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What Developers Should Know about Observability



Peter Zaitsev,
Co-Founder at Coroot
March 4, 2025

Let's Get to Know You



What is Observability?



You

what is observability



ChatGPT

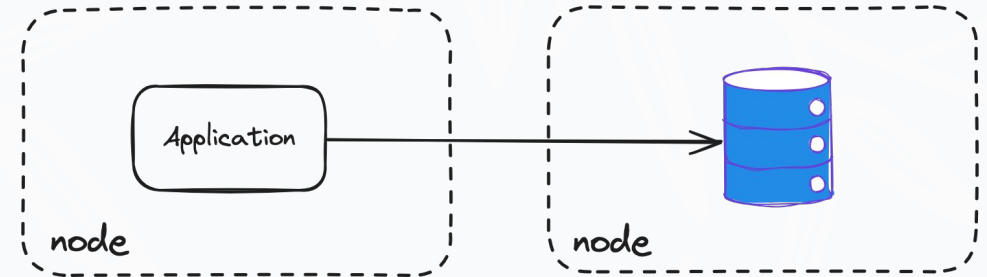
Observability is a concept in systems theory and engineering that refers to the ability to understand the internal state of a system based on its external outputs. In simpler terms, it's about how well you can observe and understand what's happening inside a system just by looking at its behavior from the outside.

In software engineering and computer science, observability is particularly important in the context of complex distributed systems, where traditional debugging techniques might not be sufficient. It involves collecting and analyzing data from various sources such as logs, metrics, traces, and events to gain insights into the performance, health, and behavior of the system.

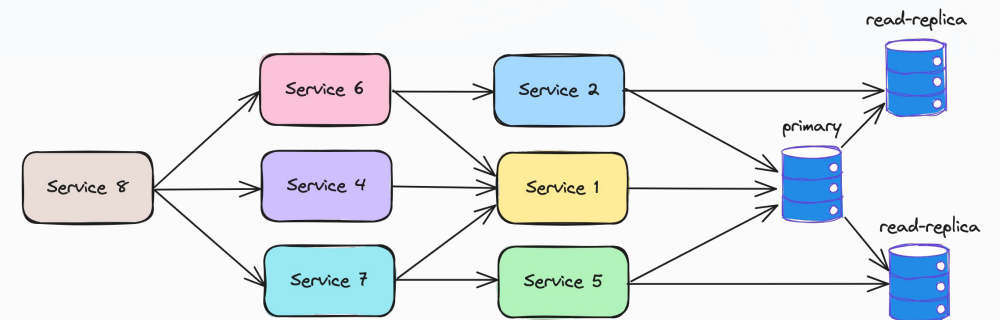
What Is Observability

Evolution of the Applications

2000s



2020s





Why Observability?

- Availability
- Performance
- Cost Management
- Security

Tasks Observability Helps with

- Reactive
 - Troubleshooting and Optimization
- Proactive
 - Finding Problems before they are Big Problems



Alerting

Notifies when Problem happens

Ensures the Right Escalation happens and the problem is resolved



4 Pillars of Observability

- Metrics
- Logs
- Tracing
- Profiling



What is the Most Useful?



Peter Zaitsev • You

Entrepreneur | Driving Success with MySQL, MariaDB, MongoDB & Post...

1d •



What is most important pillar of Observability ? [#observability](#)

What is most important pillar of #observability

You can see how people vote. [Learn more](#)

Metrics ✓

51%

Traces ✓

13%

Logs ✓

26%

Profiling ✓

10%

[220 votes](#) • Poll closed

Metrics

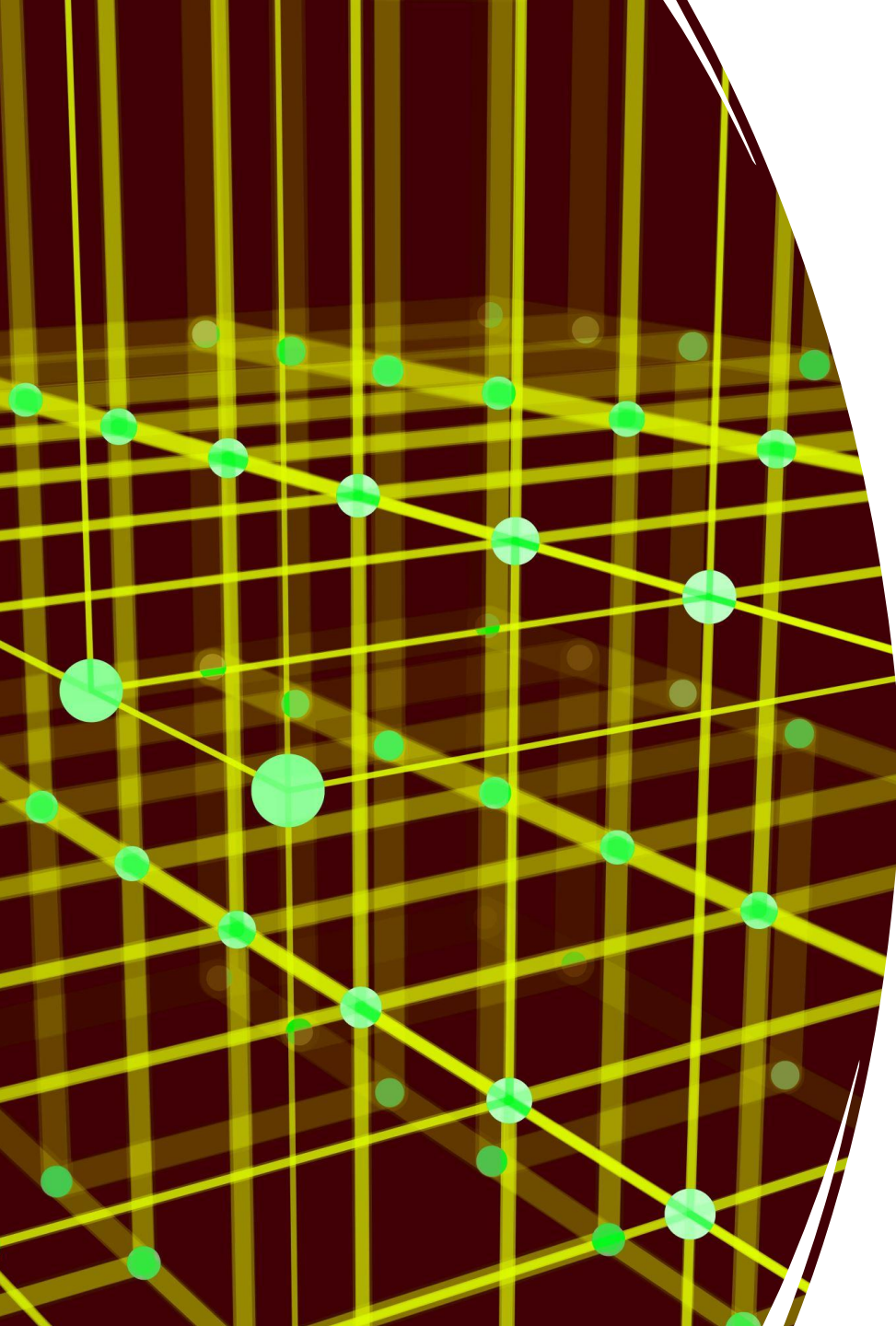
- High Level overview
- How many requests/sec there are happening?
- How many errors?
- Is the Host Down?
- 1000s of metrics may be collected every second
- Displayed on hundreds of graphs



A stack of cut logs, showing the circular cross-sections of the wood, is positioned on the left side of the slide. The logs are piled up, with some showing the dark bark and others showing the lighter wood grain. The background behind the logs is a bright, cloudy sky. The slide has a white background with a curved orange line separating the title from the list.

Logs

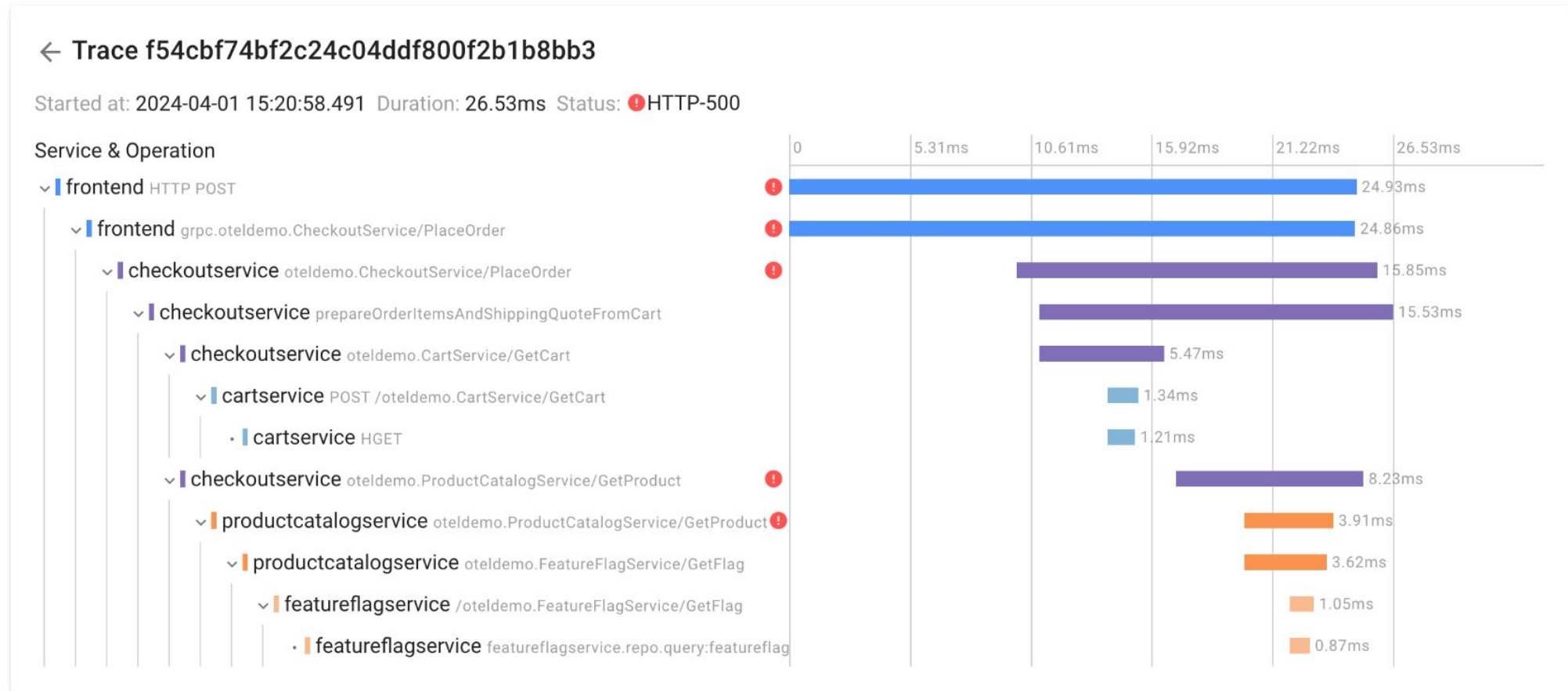
- Structured and Unstructured Format
- Have detailed information on what is happening
- Error logs – contain detailed information about cause of errors
- Expensive to Produce
- Expensive to Store and Analyze
- Sampling and Filtering is often used



Distributed Tracing

- Tracks Application Requests as they Pass through the system
- Tricky as we need to pass some Trace_ID between different services
- Span – Named, Timed Operation which represents part of Workflow
- Great for Root Cause Analyses
- Often Sampled
- Expensive to produce and store

Distributed Tracing Example

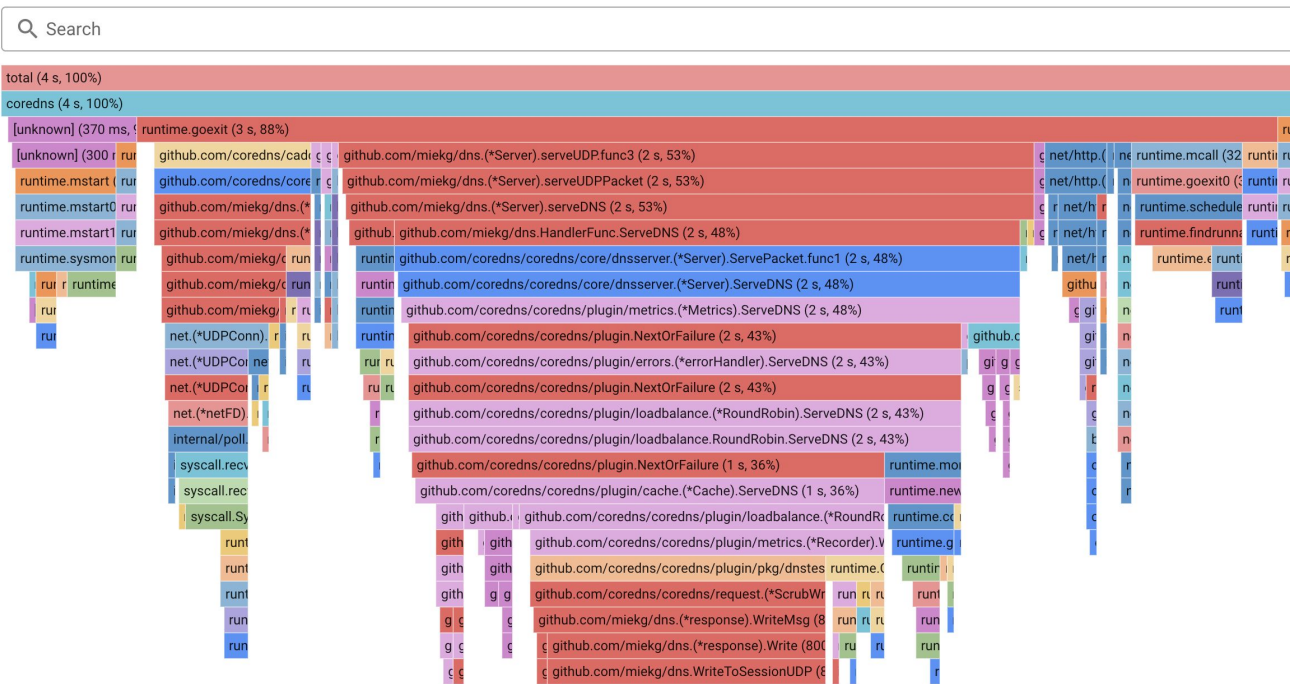
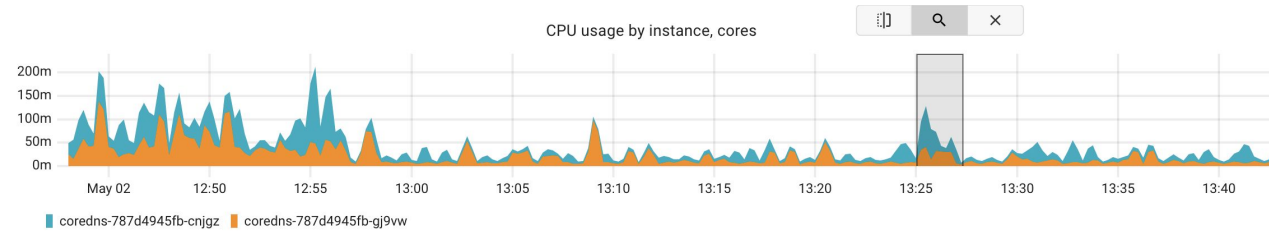


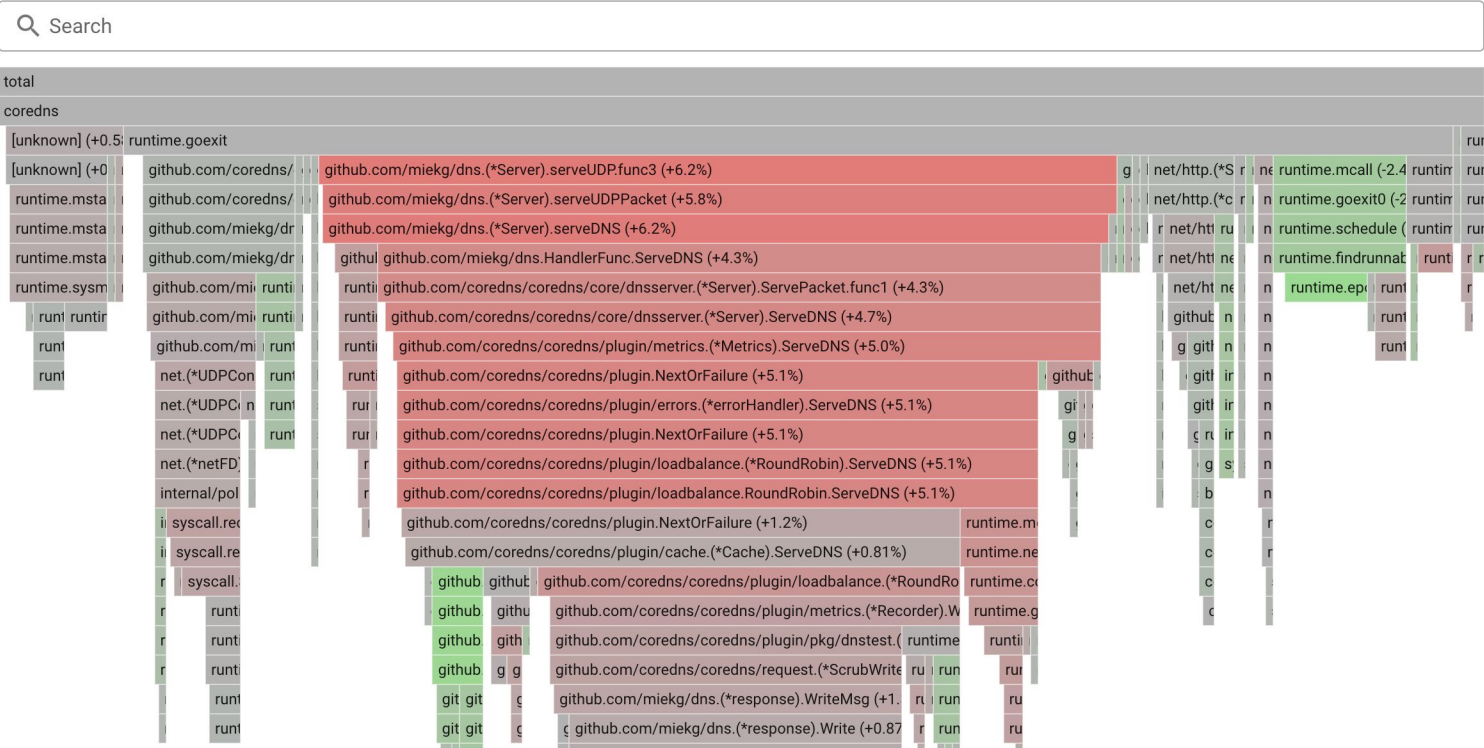


Profiling

- Where CPU Time or Wall Clock time is Spent
- Single Service or Distributed
- Language Developer can Understand
- Comparisons are very helpful
- Programming language specific support needed

eBPF Based CPU Profiling in Coroot

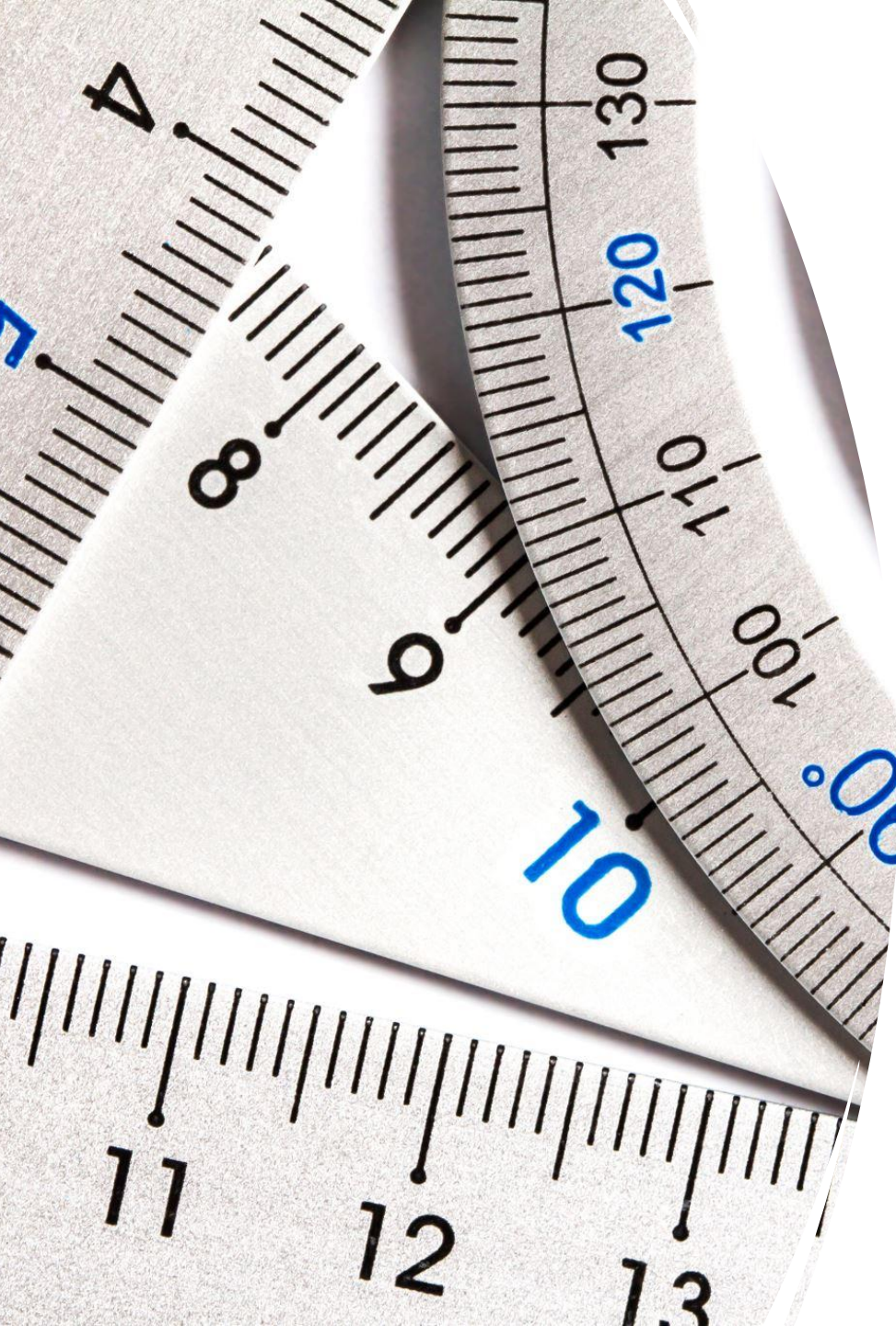






Instrumentation

How do we get all that Observability?



Types of Instrumentation

- Static Instrumentation
 - Specific Places in the Code can Produce Metrics, Emit Logs, Traces
 - Linux ProcFS
- Dynamic Instrumentation
 - Allow Instrumentation “anything” dynamically
 - dTrace, eBPF

The background is a dark blue, almost black, field filled with a complex, glowing circuit pattern. The circuit lines are thin, white, and blue, creating a dense, interconnected web. A prominent feature is a glowing green padlock, which is slightly translucent and has a bright, pixelated texture. It is positioned in the center of the image, directly behind the text. The text is white, bold, and sans-serif, with a slight shadow effect that makes it stand out against the busy background.

Key Observability Technologies

Prometheus

- Metrics Capture and Processing
- OpenMetrics merged here
- Client Libraries for many programming languages
- Easy way to expose Metrics from your Application
- Coding Required



Open Telemetry (OTEL)

- Collection of APIs, SDKs and Tools
- To Instrument, Generate, Collect and Export Telemetry Data
- Covers Metrics, Logs, Traces
- Formed through merger of OpenTracing and OpenCensus projects
- Coding Required



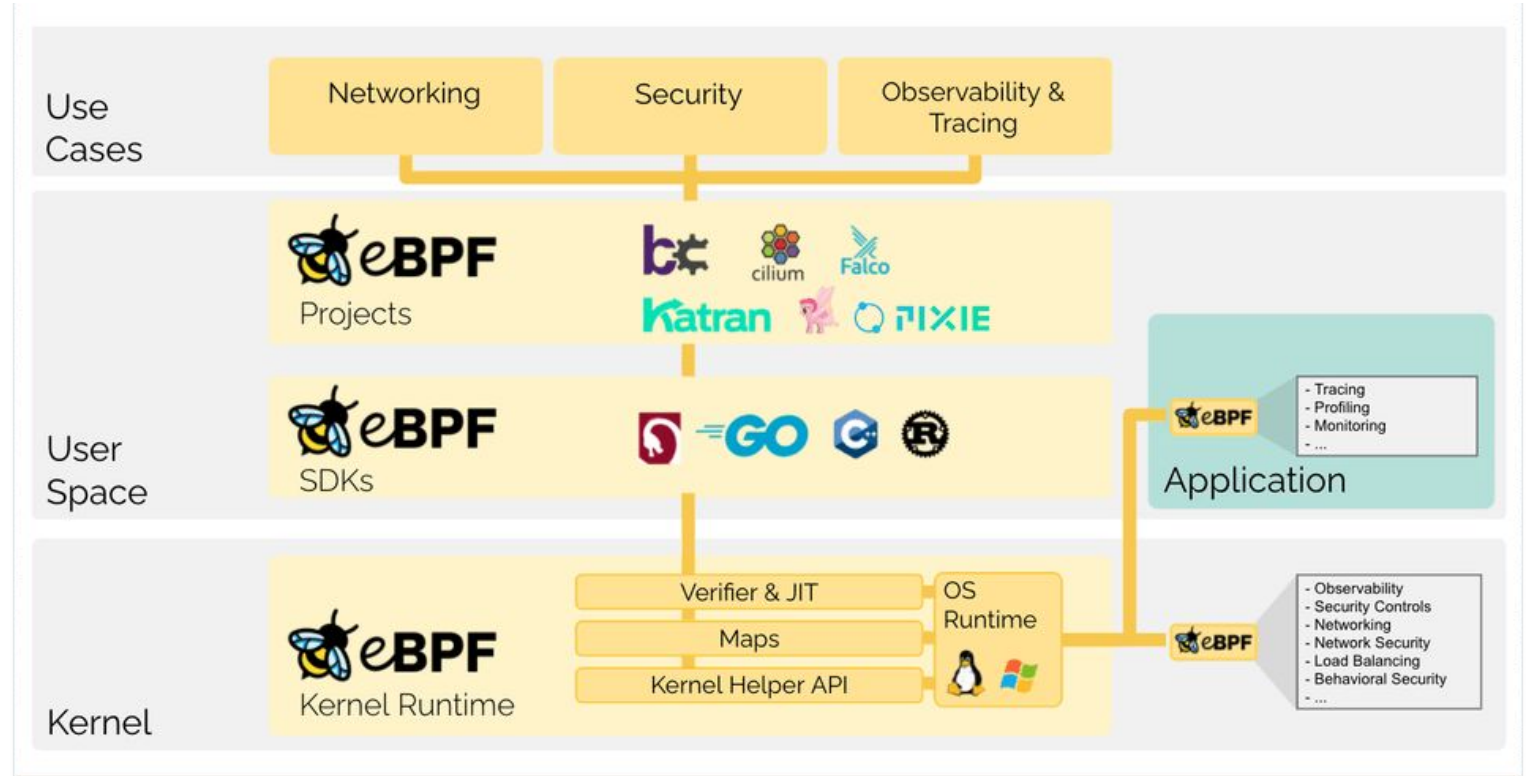
eBPF (Extended Berkley Packet Filter)

- Not Just Observability
- Dynamic Instrumentation
- User Space and Kernel Space
- Efficient
- Safe
- No Coding Required



eBPF Illustrated

<https://ebpf.io/what-is-ebpf/>



Typical SLIs (Service Level Indicators)

- Rate of Requests
 - Hard to define what is norm, through anomaly detection can help
- Availability
 - Error Rate; High Latency Becomes Error at certain point
- Request Latency
 - Looking at 99% or more; Often with breakdown

Observability Problems





Hard To Deploy

Too much effort and agent configuration required



Hard to cover all of Infrastructure

Many solutions support only some kinds
of infrastructure well

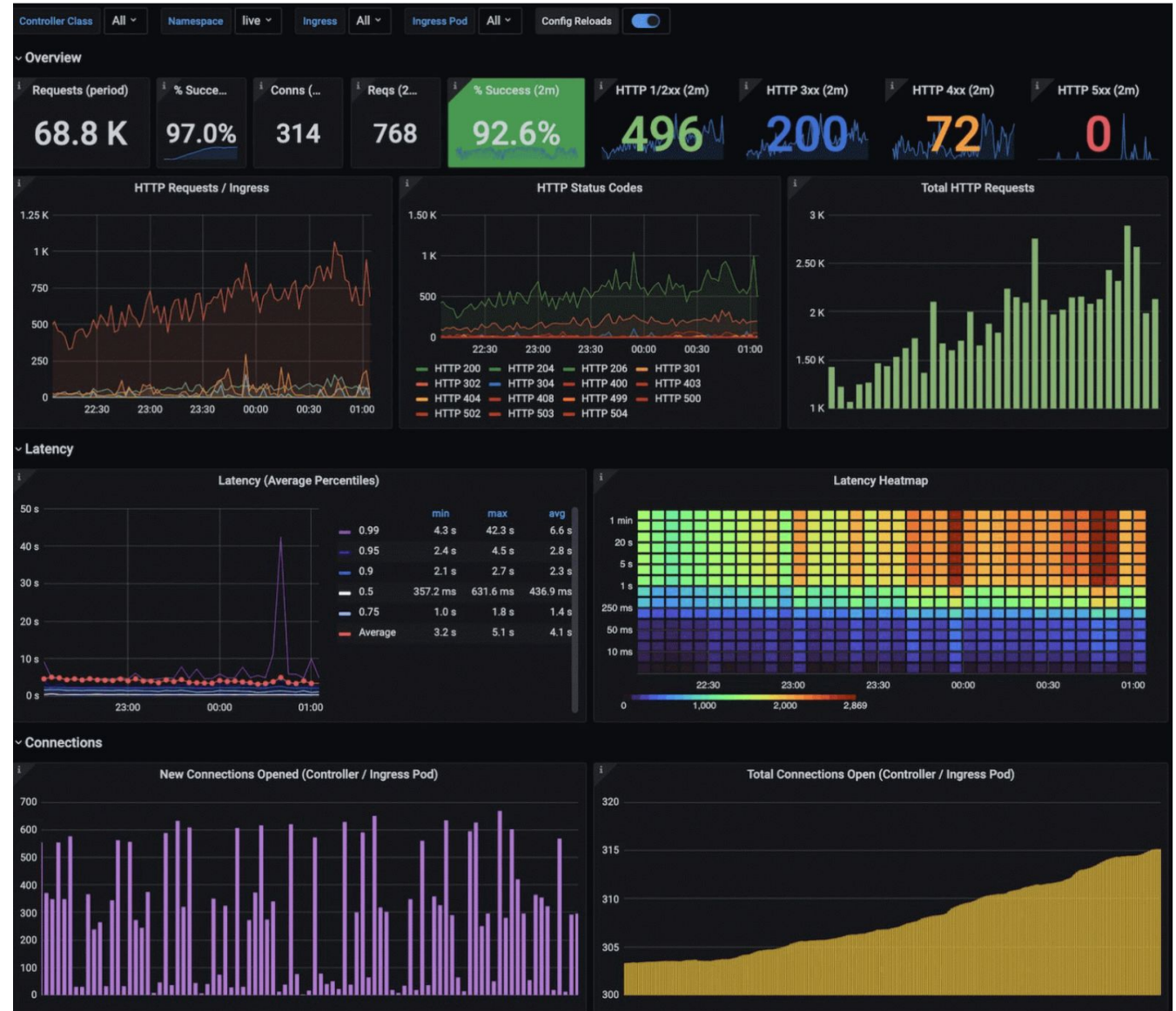
Swiss Cheese Observability

Full of Holes!



Hard to Use

Overwhelming amount of hard to understand data



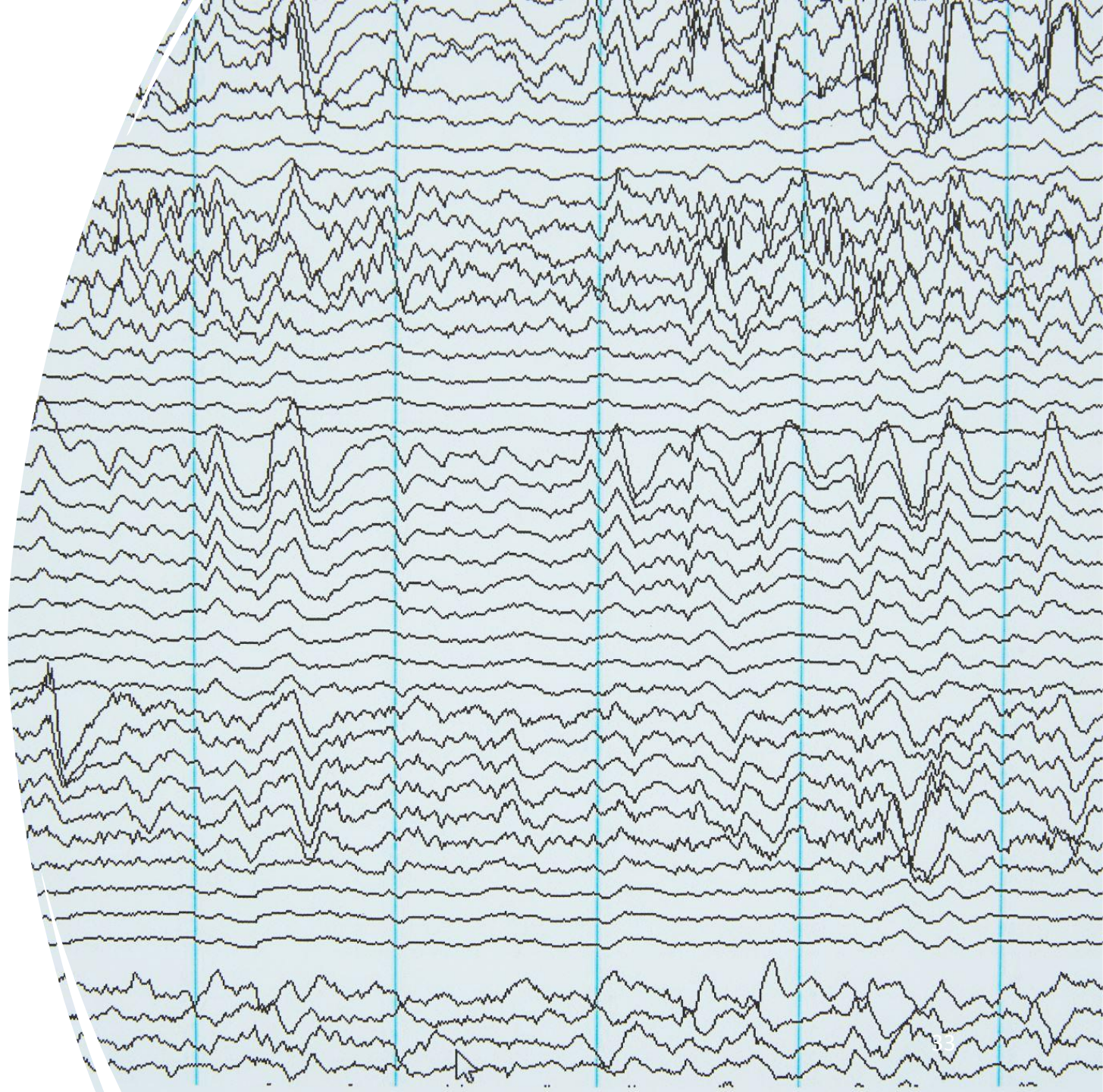
Silos

- Large organizations have many groups with different responsibilities
- Multiple Vendors responsible for different parts of infrastructure
- Often using different tools
- Blame game and responsibility avoidance is common



Noise

- Too much Noise in Alerting
- Team Fatigue and Burnout
- Alerts being Ignored or Mishandled
- Increased Downtime
- Poor User Experience



Overhead

Instrumentation Slow things down

Observability data hard to store and process

Inadequate Level of Instrumentation



Cost

- Proprietary and Cloud Observability solutions can get super expensive
- Why do you think Cisco bought Splunk ?
- High Costs drive Observability Choices
- Need Open Source, Efficient Solutions



Coroot – Looking to Solve Some of Those



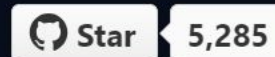
Product ▼

Solutions ▼

Pricing

Resources ▼

Live Demo



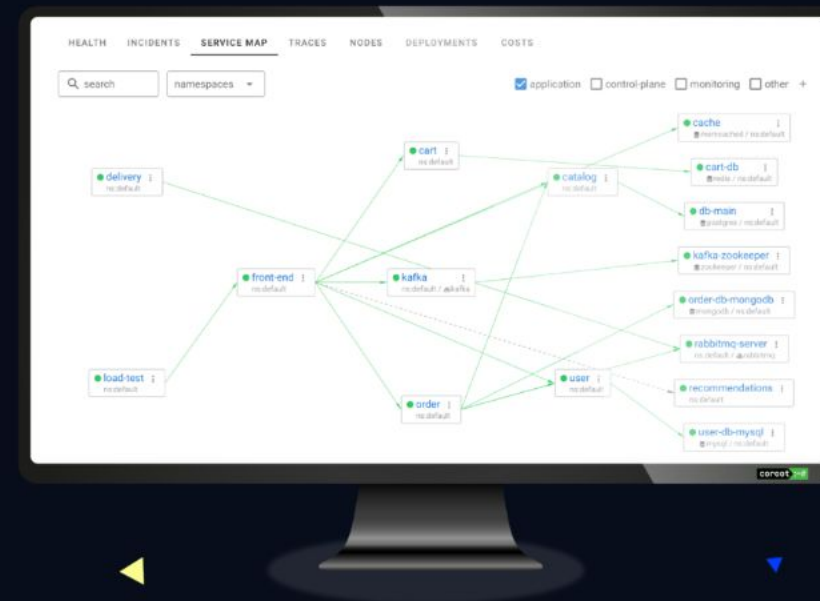
Enable system observability in minutes, no code changes required

Metrics, logs, traces, continuous profiling, and SLO-based alerting, supercharged with predefined dashboards and inspections.

[Start free trial](#)

Live demo

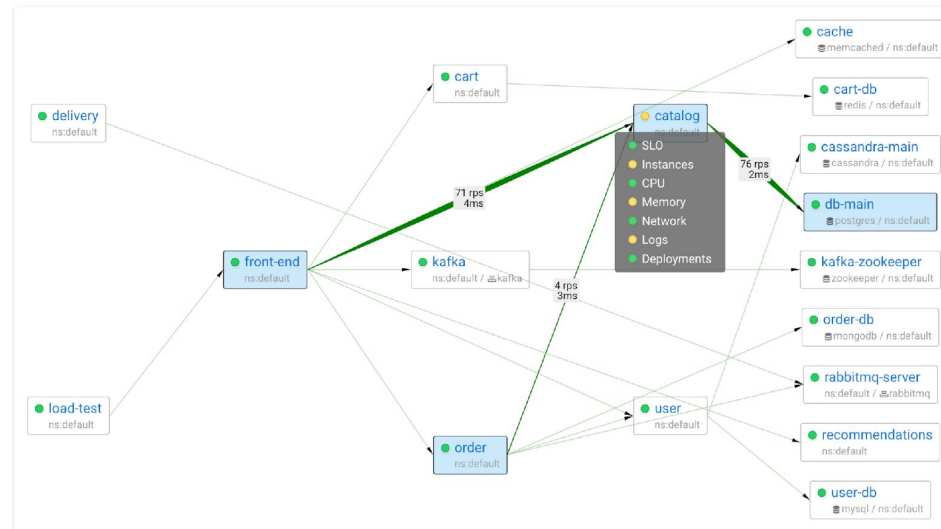
or install Coroot Community Edition (Open Source) →



Coroot Editions

Open Source
Enterprise

Zero-instrumentation observability



- ✓ Metrics, logs, traces, and profiles are gathered automatically by using eBPF
- ✓ Coroot provides you with a Service Map that covers 100% of your system with no blind spots
- ✓ Predefined inspections audit each application without any configuration

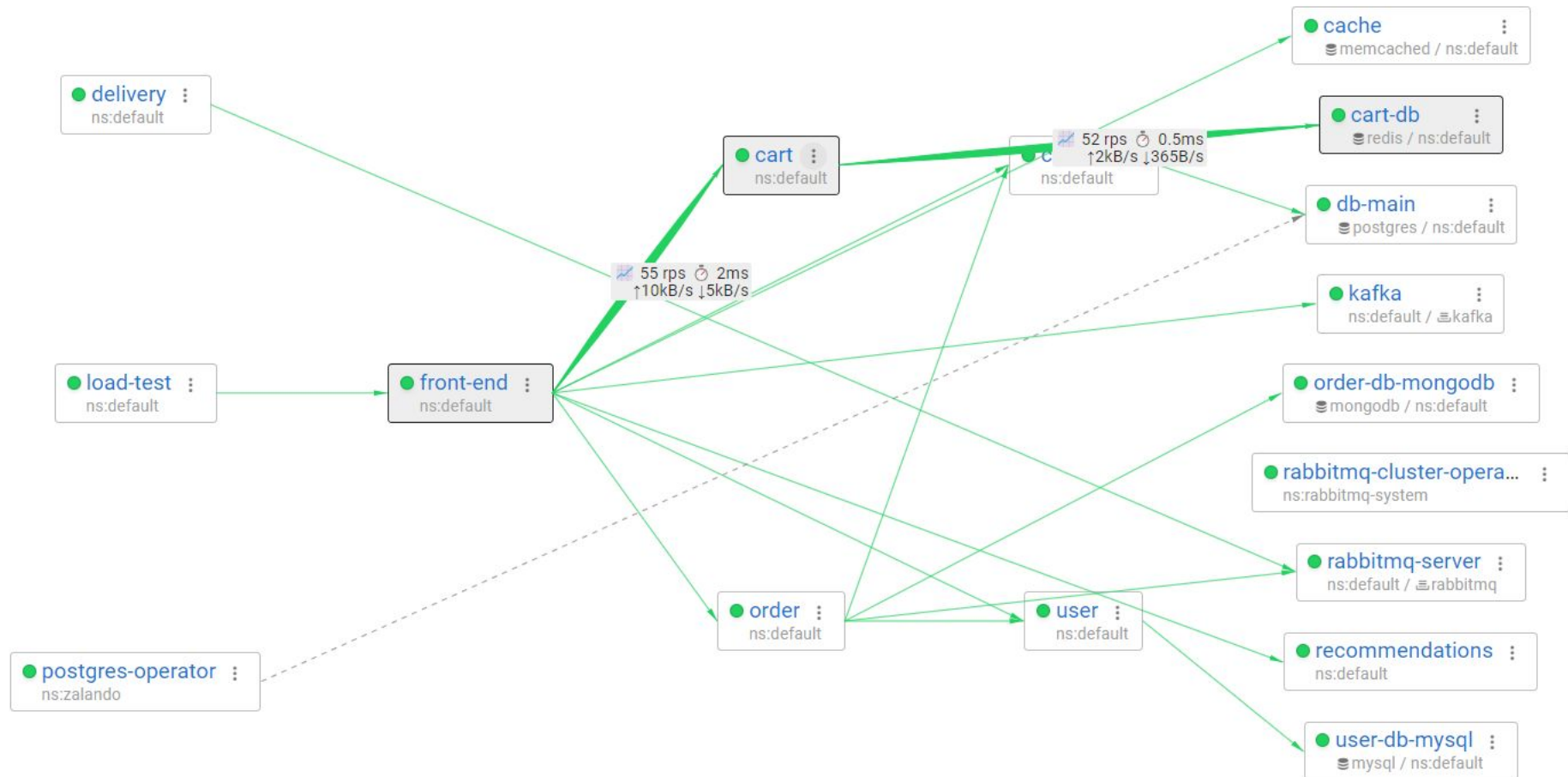
<https://coroot.com/>



eBPF Magic

- Automatic Instrumentation with eBPF
- Use to together with conventionally exposed Linux Data
- Instrument SSL Calls
- L7 Protocol Decoding

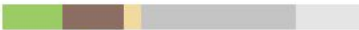
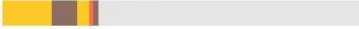
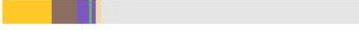
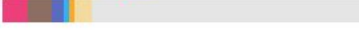
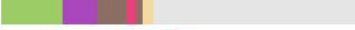
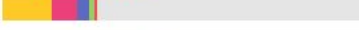
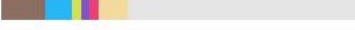
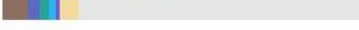
eBPF-based metrics



Node Types & Costs for major clouds

HEALTH INCIDENTS SERVICE MAP TRACES **NODES** DEPLOYMENTS COSTS ANOMALIES

Nodes ⓘ

Node		CPU	Memory	Price	↓ Idle cost	Cross-AZ traffic	Internet egress traffic
node5	usage:			\$121.18/mo	\$39.09/mo	\$0.00/mo	\$0.00/mo
	request:			on-demand			
node1	usage:			\$121.18/mo	\$34.62/mo	\$0.00/mo	\$0.00/mo
	request:			on-demand			
node3	usage:			\$121.18/mo	\$32.68/mo	\$0.00/mo	\$0.00/mo
	request:			on-demand			
node2	usage:			\$121.18/mo	\$27.39/mo	\$0.00/mo	\$0.00/mo
	request:			on-demand			
node4	usage:			\$121.18/mo	\$23.90/mo	\$0.00/mo	\$0.00/mo
	request:			on-demand			
TOTAL				\$605.88/mo	\$157.69/mo	\$0.00/mo	\$0.00/mo

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Applications ⓘ

Category	↓ Usage costs	Allocation costs	Overprovisioning costs	Cross-AZ traffic	Internet egress traffic
application	\$108.47/mo	\$174.39/mo	\$92.78/mo	—	—
monitoring	\$80.14/mo	\$1.70/mo	\$1.29/mo	—	\$0.00/mo
control-plane	\$51.47/mo	\$17.20/mo	\$11.98/mo	—	—
TOTAL	\$240.07/mo	\$193.29/mo	\$106.05/mo	—	\$0.00/mo

Handling Observability Problems



Hard to Deploy

No Code, No Configuration to get 90% of the
Value



Hard to cover all the Infrastructure

Cover Kubernetes, Containers, Cloud, VM, Bare Metal

Hard to Use

Less Raw Data, More
Actionable Insights



Silos

- Complete Infrastructure and App Coverage
- Evidence based Root Cause Analyses

Noise

Focus on Objective
Measures rather than
Vanity Ratios



Overhead

- eBPF – Modern Technology designed for speed
- Heavily Optimized Open Source Agents



Cost

- Roll your own
- Flexible data retention options
- State of Art Data Storage Technologies



Words of Advice

- Ensure your observability is complete, with no blind spots
- Ensure you have tools to reliably identify the components experiencing issues
- Use skill-appropriate tools, less can be more in the time crunch
- Have evidence for escalation to another team or vendor

Thank you! Let's Connect!

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<https://twitter.com/PeterZaitsev>

<http://www.peterzaitsev.com>

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