



# How To Observe Your Blazor WebAssembly Application With OpenTelemetry And Real User Monitoring?

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# whoami



# Harry Kimpel

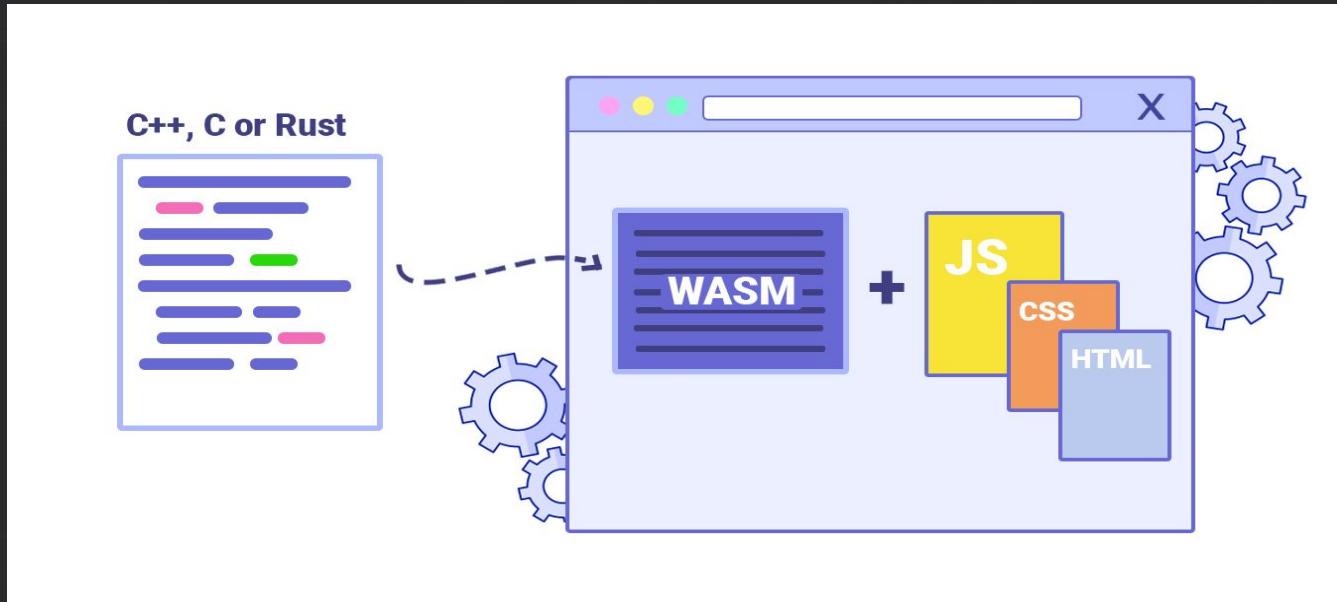
Principal Developer Relations Engineer

**New Relic**

**@harrykimpel**



# Web Assembly



BYTECODE  
ALLIANCE



WasmEdgeRuntime



.NET



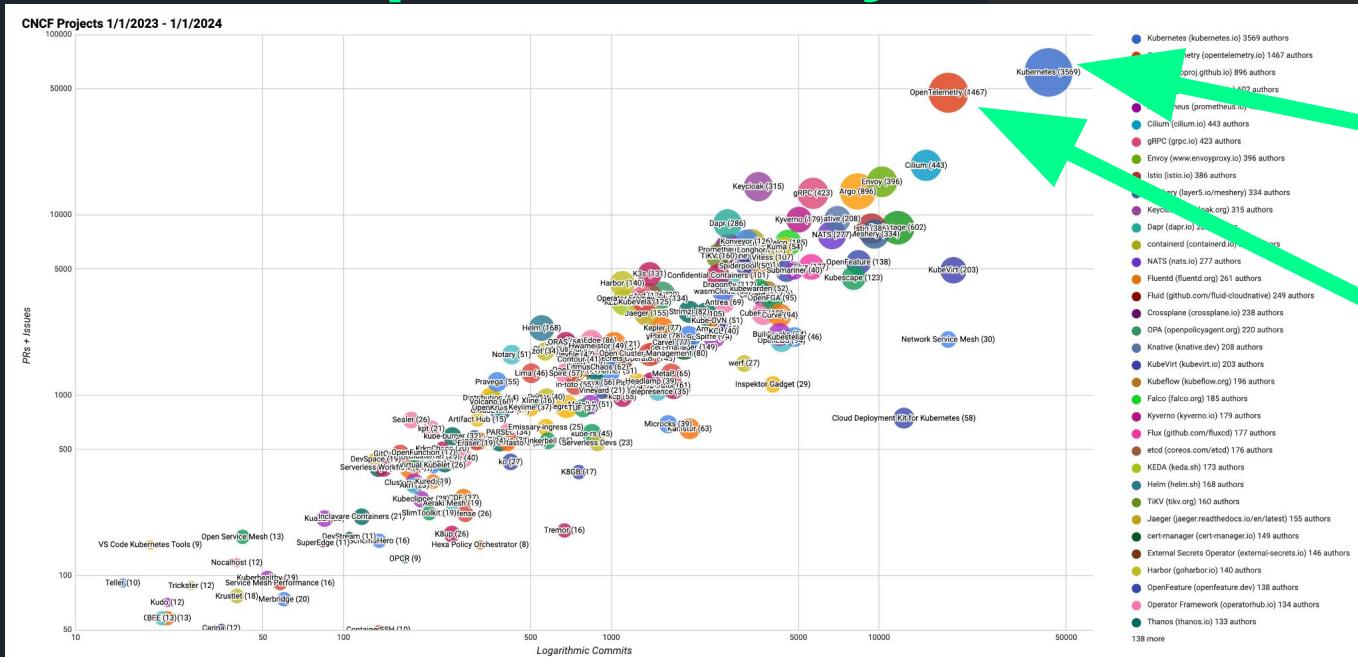
WA

# Key Facts on OpenTelemetry

- OpenTelemetry is an **Incubating** project of CNCF.
- Formed through a merger of the **OpenTracing** and **OpenCensus** projects.
- **Vendor agnostic** - set of APIs, libraries, integrations, and a collector service for telemetry.
- **Standardizes** how you collect telemetry data from your applications and services.
- Send it to an **Observability platform** of your choice.



**Key Facts on OpenTelemetry** (CNCF Projects 1/1/2023 - 1/1/2024)



**OpenTelemetry** is second in CNCF - strong interest in modern **Observability**.

Enhanced support for **Open Standards**, including OpenTelemetry, eBPF, and Grafana - Gartner MQ 2022

.NET



WA



.NET



# OpenTelemetry with Blazor backend Service

# OpenTelemetry with .NET backend

**Current Status:** <https://opentelemetry.io/docs/languages/>

Language	Traces	Metrics	Logs
<a href="#">C++</a>	Stable	Stable	Stable
<a href="#">C#/NET</a>	Stable	Stable	Stable
<a href="#">Erlang/Elixir</a>	Stable	Experimental	Experimental
<a href="#">Go</a>	Stable	Stable	Alpha
<a href="#">Java</a>	Stable	Stable	Stable
<a href="#">JavaScript</a>	Stable	Stable	Experimental
<a href="#">PHP</a>	Stable	Stable	Stable
<a href="#">Python</a>	Stable	Stable	Experimental
<a href="#">Ruby</a>	Stable	In development	In development
<a href="#">Rust</a>	Beta	Alpha	Alpha
<a href="#">Swift</a>	Stable	Experimental	In development

# OpenTelemetry with .NET backend

## OpenTelemetry .NET Automatic Instrumentation



```
<Project Sdk="Microsoft.NET.Sdk.Web">

<ItemGroup>
    <PackageReference Include="Microsoft.AspNetCore.Identity.EntityFrameworkCore" Version="8.0.0" />
    <PackageReference Include="Microsoft.EntityFrameworkCore.InMemory" Version="8.0.0" />
    <PackageReference Include="NSwag.AspNetCore" Version="14.0.3" />
    <PackageReference Include="OpenTelemetry.Exporter.OpenTelemetryProtocol" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry.Instrumentation.EntityFrameworkCore" Version="1.0.0-beta.9" />
    <PackageReference Include="OpenTelemetry.Instrumentation.Runtime" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry.AutoInstrumentation.Runtime.Native" Version="1.5.0" />
    <PackageReference Include="OpenTelemetry.Exporter.Console" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry.Extensions.Hosting" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry.Instrumentation.AspNetCore" Version="1.8.1" />
    <PackageReference Include="OpenTelemetry.Instrumentation.Http" Version="1.8.1" />
</ItemGroup>

</Project>
```

The screenshot shows a Visual Studio Code interface with the following details:

- Explorer View:** Shows the project structure under "BLAZORWEBASSEMBLYST...".
- Terminal Tab:** Active tab, showing application logs:

```
info: Microsoft.EntityFrameworkCore.Update[30100]
      Saved 1 entities to in-memory store.
info: Microsoft.EntityFrameworkCore.Update[30100]
      Saved 3 entities to in-memory store.
info: Microsoft.EntityFrameworkCore.Update[30100]
      Saved 1 entities to in-memory store.
info: Microsoft.EntityFrameworkCore.Update[30100]
      Saved 2 entities to in-memory store.
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: https://localhost:7211
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://localhost:5266
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]
```
- Activity Trace:** A specific log entry is highlighted with a green border:

```
lonewithIdentity/Backend
Activity.TraceId: 5e199324748dc33fefef6be9ef87051551
Activity.SpanId: 6d09758bacac66ec
Activity.TraceFlags: Recorded
Activity.ActivitySourceName: Microsoft.AspNetCore
Activity.DisplayName: OPTIONS
Activity.Kind: Server
Activity.StartTime: 2024-05-06T16:24:05.7253440Z
Activity.Duration: 00:00:00.1363160
Activity.Tags:
  server.address: localhost
  server.port: 7211
  http.request.method: OPTIONS
  url.scheme: https
  url.path: /manage/info
  network.protocol.version: 2
  user_agent.original: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/124.0.0.0 Safari/537.36
  http.response.status_code: 204
Resource associated with Activity:
  service.name: BlazorWasmBackend
  service.instance.id: 03859d9a-2433-4c04-8bf7-128c93c79744
  deployment.environment: staging
  service.version: 1.0.0
  telemetry.sdk.name: opentelemetry
  telemetry.sdk.language: dotnet
  telemetry.sdk.version: 1.8.0
```
- Bottom Status Bar:** Shows icons for CodeStream, Live Share, Downloading .NET..., and a progress bar.
- Page Header:** Shows the title "BlazorWebAssemblyStandaloneWithIdentity" and system status icons.

Backend > \$ run.sh

```
1 export NEW_RELIC_LICENSE_KEY=MY_NEW_RELIC_LICENSE_KEY
2 export OTEL_EXPORTER_OTLP_HEADERS=api-key=${NEW_RELIC_LICENSE_KEY}
3 export OTEL_EXPORTER_OTLP_ENDPOINT=https://otlp.nr-data.net
4 export OTEL_EXPORTER_OTLP_PROTOCOL=http/protobuf
5 export OTEL_SERVICE_NAME=BlazorWASMBackend
6 export OTEL_RESOURCE_ATTRIBUTES=deployment.environment=staging,service.version=1.0.0
7 export DOTNET_RUNTIME_ID="osx-x64"
8 export ENABLE_PROFILING=true
9 export OTEL_DOTNET_AUTO_HOME=/Users/hkimpel/.otel-dotnet-auto
10 export CORECLR_ENABLE_PROFILING=1
11 export CORECLR_PROFILER="{918728DD-259F-4A6A-AC2B-B85E1B658318}"
12 export DOTNET_RUNTIME_ID="osx-x64"
13 export SUFIX="dylib"
14 export CORECLR_PROFILER_PATH="$OTEL_DOTNET_AUTO_HOME/$DOTNET_RUNTIME_ID/OpenTelemetry.AutoInstrumentation.Native.$SUFIX"
15
16 dotnet run -lp https://bin/Release/net8.0/publish/Backend
17
```

品 Good ○ ⊕ Good< ⌚ from May 6, 06:34 pm to May 6, 06:55 pm (GMT+2) >[Summary](#)

## MONITOR

[Distributed tracing](#)[Service map](#)[Transactions](#)[Databases](#)[External services](#)[Logs](#)

## TRIAGE

[Errors \(errors inbox\)](#)[Diagnose](#)

## EVENTS

[Change tracking](#)

## DATA

[Metrics explorer](#)

## SETTINGS

[Alert conditions](#)

## MORE VIEWS

[Add app](#)[Events explorer](#)[Help](#)[Issues & activity](#)View charts by [Metrics](#) [Spans](#)Narrow data to  Enter any attribute or valueGroup by none [...](#) Compare with none [...](#)

## Response time

Since May 6, 06:34 pm until May 6, 06:55 pm

[W](#) [H](#) [%](#)

800 ms

700 ms

600 ms

500 ms

400 ms

300 ms

200 ms

100 ms

0 ms

6:35pm

6:40pm

6:45pm

6:50pm

...

● Response time

## Throughput

Since May 6, 06:34 pm until May 6, 06:55 pm

50

45

40

35

30

25

20

15

10

5

0

...

0.05 0.10 0.15 0.20 0.25 0.30

Error rate [info](#)

Since May 6, 06:34 pm until May 6, 06:55 pm

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

0.05 0.10 0.15 0.20 0.25 0.30

## Activity

[Filters](#) [...](#)

No activity in this time range

To see more activity, try adjusting your filters or time range.

Related entities [...](#)

You have gaps in your alert coverage

Some parts of your stack don't have alerts watching them.

[Set up alerts](#)

## User Experience

2

Services

[See full map](#)[Add to dashboard](#)

BlazorWASMBackend [Tags](#) [Metadata](#) ... Good  Good

from May 6, 06:34 pm to May 6, 06:55 pm (GMT+2) &gt;

 Summary

## MONITOR

 Distributed tracing Service map Transactions Databases External services Logs

## TRIAGE

 Errors (errors inbox) Diagnose

## EVENTS

 Change tracking

## DATA

 Metrics explorer

## SETTINGS

 Alert conditions

## MORE VIEWS

 Add app Events explorer Help Issues & activity

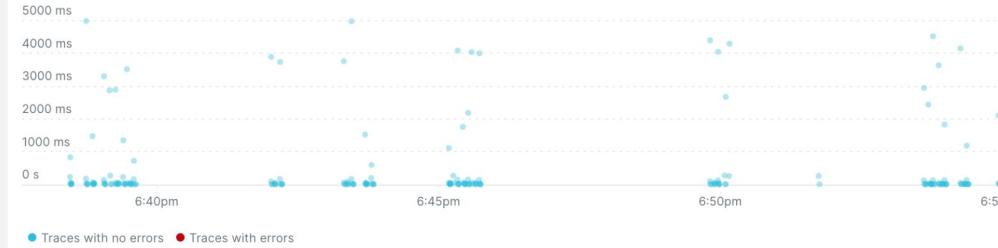
Search for traces by span attributes... (e.g. name = spanName)

 Refine

Trace groups Root entry span Root entity Errors

 Multi-span only

View by Root span duration



Plot	Trace name	Start time	Root span duration	Entities	Spans	Errors ↓
●	OPTIONS BlazorWASMBackend	14 min ago May 6, 2024 18:...	118 µs	1	1	0
●	OPTIONS BlazorWASMBackend	14 min ago May 6, 2024 18:...	109 µs	1	1	0
●	OPTIONS BlazorWASMBackend	14 min ago May 6, 2024 18:...	87 µs	1	1	0
●	GET localhost:7211/roles BlazorWASMFrontend	14 min ago May 6, 2024 18:...	4621 ms	2	2	0
●	GET localhost:7211/manage/info BlazorWASMFrontend	14 min ago May 6, 2024 18:...	7 ms	2	2	0
●	POST localhost:7211/login BlazorWASMFrontend	14 min ago May 6, 2024 18:...	115 ms	2	2	0
●	OPTIONS BlazorWASMBackend	14 min ago May 6, 2024 18:...	79 µs	1	1	0

# GET localhost:7211/roles

BlazorWebAssemblyStandaloneWithIdentityFrontend | May 6 at 6:45pm | Trace ID: [fdbc8270ba4fba513f605be43d1f21b8](#) | Spans: 2 [i](#)

Trace details Logs (0)

0 anomalous spans [▼](#)

0 errors [▼](#)

3 entities [▼](#)

Find spans by name or ID

Trace duration  
4579.99 ms

Back-end duration  
4019.99 ms

1

GET localhost:7211/roles

BlazorWASMFrontend

4.62 s

GET /roles

BlazorWASMBackend



4.61 s



BlazorWebAssemb...Frontend

1 CALLS



BlazorWASMBackend

1 CALLS



localhost



Expand all

Collapse all

Standard Manual



Focus on:  Slow spans

Reset

Maximize

1

GET localhost:7211/roles

BlazorWebAssemblyStandaloneWithIdentityFrontend

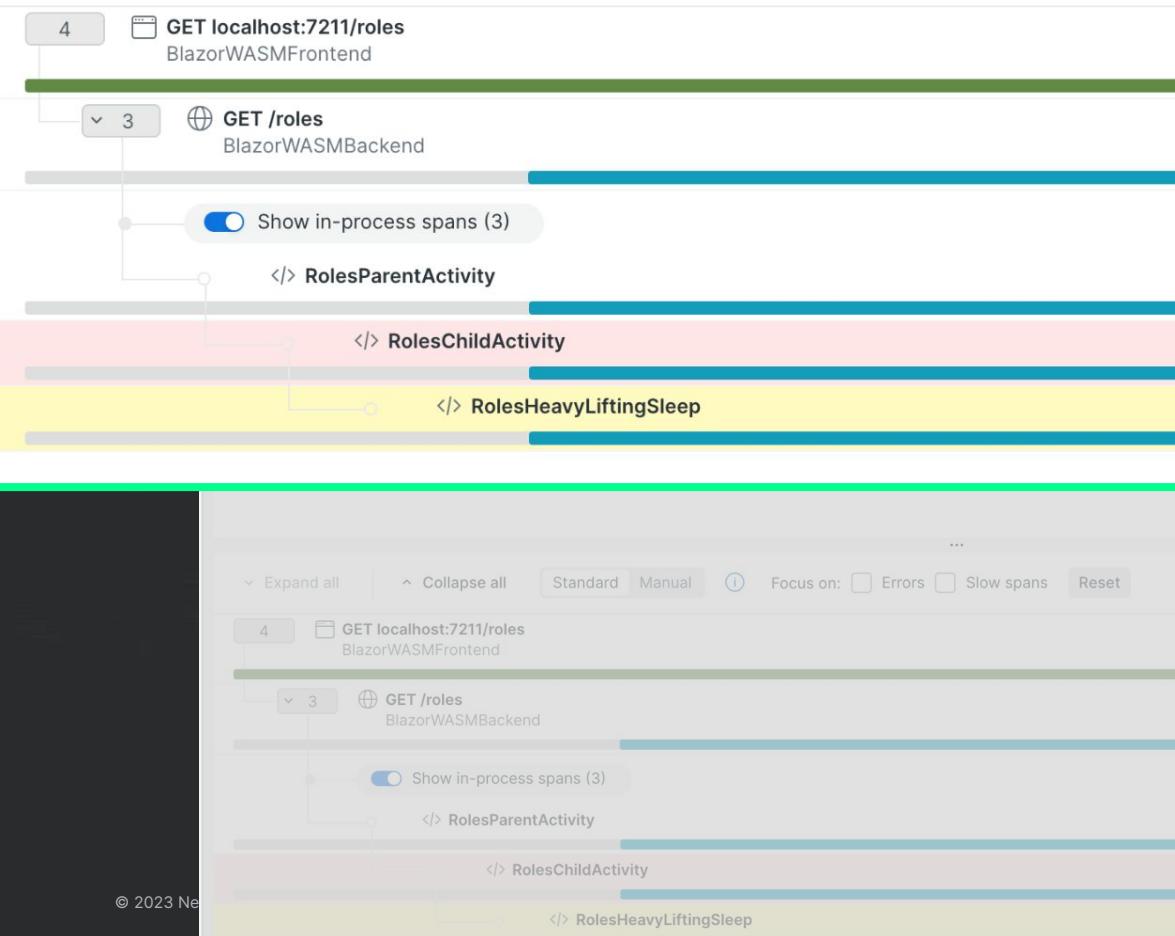
4.02 s

GET /roles

BlazorWASMBackend



4.02 s



## RolesHeavyLiftingSleep

BlazorWASMBackend

Performance Attributes Details

2391.64 ms

DURATION

BlazorWASMBackend

service.version  
1.0.0simulatedWaitMsg  
ChildActivity simulated wait (2390ms)simulatedWaitTimeMs  
2390span.kind  
internaltelemetry.sdk.language  
dotnettelemetry.sdk.name  
opentelemetrytelemetry.sdk.version  
1.8.0timestamp  
1715017304702

# OpenTelemetry manual instrumentation

```
225     .....//.Instantiate·random·number·generator·using·system-supplied·value·as·seed.  
226     .....var rand = new Random();  
227     .....int waitTime = rand.Next(500, 5000);  
228  
229     .....using (var sleepActivity = DiagnosticsConfig.ActivitySource.StartActivity("RolesHeavyLiftingSleep"))  
230     .....{  
231     .....    .....// do some heavy lifting work  
232     .....    Thread.Sleep(waitTime);  
233  
234     .....    .....string waitMsg = string.Format(@"ChildActivty·simulated·wait·({0}ms)", waitTime);  
235     .....    .....sleepActivity?.SetTag("simulatedWaitMsg", waitMsg);  
236     .....    .....sleepActivity?.SetTag("simulatedWaitTimeMs", waitTime);  
237     .....    .....DiagnosticsConfig.logger.LogInformation(eventId: 123, waitMsg);  
238     .....}  
239
```

.NET



# OpenTelemetry with Blazor WASM App

# OpenTelemetry with .NET Blazor WASM

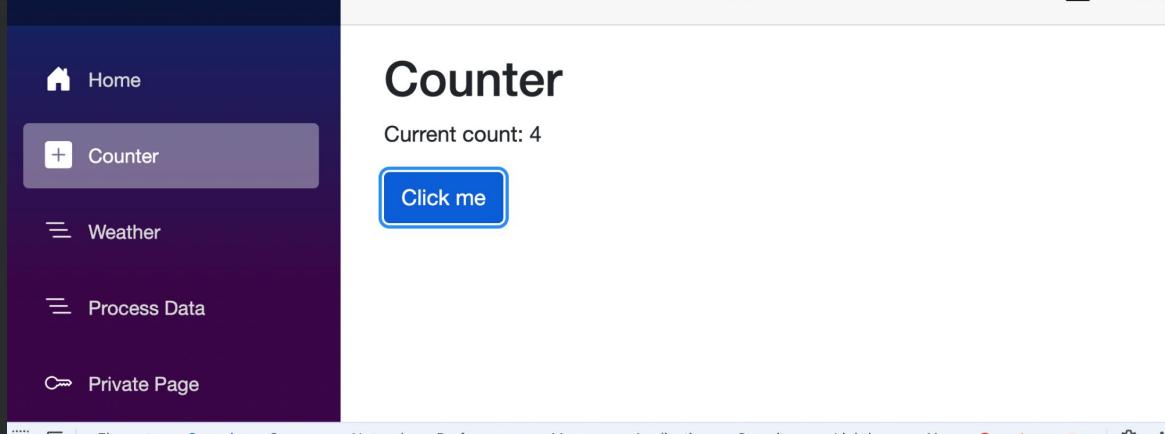
## OpenTelemetry .NET Automatic Instrumentation for Blazor



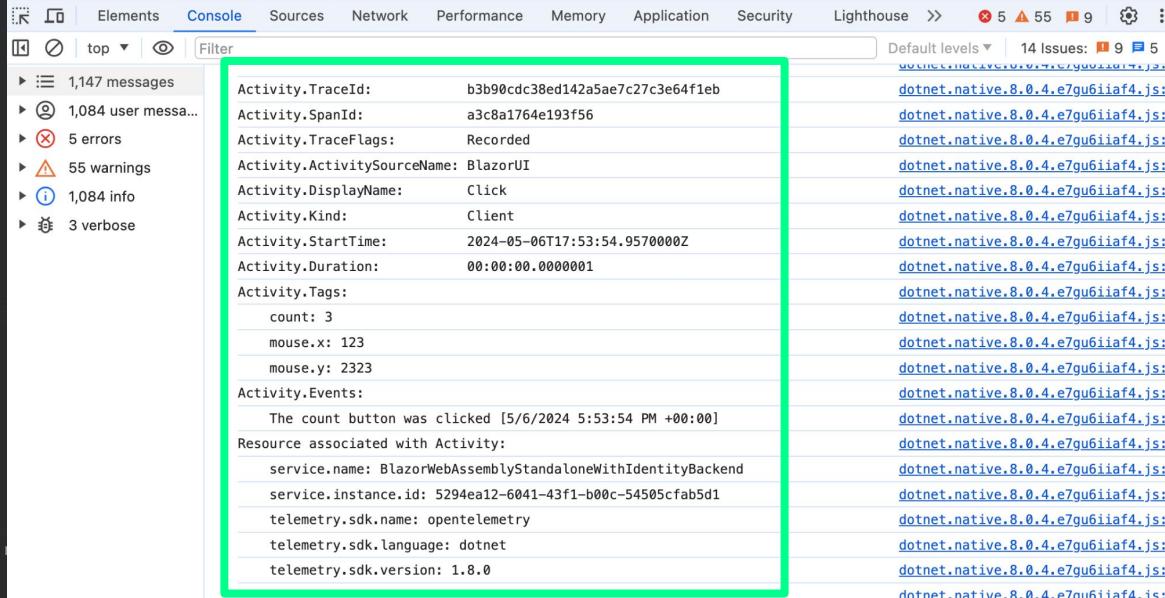
```
<Project Sdk="Microsoft.NET.Sdk.BlazorWebAssembly">

  <ItemGroup>
    <PackageReference Include="Microsoft.AspNetCore.Components.WebAssembly.Authentication" Version="8.0.0" />
    <PackageReference Include="Microsoft.Extensions.Http" Version="8.0.0" />
    <PackageReference Include="Microsoft.AspNetCore.Components.WebAssembly" Version="8.0.0" />
    <PackageReference Include="Microsoft.AspNetCore.Components.WebAssembly.DevServer" Version="8.0.0" />
    <PrivateAssets="all" />
    <PackageReference Include="OpenTelemetry.Exporter.OpenTelemetryProtocol" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry.Instrumentation.Runtime" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry.AutoInstrumentation.Runtime.Native" Version="1.5.0" />
    <PackageReference Include="OpenTelemetry.Exporter.Console" Version="1.8.0" />
    <PackageReference Include="OpenTelemetry.Extensions.Hosting" Version="1.8.0" />
  </ItemGroup>

</Project>
```



The screenshot shows a Blazor WASM application interface. On the left is a sidebar with navigation links: Home, Counter (which is currently selected), Weather, Process Data, and Private Page. The main content area is titled "Counter" and displays the message "Current count: 4" above a blue button labeled "Click me".



The screenshot shows the New Relic browser extension's Console tab. The left sidebar lists various logs and metrics. The main pane displays a detailed activity trace for a click event. A green box highlights the following details:

- Activity.TraceId: b3b90cdc38ed142a5ae7c27c3e64f1eb
- Activity.SpanId: a3c8a1764e193f56
- Activity.TraceFlags: Recorded
- Activity.ActivitySourceName: BlazorUI
- Activity.DisplayName: Click
- Activity.Kind: Client
- Activity.StartTime: 2024-05-06T17:53:54.957000Z
- Activity.Duration: 00:00:00.000001
- Activity.Tags:
  - count: 3
  - mouse.x: 123
  - mouse.y: 2323
- Activity.Events:

The count button was clicked [5/6/2024 5:53:54 PM +00:00]
- Resource associated with Activity:
  - service.name: BlazorWebAssemblyStandaloneWithIdentityBackend
  - service.instance.id: 5294ea12-6041-43f1-b00c-54505cfab5d1
  - telemetry.sdk.name: opentelemetry
  - telemetry.sdk.language: dotnet
  - telemetry.sdk.version: 1.8.0

The right side of the console shows a list of native .NET library calls, all of which are identical: `dotnet.native.8.0.4.e7gu6liaf4.js:8`.

# OpenTelemetry with .NET Blazor WASM

## Limitations with Blazor WebApp



✖ ► crit: Microsoft.AspNetCore.Components.WebAssembly.Rendering.WebAssemblyRenderer[100]  
    Unhandled exception rendering component: Operation is not supported on this platform.  
System.PlatformNotSupportedException: Operation is not supported on this platform.

A screenshot of the New Relic browser extension's error monitoring interface. It shows a list of errors on the left and a detailed error stack trace on the right. The stack trace is for a Microsoft.AspNetCore.Components.WebAssembly.Rendering.WebAssemblyRenderer[100] error, specifically for an "Operation is not supported on this platform" exception. The stack trace includes frames from OpenTelemetry, Microsoft.AspNetCore.Components, and Microsoft.AspNetCore.Components.WebAssembly.

```
✖ ► crit: Microsoft.AspNetCore.Components.WebAssembly.Rendering.WebAssemblyRenderer[100]
    Unhandled exception rendering component: Operation is not supported on this platform.
System.PlatformNotSupportedException: Operation is not supported on this platform.

at System.Threading.ThreadStart.<Run>()
at System.Threading.Thread.<Start>()
at System.Threading.Thread.<Start>()

at OpenTelemetry.BatchExportProcessor`1[System.Diagnostics.Activity, System.Diagnostics.DiagnosticSource, Version=0.0.0.0, Culture=neutral, PublicKeyToken=null]<ctor>()
at OpenTelemetry.BatchExportProcessor`1.<ctor>(IExporter<T> exporter, Int32 maxQueueSize, Int32 scheduledDelayMilliseconds, Int32 exporterTimeoutMilliseconds, Int32 maxExportBatchSize)
at OpenTelemetry.BatchActivityExportProcessor`1.<ctor>(BaseExporter`1 exporter, Int32 maxQueueSize, Int32 scheduledDelayMilliseconds, Int32 exporterTimeoutMilliseconds, Int32 maxExportBatchSize)
at OpenTelemetry.Trace.OtlpTraceExporterHelperExtensions.<BuildOtlpExporterProcessor>f__AnonymousType0<ServiceProvider, OtlpExporterOptions>.<BuildOtlpExporterProcessor>()
at OpenTelemetry.Trace.TracerProviderBuilderExtensions.<>c__DisplayClass8_0.<>c__DisplayClass8_0.<AddOtlpExporter>b__0(IServiceProvider sp)
at OpenTelemetry.Trace.TracerProviderBuilderExtensions.<>c__DisplayClass8_0.<>c__DisplayClass8_0.<AddOtlpExporter>b__0(IServiceProvider sp, TracerProviderBuilder builder)
at OpenTelemetry.Trace.OpenTelemetryDependencyInjectionServiceCollectionExtensions.ConfigureTraceProviderBuilderCallbackWrapper.ConfigureBuild
er(IServiceProvider serviceProvider, TracerProviderBuilder tracerProviderBuilder)
at OpenTelemetry.Trace.TracerProviderBuilder.<Build>()
at BlazorWebAssemblyStandaloneWithIdentity.CookiesAuthenticationStateProvider.LoginAsync(String email, String password, ILogger Logger) in
    /Users/kimpe1/Projects/dotnet/dotnet8/dotnet-blazor-samples/8.0/BlazorWebAssemblyStandaloneWithIdentity/BlazorWebAssembly/Identity/CookieAuthenticationStateProvider.cs:line 140
    at BlazorWebAssemblyStandaloneWithIdentity/BlazorWebAssembly/Components/Identity/Login.razor:line 74
    at Microsoft.AspNetCore.Components.ComponentBase.CallStateHasChangedOnAsyncCompletion(Task task)
    at Microsoft.AspNetCore.Components.RenderTree.Renderer.GetErrorHandledTask(Task taskToHandle, ComponentState owningComponentState)
```

# OpenTelemetry with .NET Blazor WASM

Real User Monitoring is coming ...

[Docs](#) / [Language APIs & SDKs](#) / [JavaScript](#) / [Getting Started](#) / Browser

## Browser

Learn how to add OpenTelemetry to your browser app

### Warning

Client instrumentation for the browser is **experimental** and mostly **unspecified**. If you are interested in helping out, get in touch with the [Client Instrumentation SIG](#).

While this guide uses the example application presented below, the steps to instrument your own application should be similar.

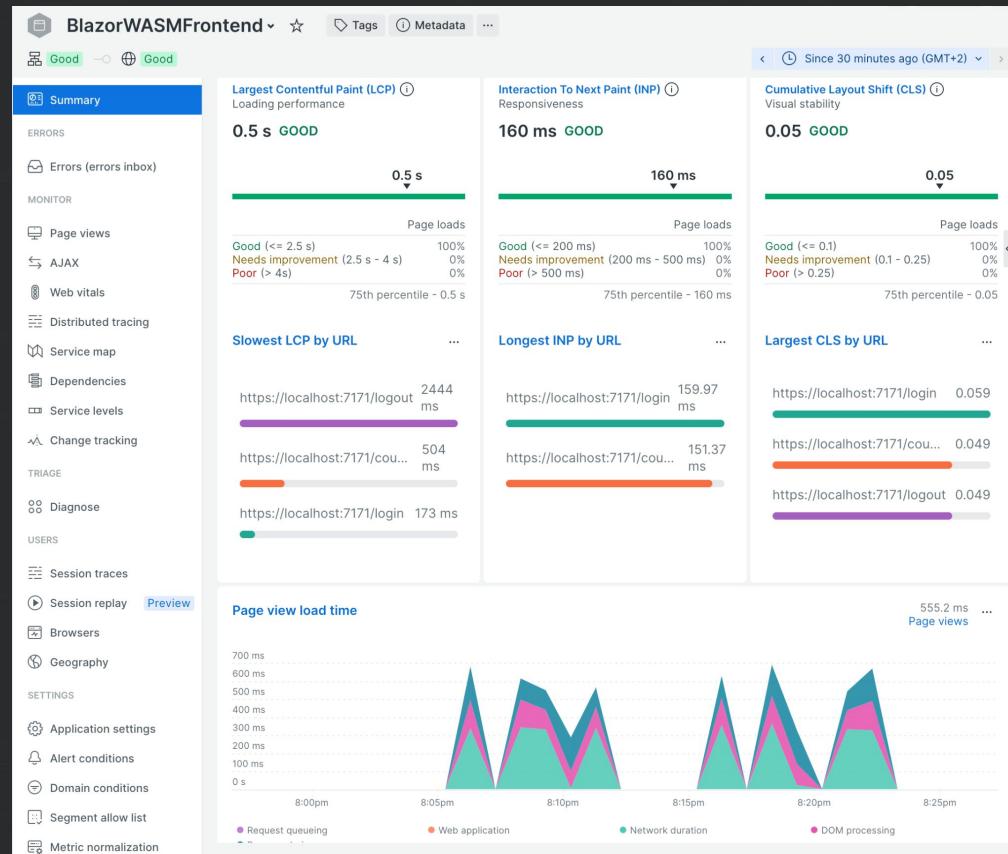
## Prerequisites

Ensure that you have the following installed locally:

- [Node.js](#)
- [TypeScript](#), if you will be using TypeScript.

# OpenTelemetry with .NET Blazor WASM

## New Relic Browser - Real User Monitoring



BlazorWASMFrontend Good Tags Metadata ...

Since 30 minutes ago (GMT+2)

Summary

ERRORS

Errors (errors inbox)

MONITOR

Page views

AJAX

Web vitals

Distributed tracing

Service map

Dependencies

Service levels

Change tracking

TRIAGE

Diagnose

USERS

Session traces

Session replay Preview

Browsers

Geography

SETTINGS

Application settings

Alert conditions

Domain conditions

Segment allow list

Search for traces by span attributes... (e.g. name = spanName)

Trace groups Root entry span Root entity Errors

Multi-span only

View by Root span duration

5000 ms  
4000 ms  
3000 ms  
2000 ms  
1000 ms  
0 s

8:10pm 8:15pm 8:20pm

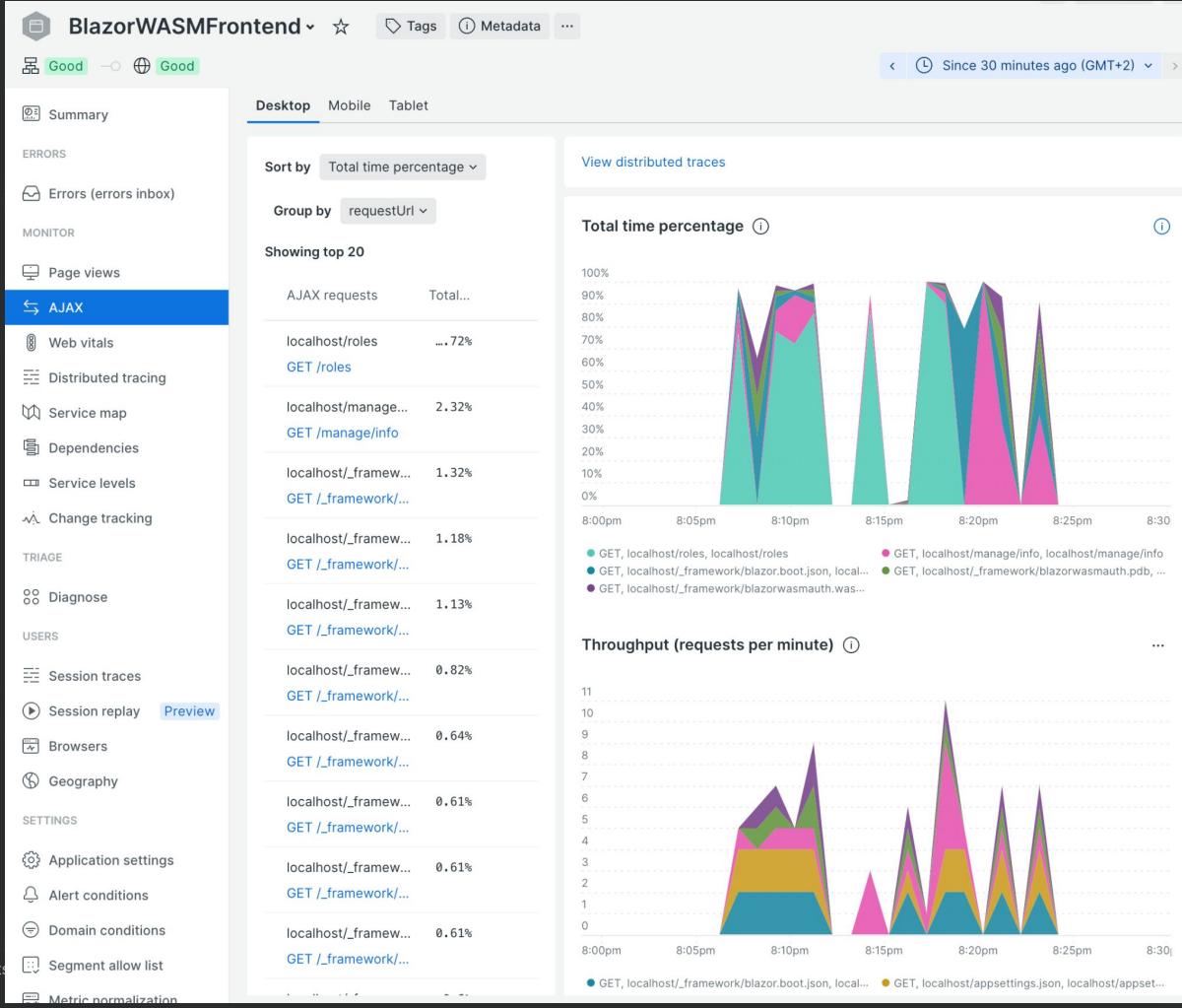
Traces with no errors Traces with errors

Plot Trace name Start time ↓ Root span d... Enti... Spa... Errors

●	GET localhost:7211/manage/info BlazorWASMFrontend	7 min ago May 6, 2024 20:...	236 ms	2	2	0
●	GET localhost:7171/_framework/* BlazorWASMFrontend	7 min ago May 6, 2024 20:...	77 ms	1	1	0
●	GET localhost:7171/_framework/* BlazorWASMFrontend	7 min ago May 6, 2024 20:...	75 ms	1	1	0
●	GET localhost:7171/appsettings.json BlazorWASMFrontend	7 min ago May 6, 2024 20:...	27 ms	1	2	0
●	GET localhost:7171/_framework/* BlazorWASMFrontend	7 min ago May 6, 2024 20:...	74 ms	1	2	0
●	GET localhost:7211/manage/info BlazorWASMFrontend	9 min ago May 6, 2024 20:...	236 ms	2	2	0
●	GET localhost:7171/_framework/* BlazorWASMFrontend	9 min ago May 6, 2024 20:...	114 ms	1	1	0

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 new relic



 [Home](#) [Counter](#) [Weather](#) [Process Data](#)

# Counter

Current count: 0

 [Click me](#)

```
1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5   <meta charset="utf-8" />
6   <meta name="viewport" content="width=device-width, initial-scale=1.0" />
7   <script src="newrelic.js"></script>
8   <title>Blazor WASM Auth</title>
9   <base href="/" />
10  <link rel="stylesheet" href="css/bootstrap/bootstrap.min.css" />
11  <link rel="stylesheet" href="css/app.css" />
12  <link rel="icon" type="image/png" href="favicon.png" />
13  <link href="BlazorWasmAuth.styles.css" rel="stylesheet" />
14 </head>
15
16 <body>
17   <div id="app">
18     <svg class="loading-progress">
19       <circle r="40%" cx="50%" cy="50%" />
20       <circle r="40%" cx="50%" cy="50%" />
21     </svg>
22     <div class="loading-progress-text"></div>
23   </div>
24
25   <div id="blazor-error-ui" data-nosnippet>
26     An unhandled error has occurred.
27     <a href="" class="reload">Reload</a>
28     <a class="dismiss">✖</a>
29   </div>
30   <script src="\_framework/blazor.webassembly.js"></script>
31 </body>
32
33 </html>
```

### ≡ Counter.razor ×

BlazorWasmAuth > Components > Pages > ≡ Counter.razor

```
1  @page "/counter"
2  @inject IJSRuntime JS
3
4  <script type="text/javascript">
5  function addNewRelicPageAction(currentCount) {
6    newrelic.addPageAction('counterClicked', {currentCount: currentCount});
7    return "success";
8  }
```

```
· private void IncrementCount()
· {
·     ···· currentCount++;
·     ···· Trace(currentCount);
·     ···· JS.InvokeAsync<string>("addNewRelicPageAction", currentCount);
· }
```

```
23
24  @code {
25      ···· private int currentCount = 0;
26
27      ···· private void IncrementCount()
28      {
29          ···· currentCount++;
30          ···· Trace(currentCount);
31          ···· JS.InvokeAsync<string>("addNewRelicPageAction", currentCount);
32      }
}
```

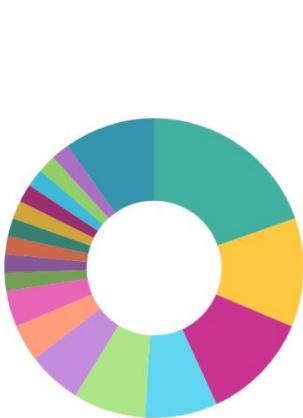
+ Add variable



Search for any attribute or value.

**Click Counter distribution**

May 7, 1:53am – May 7, 3:58am



counts (51)

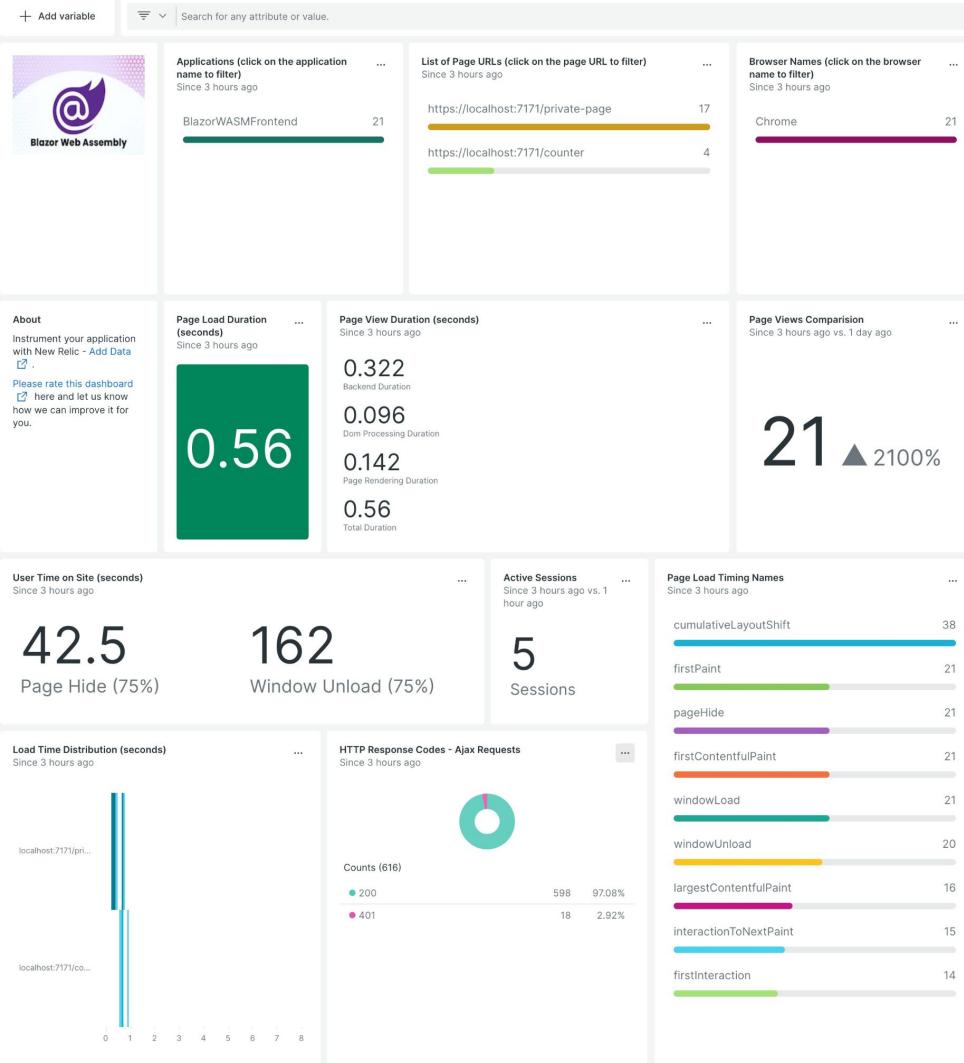
● 1	10	19.61%
● 2	6	11.76%
● 3	6	11.76%
● Other	5	9.8%
● 4	4	7.84%
● 5	4	7.84%
● 6	3	5.88%
● 7	2	3.92%
● 8	2	3.92%
● 10	1	1.96%
● 11	1	1.96%

**Click Counter distribution**

May 7, 1:54am – May 7, 3:58am



● 1 ● 2 ● 3 ● 4 ● 5 ● 6 ● 7 ● 8 ● 10 ● 11 ● 12 ● 13 ● 14 ● 15 ● 16 ● 17 ● 9



# References

- [Build a full-stack web app with Blazor](#)
- OpenTelemetry
  - [.NET](#)
  - [Other languages](#)
  - [Real User Monitoring](#)
- New Relic
  - [Real User Monitoring](#)
  - [New Relic Browser APIs](#)
- [Blazor WebAssembly sample app](#)

Slides available here:



<https://bit.ly/LambdaConf2024>



# THANK YOU

A large, bold, teal-colored text "THANK YOU" is centered on the slide. The letters have a subtle, wavy, organic texture. To the left of the text, there is a graphic element consisting of a teal vertical bar with a pink fingerprint-like pattern running along its length.