.NET and C# Training

Prepared for KeHE

Hi, I'm J.

Jonathan "J." Tower

Principal Consultant & Partner

Trailhead Technology Partners

trailheadtechnology.com

🏆 Microsoft MVP in .NET

🏆 Frequent conference speaker

🍺 Organizer of Beer City Code conference

✉️ jtower@trailheadtechnology.com

🌐 trailheadtechnology.com/blog

🐦 jtowermi

Introductions

1. Your name
2. Your role on the team
3. Your experience with programming or software development

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More About Me

1. Jonathan "J." Tower

2. Partner & Principal Consultant, Trailhead Technology Partners
   - Trainer

3. Developing professionally for 23 years
   - Started .NET in 2001
   - Microsoft MVP in .NET
   - Consultant most of my career
   - Started in Chicago
   - Started Trailhead about 6.5 years ago
   - Architect and run projects today

Introductions

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Introductions

1. Your favorite aspect of software development
2. One interesting fact about you
3. What you are hoping to get out of the training
4. Your biggest fear about the training, if any

More About Me

1. I like the creative aspects of software

2. I've been to all 50 states, and 52 of the 63 US National Parks

3. I'm looking forward to teaching something I love to people who want to learn about it

4. Wanting to make sure its as useful as possible for everyone

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Introductions

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How It's Going To Work

- In-person today; online after
- Most Wednesday mornings this summer
- Estimated 16 times
- Questions at ANY TIME
- Joe and team available for questions between sessions

How It's Going To Work

1. Review solution to previous assignment (15 min)
2. New topic instruction, examples (3.5 hr)
3. Review assignment for next time (<15 min)

NOTE: Assignments should take between 15 minutes and 2 hours per week

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Course Agenda

1. .NET History and Overview

2. Visual Studio 2022 IDE Basics

3. Visual Studio Advanced

4. C# Introduction

5. .NET BCL Introduction

6. Data Access Basics

7. C# Advanced

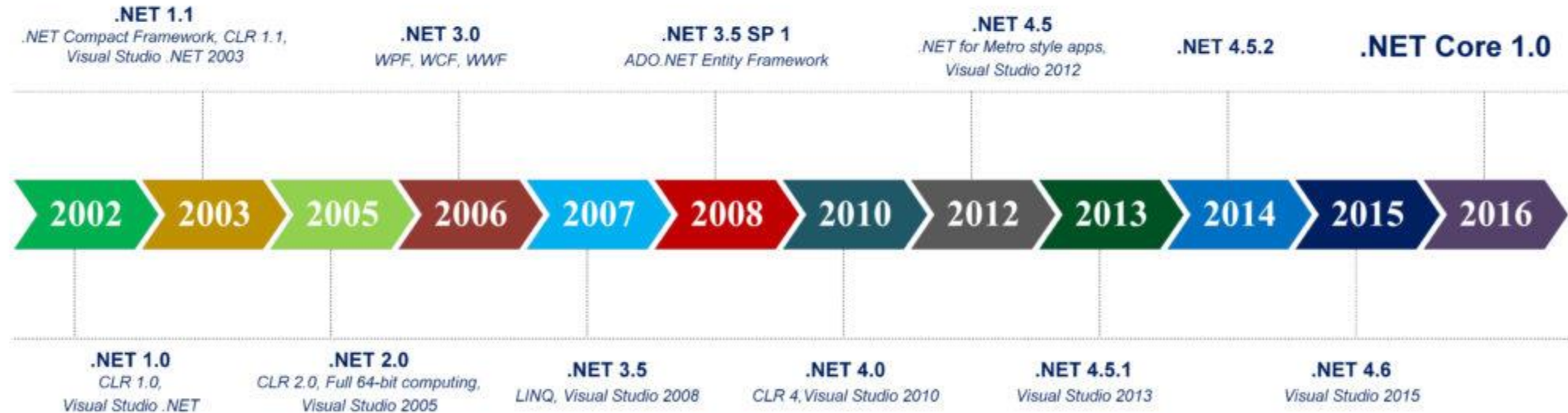8. Entity Framework 6

9. Version Control

10. ASP.NET Web APIs

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Today's Agenda

1. Format overview and expectation setting
2. .NET History and Overview
3. Visual Studio 2022 IDE Basics
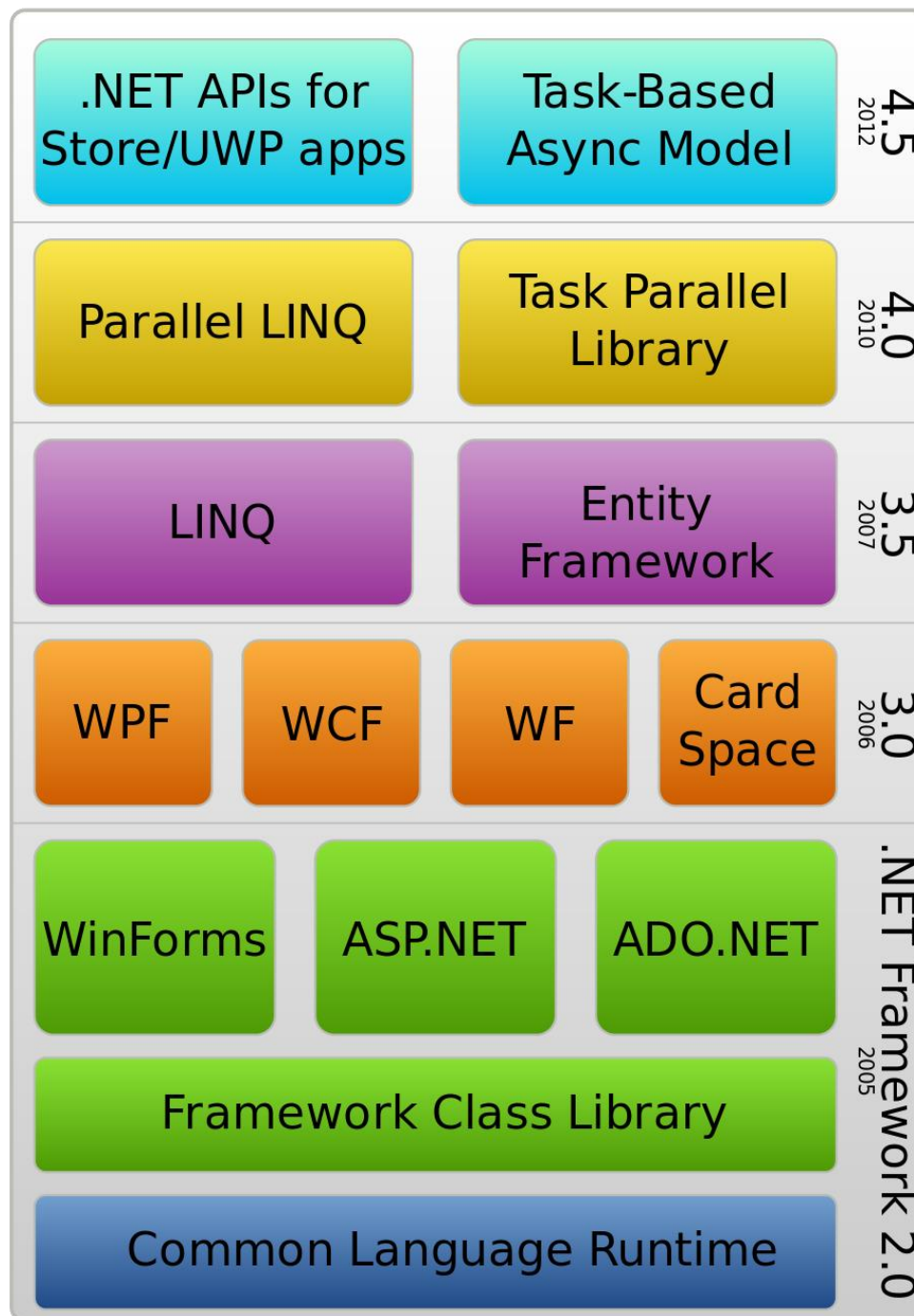
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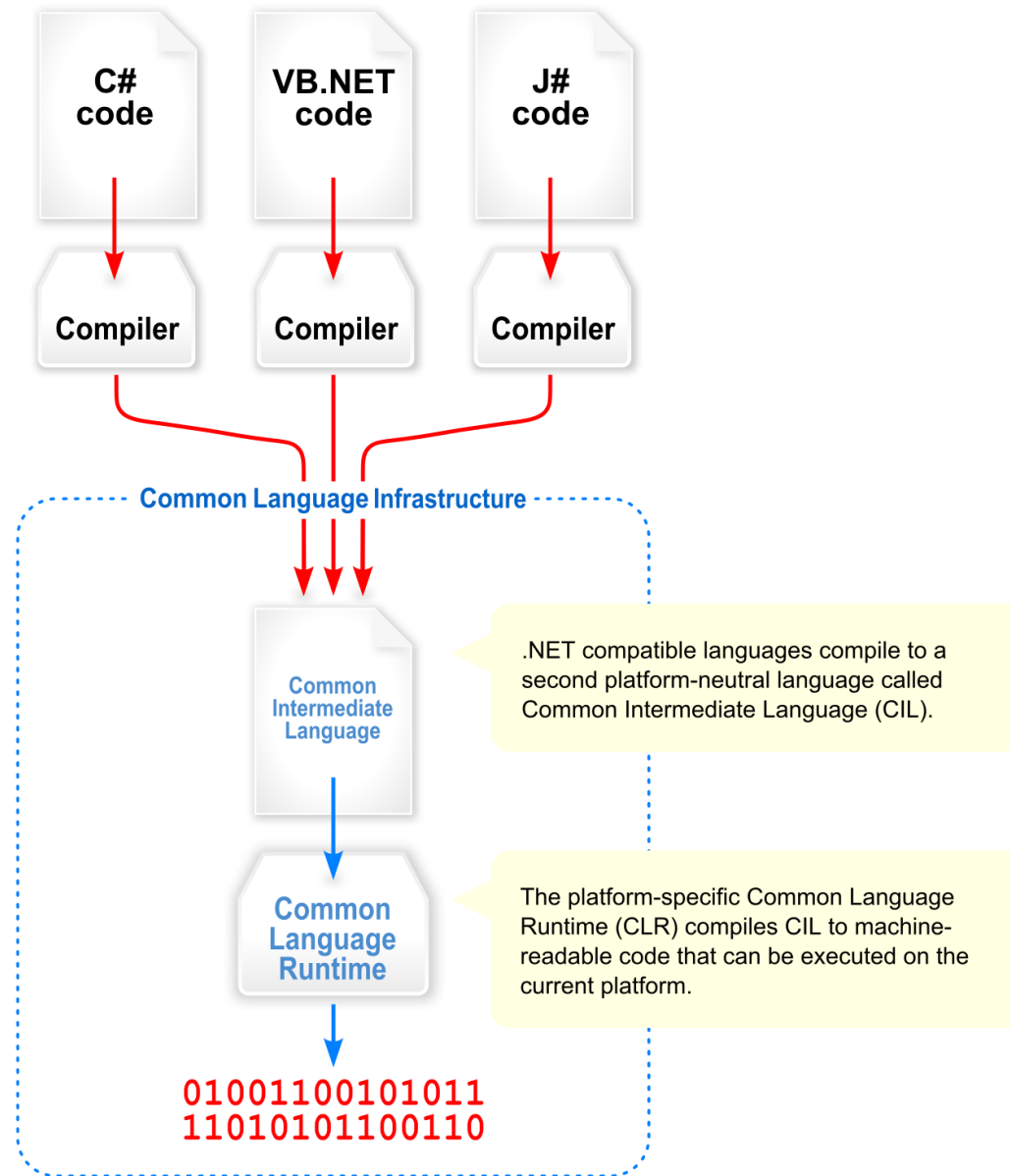# .NET History and Overview

What is .NET Framework

- The .NET Framework is a proprietary software framework developed by Microsoft that runs primarily on Microsoft Windows

- Most popular languages C# and VB.NET
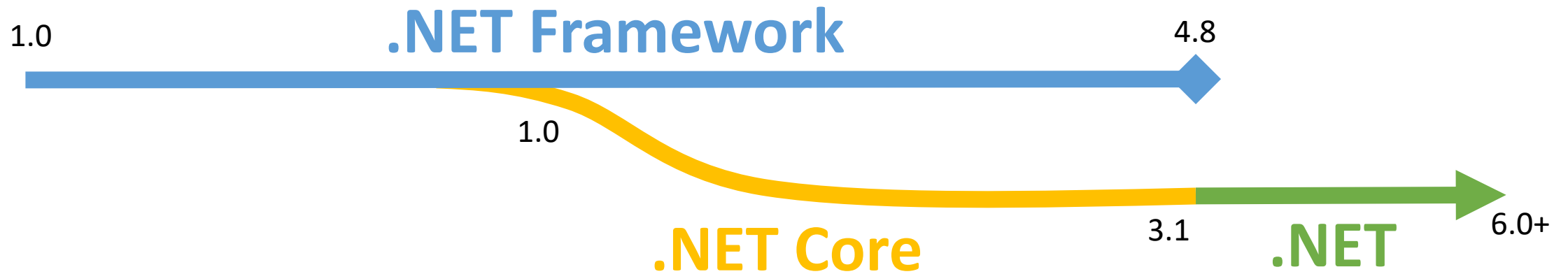
- Most popular IDE: Visual Studio

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The release history of .NET Framework

.NET 1.1
.NET Compact Framework, CLR 1.1,
Visual Studio .NET 2003

.NET 3.0
WPF, WCF, WWF

.NET 3.5 SP 1
ADO.NET Entity Framework

.NET 4.5
.NET for Metro style apps,
Visual Studio 2012

.NET 4.5.2

.NET Core 1.0

| 2002 | 2003 | 2005 | 2006 | 2007 | 2008 | 2010 | 2012 | 2013 | 2014 | 2015 | 2016 |

.NET 1.0
CLR 1.0,
Visual Studio .NET

.NET 2.0
CLR 2.0, Full 64-bit computing,
Visual Studio 2005

.NET 3.5
LINQ, Visual Studio 2008

.NET 4.0
CLR 4, Visual Studio 2010

.NET 4.5.1
Visual Studio 2013

.NET 4.6
Visual Studio 2015

.NET APIs for Store/UWP apps	Task-Based Async Model	**4.5** 2012
Parallel LINQ	Task Parallel Library	**4.0** 2010
LINQ	Entity Framework	**3.5** 2007
WPF	WCF	WF	Card Space	**3.0** 2006
WinForms	ASP.NET	ADO.NET	
Framework Class Library	
Common Language Runtime	

.NET Framework 2.0
2005

C# code

VB.NET code

J# code

Compiler

Compiler

Compiler

Common Language Infrastructure

Common Intermediate Language

.NET compatible languages compile to a second platform-neutral language called Common Intermediate Language (CIL).

Common Language Runtime

The platform-specific Common Language Runtime (CLR) compiles CIL to machine-readable code that can be executed on the current platform.

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.NET Acronym Soup

- CLI/CLR
- CTS
- CSC/VBC
- MSIL
- JIT
- BCL/FCL
- Roslyn

What is .NET Core

- Completely rewritten .NET
- Staring in 2016
- Cross-platform: Windows, Linux, and Mac
- Performance is a feature

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.NET Branding Going Forward
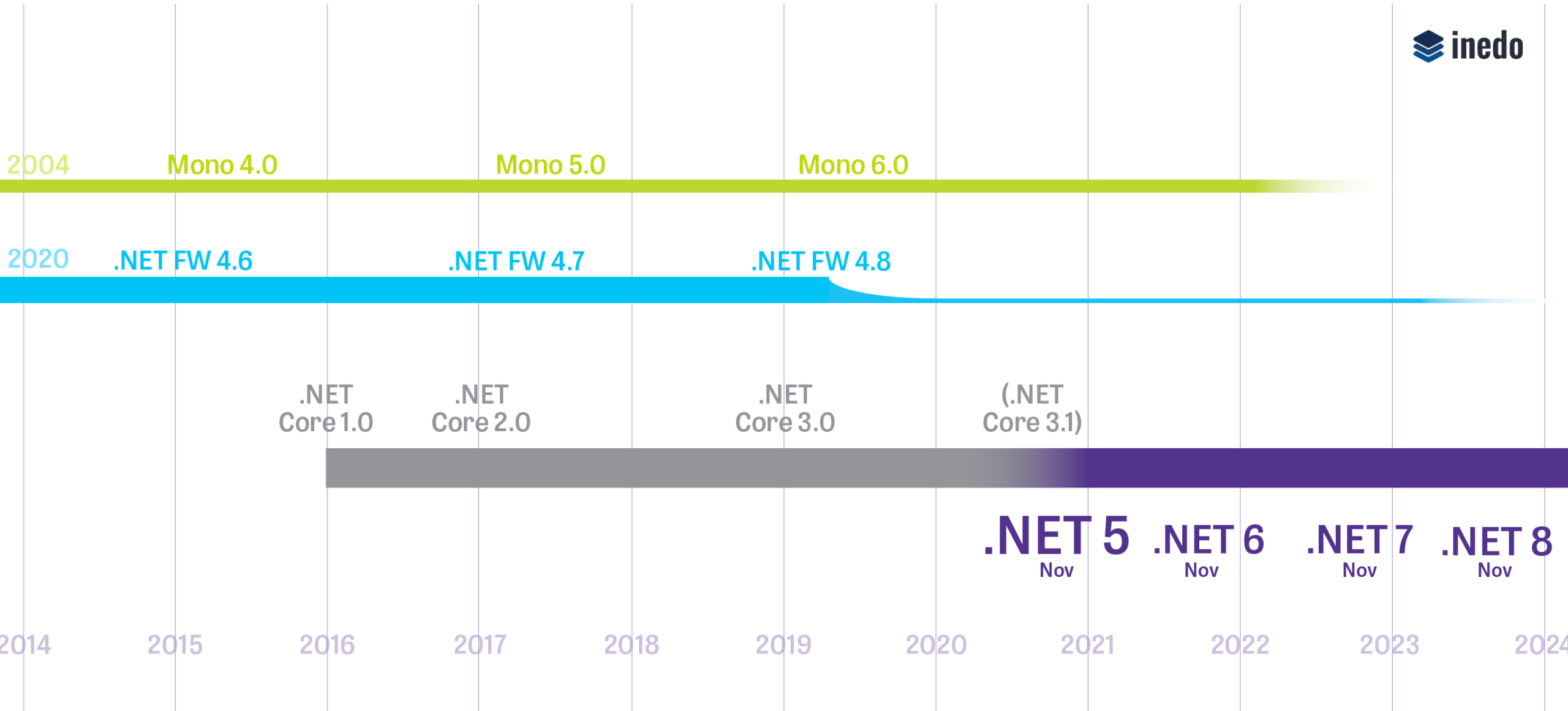
Visual Studio Basics

What is an IDE?

- Integrated Development Environment
  - Projects
  - Syntax highlighting
  - Code completion
  - Refactoring
  - Debugging
  - Version control
  - Search
  - AI
- Visual Studio = Most popular IDE in the world

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VS Editions

- Community, Professional, and Enterprise

Supported Features	Visual Studio Community Free download	Visual Studio Professional Buy	Visual Studio Enterprise Buy
⊕ Supported Usage Scenarios	●●●○	●●●●	●●●●
Development Platform Support [2]	●●●●	●●●●	●●●●
⊕ Integrated Development Environment	●●●○	●●●○	●●●●
⊕ Advanced Debugging and Diagnostics	●●○○	●●○○	●●●●
⊕ Testing Tools	●○○○	●○○○	●●●●
⊕ Cross-platform Development	●●○○	●●○○	●●●●
⊕ Collaboration Tools and Features	●●●●	●●●●	●●●●

https://visualstudio.microsoft.com/vs/compare/

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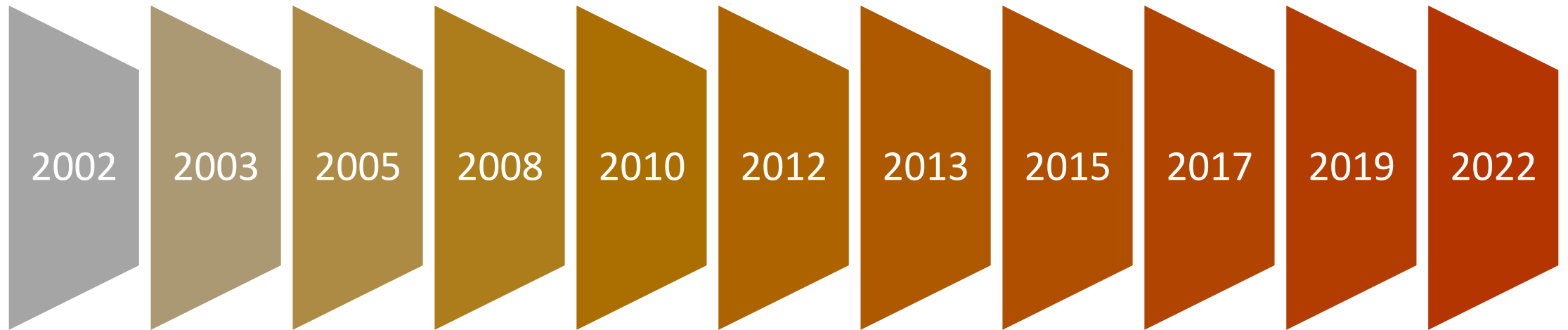TECHNOLOGY PARTNERS

Let's Install Visual Studio Now

If You Don't Have It Already...

Visual Studio Versions

Visual Studio vs Visual Studio Code

- Visual Studio
  - Fully featured IDE
  - Available for Windows and MacOS*
  - Paid product (excluding Community Edition)
  - Project and solution based
  - Compilation and debugging built in
- Visual Studio Code
  - Light-weight editor
  - Windows, Linux and MacOS
  - Free
  - Compilation or debugging using plug-ins

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Project and Solution Structure

- Solution file – group of projects edited/compiled together
- Project file – group of files compiled into single output
- Folders & Solutions Folders

Compilation and Assemblies

- Assemblies
  - DLL – libraries used by executables at run-time
  - EXE – directly executable
- Selected build configuration
- /bin and /obj directories

Demo

Project Structure and Compilation

ASP.NET = .NET Web Development

- Replaced older Active Server Pages (ASP) technology
- Started with "Web Forms" to make web development feel like desktop Development (Win Forms)
- Eventually replaced with other models: MVC, Web API, Razor Pages, and more.

Demo

ASP.NET

Desktop Development

- Console (command-line, text only)
- WinForms
- Windows Presentation Foundation, or WPF (XML-based UIs)
- Universal Windows Platform (UWP)
- WinUI
- .NET MAUI - Multi-platform App UI

Demo

WinForms

Class Library

- Shared code
- Only runs in the context of another project using it

Demo

ASP.NET + WinForms + Class Library

Many Other Project Types

- JavaScript SPAs
- Unit Testing
- UI Automation Testing
- Windows Service
- Xbox/Video Games
- Database
- Cloud-Native Technologies
- Blazor

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IDE Panes

- Documents
- Solution Explorer
- Toolbox
- Properties
- Output
- Object Browser

Demos

Commonly Used IDE Panes

Assignment 01

- Create a .NET console "Hello world" application using the code below

```
using System;
namespace MyConsoleApp
{
    internal class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Hello, world");
            Console.ReadKey();
        }
    }
}
```

- Run the application in the IDE
- Build the application and run the .EXE from outside the IDE

https://github.com/jonathantower/learning-dotnet

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