

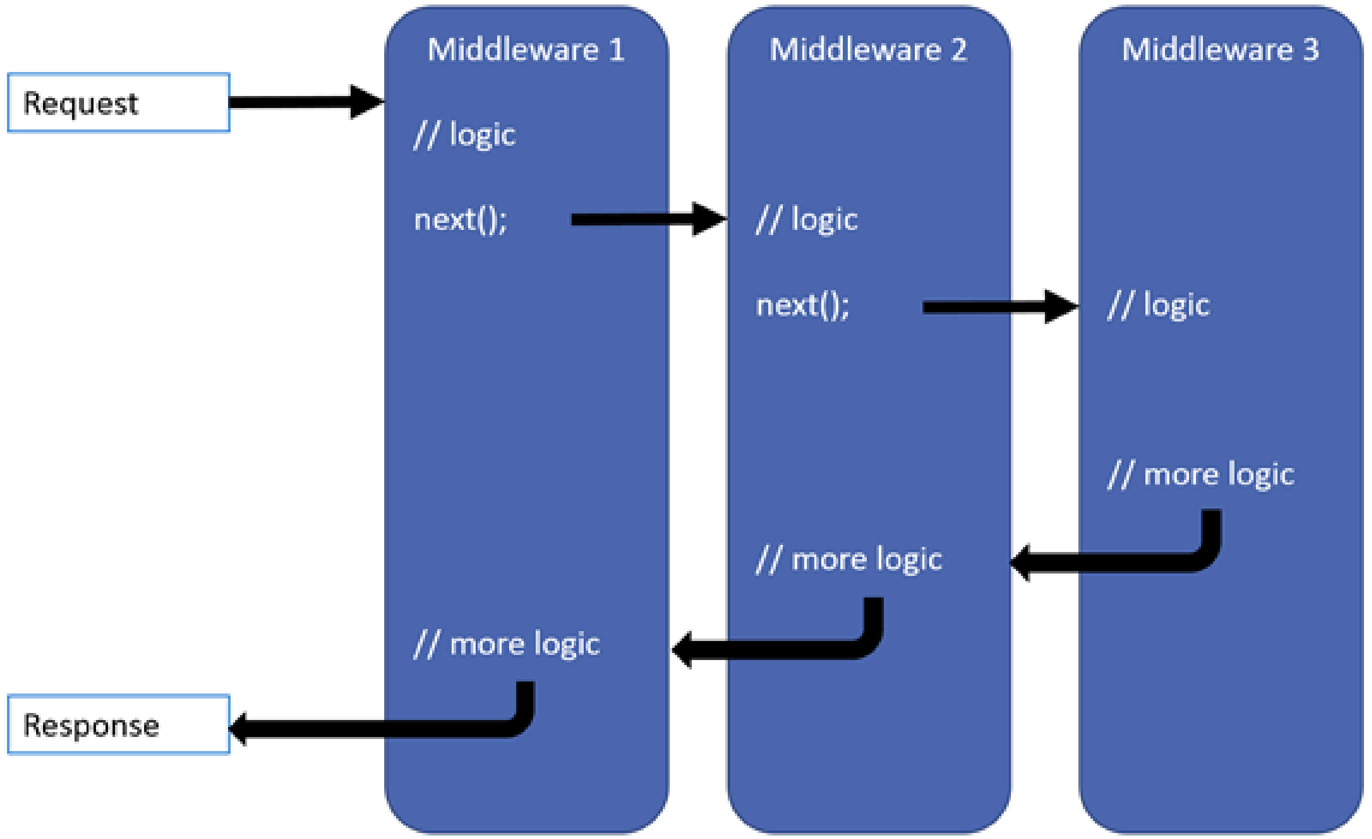

Request
IIS runs the application in-process.
ASP.NET Core application
IIS receives a request.
ASP.NET Core Kestrel web server
IIS passes the raw request to Kestrel.
Application handles request and generates response
Response

Kestrel processes the incoming request and passes it to the rest of the application.

What is Middleware ?

- “Middleware are software components that are assembled into an application pipeline to handle requests and responses”
- Each component in the pipeline is a request delegate
- Each delegate can invoke the next component in the chain, or short-circuit, returning back up the call chain

Middleware

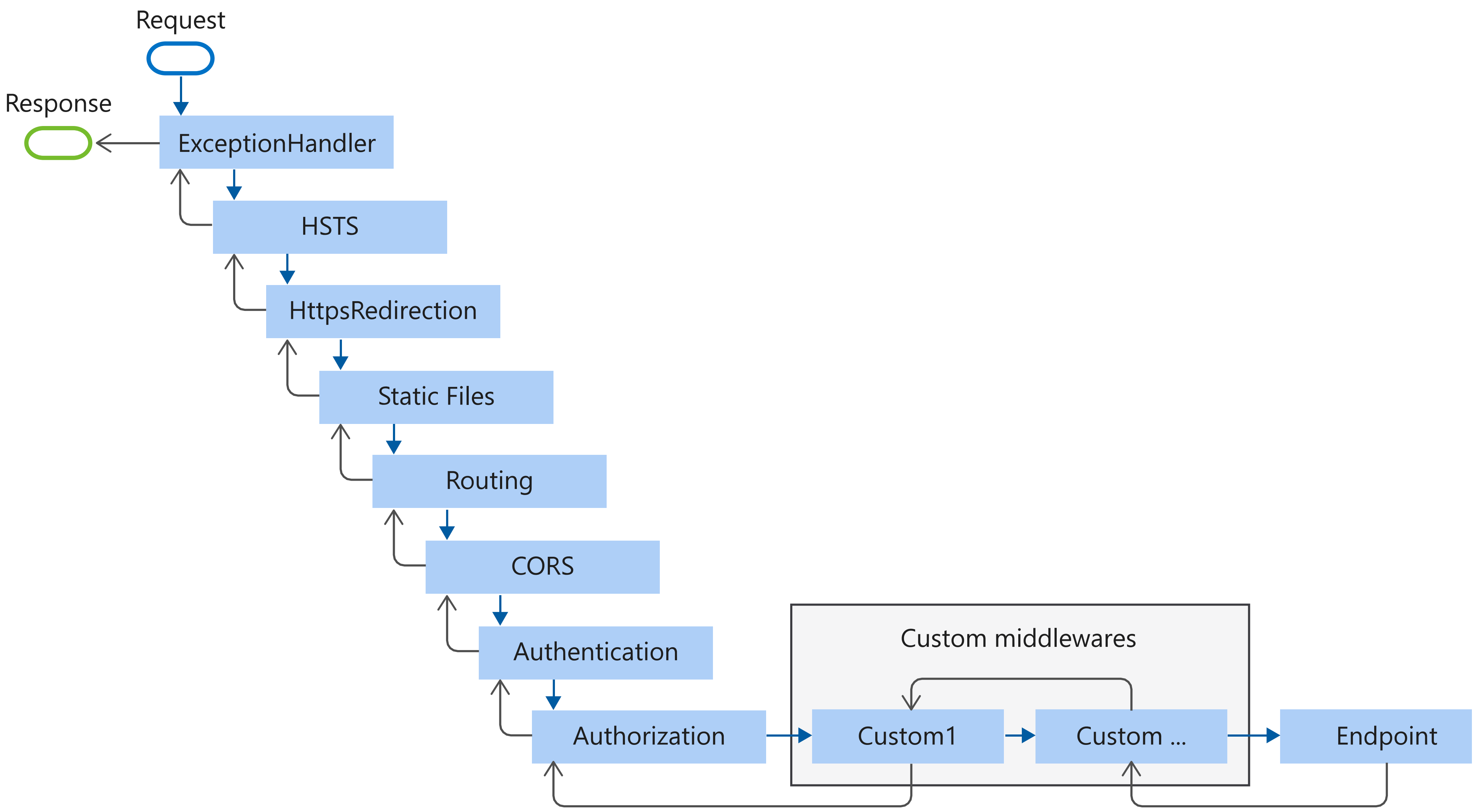


- https://learn.microsoft.com/en-us/aspnet/core/fundamentals/middleware/

Build-in Middlewares

- Routing
- Authentication
- Static files
- Diagnostics
- Error handling
- Session
- CORS
- Localization
- Custom

Middleware Order



Demo

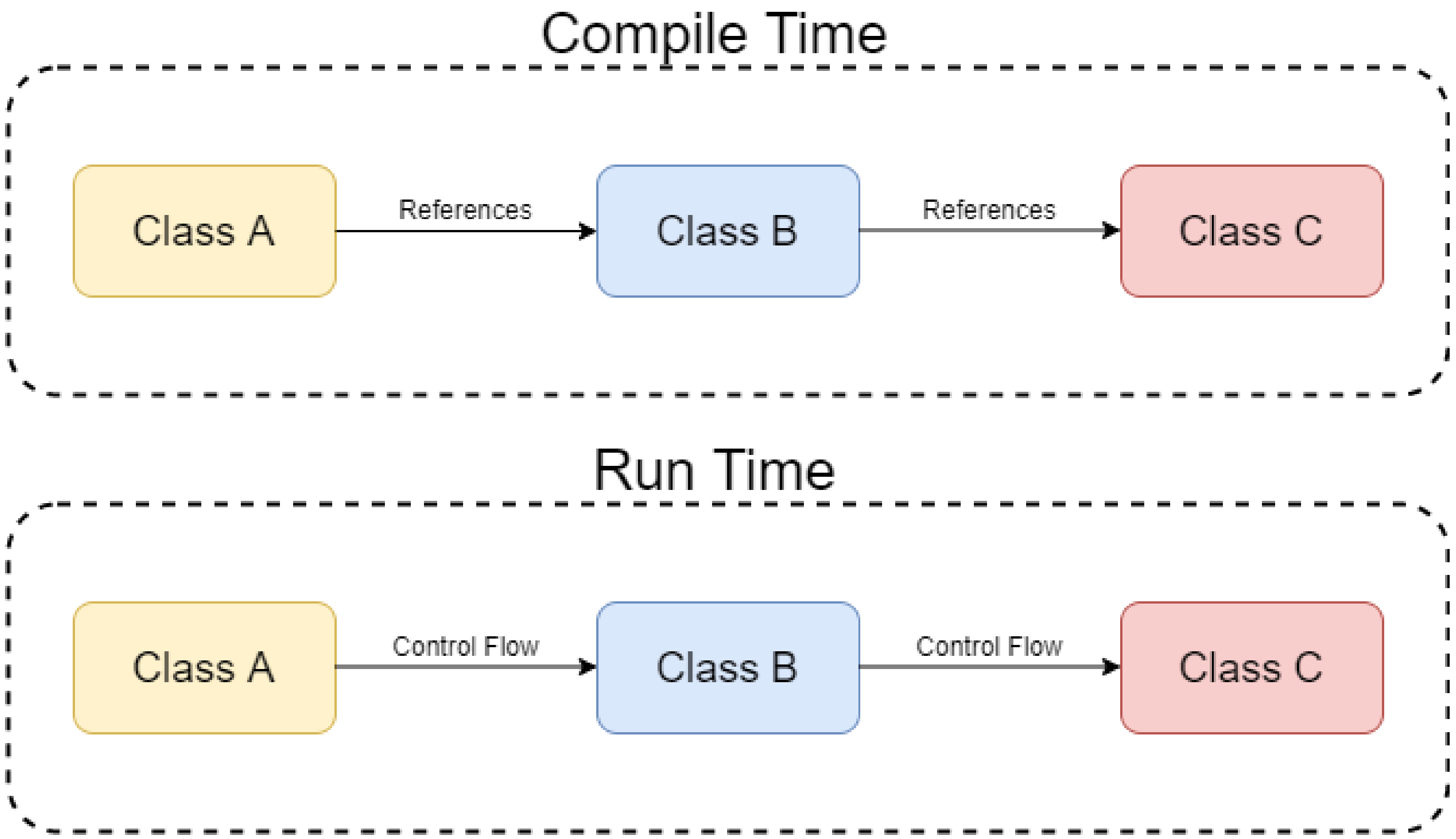
- Create an ASP.NET Core project
- Project structure
- Write simple middlewares
- Working with CLI

What is Dependency Injection ?

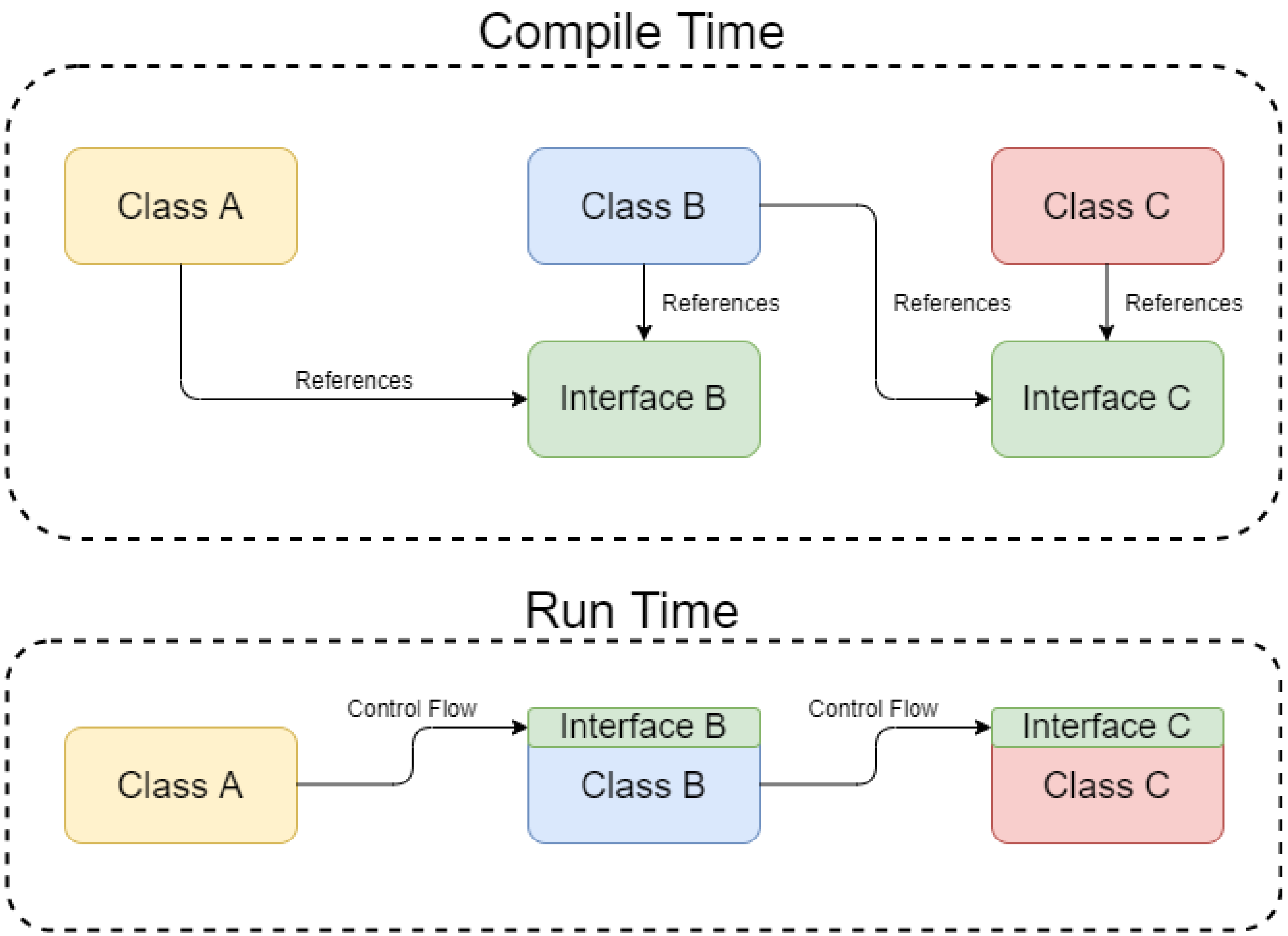
- Dependency Injection (often called just DI) is a software **design pattern that helps us create loosely coupled applications**.

  It is an implementation of the **Inversion of Control** (IoC) principle, and **Dependency Inversion Principle (D in SOLID)**.

Normal Flow vs DI Flow



Normal Flow vs DI Flow



Dependency Injection approaches

- Constructor Injection
- Method Injection
- Property Injection

Different Service Registration Lifetimes

- **Transient** – We can use this for lightweight, stateless services. Each time the service is called, the new instance is created
- **Scoped** – The instance of the service is created once per request and within that request (scope) it is reused
- **Singleton** – The instance is created only once

Benefits of Dependency injection

- Dependency injection facilitates loose coupling of software components
- The Code is clean and more readable
- Improves the testability and maintainability of the applications
- Allows you to change your implementations without having to change the classes

Thank you