Application Modernization: Monolith to Microservices with Containers

Joel Ponukumatla

Senior Solution Architect
Amazon Web Services

Agenda

01 Trends & Challenges

02 Solution Overview

03 Customer References

04 Next steps

What is Application Modernization

Modern Applications are a combination of modern technologies, architectures, software delivery practices, and operational processes that lead teams to deliver value more quickly, frequently, reliably, and consistently to customers.

Benefits of Modernization

Achieve Uptime Goals

Innovation

Increase the efficiency of developers

Increase business agility

Improve ROI and reduce TCO

9

Months to payback

43%

Fewer security incidents per year

89%

Faster compute deployment

3x

More features delivered per year

Legacy Applications Impacts the Business

Long release cycles for new products and features

Lost revenue due to missed opportunity, loss of competitive edge

Operational inefficiencies resulting in overhead costs

Lost productivity or high costs for undifferentiated skills

Inability to support changing compliance, security regulations

Non-compliance and priority disruptions to resolve compliance and security issues

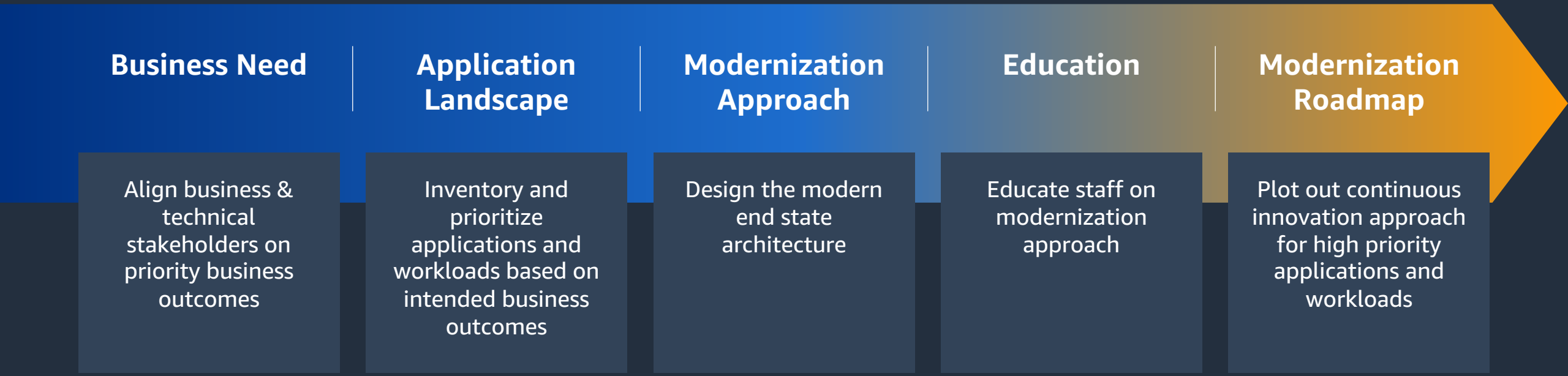
Low Innovation More Maintenance

80%

Developers' time is spent on the operations and maintenance of applications and only **20%** of the time is actually spent on innovation.

Modernization Strategy – Phased Approach for Success

THE MODERNIZATION JOURNEY



Diligent Planning Enables…

Continuous Success in Innovation

How are customers modernizing?

BUILD NEW INNOVATION

REDUCE
the amount of DIY

Retire + SaaS

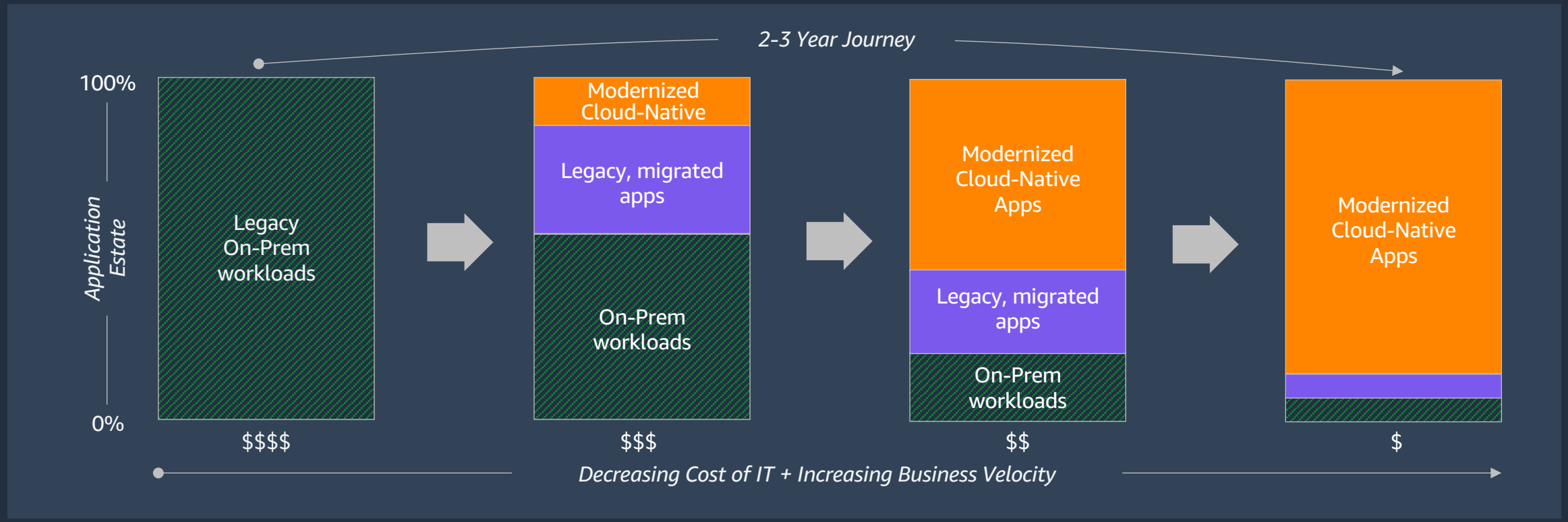
MIGRATE
to AWS

Lift and shift

MODERNIZE
on AWS

Replatform + Refactor

But WHEN ? Modernization is a Journey

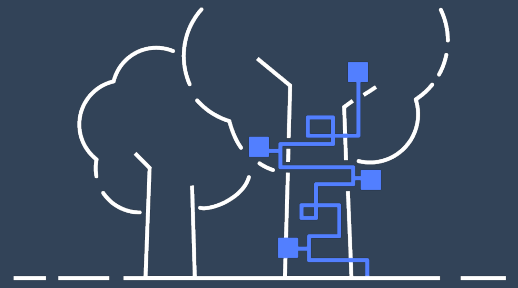


1. Conduct assessment / Pilot
2. Modernize a handful of apps - Refactor or Build new
3. Continue to scale across the org to modernize business critical apps
4. Cloud-Native transformation complete, optimization continues

From mono to micro: when the impact of change is small, it is deployed faster

Monolith
Does everything

Microservices
Does one thing

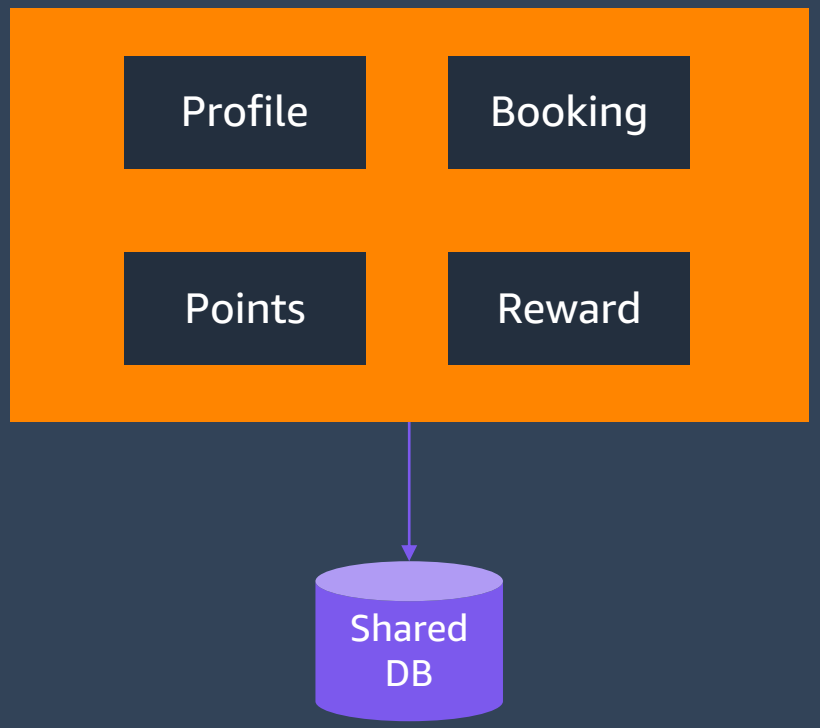


The Strangler Pattern

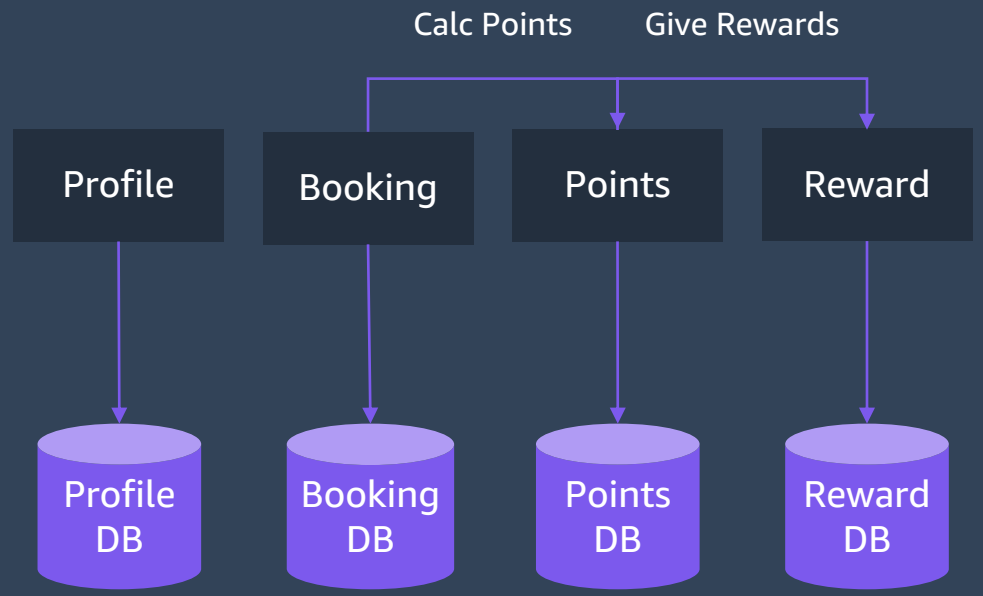
Moving monolithic applications to microservices by gradually creating events and APIs for various components on the legacy application

Microservice Vs Monolith App

Traditional Monolithic App



Same App as Microservices



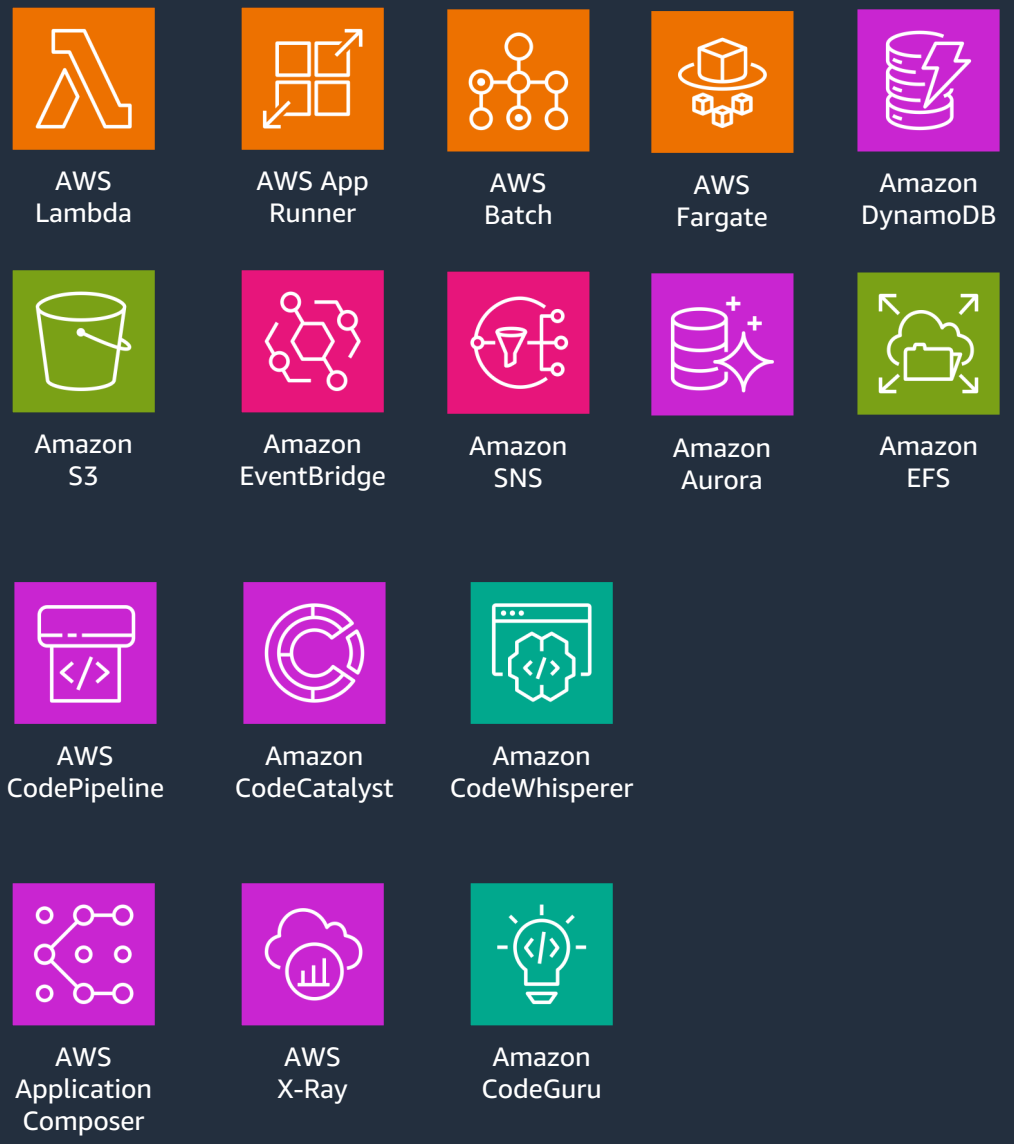
Modern Application Foundations

MODERN TECHNOLOGIES

Serverless Compute & Purpose Built Data Stores

DEV OPS

Faster, better application delivery

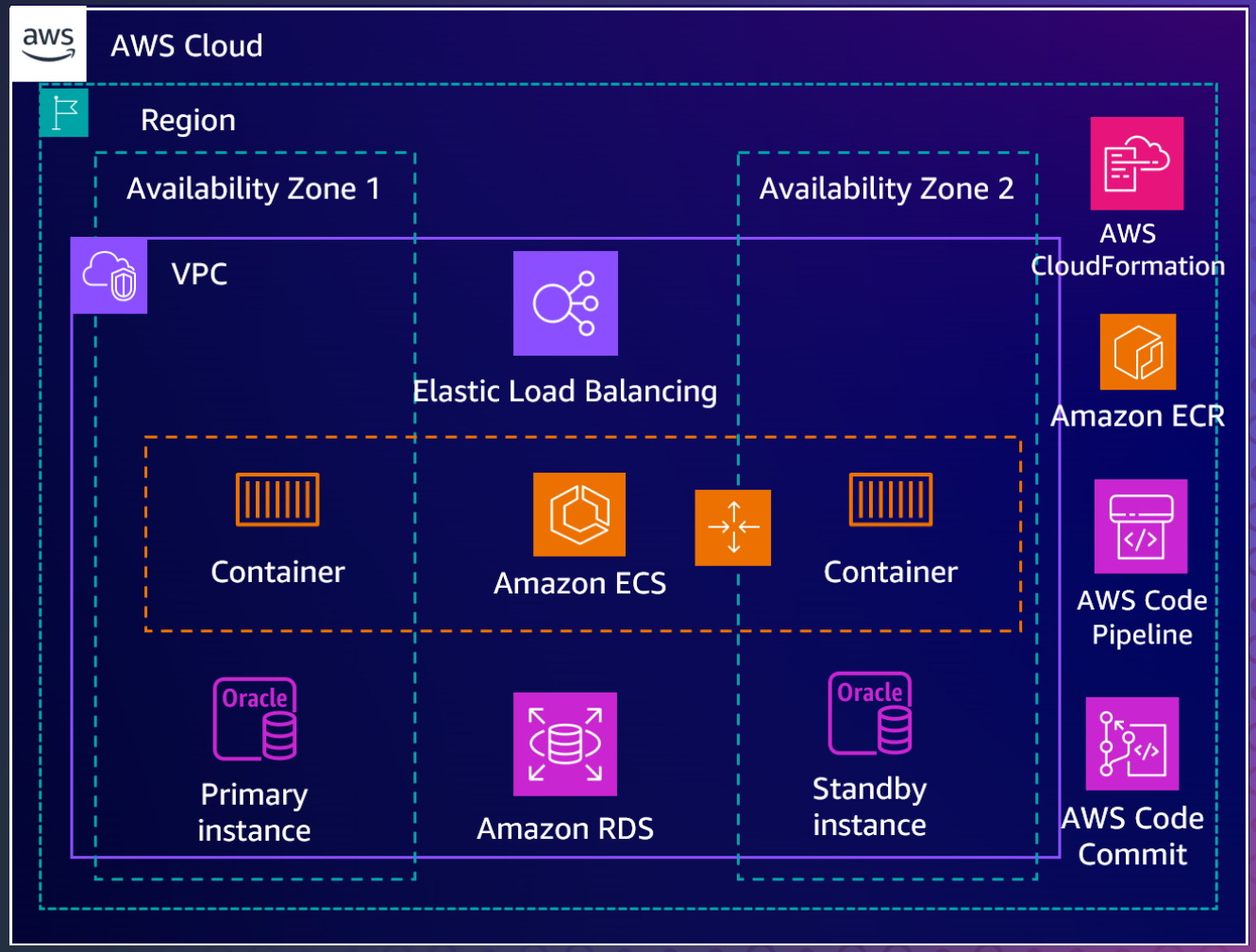


Modernization pathways and tools

Move to containers

Monolith on VMs
or Bare Metal

Minimal viable
modernization

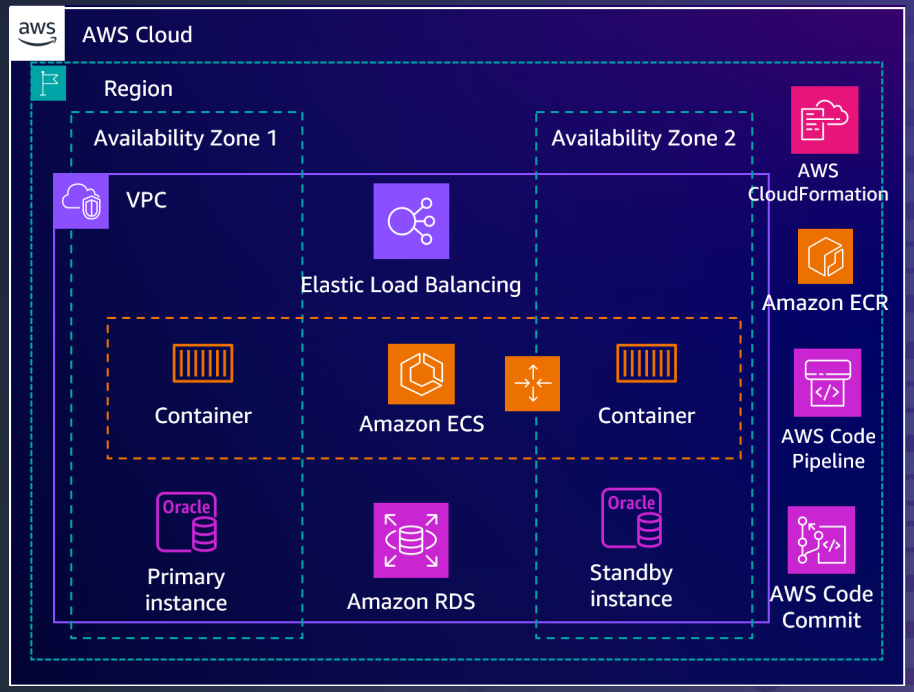


Monolith on containers

Move to containers

Minimal viable modernization

Monolith on VMs or Bare Metal



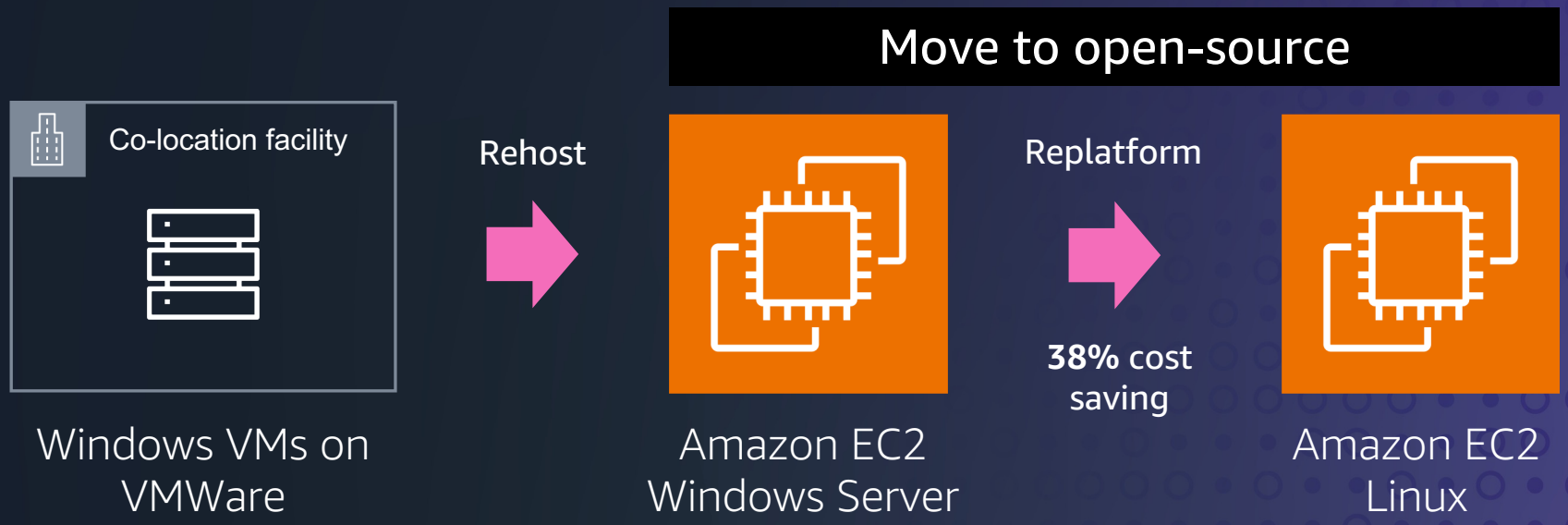
Monolith on containers

App2Container

AWS Microservice Extractor for .NET

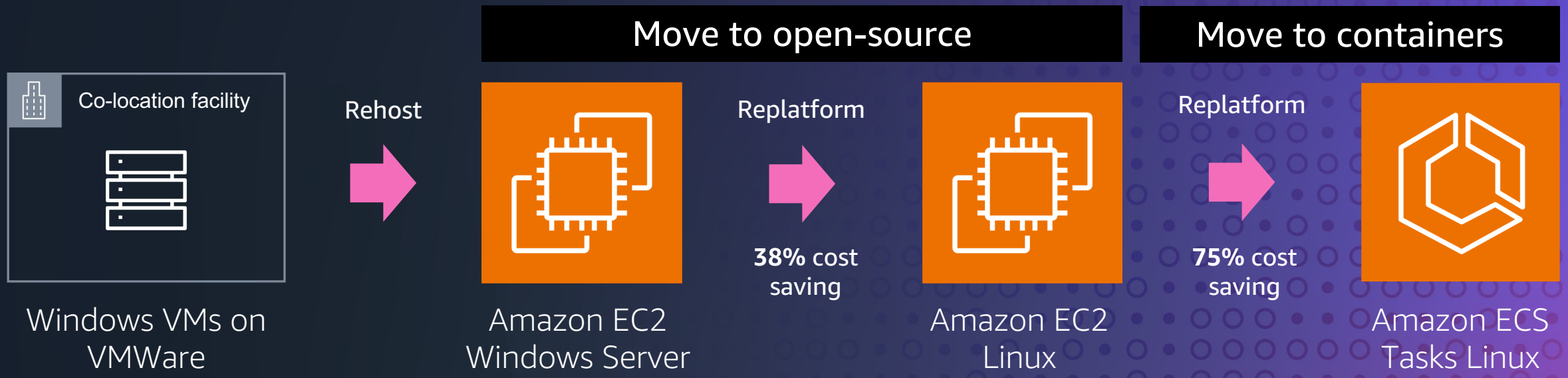
Move to containers

A customer's story of cost optimization



Move to containers

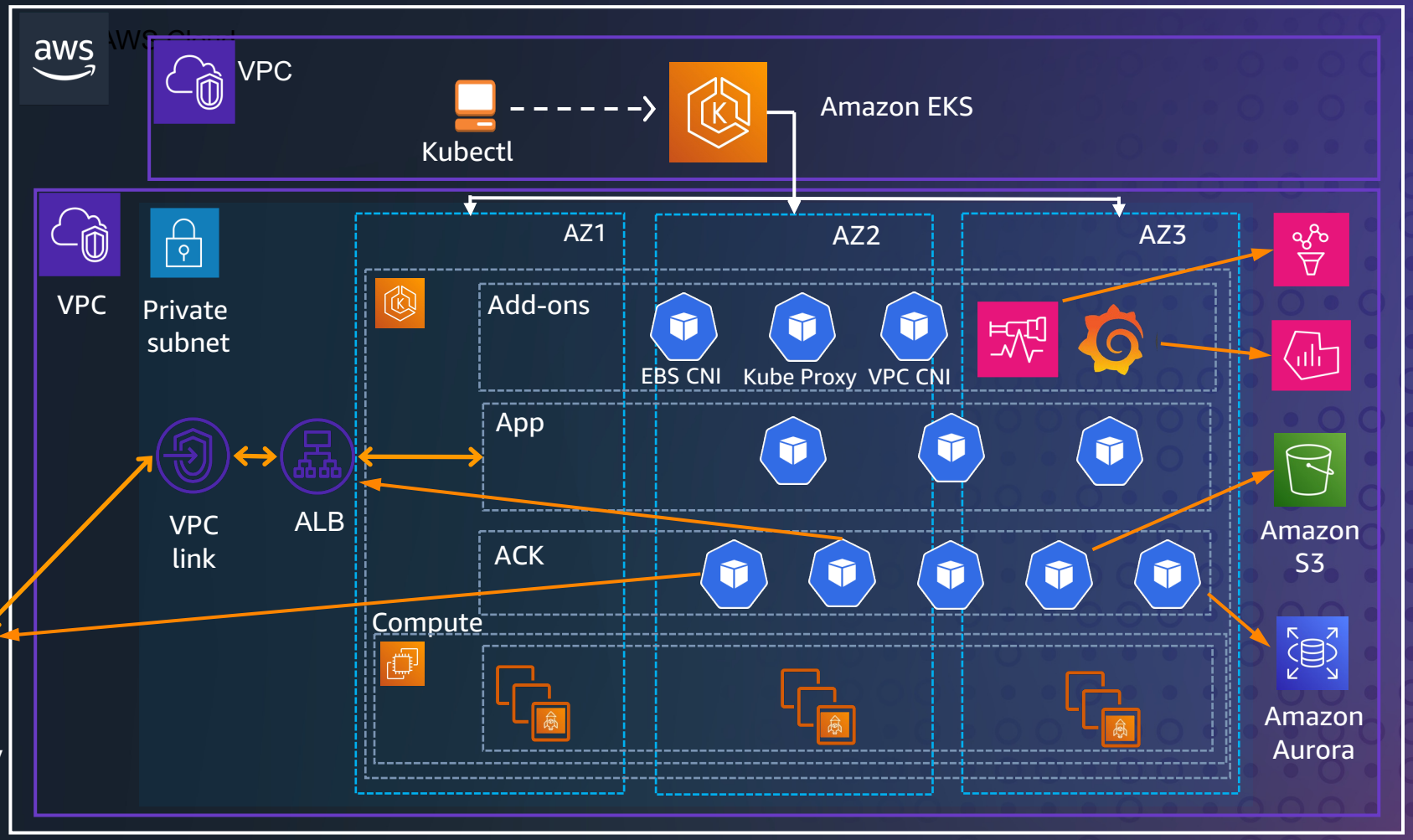
A customer's story of cost optimization



Ubertas Consulting

Move to containers

Accelerate Kubernetes adoption with Amazon EKS Blueprints



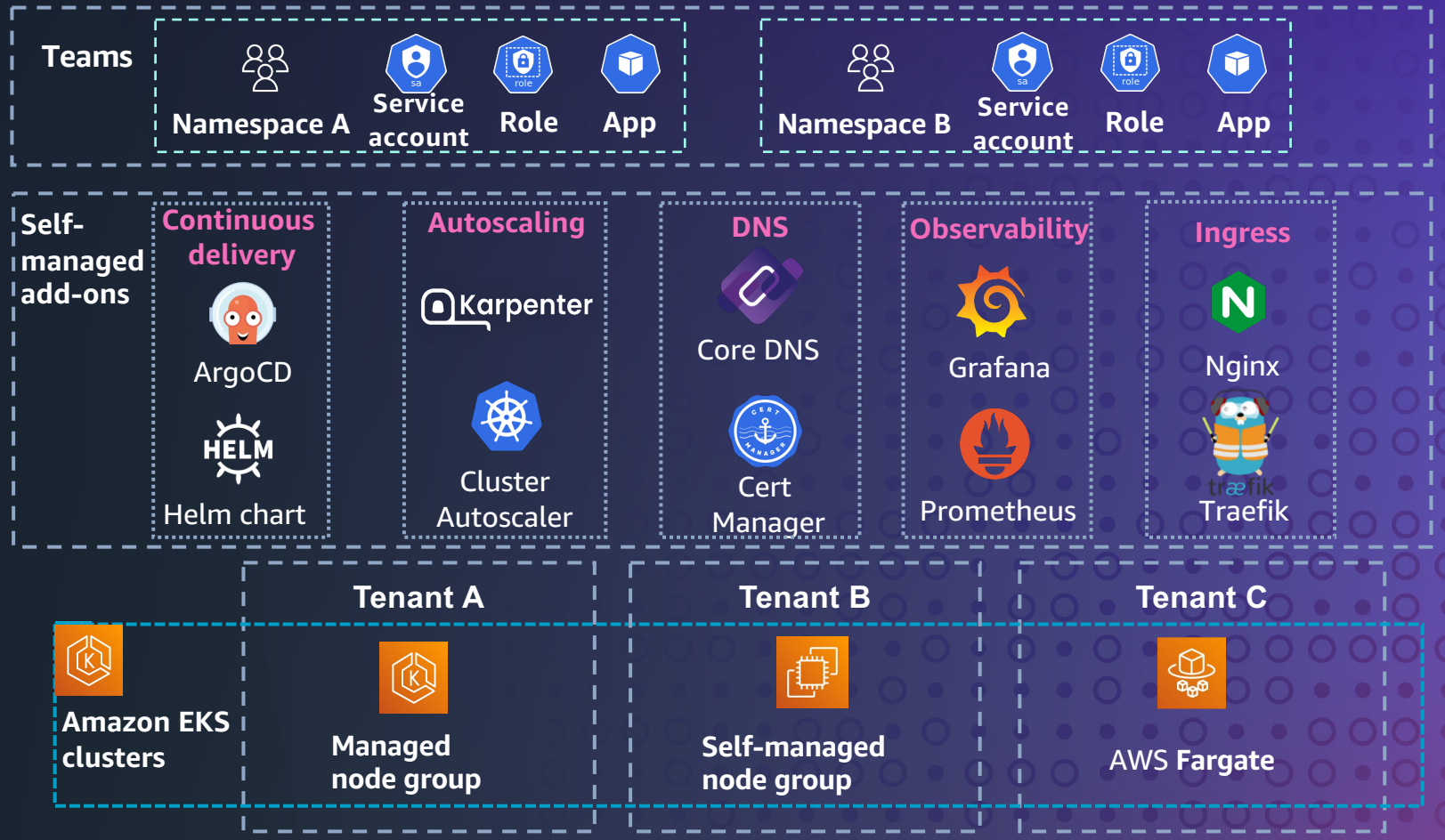
Move to containers

AWS

- App2Container
- AWS Microservice Extractor for .NET
- Amazon EKS Blueprints
- Amazon Managed Grafana
- AWS Distro for OpenTelemetry
- Amazon Managed Service for Prometheus

Move to containers with Amazon EKS Blueprints

Reference architectures in CDK and Terraform



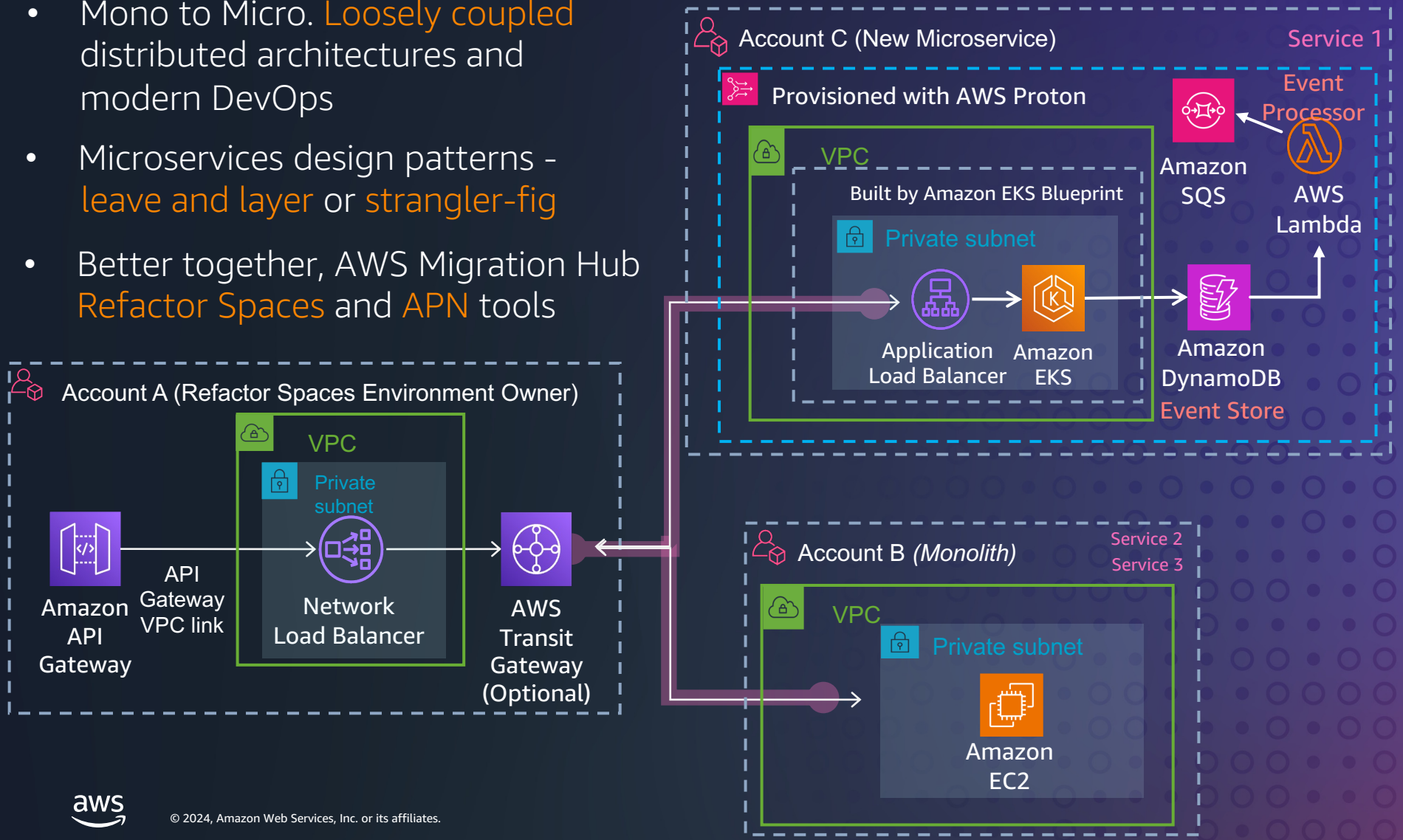
Visit:
Amazon EKS Blueprints
to learn more

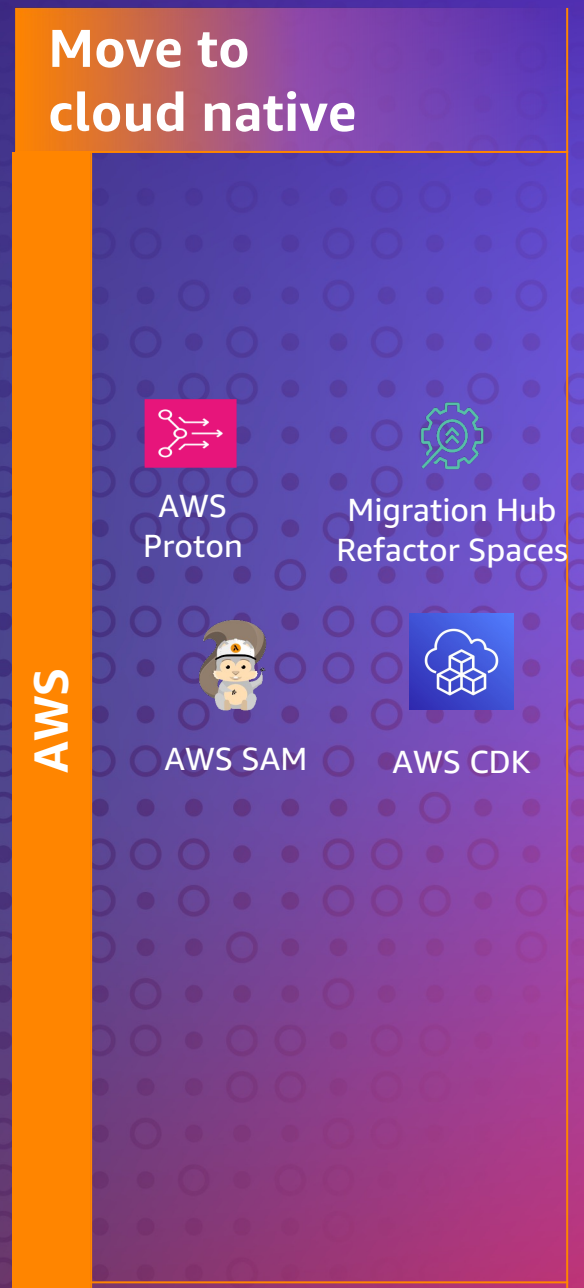
```
$ git clone https://github.com/awslabs/data-on-eks.git
$ cd analytics/emr-eks-yunikorn
$ terraform init
$ export AWS_REGION=us-west-2
$ terraform apply --auto-approve
```

Deploy in 20 minutes with 5 commands

Move to cloud native

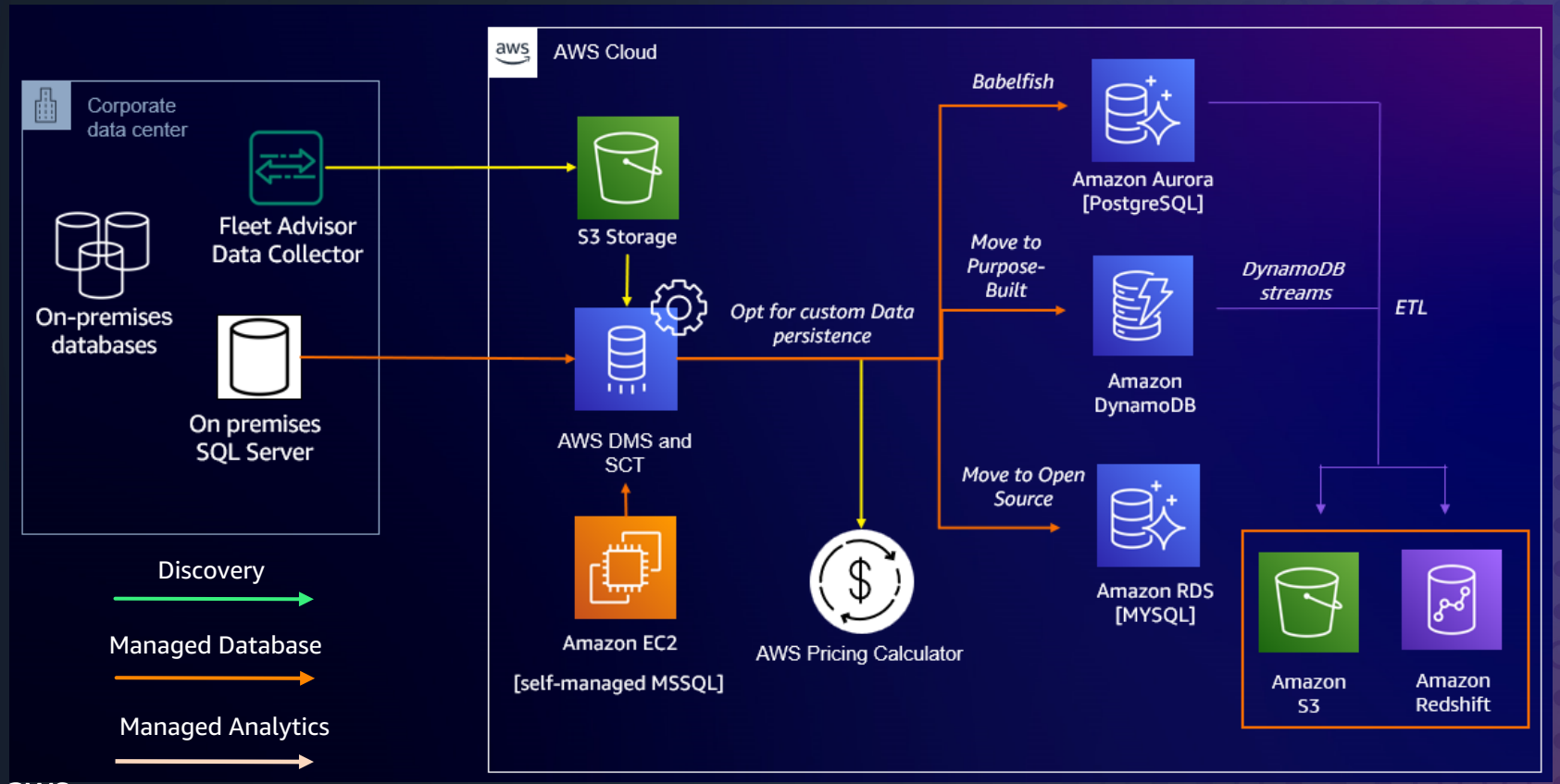
- Mono to Micro. Loosely coupled distributed architectures and modern DevOps
- Microservices design patterns - leave and layer or strangler-fig
- Better together, AWS Migration Hub Refactor Spaces and APN tools

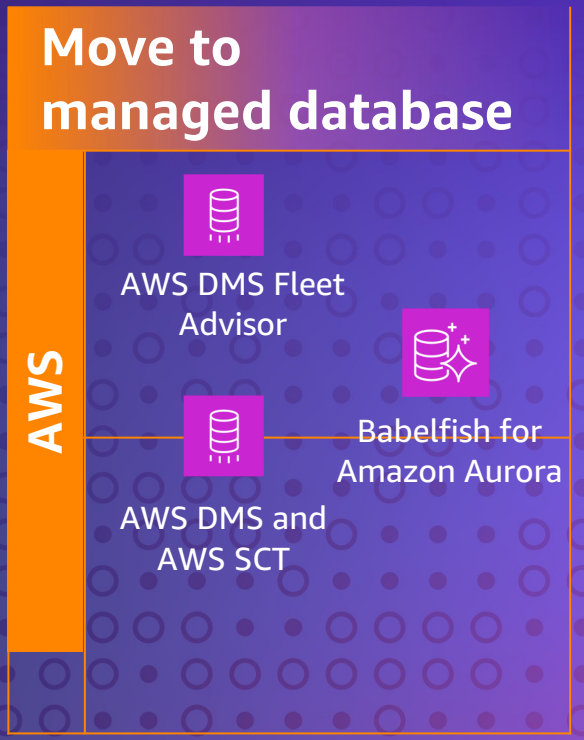




Move to managed database

- Database discovery and license evaluation
- Schema analysis recommendations and conversion
- Data migration and data transformation to purpose-built

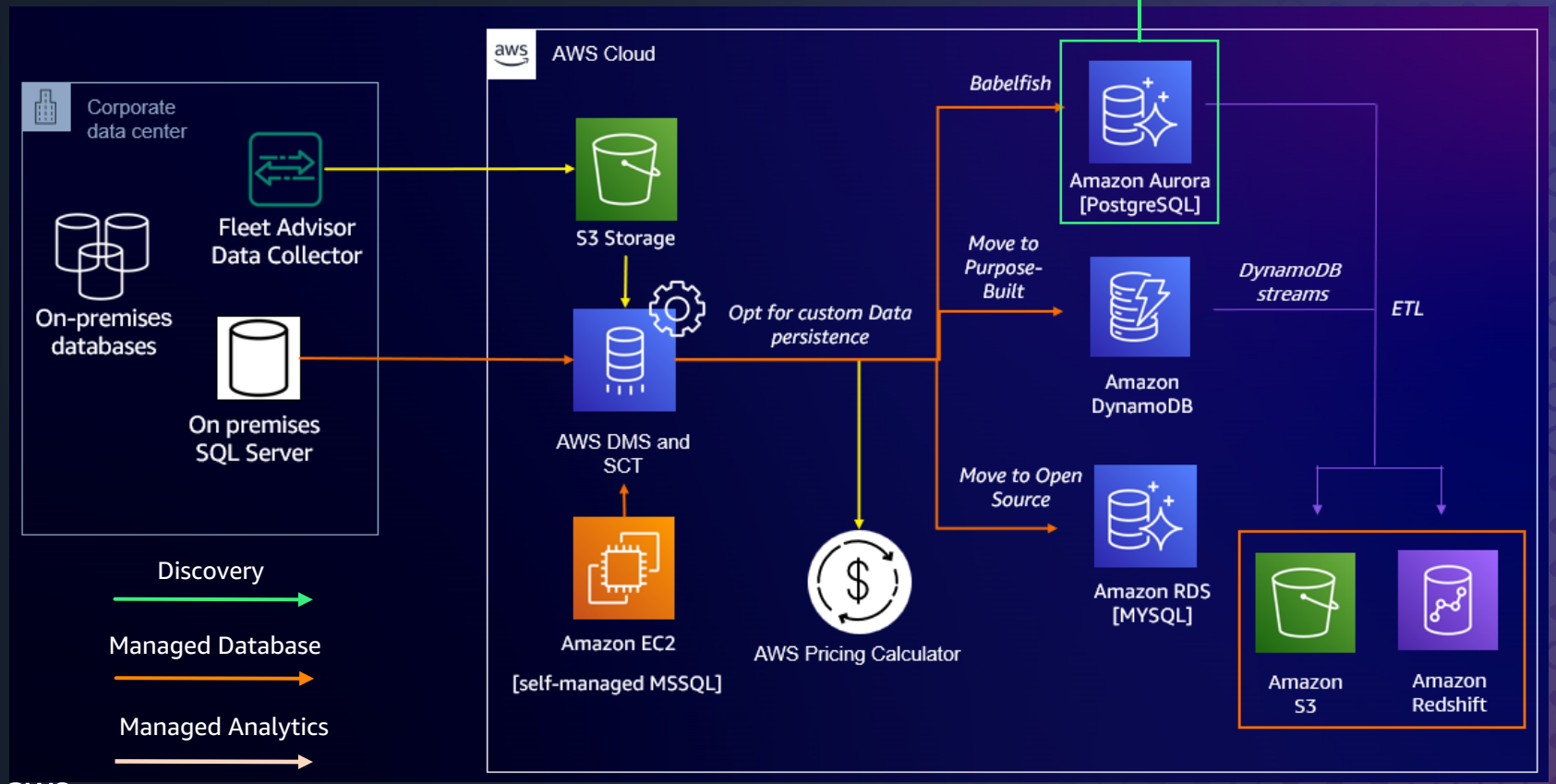


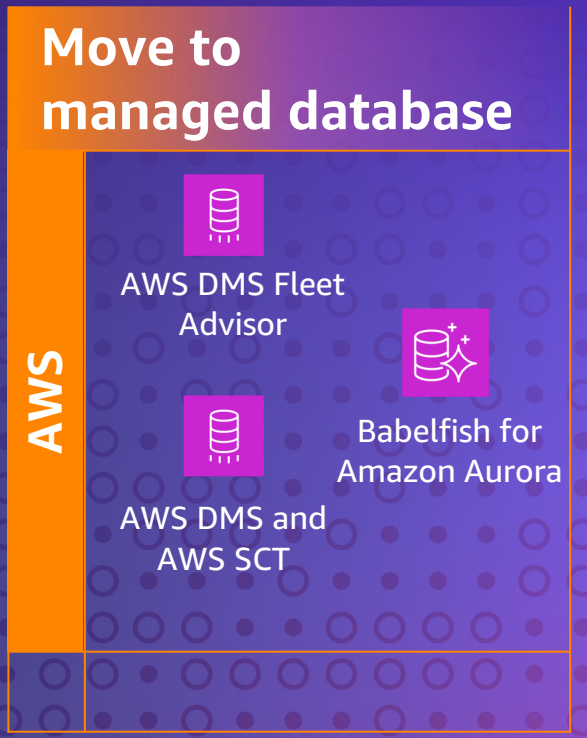


Move to managed database

- Database discovery and license evaluation
- Schema analysis recommendations and conversion
- Data migration and data transformation to purpose-built

Compass- Babelfish, compatibility assessment





Pathways to Modernizing Legacy Applications

01

AWS Schema Conversion Tool

Analyze and convert source schema for heterogeneous database migrations

02

Porting Assistance for .Net

Scan and convert .NET Framework applications to .NET Core

03

AWS Microservice Extractor for .NET

Breakdown architecting and refactoring applications into smaller code projects

04

App2Container

Command Line Tool for modernizing .NET and Java apps into containers

AWS Solutions and Solution Guidance

VETTED SOLUTIONS AND ARCHITECTURAL GUIDANCE TO RAPIDLY SOLVE BUSINESS CHALLENGES

AWS Innovation Sandbox

Secure, self-contained, isolated environments to safely experiment with AWS services and third-party applications that run on AWS

Link to Access
AWS Innovation Sandbox

Distributed Load Testing on

Automates software applications testing at scale and at load to help you identify potential performance issues before their release

Link to Access
Distributed Load Testing on AWS

DevOps Monitoring Dashboard

Automate the process of ingesting, analyzing, and visualizing continuous integration/continuous delivery (CI/CD) metrics

Link to Access
DevOps Monitoring Dashboard on AWS

Multi-Tenant Architectures

Shows three different models for handling multi-tenancy in the database tier, each offering a trade-off between tenant isolation and cost and complexity.

Link to Access
Guidance for Multi-Tenant Architectures on AWS

CI/CD for .NET Applications on AWS Fargate

Deploy an automated pipeline to build and deploy a .NET application to Fargate

Link to Access
CI/CD for .NET Applications on AWS Fargate

Next steps

AWS IS A PARTNER, HERE TO SUPPORT YOU ON YOUR CLOUD JOURNEY

Deliver value more quickly, frequently, reliably, and consistently to customers

IDENTIFY PARTNERS

Gain access to subject matter experts from the start.

01

STRAIGHTFORWARD ASSESSMENT

Review workloads to simplify your migration.

02

BUSINESS INTELLIGENCE

Map and migrate applications, websites, databases, storage, physical or virtual servers, frameworks, languages, processors, and operating systems.

03

Useful Resources

Amazon ECS Workshop – https://ecsworkshop.com/

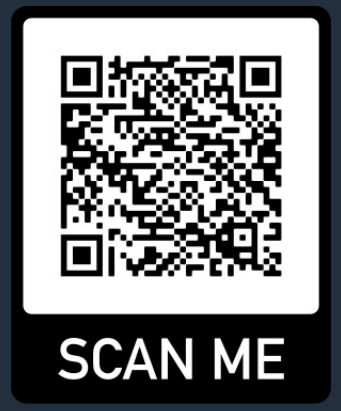
Amazon EKS Workshop – https://www.eksworkshop.com/

Monolith to Microservices Workshop – https://aws.amazon.com/getting-started/hands-on/break-monolith-app-microservices-ecs-docker-ec2/

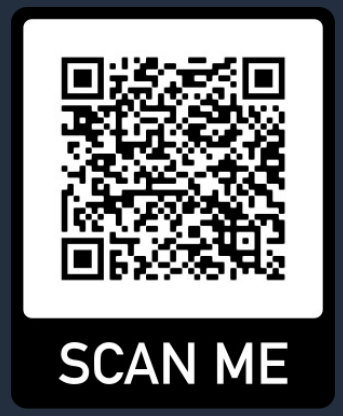
Strangler Application Pattern – https://martinfowler.com/bliki/StranglerFigApplication.html

Next Steps

- AWS Free Tier
- Training / Workshops
- AWS Ask-the-expert Booth



Public Sector Blog



SLG Webpage

Contact Us

Please complete the session survey by scanning the QR code

Thank you!

Joel Ponukumatla
Sr. Solutions Architect
Amazon Web Services
ponukuma@amazon.com

1. Select Track: Security and Application Modernization
2. Select Session: Application Modernization: Monolith to Microservices with Containers

Learning Day Content

https://sanfrancisco2024.awslearningday.com/

Thank you!