USE THE OBSERVABILITY, LUKE!

How good is your monitoring?

Pawel Piwosz

CD.FOUNDATION

CD.Foundation Ambassador

AWS community builders

AWS Community Builders

AMBASSADOR

DevOps Institute

ADVANCING THE HUMANS OF DEVOPS

DevOps Institute Ambassador

LESS VISIBILITY

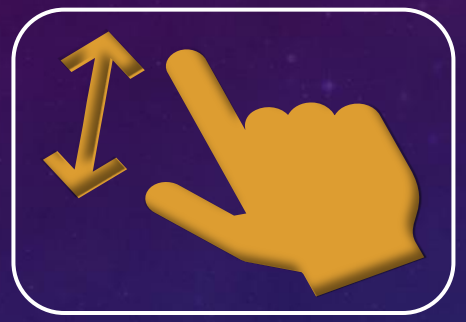
Bare metal

Virtual machine

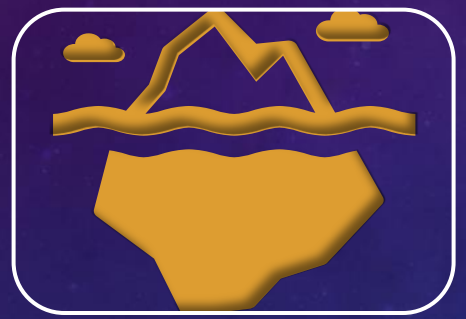
Container

Serverless

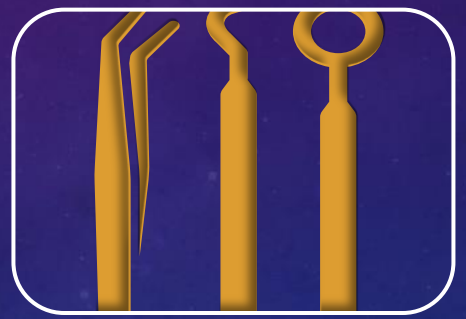
WHY?



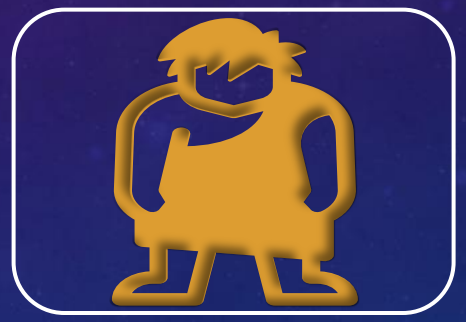
Less interactions



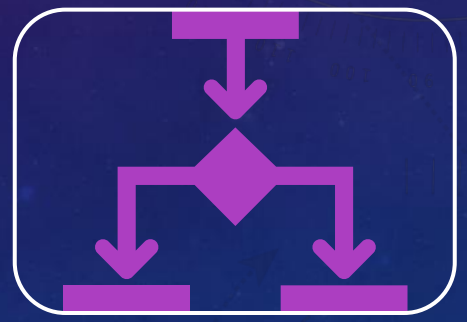
Less accessibility



More tools



„Central Logs are passe”



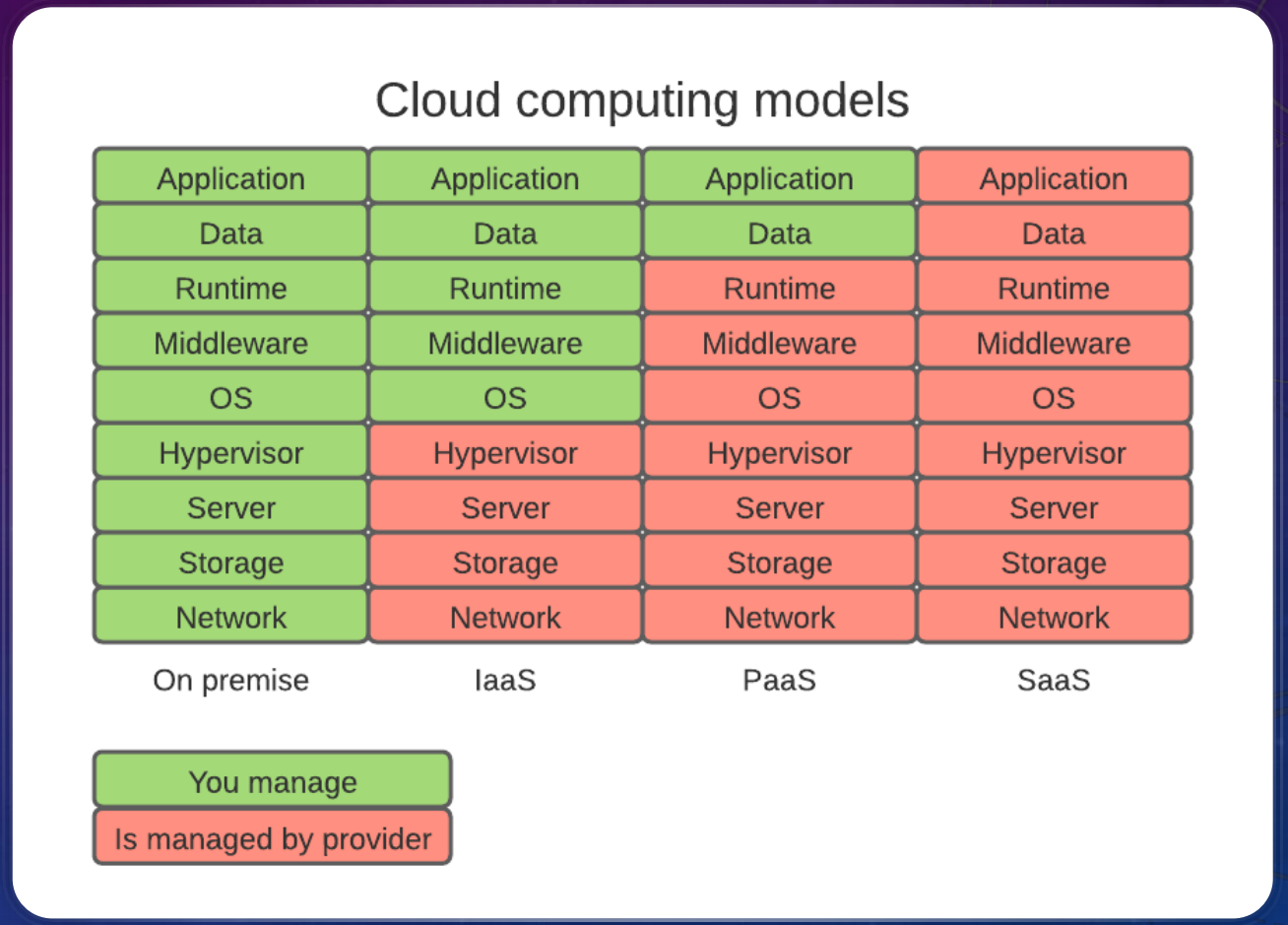
Decoupling

LESS VISIBILITY

IaaS

PaaS

SaaS (FaaS)



CULTURAL SHIFT

BECAUSE WE CANNOT CATCH LOGS AS WE USED TO DO…

WE HAVE TO CREATE NEW, MORE COMPLEX BUT MORE RESPONSIVE APPROACHES

STRUCTURED LOGS

Structured logging is the practice of implementing a consistent, predetermined message format for application logs that allows them to be treated as data sets rather than text.

(Sumologic)

Structured message != structured logs

STANDARD LOG LINE - EXAMPLE

<4>Nov 21 2:53:17 192.168.0.1 fluentd[11111]: [error] Syslog test

(Sumologic)

SCTRUCTURIZED MESSAGE - EXAMPLE

jsonPayload: { "pri": "6", "host": "192.168.0.1", "ident": "fluentd", "pid": "11111", "message": "[error] Syslog test" }

(Sumologic)

SCTRUCTURIZED LOG LINE - EXAMPLE

{ timestamp: 2017-04-10 09:50:32 -0700,username: dan12345,source_ip: 10.0.24.123,
method: GET,resource: /checkout/flights/,gateway: credit.payments.io,
audit: Success,flights_purchased: 2,value: 241.98,}

(Sumologic)

IT IS A GOOD START

But it isn’t the structured logs yet

OBSERVABILITY

ELEMENTS

Logs

Traces

Metrics


We write everything to logs
Well, with small “but”…
We write errors only
Because we must save money…

LOGS

Structurized

Consistent

Full information

Constructed for automated systems

Collected consistently

They asked for performance metrics

METRICS

Structurized

Consistent

Context!

Full information

Constructed for automated systems

Collected consistently

Relevant for business

Collected directly and from logs

Business waits for IT gathering data from logs

TRACES

Consistent

Collected consistently

Allow to track requests through the whole system

Performance measurements

“zooming option”

CONTEXT!

CONTEXT IN OBSERVABILITY

Understand surroundings

Understand the path

Understand the scale


There is something in the logs…
Then do something!

MEAL

MEAL – INTELLIGENT MONITORING FOUNDATION

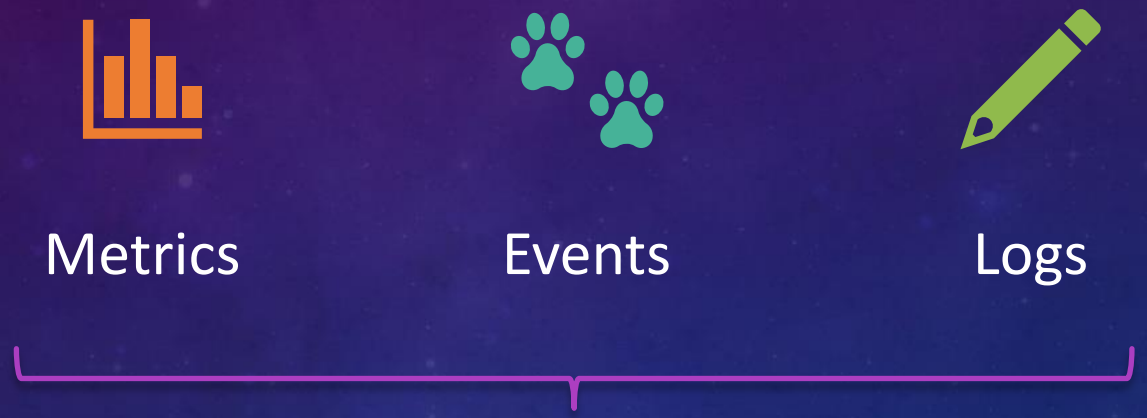
Logs

Events

Metrics

Actions

MEAL

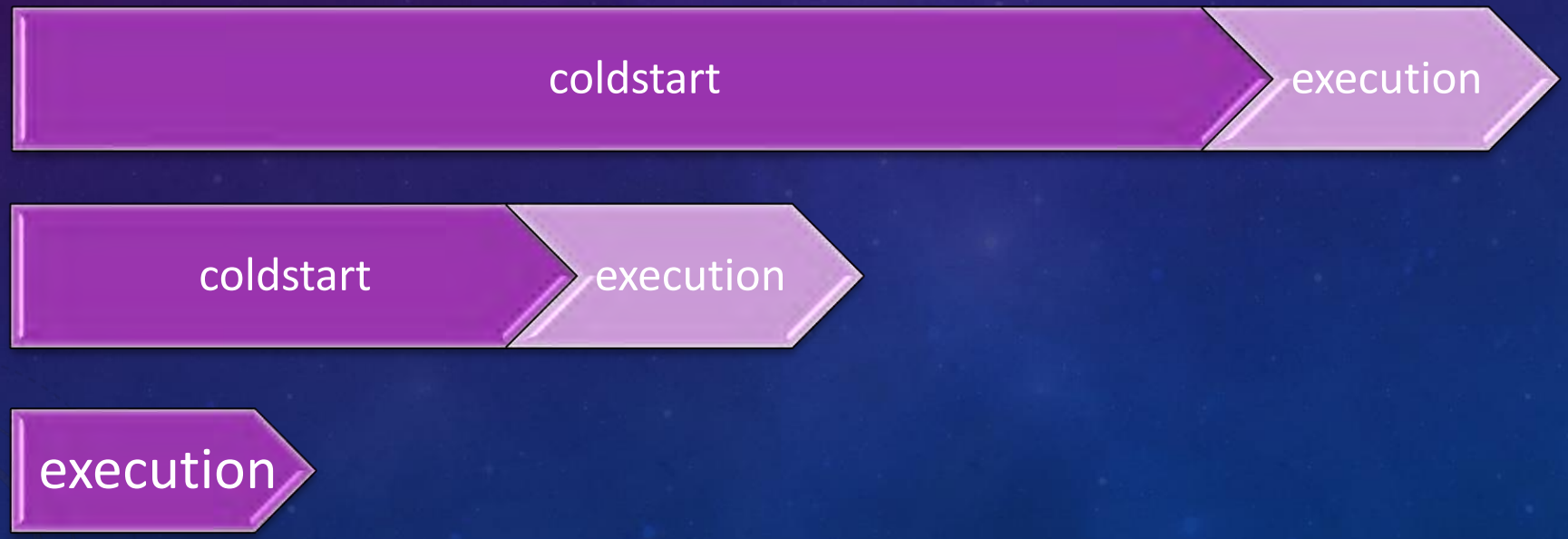


TECH STACK

AWS LAMBDA

ISSUES?

Coldstart
Lambda Insights (how many invocations suffers from coldstart)
X-Ray (what impact on invocation coldstart has)



AWS SAM

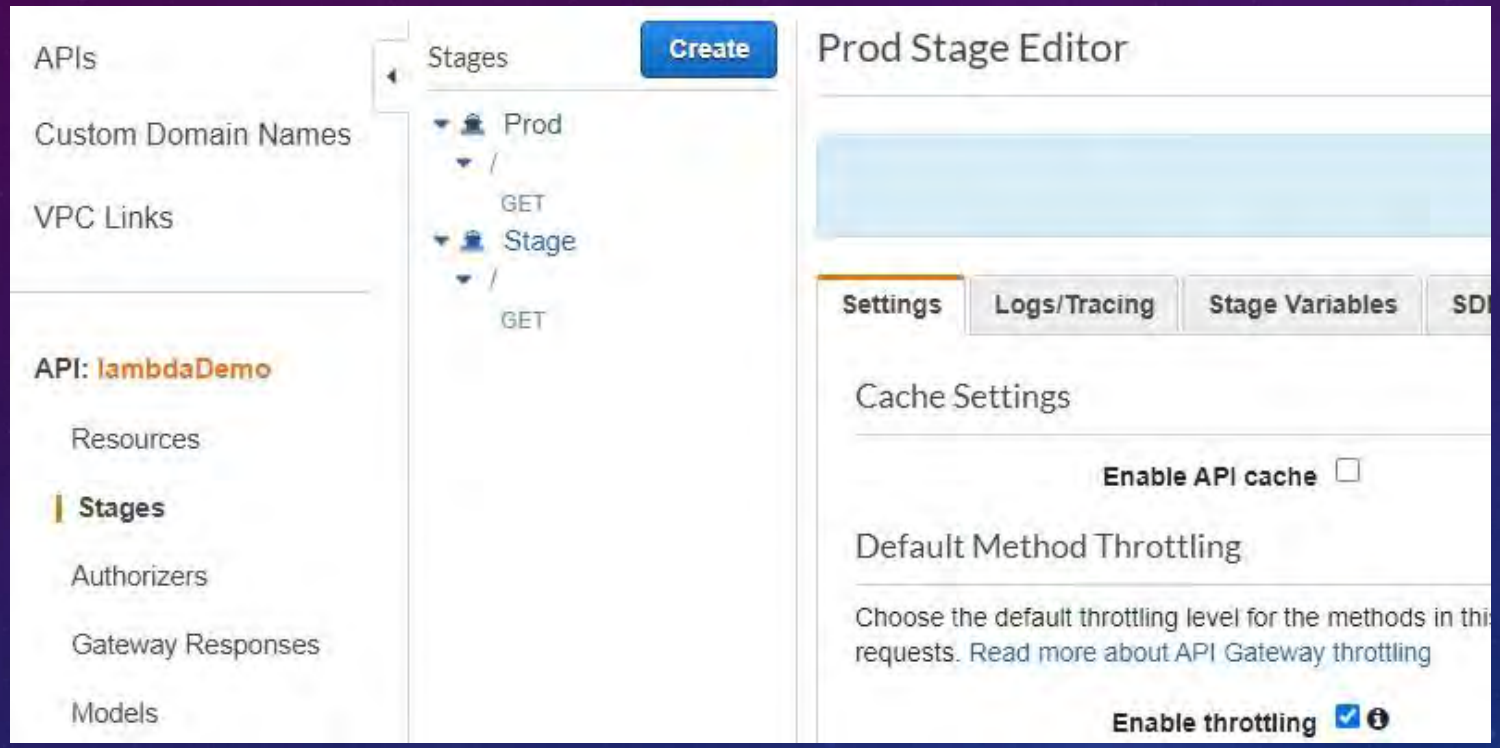
STANDARD TEMPLATE

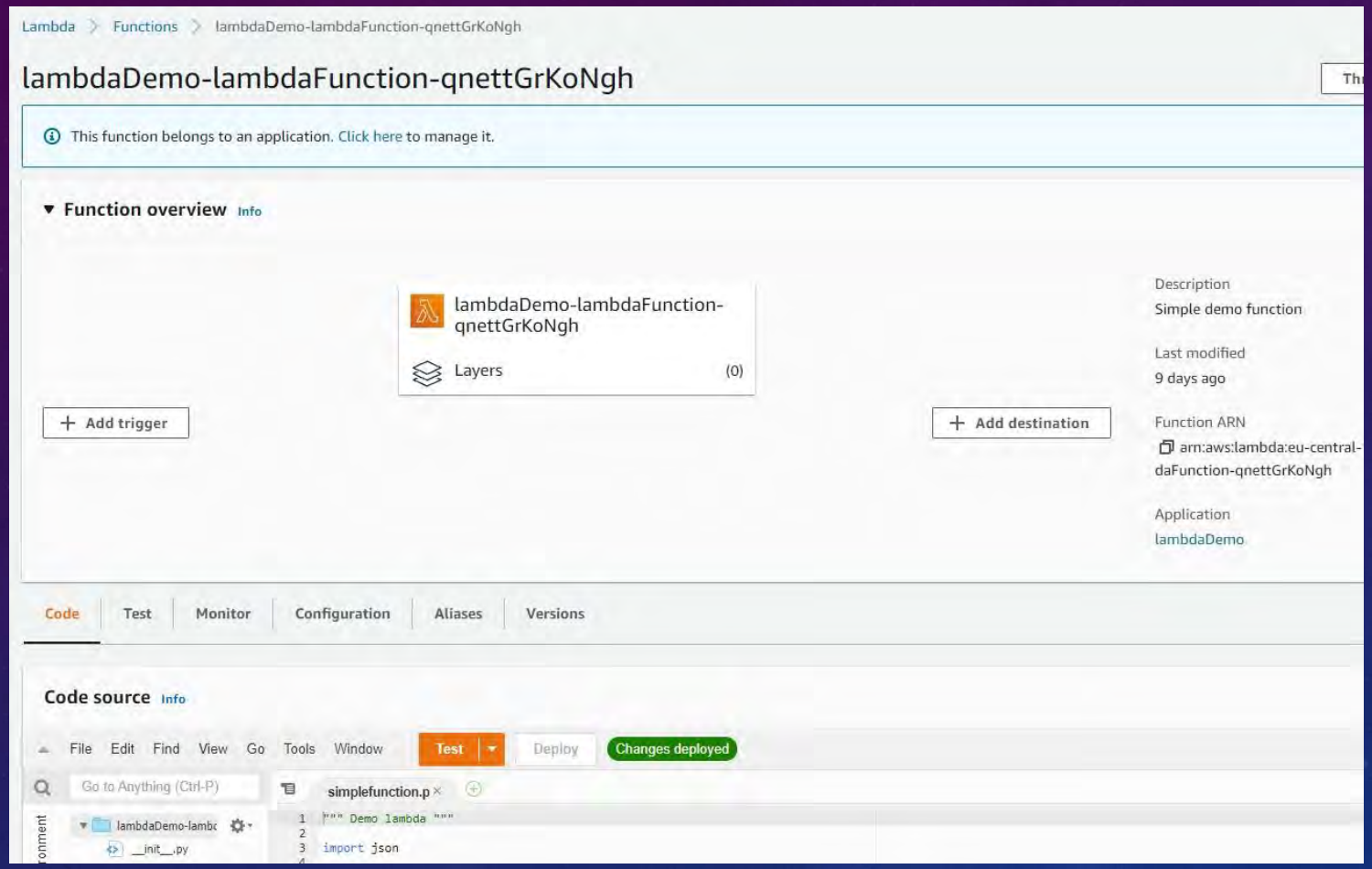
WITH STANDARD LOGGING

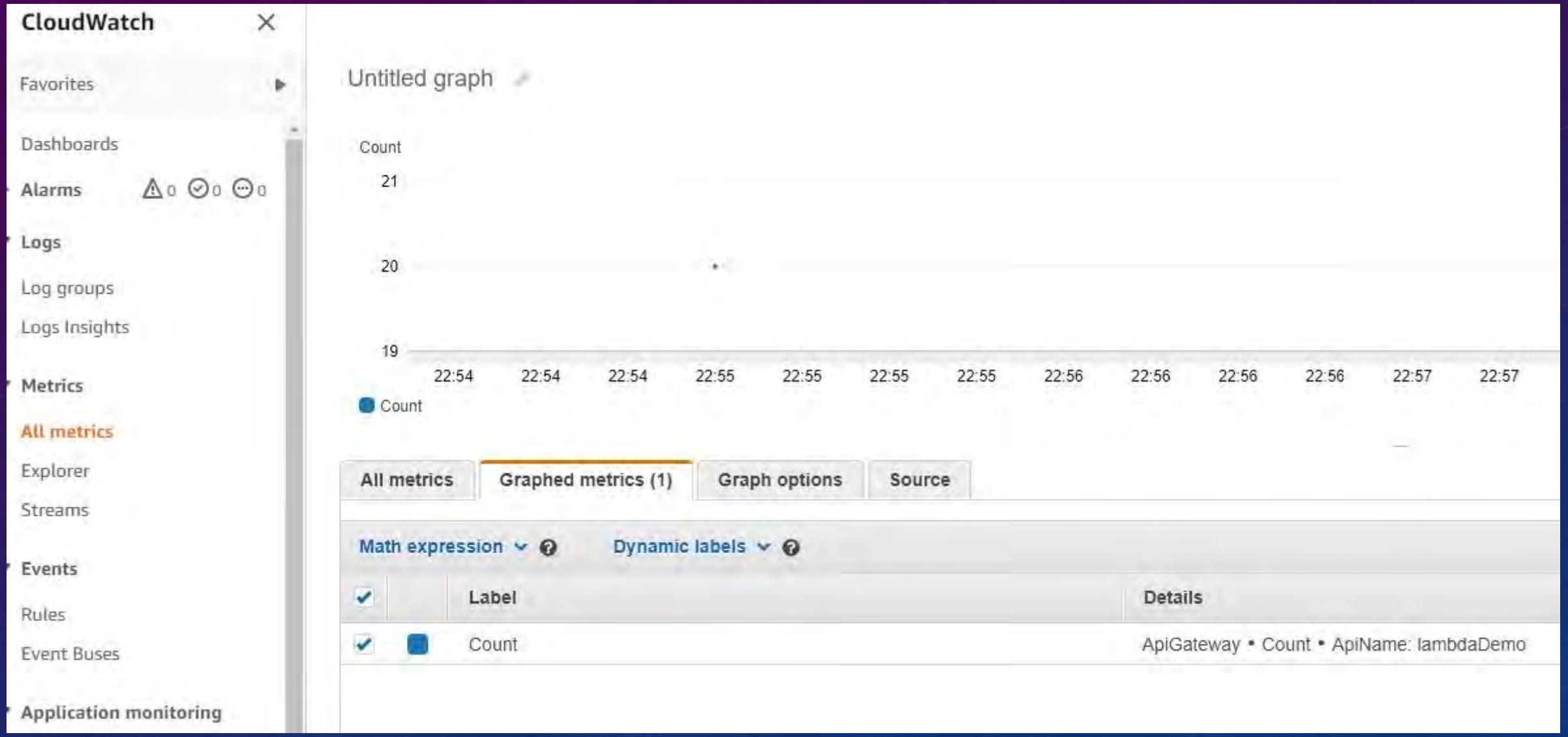
```yaml
AWSTemplateFormatVersion: 2010-09-09
Transform: AWS::Serverless-2016-10-31
Description: Simple Lambda

Resources:
  lambdaFunction:
    Type: AWS::Serverless::Function
    Properties:
      Handler: simplefunction.handler
      CodeUri: lambdafunction/
      Runtime: python3.8
      AutoPublishAlias: live
      Description: Simple demo function
      MemorySize: 128
      Timeout: 10
      Events:
        simpleApi:
          Type: Api
          Properties:
            Path: /
            Method: get
```

20 lines


APIs
Custom Domain Names
VPC Links
API: lambdaDemo
Resources
Stages
Authorizers
Gateway Responses
Models
Stages
Create
Prod
/
GET
Stage
/
GET
Prod Stage Editor
Settings
Logs/Tracing
Stage Variables
Cache Settings
Enable API cache
Default Method Throttling
Choose the default throttling level for the methods in thi
requests. Read more about API Gateway throttling
Enable throttling


Lambda
Functions
lambdaDemo-lambdaFunction-qnettGrKoNgh
lambdaDemo-lambdaFunction-qnettGrKoNgh
This function belongs to an application. Click here to manage it.
Function overview Info
lambdaDemo-lambdaFunction-qnettGrKoNgh
Layers (0)
Add trigger
Add destination
Description
Simple demo function
Last modified
9 days ago
Function ARN
arn:aws:lambda:eu-central-
daFunction-qnettGrKoNgh
Application
lambdaDemo
Code
Test
Monitor
Configuration
Aliases
Versions
Code source Info
File Edit Find View Go Tools Window
Test
Deploy
Changes deployed
Go to Anything (Ctrl-P)
simplefunction.p
lambdaDemo-lambc
__init__.py
""" Demo lambda """
import json


CloudWatch
Favorites
Dashboards
Alarms 0 0 0
Logs
Log groups
Logs Insights
Metrics
All metrics
Explorer
Streams
Events
Rules
Event Buses
Application monitoring
Untitled graph
Count
21
20
19
22:54
22:54
22:54
22:55
22:55
22:55
22:55
22:56
22:56
22:56
22:56
22:57
22:57
Count
All metrics
Graphed metrics (1)
Graph options
Source
Math expression
Dynamic labels
Label
Details
Count
ApiGateway • Count • ApiName: lambdaDemo

Code | Test | Monitor | Configuration | Aliases | Versions

Metrics | Logs | Traces

View logs in CloudWatch | View X-Ray traces in ServiceLens | View Lambda Insights | View profiles in CodeGuru

CloudWatch metrics Info

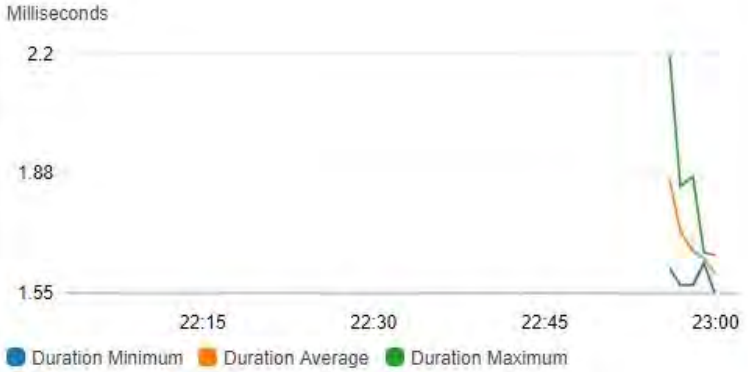
Filter by Function

Lambda sends runtime metrics for your functions to Amazon CloudWatch. The metrics shown are an **aggregate** view of all function runtime activity. To view metrics for the unqualified or $LATEST resource, choose an option in the dropdown list. To view metrics for a specific function version or alias, choose the qualifier name on the Function details page, and select the Monitoring page.

1h 3h 12h 1d 3d 1w Custom | Add to dashboard

Invocations

Duration



Error count and success rate (%)

Throttles

Count

Async delivery failures

1

IteratorAge

1

Timestamp	Message
	No older events at this moment. *Retry*
2021-10-23T00:56:14.358+02:00	START RequestId: fcff8d2a-2fd4-49ca-ab66-f667a77fe168 Version: 1

```
START RequestId: fcff8d2a-2fd4-49ca-ab66-f667a77fe168 Version: 1
```

Copy

2021-10-23T00:56:14.361+02:00	END RequestId: fcff8d2a-2fd4-49ca-ab66-f667a77fe168

```
END RequestId: fcff8d2a-2fd4-49ca-ab66-f667a77fe168
```

Copy

2021-10-23T00:56:14.361+02:00	REPORT RequestId: fcff8d2a-2fd4-49ca-ab66-f667a77fe168 Duration: 2.20 ms Billed Duration: 3 ms Memory Size: 128 MB Max Memory Used: 38 MB Init Duration: 128.83 ms XRAY TraceId: 1-6173…

```
REPORT RequestId: fcff8d2a-2fd4-49ca-ab66-f667a77fe168  Duration: 2.20 ms       Billed Duration: 3 ms   Memory Size: 128 MB     Max Memory Used: 38 MB  Init Duration: 128.83 ms
XRAY TraceId: 1-6173418e-794c020e43914b962a8a5282       SegmentId: 59fe41ca00bb8a36     Sampled: true
```

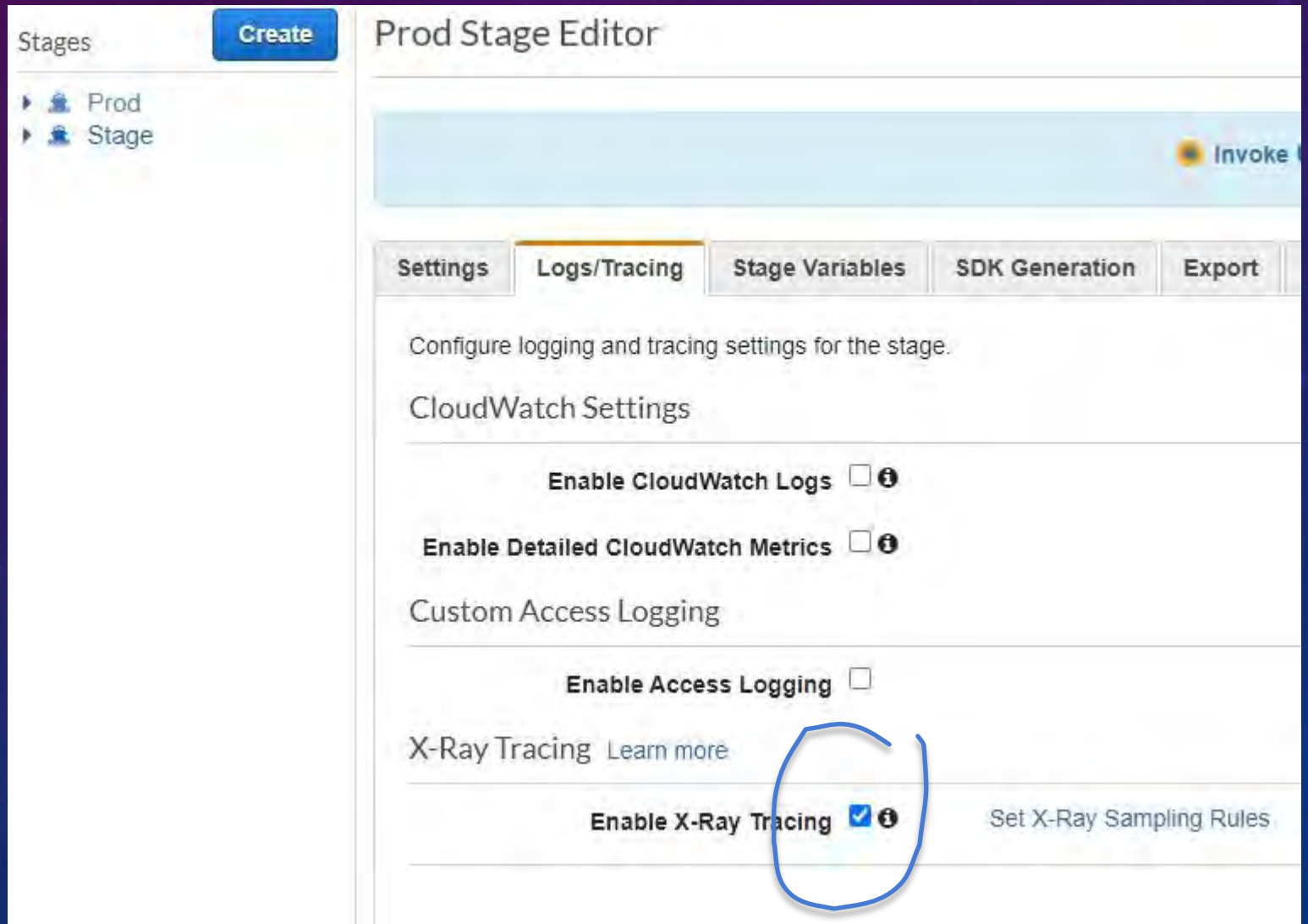
Copy

2021-10-23T00:56:17.520+02:00	START RequestId: 6bbdd1fd-b521-4545-9153-2c5666703e1f Version: 1
2021-10-23T00:56:17.524+02:00	END RequestId: 6bbdd1fd-b521-4545-9153-2c5666703e1f
2021-10-23T00:56:17.524+02:00	REPORT RequestId: 6bbdd1fd-b521-4545-9153-2c5666703e1f Duration: 1.91 ms Billed Duration: 2 ms Memory Size: 128 MB Max Memory Used: 39 MB XRAY TraceId: 1-61734191-2d3a52562044e12e422a…
2021-10-23T00:56:19.528+02:00	START RequestId: 198f89d9-cff7-41e3-a08e-7a3820b47e66 Version: 1
2021-10-23T00:56:19.533+02:00	END RequestId: 198f89d9-cff7-41e3-a08e-7a3820b47e66

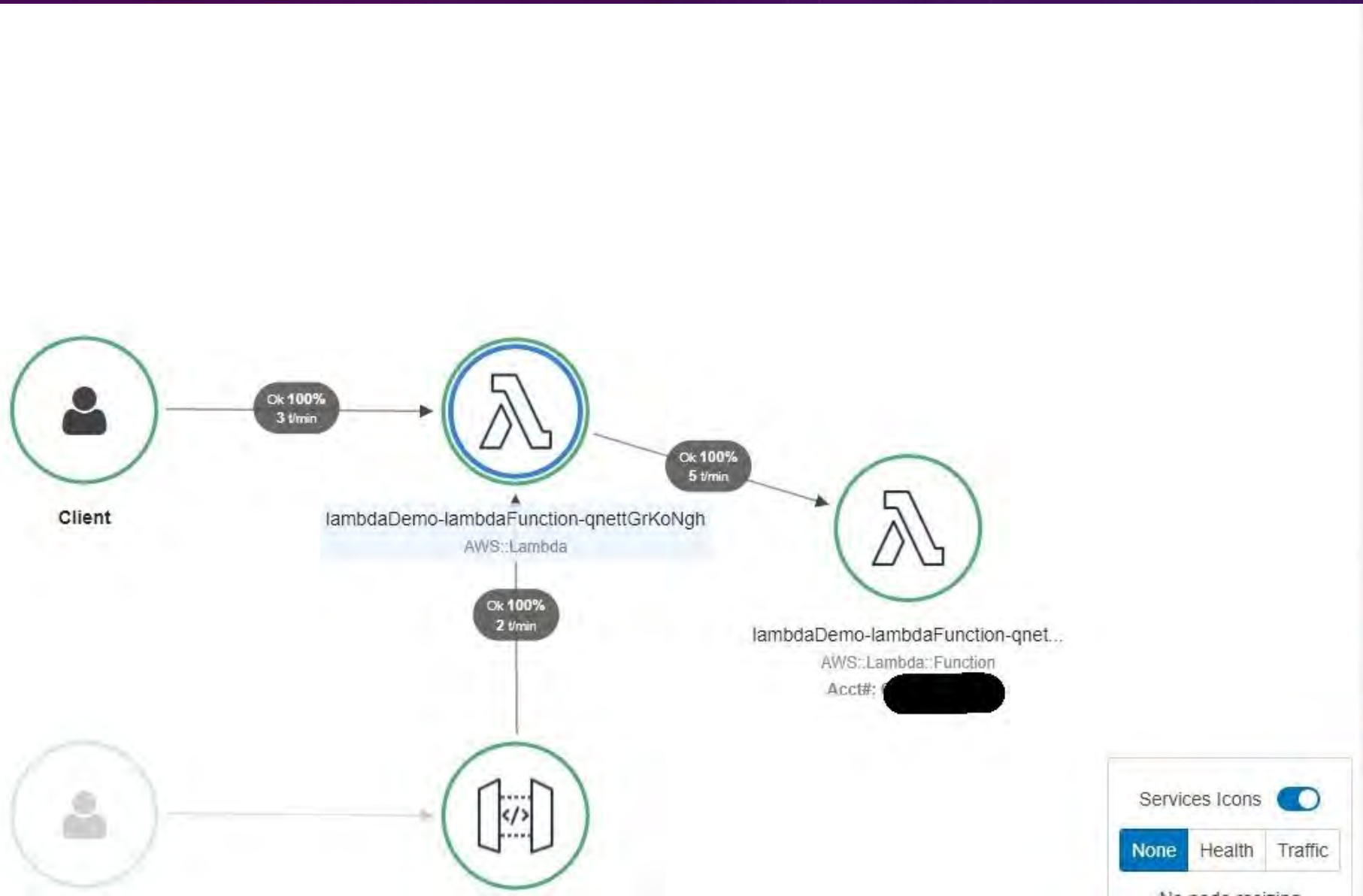

IMPROVE!

ENABLE X-RAY (LAMBDA)

ENABLE X-RAY (API GATEWAY)



THE EFFECT

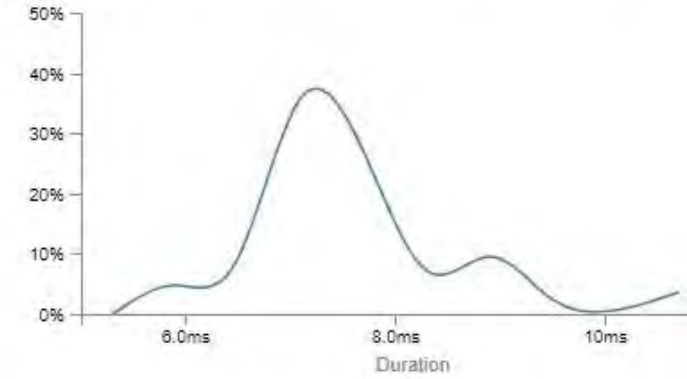


Name: lambdaDemo-lambdaFunction-qnettGrKoNgh

Type: AWS::Lambda

Response distribution

Click and drag to select an area to zoom in on or use as a latency filter viewing traces.



Response status

Choose response statuses to add to the filter when viewing traces.

- Fault: 0%
- Error: 0%
- Throttle: 0%
- OK: 100%

Analyze traces | View traces

Trace list

ID	AGE	METHOD	RESPONSE	RESPONSE TIME
...7b0a8b236f59f2b	6.1 min	GET	200	28.0 ms
...f0e79294b27a13e	5.4 min	GET	200	26.0 ms
...55904d60e0d0ad	6.1 min	GET	200	26.0 ms
...106e2209363b9d	6.1 min	GET	200	25.0 ms
...2f5b58f830c4fb42	6.1 min	GET	200	24.0 ms
...15a6cb642dbc2e5	5.4 min	GET	200	22.0 ms
...7636f44c2fe8ccb5	6.0 min	GET	200	20.0 ms
...cb7121a45eb16c5	6.0 min	GET	200	20.0 ms
...2ff2e4ef1bab222b	6.0 min	GET	200	19.0 ms
...2c483f0814ee87f9	6.1 min	GET	200	17.0 ms
...3c4eca8411d1b9b	6.0 min	GET	200	16.0 ms
...0e3680a5f291121	10.2 min		200	9.0 ms

AWS X-Ray

- Getting started
- Insights new
- Service map
- Traces
- Analytics
- Configuration
- Sampling
- Encryption
- Groups new

AWS X-Ray

- Getting started
- Insights new
- Service map
- Traces
- Analytics
- Configuration
- Sampling
- Encryption
- Groups new

Traces > Details

1-61734922-6392a51a13c4eca8411d1b9b

Timeline | Raw data

Method	Response	Duration	Age	ID
GET	200	16.0 ms	10.5 min (2021-10-22 23:28:34 UTC)	1-61734922-6392a51a13c4eca8411d1b9b

Trace Map

Name	Res.	Duration	Status
lambdaDemo/Prod AWS::ApiGateway::Stage			
lambdaDemo/Prod	200	16.0 ms	✓
Lambda	200	13.0 ms	✓
lambdaDemo-lambdaFunction-qnettGrKoNgh AWS::Lambda			
lambdaDemo-lambdaFunction-qnettGrKoNgh	200	6.0 ms	✓
lambdaDemo-lambdaFunction-qnettGrKoNgh AWS::Lambda::Function			
lambdaDemo-lambdaFunction-qnettGrKoNgh	-	1.7 ms	✓
Invocation	-	1.2 ms	✓
Overhead	-	0.1 ms	✓

0.0ms 2.0ms 4.0ms 6.0ms 8.0ms 10ms 12ms 14ms 16ms

ENABLE LAMBDA INSIGHTS

THE EFFECT

Invocations | Application logs

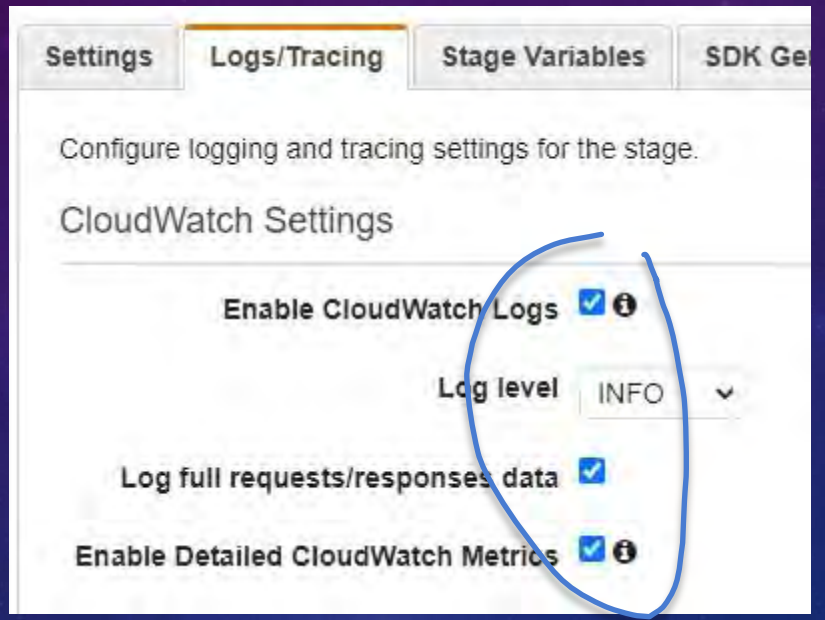
Most recent 1000 invocations (15)

View performance or application logs of this function, or select a few invocations to view logs for selected invocations.

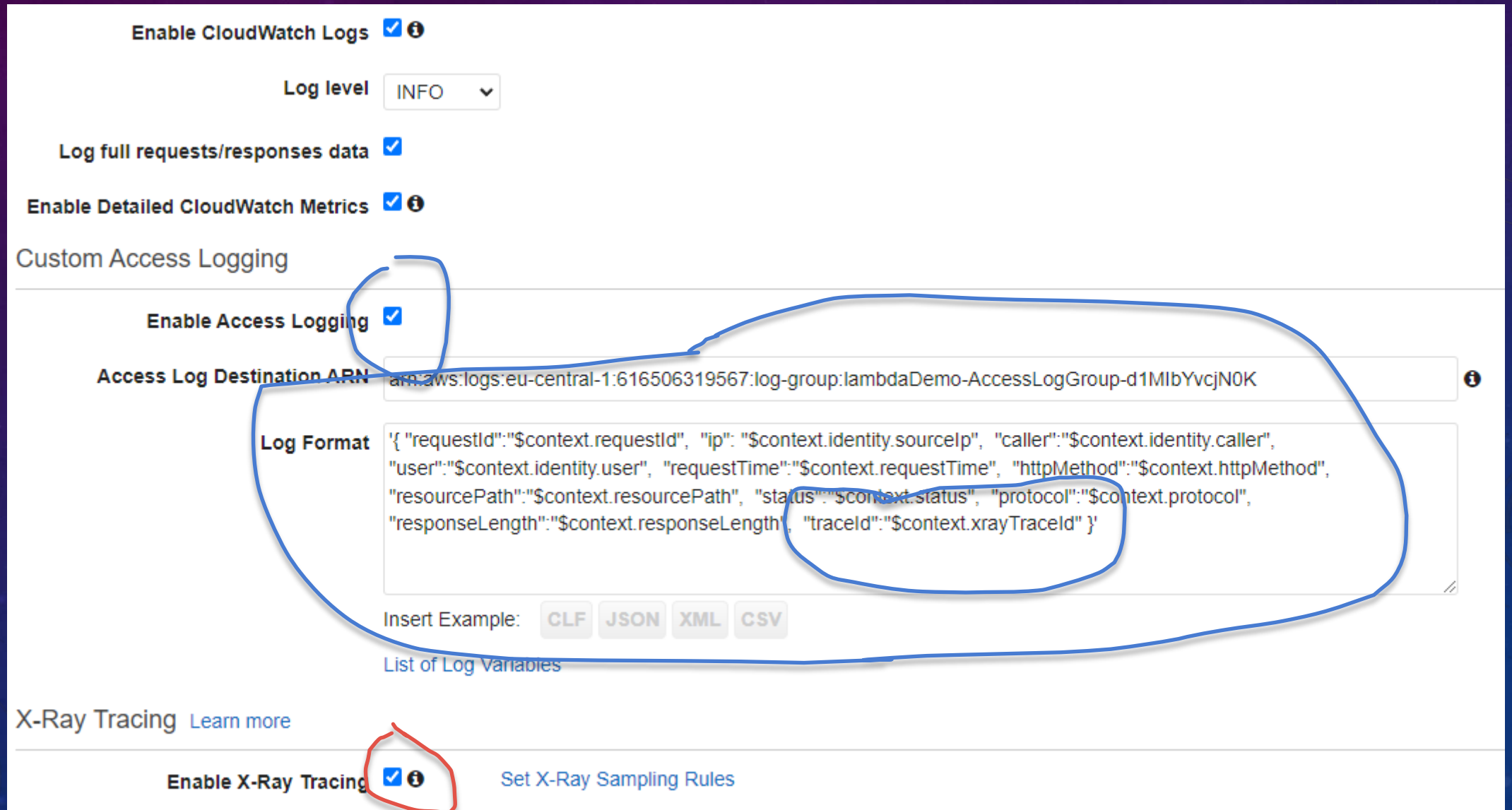
1

Timestamp	Request ID	Trace	Error	Init duration	Duration	Memory %	CPU time	Network IO
2021-10-23 18:06:05 (UTC+02:00)	a45db48e-f218-...	View	-	200ms	77ms	42%	140ms	84 bytes
2021-10-23 18:06:07 (UTC+02:00)	4cd103ca-4883-...	View	-	-	4ms	42%	20ms	650 bytes
2021-10-23 18:06:08 (UTC+02:00)	bcc077ad-9f6d-...	View	-	-	25ms	42%	-	10673 bytes
2021-10-23 18:06:08 (UTC+02:00)	507fbb87-98e5-...	View	-	-	15ms	43%	-	7515 bytes
2021-10-23 18:06:09 (UTC+02:00)	a16a093f-34cb-...	View	-	-	7ms	43%	10ms	2954 bytes
2021-10-23 18:06:09 (UTC+02:00)	55658440-d6aa...	View	-	-	10ms	43%	-	3379 bytes
2021-10-23 18:06:11 (UTC+02:00)	62a0a5bc-13fc-...	View	-	-	15ms	43%	-	3596 bytes
2021-10-23 18:06:11 (UTC+02:00)	4e538813-746a...	View	-	-	5ms	43%	10ms	4836 bytes
2021-10-23 18:06:12 (UTC+02:00)	40b4601f-c7da-...	View	-	-	1ms	43%	-	7410 bytes
2021-10-23 18:06:12 (UTC+02:00)	37056a0e-0126...	-	-	-	1ms	43%	-	612 bytes
2021-10-23 18:06:13 (UTC+02:00)	6d7c79e9-5ab6...	View	-	-	1ms	43%	-	-
2021-10-23 18:06:13 (UTC+02:00)	a6f5dda6-ab11-...	View	-	-	1ms	43%	10ms	-

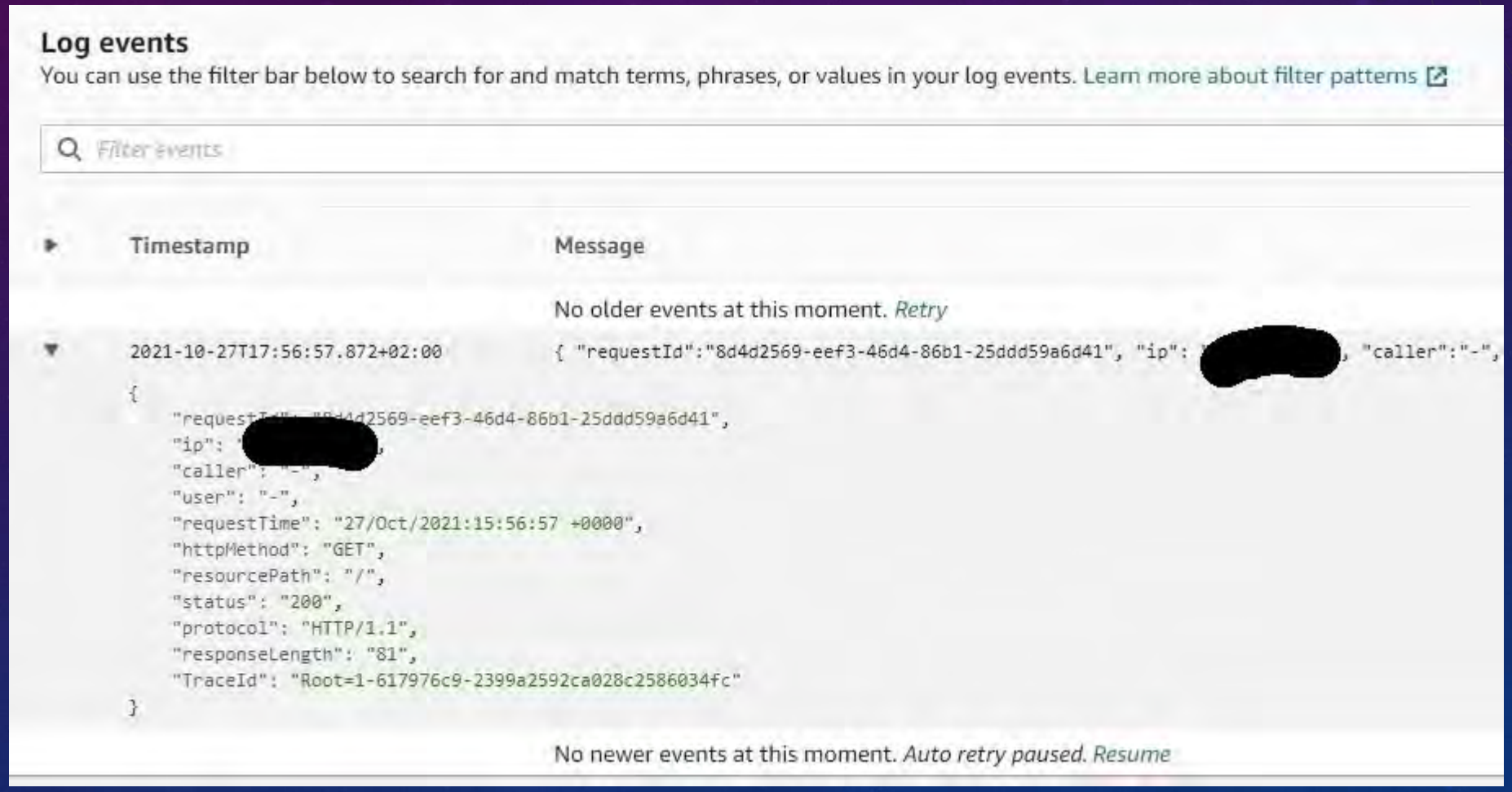
ENABLE API GATEWAY LOGS



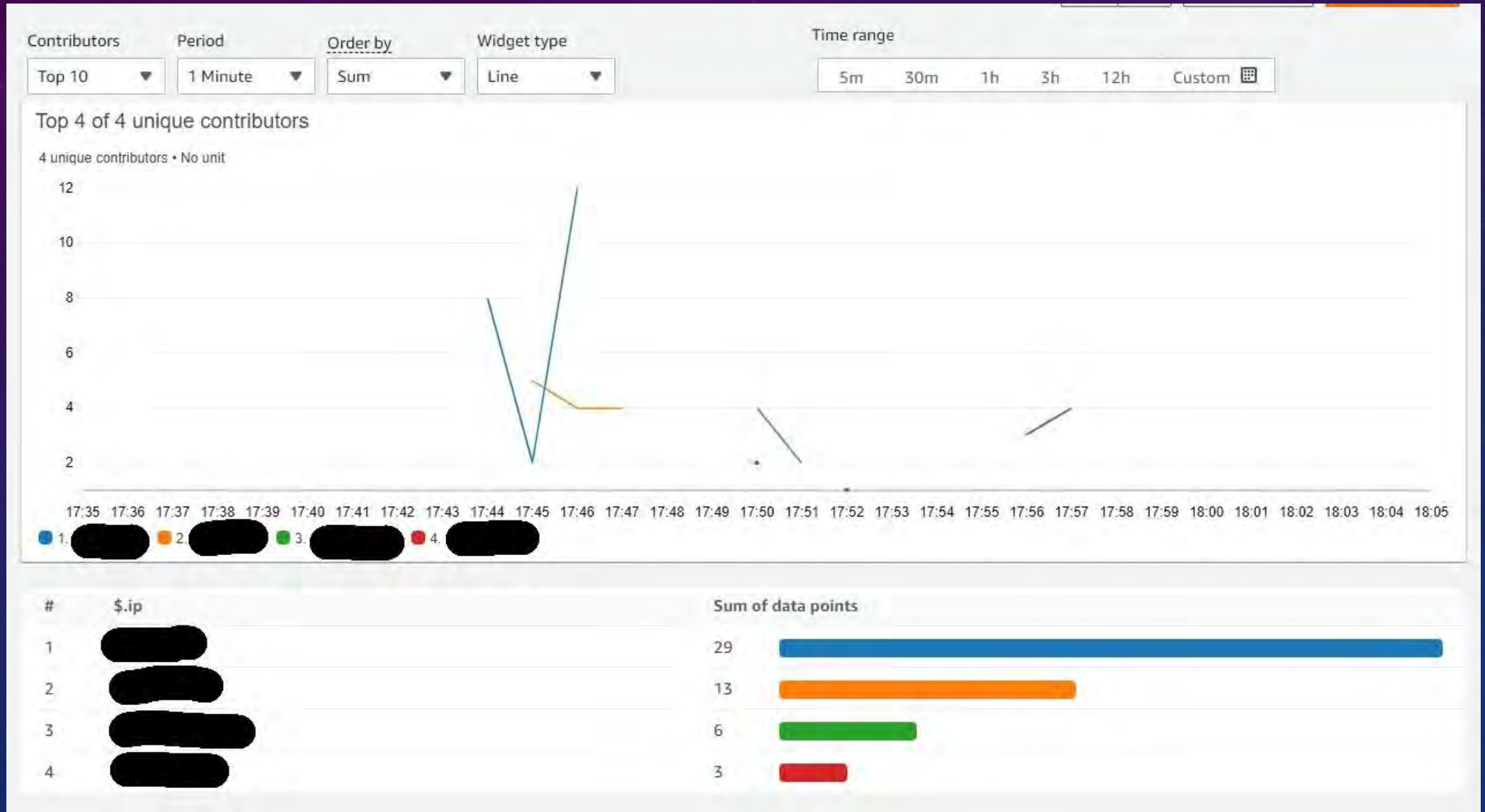
CUSTOM LOG FORMAT



LOGGED REQUEST



CONTRIBUTOR INSIGHTS



WE KNOW THE REQUEST “EXTERIALS”. WHAT ABOUT ITS “INTERNALS”?

AWS LAMBDA POWERTOOLS

Multiple ways of implementation

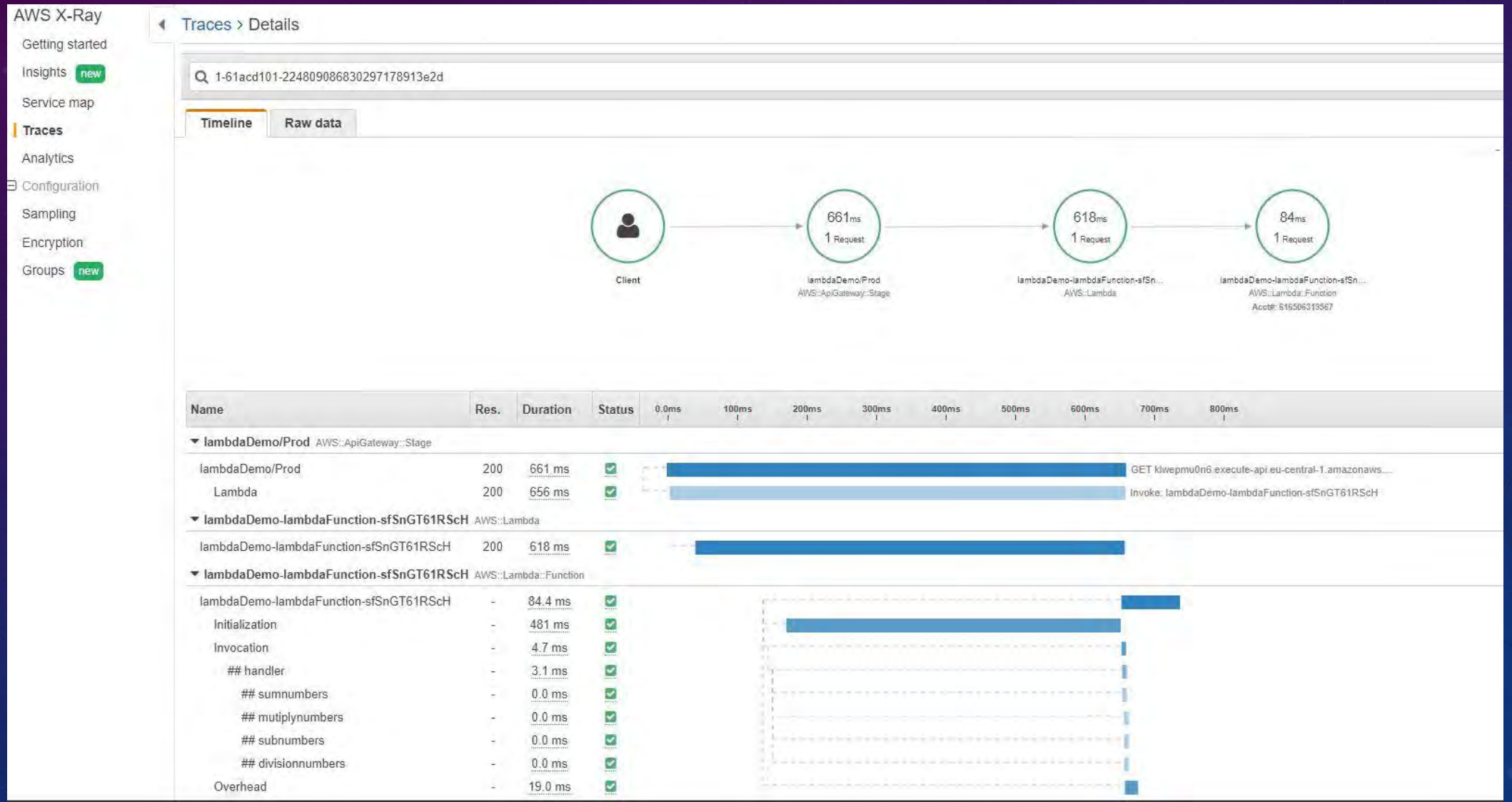
Ready for Python, TypeScript, Java and .Net

Allows to build Observability “out of the box”

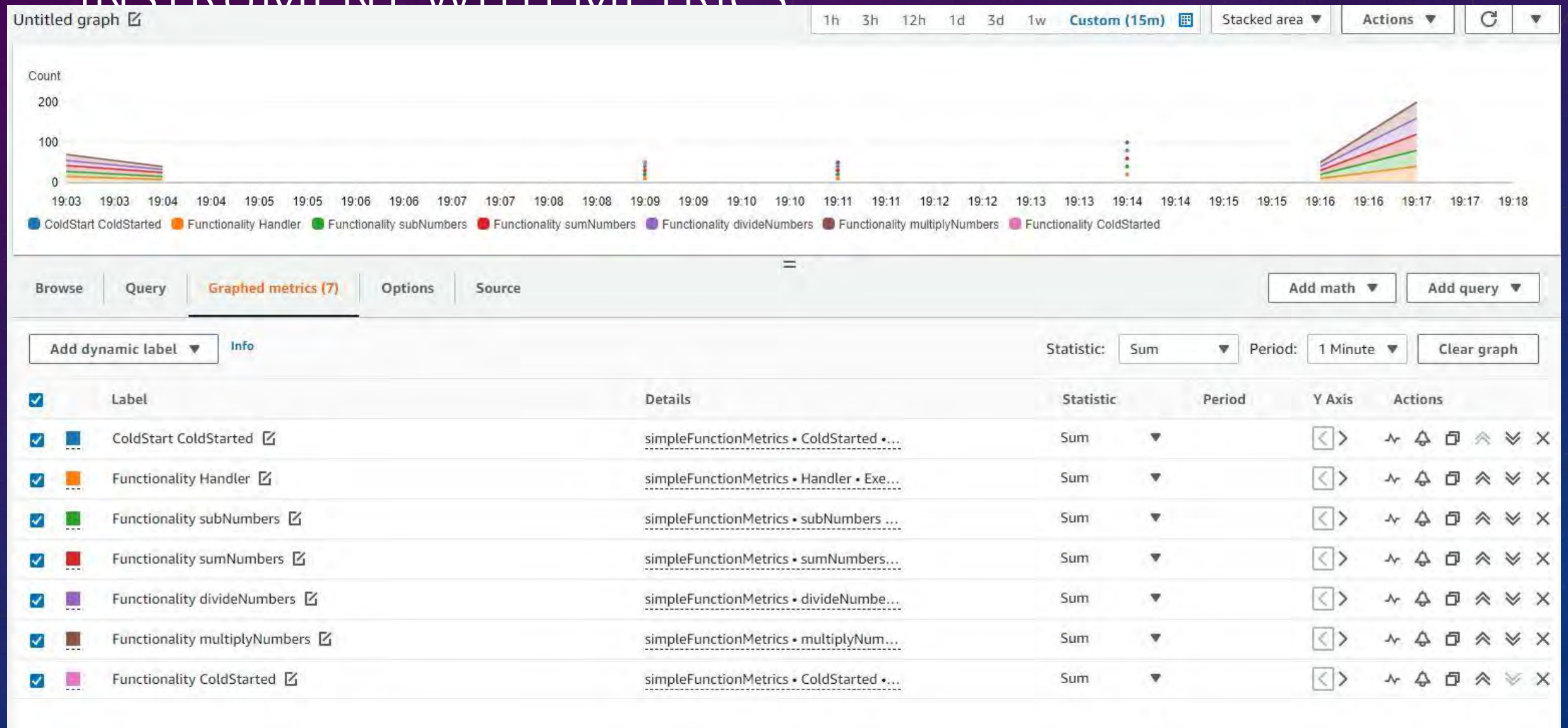
The best use – Lambda layer

Finally, we start to implement logging in the code of the function

INSTRUMENT WITH TRACES



INSTRUMENT WITH METRICS



INSTRUMENT WITH LOGGING

```yaml
AWSTemplateFormatVersion: 2010-09-09
Transform: AWS::Serverless-2016-10-31
Description: CodePipeline for Lambda

Resources:
  AccessLogGroup:
    Type: AWS::Logs::LogGroup

  AwsLambdaPowertoolsPythonLayer:
    Type: AWS::Serverless::Application
    Properties:
      Location:
        ApplicationId: arn:aws:serverlessrepo:eu-west-1:057560766410:applications/aws-lambda-powertools-python-layer
        SemanticVersion: 1.22.0 # change to latest semantic version available in SAR

  lambdaDemoApi:
    Type: AWS::Serverless::Api
    Properties:
      StageName: Prod
      Description: 'Prod stage'
      TracingEnabled: true
      MethodSettings:
      - HttpMethod: '*'
        LoggingLevel: INFO
        ResourcePath: '/*'
        MetricsEnabled: true
        DataTraceEnabled: true
      AccessLogSetting:
        DestinationArn: !GetAtt AccessLogGroup.Arn
        Format: >-
          '{ "requestId":"$context.requestId",
          "ip": "$context.identity.sourceIp",
          "caller":"$context.identity.caller",
          "user":"$context.identity.user",
          "requestTime":"$context.requestTime",
          "httpMethod":"$context.httpMethod",
          "resourcePath":"$context.resourcePath",
          "status":"$context.status",
          "protocol":"$context.protocol",
          "responseLength":"$context.responseLength",
          "traceId":"$context.xrayTraceId" }'

  lambdaFunction:
    Type: AWS::Serverless::Function
    Properties:
      Handler: simplefunction.handler
      CodeUri: lambdafunction/
      Runtime: python3.8
      Policies:
        - CloudWatchLambdaInsightsExecutionRolePolicy
      AutoPublishAlias: live
      Description: Simple demo function
      MemorySize: 128
      Timeout: 10
      Tracing: Active
      Layers:
        - !GetAtt AwsLambdaPowertoolsPythonLayer.Outputs.LayerVersionArn
        - !Sub "arn:aws:lambda:${AWS::Region}:580247275435:layer:LambdaInsightsExtension:14"
      Environment:
        Variables:
          LOG_LEVEL: "INFO"
          POWERTOOLS_SERVICE_NAME: simpleFunctionService
          POWERTOOLS_METRICS_NAMESPACE: simpleFunctionMetrics
      Events:
        simpleApi:
          Type: Api
          Properties:
            RestApiId:
              !Ref lambdaDemoApi
            Path: /
            Method: get
```

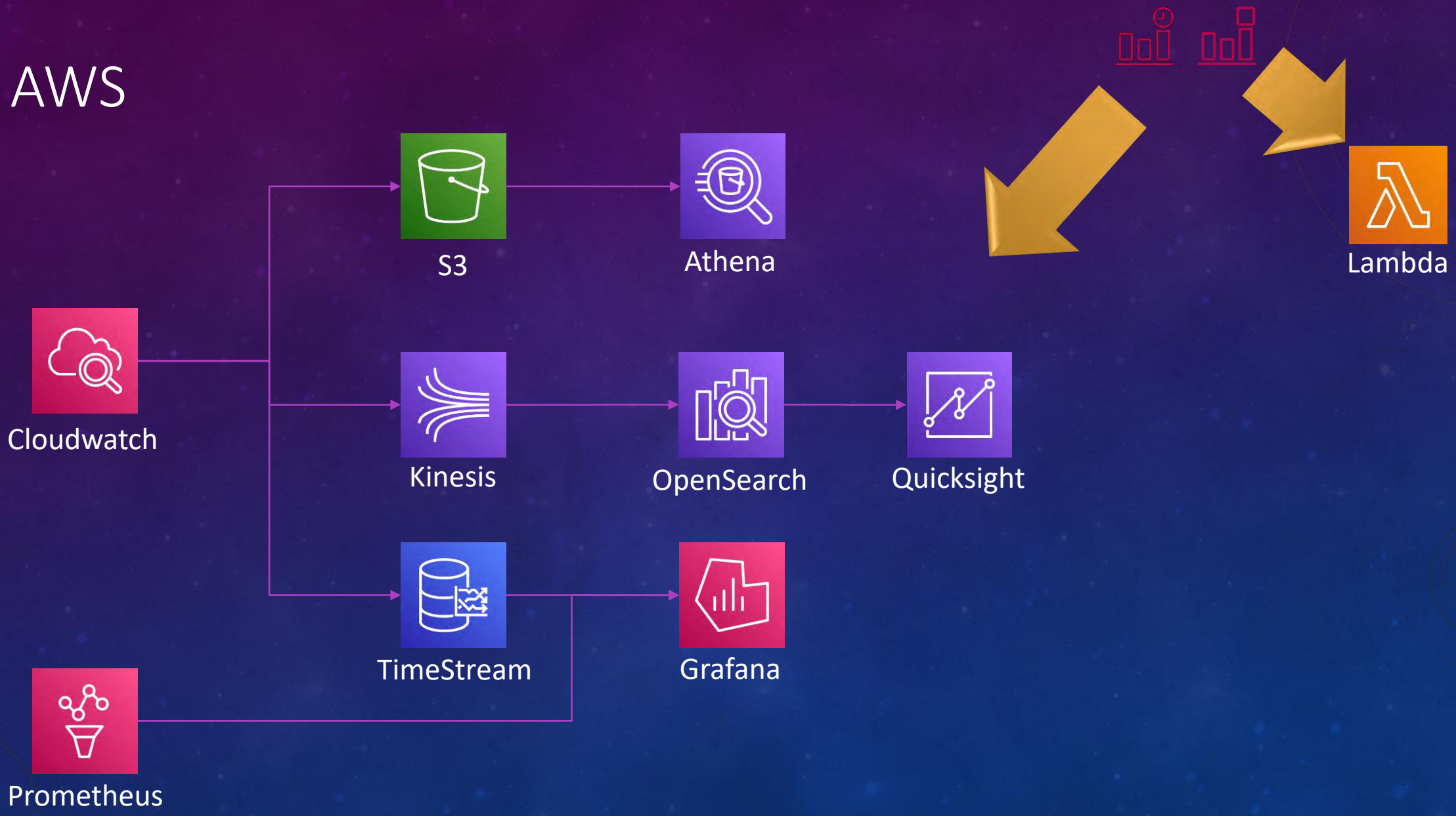
67 lines

DO YOU WISH TO IMPLEMENT IT BY YOURSELF?

HTTPS://DEV.TO/PAWELPIWOSZ/SERIES/15135

WHERE TO GO NOW?

AWS


S3
Athena
Lambda
Cloudwatch
Kinesis
OpenSearch
Quicksight
TimeStream
Grafana
Prometheus

TOOLS

Instrumentation

AWS Powertools

Jaeger

Prometheus

Open Telemetry

Visualization

Grafana

Prometheus

TOOLS

Databases

NoSQL

Time series

“all-in-one”

Prometheus

Jaeger

Honeycomb.io

Dynatrace

Splunk

"Who is monitor your monitor server?"

DevOps Borat

Questions? Let’s discuss! ☺

STAY IN TOUCH!

https://www.linkedin.com/in/pawelpiwosz/

https://www.pawelpiwosz.net/

Last Week in IT