AMAZON EC2 CONTAINER SERVICE

AWS ECS

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INTRODUCTION

➢ Amazon EC2 Container Service (Amazon ECS) is a highly scalable and fast container management service

➢ This service will make it easy for you to run any number of Docker containers on a cluster of Amazon EC2 instance

➢ With the help of amazon EC2 container Service one can launch and stop container-based applications with simple API calls and it allows to get the state of your cluster from a centralized service

➢ Amazon EC2 Container Service includes schedulers that place containers across your clusters based on your resource needs (e.g., CPU or RAM) and availability requirements

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HISTORY
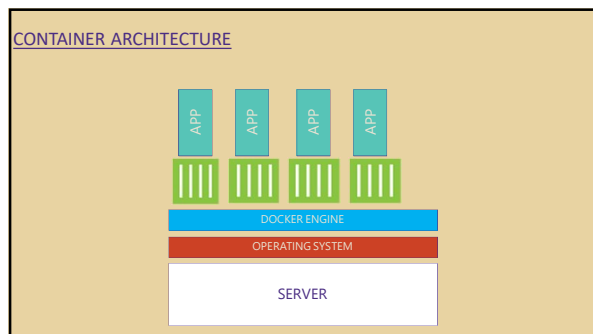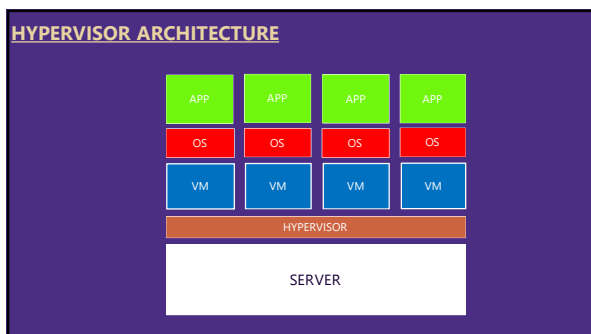
➢ Amazon launched EC2 Container Service(ECS) in 2014 with support for Docker, an open source Linux container service.

docker
containers   swarm   compose
+
amazon web services™

HYPERVISOR ARCHITECTURE

APP	APP	APP	APP
OS	OS	OS	OS
VM	VM	VM	VM

HYPERVISOR

SERVER

CONTAINER ARCHITECTURE

APP   APP   APP   APP

DOCKER ENGINE

OPERATING SYSTEM

SERVER

EVOLUTION

➢ Amazon added support for the use of images from private Docker repositories along with support for mounting data volumes

➢ Gained a new service scheduler for long-running applications, load balancing, rich console support

➢ Included support for the use of UDP Protocol

Launch and terminate Docker containers   Access a cluster of EC2 instances   Mount persistent volumes at launch   Private Docker repositories

EVOLUTION (1)

➢ Added support for CloudFormation

➢ The ability to remotely update the on-instance Docker, ECS agents and task definition deregistration

➢ Supports networking modes and memory reservations
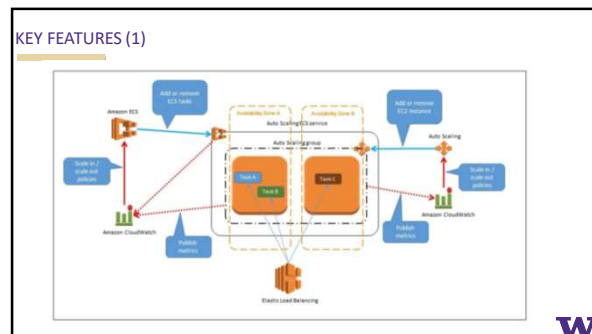
➢ Added supports for Windows container

KEY FEATURES

➢ Container Instance - An EC2 instance with a Docker daemon and an ECS agent
➢ Cluster
➢ Tasks definitions
➢ Built-in Scheduler – Tasks and Services
➢ Supports third party scheduler like Marathon, Chronos
➢ Uses other AWS services – Elastic load balancing (ELB), Amazon Elastic Block store (EBS), Amazon Virtual private cloud (VPC), AWS Identity and Access Management (IAM), AWS CloudTrail
➢ Cluster Management with AWS CloudFormation, AWS Auto scaling
➢ Amazon ECR - repository for storing Docker images
➢ Service discovery via Consul, Weave

KEY FEATURES (1)

USED CASES

1. **Batch/ETL Jobs:**
   Different versions of the same job or multiple jobs can run on the same cluster or even the same instance since containers are isolated.
   Eg: Coursera runs large-scale batch jobs on the service

2. **Distributed Applications and Microservices:**
   Containers can be used to create distributed applications by breaking apart the application into independent tasks/processes (eg.Microservices)
   Hailo hosts their smartphone app for taxi hailing on AWS using EC2 Container Service as their cluster manager for their microservice-based architecture

3. **Continuous Integration and Continuous Deployment:**
   Scenario where an application works on development environment but fails in production can be avoided. Because, docker daemon is the same across the development, staging, and production machines

BENEFITS & DRAWBACKS

BENEFITS :

➢ Easy cluster management

➢ High performance/Performance at scale

➢ Flexible scheduling

➢ Extensible and portable

➢ Resource efficiency

➢ AWS Integration

DRAWBACKS:

➢ Security

➢Reporting on ECS is limited to logging, which can result in container sprawl.

➢Port management

➢Users preferring third party scheduler rather in-built schedulers

USABILITY

➢ Improvements needed for AWS ECS Management console

➢ Documentation on AWS ECS is good but unclear for some topics E.g. Deploying Docker image to an EC2 container from ECR

➢ AWS CLI is not available for ECS in windows

PRICING

➤ There is no additional charge for Amazon ECS
➤ Customer pay only for AWS resources (example - EC2 instances, EBS volumes) that they create to store and run their application
➤ Default limits for Amazon ECS for an AWS account which can be changed

Resource	Default limits
No. of cluster per region, per account	1000
No of Container instance per cluster	1000
No of services per cluster	500

➤ Limitations in AWS ECS that cannot be changed

Resource	Default limit
No of load balancer per service	1
No of load balancer per service	1000
The no of tasks launched(count) per run task	10
The no of tasks launched(count) per start task	10
Task definition max container	10

ALTERNATIVES

➤ The most widely adopted Docker container management project
➤ An Open Source project
➤ Port management by using "virtual" ports instead of binding the original ports on the VM
➤ Kubernetes is cloud agnostic

kubernetes

SUMMARY

➤ One of the leading Docker Orchestration framework
➤ Support for cross AZ-clusters
➤ ECS evaluates and monitors CPU and memory output to determine the optimal deployment for a container
➤ Amazon ECR (Private image repository) - It makes "easy for developers to store, manage, and deploy Docker container images"
➤ No installation or management. It is simpler to setup and use
➤ No additional cost

Start DEMO

host a WORDPRESS site by using AWS EC2 container service.
1. we need images
   a. Mariadb
   b. wordpress
2. task definition: information of container
3. cluster: create ec2 instances for container
   : initiate a service

THANK YOU!!!

QUESTIONS???