



Solving Microservices Mysteries with Distributed Tracing



ABOUT ME



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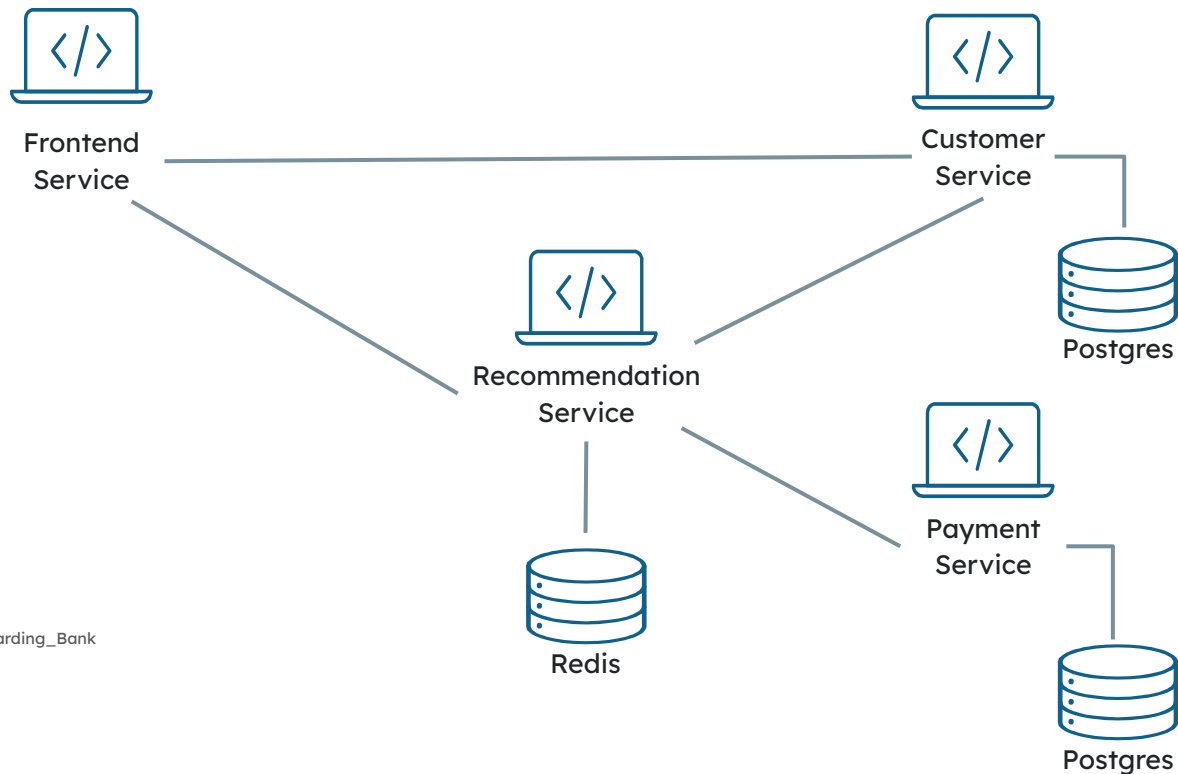
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GRINGOTTS BANK - MICROSERVICES APP

Architecture

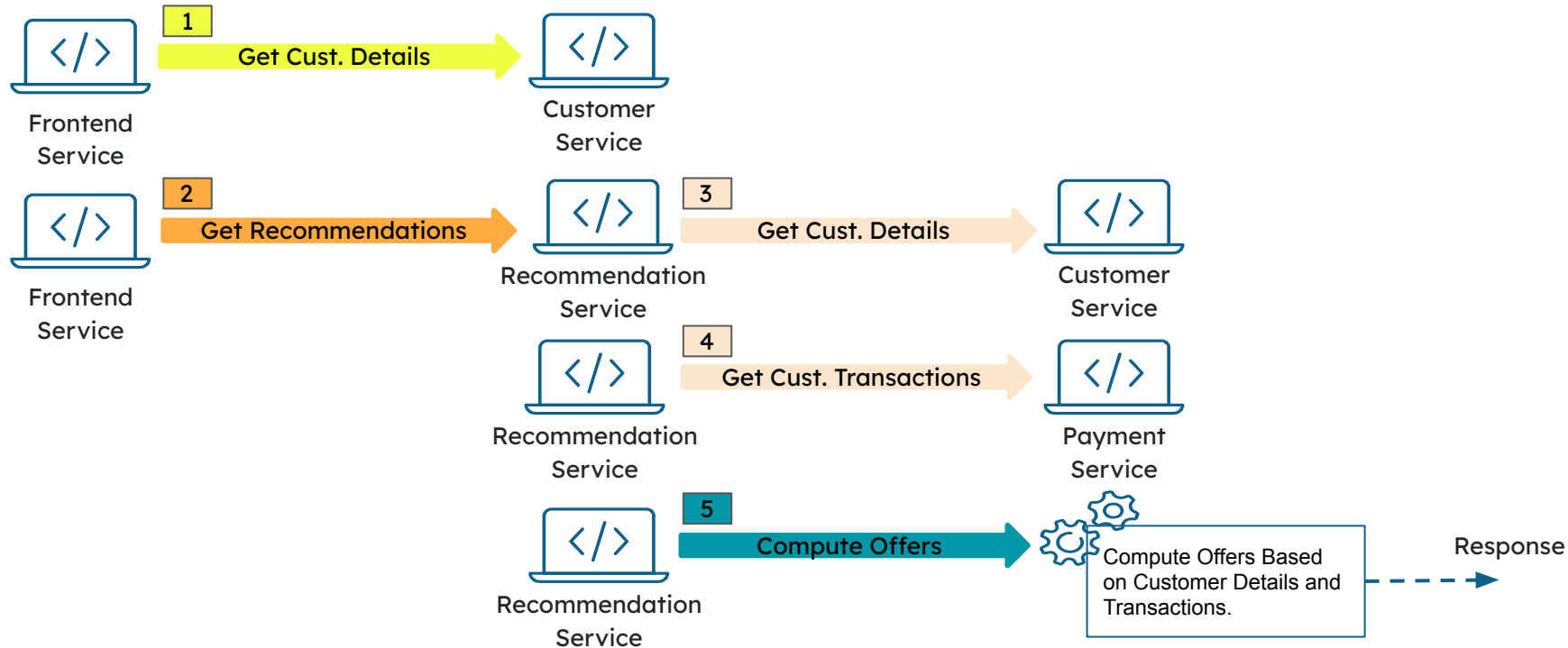


Source: https://harrypotter.fandom.com/wiki/Gringotts_Wizarding_Bank



GRINGOTTS BANK - MICROSERVICES APP

GET /recommendations



Challenges in Production

- End to end visibility
- Debugging (unknown) issues
- Identifying performance/latency issues



Let's See it in Action

OBSERVABILITY

Beyond Traditional Monitoring



Source: <https://gomechanic.in/blog/car-dashboard-warning-lights-guide/>

Monitoring: Something is wrong



Source: Gemini

Observability: Why something is wrong

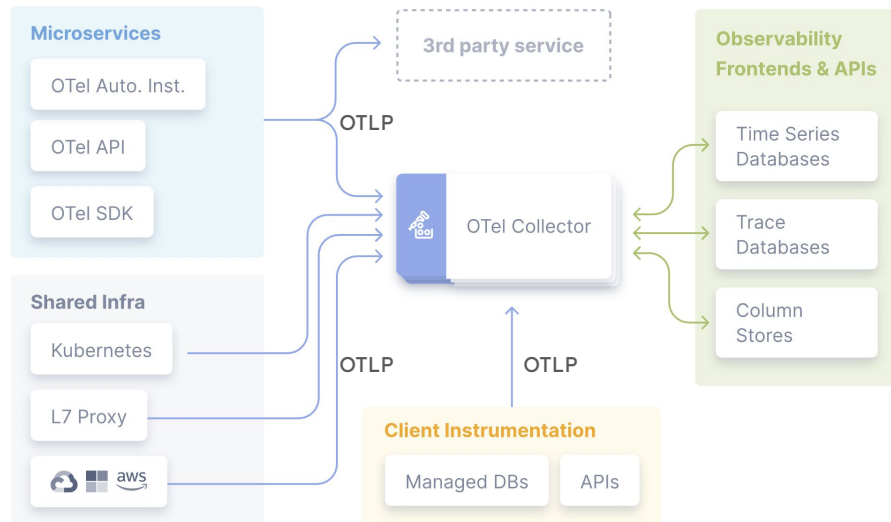
The logo consists of a light blue L-shaped graphic in the top-left corner of a dark blue rectangular field.

OpenTelemetry

OPENTELEMETRY

A De Facto Standard for Observability

- OTLP Protocol
- SDKs
- Signals:
 - Logs
 - Metrics
 - **Traces**



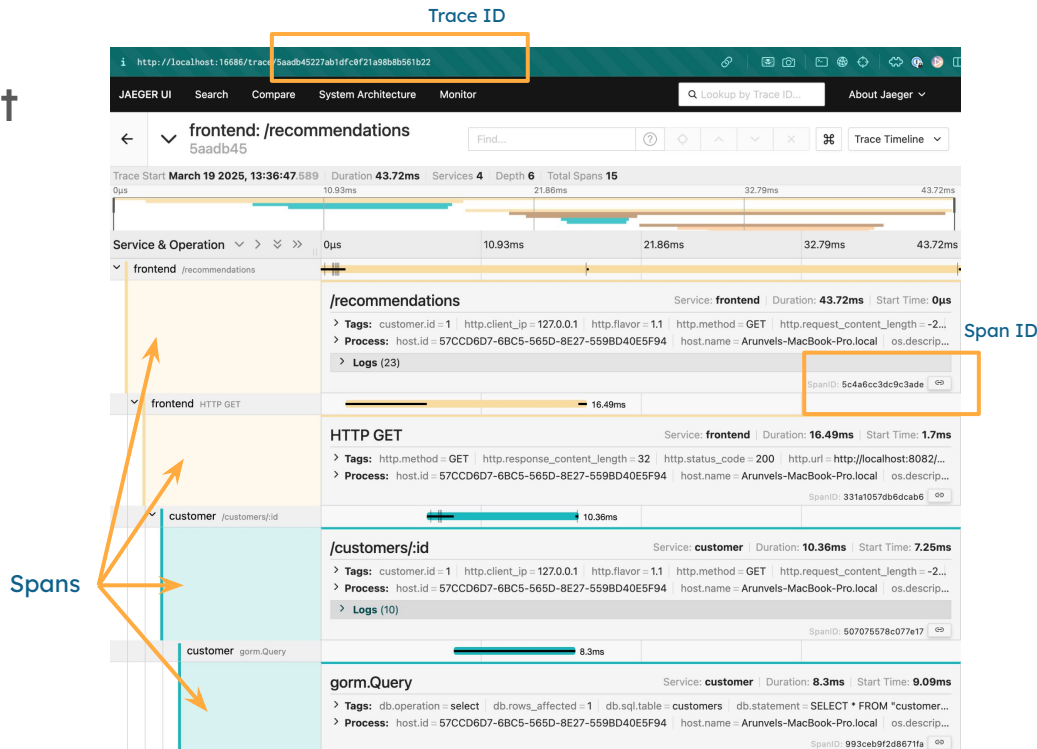
Source: <https://opentelemetry.io/docs/>

Distributed Tracing

OPENTELEMETRY DISTRIBUTED TRACING

Span

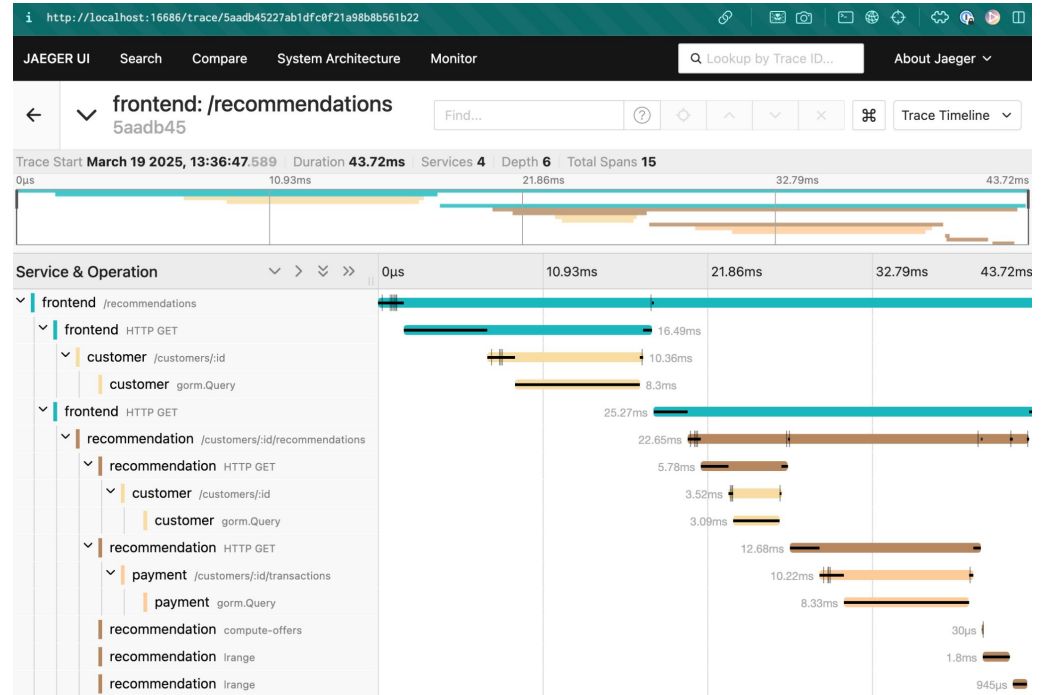
- A Span represents a unit of work or operation
- Span contains:
 - Span ID
 - Trace ID (for correlation)
 - Parent Span ID (for causality)
 - Start Time
 - End Time
 - Logs
 - Attributes



OPENTELEMETRY DISTRIBUTED TRACING

Trace

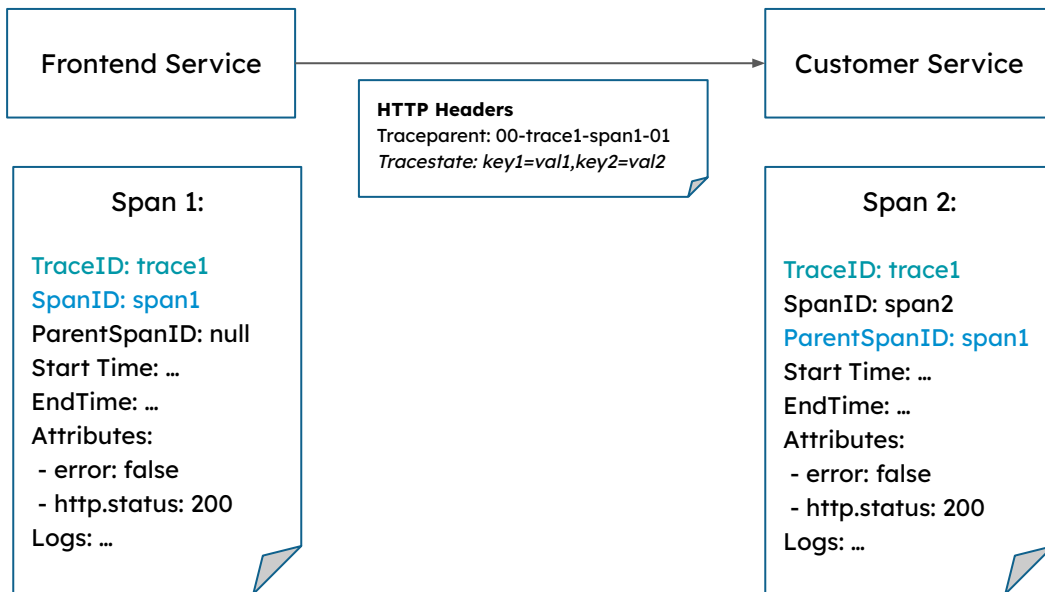
- Trace records path taken by a request
- One or more Spans form a Trace



OPENTELEMETRY DISTRIBUTED TRACING

Context Propagation

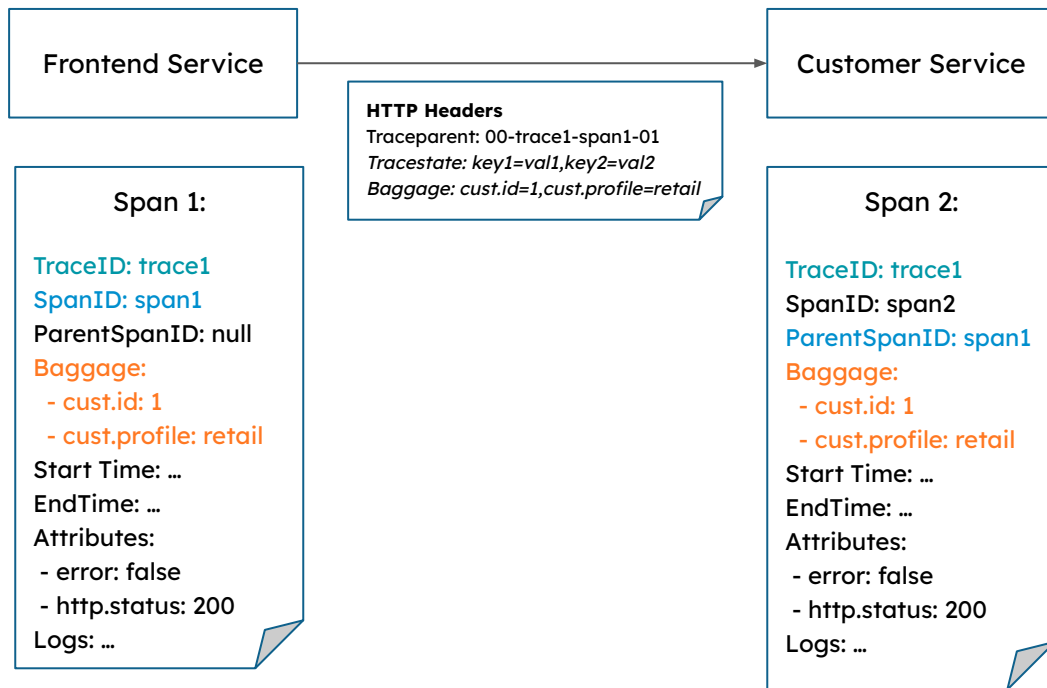
- Correlation and building causal information
- W3C TraceContext Headers



OPENTELEMETRY DISTRIBUTED TRACING

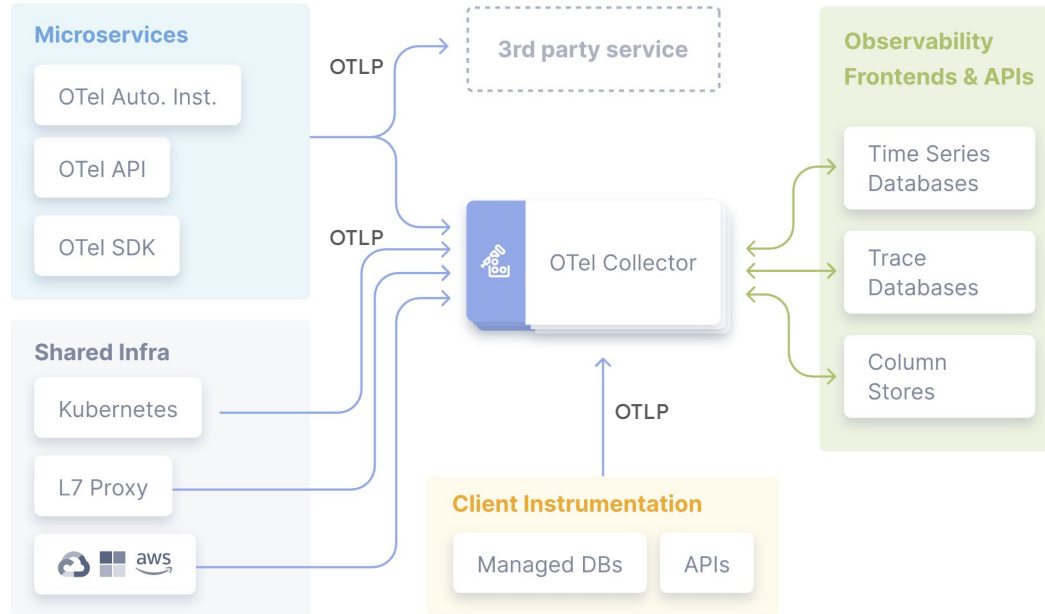
Baggage

- Arbitrary key value pairs alongside context
- Examples: CustomerID, OriginIPs
- Security risk: sharing to unintended receiver (eg. 3rd party APIs)



OPENTELEMETRY COLLECTOR

What? Why?

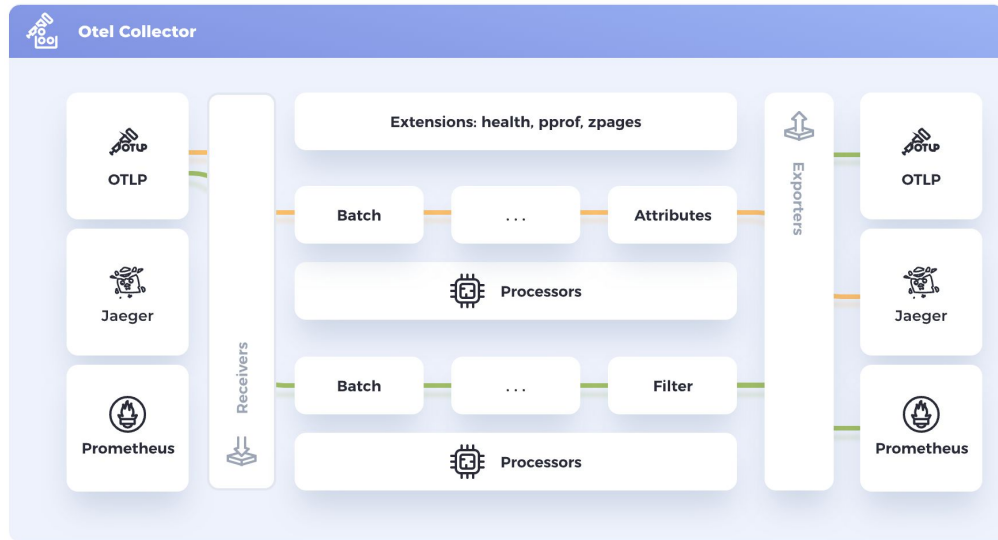


Source: <https://opentelemetry.io/docs/>

OPENTELEMETRY COLLECTOR

What? Why?

- Offload:
 - Retries and batching
 - Transformations
 - Filtering (Sensitive Data)
- Centralized config
- Securing Egress Traffic



Source: <https://opentelemetry.io/docs/collector/>

OPENTELEMETRY COLLECTOR

Deployment Modes

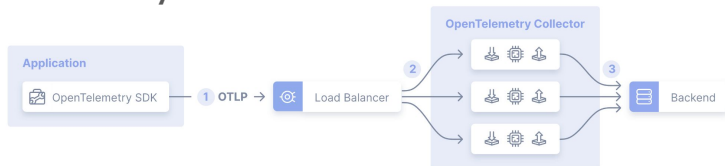
No Collector



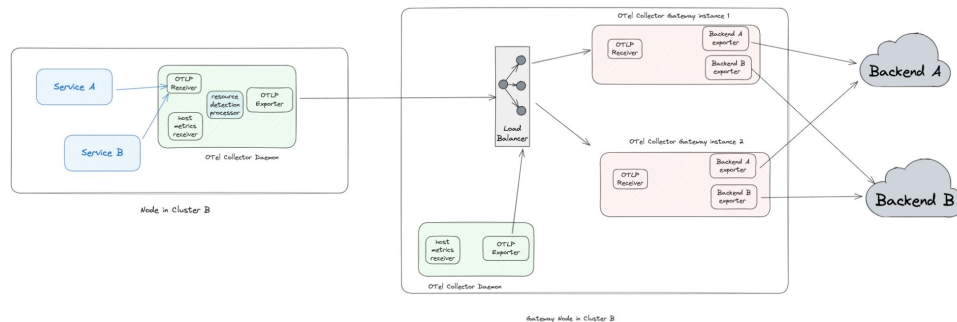
Agent



Gateway

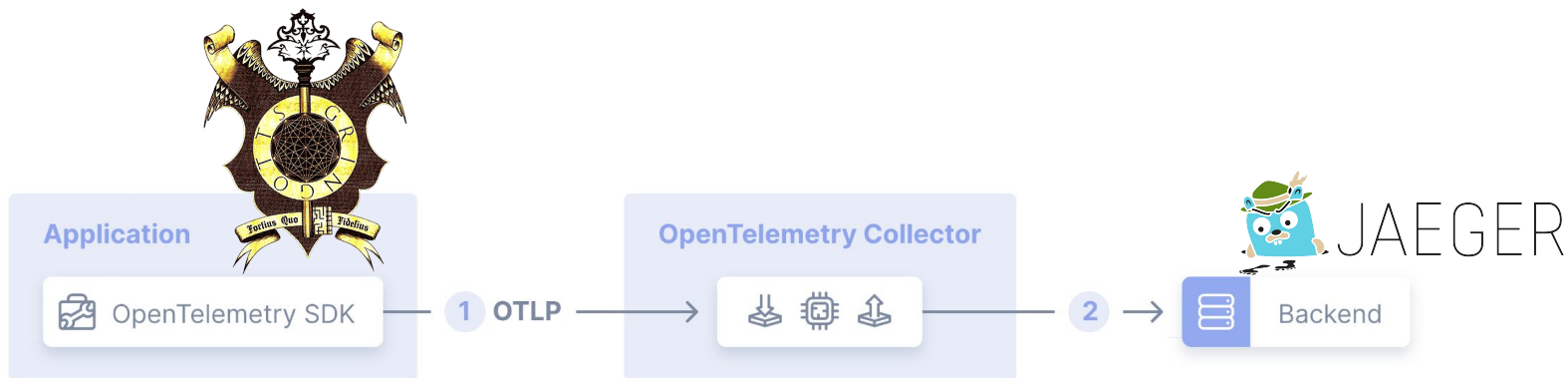


Agent + Gateway



OpenTelemetry Collector Deployment Mode

Agent Mode





Let's See it in Action

Thank you

Useful Links

- Gringotts Bank Codebase:
<https://github.com/arunvelsriram/gringotts-bank>