Elastic Container Service

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What is Elastic Container Service?

Amazon Elastic Container Service (Amazon ECS) is a highly scalable and fast container management service. You can use it to run, stop, and manage containers on a cluster.

With Amazon ECS, your containers are defined in a task definition that you use to run an individual task or task within a service. In this context, a service is a configuration that you can use to run and maintain a specified number of tasks simultaneously in a cluster.

You can run your tasks and services on a serverless infrastructure that's managed by AWS Fargate. Alternatively, for more control over your infrastructure, you can run your tasks and services on a cluster of Amazon EC2 instances that you manage.

Amazon Elastic Container Service (ECS), also known as Amazon EC-2 Container Service, is a managed service that allows users to run Docker-based applications packaged as containers across a cluster of EC2 instances.

Running simple containers on a single EC-2 instance is simple but running these applications on a cluster of instances and managing the cluster is being administratively heavy process.

With ECS, Fargate launch type, the load, and responsibility of managing the EC2 cluster is transferred over to the AWS, and you can focus on application development rather than management of your cluster architecture.

Features of Elastic Container Service:

- Removes the need for users to manage your own cluster management system by interacting with AWS Fargate.
- Allows seamless deployment of container-based applications. This can be scheduled or done by simple API calls.
- AWS ECS takes care of the management and monitoring of the application cluster.
- Amazon ECS is *region specific.* This means that a cluster can only scale up/down (start-up or shut down container instances) in a single region.
- Clusters are dynamically scalable.

Launch Types in ECS:

There are two models that you can use to run your container:
Fargate launch type:
This is server-less pay-as-you-go option. You can run containers without needing to manage your infrastructure.
Large workloads need to be optimized for low overhead.
Small workloads that have occasional burst.
Tiny workloads.
Batch workloads.

EC2 Launch type:
Configure and deploy EC2 instances in your cluster to run your containers.
Workloads that require consistently high CPU core and memory usage.
Large workloads that need to be optimized for price.
Your applications need to access persistent storage.
You must directly manage your infrastructure.

Amazon ECS Components

Clusters

Containers and Images

Task definitions

Tasks

Services

Container agent

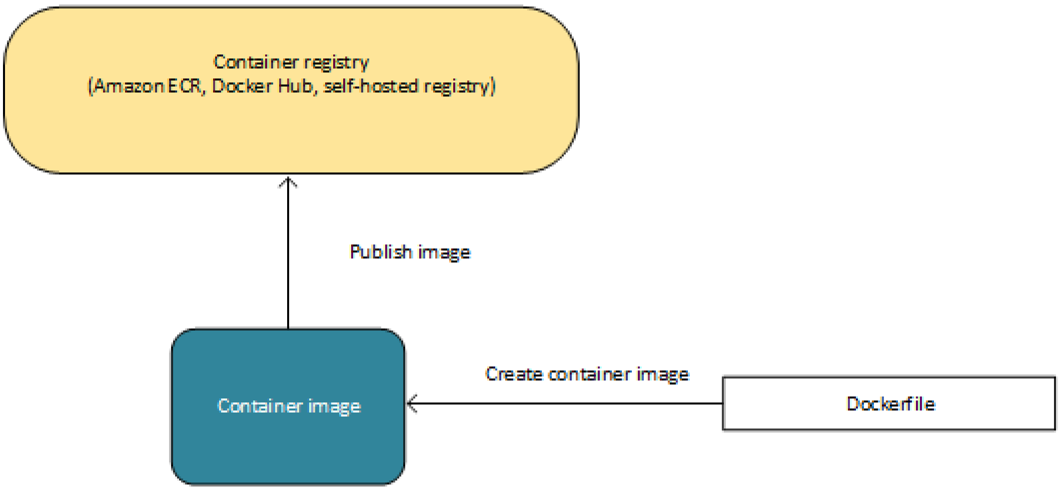
Cluster: -

An Amazon ECS *cluster* is a logical grouping of tasks or services. You can use clusters to isolate your applications. This way, they don't use the same underlying infrastructure. When your tasks are run on Fargate, your cluster resources are also managed by Fargate.

Containers and Images: -

To deploy applications on Amazon ECS, your application components must be configured to run in *containers*. A container is a standardized unit of software development that holds everything that your software application requires to run. This includes relevant code, runtime, system tools, and system libraries. Containers are created from a read-only template that's called an *image*.

Images are typically built from a Dockerfile. A Dockerfile is a plaintext file that specifies all the components that are included in the container. After they're built, these images are stored in a *registry* where they can be downloaded from. Then, after you download them, you can use them to run on your cluster.



Task definitions:-

A *task definition* is a text file that describes one or more containers that form your application. It's in JSON format. You can use it to describe up to a maximum of ten containers. The task definition functions as a blueprint for your application.

It specifies the various parameters for your application. For example, you can use it to specify parameters for the operating system, which containers to use, which ports to open for your application, and what data volumes to use with the containers in the task.

The specific parameters available for your task definition depend on the needs of your specific application.

Your entire application stack doesn't need to be on a single task definition. In fact, we recommend spanning your application across multiple task definitions. You can do this by combining related containers into their own task definitions, each representing a single component.

Tasks:-

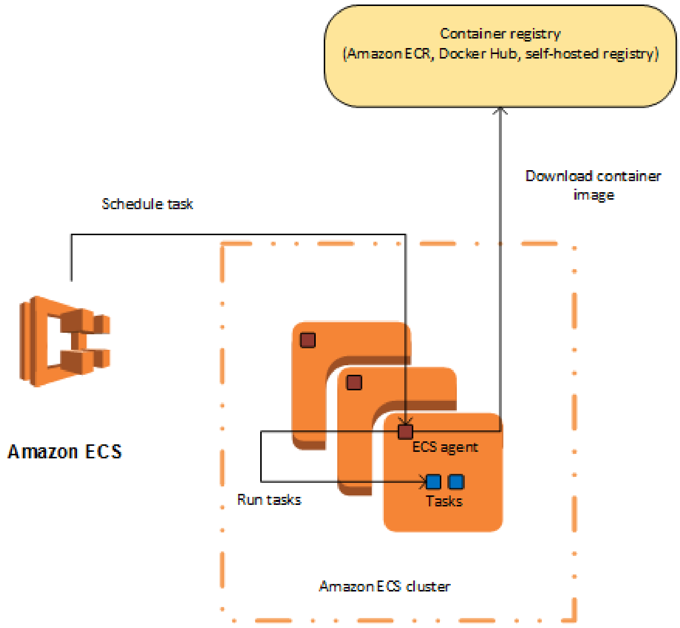
A *task* is the instantiation of a task definition within a cluster. After you create a task definition for your application within Amazon ECS, you can specify the number of tasks to run on your cluster. You can run a standalone task, or you can run a task as part of a service.

Services:-

You can use an Amazon ECS *service* to run and maintain your desired number of tasks simultaneously in an Amazon ECS cluster. How it works is that, if any of your tasks fail or stop for any reason, the Amazon ECS service scheduler launches another instance based on your task definition. It does this to replace it and thereby maintain your desired number of tasks in the service.

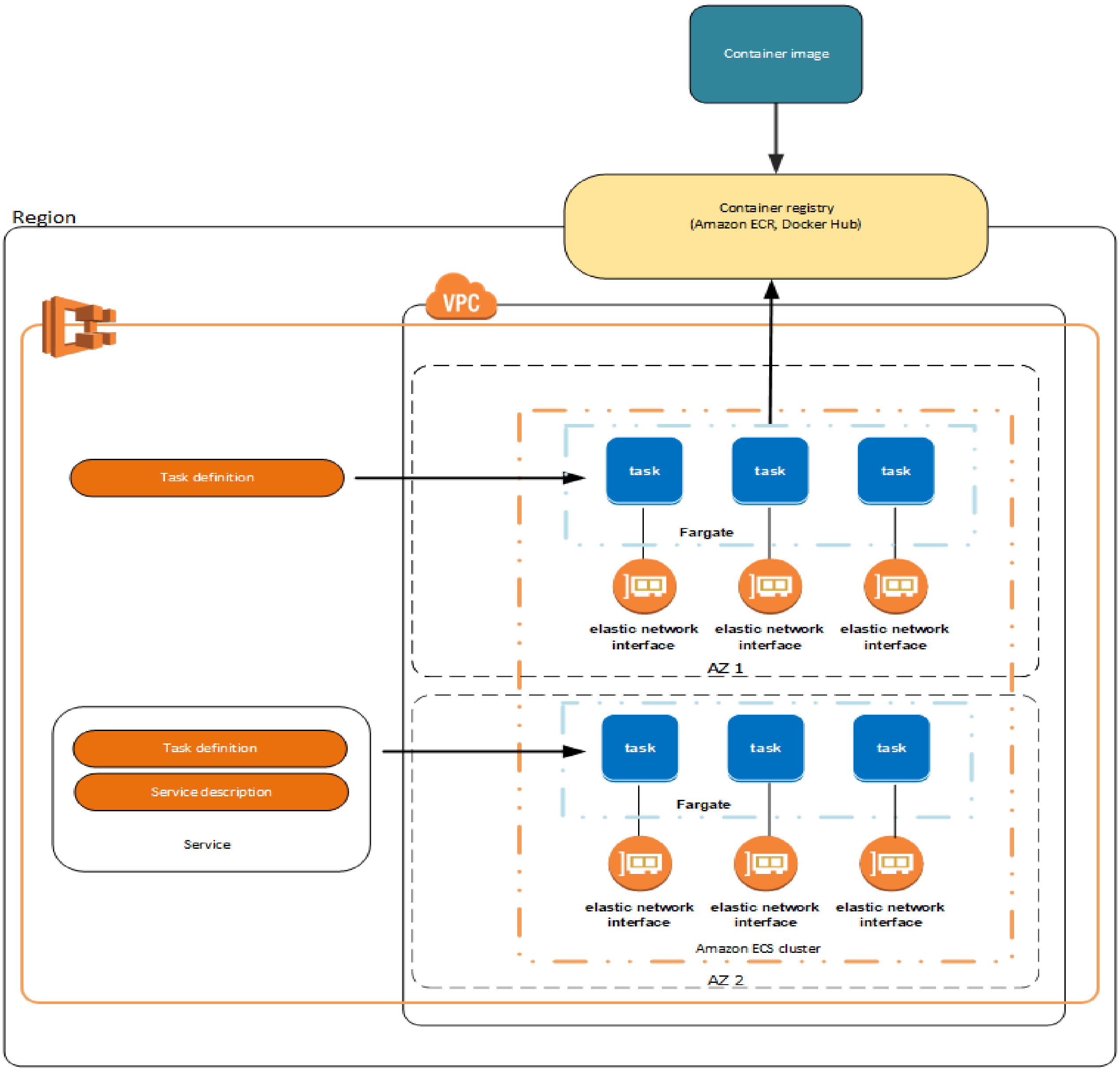
Container Agent: -

The *container agent* runs on each container instance within an Amazon ECS cluster. The agent sends information about the current running tasks and resource utilization of your containers to Amazon ECS. It starts and stops tasks whenever it receives a request from Amazon ECS.



Fargate Architecture Overview

Amazon ECS is a regional service that simplifies the management involved with running containers in a highly available manner across multiple Availability Zones within an AWS Region. You can create Amazon ECS clusters within a new or existing VPC. After a cluster is up and running, you can create task definitions that define which container images run across your clusters. Your task definitions are used to run tasks or create services. Container images are stored in and pulled from container registries.


Container image
Container registry
(Amazon ECR, Docker Hub)
Region
VPC
Task definition
task
task
task
Fargate
elastic network interface
elastic network interface
elastic network interface
AZ 1
Task definition
Service description
Service
task
task
task
Fargate
elastic network interface
elastic network interface
elastic network interface
Amazon ECS cluster
AZ 2