.NET Conf China 2025

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.NET Conf China 2025
改变世界 改变自己

更简单的 C# dotnet app.cs

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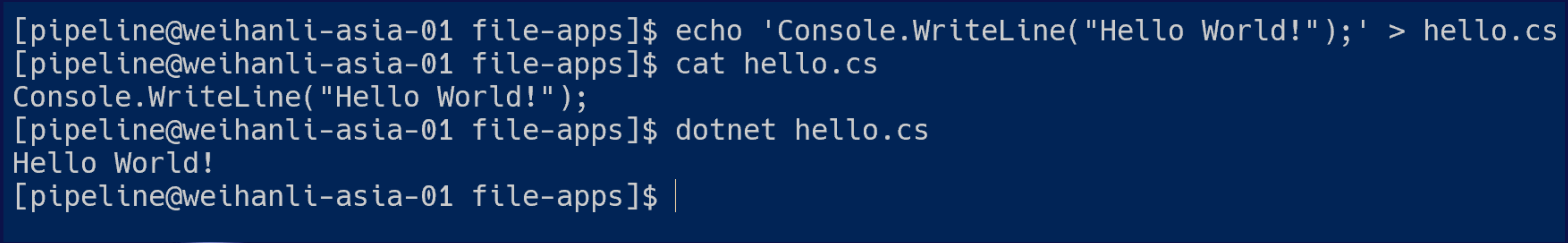
What is it

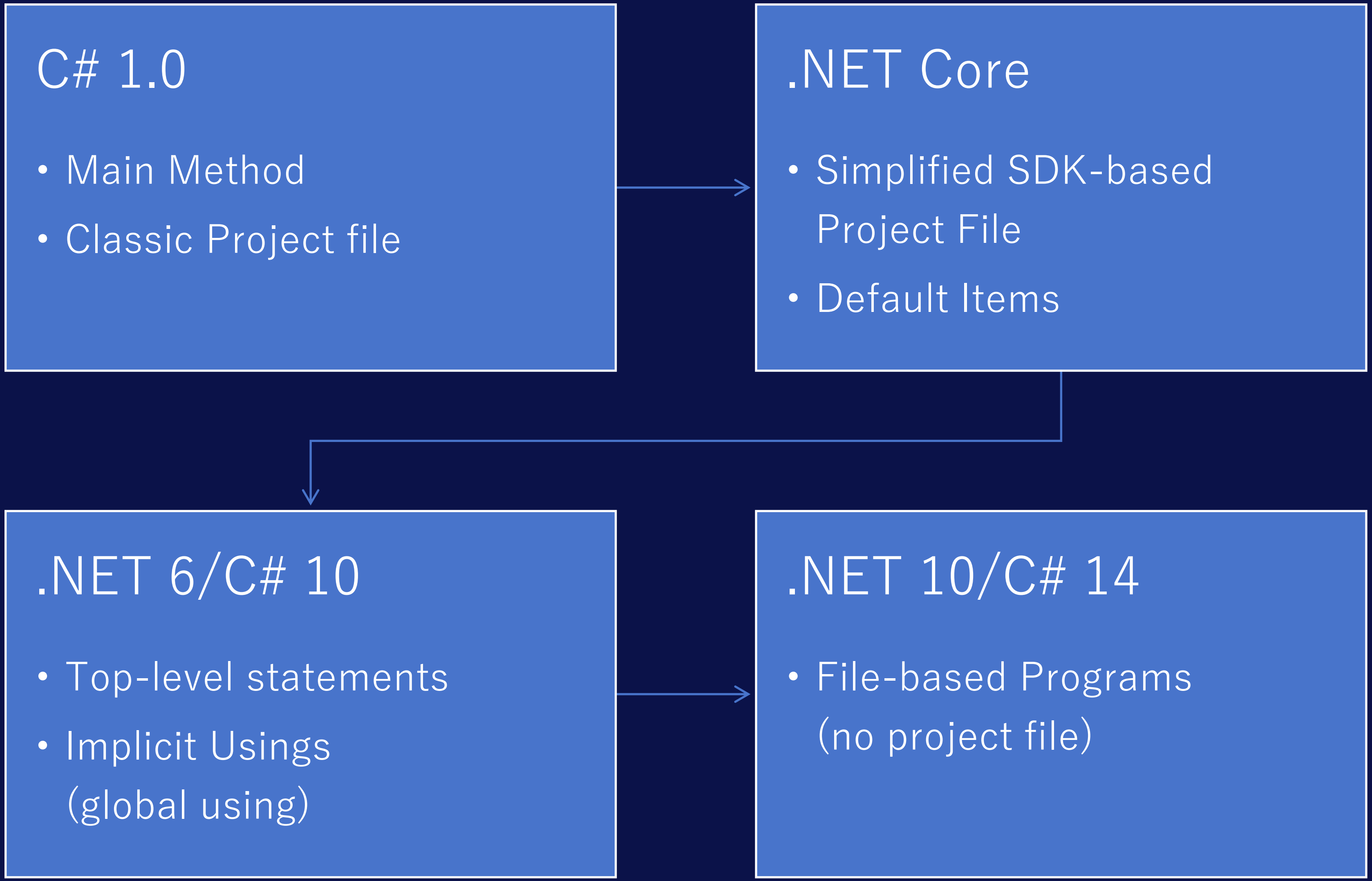


```
[pipeline@weihanli-asia-01 file-apps]$ echo 'Console.WriteLine("Hello World!");' > hello.cs
[pipeline@weihanli-asia-01 file-apps]$ cat hello.cs
Console.WriteLine("Hello World!");
[pipeline@weihanli-asia-01 file-apps]$ dotnet hello.cs
Hello World!
[pipeline@weihanli-asia-01 file-apps]$ 
```

- **No Project File**
- run file
- file-based programs/apps

简化 C# -
初学者友好 –
原型设计(PoC) -
类脚本语言， 自动化 –
可成长为项目 -

The Evolution of C# Simplicity



C# 1.0

- Main Method
- Classic Project file

.NET Core

- Simplified SDK-based Project File
- Default Items

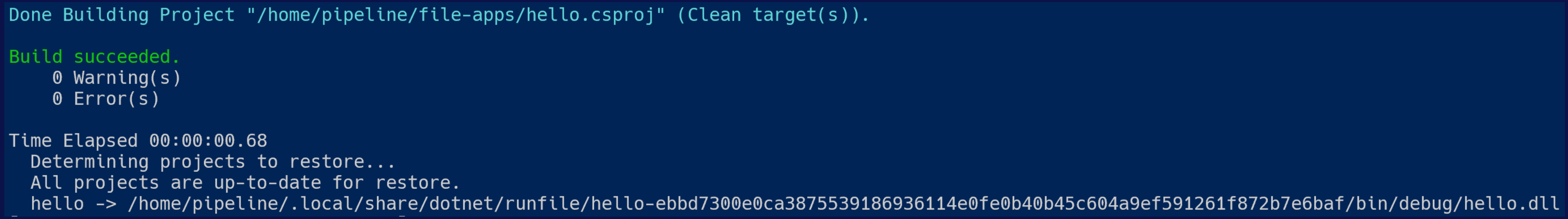
.NET 6/C# 10

- Top-level statements
- Implicit Usings (global using)

.NET 10/C# 14

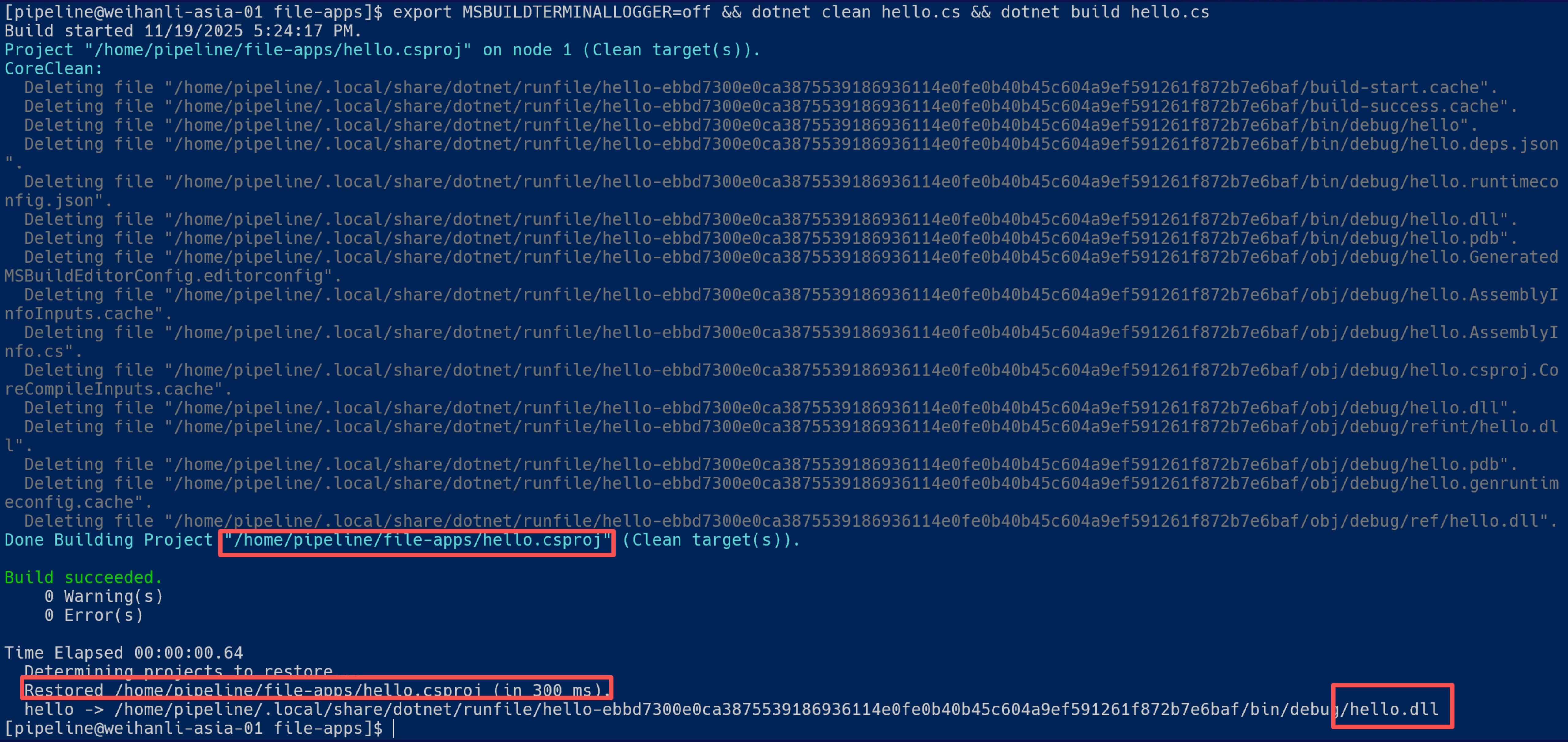
- File-based Programs (no project file)

How it works



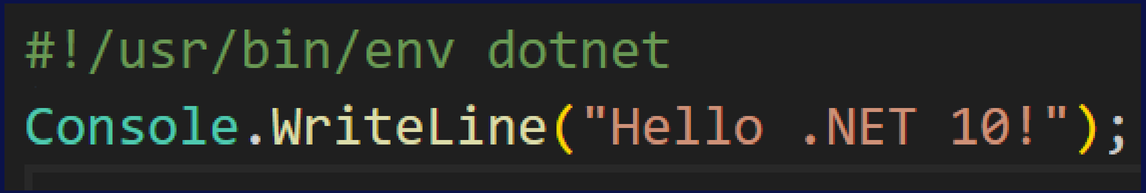
```
Done Building Project "/home/pipeline/file-apps/hello.csproj" (Clean target(s)).

Build succeeded.
    0 Warning(s)
    0 Error(s)

Time Elapsed 00:00:00.68
  Determining projects to restore...
  All projects are up-to-date for restore.
  hello -> /home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/bin/debug/hello.dll
```

In-Memory Virtual Project 基于内存的虚拟项目

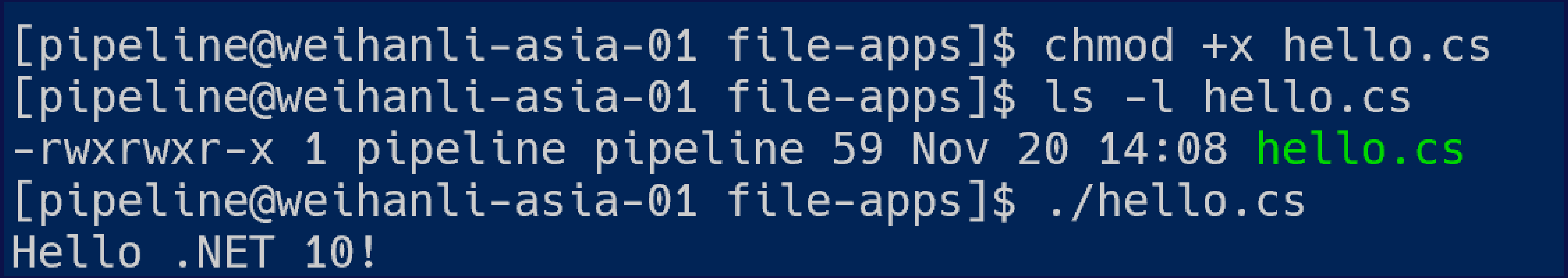


```
[pipeline@weihanli-asia-01 file-apps]$ export MSBUILDTERMINALLOGGER=off && dotnet clean hello.cs && dotnet build hello.cs
Build started 11/19/2025 5:24:17 PM.
Project "/home/pipeline/file-apps/hello.csproj" on node 1 (Clean target(s)).
CoreClean:
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/build-start.cache".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/build-success.cache".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/bin/debug/hello".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/bin/debug/hello.deps.json
".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/bin/debug/hello.runtimeco
nfig.json".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/bin/debug/hello.dll".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/bin/debug/hello.pdb".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/hello.Generated
MSBuildEditorConfig.editorconfig".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/hello.AssemblyI
nfoInputs.cache".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/hello.AssemblyI
nfo.cs".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/hello.csproj.Co
reCompileInputs.cache".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/hello.dll".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/refint/hello.dl
l".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/hello.pdb".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/hello.genruntim
econfig.cache".
  Deleting file "/home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/obj/debug/ref/hello.dll".
Done Building Project "/home/pipeline/file-apps/hello.csproj" (Clean target(s)).

Build succeeded.
    0 Warning(s)
    0 Error(s)

Time Elapsed 00:00:00.64
  Determining projects to restore...
  Restored /home/pipeline/file-apps/hello.csproj (in 300 ms).
  hello -> /home/pipeline/.local/share/dotnet/runfile/hello-ebbd7300e0ca3875539186936114e0fe0b40b45c604a9ef591261f872b7e6baf/bin/debug/hello.dll
[pipeline@weihanli-asia-01 file-apps]$
```

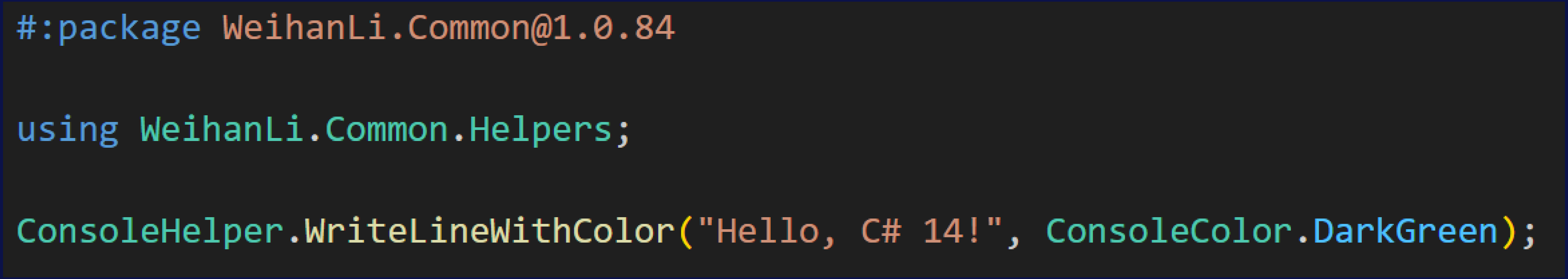
How to use it



```
#!/usr/bin/env dotnet
Console.WriteLine("Hello .NET 10!");
```

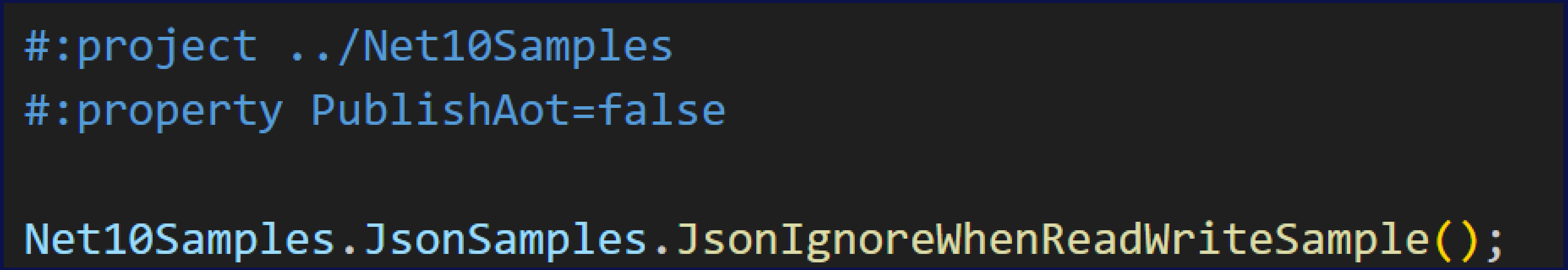


```
[pipeline@weihanli-asia-01 file-apps]$ chmod +x hello.cs
[pipeline@weihanli-asia-01 file-apps]$ ls -l hello.cs
-rwxrwxr-x 1 pipeline pipeline 59 Nov 20 14:08 hello.cs
[pipeline@weihanli-asia-01 file-apps]$ ./hello.cs
Hello .NET 10!
```

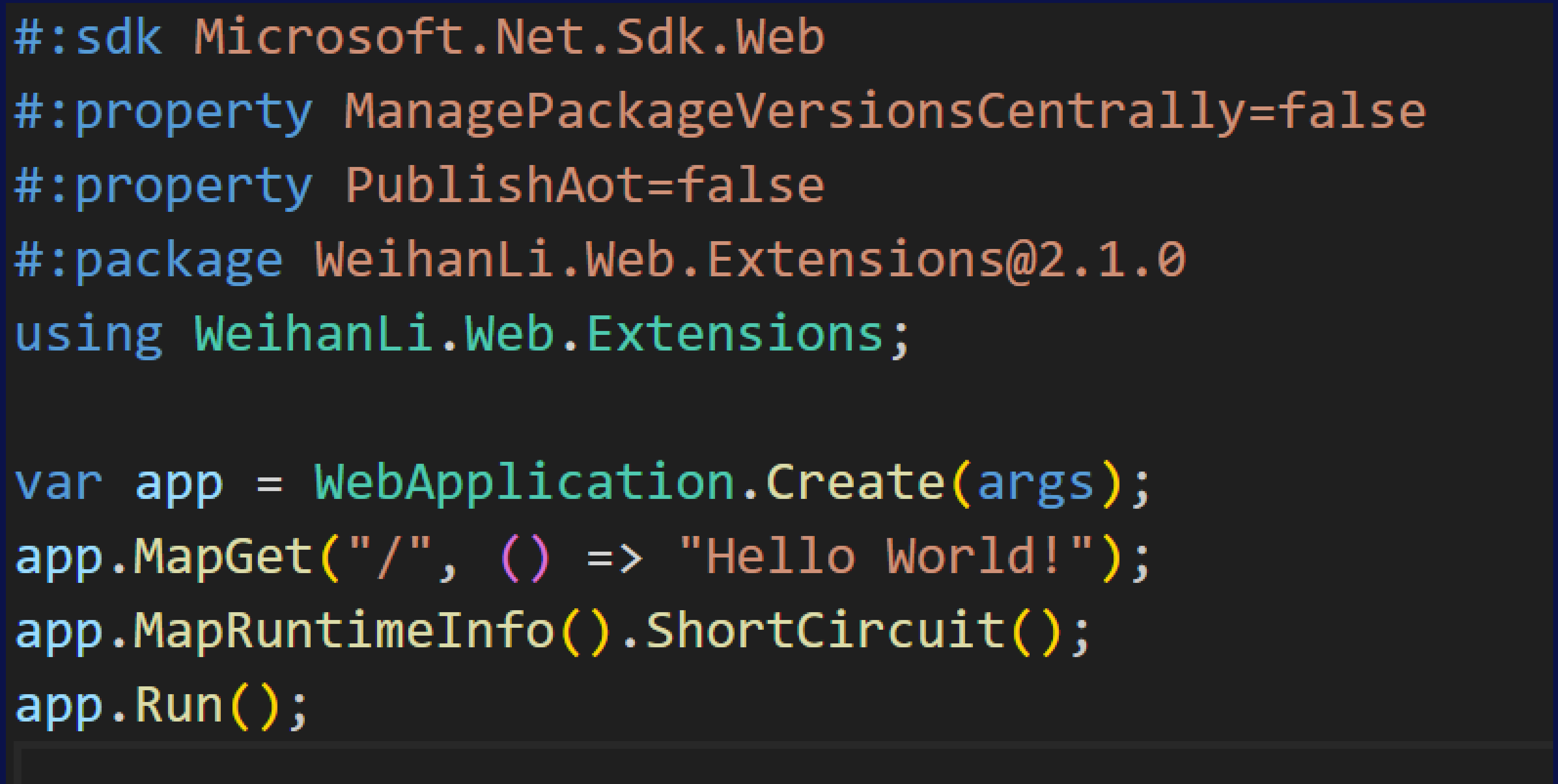


```
#:package WeihanLi.Common@1.0.84

using WeihanLi.Common.Helpers;

ConsoleHelper.WriteLineWithColor("Hello, C# 14!", ConsoleColor.DarkGreen);
```

How to use it

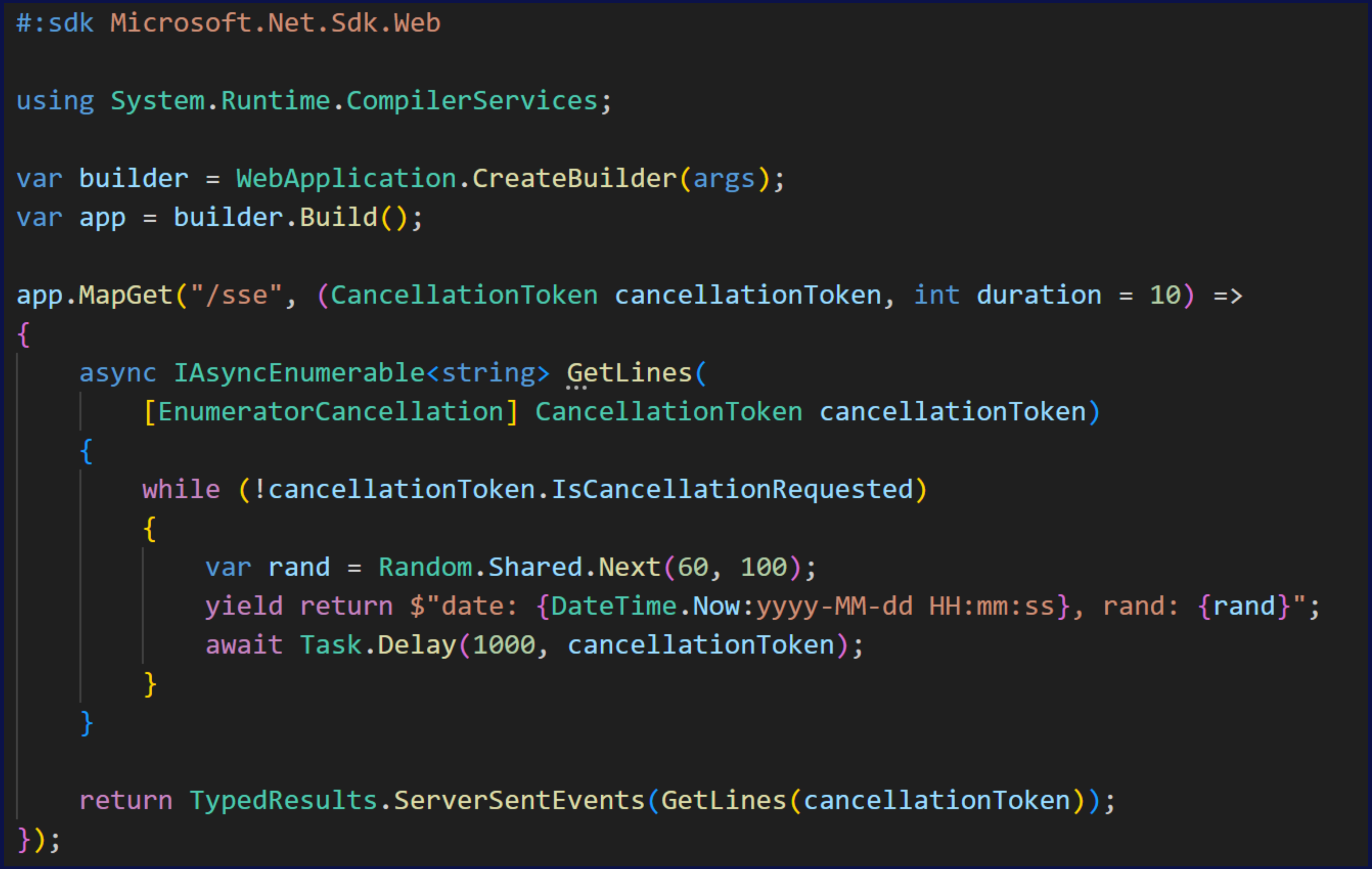


```
#:project ../Net10Samples
#:property PublishAot=false

Net10Samples.JsonSamples.JsonIgnoreWhenReadWriteSample();
```



```
#:sdk Microsoft.Net.Sdk.Web
#:property ManagePackageVersionsCentrally=false
#:property PublishAot=false
#:package WeihanLi.Web.Extensions@2.1.0
using WeihanLi.Web.Extensions;

var app = WebApplication.Create(args);
app.MapGet("/", () => "Hello World!");
app.MapRuntimeInfo().ShortCircuit();
app.Run();
```

How to use it

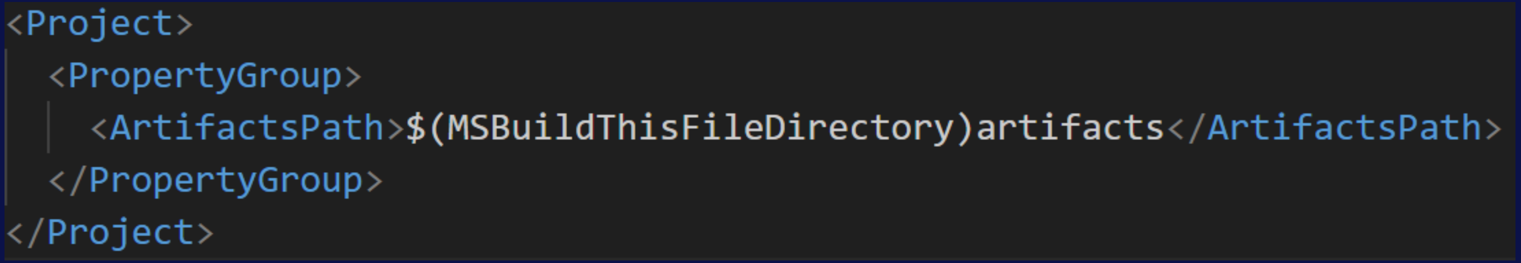


```csharp
#:sdk Microsoft.Net.Sdk.Web

using System.Runtime.CompilerServices;

var builder = WebApplication.CreateBuilder(args);
var app = builder.Build();

app.MapGet("/sse", (CancellationToken cancellationToken, int duration = 10) =>
{
    async IAsyncEnumerable<string> GetLines(
        [EnumeratorCancellation] CancellationToken cancellationToken)
    {
        while (!cancellationToken.IsCancellationRequested)
        {
            var rand = Random.Shared.Next(60, 100);
            yield return $"date: {DateTime.Now:yyyy-MM-dd HH:mm:ss}, rand: {rand}";
            await Task.Delay(1000, cancellationToken);
        }
    }

    return TypedResults.ServerSentEvents(GetLines(cancellationToken));
});
```

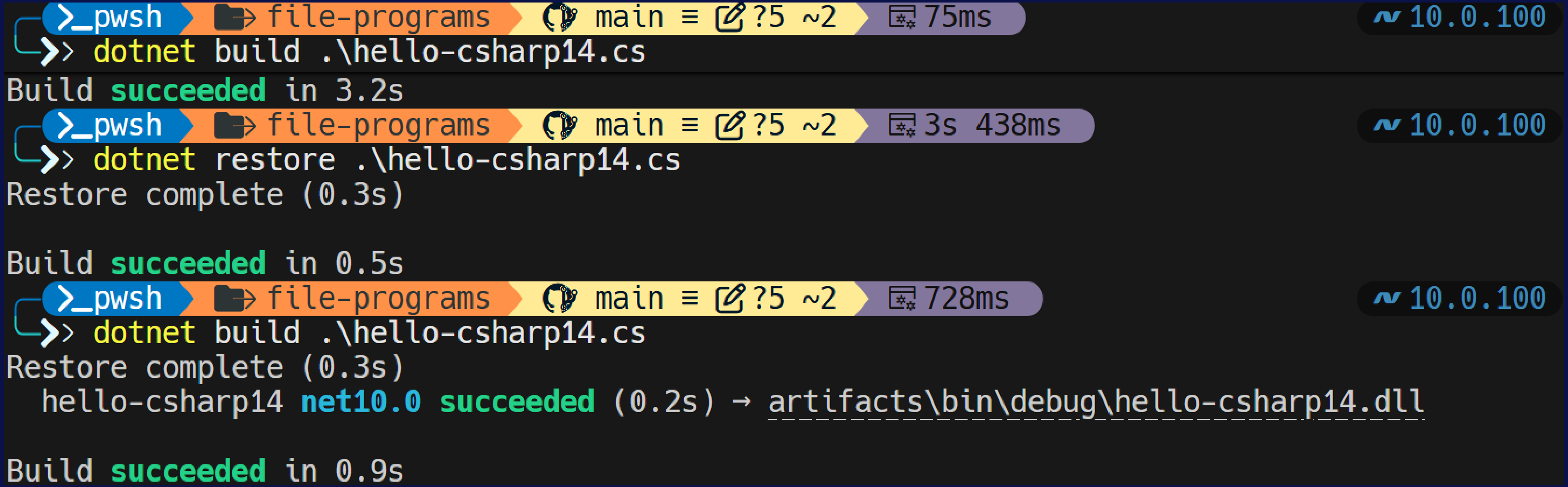
How to use it

Common Build files

- Directory.Build.props
- Directory.Build.targets
- Directory.Packages.props

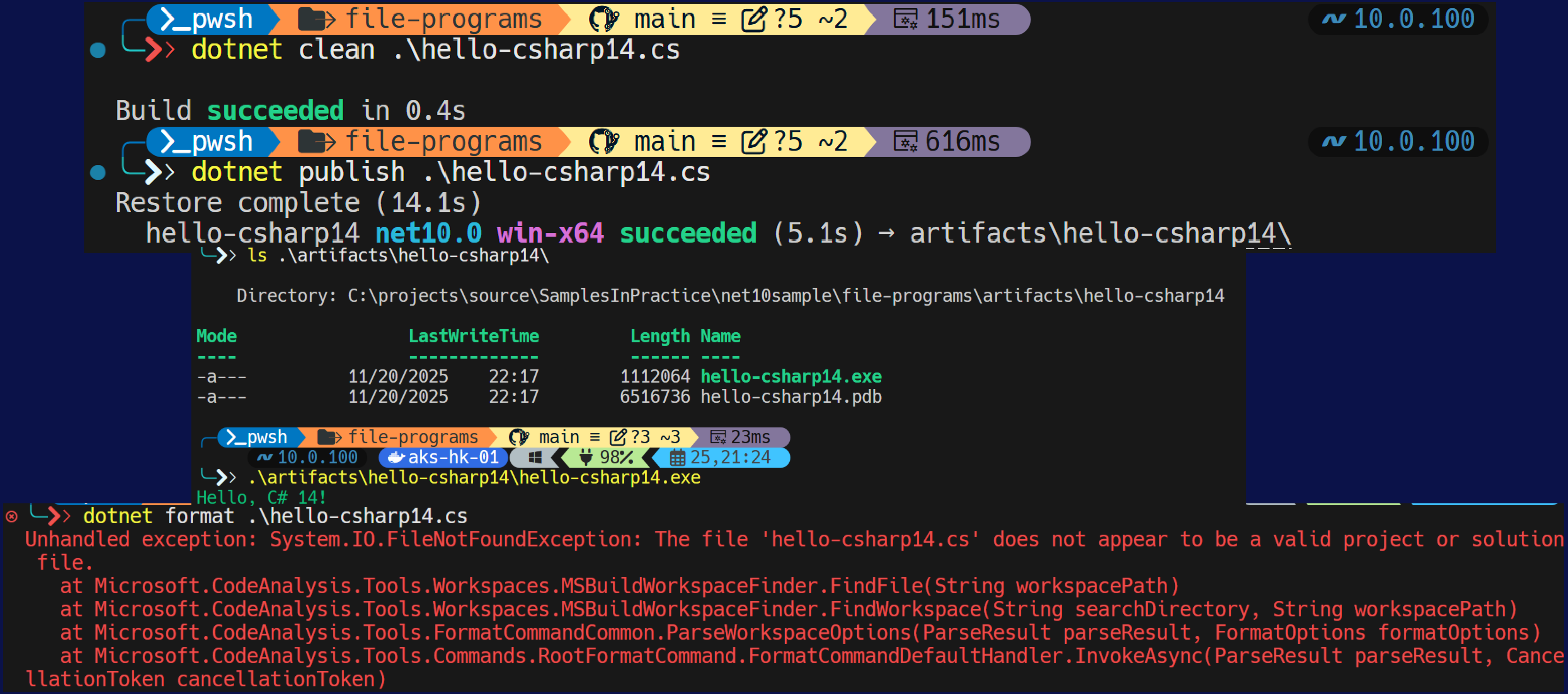


```xml
<Project>
  <PropertyGroup>
    <ArtifactsPath>$(MSBuildThisFileDirectory)artifacts</ArtifactsPath>
  </PropertyGroup>
</Project>
```



```
╭─ >_pwsh   file-programs   main ≡  ?5 ~2   75ms                      10.0.100
╰─❯❯ dotnet build .\hello-csharp14.cs
Build succeeded in 3.2s
╭─ >_pwsh   file-programs   main ≡  ?5 ~2   3s 438ms                  10.0.100
╰─❯❯ dotnet restore .\hello-csharp14.cs
Restore complete (0.3s)

Build succeeded in 0.5s
╭─ >_pwsh   file-programs   main ≡  ?5 ~2   728ms                     10.0.100
╰─❯❯ dotnet build .\hello-csharp14.cs
Restore complete (0.3s)
  hello-csharp14 net10.0 succeeded (0.2s) → artifacts\bin\debug\hello-csharp14.dll

Build succeeded in 0.9s
```

How to use it

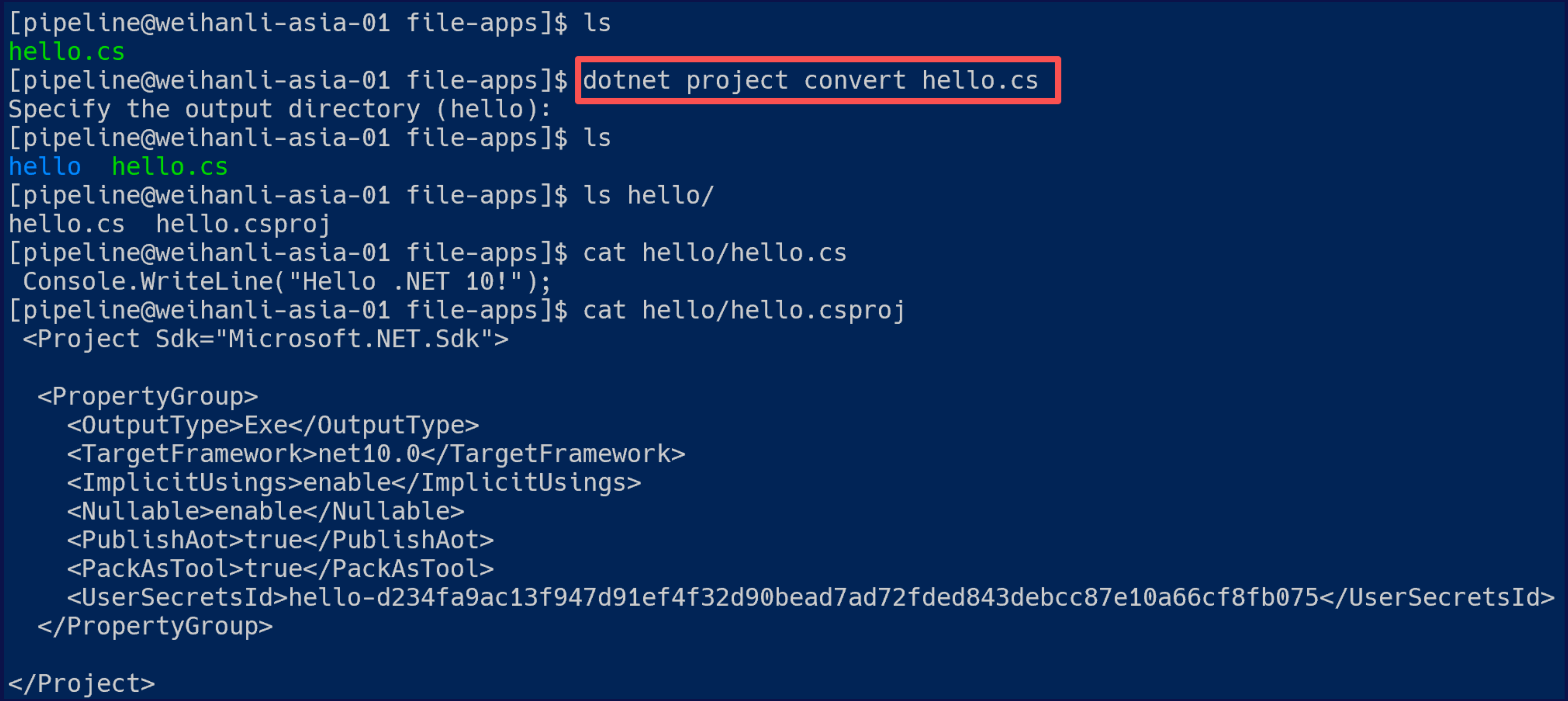


```
 ╭─ ❯_pwsh   file-programs    main ≡ ?5 ~2   151ms                                   10.0.100
● ╰─❯❯ dotnet clean .\hello-csharp14.cs

  Build succeeded in 0.4s
 ╭─ ❯_pwsh   file-programs    main ≡ ?5 ~2   616ms                                   10.0.100
● ╰─❯❯ dotnet publish .\hello-csharp14.cs
  Restore complete (14.1s)
    hello-csharp14 net10.0 win-x64 succeeded (5.1s) → artifacts\hello-csharp14\
```

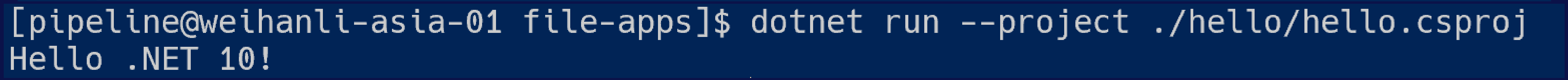
```
╰─❯❯ ls .\artifacts\hello-csharp14\

    Directory: C:\projects\source\SamplesInPractice\net10sample\file-programs\artifacts\hello-csharp14

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a---          11/20/2025    22:17        1112064 hello-csharp14.exe
-a---          11/20/2025    22:17        6516736 hello-csharp14.pdb

╭─ ❯_pwsh   file-programs    main ≡ ?3 ~3   23ms
│   10.0.100   aks-hk-01      98%   25,21:24
╰─❯❯ .\artifacts\hello-csharp14\hello-csharp14.exe
Hello, C# 14!
```

```
⊗ ╰─❯❯ dotnet format .\hello-csharp14.cs
 Unhandled exception: System.IO.FileNotFoundException: The file 'hello-csharp14.cs' does not appear to be a valid project or solution
  file.
    at Microsoft.CodeAnalysis.Tools.Workspaces.MSBuildWorkspaceFinder.FindFile(String workspacePath)
    at Microsoft.CodeAnalysis.Tools.Workspaces.MSBuildWorkspaceFinder.FindWorkspace(String searchDirectory, String workspacePath)
    at Microsoft.CodeAnalysis.Tools.FormatCommandCommon.ParseWorkspaceOptions(ParseResult parseResult, FormatOptions formatOptions)
    at Microsoft.CodeAnalysis.Tools.Commands.RootFormatCommand.FormatCommandDefaultHandler.InvokeAsync(ParseResult parseResult, Cance
 llationToken cancellationToken)
```

How to use it

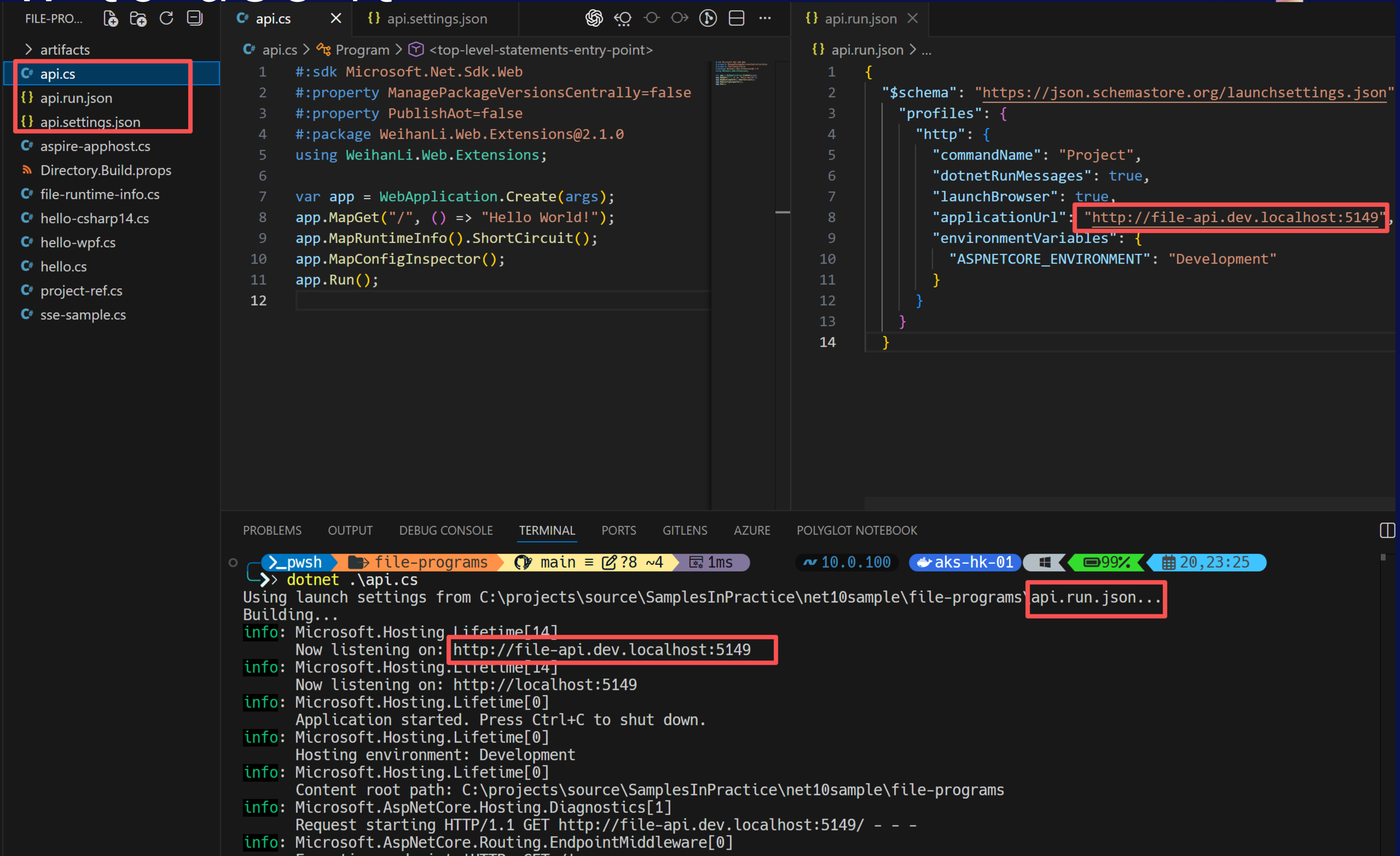


```
[pipeline@weihanli-asia-01 file-apps]$ ls
hello.cs
[pipeline@weihanli-asia-01 file-apps]$ dotnet project convert hello.cs
Specify the output directory (hello):
[pipeline@weihanli-asia-01 file-apps]$ ls
hello  hello.cs
[pipeline@weihanli-asia-01 file-apps]$ ls hello/
hello.cs  hello.csproj
[pipeline@weihanli-asia-01 file-apps]$ cat hello/hello.cs
 Console.WriteLine("Hello .NET 10!");
[pipeline@weihanli-asia-01 file-apps]$ cat hello/hello.csproj
 <Project Sdk="Microsoft.NET.Sdk">

  <PropertyGroup>
    <OutputType>Exe</OutputType>
    <TargetFramework>net10.0</TargetFramework>
    <ImplicitUsings>enable</ImplicitUsings>
    <Nullable>enable</Nullable>
    <PublishAot>true</PublishAot>
    <PackAsTool>true</PackAsTool>
    <UserSecretsId>hello-d234fa9ac13f947d91ef4f32d90bead7ad72fded843debcc87e10a66cf8fb075</UserSecretsId>
  </PropertyGroup>

</Project>
```



```
[pipeline@weihanli-asia-01 file-apps]$ dotnet run --project ./hello/hello.csproj
Hello .NET 10!
```

How to use it

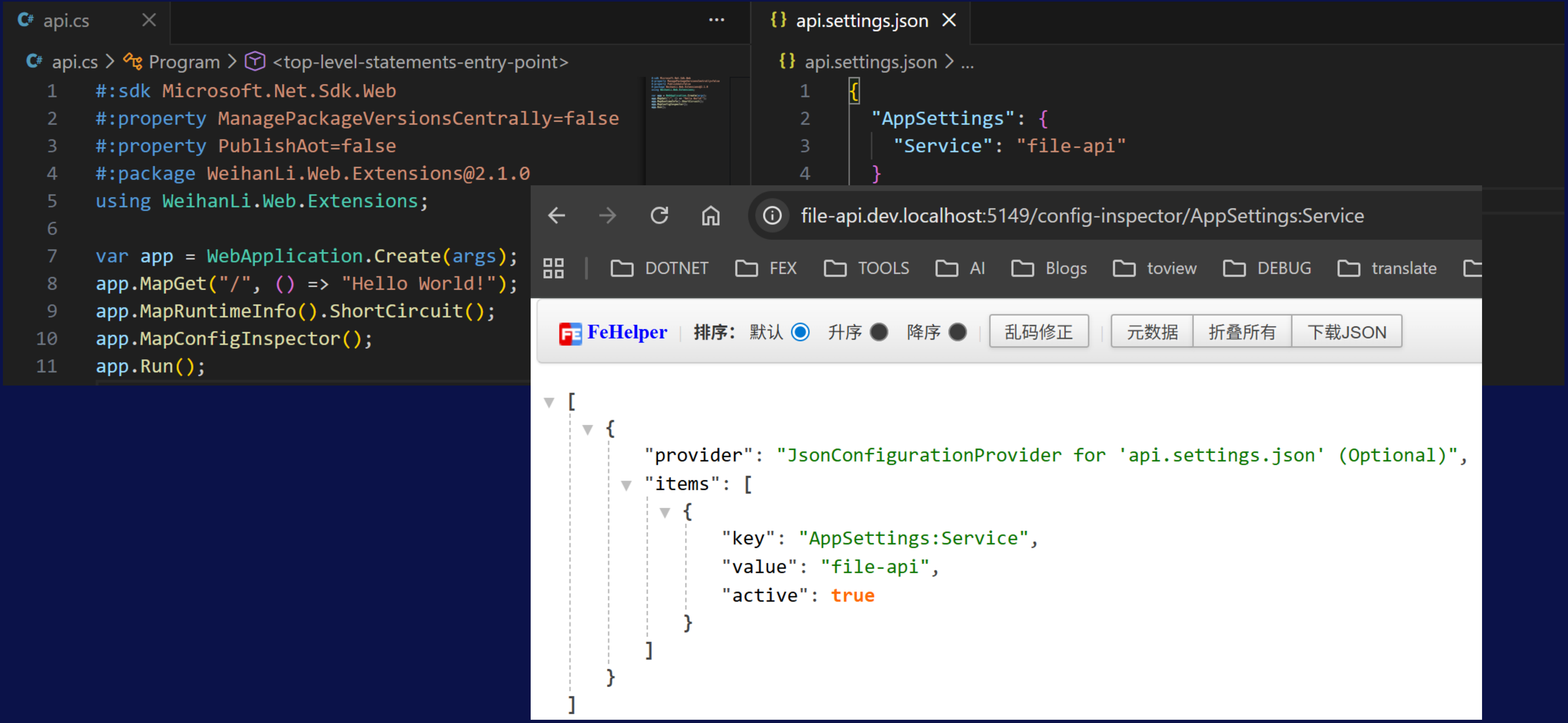


```csharp
#:sdk Microsoft.Net.Sdk.Web
#:property ManagePackageVersionsCentrally=false
#:property PublishAot=false
#:package WeihanLi.Web.Extensions@2.1.0
using WeihanLi.Web.Extensions;

var app = WebApplication.Create(args);
app.MapGet("/", () => "Hello World!");
app.MapRuntimeInfo().ShortCircuit();
app.MapConfigInspector();
app.Run();
```

```json
{
  "$schema": "https://json.schemastore.org/launchsettings.json",
    "profiles": {
      "http": {
        "commandName": "Project",
        "dotnetRunMessages": true,
        "launchBrowser": true,
        "applicationUrl": "http://file-api.dev.localhost:5149",
        "environmentVariables": {
          "ASPNETCORE_ENVIRONMENT": "Development"
        }
      }
    }
}
```

```
╭ >_pwsh  file-programs   main ≡ ?8 ~4   1ms          10.0.100   aks-hk-01     99%   20,23:25
╰─>> dotnet .\api.cs
Using launch settings from C:\projects\source\SamplesInPractice\net10sample\file-programs\api.run.json...
Building...
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://file-api.dev.localhost:5149
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://localhost:5149
info: Microsoft.Hosting.Lifetime[0]
      Application started. Press Ctrl+C to shut down.
info: Microsoft.Hosting.Lifetime[0]
      Hosting environment: Development
info: Microsoft.Hosting.Lifetime[0]
      Content root path: C:\projects\source\SamplesInPractice\net10sample\file-programs
info: Microsoft.AspNetCore.Hosting.Diagnostics[1]
      Request starting HTTP/1.1 GET http://file-api.dev.localhost:5149/ - - -
info: Microsoft.AspNetCore.Routing.EndpointMiddleware[0]
```

How to use it



api.cs
api.cs > Program > <top-level-statements-entry-point>
api.settings.json
api.settings.json > ...

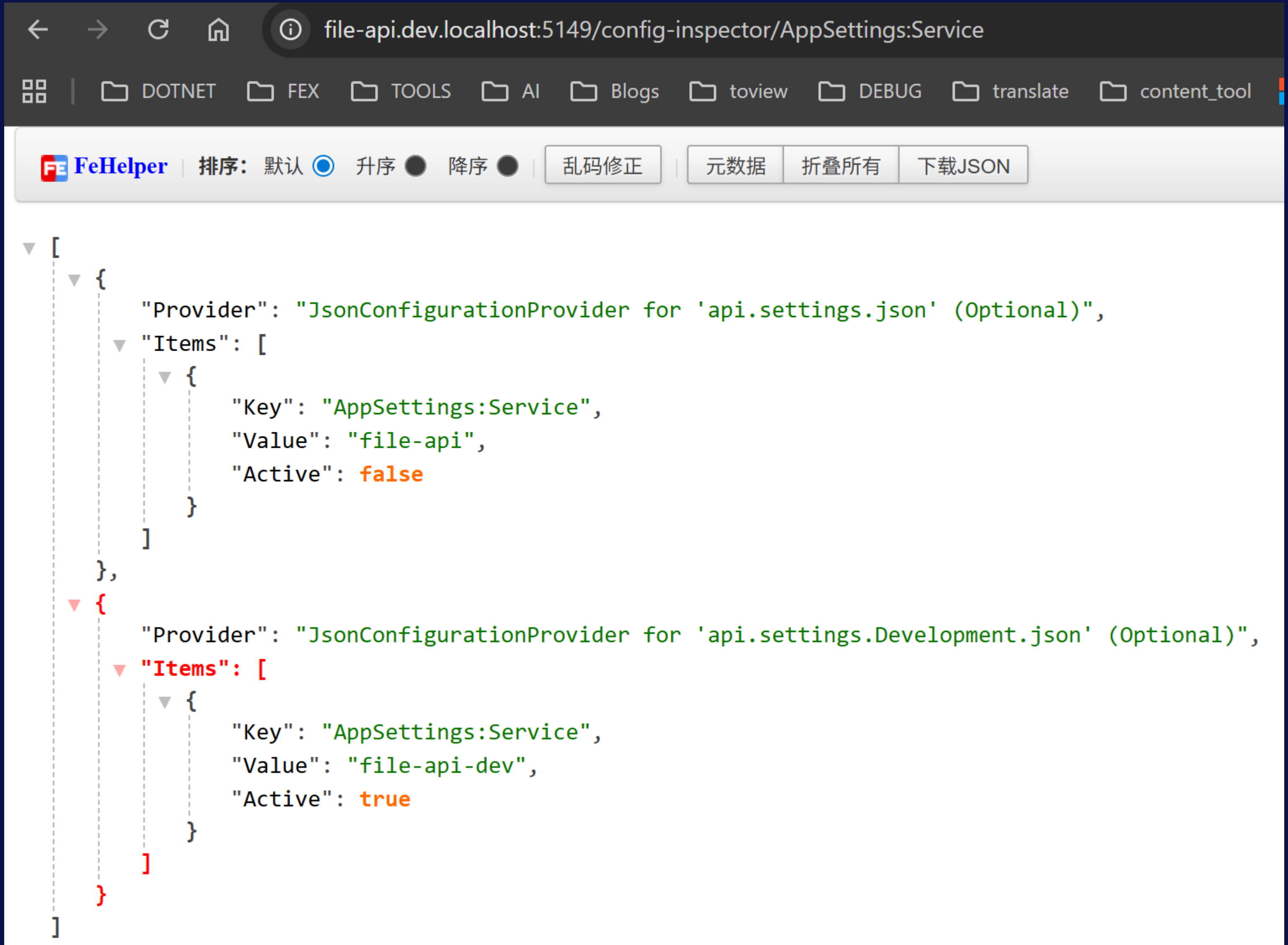
```csharp
#:sdk Microsoft.Net.Sdk.Web
#:property ManagePackageVersionsCentrally=false
#:property PublishAot=false
#:package WeihanLi.Web.Extensions@2.1.0
using WeihanLi.Web.Extensions;

var app = WebApplication.Create(args);
app.MapGet("/", () => "Hello World!");
app.MapRuntimeInfo().ShortCircuit();
app.MapConfigInspector();
app.Run();
```

```json
{
  "AppSettings": {
    "Service": "file-api"
  }
```

file-api.dev.localhost:5149/config-inspector/AppSettings:Service
DOTNET
FEX
TOOLS
AI
Blogs
toview
DEBUG
translate
FeHelper
排序: 默认 ● 升序 ● 降序 ●
乱码修正
元数据
折叠所有
下载JSON

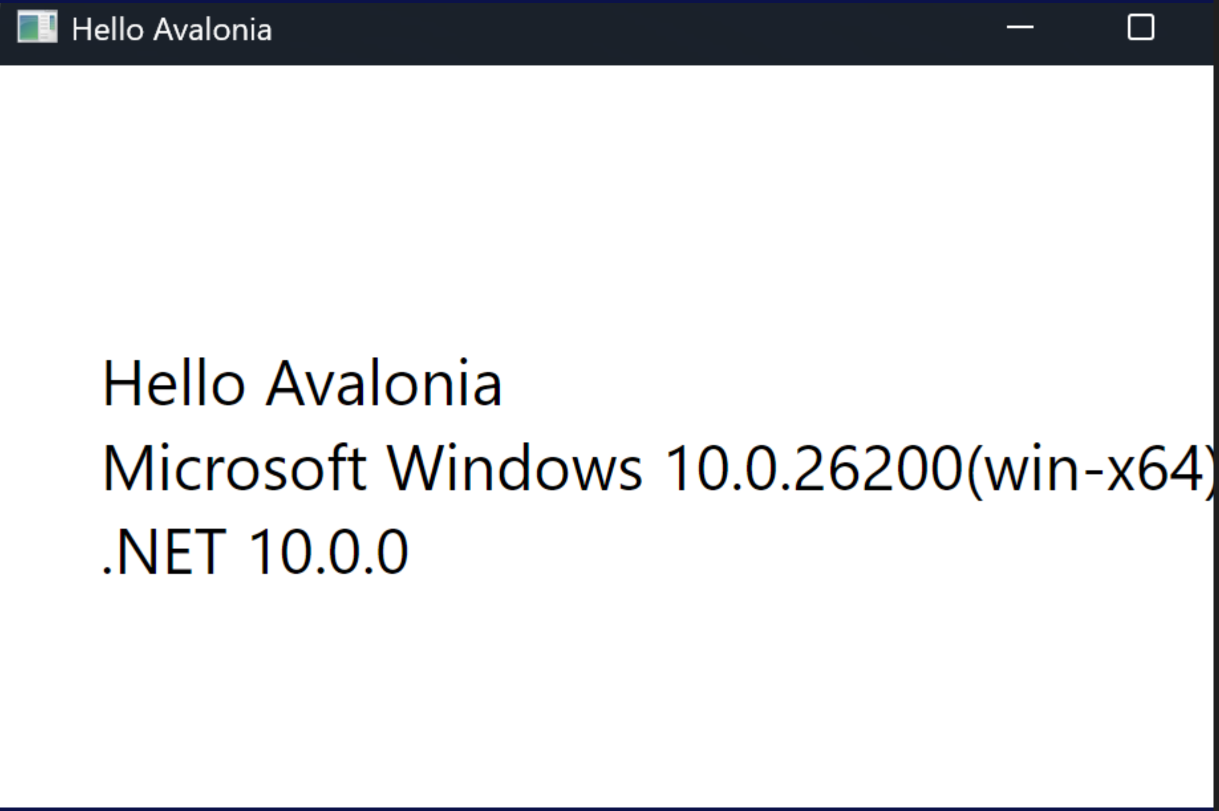
```json
[
  {
    "provider": "JsonConfigurationProvider for 'api.settings.json' (Optional)",
    "items": [
      {
        "key": "AppSettings:Service",
        "value": "file-api",
        "active": true
      }
    ]
  }
]
```

How to use it

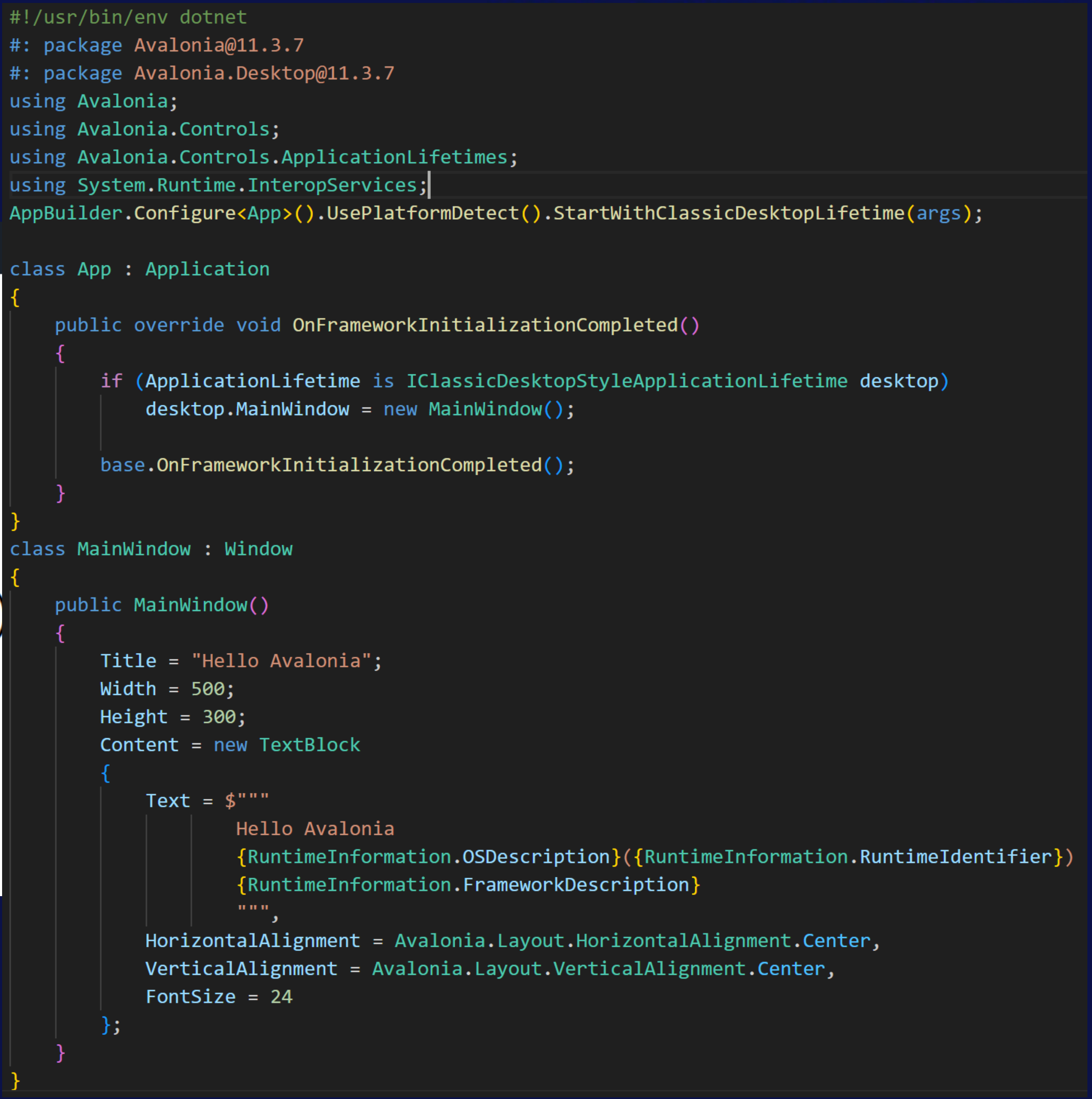


```
[
  {
    "Provider": "JsonConfigurationProvider for 'api.settings.json' (Optional)",
    "Items": [
      {
        "Key": "AppSettings:Service",
        "Value": "file-api",
        "Active": false
      }
    ]
  },
  {
    "Provider": "JsonConfigurationProvider for 'api.settings.Development.json' (Optional)",
    "Items": [
      {
        "Key": "AppSettings:Service",
        "Value": "file-api-dev",
        "Active": true
      }
    ]
  }
]
```

How to use it

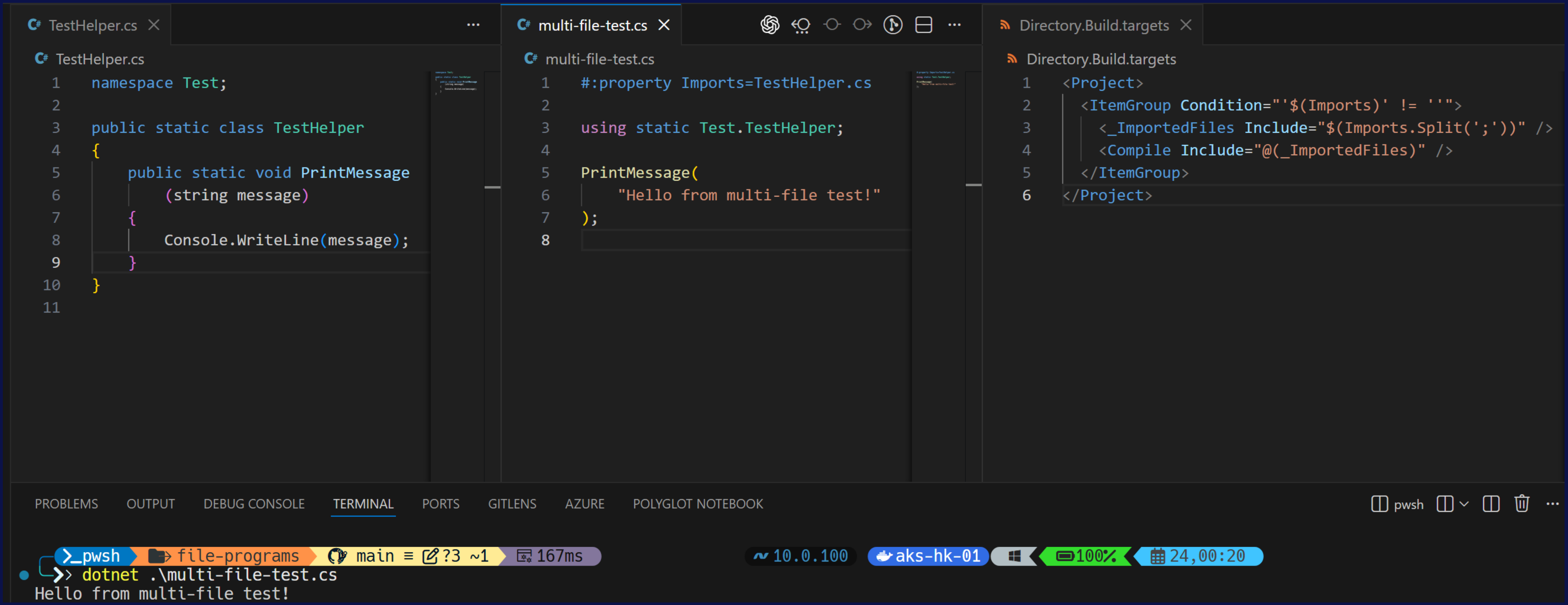


```
Hello Avalonia
Microsoft Windows 10.0.26200(win-x64)
.NET 10.0.0
```



```csharp
#!/usr/bin/env dotnet
#: package Avalonia@11.3.7
#: package Avalonia.Desktop@11.3.7
using Avalonia;
using Avalonia.Controls;
using Avalonia.Controls.ApplicationLifetimes;
using System.Runtime.InteropServices;
AppBuilder.Configure<App>().UsePlatformDetect().StartWithClassicDesktopLifetime(args);

class App : Application
{
    public override void OnFrameworkInitializationCompleted()
    {
        if (ApplicationLifetime is IClassicDesktopStyleApplicationLifetime desktop)
            desktop.MainWindow = new MainWindow();

        base.OnFrameworkInitializationCompleted();
    }
}
class MainWindow : Window
{
    public MainWindow()
    {
        Title = "Hello Avalonia";
        Width = 500;
        Height = 300;
        Content = new TextBlock
        {
            Text = $"""
                    Hello Avalonia
                    {RuntimeInformation.OSDescription}({RuntimeInformation.RuntimeIdentifier})
                    {RuntimeInformation.FrameworkDescription}
                    """,
            HorizontalAlignment = Avalonia.Layout.HorizontalAlignment.Center,
            VerticalAlignment = Avalonia.Layout.VerticalAlignment.Center,
            FontSize = 24
        };
    }
}
```

How to use it



TestHelper.cs

```
namespace Test;

public static class TestHelper
{
    public static void PrintMessage
        (string message)
    {
        Console.WriteLine(message);
    }
}
```

multi-file-test.cs

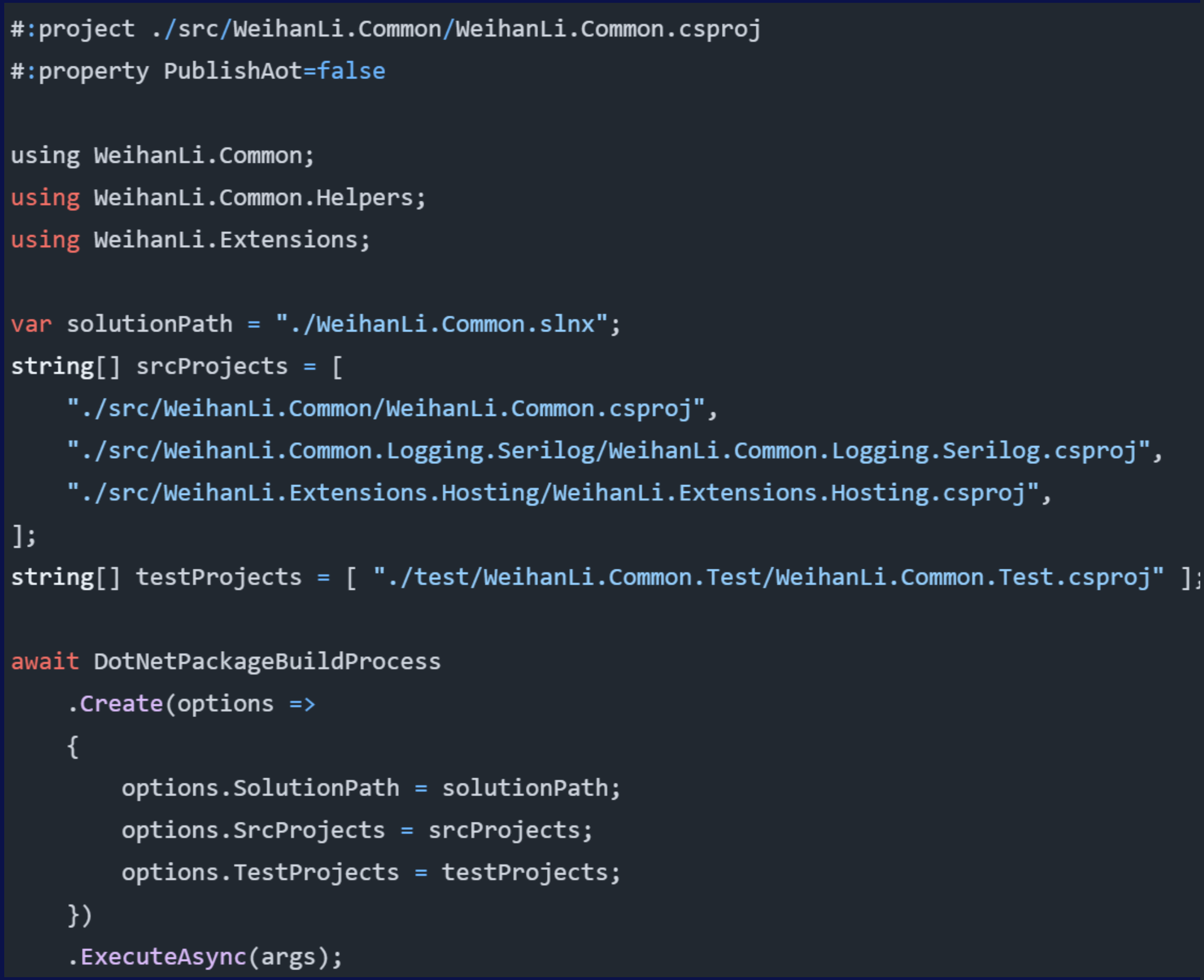
```
#:property Imports=TestHelper.cs

using static Test.TestHelper;

PrintMessage(
    "Hello from multi-file test!"
);
```

Directory.Build.targets

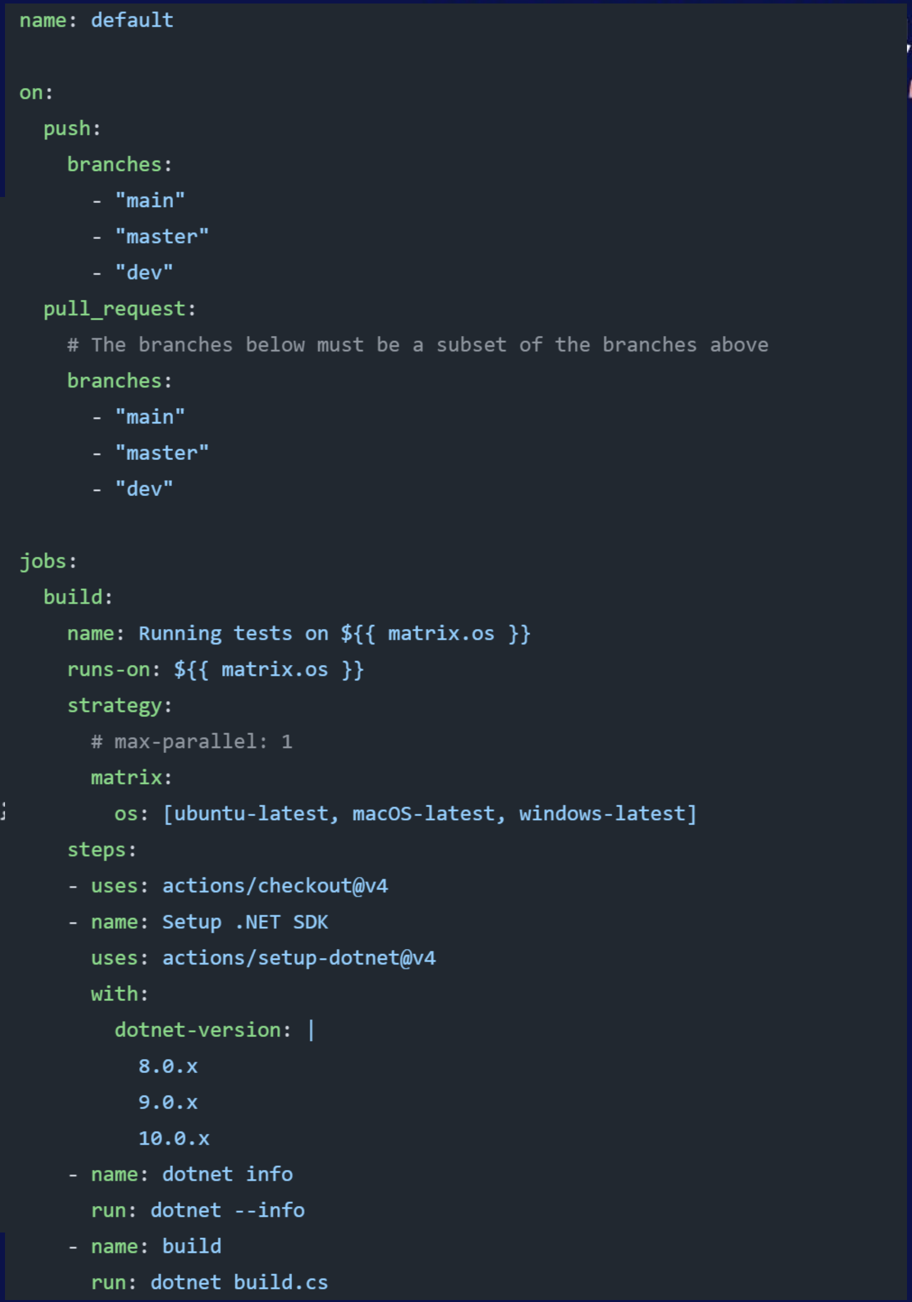
```
<Project>
  <ItemGroup Condition="'$(Imports)' != ''">
    <_ImportedFiles Include="$(Imports.Split(';'))" />
    <Compile Include="@(_ImportedFiles)" />
  </ItemGroup>
</Project>
```

```
 ╭─ >_pwsh  file-programs  main ≡ ?3 ~1  167ms        10.0.100  aks-hk-01   100%  24,00:20
 ╰─» dotnet .\multi-file-test.cs
Hello from multi-file test!
```

How to use it

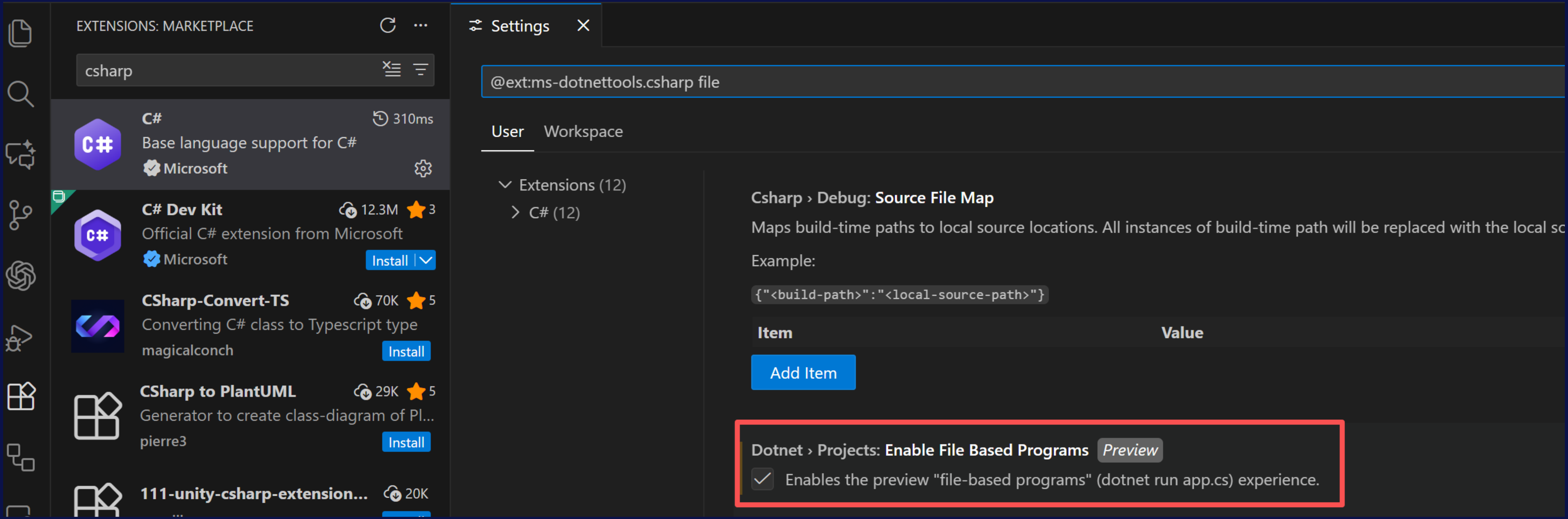


```
#:project ./src/WeihanLi.Common/WeihanLi.Common.csproj
#:property PublishAot=false

using WeihanLi.Common;
using WeihanLi.Common.Helpers;
using WeihanLi.Extensions;

var solutionPath = "./WeihanLi.Common.slnx";
string[] srcProjects = [
    "./src/WeihanLi.Common/WeihanLi.Common.csproj",
    "./src/WeihanLi.Common.Logging.Serilog/WeihanLi.Common.Logging.Serilog.csproj",
    "./src/WeihanLi.Extensions.Hosting/WeihanLi.Extensions.Hosting.csproj",
];
string[] testProjects = [ "./test/WeihanLi.Common.Test/WeihanLi.Common.Test.csproj" ];

await DotNetPackageBuildProcess
    .Create(options =>
    {
        options.SolutionPath = solutionPath;
        options.SrcProjects = srcProjects;
        options.TestProjects = testProjects;
    })
    .ExecuteAsync(args);
```



```
name: default

on:
  push:
    branches:
      - "main"
      - "master"
      - "dev"
  pull_request:
    # The branches below must be a subset of the branches above
    branches:
      - "main"
      - "master"
      - "dev"

jobs:
  build:
    name: Running tests on ${{ matrix.os }}
    runs-on: ${{ matrix.os }}
    strategy:
      # max-parallel: 1
      matrix:
        os: [ubuntu-latest, macOS-latest, windows-latest]
    steps:
    - uses: actions/checkout@v4
    - name: Setup .NET SDK
      uses: actions/setup-dotnet@v4
      with:
        dotnet-version: |
          8.0.x
          9.0.x
          10.0.x
    - name: dotnet info
      run: dotnet --info
    - name: build
      run: dotnet build.cs
```

How to use it



@ext:ms-dotnettools.csharp file

Csharp › Debug: **Source File Map**

Maps build-time paths to local source locations. All instances of build-time path will be replaced with the local sc

Example:

```
{"<build-path>":"<local-source-path>"}
```

Item	Value

Add Item

Dotnet › Projects: **Enable File Based Programs** *Preview*

☑ Enables the preview "file-based programs" (dotnet run app.cs) experience.

Next

- Multiple Files
- Multiple Targets
- dotnet format
- Performance Enhancements
- Debug
- More…

References

- https://github.com/dotnet/sdk/blob/main/documentation/general/dotnet-run-file.md
- https://github.com/dotnet/roslyn/blob/main/docs/features/file-based-programs-vscode.md
- https://github.com/dotnet/sdk/pulls?q=is%3Apr+label%3AArea-run-file
- https://github.com/dotnet/sdk/issues?q=is%3Aissue+label%3AArea-run-file
- https://github.com/WeihanLi/SamplesInPractice/tree/main/net10sample/file-programs
- https://github.com/WeihanLi/SamplesInPractice/tree/main/AvaloniaSamples/file-scripts
- https://learn.microsoft.com/en-us/dotnet/core/whats-new/dotnet-10/sdk?WT.mc_id=DT-MVP-5004222
- https://devblogs.microsoft.com/dotnet/announcing-dotnet-run-app/
- https://learn.microsoft.com/en-us/dotnet/csharp/tour-of-csharp/overview#file-based-programs
- https://learn.microsoft.com/en-us/dotnet/csharp/fundamentals/program-structure/#building-and-running-c-programs
- https://github.com/DamianEdwards/runfile

Thank You

https://github.com/WeihanLi