MA-01

Reduce operational burden while improving scalability, reliability, security, and availability

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Senior Solutions Architect
Amazon Web Services
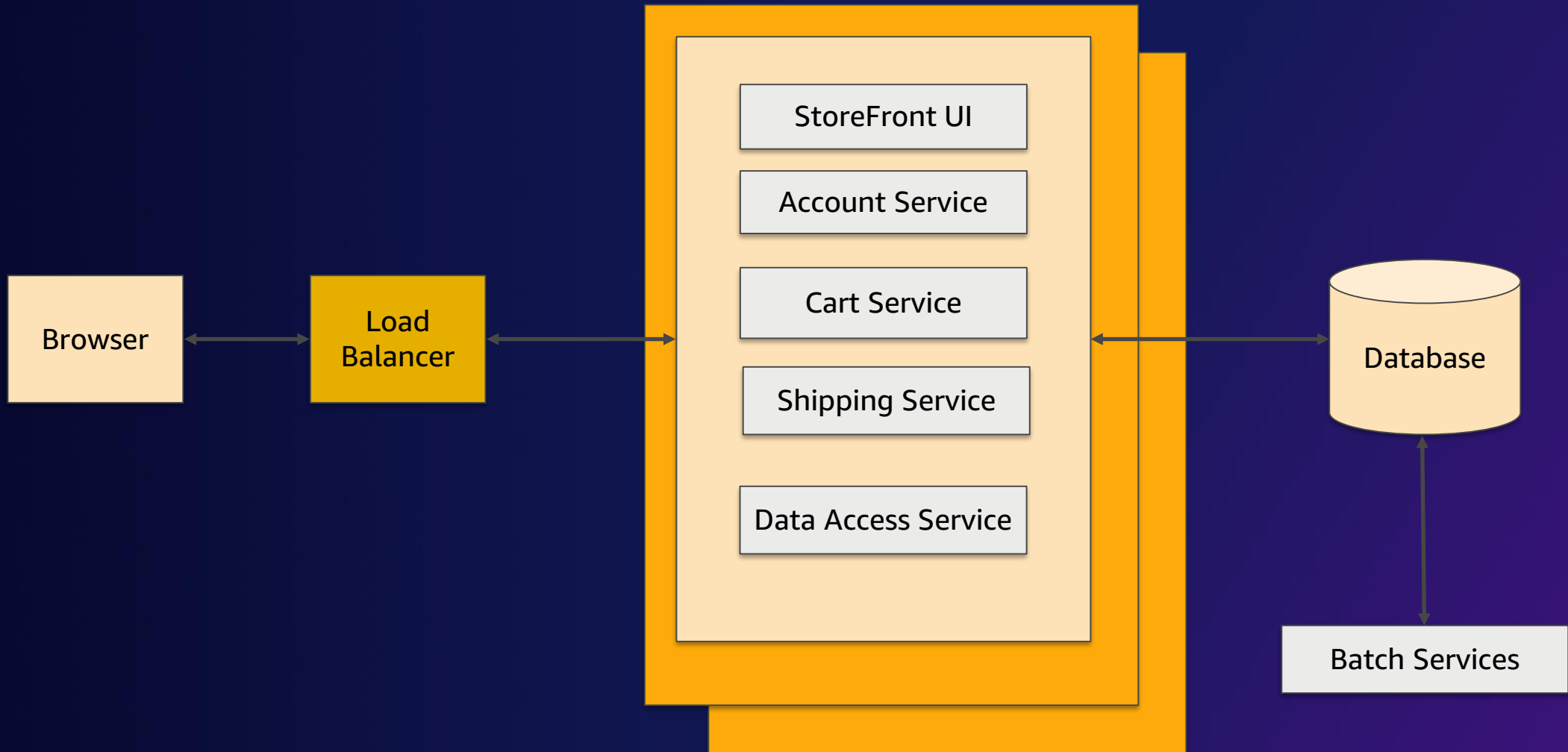
Toby O'Rourke

Chief Technology Officer
FundApps

Agenda

- Introduction

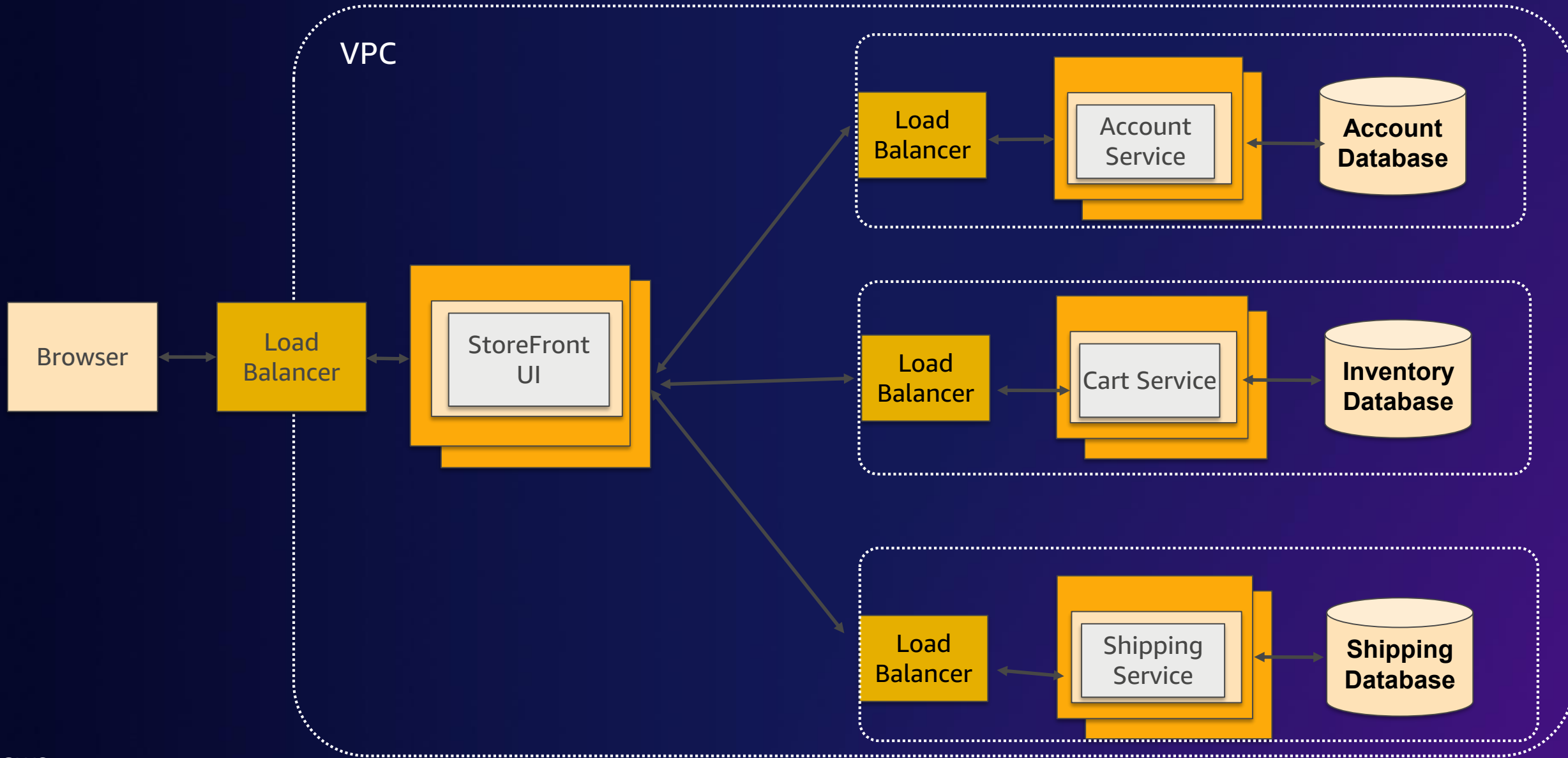- Monothlithic Architecture

- Microservices Architecture

- AWS Container Services

- Demo

- Customer Presentation (FundApps)

- Summary

Monolithic Architectures

Microservices Architecture

VPC

Browser → Load Balancer → StoreFront UI

Load Balancer → Account Service → Account Database

Load Balancer → Cart Service → Inventory Database

Load Balancer → Shipping Service → Shipping Database

Microservices Architecture

VPC

Browser → Load Balancer → StoreFront UI

StoreFront UI connects to:
- Load Balancer → Account Service → Account Database
- Load Balancer → Cart Service → Inventory Database
- Load Balancer → Shipping Service → Shipping Database

aws

Container benefits

Runs reliably everywhere

Run different apps simultaneously

Better resource utilization

Container benefits

Runs reliably everywhere

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Better resource utilization

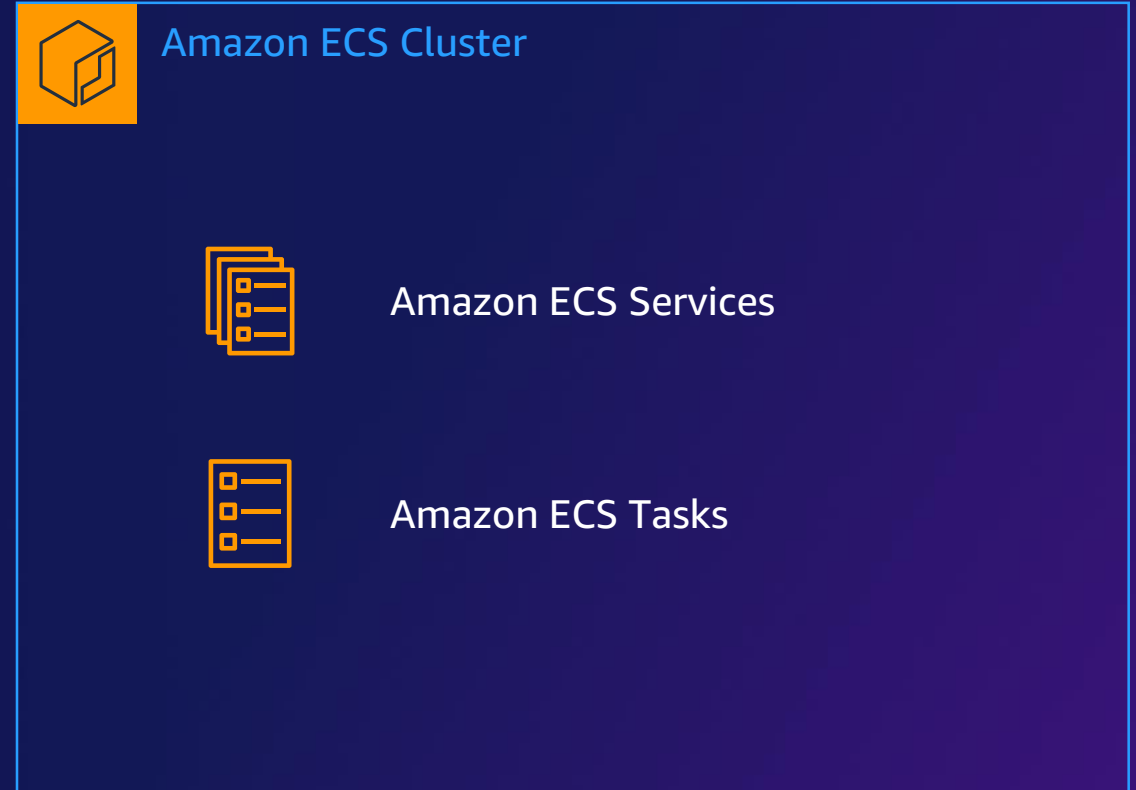How do you manage containers at scale?

AWS Container Services

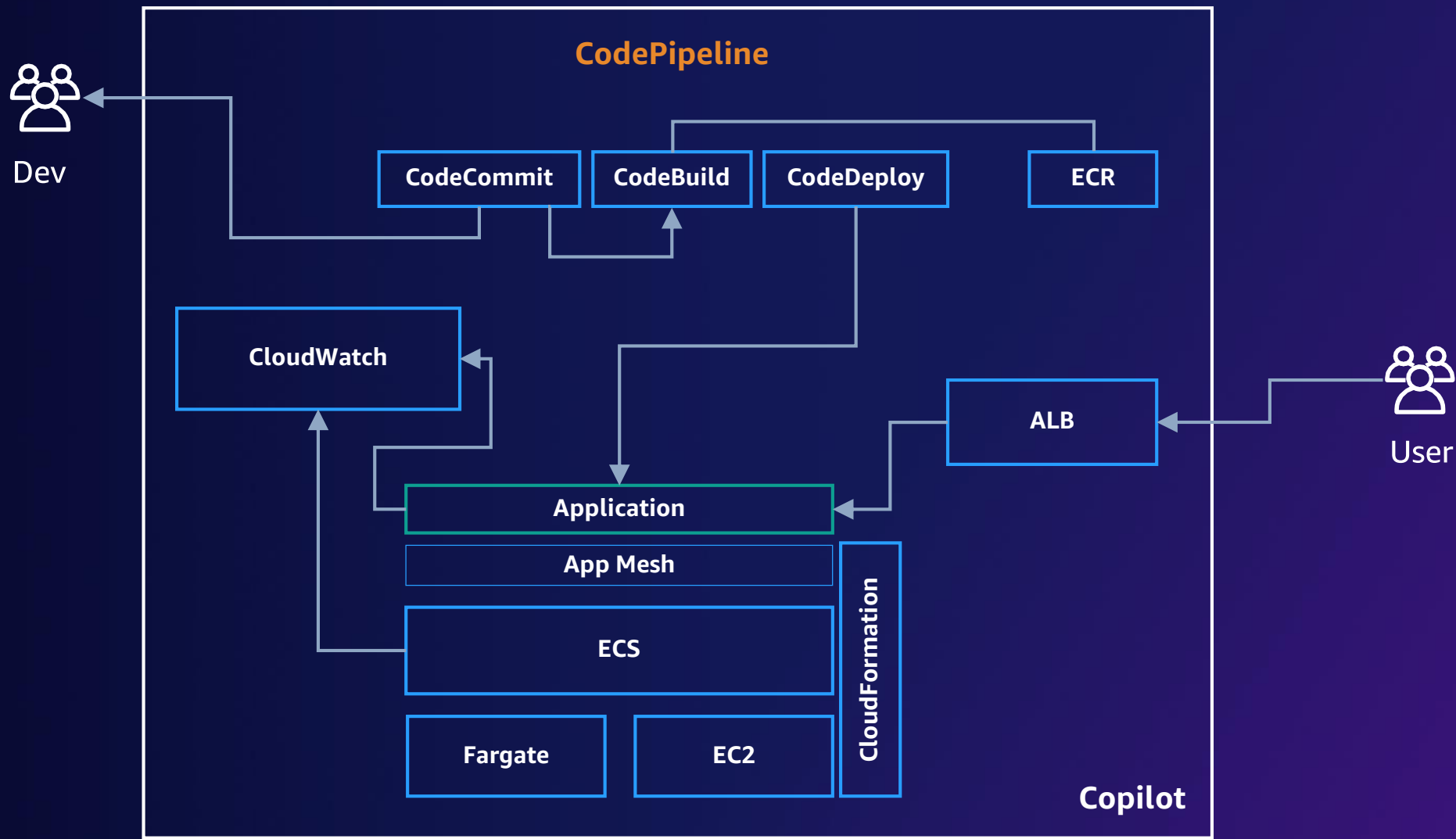## Amazon Elastic Container Service

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Powerful simplicity

Amazon ECS Clusters

A logical grouping of
Services/Tasks/Capacity Providers
within in a region

There is no additional cost for
Amazon ECS Clusters

Amazon ECS Cluster

Amazon ECS Services

Amazon ECS Tasks

Powerful simplicity

AWS Container Services

Amazon Elastic Kubernetes Service

Open flexibility

EKS Architecture

Unmodified upstream Kubernetes (with backported security fixes)

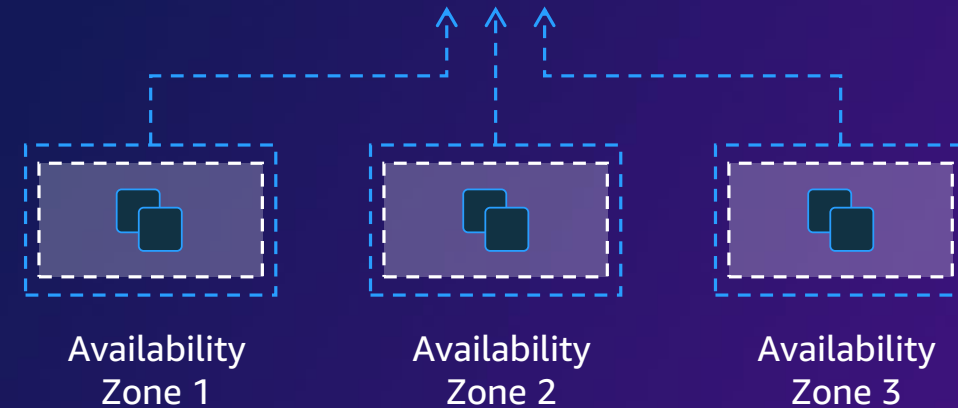EKS supports 3 Kubernetes versions at any given time to allow for upgrading

Supports automatic upgrades of worker nodes and control plane

kubectl

mycluster.eks.amazonaws.com

Availability Zone 1

Availability Zone 2

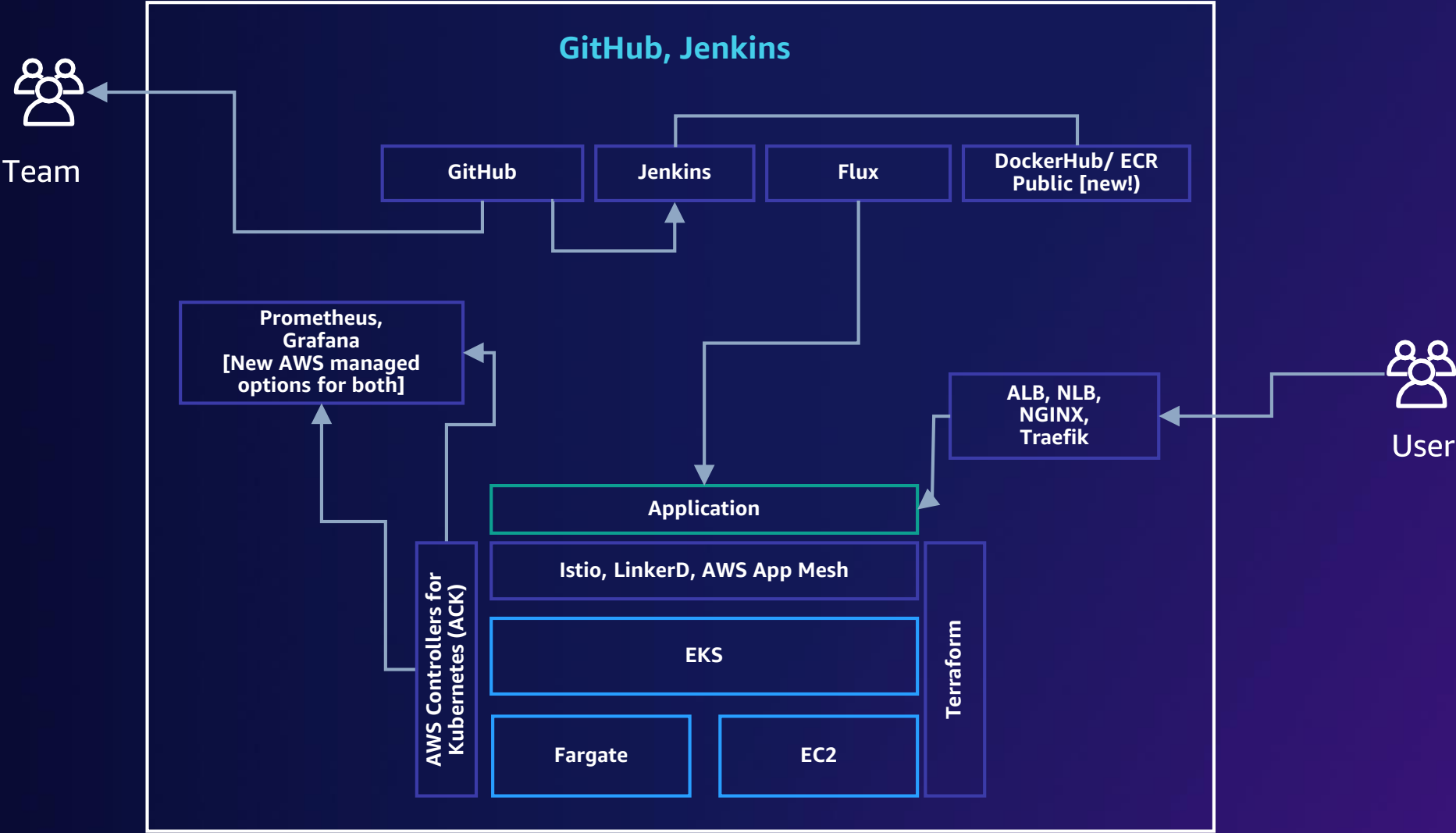Availability Zone 3

EKS Control Plane Architecture

Native AWS Services

Architected for High Availability and Fault Tolerance

Dedicated control plane for each cluster, not running on shared infrastructure

API Network Load Balancer

Auto Scaling Group

Kubernetes Control Plane

etcd Network Load Balancer

Auto Scaling Group

etcd Instances

Open flexibility

GitHub, Jenkins

Team

| GitHub | Jenkins | Flux | DockerHub/ ECR Public [new!] |

Prometheus, Grafana [New AWS managed options for both]

ALB, NLB, NGINX, Traefik

User

Application

Istio, LinkerD, AWS App Mesh

AWS Controllers for Kubernetes (ACK)

EKS

Terraform

Fargate

EC2

Which do I choose?

Amazon ECS

Powerful simplicity

Amazon EKS

Open flexibility

Run your containers anywhere based on your workload needs

Serverless

AWS Fargate

EC2 options

Amazon EC2

Edge and 5G

AWS Local Zones

AWS Wavelength

On-premises

AWS Outposts

EKS Anywhere
ECS Anywhere

Demo

The FundApps Engine

Toby O'Rourke

Chief Technology Officer
FundApps

The FundApps Engine

Or, how we went from ~20 pet boxes to 20k head of ~~cattle~~ containers and have fewer sleepless nights

FUND**APPS**

About FundApps

Founded in 2010, with offices in London, New York and Singapore, we automate our clients' compliance processes for their collective **US $14+ trillion** in assets.
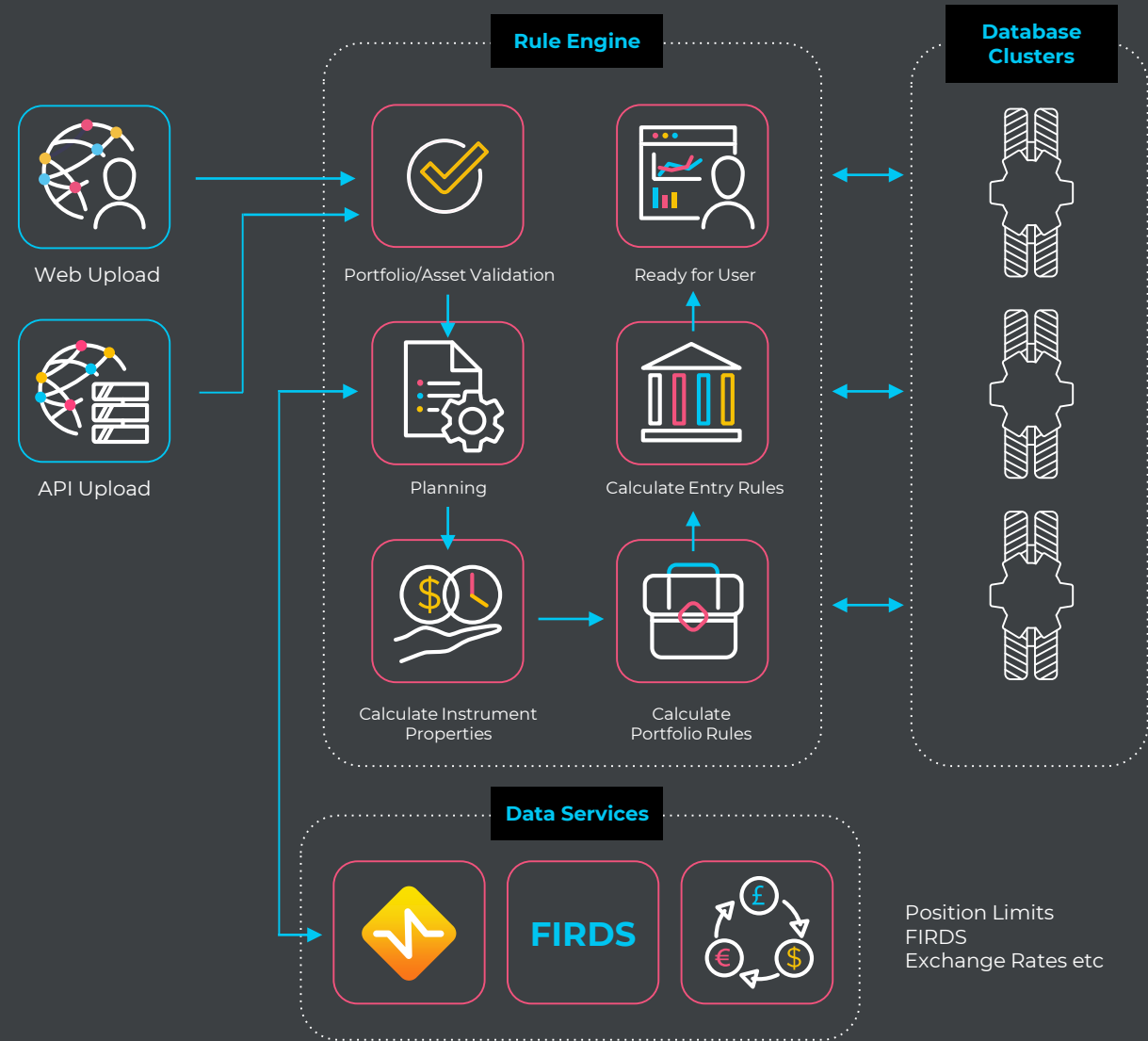
ENGINE

RULES

MARKET DATA

COMMUNITY

Meet the Monolith

- Highly complex, bespoke rule engine
- Heavily over-provisioned
- Relatively few long-lived boxes
- Maintenance nightmare
- **Expensive**

Web Upload

API Upload

Rule Engine

Portfolio/Asset Validation

Ready for User

Planning

Calculate Entry Rules

Calculate Instrument Properties

Calculate Portfolio Rules

Database Clusters

Data Services

FIRDS

Position Limits
FIRDS
Exchange Rates etc

Modernising the platform

CLOUD NATIVE, SHARED NOTHING

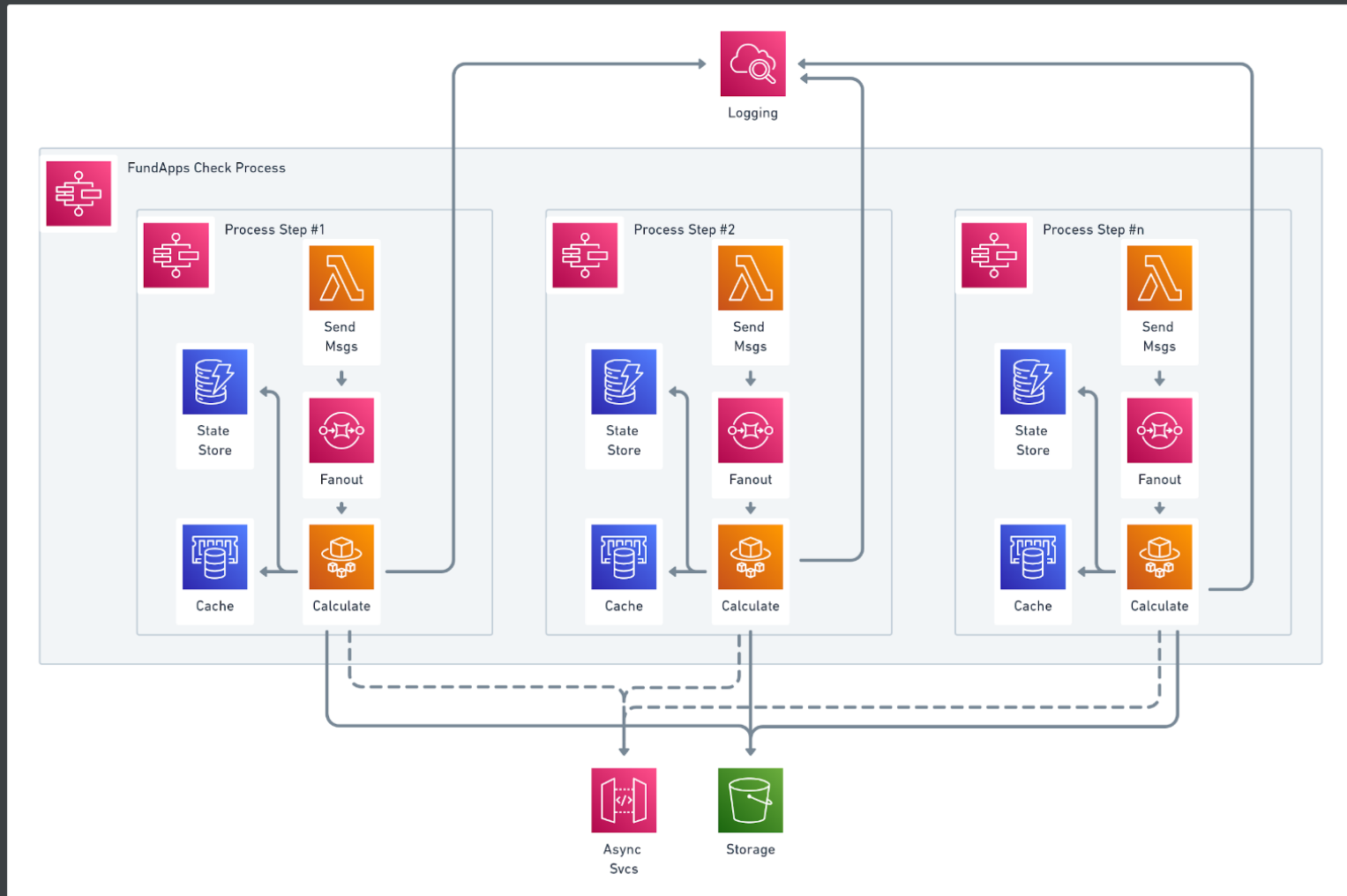### Design Principles

- **Horizontally scale computation**
- Maximum tenant isolation
- **No shared infrastructure**
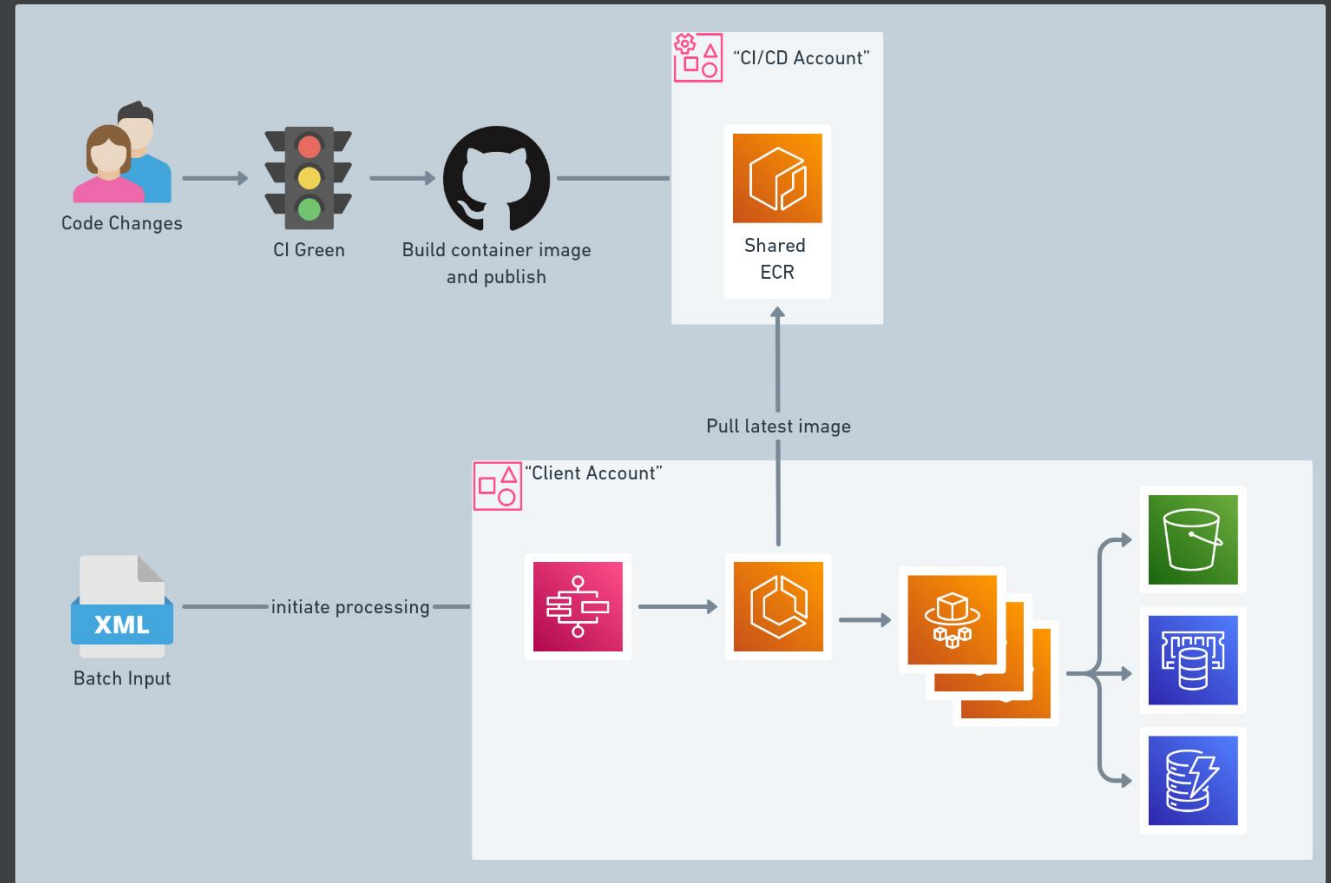- Heterogeneous data persistence

Benefits

- Work at extreme scale
- Greater security & visibility
- **Simplify Operations**

Engine Architecture

Engine Life Cycle

- 10's daily changes
- 100's containers per-account
- 200+ accounts
- **Total confidence** all containers in account are the same
- Batch **always** uses the latest & greatest version

Thank you!

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Summary

- AWS Container Services help manage the operations of containers at scale.

- Flexible choices of container orchestration depending on existing skills and requirements.

- Easy to go from local container development to running scalable workloads.

Resources

- ECS Workshop (https://www.ecsworkshop.com)

- EKS Workshop (https://www.eksworkshop.com)

- AWS Copilot (https://aws.github.io/copilot-cli/)

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Access **new** exam guides

Thank you!

Darren Paxton

https://www.linkedin.com/in/darren-paxton/

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