

AWS Serverless

API Gateway + Lambda

implementation guide

Quick survey

- Dev / Ops / DevOps
- who uses "cloud"?
- who know/uses Lambda
- who know/uses Serverless?



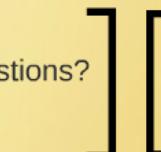
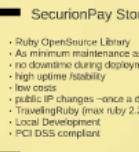
AWS Serverless

API Gateway + Lambda

implementation guide

by

SECURIONPAY

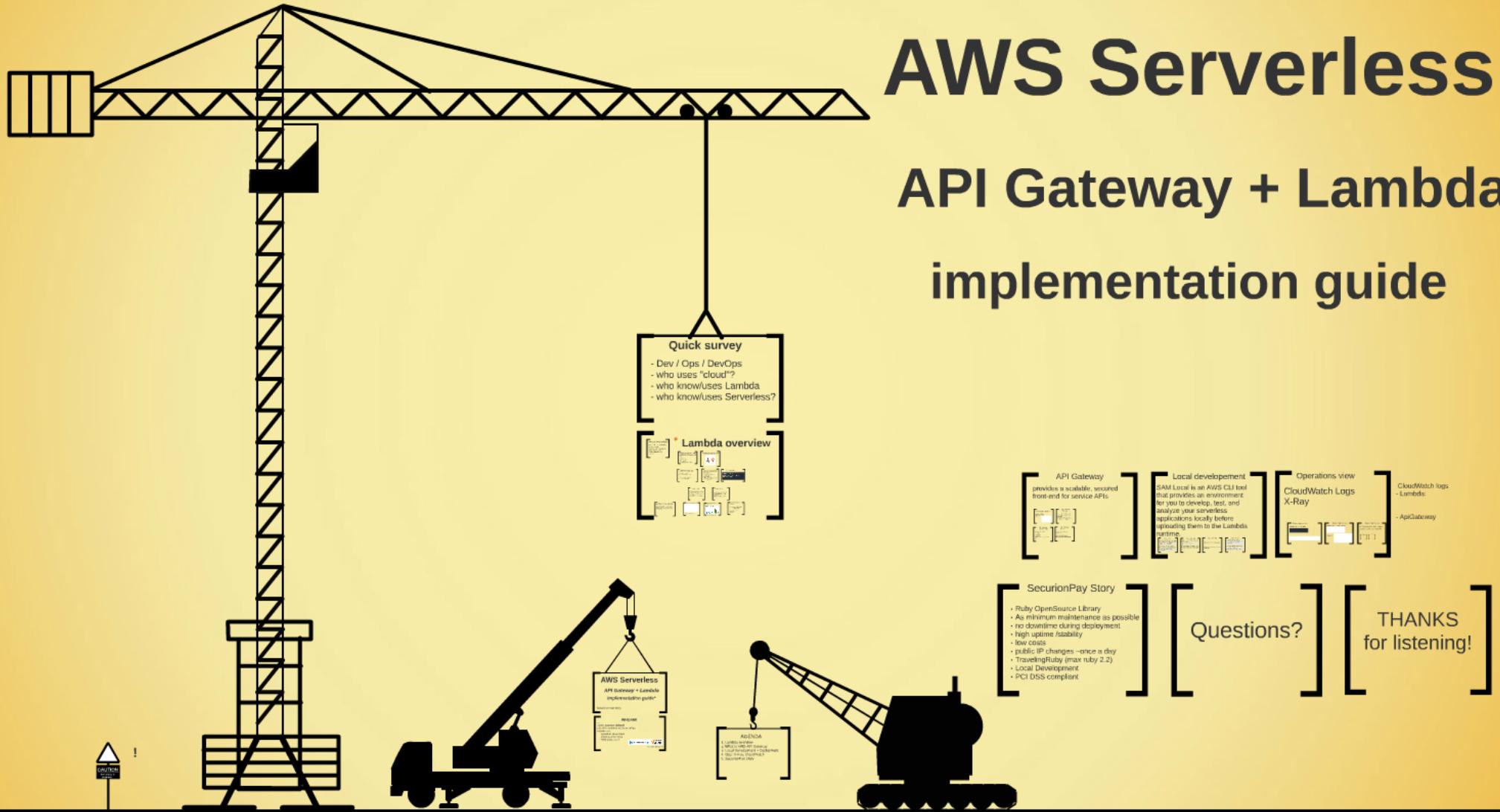




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AWS Serverless

API Gateway + Lambda implementation guide



AWS Serverless

*API Gateway + Lambda
implementation guide**

*based on true story

*based on true story

WHOAMI

name: **Szymon Święcki**

job: AWS architect at SecurionPay

experience:

- sysadmin since 2004
- DevOps since 2010
- AWS since 2014



*partner program

AGENDA

1. Lambda overview
2. What is AWS API Gateway
3. Local Development + Deployment
4. Ops: X-Ray, CloudWatch
5. SecurionPay story

Quick survey

- Dev / Ops / DevOps
- who uses "cloud"?
- who know/uses Lambda
- who know/uses Serverless?

What is AWS lambda?

Run code without thinking about servers.
Pay for only the compute time you consume.
Invoke functions by events.



Lambda overview

Invoke Lambda with AWS services as event sources

- S3
- Kinesis
- DynamoDB
- AWS CloudTrail
- Amazon SNS
- CloudWatch (logs + events)

Invoke Lambda via HTTP



Other invoke sources

- Scheduled events (cron - min interval 1 min)
- Your own event sources (invoke via AWS SDK)

Lambda Supported frameworks

- Node.js – v4.3.2 and 6.10.3
- Java – Java 8
- Python – Python 3.6 and 2.7
- .NET Core – .NET Core 1.0.1 (C#)
- php/go/ruby *via hacks

Run any code...

```
var spawn = require('child_process').spawn;
var wrapper = './wraper.sh';

exports.handler = function(event, context) {
    console.log("Starting process: " + wrapper);
    var child = spawn(wrapper, [JSON.stringify(event)]);
}
```

Lambda Limits

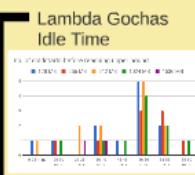
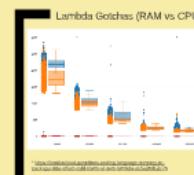
- A 6MB request or response payload size.
- A 50 MB limit on the compressed zip/jar file deployment package size.
- A 250 MB limit on the codem dependencies in the package before compression.
- A 500 MB limit on local storage in /tmp.

Lambda Limits

- Minimum = 128 MB / Maximum = 1536 MB (with 64 MB increments). If max reached - function will be terminated.
- Maximum execution duration per request: 300 seconds.
- Concurrent executions - 1000 (soft limit) - may take days to increase by support

Lambda Gotchas (cold start)

A cold start occurs when an AWS Lambda function is invoked after not being used for an extended period of time resulting in increased invocation latency.



Lambda Gotchas pricing

- Price per 100ms (\$): 0.000002501

*100 concurrent lambdas
*1.0 (one second)
*60 (one minute)
*60 (one hour)

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+



Amazon API
Gateway

Lambda
function

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(invoke via AWS SDK)

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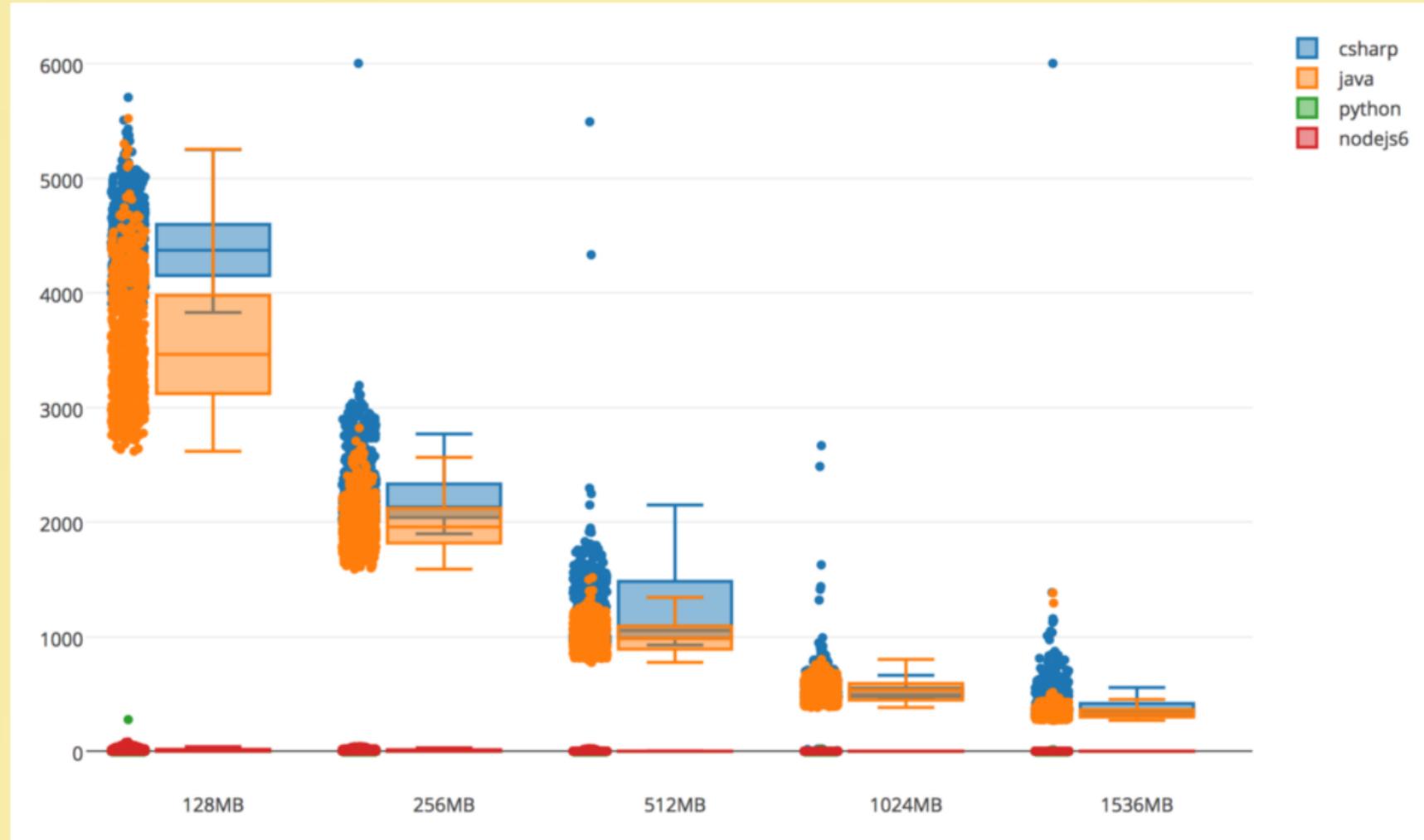
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Lambda Gotchas (RAM vs CPU)

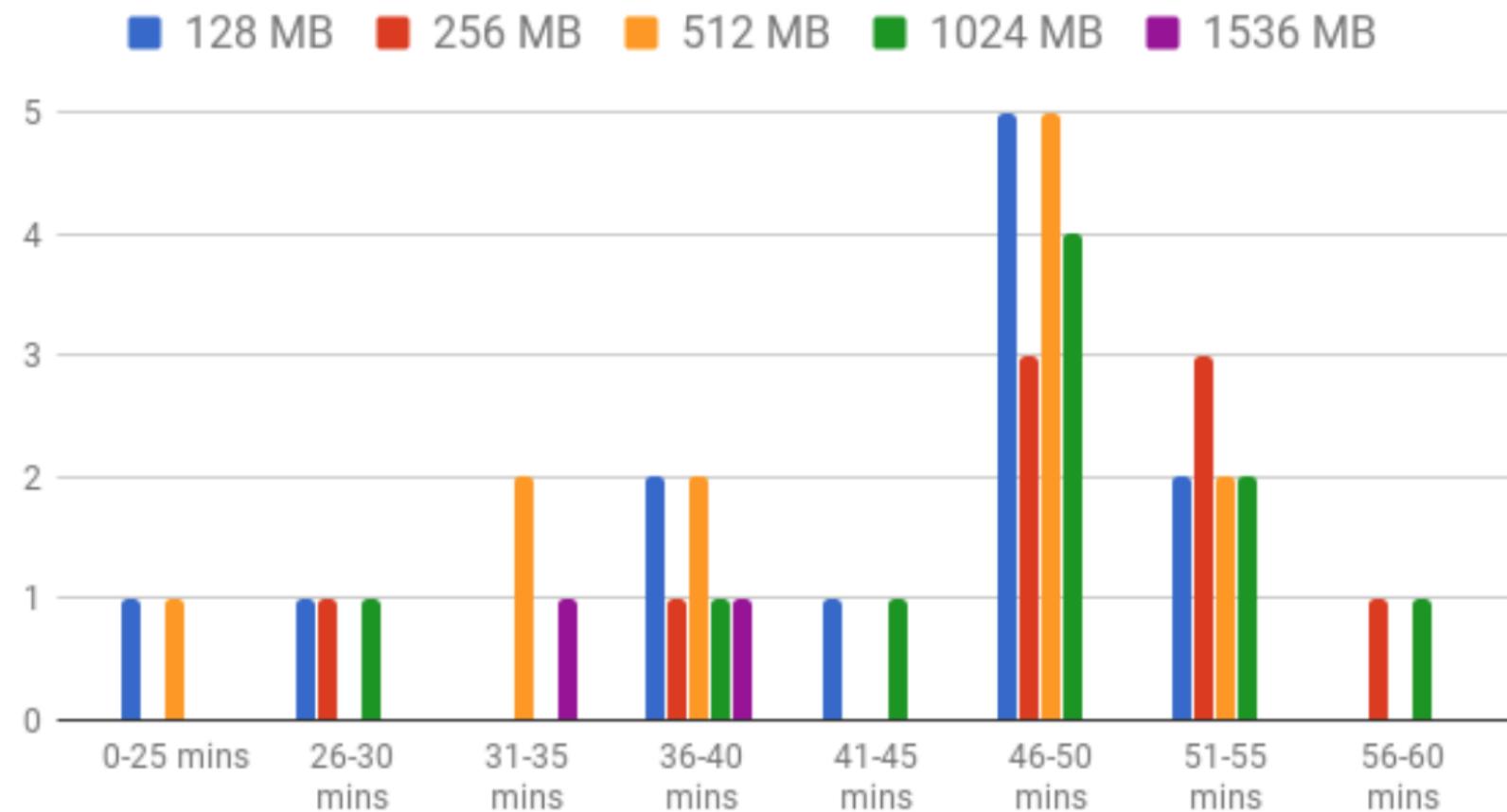


* <https://read.acloud.guru/does-coding-language-memory-or-package-size-affect-cold-starts-of-aws-lambda-a15e26d12c76>

Lambda Gochas

Idle Time

no. of coldstarts before reaching upper bound



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Lambda Gochas pricing

- Price per 100ms (\$):
0.000002501

- *1000 concurrent lambdas
- *10 (one second)
- *60 (minute)
- *60 (hour)

[
\$90.036
]

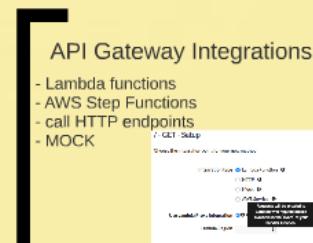


Lambda Gochas
top price per hour!

\$90.036

API Gateway

provides a scalable, secured front-end for service APIs



API Gateway Integrations

- Lambda functions
- AWS Step Functions
- call HTTP endpoints
- MOCK

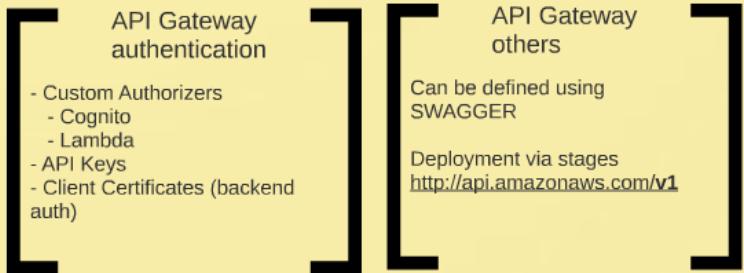
- endpoints are always public
- does not support gzip of responses
- Integration timeout - 30 sec
- payload size - 10Mb



API Gateway authentication

- Custom Authorizers
- Cognito
- Lambda
- API Keys
- Client Certificates (backend auth)

Can be defined using SWAGGER
<http://api.amazonaws.com/v1>



API Gateway others

API Gateway Integrations

- Lambda functions
- AWS Step Functions
- call HTTP endpoints
- MOCK

/ - GET - Setup

Choose the integration point for your new method.

Integration type Lambda Function i

HTTP i

Mock i

AWS Service i

Use Lambda Proxy integration i

Lambda Region US West (Oregon)

Requests will be proxied to Lambda with request details available in the 'event' of your handler function.

API Gateway limits/gotchas

- endpoints are always public
- does not support gzip of responses
- Integration timeout - 30 sec
- payload size - 10Mb

API Gateway authentication

- Custom Authorizers
 - Cognito
 - Lambda
- API Keys
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API Gateway others

Can be defined using
SWAGGER

Deployment via stages
<http://api.amazonaws.com/v1>

Local development

SAM Local is an AWS CLI tool that provides an environment for you to develop, test, and analyze your serverless applications locally before uploading them to the Lambda runtime.

SAM Local

- Generate sample function payloads (for example, an Amazon S3 event)

```
sam local generate-event s3  
--bucket bucket-name
```

Test a sample function payload locally with your Lambda functions.

```
sam local invoke function-name -e  
event_file.json
```

SAM local-api

Spawn a local API Gateway to test HTTP request

```
sam local start-api
```

SAM Local will automatically find any functions within your **SAM template**

SAM local-api

requires Lambda Proxy Integration

Change code on the fly. No need to package/zip!

SAM Deploy

Package SAM template

```
$ sam package --template-file sam.yaml --s3-  
bucket mybucket --output-template-file  
packaged.yaml
```

Deploy packaged SAM template

```
$ sam deploy --template-file ./  
packaged.yaml --stack-name mystack
```

SAM Local

- Generate sample function payloads
(for example, an Amazon S3 event)

```
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Test a sample function payload locally with your Lambda functions.

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SAM Deploy

Package SAM template

```
$ sam package --template-file sam.yaml --s3-bucket mybucket --output-template-file packaged.yaml
```

Deploy packaged SAM template

```
$ sam deploy --template-file ./packaged.yaml --stack-name mystack
```



Operations view

CloudWatch Logs X-Ray

Operations view

CloudWatch Logs Lambda

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Operations view

X-Ray: end-to-end, cross-service view of requests

Operations view

CloudWatch Logs Lambda

```
exports.handler = function(event, context) {
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```

```
▼ 17:51:07          START RequestId: 505a6f51-b99c-11e7-a508-7f6d9426e435 Version: $LATEST
START RequestId: 505a6f51-b99c-11e7-a508-7f6d9426e435 Version: $LATEST
▼ 17:51:07          2017-10-25T15:51:07.266Z 505a6f51-b99c-11e7-a508-7f6d9426e435 Starting process: ./wrapper.sh
2017-10-25T15:51:07.266Z 505a6f51-b99c-11e7-a508-7f6d9426e435 Starting process: ./wrapper.sh
```

Operations view

CloudWatch Logs Api Gateway

```
▼ 10:02:39 (eabfc254-93a2-11e7-a3de-b7d154368a05) Endpoint request URI: http://pets
(eabfc254-93a2-11e7-a3de-b7d154368a05) Endpoint request URI: http://petstore-demo-endpoint.execute-api.us-east-1.amazonaws.com/v2/pets/3
▶ 10:02:39 (eabfc254-93a2-11e7-a3de-b7d154368a05) Endpoint request headers: {x-amazon-apigateway-request-id: "eabfc254-93a2-11e7-a3de-b7d154368a05", host: "petstore-demo-endpoint.execute-api.us-east-1.amazonaws.com", accept: "application/json", user-agent: "Apache-HttpClient/4.5.13 (Java/1.8.0_265)"}
▶ 10:02:39 (eabfc254-93a2-11e7-a3de-b7d154368a05) Endpoint request body after transformations:
{
    "id": 3,
    "type": "fish",
    "price": 0.99
}
▼ 10:02:39 (eabfc254-93a2-11e7-a3de-b7d154368a05) Endpoint response body before transformations:
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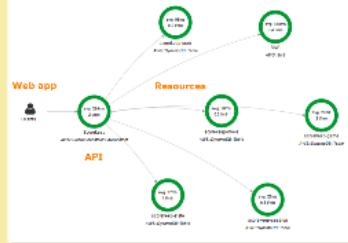
streams :(

Search Log Group		Create Log Stream	Delete Log Stream
Filter: Log Stream Name Prefix		Last Event Time	
<input type="checkbox"/>	Log Streams		
<input type="checkbox"/>	8613985ec49eb8f757ae6439e879bb2a	2017-09-07 10:02 UTC+2	
<input type="checkbox"/>	9b04d152845ec0a378394003c96da594	2017-09-07 10:02 UTC+2	
<input type="checkbox"/>	1f0e3dad99908345f7439f8ffabdfcc4	2017-09-07 10:02 UTC+2	
<input type="checkbox"/>	e2c0be24560d78c5e599c2a9c9d0bbd2	2017-09-07 10:02 UTC+2	
<input type="checkbox"/>	d1f491a404d6854880943e5c3cd9ca25	2017-09-07 10:02 UTC+2	
<input type="checkbox"/>	49182f81e6a13cf5eaaa496d51fea6406	2017-09-06 15:27 UTC+2	
<input type="checkbox"/>	07e1cd7dca89a1678042477183b7ac3f	2017-09-06 15:13 UTC+2	
<input type="checkbox"/>	f457c545a9ded88f18ecee47145a72c0	2017-09-06 15:12 UTC+2	
<input type="checkbox"/>	eb163727917cbba1eea208541a643e74	2017-09-06 15:11 UTC+2	
<input type="checkbox"/>	d9d4f495e875a2e075a1a4a6e1b9770f	2017-09-06 15:11 UTC+2	
<input type="checkbox"/>	da4fb5c6e93e74d3df8527599fa62642	2017-09-06 15:02 UTC+2	
<input type="checkbox"/>	36660e59856b4de58a219bcf4e27eba3	2017-09-06 15:02 UTC+2	

Operations view

X-Ray: end-to-end, cross-service view of requests

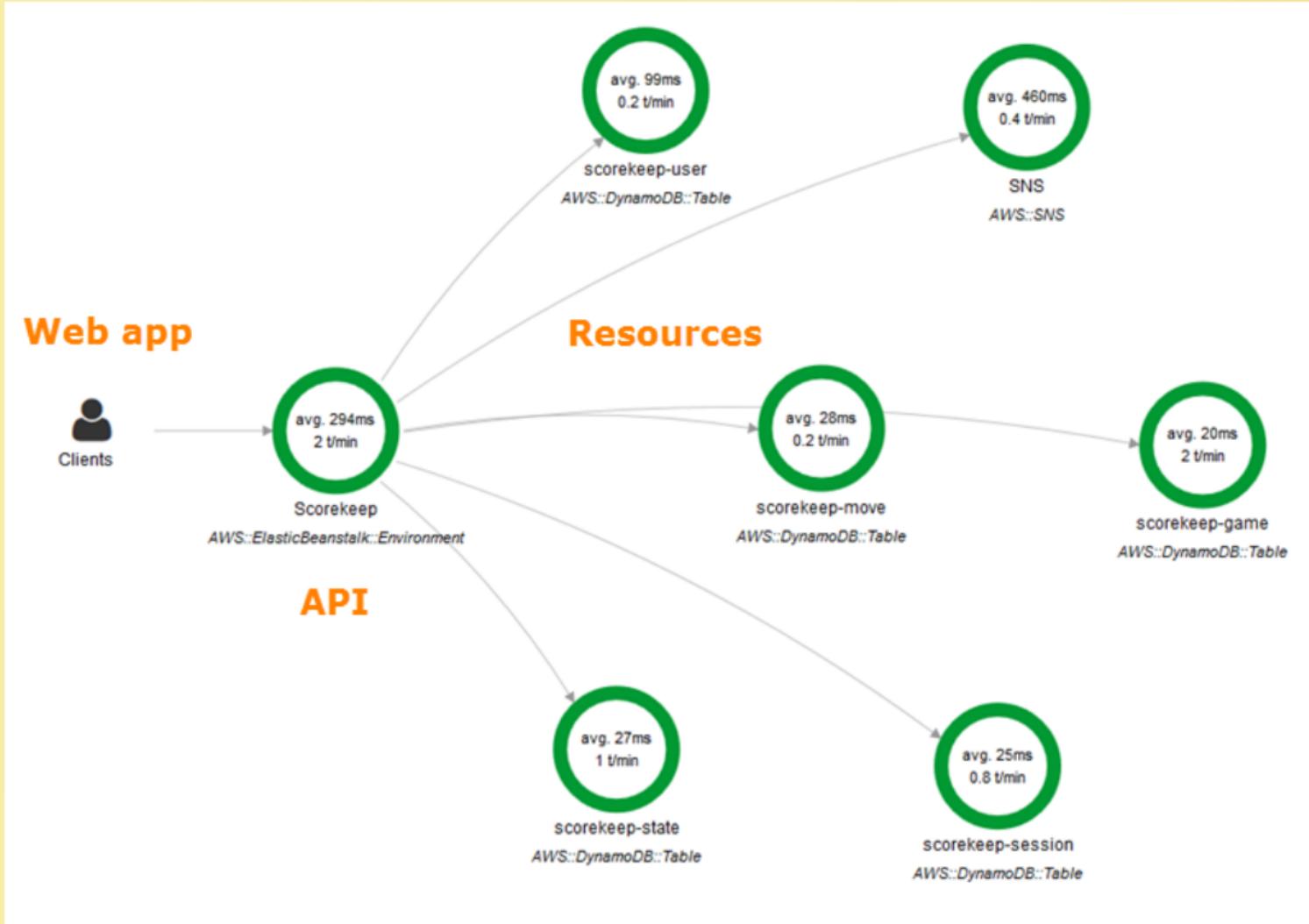
X-Ray
Service map



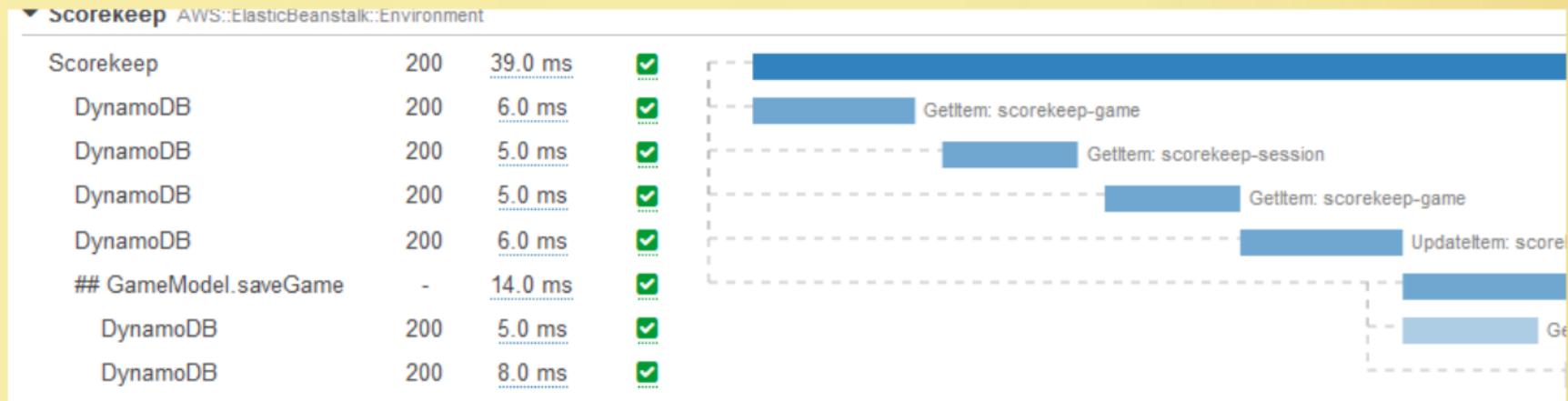
X-Ray
traces



X-Ray Service map



X-Ray traces



SecurionPay Story

- Ruby OpenSource Library
- As minimum maintenance as possible
- no downtime during deployment
- high uptime /stability
- low costs
- public IP changes ~once a day
- TravelingRuby (max ruby 2.2)
- Local Development
- PCI DSS compliant



Questions?



**THANKS
for listening!**

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