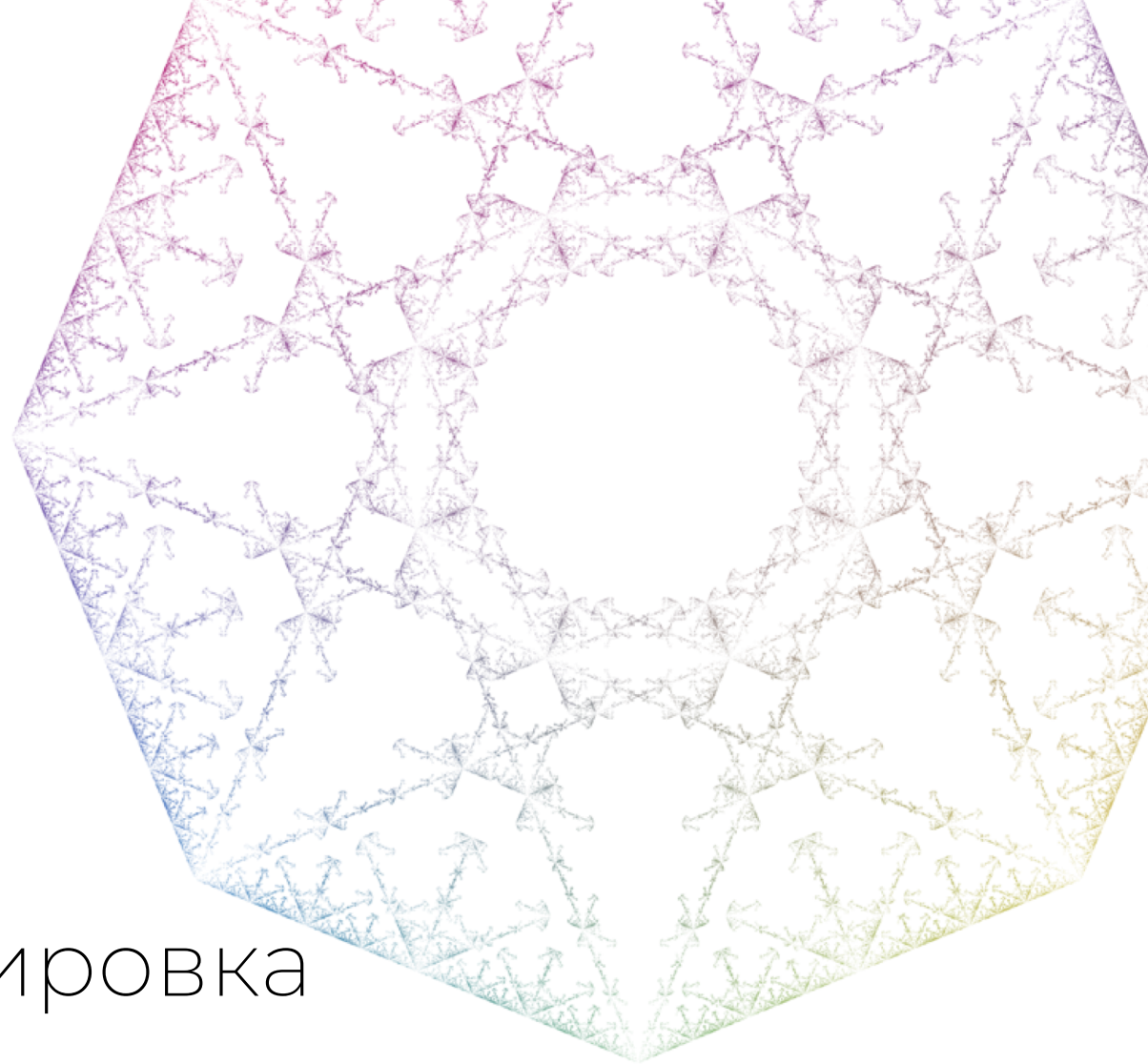




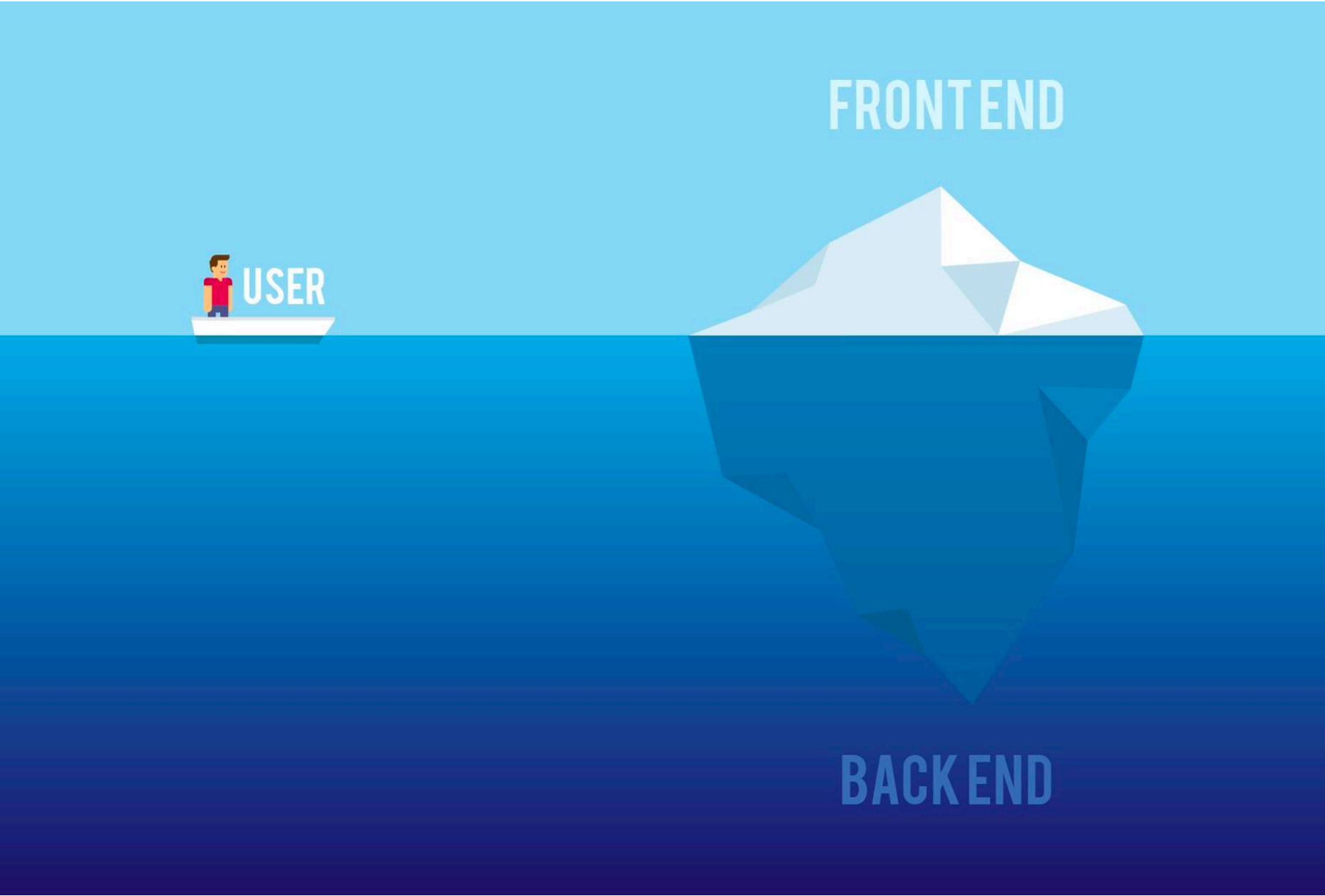
INSOLAR
DISTRIBUTED BUSINESS NETWORKS



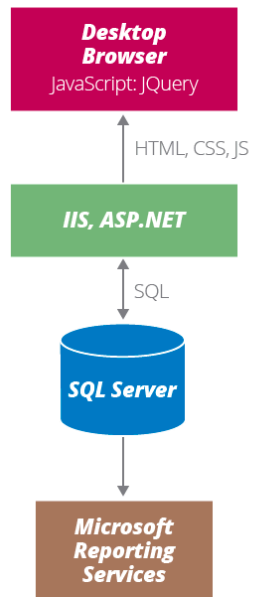
Распределенная трассировка запросов в .NET

Егор Гришечко
Senior Developer

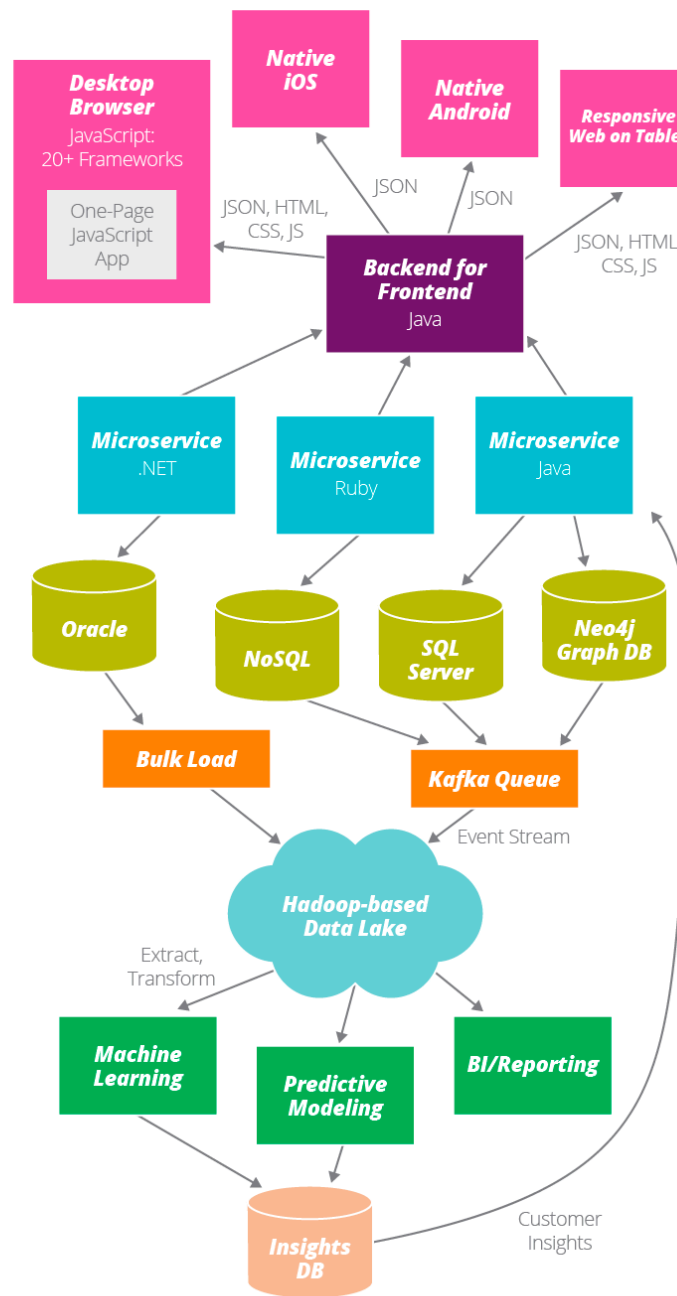
- Что такое observability/наблюдаемость
- Зачем это нужно
- Распределенные trace-метки
- Jaeger
- OpenTracing и OpenCensus
- Немного про будущее

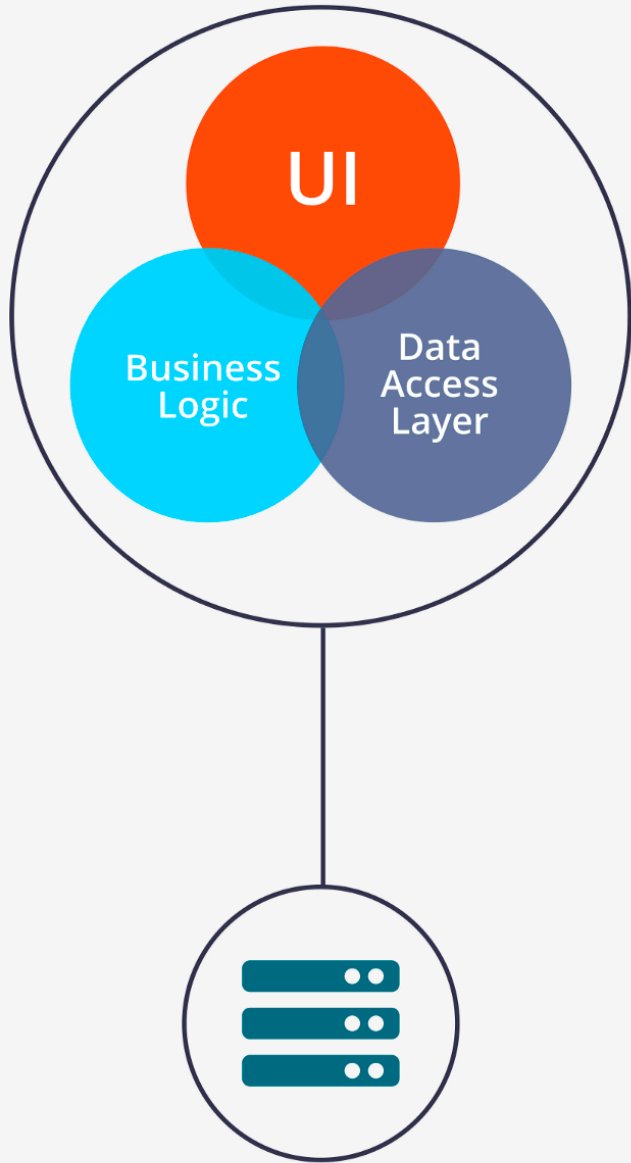


2005

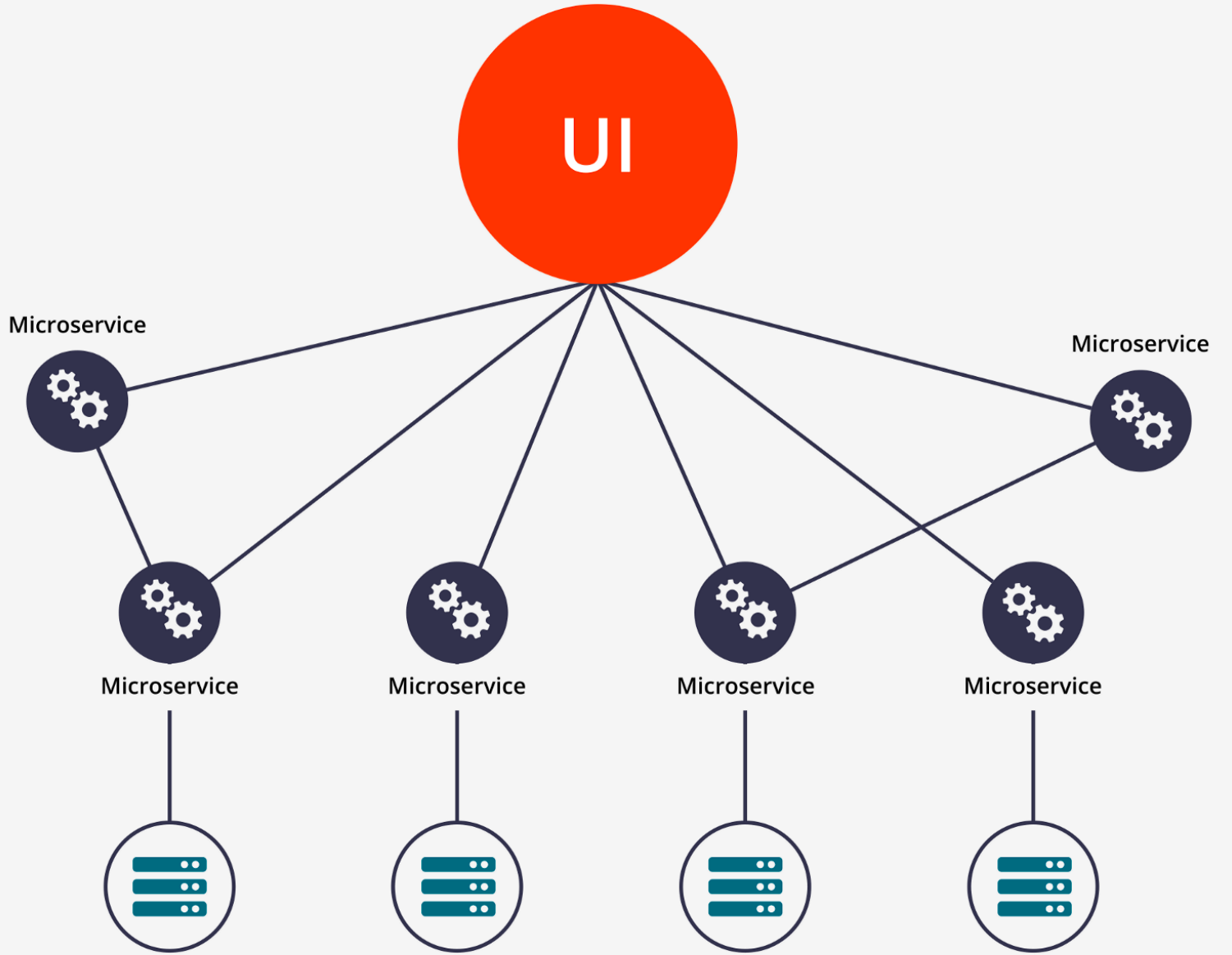


2016

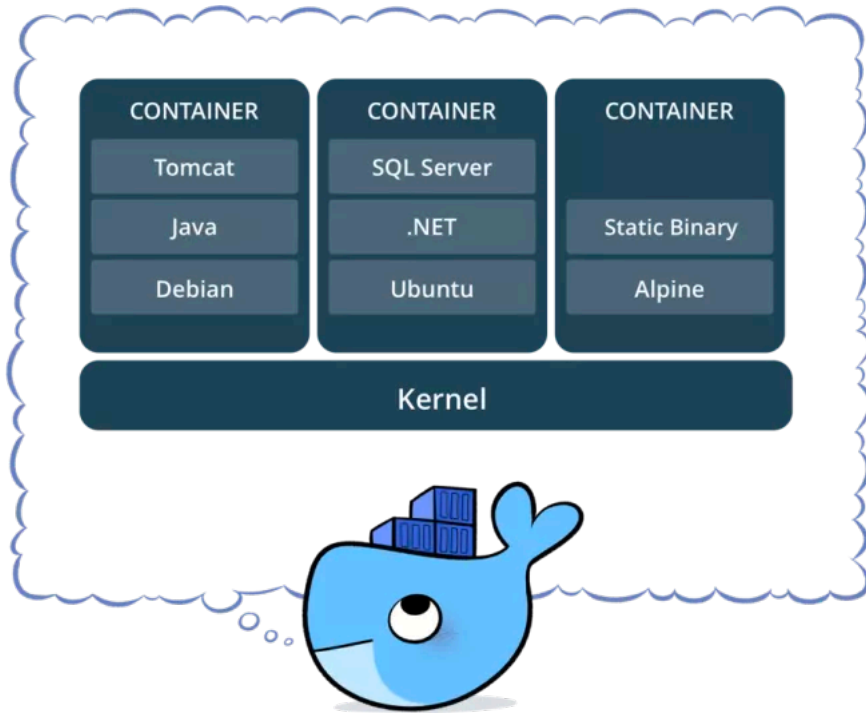




Monolithic Architecture



Microservice Architecture



kubernetes

- В любой комплексной системе есть проблемы
- Поведение распределенной системы – патологически не предсказуемо
- Невозможно предсказать все комбинации сбоев и падений компонентов системы
- Возможность локализовать и починить проблему - фундамент для поддержания и развития системы

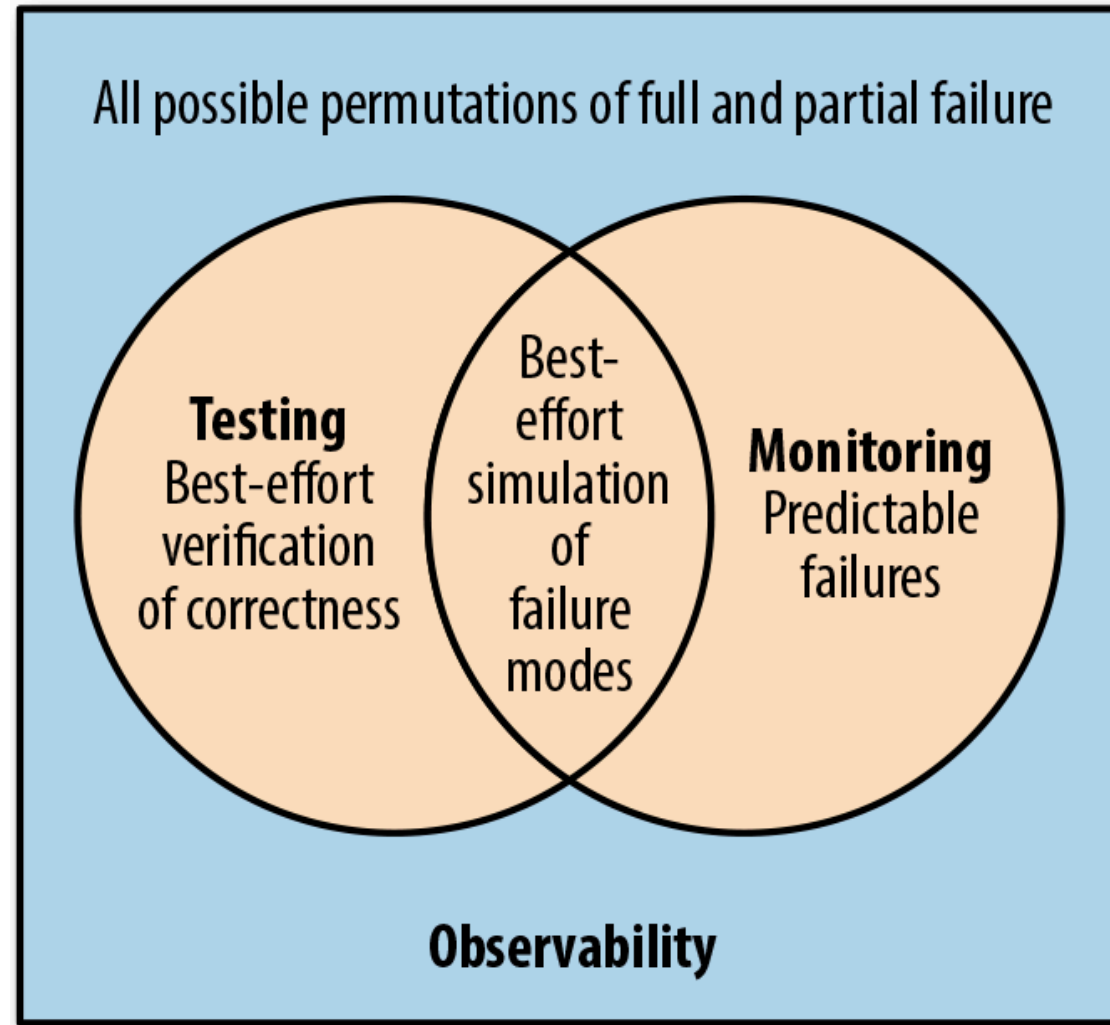
Что такое observability?

Observability might mean different things to different people. For some, it's about logs, metrics, and traces. For others, it's the old wine of monitoring in a new bottle. The overarching goal of various schools of thought on observability, however, remains the same—bringing better visibility into systems.

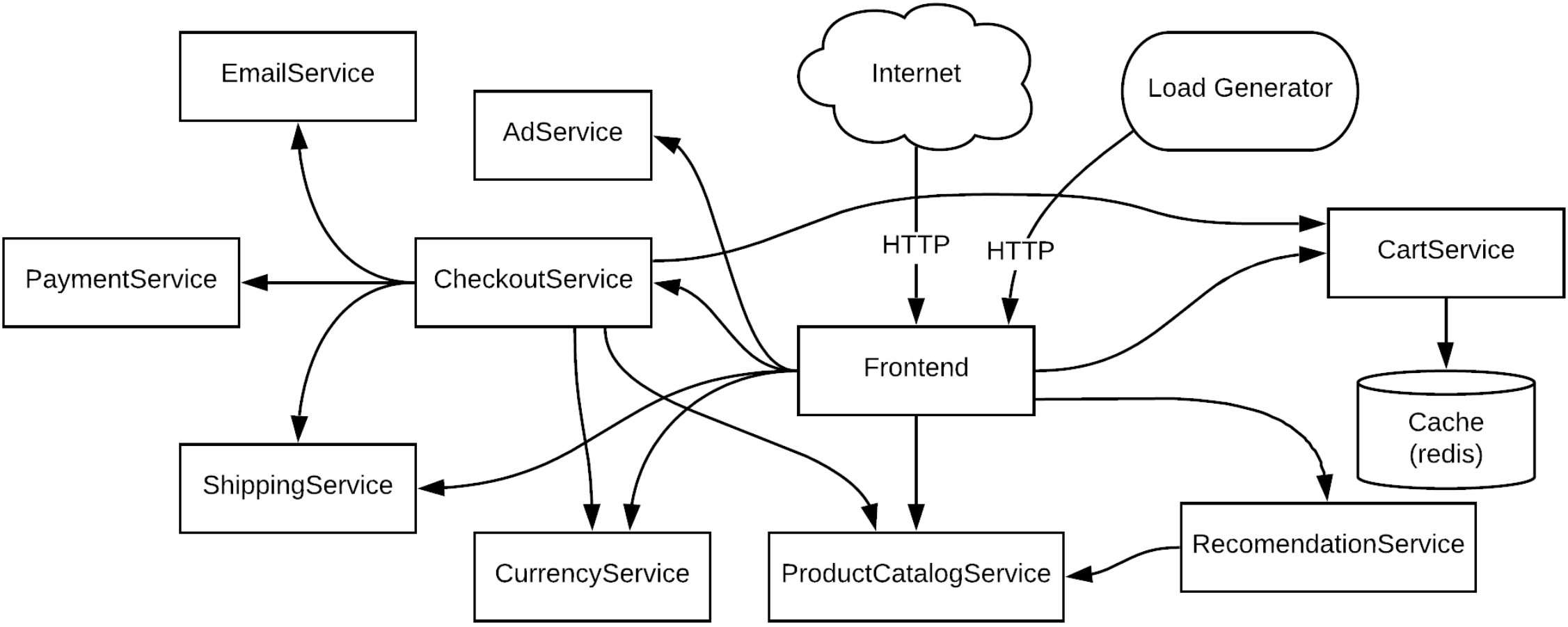
Наблюдаемость – для разных людей, может значить разные вещи. Для некоторых – это логи, метрики и трейс-метки. Для других - это мониторинг, но в новой обертке.

Тем не менее, общая мысль всех толкований этого термина остается одной – обеспечение лучшей прозрачности процесса работы системы

А, так это мониторинг?

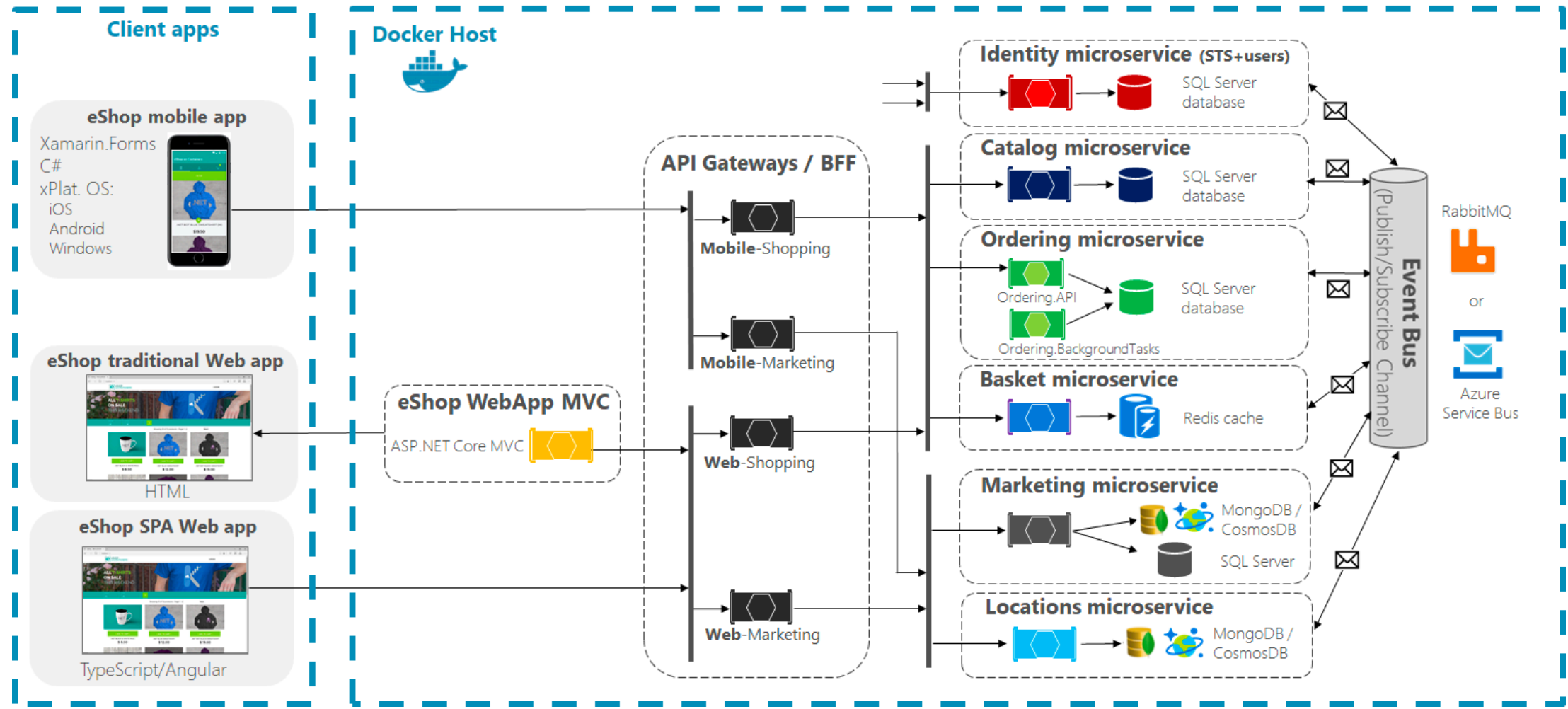


А зачем это нужно?
Можно пример?



eShopOnContainers reference application

(Development environment architecture)



Что мне нужно, чтобы
увеличить наблюдаемость?

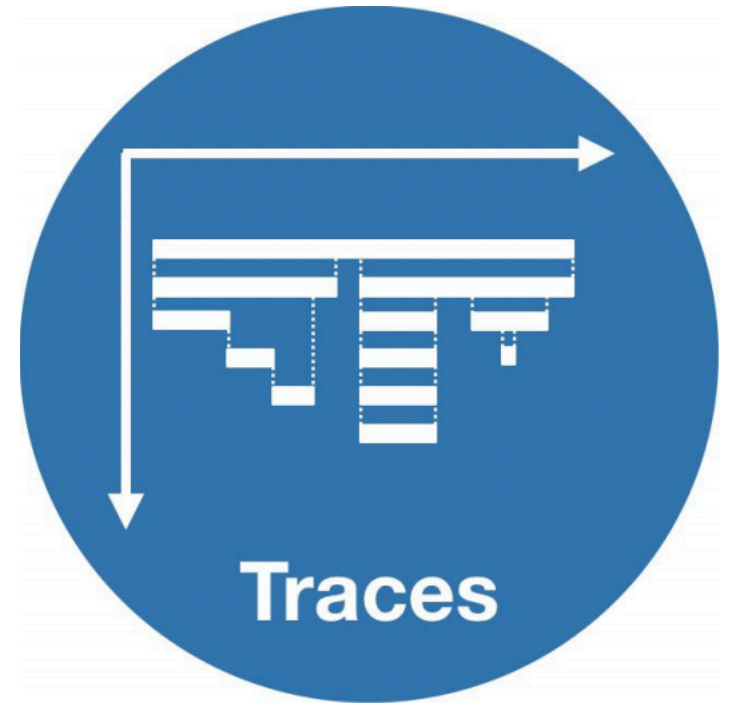
Три столпа наблюдаемости



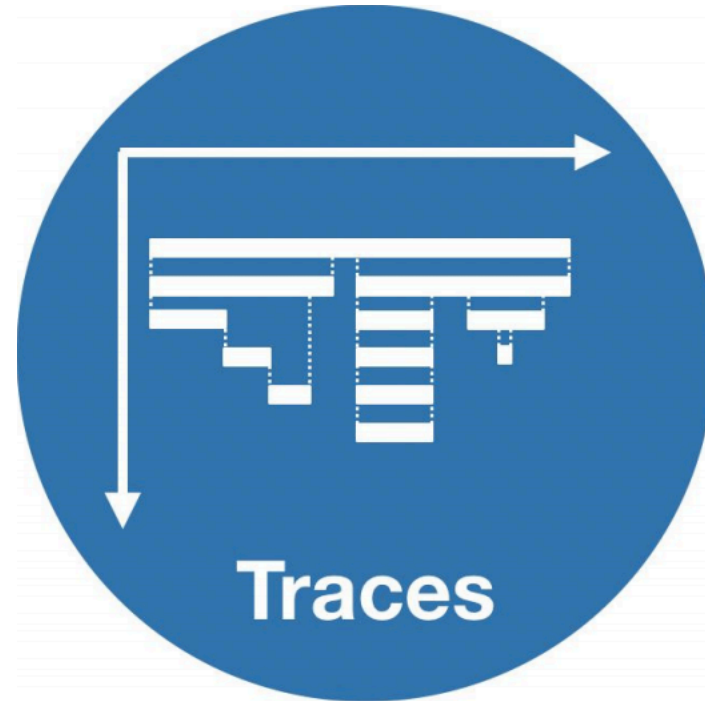
A circular icon with a green background. Inside the circle is white text representing log entries. The text is repeated 16 times, showing a timestamp, a message, and an error type. Below the text, the word "Logs" is written in white.

```
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"  
level:error ts=2019-05-15T11:51:43 msg="failed" err="connect timeout"
```

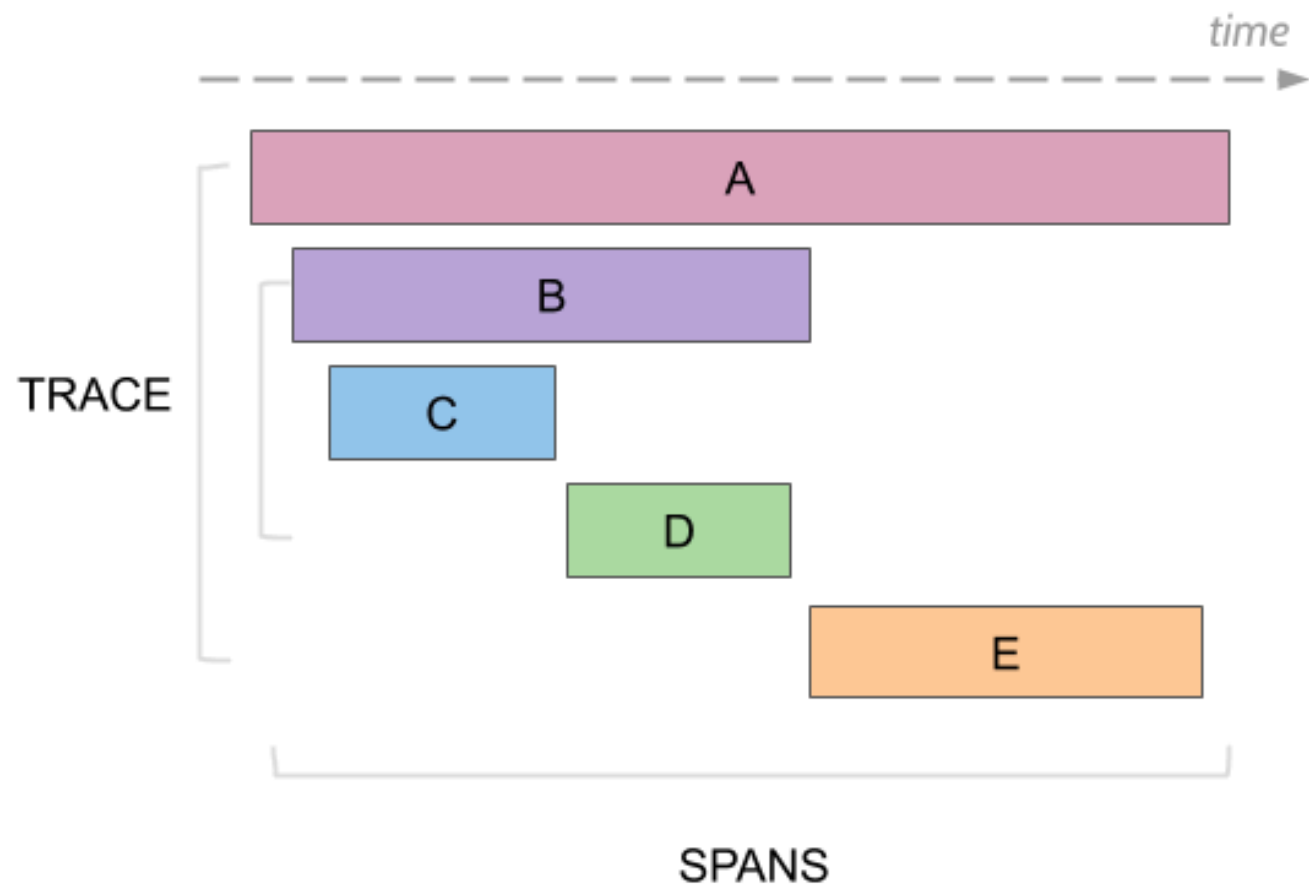
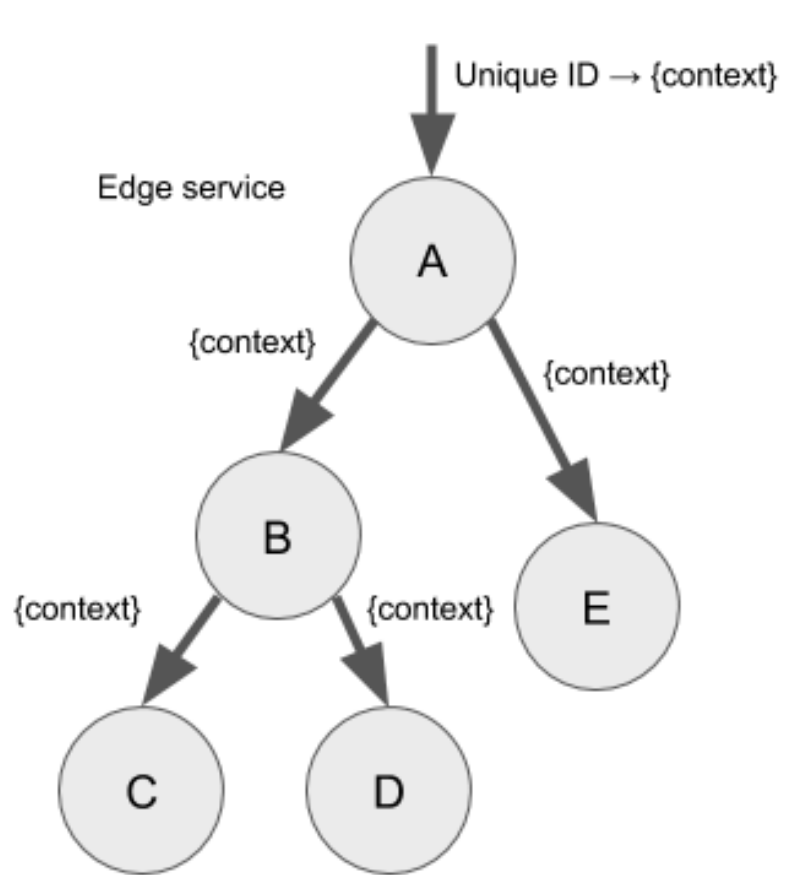
Logs

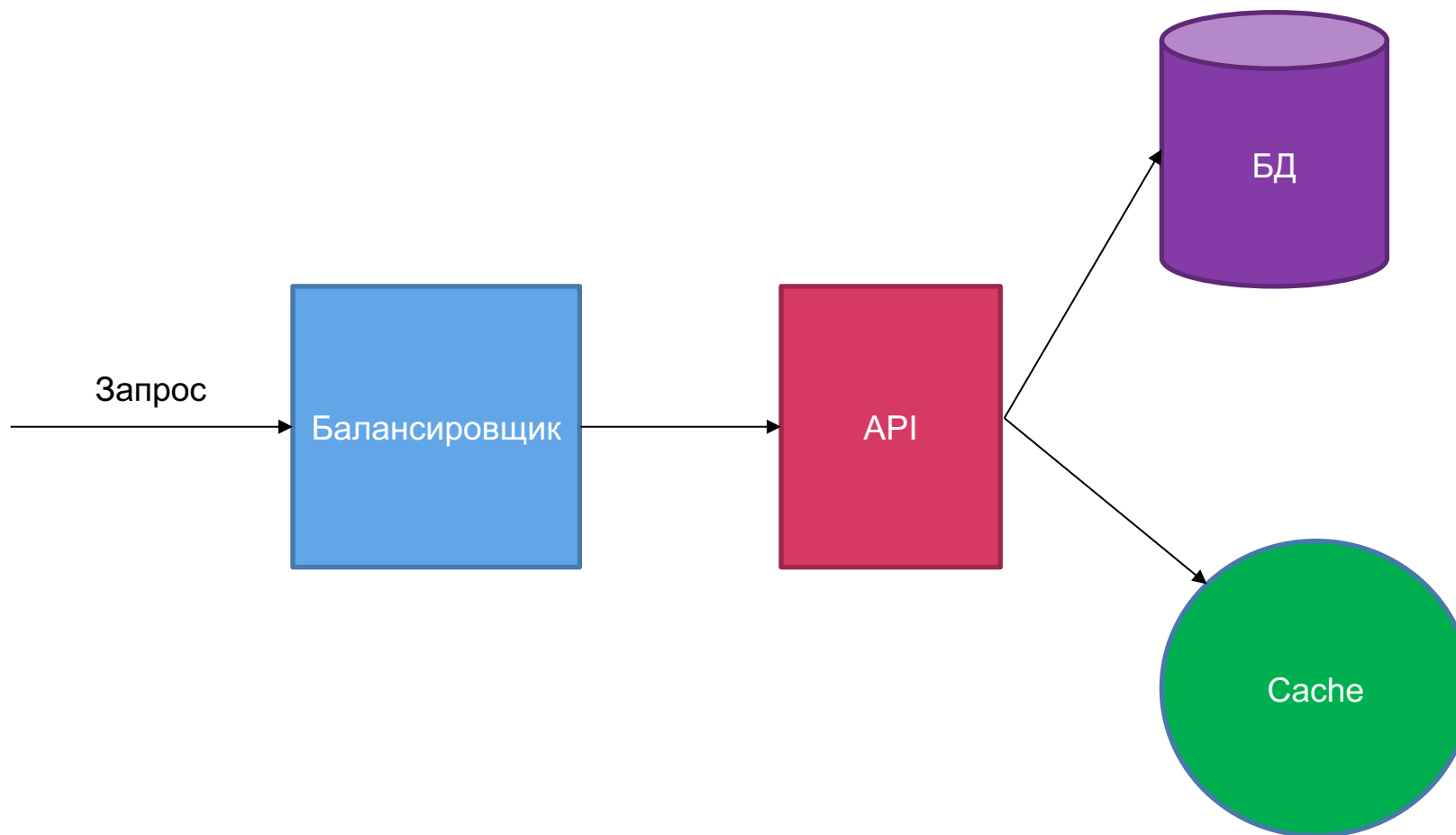


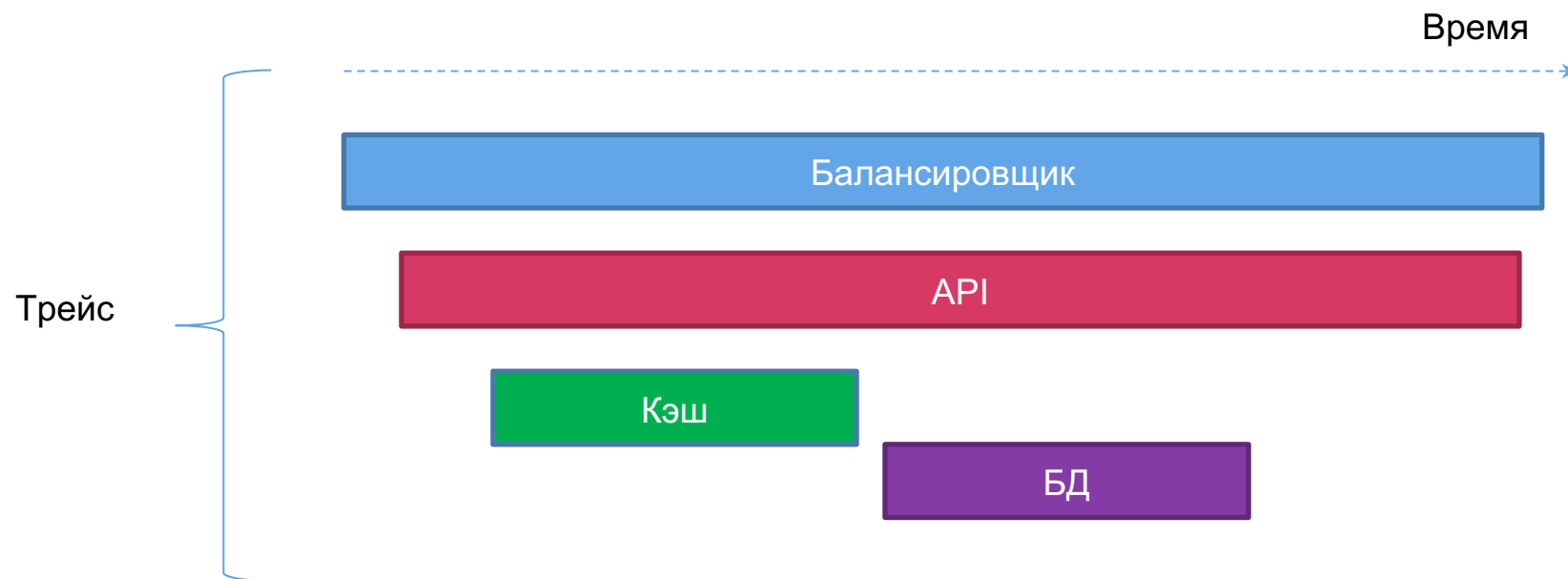
Три столпа наблюдаемости



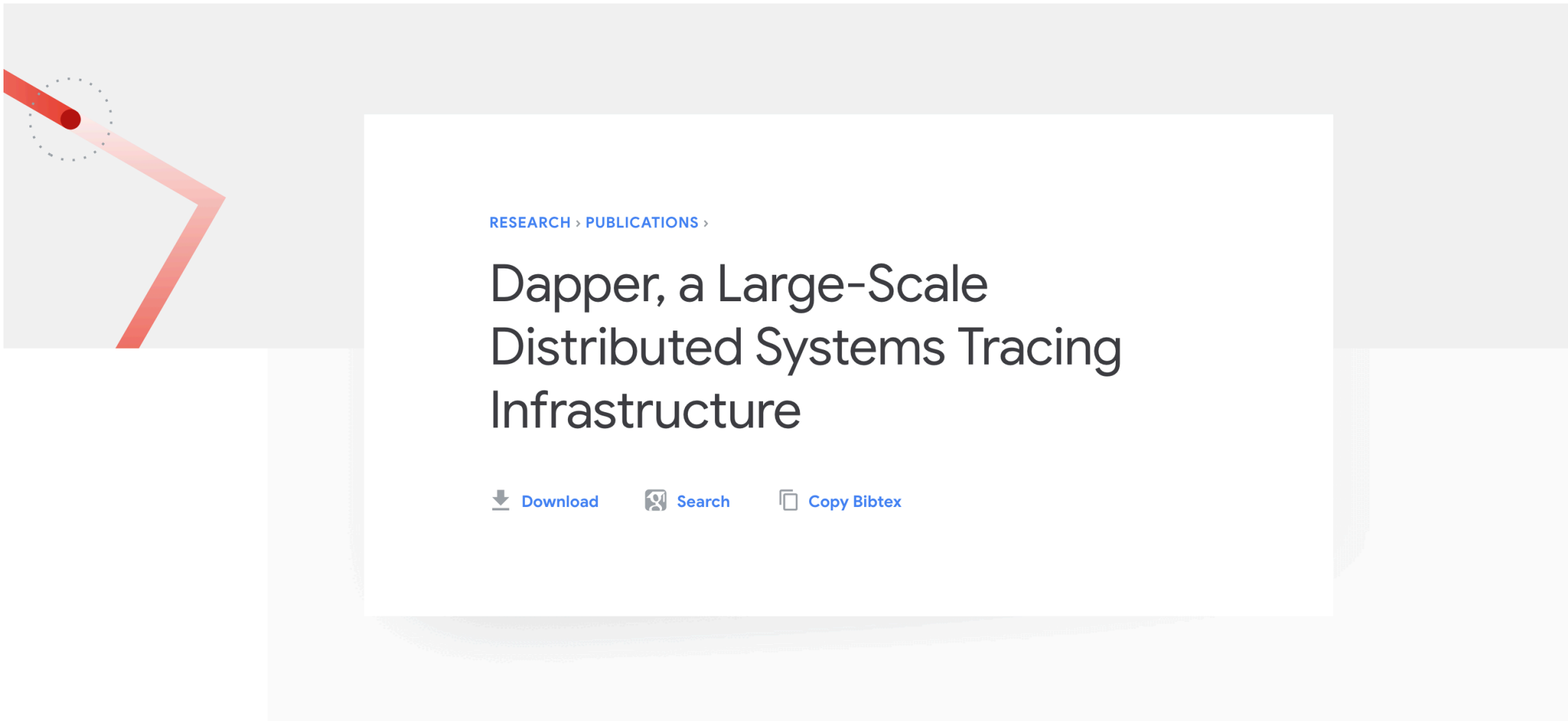
Что такое трейс-метки?







С чего все началось?



Venue

Google, Inc. (2010)

Abstract

Modern Internet services are often implemented as complex, large-scale

Distributed Systems Tracing with Zipkin

By @cra

Thursday, 7 June 2012



Zipkin is a distributed tracing system that we created to help us gather timing data for all the disparate services involved in managing a request to the Twitter API. As an analogy, think of it as a performance profiler, like **Firebug**, but tailored for a website backend instead of a browser. In short, it makes Twitter faster. Today we're open sourcing **Zipkin** under the APLv2 license to share a useful piece of our infrastructure with the open source community and gather feedback.

openzipkin / zipkin

Watch 718

Star 11,333

Fork 2,036

Code

Issues 238

Pull requests 13

Projects 2

Wiki

Security

Insights

Zipkin is a distributed tracing system <https://zipkin.io/>

zipkin

distributed-tracing

tracing

openzipkin

observability

Java 80.8%

JavaScript 17.4%

CSS 1.3%

Other 0.5%

Branch: master

New pull request

Create new file

Upload files

Find File

Clone or download

Distributed Systems Tracing with Zipkin

By @cra

Thursday

7 June 2012

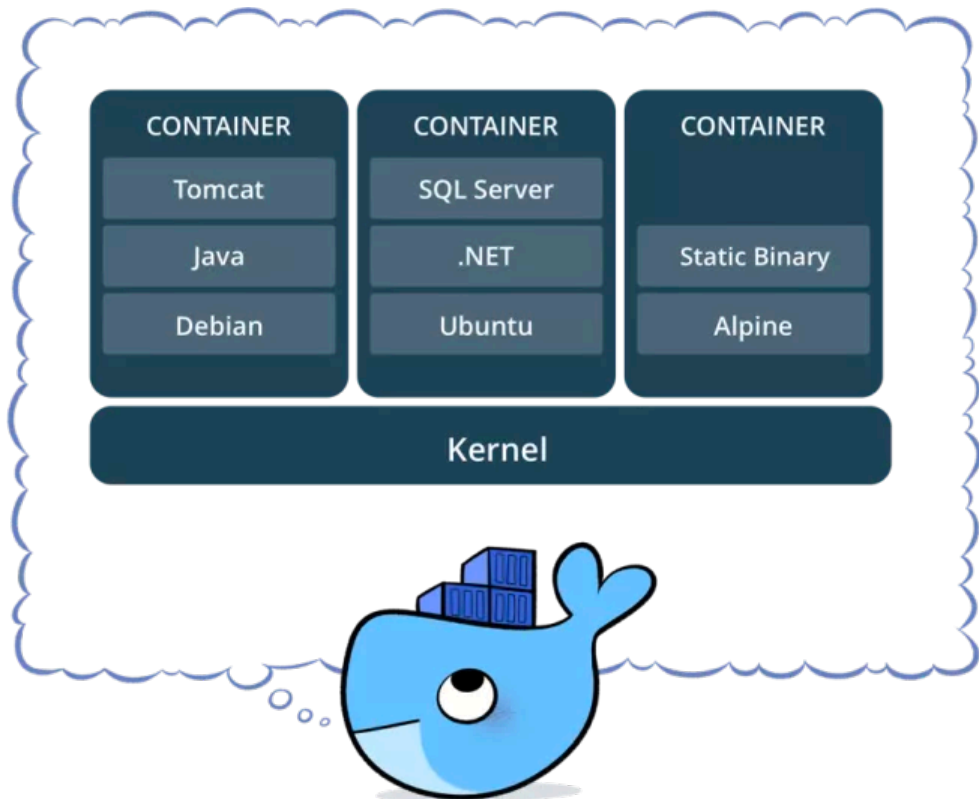


Zipkin is a distributed tracing system that we created to help us gather timing data for all the disparate services involved in managing a request to the Twitter API. As an analogy, think of it as a performance profiler, like **Firebug**, but tailored for a website backend instead of a browser. In short, it makes Twitter faster. Today we're open sourcing **Zipkin** under the APLv2 license to share a useful piece of our infrastructure with the open source community and gather feedback.

А зачем
акцентировать
внимание на 2012?



**CLOUD NATIVE
COMPUTING FOUNDATION**



kubernetes

Uber

500



JAEGER

jaegertracing / jaeger

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★ Unstar 8,522

Fork 855

Code

Issues 255

Pull requests 26

Projects 1

Security

Insights

CNCF Jaeger, a Distributed Tracing Platform <https://jaegertracing.io/>

distributed-tracing

opentracing

jaeger

dapper

zipkin

cncf

● Go 96.9%

● Shell 1.1%

● Other 2.0%

Branch: master

New pull request

Create new file

Upload files

Find File

Clone or download

 **tcolgate** and **yurishkuro** Add optional client TLS auth (#1591) ...

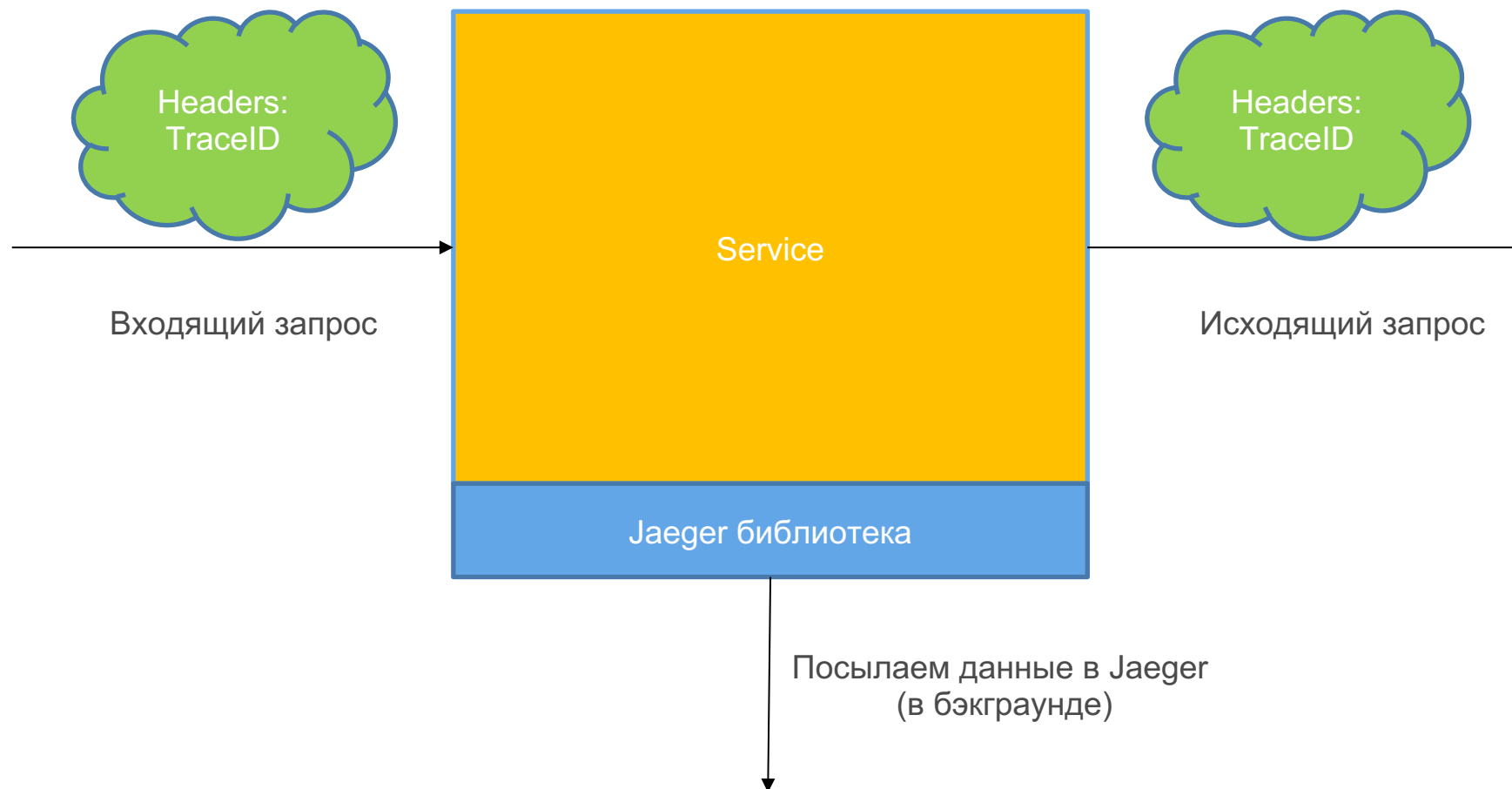
Latest commit 428cc1a 2 days ago

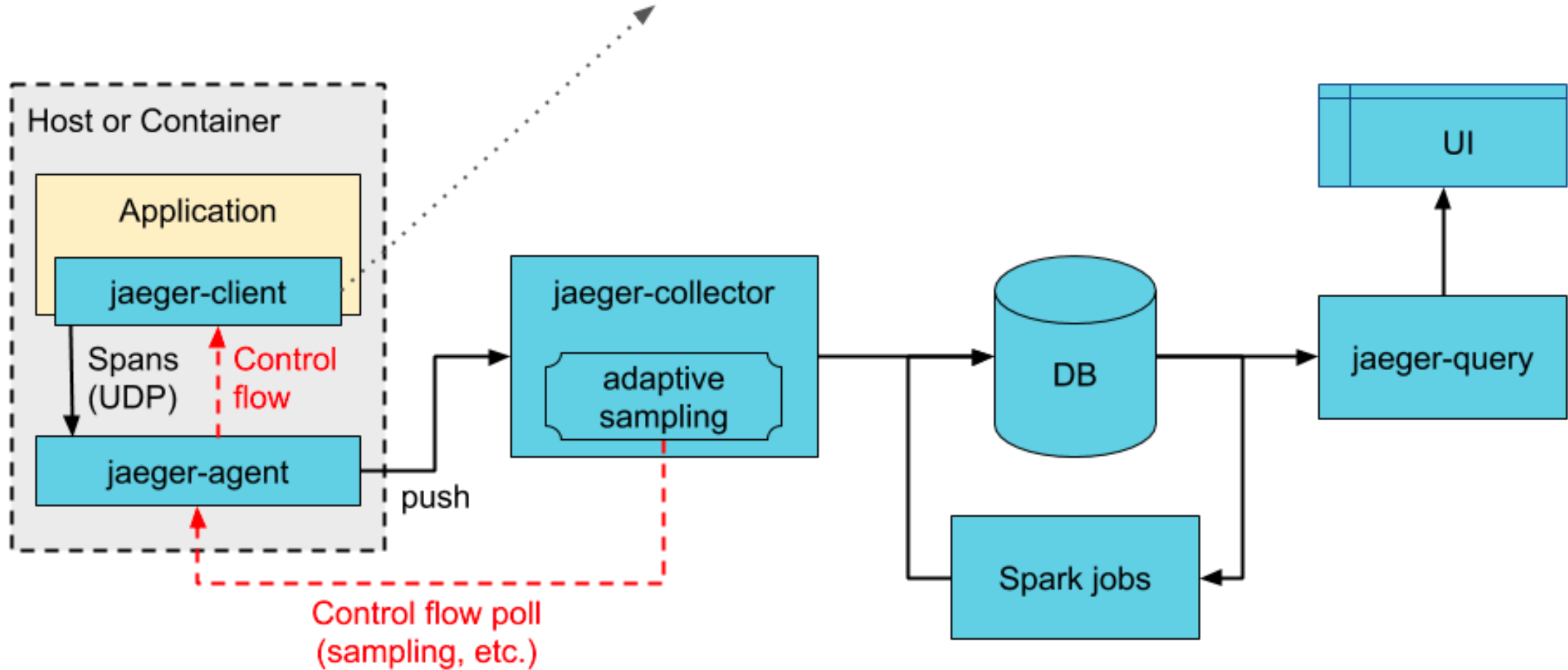
 .github

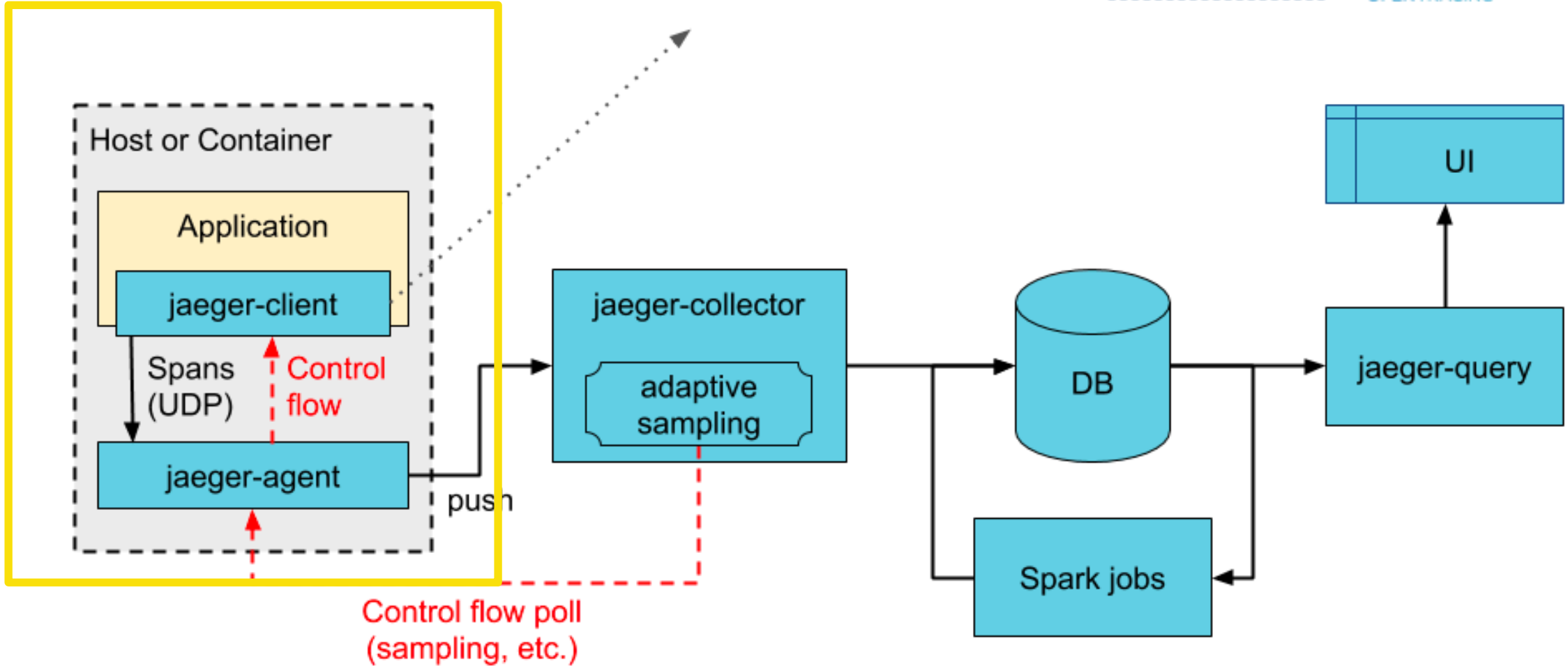
Replacing the wrong link with the correct. (#1416)

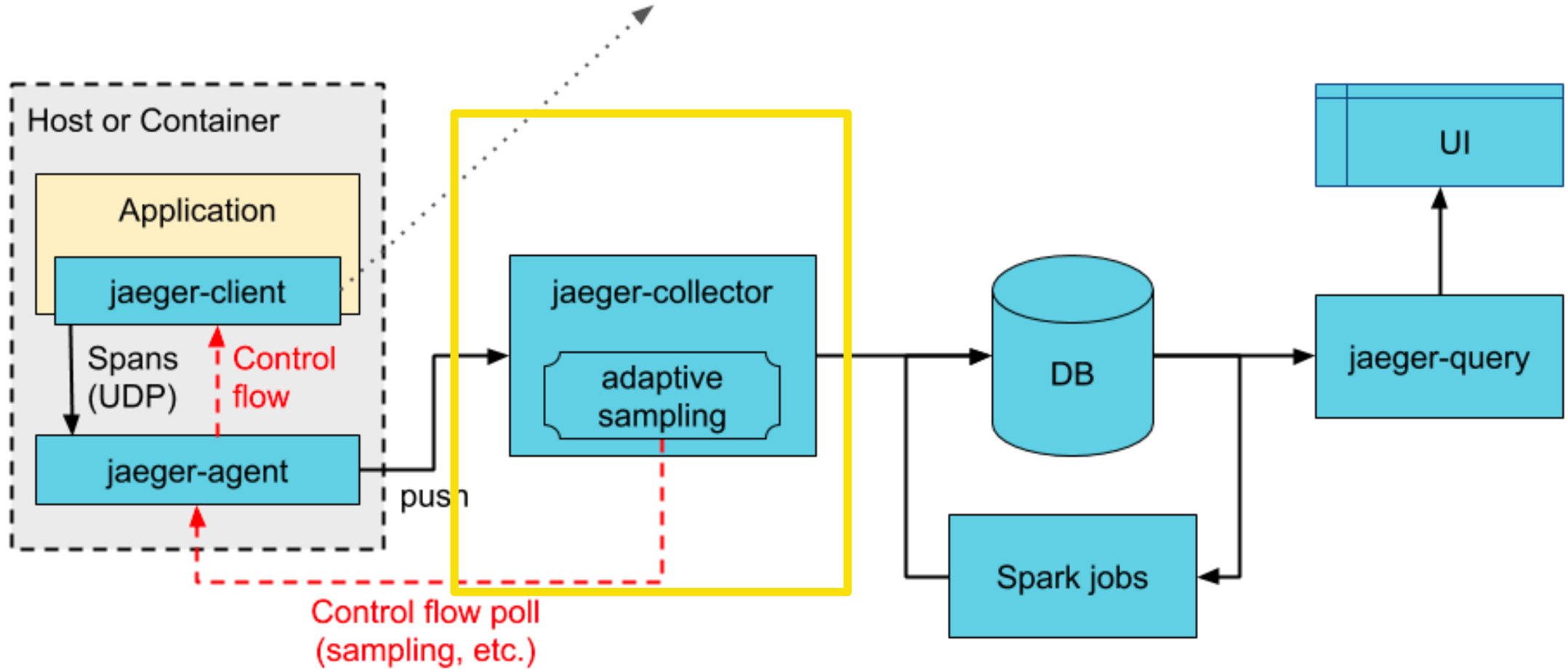
4 months ago

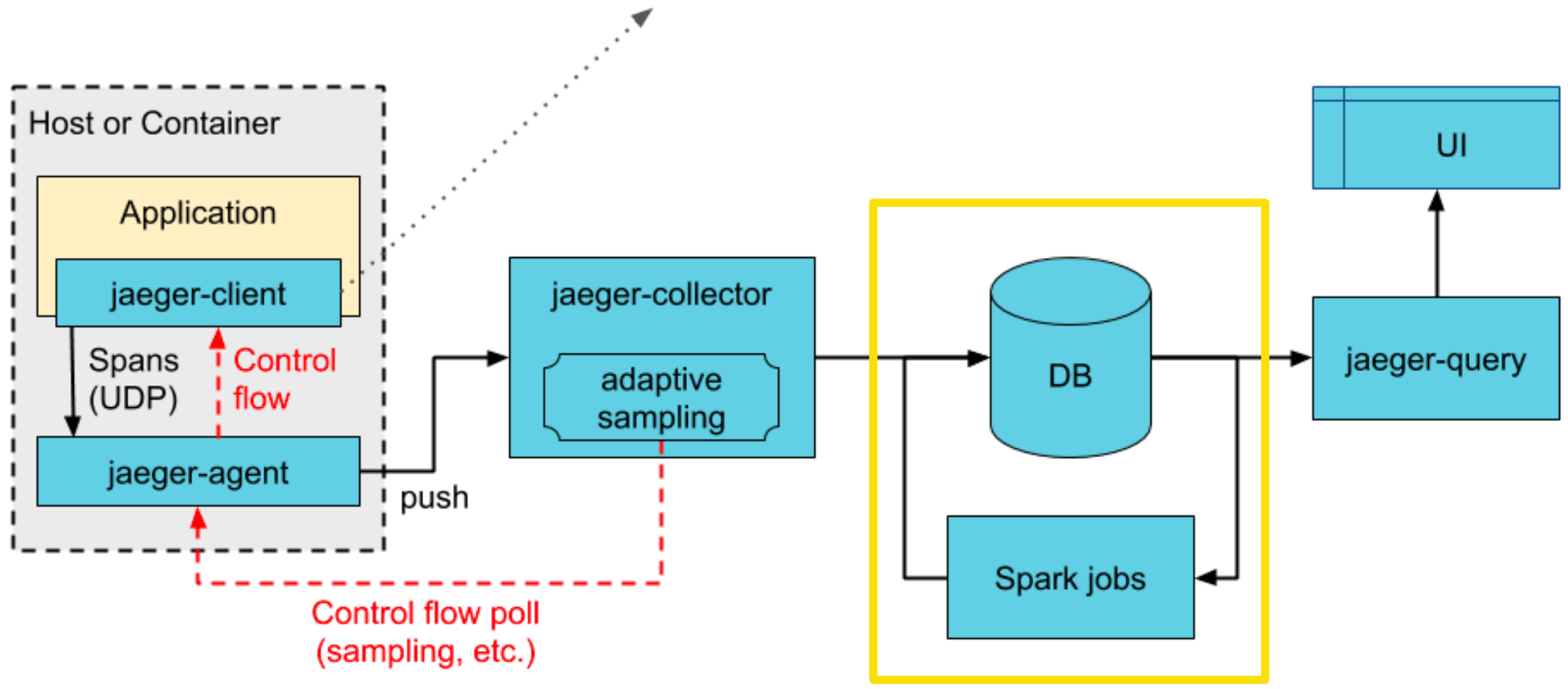




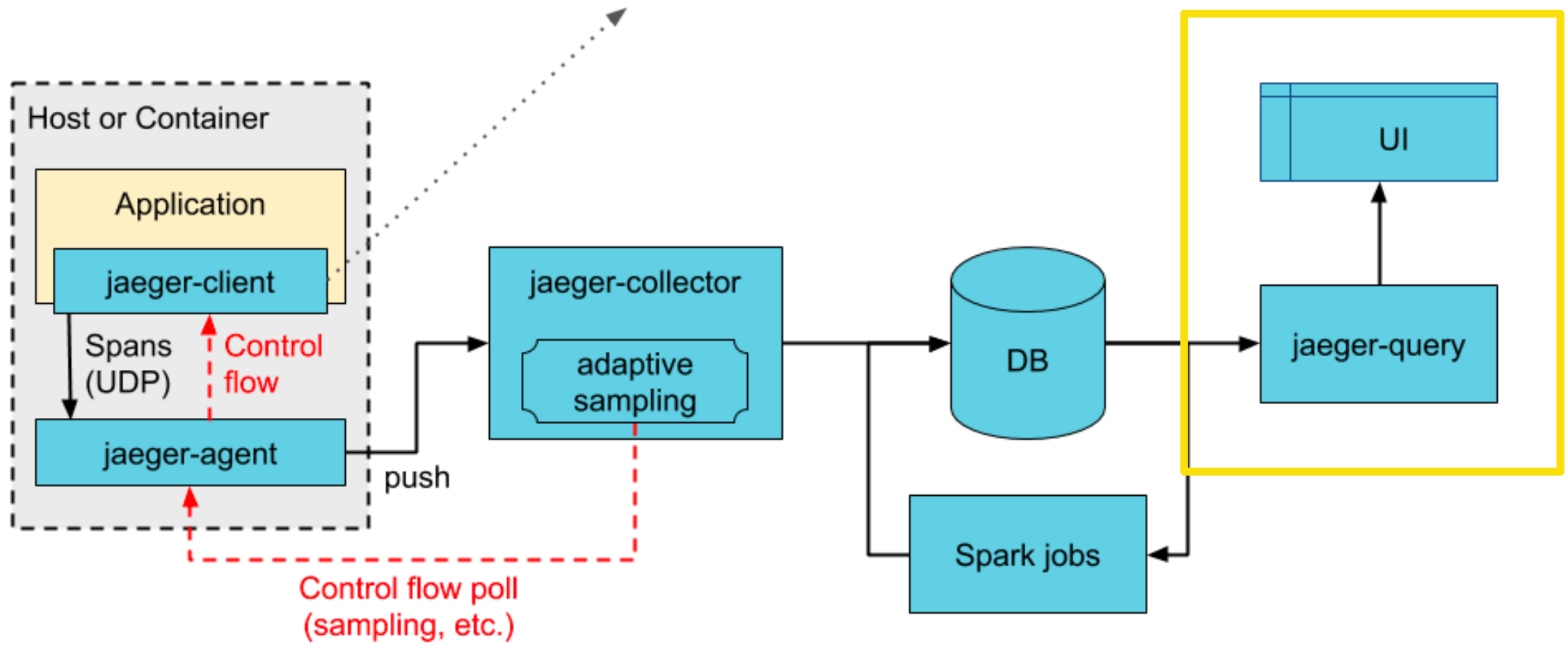




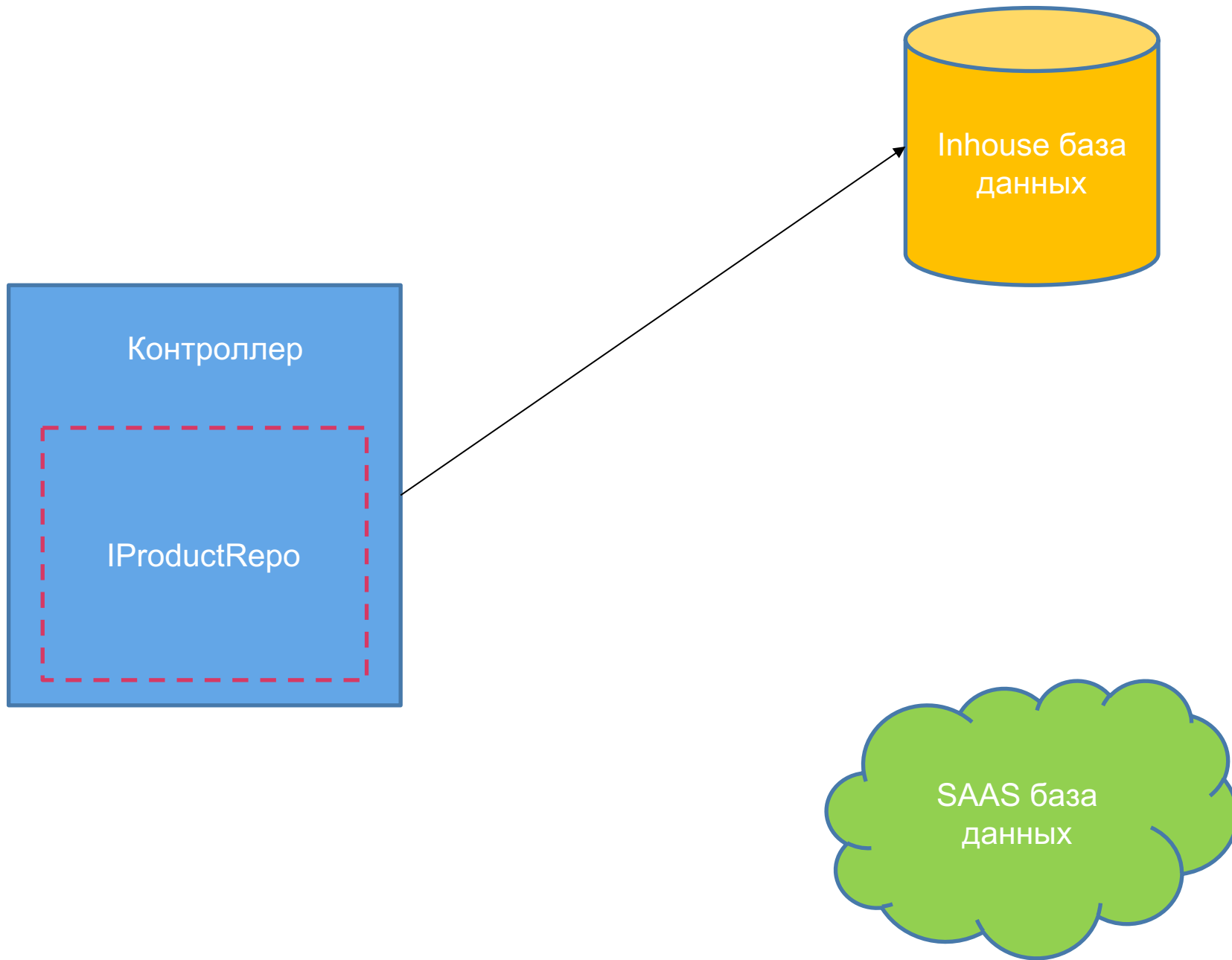


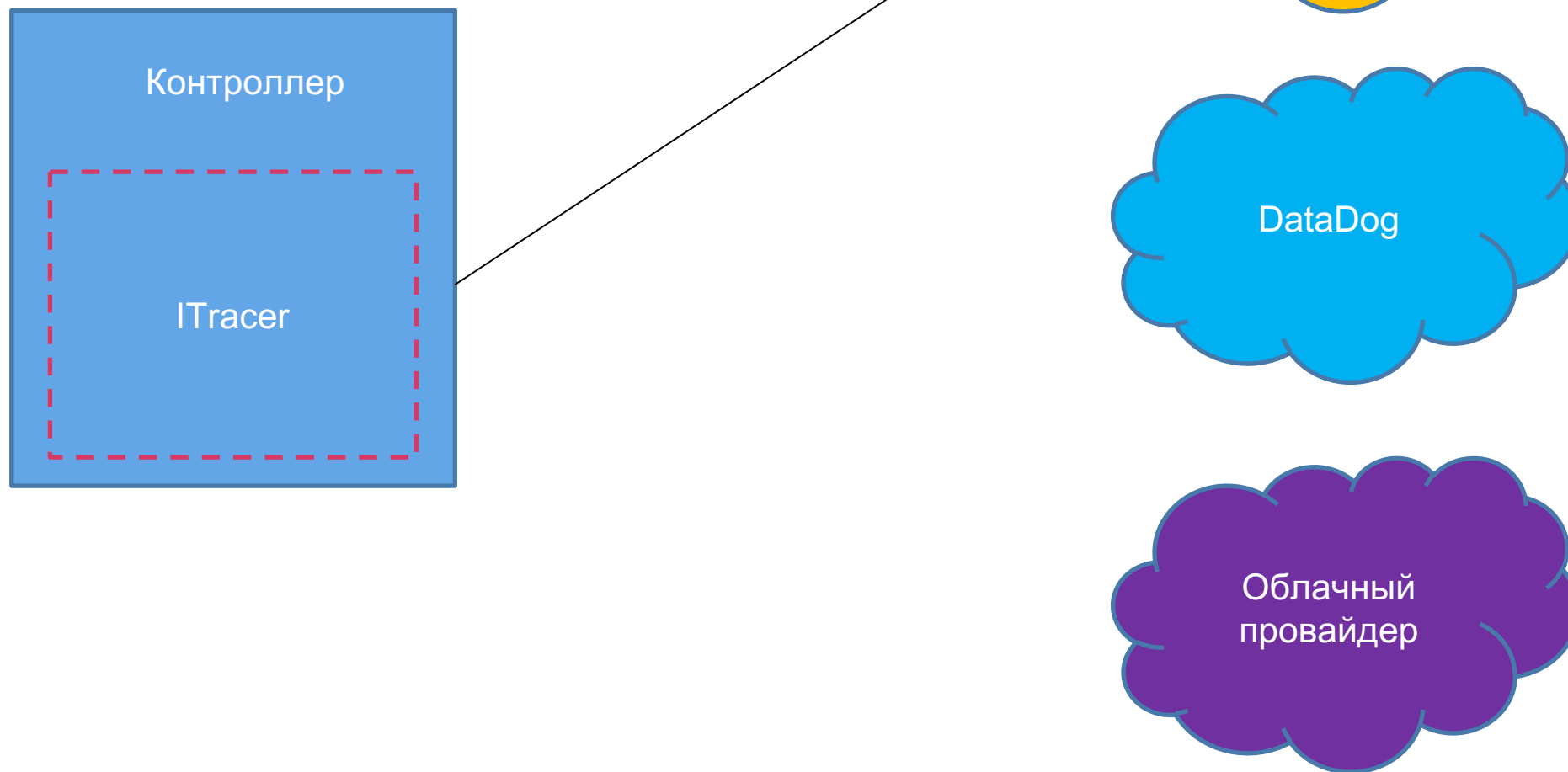



- Supported storage backends:
 - **Cassandra 3.4+**
 - **Elasticsearch 5.x, 6.x, 7.x**
 - **Kafka**
 - memory storage



А что за OpenTracing?







OpenTracing API


Consistent, expressive, vendor-neutral APIs for distributed tracing and context propagation

Earth <http://opentracing.io/>


[Report abuse](#)


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Pinned repositories



 **specification**


A place to document (and discuss) the OpenTracing specification

★ 667  100



 **opentracing-go**


OpenTracing API for Go

 Go ★ 1.8k  173



 **opentracing-java**


OpenTracing API for Java

 Java ★ 1.1k  227



 **opentracing-javascript**


OpenTracing API for Javascript (both Node and browser)

 TypeScript ★ 724  68


 **opentracing-python**

OpenTracing API for Python

 Python ★ 522  73

 **contrib**

A place (or, really, a pointer) for community contributions to OpenTracing

★ 4  2

opentracing / opentracing-csharp

Watch ▾

42

★ Star

331

🔗 Fork

50

Code

Issues 18

Pull requests 4

Projects 0

Wiki

Security

Insights

OpenTracing API for C# (.NET) <http://opentracing.io>

144 commits

5 branches

10 releases

15 contributors

Apache-2.0

Branch: master ▾

New pull request

Create new file

Upload files

Find file

















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cwe1ss and austinlparker Updates GitHub token for creating releases (#132)

Latest commit e727e73 on 19 Aug

📁 .vscode	EditorConfig coding conventions (copied from dotnet/corefx) (#60)	2 years ago
📁 examples	Add a binary propagator format option (#116)	9 months ago
📁 src/OpenTracing	reset position (#131)	2 months ago
📁 test/OpenTracing.Tests	Fixing binary propagation (#130)	2 months ago
📄 .appveyor.yml	Updates GitHub token for creating releases (#132)	2 months ago
📄 .editorconfig	EditorConfig coding conventions (copied from dotnet/corefx) (#60)	2 years ago
📄 .gitattributes	EditorConfig coding conventions (copied from dotnet/corefx) (#60)	2 years ago

- ▼  OpenTracing
 - ▶  Dependencies
 - ▶  Properties
 - ▶  Mock
 - ▶  Noop
 - ▶  Propagation
 - ▶  Tag
 - ▶  Util
 -  IScope.cs
 -  IScopeManager.cs
 -  ISpan.cs
 -  ISpanBuilder.cs
 -  ISpanContext.cs
 -  ITracer.cs
 -  LogFields.cs
 -  References.cs


```
[Route("api/number")]
[ApiController]
public class NumberController : ControllerBase
{
    private readonly ITracer _tracer;

    public NumberController(ITracer tracer)
    {
        _tracer = tracer;
    }

    // GET api/values
    [HttpGet]
    public async Task<string> Get()
    {
        var span = _tracer.BuildSpan("я новый спан").Start();
        span.SetTag("error", true);
        span.Finish();
        return "третий";
    }
}
```

```
public interface ITracer
{
    ...
    ISpanBuilder BuildSpan(string operationName);
    ...
}
```

```
[Route("api/number")]
[ApiController]
public class NumberController : ControllerBase
{
    private readonly ITracer _tracer;

    public NumberController(ITracer tracer)
    {
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    // GET api/values
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        span.SetTag("error", true);
        span.Finish();
        return "третий";
    }
}
```

```
public interface ISpanBuilder
{
    ...
    ISpan Start();
    ...
}
```

```
[Route("api/number")]
[ApiController]
public class NumberController : ControllerBase
{
    private readonly ITracer _tracer;

    public NumberController(ITracer tracer)
    {
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    }

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    [HttpGet]
    public async Task<string> Get()
    {
        var span = _tracer.BuildSpan("я новый спан").Start();
        span.SetTag("error", true);
        span.Finish();
        return "третий";
    }
}
```

```
public interface ISpan
{
    ISpan SetTag(string key, bool value);
    ISpan Log(string @event);
    void Finish();
}
```

```
// Регистрируем middleware
services.AddOpenTracing();

// Добавляем Jaeger Tracer.
services.AddSingleton<ITracer>(serviceProvider =>
{
    var tracer = new Jaeger.Tracer.Builder("jaeger")
        .WithSampler(new ConstSampler(true))
        .Build();

    // Метод из пакета OpenTracing
    GlobalTracer.Register(tracer);

    return tracer;
});
```



INSTANA




```
using LightStep;
```

```
// Регистрируем middleware  
services.AddOpenTracing();
```


```
// Добавляем LightStep Tracer.
```

```
services.AddSingleton<ITracer>(serviceProvider =>  
{  
    var tracerOptions = new LightStep.Options();  
    var tracer = new LightStep.Tracer(tracerOptions);  
    GlobalTracer.Register(tracer);  
  
    return tracer;  
});
```



OpenCensus

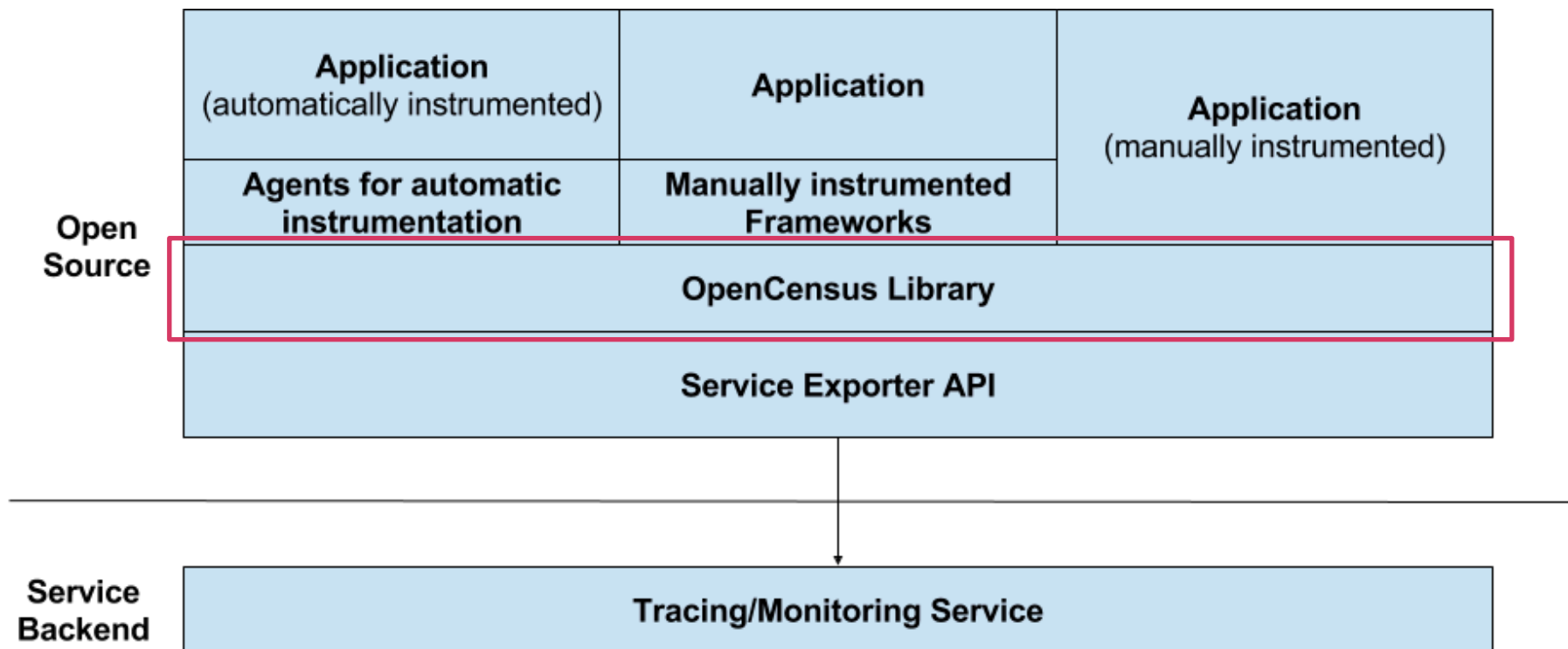
What is OpenCensus?

 OpenCensus is a set of libraries for various languages that allow you to collect application metrics and distributed traces, then transfer the data to a backend of your choice in real time. This data can be analyzed by developers and admins to understand the health of the application and debug problems.

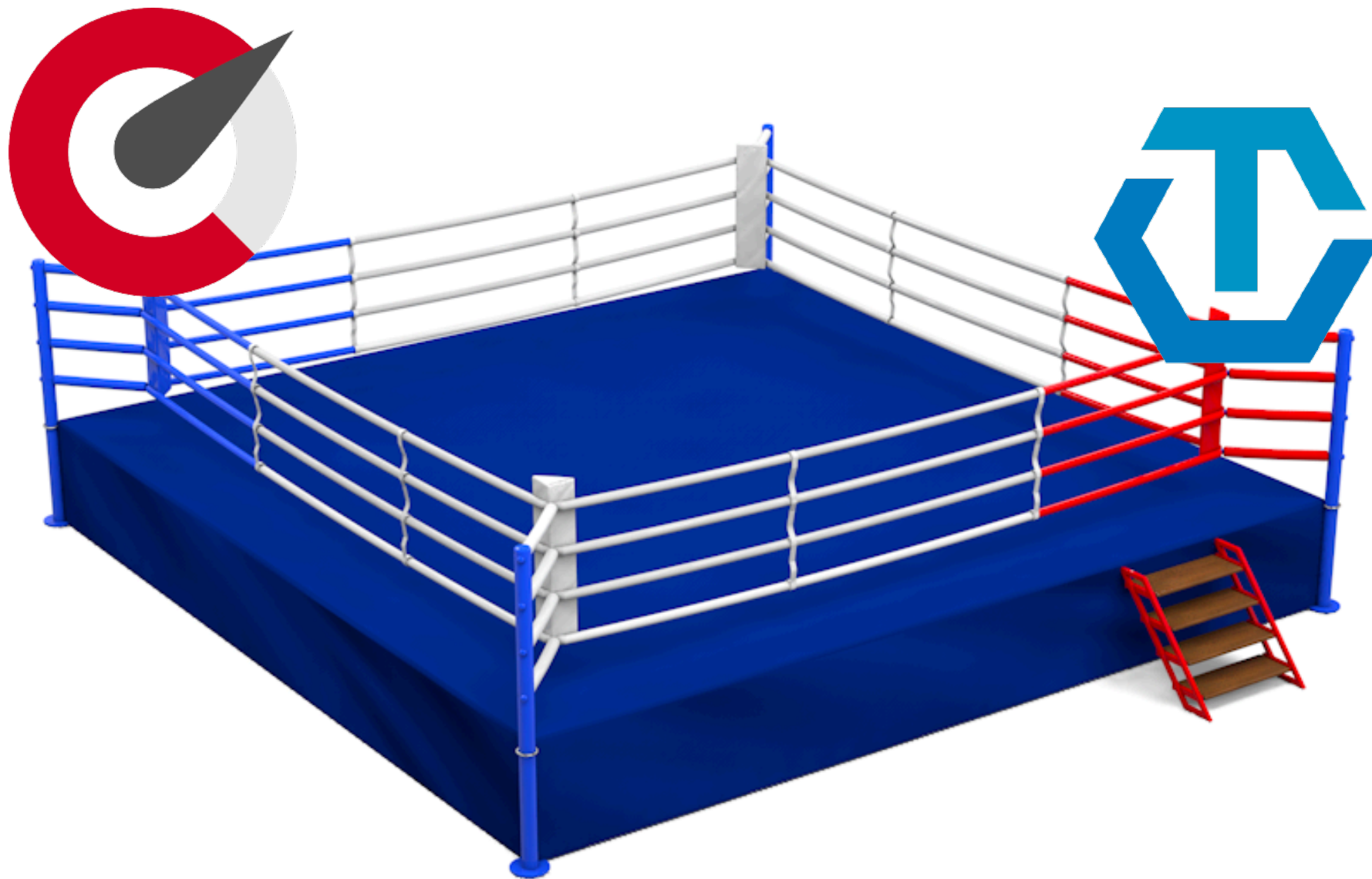
How does OpenCensus benefit the ecosystem?

- Making application metrics and distributed traces more accessible to developers. Today, one of the biggest challenges with gathering this information is the lack of good automatic instrumentation, as tracing and APM vendors have typically supplied their own limited, incompatible instrumentation solutions. With OpenCensus, more developers will be able to use these tools, which will improve the overall quality of their services and the web at large.

```
using (var scope = tracer.SpanBuilder("Main").StartScopedSpan())
{
    Console.WriteLine("About to do a busy work");
    for (int i = 0; i < 10; i++)
    {
        DoWork(i);
    }
}
```



BACKEND	C#	C++	ERLANG	GO	JAVA	NODE.JS	PHP	PYTHON	RUBY
AWS X-Ray	-	-	-	T		-	-	-	-
Azure Monitor	T S	-	-	T	T	-	-	T	-
Datadog	-	-	T S	T S	T	-	-	-	-
Elasticsearch	-	-	-	-	T	-	-	-	-
Honeycomb	-	-	-	T	-	-	-	-	-
Instana	-	-	-	-	T	T	-	-	-
Jaeger	-	-	-	T	T	T	-	T	-
Prometheus	S	S	S	S	S	S	-	S	-
SignalFx	T	T	T	T S	T S	T	-	T	-
Stackdriver	T	T S	T	T S	T S	T S	-	T S	-
Wavefront	-	-	-	T S	-	-	-	-	-
Zipkin	T	T	T	T	T	T	-	T	-





```
public interface ITracer
{
    ISpanBuilder SpanBuilder(string spanName, SpanKind spanKind);
}
```



```
public interface ITracer
{
    ISpanBuilder BuildSpan(string operationName);
}
```



```
public interface ISpanBuilder  
{  
    ISpan StartSpan();  
}
```



```
public interface ISpanBuilder  
{  
    ISpan Start();  
}
```



```
public interface ISpan
{
    void PutAttribute(string key, IAttributeValue value);
    void AddAnnotation(IAnnotation annotation);
    void End();
}
```



```
public interface ISpan
{
    ISpan SetTag(string key, bool value);
    ISpan Log(string @event);
    void Finish();
}
```

A stylized graphic of a satellite or antenna, composed of several rectangular segments in blue and orange, arranged in an upward-curving arc.

OpenTelemetry

OpenTelemetry is the next major version of the **OpenTracing** and **OpenCensus** projects



+



=



Effective observability requires high-quality telemetry

OpenTelemetry makes robust, portable telemetry a built-in feature of cloud-native software.

OpenTelemetry provides a single set of APIs, libraries, agents, and collector services to capture distributed traces and metrics from your application. You can analyze them using Prometheus, Jaeger, and other observability tools.



OpenTelemetry

Report abuse

OpenTelemetry makes robust, portable telemetry a built-in feature of cloud-native software.

<https://opentelemetry.io>

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community

OpenTelemetry community content

★ 92 🍴 41

opentelemetry-specification

Specifications for OpenTelemetry

● Go ★ 268 🍴 70

oteps

OpenTelemetry Enhancement Proposals

● Go ★ 29 🍴 25

opentelemetry.io

The OpenTelemetry website and documentation

● HTML ★ 23 🍴 20

opentelemetry-proto

● Shell ★ 25 🍴 12

Find a repository...

Type: All ▾

Language: All ▾

opentelemetry-js

OpenTelemetry API for Javascript (both Node and browser)



api monitoring metrics telemetry distributed-tracing

Top languages

- Go
- Erlang
- Java
- C#
- TypeScript

open-telemetry / opentelemetry-dotnet

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Code Issues 49 Pull requests 5 Actions Projects 0 Security Insights

OpenTelemetry .NET SDK

telemetry distributed-tracing sdk api asp-net-core metrics

141 commits 4 branches 0 packages 1 release 16 contributors Apache-2.0

Branch: master New pull request Create new file Upload files Find file Clone or download

bruno-garcia and Imolkova ref: Move using outside namespace (#277)		Latest commit d48e702 yesterday
.vscode	Jaeger exporter implementation (#132)	3 months ago
.vsts	fix few warnings (#39)	5 months ago
benchmarks	Tracing configuration API (#267)	2 days ago
build	ref: Move using outside namespace (#277)	yesterday
docs	find and replace OpenCensus -> OpenTelemetry	5 months ago
lib	Make Thrift project not packable (#169)	2 months ago
samples	ref: Move using outside namespace (#277)	yesterday
src	ref: Move using outside namespace (#277)	yesterday
test	ref: Move using outside namespace (#277)	yesterday

Notes: OpenTelemetry .NET SIG ☆ ↕

File Edit View Insert Format Tools Add-ons Help

100% Title Arial 26 B I U A

Outline

Notes: OpenTelemetry .NET SIG

10/8/2019

Notes:

10/1/2019

09/24/2019

09/17/2019

09/10/2019

09/03/2019

08/27/2019

08/20/2019

08/13/2019

Notes: OpenTelemetry .NET SIG

See details about this call: <https://github.com/open-telemetry/community#net-sdk>

10/8/2019

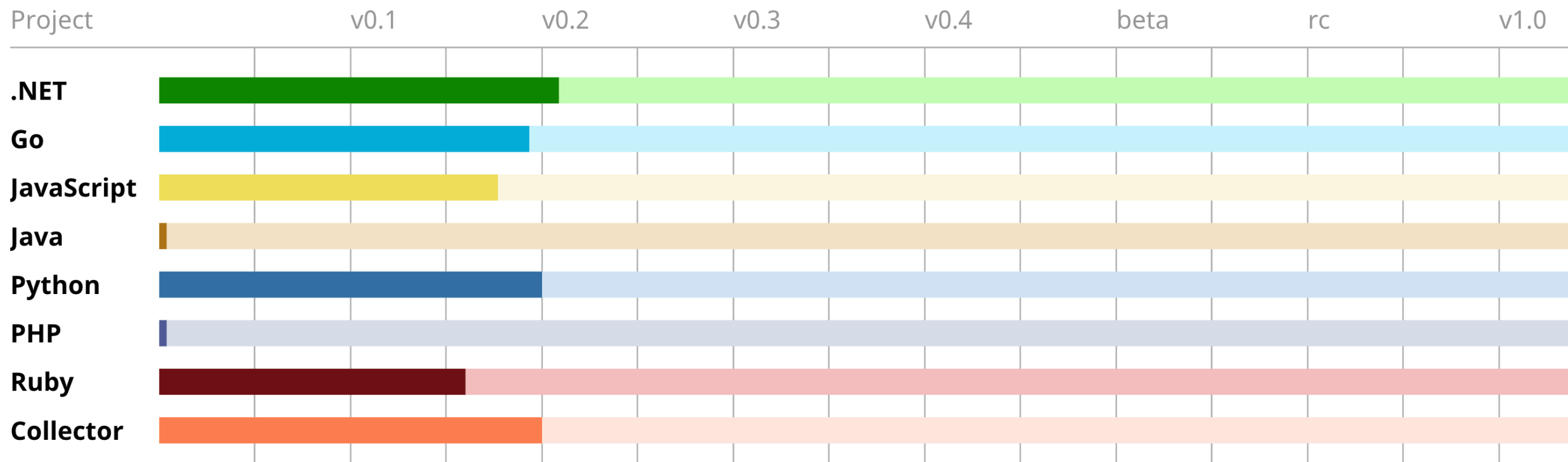
Attendees: Liudmila Molkova (Microsoft), Wolfgang Ziegler (Dynatrace), Bruno Garcia (Sentry.io)

Notes:

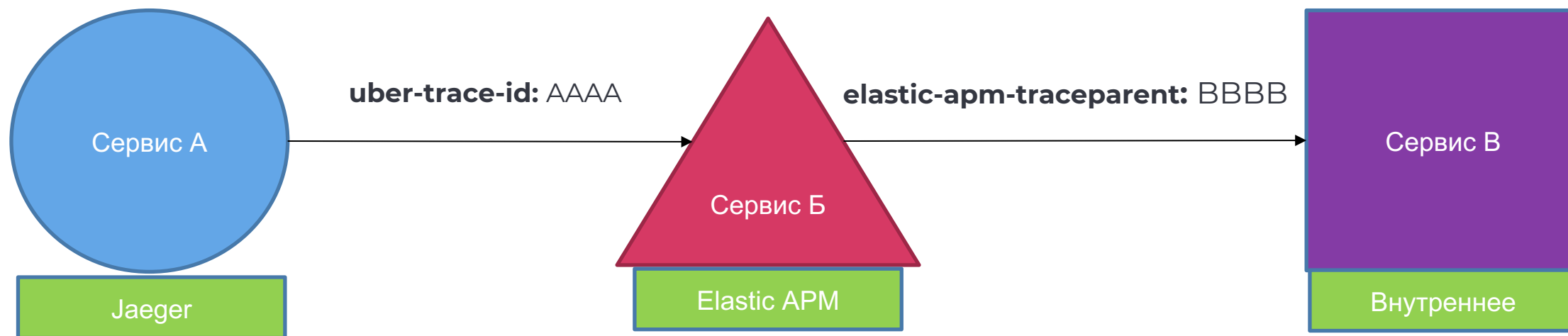
- Bruno - PR review, how to become approver?
- Wolfgang - Looking into metrics
 - Do we support tracing without SDK (noop): yes, and it will fully work after we merge <https://github.com/open-telemetry/opentelemetry-dotnet/pull/261>
- Liudmila
 - blocked on PRs - more approvers needed
 - working on tracing API clean up and configuration.

Named tracer, what if library was initialized before SDK and needed noop tracer

Current SIG Progress



Click a progress bar in the above chart to go to that SIGs repository.



Trace Context

W3C Candidate Recommendation 13 August 2019



This version:

<https://www.w3.org/TR/2019/CR-trace-context-20190813/>

Latest published version:

<https://www.w3.org/TR/trace-context/>

Latest editor's draft:

<https://w3c.github.io/trace-context/>

Implementation report:

<https://github.com/w3c/trace-context/#reference-implementations>

Previous version:

<https://www.w3.org/TR/2019/CR-trace-context-20190509/>

Editors:

Sergey Kanzhelev ([Microsoft](#))

Morgan McLean ([Google](#))

Alois Reitbauer ([Dynatrace](#))

Bogdan Drutu ([Google](#))

Nik Molnar ([Microsoft](#))

Yuri Shkuro (Invited Expert)

Participate:

[GitHub w3c/trace-context](#)

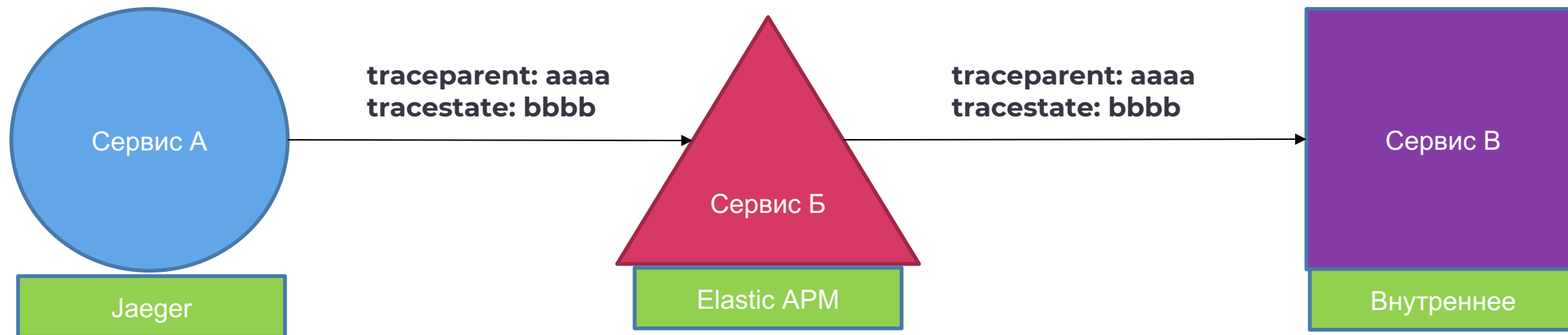
[File a bug](#)

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[Pull requests](#)

Discussions:

[We are on Gitter.](#)



open-telemetry / opentelemetry-dotnet

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Code

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Security

Insights

Is OpenTelemetry supporting W3C Trace Context? #135

New issue

Closed

thangchung opened this issue on 5 Jul · 1 comment



thangchung commented on 5 Jul

+ 😊 ...

We have a little bit concern that if OpenTelemetry is supporting [Trace Context](#) or not? I have searched around in this repository but no clue about Trace Context implemented with standard from W3C. Due to the built-in with Trace Context feature in the next .NET Core 3.0, could you shed the light on Trace Context in OpenTelemetry for us a little bit as well?

/cc @davidfowl @thiennn



Imolkova commented on 5 Jul

Contributor + 😊 ...

Yes, it does support trace-context. Here is an implementation: <https://github.com/open-telemetry/opentelemetry-dotnet/blob/master/src/OpenTelemetry.Abstractions/Context/Propagation/TraceContextFormat.cs>

Assignees

No one assigned

Labels

None yet

Projects

None yet

Milestone

No milestone

Notifications

Customize



David Fowler
@davidfowl



ASP.NET Core 3.0 now natively supports the w3c trace-context ([w3.org/TR/trace-conte...](https://w3.org/TR/trace-context)). When a request comes in an activity is created with the right id format and outgoing requests with http client will stomp it onto the header in the specification. #aspnetcore

Tradueix el tuit

<pre> namespace WebApplication296 { public class Program { public static void Main(string[] args) { Activity.DefaultIdFormat = ActivityI CreateHostBuilder(args).Build().Run(} public static IHostBuilder CreateHostBui Host.CreateDefaultBuilder(args) .ConfigureLogging(logging => { logging.AddSeq(); }) .ConfigureWebHostDefaults(webBui { webBuilder.UseStartup<Startu }); } } } </pre>	<pre> HTTP/2.0 GET https://localhost:44359/ on) Type (0x1C2B74E1) Retain Raw JSON > {Id: 1} localhost:44359 StartingLog Request starting HTTP/2.0 GET https: GET 0000000000000000 / HTTP/2.0 80000021-0006-fe00-b63f-84710c7967bb / https Microsoft.AspNetCore.Hosting.Diagnos 33f0a9ea0bcbc541 f0299e207085c14198bf5624b2ba5739 </pre>
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9:15 a. m. · 27 juny 2019 · Twitter Web Client

Куда смотреть?

1. <https://www.oreilly.com/library/view/distributed-systems-observability/9781492033431/>
2. <https://www.jaegertracing.io/>
3. <https://opencensus.io/>
4. <https://opentelemetry.io/>
5. <https://blog.newrelic.com/engineering/opentelemetry-opentracing-opencensus/>
6. <https://opentelemetry.io/project-status/>
7. <https://github.com/open-telemetry/opentelemetry-dotnet>
8. <https://www.jaegertracing.io/docs/1.14/>

Конец.