

Migrate from .NET Framework to .NET 5

Hi, I'm J.

Jonathan "J." Tower

Partner & Principal Consultant

Trailhead Technology Partners



Microsoft MVP in ASP.NET



Telerik/Progress Developer Expert



Organizer of Beer City Code



TRAILHEAD
TECHNOLOGY PARTNERS

trailheadtechnology.com



jtower@trailheadtechnology.com



trailheadtechnology.com/blog



[jtowermi](https://twitter.com/jtowermi)

github.com/jonathantower/migrate-net-5

Preview



Some Definitions



Why Upgrade?



Upgrade Paths



8 Steps toward Upgrading



6 Migration Demos!

If You Give \$100, So Will I!

bit.ly/cpl21-water

"charity:water is a non-profit organization that provides clean and safe drinking water to people in developing nations. The organization was founded in 2006 and has helped fund 22,936 projects in 24 countries, benefiting over 4.6 million people." - Wikipedia

*"4/4 Stars"
- CharityNavigator.org*



charity: water

Some Definitions

.NET Framework vs Core vs 5

Some Quick Definitions

.NET Framework

- Windows-only

- Over 20 years old

- ASPX/WebForms

.NET Core

- Linux, Mac, and Windows

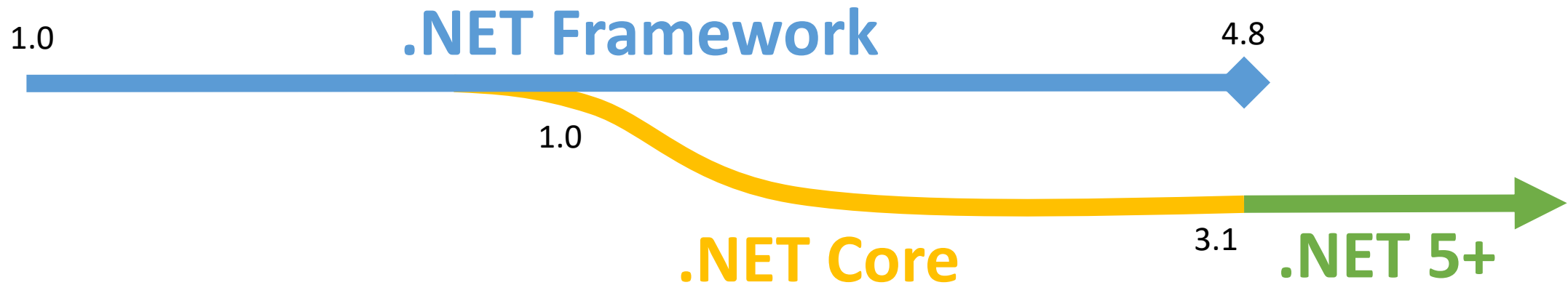
- Modern, rewritten from scratch

- Performance

.NET 5

- The future of .NET (really, it's .NET Core)

The Future of .NET



Why Upgrade?

Is .NET Core or .NET 5 Worth It?

Why Upgrade to .NET 5

Performance (!!!)

Actively developed

Easier future upgrades

Develop and run cross-platform (Linux, Mac, Windows)

Faster project load and build

Cloud-ready

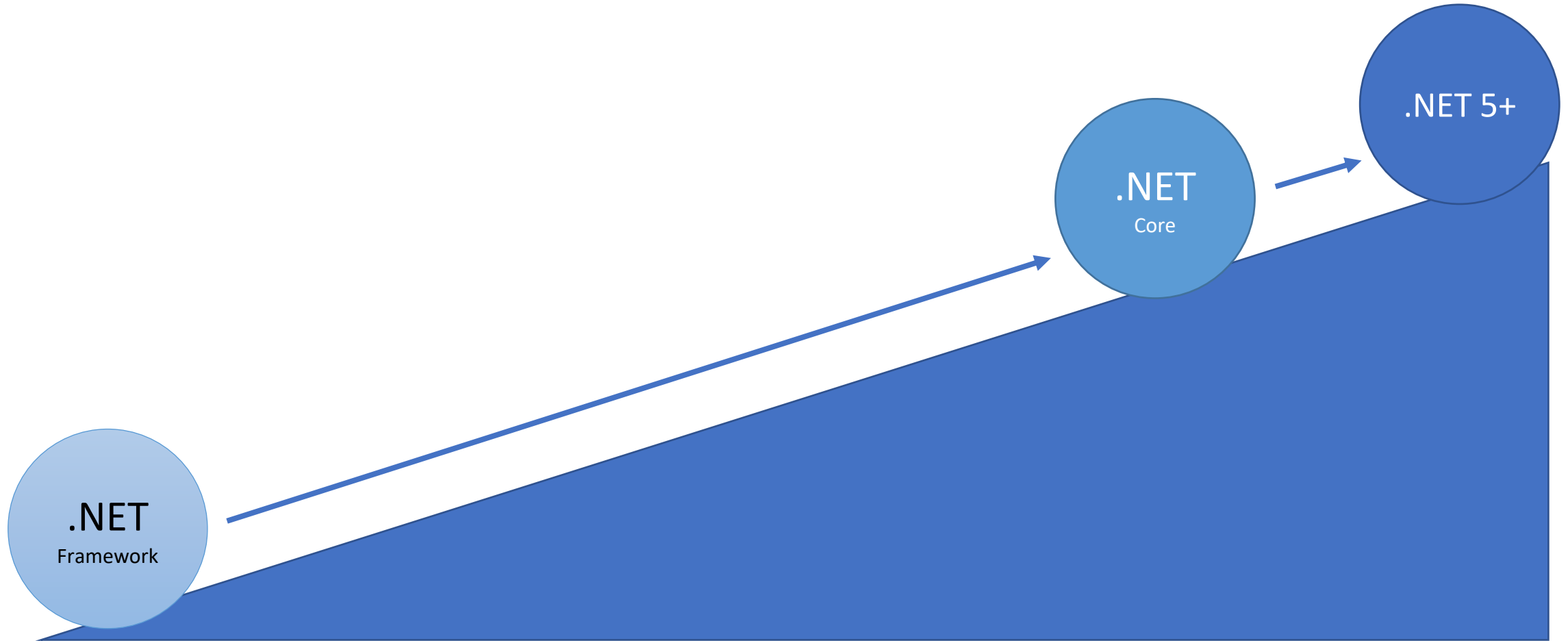
Open source on GitHub

Command Line Interface (CLI)

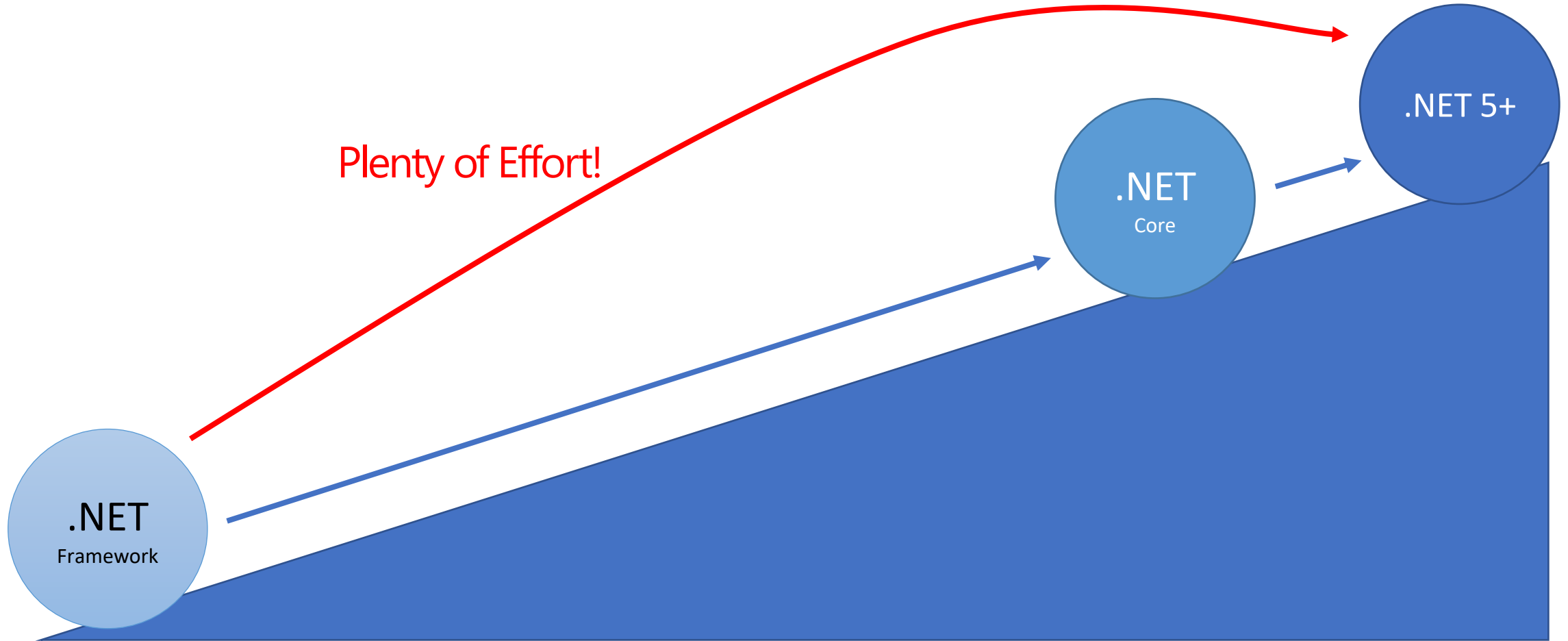
Attract and retain top developers

Upgrade Paths

Upgrade Difficulty



Upgrade Difficulty

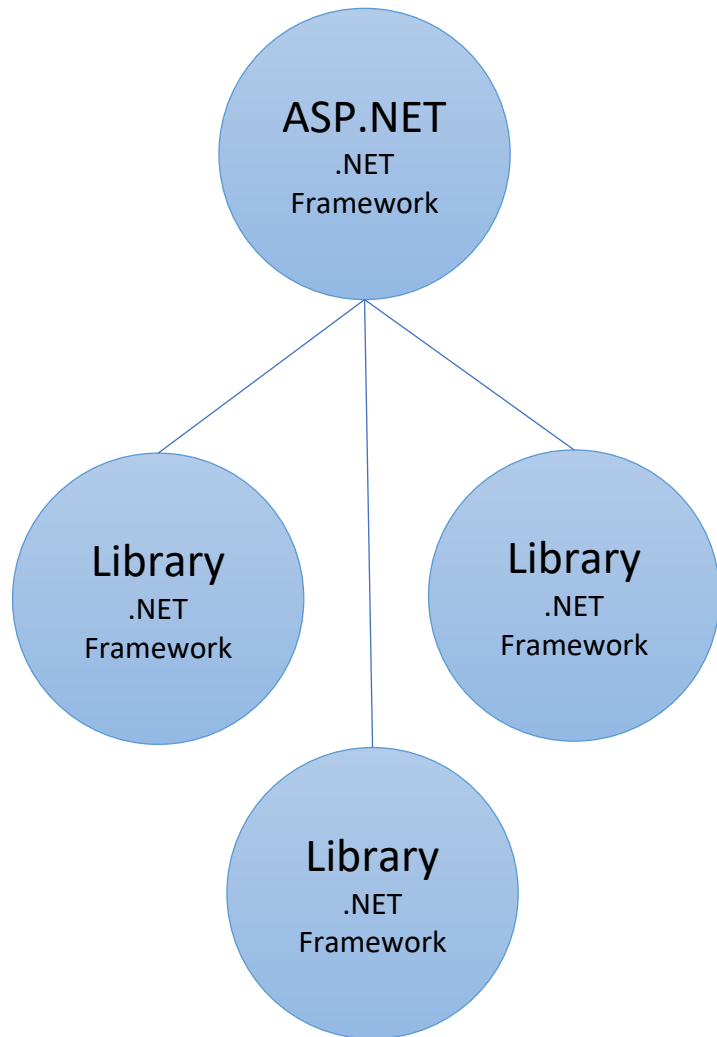


Upgrade Difficulty

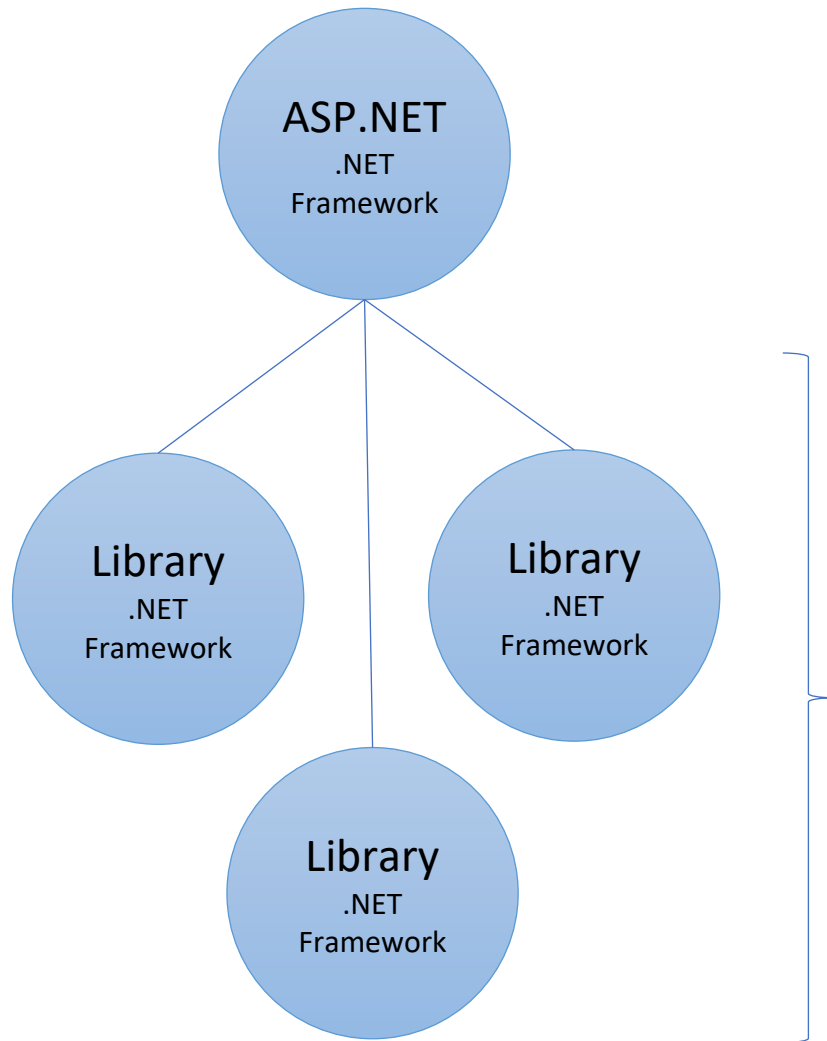
Project Types (Easiest to Hardest)

1. Class Libraries
2. WinForms & WPF
3. ASP.NET API
4. ASP.NET MVC
- ~~5. ASP.NET WebForms~~
- ~~6. WCF Services~~

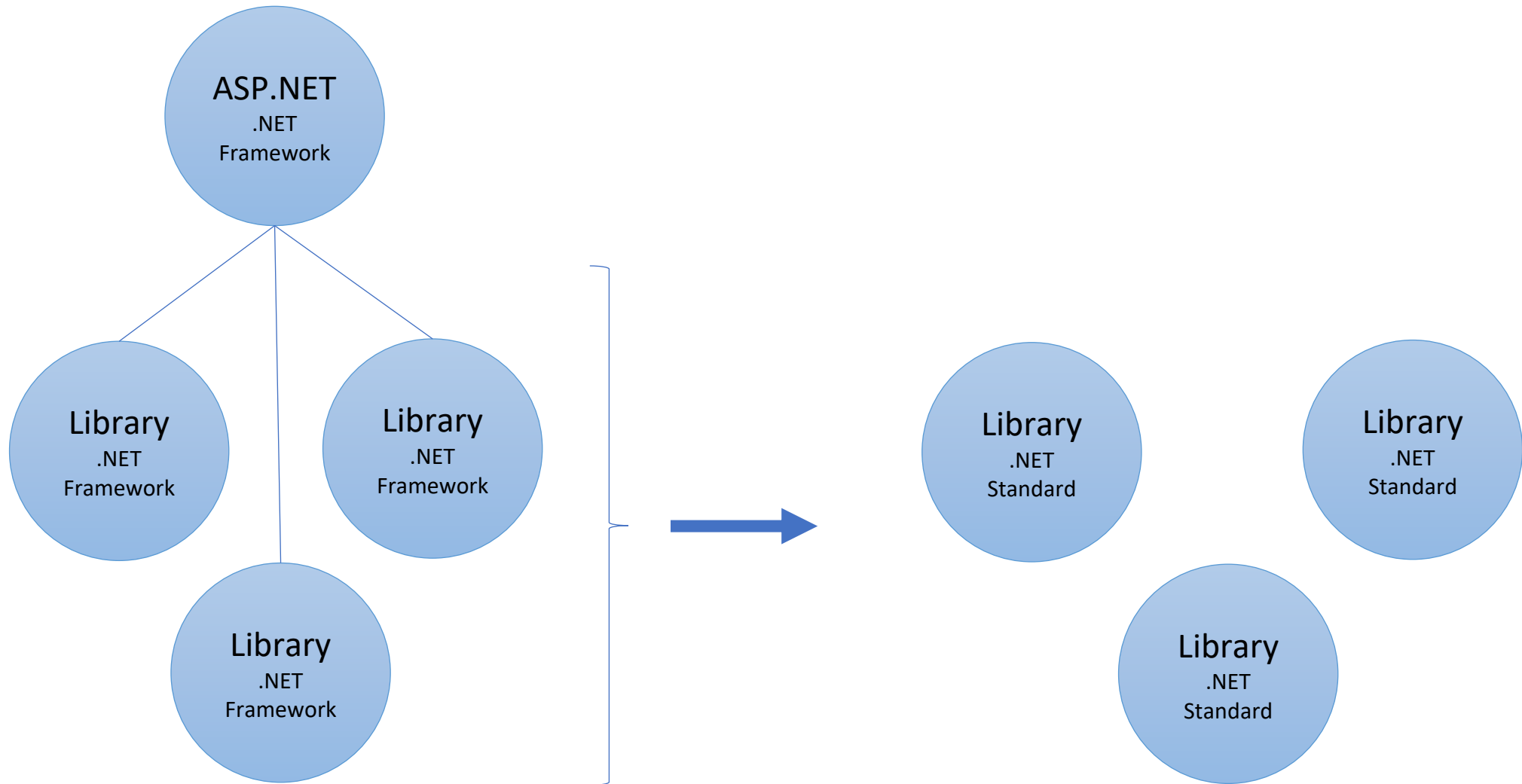
Partial Upgrades



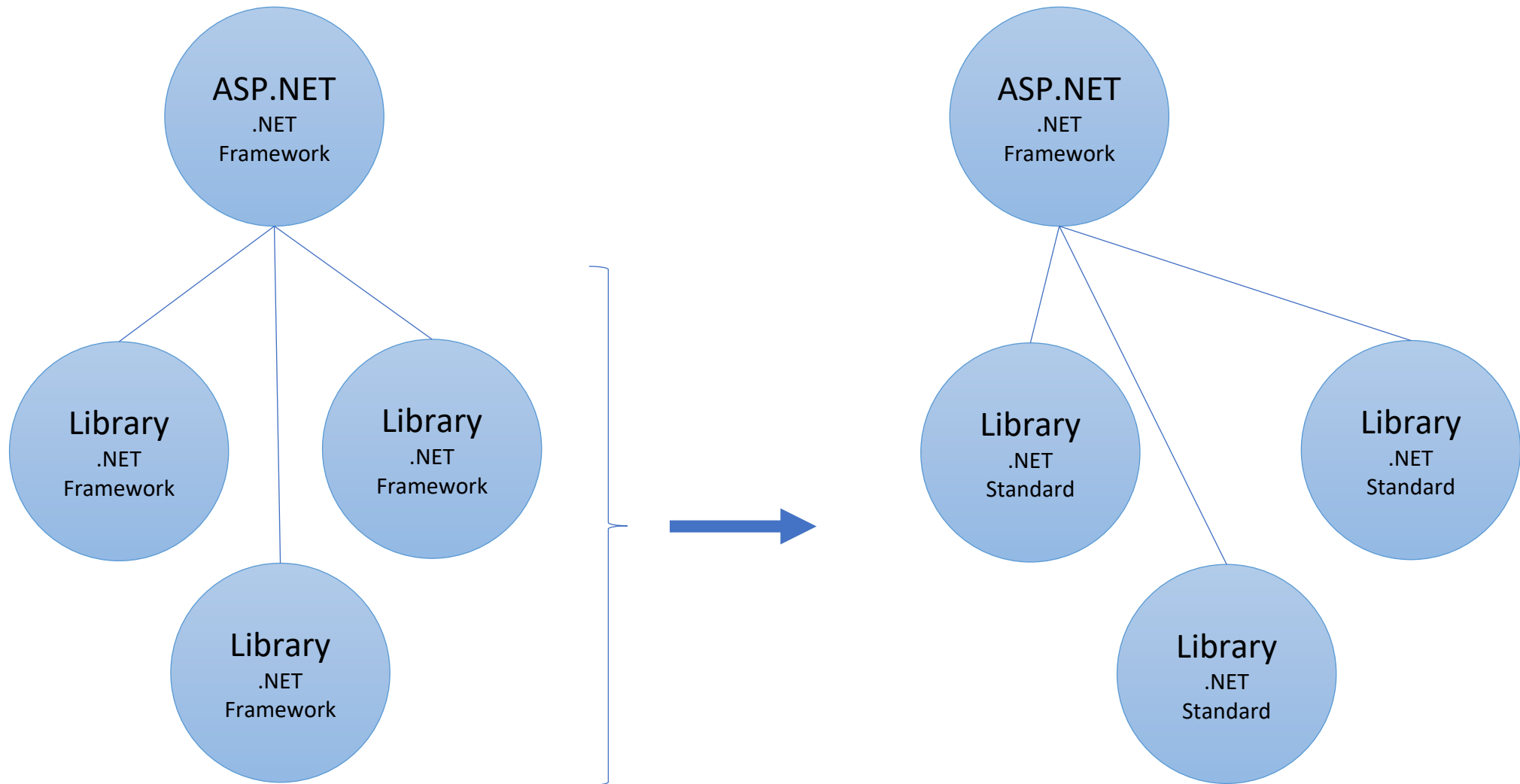
Partial Upgrades



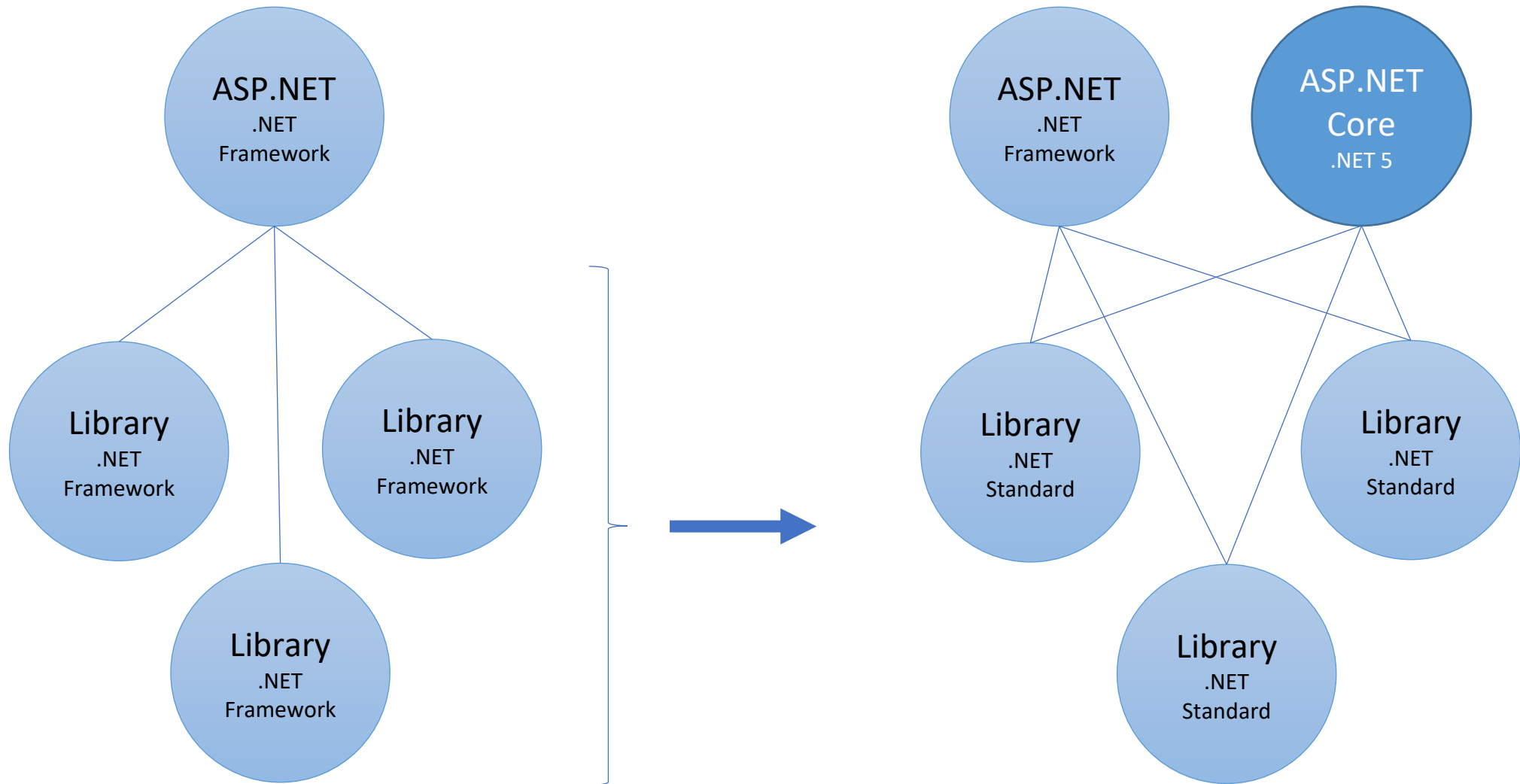
Partial Upgrades



Partial Upgrades



Partial Upgrades



Partial Upgrades

- Many ways to accomplish partial upgrades
- Be creative about sub-dividing project
- Upgrade in phases

8 Upgrade Steps

From .NET Framework to .NET 5

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1) .NET Portability Analyzer

Submission Id	d3c04720-2a8e-4c58-a677-60f3b203c24c			
Description				
Targets	.NET Core + Platform Extensions,.NET Framework,.NET Standard + Platform Extensions			
Header for assembly name entries	Target Framework	.NET Core + Pla	.NET Framework	.NET Standard
Interop.WIA		100	100	84.13
PaintDotNet	.NETFramework,Version=v4.7	58.5	100	58.5
PaintDotNet.Base	.NETFramework,Version=v4.7	95.3	100	95.3
PaintDotNet.Core	.NETFramework,Version=v4.7	80.73	100	80.73
PaintDotNet.Data	.NETFramework,Version=v4.7	92.23	100	92.23
PaintDotNet.Effects	.NETFramework,Version=v4.7	62.06	100	62.06
PaintDotNet.Framework	.NETFramework,Version=v4.7	45.05	100	45.05
PaintDotNet.Resources	.NETFramework,Version=v4.7	97.52	100	97.52
PaintDotNet.SystemLayer	.NETFramework,Version=v4.7	77.49	100	77.21
PaintDotNet.SystemLayer.Native.x64	.NETFramework,Version=v4.7	99.69	100	99.69
PaintDotNet.SystemLayer.Native.x86	.NETFramework,Version=v4.7	99.69	100	99.69
PdnRepair	.NETFramework,Version=v4.7	100	100	100
SetupNgen	.NETFramework,Version=v4.7	100	100	100
UpdateMonitor	.NETFramework,Version=v4.7	100	100	100
API Catalog last updated on	Monday, May 7, 2018			
See 'http://go.microsoft.com/fwlink/?LinkId=397652' to learn how to read this table				

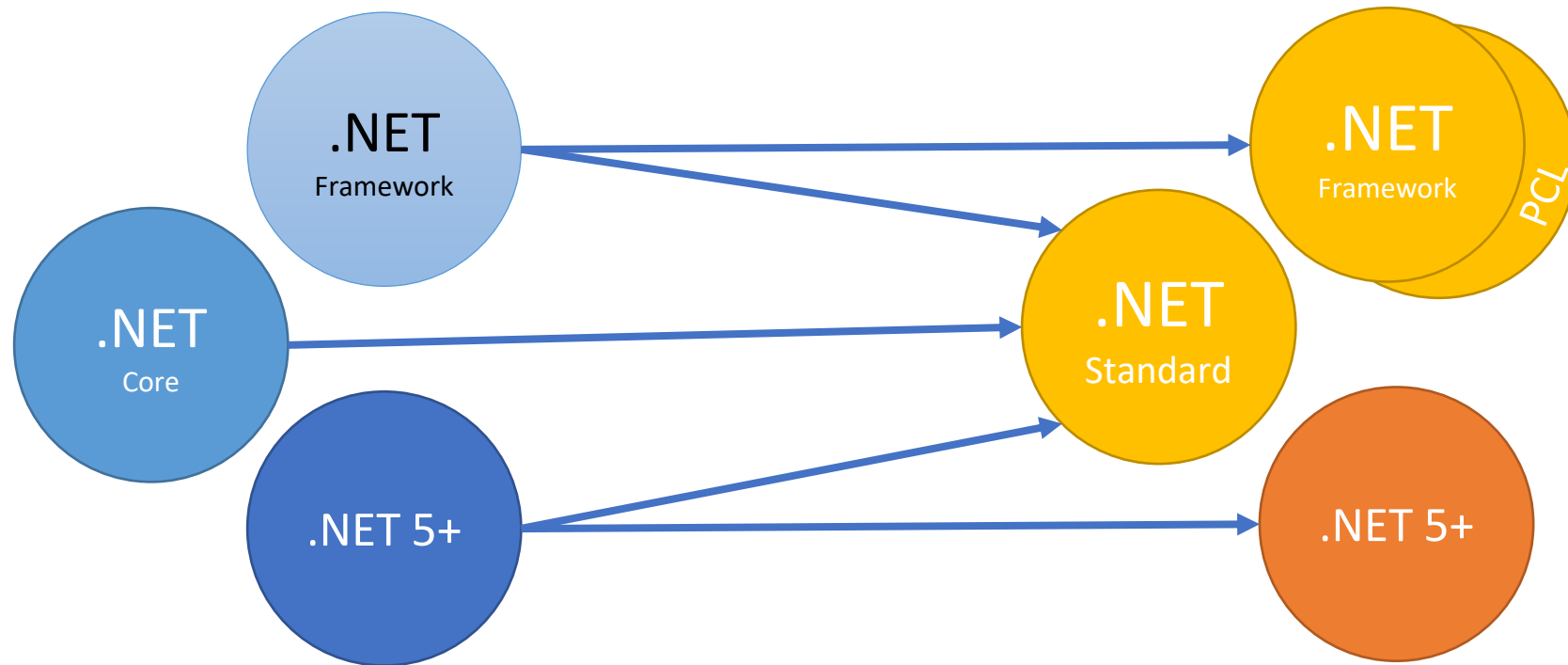
Demo

.NET Portability Analyzer

2) Evaluate Project Dependencies

.NET Framework, .NET Core, .NET Standard, or .NET 5+

.NET Standard - <https://dotnet.microsoft.com/platform/dotnet-standard#versions>



3) Convert Class Libraries

Automatically

```
dotnet tool install -g try-convert  
try-convert -tfm netstandard2.0
```

Manually

1. New class library
2. Move files
3. Migrate Nuget packages.config
4. Build
5. Resolve references or build errors
6. Update references

Demo

Convert Class Libraries

4) Convert WinForms & WPF

Automatically

```
try-convert -tfm net5.0
```

Manually

1. Project file upgrades (XML)
2. Opt-out unused code files (Properties folder)
3. Convert settings and resources
4. Build and fix issues
5. Include nuget package **Microsoft.Windows.Compatibility**

Demo

Convert WinForms Application

5) Convert ASP.NET Projects

Automatically

```
try-convert -tfm net5.0 --force-web-conversion
```

Manually

NOTE: Either way, *significant* manual work is necessary!

5) Convert ASP.NET Projects

Manually (Recommended)

1. Create a new ASP.NET .NET 5 project
2. Global.asax.cs to Startup class
3. Copy existing controllers and classes
4. Handle content files and bundles
5. MVC controllers derived from Microsoft.AspNetCore.Mvc.Controller.
6. API controllers derived from Microsoft.AspNetCore.Mvc.Controller with the [ApiController] attribute
7. Resolve any Nuget and reference errors
8. Adjust using statements for changed namespaces
9. Migrate handlers to .NET 5 Middleware
10. Migrate appSettings and connectionStrings from web.config to appsettings.json
11. Clean up any unnecessary files (Global.asax, app.config, packages.config)

Demo

Convert ASP.NET Application

6) Porting EF 6 to EF Core 5

MOST things just work

Some things won't work

INSPECT THE SQL!

Performance testing is key to find these

Includes() "Cartesian Explosion"

Solved by AsSplitQuery()

Complex GroupBy() can happen in memory

Flatten before grouping

Minor FluentAPI mapping changes

Global find/replace

Lazy Loading off by default

FULL REGRESSION TESTING!

7) Review Dependency Injection

Continue to use most DI Frameworks

Start using built-in ASP.NET DI framework

Set up or migrate mappings

Demo

Dependency Injection

8) Migrate to System.Text.Json

Upgrade to System.Text.Json

Newtonsoft.Json != System.Text.Json

No ReferenceLoopHandling!!! Many minor differences

System.Text.Json is generally faster

NOTE: SWITCH REQUIRES FULL REGRESSION TESTING!

Stay on NewtonSoft.Json

Demo

Migrate to System.Text.Json

Recap



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Thanks! Questions?

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github.com/jonathantower/migrate-net-5