AWS re:Invent

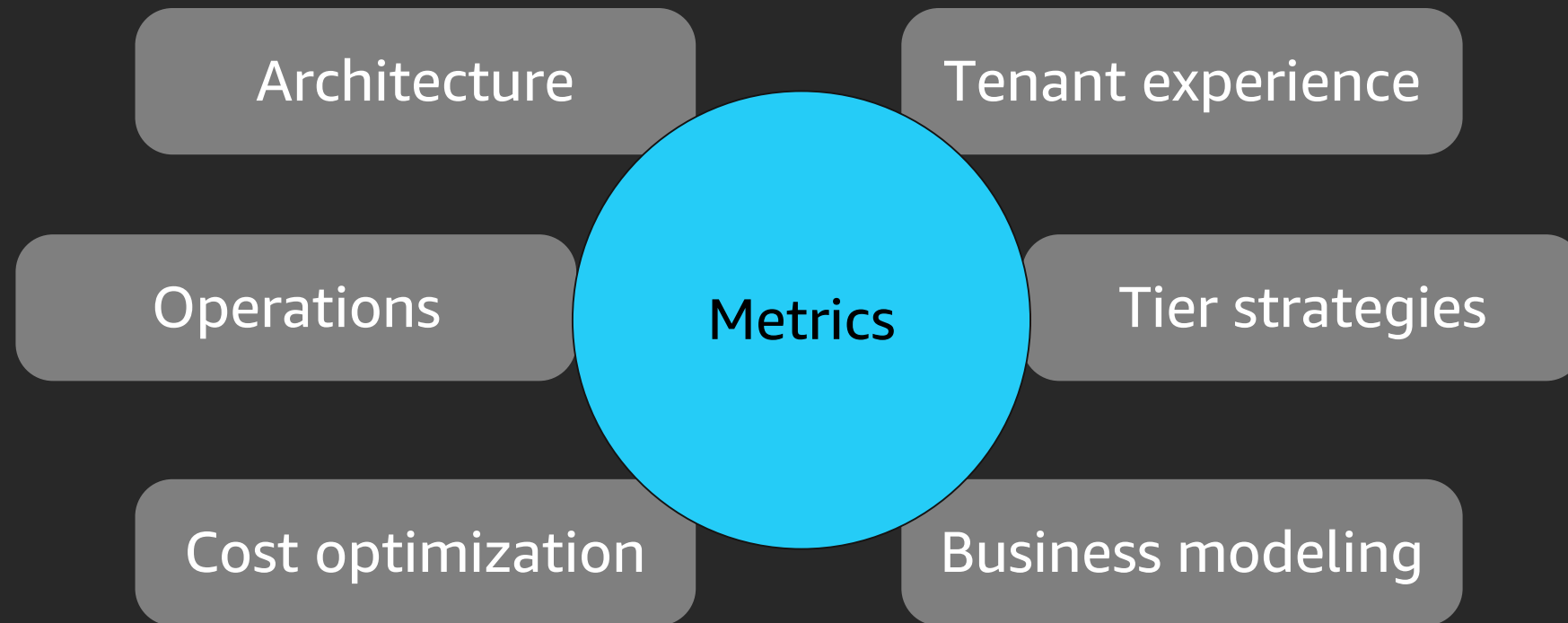# SaaS metrics deep dive: A look inside multi-tenant analytics

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Amazon Web Services

aws
re:Invent

Why do metrics matter?

Metrics are at the core of SaaS success

Architecture

Tenant experience

Operations

Metrics

Tier strategies

Cost optimization

Business modeling

Business, technical, and operational agility relies on rich metrics

The profile of activity is a moving target

Tenant profile on January 1

Tenant profile on June 1

Enabling operational views of tenant health

Most Active Tenants

- 🟢 T-Shirts For Techies
- 🟡 Unicorn Rental Agency
- 🟡 Golf Club Clearance Center
- 🔴 AnyCompany
- 🟢 Example Corp Rug Shop

Tenant Resource Consumption

Amazon DynamoDB

T-Shirts For Techies	12%
Unicorn Rental Agency	10%

Compute

AnyCompany	27%
Example Corp Rug Shop	9%

Tenant Service Activity

Catalog Manager	Unicorn Rentals	Example	Golf Club
Shopping Cart	AnyCompany	Unicorn	T-Shirts
Product Ratings	T-Shirts	Golf Club	Example

What kinds of metrics should you be capturing?
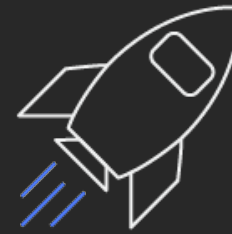
Metrics are more than tenant activity
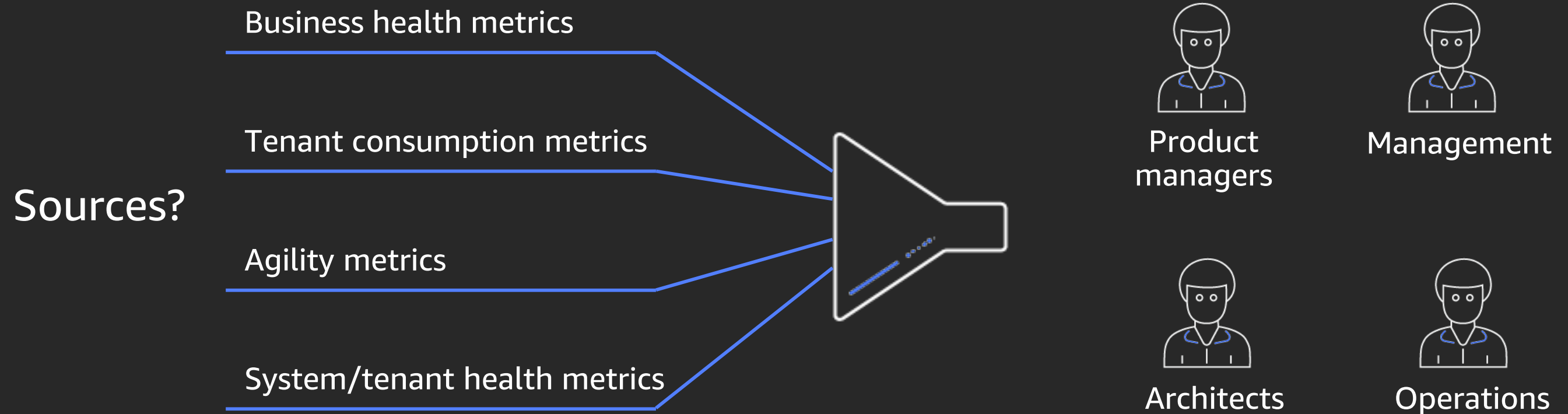
Business health

Tenant consumption

Agility

System/tenant health

More complex than just emitting system events or messages

A diverse range of sources and consumers

Business health metrics

Tenant consumption metrics

Sources?

Agility metrics

System/tenant health metrics

Product managers

Management

Architects

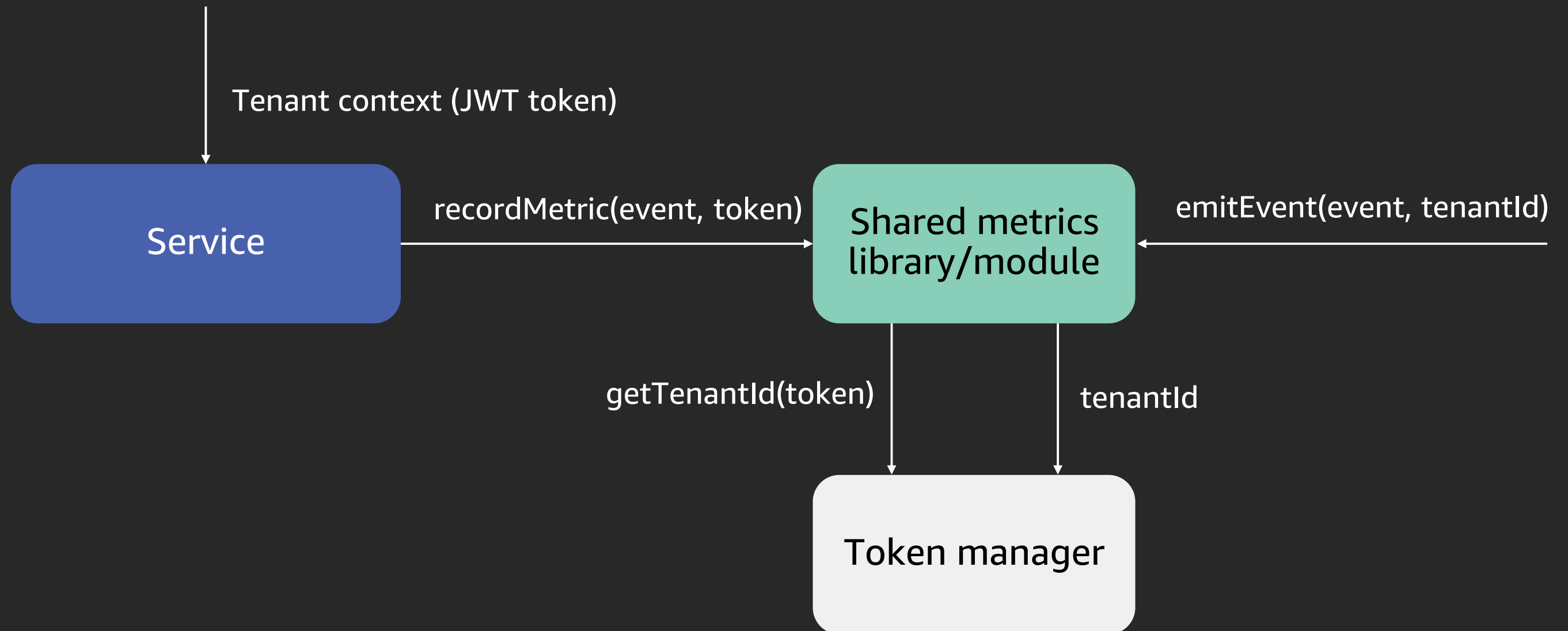Operations

Metrics can be used to convey agility

- Availability

- Cycle time

- Deployment/release frequency

- Mean time to detection (MTTD)

- Mean time to recovery (MTTR)

- Defect escape rate

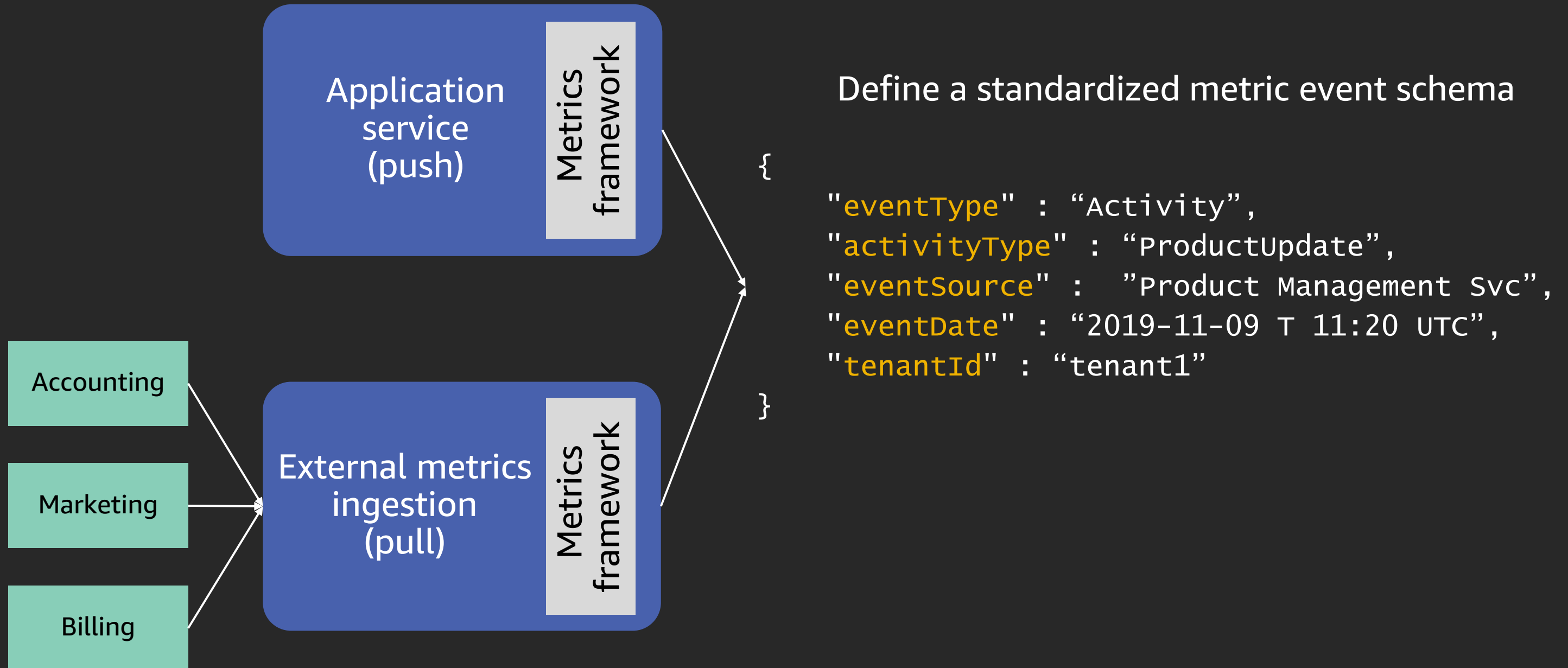- Failed deployments

- New tenants provisioned
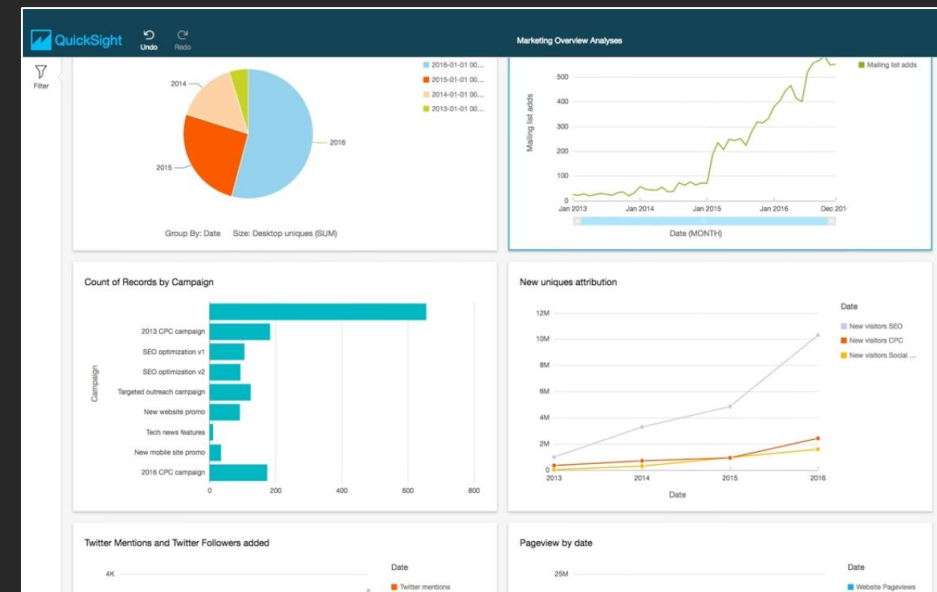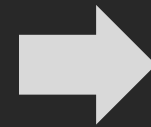
Organizational view of agility

How do we instrument our application with metrics?

Hiding away tenant context

Ingest and publish to a common representation

Application service (push) — Metrics framework

Accounting
Marketing
Billing

External metrics ingestion (pull) — Metrics framework

Define a standardized metric event schema

```
{

    "eventType" : "Activity",
    "activityType" : "ProductUpdate",
    "eventSource" :  "Product Management Svc",
    "eventDate" : "2019-11-09 T 11:20 UTC",
    "tenantId" : "tenant1"

}
```

What developer experience are you targeting?

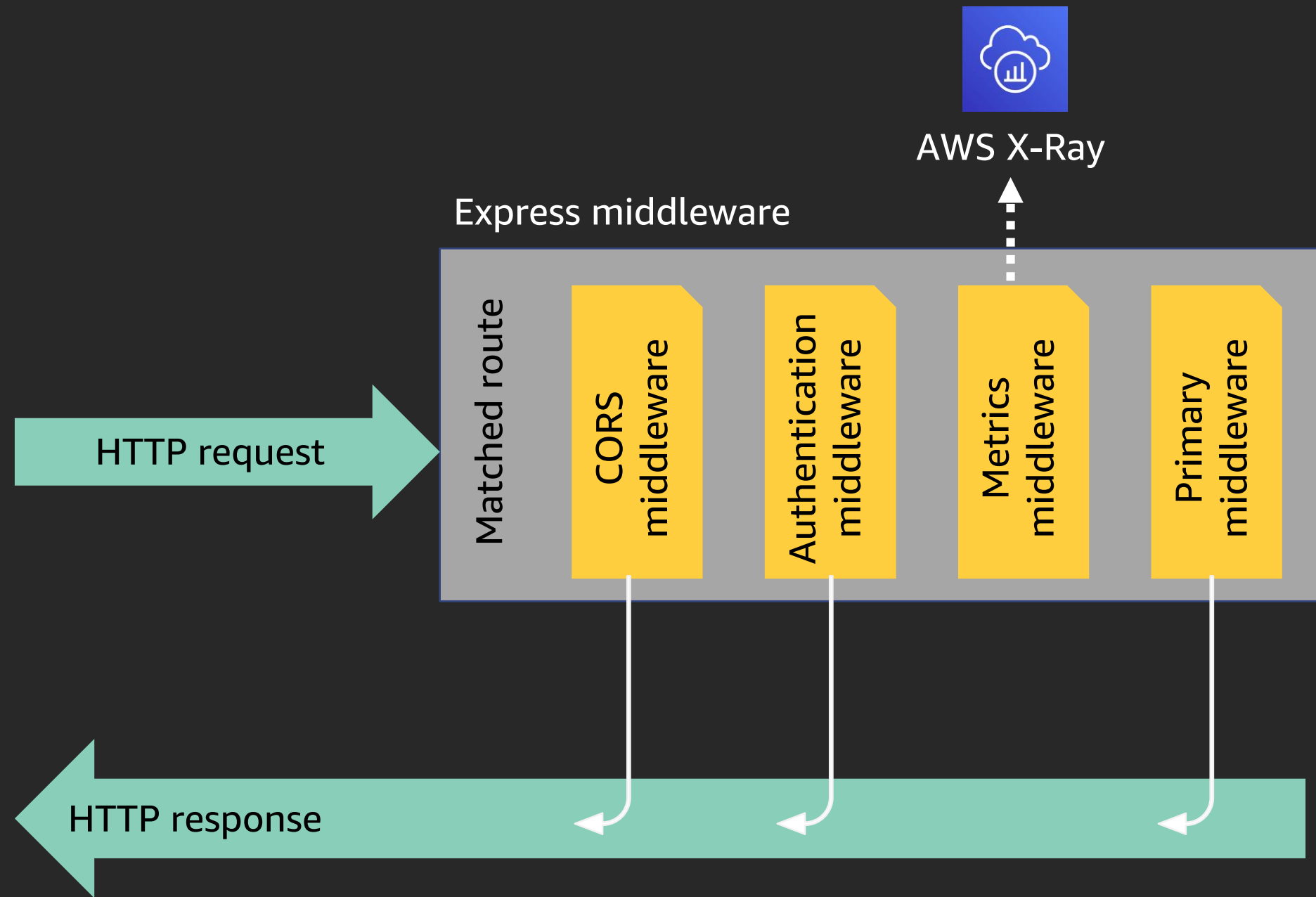# Using aspects with Java to capture common metrics
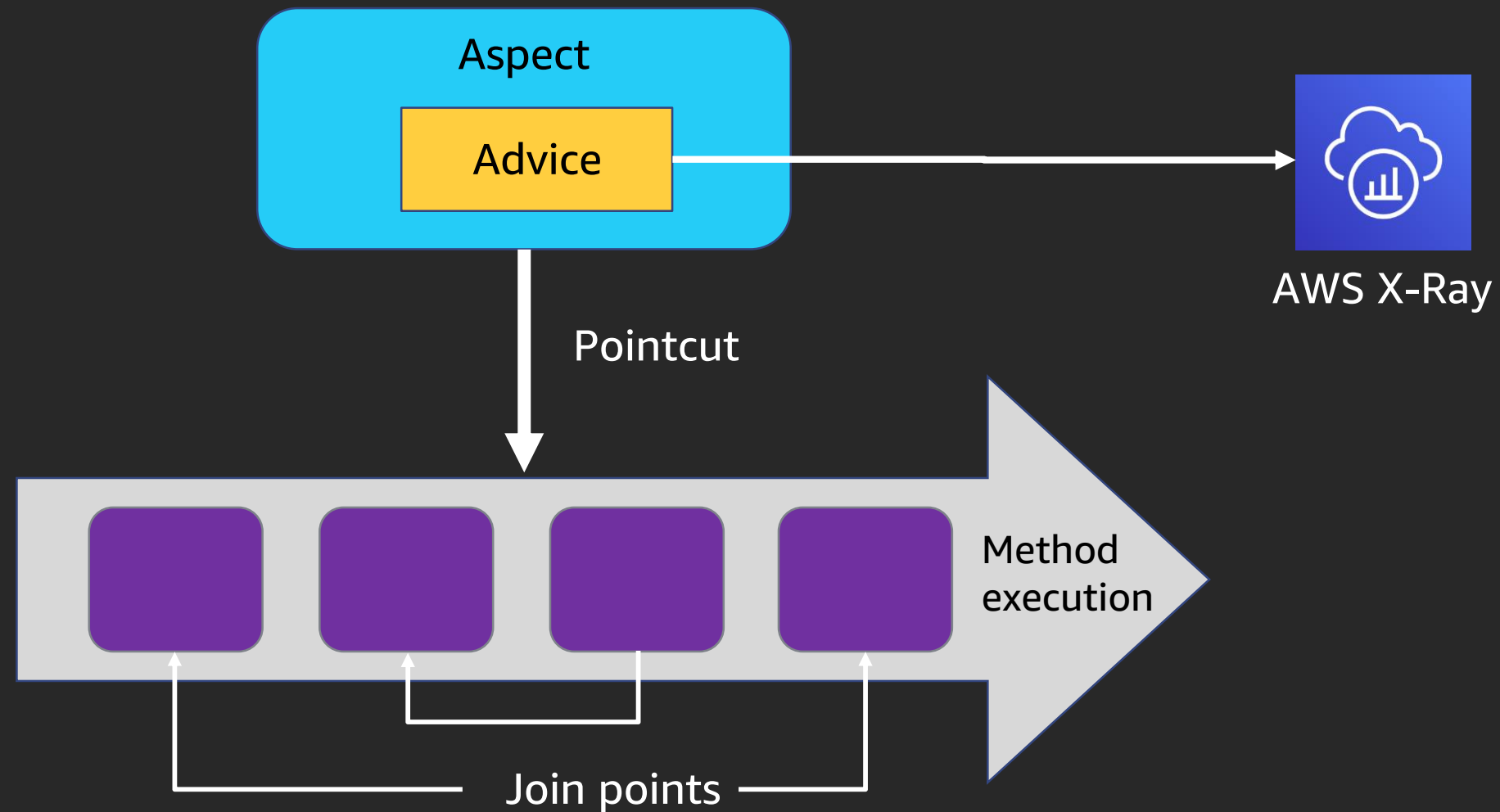
Wrapping lambda functions

```
var lambdaFunc = require('myModule/mymod.js');
var lambda = require('lambda-wrapper').wrap(lambdaFunc);
```

Metric capture injection

```
lambda.run(event, function(err, data) {
    if (err) {
        ... handle error
    }
    ... process data returned by the Lambda function
})
```

JavaScript middleware instrumentation

Extending open source metering tools

Meters – rate of events over time

```java
private final Meter requests = metrics.meter("requests");
public void handleRequest(Request request, Response response)
{

    requests.mark(tenantContextToken);

}
```

Counters – keep a running count events

```java
private final Counter pendingJobs = metrics.counter(name(QueueManager.class, "pending-jobs"));

public void addJob(Job job) {
    pendingJobs.inc(tenantContextToken);
}
public Job takeJob() {
    pendingJobs.dec(tenantContextToken);
}
```
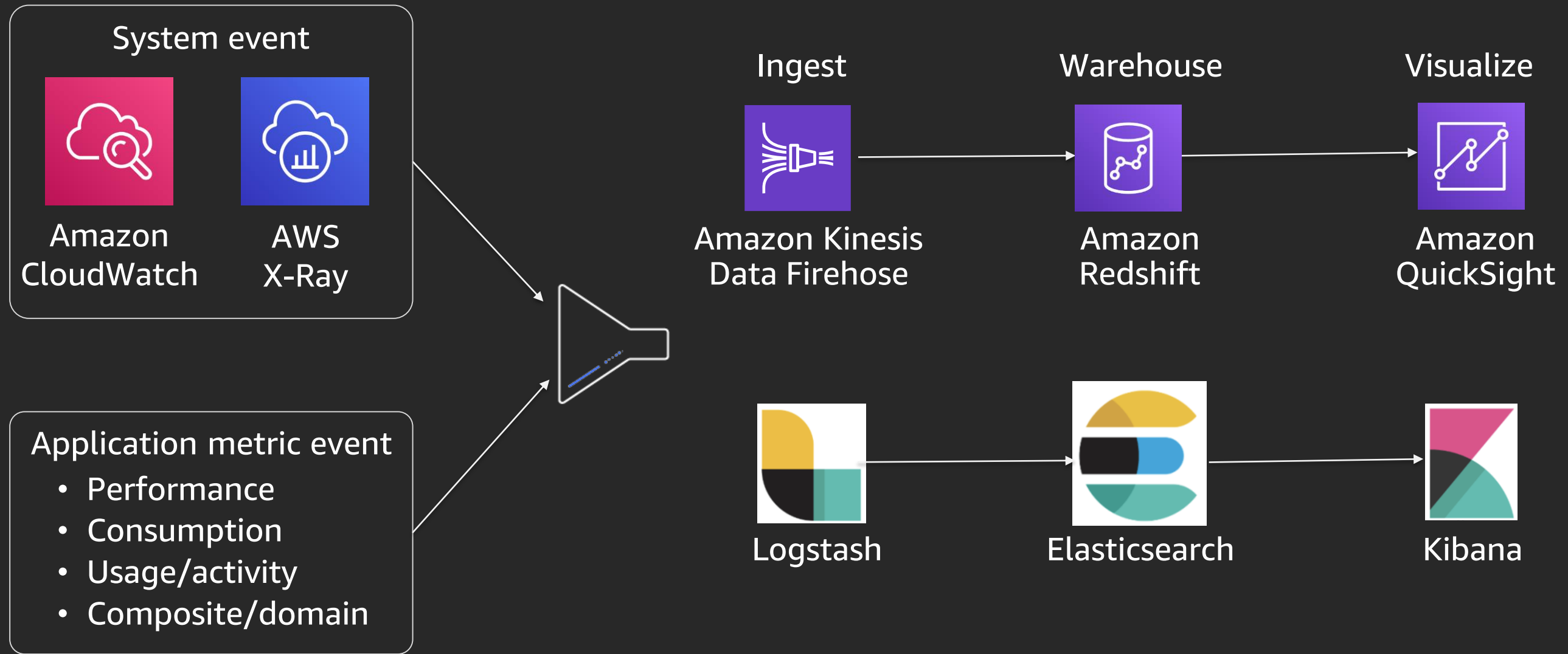
Extending open source metering tools

Timers – duration of an event

```java
final Timer timer = registry.timer(name(WebProxy.class, "get-requests"));
final Timer.Context context = timer.time();

try {
    // handle request
}
finally {
    context.stop();
}
```
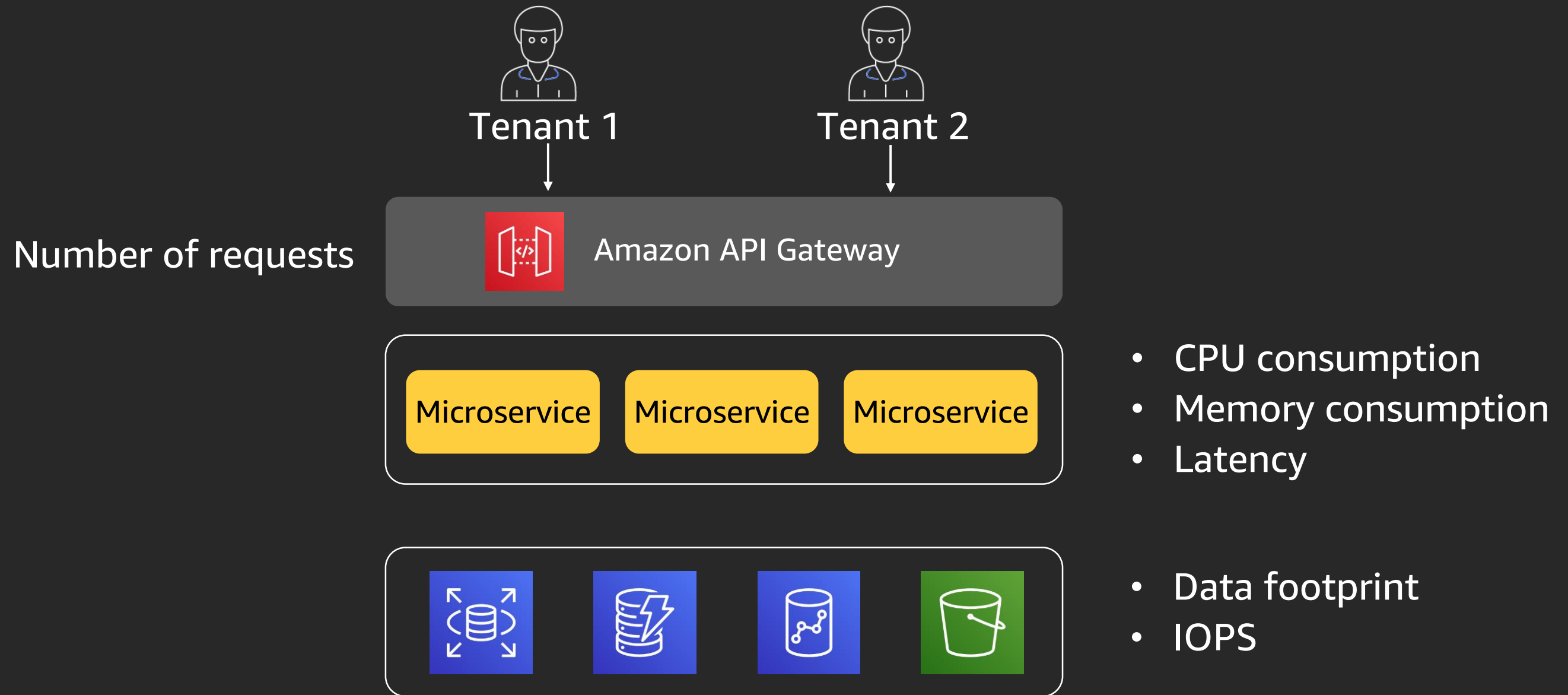
How will you aggregate and surface metrics data?

Aggregating metrics data

System event

Amazon CloudWatch

AWS X-Ray

Application metric event
- Performance
- Consumption
- Usage/activity
- Composite/domain

Ingest

Amazon Kinesis Data Firehose

Warehouse

Amazon Redshift

Visualize

Amazon QuickSight

Logstash → Elasticsearch → Kibana

What other types of metrics might be important to your business?

Deriving tenant consumption from metrics

Tenant 1

Tenant 2

Number of requests

Amazon API Gateway

Microservice   Microservice   Microservice

- CPU consumption
- Memory consumption
- Latency

- Data footprint
- IOPS

Developing composite metrics
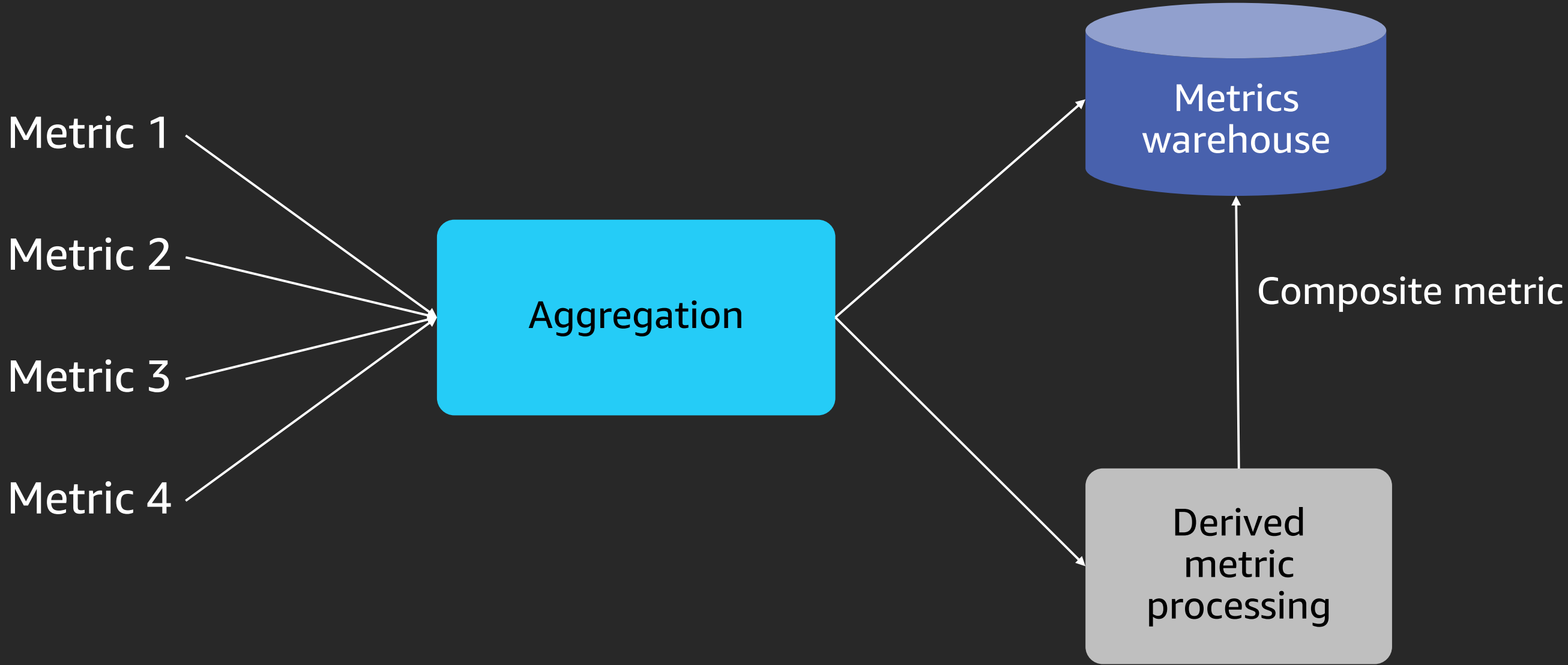
Can we use metrics for predictive analytics?

Related SaaS sessions

Breakouts

- ARC410 Serverless SaaS deep dive: Building serverless SaaS on AWS

- ARC210 Microservices decomposition for SaaS environments

- GPSTEC337 Architecting multi-tenant PaaS offerings with Amazon EKS

Chalk talks

- ARC305 Migrating single-tenant applications to multi-tenant SaaS

- GPSTEC306 Reinventing your technology product strategy with a SaaS delivery model

- API308 Monolith to serverless SaaS: Migrating to multi-tenant architecture

Related SaaS sessions (cont'd)

Workshops

- SVS303 Monolith to serverless SaaS: A hands-on service decomposition

- ARC308 Hands-on SaaS: Constructing a multi-tenant solution on AWS

Builder sessions

- ARC405 Building multi-tenant-aware SaaS microservices

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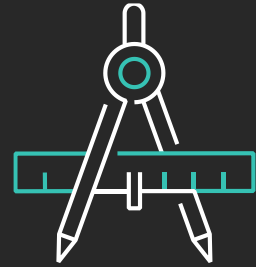
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Thank you!

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