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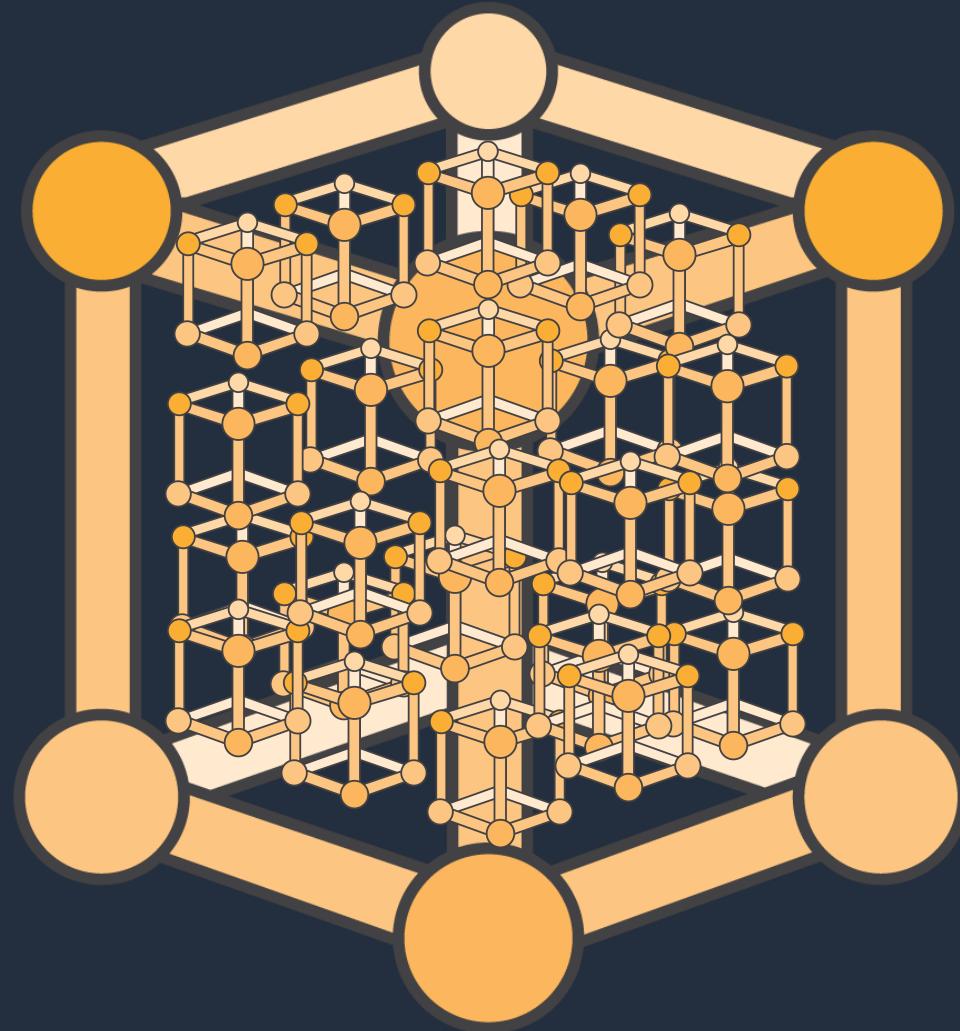
ONLINE CONFERENCE



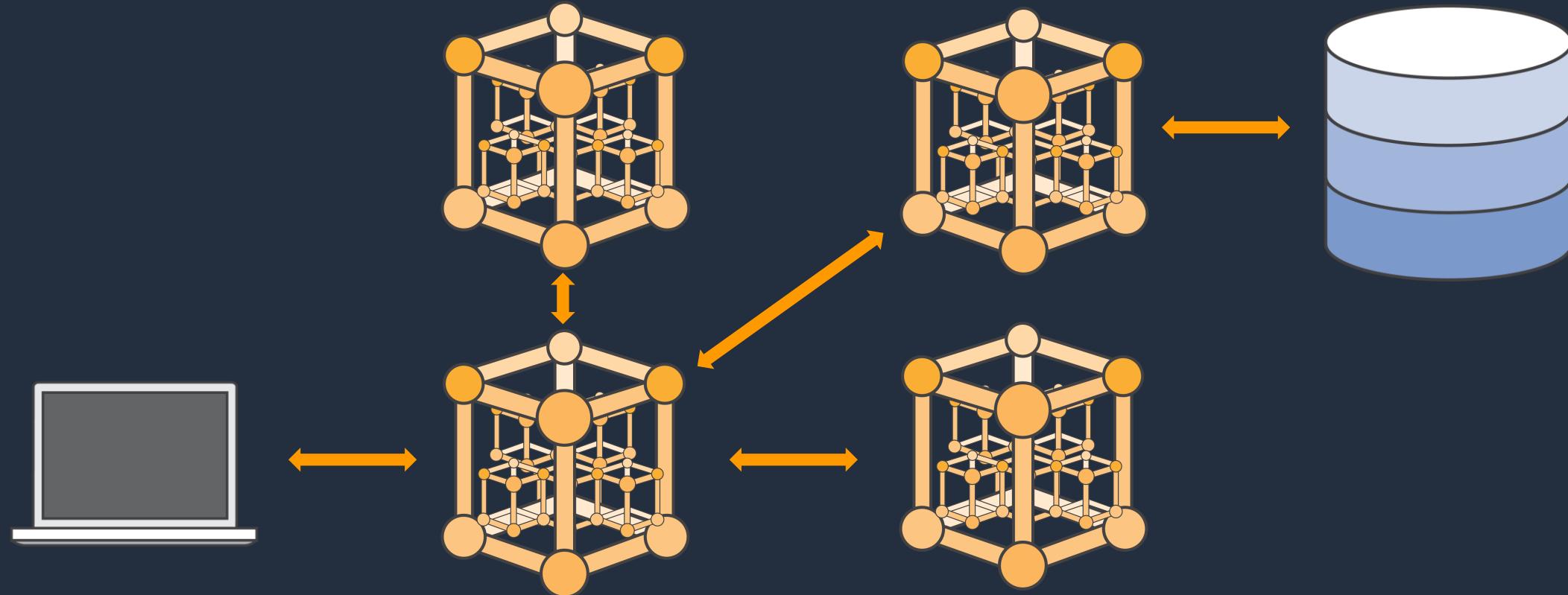
Comparing Container Options for Microservices on AWS (Level 200)

Gaurav Jagavkar, Solution Architect

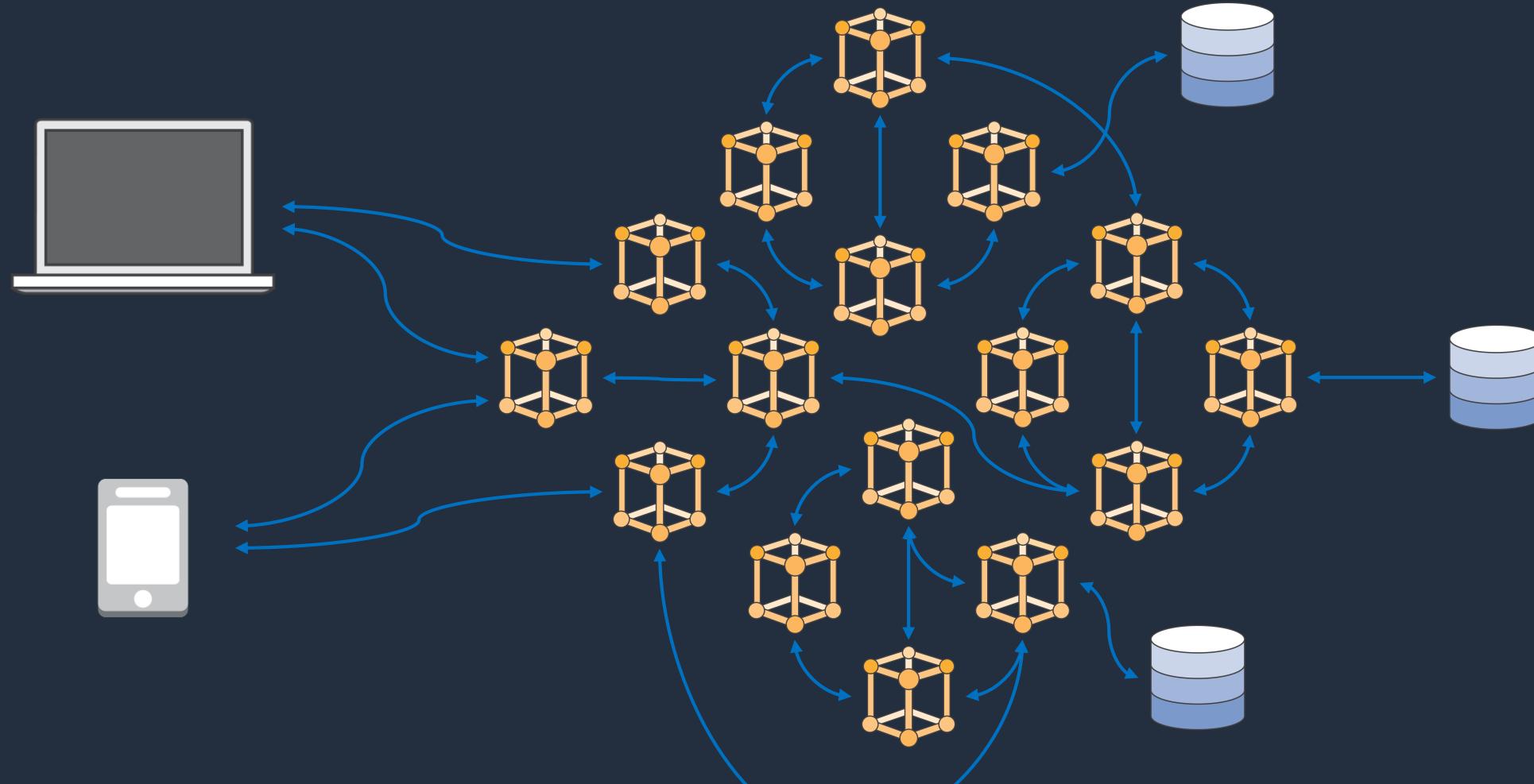
The Monolith



The Service-Oriented Architecture



The Microservices Architecture



The Microservices Architecture





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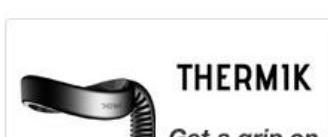
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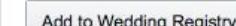
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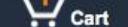
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Creating Microservices on AWS

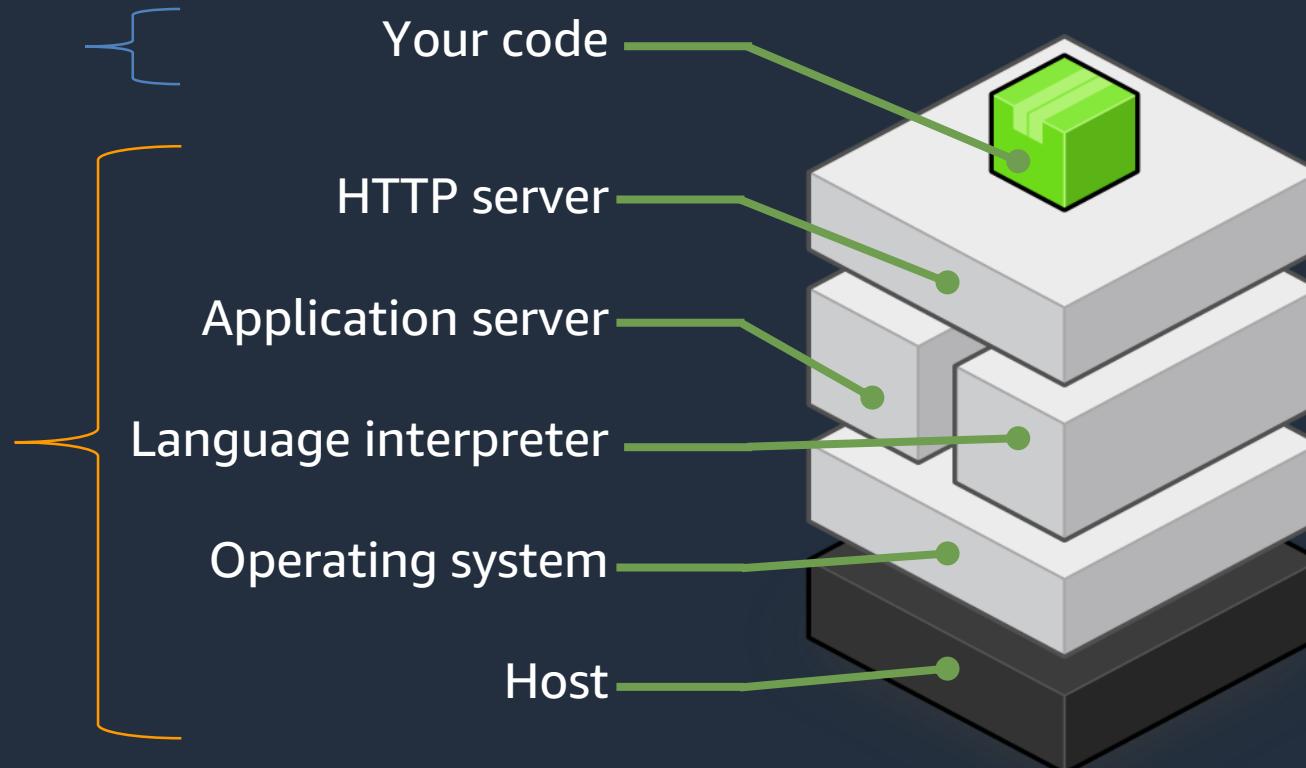
AWS Elastic Beanstalk

On-instance configuration



Focus on building your application

Elastic Beanstalk configures each EC2 instance in your environment with the components necessary to run applications for the selected platform. No more worrying about logging into instances to install and configure your application stack.



Provided by you



Provided and managed by Elastic Beanstalk

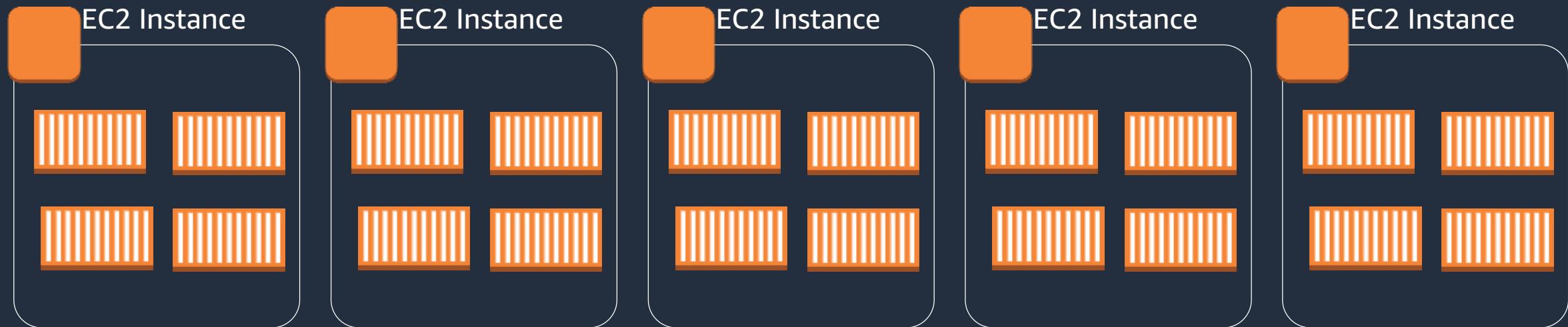
Microservices and Containers



- Do one thing, really well
- Any app, any language
- Test and deploy same artifact
- Self-contained services
- Isolated execution environment
- Faster startup
- Scaling and upgrading



Running Containers



Running Containers on AWS



Using Managed Services



Amazon ECS



Amazon EKS
(coming soon)



Fargate



Amazon ECR

Running Containers on AWS



Using Managed Services



Amazon ECS



Amazon EKS
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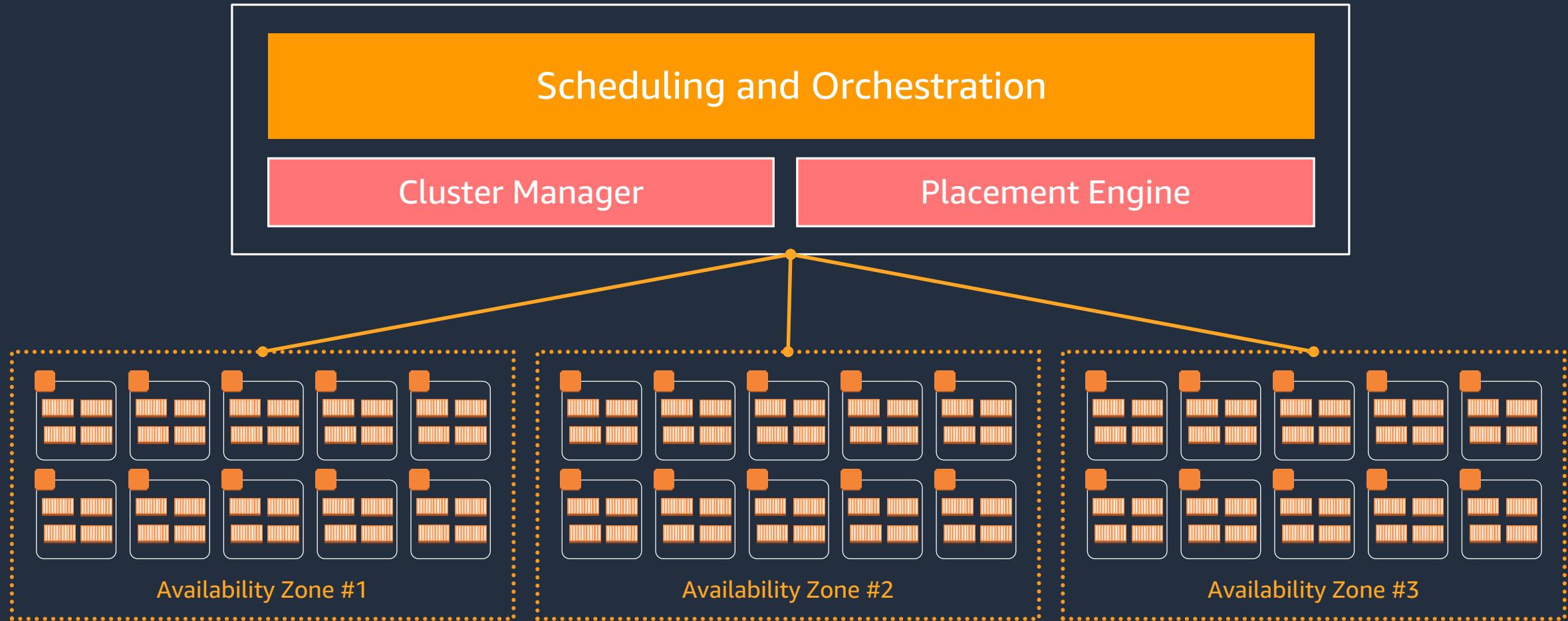


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Running Containers at Scale



Running Containers at Scale



EKS Core Tenets



- Platform to run production-grade workloads
- Native and upstream Kubernetes experience
- Seamless integration with AWS services
- EKS team actively contributes upstream

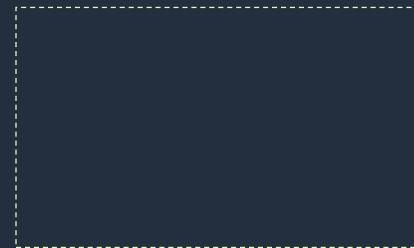




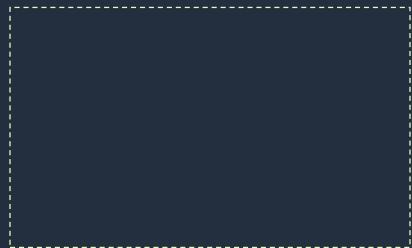
Kubectl



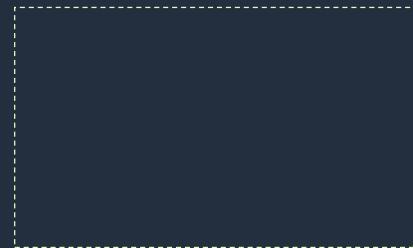
mycluster.eks.amazonaws.com



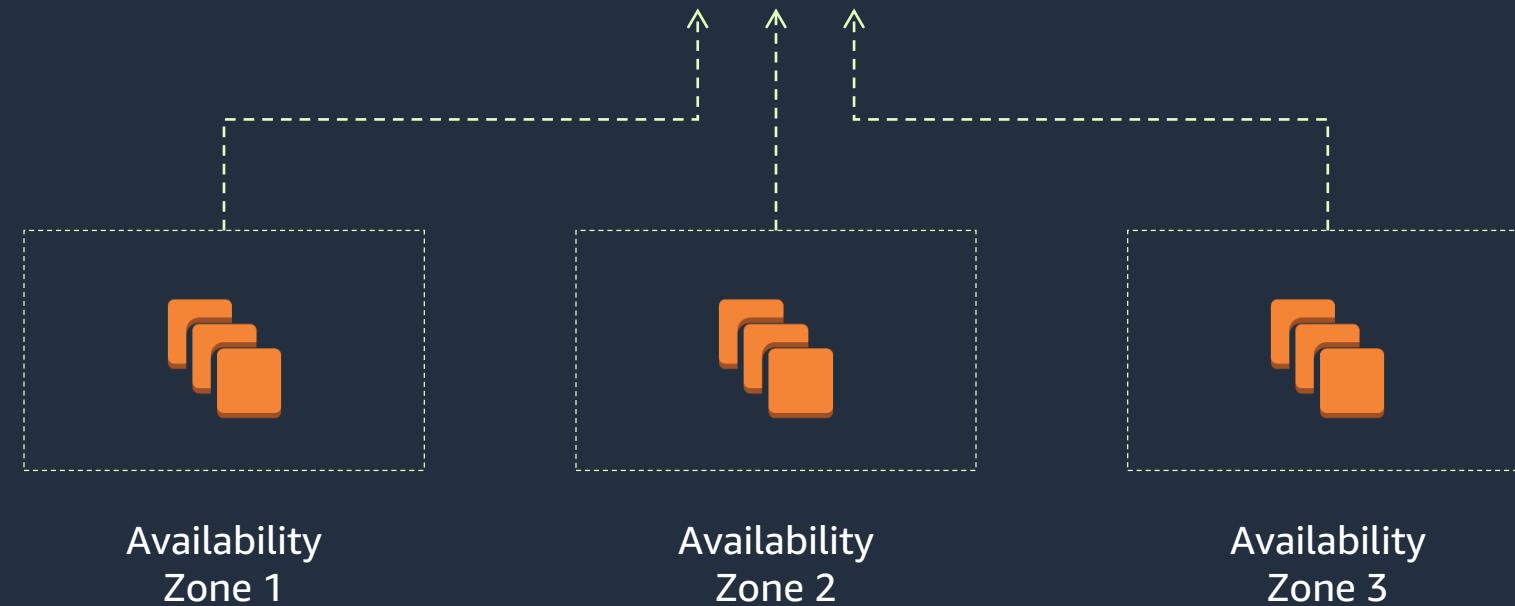
Availability
Zone 1



Availability
Zone 2



Availability
Zone 3



Running Containers with ECS



Create new Task Definition

Step 1: Select launch type compatibility

Step 2: Configure task and container definitions

Select launch type compatibility

Select which launch type you want your task definition to be compatible with based on where you want to launch your task.

FARGATE



Price based on task size

Requires network mode awsvpc

AWS-managed infrastructure, no Amazon EC2 instances
to manage

EC2



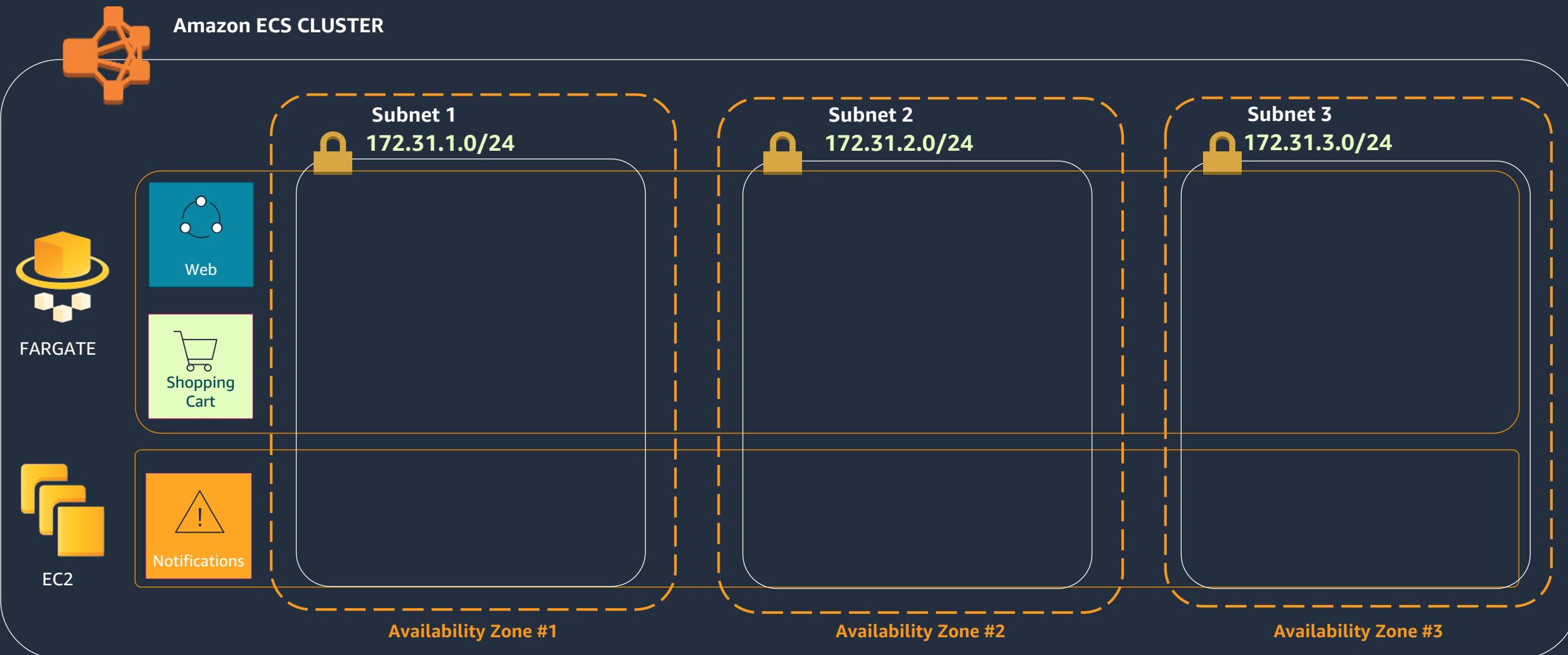
Price based on resource usage

Multiple network modes available

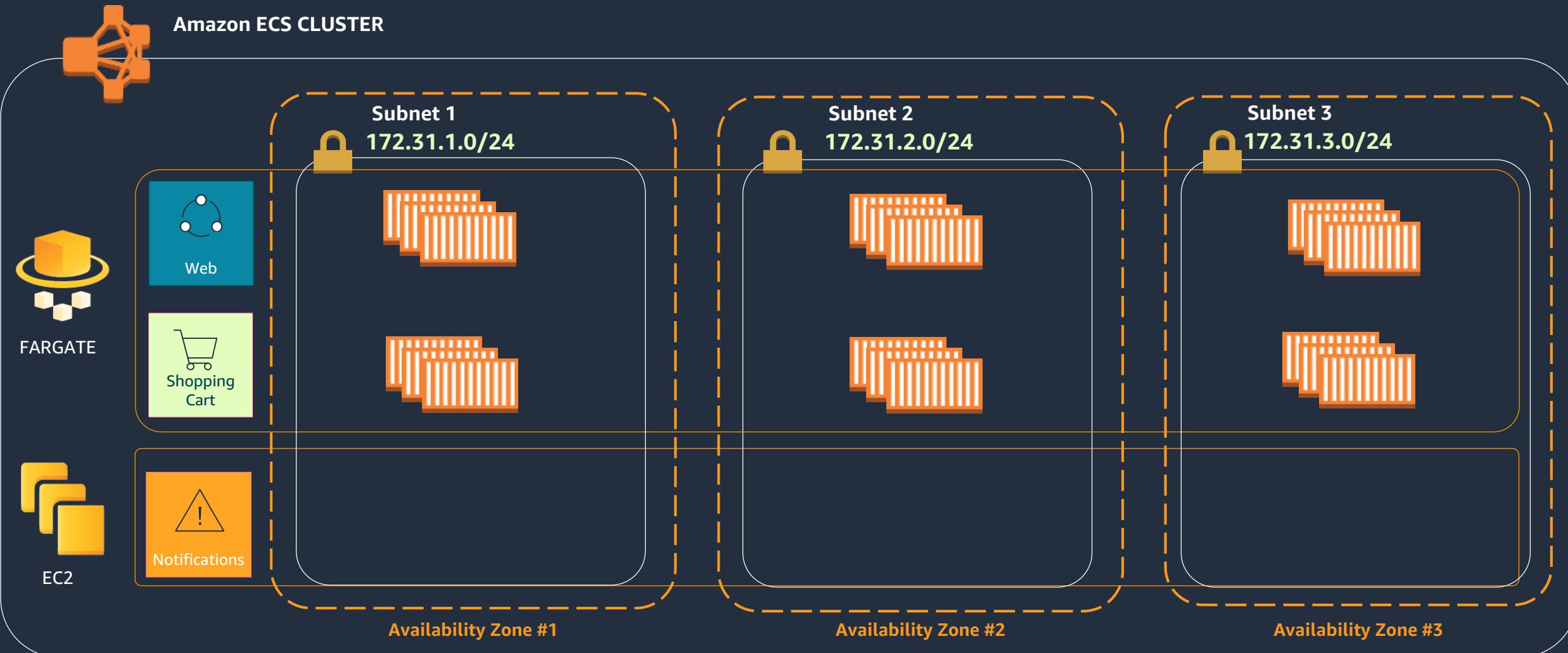
Self-managed infrastructure using Amazon EC2 instances



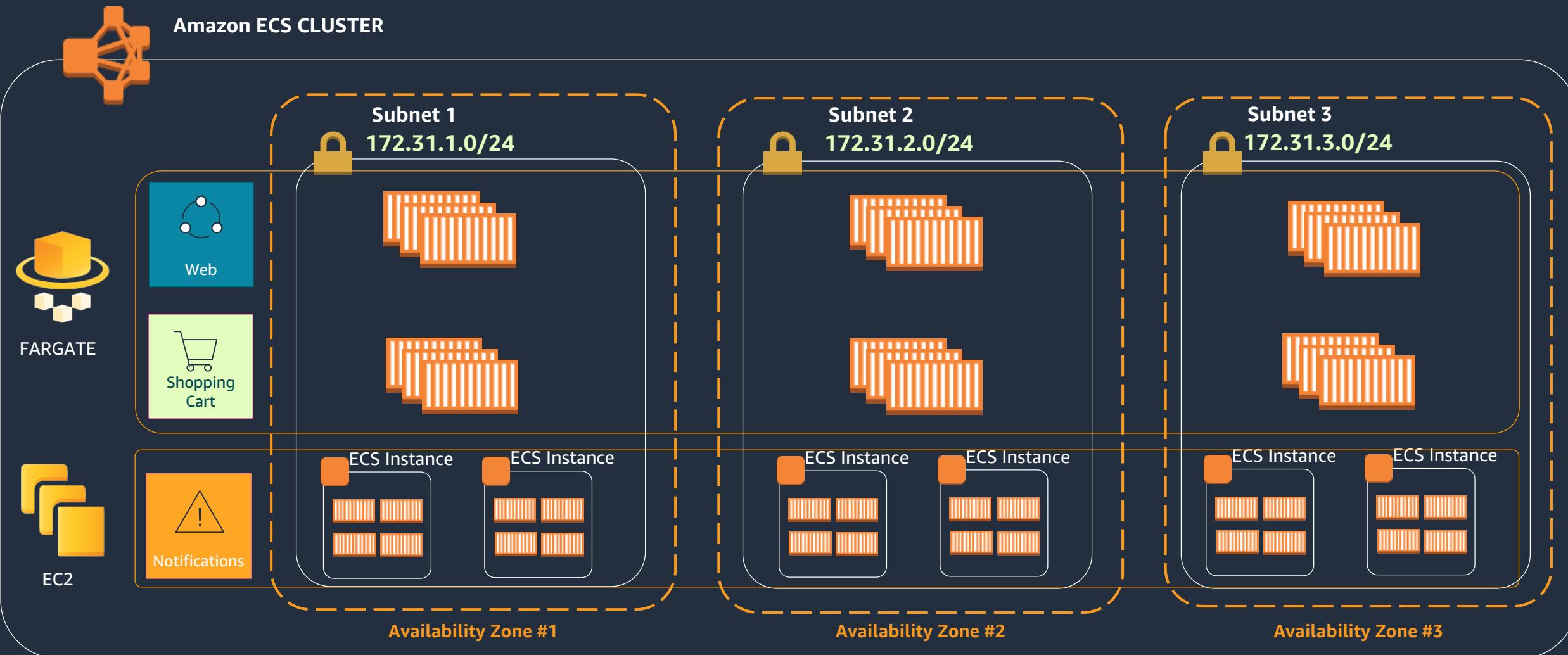
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Going Serverless with AWS Lambda



Serverless, event-driven compute service

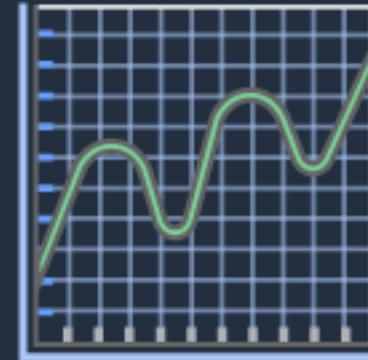


Lambda = microservice without servers

Serverless means..



Simple but usable primitives



Scales with usage



Never pay for idle

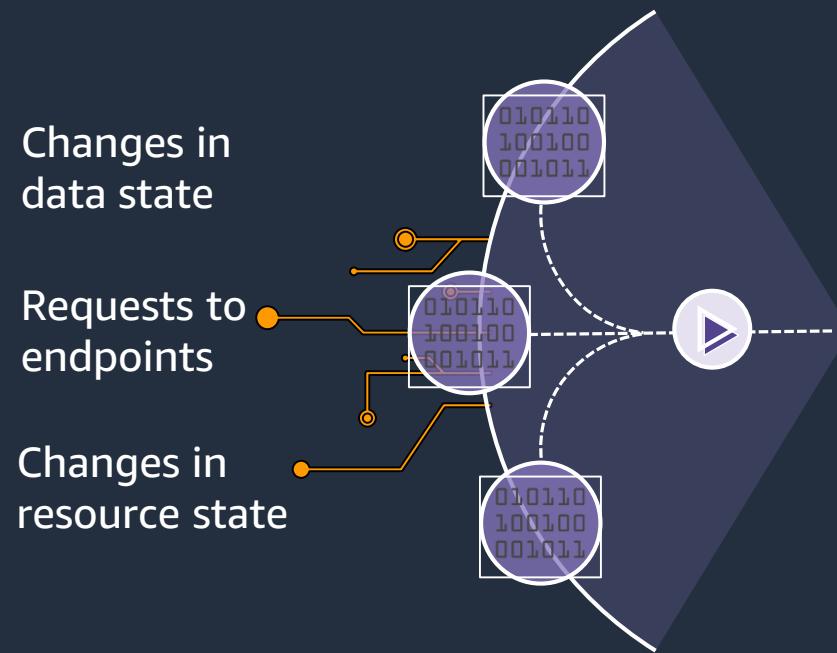


Availability and fault tolerance built in

Deliver on demand, never pay for idle



EVENT DRIVEN



Deliver on demand, never pay for idle

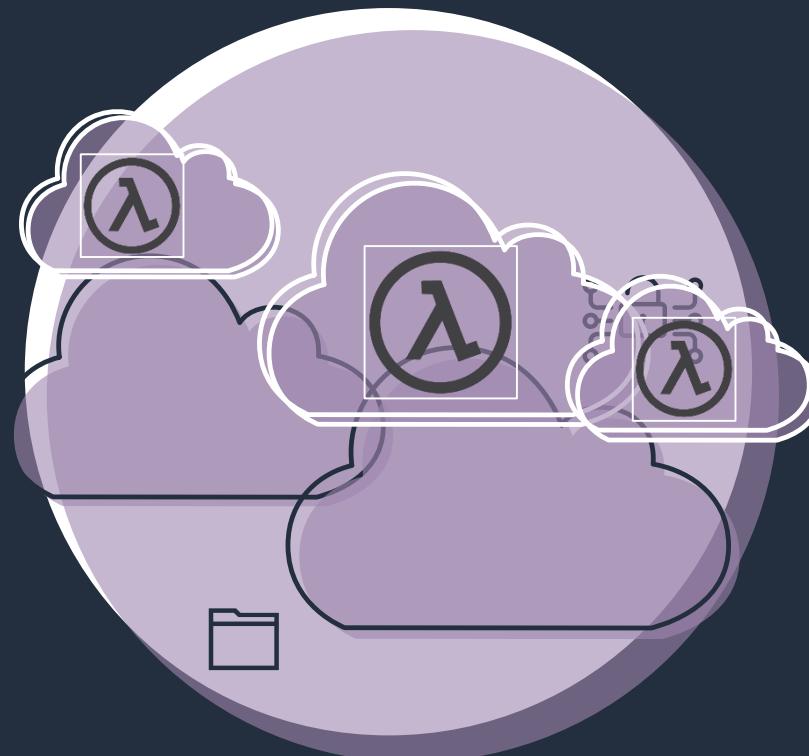


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Changes in data state
Requests to endpoints
Changes in resource state



CONTINUOUS SCALING



Deliver on demand, never pay for idle



EVENT DRIVEN

Changes in data state
Requests to endpoints
Changes in resource state

CONTINUOUS SCALING



PAY BY USAGE



Using AWS Lambda



- **Bring your own code**
- Node.js, Java, Python, C#, Go
- Bring your own libraries (even native ones)

Using AWS Lambda



- **Bring your own code**
- Node.js, Java, Python, C#, Go
- Bring your own libraries (even native ones)



Simple resource model

- Select power rating from 128 MB to 3 GB
- CPU and network allocated proportionately

Using AWS Lambda



- **Bring your own code**
- Node.js, Java, Python, C#, Go
- Bring your own libraries (even native ones)



Simple resource model

- Select power rating from 128 MB to 3 GB
- CPU and network allocated proportionately



Flexible use

- Synchronous or asynchronous
- Integrated with other AWS services

Using AWS Lambda



- **Bring your own code**
- Node.js, Java, Python, C#, Go
- Bring your own libraries (even native ones)



Simple resource model

- Select power rating from 128 MB to 3 GB
- CPU and network allocated proportionately



Flexible use

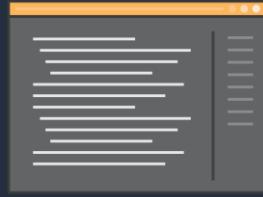
- Synchronous or asynchronous
- Integrated with other AWS services



Flexible authorization

- Securely grant access to resources and VPCs
- Fine-grained control for invoking your functions

Using AWS Lambda



Authoring functions

- Cloud9 editor or upload packaged .zip
- Third-party plugins
(Eclipse, Visual Studio)

Using AWS Lambda



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Monitoring and logging

- Metrics for requests, errors, and throttles
- Built-in logs to Amazon CloudWatch Logs

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Programming model

- Use processes, threads, /tmp, sockets normally
- AWS SDK built in (Python and Node.js)

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Programming model

- Use processes, threads, /tmp, sockets normally
- AWS SDK built in (Python and Node.js)



Stateless

- Persist data using external storage
- No affinity or access to underlying infrastructure

Spectrum of Compute Services

Spectrum of Compute Services at AWS



"On EC2"



Amazon EC2



Microsoft SQL
Server



kafka



cassandra



docker

Managed



Amazon
EMR



Amazon ES



AWS Elastic
Beanstalk



Amazon
Redshift



Amazon
RDS



Amazon
ElastiCache

Serverless



AWS
Lambda



Amazon
Cognito



Amazon
Kinesis



Amazon
S3



Amazon
DynamoDB



Amazon
SQS



Amazon
API
Gateway



Amazon
CloudWatch



AWS
IoT

Microservices Deployment Using Serverless Application Model

AWS Serverless Application Model (SAM)



AWS Serverless Application Model (SAM)



CloudFormation extension optimized for
serverless



AWS Serverless Application Model (SAM)



CloudFormation extension optimized for serverless

New serverless resource types: functions, APIs, and tables

AWS Serverless Application Model (SAM)



CloudFormation extension optimized for serverless

New serverless resource types: functions, APIs, and tables

Supports anything CloudFormation supports

AWS Serverless Application Model (SAM)



CloudFormation extension optimized for serverless

New serverless resource types: functions, APIs, and tables

Supports anything CloudFormation supports

Open specification (Apache 2.0)

Deployment using AWS Lambda



webapp

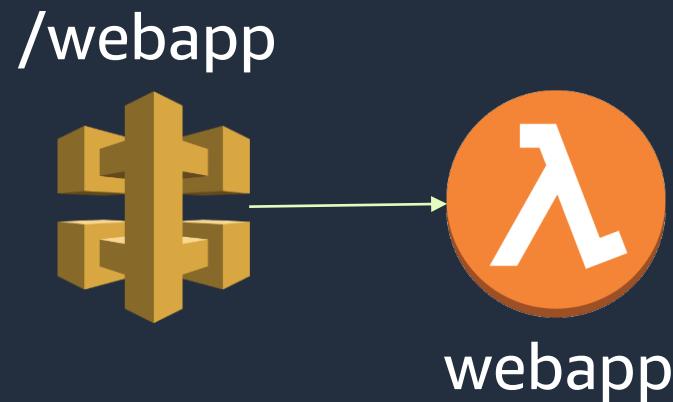


greeting

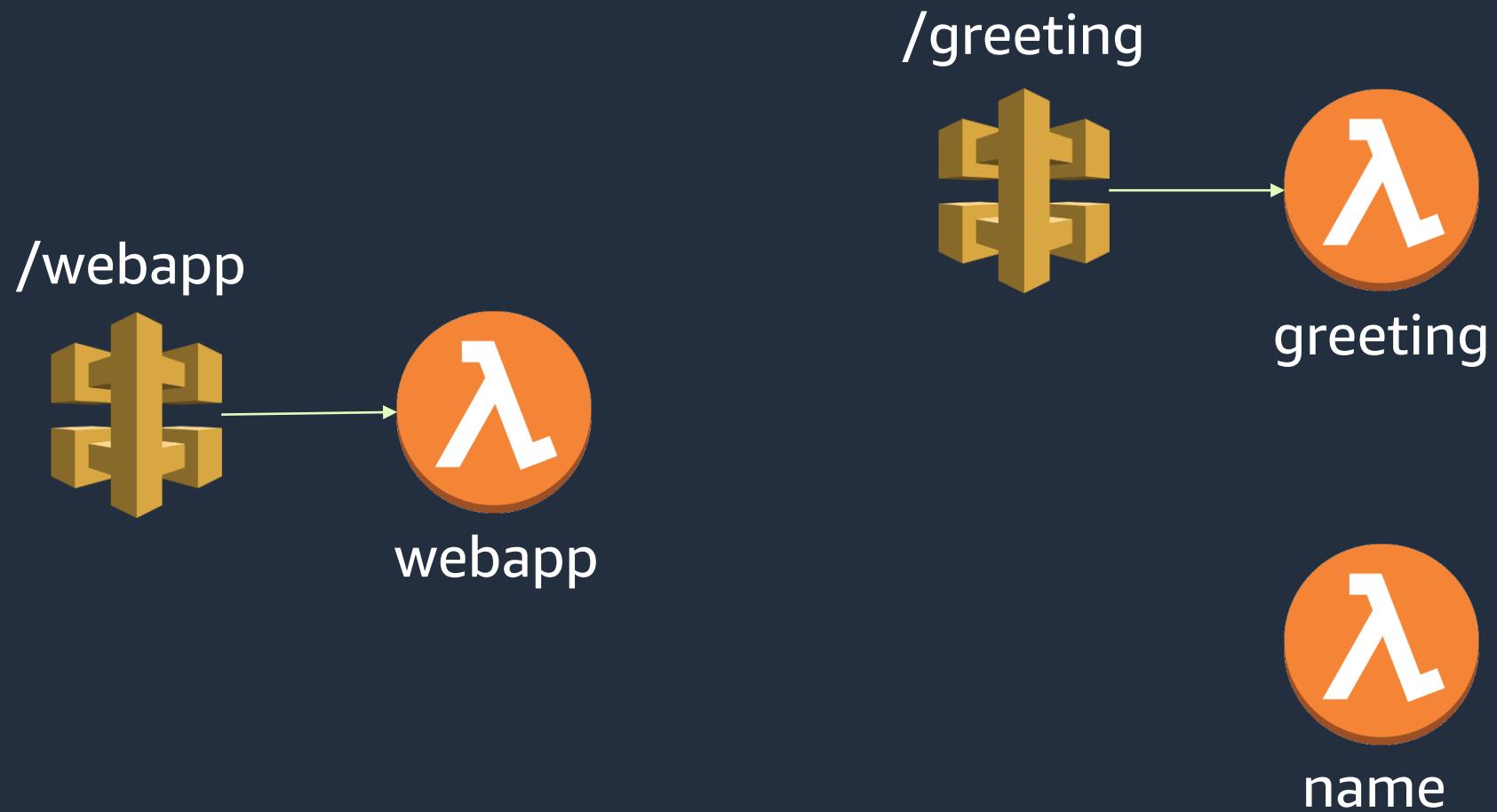


name

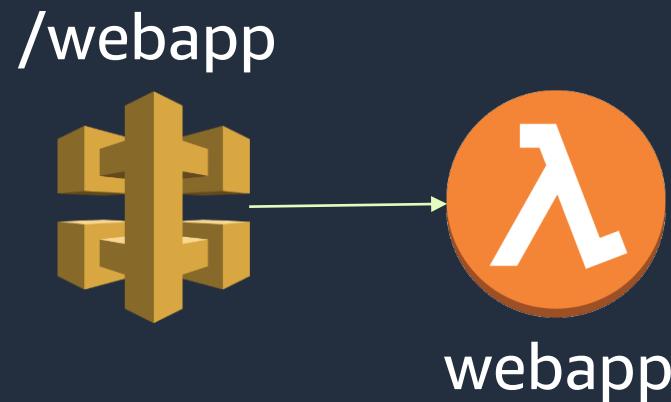
Deployment using AWS Lambda



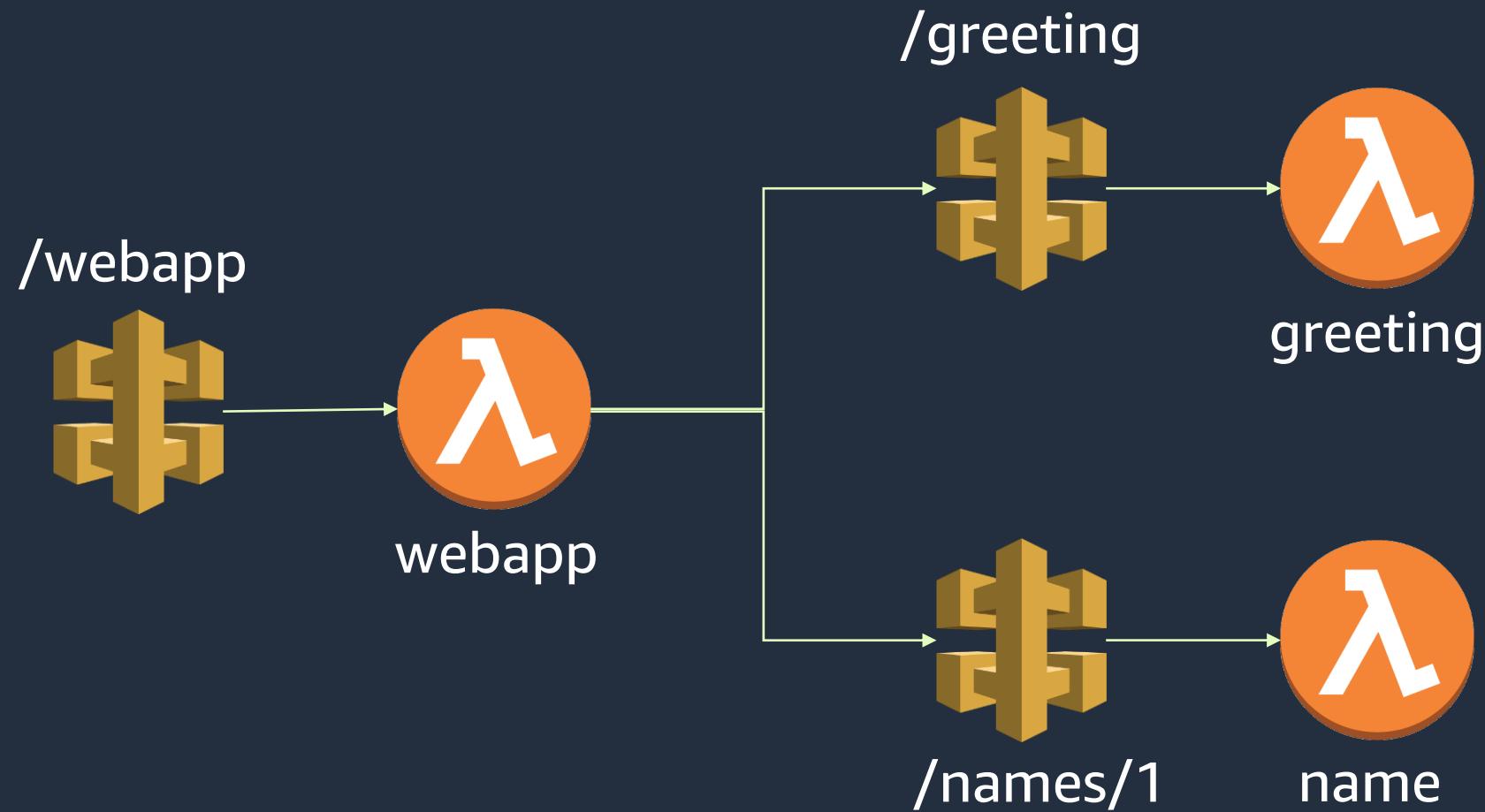
Deployment using AWS Lambda



Deployment using AWS Lambda



Deployment using AWS Lambda



Monitoring Microservices Using AWS X-Ray

X-Ray Service



TRACE REQUESTS



AWS X-Ray traces requests made to your application X-Ray collects data about the request from each of the underlying application services it passes through

X-Ray Service



TRACE REQUESTS



AWS X-Ray traces requests made to your application

X-Ray collects data about the request from each of the underlying applications services it passes through

RECORD TRACES



X-Ray combines the data gathered from each service into singular units called traces

X-Ray Service



TRACE REQUESTS



AWS X-Ray traces requests made to your application

X-Ray collects data about the request from each of the underlying applications services it passes through

RECORD TRACES



X-Ray combines the data gathered from each service into singular units called traces

VIEW SERVICE MAP



View the service map to see trace data such as latencies, HTTP statuses, and metadata for each service

X-Ray Service



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RECORD TRACES



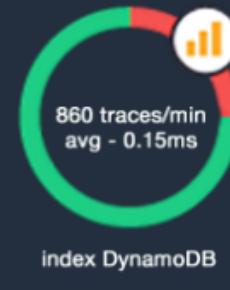
X-Ray combines the data gathered from each service into singular units called traces

VIEW SERVICE MAP



View the service map to see trace data such as latencies, HTTP statuses, and metadata for each service

ANALYZE ISSUES



index DynamoDB

Drill into the service showing unusual behavior to identify the root issue

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