

ObservabilityCON
ON THE ROAD • 2023

Keynote



Richard Hartmann

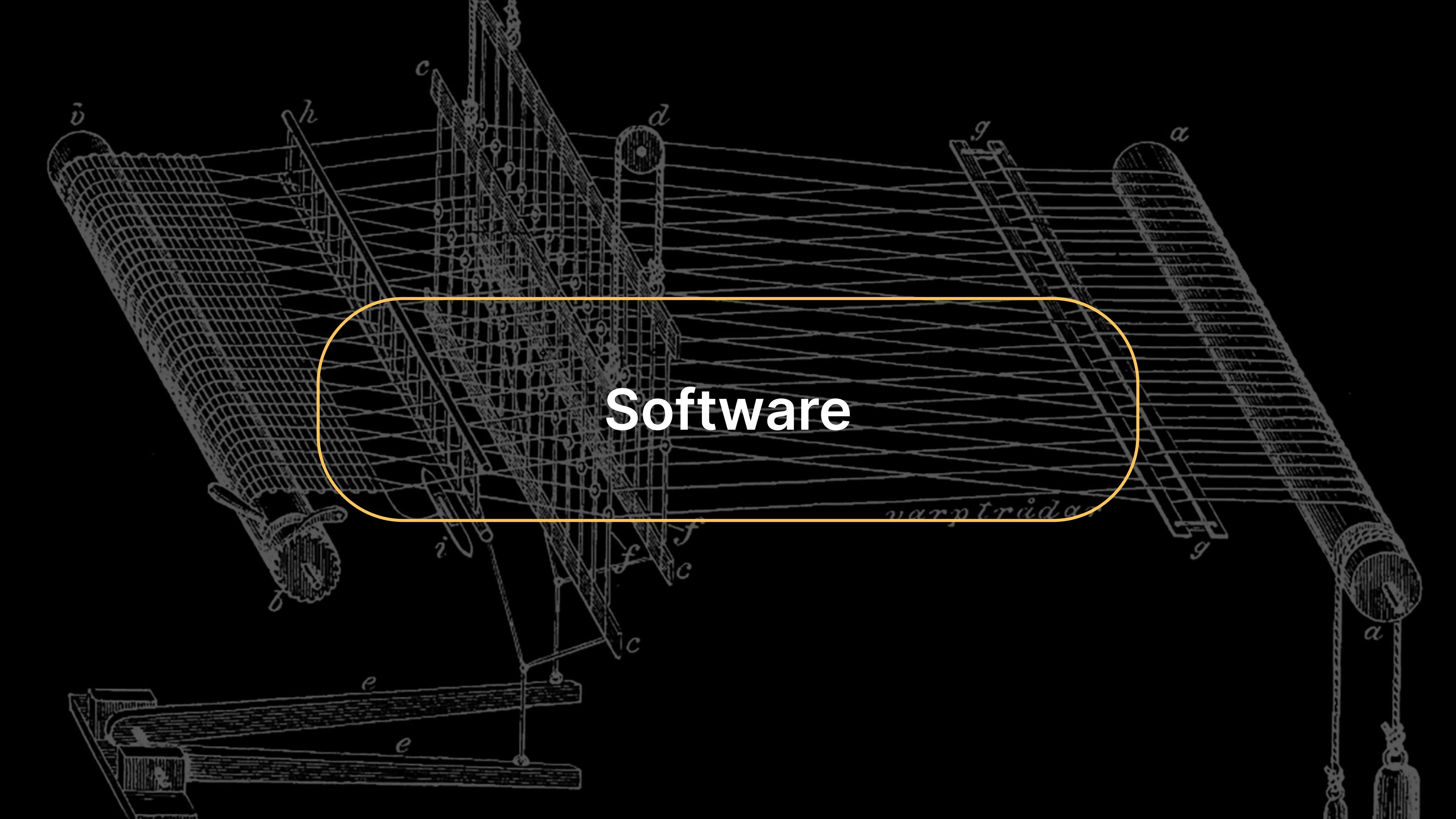
Director of Community, Grafana Labs

“ [...] observations are [...] approximations
to the truth [...]”

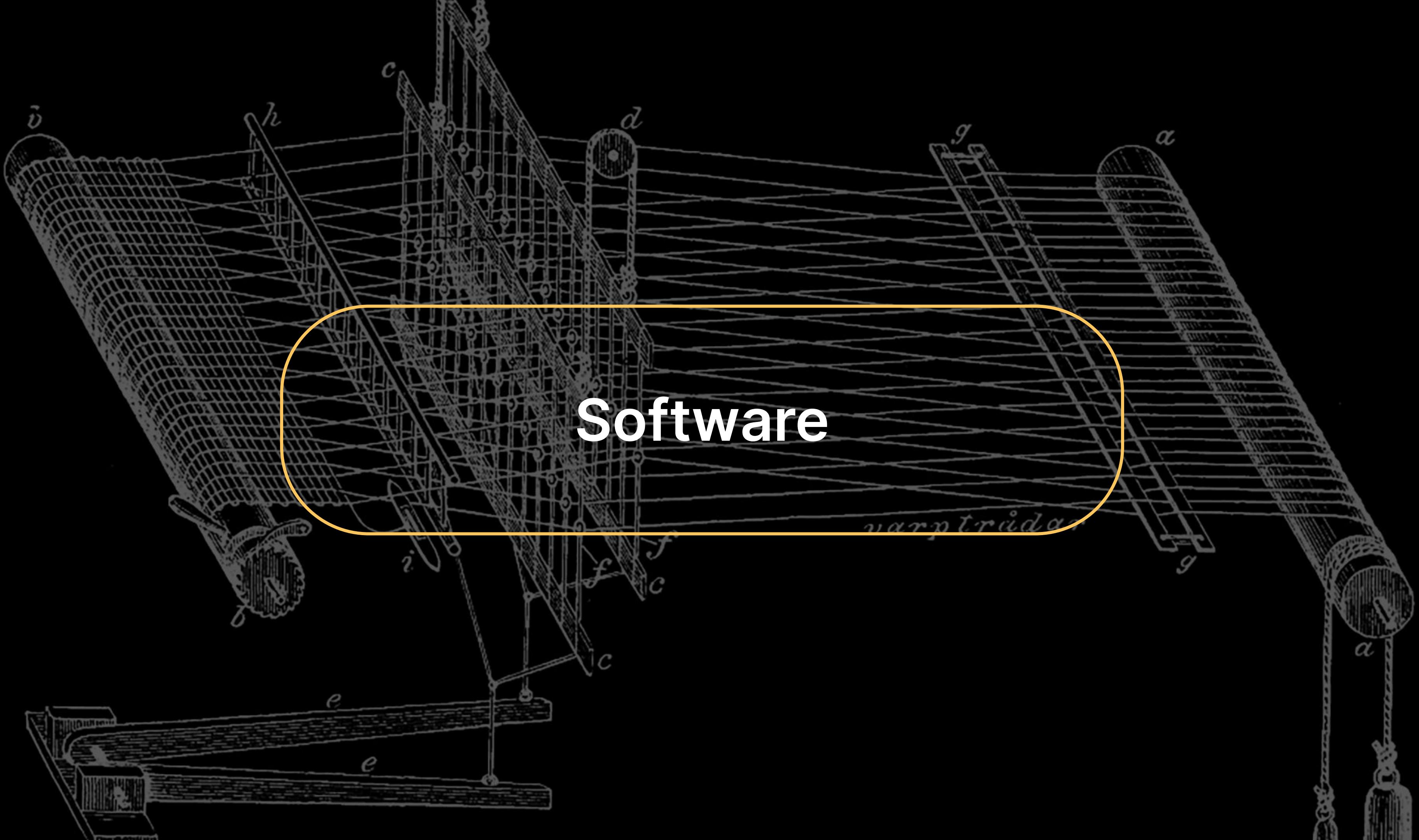
Carl Friedrich Gauß, 1809

“ Observability is a measure of how well internal
states of a system can be inferred from
knowledge of its external outputs.”

Rudolf Emil Kálmán, 1960



Software

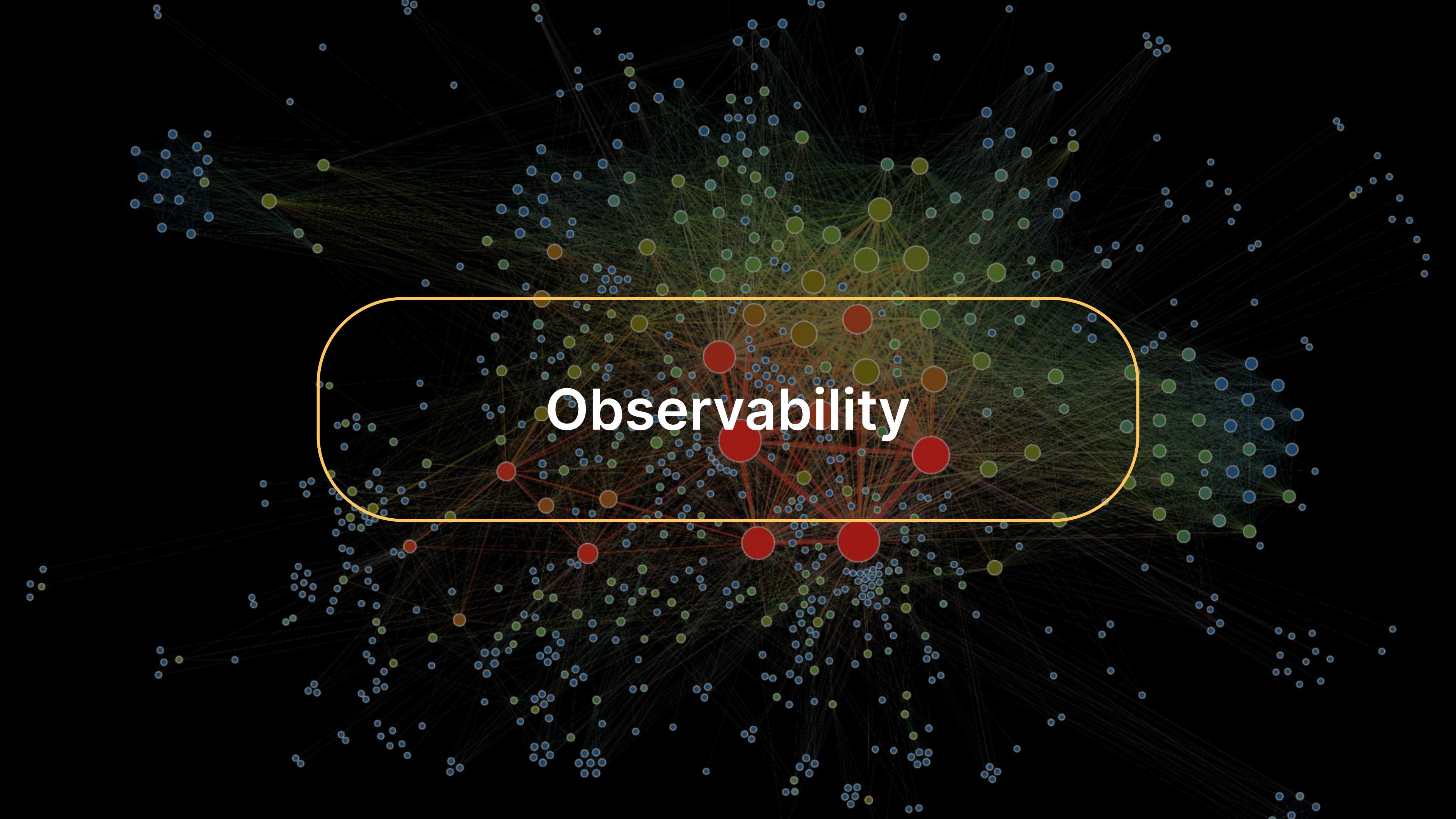




Software engineering



Complexity



Observability

Grafana is the the world's most popular operational dashboarding technology

1.2M+ active installations
of Grafana, and growing

25M+ users
of Grafana



5K+ customers
Significant enterprise growth
in the last year

54K GitHub stars
Accelerating Grafana adoption
and development



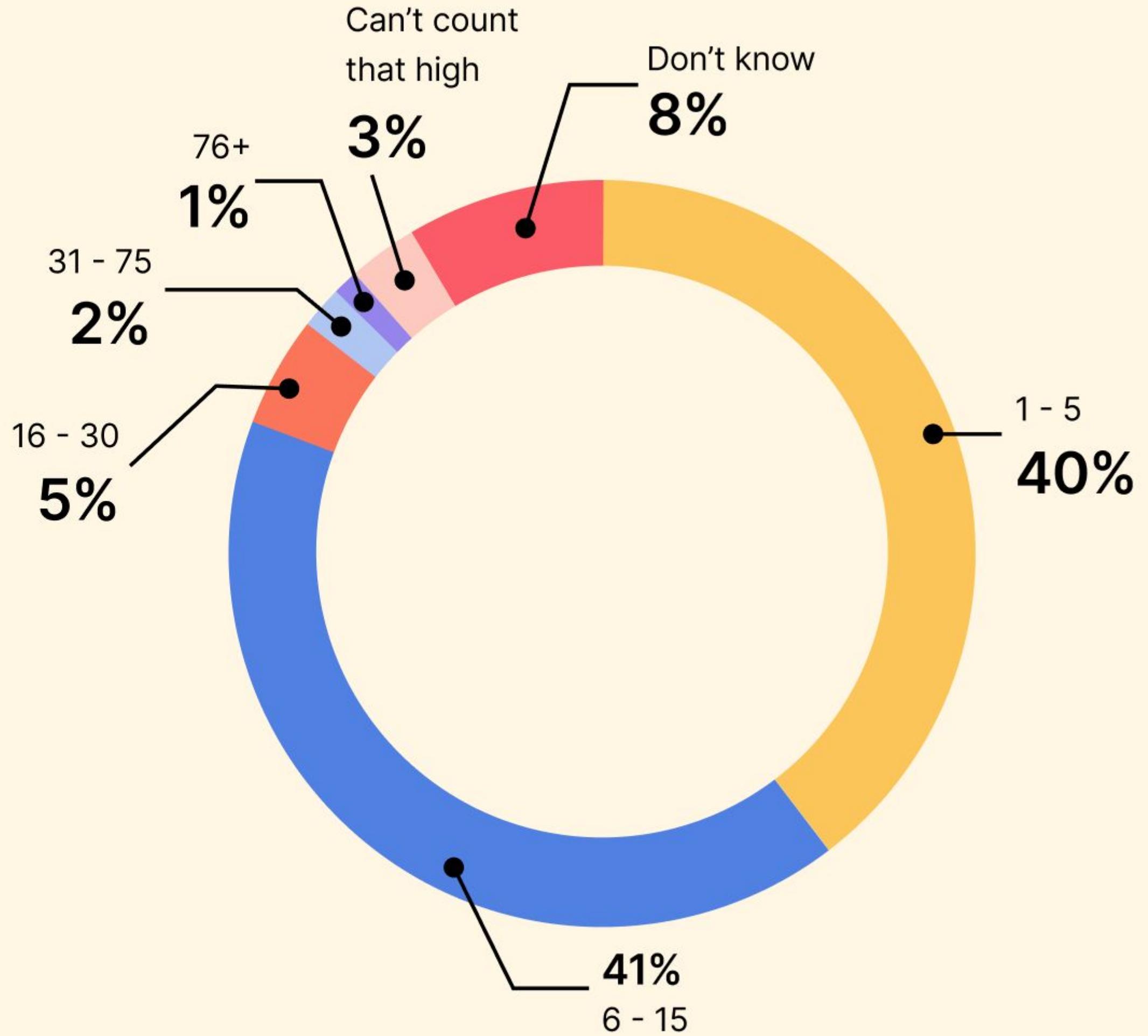


Grafana Labs' big tent strategy

Observability Survey

2023

How many different observability technologies does your entire company use?



Responses from 250+ practitioners
Not limited to users or customers
Conducted between 9/2022 – 1/2023

Key takeaways →

Read the report



Companies are juggling lots of tools and data sources



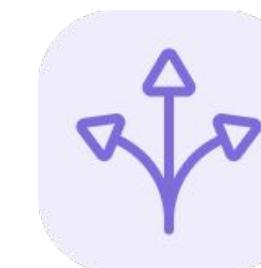
Organizations are at different stages in their observability journey



Consolidated observability saves time and money



Accountability and market maturity come to observability



Not all ROI is the same



Grafana Labs' big tent strategy



Loki
for logs



Grafana
for visualizations



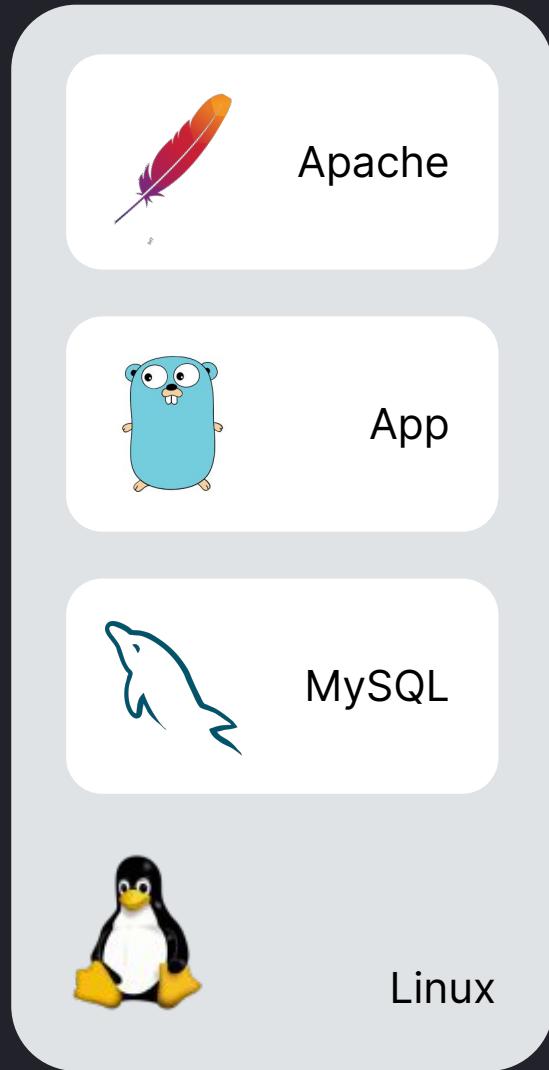
Tempo
for traces

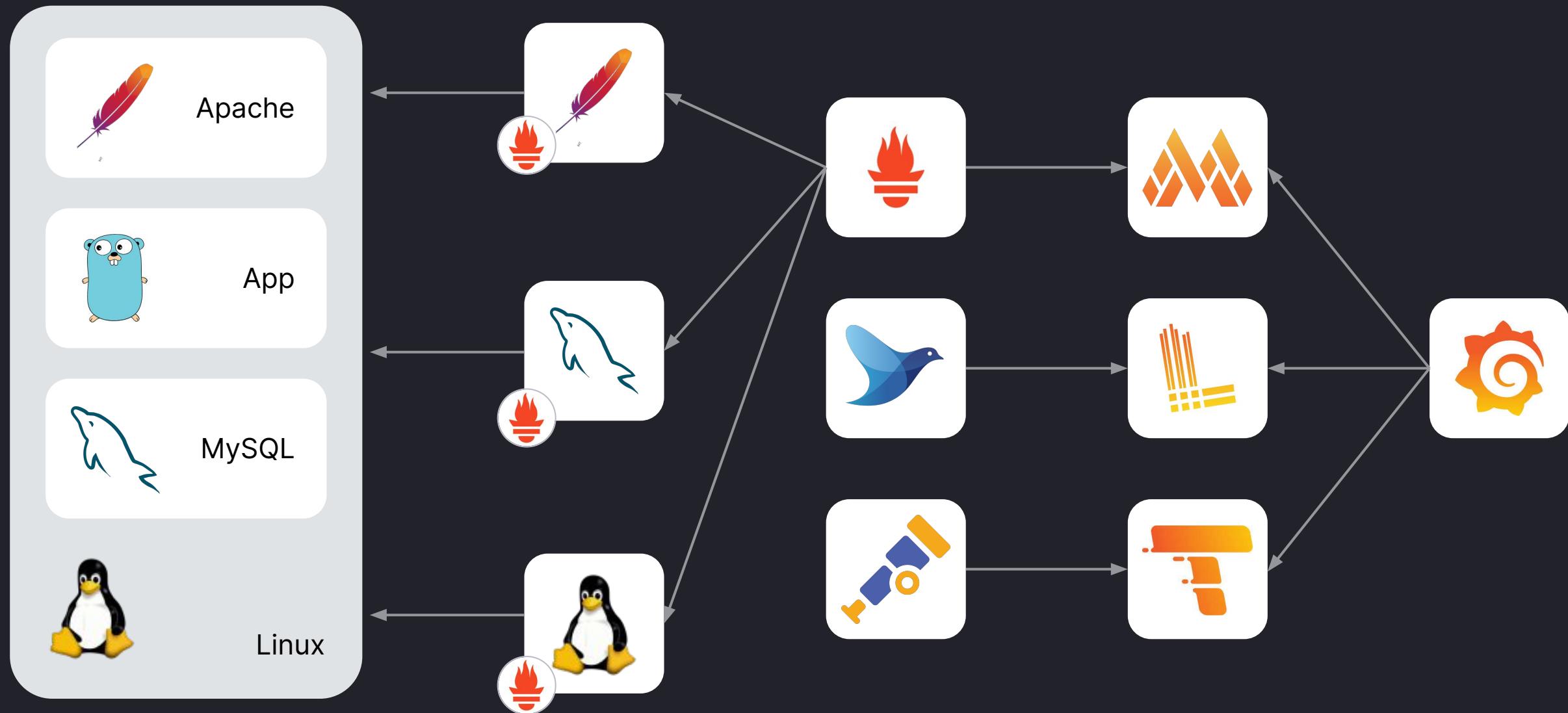


Mimir
for metrics

Tom Wilkie

CTO, Grafana Labs

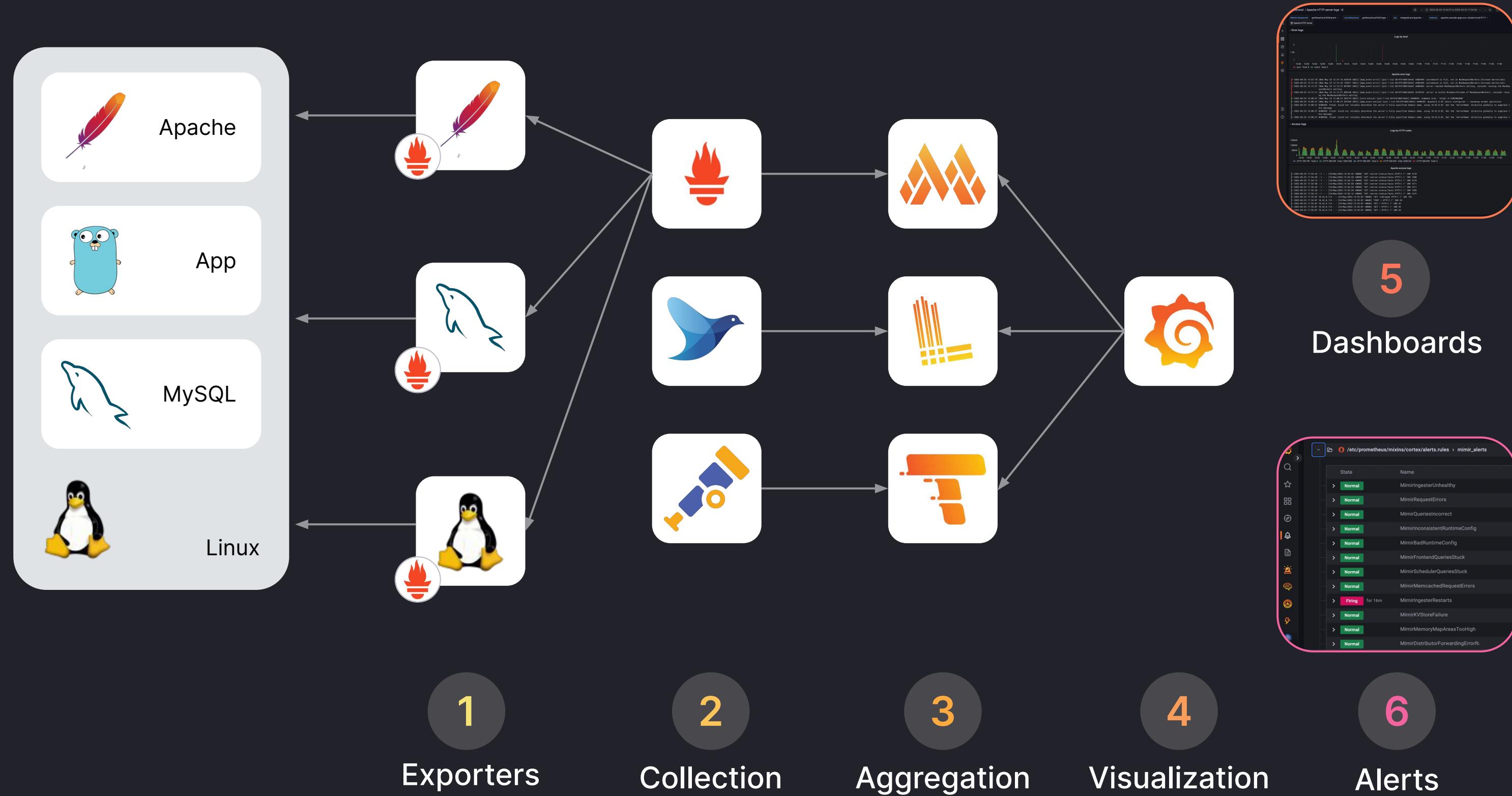


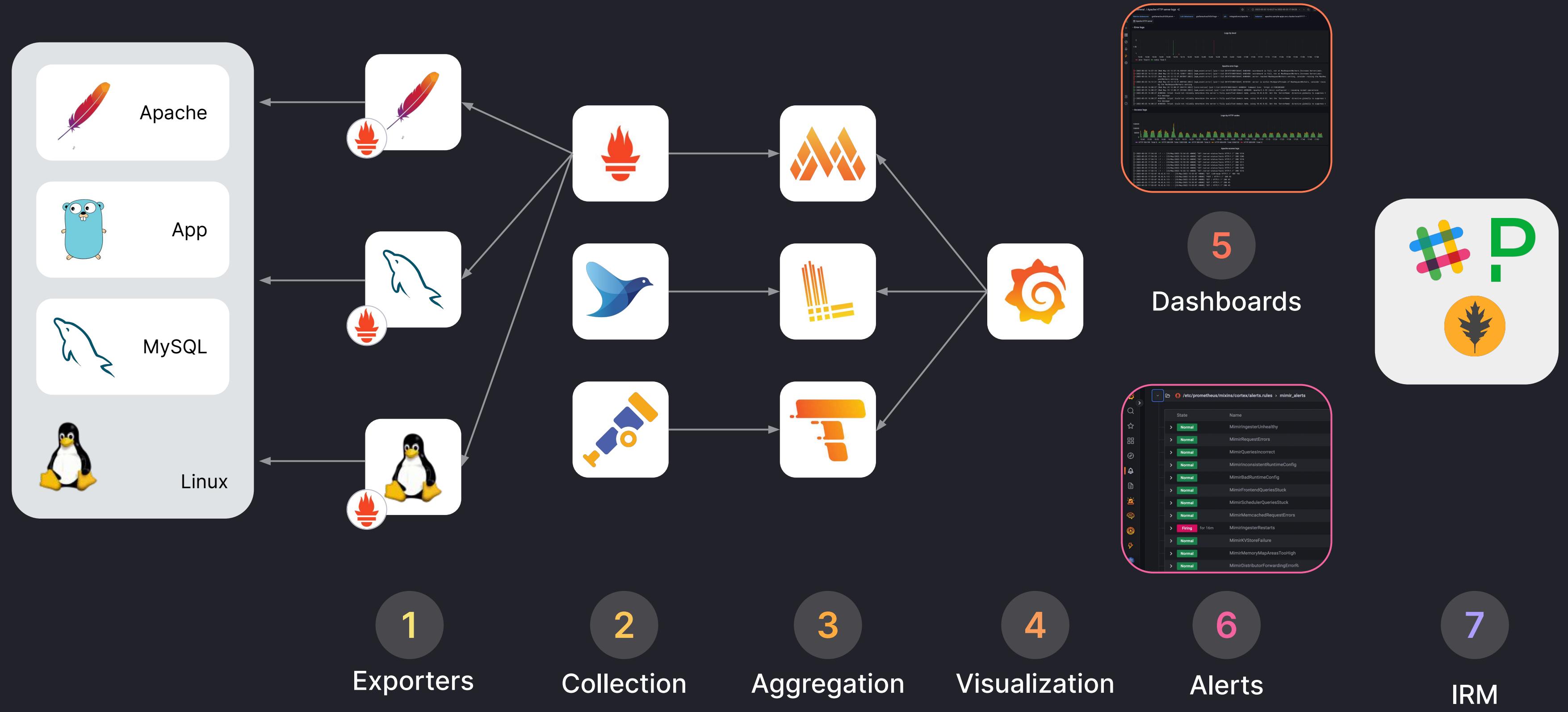


1 Exporters

2 Collection

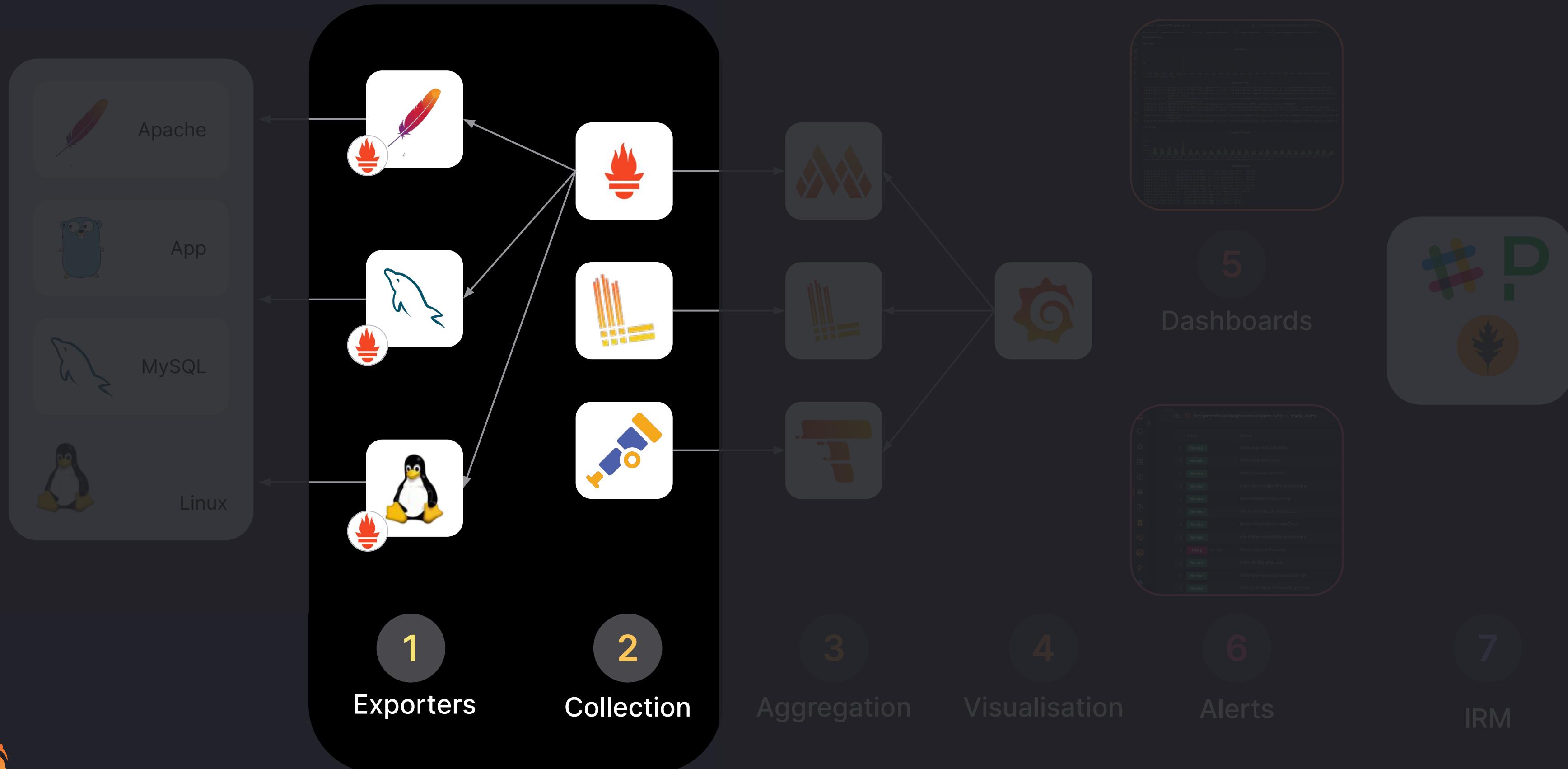


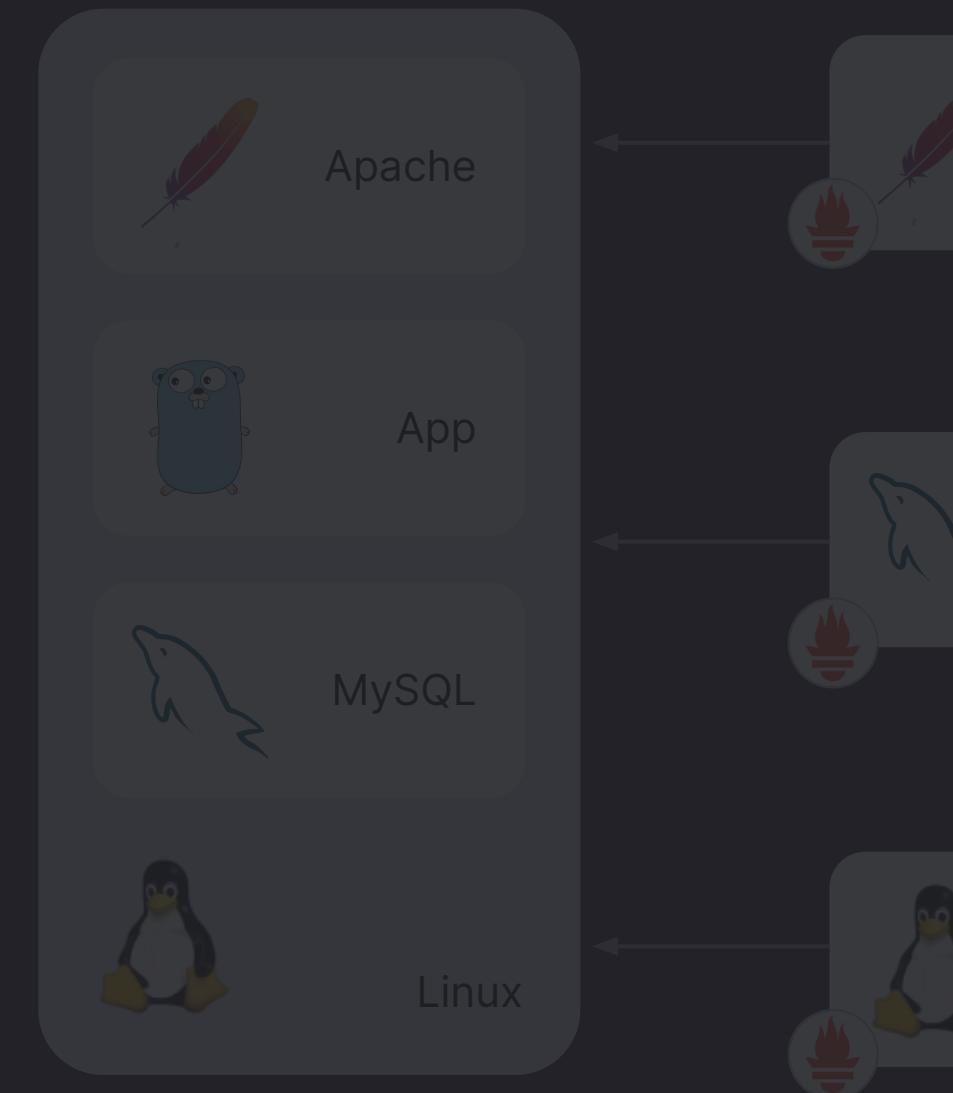






Grafana Agent





1

Exporters

2

Collection

3

Aggregation

4

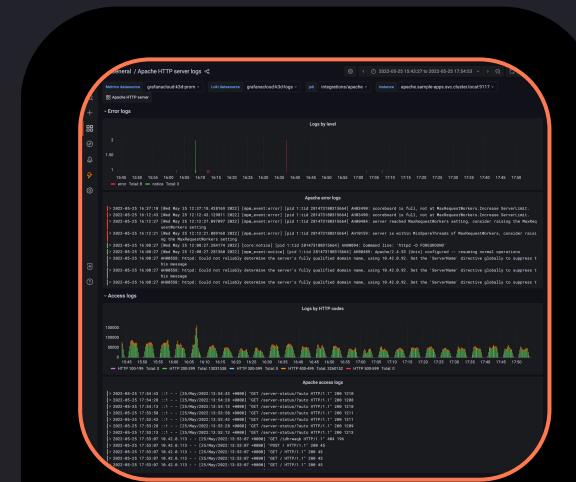
Visualisation

6

Alerts

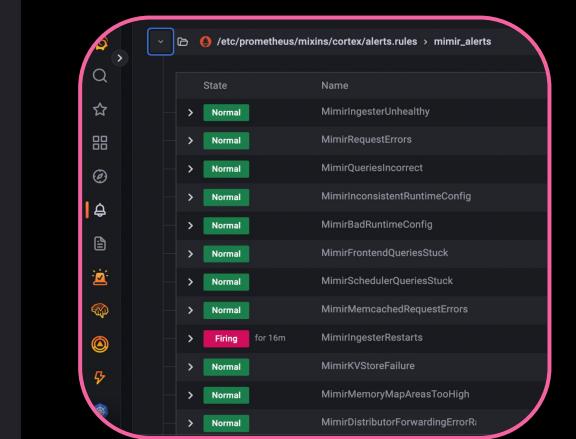
7

IRM



5

Dashboards





>60 observability integrations



Kubernetes Monitoring

Cluster navigation Nodes Dashboards Alerts Configuration

[nodes / se-demo-cluster - gke-se-demo-cluster-highmem-5dd4e148-eue8](#)

Node: gke-se-demo-cluster-highmem-5dd4e148-eue8 [Copy node name](#) [Copy kubectl describe for node](#) [Explore node](#) Updated 1s ago

Create date
8/6/2022 at 1:23:26 AM

Node capacity [Explore node capacity](#)

Pods 50 out of 110 total pods.	CPU (8 cores) Usage: 66%	Memory (GB) 67.44 GB in total. Using: 19%	Disk space (GB) 101.24 GB in total. Using: 25%	Attachable volumes (bytes) 127
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Node information

cluster	se-demo-cluster
container_runtime_version	containerd://1.5.11
instance	10.48.13.21:8080
internal_ip	10.0.0.208
job	integrations/kubernetes/kube-state-metrics
kernel_version	5.10.109+
kubelet_version	v1.22.10-gke.600
kubeproxy_version	v1.22.10-gke.600
node	gke-se-demo-cluster-highmem-5dd4e148-eue8

Kubernetes Monitoring

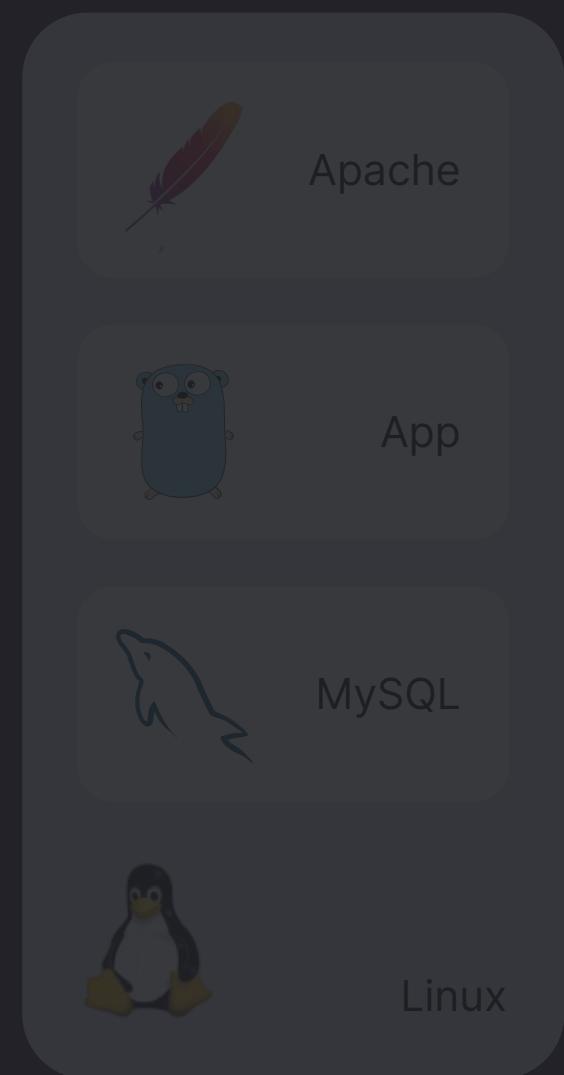
Cluster navigation Nodes Dashboards Alerts Configuration

[Search for workloads](#) [Select workload type for more details](#) [Only show workloads with unhealthy pods](#) Updated 7s ago

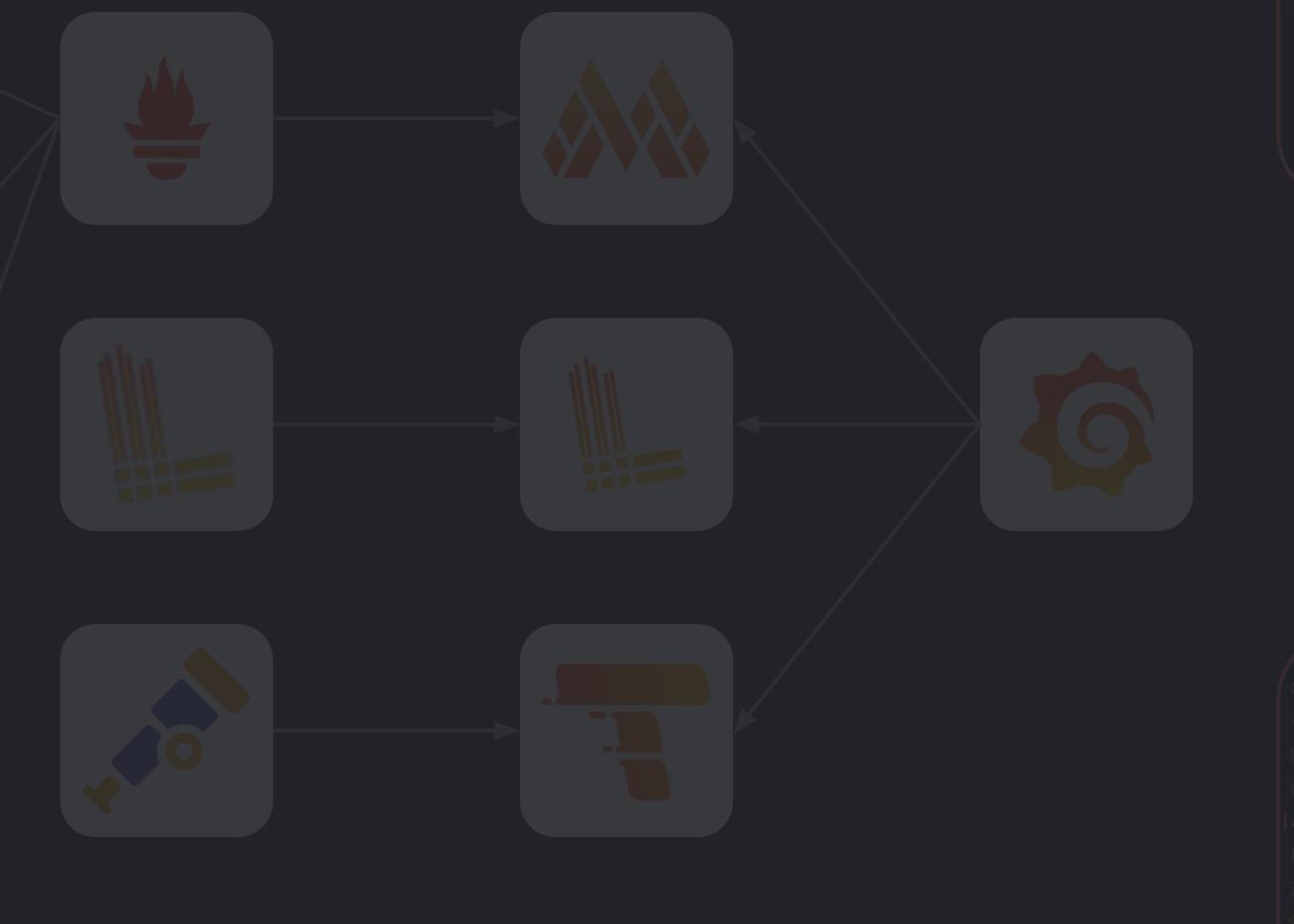
[overview / se-demo-cluster - flux-testing](#)

Namespace: flux-testing in se-demo-cluster [Copy namespace name](#) [Explore pod status](#)

Workload	Type	Namespace	Alerts	Pods
adservice	Deployment	flux-testing	2	0 / 1
cartservice	Deployment	flux-testing	None	1 / 1
checkoutservice	Deployment	flux-testing	None	1 / 1
currencyervice	Deployment	flux-testing	None	1 / 1
emailservice	Deployment	flux-testing	None	1 / 1
frontend	Deployment	flux-testing	None	1 / 1
loadgenerator	Deployment	flux-testing	None	1 / 1
paymentservice	Deployment	flux-testing	None	1 / 1
productcatalogservice	Deployment	flux-testing	None	1 / 1
recommendationservice	Deployment	flux-testing	None	1 / 1
redis-cart	Deployment	flux-testing	None	1 / 1



1
Exporters

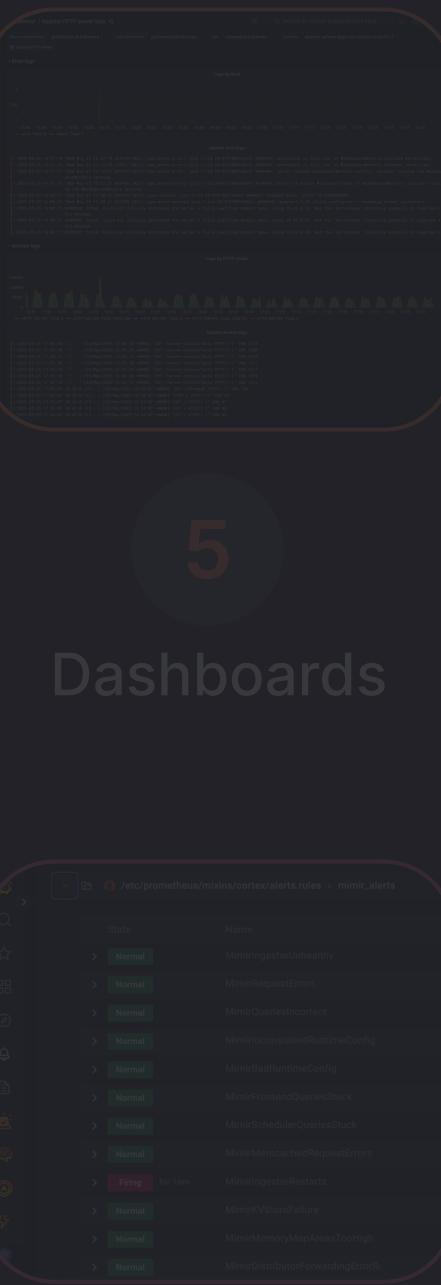


2
Collection

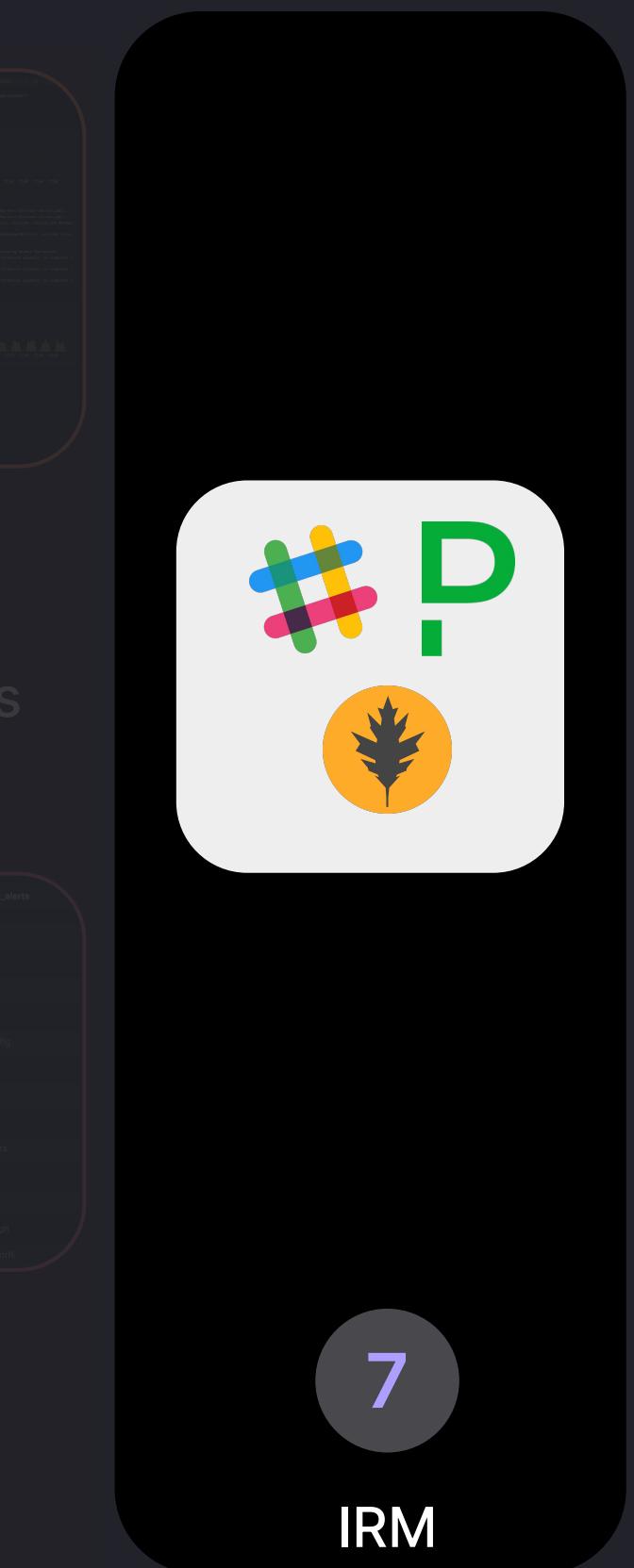
3
Aggregation

4
Visualisation

5
Dashboards



6
Alerts



7
IRM



Grafana Incident Response & Management (IRM)



Grafana
Alerting



Grafana
OnCall



Grafana
Incident

Alerting
Alert rules and notifications

Alert rules

Search by data source: All data sources

Search by label: Search, Firing, Normal, Pending, Alert, Recording

Rule type: List, Grouped, Starred

View as: Timeline, Grid

1082 rules: 254 normal, 793 recording

Grafana

- Alex D
- Energy
- General Alerting

OnCall
Developer-friendly incident response (1.0.0)

Schedule Team 1

Daily timezones: Current timezone: Etc/Universal, local time: 11:52

Rotations: 17 Jul - 23 Jul

17 Jul: Michael, Vadim

18 Jul: Michael, Vadim

19 Jul: Michael, Vadim

20 Jul: Michael, Vadim

21 Jul: Michael, Vadim

22 Jul: Michael, Vadim

23 Jul: Michael, Vadim

LAYER 1: Michael, Vadim

LAYER 2: Michael, Vadim

Incident
Smart incident management

Incidents

Grafana ML high CPU usage and latency in prod-us-central

Started 24 Jan 2022, 09:56
Ended 24 Jan 2022, 12:48
Unresolve Incident

COMMANDER: yas queried for data in time range

INVESTIGATOR:

Open Google Docs: pending
Join Google Meet: pending

Machine Learning latency dashboard: GRAFANA

Grafana Labs Status - Machine Learning - increased latencies: STATUS.GRAFANA

Incident 772 dashboard: GRAFANA

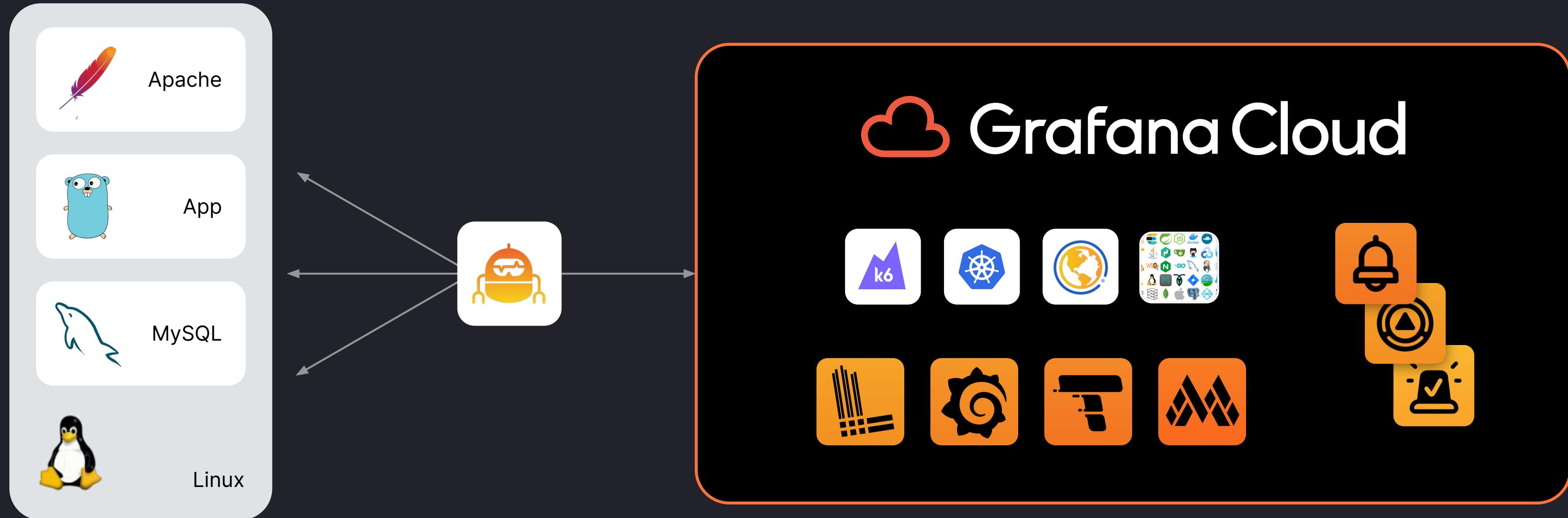
Google Docs - create and edit documents online, for free!: DOCS.GOOGLE

gist.github.com: GITHUB

Grafana Cloud SLOs: GRAFANA

"What do you think about this?" Slack message





LGTM
Open



Big tent
Composable



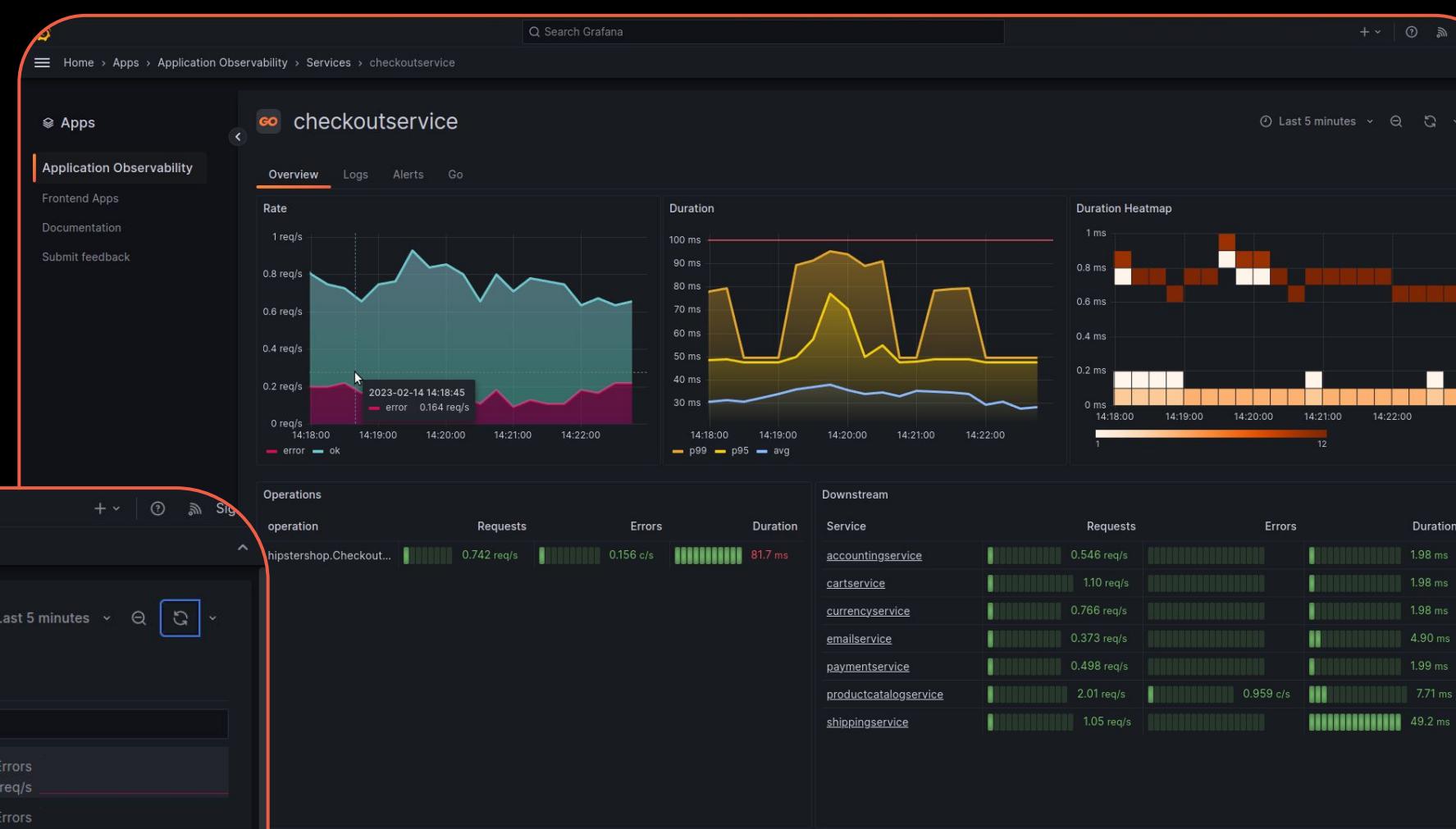
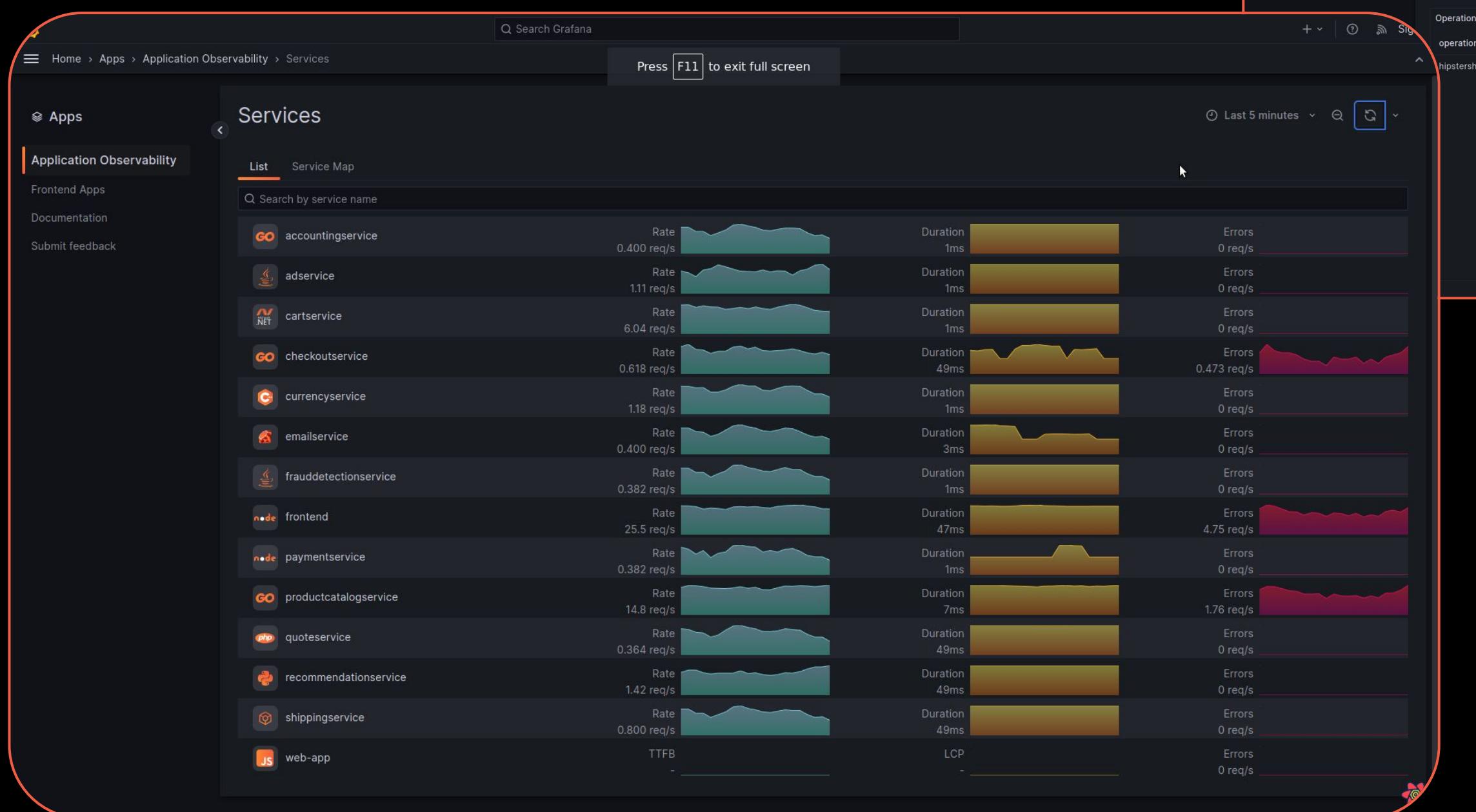
Grafana Cloud
Easier



Richard Hartmann

Director of Community, Grafana Labs

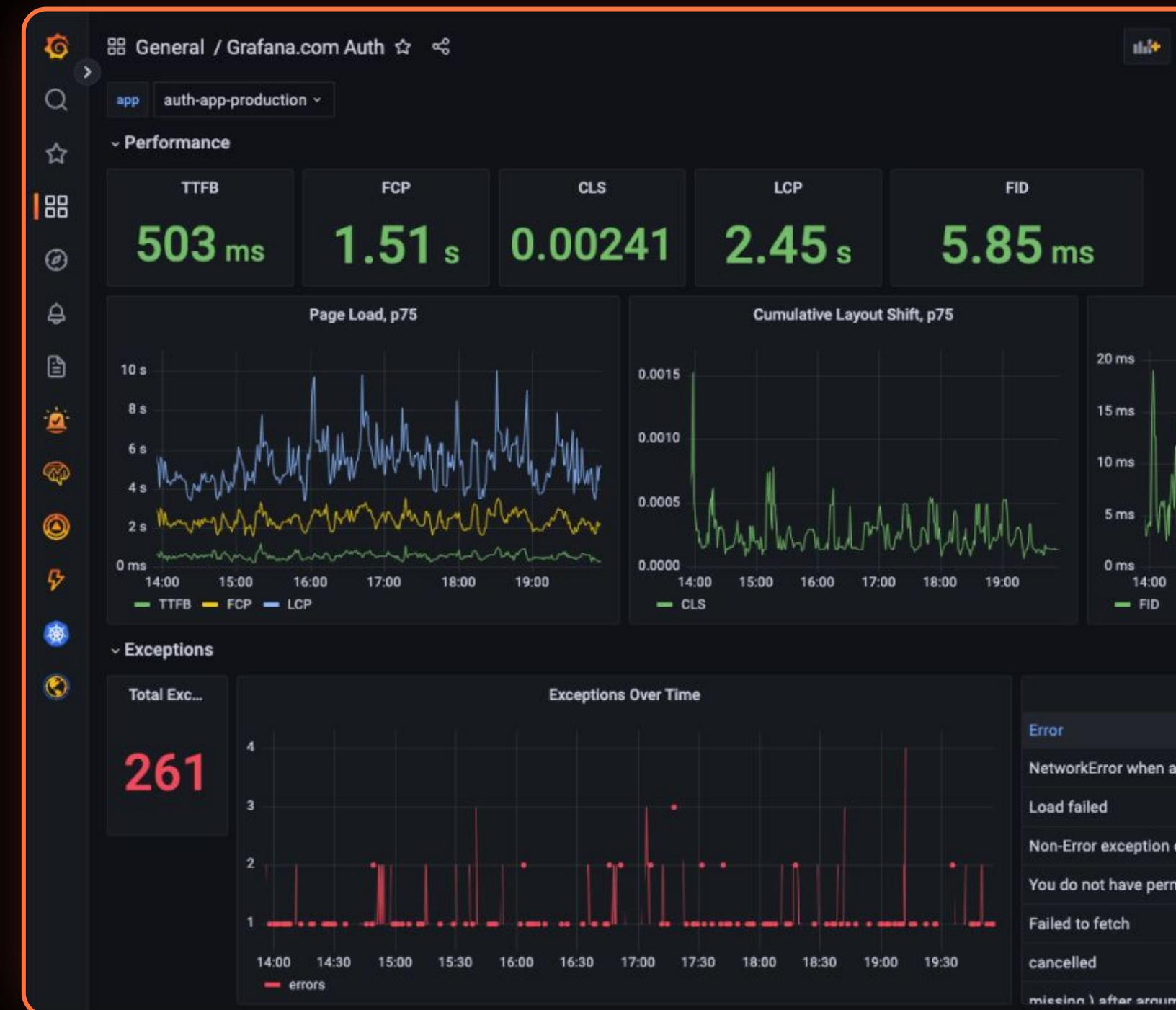
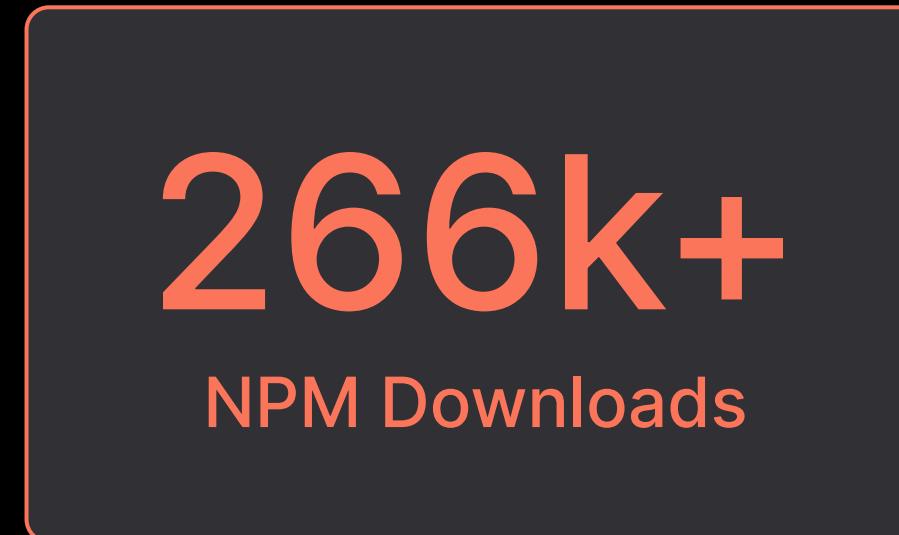
Application Observability





Grafana Faro

An open source web SDK for frontend application observability



Continuous profiling



NEW

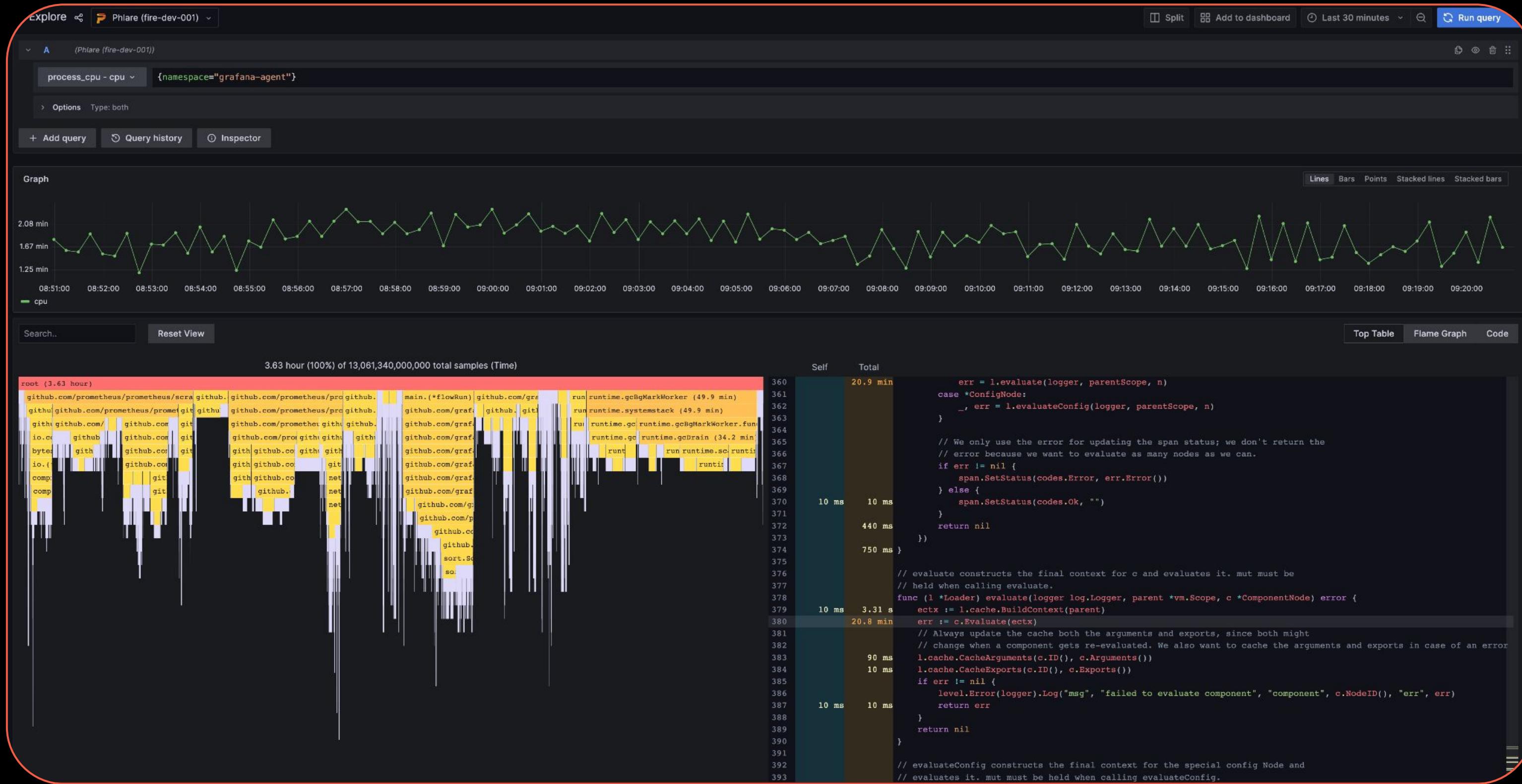


Grafana Pyroscope



Grafana

Phlare +  Pyroscope



Tom Wilkie

CTO, Grafana Labs

Investing in the core of observability





Loki



Nov. 2021

Loki v2.4.0

Out-of-order ingestion
Simplified deployment
Promtail Kafka support

Jul. 2022

Loki v2.6.0

Query multiple tenants at once
Faster instant queries
Filter & delete certain log lines

Apr. 2022

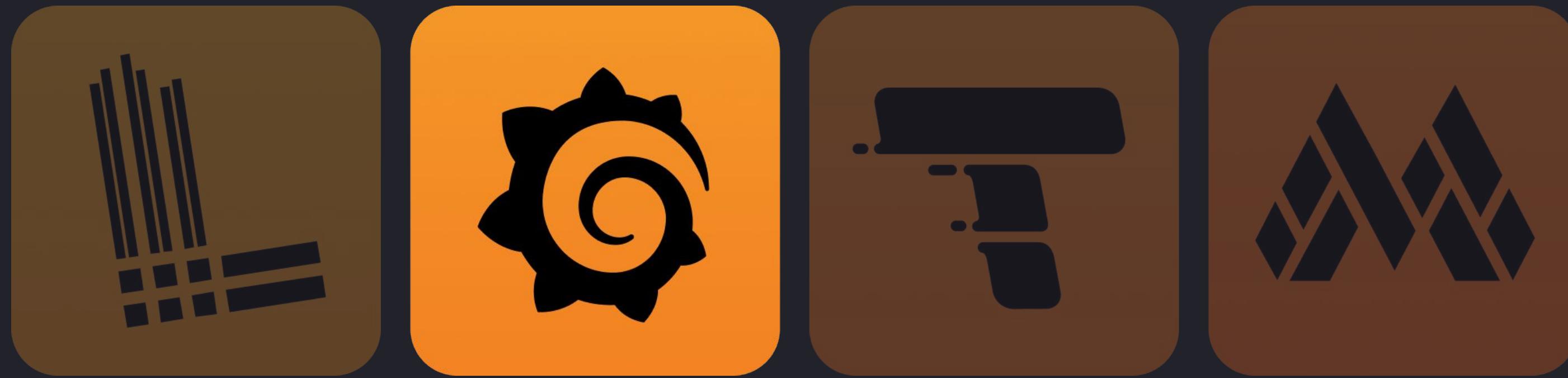
Loki v2.5.0

Regex performance improvements
Parallelized binary ops in queries
Improved tail latencies with request hedging
Promtail Cloudflare, Docker, and Graylog support

Nov. 2022

Loki v2.7.0

New TSDB index
4x faster queries
50% less CPU



Grafana



June 2022

Grafana v9.0.0

Grafana Alerting GA
New Prometheus & Loki query builder
New search

Oct. 2022

Grafana v9.2.0

Custom elements with canvas panel
Loki simplified query variable editor
Transformations: INNER JOIN
Public dashboards

Feb. 2022

Grafana v9.4.0

New search & nav
New panel chrome
Loki enhancements
Lots of alerting improvements

Aug. 2022

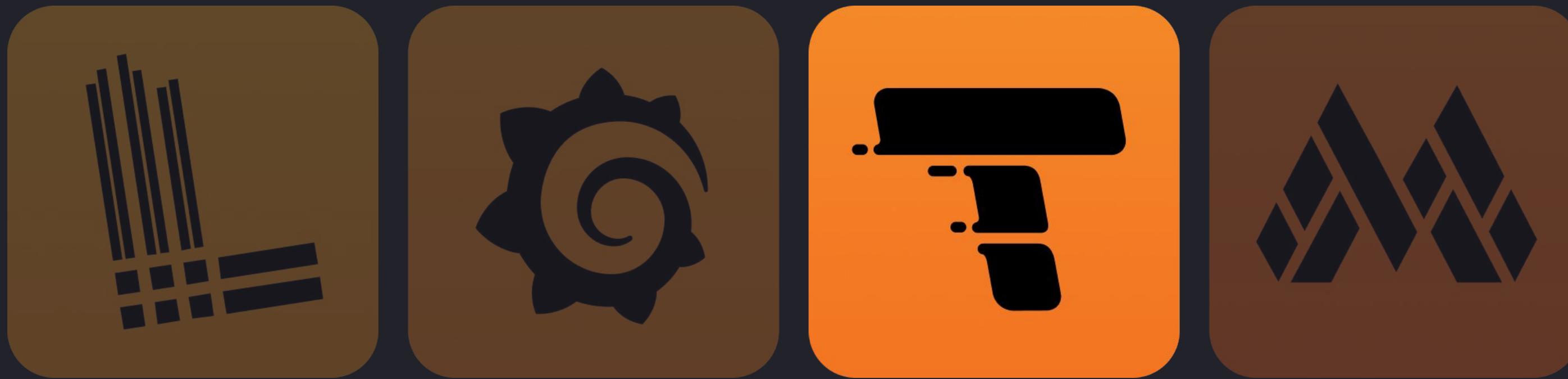
Grafana v9.1.0

Numerous alerting, reporting, and transform enhancements
Improvements to the GeoMap, Heatmap, and Azure Monitor data source

Nov. 2022

Grafana v9.3.0

New navigation layout
ES, FR, DE, CN internationalisation
Geomap panel GA



Tempo



Nov. 2021

Tempo v1.2.0

Ingester search
Simplified scalable deployment

April 2022

Tempo v1.4.0

Generate metrics from traces
Better long tail latency though request hedging on queries

Jan. 2023

Tempo v2.0.0

TraceQL
Parquet GA

Jan. 2022

Tempo v1.3.0

Full backend search

Aug. 2022

Tempo v1.5.0

Experimental Parquet storage



NEW



Grafana Tempo 2.0

A (Tempo)

Query type Search TraceID JSON File Service Graph Loki Search TraceQL

Build complex queries using TraceQL to select a list of traces.

```
{ .http.status_code >= 200 && .http.status_code < 300}
```

Options Limit: 20

+ Add query ⌂ Query history ⌂ Inspector

Table

Trace ID	Name	Start time	Duration
21a9bf7c2302d120fe36f9...	mythical-requester reques...	3 minutes ago	193 ms
17505262837134f5147b2...	mythical-requester reques...	3 minutes ago	72 ms

Span ID Name Start time http.status_code Duration

e837823b3835c4e5		3 minutes ago	201	13.1 ms
3840108ab7d46efc		3 minutes ago	204	18.2 ms

Trace ID 17505262837134f5147b2f9fdb214

+ Add query ⌂ Query history ⌂ Inspector

> Node graph ⌂ Beta

Trace View Find...

mythical-requester: requester 0017505262837134f5147b2f9fdb214

Trace Start: 2022-11-01 19:27:10.498 Duration: 72.27ms Services: 3 Depth: 5 Total Spans: 19

Service ... > > > > 0μs 18.07ms 36.14ms

mythical-requester req 20.39ms
mythical-requester tcp 1.37ms
mythical-server POST / 13.12ms
mythical-server mi 59.65μs
mythical-server mi 166.66μs



TraceQL

NEW

- { Inspired by PromQL
and LogQL }

```
{ .namespace = "prod" } >  
{ .service.name = "auth" &&  
{ .http.status_code = 500 }
```

- | Extract insights from
traces interactively

```
{ .http.status_code = 500 }  
| count() > 1
```

- > Analyze traces based
on their structure

 Parquet





Mimir



Mar. 2022

Mimir v2.0.0

>1 billion active series
Scalable, concurrent compactor
Parallelized, blazin' fast PromQL

Jul. 2022

Mimir v2.2.0

Out-of-order ingestion
Faster ingester startup
Datadog, Graphite & Influx ingestion

Oct. 2022

Mimir v2.4.0

Query-scheduler ring SD
Per-tenant limits API

Feb. 2023

Mimir v2.6.0

Improved store gateway stability
Even more memory savings

May 2022

Mimir v2.1.0

ARM support
Custom cardinality tracking

Sept. 2022

Mimir v2.3.0

OpenTelemetry ingestion
Metadata query federation
Historic import
Parallelized instant queries

Dec. 2022

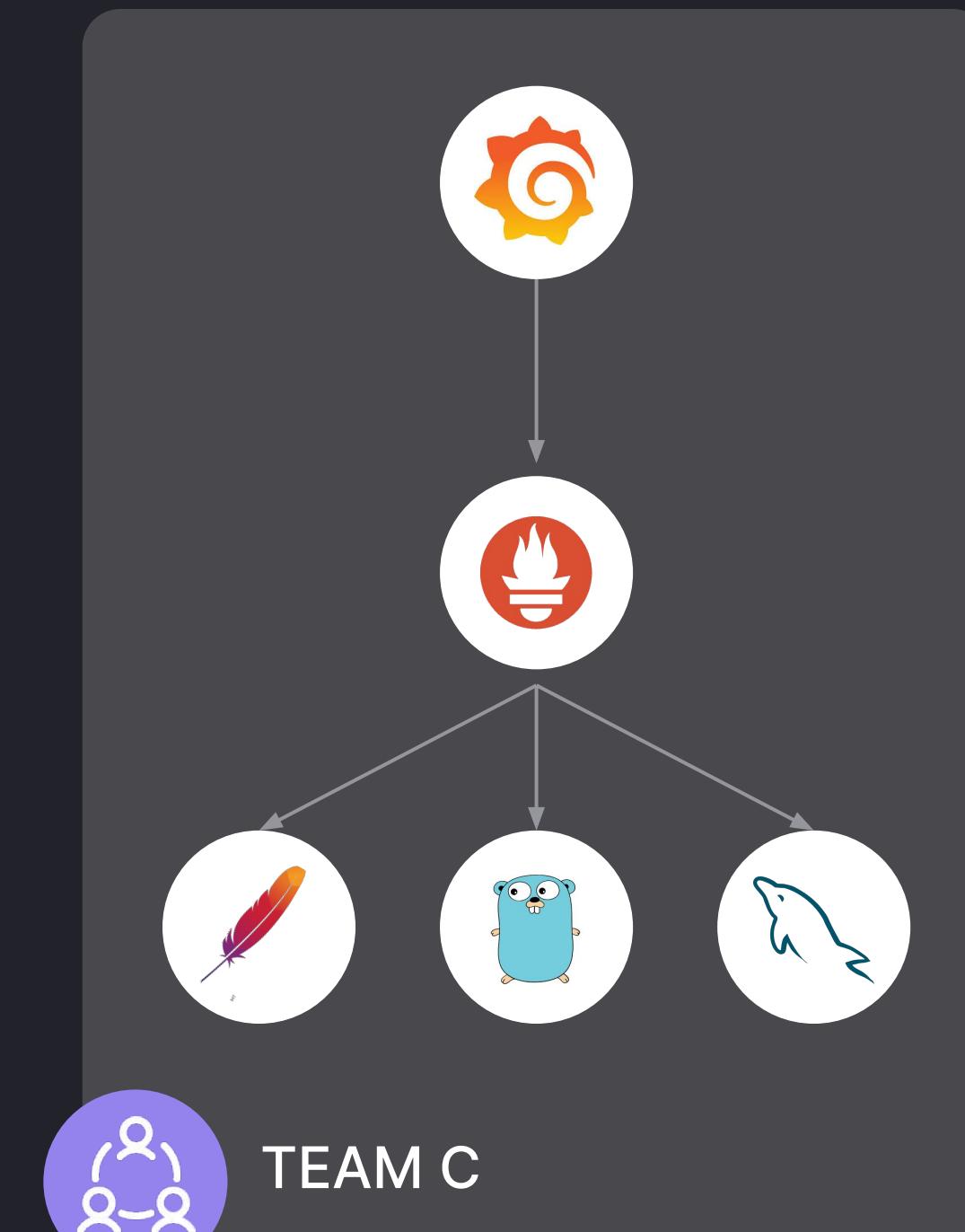
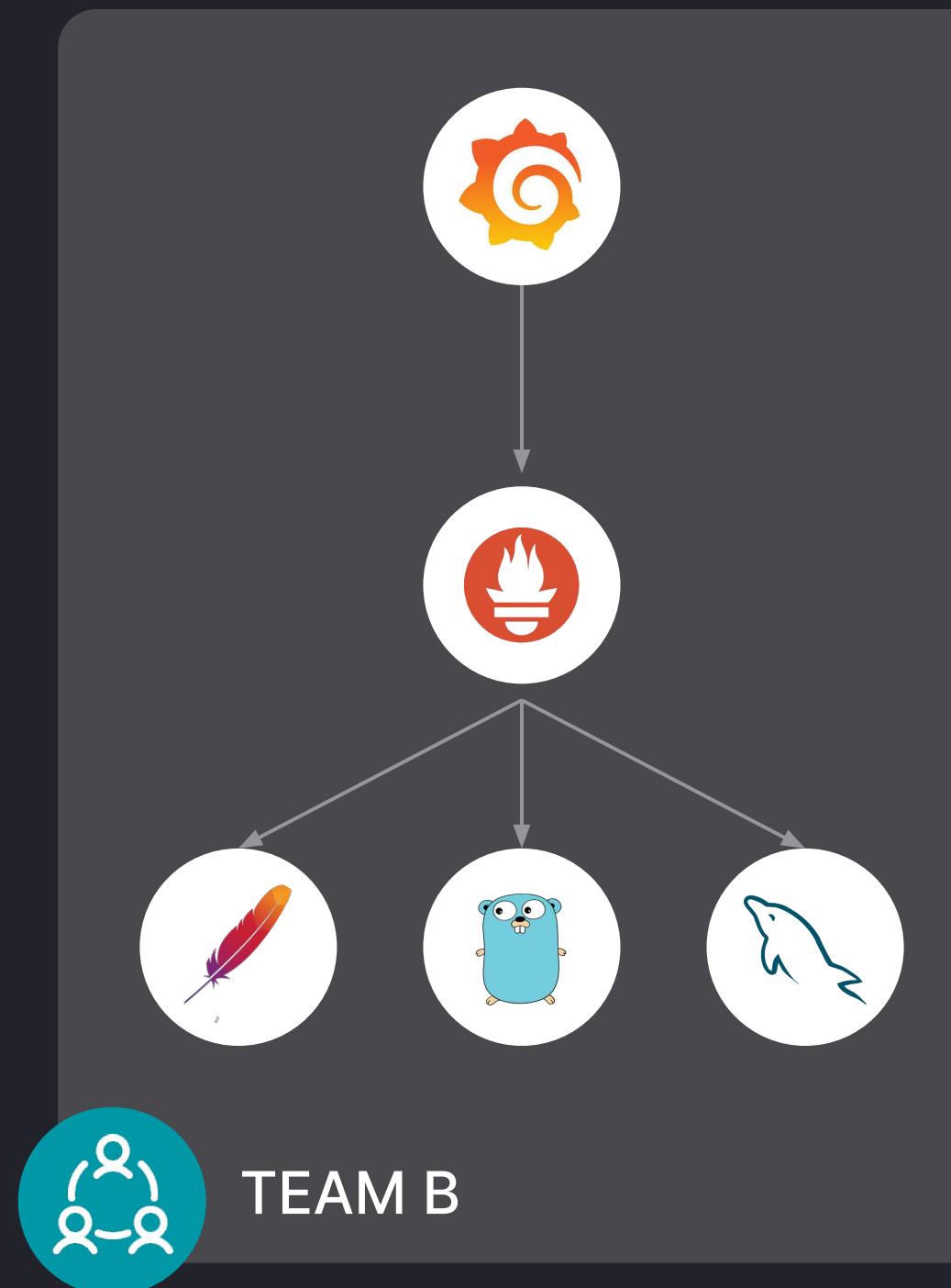
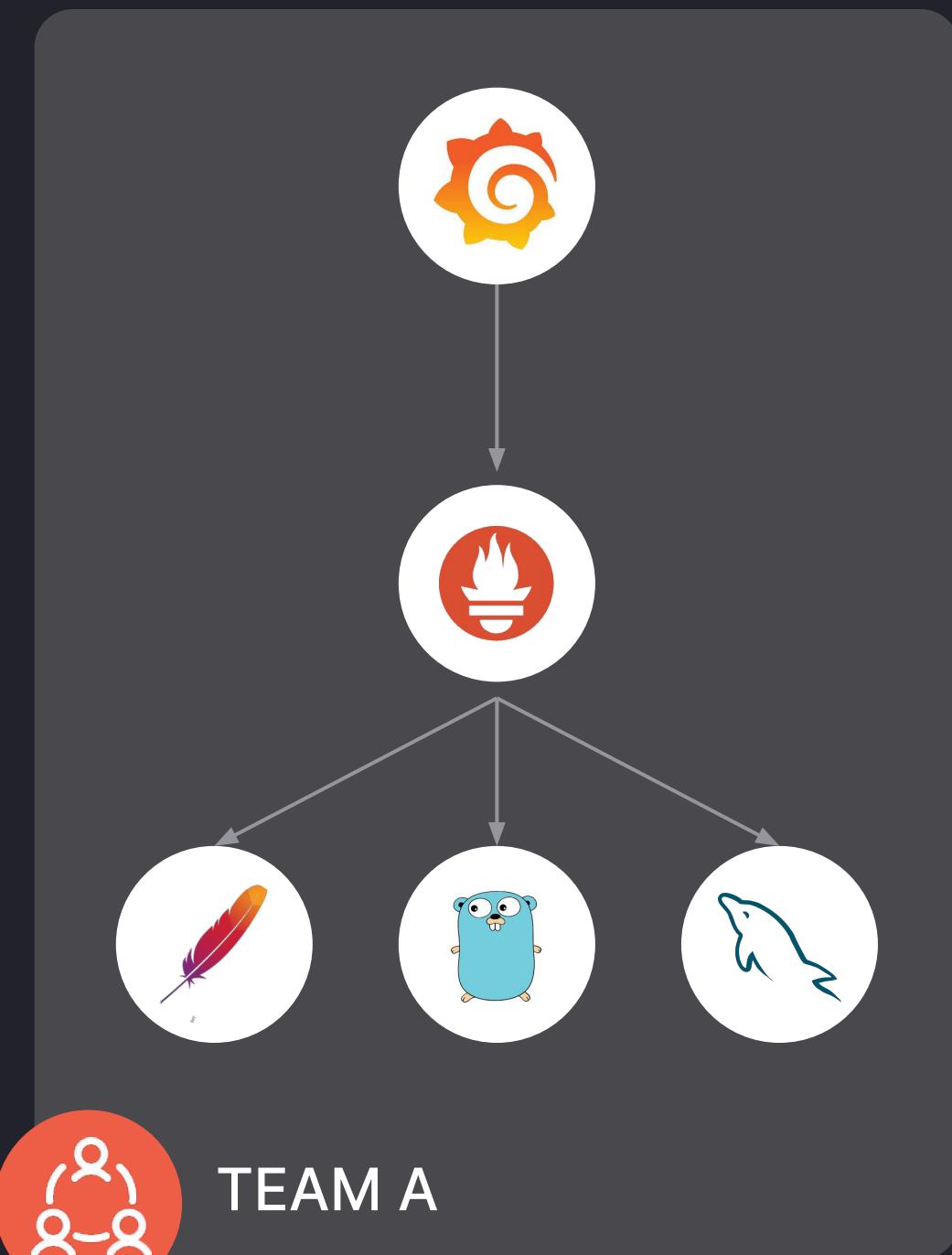
Mimir v2.5.0

Improved memory usage
Better operational dashboards

Mar. 2022

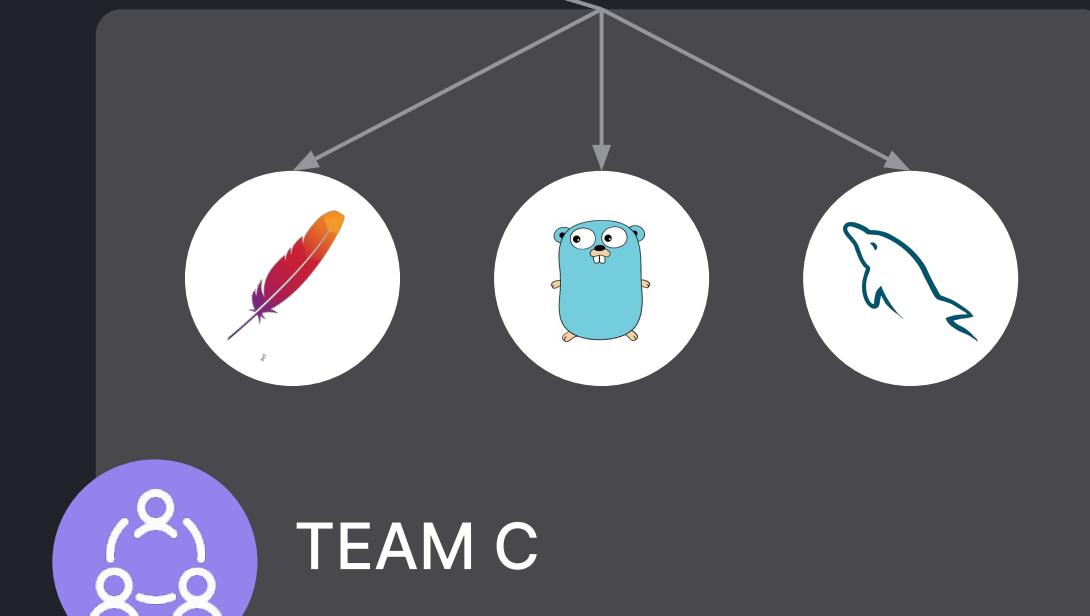
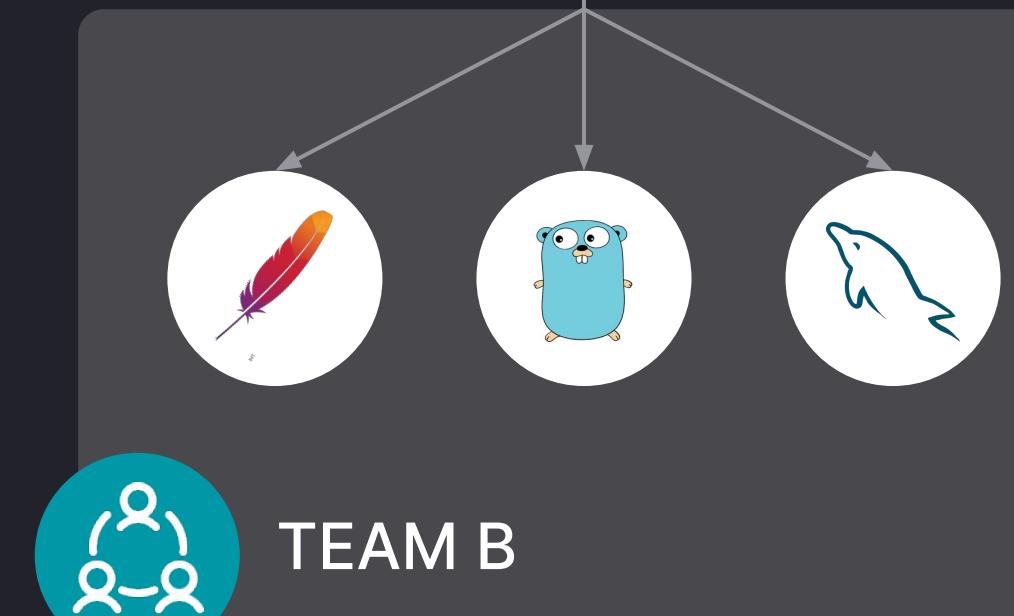
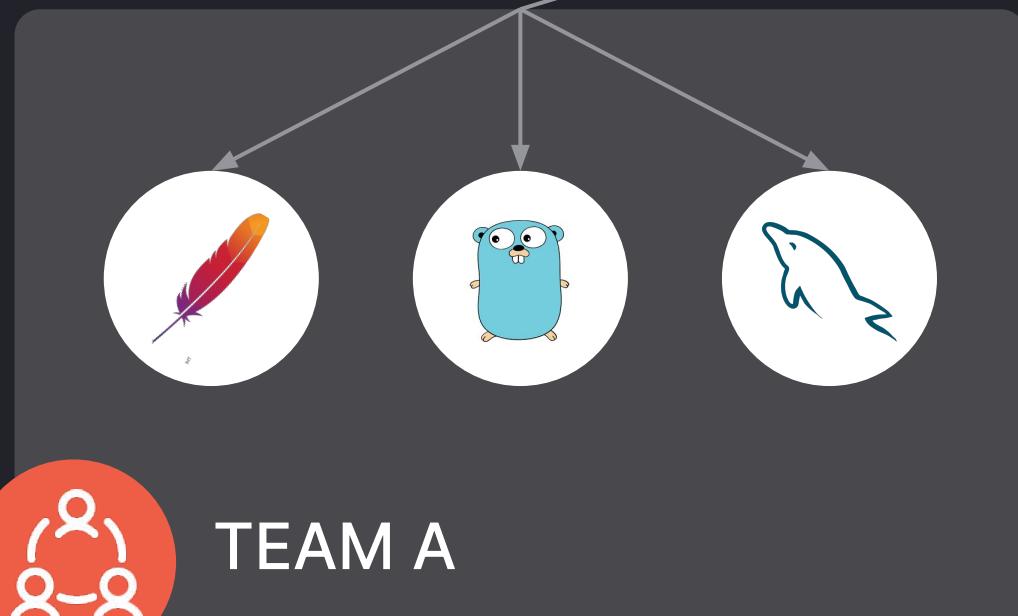
Mimir v2.7.0

Streaming store gateway
Efficient chunk fetching & caching
Native histograms



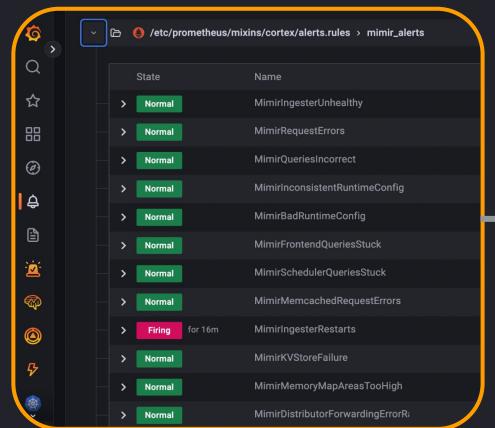


OBSERVABILITY TEAM

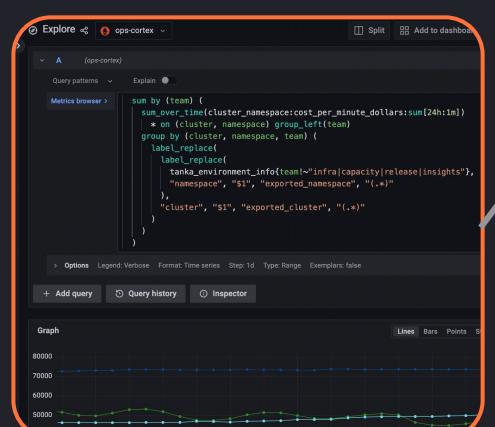




Dashboards



Alerts



Ad hoc

```

sum(rate(loki_request_duration_seconds_count{cluster="ops-us-east-0",
          namespace="loki-ops", job=~"(loki-ops)/distributor"}[5m])) by (route)

topk(10,
      sum(rate(loki_distributor_bytes_received_total{cluster="ops-us-east-0",
          namespace="loki-ops"}[5m])) by (tenant))

sum(rate(promtail_sent_bytes_total{namespace="gcp-logs-ops"}[2m]))

sum by (namespace, pod, owner_name, cluster_id
          (kube_pod_owner{cluster="prod-ap-south-0", owner_kind="DaemonSet"}))

max by (user)
  ({__name__=~^(cortex_overrides|cortex_limits_overrides)$,
    limit_name="max_global_series_per_user"})

avg_over_time(kube_pod_labels{cluster="prod-eu-west-1"}[1h])

rate(kube_pod_container_status_restarts{cluster="hm-us-west2c"}[5m])

```

Queries

user
pod
instance
job
cluster

Unused labels

loki_request_duration_seconds_count
kube_apiblah

Unused metrics





```
ingested_samples  
{instance="first", user="bar"} = 1
```

```
ingested_samples  
{instance="second", user="bar"} = 1
```

```
ingested_samples{user="bar"} = 2
```



110M

Series

50%

Unused

60%

Reduction

in Grafana Ops environment



Thank You!

Up next

10:45 AM

**How to reduce observability costs
by controlling metrics growth**