



# COMMUNITY DAY

— AHMEDABAD —



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“Everything fails,  
all the time”

Werner Vogels  
CTO Amazon





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## The **Art of Insights:** **AWS** cloud native **Observability** Essentials

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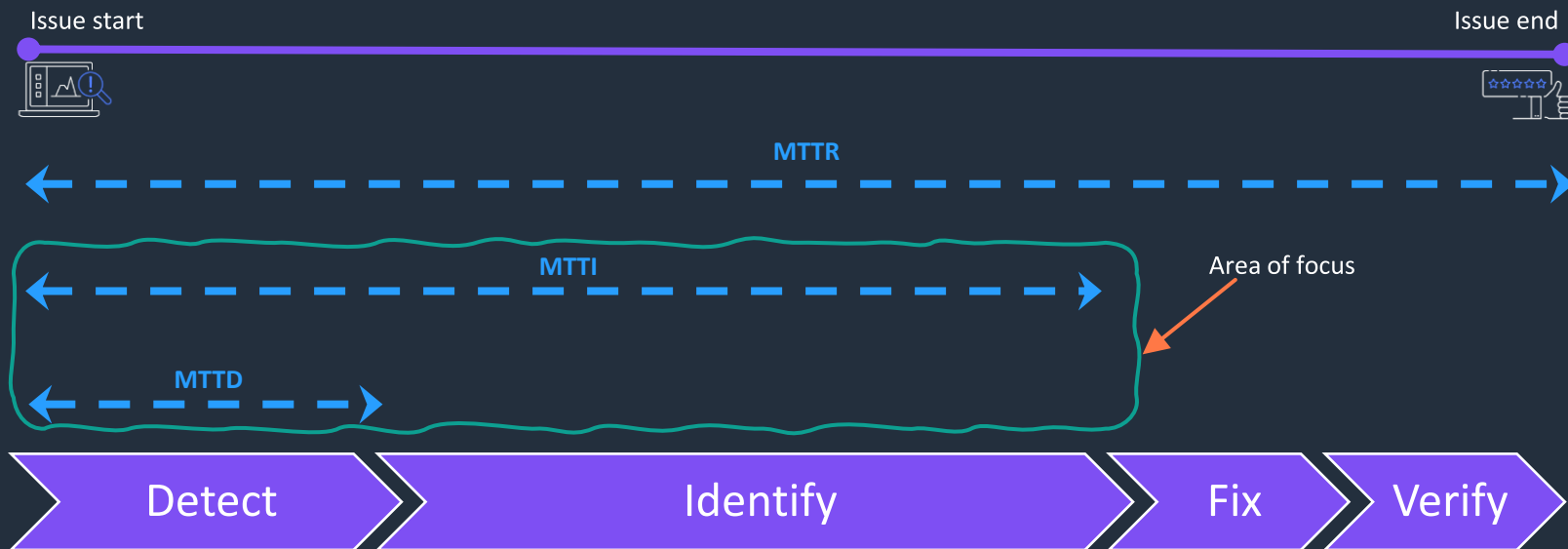
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Solutions Architect

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## Issue timeline





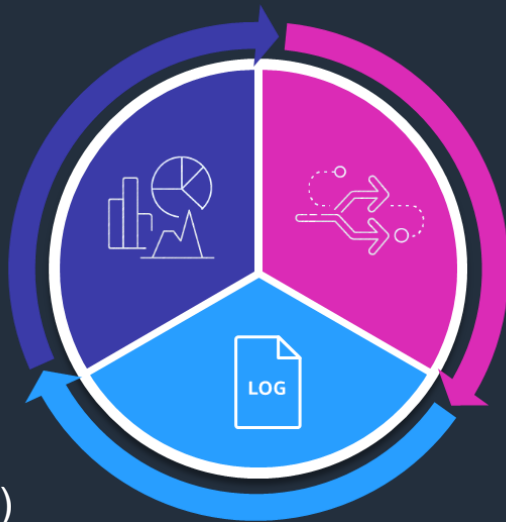
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# Foundations of observability



Metrics

Numeric data measured at various time intervals (time series data); SLIs (request rate, error rate, duration, CPU%, etc.)



Traces

A trace represents a single user's journey across multiple applications and systems (usually microservices)

Logs

Timestamped records of discrete events that happened within an application or system, such as a failure, an error, or a state transformation



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# Foundations of observability

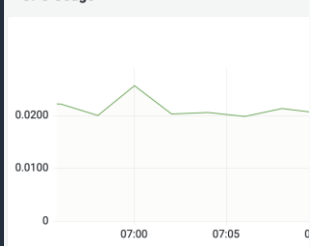


## Traces

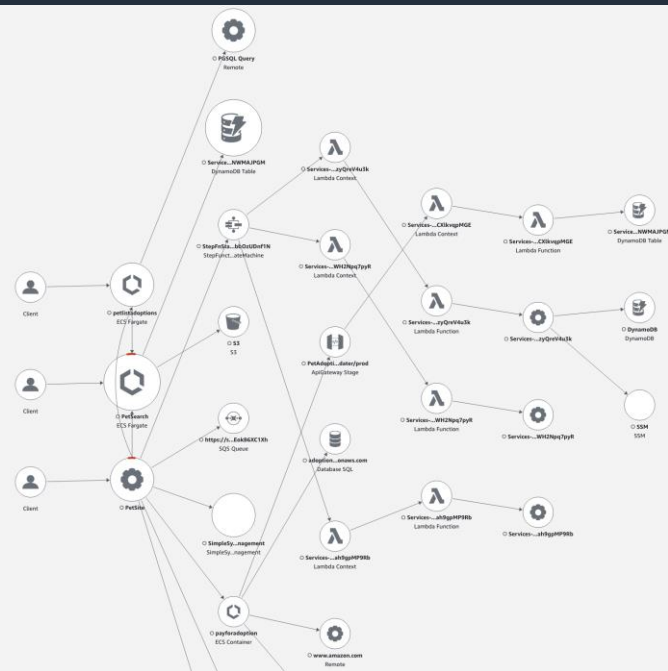
## Logs

## Metrics

▼ CPU Usage



[eCommerce] Orders		
Time	category	sku
> Oct 14, 2022 @ 10:57:07.000	Women's Clothing	ZO0060600606, ZO0052600526
> Oct 14, 2022 @ 10:47:02.000	Women's Shoes	ZO0371303713, ZO0030600306
> Oct 14, 2022 @ 10:38:24.000	Men's Clothing	ZO0583405834, ZO0458504585
> Oct 14, 2022 @ 10:19:41.000	Women's Clothing	ZO0265702657, ZO0706107061
> Oct 14, 2022 @ 10:13:12.000	Men's Clothing	ZO0130201302
> Oct 14, 2022 @ 10:03:50.000	Women's Clothing, Women's Shoes	ZO0032600326, ZO0014000140
> Oct 14, 2022 @ 09:56:38.000	Women's Shoes, Women's Clothing	ZO0019900199, ZO0643606436
> Oct 14, 2022 @ 09:49:26.000	Men's Shoes, Men's Clothing	ZO0690206902, ZO0297302973, ZO0565905659
> Oct 14, 2022 @ 09:43:41.000	Women's Shoes	ZO0019300193, ZO0367503675
> Oct 14, 2022 @ 09:43:41.000	Men's Accessories, Men's Clothing	ZO0467104671, ZO0424404244, ZO0571305713, ZO0000000000
> Oct 14, 2022 @ 09:37:55.000	Women's Shoes	ZO0367603676, ZO0704407044





## What do I **collect**?

What do my customers want?



What do stakeholders need?



What are my KPIs?

## What do I **observe**?

Customer experience



Metrics, logs, and traces



Identify data sources

## How do I **act**?

Alert when outcomes are at risk



Evaluate impact



Establish root cause and fix



# Observability Strategy KPIs



Begin with establishing what good looks like to your **end users**

Examples include

- Web page response times
- Failed purchases
- JavaScript errors
- New feature adoption rates
- Conversion rates and new customer acquisition

Outside-in



Begin by establishing what good looks like for your **backend applications**

Examples include

- Slow queries
- Integration health
- Container restarts
- Errors, faults, and retries
- CPU utilization, Disk usage, IOPS

Inside-out

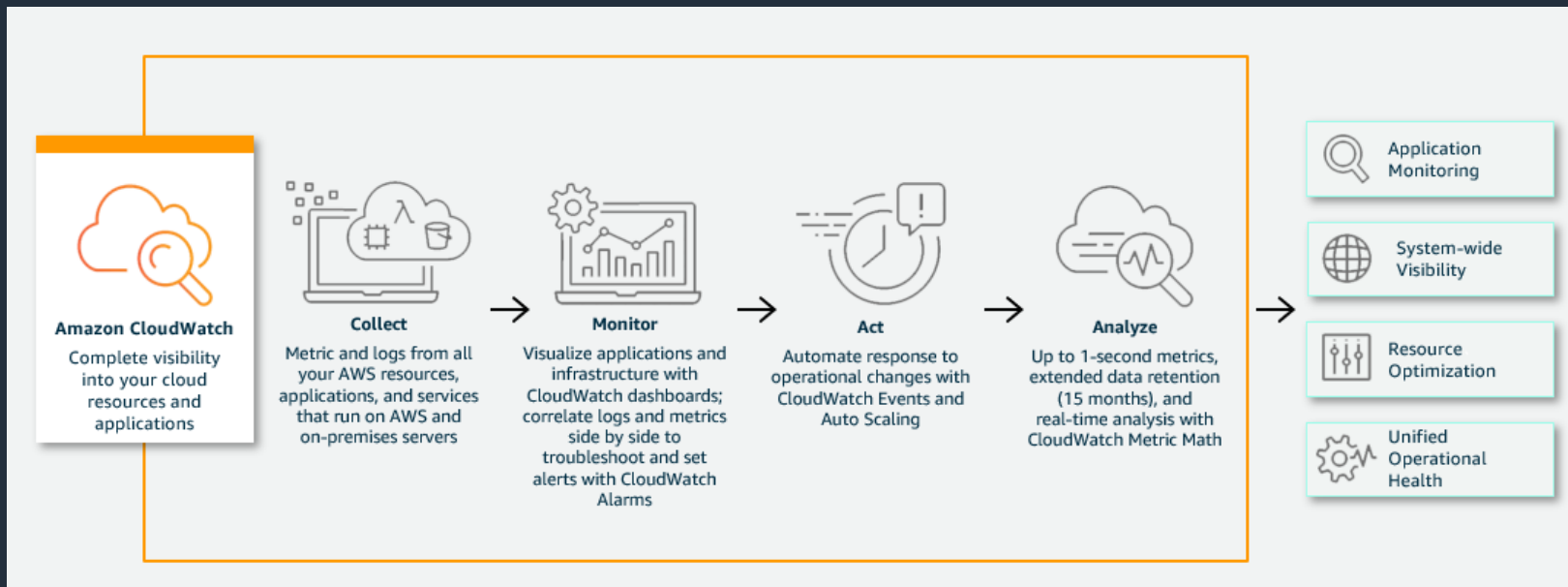


What you observe should reflect your desired **business outcomes**



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## Amazon CloudWatch





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## CloudWatch key features



### Anomaly Detection

### Logs Insights

#### Logs Insights

Select log groups, and then run a query or [choose a sample query](#).

Select log group(s)

/films/php\_error\_log

```
1 filter @message like /Exception/
2 | stats count(*) as exceptionCount by bin(4m)
3 | sort exceptionCount desc
```

Run query

Save

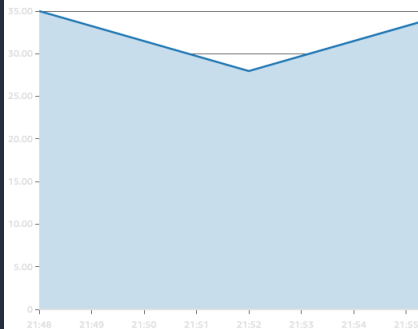
Actions

History

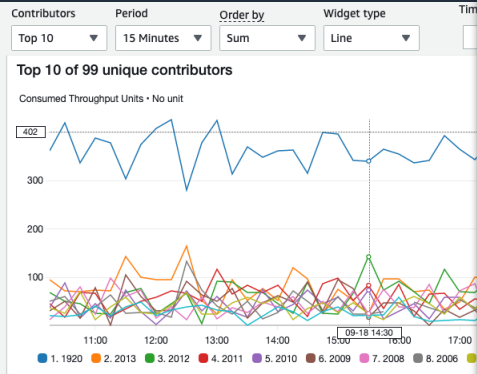
Queries are allowed to run for up to 15 minutes.

Logs Visualization

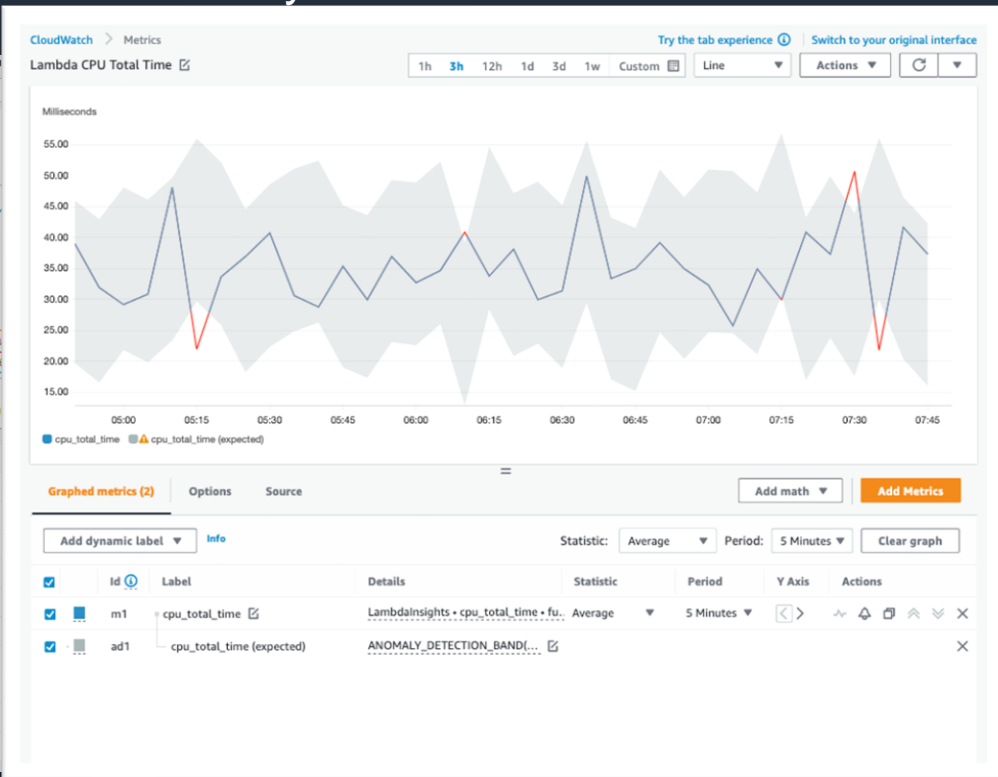
Stacked area



### Contributor Insights



#	PartitionKey
1	1920
2	2013
3	2012
4	2011
5	2010
6	2009
7	2008
8	2006
9	2007
10	2005





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## AWS X-Ray



### AWS X-Ray

AWS X-Ray helps you analyze and debug modern applications built using microservices and serverless architecture and quantify customer impact



### Collect traces

Collect data about the request from each of the underlying application services it passes through



### Record traces

X-Ray combines the data gathered from each service into singular units called traces



### View service map

View the service map to see trace data such as latencies, HTTP statuses, and metadata for each service



### Analyze issues

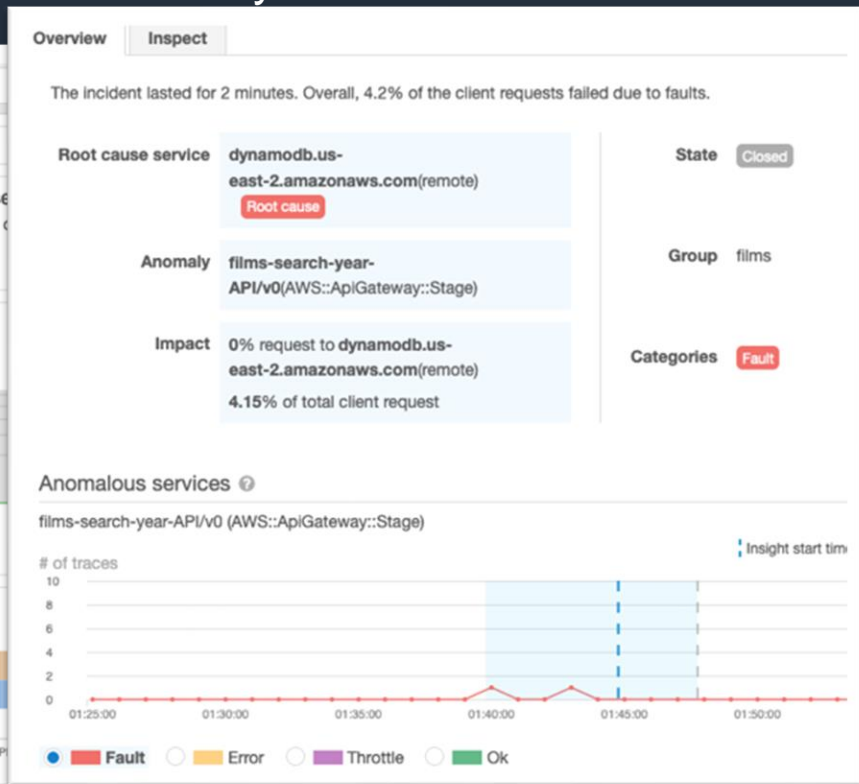
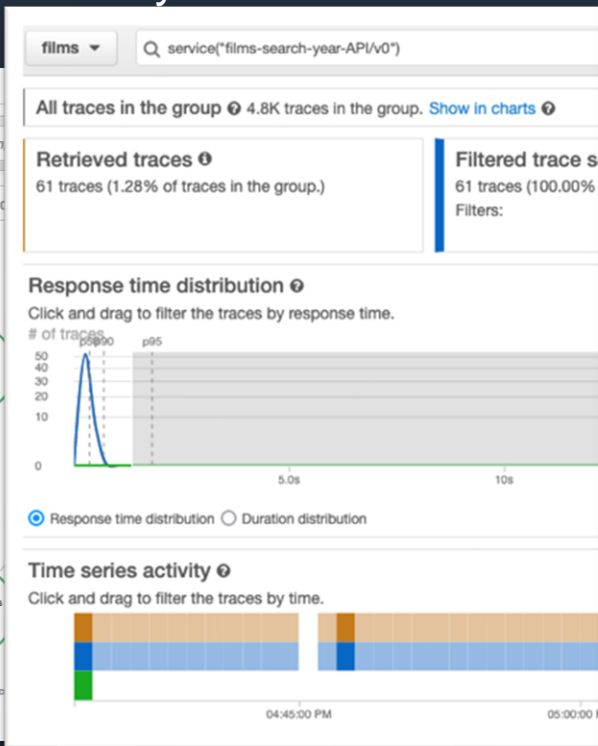
Drill into the service showing unusual behavior to identify the root issue



## Service Map

## Analytics

## Anomaly Detection





# COMMUNITY DAY AWS Distro for Open Telemetry (ADOT)



## AWS Distro for OpenTelemetry

Secure, production-ready open source distribution with predictable performance



### Collect traces

Collect data about the request from each application the request passes through



### Collect Application Metrics

Collect custom application metrics from each application the request passes through



### Correlate Traces & Metrics

Correlate traces and application metrics at ingestion to help in triaging issues faster



### AWS Resource and Contextual Data

Collect contextual information about AWS resources and metadata where the application code is running



AWS X-Ray



Amazon CloudWatch



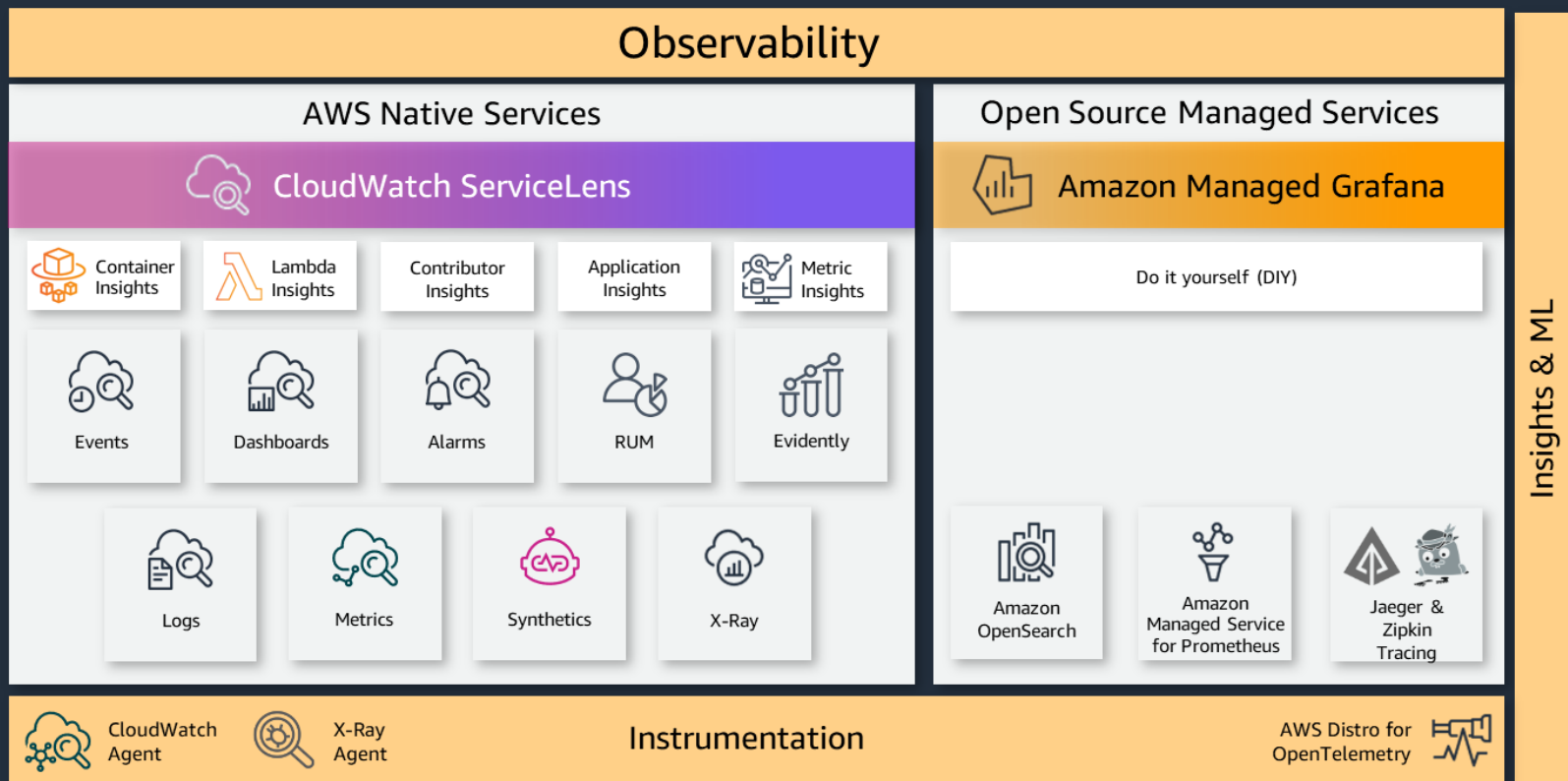
Amazon Managed Service for Prometheus



Partner monitoring solutions



# COMMUNITY DAY AWS-native observability stack





# COMMUNITY DAY AWS-native observability stack



Outside-in

**Digital experience**

CloudWatch Synthetics  
CloudWatch RUM  
CloudWatch Evidently  
CloudWatch Internet Monitor

**Application**

AWS X-Ray insights  
CloudWatch ServiceLens, Container Insights, Lambda Insights,  
Contributor Insights, CloudWatch Application Insights

**Infrastructure**

AWS X-Ray  
CloudWatch Logs, alarms, metrics, and dashboards

Inside-out



# Serverless Lens in AWS Well-Architected Tool



## Focus Areas

### OPS 1. How do you evaluate your Serverless application's health? [Info](#)

Evaluating your metrics, distributed tracing, and logging gives you insight into business and operational events, and helps you understand which services should be optimized to improve your customer's experience.

☒ Question does not apply to this workload [Info](#)

Select from the following

- ☐ Understand, analyze, and alert on metrics provided out of the box [Info](#)
- ☐ Use distributed tracing and code is instrumented with additional context [Info](#)
- ☐ Use structured and centralized logging [Info](#)
- ☐ Use application, business, and operations metrics [Info](#)
- ☐ None of these [Info](#)



# COMMUNITY DAY Serverless application model



## Operational excellence best practices

- Adopt a modern way to build applications
  - Use infrastructure as code
  - Define and deploy infrastructure in stages isolated in separate environments/accounts



## AWS Serverless Application Model (SAM)

```
AWSTemplateFormatVersion: '2010-09-09'
Transform: AWS::Serverless-2016-10-31
Resources:
  GetProductsFunction:
    Type: AWS::Serverless::Function
    Properties:
      Handler: index.getProducts
      Runtime: nodejs10.x
      CodeUri: src/
      Policies:
        - DynamoDBReadPolicy:
            TableName: !Ref ProductTable
  Events:
    GetResource:
      Type: Api
      Properties:
        Path: /products/{productId}
        Method: get
  ProductTable:
    Type: AWS::Serverless::SimpleTable
```



# COMMUNITY DAY AWS Lambda Powertools



Powertools is a developer toolkit to implement Serverless best practices and increase developer velocity.

## Key Features

Logger

Idempotency

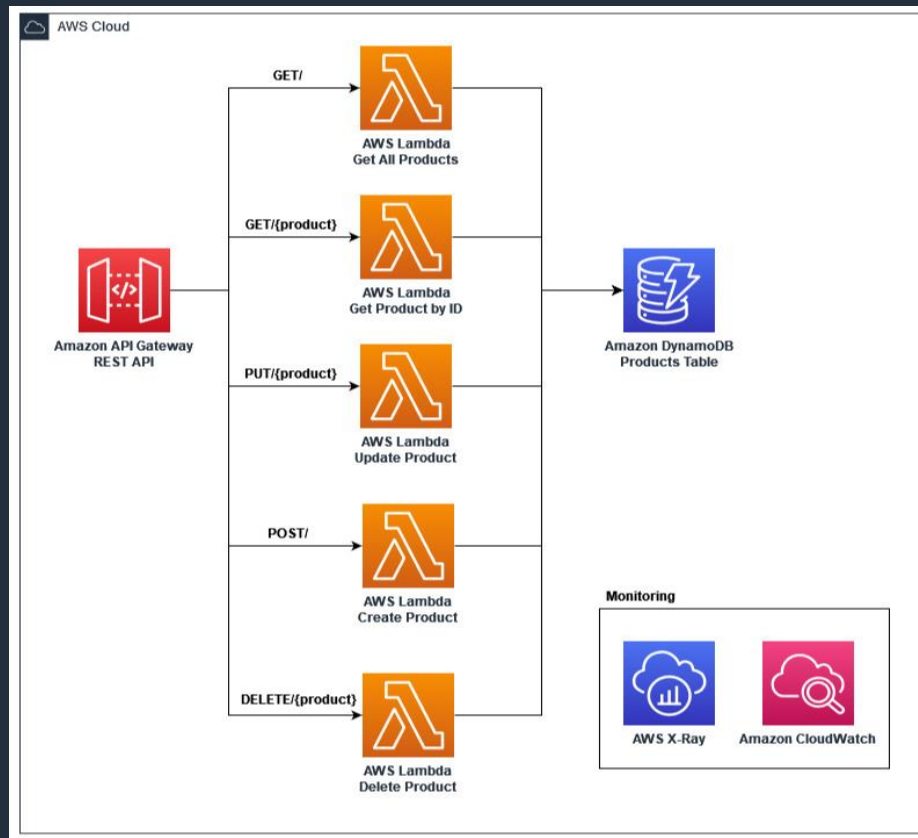
Metrics

Parameters

Tracer



## Demo





us-west-2.console.aws.amazon.com/cloud9/ide/8a79daf351d3495d97aee85158ecf40f?region=us-west-2

AWS Cloud9 File Edit Find View Go Run Tools Window Support Preview Run Auto

Go to Anything (⌘ P)

Environment

- Powertools - /home/ec2-user/environment
  - aws-lambda-powertools-java-idempotency
    - events
      - event.json
    - ProductsFunction
      - src
      - target
      - dependency-reduced-pom.xml
      - pom.xml
    - scripts
      - lab-1-test-data.sh
      - lab-2-test-data.sh
      - Untitled
      - CODE\_OF\_CONDUCT.md
      - CONTRIBUTING.md
      - LICENSE
      - README.md
      - samconfig.toml
      - template.yaml

Source Control

template.yaml ProductHandler.j

```
1 AWSTemplateFormatVersion: '2010-09-09'
2 Transform: AWS::Serverless-2016-10-31
3 Description: >
4   reinvent-2022-products
5
6   Sample SAM Template for reinvent-2022-products
7 Parameters:
8   MetricsNamespace:
9     Type: String
10    Default: ServerlessProductApp
11   ServiceName:
12     Type: String
13     Default: ProductService
14
15
16 Globals:
17   Function:
18     Tracing: Active
19     Runtime: java11
20     Timeout: 30
21     MemorySize: 1024
22     Environment:
23       Variables:
24         PRODUCT_TABLE_NAME: !Ref ProductsTable
25         POWERTOOLS_SERVICE_NAME: !Ref ServiceName
26         IDEMPOTENCY_TABLE: !Ref IdempotencyTable
27         POWERTOOLS_LOG_LEVEL: INFO
28         POWERTOOLS_METRICS_NAMESPACE: !Ref MetricsNamespace
29
30   Api:
31     TracingEnabled: True
32
33 Resources:
34   MyApi:
35     Type: AWS::Serverless::Api
36     Properties:
```

27:35 YAML Spaces: 2

.\*? aA 1 Find Replace With Replace Replace All

bash - "p-172-31" Immediate

main\* CodeWhisperer AWS: profile:default



# Thank You

*Questions ?*

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