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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

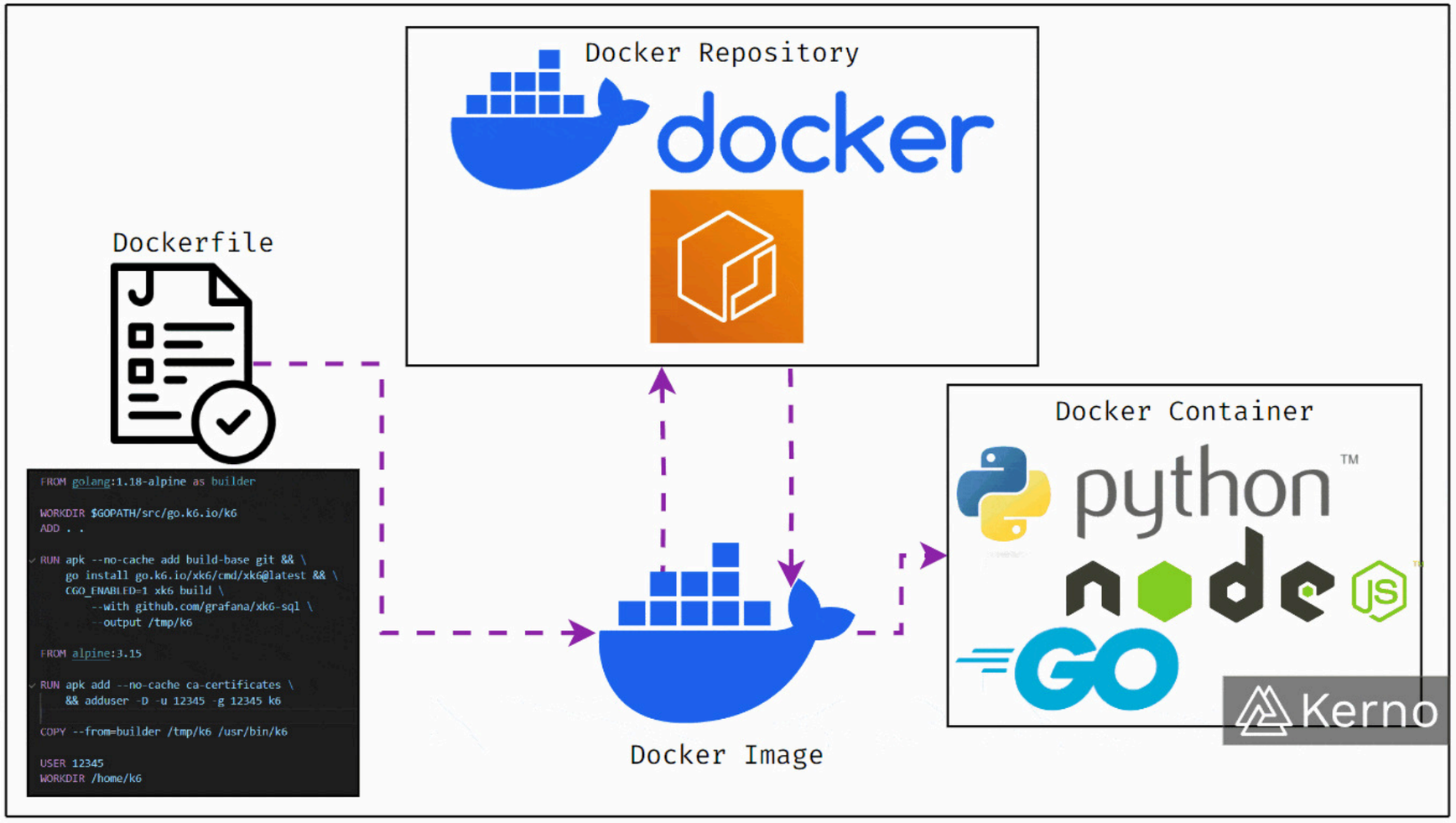
A service by Amazon Web Services (AWS).

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.

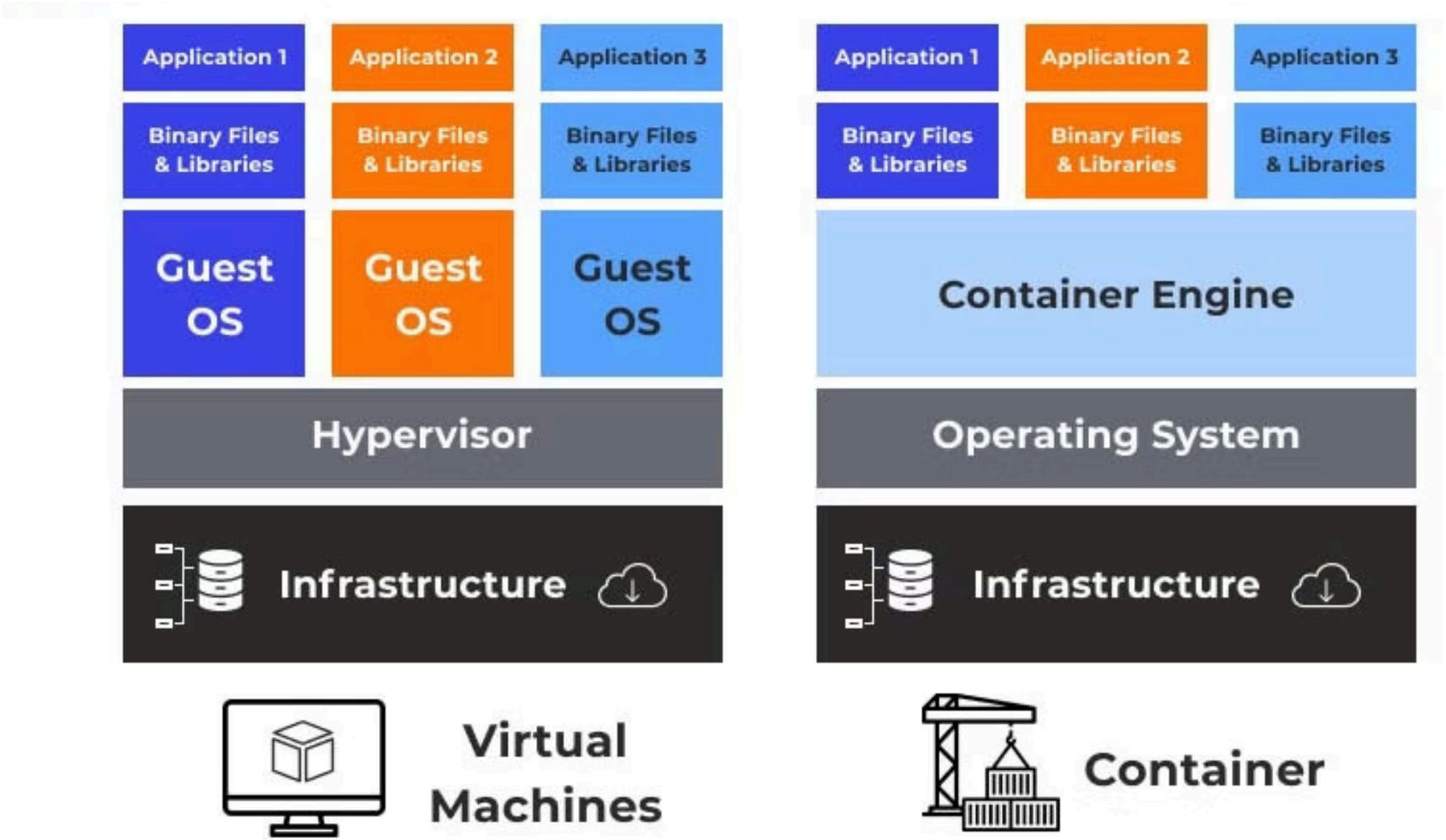
It helps run and manage apps inside containers (like Docker).

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.



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)

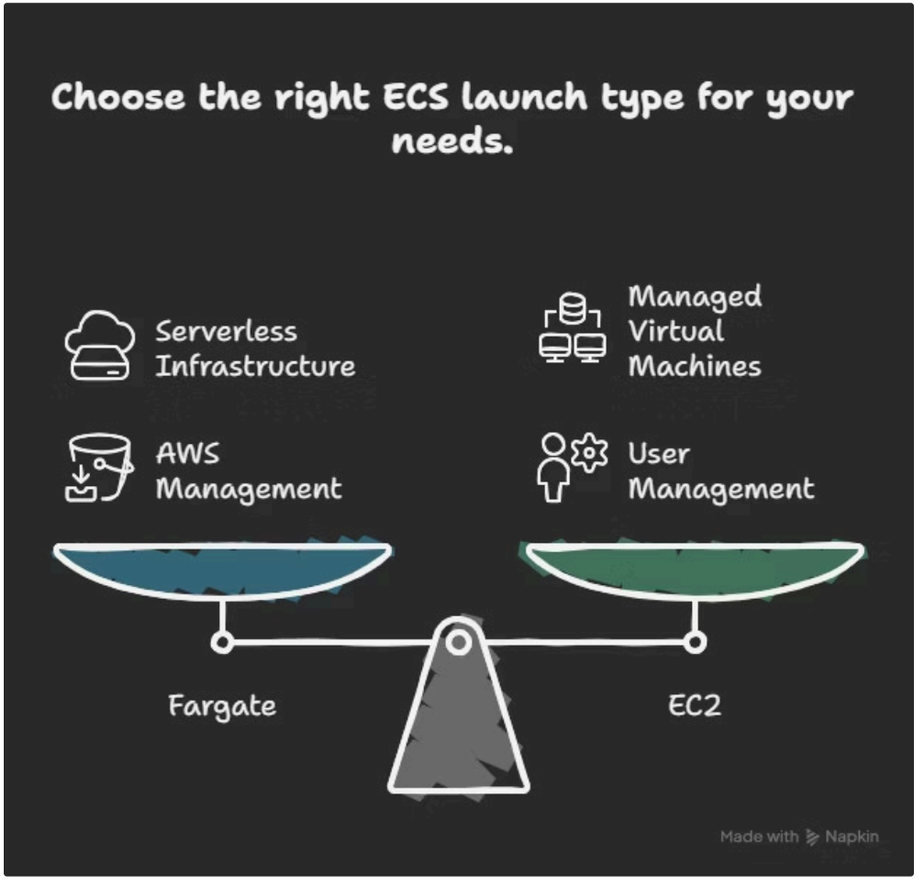
- A **private Docker image storage** on AWS.
- You store your **Docker Images** here before launching them with ECS.
- Like a **Google Drive for app containers** — safe, organized, and accessible by ECS.

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

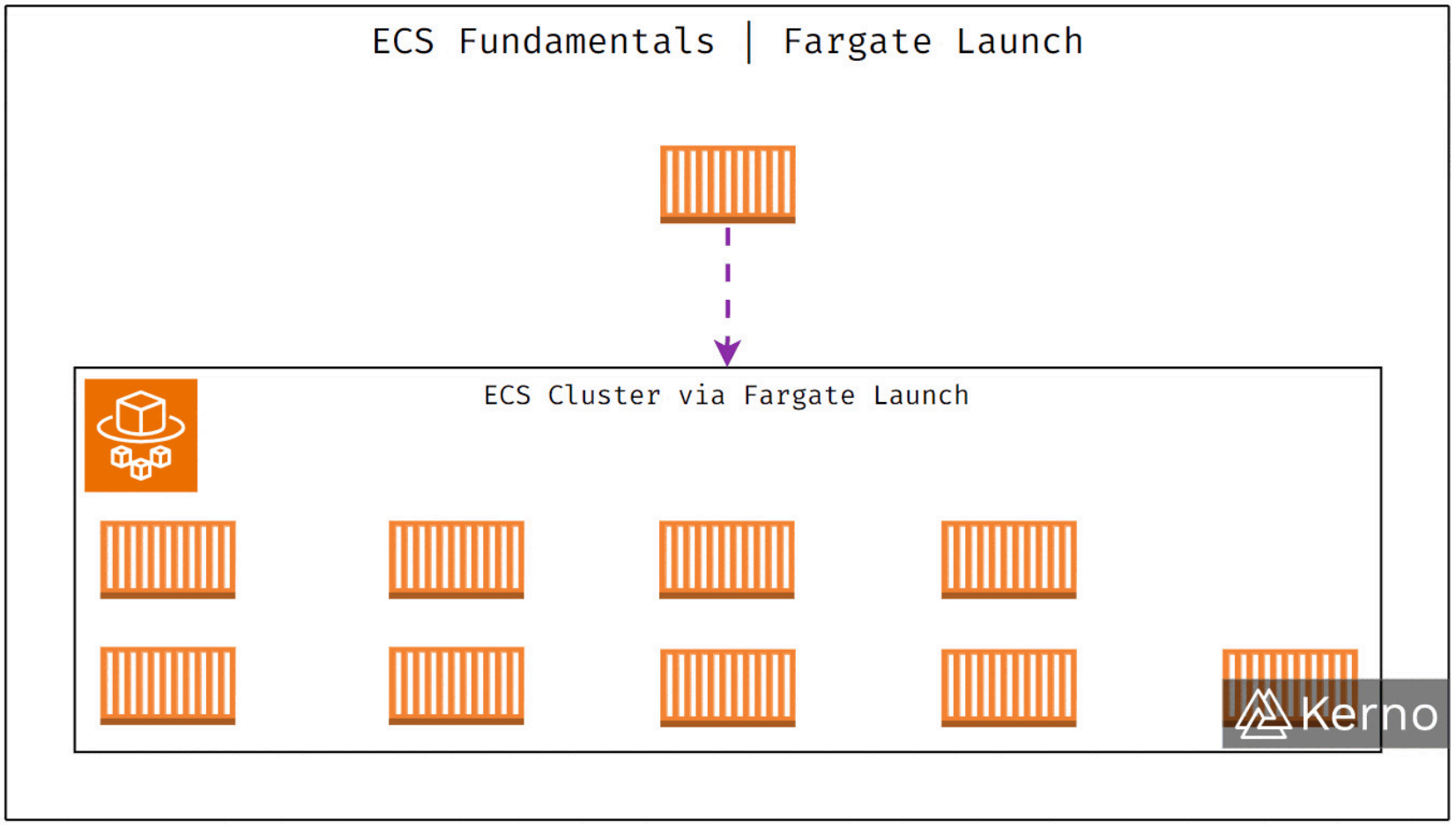
Two Launch Types –

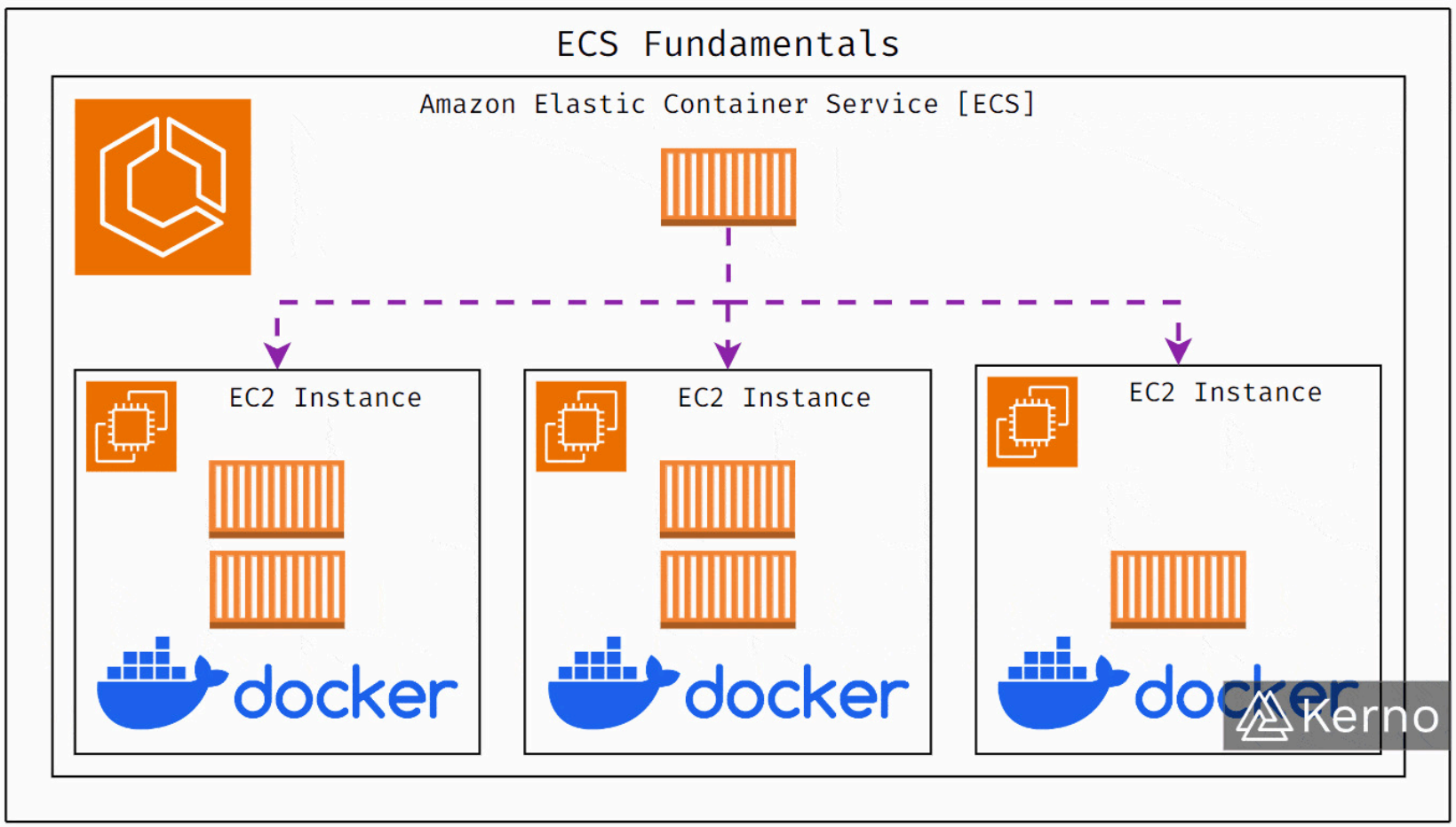
1. Fargate (no server management)
2. EC2 (you manage the servers)

- You want to the **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.





How ECS Works

ECS Cluster

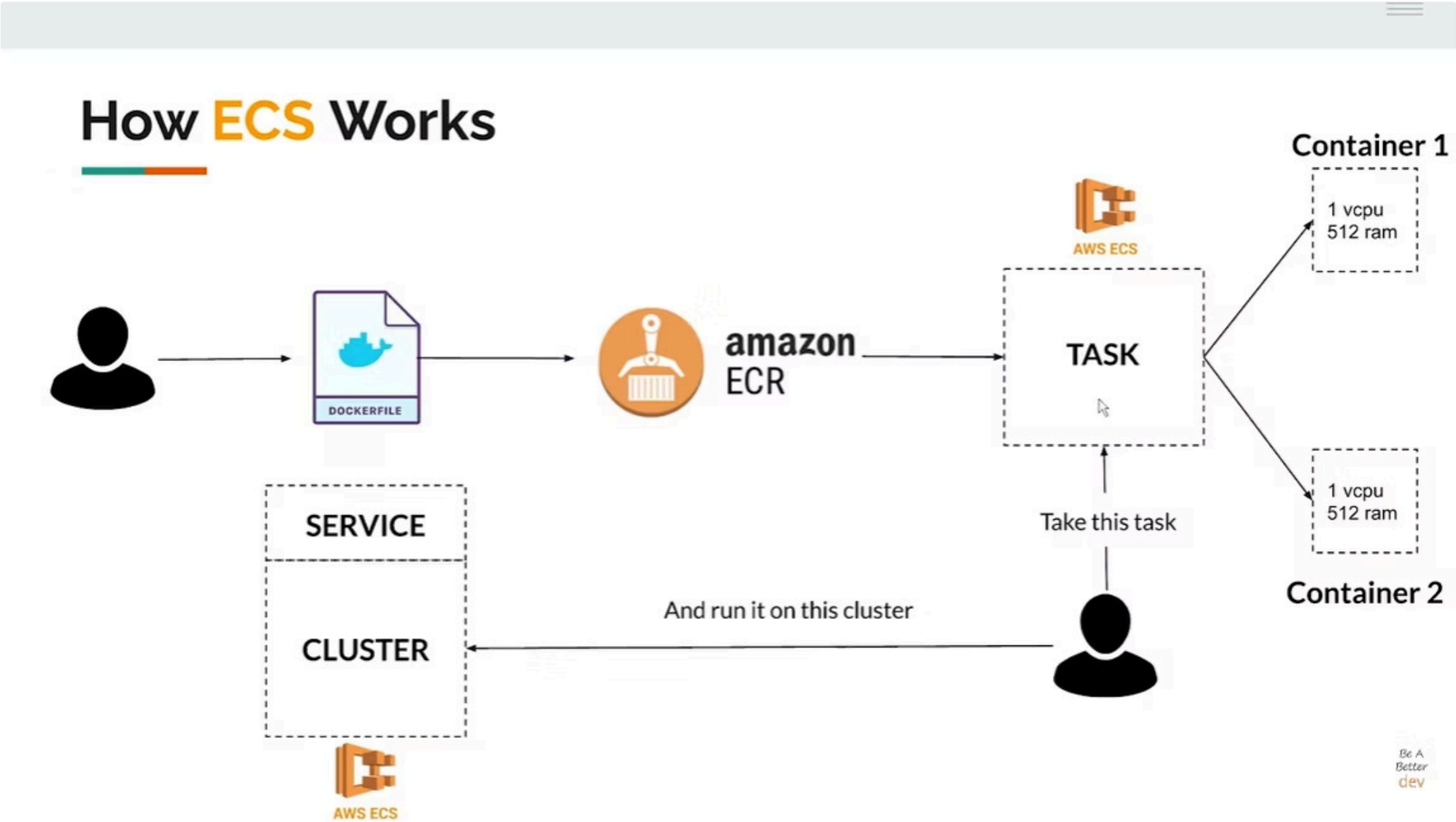
Runs containers on a group of machines.

Fargate

AWS manages everything for you.

EC2

You manage the machines.



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

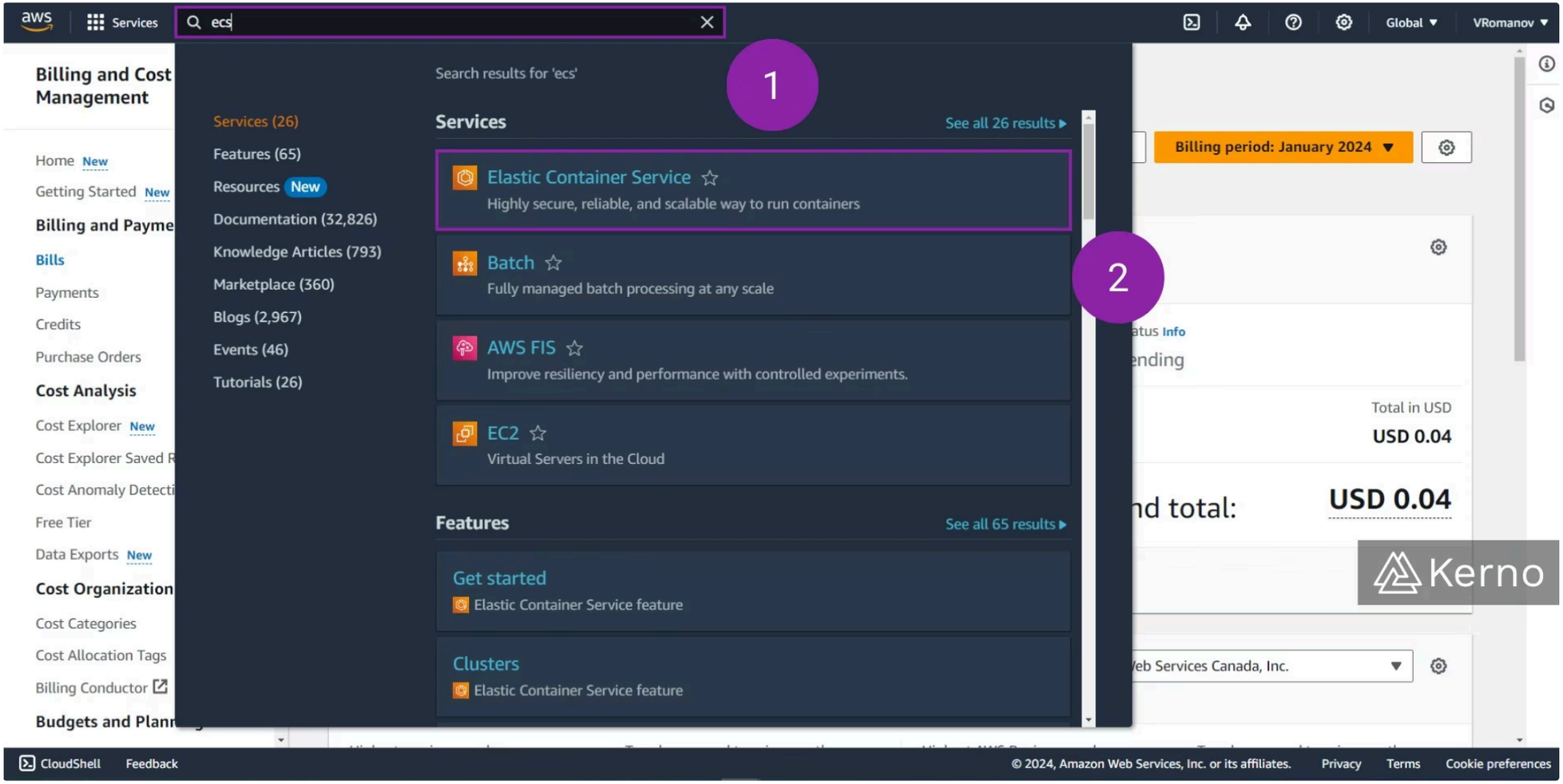
Works with other AWS tools.

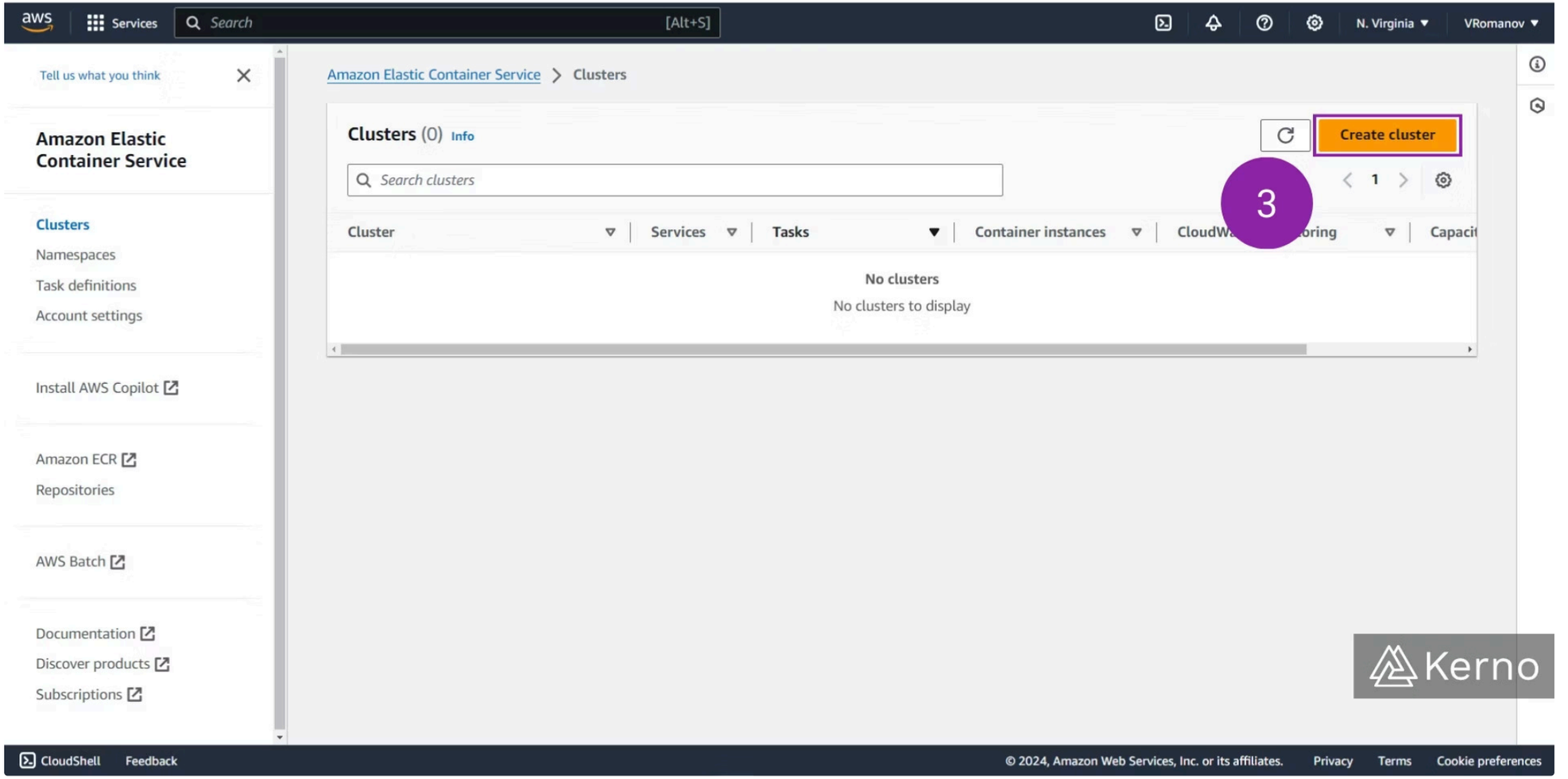
Key ECS Terms

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

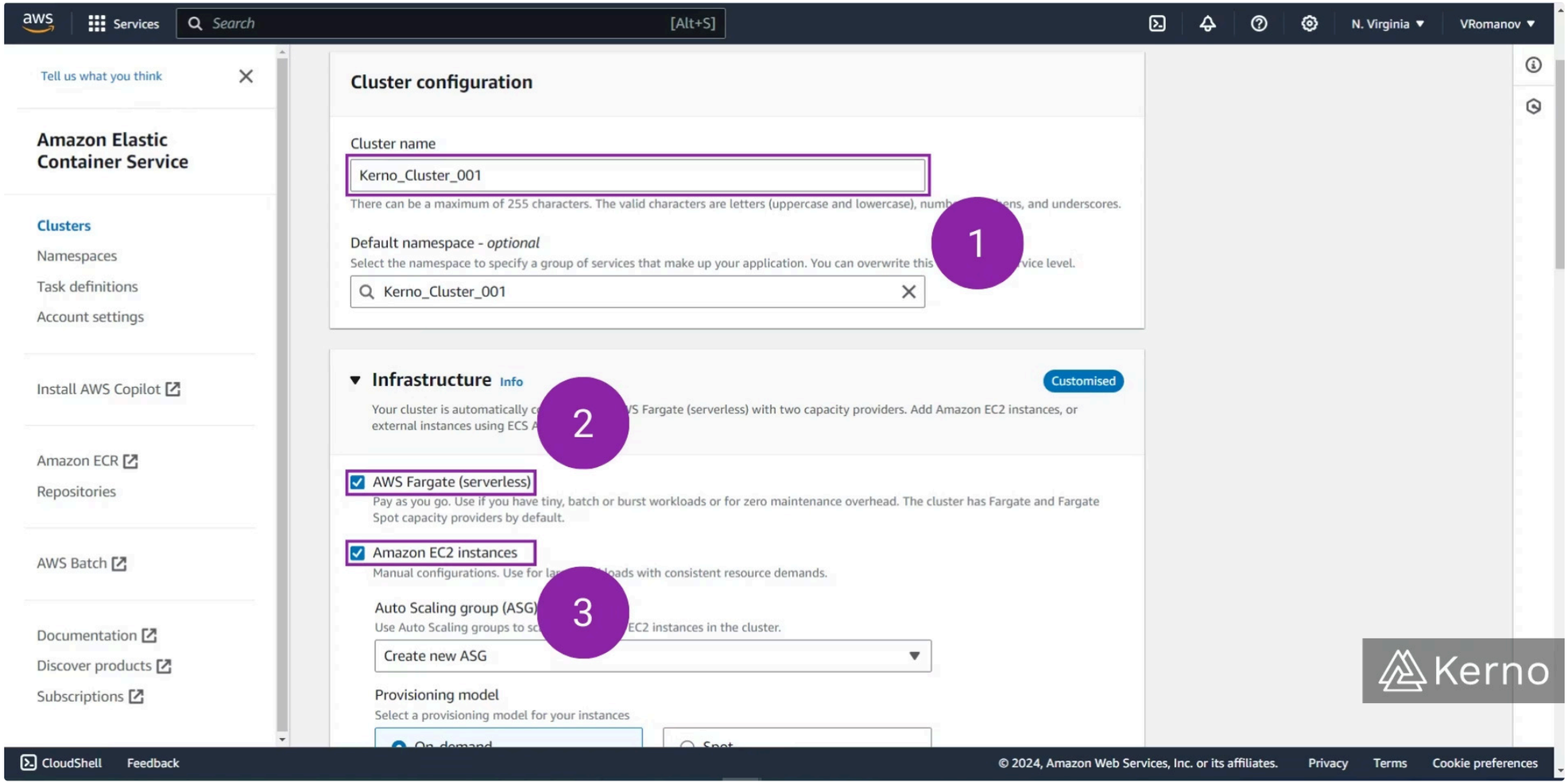
ECS Hands-on Lab

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

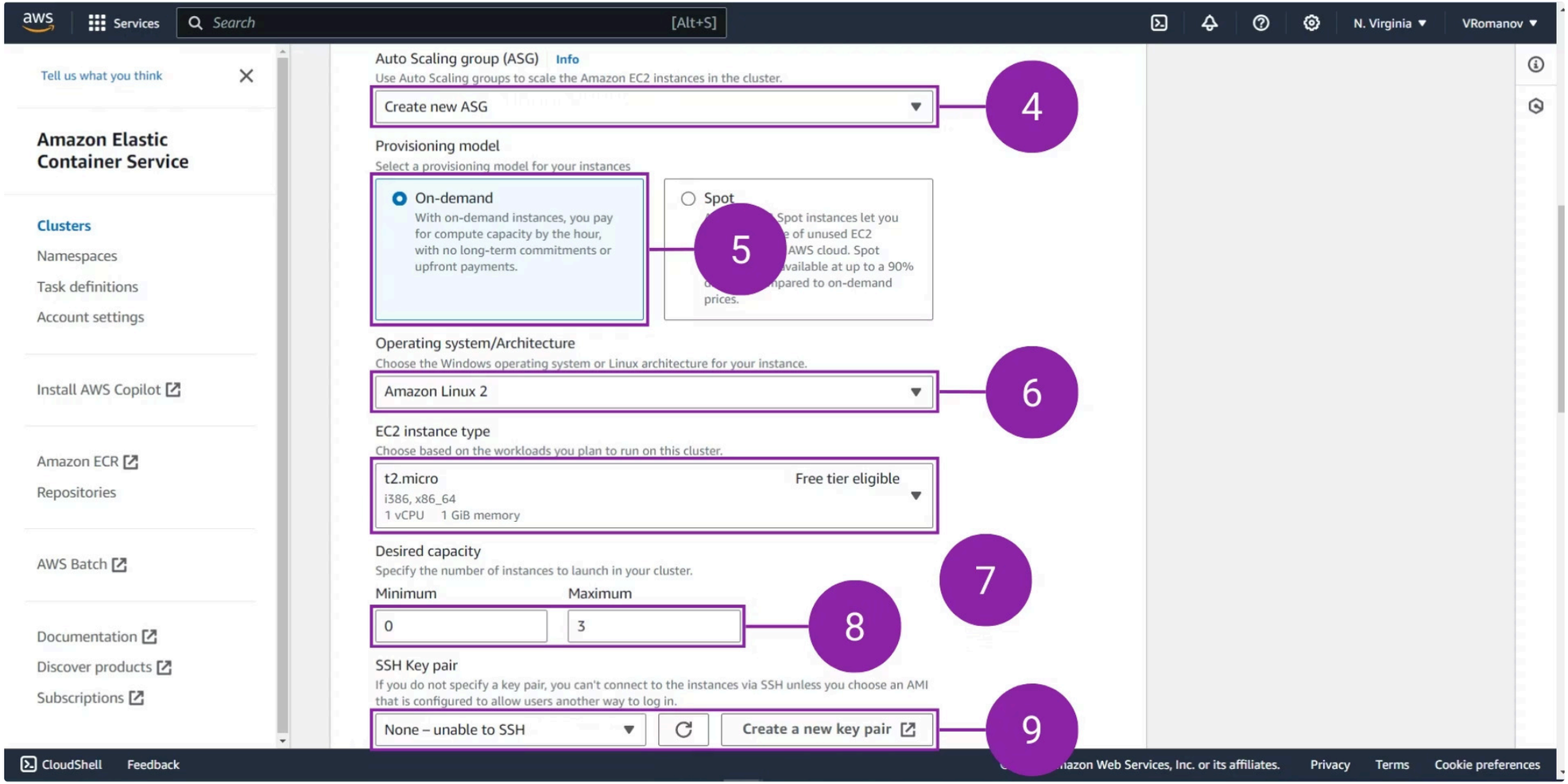


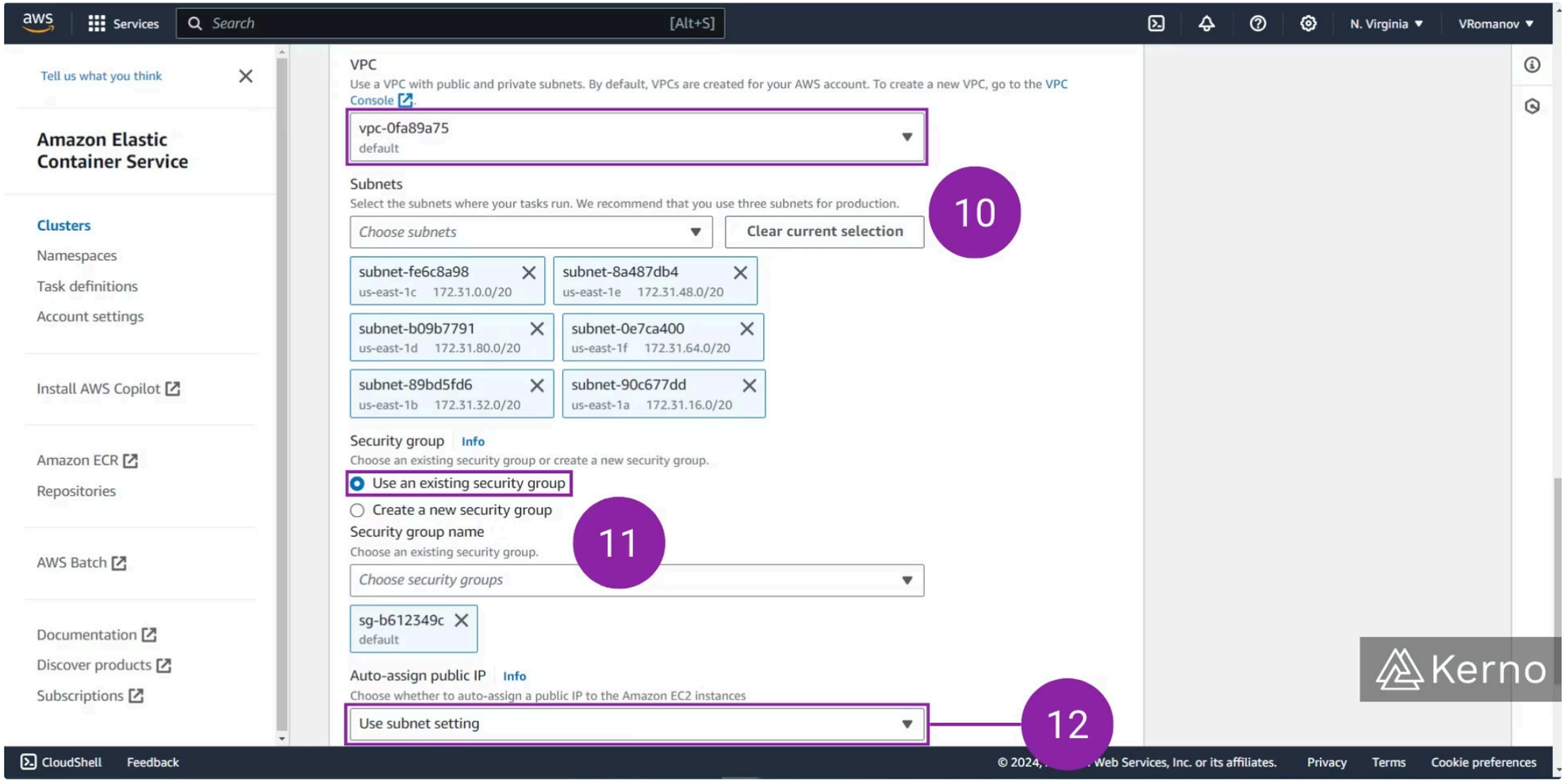


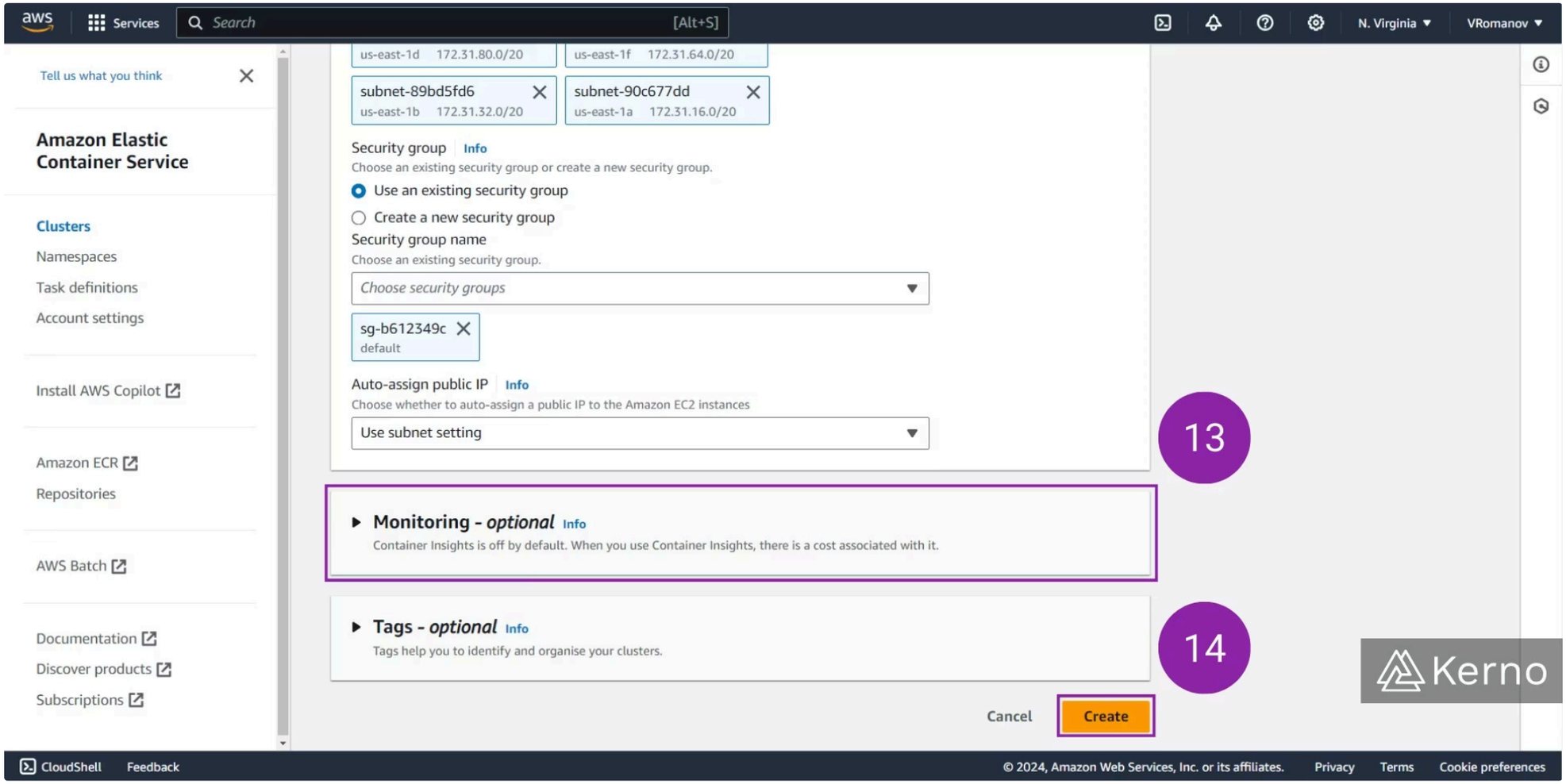
Step 2: Choose EC2 or Fargate



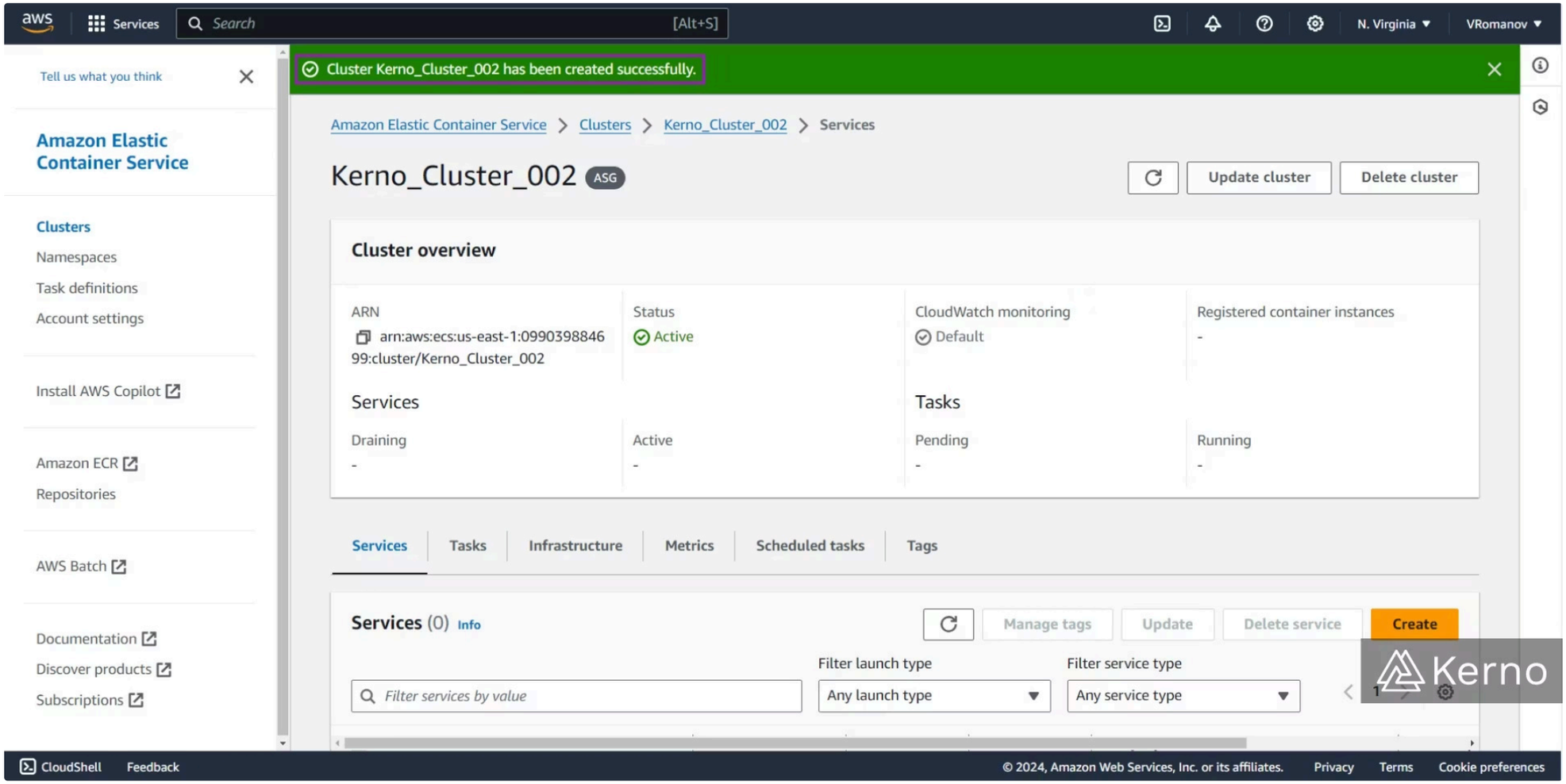
Step 3: Set up VPC, Instance Type (e.g., t2.micro), Security Group and desired capacity, OS (Amazon Linux 2), and SSH Key

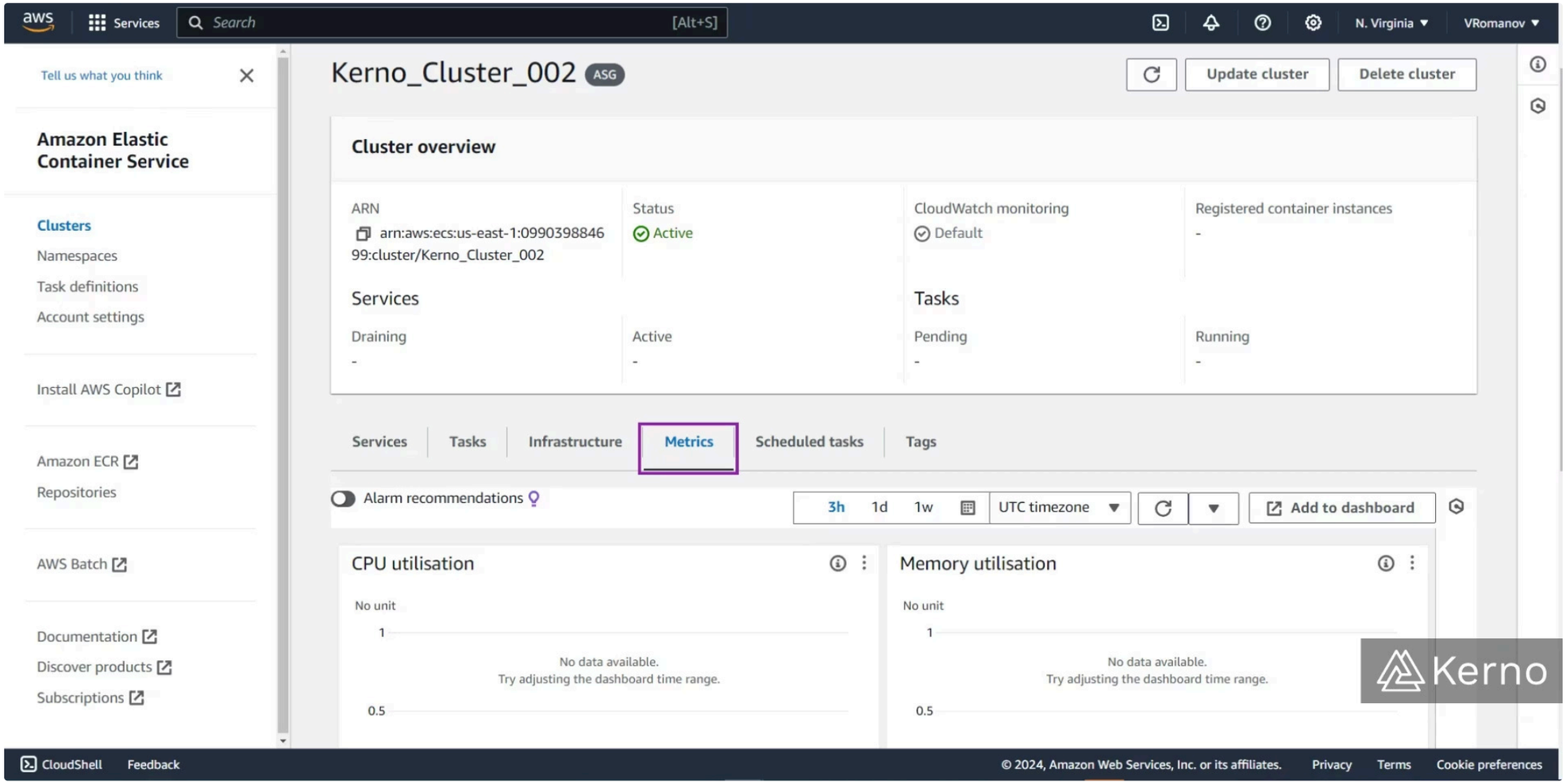






Step 5: Monitor via CloudWatch & Review the ECS Cluster Deployment





Amazon ECS Benefits

Easy App Deployment

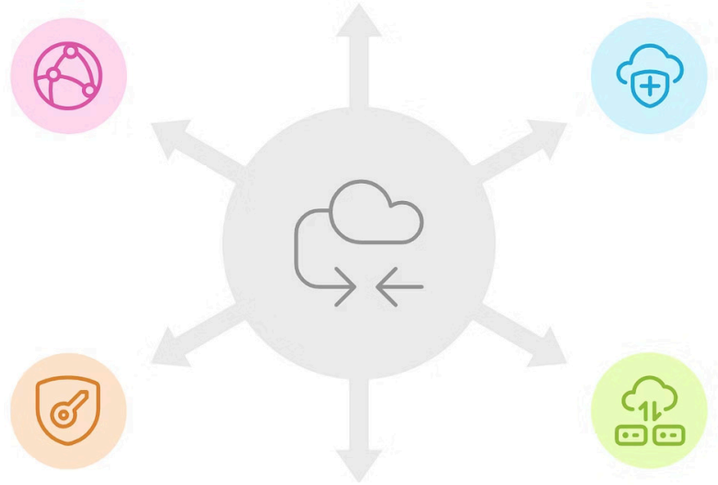
Simplifies the process of deploying applications.

Integrated with AWS Ecosystem

Seamlessly works with other AWS services.

Fully Managed by AWS

AWS handles all management aspects.



Secure

Ensures data and application security.

Supports EC2 and Fargate

Flexibility in choosing infrastructure.

Scalable

Easily adjusts to changing demands.

🔹 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.