

AWS Workshops

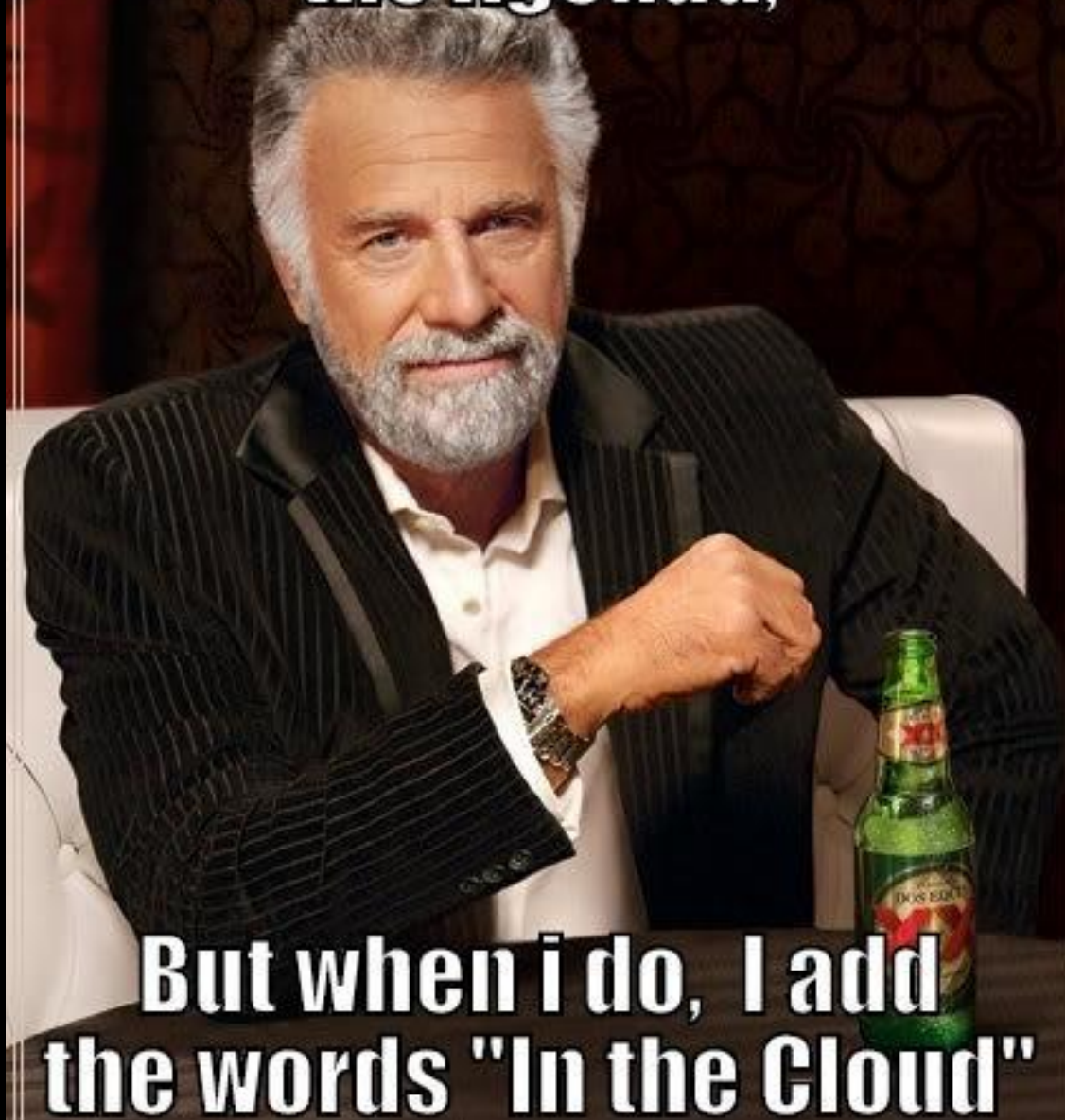
@rorypreddy

Meet Rory

- **Developer** in **R&D** team at **BBD**
- Organizer for
 - Jozi-JUG
 - AWS-Jozi
- Not related to **Tyrion Lannister**
- Don't do **kids** parties



**I don't usually read out
the Agenda,**



**But when i do, I add
the words "In the Cloud"**

Agenda

- The “Cloud”
- Core AWS Services
 - Tooling
 - Billing
 - Monitoring
- Serverless
- Labs



NOT SURE

WHAT JUST HAPPENED

6 Cloud Benefits

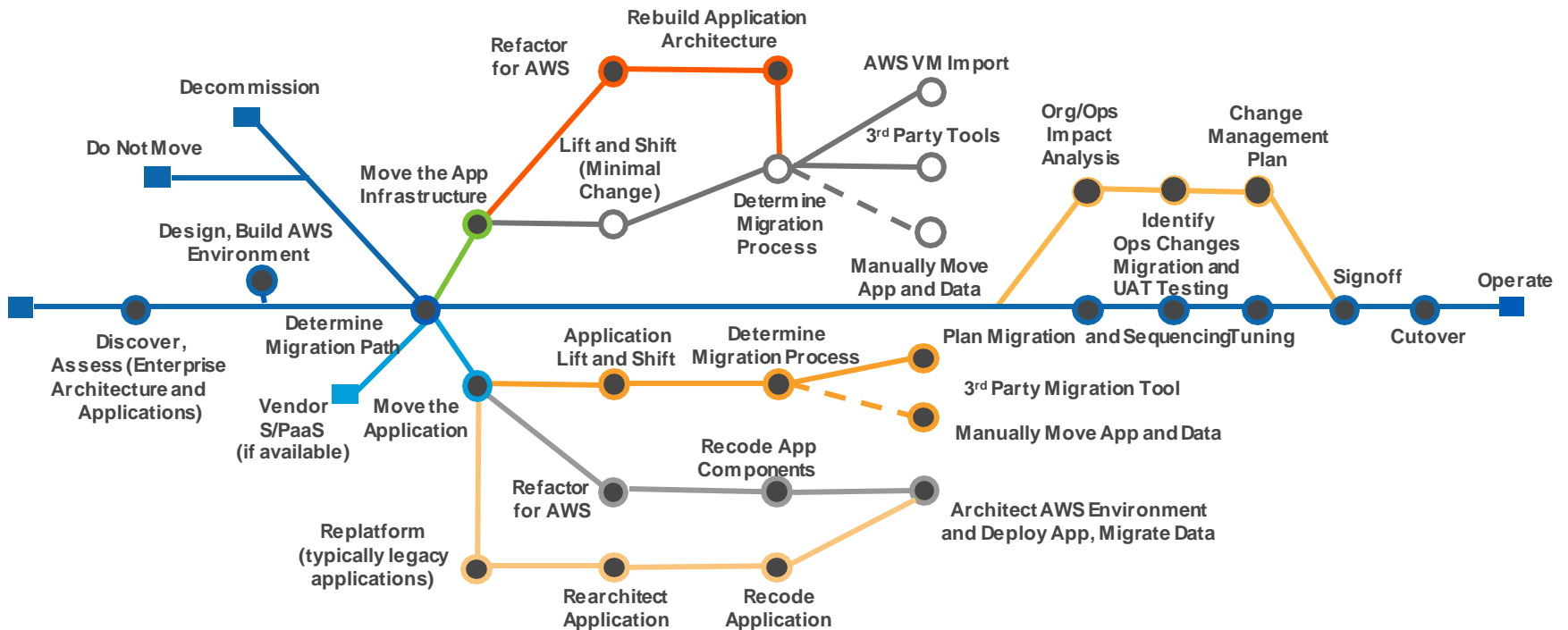
1. Trade capital expense for flexible expense.
2. Economies of scale.
3. Eliminate guessing capacity needs.
4. Speed and agility.
5. Stop spending money on running and maintaining data centers.
6. Global quickly.

YOU MERELY ADOPTED THE CLOUD



**I WAS BORN IN IT,
MOLDED BY IT**

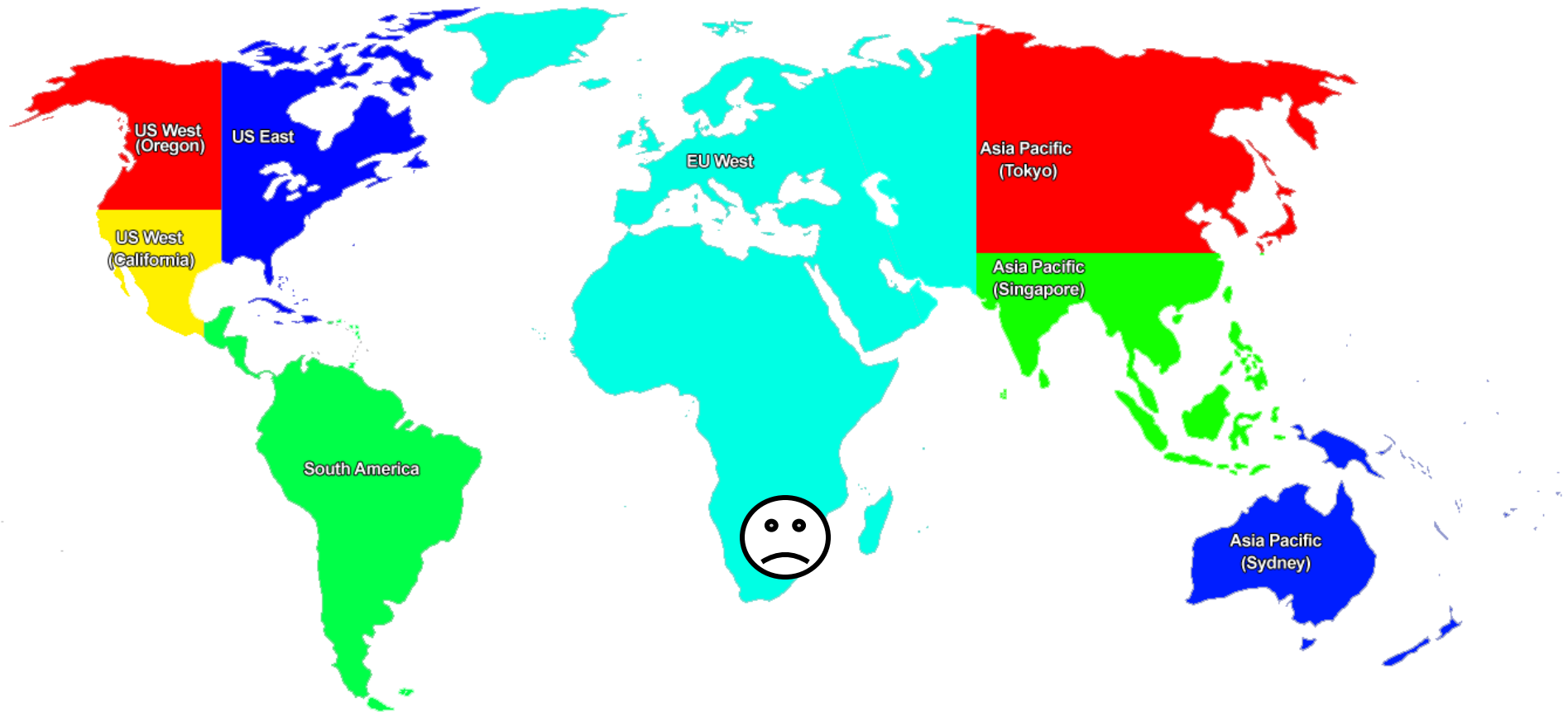
Adoption



Signing up for an AWS account

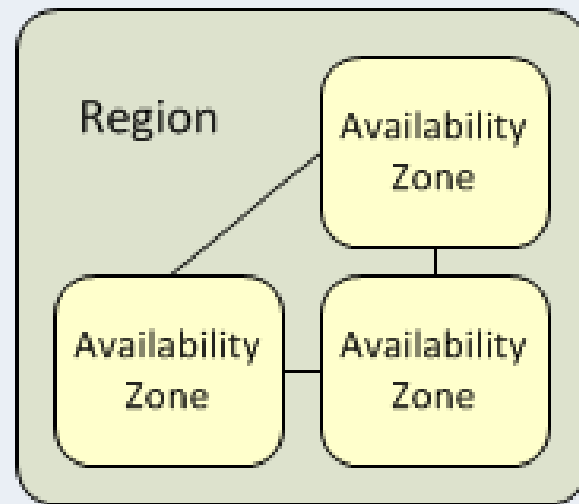
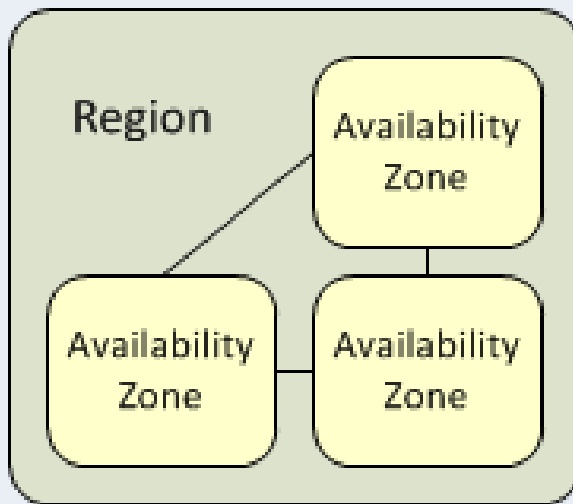
- Sign up through <https://aws.amazon.com>
- You will need a credit card
- There will be a telephone verification
- Choose a zone
 - try and stick to one
 - Ireland is Best!

Regions and Availability Zones



Regions and Availability Zones

Amazon Web Services



Core Services

Security



Firewalls



ACLs



Administrators



Security Groups



Network ACLs

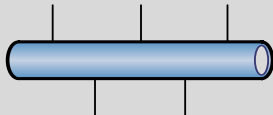


AWS IAM

Networking



Router



Network Pipeline



Switch



ELB



VPC

Servers



On-Premises Servers



Amazon EC2 Instances

Storage and Database



SAN



mongoDB

RDBMS



Amazon
EBS



Amazon
EFS



Amazon
S3



Amazon
RDS

NICE BUCKET YOU HAVE THERE

**SHAME IF SOMETHING
HAPPENED TO IT**

S3

Simple Storage Service (S3)

- Cloud based file storage
- Simple API to CRUD files
- Unlimited capacity
- Static website hosting

YALL GOT ANY MORE

OF

THOSE EC2 SERVERS?

EC2

- Hardware virtualization in the cloud
- Various sized servers
- All major operating systems
- Provision, configure, start and stop machines from Java App!
- Full operating system access via SSH and Security Groups

EC2 Purchasing Options

- **On Demand** – allow you to pay a fixed rate by the hour/minute with no commitment.
- **Reserved** – provide you with a capacity reservation, and offer a significant discount on the hourly charge for an instance. 1 Year or 3 Year Terms.
- **Spot** – bid whatever price you want for instance capacity
- **Dedicated Hosts** – physical EC2 server dedicated for your use.
- **Dedicated instances** – Pay, by the hour, for instances that run on single-tenant hardware.

EC2 Instance Types

- General Purpose
- Compute Optimized
 - batch processing
- Memory Optimized
 - big data processing
- Accelerated Computing
 - 3D rendering
- Storage Optimized
 - noSQL

Databases

Relational Database Service (RDS)

- MySQL, Oracle, SQL Server, PostGres
- Automated backups
- Live replication for fail-over support
- No difference for JDBC based apps
- DB provisioning from your browser or from within your Java app.

NOSQL databases

- SimpleDB – small amounts of structured data 10GB limit per table
- DynamoDB – hosted on SSD – no size or request limitations

Elastic Beanstalk

- Deploy and scale web applications
- Languages: Java, .NET, PHP, Node.js, Python, Ruby
- Servers: Apache, Nginx, Tomcat , IIS
- Upload your code; AWS handles:

Deployment

Capacity Provisioning

Load balancing

Auto scaling

Health Monitoring

**TRIED TO GET DOCKER SWARM
RUNNING**



Container Service

- ECS
 - AWS container cluster
- EKS
 - Kubernetes for AWS
- API controlled
- Support Images from private Docker repositories

THEY WANT BREAD?

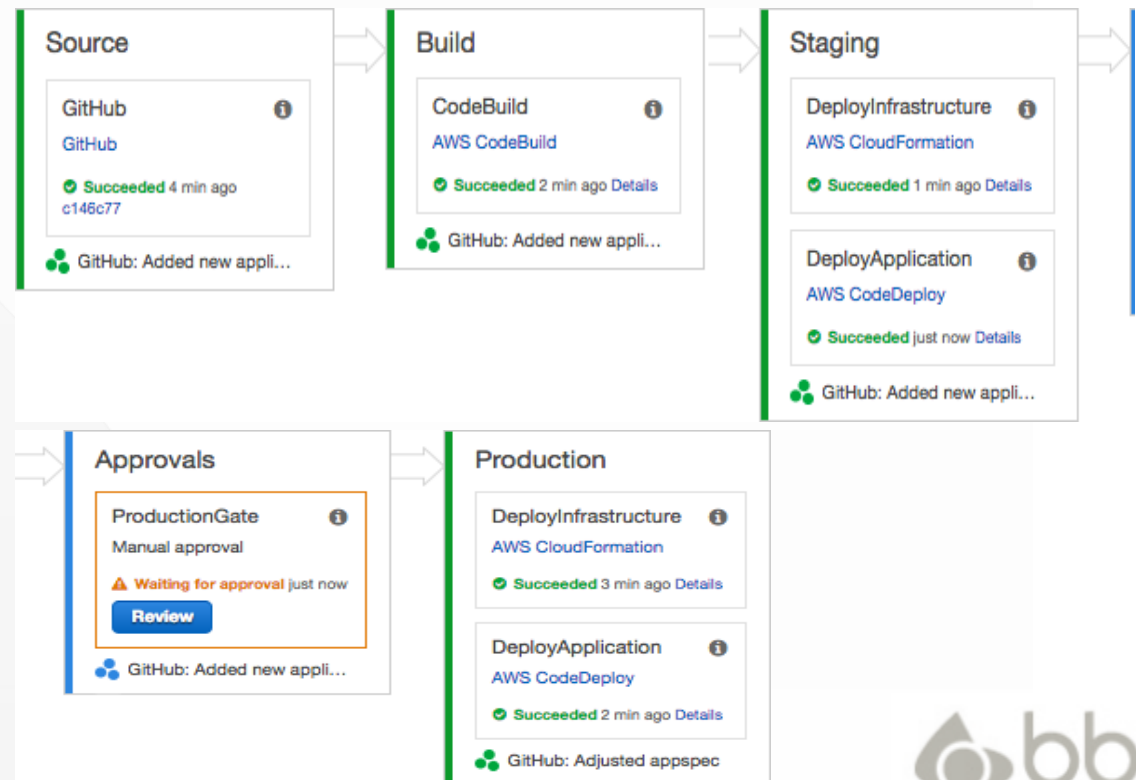
**LET THEM EAT
ECLIPSE!**

Tooling

- AWS and EB CLI
- IDE integration – Eclipse, IntelliJ, Visual Studio
- AWS Java SDK
 - API to manage AWS services
 - Use services from within your application
- Android and IOS app

AWS Pipelines

- CodeCommit or GitHub or BitBucket
- CodeBuild or Jenkins
- CodeDeploy or Jenkins



- CodePipeline



THE EC2 BILL

**IS TOO DAMN
HIGH!**

Billing

Free Tier

- Free for 12 months
- EC2 - run 1 micro instance x 1 month or 2 micro instances x half a month
- S3 - 5 GB of Standard Storage
- RDS - 750 Hours

And a lot more....

Billing

- Keep a close handle on what you are running in the cloud
- Measure what you are spending
 - Alarms and Reports
- Calculate Return On Investment
- Minimize what you don't need
- Protect yourself from DDoS

SSH

- SSH keys are used for secured access to EC2 instances

Monthly Spend

Welcome to the AWS Account Billing console. Your current balance appears below. The accompanying graph shows the proportion of costs spent for each service you use.

Current month-to-date balance for August 2014

\$50,436.95



▲
\$213.99

Previous month bill

Monthly Spend

Welcome to the AWS Account Billing console. Your current balance appears below. The accompanying graph shows the proportion of costs spent for each service you use.

Current month-to-date balance for September 2014

\$39,725.84



▲
\$4.17

Previous month bill

Security Group

- Security Groups are firewalls for your instances
- By default, they block all traffic
- You can choose what protocols and ports to open

WHAT THE...?

MY EC2 REBOOTED

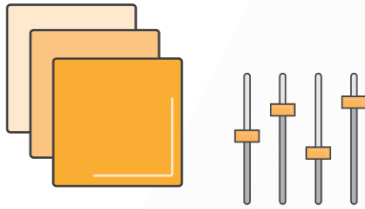
Monitoring

Service	Type
CloudTrail	Continuous logging
Config Rules	Continuous evaluations
Inspector	On-demand evaluations
Trusted Advisor	Periodic evaluations
CloudWatch Events	Actions in response to APIs and state change
X-Ray	Helps developers analyze and debug production, distributed applications

**YOU WENT FULL CLOUD
MAN**

**NEVER GO FULL
CLOUD**

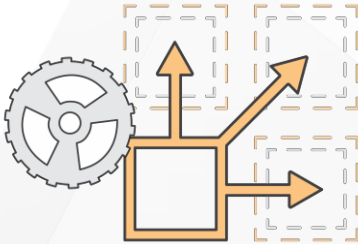
Owning servers means dealing with ...



Operations and management



Scaling



Provisioning and utilization



Availability and fault tolerance

AWS Lambda is a compute service that runs your code in response to events and automatically manages the compute resources for you

Benefits of Lambda and serverless compute



**No servers to provision
or manage**



Scales with usage



Never pay for idle



**Availability and fault
tolerance built in**

Run code in response to events

EVENT SOURCE



Changes in
data state



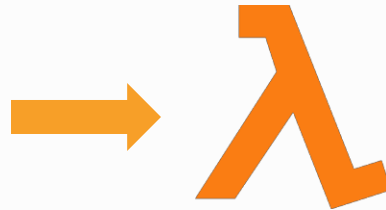
Requests to
endpoints



Changes in
resource state



FUNCTION



Node
Python
Java
C#

SERVICES (ANYTHING)

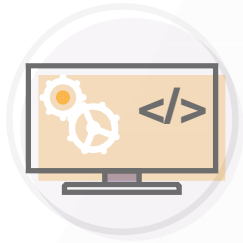


Common use cases



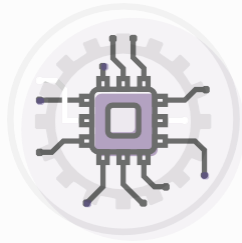
Web Applications

- Static websites
- Complex web apps



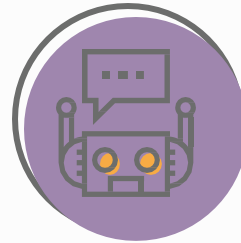
Backends

- Apps & services
- Mobile
- IoT



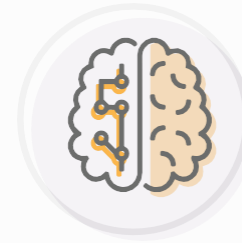
Data Processing

- Real time
- MapReduce
- Batch



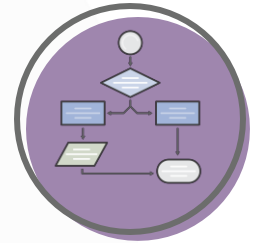
Chatbots

- Powering chatbot logic



Personal Assistant

- voice-enabled apps



IT Automation

- Policy engines
- Extending AWS services
- Infrastructure management

API Gateway

- RESTful API gateway service
- Multiple API stages that you define (e.g., dev, test, prod)
- Works well with Lambda functions

- ▼ /
 - ▼ /category
 - ▼ /{category}
 - ▼ /task
 - GET
 - ▼ /user
 - GET
 - POST
 - ▼ /{userId}
 - DELETE
 - GET
 - ▼ /task
 - GET
 - POST
 - ▼ /{taskId}
 - DELETE
 - PUT

Make a test call to your method with the provided input

Path
{userId}

Query Strings
category

dueafter

futuredue

limit

withoutdue

duebefore

overdue

due

Request: /user/a85cf0ef-3ee3-

Status: 200

Latency: 362 ms

Response Body

```
[
  {
    "tid": "1488195936242",
    "description": "test task",
    "created": "20170227",
    "due": null,
    "category": null,
    "completed": null
  }
]
```

Response Headers

```
{"X-Amzn-Trace-Id": "Root=1-58b41
lication/json"}
```

Logs

```
Execution log for request test-r
Mon Feb 27 11:46:41 UTC 2017 : S
Mon Feb 27 11:46:41 UTC 2017 : H
48-161532711d47/task
Mon Feb 27 11:46:41 UTC 2017 : M
11d47}
Mon Feb 27 11:46:41 UTC 2017 : M
Mon Feb 27 11:46:41 UTC 2017 : M
Mon Feb 27 11:46:41 UTC 2017 : M
Mon Feb 27 11:46:41 UTC 2017 : E
```

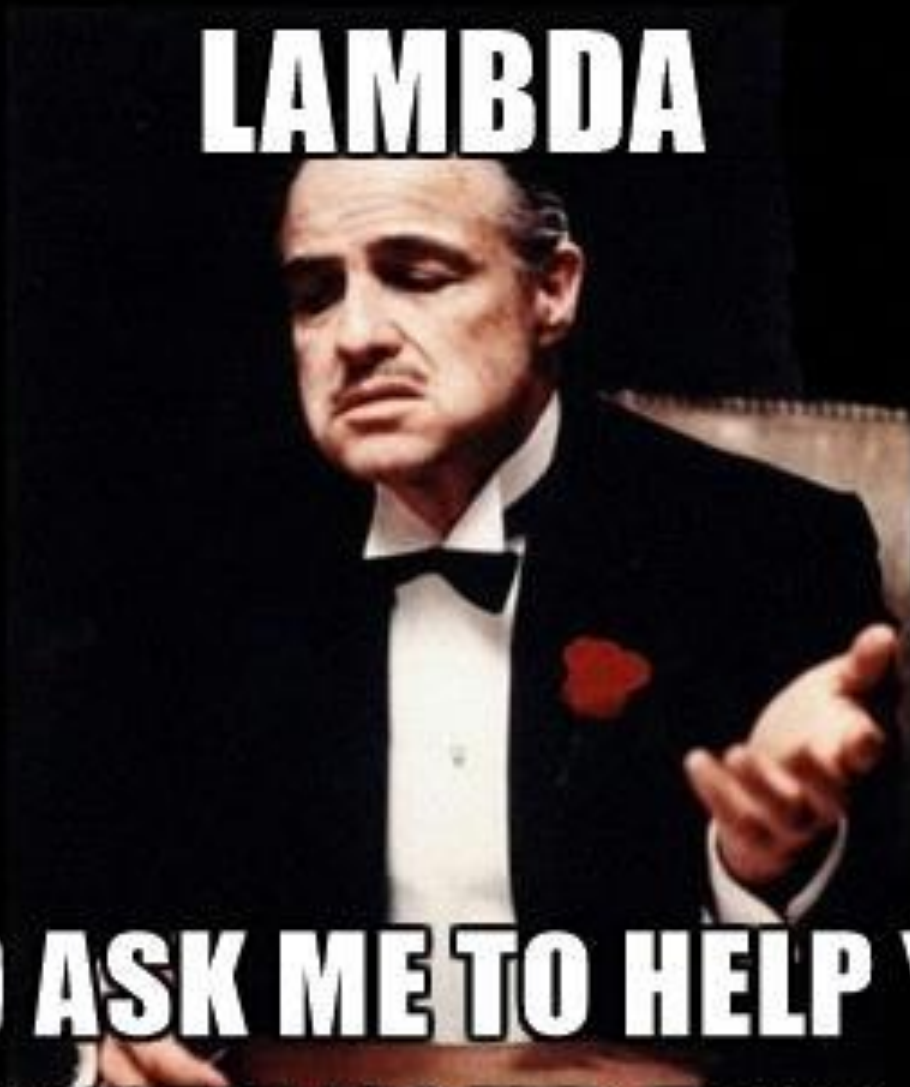
LAMBDA PRICING

- Lambda
 - Requests
 - First 1 million per month are free
 - \$0.20 per 1 million requests thereafter
 - Duration
 - Charged per 100ms execution time
 - First 400,000 GB-seconds of compute time per month are free
 - \$0.00001667 for every GB-second thereafter
- API Gateway
 - \$3.50 per million API calls received plus data transfer costs
- Estimate for Malicious Domain Application:
 - Lambda: \$0.37/hour with 10 threads after free-tier
 - API Gateway: \$0.71/hour
 - Total: ~\$1/hr

Limitations

- Stateless
- Cold start behavior
- API Gateway timeout of 10 secs

**YOU USE JAVA FOR
LAMBDA**



**AND ASK ME TO HELP YOU
OUT WITH YOUR AWS BILL**

Lambda Considerations

- Lambda can be invoked by ****anything**** or you can figure out a way to make it happen.
- NodeJs and .Net Core perform well
- Java 9?
- Iterate and test quickly with local code and mock events.

Labs

<https://github.com/roryp/awslabs>

1. Create a Spring Project with a EC2 server
2. Beanstalk with Autoscaling group
3. Serverless with Lambda and API Gateway
4. Calling an 3rd party API via Java SDK