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DevOps Engineer at Globant

Observability Ecosystem
in Kubernetes: Metrics,
Logs, and Traces with
open source tools

Conf42 Kube Native 2023

Thursday • September 28th • 5PM GMT



CONF42

Who is JhonnyPong (Jhonnatan Gil)

Just a human who loves Linux, share knowledge and very passionate about tech in general especially with make more easy every life that needs deploy in local mode on prem or bare metal and any other environment



@jthan24



“Life is really simple, but we insist on making it complicated..”

Confucius





Observability Ecosystem in Kubernetes: Metrics, Logs, and Traces with open source tools



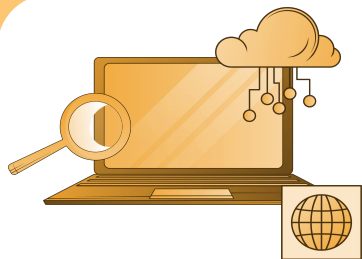


Table of contents

01

Introduction

02

Observability

03

CNCF

04

Open Source Tools

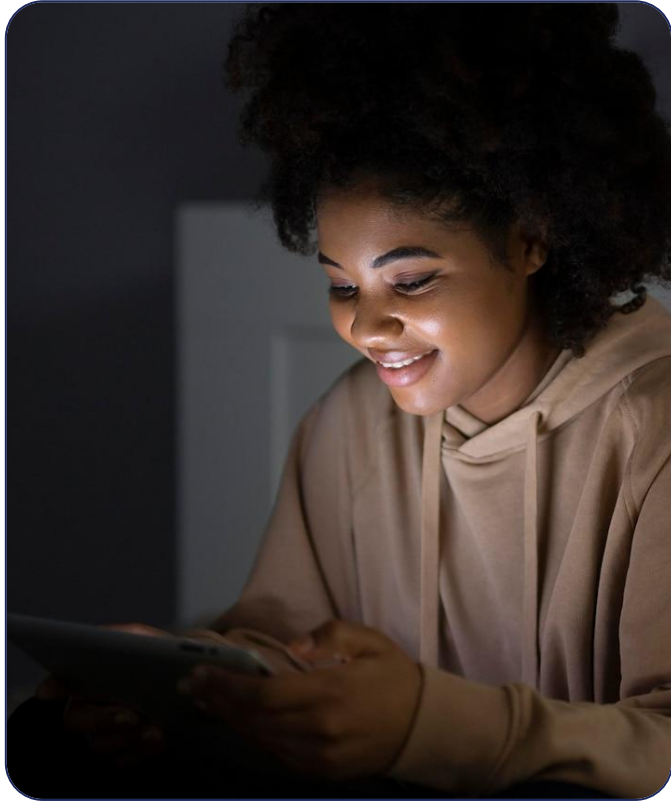
05

o11y Kubernetes

06

DEMO

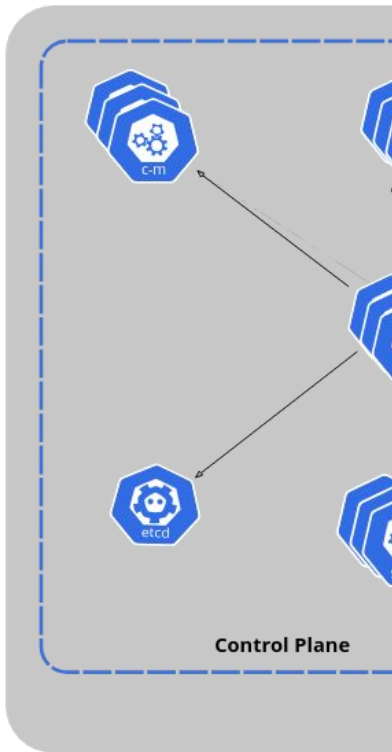




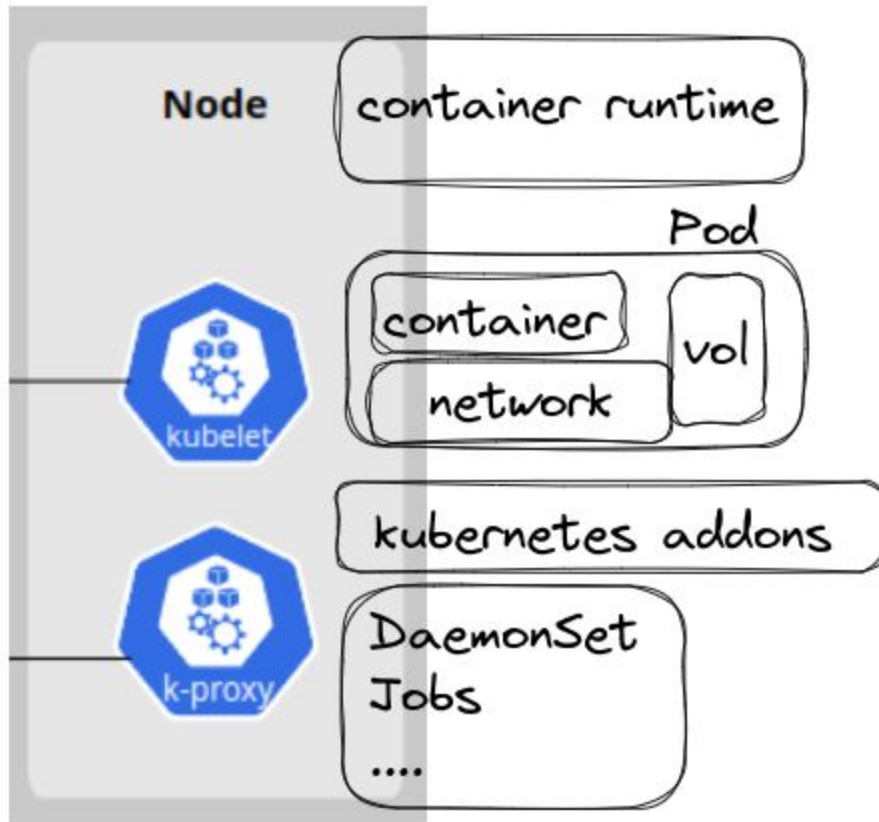
01

Introduction



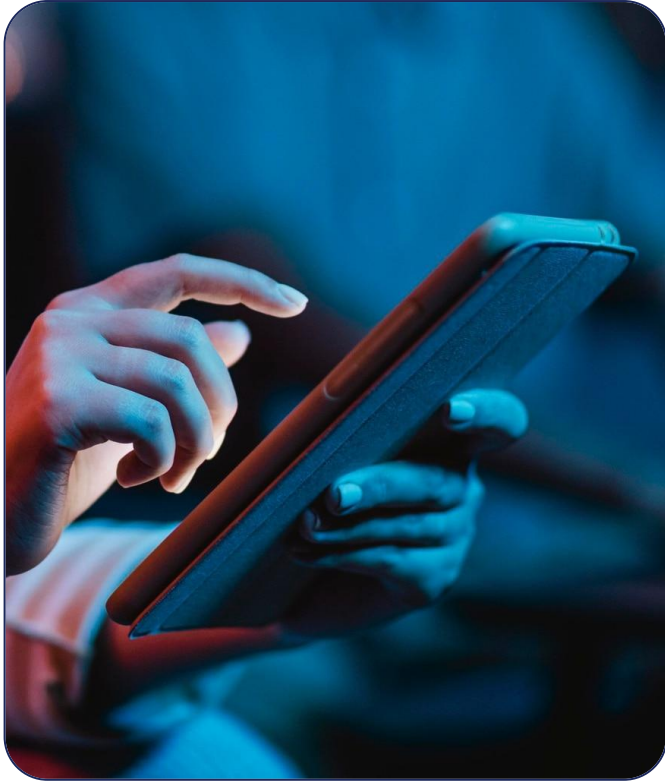


<https://kubernetes.io/>



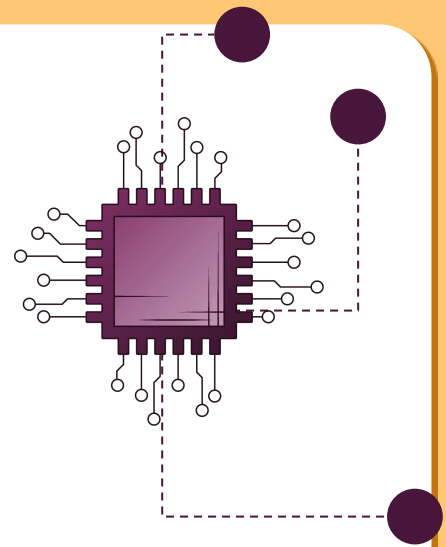
- API server 
- Cloud controller manager (optional) 
- Controller manager 
- etcd (persistence store) 
- kubelet 
- kube-proxy 
- Scheduler 
- Control plane 
- Node 





02

Observability



Observability

Observability is a system property that defines the degree to which the system can generate actionable insights. It allows users to understand a system's state from these external outputs and take (corrective) action.

o11y

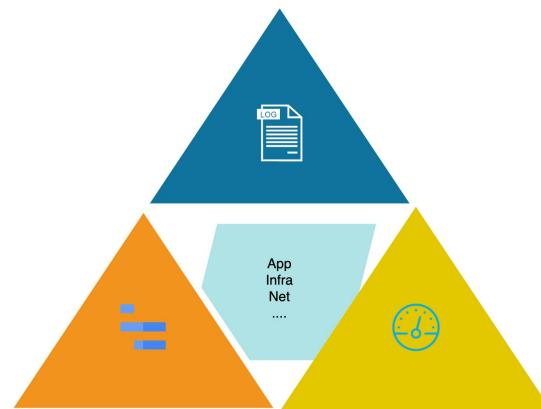


o11y Golden triangle

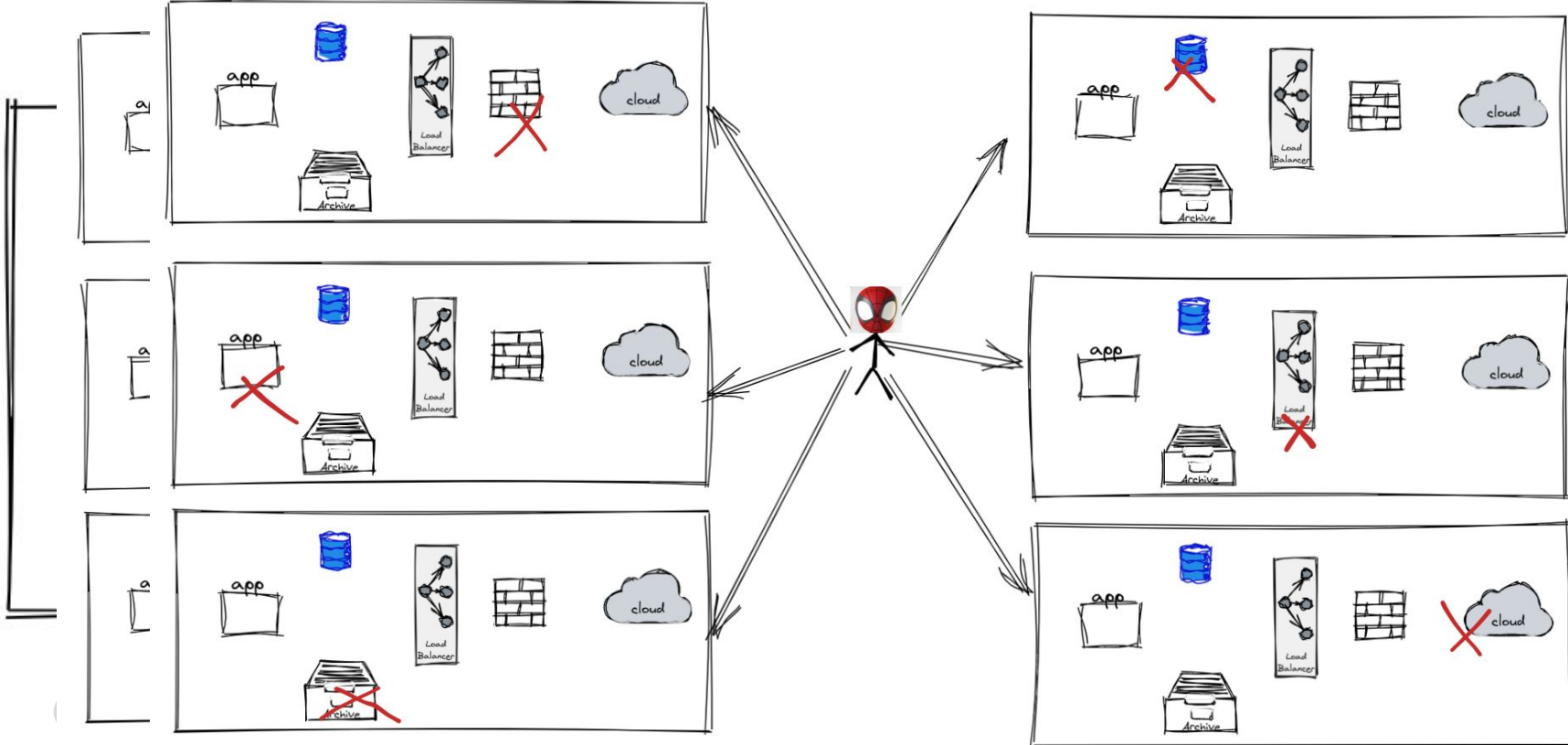
Logs Unstructured data that provides a record of events and actions within a system.

Metrics Structured data that provides a quantitative measure of a system's performance or behavior

Traces A record of the interactions between components or services within a distributed system.



Why observability.....

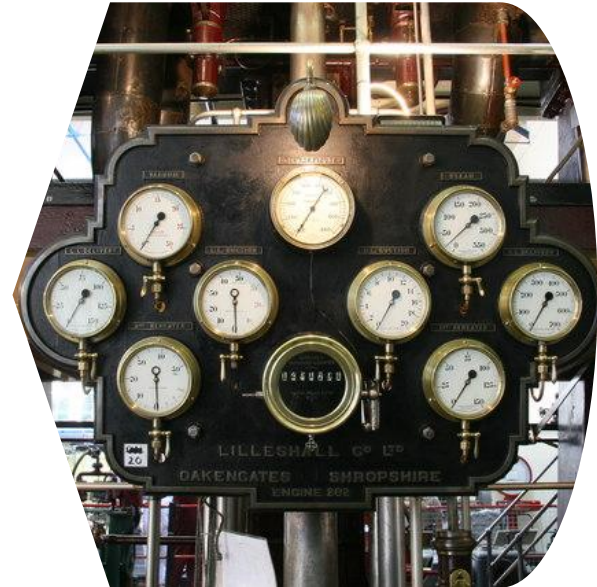


Instrumentation

Instrumentation is a collective term for measuring instruments, used for indicating, measuring and recording physical quantities. It is also a field of study about the art and science about making measurement instruments, involving the related areas of metrology, automation, and control theory. The term has its origins in the art and science of scientific instrument-making.

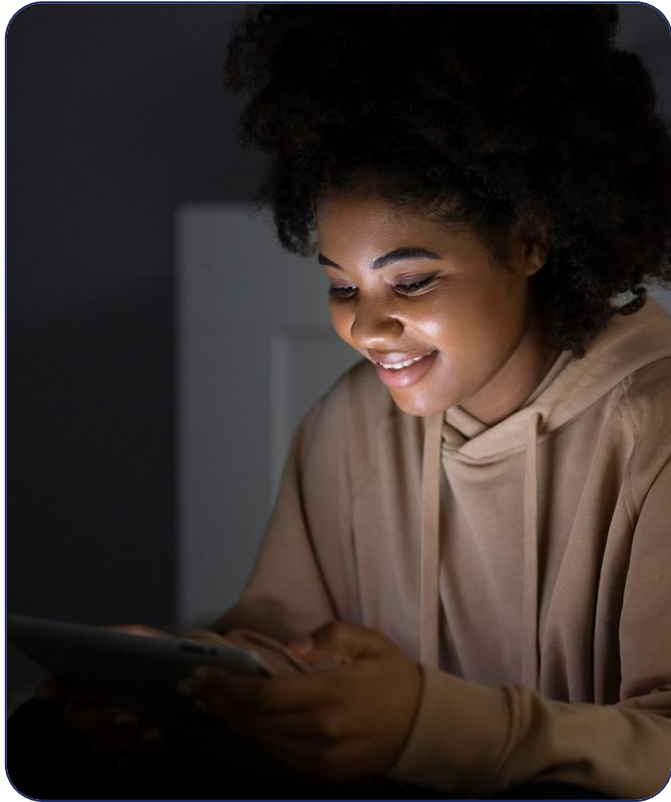


OpenTelemetry <https://opentelemetry.io/docs/what-is-opentelemetry/>



<https://en.wikipedia.org/wiki/Instrumentation>





03

CNCF



How they are

The Cloud Native Computing Foundation (CNCF) hosts critical components of the global technology infrastructure.

We bring together the world's top developers, end users, and vendors and run the largest open source developer conferences. CNCF is part of the nonprofit Linux Foundation.

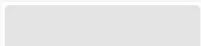


<https://www.cncf.io/about/who-we-are/>





Observability and Analysis - Monitoring (90)



Observability and Analysis - Logging (21)

Observability and Analysis - Tracing (18)

Aspecto

Aspecto

Aspecto



EaseAgent

EaseAgent
MegaEase ★ 516



elastic apm

Elastic APM
Elastic ★ 1,093



Grafana Tempo

Grafana Tempo
Grafana Labs ★ 2,922
Funding: \$335.2M



Helios

Helios
Helios ★ 2,922
Funding: \$3M



honeycomb.io

Honeycomb
Honeycomb ★ 1,748
Funding: \$148.9M



JAEGER

Jaeger
Cloud Native Computing
Foundation (CNCF) ★ 17,481
Funding: \$3M



Lightstep

LightStep
LightStep ★ 1,604
Funding: \$70M



OpenTelemetry

OpenTelemetry
Cloud Native Computing
Foundation (CNCF) ★ 1,604
Funding: \$3M

OPENTRACING

OpenTracing

OpenTracing

PINPOINT

Pinpoint
Pinpoint ★ 12,712

Skywalking

SkyWalking
The Apache Software Foundation ★ 21,668



SOFATracer

SOFATracer
Ant Group ★ 1,047



Spring Cloud Sleuth

Spring Cloud Sleuth
VMware ★ 1,687

TelemetryHub
by Scout APM

TelemetryHub by Scout APM
TelemetryHub by Scout APM ★ 8M
Funding: \$8M



Teletrace

Teletrace
Cisco ★ 535



tracetest

Tracetest
Kubeshop ★ 504



Zipkin
Zipkin ★ 16,118

Cloud Log Service

Sumo Logic

Sumo Logic

Tencent Cloud Log Service

Tencent

Trink.io

Trink.io

Google Stackdriver

Google

Cloud Log Service

Tencent Cloud Log Service

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Google

Grade Enterprise

Grade Inc. ★ 54,952
Funding: \$54.7M

Grafana

Grafana Labs ★ 54,952
Funding: \$335.2M

Grafana Mimir

Grafana Labs ★ 3,058
Funding: \$335.2M

Grafana Phlare

Grafana Labs ★ 2,034
Funding: \$335.2M

Graphite

Graphite ★ 5,648

Gaunce Cloud

Gaunce Cloud ★ 1,070
Funding: \$70.6M

HEADLAMP

Headlamp
Cloud Native Computing
Foundation (CNCF) ★ 1,070
Funding: \$3M

Honeybadger

Honeybadger

Google Stackdriver

Google

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Graphite ★ 5,648

Gaunce Cloud

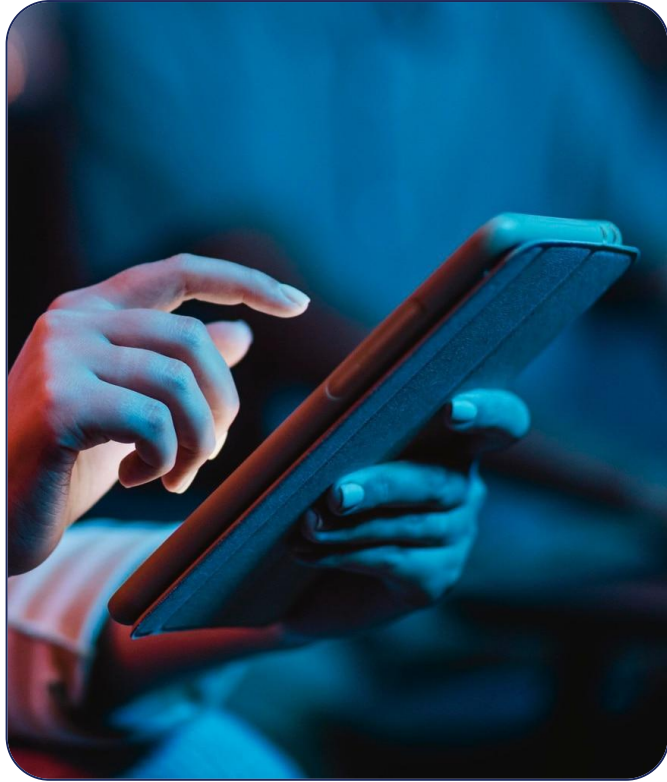
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Headlamp
Cloud Native Computing
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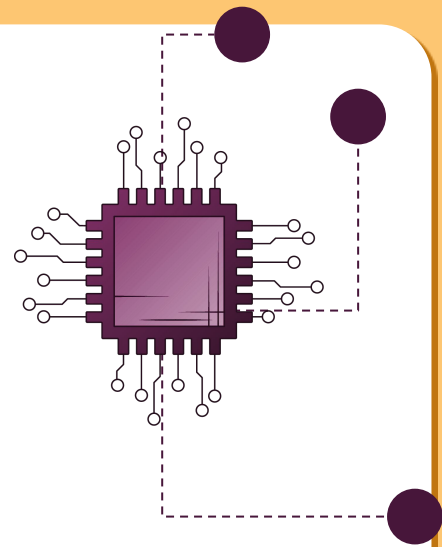
Honeybadger

Honeybadger



04

Open Source Tools



Open Source Tools

Instrumentation

opentelemetry

logs

filelog

traces

jaeger

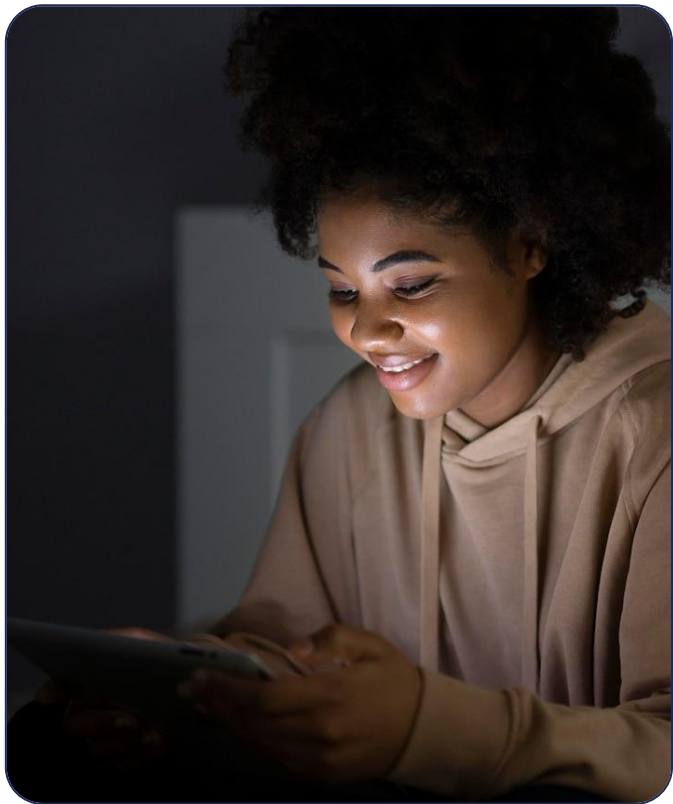
metrics

prometheus

analysis

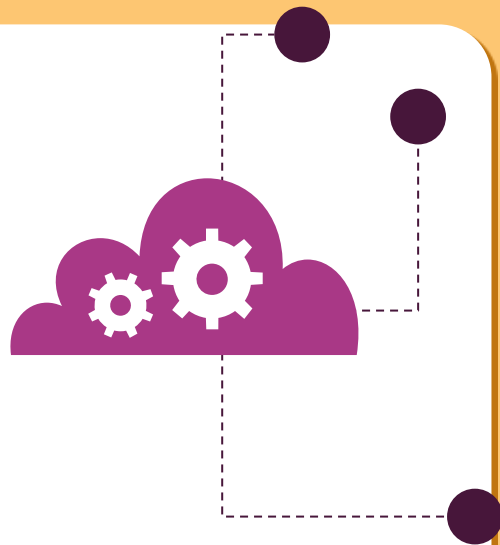
grafana





05

o11y on
kubernetes



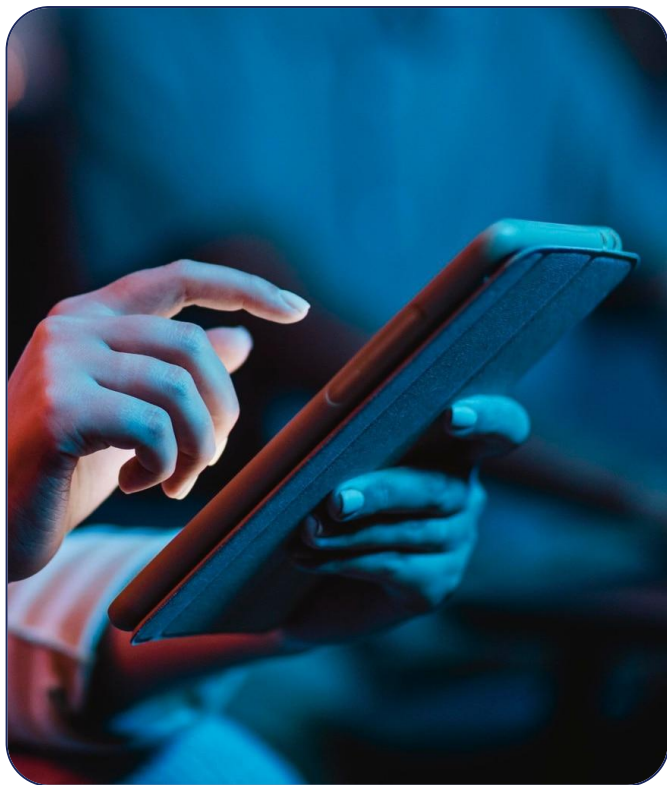
o11y on kubernetes

OpenTelemetry vs. eBPF: Which Has the Advantage?



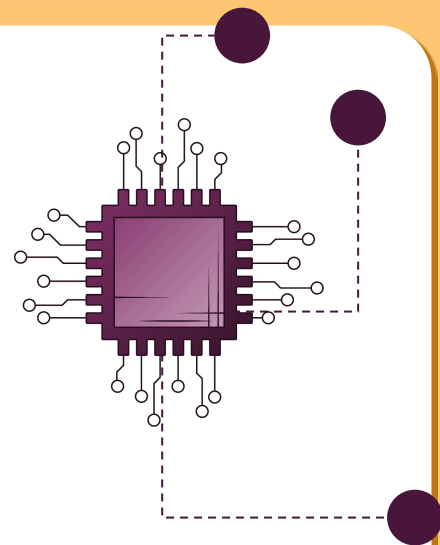
	OpenTelemetry	eBPF
Implementation		✓
Efficiency		✓
Compatibility	✓	
Ease of use	✓	



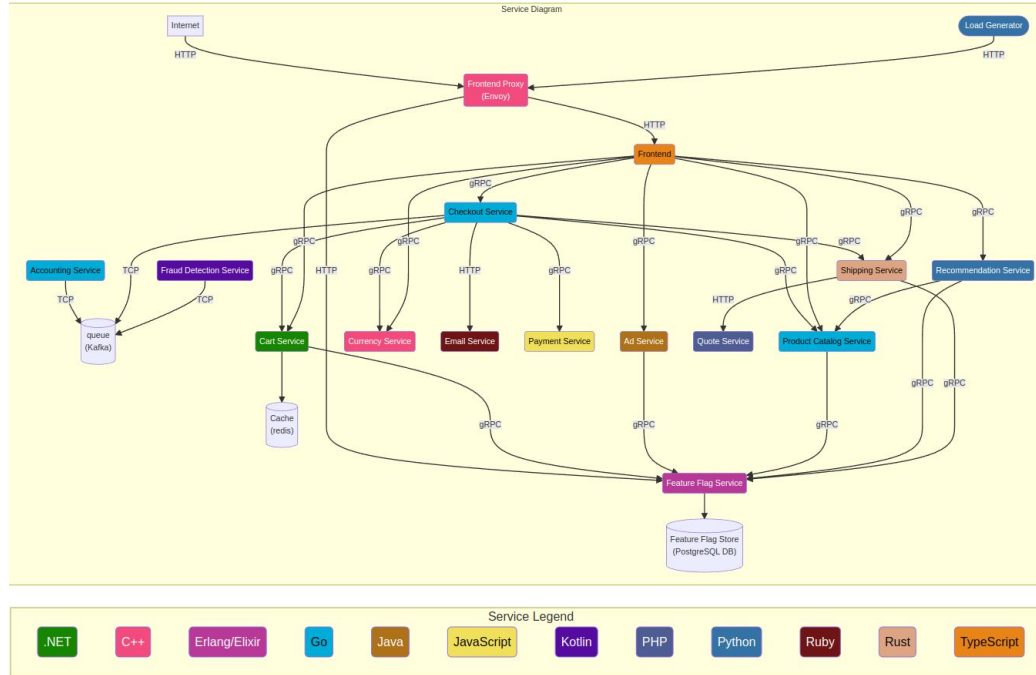


06

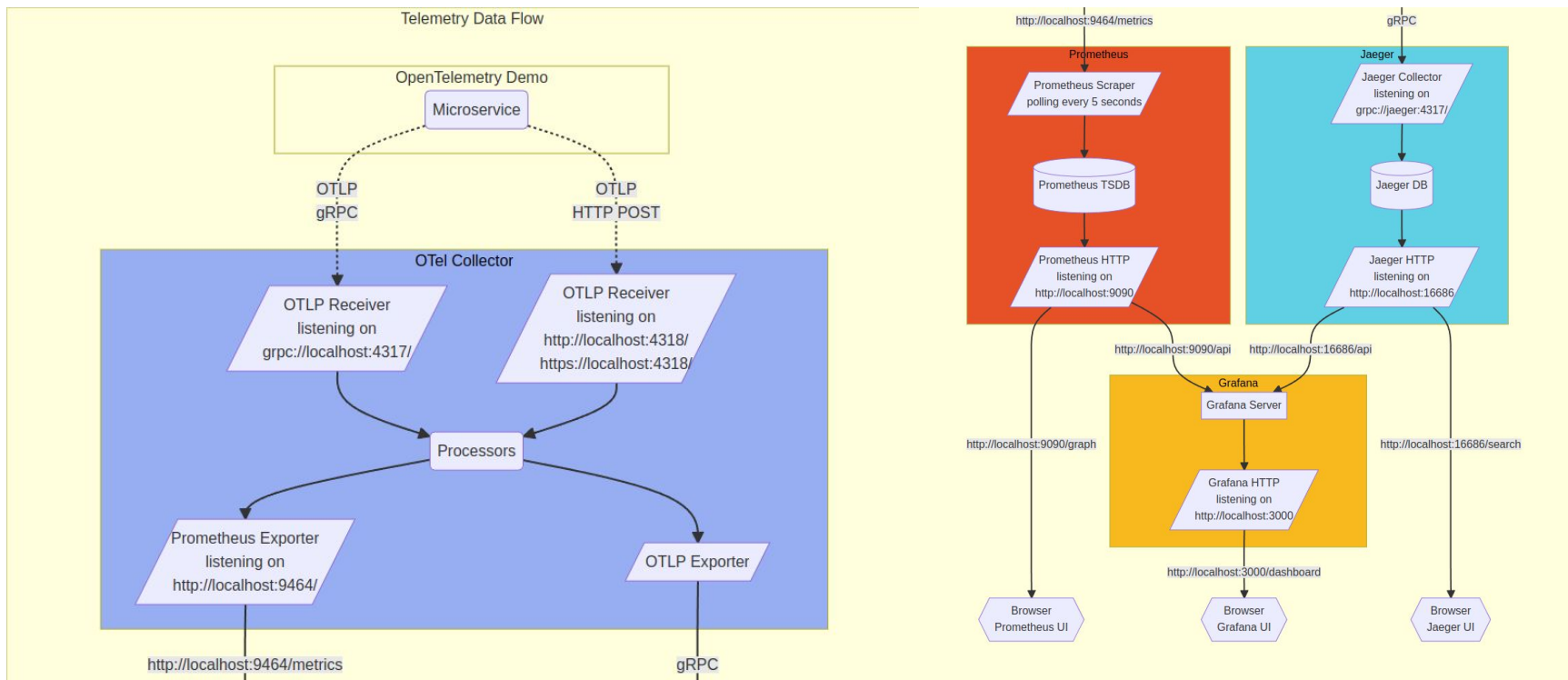
DEMO



Architecture



Ingest Flow



DEMO time



Don't run this on production



WARNING



<https://github.com/jthan24/conf42-kubernetes-observability>



Brief resume

Metrics, Logs, and Traces with open source tools



- Kubernetes architecture
 - Observability
 - What
 - Why
 - Where
 - How
 - Instrumentation
 - Golden Triangle
 - CNCF
 - Open Source Tools
-

Thank you,

Please feel free to ask any questions. 😊



@jthan24



References

<https://www.blameless.com/blog/sre-maturity-model>

<https://devops.com/metrics-logs-and-traces-the-golden-triangle-of-observability-in-monitoring/>

<https://www.oreilly.com/library/view/distributed-systems-observability/9781492033431/ch04.html>

<https://www.plutora.com/blog/observability-pillar-site-reliability-engineering>

https://linkedin.github.io/school-of-sre/level101/metrics_and_monitoring/observability/

<https://landscape.cncf.io/card-mode?category=observability-and-analysis&grouping=category>

<https://opentelemetry.io/>

<https://opentelemetry.io/docs/instrumentation/>

<https://grafana.com/>

<https://opentelemetry.io/docs/demo/kubernetes-deployment/>

<https://opentelemetry.io/docs/demo/architecture/>

<https://signoz.io/blog/kubernetes-observability/>

<https://www.itprotoday.com/it-operations-and-management/when-use-opentelemetry-and-ebpf-modern-observability>

