Containers on AWS

AWS Riyadh User Group

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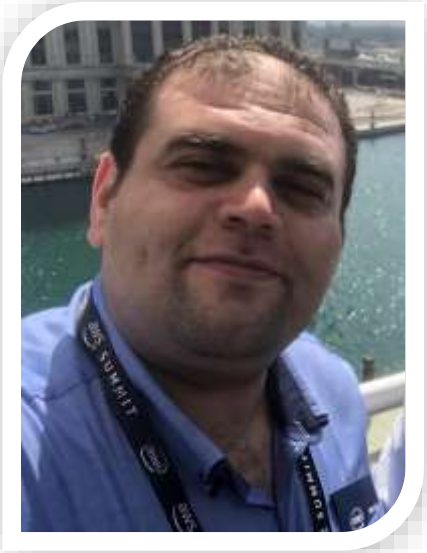
22-12-2018



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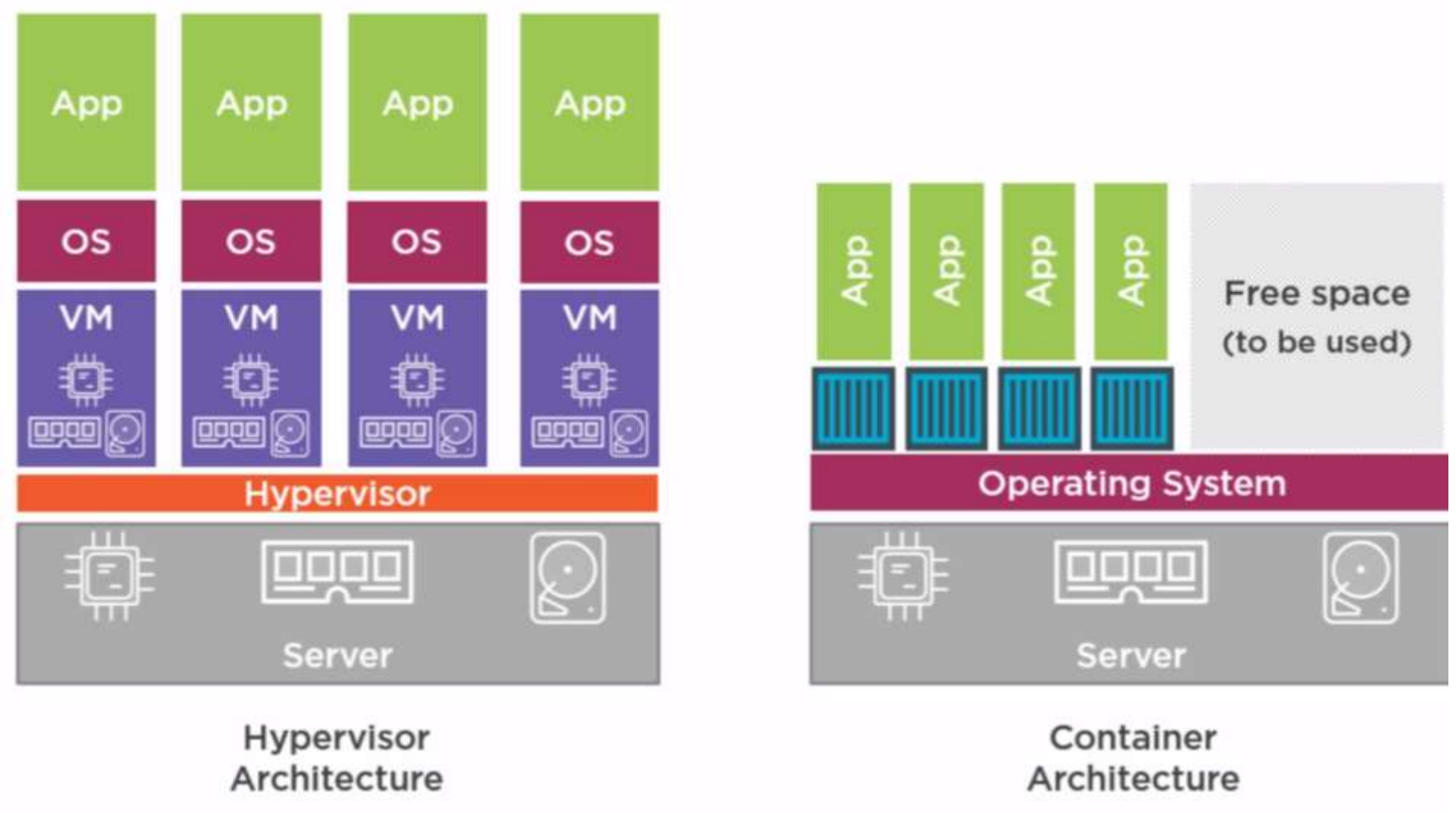
Agenda

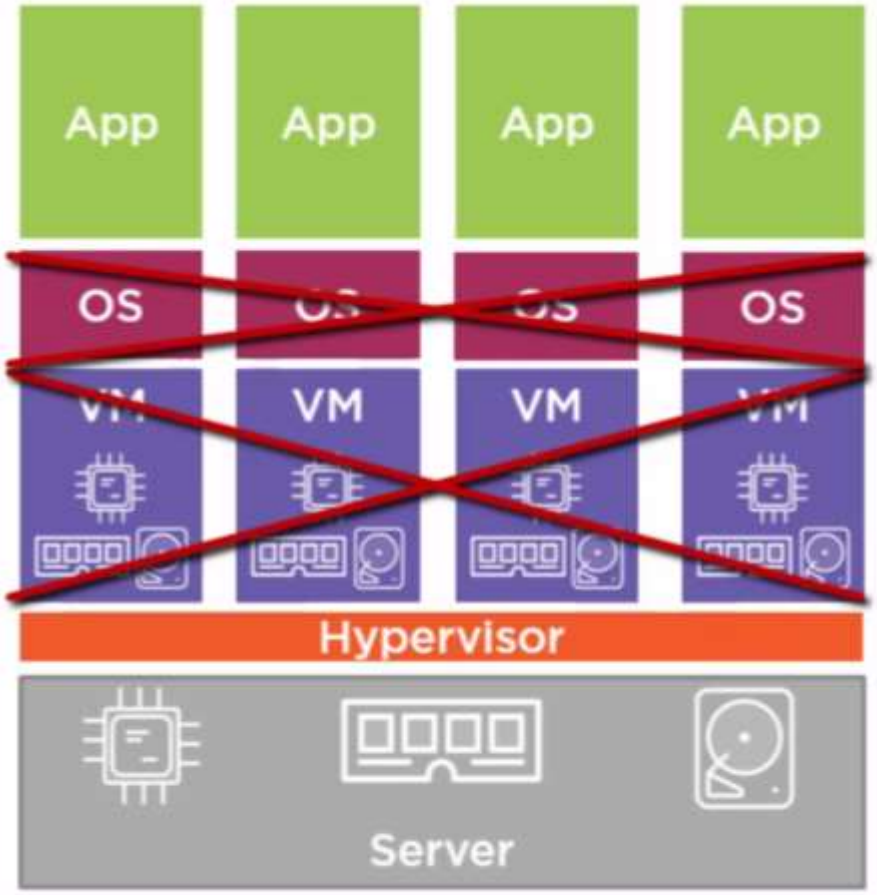
- Containers
- Docker
- Orchestration
- AWS Compute
  - Faregate – EC2
- AWS Orchestration
  - ECS – EKS
- Microservices-DevOps


MAERSK LINE

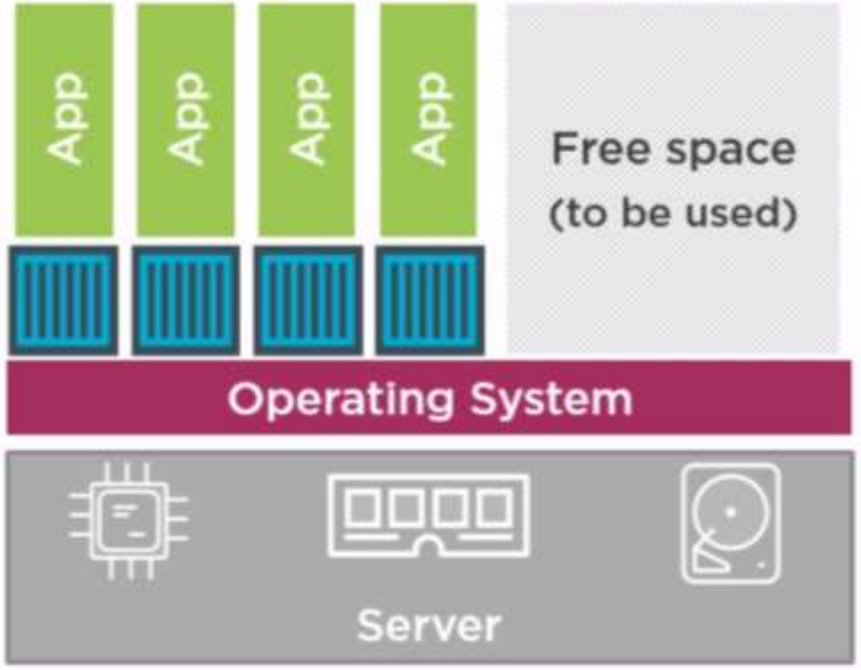
Virtual Machines vs. Containers



Virtual Machines vs. Containers



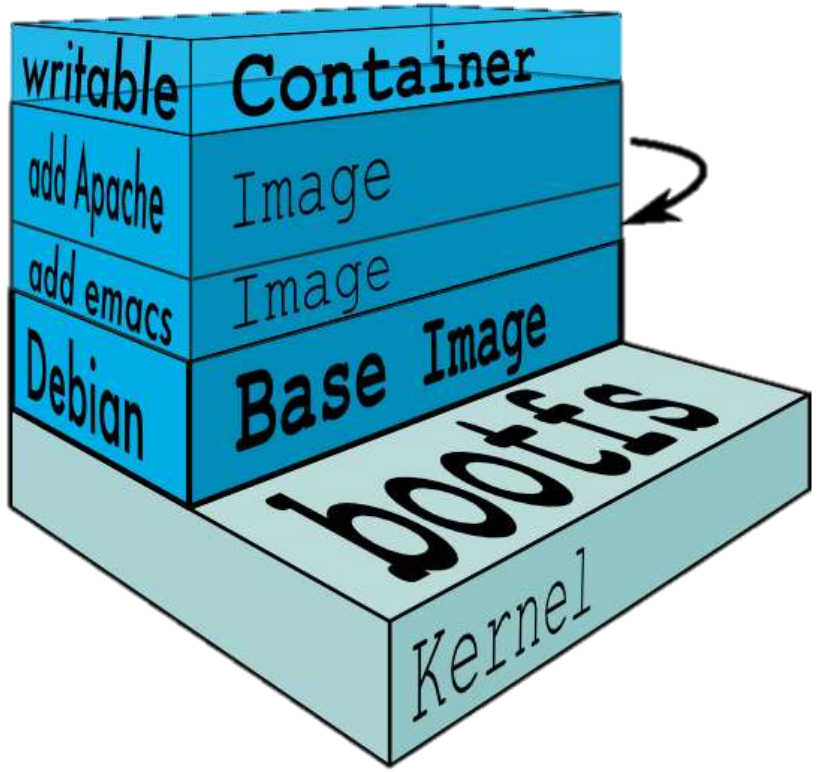
Hypervisor Architecture



Container Architecture

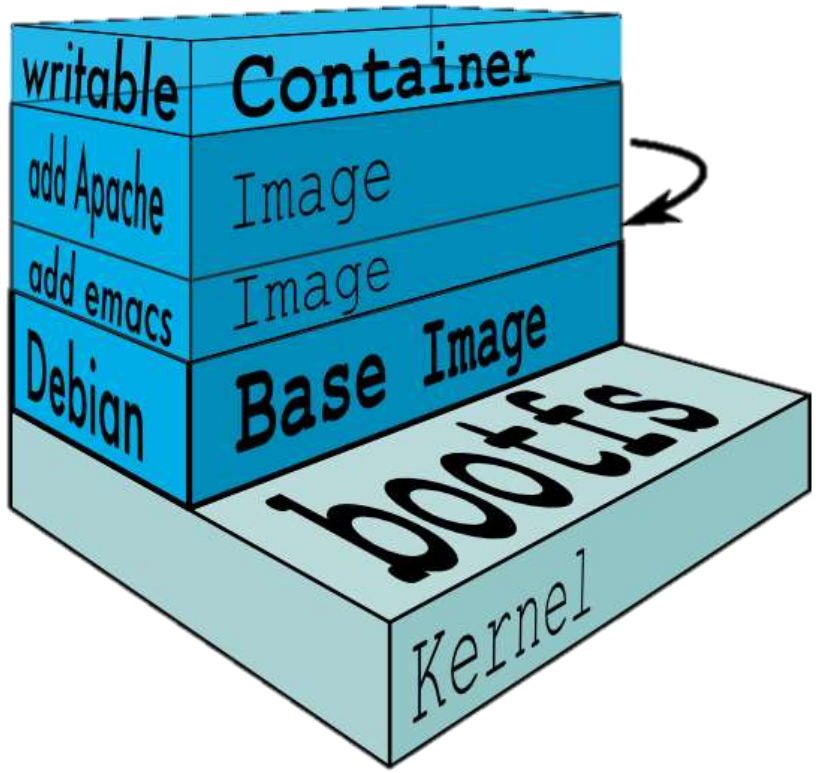
Containerization Terminologies

- Container
- Image
- Image Layer
- Base Image
- Registry
- Tag

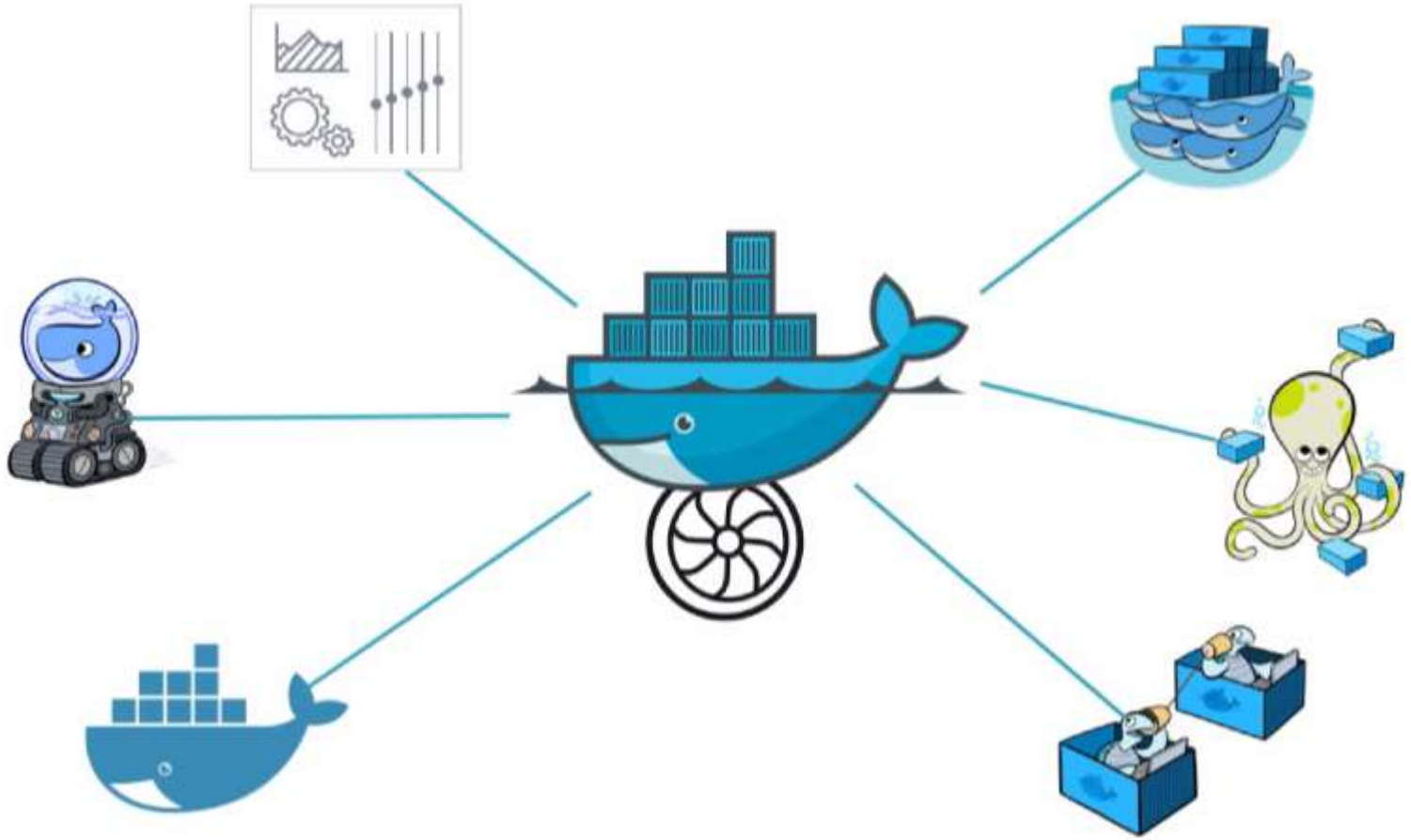


Container Images

- A container image is structured in terms of “**layers**”.
- An image is a collection of files and some meta data
- Each image contains software you want to run
- Every image contains a base layer
- Layers are read only
- Image Tags => Images are specified by repository:tag Default tag is latest



Docker



docker

Docker is an Open platform for developers and sysadmins to build, ship and run distributed applications.

Docker Momentum

450+

Docker EE commercial customers

37B

Container downloads

15K

Job listings on LinkedIn

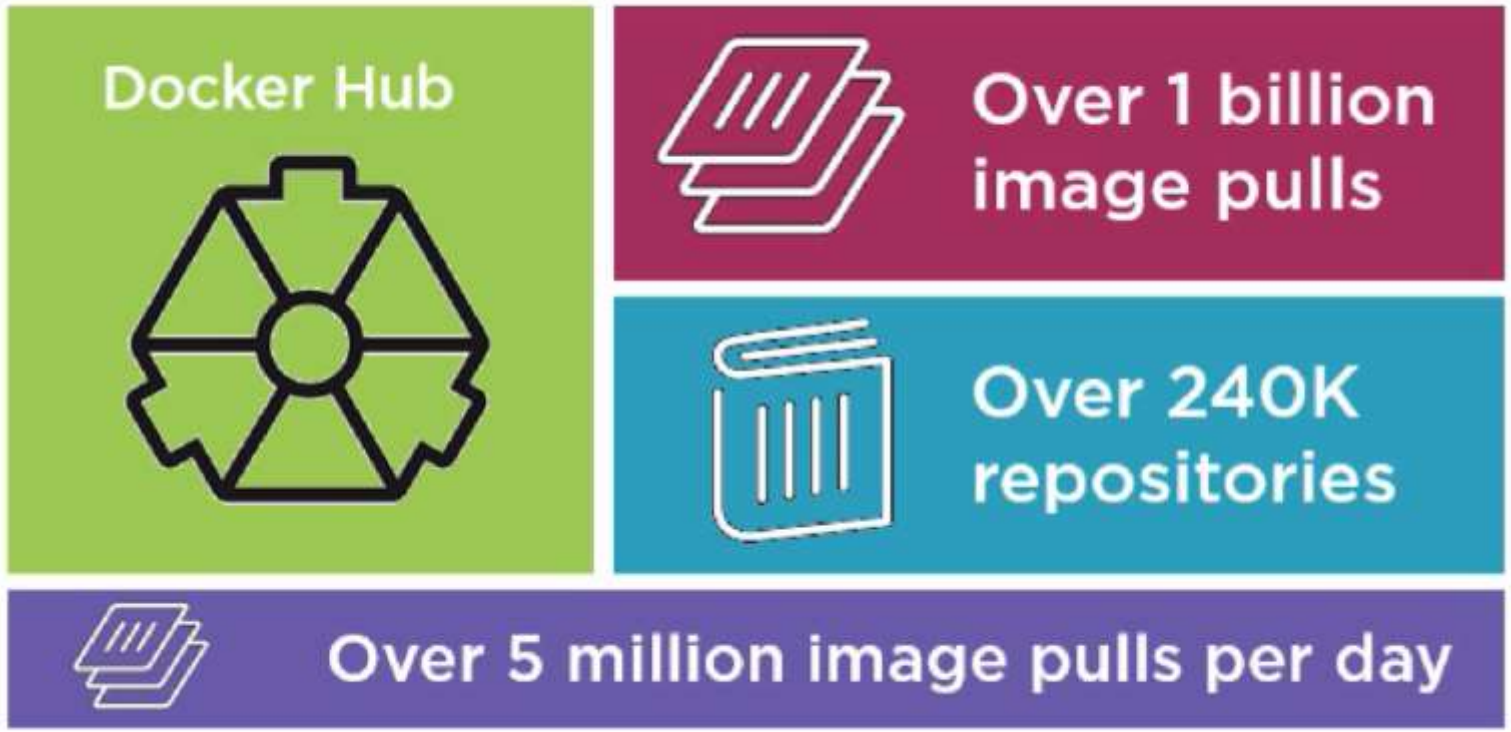
3.5M

Dockerized apps

200+

Active Docker user groups

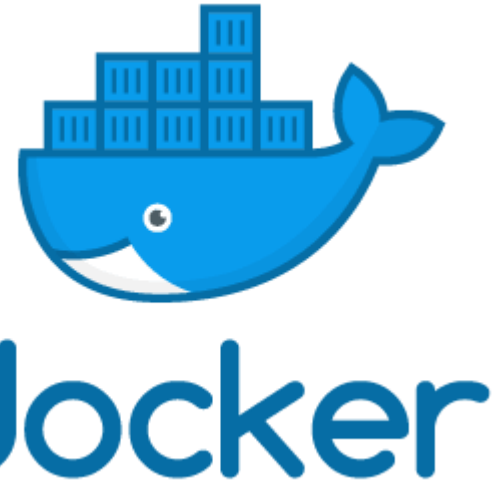
The Docker Project



docker

Docker - Terminologies

- **Docker Engine** – Docker Registry, CLI.
- Image – operating systems kernels supplied for a specific instance type / application.
- Container – an application running from an image.
- DockerFile – a text file with a list of steps to perform to create an image.
- Docker Hub – Docker Registry and Repository used for download and share images.



Docker Benefits

- Fast (deployment, migration, restarts)
- Secure
- Lightweight (save disk & CPU)
- Open Source
- Portable software
- Microservices and integrations (APIs)
- Simplify DevOps
- Version control capabilities

Docker Flow

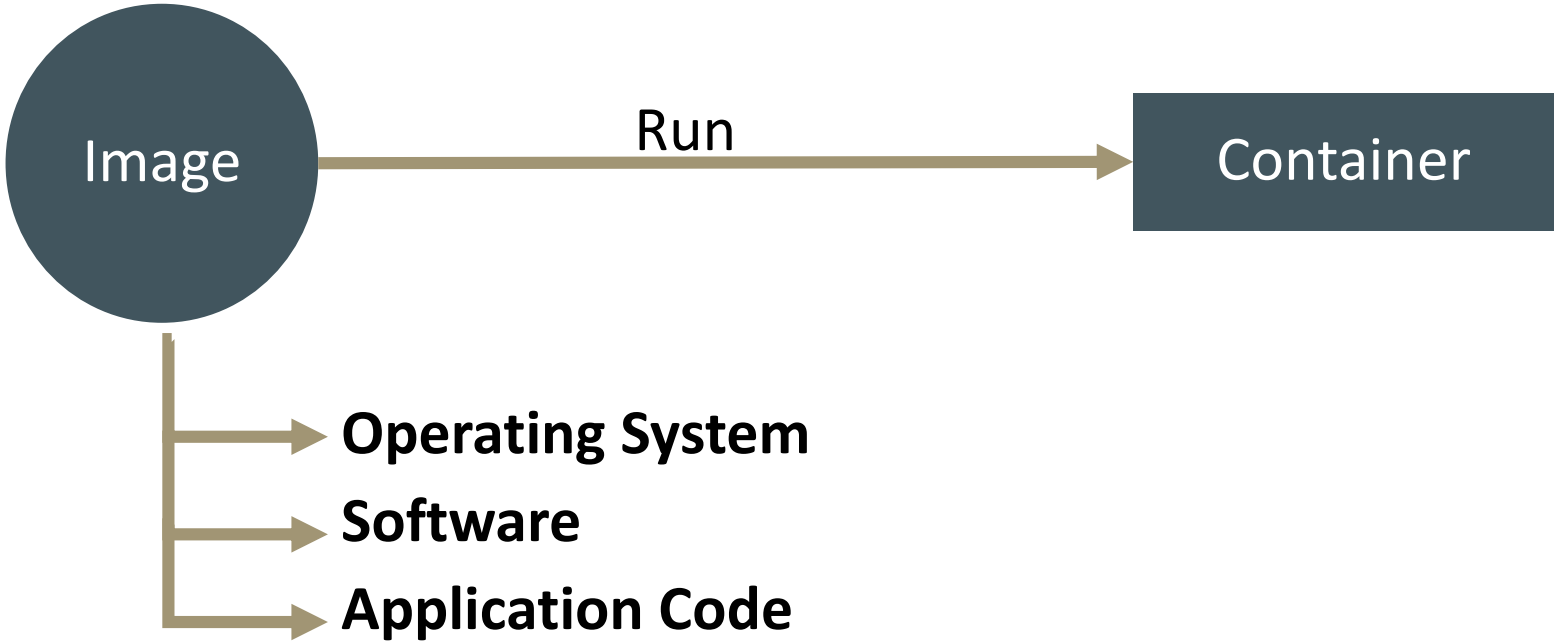
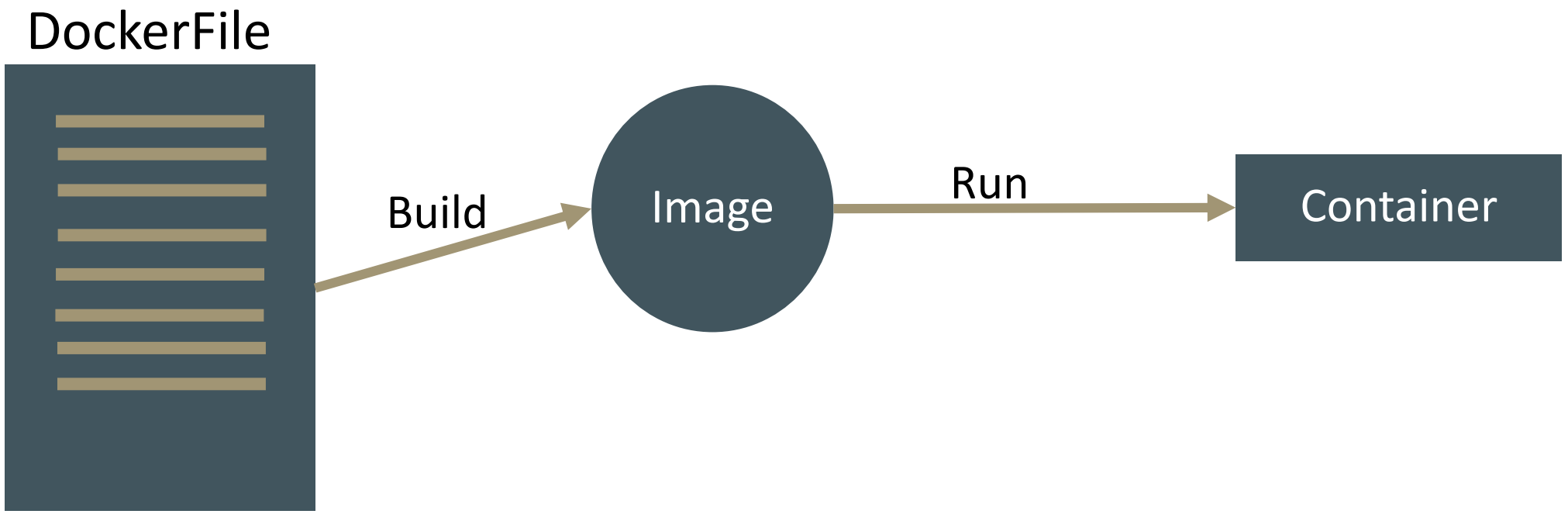


Image
Run
Container
Operating System
Software
Application Code

Docker Flow

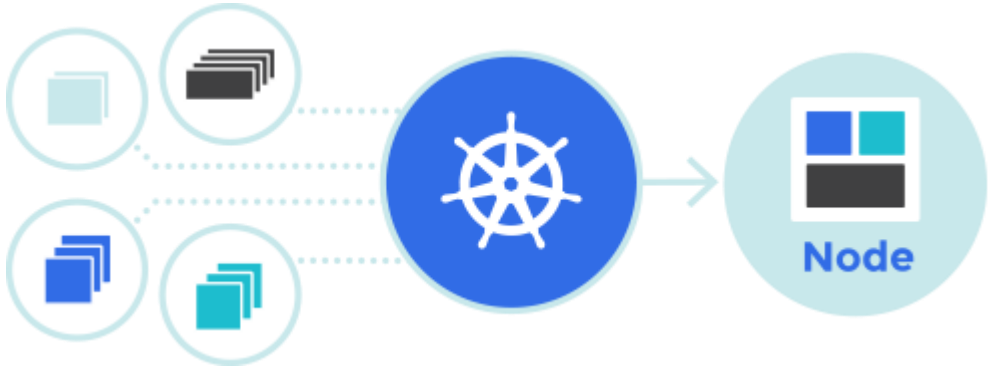


Kubernetes (k8s)

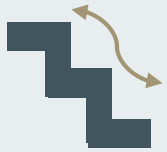
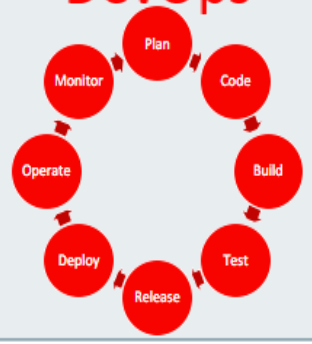
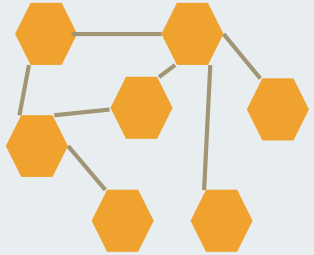
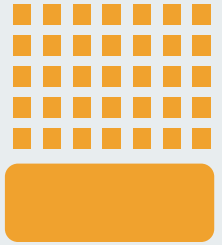
kubernetes

is an open-source system for automating deployment, scaling, and management of containerized applications.

It groups containers that make up an application into logical units for easy management and discovery



History and Multi-Dimensional Evolution of Computing

Development Process	Application Architecture	Deployment and Packaging	Application Infrastructure
Waterfall 	Monolithic 	Physical Server 	Datacenter 
Agile 	N-Tier 	Virtual Servers 	Hosted 
DevOps 	Microservices 	Containers 	Cloud 

Containers on AWS

Containers on AWS

- COMPUTE
  - Amazon EC2
  - AWS Fargate
- ORCHESTRATION
  - Amazon Elastic Container Service (ECS)
  - Amazon Elastic Container Service for Kubernetes (EKS)
- REGISTRY
  - Amazon Elastic Container Registry

ECS - Elastic Container Service

Why use Amazon ECS

- Containers Without Servers
- Containerize Everything
- Secure
- Performance At Scale
- Aws Integration

https://containersonaws.com

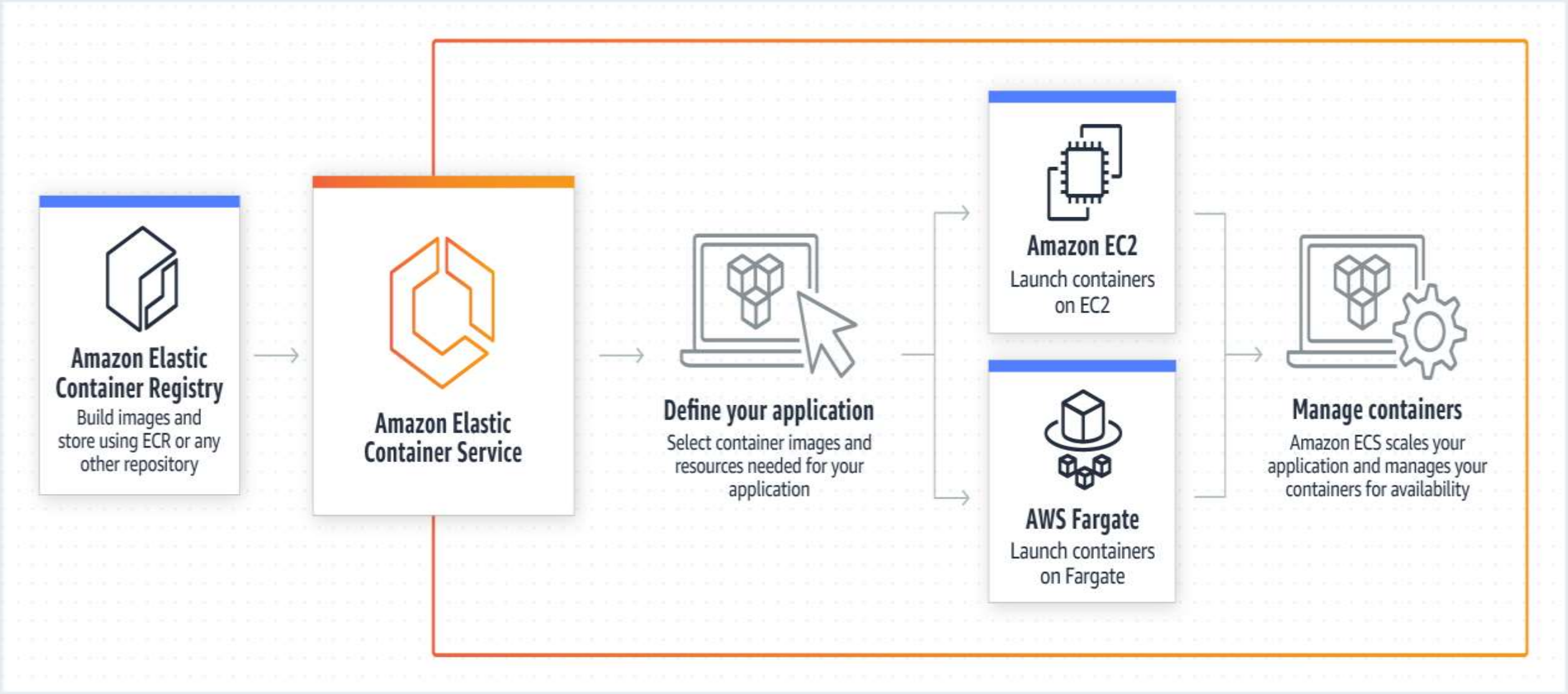
ECS - Elastic Container Service

Run my container for me

When to use Amazon ECS

- Microservices
- Batch Processing
- Application Migration to the Cloud
- Machine Learning

How Amazon ECS works



AWS Fargate

Run containers without managing servers or clusters ☺ إرتاح وسلمنا المفتاح

- Amazon ECS has two modes:
  1. **Fargate** launch type
  2. EC2 launch type.

AWS Fargate

- With **Fargate** launch type, all you have to do is
  1. Package your application in containers,
  2. Specify the CPU and memory requirements, define networking and IAM policies, and launch the application.

EKS - Amazon Elastic Container Service for Kubernetes

Highly available, scalable, and secure Kubernetes service

Run Kubernetes for me

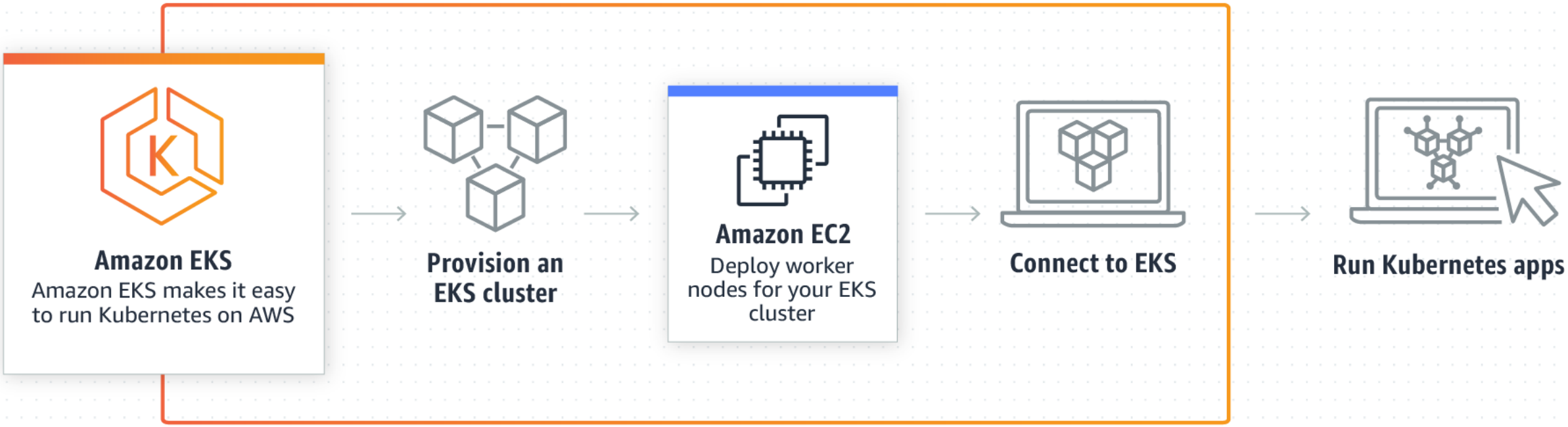
Platform for enterprises to run production-grade Kubernetese-grade installation

Amazon EKS

Benefits

- Seamless Integration with AWS
- Secure By Default
- Built With The Community

How Amazon EKS works



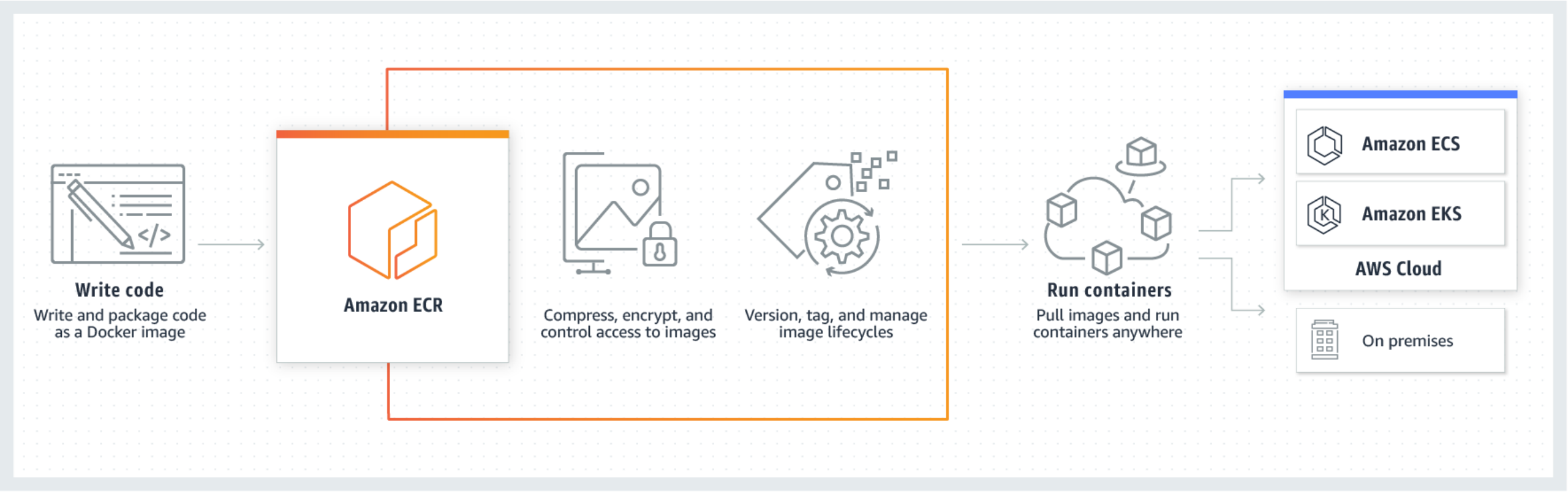
https://eksworkshop.com/

ECR - Amazon Elastic Container Registry

Easily store, manage, and deploy container images

Amazon Elastic Container Registry (ECR) is a fully-managed Docker container registry that makes it easy for developers to store, manage, and deploy Docker container images.

How Amazon ECR works



Containers run better on AWS

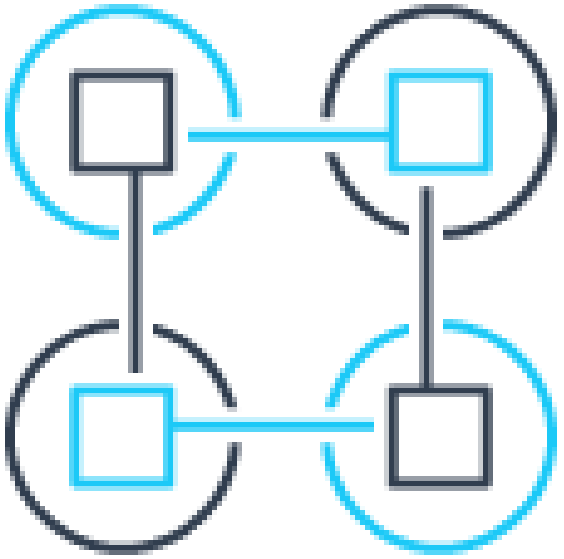
Serverless

Serverless technologies let you focus on designing and building your containerized applications instead of managing the infrastructure that runs them. **AWS Fargate** is a serverless compute engine that makes it easy to run containers in production.

Containers run better on AWS

Microservices

AWS offers managed services for Service Discovery and *Service Mesh* that make it easy to run microservices.

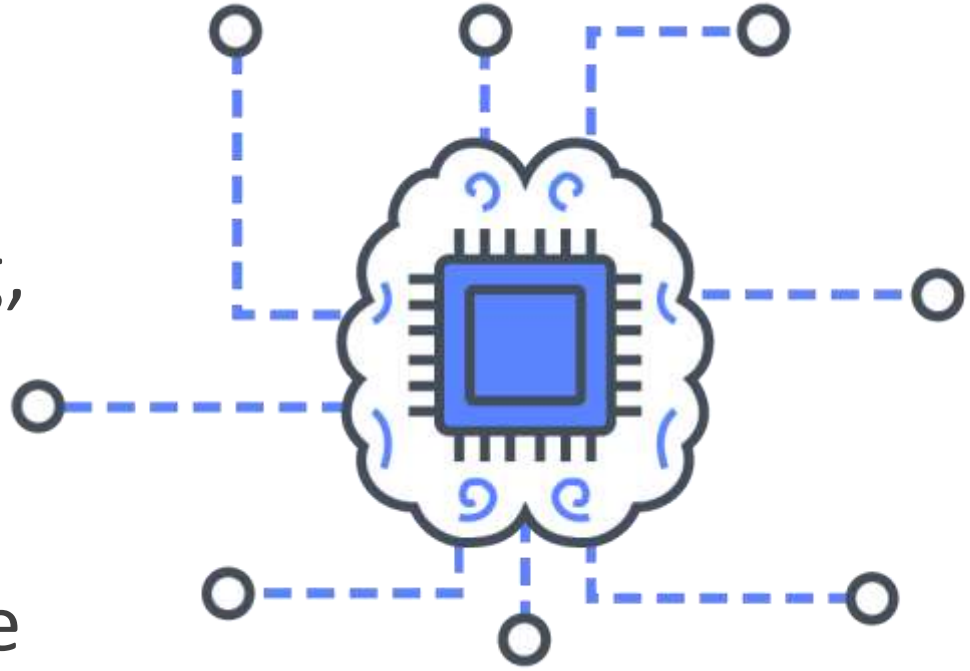


AWS Cloud Map is a cloud resource discovery service that lets you define how services discover and connect with each other.

https://d1.awsstatic.com/whitepapers/microservices-on-aws.pdf

Containers run better on AWS

Machine learning



AWS makes it easy to use containers run advanced workloads for machine learning, high performance computing, financial analytics, and video transcoding.

Amazon EKS makes it easy to run machine learning workloads using Kubernetes on AWS with an optimized Amazon Machine Image (AMI)

Companies adopting Amazon EKS

GoDaddy
Pearson
FICO
intuit
verizon
Honeywell
THE POWER OF CONNECTED
logicworks
RetailMeNot
mercari
CONDÉ NAST
INTERCULTURE GROUP | TAIWAN
trainline
Wonderfully Predictable
Verisk
EBSCO
skyscanner
axway
CyberAgent.

Companies adopting Amazon EKS

bynder
PubNub
SCHIBSTED MEDIA GROUP
YSDT
Yuan Shi Digital Technology
TROOPS
FireEye
INSIKT
sift science
Numerate
Insider
Time Inc.
FollowAnalytics
WIZELINE
eclectic iq
INTELLIGENCE POWERED DEFENSE
SafetyCulture
DEV FACTORY
usabilla
SHIELDX
Reltio
virtuagym
Dimebox
Qubole
TERADATA
otonomo

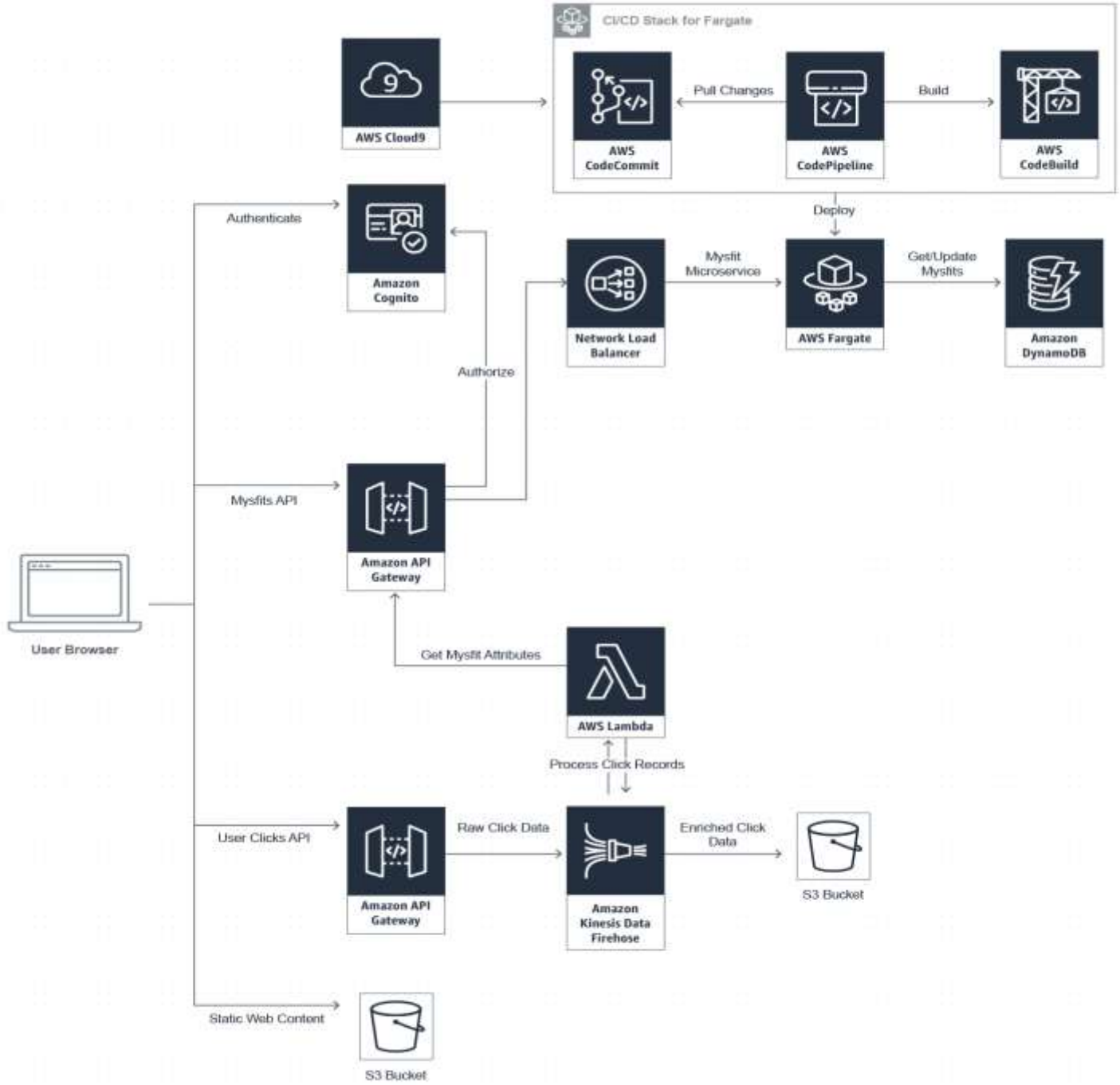

AWS
Amazon
EKS
K
Fargate
ECS

Build a Modern Web Application (Use case)

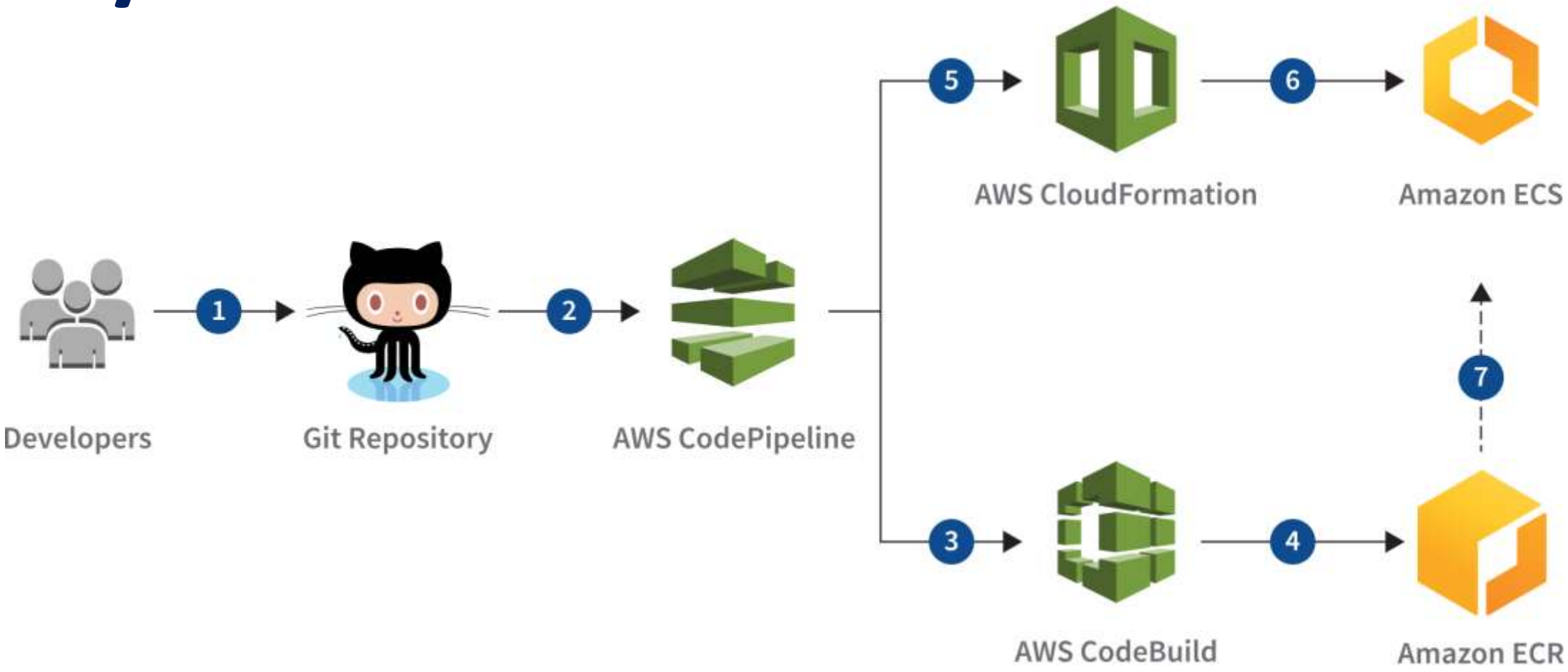
Deploy a web application, connect to a database, and analyze user behavior

Follow step-by-step instructions to build your first modern application using Python.

https://aws.amazon.com/getting-started/projects/build-modern-app-fargate-lambda-dynamodb-python/


CI/CD Stack for Fargate
AWS Cloud9
AWS CodeCommit
Pull Changes
AWS CodePipeline
Build
AWS CodeBuild
Deploy
Authenticate
Amazon Cognito
Authorize
Network Load Balancer
Mysfit Microservice
AWS Fargate
Get/Update Mysfits
Amazon DynamoDB
Mysfits API
Amazon API Gateway
User Browser
Get Mysfit Attributes
AWS Lambda
Process Click Records
User Clicks API
Amazon API Gateway
Raw Click Data
Amazon Kinesis Data Firehose
Enriched Click Data
S3 Bucket
Static Web Content
S3 Bucket

CI/CD PIPELINE



https://ecsworkshop.com/introduction/cicd/

Questions

AWS Riyadh User Group

See You Next Meetup