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Roll No. - 32

Amazon ECS



Cloud - AWS

Explore how Amazon Elastic Container Service simplifies running and managing your applications in the cloud



What is Amazon ECS?

Elastic Container Service

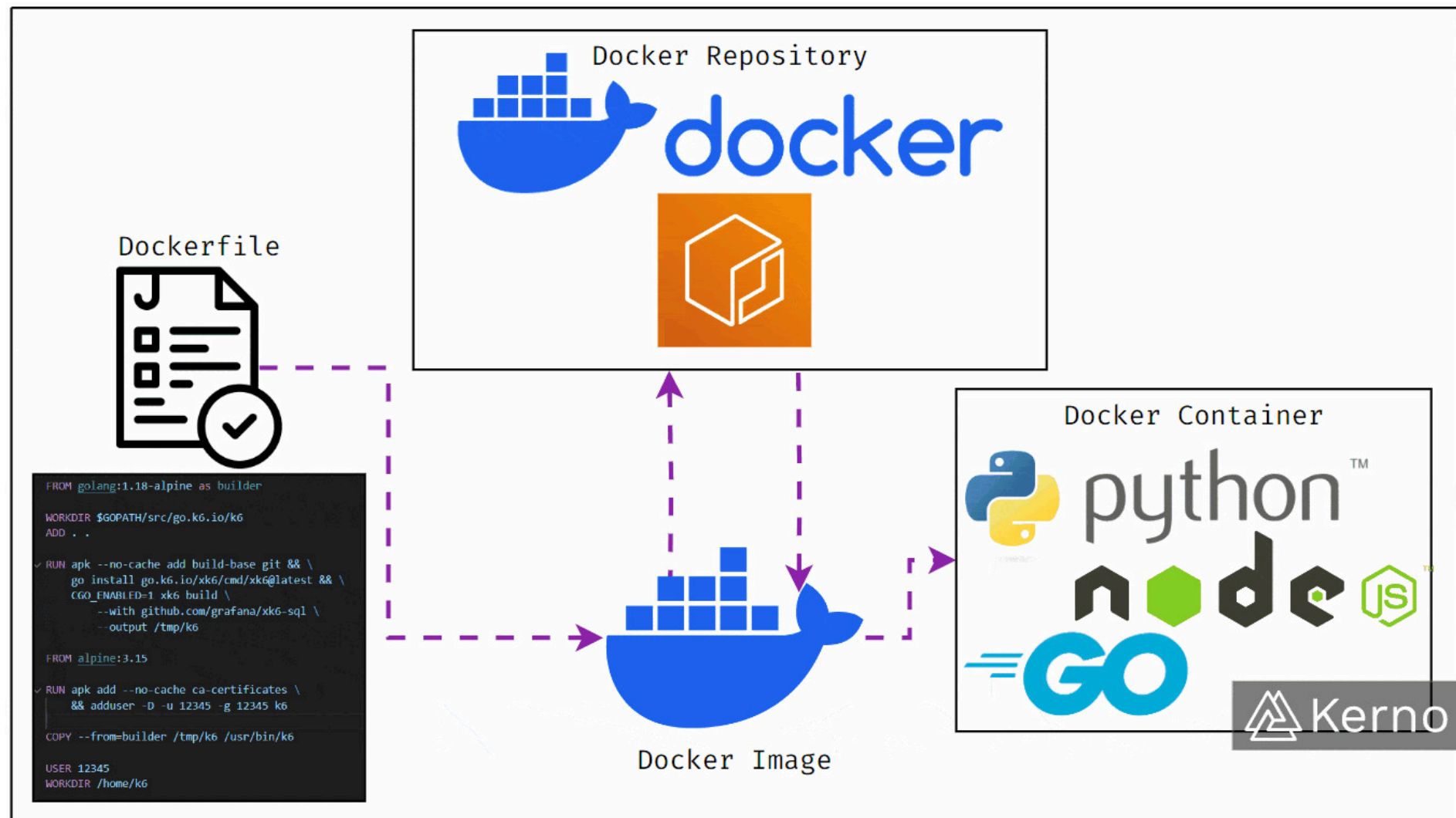
A service by Amazon Web Services (AWS).

Container Management

fully managed service to deploy, run, and scale **Docker containers** (applications in containers).

Serverless Option

AWS can manage the underlying servers for you.



What is a Container?

A container is a small, lightweight package that includes the application, required files, and settings.

It helps run and manage apps inside containers (like Docker).

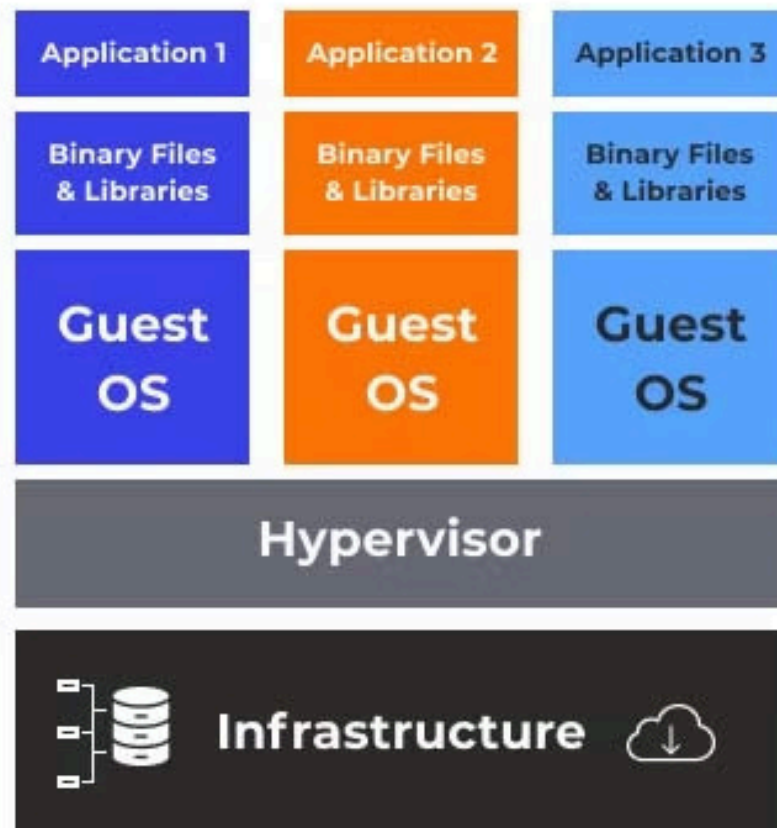
It runs consistently on any computer or cloud environment.



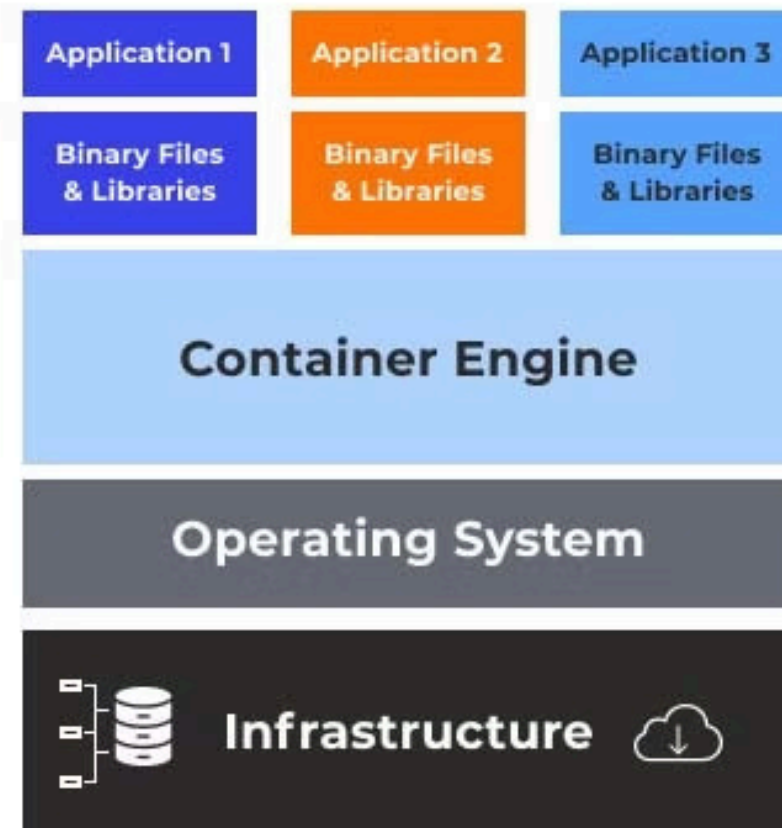
Think of it like a Tiffin Box – all ingredients in one place, ready to eat (run).

Docker Container v/s Virtualization Basics

- Docker is a lightweight alternative to virtual machines.
- It uses fewer system resources by sharing the host OS.
- Docker containers can run on Linux, Windows, or Mac without code changes.



**Virtual
Machines**



Container

Docker Images & ECR

Docker Image –

- A Docker Image is like a *blueprint or snapshot* of your app code + settings & configurations + libraries.
- It's **read-only** — used to **create containers**.
- You create images using a **Docker File** (list of instructions) written by Developers.
 - Run `docker build` → creates the **image**.
 - Run `docker run` → launches a **container from that image**.

ECR (Elastic Container Registry)

- A **private Docker image storage** on AWS.
- You store your **Docker Images** here before launching them with ECS.
- Like a **Google Drive for app containers** — safe, organized, and accessible by ECS.

✅ **Use:** ECS pulls your container app image from ECR to run it.

Two Launch Types –

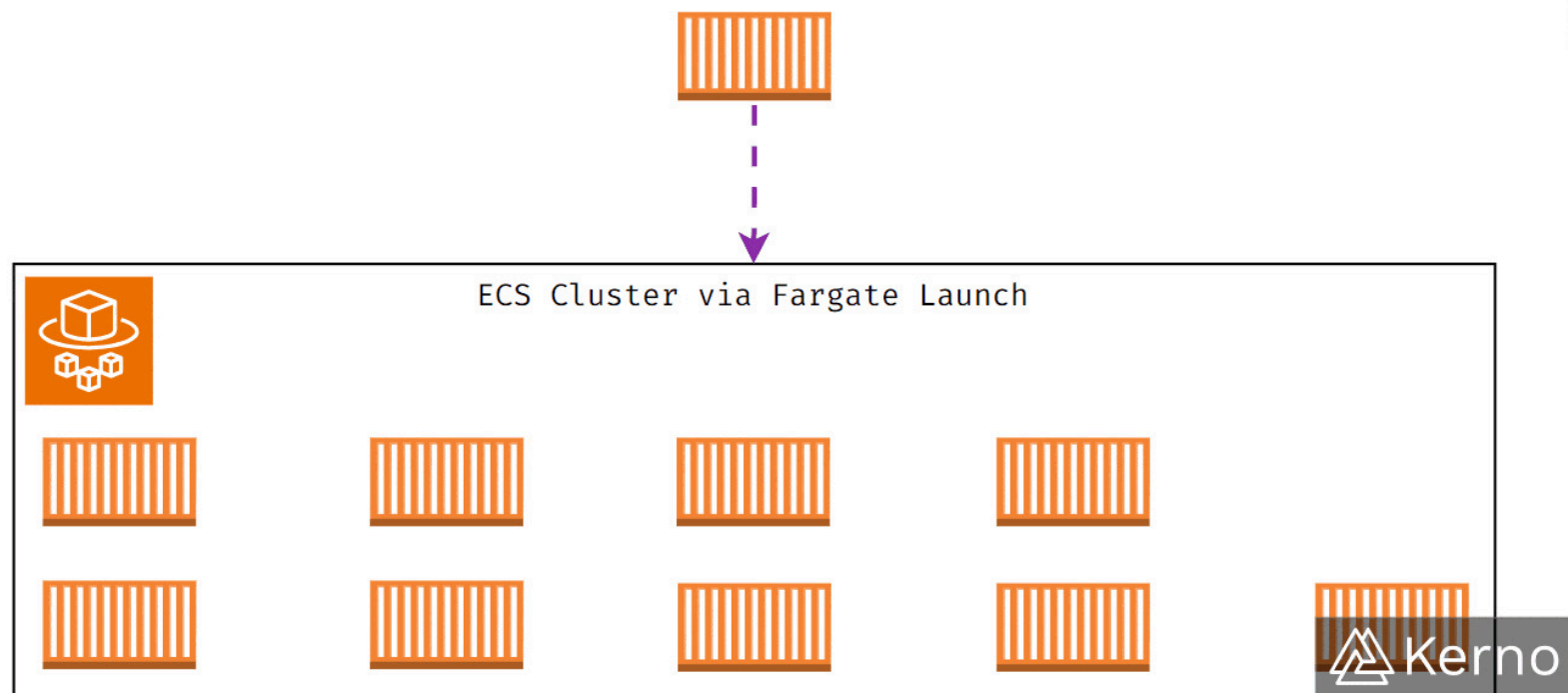
1. Fargate (no server management)
2. EC2 (you manage the servers)

- You want to **avoid managing servers**
- AWS manages all servers
- Limited OS Access (no custom software)
- Pay for CPU & RAM you have used
- Great for Simple microservices
- Very Fast - just Define & Run
- **Analogy:** Teacher assigning work, Self-updating online classroom — no need to maintain the room, just teach.

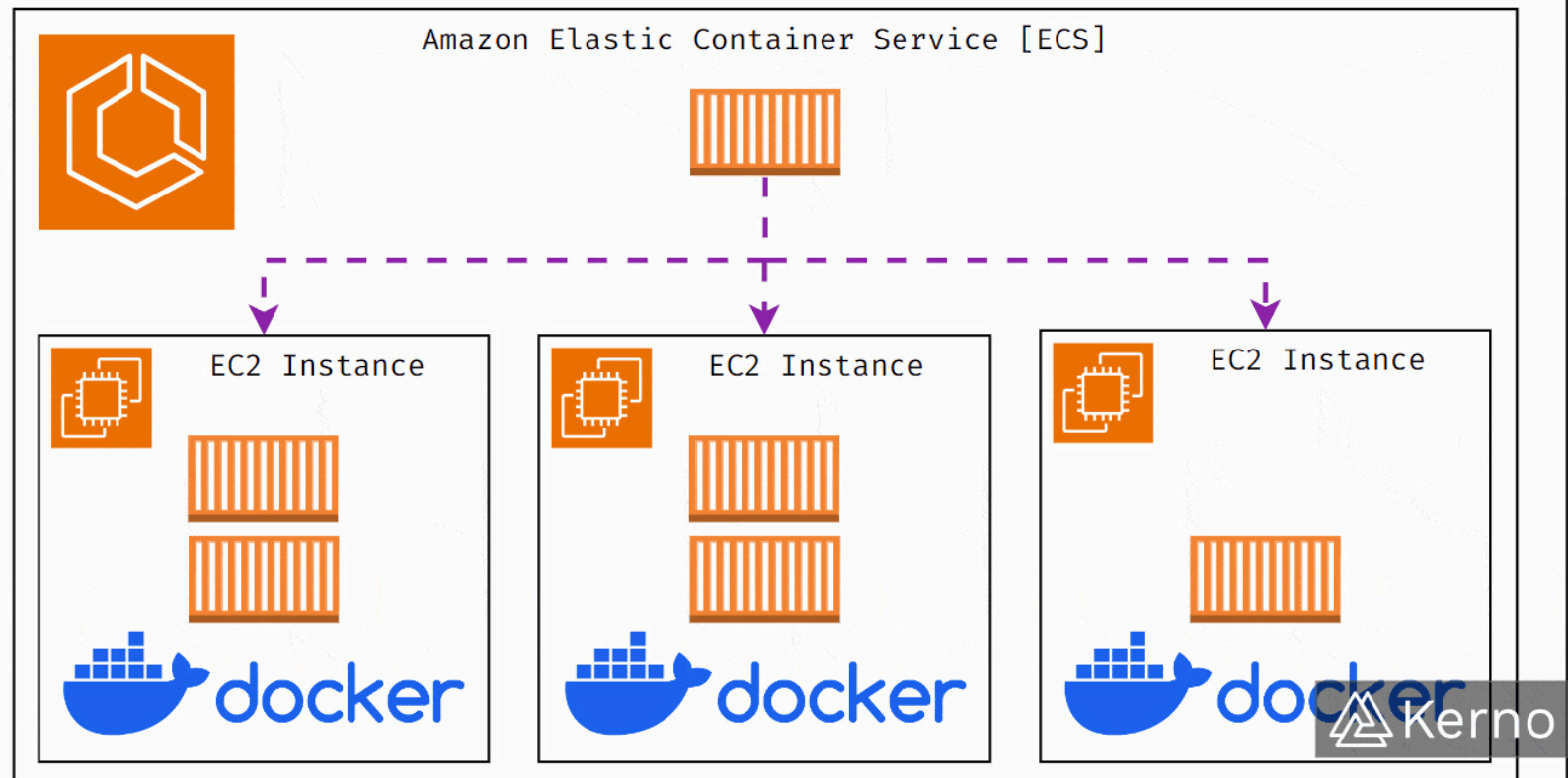


- You need **more control** over the servers
- You manage EC2 instances yourself
- Full control – install anything on EC2
- Pay for **running EC2 instances (24/7)**
- Better for **complex workloads**
- Slower – need to set up and manage instances.
- **Analogy:** ECS = Teacher assigning work, EC2 = Classroom where it's done.

ECS Fundamentals | Fargate Launch



ECS Fundamentals



How ECS Works



ECS Cluster

Runs containers on a group of machines.



Fargate

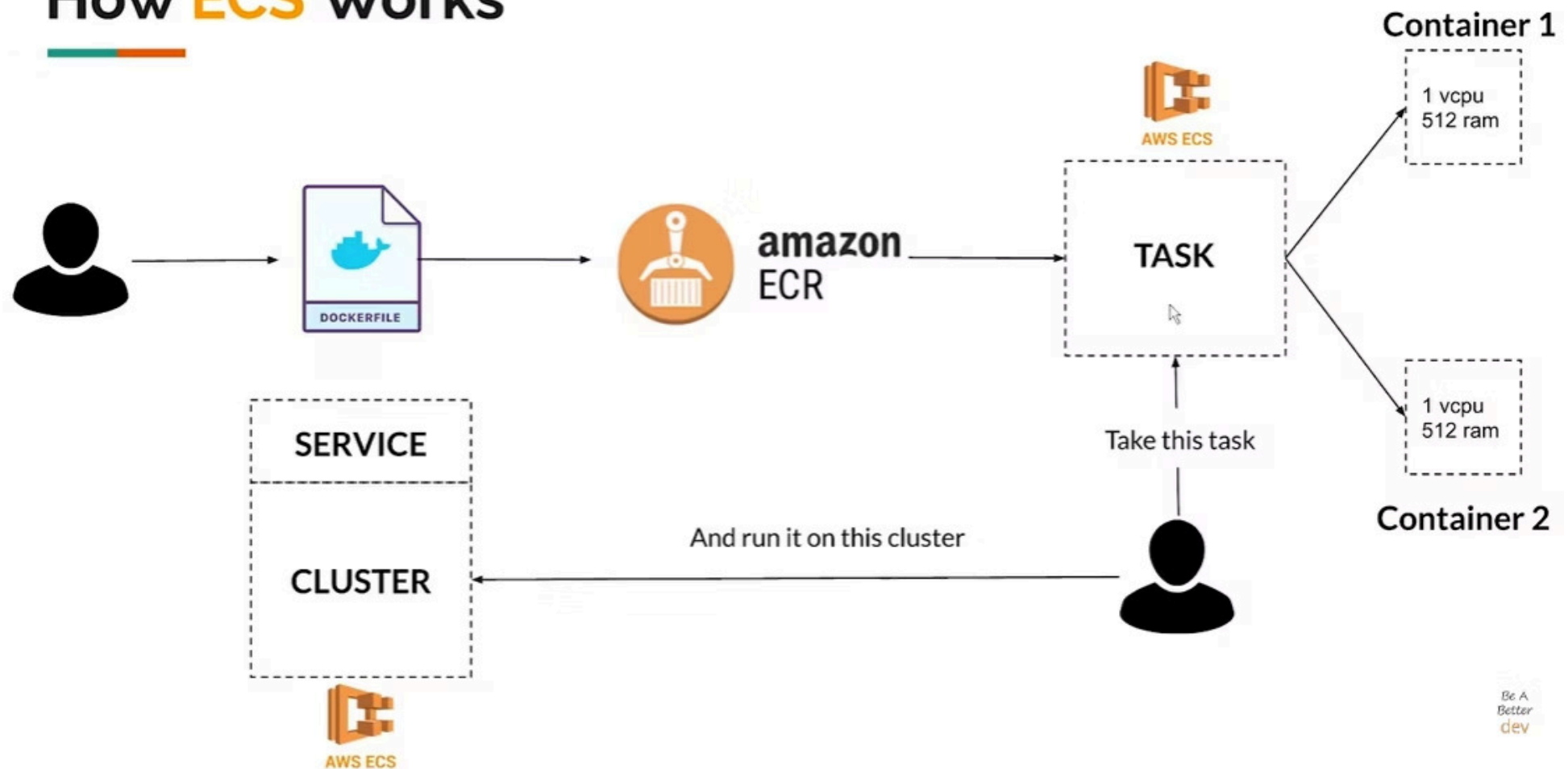
AWS manages everything for you.



EC2

You manage the machines.

How ECS Works



Be A
Better
dev

Why Use ECS?



Auto-scaling

Handles more users automatically.



Cost-saving

Pay only for what you use.



Secure

Uses IAM roles, encryption, private networks.



Integrated

Works with other AWS tools.

Key ECS Terms

Container	Small app package
Cluster	Group of EC2 machines / instances or Fargate infra
Fargate	Serverless option (AWS manages it)
EC2	Virtual machine (you manage)
Task	A running container
Task Definition	Blueprint for running containers
Service	Ensures your app / tasks keeps running
Image	A packaged version of your app with config

ECS Hands-on Lab

Step 1: Go to AWS Console → Search "ECS" → Click "Create Cluster"

The screenshot shows the AWS Console interface with the search bar at the top containing the text "ecs". A purple circle with the number "1" highlights the search bar. Below the search bar, the search results for "ecs" are displayed. The "Services" section lists several services, with "Elastic Container Service" highlighted by a purple box and a purple circle with the number "2". The "Features" section is also visible below the services. The right sidebar shows the billing period as "January 2024" and a total cost of "USD 0.04". The bottom of the console shows the footer with "© 2024, Amazon Web Services, Inc. or its affiliates." and links for "Privacy", "Terms", and "Cookie preferences".

Search results for 'ecs'

Services [See all 26 results ▶](#)

- Elastic Container Service** ☆
Highly secure, reliable, and scalable way to run containers
- Batch** ☆
Fully managed batch processing at any scale
- AWS FIS** ☆
Improve resiliency and performance with controlled experiments.
- EC2** ☆
Virtual Servers in the Cloud

Features [See all 65 results ▶](#)

- Get started**
 - Elastic Container Service feature
- Clusters**
 - Elastic Container Service feature

Billing period: January 2024 [Settings](#)

Total in USD
USD 0.04

and total: **USD 0.04**

Web Services Canada, Inc. [Settings](#)

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Namespaces

Task definitions

Account settings

Install AWS Copilot

Amazon ECR

Repositories

AWS Batch

Documentation

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Amazon Elastic Container Service > Clusters

Clusters (0) Info

Search clusters

Cluster Services Tasks Container instances CloudWatch Logging Capacity

No clusters

No clusters to display

Refresh

Create cluster

3

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Kerno

Step 2: Choose EC2 or Fargate

Cluster configuration

Cluster name
Kerno_Cluster_001

There can be a maximum of 255 characters. The valid characters are letters (uppercase and lowercase), numbers, hyphens, and underscores.

Default namespace - *optional*
Select the namespace to specify a group of services that make up your application. You can overwrite this at the service level.
Kerno_Cluster_001

Infrastructure Info Customised

Your cluster is automatically configured with AWS Fargate (serverless) with two capacity providers. Add Amazon EC2 instances, or external instances using ECS Anywhere.

☒ **AWS Fargate (serverless)**
Pay as you go. Use if you have tiny, batch or burst workloads or for zero maintenance overhead. The cluster has Fargate and Fargate Spot capacity providers by default.

☒ **Amazon EC2 instances**
Manual configurations. Use for large workloads with consistent resource demands.

Auto Scaling group (ASG)
Use Auto Scaling groups to scale your EC2 instances in the cluster.
Create new ASG

Provisioning model
Select a provisioning model for your instances
On-demand Spot

Kerno

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Step 3: Set up VPC, Instance Type (e.g., t2.micro), Security Group and desired capacity, OS (Amazon Linux 2), and SSH Key

The screenshot displays the AWS Management Console interface for creating an Auto Scaling group (ASG). The left sidebar shows the navigation menu with options like 'Amazon Elastic Container Service', 'Clusters', 'Namespaces', 'Task definitions', 'Account settings', 'Install AWS Copilot', 'Amazon ECR', 'Repositories', 'AWS Batch', 'Documentation', 'Discover products', and 'Subscriptions'. The main content area is titled 'Auto Scaling group (ASG)' and includes an 'Info' link. Below the title, there's a description: 'Use Auto Scaling groups to scale the Amazon EC2 instances in the cluster.' The configuration steps are as follows:

- 4**: A dropdown menu labeled 'Create new ASG'.
- 5**: The 'Provisioning model' section, where 'On-demand' is selected. The description for 'On-demand' states: 'With on-demand instances, you pay for compute capacity by the hour, with no long-term commitments or upfront payments.' The 'Spot' option is also visible, with a description: 'Spot instances let you use spare EC2 capacity at a discount. Spot instances are available at up to a 90% discount compared to on-demand prices.'
- 6**: The 'Operating system/Architecture' section, where 'Amazon Linux 2' is selected. The description says: 'Choose the Windows operating system or Linux architecture for your instance.'
- 7**: The 'EC2 instance type' section, where 't2.micro' is selected. The description says: 'Choose based on the workloads you plan to run on this cluster.' The instance type details are: 'i386, x86_64, 1 vCPU, 1 GiB memory'. A 'Free tier eligible' badge is also present.
- 8**: The 'Desired capacity' section, where the number of instances to launch is specified. The 'Minimum' is set to 0 and the 'Maximum' is set to 3. The description says: 'Specify the number of instances to launch in your cluster.'
- 9**: The 'SSH Key pair' section, where 'None - unable to SSH' is selected. The description says: 'If you do not specify a key pair, you can't connect to the instances via SSH unless you choose an AMI that is configured to allow users another way to log in.' A 'Create a new key pair' button is also visible.

The bottom of the console shows the 'CloudShell' and 'Feedback' links, along with the Amazon Web Services, Inc. or its affiliates. logo and links to 'Privacy', 'Terms', and 'Cookie preferences'.

Services

Search

[Alt+S]

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Amazon Elastic Container Service

Clusters

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Account settings

Install AWS Copilot

Amazon ECR

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VPC

Use a VPC with public and private subnets. By default, VPCs are created for your AWS account. To create a new VPC, go to the [VPC Console](#).

vpc-0fa89a75

default

Subnets

Select the subnets where your tasks run. We recommend that you use three subnets for production.

Choose subnets

Clear current selection

subnet-fe6c8a98

us-east-1c

172.31.0.0/20

×

subnet-8a487db4

us-east-1e

172.31.48.0/20

×

subnet-b09b7791

us-east-1d

172.31.80.0/20

×

subnet-0e7ca400

us-east-1f

172.31.64.0/20

×

subnet-89bd5fd6

us-east-1b

172.31.32.0/20

×

subnet-90c677dd

us-east-1a

172.31.16.0/20

×

Security group

Info

Choose an existing security group or create a new security group.

Use an existing security group

Create a new security group

Security group name

Choose an existing security group.

Choose security groups

sg-b612349c

default

×

Auto-assign public IP

Info

Choose whether to auto-assign a public IP to the Amazon EC2 instances

Use subnet setting

CloudShell

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Made with GAMMA

Step 5: Monitor via CloudWatch & Review the ECS Cluster Deployment

The screenshot displays the AWS Management Console for the Amazon Elastic Container Service (ECS). A green notification bar at the top indicates that the cluster 'Kerno_Cluster_002' has been created successfully. The console shows the cluster overview, including the ARN, status (Active), CloudWatch monitoring (Default), and registered container instances. The 'Services' tab is selected, showing a list of services with filters for launch type and service type.

Cluster overview

ARN	Status	CloudWatch monitoring	Registered container instances
arn:aws:ecs:us-east-1:099039884699:cluster/Kerno_Cluster_002	Active	Default	-

Services

Draining	Active	Pending	Running
-	-	-	-

Services (0) Info

Filter launch type: Any launch type

Filter service type: Any service type

Buttons: Manage tags, Update, Delete service, Create

aws

Services

Search

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Kerno_Cluster_002

ASG

Update cluster

Delete cluster

Cluster overview

ARN

arn:aws:ecs:us-east-1:099039884699:cluster/Kerno_Cluster_002

Status

Active

CloudWatch monitoring

Default

Registered container instances

-

Services

Draining

Active

Tasks

Pending

Running

-

-

Services

Tasks

Infrastructure

Metrics

Scheduled tasks

Tags

Alarm recommendations

3h

1d

1w

UTC timezone

Add to dashboard

CPU utilisation

No unit

1

No data available.
Try adjusting the dashboard time range.

0.5

Memory utilisation

No unit

1

No data available.
Try adjusting the dashboard time range.

0.5

CloudShell

Feedback

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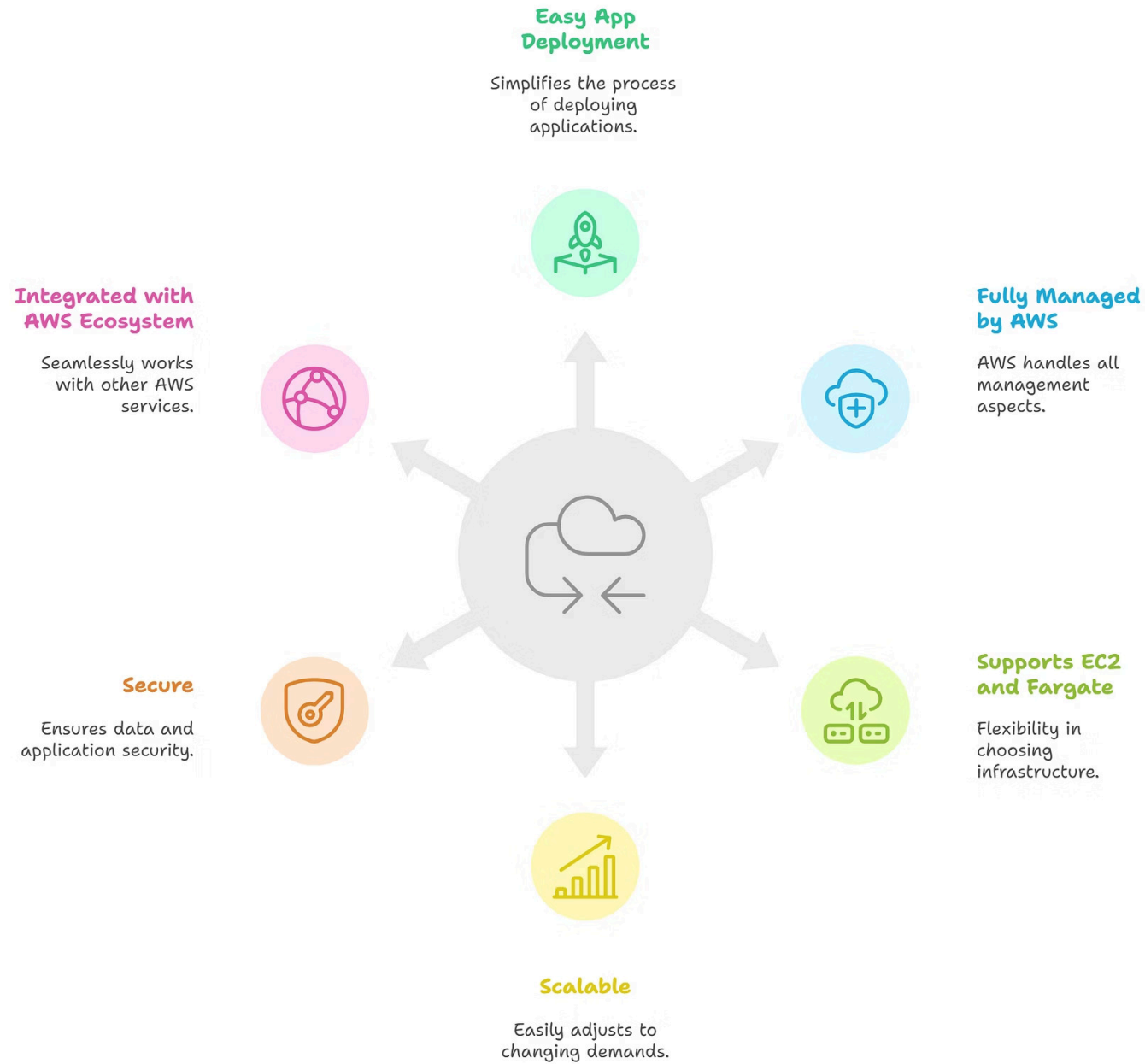
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Amazon ECS Benefits



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◆ 1. Is ECS Free?

✓ Yes, ECS service itself is free.

✗ But you pay for the resources (Fargate or EC2) used underneath ECS.

Pricing in Amazon ECS

◆ 2. Fargate Pricing (Serverless – You Pay per App Runtime)

- You pay per second for:
 - vCPU (CPU)
 - Memory (RAM)
 - Storage (optional)

📌 Example Cost (approx in ₹/month):

Config (vCPU + RAM)	₹/Hour	Monthly Cost (730 hrs)
0.25 vCPU + 0.5 GB RAM	₹0.40	₹292
1 vCPU + 2 GB RAM	₹3.35	₹2,446
2 vCPU + 4 GB RAM	₹6.70	₹4,892

Note: You only pay when containers are running.

♦ 3. EC2 Pricing (You Manage VMs)

You pay for:

- EC2 instances (by the hour)
- EBS(Elastic Block Store) volumes (like virtual hard drive for storage)

🧠 Think of it Like:

- EBS = Hard Disk
- EC2 = Computer

📌 Example EC2 Cost (t2.micro)

Instance Type	₹/Hour	Monthly Cost	Free Tier?
t2.micro	₹0.00	✅ Free Tier - If you're a new user , you can use services like EC2 for free , but only up to a certain limit each month — and only for 12 months .	Yes (750 hrs/mo)
t3.medium	₹0.81	₹591 approx	❌ No

🏠 Summary:

Launch Type	Free?	Pricing Model	Best For
Fargate	❌	Per second (vCPU + RAM)	Easy setup, small to medium apps
EC2	✅❌	Hourly per instance	Full control, large workloads

Summary

- ECS helps manage, deploy, and scale Docker apps on AWS.
- Use **Fargate** for serverless, or **EC2** for more control.
- Docker Images + ECS = Fast, scalable, efficient deployment.
- Perfect for microservices, APIs, gaming, finance, etc.