C# Extension Methods

GETTING STARTED WITH EXTENSION METHODS

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ARCHITECT

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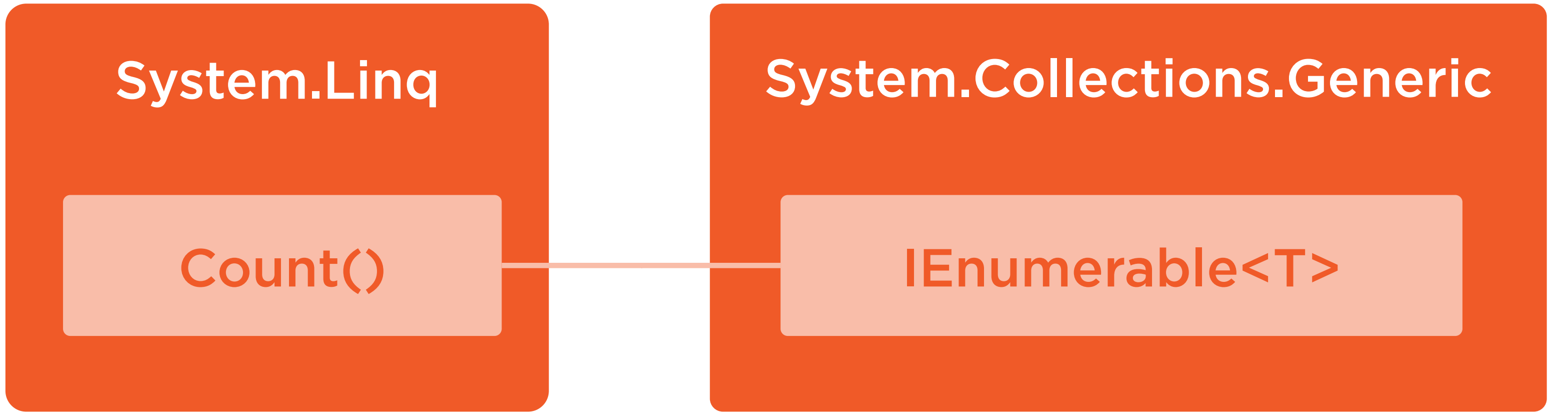
```
var strings = new List<string> { "a", "b", "c"};
Assert.AreEqual(3, strings.Count());
```

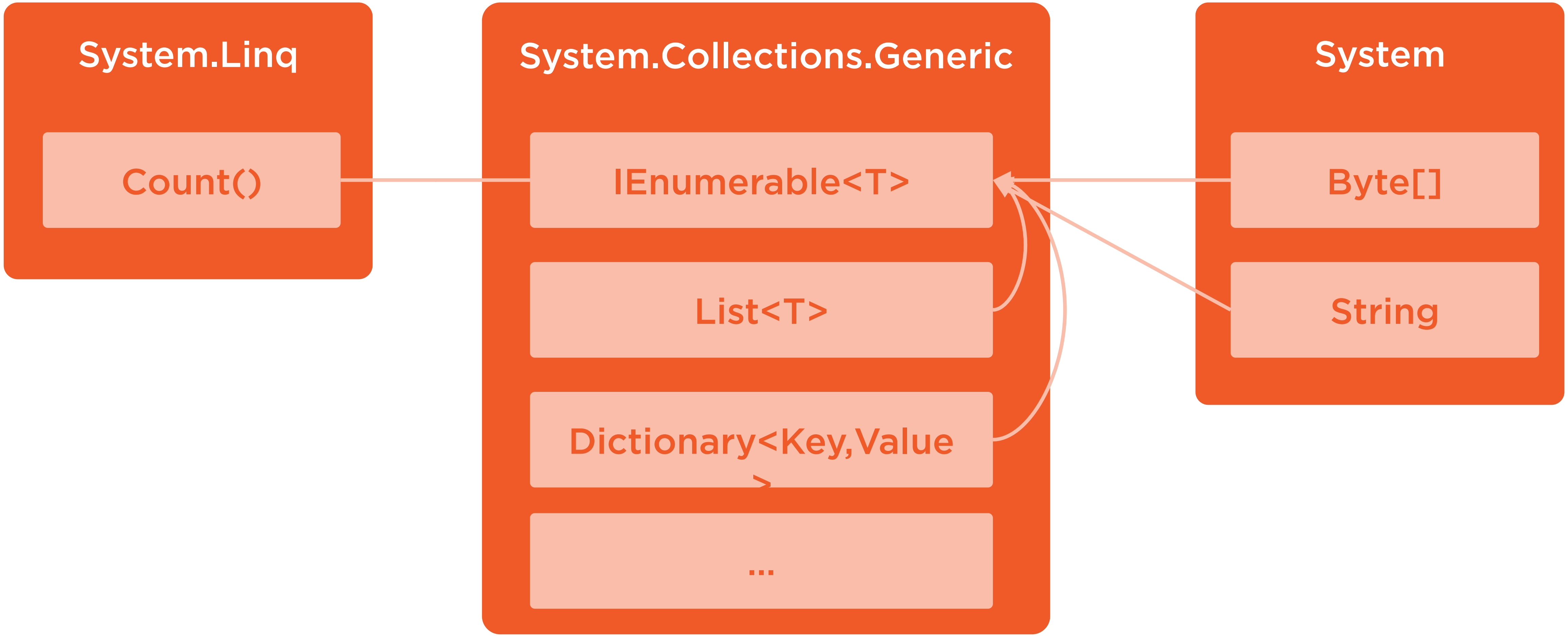
Using extension methods

Count() is an extension



Extension method

Defined in a different class, in a different assembly


System.Linq
Count()
System.Collections.Generic
IEnumerable<T>
List<T>
Dictionary<Key,Value>
...
System
Byte[]
String

```
public interface IMyInterface
{
    void NewMethod();
}

public class Class1 : IMyInterface
{
    public void NewMethod() {}
}


public class Class2 : IMyInterface
{
    public void NewMethod() {}
}
```

◀ New method defined here

◀ Every class must implement

```
public interface IMyInterface
{
    void NewMethod();
}

abstract class BaseClass : IMyInterface

{

    public void NewMethod() { }

}

public class Class1 : BaseClass
{
}
```

◀ New method defined here

◀ Abstract base class implements

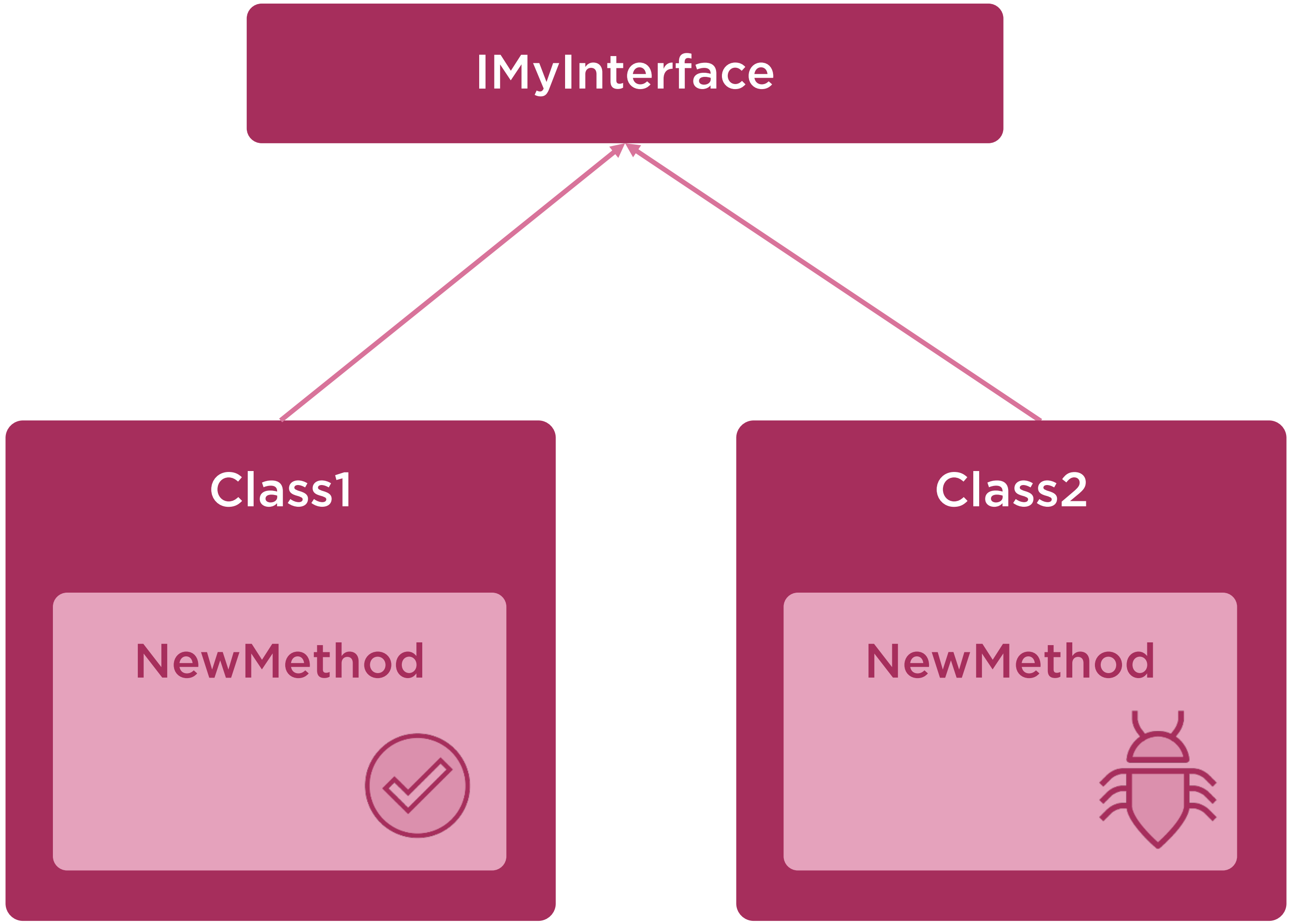
◀ Classes inherit base

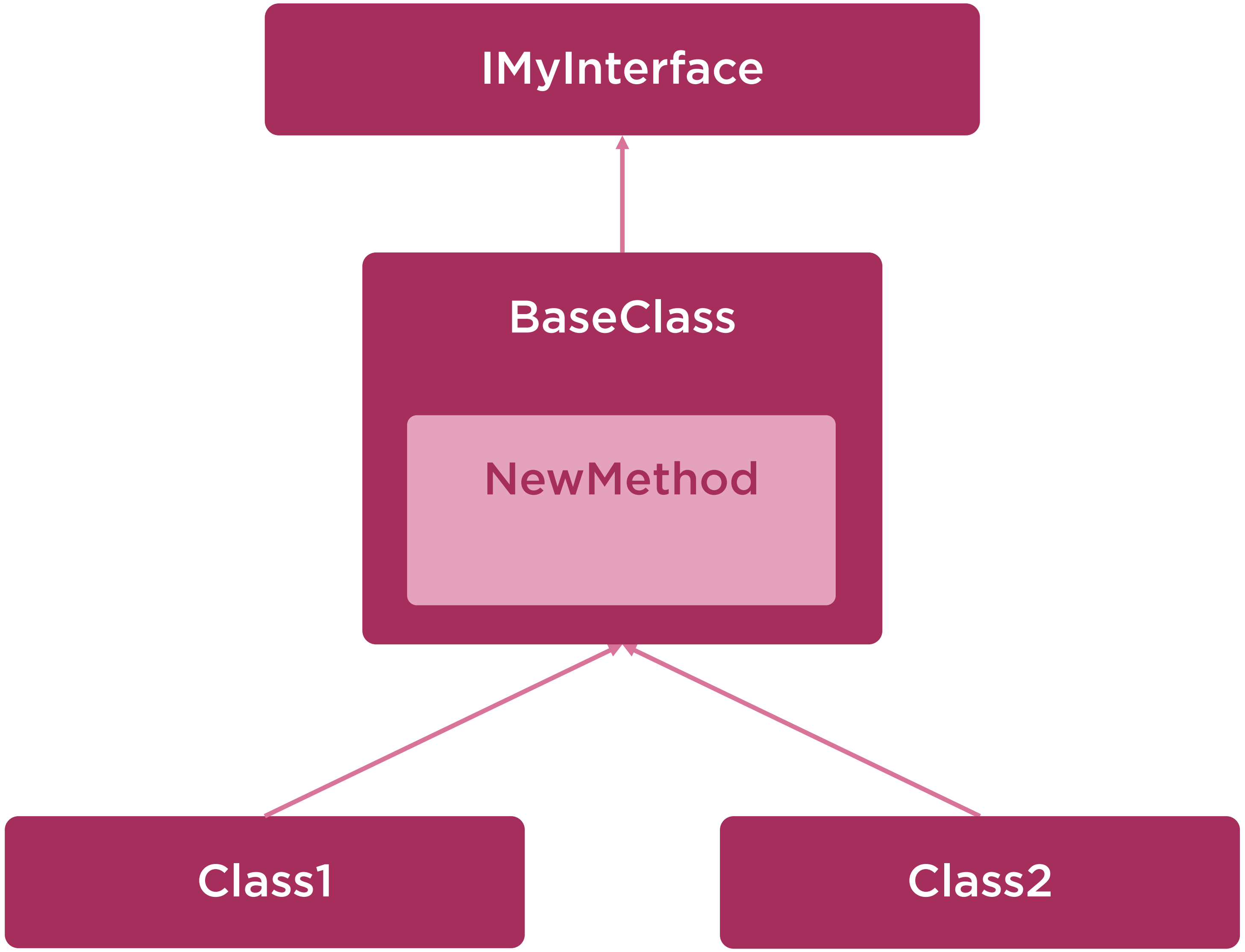
D. R. Y.

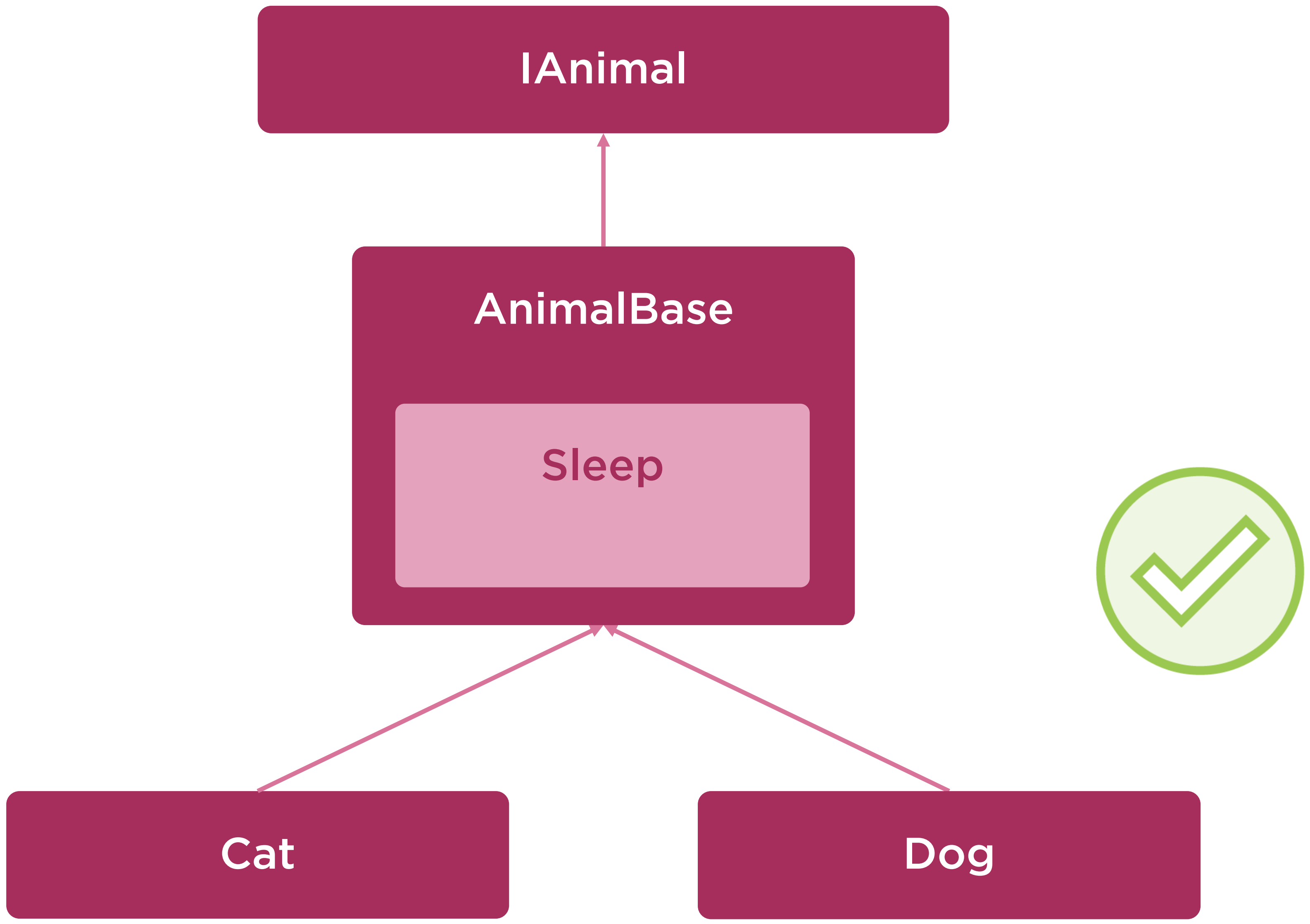
Don’t

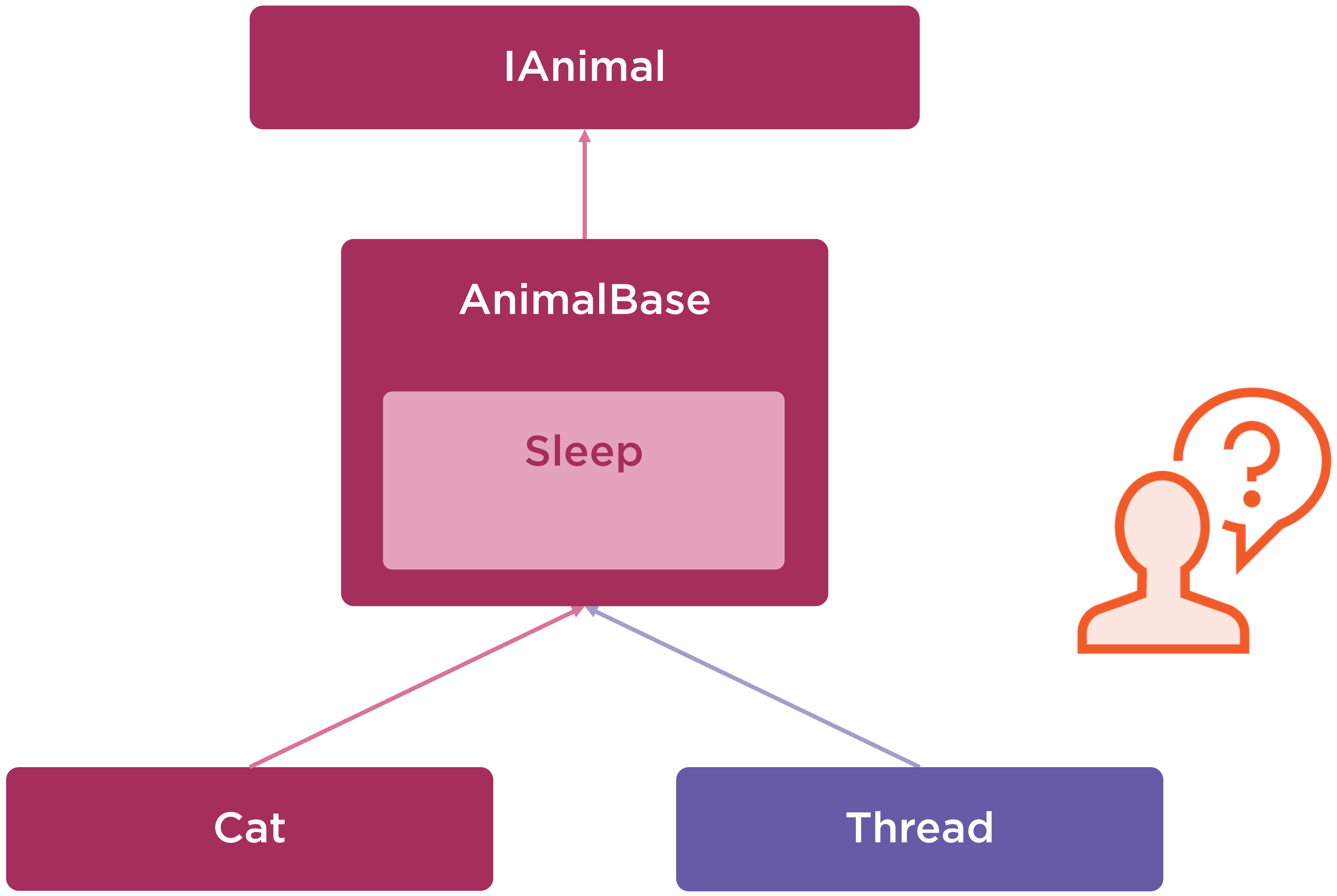
Repeat

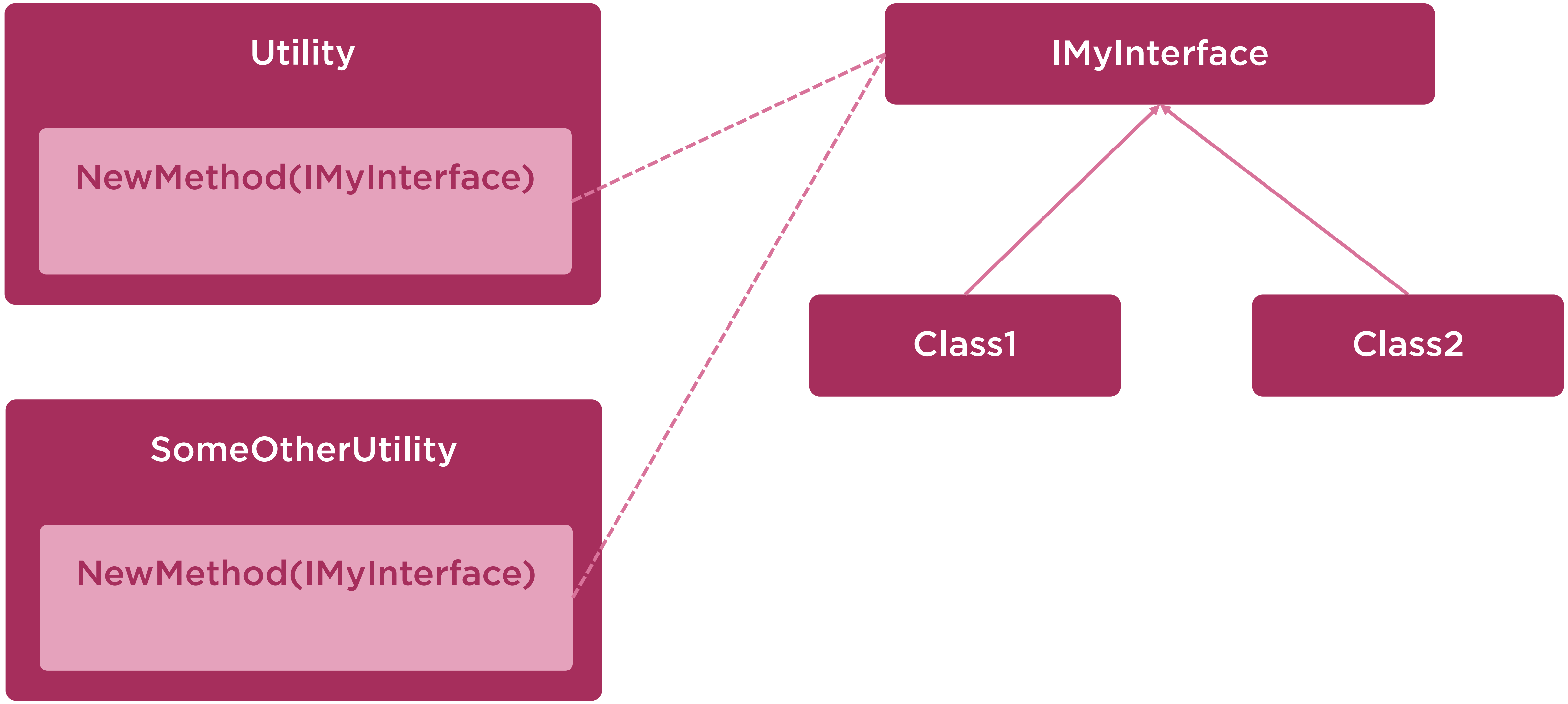
Yourself

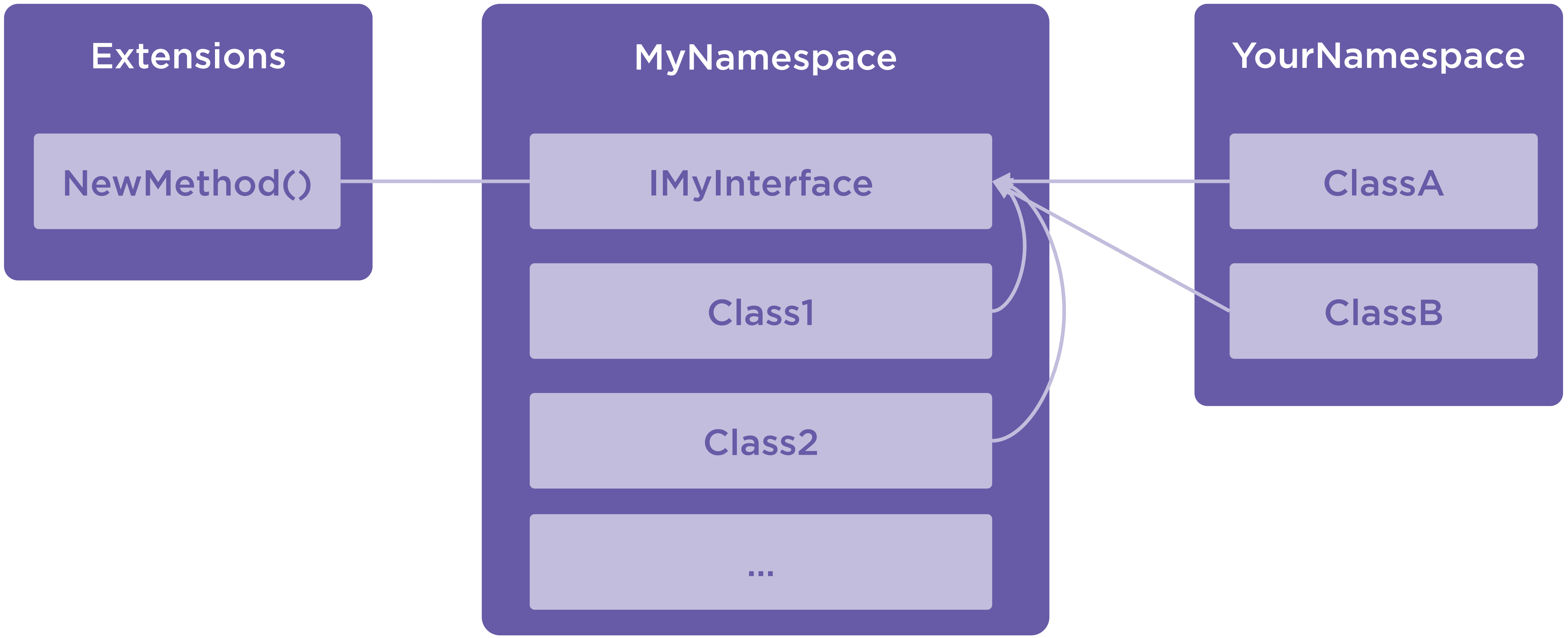

IMyInterface
Class1
NewMethod
Class2
NewMethod


IMyInterface
BaseClass
NewMethod
Class1
Class2


IAnimal
AnimalBase
Sleep
Cat
Dog


IAnimal
AnimalBase
Sleep
Cat
Thread


Utility
NewMethod(IMyInterface)
SomeOtherUtility
NewMethod(IMyInterface)
IMyInterface
Class1
Class2


Extensions
NewMethod()
MyNamespace
IMyInterface
Class1
Class2
...
YourNamespace
ClassA
ClassB

S. O. L. I. D.

Single Responsibility

Open-Closed

Liskov Substitution

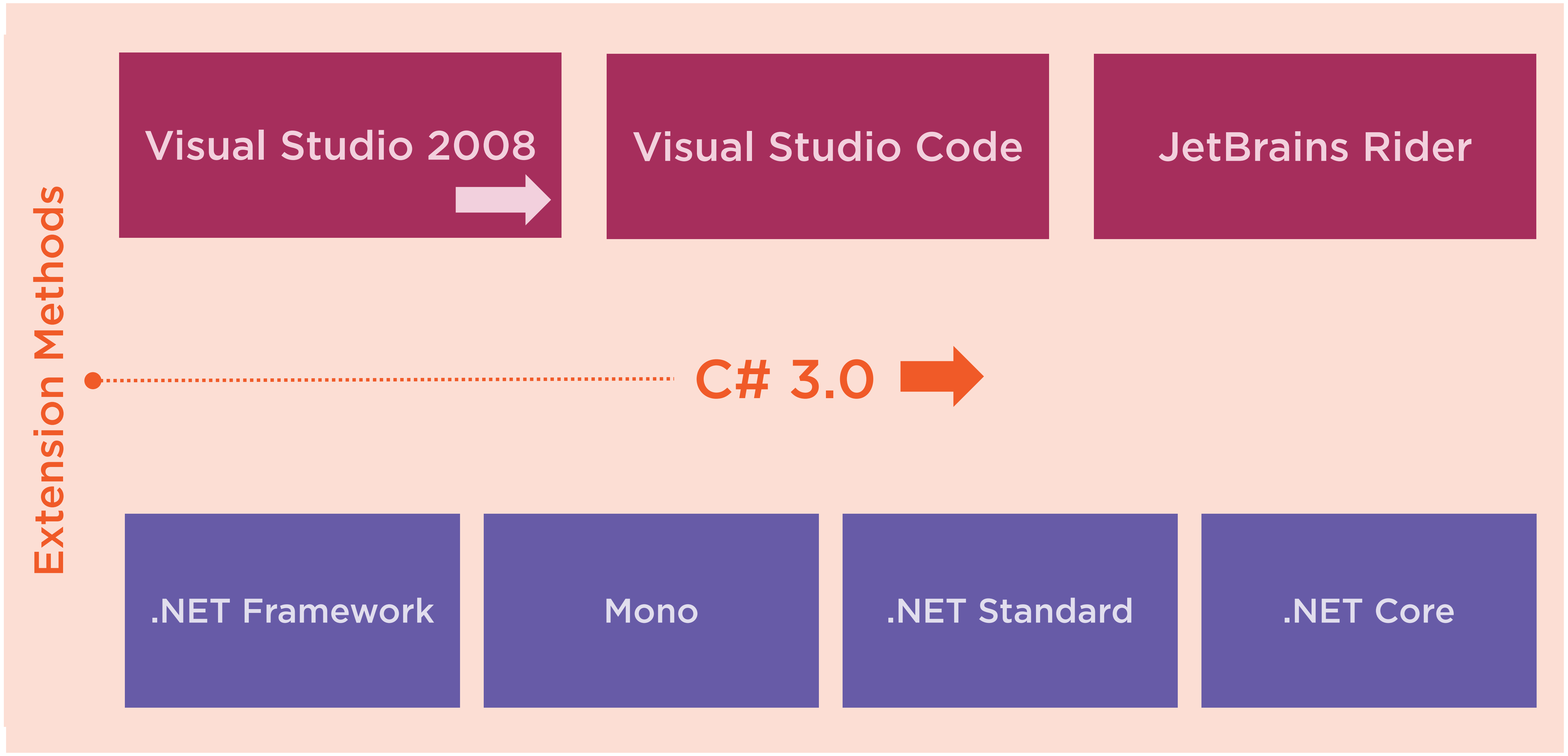
Interface Segregation

Dependency Inversion

Demo

Using extension methods

- Extension methods in the .NET BCL
- Extending interfaces and classes
- Applying extensions to new classes


Extension Methods
Visual Studio 2008
Visual Studio Code
JetBrains Rider
C# 3.0
.NET Framework
Mono
.NET Standard
.NET Core

```
var strings = new List<string> { "a", "b", "c"};
Assert.IsFalse(strings.IsCountEven());
```

IsCountEven() works on IEnumerables

The method is actually defined in a separate class

```csharp
using System.Collections.Generic;
using System.Linq;

namespace ExtensionMethods.Tests
{
  public static class EnumerableExtensions
  {
    public static bool IsCountEven<TSource>(this IEnumerable<TSource> target)
    {
      //...
```

```
Assert.IsFalse(strings.IsCountEven());
```

◀ Using the extension method

```
strings.IsCountEven();
```

◀ You write this

```
EnumerableExtensions.IsCountEven(strings);
```

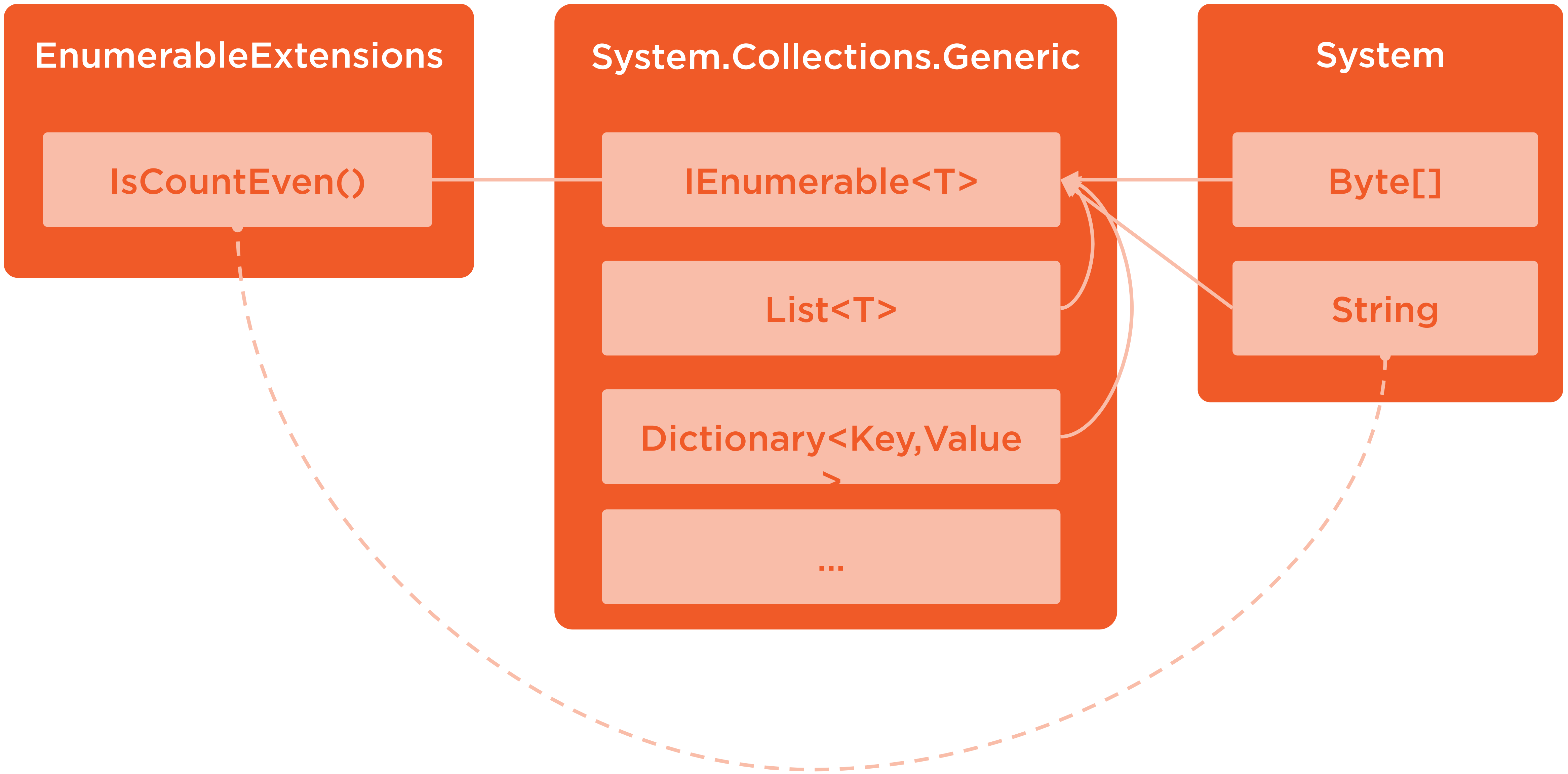
◀ The compiler generates this

```
// this code:
strings.IsCountEven();

// really generates this:
EnumerableExtensions.IsCountEven(strings);
```

Invocation is on the static class

The extension method can only use accessible members


EnumerableExtensions
IsCountEven()
System.Collections.Generic
IEnumerable<T>
List<T>
Dictionary<Key,Value>
...
System
Byte[]
String

Demo

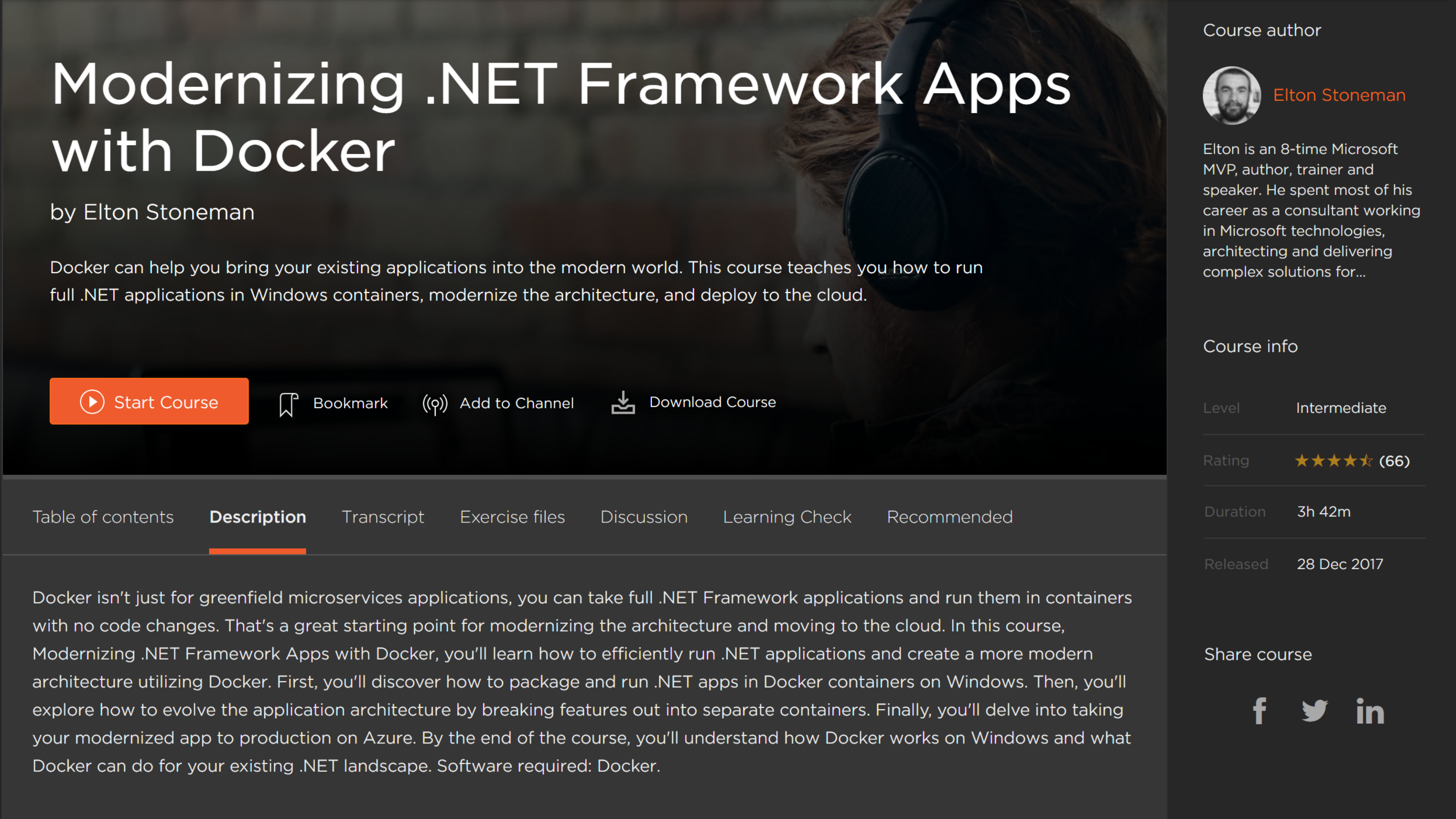
Writing extension methods

- Extending .NET Standard config
- Using extensions to centralize code
- Adding null checks in extensions

Demo

Encapsulating business logic

- Extending .NET configuration builder
- Merging multiple config sources
- Isolating rules in extension methods



Modernizing .NET Framework Apps with Docker

by Elton Stoneman

Docker can help you bring your existing applications into the modern world. This course teaches you how to run full .NET applications in Windows containers, modernize the architecture, and deploy to the cloud.

Docker isn't just for greenfield microservices applications, you can take full .NET Framework applications and run them in containers with no code changes. That's a great starting point for modernizing the architecture and moving to the cloud. In this course, Modernizing .NET Framework Apps with Docker, you'll learn how to efficiently run .NET applications and create a more modern architecture utilizing Docker. First, you'll discover how to package and run .NET apps in Docker containers on Windows. Then, you'll explore how to evolve the application architecture by breaking features out into separate containers. Finally, you'll delve into taking your modernized app to production on Azure. By the end of the course, you'll understand how Docker works on Windows and what Docker can do for your existing .NET landscape. Software required: Docker.

Course author

Elton Stoneman

Elton is an 8-time Microsoft MVP, author, trainer and speaker. He spent most of his career as a consultant working in Microsoft technologies, architecting and delivering complex solutions for...

Course info

Level	Intermediate
Rating	★★★★☆ (66)
Duration	3h 42m
Released	28 Dec 2017

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```
namespace ExtensionMethods.Library
{
  public static class ConfigurationExtensions
  {
    public static bool IsLoaded(this IConfiguration config)
    {
      return config != null && config.AsEnumerable().Any();
    }
  }
}
```

```
namespace ExtensionMethods.Library
{
  public static class ConfigurationExtensions
  {
    //...
```

Namespace defines scope

Consumers reference the library and namespace

```
namespace Microsoft.Extensions.Configuration
{
  public static class ConfigurationExtensions
  {
    //...
```

Namespace affects discoverability

Use the target type's namespace or your own

```
public static class ConfigurationExtensions
{
  public static bool IsLoaded(this IConfiguration config)
  {
    //...
```

Accessibility rules apply

Types must be accessible to the extension method library

```
public static bool IsLoaded(this IConfiguration config)
{
  return config.AsEnumerable().Any();
}
```

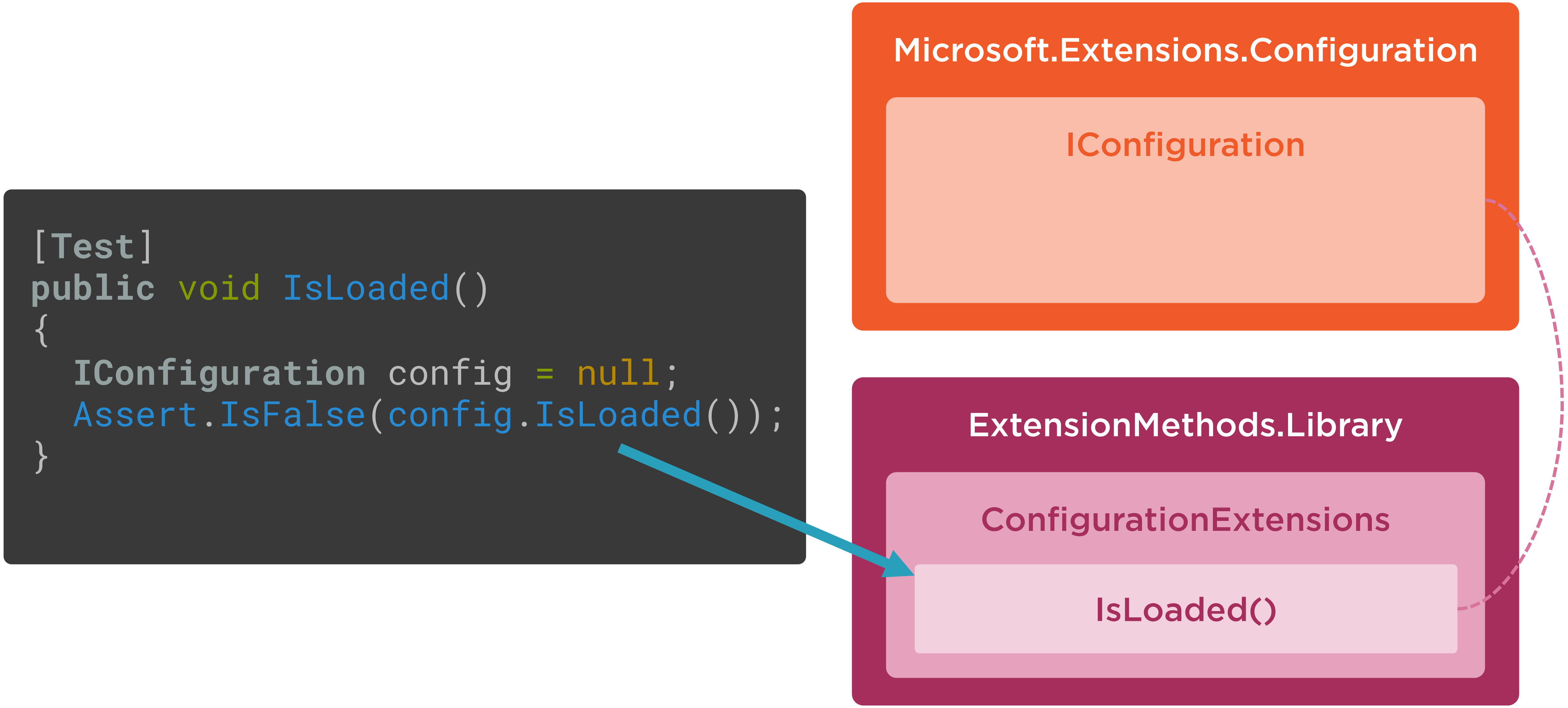
Accessibility rules apply

Members of the target type must be accessible

```csharp
public static bool IsLoaded(this IConfiguration config)
{
    return config.AsEnumerable().Any();
}
```

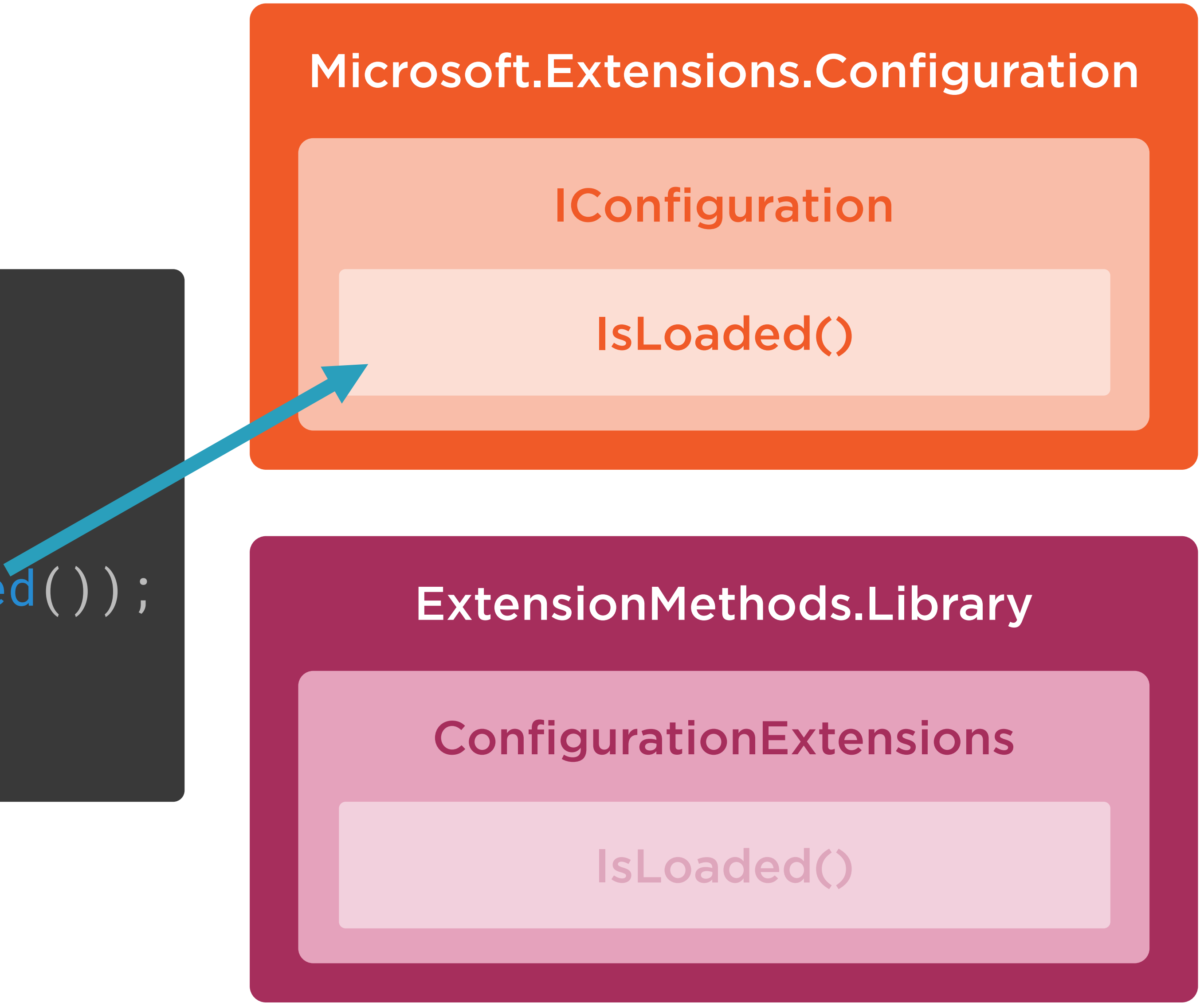
Type methods take precedence

Extension methods with matching signatures are hidden



```
[Test]
public void IsLoaded()
{
  IConfiguration config = null;
  Assert.IsFalse(config.IsLoaded());
}
```

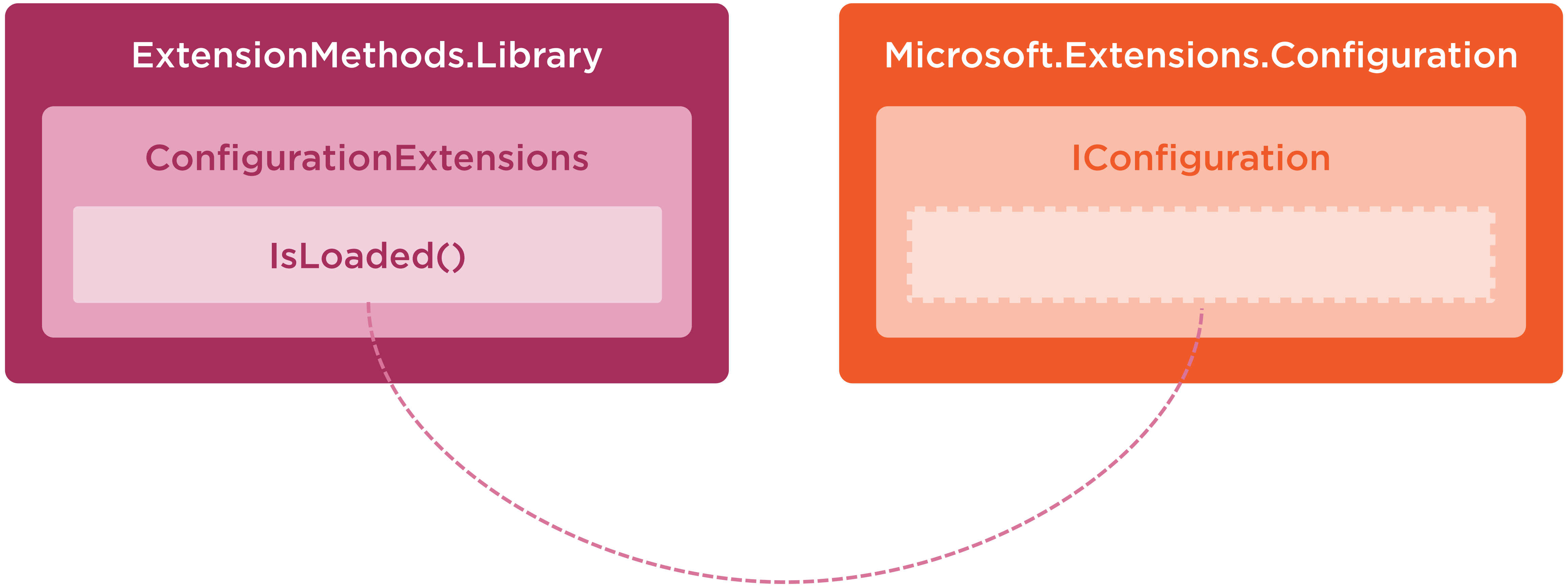
```
[Test]
public void IsLoaded()
{
   IConfiguration config = null;
   Assert.IsFalse(config.IsLoaded());
}
```



Demo

Limitations of extension methods

- Working with type accessibility
- Using accessible members
- Type methods hiding extensions


ExtensionMethods.Library
ConfigurationExtensions
IsLoaded()
Microsoft.Extensions.Configuration
IConfiguration

```
using ExtensionMethods.Library;
//...
IConfiguration config = null;
Assert.IsFalse(config.IsLoaded());
```

Using extension methods

Reference the library and the namespace

```csharp
namespace ExtensionMethods.Library
{
  public static class ConfigurationExtensions
  {
    public static bool IsLoaded(this IConfiguration config)
    {
      return config != null && config.AsEnumerable().Any();
    }
  }
}
```

Custom behavior
Same usage patterns

No subclasses
No new interfaces

Centralized libraries
Clean dependencies

Best Practices for Using Extension Methods