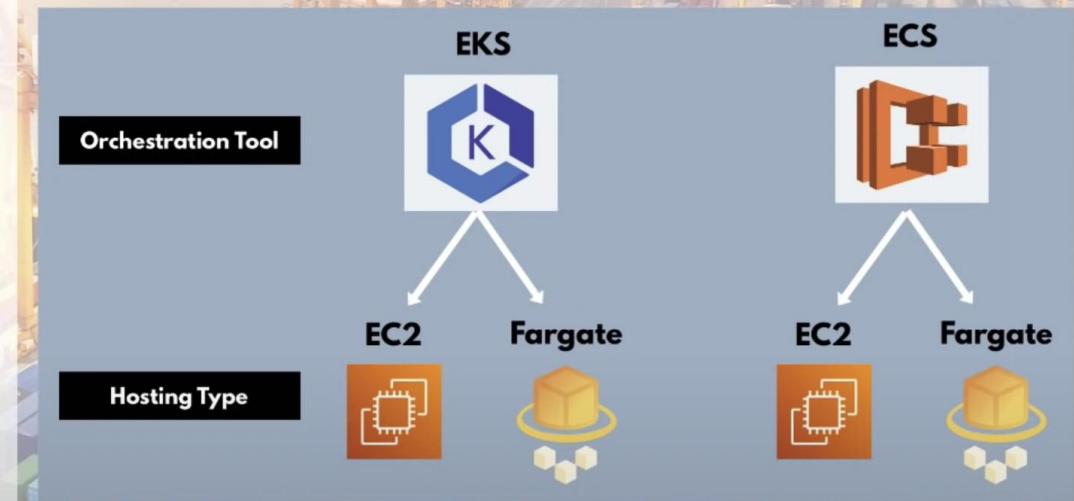


Introduction to Container Services on

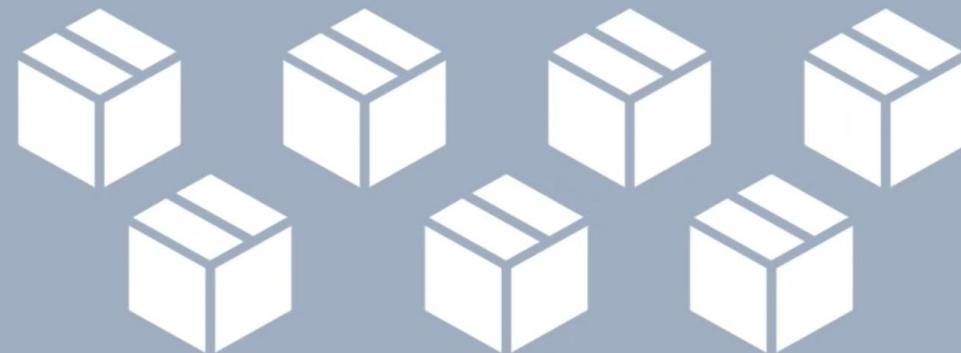
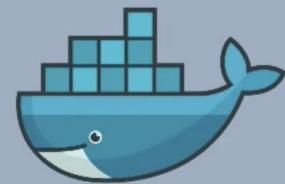


- ✓ high-level overview
- ✓ Elastic Container Service (ECS)
- ✓ Elastic Kubernetes Service (EKS)



Orchestrating your containers

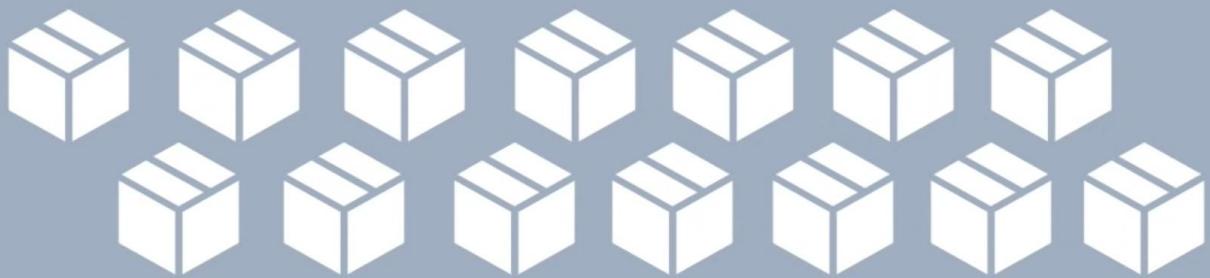
Microservice App



Deploy our containers



Orchestrating your containers



Manage these containers?

Resources still available?

Schedule next container?



Are containers crashed?

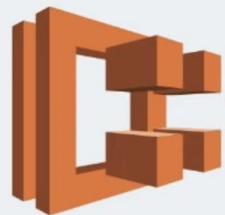
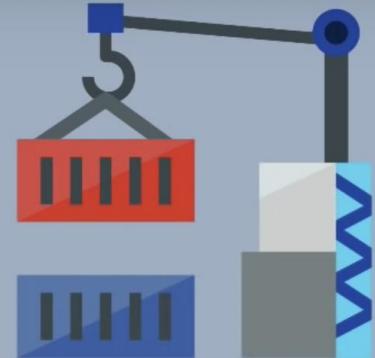
Remove multiple replicas?



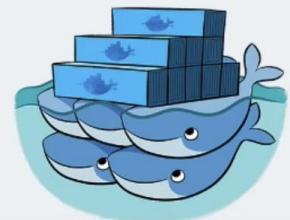
Automation Tool?

Container Orchestration Tools

Container Orchestration Tool
= Managing, scaling and deploying containers



ECS



Docker Swarm



Kubernetes



Mesos



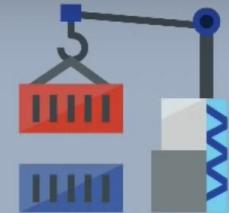
Nomad



Amazon Elastic Container Service

What is Elastic Container Service (ECS)?

- ▶ Container Orchestration Service
- ▶ Manages the whole container lifecycle



start

re-schedule

load balance

How does ECS work?

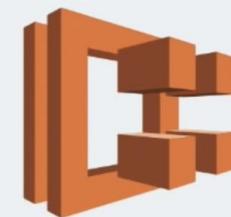
Run containerized application cluster on AWS

managed by AWS

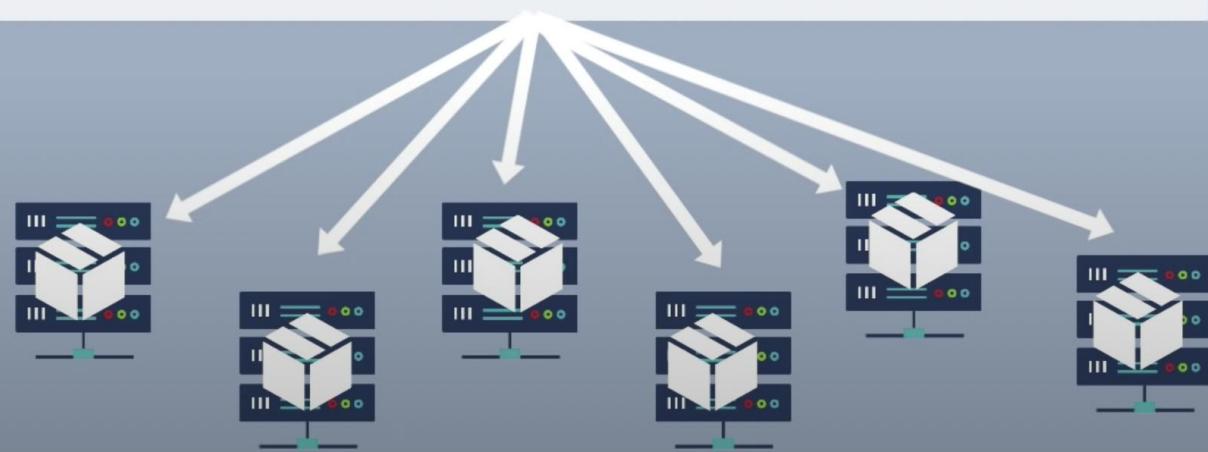


Control Plane

Scheduling and
Orchestration



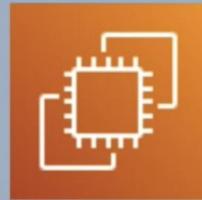
ECS Cluster



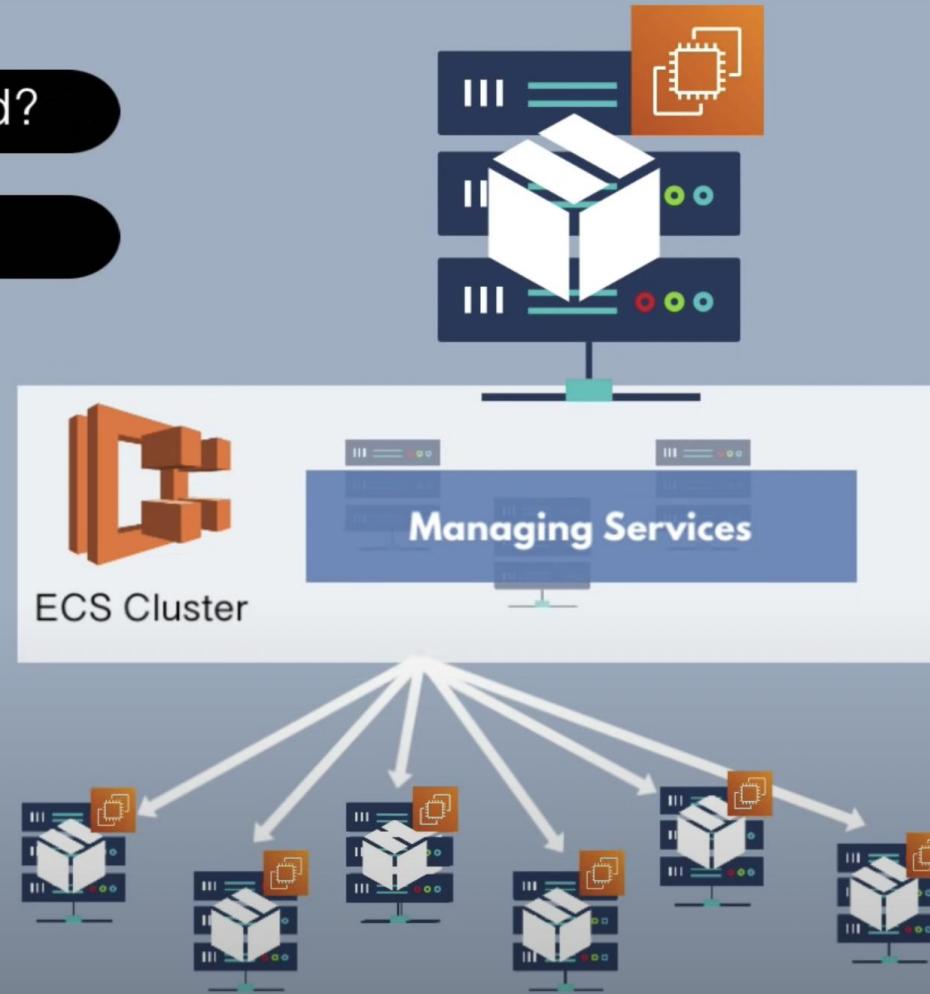
How does ECS work?

Where are these containers hosted?

Which virtual machines?



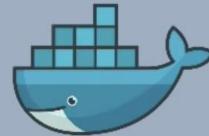
EC2 Instances



How does ECS work?

Which Services are running
on your EC2 Instance

- ▶ Container Runtime
- ▶ ECS Agent - for Control Plane Communication



ECS with EC2 Instances

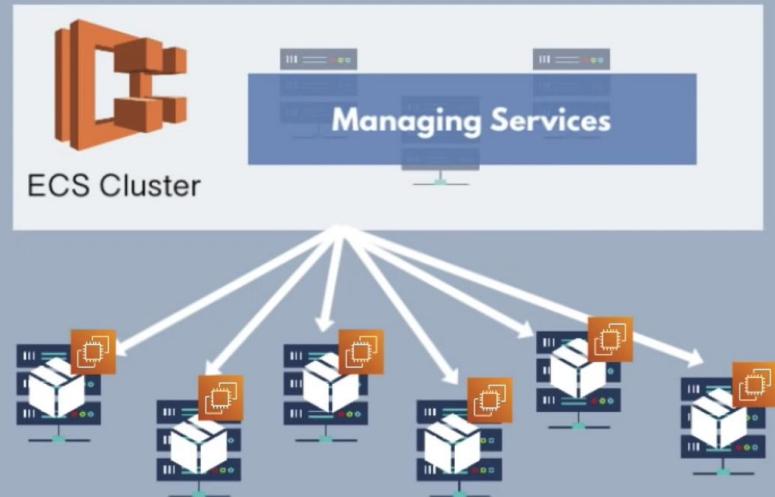
► ECS hosted on EC2 Instances



manages the **containers**



You still need to manage the Virtual Machine



- ▶ Create EC2 instances
- ▶ Join to ECS cluster
- ▶ Check, whether enough resources
- ▶ Manage Operating System
- ▶ Docker Runtime, ECS Agent



ECS with AWS Fargate



Container Orchestration



Hosting Infrastructure Management

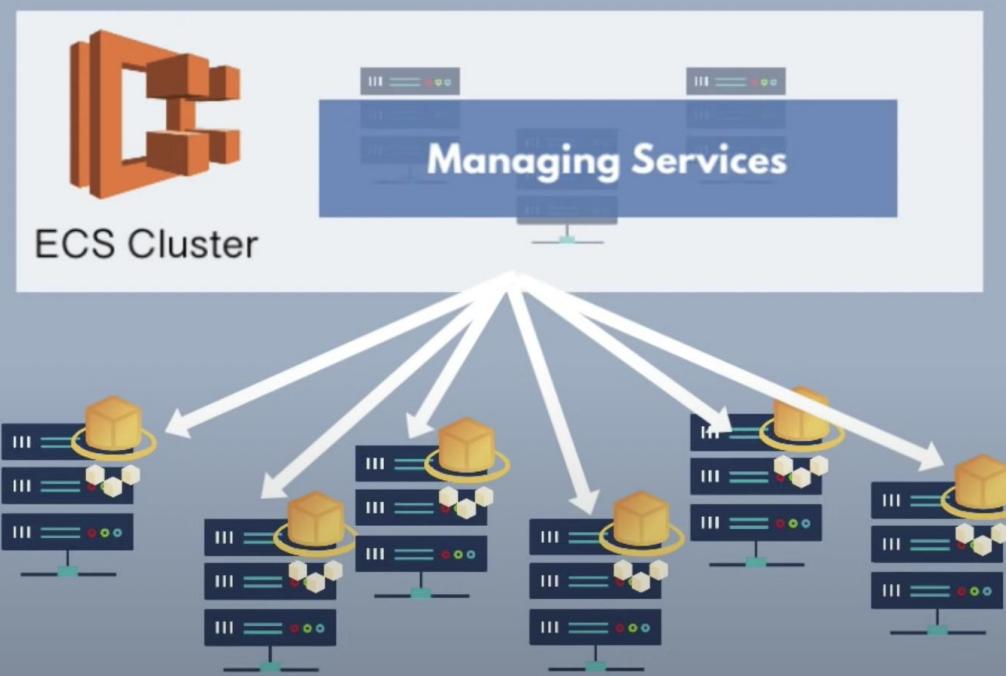
Delegate Infrastructure Management also to AWS?



AWS Fargate

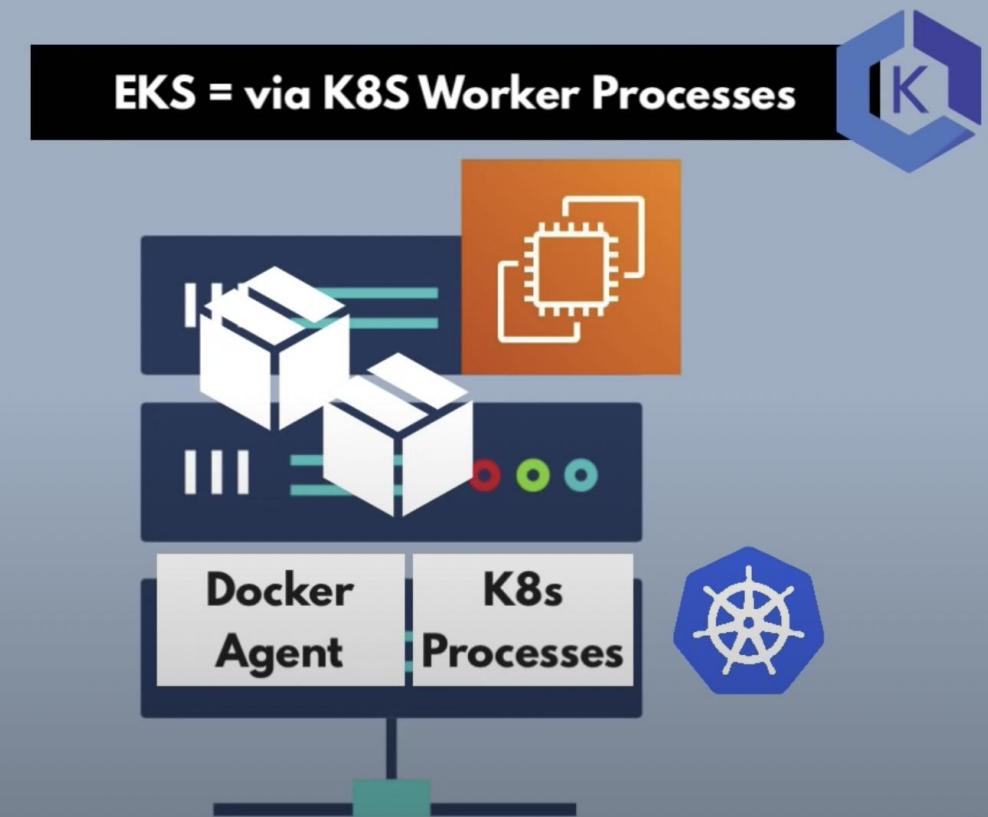
ECS with AWS Fargate

- ▶ Alternative to EC2 Instances



How does EKS work?

Communication between Control Plane (Master Nodes) and Compute Fleet





Worker Nodes

EC2 vs EC2 Nodegroup vs Fargate

EKS with EC2 Instances

self-managed

- ▶ You need to manage the infrastructure for Worker Nodes

EKS with Nodegroup

semi-managed

- ▶ Creates, deletes EC2 Instances for you, but you need to configure it

EKS with Fargate

fully-managed

EC2 vs EC2 Nodegroup vs Fargate

Orchestration Tool

EKS



Hosting Type



EC2

Fargate

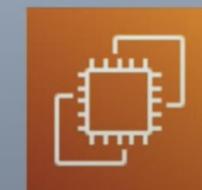


ECS



EC2

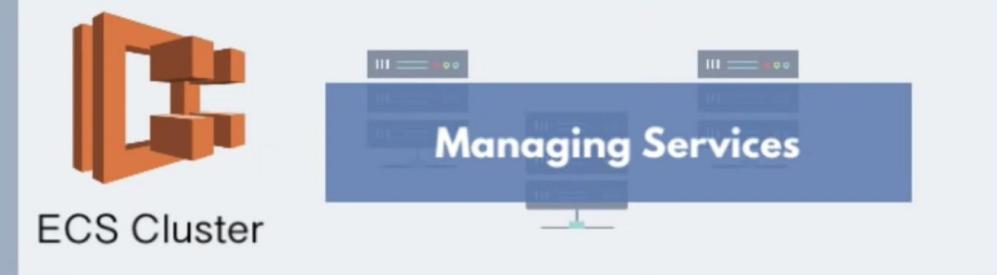
Fargate



How does AWS Fargate work?

- ▶ Serverless way to launch containers

Launch container with Fargate



No EC2 Instance
provisioned yet



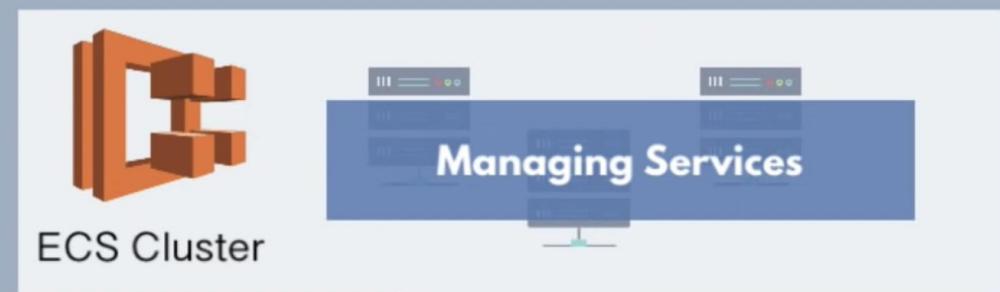
How does AWS Fargate work?

- ▶ Serverless way to launch containers

Launch container with Fargate



- ▶ provisions a server **on demand**



AWS Fargate advantages

► ECS with AWS Fargate

- ✓ No need to provision and manage servers
- ✓ on demand
- ✓ only the infrastructure resources needed to run your containers
- ✓ **pay only for what you use**
- ✓ easily scales up & down without fixed resources defined beforehand



EC2 Instance Pricing

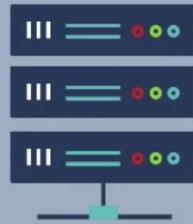
Pay for **whole server**

AWS Fargate Pricing

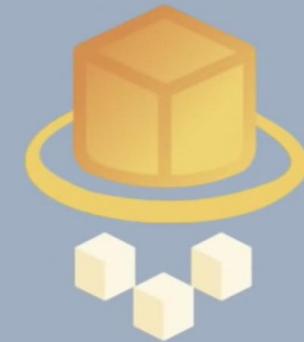
How long?

How much **capacity**?

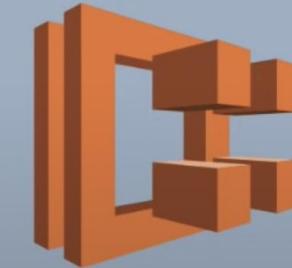
AWS Fargate advantages



**Infrastructure
managed by AWS**

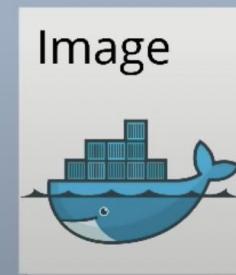
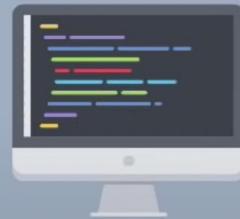


**Containers
managed by AWS**



AWS Fargate advantages

You only need to manage
your application





Integration with other AWS Services

- ▶ AWS ecosystem available

CloudWatch for
Monitoring

IAM for
Users and Permissions

Elastic Load Balancer for
Loadbalancing

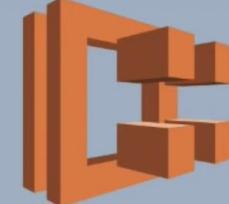
VPC for
Networking

...

Elastic Kubernetes Service (EKS)



Both managing the Control Plane, but:



- you already use K8s (**same K8s API**)
- Kubernetes is open-source
- easier to migrate to another platform



- specific to AWS
- migration difficult
- less complex applications
- ECS control plane is free

- migration can be difficult,
when using other AWS Services
- large community (Helm charts etc.)

How does EKS work?

Scheduling and
Orchestration



Control Plane



EKS Cluster



- ▶ EKS deploys and manages Kubernetes Master Nodes
- ▶ K8s Master Services already installed on them
- ▶ High Availability - Master Nodes replicated across Availability Zones



How does EKS work?

Scheduling and
Orchestration



Control Plane



EKS Cluster



Etcd

Region

AZ 1



3 Availability Zones

AZ 2



AZ 3



How does EKS work?

Scheduling and
Orchestration



Control Plane



Worker Nodes



kubectl



EKS Cluster



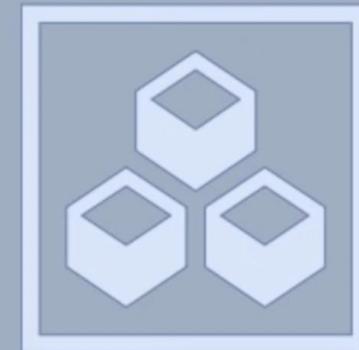
What is Amazon ECR?



Repository for Docker Images

- ▶ store, manage and deploy Docker container images
- ▶ alternative to:

Image



docker hub



Nexus

What is Amazon ECR?

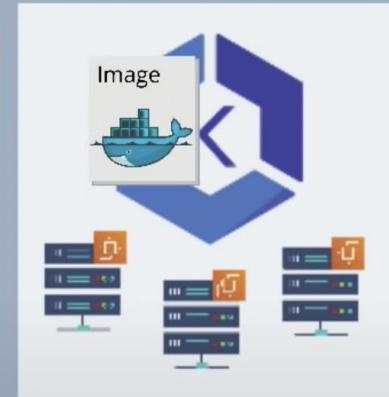
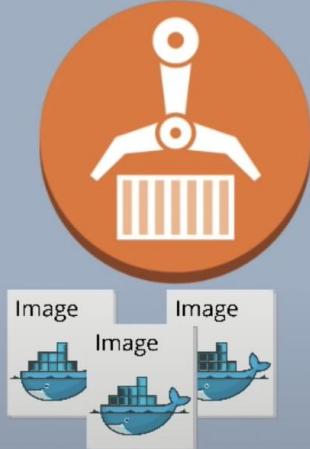


integrates well with other AWS Services



notify when new image

pull images

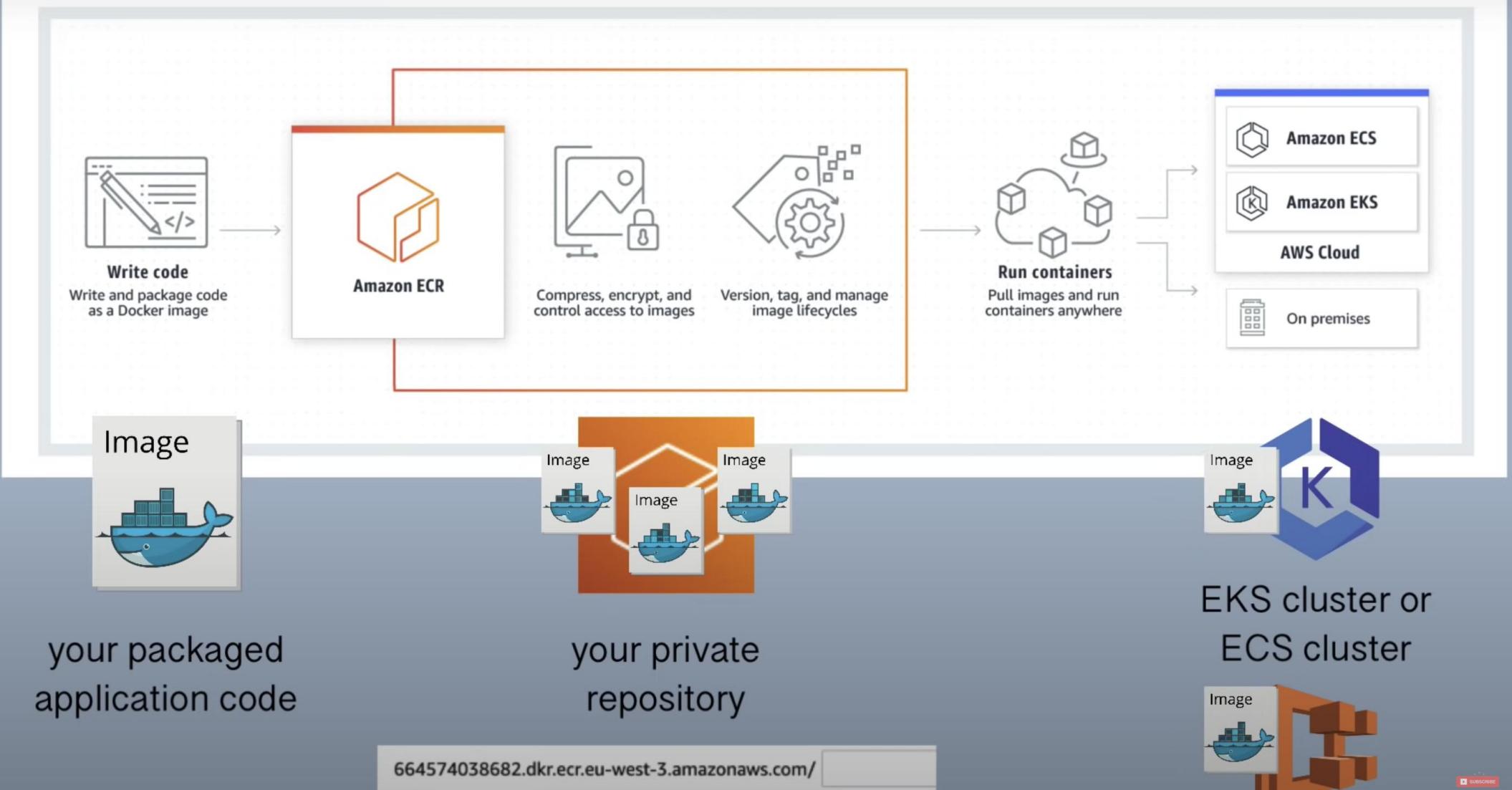


easy to connect and configure



your App Images
stored here

How it works



A screenshot of the AWS Management Console. The top navigation bar shows 'Branches (4) [java-maven-app] X' and 'Jenkinsfile - feature/payr'. Below the navigation bar, the URL 'eu-west-3.console.aws.amazon.com/console/home?region=eu-west-3' is visible. The main content area is titled 'Services' with a dropdown arrow. The sidebar menu includes sections for 'All services' (Compute, EC2, Lightsail, Lambda, Batch, Elastic Beanstalk, Serverless Application Repository, AWS Outposts, EC2 Image Builder), 'Containers' (ECR, Elastic Container Service, Elastic Kubernetes Service), and 'Storage' (S3, EFS).

3 AWS Container Services

ECR

Elastic Container Registry
Private Docker Repository

ECS

Elastic Container Service
Container Orchestration Service

EKS

Elastic Kubernetes Service
Container Orchestration Service
Managed Kubernetes Service



ECR



EKS



CI/CD Pipeline



GitLab

**Build
App**

**Build
Image**



**Push to
private Repo**



**Deploy to
AWS EKS**

