✨ What’s New in .NET 8? ✨

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What's on the menu?

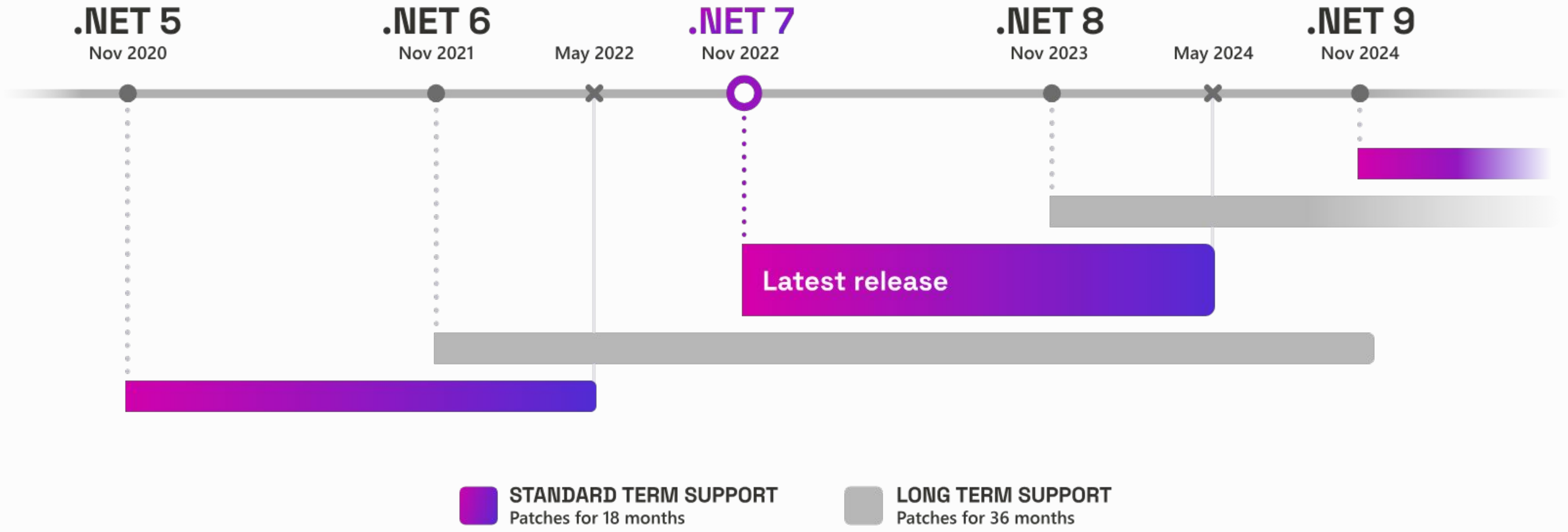
- What is .NET 8? 🤷
- Themes of .NET 8 🎼
- What's new in .NET 8? 🆕
- C# 12#️⃣
  - Collection expressions - [ ]
  - Primary constructors - 🥇
- New APIs ✨
  - TimeProvider ⏱️
  - Resilience libraries 🦜
- A brief interlude on AoT 🏃
- Source generators □
  - Request Delegate Generator⚡
  - Configuration Binding 🪢
- SDK features 🧑‍💻
  - Artifacts output 📦
  - Terminal logger 🪵

What is .NET 8? 🤷

What is .NET 8? 🤷

- The next major release of .NET (née .NET Core)
- Released on 14th November - hot off the presses 🔥
- The latest *Long Term Support* (LTS) release
- End-of-life countdown started for previous releases:
  - .NET 7 end-of-life: **14th May 2024**
  - .NET 6 end-of-life: **12th November 2024**

What is .NET 8? 🤷

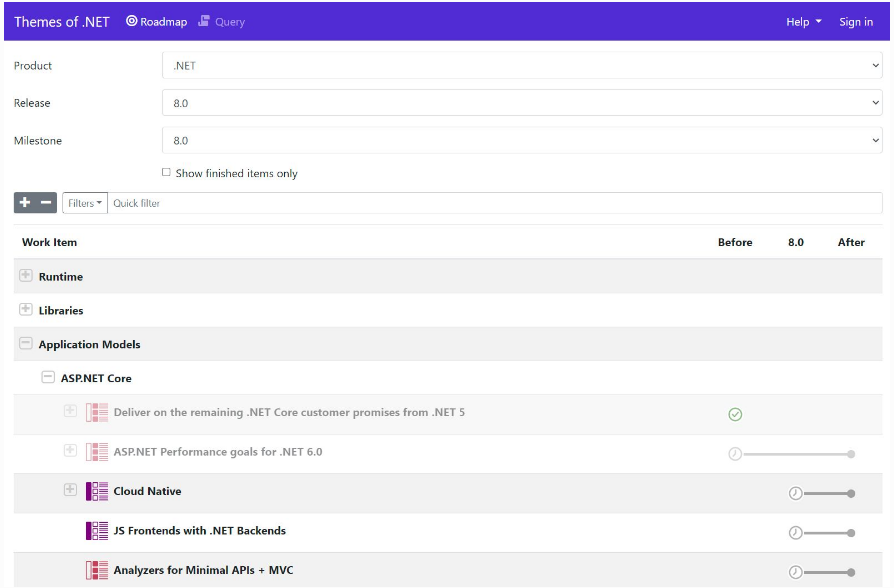


[.NET and .NET Core Support Policy]

Themes of .NET 8 🎼

Themes of .NET 8 🎼

- Runtime
  - ARM64 - Prepare for the future
- Application Models
  - ASP.NET Core
    - Cloud Native
    - JS Frontends with .NET Backends
  - MAUI
    - Delight developers building client and mobile applications with .NET 8
- Tooling
  - Secure Supply Chain with NuGet



Product: .NET

Release: 8.0

Milestone: 8.0

□ Show finished items only

Work Item	Before	8.0	After
Runtime			
Libraries			
Application Models			
ASP.NET Core			
Deliver on the remaining .NET Core customer promises from .NET 5	✓		
ASP.NET Performance goals for .NET 6.0			
Cloud Native			
JS Frontends with .NET Backends			
Analyzers for Minimal APIs + MVC			

themesof.net

What’s new in .NET 8? 🆕

What’s new in .NET 8? 🆕

- C# 12
- Runtime
    - Improvements to System.Text.Json
        - More supported types e.g. `Half`, `(U)Int128`
        - Source generator improvements
        - `snake_case` and `kebab-case` naming
    - **Time abstraction with TimeProvider**
    - Frozen collections
    - `Vector512<T>` and AVX-512 support
    - SHA-3 support
- Extensions
    - Keyed DI services
    - Options validation source generator
    - `IMeterFactory`
- Native AoT
    - Support for macOS
    - Choose between performance and size

What’s new in .NET 8? 🆕

- SDK
    - Evaluate MSBuild properties/items/target results
    - **Terminal build output**
    - **Simplified output paths**
    - dotnet workload clean
    - dotnet publish and pack for Release by default
    - dotnet restore security auditing
- Containers
    - Debian 12 (Bookworm 📖🪱)
    - Non-root user
    - New default ports - 8080/8081
- ASP.NET Core
    - Blazor full-stack web UI
    - Explicit `[FromForm]` binding for Minimal APIs
    - Antiforgery support for Minimal APIs
    - **AoT support for a subset of application types**
    - Built-in metrics for hosting, Kestrel and SignalR
- .NET Aspire

What’s new in .NET 8? 🆕

- [What’s new in .NET 8]
- [What’s new in ASP.NET Core 8]
- [What’s new in C# 12]

C# 12

C# 12

New features:

- Primary constructors
- Collection expressions
- `ref readonly` parameters
- Inline arrays
- Optional lambda expression parameters
- Alias any type
- Experimental attribute
- *Interceptors* (preview)

[What’s new in C# 12]

C# 12

New features:

- **Primary constructors**
- **Collection expressions**
- `ref readonly` parameters
- Inline arrays
- Optional lambda expression parameters
- Alias any type
- Experimental attribute
- *Interceptors* (preview)

[What’s new in C# 12]

C# 12

Visual Studio demo 🤓💻 - Sample code

New APIs ✨

New APIs ✨

`TimeProvider` ⏱️

- An abstraction for *the flow of time*
- Use cases
  - What is the current local/UTC date and time?
  - What is the current timestamp?
  - Create a timer that fires an event on a schedule
- Includes a fake implementation for tests
- Documentation

Resilience libraries 🦜

- New extensions libraries built on top of Polly
- Adding resilience with default settings for `HttpClient` can be as simple as adding **one line of code**.
- Documentation

New APIs ✨

Visual Studio demo 🤓💻 - Sample code

A brief interlude on AoT 🏃

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- AoT - Ahead of Time compilation
  - Opposite of JIT - Just in Time compilation
- Improves startup performance at the expense of increased compile times
- No runtime code generation via JIT
- No dynamic loading of assemblies (e.g. plugins)
- Types that are not used are trimmed away
- Many reflection use cases are not supported
  - An alternative to things like serializers is to use *source generators*...

Source generators □

Source generators □

- Source generators were introduced in .NET 5 with C# 9
- Allow for dynamic code generation during compilation
- Existing examples include:
    - JSON source generator
    - Regex source generator
- Benefits
    - Move overhead from runtime to compile time
    - Work around runtime environment constraints…
        - …such as AoT 💡

Source generators □

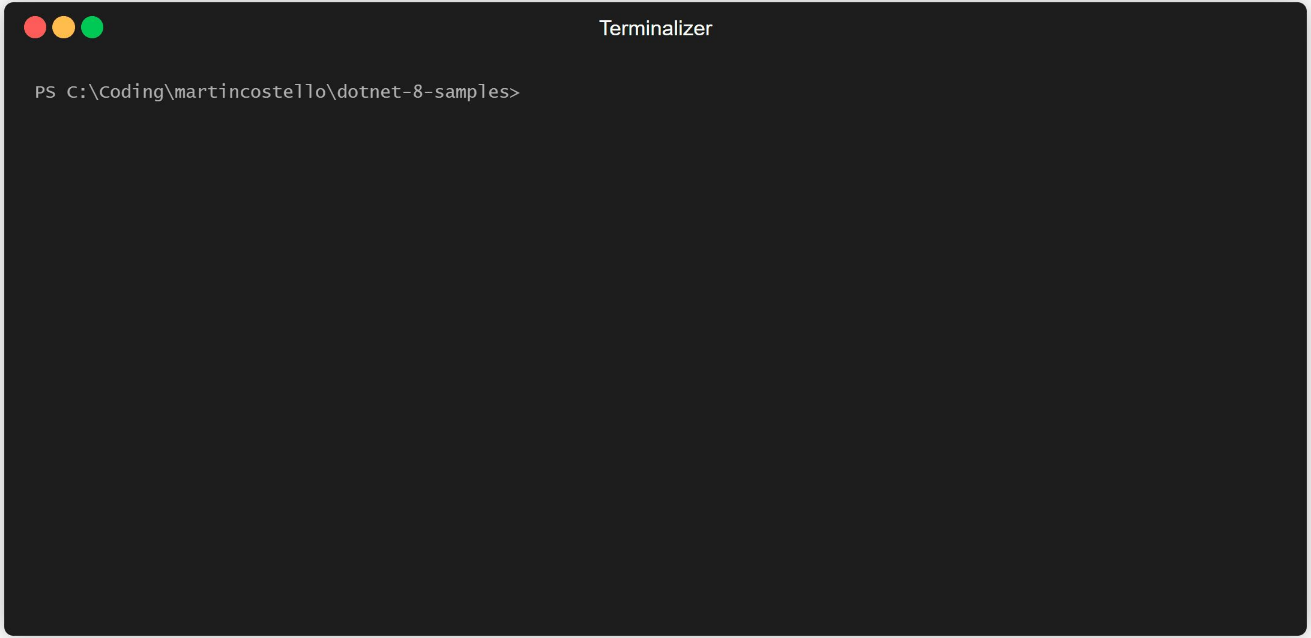
Visual Studio demo 🤓💻 - Sample code

SDK features 🧑‍💻

SDK features 🧑‍💻

- Artifacts output 📦 - predictable location of build/publish/test output
- Terminal logger 🪵 - an easier visualisation of MSBuild outputs

SDK features 🧑‍💻 - Artifacts output 📦



```
PS C:\Coding\martincostello\dotnet-8-samples>
```

Previous behaviour

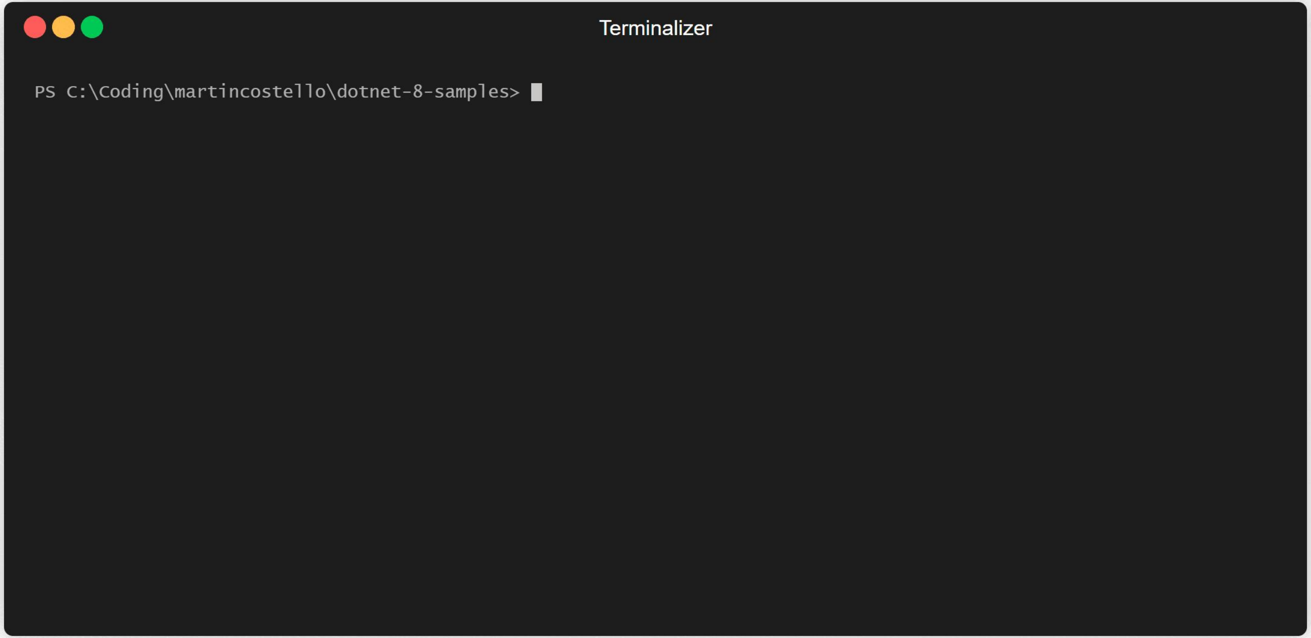
SDK features 🧑‍💻 - Artifacts output 📦

Output structure

- src
  - TimeProvider
    - bin
      - Release
        - net8.0
          - publish
  - CSharp11
    - bin
      - Release
        - net8.0
          - publish

Previous behaviour

SDK features 🧑‍💻 - Artifacts output 📦



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Artifacts output - `UseArtifactsOutput=true`

SDK features 🧑‍💻 - Artifacts output 📦

Output structure

- `artifacts`
  - `bin`
    - `CSharp12`
      - `release`
    - `TimeProvider`
      - `release`
    - `WeatherApi`
      - `release`
  - `publish`
    - `CSharp12`
      - `release`
    - `TimeProvider`
      - `release`
    - `WeatherApi`
      - `release`

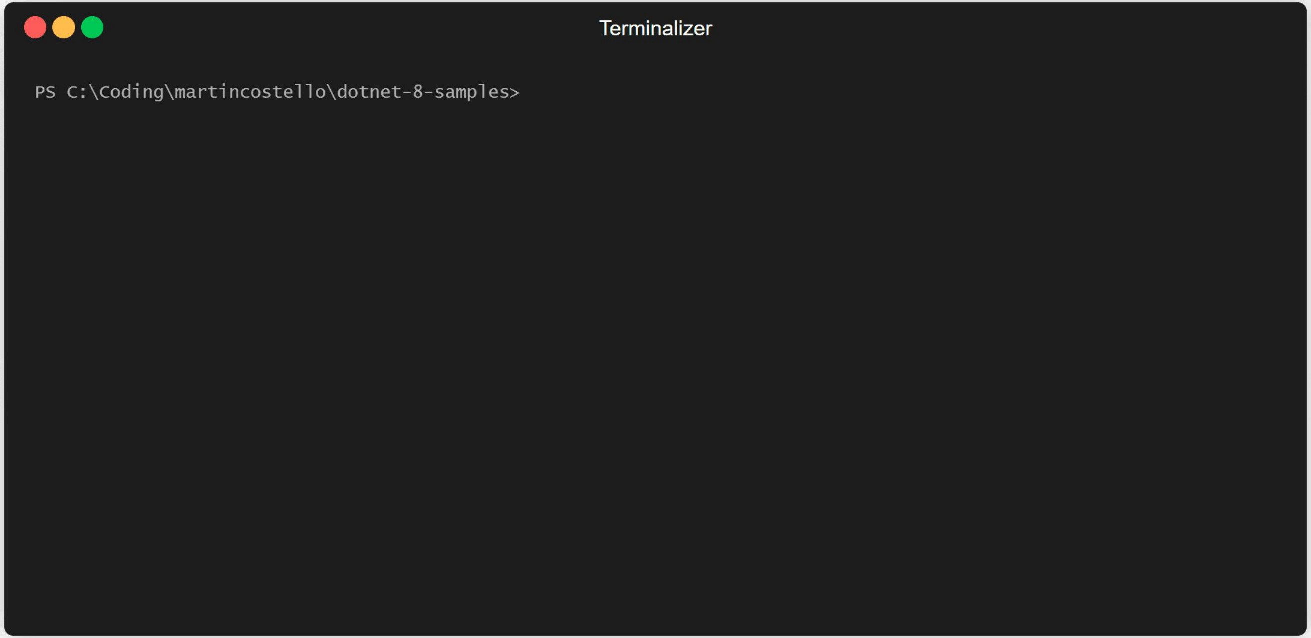
Artifacts output - `UseArtifactsOutput=true`

SDK features 🧑‍💻 - Artifacts output 📦

Benefits

- Everything within on top-level folder
- Predictable locations
- Shorter paths when only one TFM
- Only one folder to 🚮 when disk space is low

SDK features 🧑‍💻 - Terminal logger 🪵



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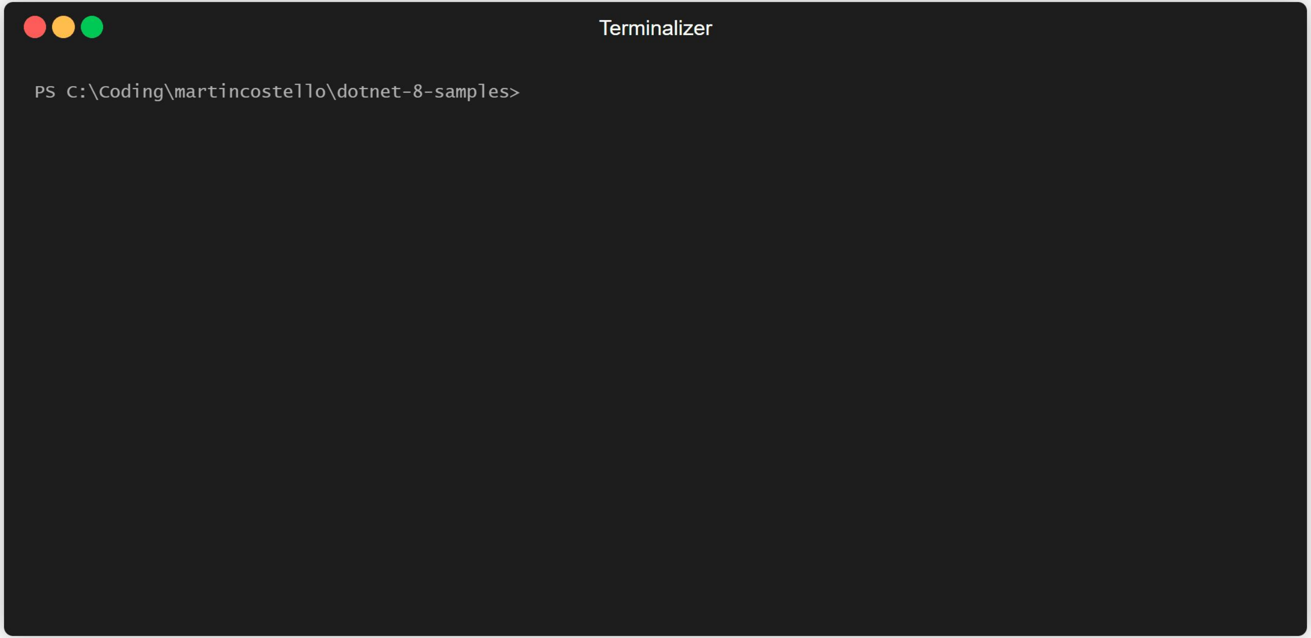
Without terminal logger 🙅 🪵

SDK features 🧑‍💻 - Terminal logger 🪵



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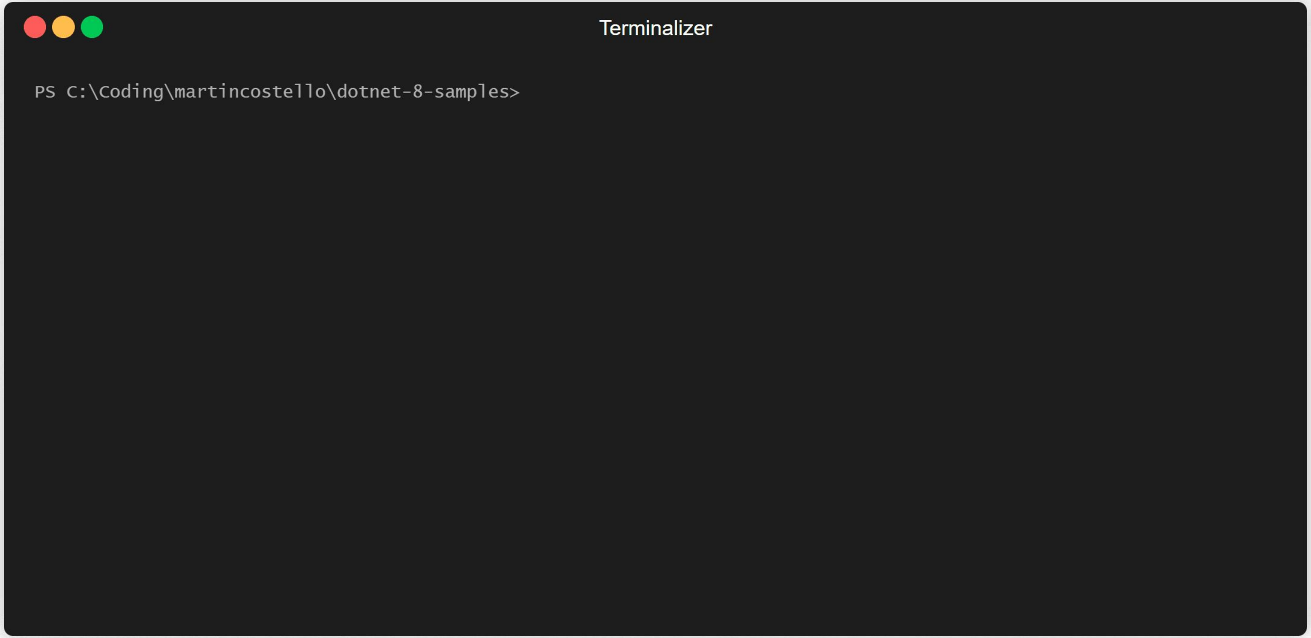
Without terminal logger 🙅 🪵

SDK features 🧑‍💻 - Terminal logger 🪵

[See here]

`dotnet` invoked with either `--tl` or `MSBUILDTERMINALLOGGER=auto` environment variable

SDK features 🧑‍💻 - Terminal logger 🪵



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`dotnet` invoked with either `--tl` or `MSBUILDTERMINALLOGGER=auto` environment variable

Resources 📖

Resources 📖

- Microsoft Learn
  - What's new in .NET 8
  - Breaking changes
  - Resilience libraries
- .NET Conf 2023
- This talk's samples
- My GitHub - @martincostello
- My Twitter - @martin_costello

These slides

Thank you! 🙇

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