Distributed Tracing

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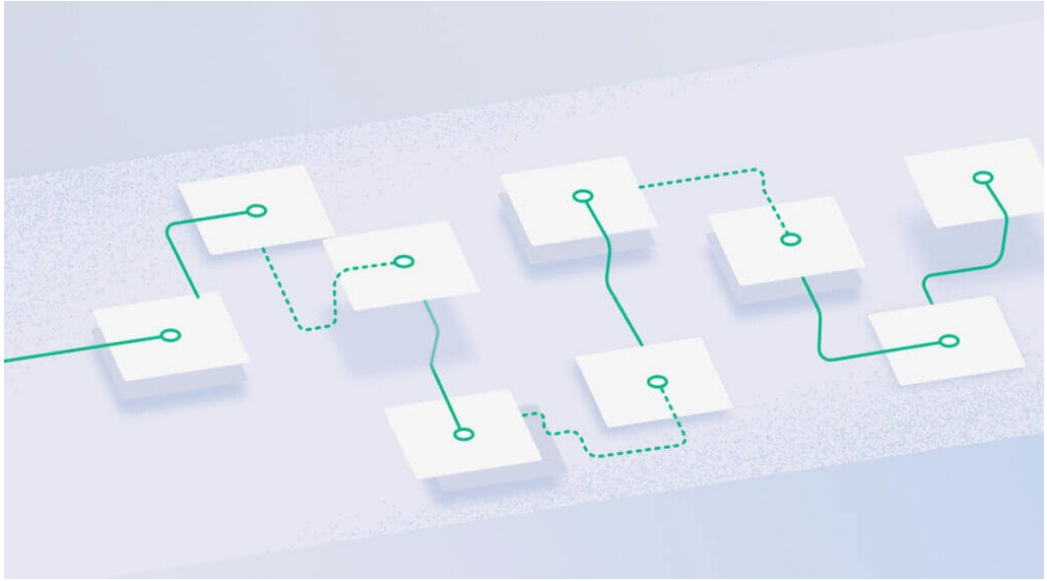
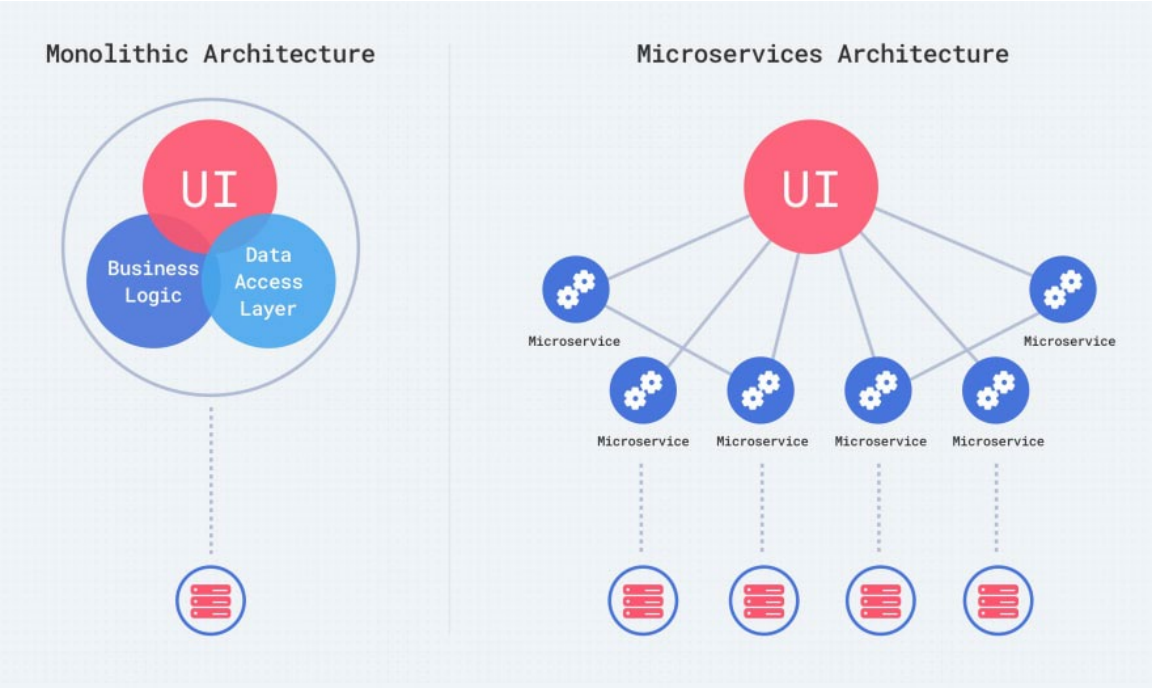
Presentation titles

- What is distributed tracing?
- Why do we need distributed tracing
- Distributed Tracing Tools
- Comparison

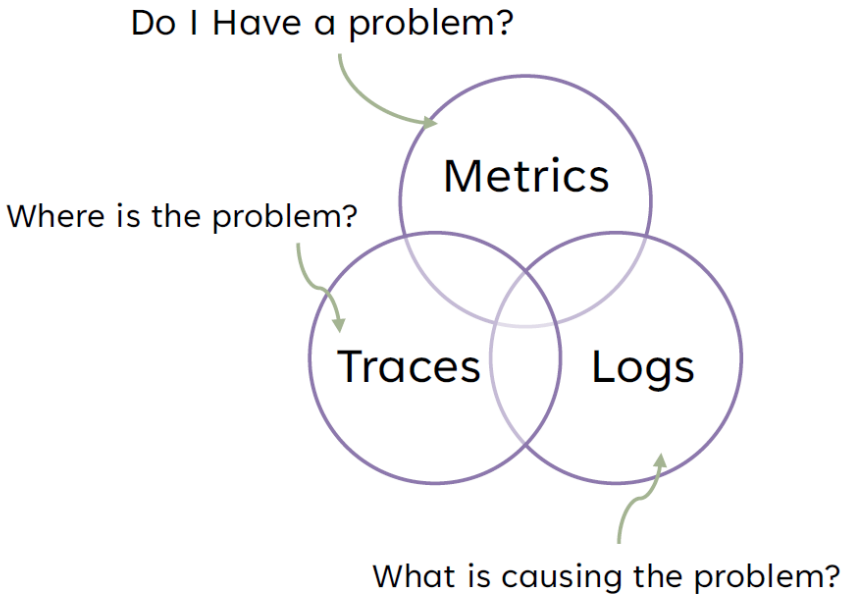
What is distributed tracing?

- Tracing, or more specifically distributed tracing or distributed request tracing, is the ability to follow a request through a system, joining the dots between all the individual system calls required to service a particular request.




Monolithic Architecture
UI
Business Logic
Data Access Layer
Microservices Architecture
UI
Microservice
Microservice
Microservice
Microservice
Microservice
Microservice

Observability

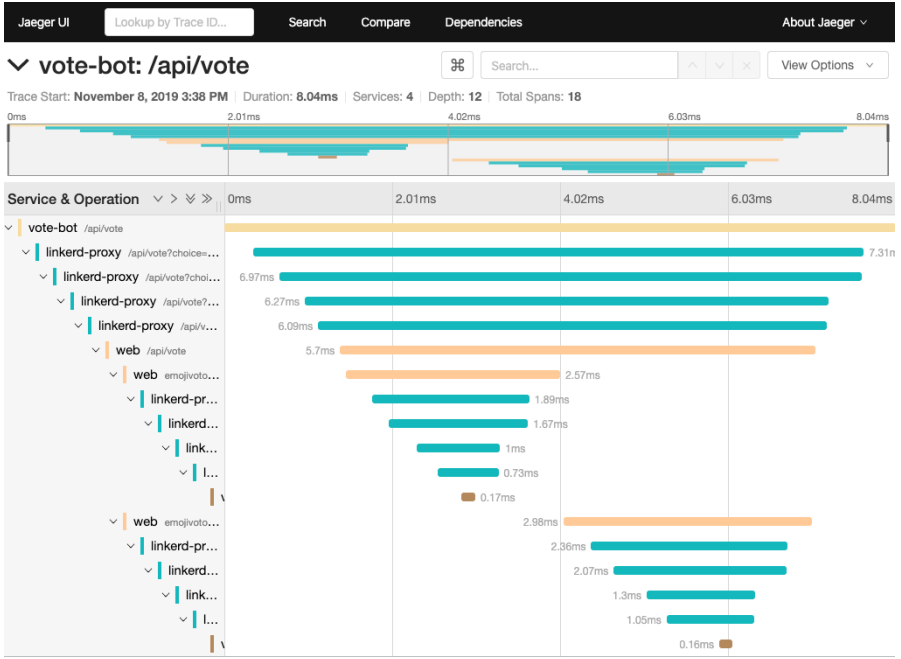


Distributed Tracing Tools

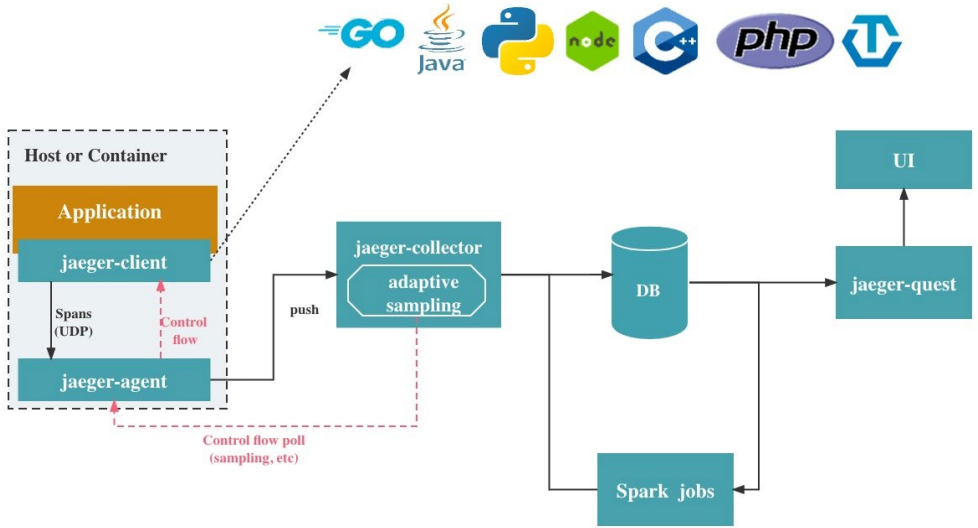
- Jaeger
- OpenTelemetry
- Zipkin
- Grafana Tempo
- SigNoz

Jaeger

- Jaeger is a distributed tracing system that helps you understand how requests flow through your distributed systems. It's a powerful tool that can help you identify performance bottlenecks, troubleshoot errors, and improve the overall reliability of your systems.

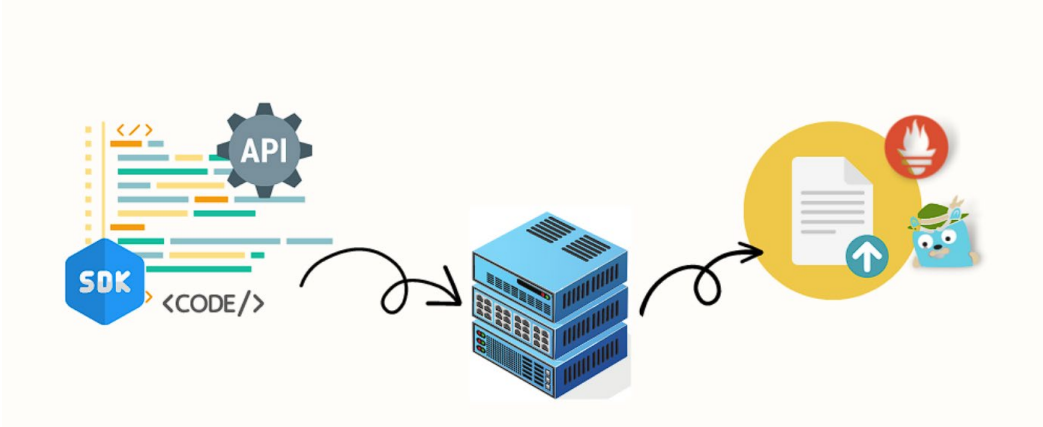


- **Agents**: These are small programs that run in each service in your system. Agents collect data about requests as they enter and exit each service.
- **Collectors**: These are servers that collect data from the agents.
- **Query engines**: These are servers that allow you to query and visualize data from Jaeger.
- By default, Jaeger uses a PostgreSQL database to store data. You can also use other databases, such as MySQL, Cassandra, and Elasticsearch.

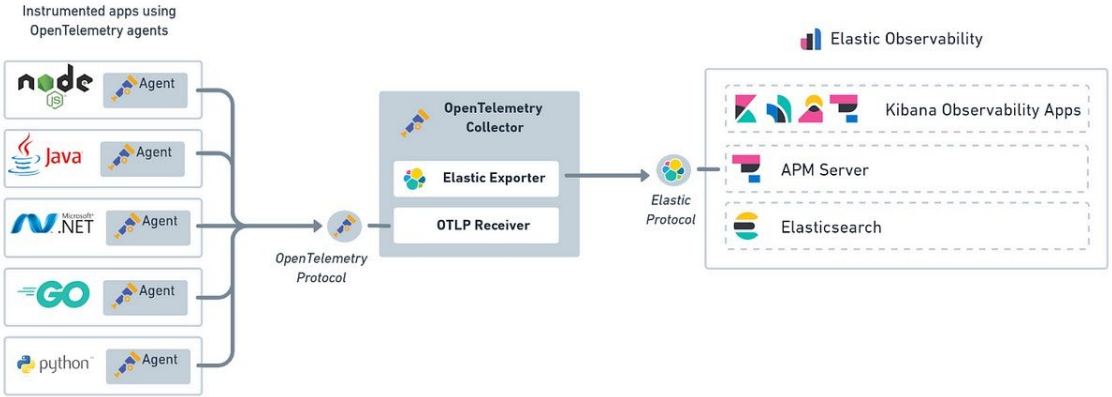


OpenTelemetry

- OpenTelemetry (OT) is a vendor-agnostic and open-source observability framework that allows developers to generate, collect, and manage telemetry data from distributed systems. With OT, developers can use standardized instrumentation for easy observation and troubleshooting of a single application or complex environment with a microservices-based architecture

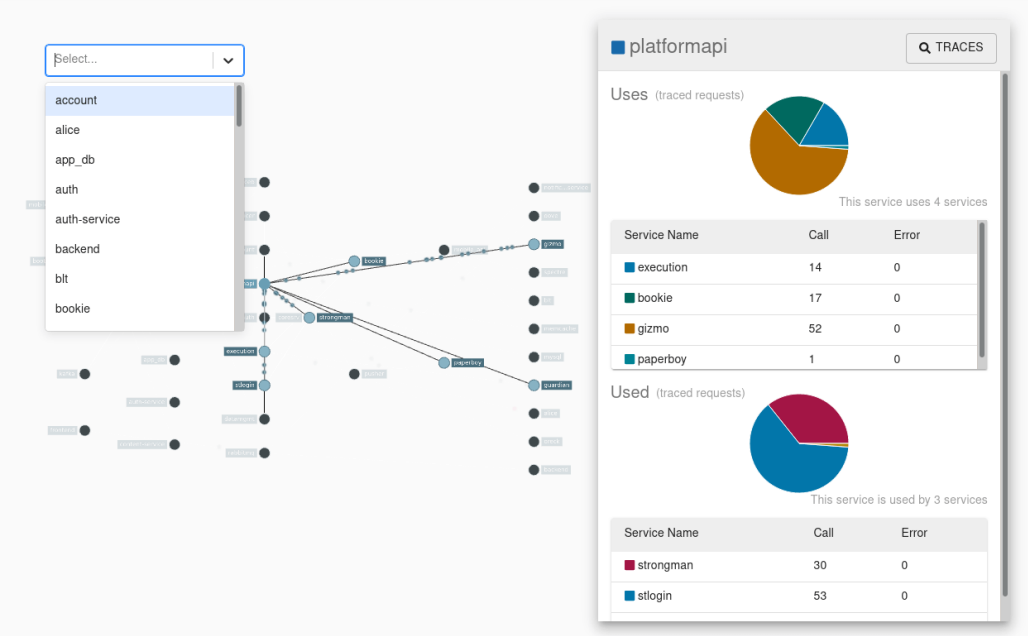


- Vendor neutrality: OT is not tied to any specific vendor or product, so developers can choose the tools and technologies that best meet their needs.
- Comprehensiveness: OT supports all three pillars of observability: traces, metrics, and logs. This gives developers a complete view of their system's performance and behavior.
- Ease of use: OT provides a standardized set of APIs and SDKs for collecting telemetry data. This makes it easy for developers to get started with OT, even if they have no prior experience with observability.



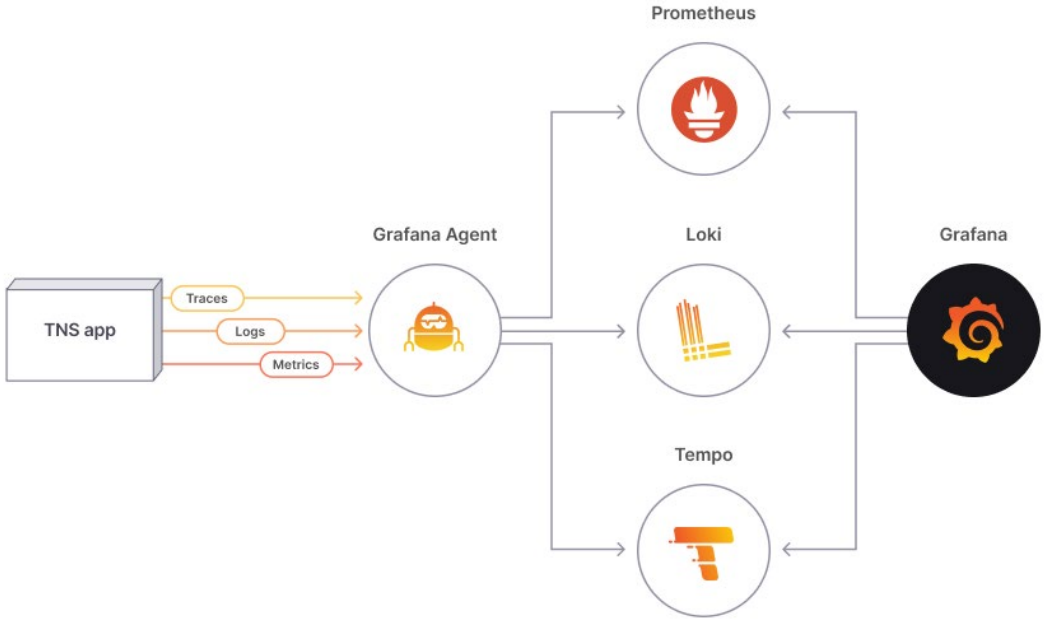
Zipkin

- Zipkin is a distributed tracing system that helps developers troubleshoot latency problems in service architectures. It gathers timing data needed to identify slow services and bottlenecks. Zipkin was created by Twitter and is open-sourced under the Apache 2.0 license



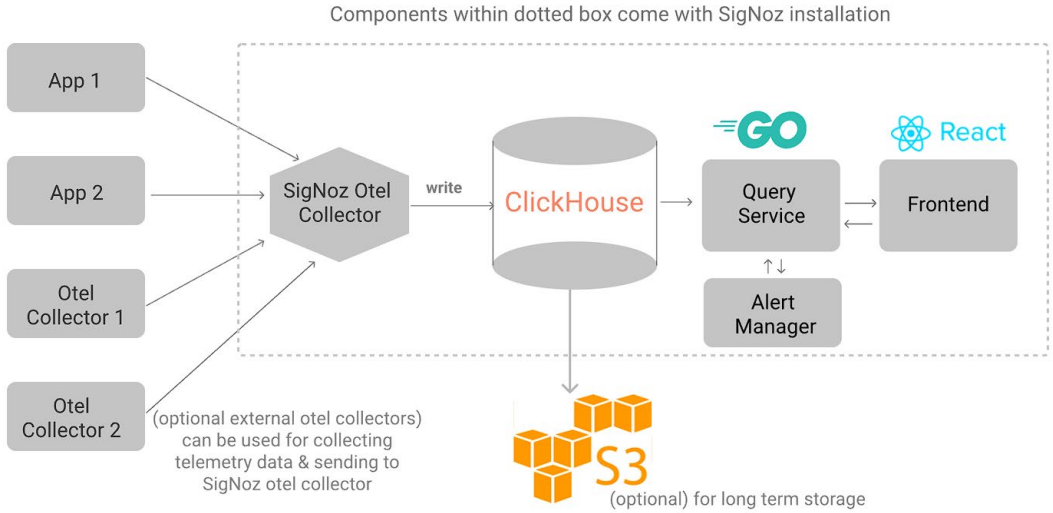
Grafana Tempo

- Grafana Tempo is an open source, easy-to-use, and high-volume distributed tracing backend. It is cost-efficient, requiring only object storage to operate, and is deeply integrated with Grafana, Prometheus, and Loki. Tempo can ingest common open source tracing protocols, including Jaeger, Zipkin, and OpenTelemetry.



SigNoz

- SigNoz is a full-stack open-source APM and observability tool. It captures both metrics and traces with log management currently in the product roadmap



Comparison

Feature	Jaeger	OpenTelemetry	Zipkin	Grafana Tempo	SigNoz
Type	Distributed tracing	Observability framework	Distributed tracing	Distributed tracing	Observability suite
Open source	Yes	Yes	Yes	Yes	Yes
Cloud native	Yes	Yes	Yes	Yes	Yes
OpenTelemetry support	Yes	Native	Yes (but not native)	Yes	Yes
Community support	Large	Large	Large	Medium	Small
Visualization	Built-in	Can use Grafana or other visualization tools	Built-in	Built-in	Built-in
Metrics format	Prometheus	Prometheus	Prometheus	Prometheus	Prometheus
Log format	JSON	JSON	JSON	JSON	JSON
Other features	Supports gRPC, HTTP, Kafka, and other protocols	Supports a wide range of telemetry data, including traces, metrics, and logs	Supports gRPC, HTTP, and other protocols	Supports gRPC, HTTP, and other protocols	Provides metrics and logs in addition to traces
Pricing	Free and commercial versions available	Free	Free and commercial versions available	Free and commercial versions available	Free and commercial versions available


Thanks