Standard Applications vs. Containerized applications

EBS & ECS-Docker

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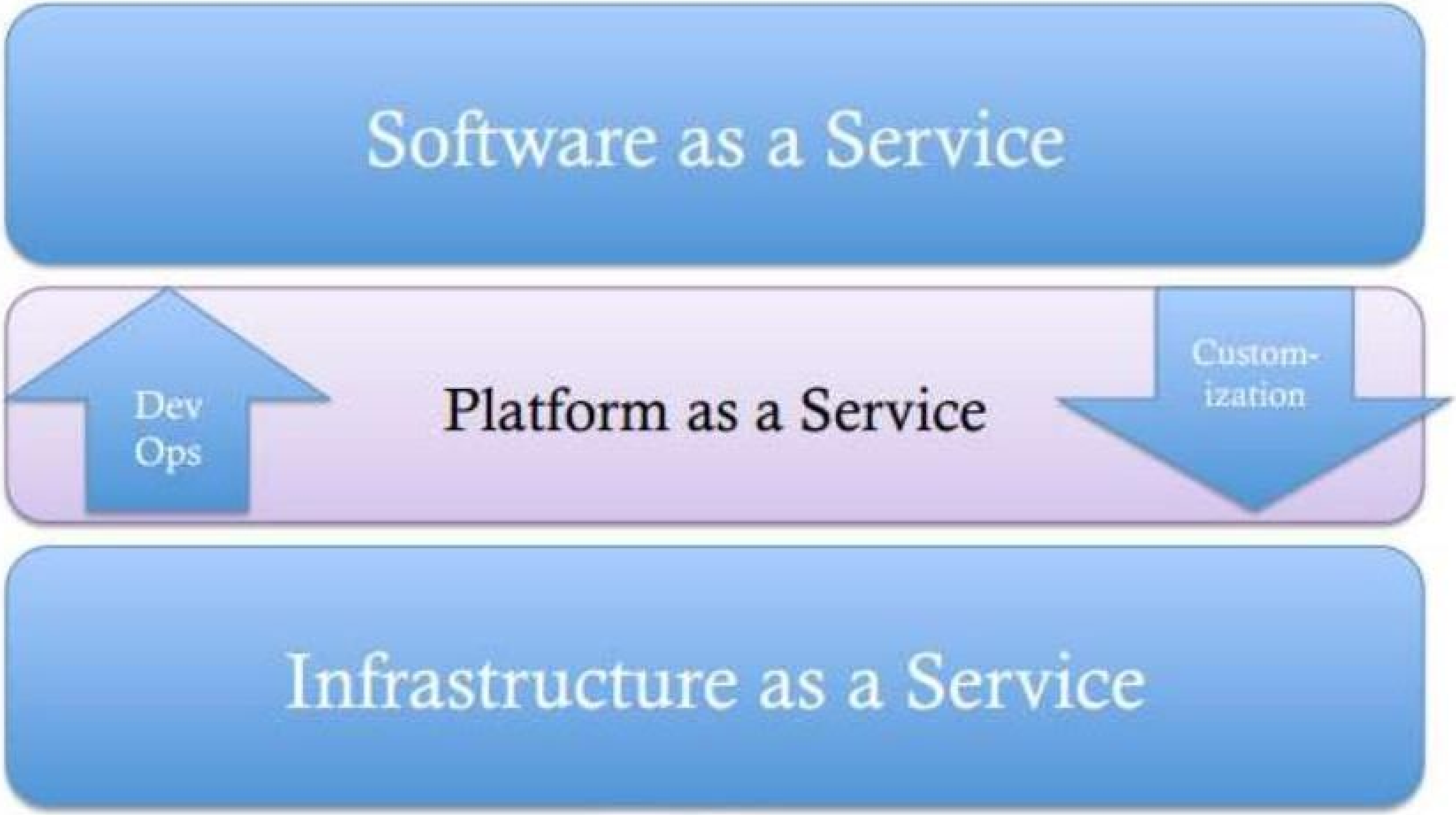
How PaaS works

- Platform as a Service allows users to create software applications using **tools** supplied by the provider.
- PaaS services can consist of preconfigured **features** that customers can subscribe
- The infrastructure and applications are managed for customers and support is available.
- Services are constantly updated, with existing features upgraded and additional features added.

Evolving from different standards



Software as a Service

Dev Ops

Platform as a Service

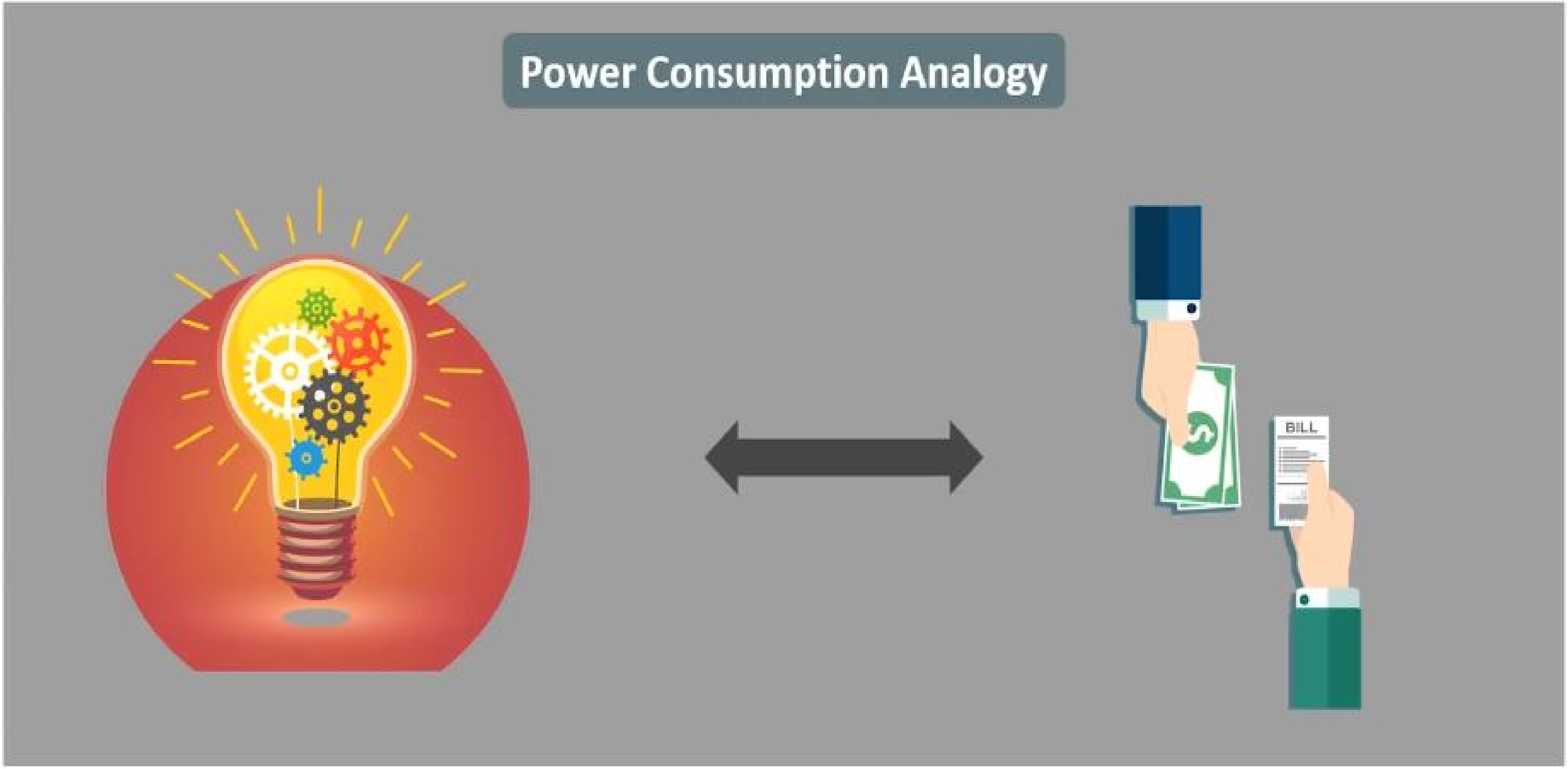
Custom- ization

Infrastructure as a Service

Agenda

- What is AWS?
- What is Docker?
- What is AWS ECS?
- Demo: Running Docker in ECS

What is AWS?

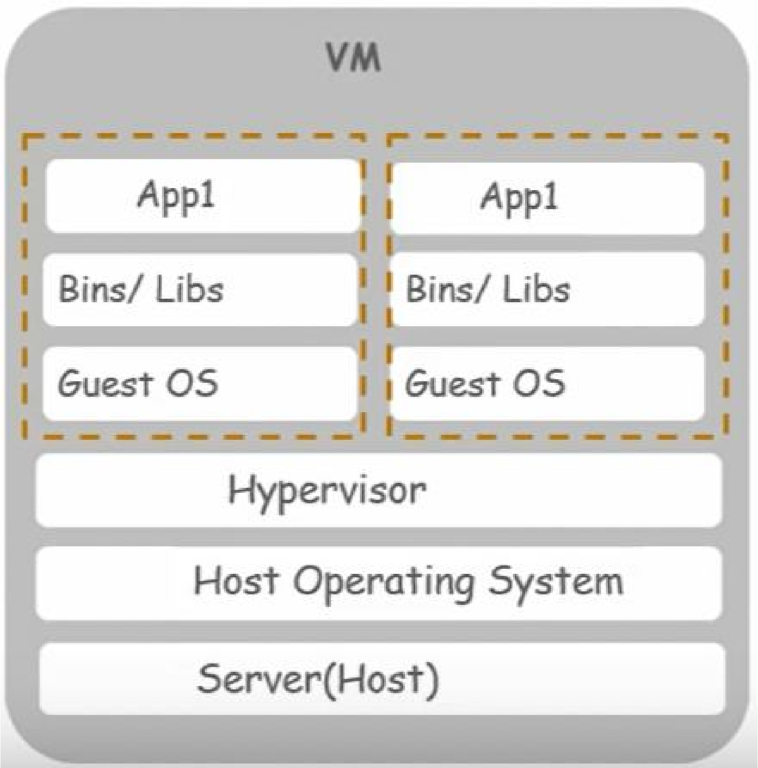


- Example: Electricity

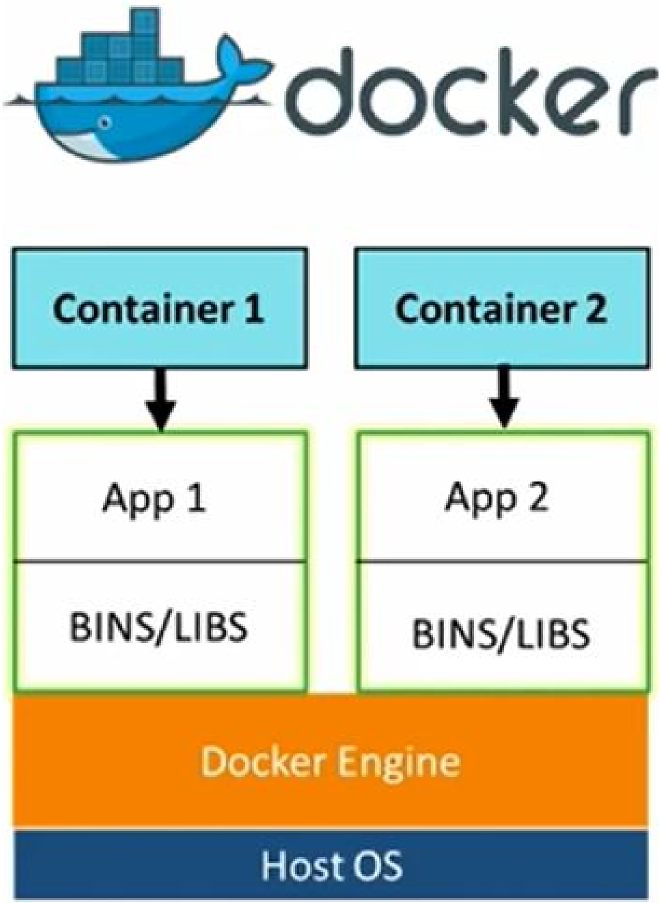
In High Level

- Operating System
- Software to build upon
- Dependencies to Run Software
- Environment Variable
- Client Pull the container

Virtualization vs Containers

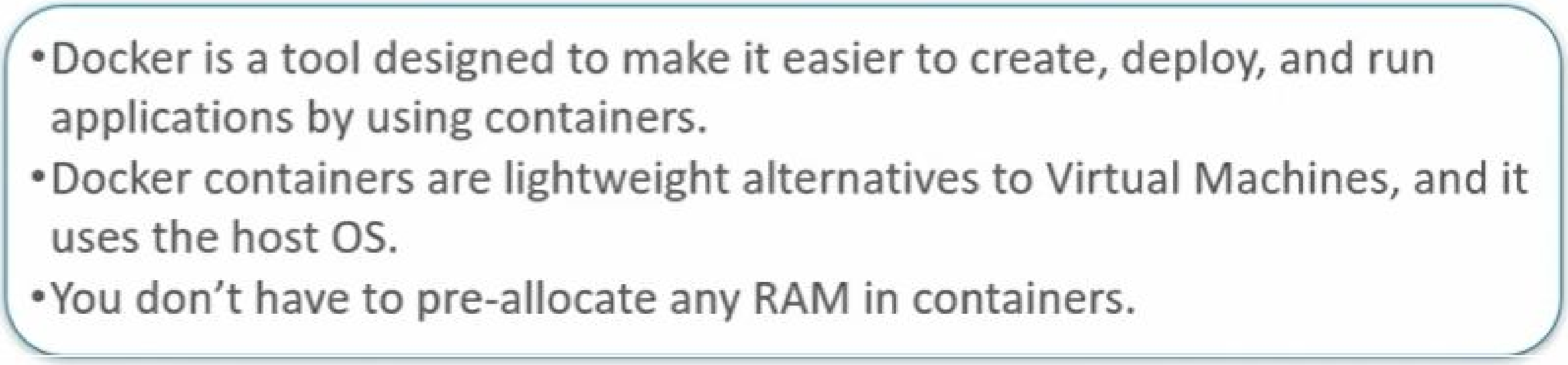


- Hyper-V, Virtual Box



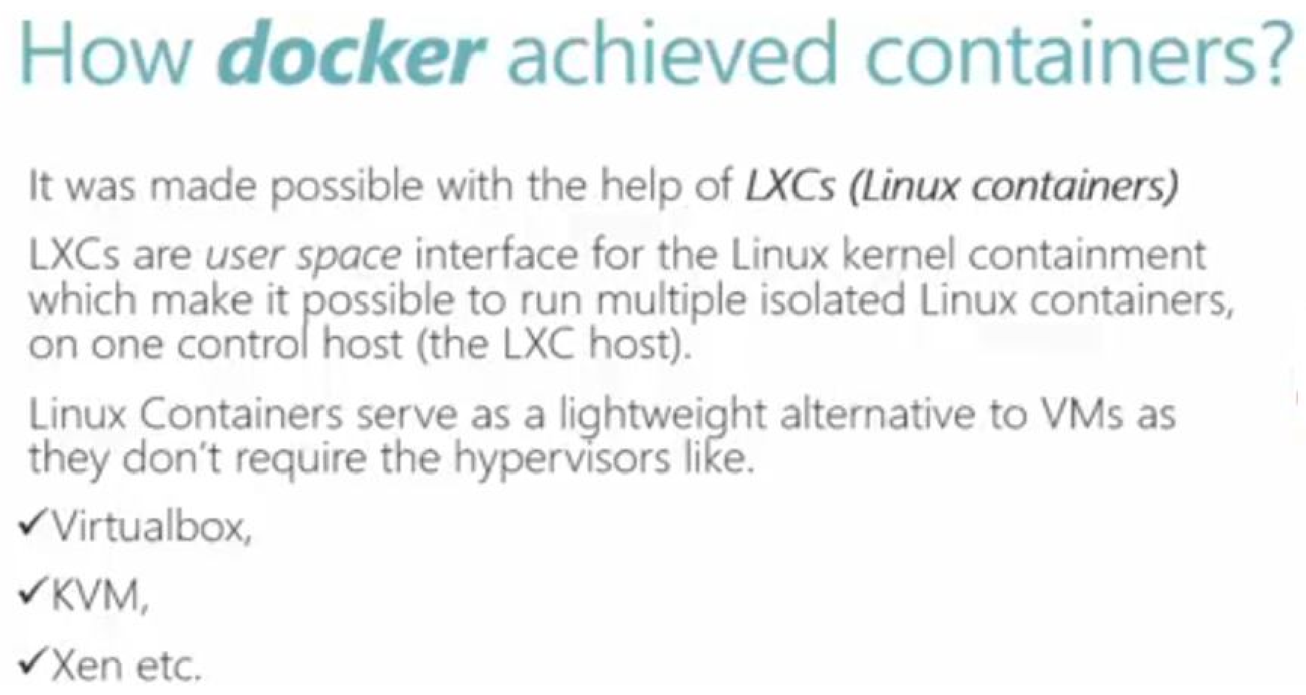
- No Guest OS
- No Hypervisor
- Docker Engine (holds tiny os)

Benefits of Docker



- Docker is a tool designed to make it easier to create, deploy, and run applications by using containers.
- Docker containers are lightweight alternatives to Virtual Machines, and it uses the host OS.
- You don’t have to pre-allocate any RAM in containers.

- **Run a Docker Container from the Docker Registry** (EBS)
  - https://hub.docker.com
  - https://www.youtube.com/watch?v=IBu7Ov3Rt-M&feature=youtu.be
  - https://docs.aws.amazon.com/elasticbeanstalk/latest/dg/single-container-docker-configuration.html



How *docker* achieved containers?

It was made possible with the help of ***LXCs (Linux containers)***

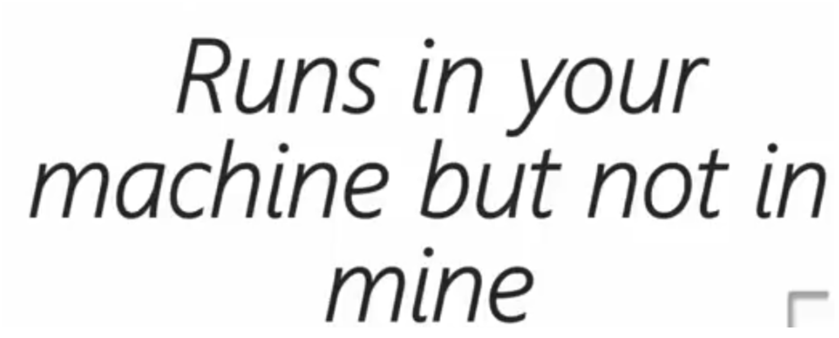
LXCs are *user space* interface for the Linux kernel containment which make it possible to run multiple isolated Linux containers, on one control host (the LXC host).

Linux Containers serve as a lightweight alternative to VMs as they don't require the hypervisors like.

✓Virtualbox,

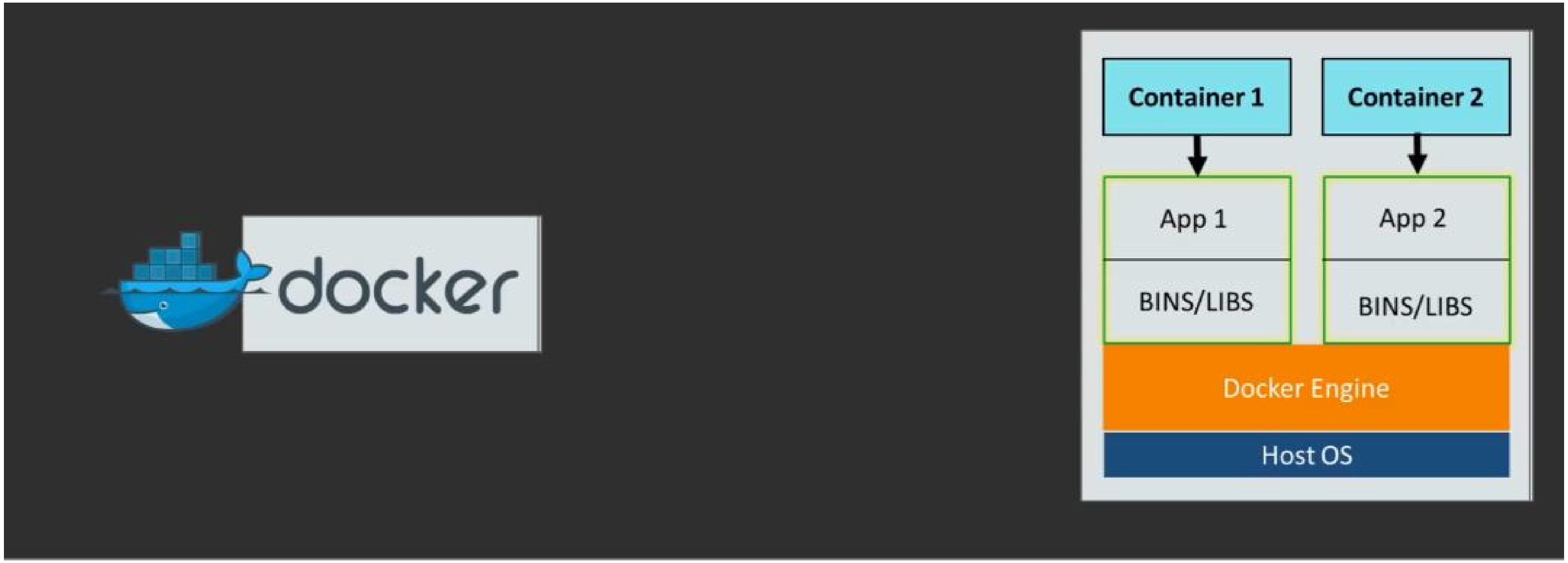
✓KVM,

✓Xen etc.



Runs in your machine but not in mine

What is Docker?



What Is Docker?

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- **Example: Laptop (MacBook)->OS**

- AWS Features
  - Virtualization
  - Middleware (Hypervisor)
- Docker-Container Agent
  - Containerization Application
  - ECS-Elastic Container Service

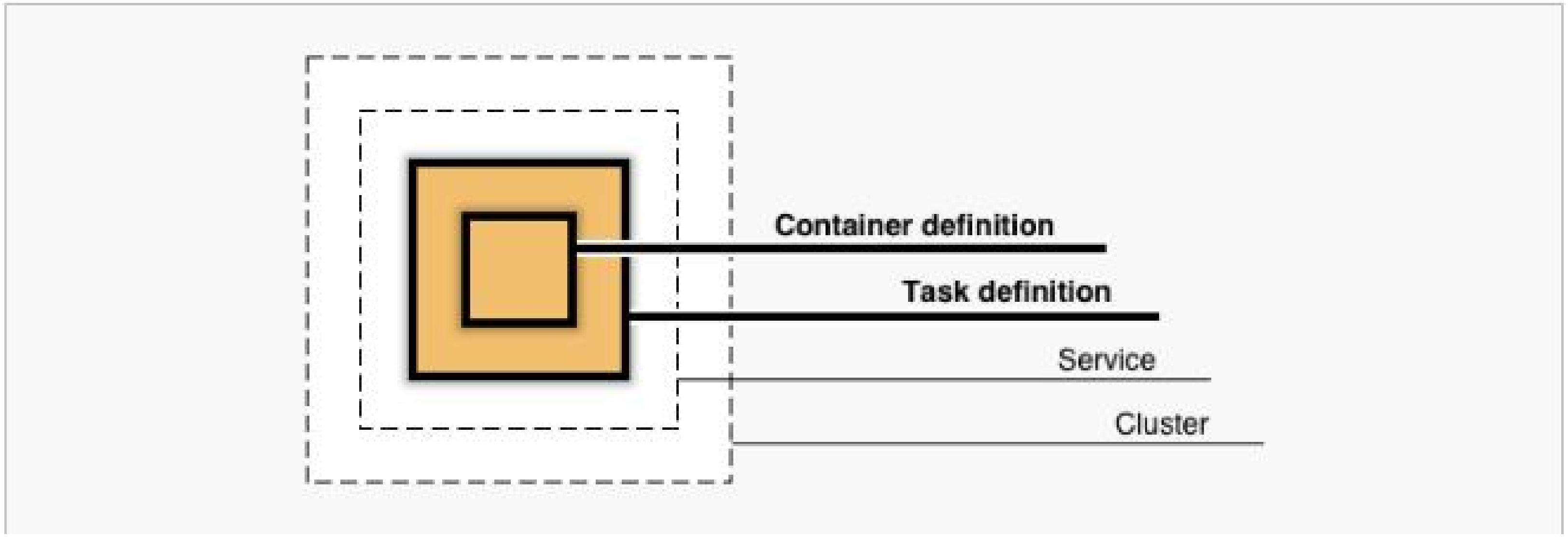
What is AWS ECS?

What Is AWS ECS?

Amazon Elastic ECS is a highly scalable, fast, container management service that makes it easy to run, stop, and manage Docker containers on a cluster, which lets you host your cluster on a serverless infrastructure.

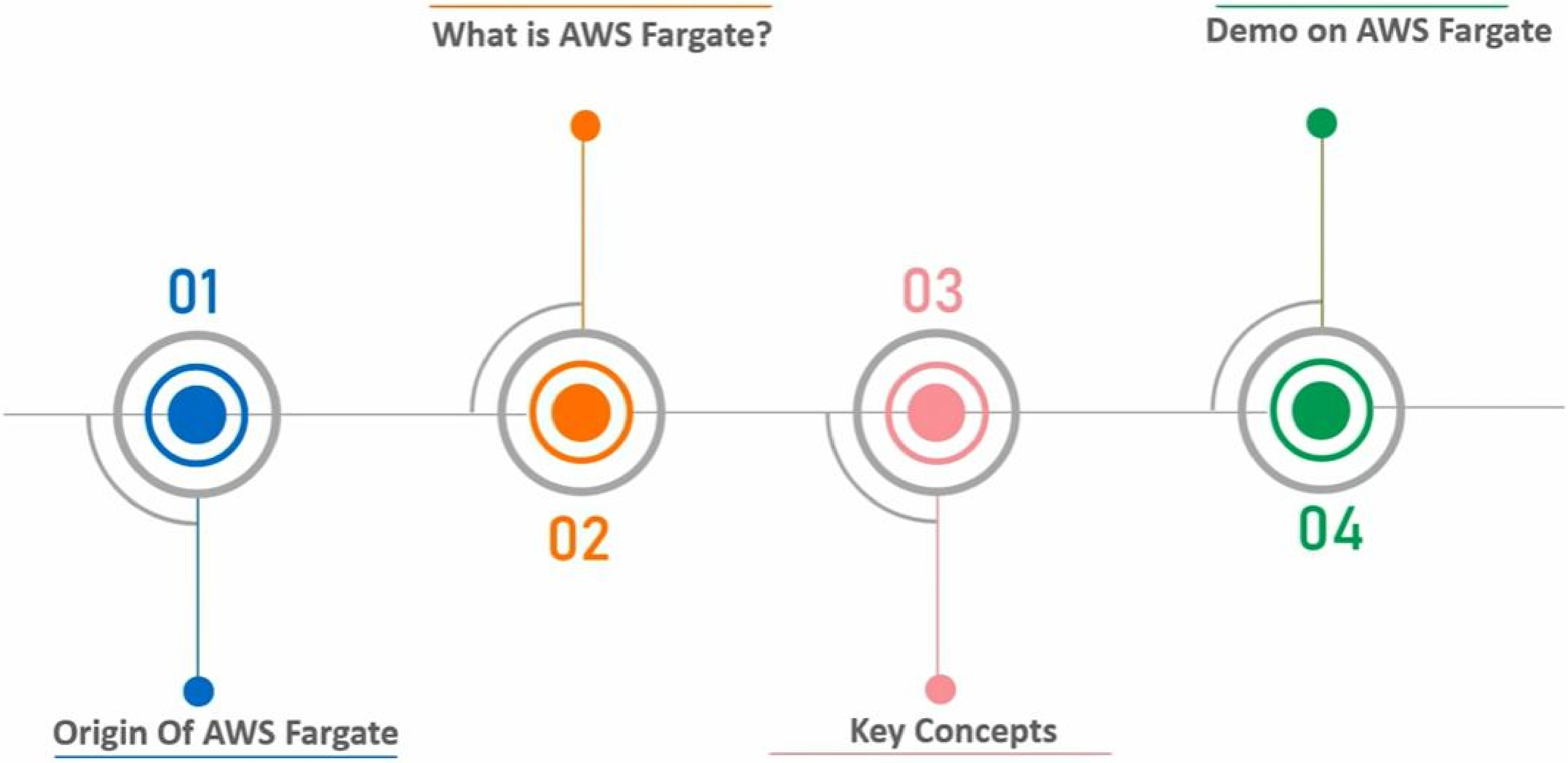
- Host the cluster application
- Cluster -> Container (Bigger Version of Container)
- Serverless Infrastructure

Diagram of ECS objects



- ECS Container Service & ECS Faregate Service
- Container Definition: Image Details
- Task Definition: Blueprint for the application
- Service: Desired number of task and clusters
- Cluster: Group your simultaneously running tasks

Agenda



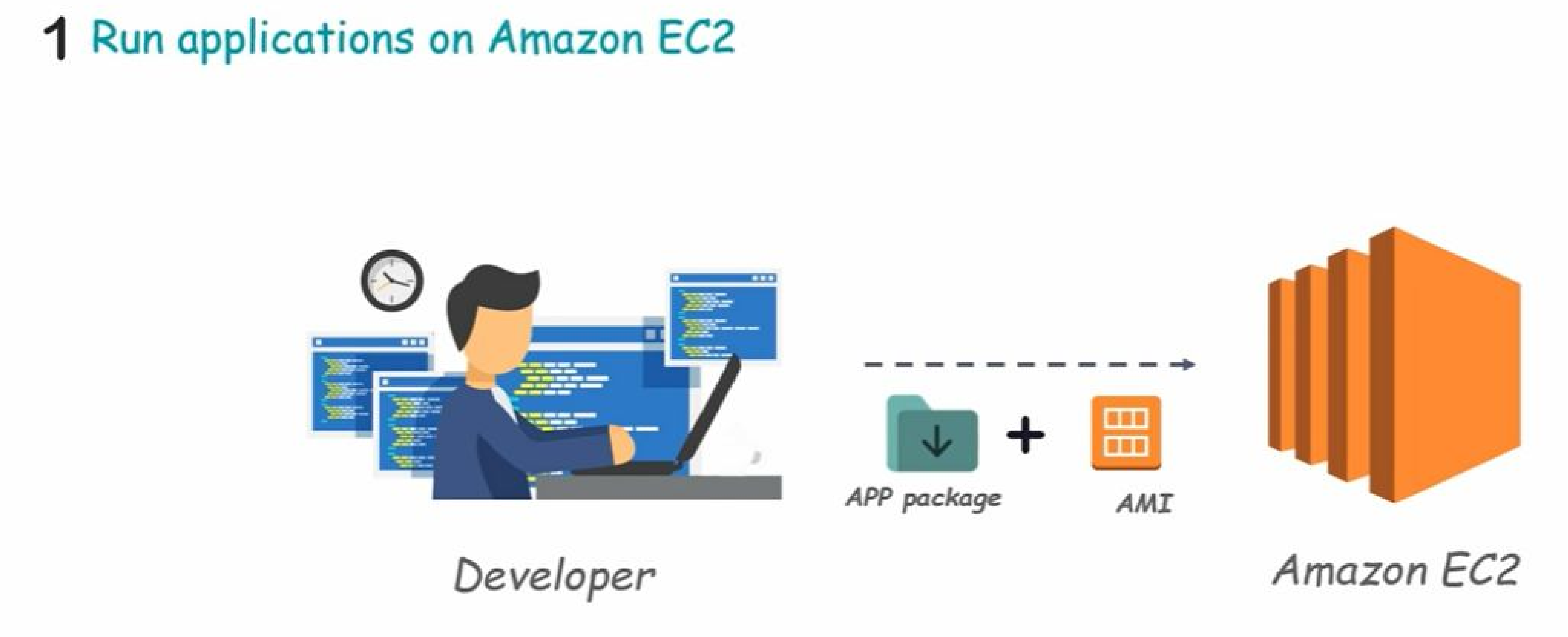
01 Origin Of AWS Fargate

02 What is AWS Fargate?

03 Key Concepts

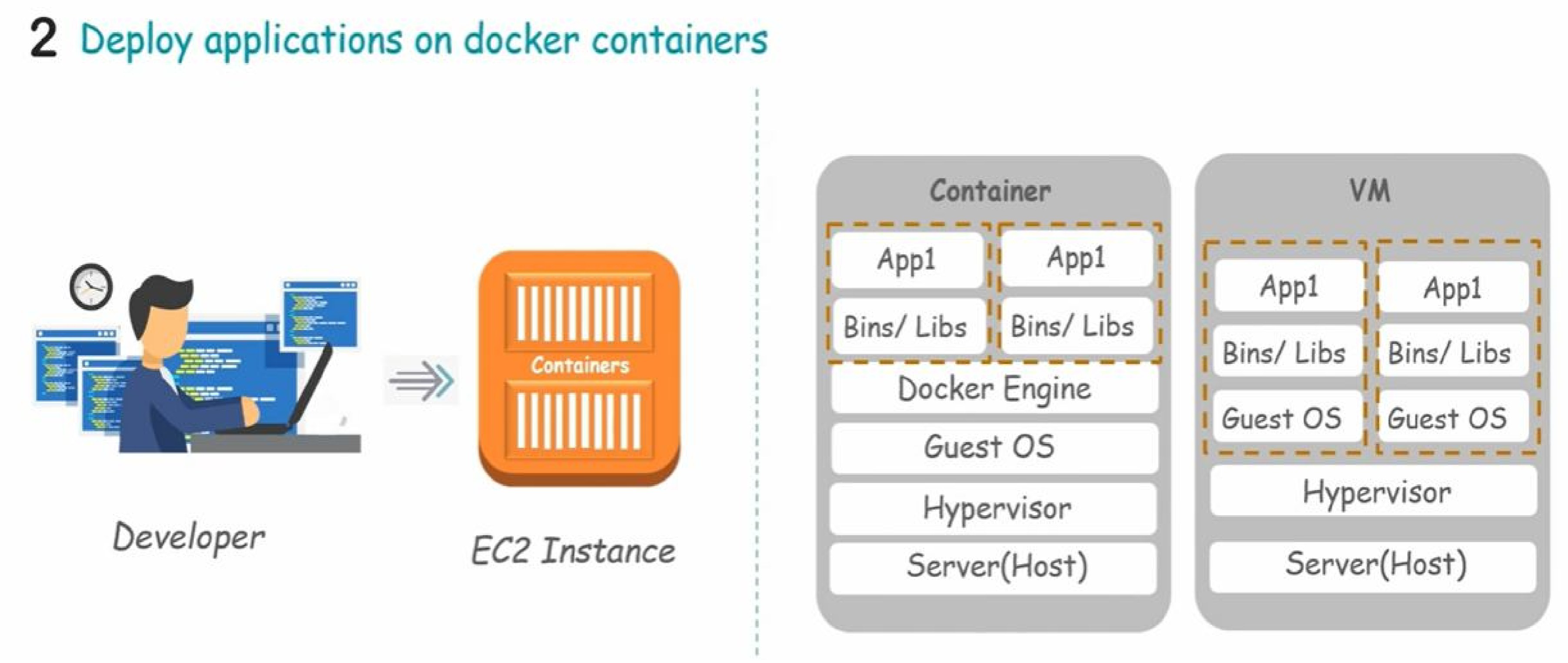
04 Demo on AWS Fargate

Motivation



1 Run applications on Amazon EC2

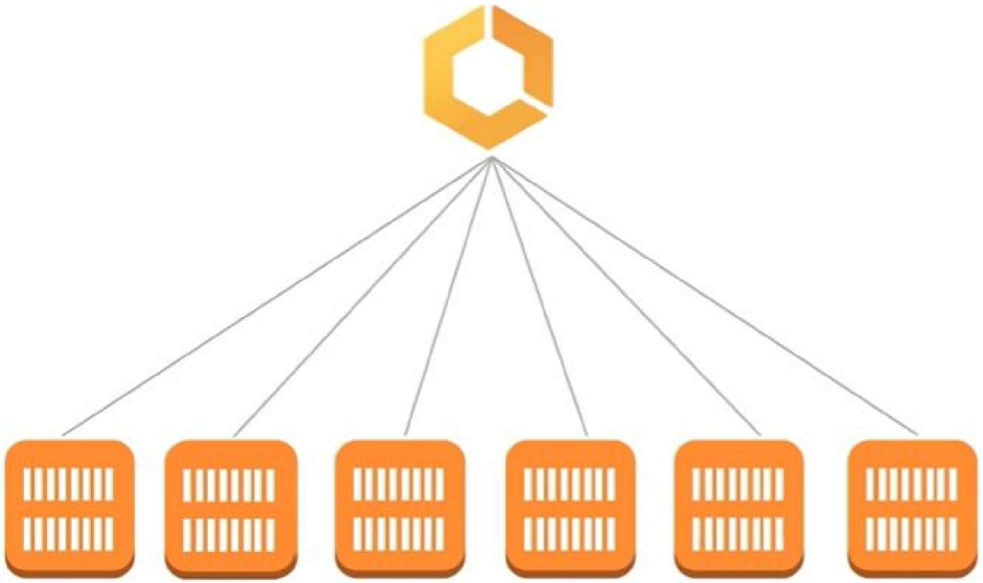
Motivation



2 Deploy applications on docker containers

Motivation

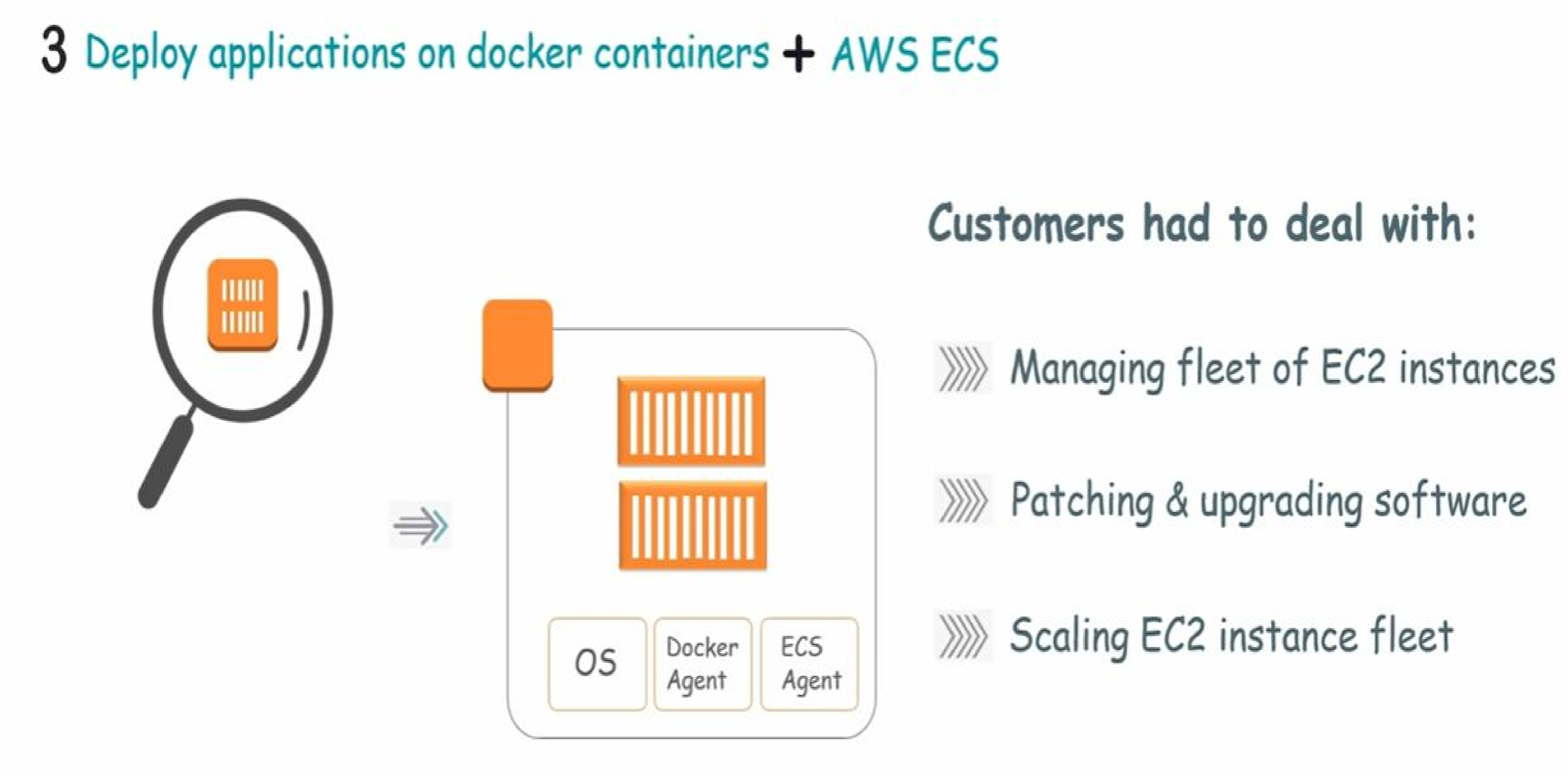
3 Deploy applications on docker containers + AWS ECS



AWS Container Service handles:

- State of EC2 instances
- Applications running
- Resources available
- Resources consumed

Motivation



3 Deploy applications on docker containers + AWS ECS

Customers had to deal with:

- Managing fleet of EC2 instances
- Patching & upgrading software
- Scaling EC2 instance fleet

Motivation

AWS Fargate

Eliminates the need for EC2 Instances

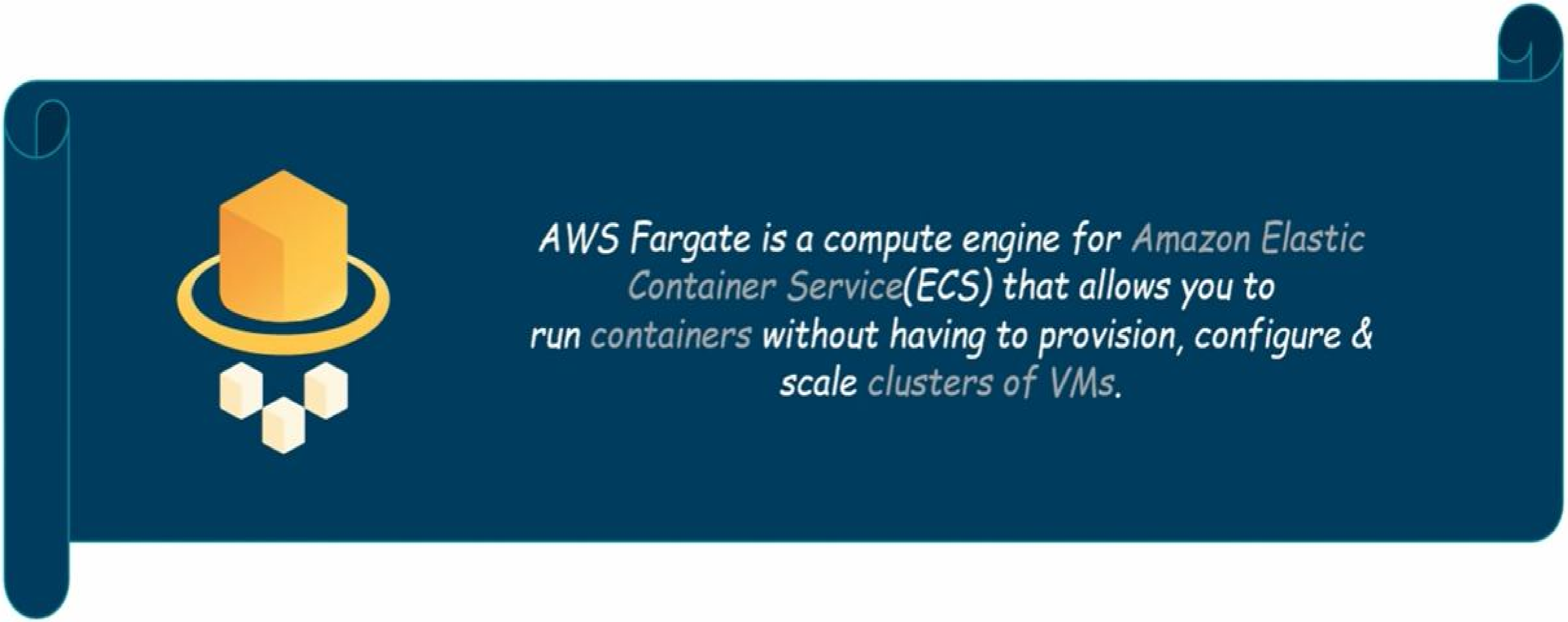
Hosts & manages containers

Offers seamless scaling

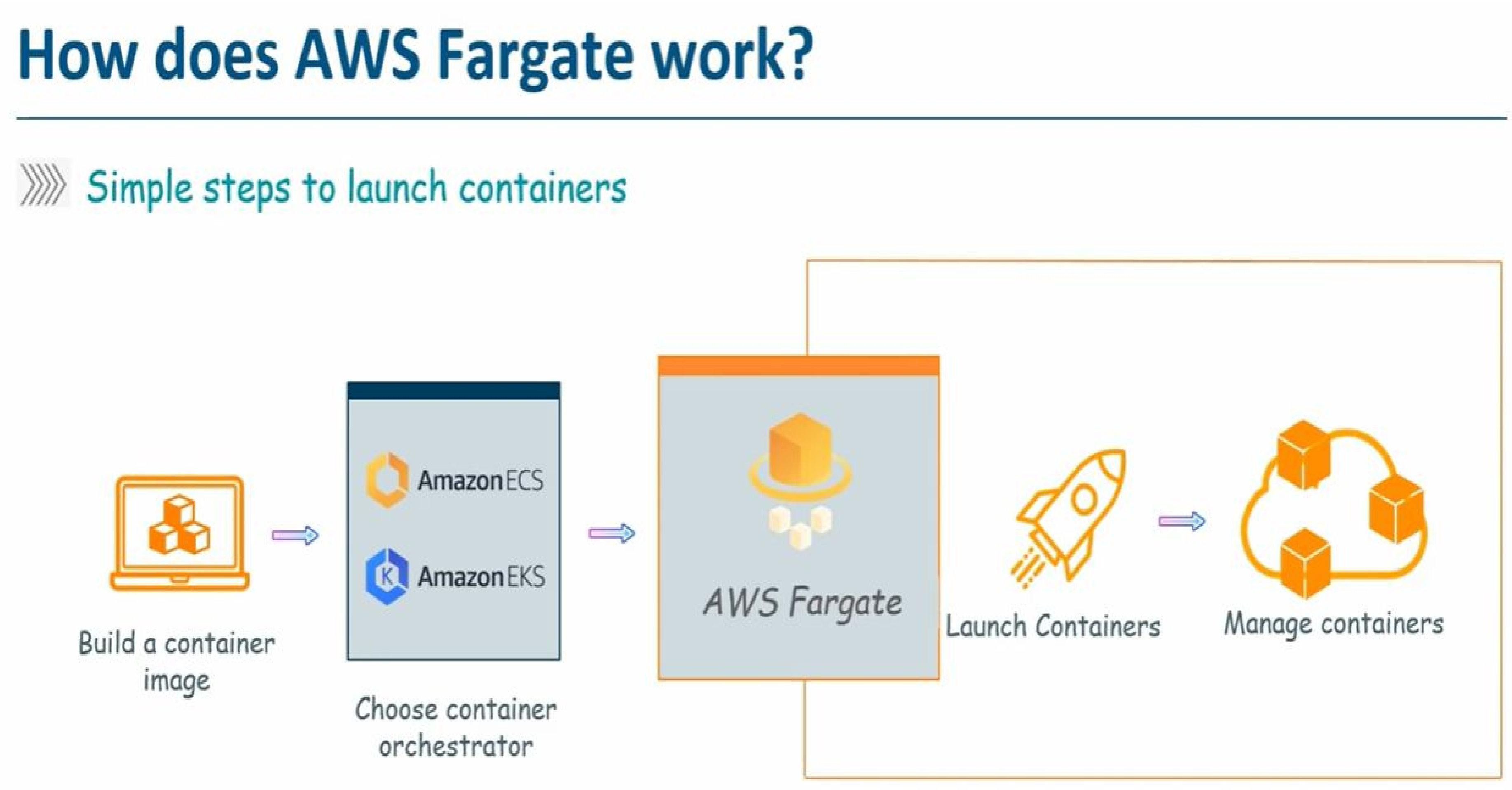
Integrated with ECS & EKS

- Elastic Container Service (**Amazon ECS**)
- Elastic Kubernetes Service. (**Amazon EKS**)
  - Kubernetes is an open-source container-orchestration system for automating application deployment, scaling, and management. It was originally designed by Google, and is now maintained by the Cloud Native Computing Foundation

AWS Fargate



AWS Fargate is a compute engine for Amazon Elastic Container Service(ECS) that allows you to run containers without having to provision, configure & scale clusters of VMs.



How does AWS Fargate work?

Simple steps to launch containers

Build a container image

Amazon ECS

Amazon EKS

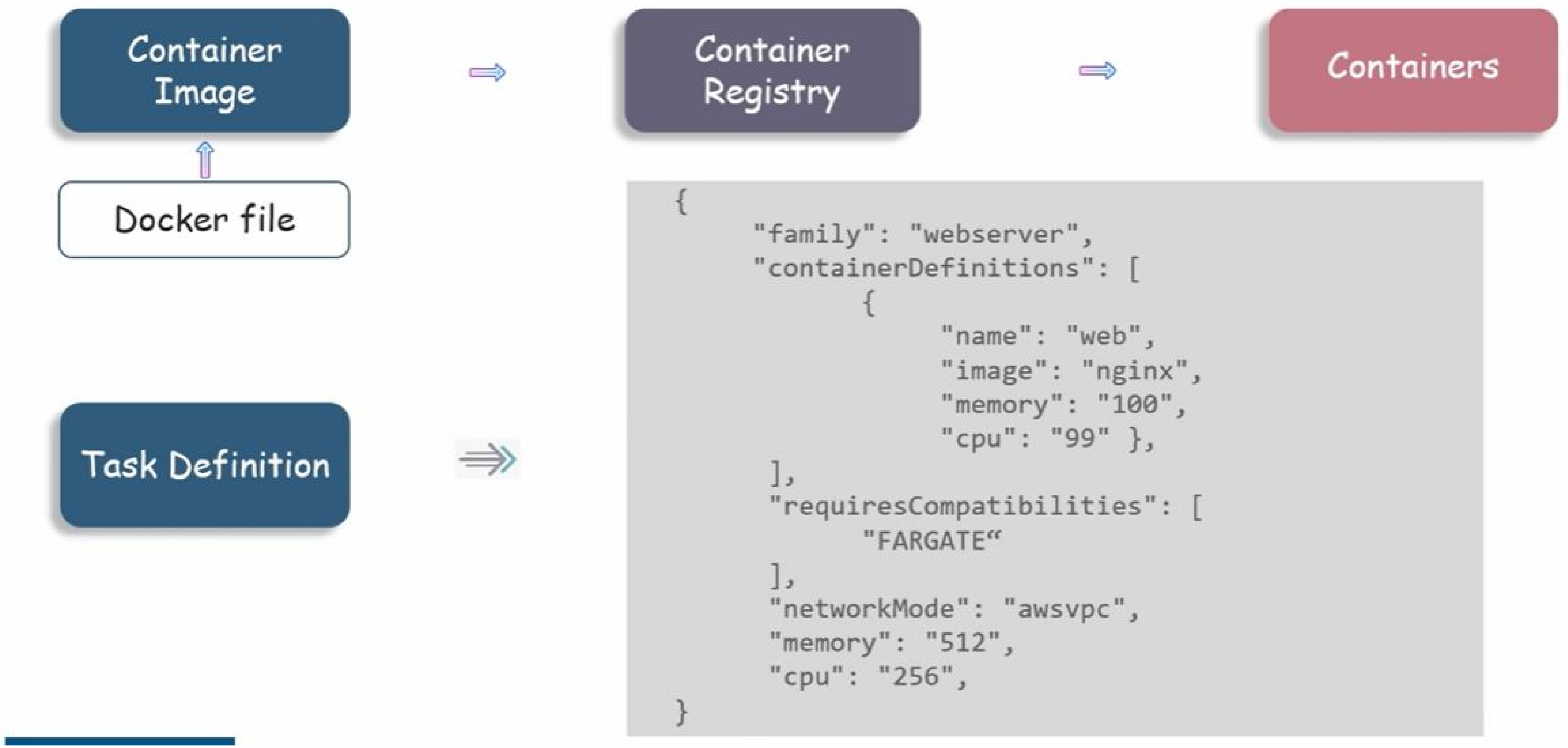
Choose container orchestrator

AWS Fargate

Launch Containers

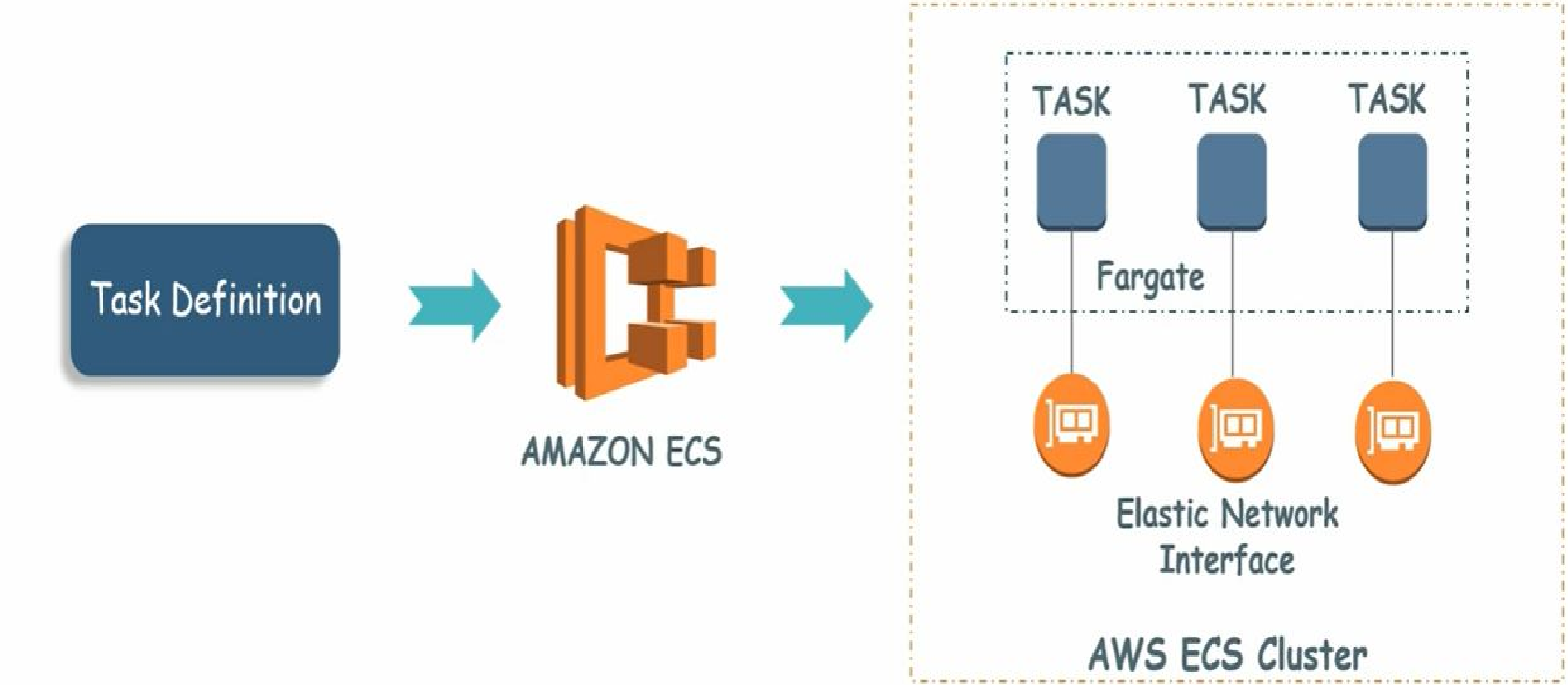
Manage containers

Key Concepts



```
{
        "family": "webserver",
        "containerDefinitions": [
                {
                        "name": "web",
                        "image": "nginx",
                        "memory": "100",
                        "cpu": "99" },
         ],
         "requiresCompatibilities": [
                 "FARGATE“
         ],
         "networkMode": "awsvpc",
         "memory": "512",
         "cpu": "256",
}
```

Key Concepts



Demo

- Search for ECS in Dashboard
- Create a **Sample-app**
  - See Task Definition
  - Number of desired task- 1
  - Security Group- Automatic create new
  - Load Balancer Type- Application Load balance
  - Cluster name: SampleMyDocker
- 10 + Services will be created.
  - View Service and Check all the tabs
  - Tasks, Events, Auto scaling, Deployments , Metrices etc.

Application Look

- Details – Click the link
  - Click on ECS Name and Load Balancer Link
  - Click on DNS to Run the Application in new browser window
- or
- Go to Details-> Load Balancer-> Target Group Link-
  - Find & Copy **Complete DNS** in Browser

- Delete the service (Cluster) in action

Nginx Server Run

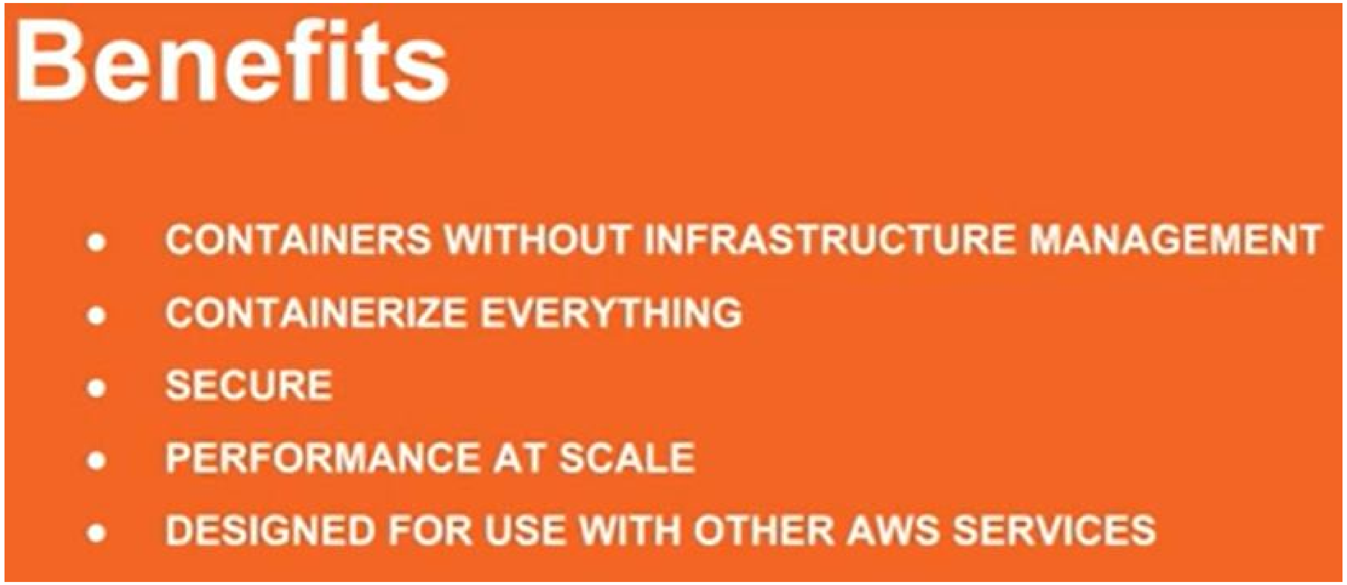
- Search for ECS in Dashboard
- Create a **nginx** definition
  - Check task definition details (Name, N/w, Compatibility, Memory etc.)
  - Edit definition, , Task 2, cluster, service.
  - Create ECS service and View it (10 Minutes creation time)
- Go to Details-> Target Group Link->Load Balancer->
  - Find & Copy Complete DNS in Browser

Home Assignment

Create and Upload own Docker Image

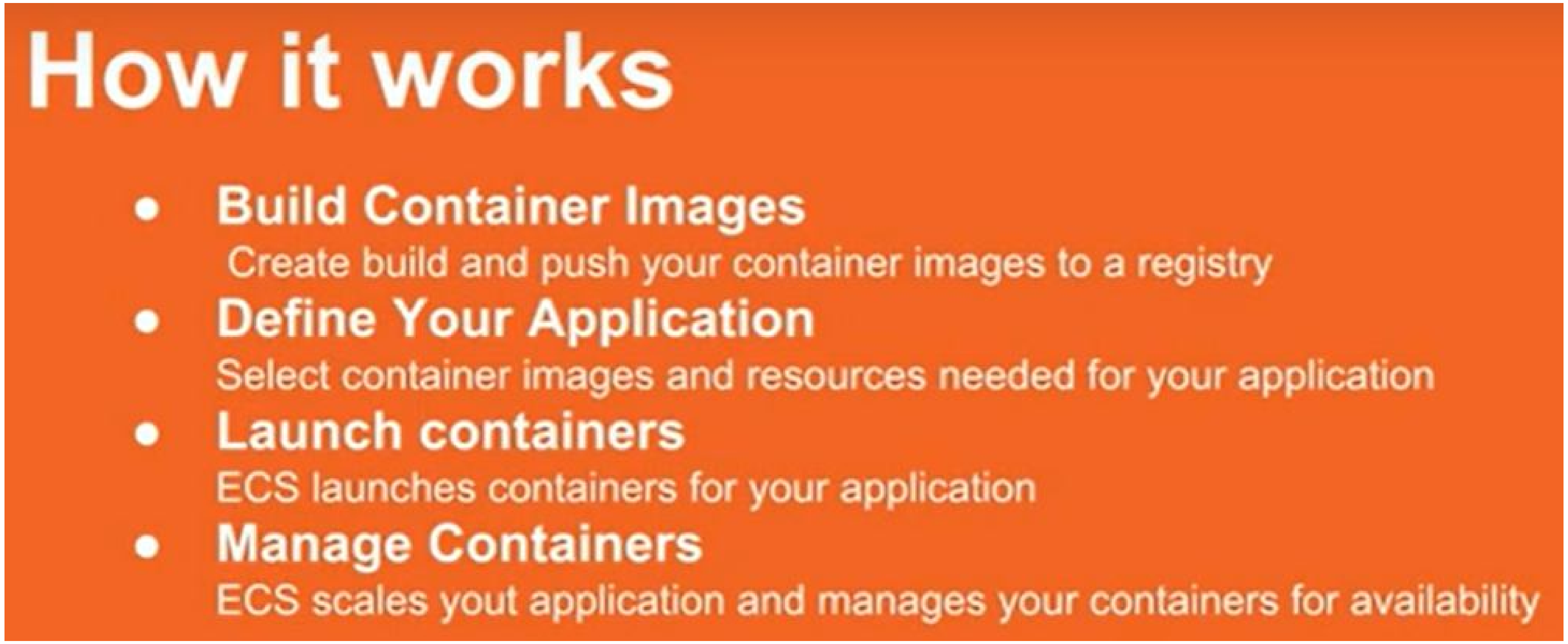
- **Create docker image**
  - https://www.howtoforge.com/tutorial/how-to-create-docker-images-with-dockerfile/
- **AWS ECS Fargate Tutorial | Running Containers Using AWS Fargate Service**
  - https://www.youtube.com/watch?v=w-nEmKwfrx8
- **Running Docker In Production Using AWS ECS**
  - https://www.youtube.com/watch?v=zp7gUCgyS34
- **Running Docker In Production Using AWS ECS**
  - https://www.youtube.com/watch?v=-vgsxR_8DcE

Running Docker In Production Using AWS ECS



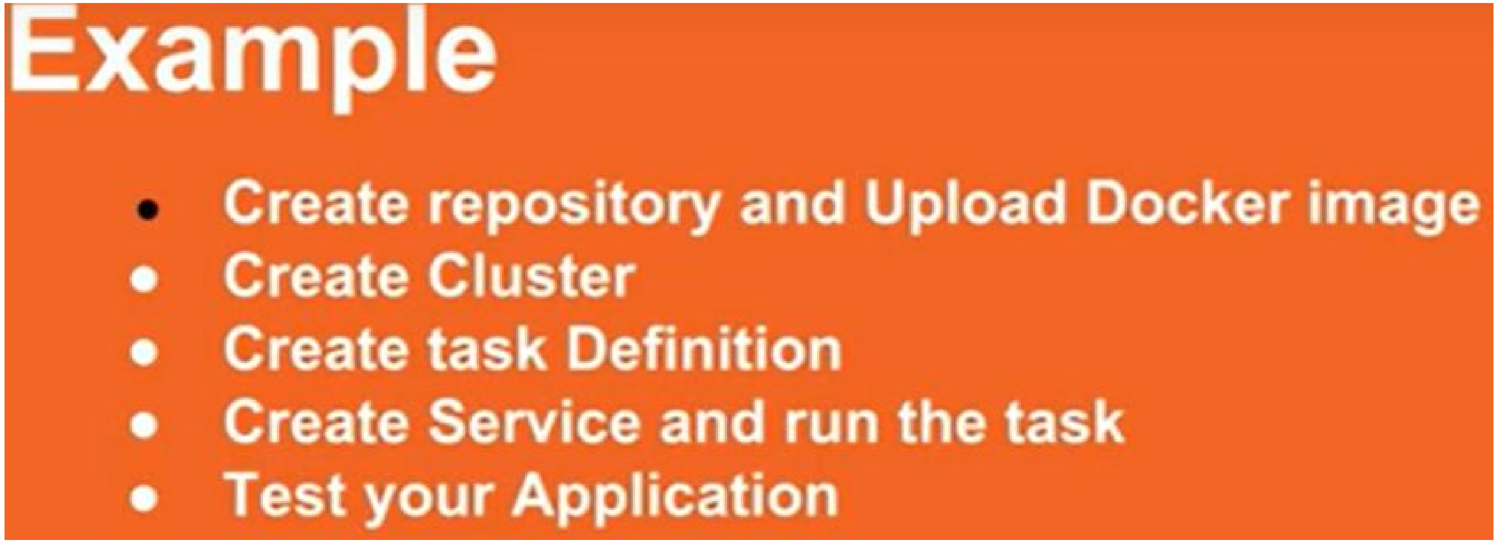
Benefits

- CONTAINERS WITHOUT INFRASTRUCTURE MANAGEMENT
- CONTAINERIZE EVERYTHING
- SECURE
- PERFORMANCE AT SCALE
- DESIGNED FOR USE WITH OTHER AWS SERVICES



How it works

- **Build Container Images**
  Create build and push your container images to a registry
- **Define Your Application**
  Select container images and resources needed for your application
- **Launch containers**
  ECS launches containers for your application
- **Manage Containers**
  ECS scales yout application and manages your containers for availability



Example

- **Create repository and Upload Docker image**
- **Create Cluster**
- **Create task Definition**
- **Create Service and run the task**
- **Test your Application**