ArchSummit
全球架构师峰会 2017

主办方 Geekbang. 极客邦科技 InfoQ

Cloud Native 架构的演进之路

代 闻

亚马逊AWS解决方案架构团队 技术经理

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AiCon

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助力人工智能落地

2018.1.13 - 1.14　北京国际会议中心

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什么是 Cloud Native?

什么是 Cloud Native?

Answer by CNCF

Cloud native computing uses an open source software stack to be:

1. Containerized.

Each part (applications, processes, etc) is packaged in its own container. This facilitates reproducibility, transparency, and resource isolation.

2. Dynamically orchestrated.

Containers are actively scheduled and managed to optimize resource utilization.

3. Microservices oriented.

Applications are segmented into microservices. This significantly increases the overall agility and maintainability of applications.

https://www.cncf.io/about/faq/

什么是 Cloud Native?

Answer by Adrian Cockcroft,

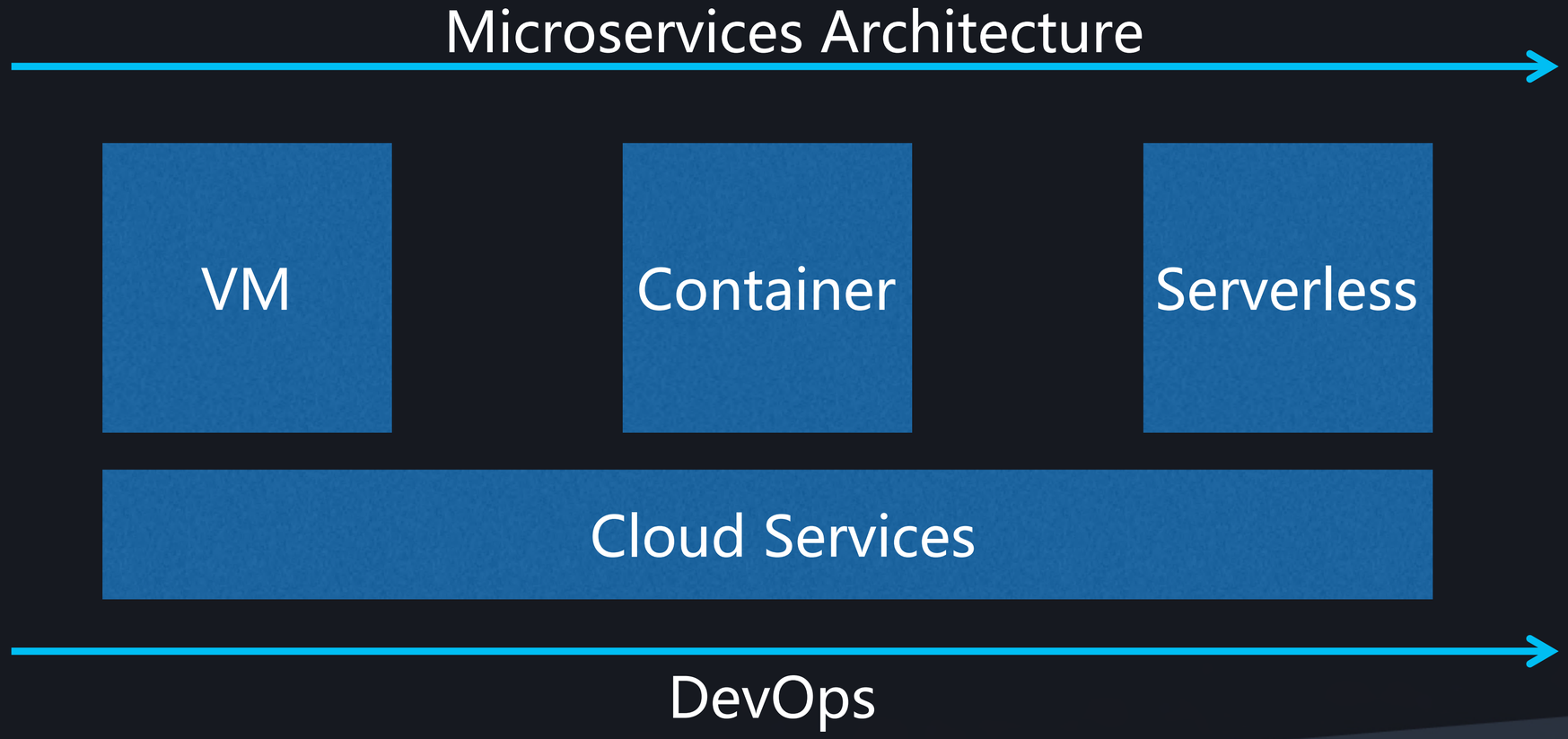
CNCF Board Member, AWS VP of Cloud Architecture, Former Cloud Architect of Netflix

Cloud native architectures take full advantage of *on-demand delivery, global deployment, elasticity, and higher-level services*.

They enable huge improvements in
developer productivity, business agility, scalability, availability,
utilization, and cost savings.

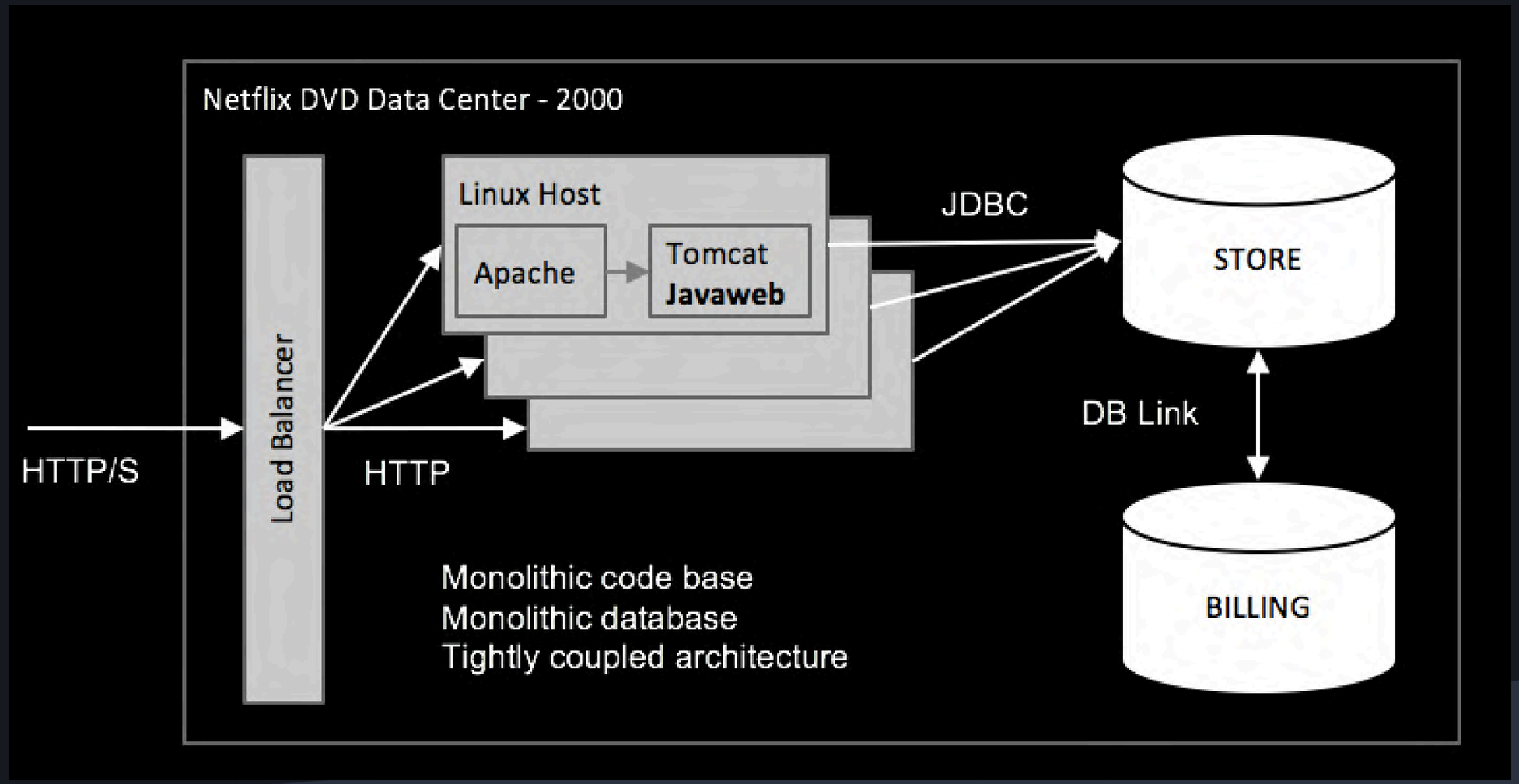
https://medium.com/@adrianco/cloud-native-computing-5f0f41a982bf

Cloud Native 架构的演进

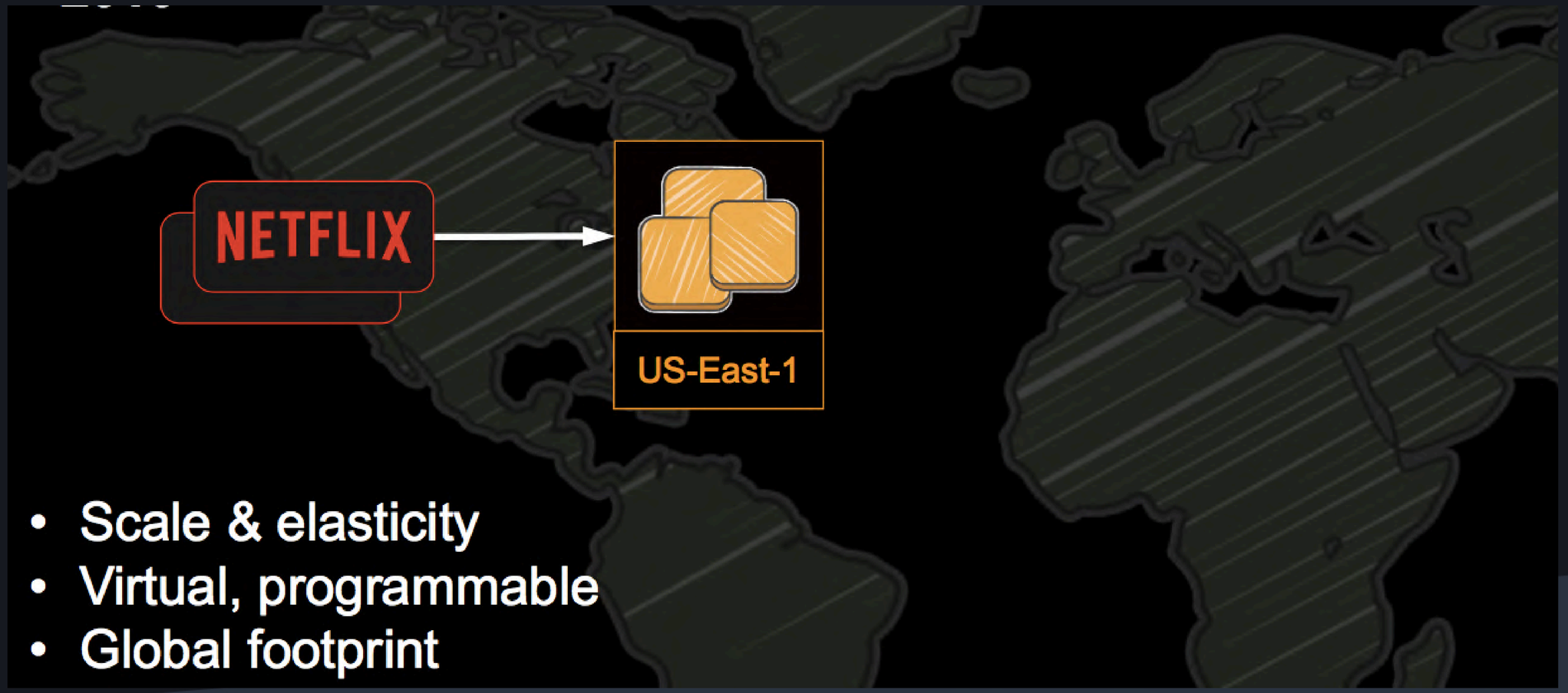



NETFLIX

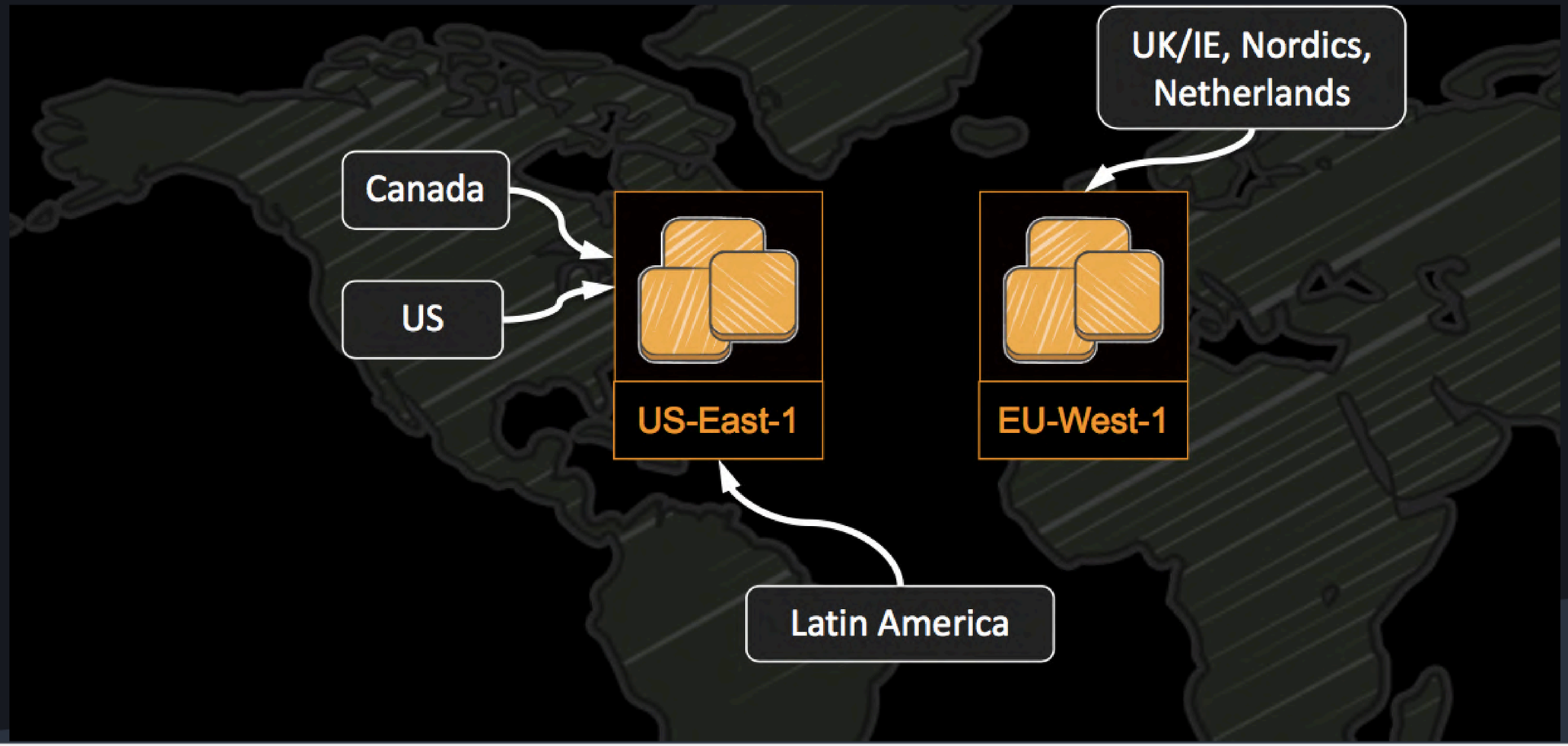
Netflix Architecture before 2009



2010年开始向云上迁移



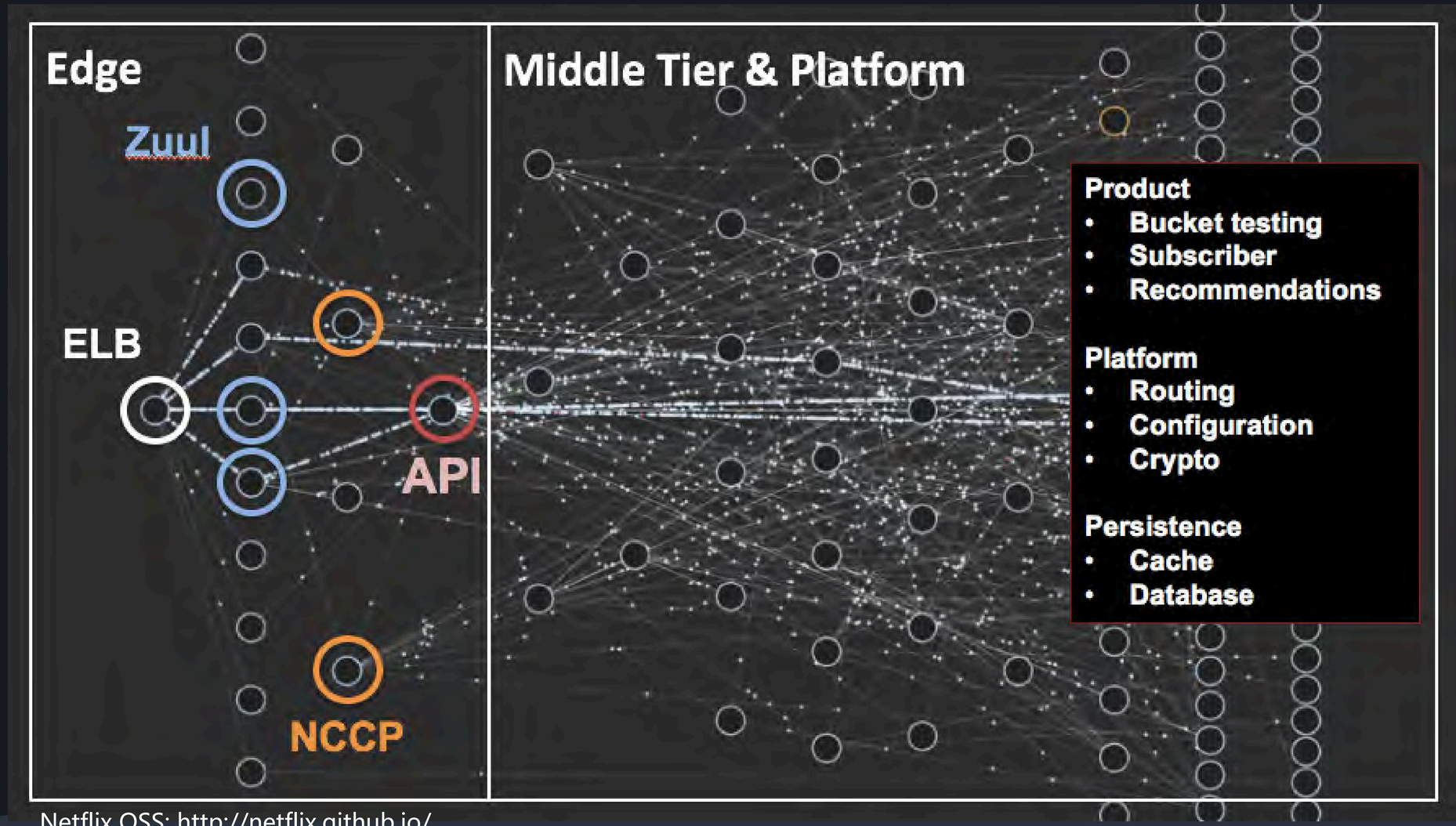
2012年多区域部署


UK/IE, Nordics, Netherlands
Canada
US
US-East-1
EU-West-1
Latin America

2013 – 2014 完成多活

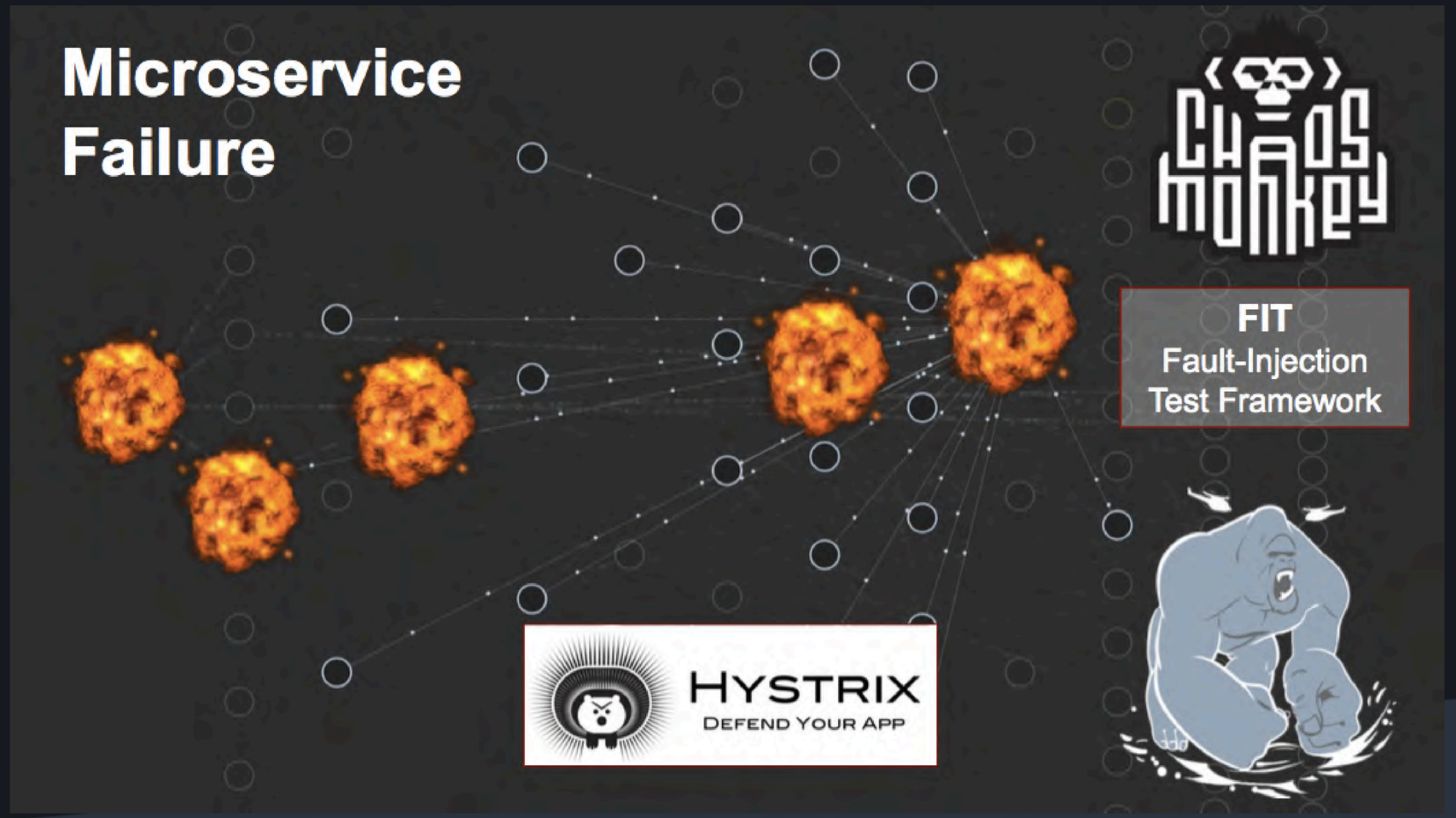
Netflix Cloud Native 架构关键点

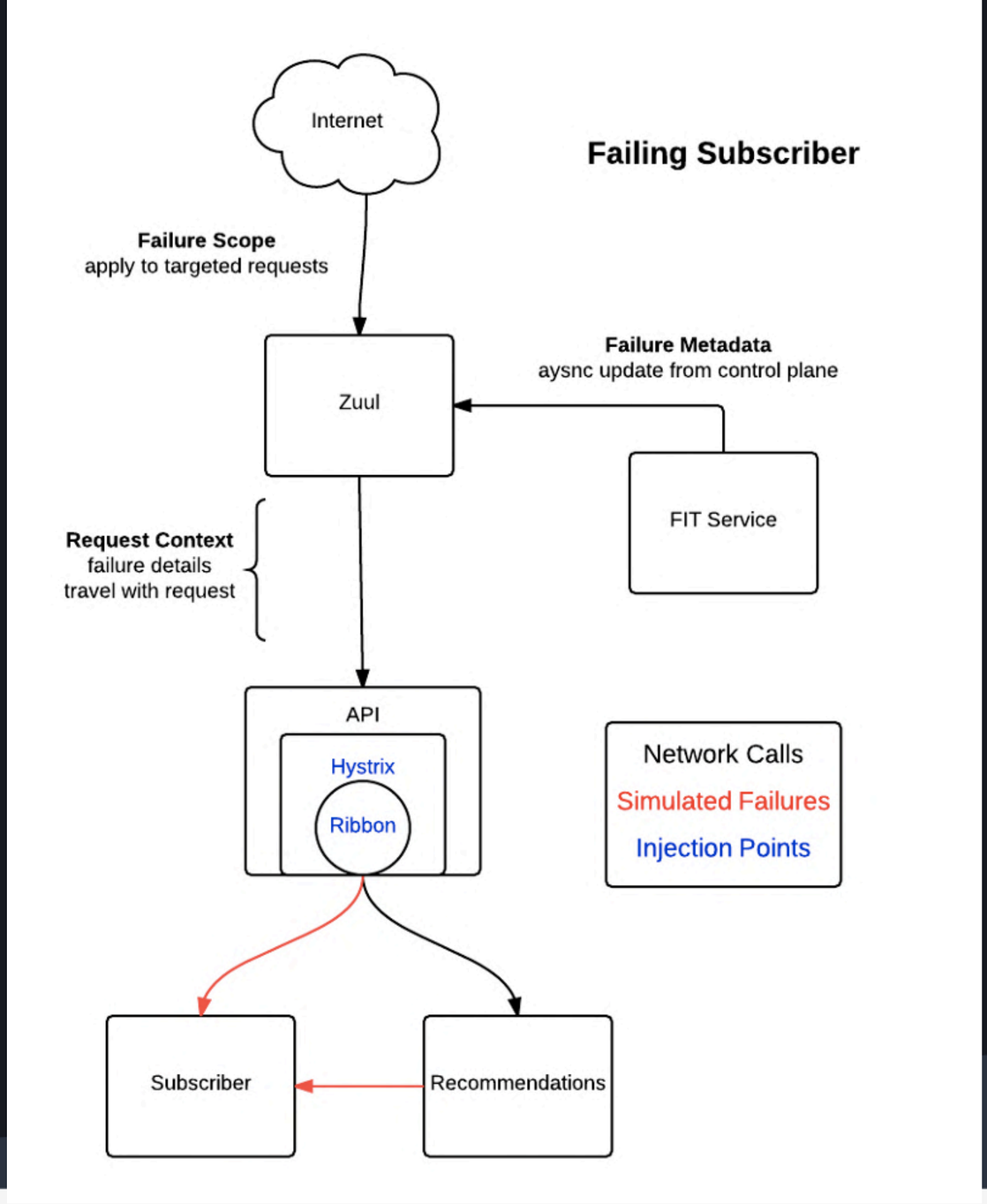
Netflix All-In AWS的微服务架构



- Netflix OSS: http://netflix.github.io/

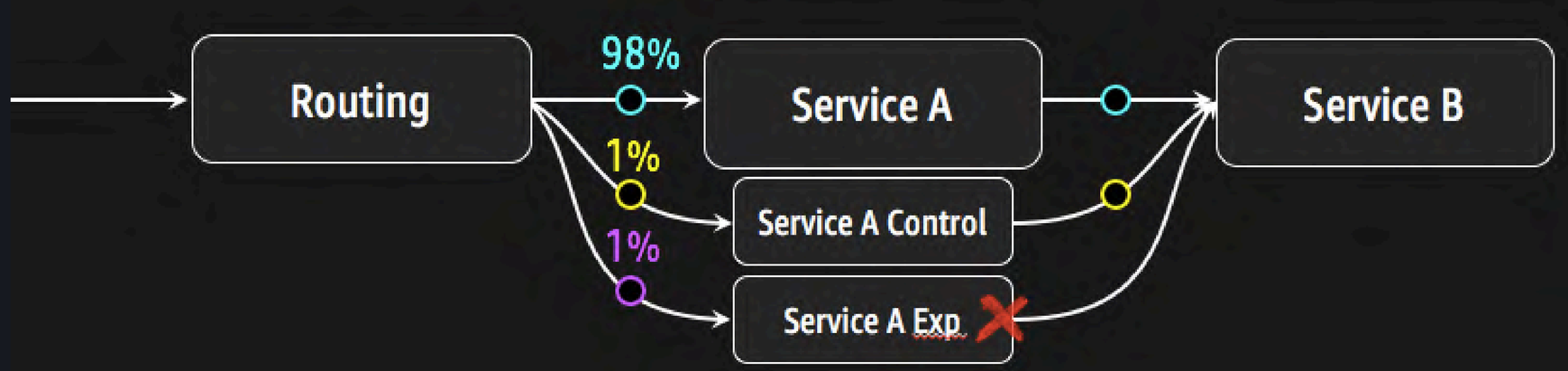
Microservice 失效测试与恢复





https://medium.com/netflix-techblog/fit-failure-injection-testing-35d8e2a9bb2

ChAP: Chaos Automation Platform



ChAP

NETFLIX


CHAOS DOESN'T CAUSE PROBLEMS.
IT REVEALS THEM.

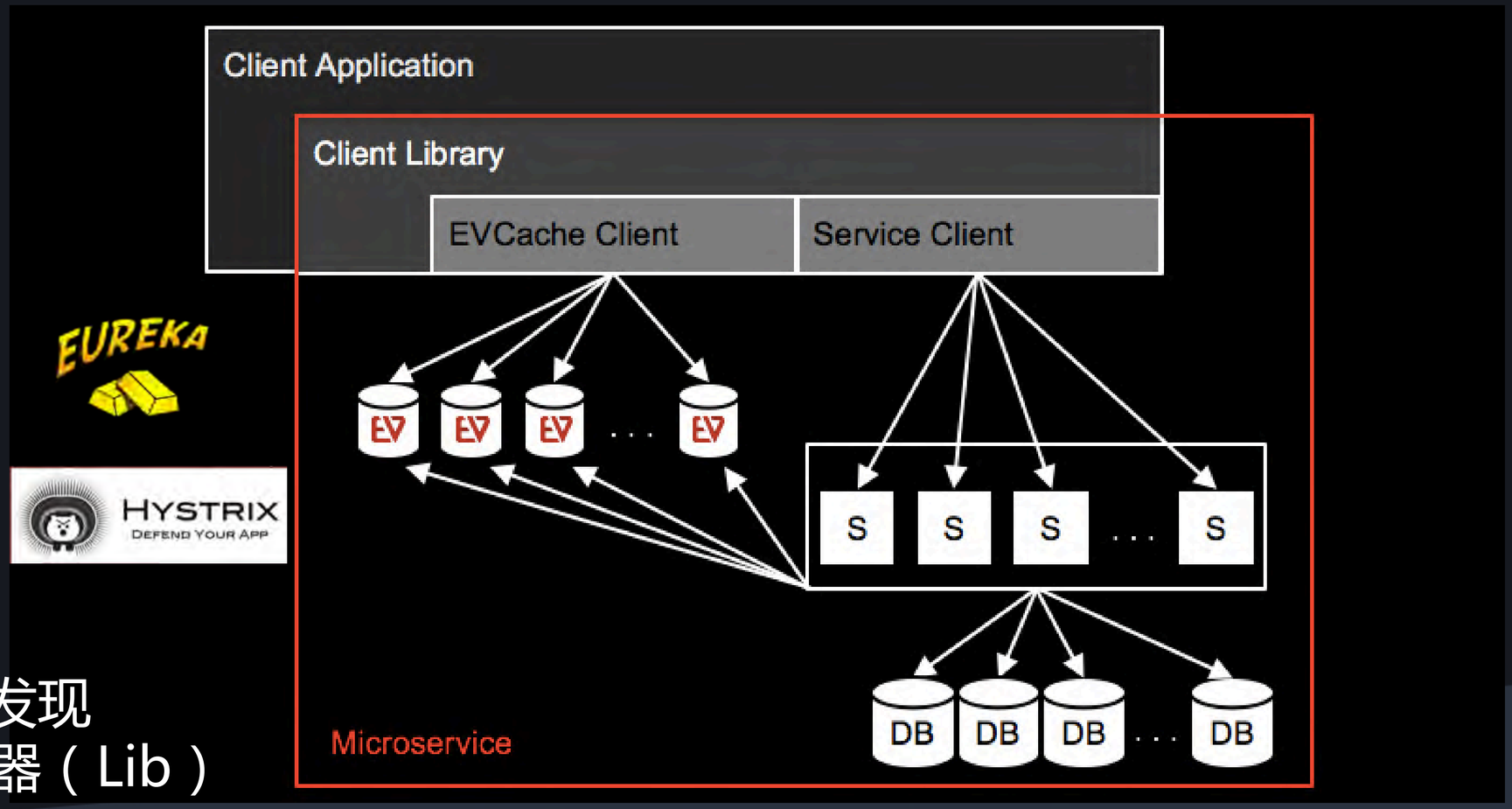
O'REILLY®

Chaos Engineering

Building Confidence in System Behavior through Experiments

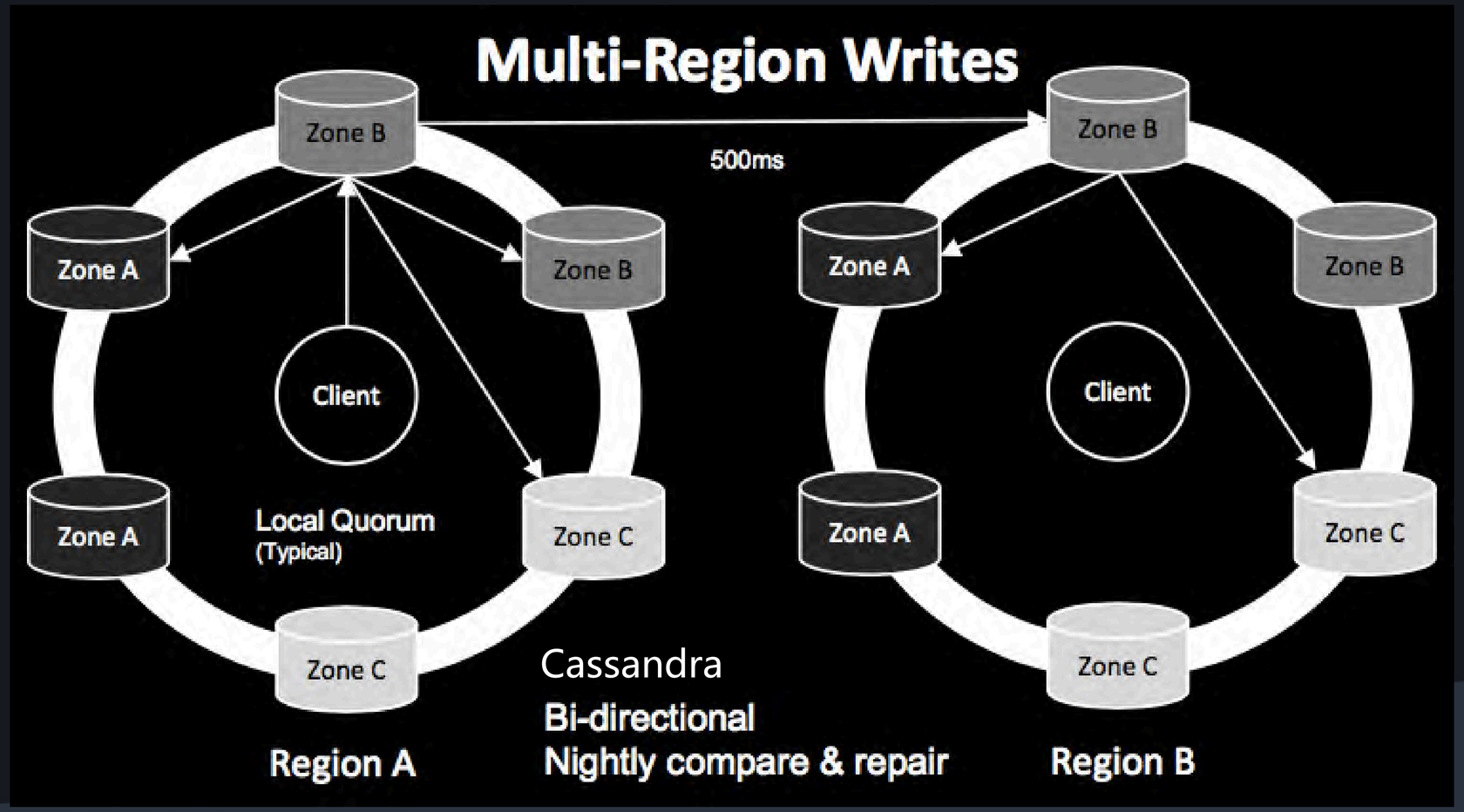
Casey Rosenthal, Lorin Hochstein,
Aaron Blohowiak, Nora Jones
& Ali Basiri

微服务典型单元

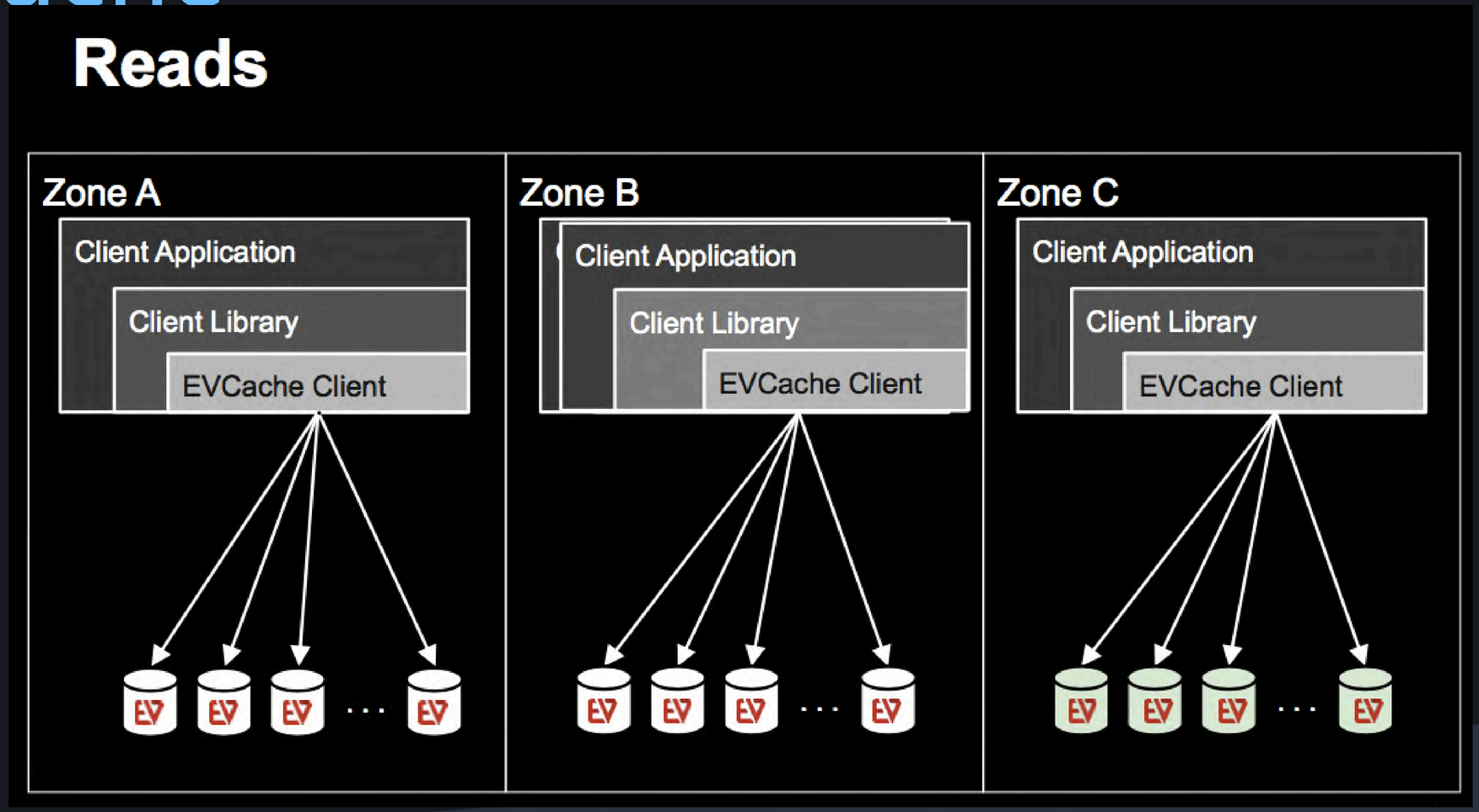


Eureka：服务发现
Hystrix：断路器（Lib）

数据库的高可用与最终一致性
Cassandra

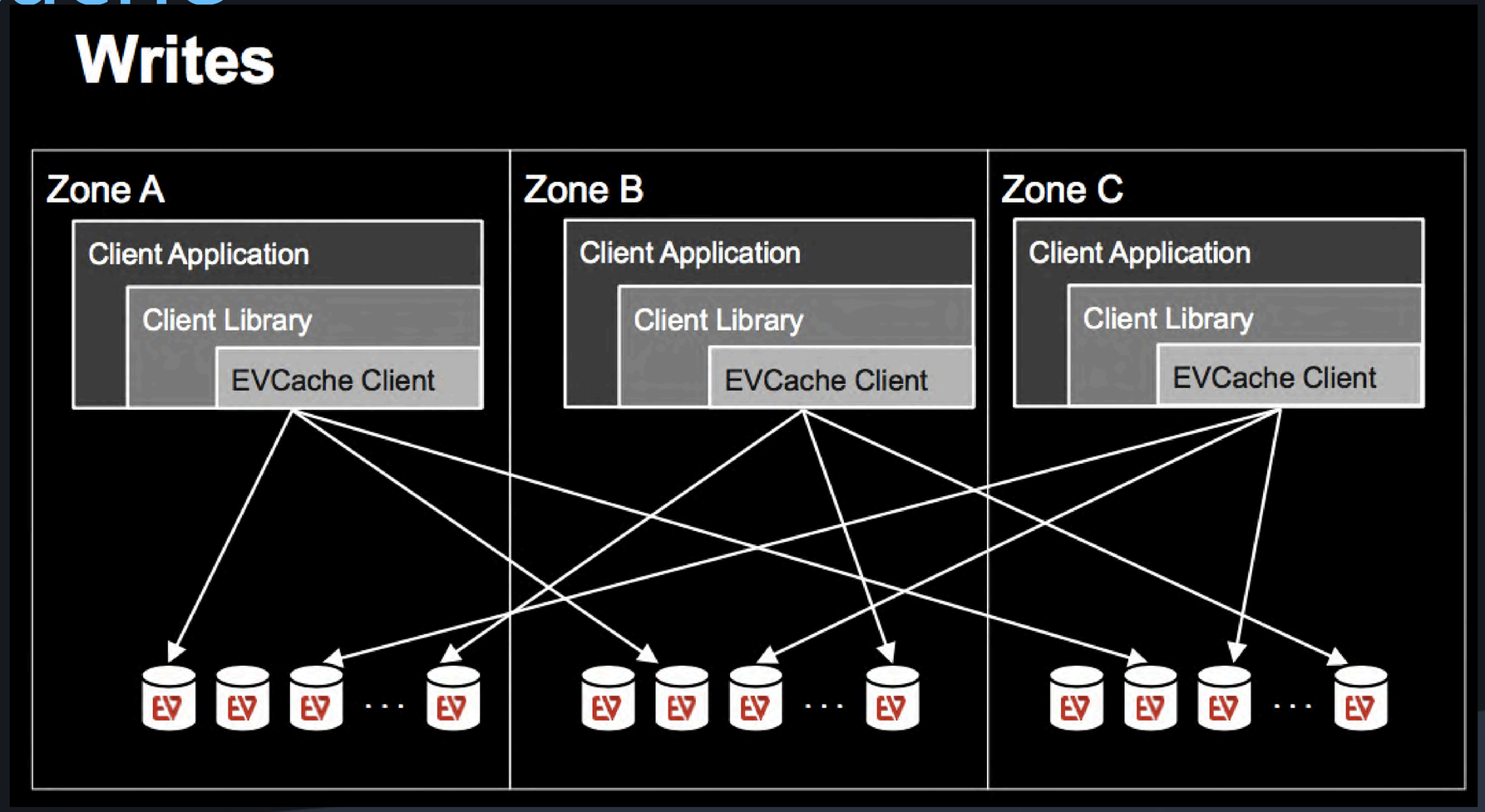


Cache的高可用与最终一致
EVCache

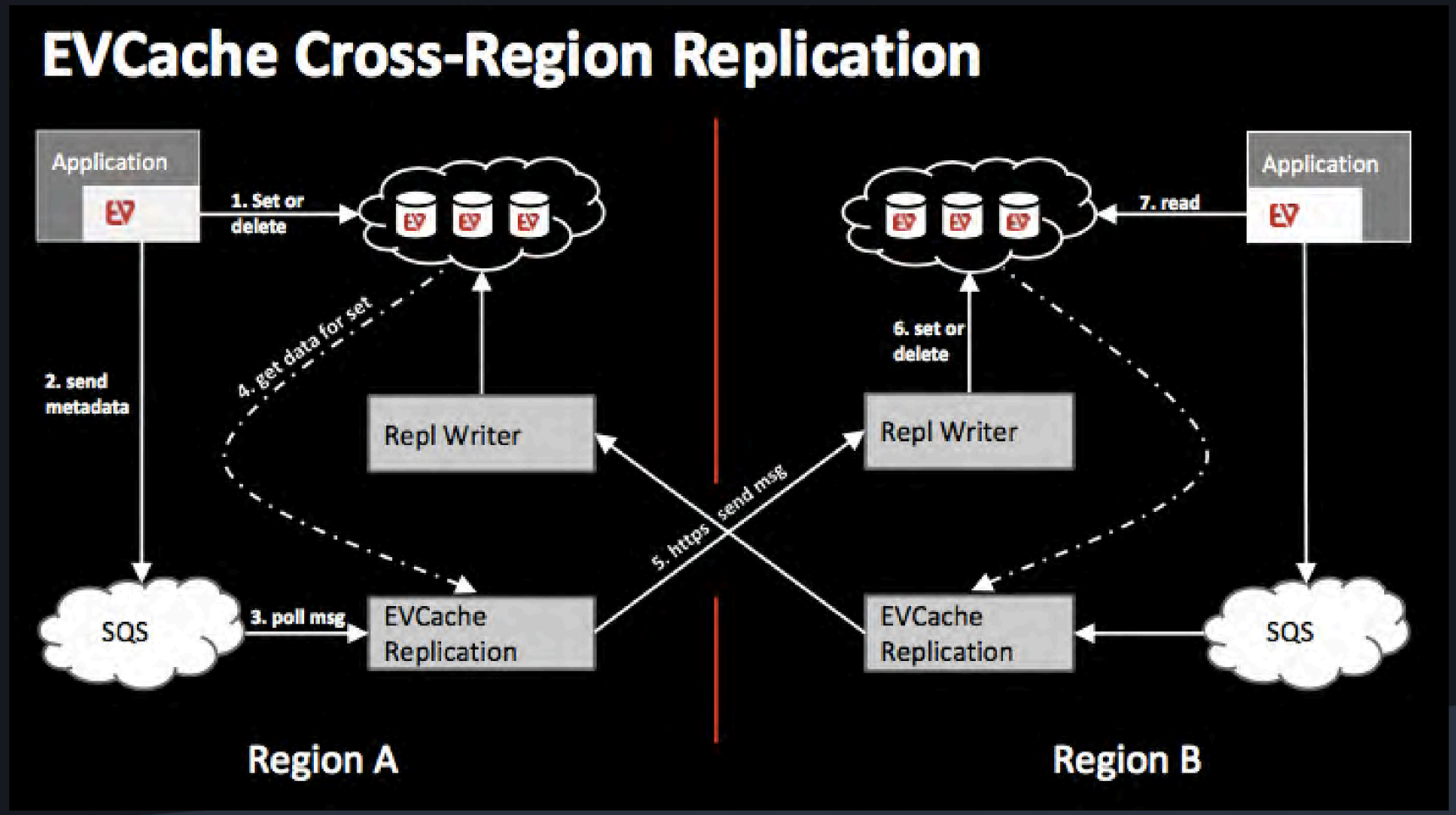


Cache的高可用与最终一致

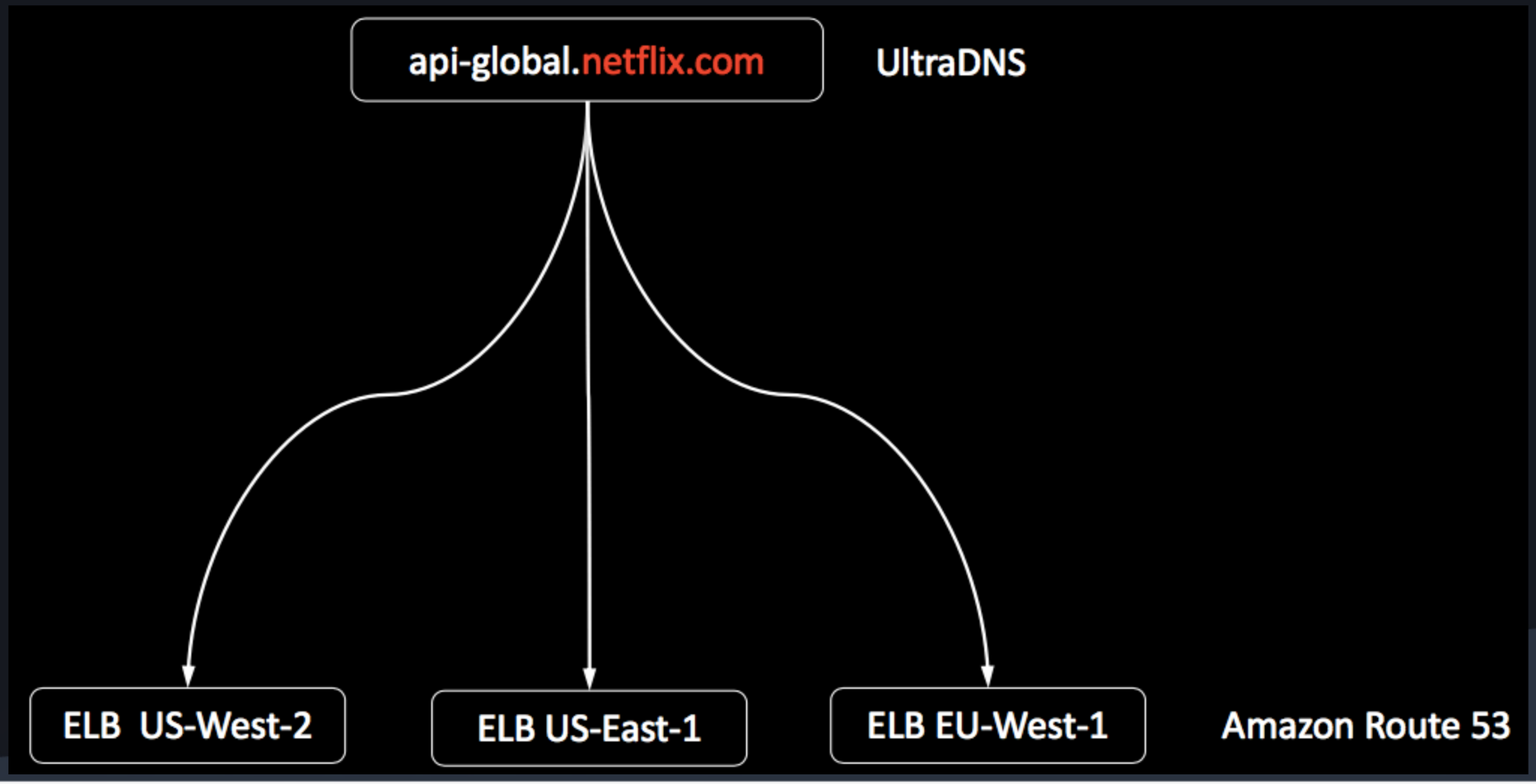
EVCache



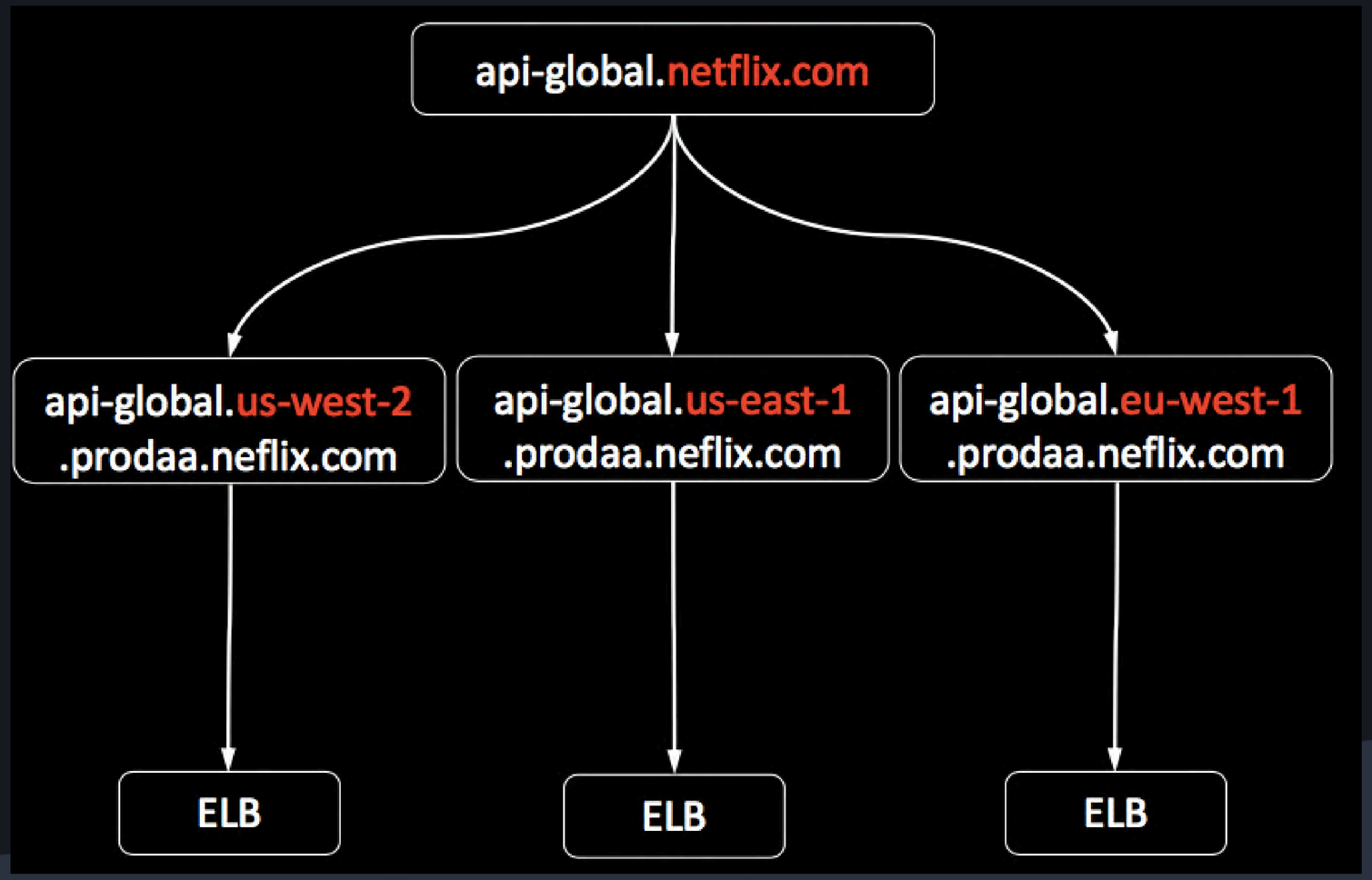
Cache的高可用与最终一致性
EVCache



DNS


api-global.netflix.com
UltraDNS
ELB US-West-2
ELB US-East-1
ELB EU-West-1
Amazon Route 53

DNS 控制- Denominator



Netflix A/A 架构关键点

- Services must be stateless—all data / state replication needs to handled in data tier.
- They must access any resource locally in-Region. This includes resources like S3, SQS, etc. This means several applications that are publishing data into an S3 bucket, now have to publish the same data into multiple regional S3 buckets.
- there should not be any cross-regional calls on user’ s call path. Data replication should be asynchronous.

https://medium.com/netflix-techblog/active-active-for-multi-regional-resiliency-c47719f6685b

Netflix OSS

- https://netflix.github.io/

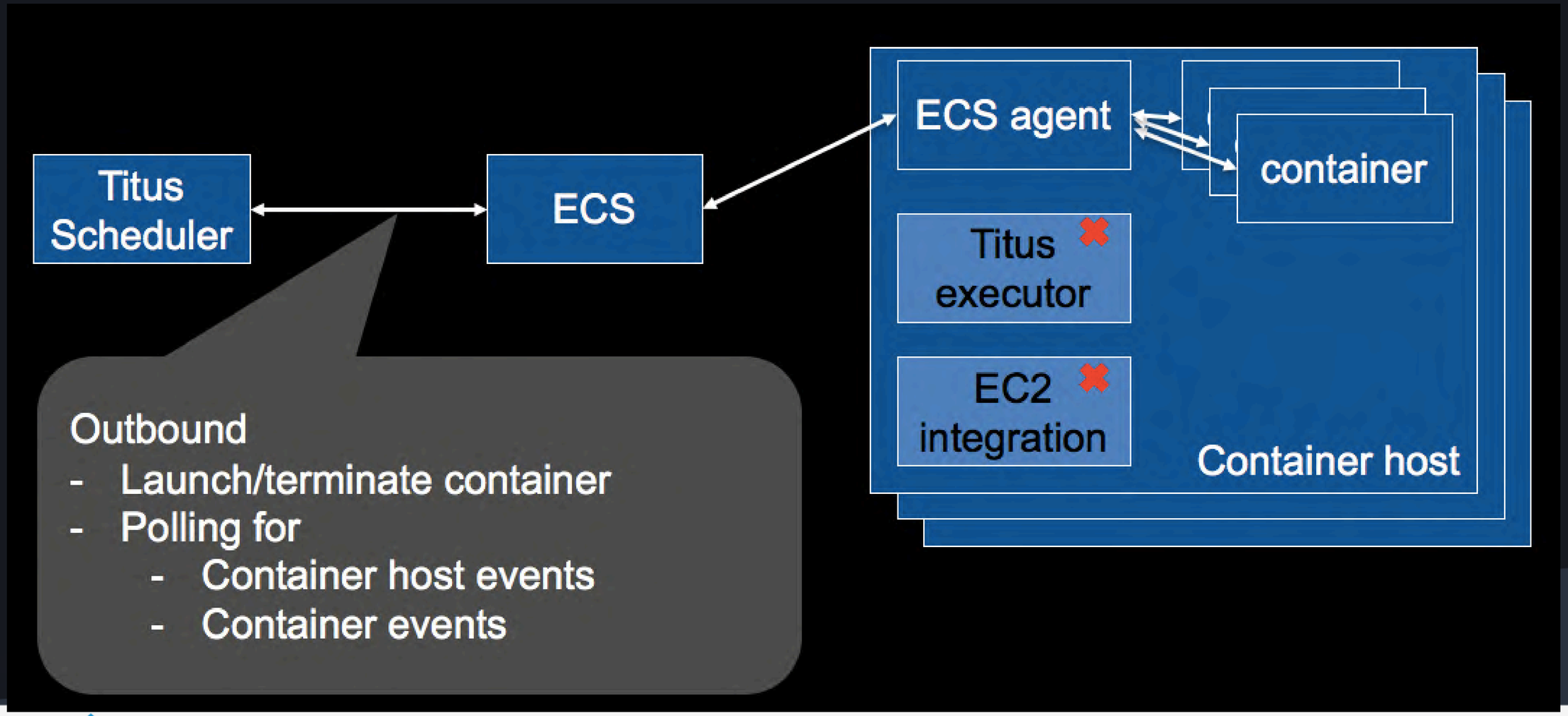
Time to re:Invent the Architecture ...

不断发展的云服务
为新用户带来的后发优势

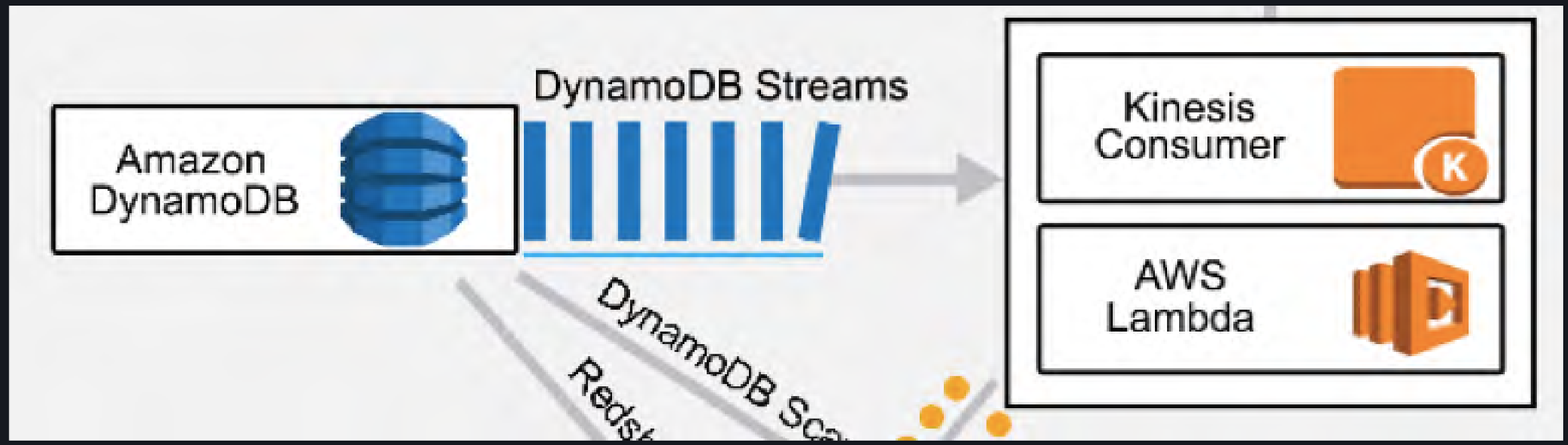
容器服务


Amazon Elastic Container Service (ECS)
Amazon Elastic Container Service for Kubernetes (EKS)
AWS Fargate

Netflix使用Amazon ECS部署容器集群



NoSQL: DynamoDB and DynamoDB Stream



NoSQL A/A: DynamoDB Global Table

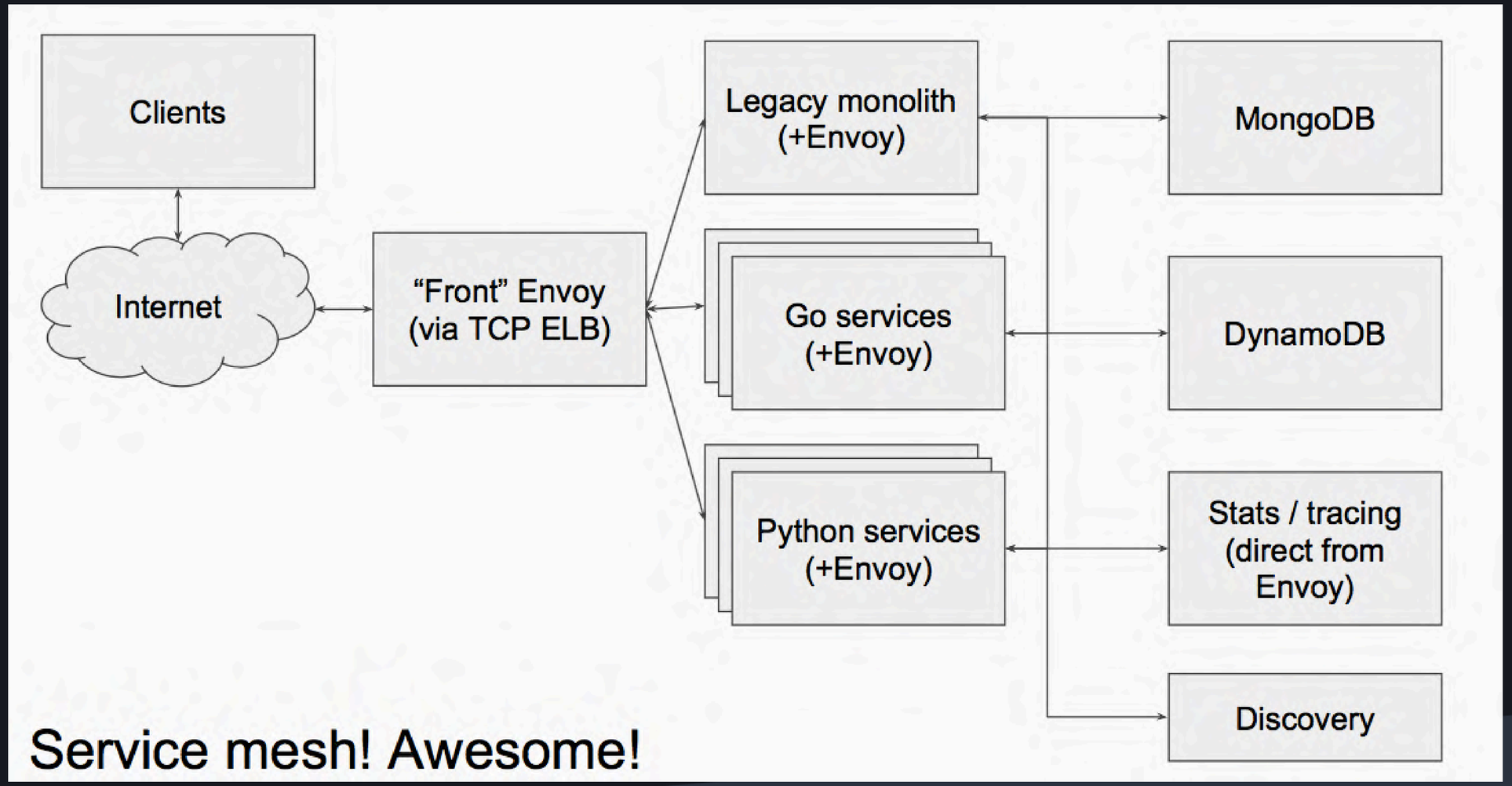
First fully managed, multi-master, multi-region database

Build high performance, globally distributed applications

Low latency reads & writes to locally available tables

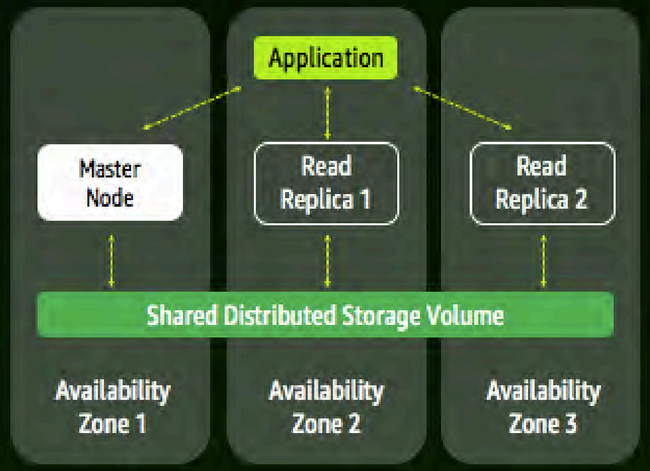
Disaster proof with multi-region redundancy

Easy to setup and no application re-writes required


Clients
Internet
"Front" Envoy
(via TCP ELB)
Legacy monolith
(+Envoy)
Go services
(+Envoy)
Python services
(+Envoy)
MongoDB
DynamoDB
Stats / tracing
(direct from
Envoy)
Discovery
Service mesh! Awesome!

RDBMS: Aurora

AURORA TODAY: SCALE OUT FOR MILLIONS OF READS PER SECOND



Up to 15 read replicas across 3 availability zones

Auto-scale new read replicas

Seamless recovery from read replica failures

RDBMS A/A: Aurora Multi-Master

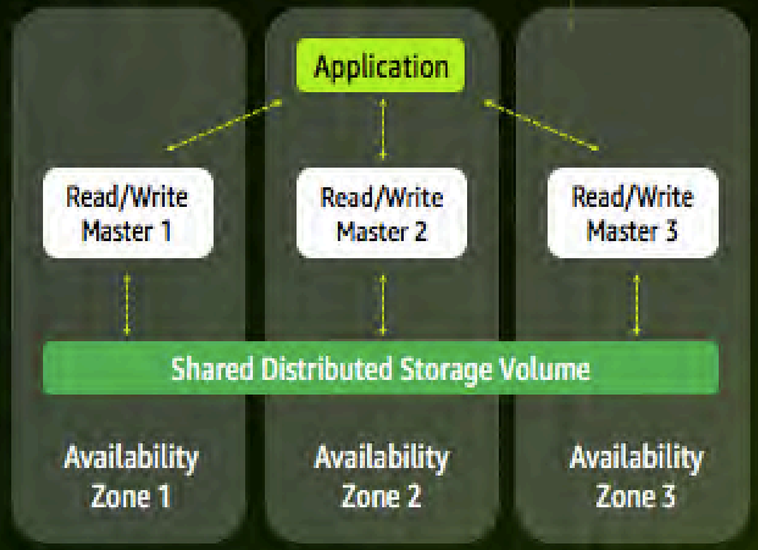
First relational database service with scale-out across multiple datacenters

Zero application downtime from ANY node failure

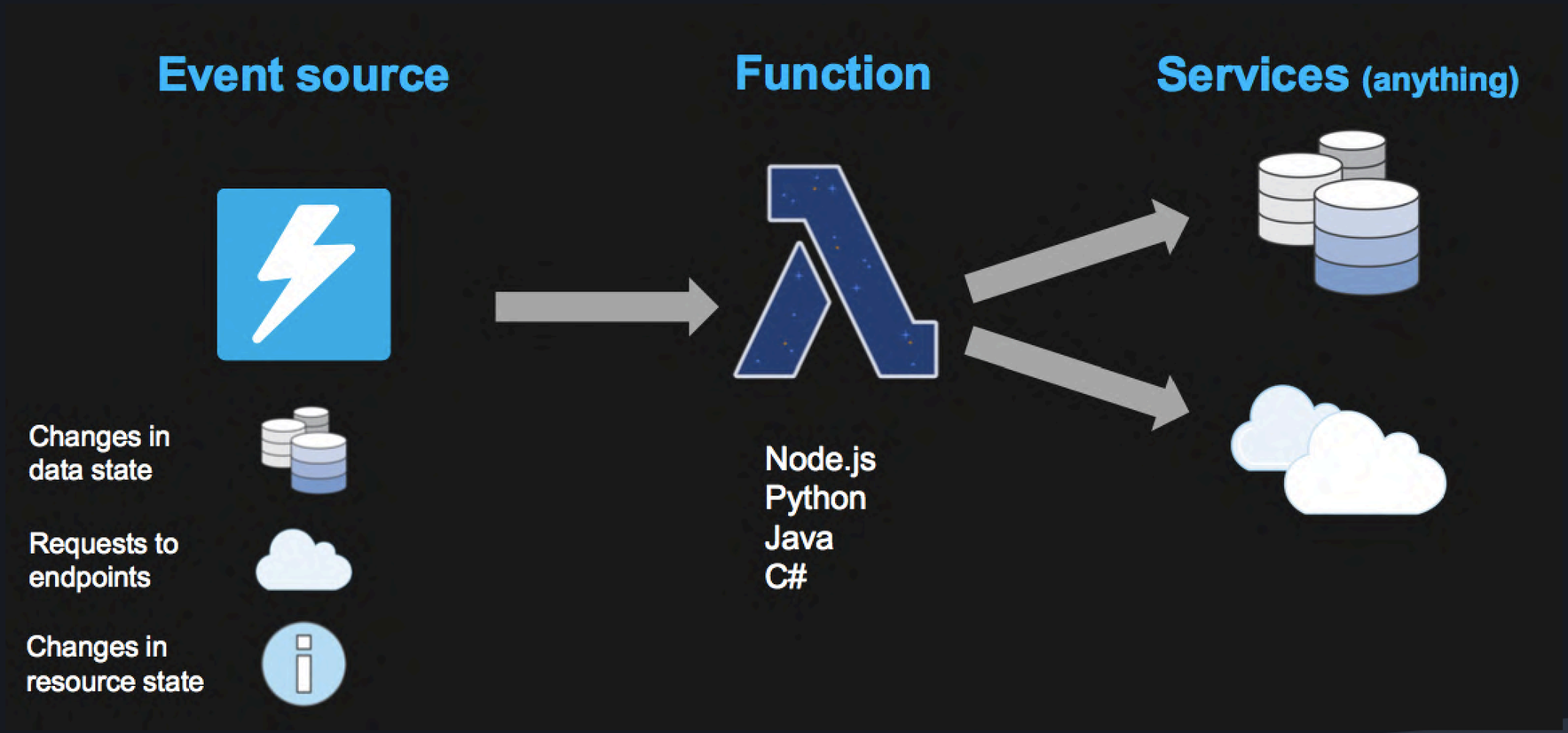
Zero application downtime from ANY AZ failure

Faster write performance

Multi-region coming in 2018



Serverless


Event source
Function
Services (anything)
Changes in data state
Requests to endpoints
Changes in resource state
Node.js
Python
Java
C#

事件驱动

Event-driven services

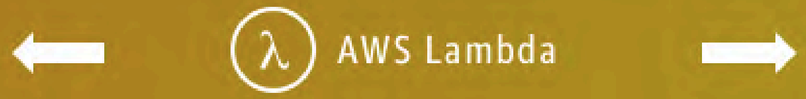
- AWS Lambda
- Amazon API Gateway
- AWS Step Functions
- AWS X-Ray

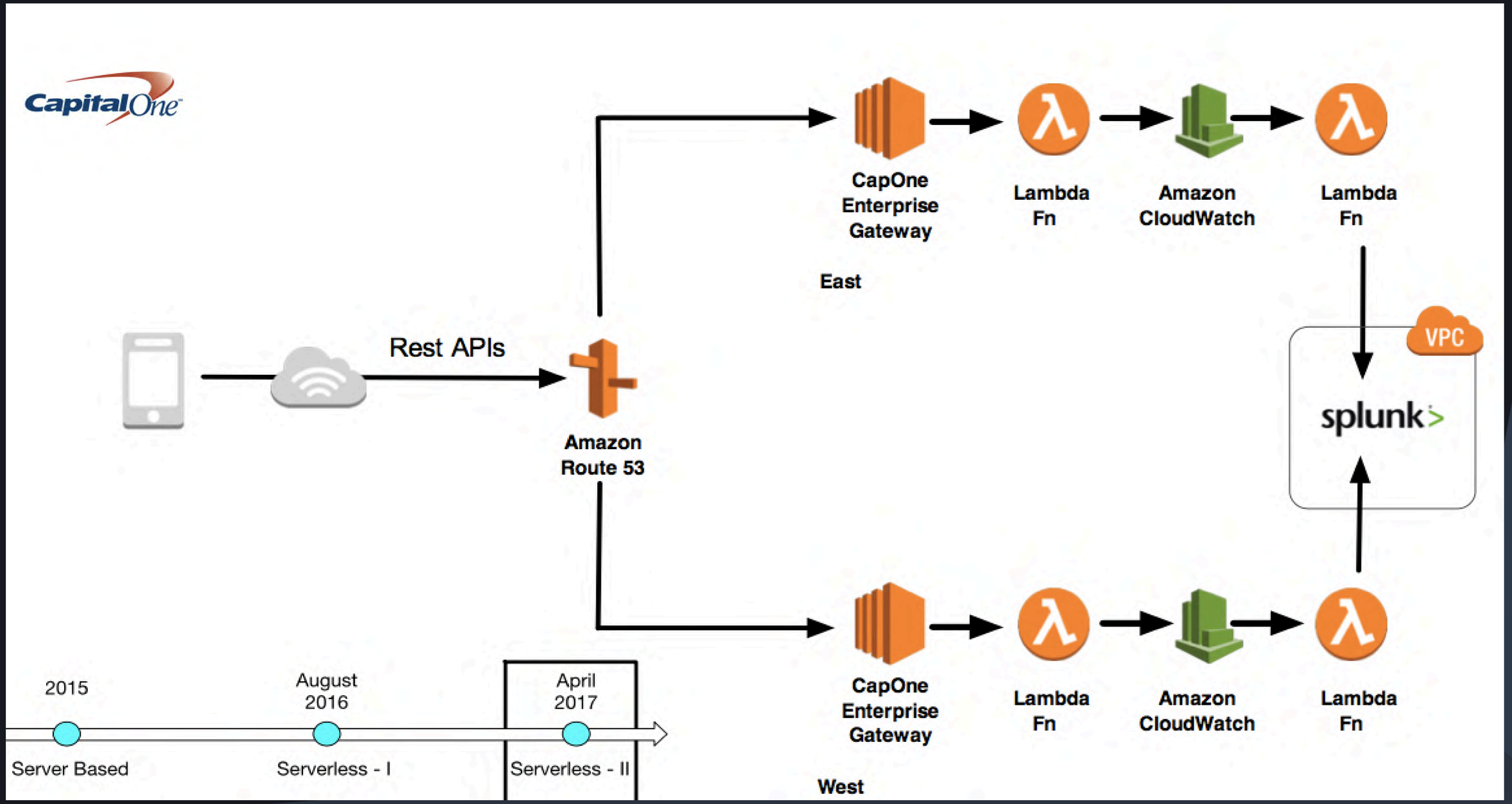
Event sources

- Amazon S3
- Amazon DynamoDB
- Amazon Kinesis Streams
- Amazon Kinesis Firehose
- Amazon SNS
- Amazon SES
- Amazon Cognito
- AWS IoT
- Amazon CloudFormation
- Amazon CloudWatch Logs
- Amazon CloudWatch Events
- AWS CodeCommit
- AWS Config
- Amazon Lex
- Amazon CloudFront

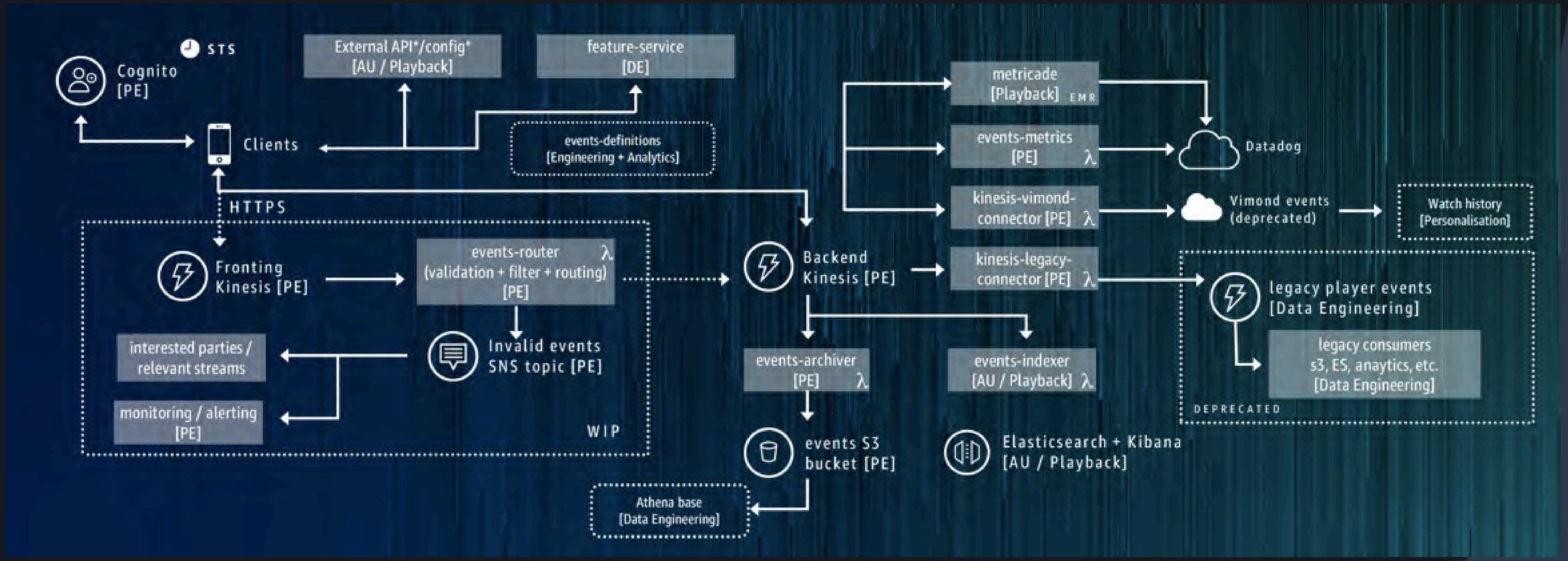
Lambda inside

- AWS IoT
- AWS IoT Button
- AWS Greengrass
- AWS Snowball Edge
- AWS Lambda@Edge




CapitalOne
CapOne
Enterprise
Gateway
Lambda
Fn
Amazon
CloudWatch
Lambda
Fn
East
VPC
splunk>
Rest APIs
Amazon
Route 53
CapOne
Enterprise
Gateway
Lambda
Fn
Amazon
CloudWatch
Lambda
Fn
West
2015
August
2016
April
2017
Server Based
Serverless - I
Serverless - II

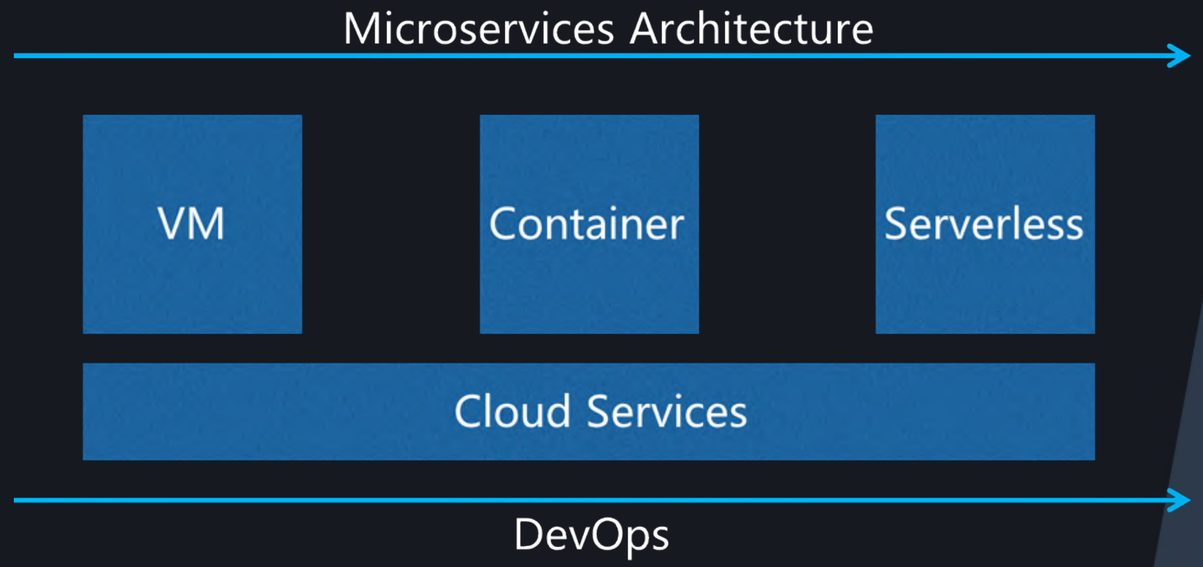
iflix


STS
Cognito [PE]
External API*/config* [AU / Playback]
feature-service [DE]
Clients
events-definitions [Engineering + Analytics]
HTTPS
Fronting Kinesis [PE]
events-router (validation + filter + routing) [PE]
Invalid events SNS topic [PE]
interested parties / relevant streams
monitoring / alerting [PE]
WIP
Backend Kinesis [PE]
metricade [Playback] EMR
events-metrics [PE]
kinesis-vimond-connector [PE]
kinesis-legacy-connector [PE]
Datadog
Vimond events (deprecated)
Watch history [Personalisation]
legacy player events [Data Engineering]
legacy consumers s3, ES, anaytics, etc. [Data Engineering]
DEPRECATED
events-archiver [PE]
events-indexer [AU / Playback]
events S3 bucket [PE]
Elasticsearch + Kibana [AU / Playback]
Athena base [Data Engineering]

Cloud Native开发测试环境

Containerized,
Dynamically Orchestrated,
Microservices Oriented.

On-Demand Delivery,
Global Deployment,
Elasticity, and Higher-Level Services.



THANK YOU

如有需求，欢迎至 [讲师交流会议室] 与我们的讲师进一步交流

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