Modern application Observability with Grafana & Quickwit

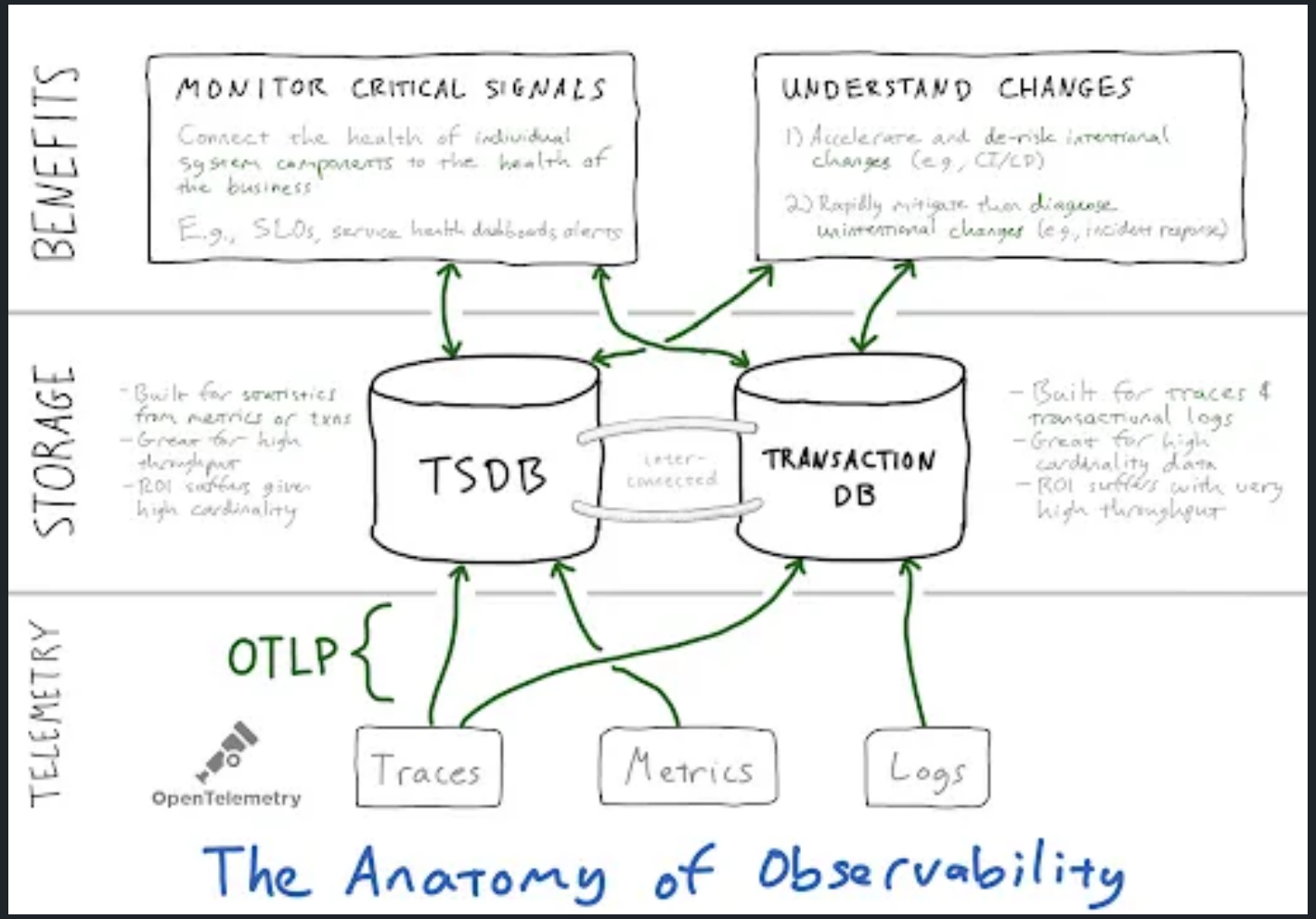
Who am I?

- François Massot @francoismassot on Twitter / Fosstodon
- Core dev on Quickwit engine (Rust) and the Grafana datasource plugin
- Cofounder of Quickwit

Agenda

1. Anatomy of observability
2. The cardinality curse
3. Logs and traces storage engine: Quickwit
4. Demo time

Anatomy of observability



Author: Ben Sigelman, link

The cardinality curse

Distributed systems can fail for a large number of reasons.

What if we have metrics with labels: `version`, `host`, `customer_id`, `service`, ...

Cardinality = 10 * 1k * 100k * 10 = 10 billion

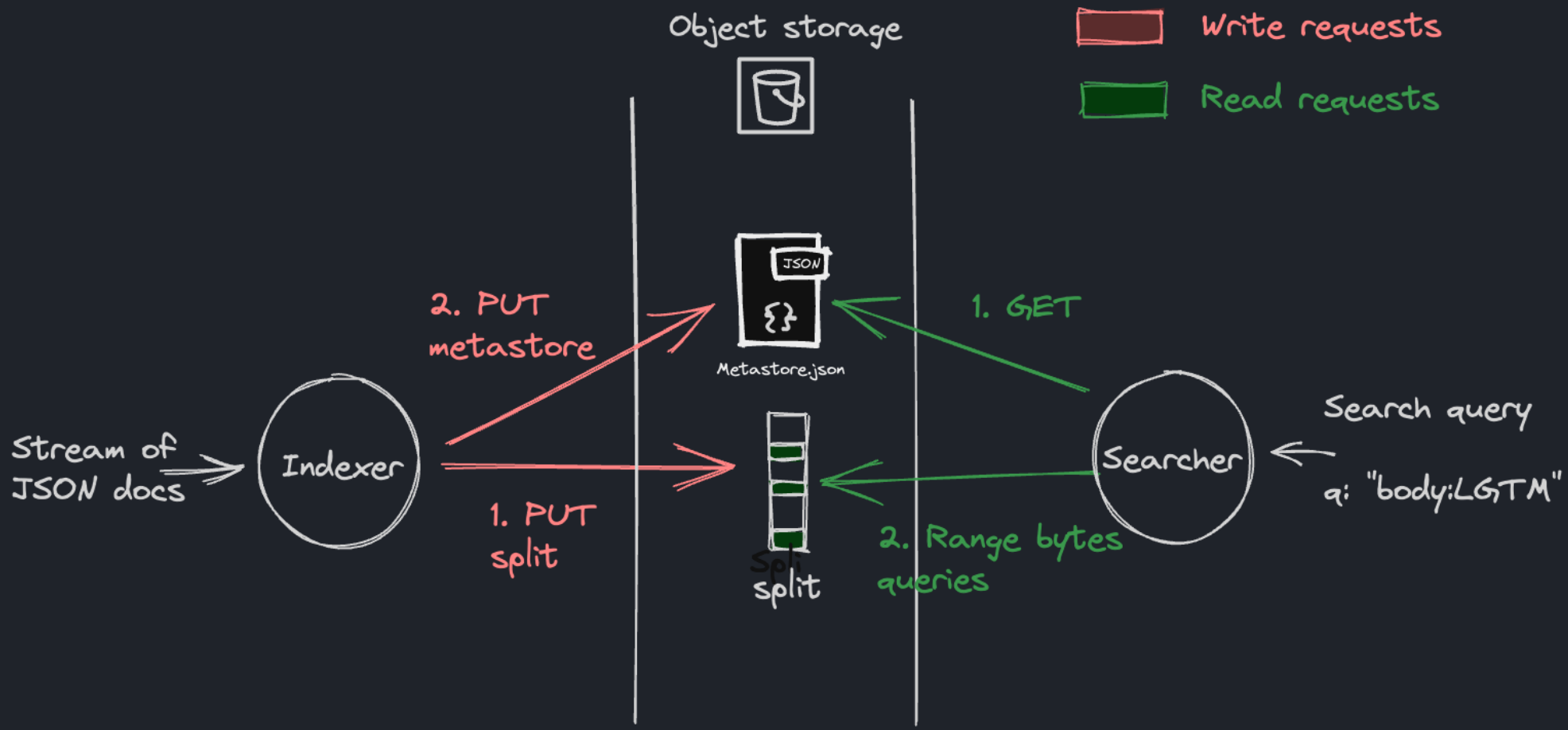
=> We should control the cardinality for metrics.
=> Let's keep all the attributes in traces.

Logs and traces storage engine: Quickwit

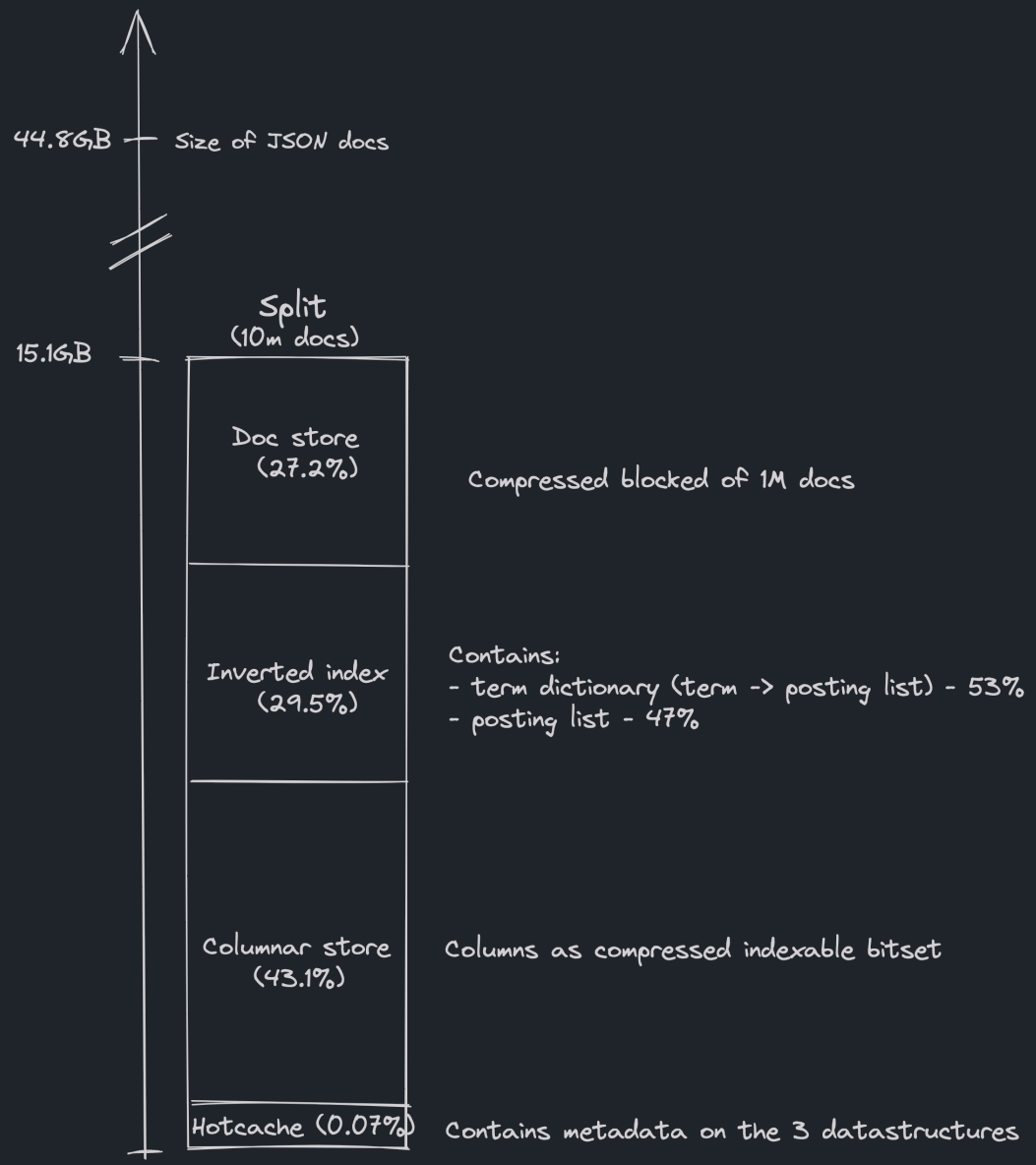
- Distributed search engine for logs and traces
- Decoupled compute & storage (like Loki/Tempo).
- Optimized (sub-second) for query on object storage.

Engine architecture

Architecture in its simplest form.



Anatomy of a split



Span data model in Quickwit

Based on the OTEL data model. `resource_attributes` and `span_attributes` are schemaless fields.

```
{
    "trace_id": "b31ab9dda41afde6b4ac992ea56afc89",
    "parent_span_id": "7505182209aa02d1",
    "span_id": "6bf90d1ffe7b9b5c",
    "span_kind": 2, // SERVER
    "service_name": "postgres",
    "span_name": "query-articles",
    "span_start_timestamp_nanos":1706984714411104000,
    "span_duration_millis":164,
    "span_attributes": {
        "net.sock.host.addr":"192.168.13.102",
        "k6.OK4pWn6reJlwtVH": "PwWJNACBiM0Kvwv2RMuykgsx0AySXl",
        ...
    },
    "resource_attributes": {...}
}
```

Demo time!

Setup:

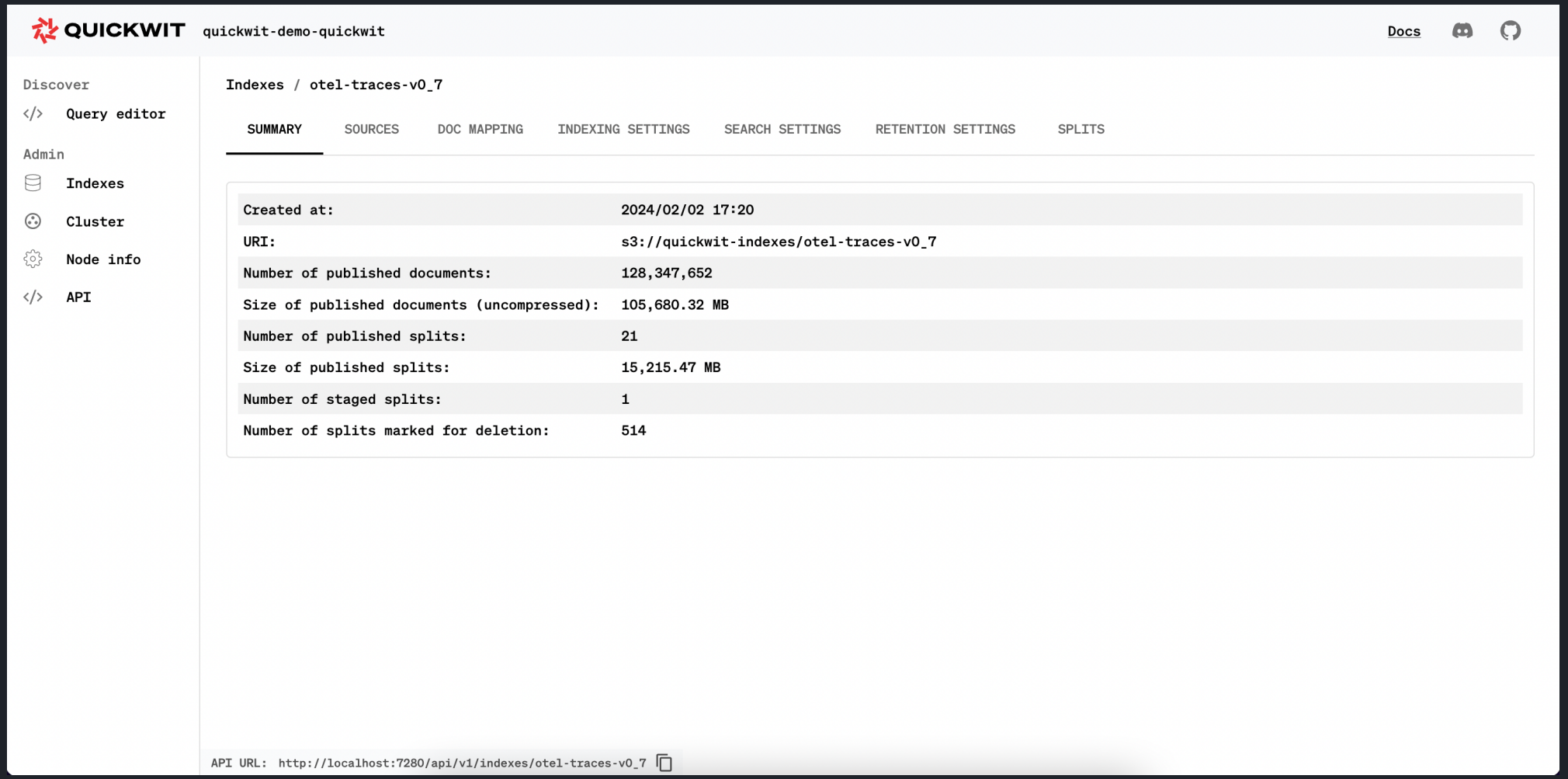
- xk6 tracing jobs to generate traces
- Quickwit deployed on a Kubernetes cluster
- Grafana instance with Quickwit datasource

Generating and sending traces to Quickwit

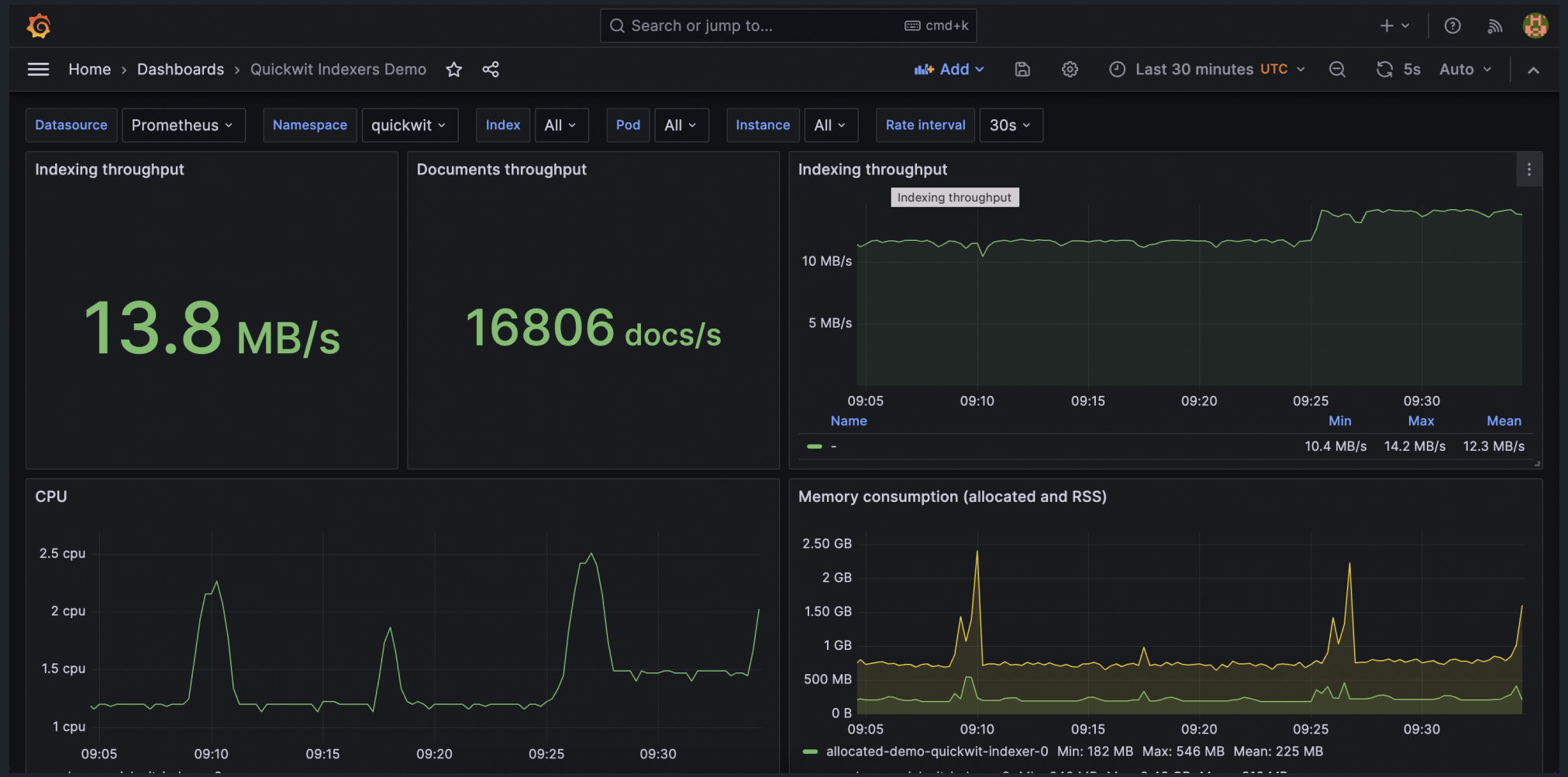
- tracegen: simple but spans are too simple
- xk6 tracing: YES!

```
const traceTemplate =
    {
        spans: [
            {service: "shop-backend", name: "list-articles", duration: {min: 200, max: 900}},
            {service: "article-service", name: "select-articles", attributeSemantics: tracing.SEMANTICS_DB},
            {service: "postgres", name: "query-articles", attributeSemantics: tracing.SEMANTICS_DB, randomAttributes: {count: 5}},
            ...
        ]
    };

const client = new tracing.Client({
  endpoint,
  exporter: tracing.EXPORTER_OTLP
});

export default function () {
    const gen = new tracing.TemplatedGenerator(traceTemplate);
    client.push(gen.traces())
}
```

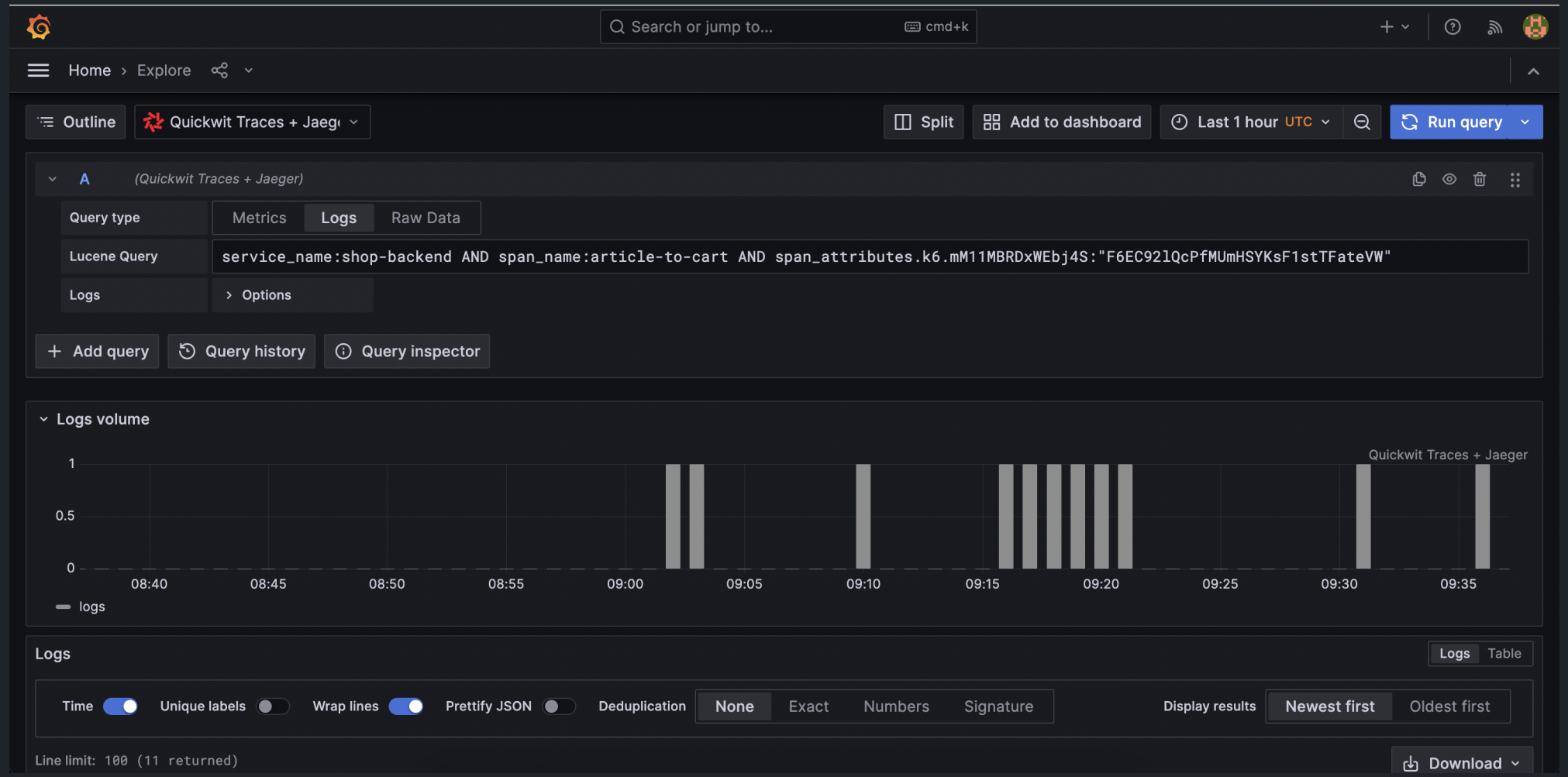
Demo: Quickwit traces index



Demo: Quickwit indexer dashboard

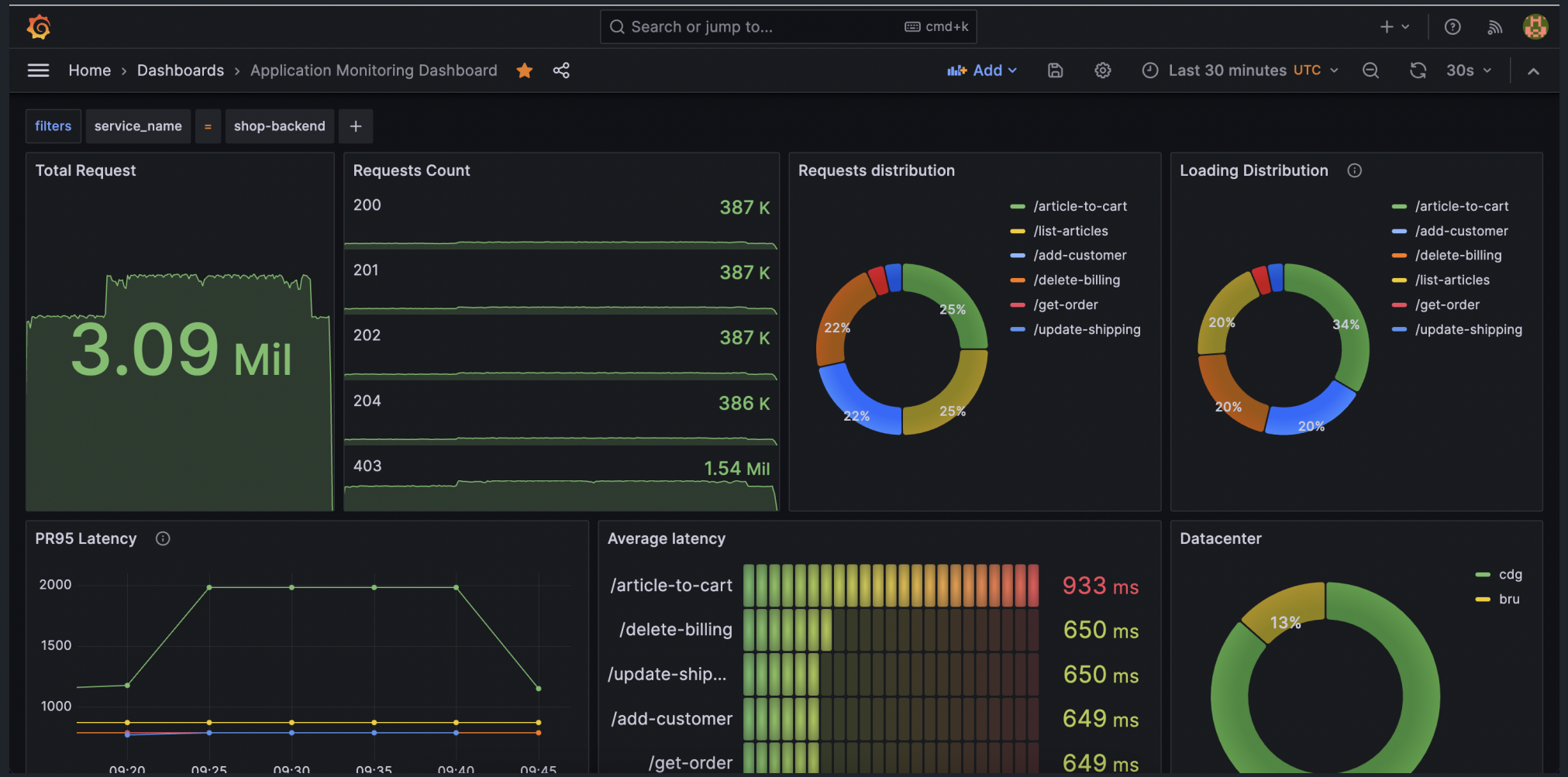


Demo: Exploring traces in Grafana



Demo: Zoom on a specific trace

Demo: APM dashboard in Grafana



Future work

- More aggregations (cardinality, rate) (Q2)
- Pipe-based query language (Q3)
- Metrics support (Q4)

Thank you!

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