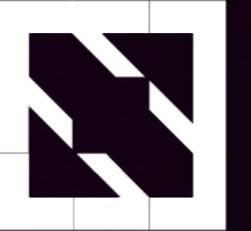
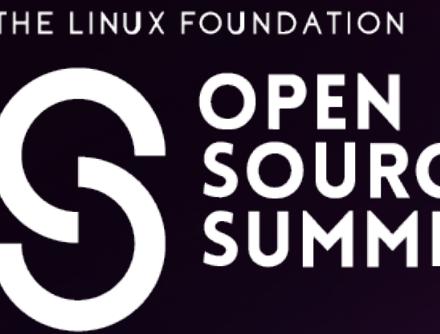




KubeCon



CloudNativeCon



China 2024



# OpenTelemetry Community Updates

Zihao Rao & Huxing Zhang & Wanqi Yang

Alibaba Cloud & Jared Tan, DaoCloud



KubeCon



CloudNativeCon



THE LINUX FOUNDATION

Open Source Summit



China 2024

# CONTENT

01 OTel Community updates in 2024

02 A Cloud Vendor's Journey with OTel Adoption

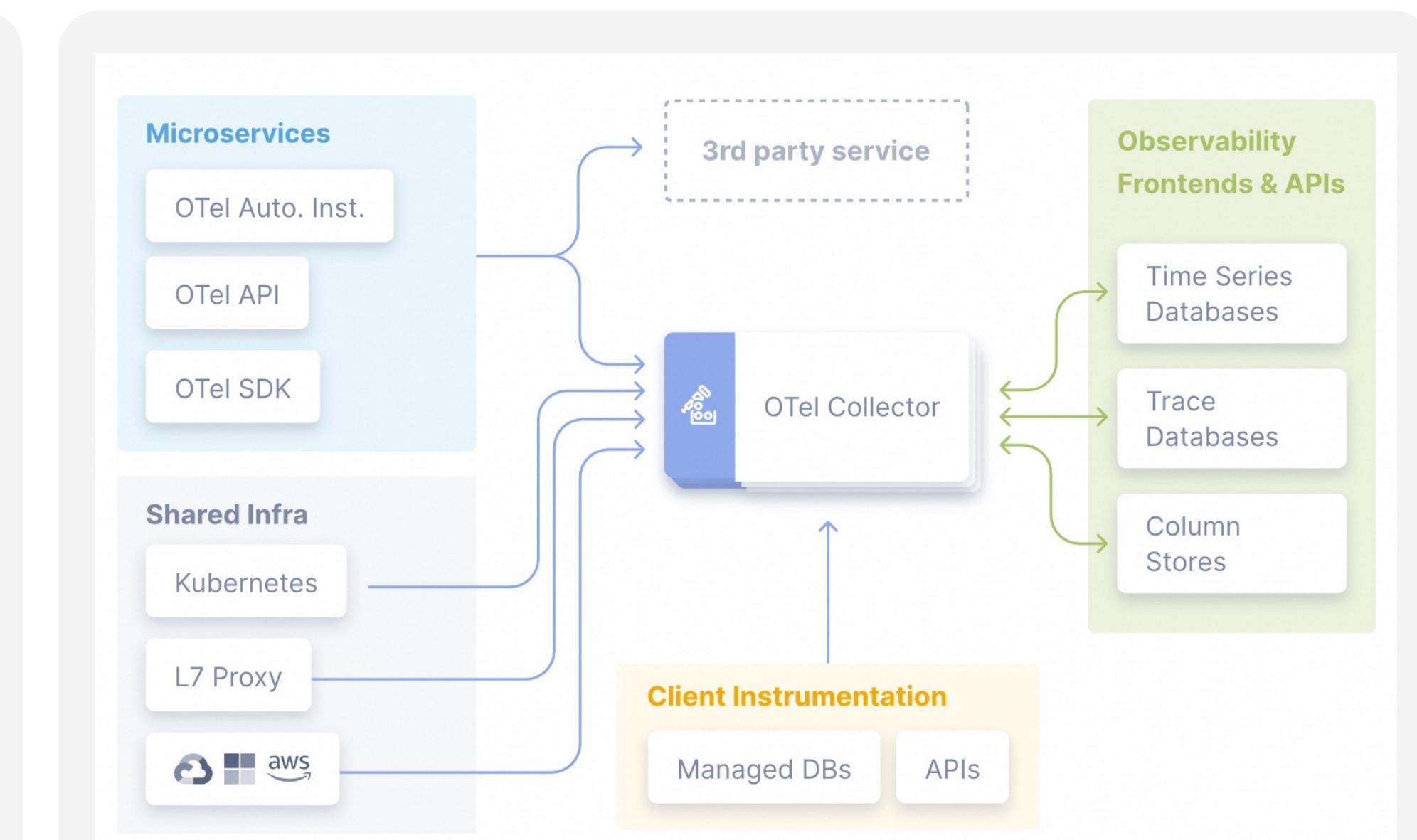
# What is OpenTelemetry?



China 2024

## OpenTelemetry is:

- An Observability framework and toolkit designed to create and manage telemetry data such as **traces, metrics, logs and profiles**.
- A major goal of OpenTelemetry is that you can **easily instrument your applications or systems, no matter their language, infrastructure, or runtime environment**.
- **Vendor and tool-agnostic**, meaning that it can be used with a broad variety of Observability backends, including open source tools, as well as commercial offerings.



Architecture of OpenTelemetry

# Accelerating OTel Profiling

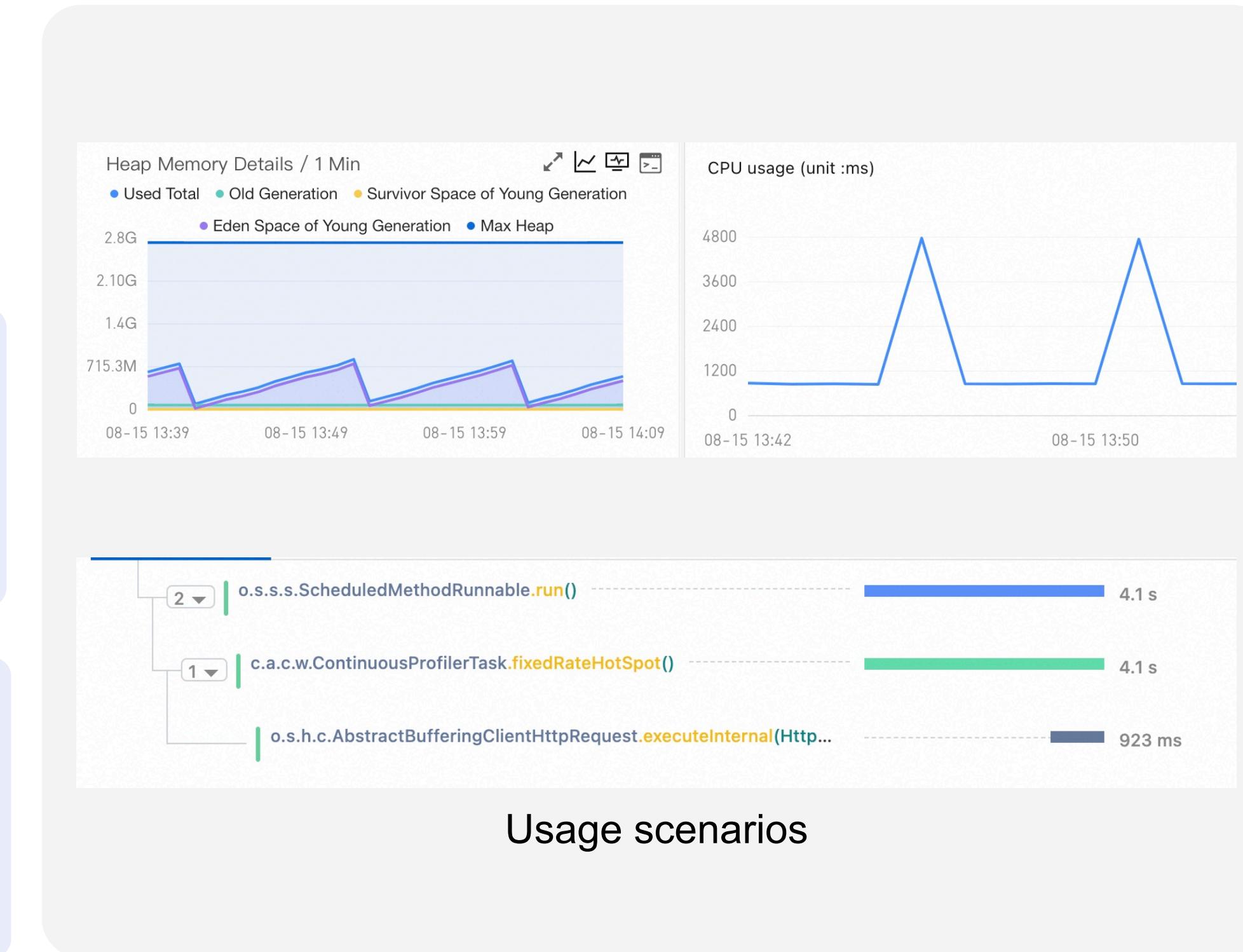


China 2024

**Profiling is a technique to dynamically inspect the behavior and performance of application code at run-time.**

**Metrics to profiles:** we can identify the specific code responsible for spikes in CPU or memory usage.

**Traces to profiles:** we can solve some monitoring blind spots that trace or span cannot handle.



# Accelerating OTel Profiling



China 2024



June '22

## Discussions commence

TAG member introduced profiling as an observability signal type for discussion in the community meetings. Over 12 meetings, 100+ attendees participated in the discussions.



Feb '24

## Introduces Data Model v2

OTel Profiling SIG introduces profiling data model v2.  
[open-telemetry/oteps/pull/237](https://github.com/open-telemetry/oteps/pull/237)



June '24

## First eBPF Profiling Agent in OTel

Community accepted Elastic's donation of its continuous profiling agent. It became the first eBPF Profiling Agent in OTel.  
[open-telemetry/community/issues/1918](https://github.com/open-telemetry/community/issues/1918)

.....



March '24

## Profiling integration into OTel

In addition to traces, metrics, and logs, the community announced official support for profiles by merging a profiling data model OTEP

#239. The pull request has been merged. The commit message from petethepig reads: 'This is second version of the Profiling Data Model OTEP. After we've gotten feedback from the greater OTel community we went back to the drawing board and came up with a new version of the data model. The main difference between the two versions is that the new version is more similar to the original pprof format, which makes it easier to understand and implement. It also has better performance characteristics. We've also incorporated a lot of the feedback we've gotten on the first PR into this OTEP.'"/>

Introduces Profiling Data Model v2 #239

Merged jsuereth merged 37 commits into open-telemetry:main from petethepig:profiling-pprofextended on Feb 24

Conversation 139 Commits 37 Checks 1 Files changed 2

petethepig commented on Nov 2, 2023 · edited

This is second version of the Profiling Data Model OTEP. After we've gotten feedback from the greater OTel community we went back to the drawing board and came up with a new version of the data model. The main difference between the two versions is that the new version is more similar to the original pprof format, which makes it easier to understand and implement. It also has better performance characteristics. We've also incorporated a lot of the feedback we've gotten on the first PR into this OTEP.

Some minor details about the data model are still being discussed and will be flushed out in the future OTEPs. We intend to finalize these details after doing experiments with early versions of working client + collector + backend implementations and getting feedback from the community. The goal of this OTEP is to provide a solid foundation for these experiments.

Profiling Data Model v2

opentelemetry-ebpf-profiler Public

Watch 31 Fork 230 Starred 2.2k

main 4 Branches 0 Tags Go to file Add file Code

florianl Go: Update module path (#104) 3b551e3 · 2 days ago 59 Commits

.github/workflows Remove warnings about not accepting contributions (#106) 2 days ago

LICENSES Add more 3rd party licenses (#35) 4 days ago

About

The production-scale datacenter profiler (C/C++, Go, Rust, Python, Java, NodeJS, .NET, PHP, Ruby, Perl, ...)

profiler ebpf Readme

OTel Profiling project

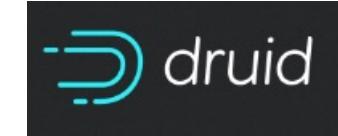
# Updates in Java Agent & SDK



China 2024

## In OTel Java Agent

1. Released **2.0 version**, fixed a lot of potential issues and made it more stable.
2. Supported frameworks/libraries from **124 -> 133(+9)**



New supported frameworks/libraries

## RoadMap of Project

### Native instrumentation

1. Native instrumentation interop story with Java Agent.
2. Start in areas with stable semantic conventions (HTTP).

### Indy instrumentation

1. Allows instrumentations to have breakpoints set in them and be debugged.

### Profiling & GraalVM auto-instrumentation

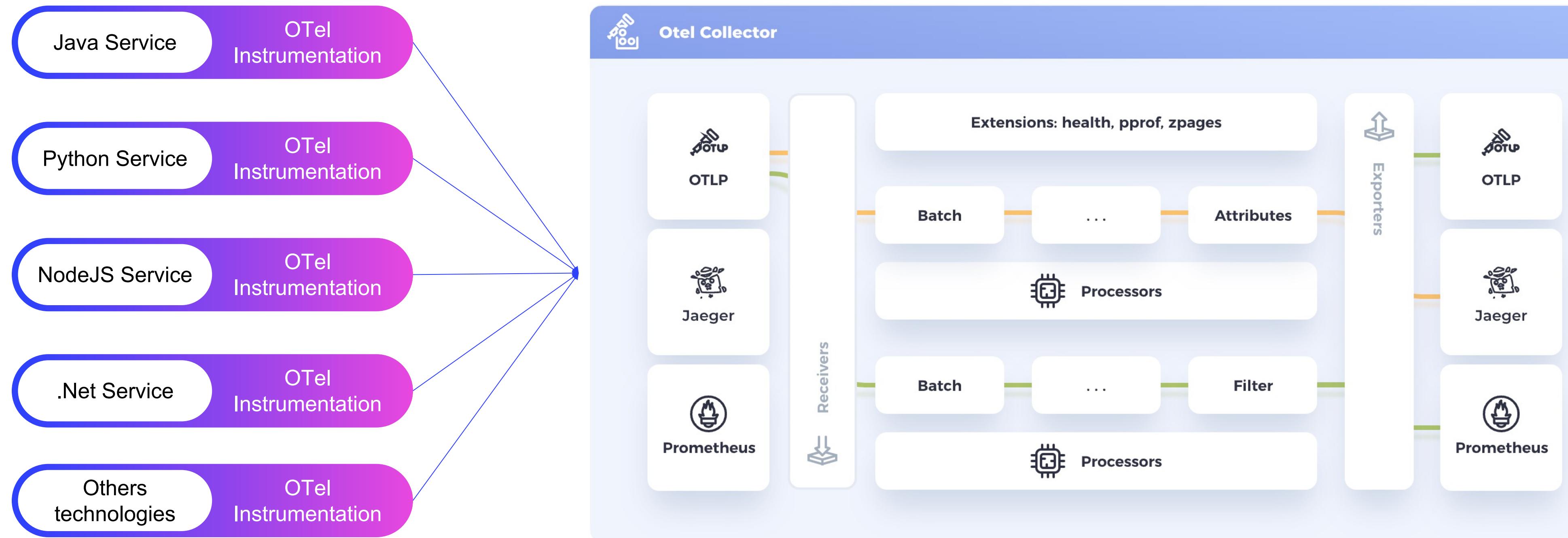
1. Adapt and support OTel Profiling.
2. Implement auto instrumentation under GraalVM.

# Introduction of OTel Collector



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The OpenTelemetry Collector offers a vendor-agnostic implementation on how to receive, process and export telemetry data



Architecture of OTel Collector

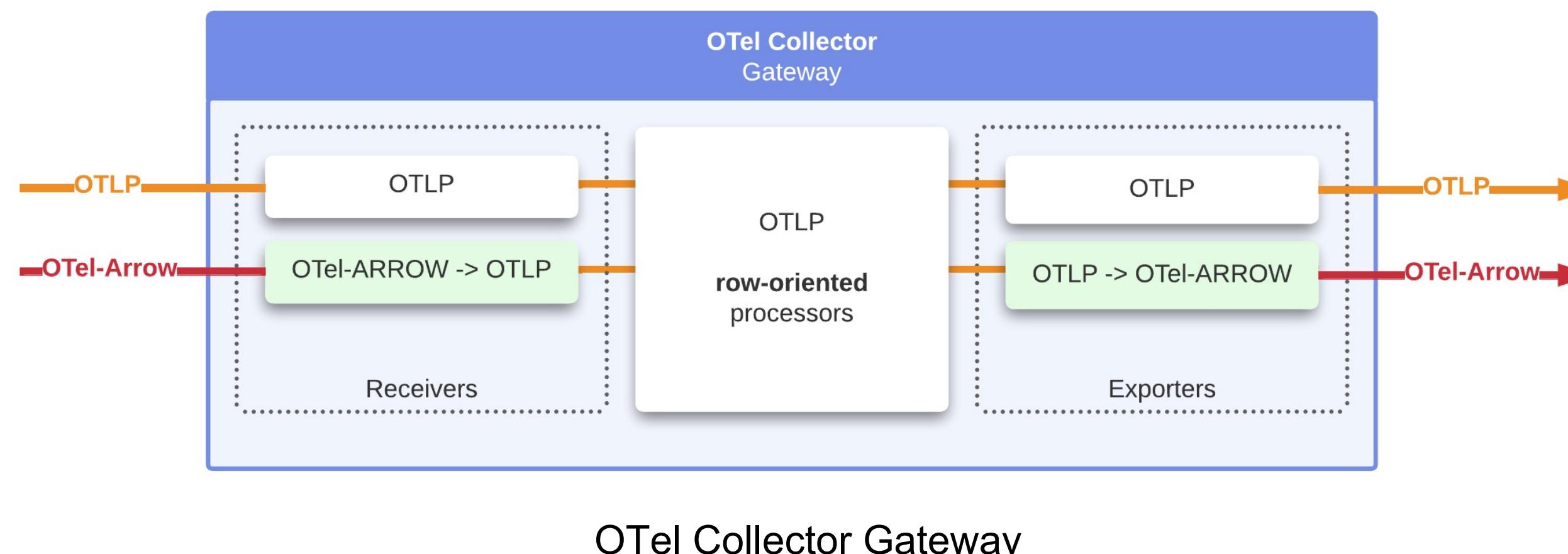
# New Apache Arrow Receiver/Exporter



China 2024

## OTel-Arrow vs OTLP(zstd)

- 40% improvement compression efficiency
- 10x reduction of internet traffic



### OpenTelemetry Protocol with Apache Arrow Receiver

Status	
Stability	<a href="#">beta</a> : traces, metrics, logs
Distributions	<a href="#">contrib</a>
Issues	<a href="#">open 1</a> <a href="#">closed 2</a>
Code Owners	@jmacd, @moh-osman3

Receives telemetry data using [OpenTelemetry Protocol with Apache Arrow](#) and standard [OTLP](#) protocol via gRPC.

#### Getting Started

The OpenTelemetry Protocol with Apache Arrow receiver is an extension of the core OpenTelemetry Collector [OTLP receiver](#) component with additional support for [OpenTelemetry Protocol with Apache Arrow](#).

OpenTelemetry Protocol with Apache Arrow supports column-oriented data transport using the Apache Arrow data format. The [OpenTelemetry Protocol with Apache Arrow exporter](#) converts OTLP data into an optimized representation and then sends batches of data using Apache Arrow to encode the stream. This component contains logic to reverse the process used in the OpenTelemetry Protocol with Apache Arrow exporter.

The use of an OpenTelemetry Protocol with Apache Arrow exporter-receiver pair is recommended when the network is expensive. Typically, expect to see a 50% reduction in bandwidth compared with the same data being sent using standard OTLP/gRPC and gzip compression.

This component includes all the features and configuration of the core OTLP receiver, making it possible to upgrade from the core.

# OpenTelemetry Security Audit



China 2024

OpenTelemetry Collector and four SDKs – Go, Java, C#, and Python.

The screenshot shows a blog post on the OpenTelemetry website. The header includes links for Docs, Ecosystem, Status, and Community. The main content is titled "OpenTelemetry Security Audit Published" and is dated Monday, July 22, 2024, by Austin Parker. The text discusses the security audit of the OpenTelemetry Collector and four SDKs. A sidebar on the left lists "Blog", "2024", "Prometheus", "Compatibility Survey", and "Security Audit Results". The "Security Audit Results" link is highlighted with a red border. At the bottom, there are links for "KubeCon China 2024", "A new default bind address for the Collector", and "OTel Security SIG".

ASECURITY

OTel Security SIG

OSTIF.org

## Pentest Report



7asecurity.com

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Pentest Report

Full report: <https://7asecurity.com/reports/pentest-report-opentelemetry.pdf>

# OTel Collector and Contrib Changes



China 2024

CVE-2024-36129 ( v0.102.1 )  
CVE-2024-42368 ( v0.107.0 )

15

versions bump up  
(0.92.0~0.107.0)

27+

Added

90+

Enhanced

3

Deprecated

The screenshot shows the GitHub repository page for 'open-telemetry/opentelemetry-collector-contrib'. The repository is public, has 744 issues, 129 pull requests, and 1 security alert. It has 1,924 branches and 19,188 tags. The main branch is selected. The commit list shows the following recent changes:

Commit	Description	Time Ago
f2f7fc8 · 1 hour ago	[receiver/datadog] update scope name (#34711)	14,716 Commits
	[receiver/datadog] update scope name (#34711)	1 hour ago
	[chore] Restore Lint on Windows (#34656)	2 days ago
	Update module github.com/IBM/sarama to v1.43.3 (#346...	2 days ago
	[chore] Remove references to ballast extension (#34683)	2 days ago
	Update module github.com/prometheus/prometheus to v...	2 days ago
	[chore] Docs/seed docs folder with some testing informat...	7 months ago
	Update docker-compose deps (#34659)	2 days ago
	[exporter/splunkhec] update scope name (#34710)	16 hours ago
	Added support for go1.23, bumped the minimum version t...	2 days ago
	Update module github.com/IBM/sarama to v1.43.3 (#346...	2 days ago
	fix nil value conversion (#34673)	14 hours ago

On the right side, there is a sidebar with repository details: Contrib repository for the OpenTelemetry Collector, links to opentelemetry.io, README, Apache-2.0 license, Code of conduct, Security policy, Activity, Custom properties, 2.8k stars, 70 watching, 2.2k forks, Report repository, and a Releases section showing 117 releases with 'v0.107.0' as the latest.

# Launch of the Chinese official website



China 2024

The screenshot shows the Chinese version of the OpenTelemetry website. The header includes the OpenTelemetry logo, a search bar, and language selection for 中文 (Chinese). A banner at the top announces an event in Hong Kong from August 21-23, 2024. The main visual features a cartoon illustration of two people looking at a telescope, with a background of stars and planets. Text on the page includes "高质量、普遍适用和可移植的遥测助你实现有效的可观测" (High-quality, widely applicable and移植able telemetry helps you achieve effective observability) and "为各种角色定制的入门指南" (Customized introductory guides for various roles). Call-to-action buttons include "了解更多" (Learn more), "尝试 Demo" (Try Demo), "探索集成组件" (Explore integration components), "开发人员" (Developers), and "运维人员" (Operations personnel).

## GitHub:

[open-telemetry/  
opentelemetry.io](https://github.com/open-telemetry/opentelemetry.io)

## Website:

[opentelemetry.io](https://opentelemetry.io)

## Help/tips on how to contribute:

[opentelemetry.io/docs/contributing/](https://opentelemetry.io/docs/contributing/)

## Slack channel:

[cloud-  
native.slack.com/archives/  
C076RUAGP37](https://cloud-native.slack.com/archives/C076RUAGP37)

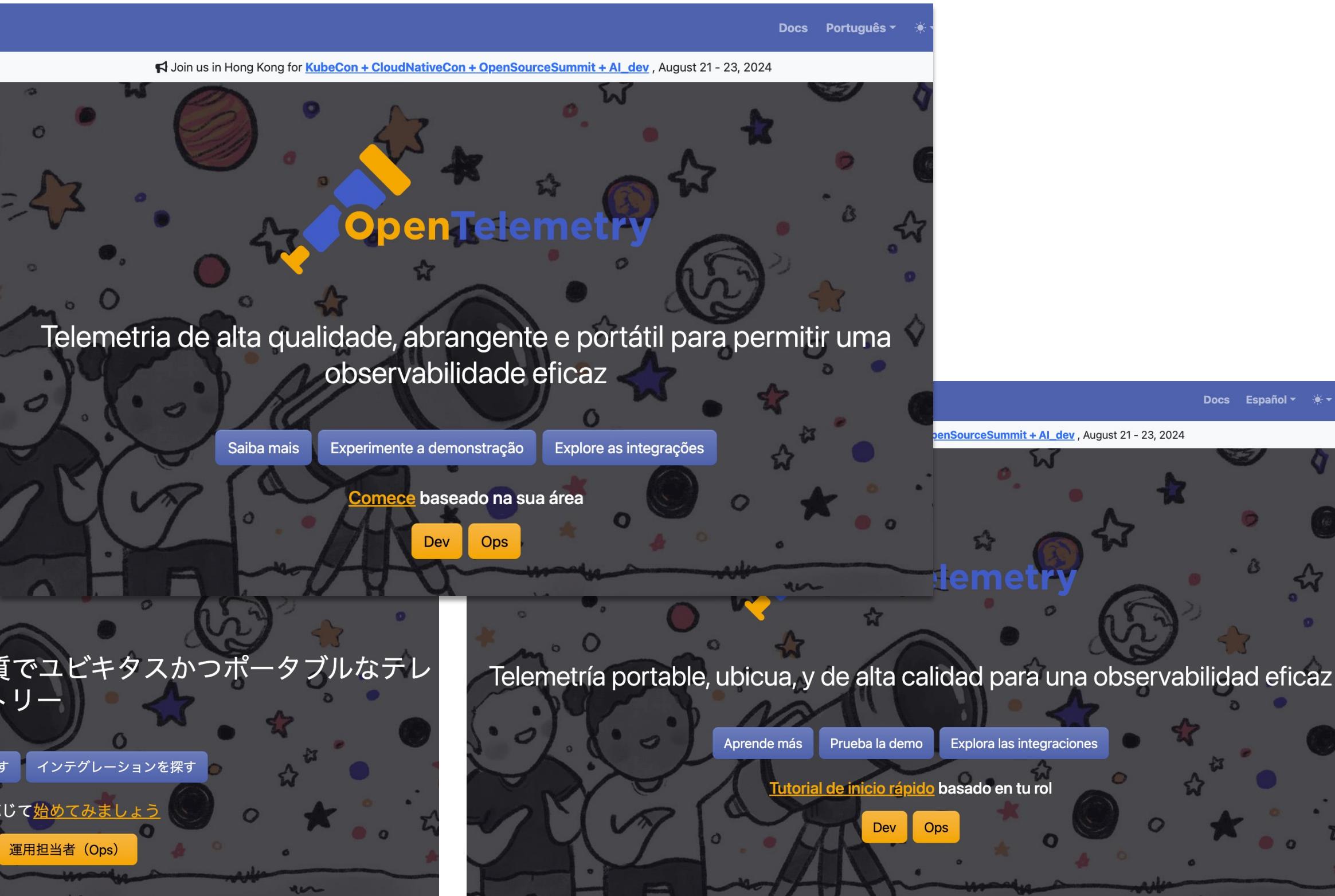
**Principle:** prioritize localizing some stable content

# Launch of the other language official websites



China 2024

Portuguese official website



Japanese official website

Spanish official website

# Alibaba Cloud's journey towards OpenTelemetry



China 2024

2013

## Eagleeye

- Internal observability platform
- Closed source
- Manual Instrumentation

2017

## Cloud Service

- Auto Instrumentation for Java
- Built from open source

2021

## Managed Service

- Managed Service for OpenTelemetry
- Support w3c tracing protocol

2023-

## OpenTelemetry Adoption

- OpenTelemetry Distribution
- Native support for cloud services
- Community Engagement

Why OpenTelemetry?

- Defacto Standard
- Fastly evolved community
- User Adoption
- Multi Language support

# Alibaba Cloud is Embracing Open Telemetry

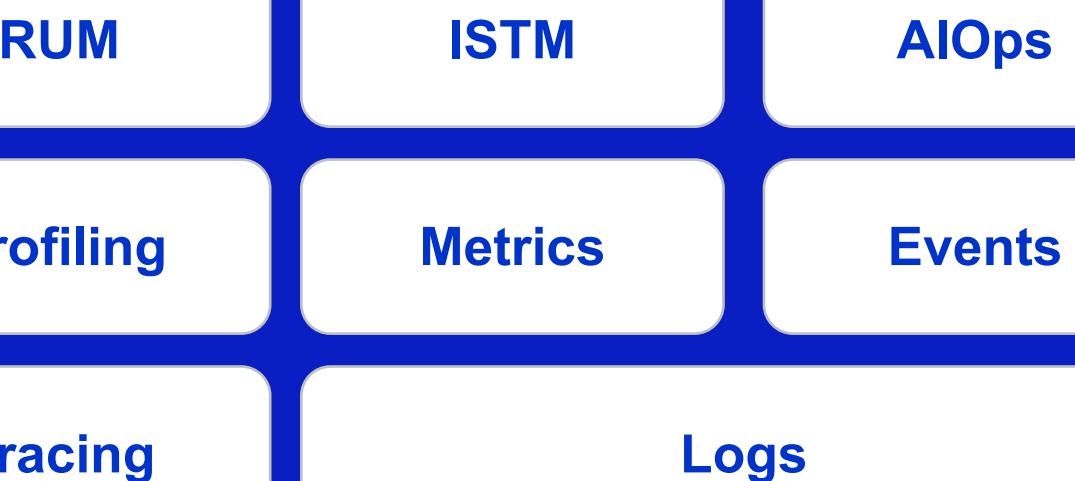


China 2024

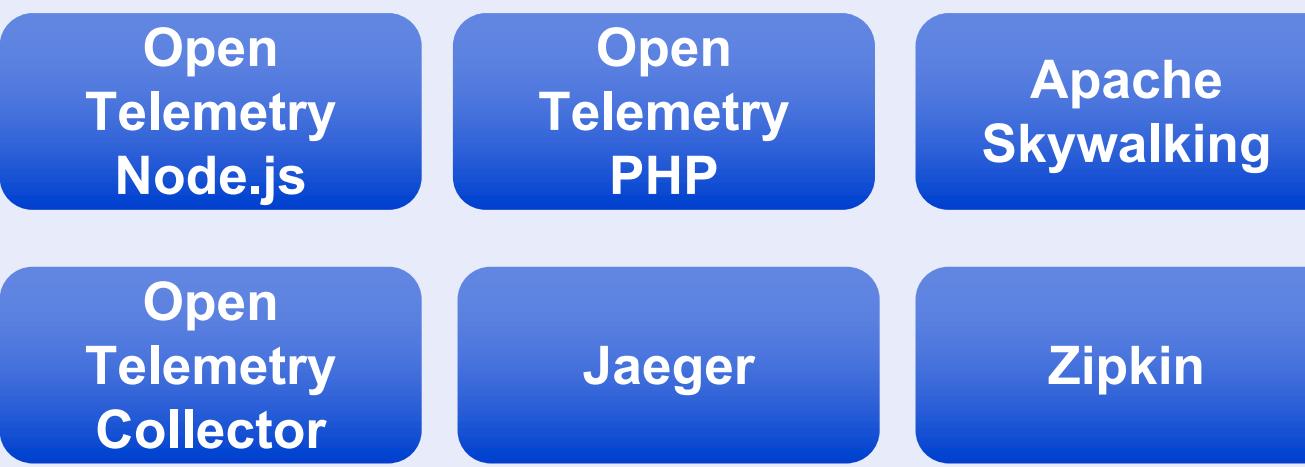
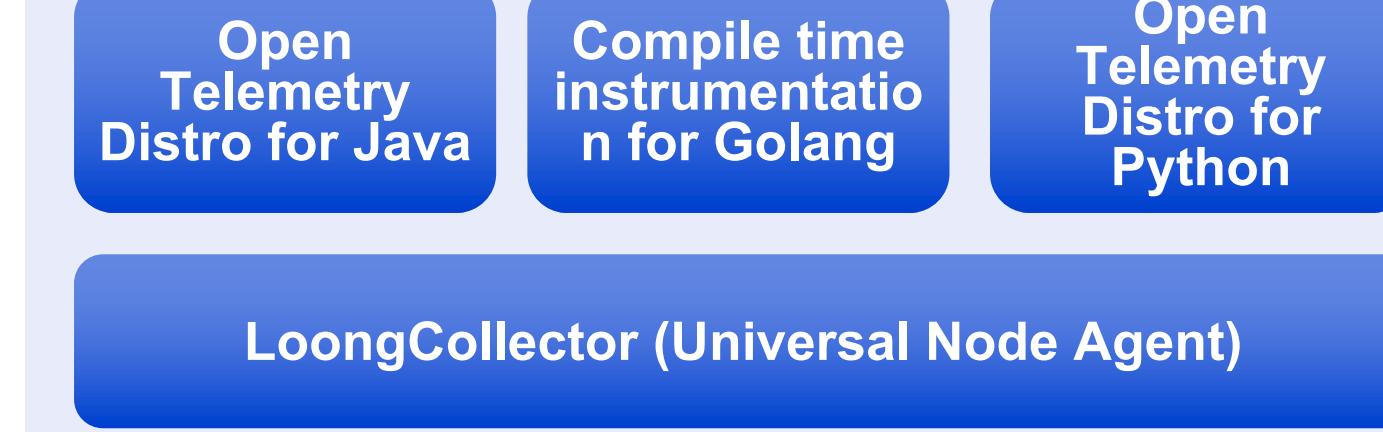
## Alibaba Cloud OpenTelemetry Distribution

- Mind shift: rebuild from OTel
- Deliver features faster
- Provider better support
- Constantly contribute back to upstream

### Alibaba Cloud Native Service



### Open Source Management Service



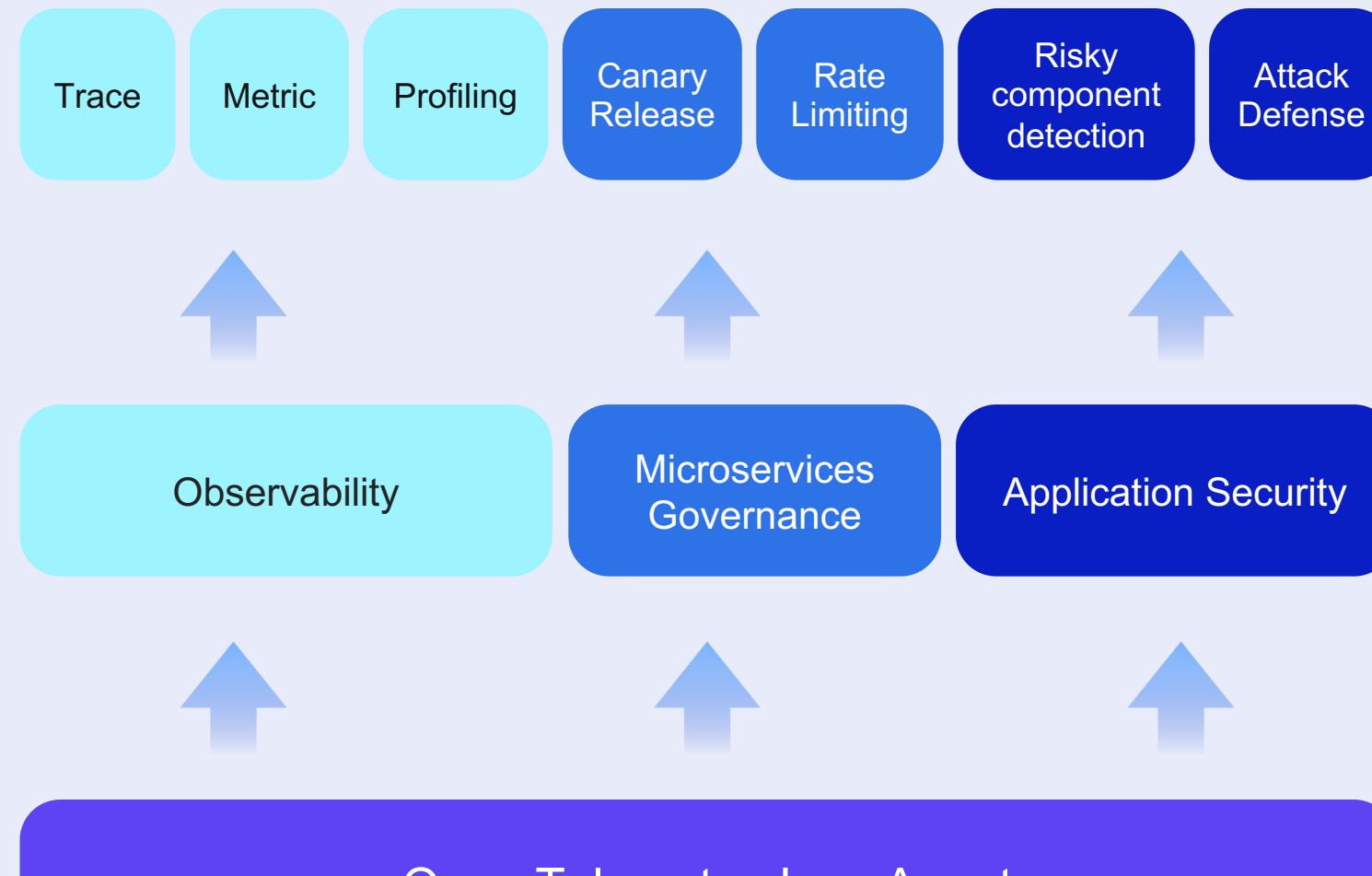
# OpenTelemetry Distro for Java



China 2024

## Embracing Open Telemetry

- Based on Open Telemetry Java Agent
- Migrated from Pinpoint
- One Java Agent: Observability, Application security, Microservices governance and etc.



## Observability Enhancements

### Tracing / Metrics

- Adding support for 10+ popular frameworks in China: [Apache ShenYu](#) / [MyBatis](#) / [XXL-JOB](#), 6 of them are contributed back
- Extra metrics for [Message](#) / [Database](#) / [RPC](#) / [Scheduled task](#)

### Sampling

- Customized sampling
- Error/Slow/Exception sampling
- Adaptive sampling

### Profiling

- CPU/Memory profiling
- correlation to trace id
- Integrated with Arthas

### Stability

- Self observability
- Dynamic configuration
- Resource consumption limit

## Benefits of OTel Adoption

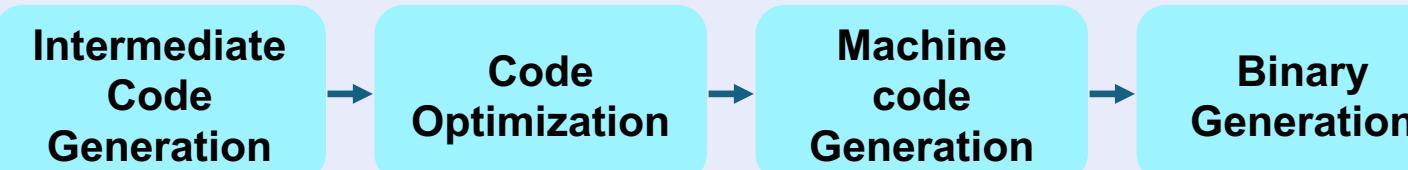
- 30% decrease of agent start time
- 30% decrease of agent package size
- 20% decrease of memory consumption
- 60% decrease in terms of number of threads

# Compile time instrumentation for Golang

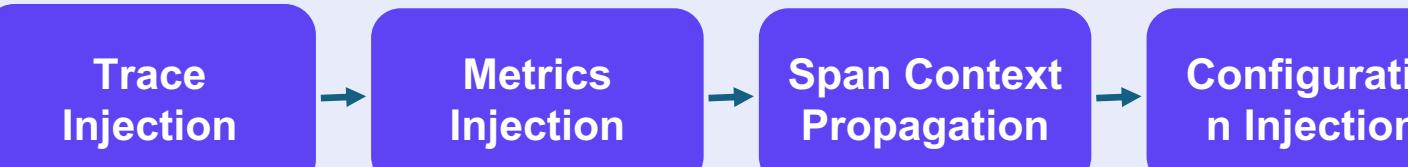


China 2024

## Compile Backend



## Code Injection



## Compile Front



Go Application Code

- No user-side code modifications are required.
- Support async context propagation, even when user do not pass Context object correctly
- Compatible with OTel-SDK
- Flexible to extend to further scenarios like: traffic management, security and etc.
- Project link: <https://github.com/alibaba/opentelemetry-go-auto-instrumentation>
- Donation Proposal: <https://github.com/open-telemetry/community/issues/1961>

We are seeking convergence between our approach and Instgen

# Open Telemetry Distro for Python



China 2024

Designed for GenAI applications

Alibaba Cloud Monitor



Management Service for Open Telemetry



SDK for LLM

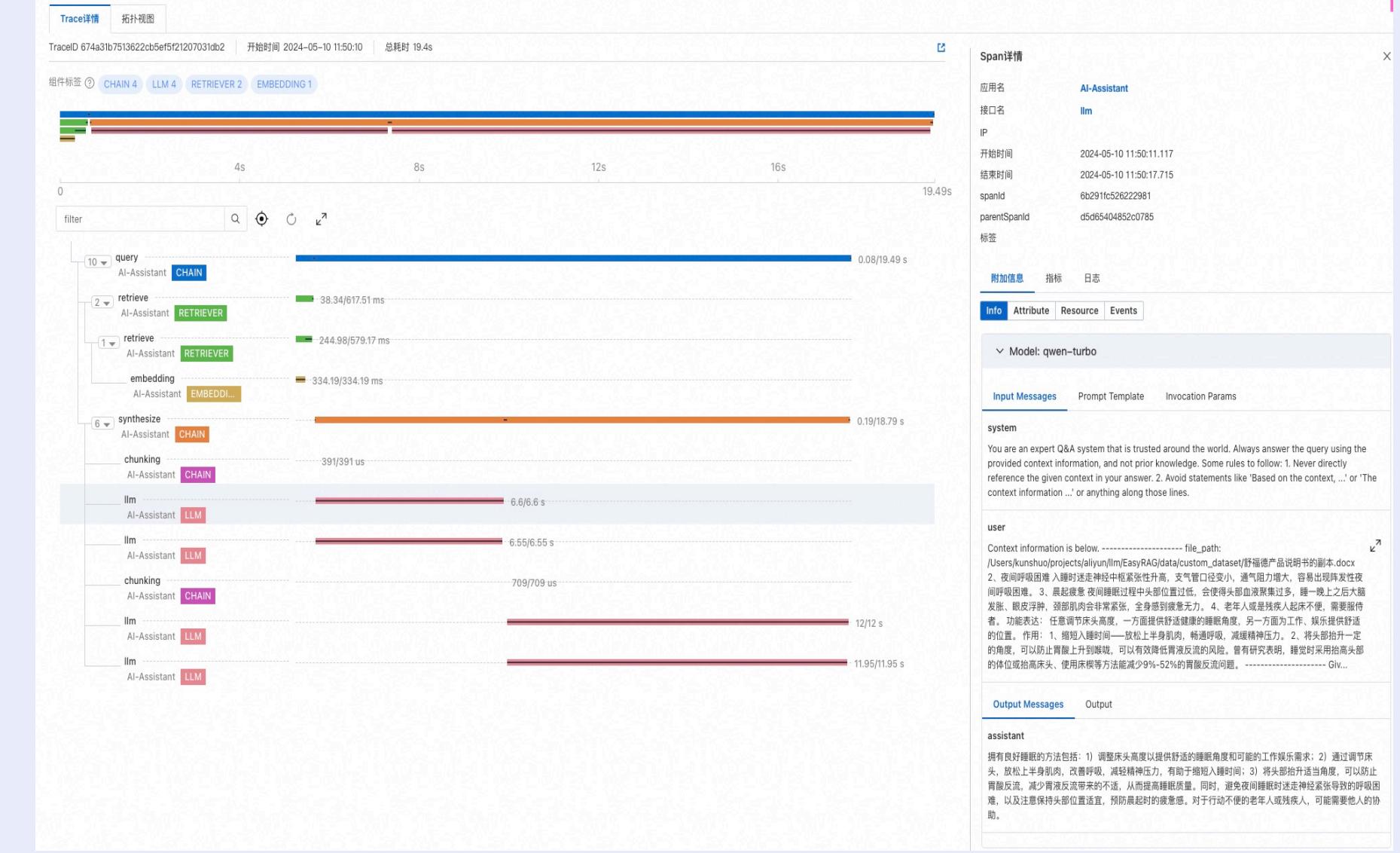
Continuous Profiling

Stability Improvement

OpenTelemetry Python Agent

- Follow the latest Open Telemetry LLM semantic convention
- Support popular frameworks and AI Models including [LLlamaindex](#) / [Langchain](#) / [Qwen2](#) / [OpenAI](#) / [PromptFlow](#)
- Fine-grained span name and attributes
- Support custom attribute propagation

Trace View for GenAI applications



- Designated span name for GenAI
- Prompt Input/Output
- Metrics for token consumption

# Application Oriented Continuous Profiling



China 2024

## Continuous Profiling

Native      3<sup>rd</sup> Party

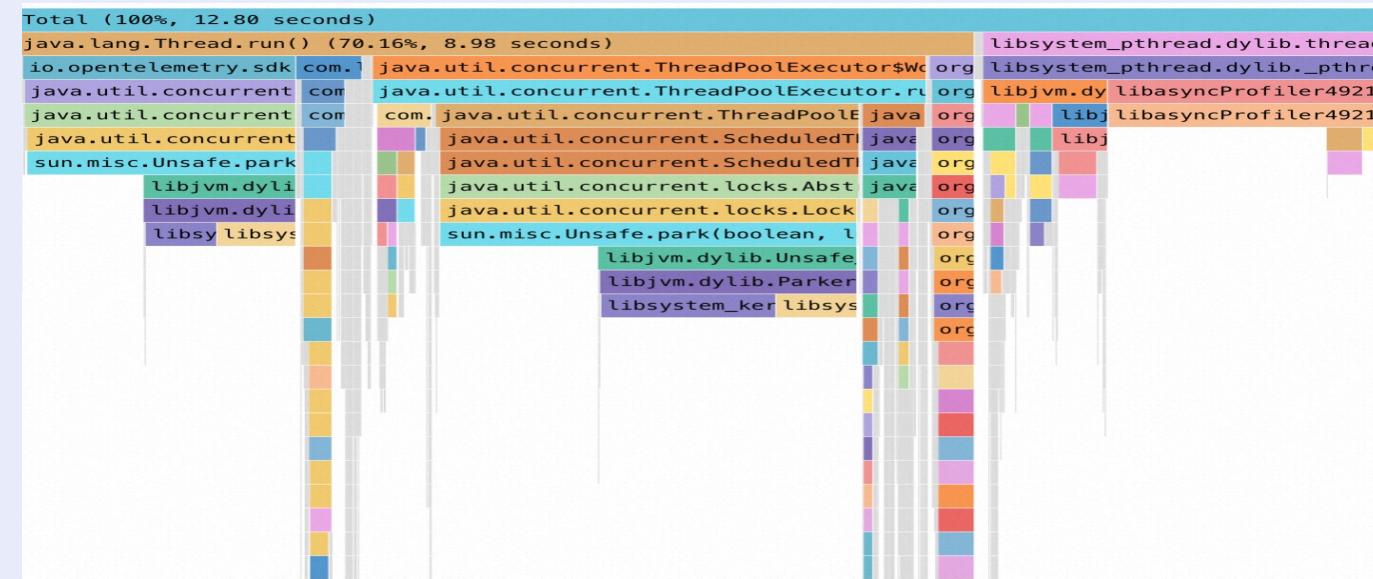
eBPF Agent      Pyroscope  
Java Agent      PProf

Profiling data storage and analysis

CPU Profiling      Memory Profiling      Code Hotspot  
Console

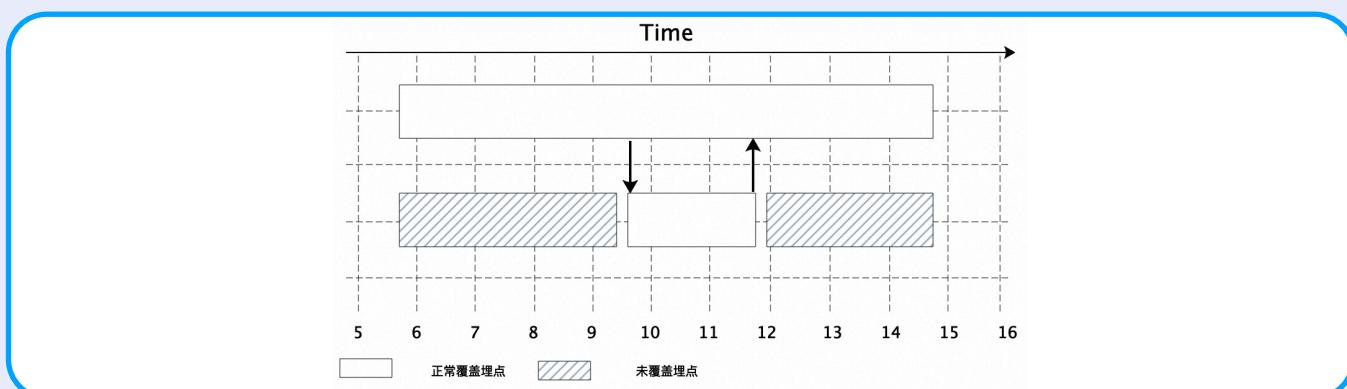
## Core features

### CPU and Memory profiling



### Code Hotspot

Correlating profiling data with traceld & spanId  
Providing trace-id level on/off cpu call stack



A joint effort of Alibaba Cloud Monitor and Alibaba Dragonwell

### Low overhead

CPU overhead < 5%  
50M off heap memory

### Fine-grained

Correlating profiling data with traceld

### Support various type

On CPU method stack  
Memory Allocation  
Off CPU method stack

Ongoing effort to support the Open Telemetry Profiling data format

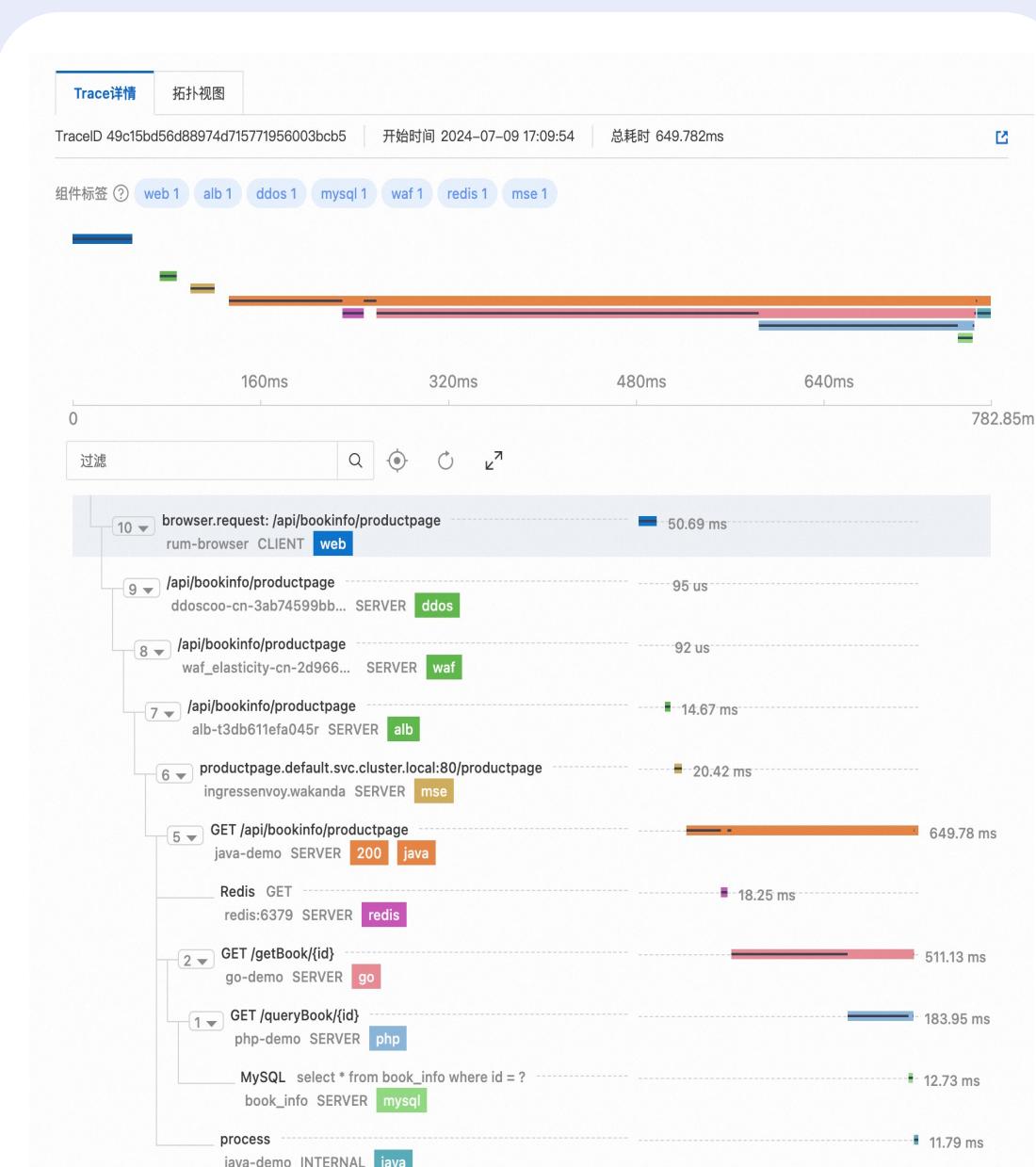
# Cloud Product Adoption for Open Telemetry



China 2024

## End-to-end tracing with OpenTelemetry

### User Data Flow



Cloud service control flow

Ongoing effort to upgrade to OpenTelemetry tracing

## Management Service for Open Telemetry



Skywalking



- Fully compatible with protocols including Open Telemetry, Apache SkyWalking, Jaeger, Zipkin, and etc.
- Support 10+ languages including Java、Go、.NET、Node.js

# OpenTelemetry Community Engagement



China 2024

- Top 1 in APAC: 1000+ PR Reviews, 400+ Pull Requests, 1 maintainer, 2 approvers, 1 triager, 7 members
- APAC friendly JAVA SIG biweekly community meeting
- APAC friendly monthly tag-observability meeting
- Donating compile time instrumentation for Golang
- Donating GraalVM support for Java Agent
- Presented in OpenTelemetry Community Day NA

Rank	Company	Number
19	Alibaba Group	838
20	Amazon	816
21	ZENVIA	803
22	Deakin University	787
23	Aspecto	636
24	SolarWinds Worldwide LLC	578
25	DaoCloud Network Technology Co. Ltd.	455

[Proposal] opentelemetry-go-auto-instrumentation #1961

D-D-H opened this issue on Feb 26 · 26 comments

D-D-H commented on Feb 26 · edited

**Description**

The opentelemetry-go-auto-instrumentation project is an auto-instrumentation solution designed for Go applications. It empowers users to harness the capabilities of OpenTelemetry for enhanced observability without any manual modifications. Like the [opentelemetry-java-instrumentation](#) project, this solution automatically modifies code, the difference is that this all happens during the build process. The current implementation reuses the existing instrumentation for Go packages and depends on the package `dave/dst` to rewrite Go source code. The side effect of this solution is similar to the impact one would expect from manual code modifications:

- Increased the final binary size.
- Introduced some performance overhead.

**Benefits to the OpenTelemetry community**

This project significantly lowers the barrier for Go applications to adopt OpenTelemetry. While there is an existing auto-instrumentation solution based on eBPF, it comes with certain limitations. Auto-instrumentation based on code rewriting can achieve the same effect as manual instrumentation in most scenarios and is easier to use in production.

Proposal to expand Observability TAG meeting for CNCF APAC community #181

alolita opened this issue on Jul 2 · 18 comments

alolita commented on Jul 2

Cloud native observability adoption and open source innovation continues to grow at a rapid pace in APAC. There are multiple end-users as well as cloud providers in Asia who are contributing to CNCF observability projects including OpenTelemetry.

We are excited that some of our APAC community members have requested that the CNCF Observability TAG consider holding a regular TAG meeting on APAC friendly times. @raffo131 and team have also offered to host the online meeting.

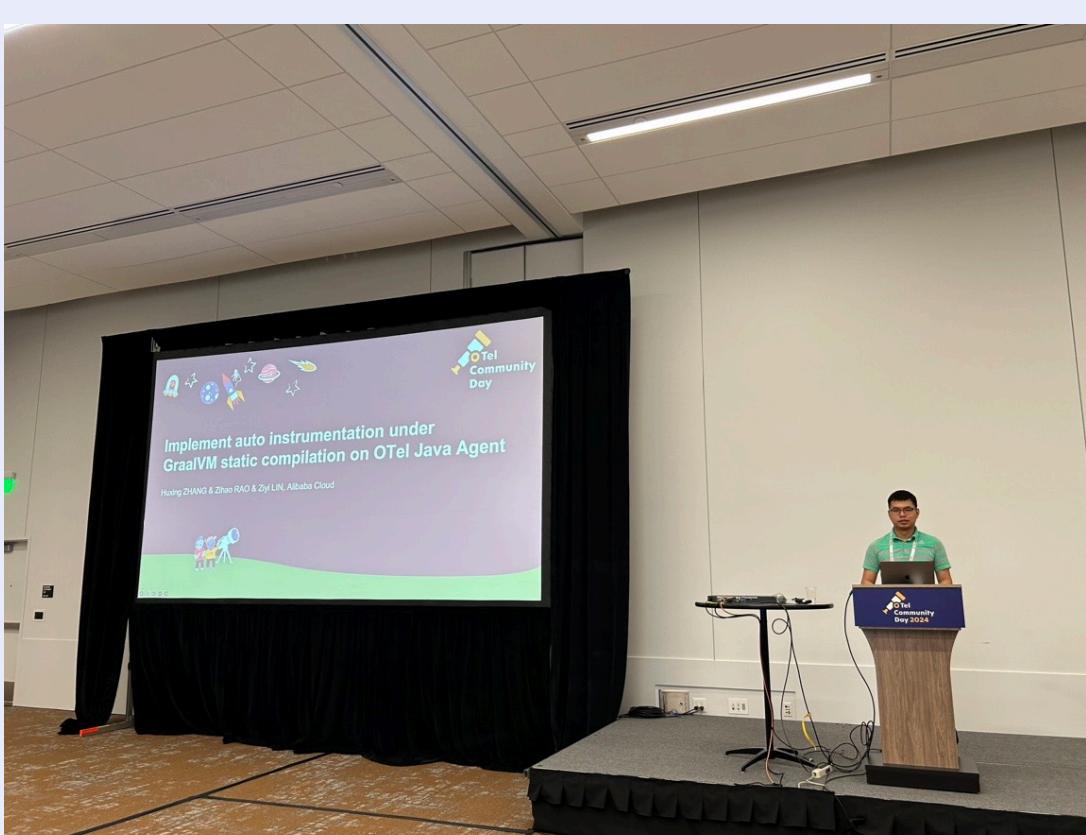
Following up on this request, I propose the Observability TAG in collaboration with the APAC observability community holds one meeting a month at a APAC friendly time. We would like to kickstart this series this month starting next Tuesday July 9 PT / Wednesday July 10 morning APAC time.

The proposed times are:

1. 5-6pm PT on the second Tuesday each month which is 9-10am (UTC+8 hours)
2. 6-7pm PT on the second Tuesday each month which is 10-11am (UTC+8 hours)

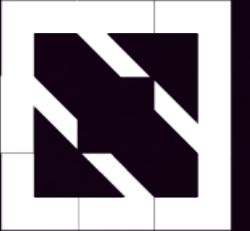
Please vote to express your interest in joining the APAC friendly meeting with a thumbs up.

Also, please express your preferred time option (1) or (2) in the comments below.





KubeCon



CloudNativeCon

THE LINUX FOUNDATION



China 2024

# THANKS