Serverless Transformation

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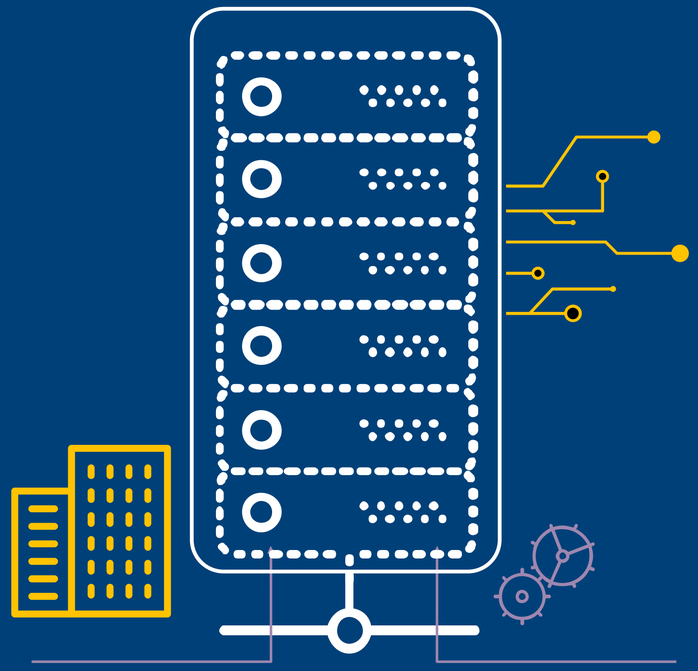
What is Serverless?

Build and run applications
without thinking about servers

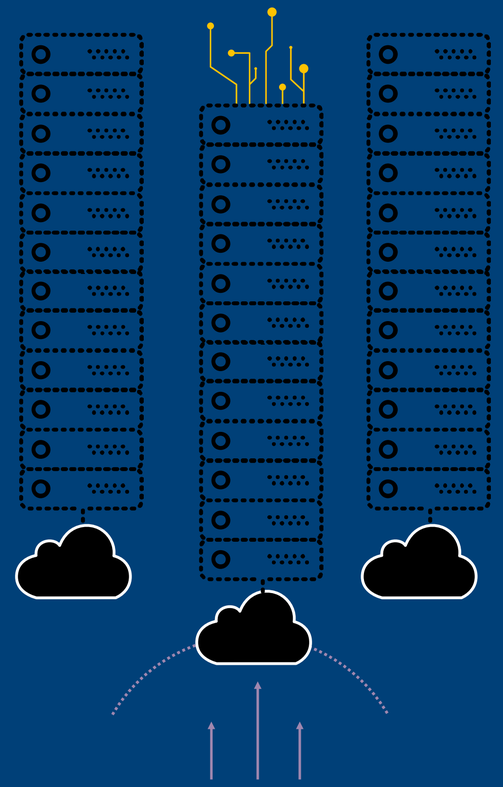
Let’s take a look at the evolution of computing

Physical Servers in Datacenters

Virtual Servers in Datacenters



Virtual Servers in the Cloud



Each progressive step was better

- Higher utilization
- Faster provisioning speed
- Improved uptime
- Disaster recovery
- Hardware independence

- Trade CAPEX for OPEX
- More scale
- Elastic resources
- Faster speed and agility
- Reduced maintenance
- Better availability and fault tolerance

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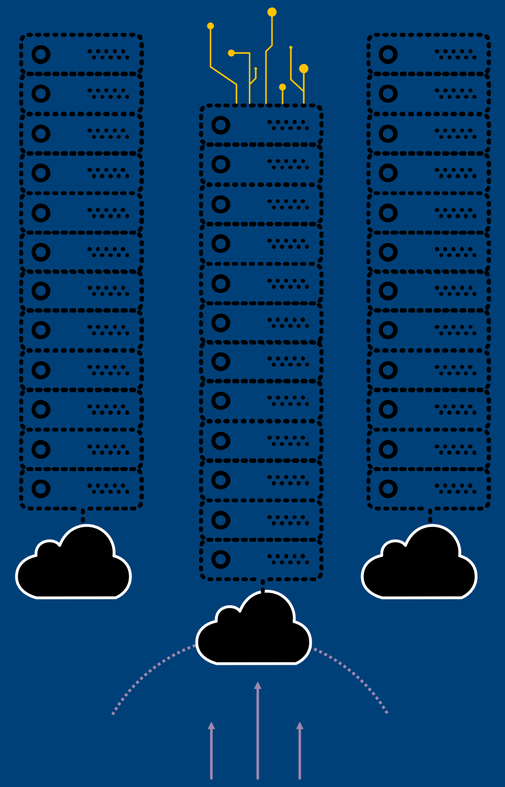
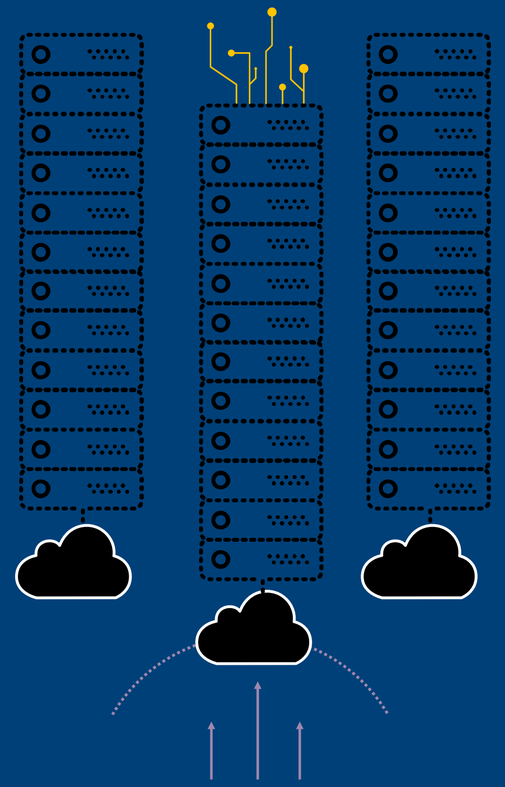


But there are still limitations

- Still need to administer virtual servers
- Still need to manage capacity and utilization
- Still need to size workloads
- Still need to manage availability, fault tolerance
- Still expensive to run intermittent jobs

- Trade CAPEX for OPEX
- More scale
- Elastic resources
- Faster speed and agility
- Reduced maintenance
- Better availability and fault tolerance

Virtual Servers in the Cloud



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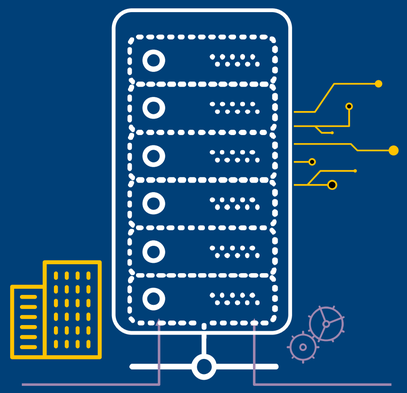
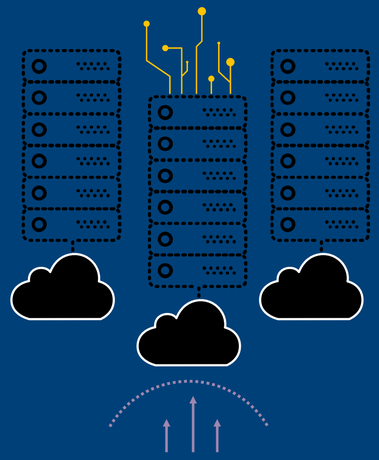
Evolving to Serverless

Physical Servers in Datacenters

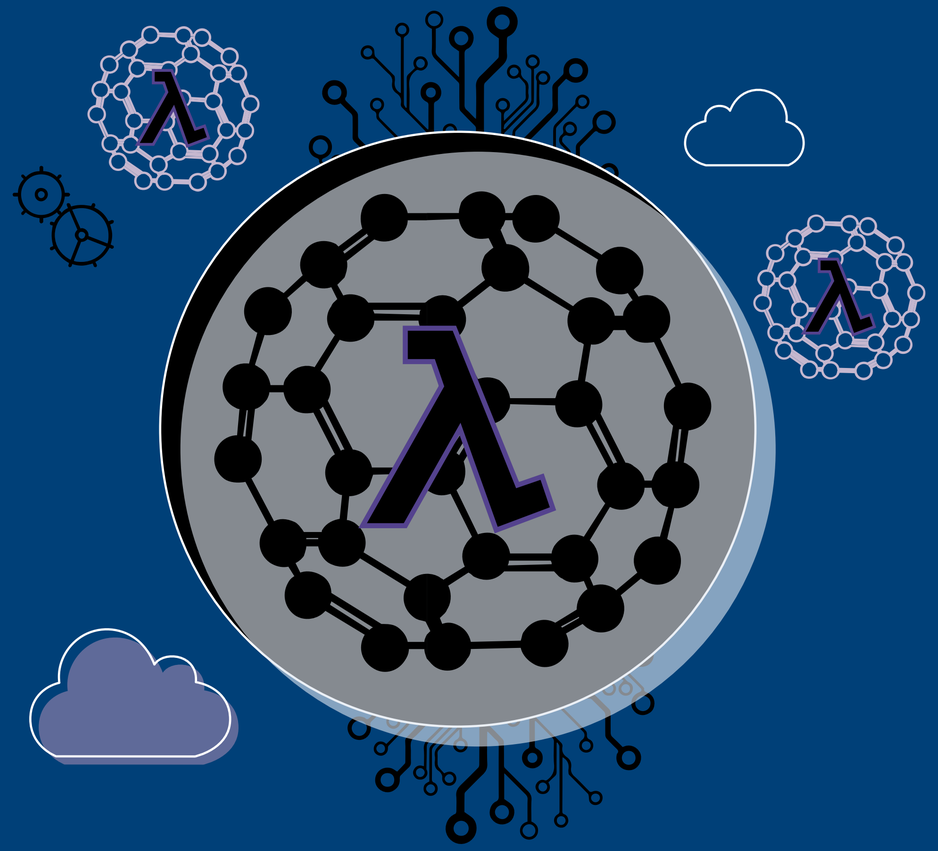
Virtual Servers in Datacenters



Virtual Servers in the Cloud



SERVERLESS



No server is easier to manage than *no* server

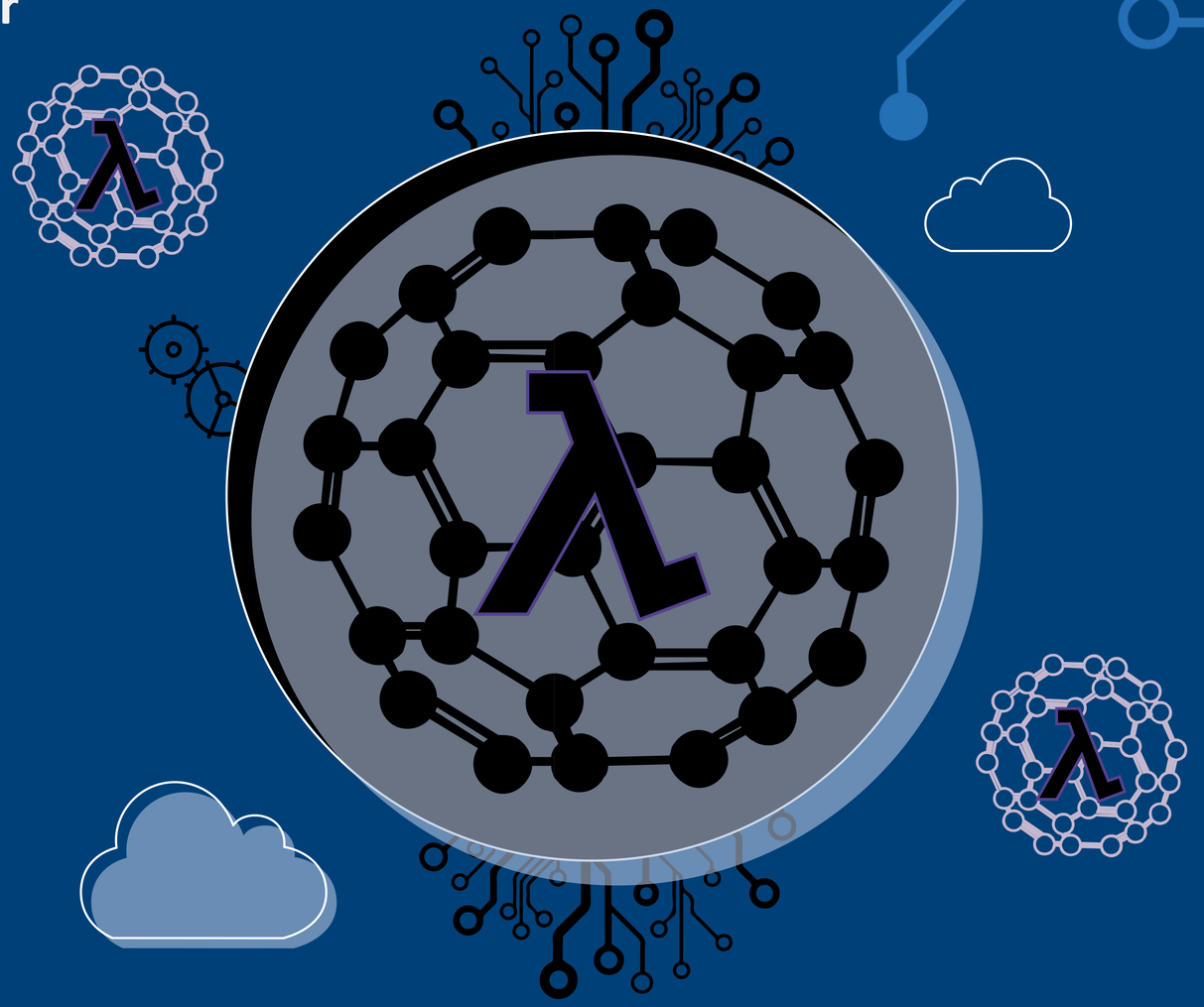
All of this
goes away

~~Provisioning and utilization~~

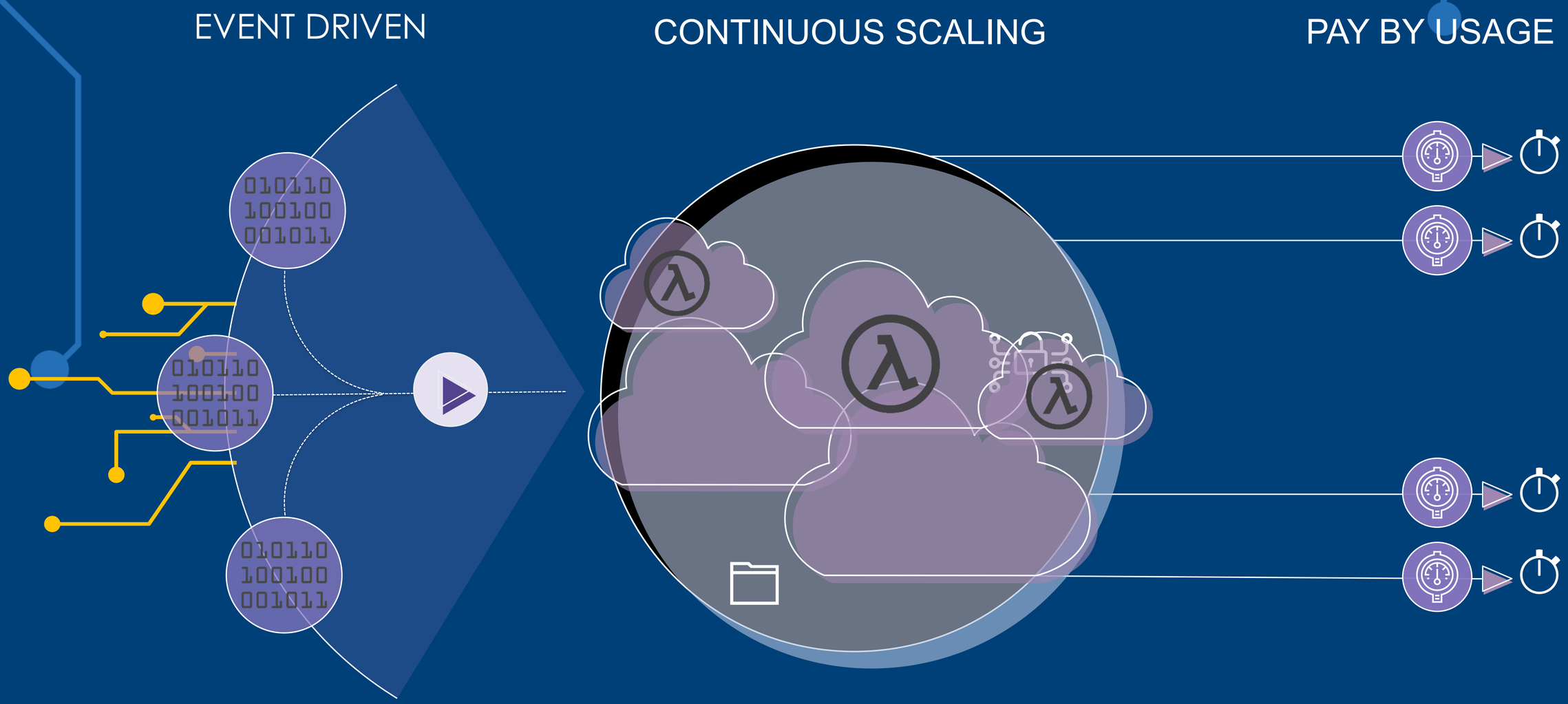
~~Availability and fault tolerance~~

~~Scaling~~

~~Operations and management~~

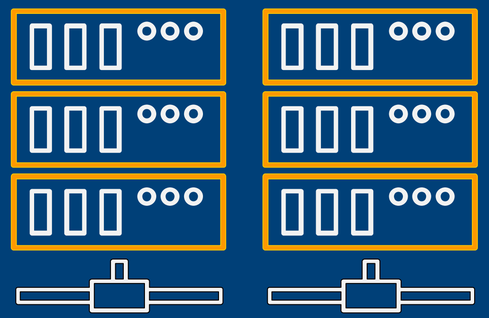


Deliver on demand, never pay for idle

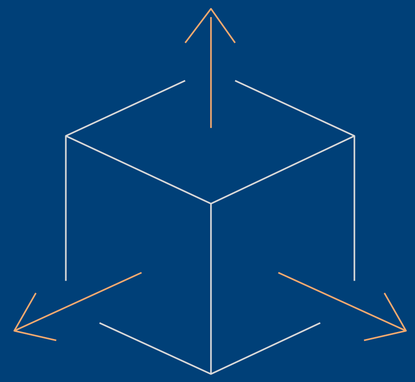


What is Serverless?

Serverless Means…



No Server Management



Flexible Scaling

High Availability

No Idle Capacity

AWS: A Mature Serverless Portfolio

Compute

AWS Lambda

Storage

Amazon S3

Database

Amazon DynamoDB

Amazon Aurora Serverless (coming soon)

API Proxy

Amazon API Gateway

Messaging

Amazon SQS

Amazon SNS

Analytics

Amazon Kinesis

Amazon Athena

Orchestration

AWS Step Functions

Monitoring and Debugging

AWS X-Ray

Edge Compute

AWS Greengrass

Lambda@Edge

Customer Stories

Customers are innovating with serverless

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Lambda is for All Application Types

Analytics
Operational management
Live Dashboards

Localytics
Zillow
mlbam

Interactive Backends
Bots
Webhooks

twilio
zapier


Data workflows
Content management
ETL workflows

THOMSON REUTERS
FireEye

Autonomous IT
Policy engines
Infrastructure mana

NETFLIX
AUTODESK
aws

Fannie Mae

Achieving Massive Scale Not Massive Cost

Existing on-premises daily mortgage cash flow risk simulation architecture not scaling with business needs

AWS Lambda

Why Lambda?

Concurrency: able to scale up to 20,000 concurrent Lambda executions in testing

One simulation of 20 million mortgages ran in 1.5 hours, or more than 4X faster than existing process

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Agero
Safe. Smart. Driven.

Serverless Driving Faster Time to Market

Agero created the MileUp app and used crash prediction models to speed up emergency response

AWS Lambda

Why Lambda?

Continuous scale: seamlessly ramps up to peak traffic of 22K Concurrent Requests

Quick time to market: 8 weeks from conception to production

Event driven architecture maximizes resource efficiency

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Enterprises are achieving massive scale with Lambda

THOMSON REUTERS

processes **4,000 requests** per second

HEARST

reduced the time to ingest and process data for its analytics pipeline by **97%**

vevo

can handle spikes of **80x normal traffic**

FINRA

processes **half a trillion** validations of stock trades daily

Expedia®

triggers **1.2 billion Lambda requests** each month

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FICO™

95% Reduction in Computation Cost

AWS Lambda enables the FICO Decision Management Suite (DMS) to perform computations on machine learning models quickly, cheaply, and efficiently

AWS Lambda

Why Lambda?

>95% decrease in overall deployment and operational costs

Scales up or down for variation in customer request volume

Migrating tasks to Lambda took only a few weeks

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Customer benefits: Agility, scale, cost savings

iRobot does >1,000 Lambda deploys per day for its serverless IoT backend that runs internet connected-vacuums, with 2M connected robots by 2018 (FY17 projected)

HomeAway uses Lambda to process and prepare 6M user-uploaded photos a month for its vacation rental marketplace

Fannie Mae is replacing on-prem data centers with a Lambda-based solution that can run a Monte Carlo simulation on 20M mortgage calculations in 1.5 hours

Agero's accident detection and driver behavior analysis platform handles over 1B Lambda requests each month and scales to handle 20x at peak load

Nextdoor replaced its Apache Flume platform with a serverless data ingestion pipeline that handles 3B events daily

Revvel reduced video transcoding time by >95% at a fraction of the cost of transcoding videos on server-based solutions

Native Cloud Development

Re-Imagining Applications in the AWS Cloud

CLIENT INDUSTRY: Agriculture
CAPGEMINI UNITS INVOLVED: Iowa, OneDeliver
MAIN PRACTICE INCLUDED: ACT

SOLUTION(S): Cloud Native Development
TCHNOLOGIES UTILIZED: AWS, Python, Hadoop, NodeJS
RIGHTSHORE® INCLUDED: Yes

BUSINESS GOAL

- Customer took a ‘cloud first’ approach to all new application development
- Needed a strong governance and maintainability model in AWS
- Customer limited by processing limitations in on premise data center
- Needed to process 2 petabytes of genomics data per year
- Needed to be able to scale quickly to handle unpredictable demand
- On premise storage costs were becoming unsustainable

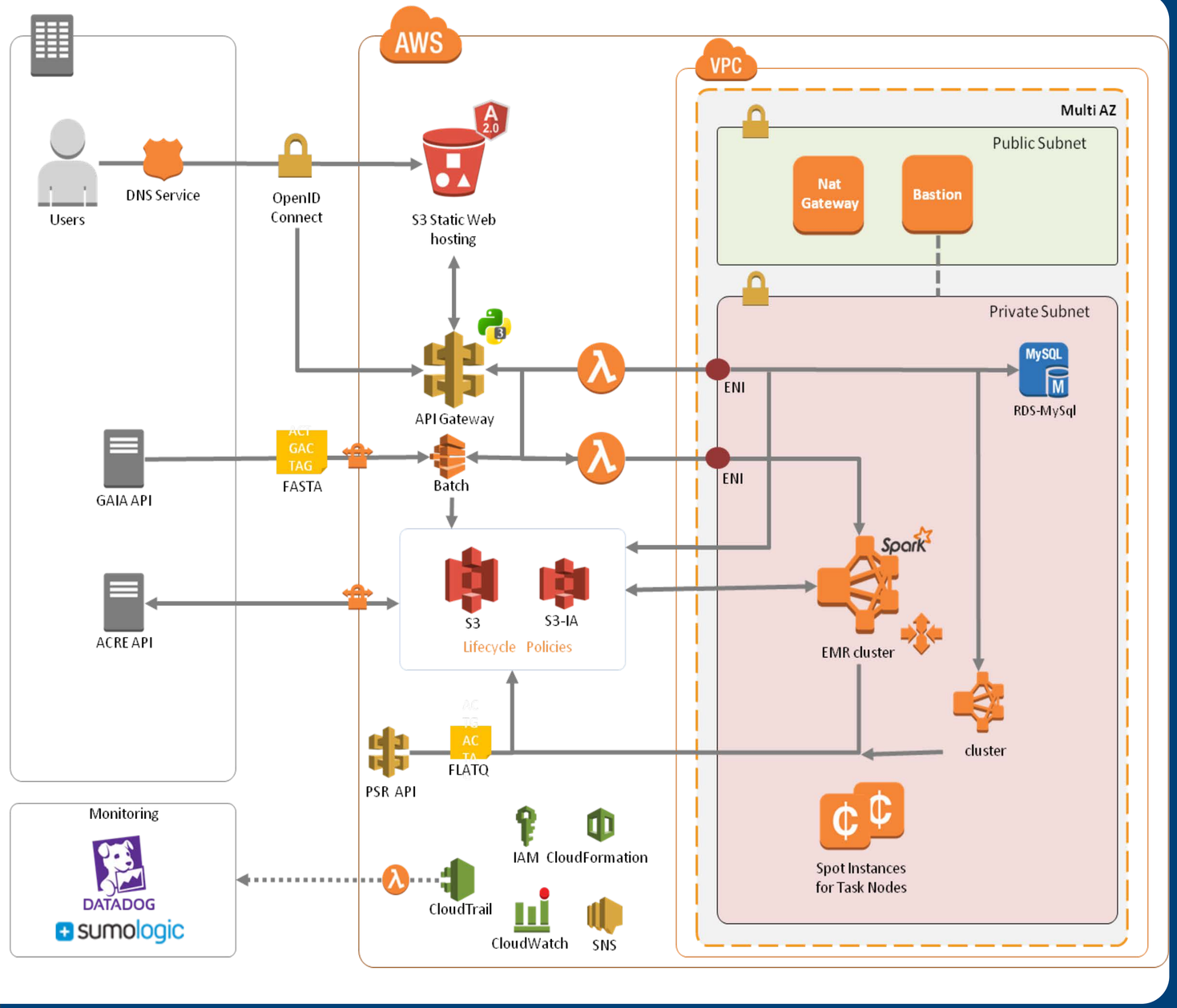
APPROACH

- Established a Cloud Center of Excellence to create architecture, best practices and a governance model
- Worked with Customer to develop a security model that meets all regulatory compliance
- Built serverless applications to support Genomics processing pipeline
- Genomics applications utilize AWS S3, Lambda, EMR, API Gateway and other AWS services
- Built full DevOps and CI/CD pipeline in AWS
- Created source of truth data repositories with 1000’s of data sources

RESULTS

- Cloud Center of Excellence continues to govern and set standards for all Customer cloud deployments
- Ability to scale compute power rapidly and cost efficiently
- Able to process 5x more genomes per year
- Significant cost savings versus traditional on premise infrastructure
- All new applications development is targeted for the AWS cloud
- Customer development, QA, infrastructure and business staff trained to work in a cloud first model

Solution Overview



Solution

- Provide secure, scalable, reliable and highly available environment for the genomics applications using AWS
- Serverless architecture with Lambda and API Gateway
- Use S3 for storing around 1.5 PB genomics data
- Fully automated infrastructure as code using cloudformation and python scripts
- Continuous delivery using TeamCity and OctopusDeploy
- Agile using tools like JIRA, Confluence, Sonar for code quality
- Latest technologies like Angular 2, Python 3.6, AWS Batch and Zappa serverless framework

Thank you