Observability on Service Mesh

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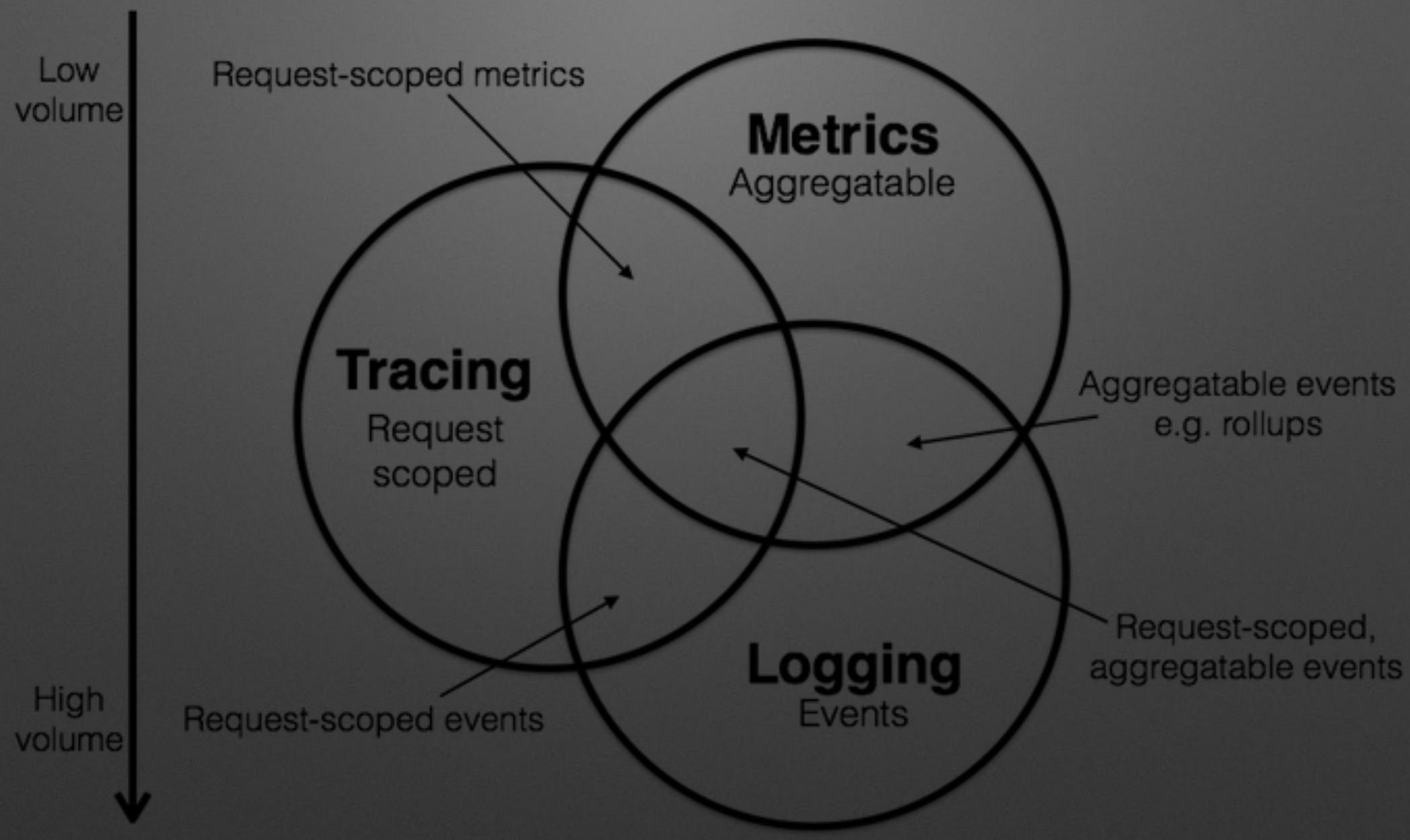
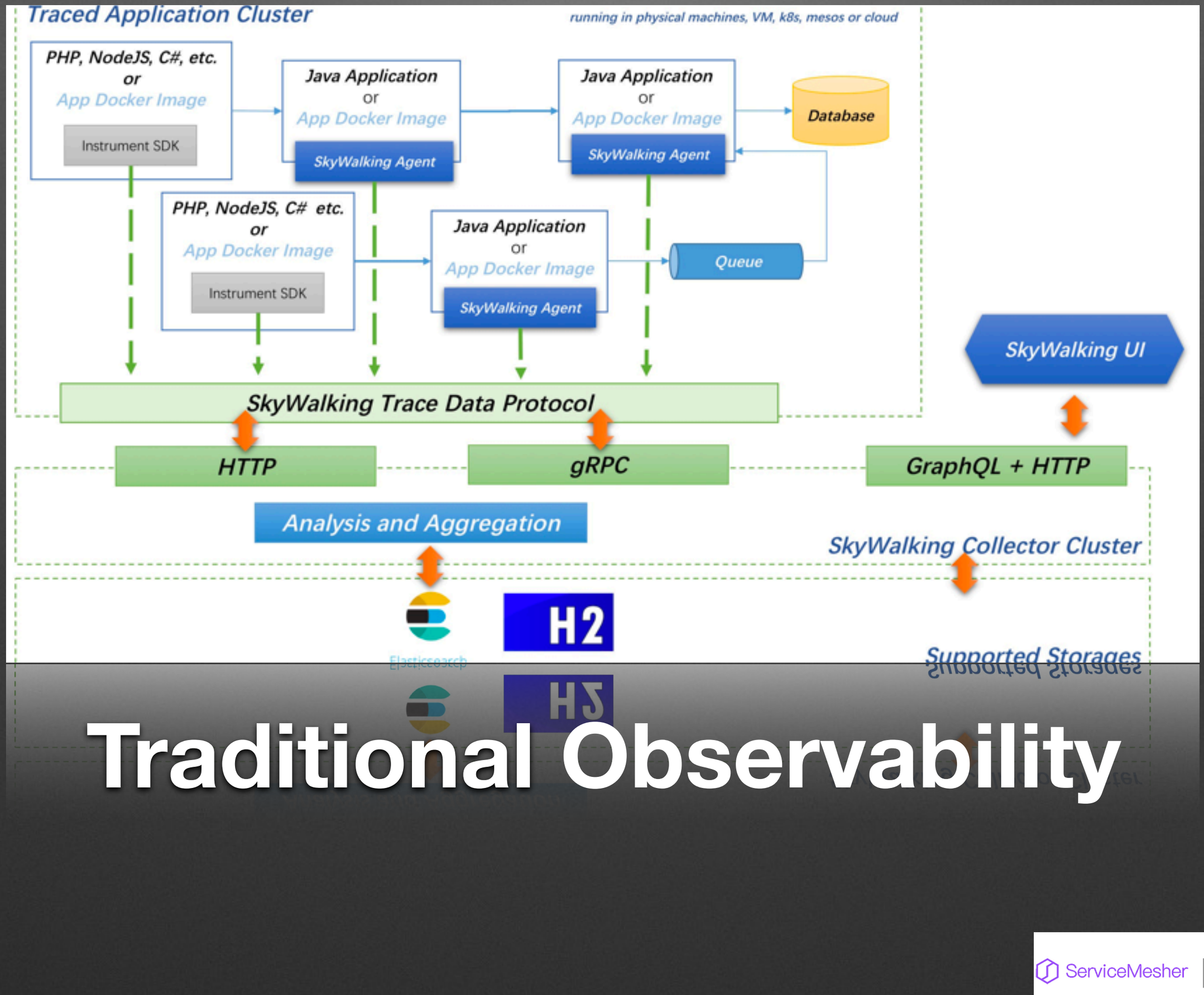
Observability

CNCF Landscape

CLOUD NATIVE COMPUTING FOUNDATION

Metric, Tracing, Logging





Traditional Observability

How does agent work?

```
PreparedStatement updateSales = con.prepareStatement(
            "UPDATE COFFEES SETSALES = ? WHERE COF_NAME LIKE ? ");
updateSales.setInt(1, 75);
updateSales.setString(2, "Colombian");
updateSales.executeUpdate();
```

```
PreparedStatement updateSales = con.prepareStatement(
            "UPDATE COFFEES SETSALES = ? WHERE COF_NAME LIKE ? ");
tracer.cacheSQL("UPDATE COFFEES SETSALES = ? WHERE COF_NAME LIKE ? ");
updateSales.setInt(1, 75);
tracer.cacheDbParam(1, 75);
updateSales.setString(2, "Colombian");
tracer.cacheDbParam(2, "Colombian");
Span span = tracer.createSpan().start();
updateSales.executeUpdate();
span.tag(Tags.Basic.TYPE, "Database");
span.tag(Tags.SQL, tracer.getCachedSQL());
span.tag(Tags.SQL_PARAMETERS, tracer.getCachedDbParams());
span.stop();
```

Application Performance Management

- Agent based
- Manipulate source codes
  - Auto
  - Manual
- CPU, Memory, Latency Cost, GC

Id	APM	采样率	线程数	请求总数	平均请求时间 ms	最小请求时间 ms	最大请求时间 ms	90%Line	错误率 %	CPU	memory	Throughput /sec
1	none	1	500	15000	17	9	824	21	0	45%	50%	1385
2	Zipkin	1	500	15000	117	10	2101	263	0	56%	55%	990
3	Skywalking	1	500	15000	22	10	1026	23	0	50%	52%	1228
4	Pinpoint	1	500	15000	201	10	7236	746	0	48%	52%	774
5	none	1	750	22500	321	10	15107	991	0	56%	48%	956
6	Zipkin	1	750	22500	489	10	27614	1169	0	63%	55%	582
7	Skywalking	1	750	22500	396	10	16478	941	0	55%	50%	908
8	Pinpoint	1	750	22500	681	10	28138	1919	0	56%	48%	559
9	none	1	1000	30000	704	10	39772	1621	0	59%	53%	557
10	Zipkin	1	1000	30000	1021	10	36836	1978	0	63%	55%	533
11	Skywalking	1	1000	30000	824	10	25983	1758	0	62%	55%	667
12	Pinpoint	1	1000	30000	1148	10	40971	2648	0	60%	52%	514

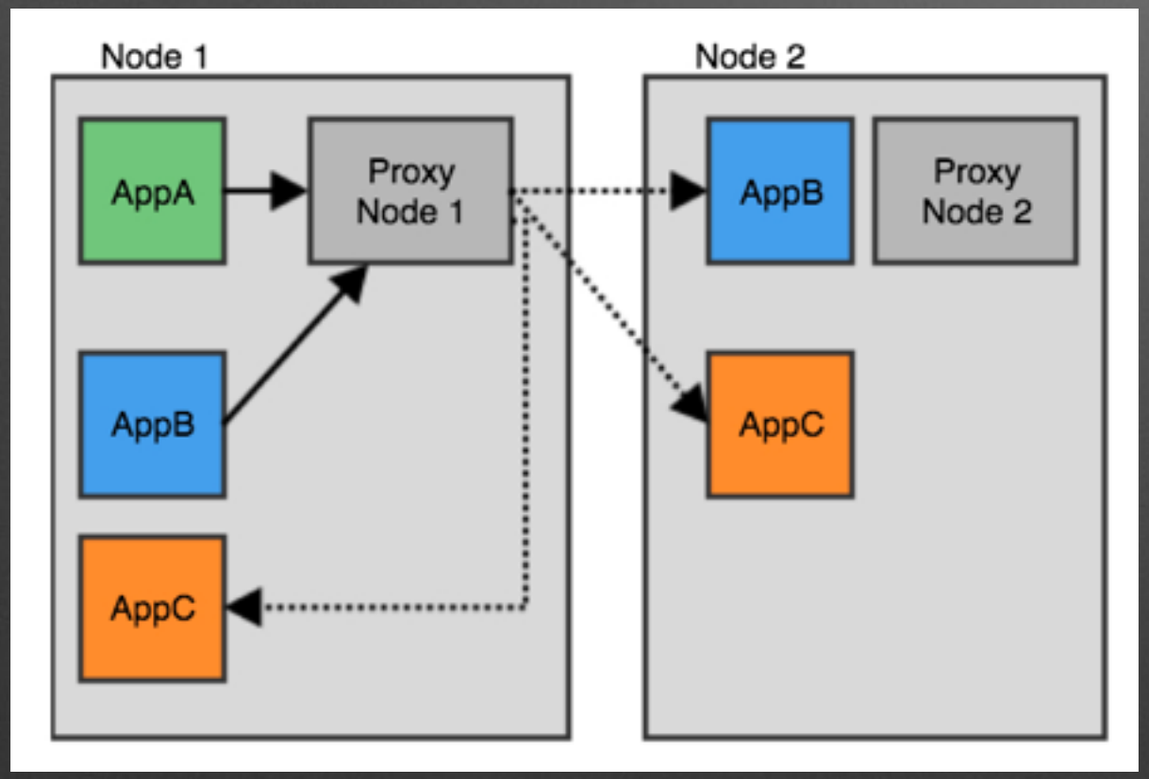
Cost of open source solutions

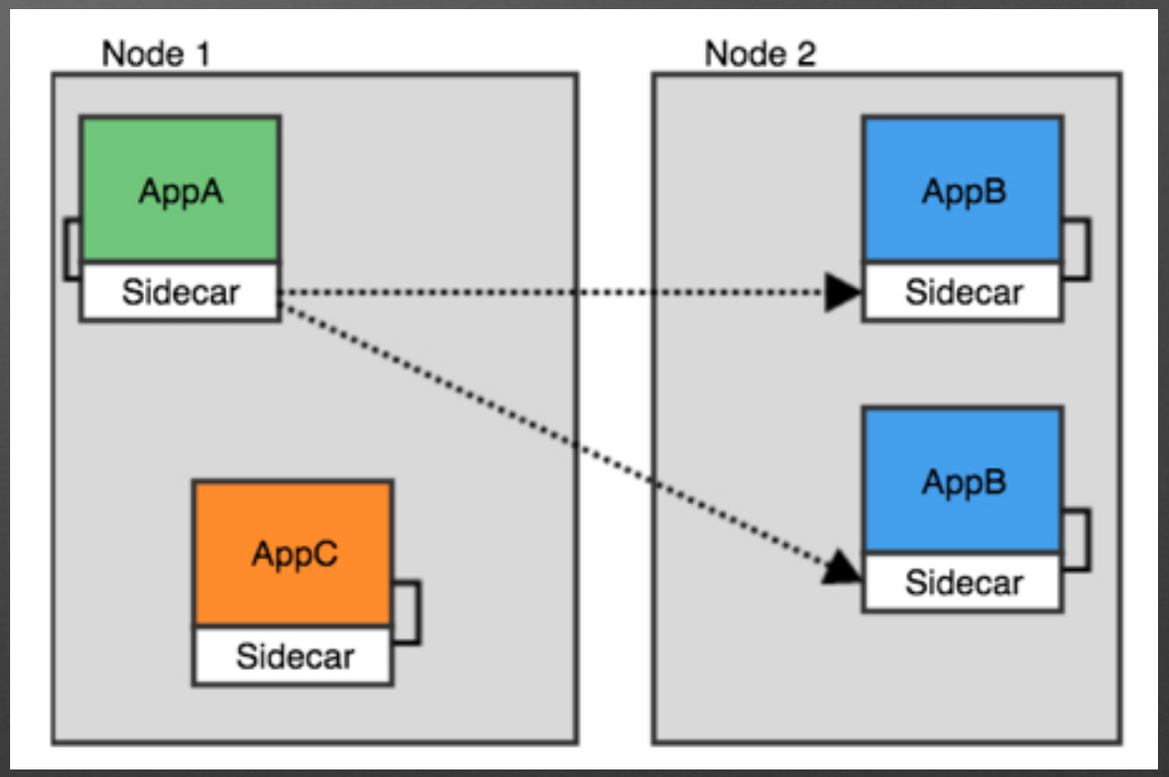
Don’t consider this as an competition. It is a fact that everyone costs resources.

What change?

Container, K8s and Service Mesh

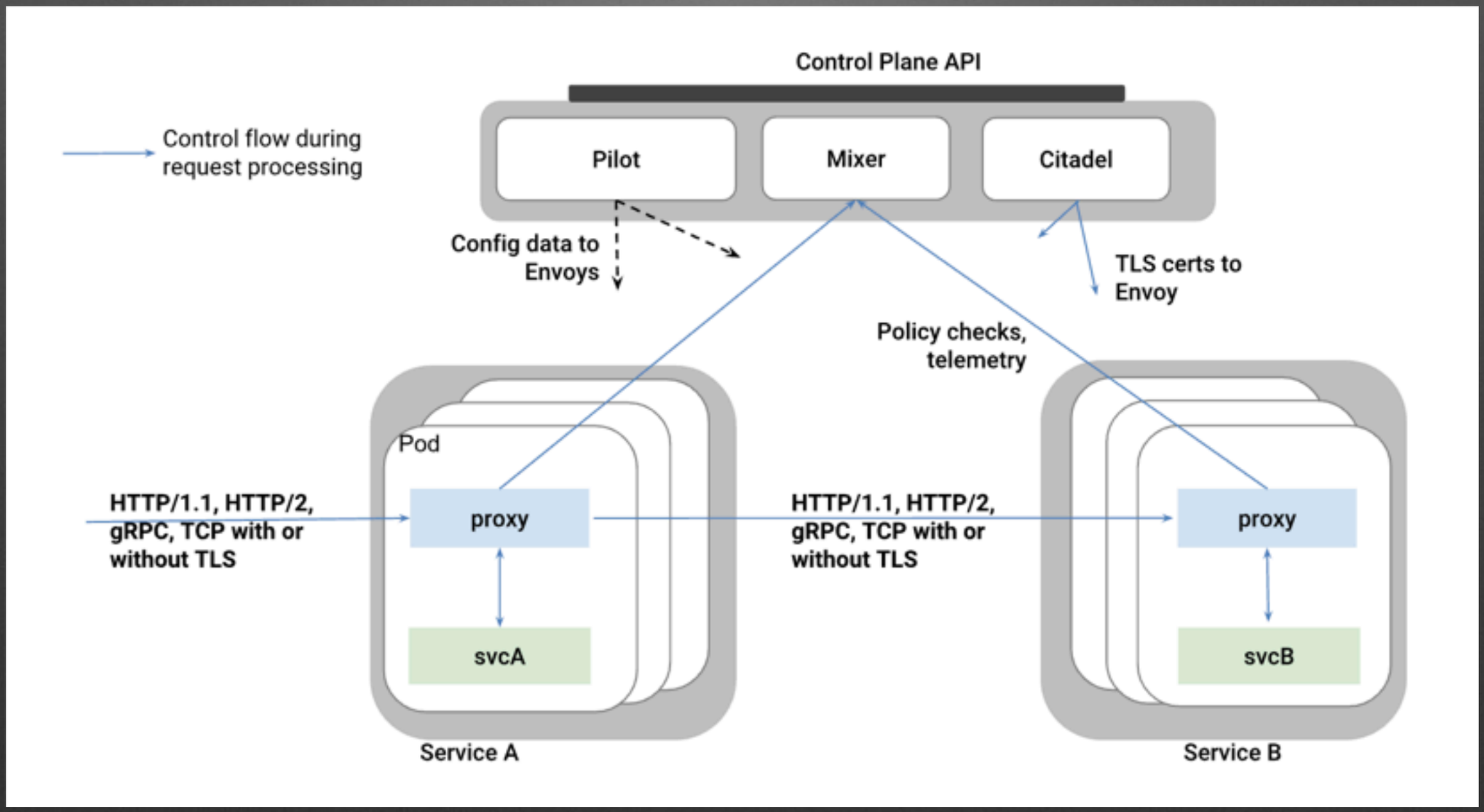
Proxy and Sidecar



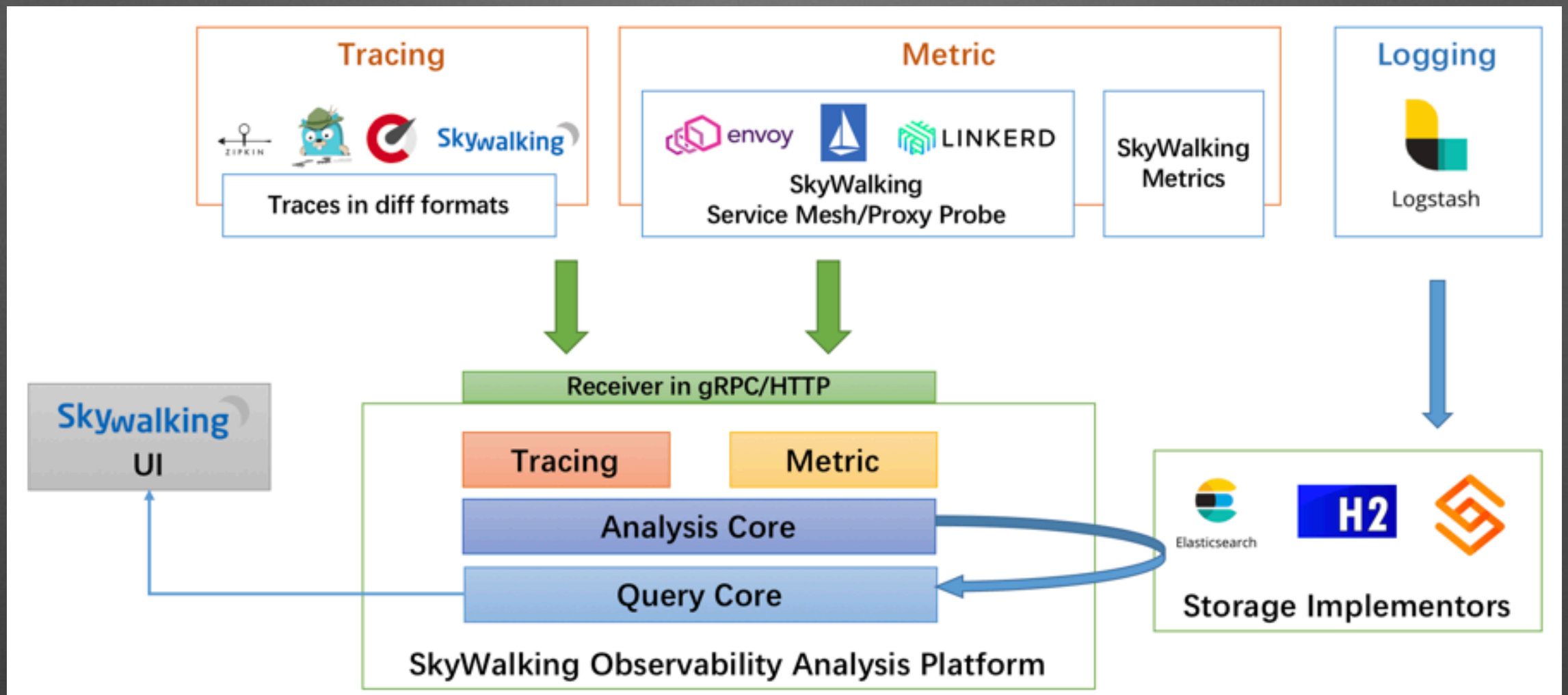


Istio + Envoy

Representative Service Mesh implementor



SkyWalking 6.0
Observability Analysis Platform



OAP > APM

Core Concepts

- **Service**. Represent a set/group of workloads to provide the same behaviors for incoming requests. You can define the service name when you are using instrument agents or SDKs. Or SkyWalking uses the name you defined in platform such as Istio.

- **Service Instance**. Each one workload in the Service group is named as an instance. Like pods in Kubernetes, it doesn't need to be a single process in OS. Also if you are using instrument agents, an instance is actually a real process in OS.

- **Endpoint**. It is a path in the certain service for incoming requests, such as HTTP URI path or gRPC service class + method signature.

OAP Key Feature

Multiple telemetry sources

1. Language based Agent
2. Service Mesh Probe
3. Other eco-system, like Zipkin

Observability Analysis Language

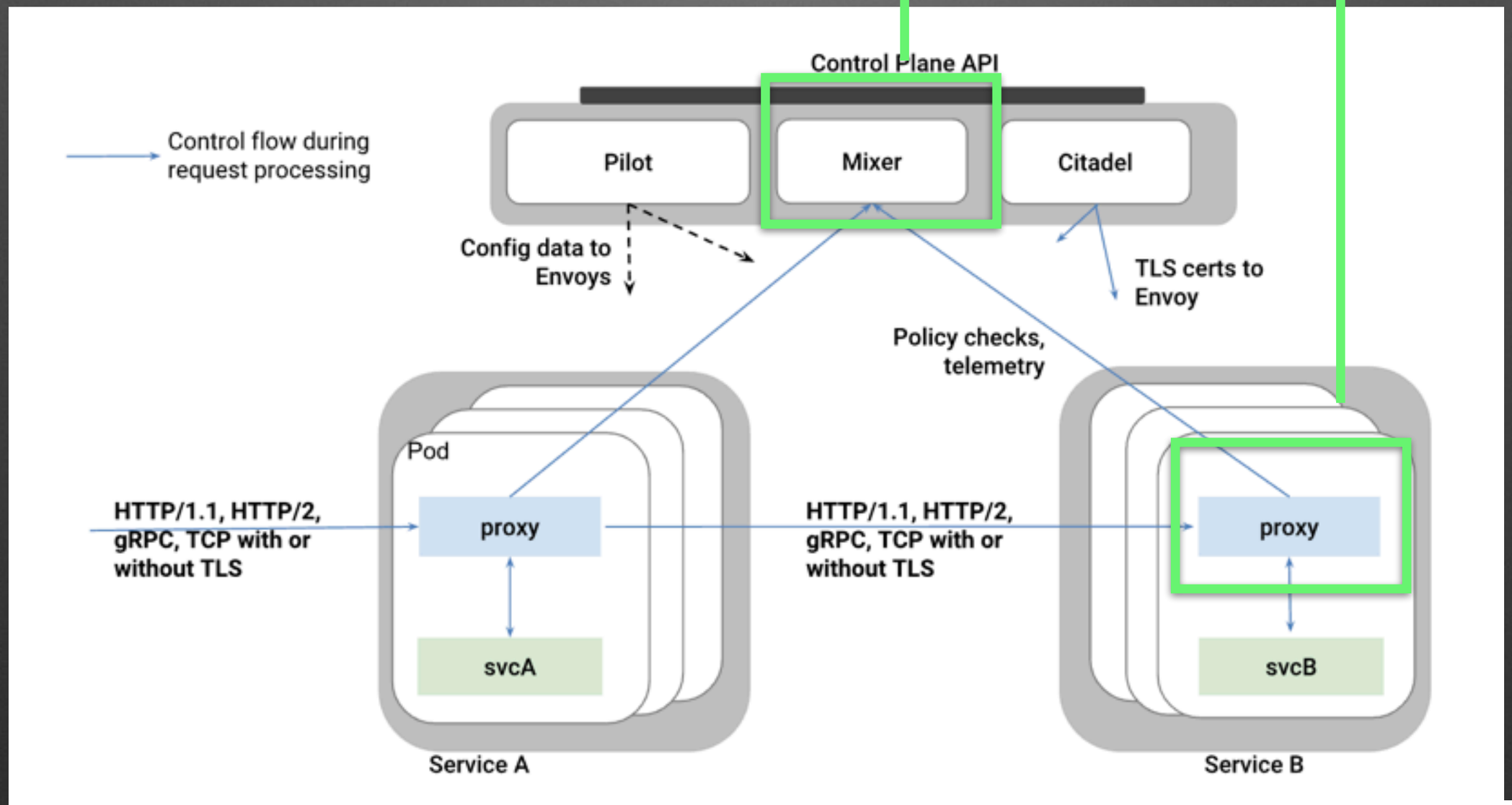
- A compile language
- Scopes
  - All
  - Service
  - ServiceInstance
  - Endpoint
  - ServiceRelation
  - ServiceInstanceRelation
  - EndpointRelation
- Extendable Aggregation Functions

```
// Caculate p99 of both Endpoint1 and Endpoint2
Endpoint_p99 = from(Endpoint.latency).filter(name in ("Endpoint1", "Endpoint2")).summary(0.99)

// Caculate p99 of Endpoint name started with `serv`
serv_Endpoint_p99 = from(Endpoint.latency).filter(name like ("serv%")).summary(0.99)

// Caculate the avg response time of each Endpoint
Endpoint_avg = from(Endpoint.latency).avg()

// Caculate the histogram of each Endpoint by 50 ms steps.
// Always thermodynamic diagram in UI matches this metric.
Endpoint_histogram = from(Endpoint.latency).histogram(50)

// Caculate the percent of response status is true, for each service.
Endpoint_success = from(Endpoint.*).filter(status = "true").percent()

// Caculate the percent of response code in [200, 299], for each service.
Endpoint_200 = from(Endpoint.*).filter(responseCode like "2%").percent()

// Caculate the percent of response code in [500, 599], for each service.
Endpoint_500 = from(Endpoint.*).filter(responseCode like "5%").percent()

// Caculate the sum of calls for each service.
EndpointCalls = from(Endpoint.*).sum()
```

https://github.com/apache/incubator-skywalking/blob/6.0/docs/en/concepts-and-designs/oal.md

What is Service Mesh probe?

Metric from Service Mesh by native supported

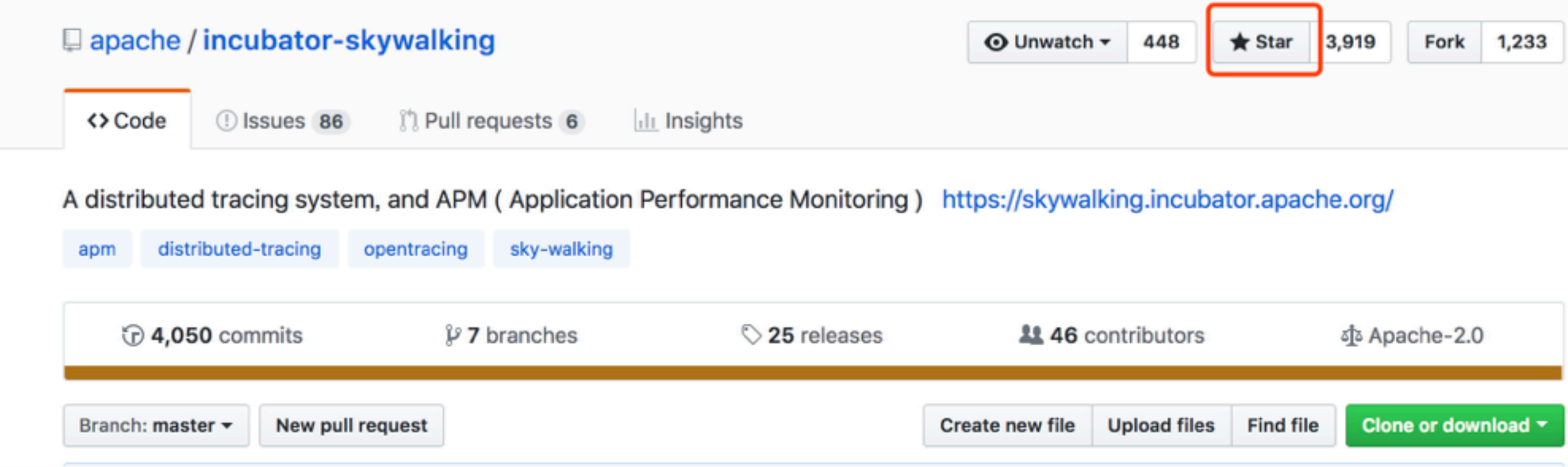


Metric Data Structure

- Service Names at both sides.
- Service Instance Names at both sides.
- Endpoint. URI in HTTP, service method full signature in gRPC.
- Start Time. Request time.
- Latency. In milliseconds.
- Response code in HTTP
- Status. Success or fail.
- Protocol. HTTP, gRPC
- DetectPoint. In Service Mesh sidecar, client or server. In normal L7 proxy, value is proxy.

We need your star on GitHub

- https://github.com/apache/incubator-skywalking



Thanks

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