C# Design Patterns: Decorator

THE DECORATOR PATTERN

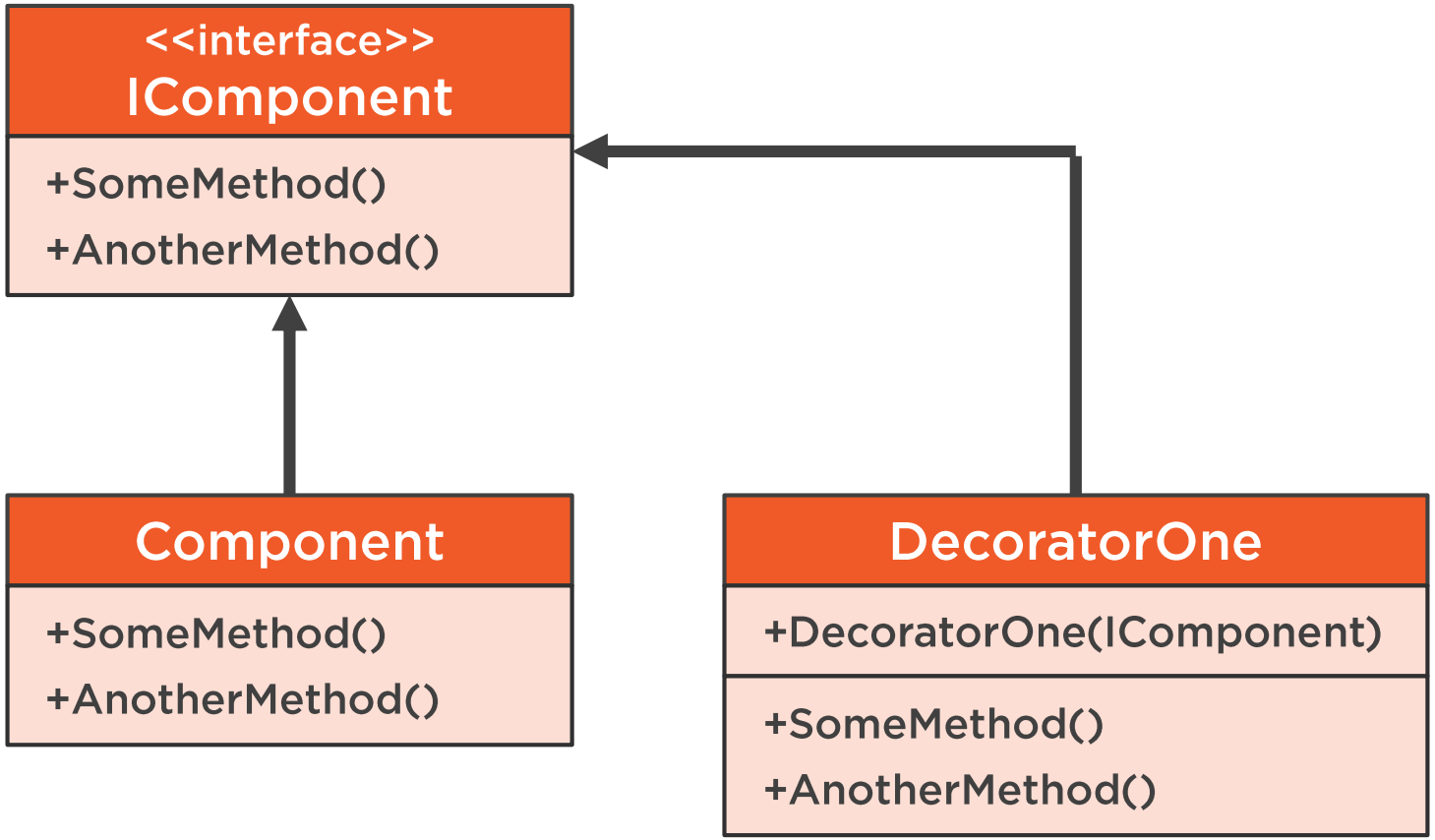
David Berry
PLURALSIGHT AUTHOR

@davidcberry13

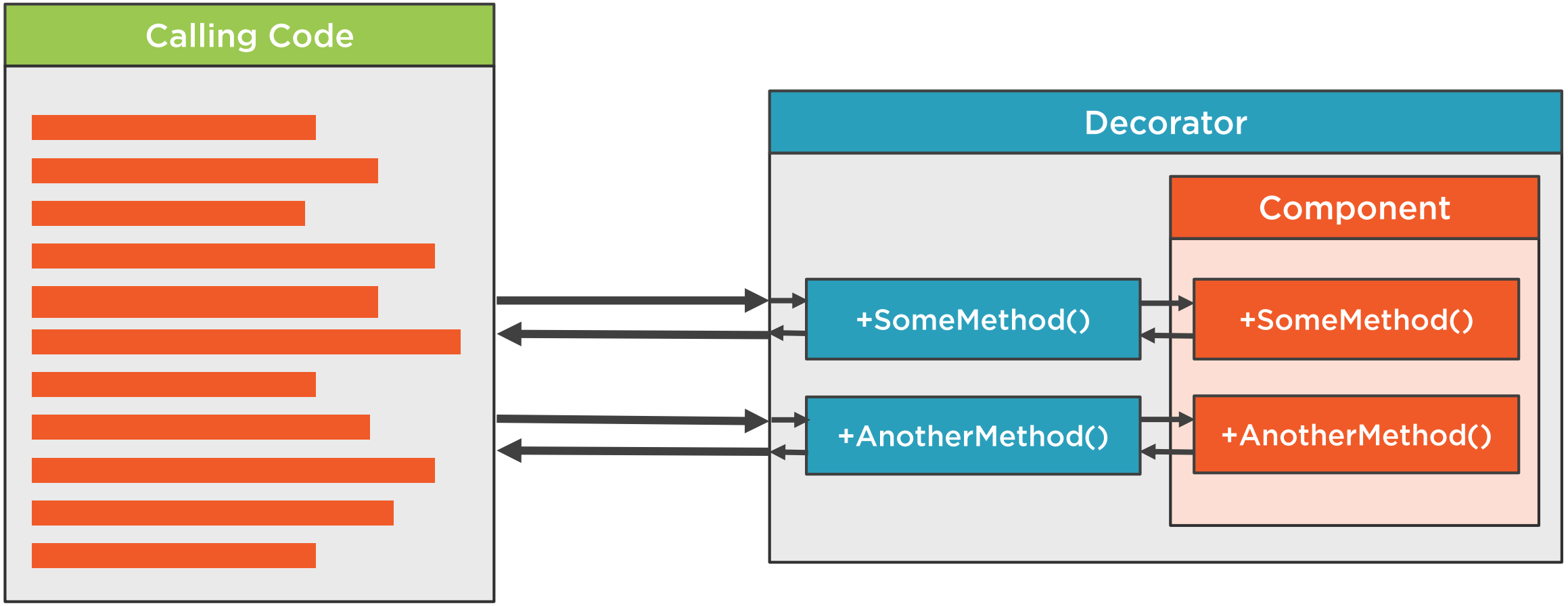
Decorator Pattern

A structural design pattern used for dynamically adding behavior to a class

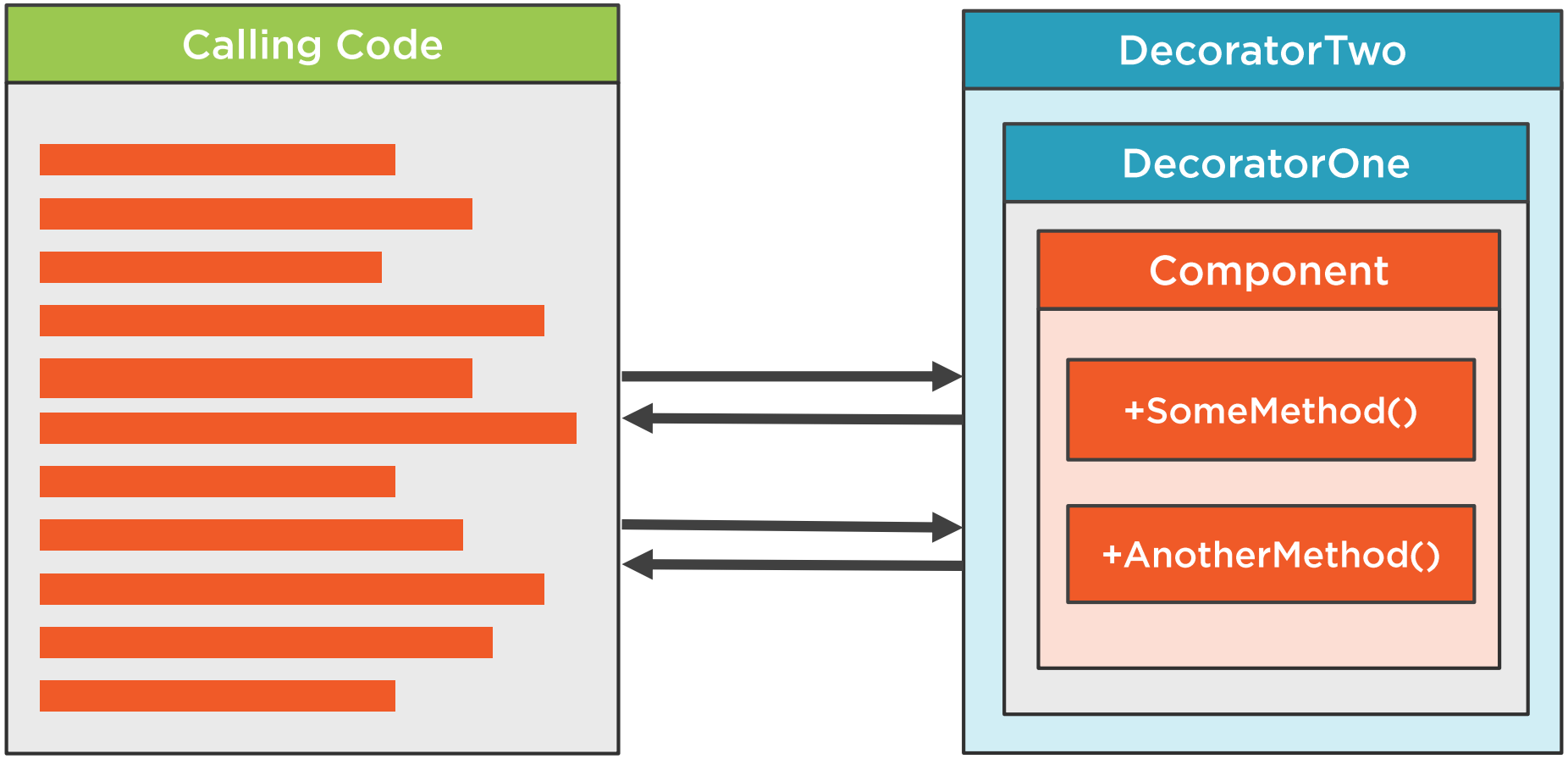
Decorator Pattern Structure



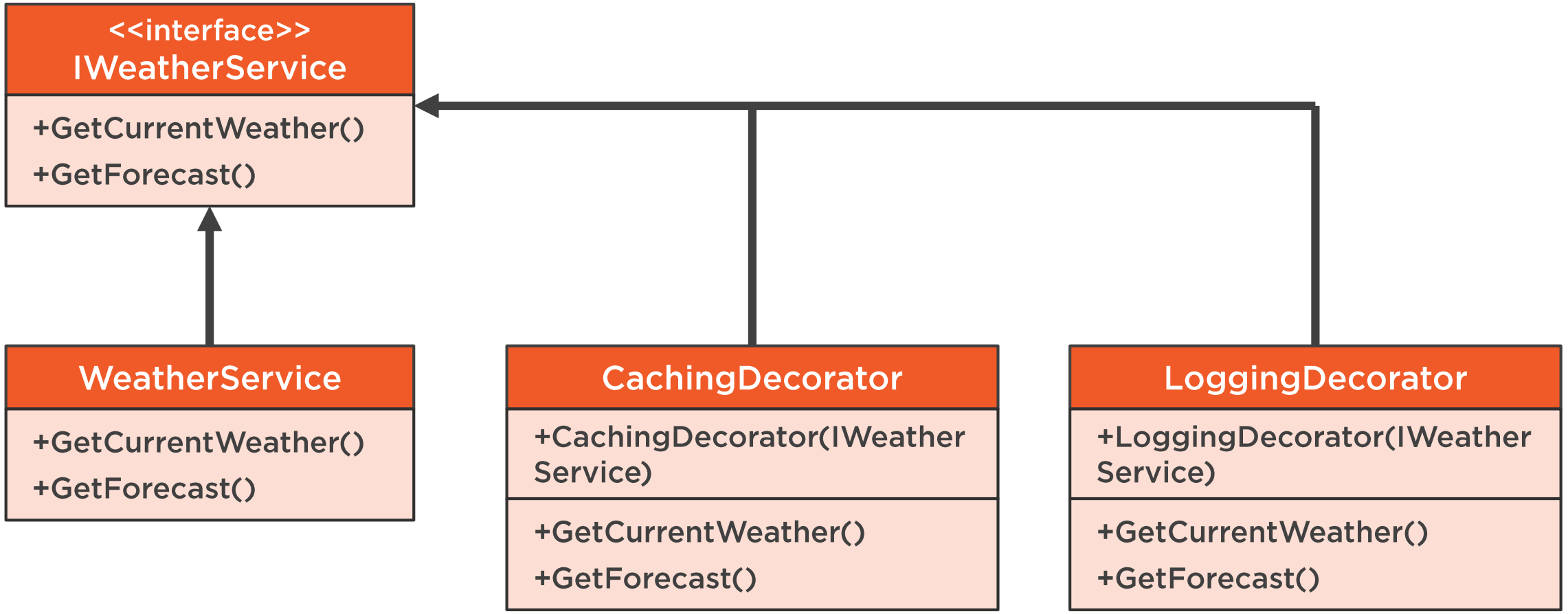
Onion Structure of the Decorator Pattern



Multiple Levels of Decoration



Decorator Pattern Example



Using Decorator Objects

```
// Standard component instantiation
IWeatherService weatherService = new WeatherService();


// Instantiation with decorator objects
IWeatherService weatherService =
    new CachingDecorator
        new LoggingDecorator(
            new WeatherService()));
```

Logging Decorator

Log how often a method was called, how long it took, parameters and responses

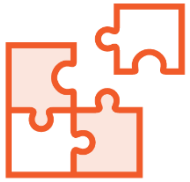
Caching Decorator

Cache weather conditions, forecasts for a city to reduce the number of external API calls

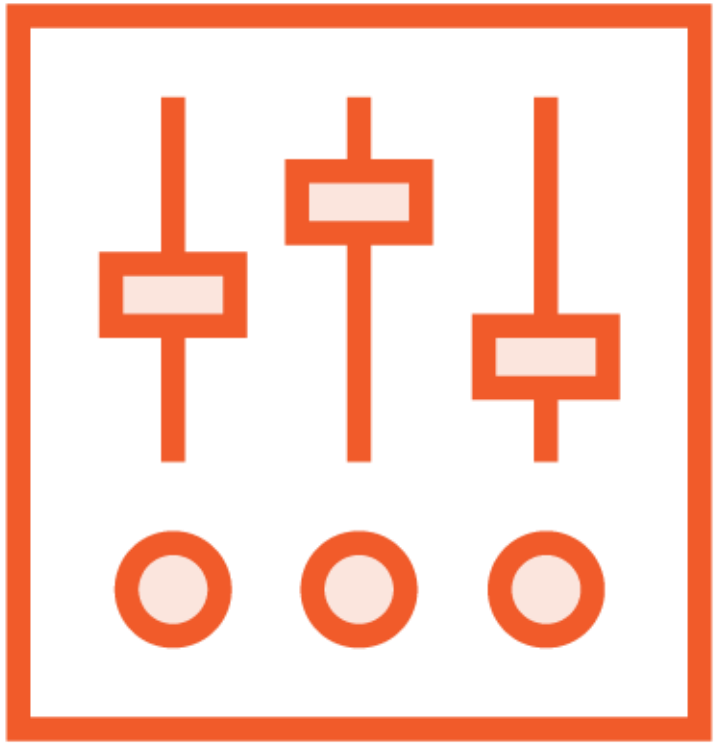
Decorator Demo Summary

Multiple decorators can be used in conjunction with one another

Each decorator can focus on a single task, promoting separation of concerns

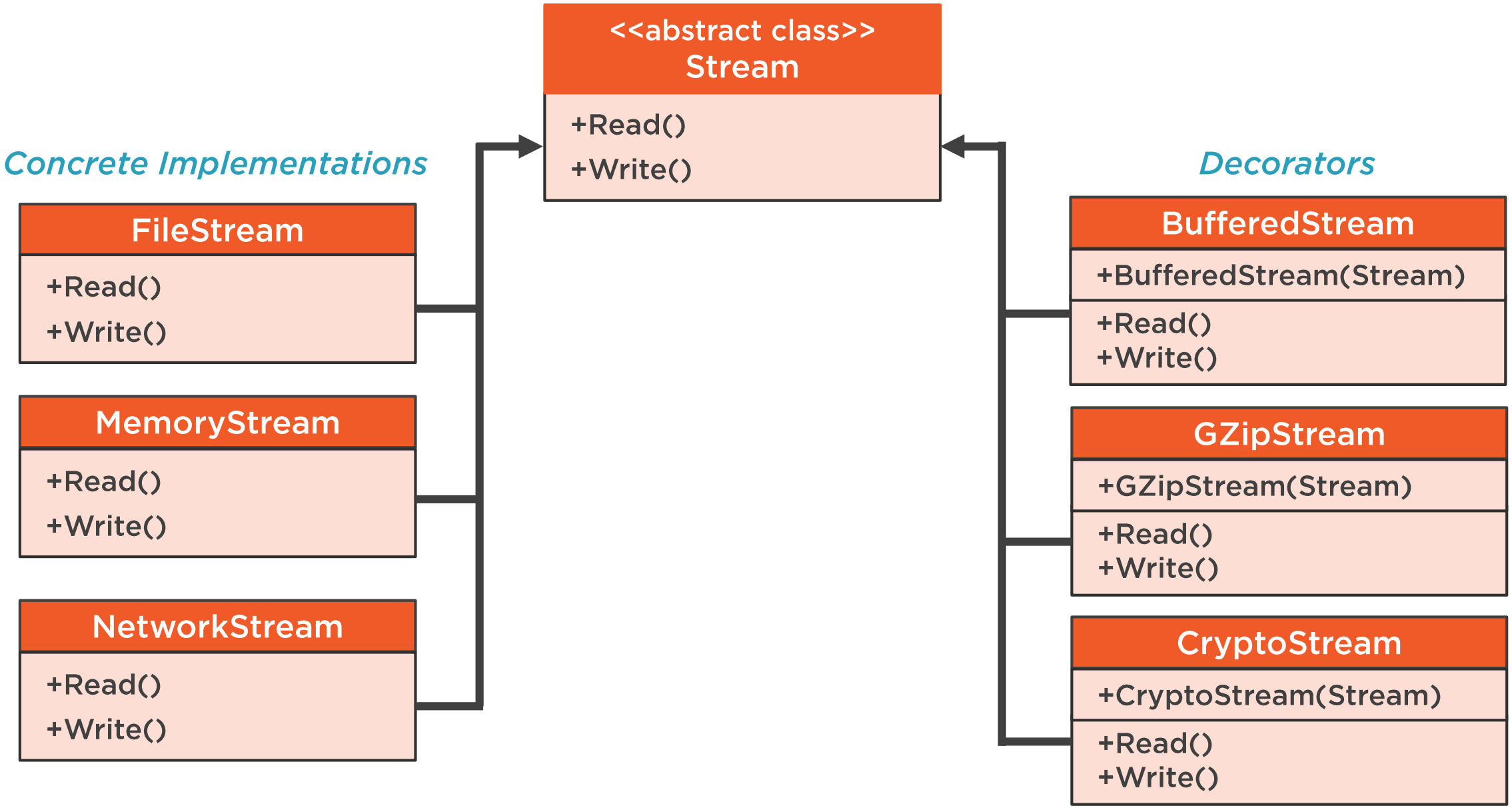


Decorator classes allow functionality to be added dynamically



IoC container configuration varies between .NET Core and libraries in .NET Framework

For other IoC libraries like Autofac and Ninject or others, check the documentation


Concrete Implementations
FileStream
+Read()
+Write()
MemoryStream
+Read()
+Write()
NetworkStream
+Read()
+Write()
<<abstract class>>
Stream
+Read()
+Write()
Decorators
BufferedStream
+BufferedStream(Stream)
+Read()
+Write()
GZipStream
+GZipStream(Stream)
+Read()
+Write()
CryptoStream
+CryptoStream(Stream)
+Read()
+Write()

You will frequently see the decorator pattern used in frameworks and libraries

Making Use of the Decorator Pattern in Your Projects

Decorator Pattern Use Cases

Cross cutting concerns

Manipulate data going to/from component

Question

What if your component does not have an interface/extend from a base class?

Answer

Extract an interface from the class

What if You Cannot Change the Component?