Distributed Tracing

Fighting Bugs with Confidence

30.04.2025 Freiburg Devsmeetup, Maksym Prokopov

Agenda

- Intro
- The problem
- How to improve
- Tools Overview 🛠️
- 3 Demos 😍
- Summary

Me

Maksym Prokopov - SRE

- Many years in the software development
- Work at Billie - Buy Now Pay Later platform from Berlin
- Love "fiddling" with technology and building pet projects

The problem

How do we fight a bug?

Sentry APP 3:48 PM

replied to **a thread**

App\Infrastructure\InvoiceButler\InvoiceNotFound

/src/Infrastructure/InvoiceButler/InvoiceButlerClient.php in App\Infrastructure\InvoiceButler\InvoiceButlerClient::App\Infrastructure\InvoiceButler\{closure}

```
App\Infrastructure\InvoiceButler\InvoiceButlerClient::App\Infrastructure\Invoice
Butler\{closure}
```

Events: **4542** State: **Ongoing** First Seen: **2023-12-01**

Resolve **Archive** Select Assignee...

Suspect Commit: 31dbe2 by Tomi Atanasoski 2023-06-12

'Om 1900 invoice external code validation is broken (#1875)' View Pull Request

Project: paella Alert: Paella prod exceptions slack Short ID: PAELLA-60D

Sentry

- We start digging...

HTTP Request Formatted curl

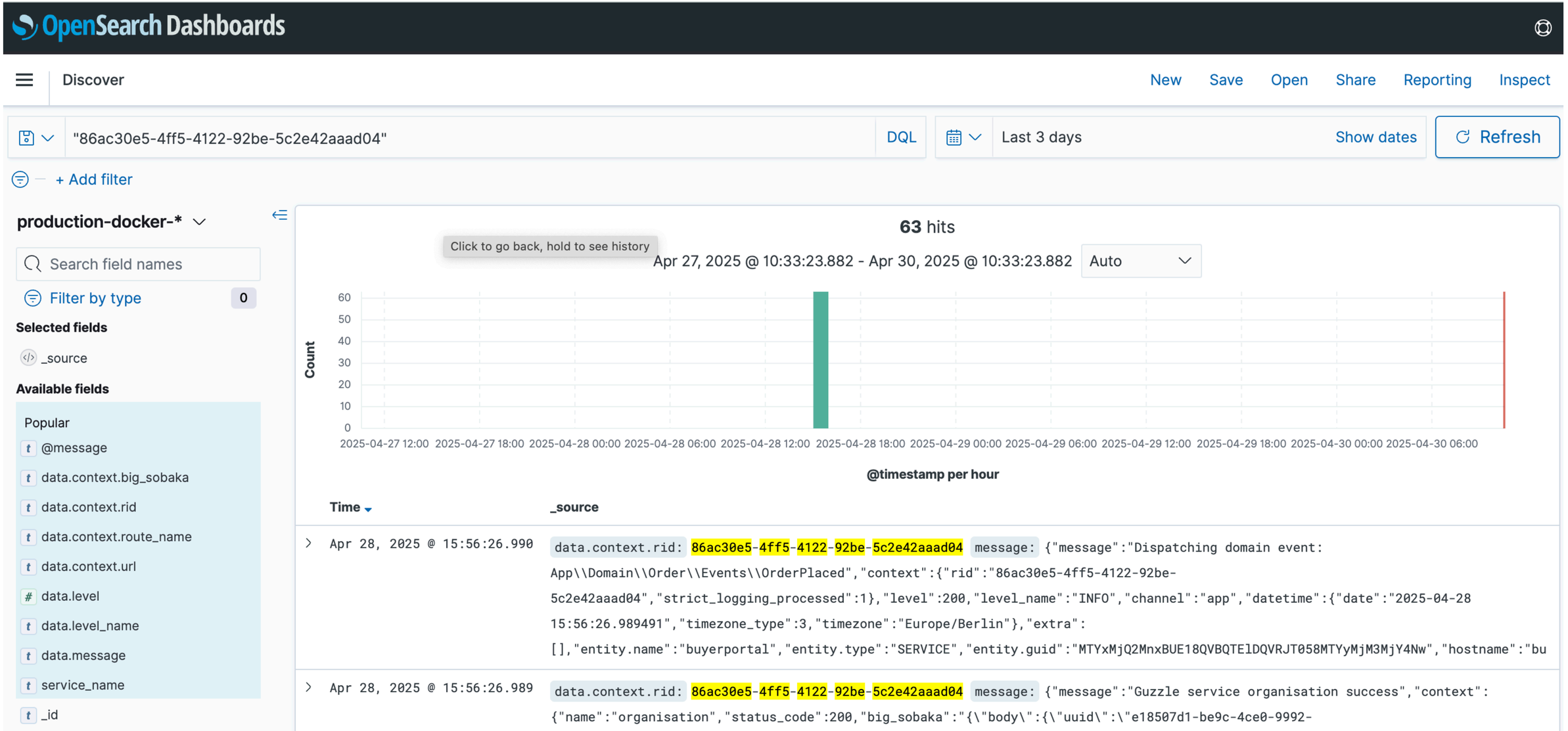
GET … 2f52-e126-494d-9495-1b2798326823 env-production.haproxy-application.service.production.billie.internal

Headers

Connection	close
Content-Length	
Content-Type	application/json
Host	env-production.haproxy-application.service.production.billie.internal:8004
Newrelic	eyJ2IjpbMCwxXSwiZCI6eyJ0eSI6IkFwcCIsImFjIjoiMTYxMjQ2MiIsImFwIjoiMTYyMjM3MjY4NyIsImlkIjoiMzhhOTk5NGJjNDk2YjUwYSIsInRyIjoiNTNjMzZhMTU2OWNiNTFlMyIsInR4IjoiNTNjMzZhMTU2OWNiNTFlMyIsInByIjoxLjYzMjkwLCJzYSI6dHJ1ZSwidGkiOjE3NDU4NDg1NjA2Mjh9fQ==
Traceparent	00-00000000000000053c36a1569cb51e3-38a9994bc496b50a-01
Tracestate	1612462@nr=0-0-1612462-1622372687-38a9994bc496b50a-53c36a1569cb51e3-1-1.632902-1745848560628
User-Agent	GuzzleHttp/7
X-Forwarded-For	[Filtered]
X-Php-Ob-Level	1
X-Real-Ip	[Filtered]
X-Request-Id	86ac30e5-4ff5-4122-92be-5c2e42aaad04

ELK

Checking logs...



More logs

Diving deeper...

OpenSearch Dashboards

Discover

New Save Open Share Reporting Inspect

"86ac30e5-4ff5-4122-92be-5c2e42aaad04" DQL Last 3 days Show dates Refresh

+ Add filter

production-docker-*

Search field names

Filter by type 0

Selected fields

- t data.message
- t service_name

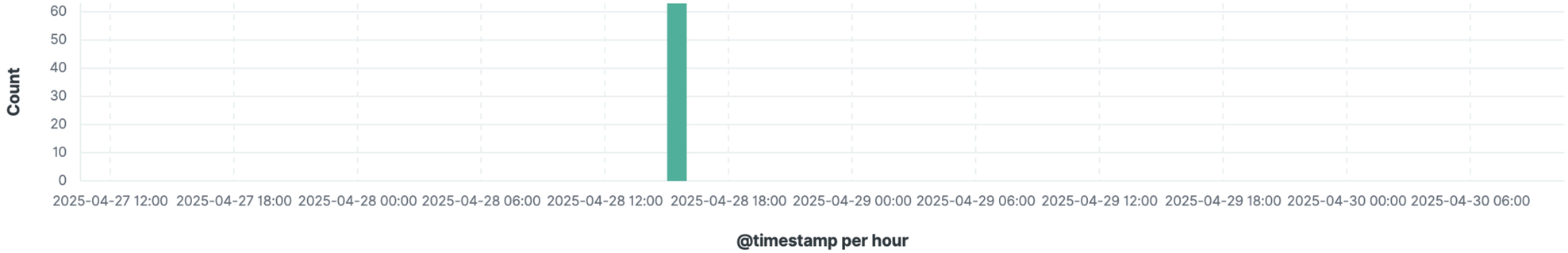
Available fields

Popular

- t @message
- t data.context.big_sobaka
- t data.context.rid
- t data.context.route_name
- # data.context.status_code
- t data.context.url
- # data.level
- t data.level_name
- t instance_name
- t _id
- t _index
- # _score
- t _type
- t @id

63 hits

Apr 27, 2025 @ 10:33:23.882 - Apr 30, 2025 @ 10:33:23.882 Auto



Time	service_name	data.message
Apr 28, 2025 @ 15:56:26.990	buyerportal	Dispatching domain event: App\Domain\Order\Events\OrderPlaced
Apr 28, 2025 @ 15:56:26.989	buyerportal	Guzzle service organisation success
Apr 28, 2025 @ 15:56:26.971	buyerportal	Guzzle service organisation outgoing request
Apr 28, 2025 @ 15:56:26.957	buyerportal	Request to http://env-production.haproxy-application.service.production.billie.internal:8004/private/compact/orders/cdba2f52-e126-494d-9495-1b2798326823 took 13165ms
Apr 28, 2025 @ 15:56:26.957	buyerportal	Guzzle service paella success
Apr 28, 2025 @ 15:56:26.955	paella-core	Response for private_oa_compact_order_get_details sent
Apr 28, 2025 @ 15:56:26.953	paella-core	Request to get_invoices took 59ms
Apr 28, 2025 @ 15:56:26.953	paella-core	Guzzle service invoice_butler success
Apr 28, 2025 @ 15:56:26.952	invoice-butler	Response for get_invoices sent

Demo

Current debugging flow

- Find Request ID
- Filter Logs
- 🔮

The problem?

- Too many logs to filter
- It takes time
- Switching between different systems

- Some requests were slow?
- And when?
- And, more importantly, why?

How to Improve?

Imagine building own solution

- A database with RequestId as an index
  - Let's call it **TraceID**
- Record Every Component separately
  - Component can be any part of your system
  - Let's call it a "span" and assign unique Id as **SpanID**
  - Save start and end time
  - Save parentId
  - Add metadata as **attributes**

https://www.welovecycling.com/wide/2020/01/08/bad-bike-designs-that-were-destined-to-fail/

Components

- Backend
  - Write/Query
  - Jaeger, Grafana Tempo, commercial
- Client
  - **Instrumentation**
- **Collector** may help to buffer
- Emerging Standard - OTEL (Open Telemetry)

Tools Overview

Cloud Only

- NewRelic
- DataDog
- HoneyComb
- and many more...

Tools Overview

Cloud and self-hosted

- Grafana Stack with Grafana Tempo
- Signoz OSS

Demo

Grafana Tempo

Demo

NewRelic

Summary

- We can have better experience!
- Explore solutions supporting OpenTelemetry
- Debugging is much better with distributed tracing

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