Amazon Elastic Kubernetes Service

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What is EKS?

- Elastic Kubernetes Service-managed Kubernetes Service
- AWS manages control plane
- Provisioning/maintaining master nodes
- Install control plane process
- Scaling and backups

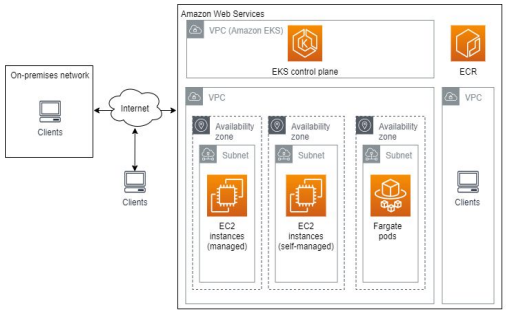
History of EKS: Who?

- Who invented the EKS
  - It was introduced in 2017 by AWS and became generally available in 2018
- Competitive alternatives
  - Other cloud platforms: Google GKE, Microsoft AKS
  - Other service in AWS: ECS

Why EKS?

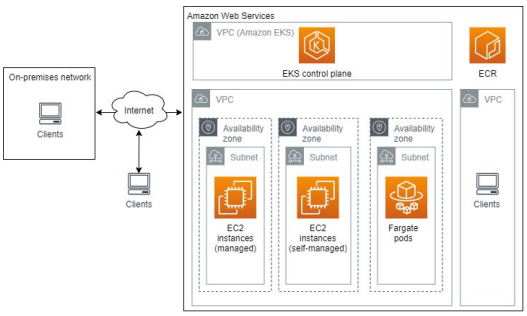
- Running and scaling Kubernetes can be difficult
- Properly securing Kubernetes increases operational overhead
- Tight integration with other AWS services
  - S3
  - IAM
  - Secrets Manager
  - Load Balancer

The Evolution of EKS



- Self managed nodes (June 2018)
  - Users must provision manually EC2 instances
  - All Kubernetes processes must be installed
  - Updates and security patches are the user's responsibility
- Managed node groups (Nov 2019)
  - Automates the provisioning and lifecycle management of EC2 nodes
  - Streamlined way to manage life cycle of nodes using single EKS API call
  - Every node is part of an Auto Scaling group that's managed for you

The Evolution of EKS - 2



- Fargate (Dec 2019)
  - Follows a serverless architecture
  - Fargate will create worker nodes on demand
  - No need to provision EC2 servers
  - You only pay for what you use
- Aim: provide a fully managed experience across the entire cluster lifecycle

Summary of Features

- Managed Control Plane
  - Provides a fully managed Kubernetes control plane.
- Serverless Compute
  - Supports AWS Fargate to run Kubernetes applications using serverless compute
- Service Integrations
  - Integrates with various AWS services
- Autoscaling and Resource Optimization
  - Supports autoscaling for both the control plane and worker nodes.

Summary of Features - 2

- Managed Cluster Updates
  - Makes it easy to update running clusters to the latest Kubernetes version
- VPC Networking
  - Utilizes Amazon VPC for networking, providing isolation, and security for clusters

Example Use Case

- Build and run web applications:
  - A company wants to adopt a microservices architecture
  - The company doesn't have enough resources and expertise to establish a self-managed Kubernetes cluster
  - The company deploys containerized microservices on EKS
  - EKS automatically manages the Kubernetes control plane

Technology Advantages

- High availability
  - EKS runs the Kubernetes control plane across multiple AWS availability zones
- Hybrid cloud capabilities
  - EKS supports hybrid cloud architecture, you can run worker nodes on premises with AWS Outposts (a fully managed service that extends AWS infrastructure, services, APIs, and tools to customer premises)
- Usability
  - Reviews of EKS on g2.com:
  - "The ease of use and less complexity."
  - "it's very easy to setup and provides lots of built-in functionalities…"

Technology Disadvantages

- Cost
  - More expensive than self-managed Kubernetes
  - More expensive than Amazon Elastic Container Service (Amazon's version of K8s)
  - Not the cheapest service in the market. Azure Kubernetes Service does not charge a management fee for the Kubernetes control plane in the free tier
- Limited customization
  - No direct access to the control plane
  - Doesn't support some tools developed by K8s community

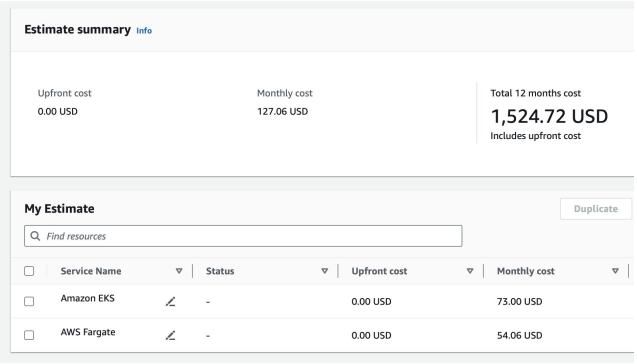
Cost Discussion

- $0.10 per hour for each EKS cluster (cluster management fee)
  - $73 per month, $876 USD per year
- Additional worker node costs
  - Cost of running worker nodes on EC2 or Fargate in the cloud
    - You only pay for what you use, as you use it
  - Cost of running worker nodes in your data center
    - Hardware, power, network etc.

Cost Example

Run EKS in the cloud and deploy worker nodes on AWS Fargate

- Price shown from AWS pricing calculator in US East (Ohio)
- 1 EKS cluster ~ $73 per month
- 3 pods with average duration of 1 day in a month, 0.5 vCPU, 1 GB memory, and 20 GB storage on AWS Fargate ~ $54.06
- Total monthly cost ~ $127.05



Conclusions

- ❖ Streamlined Kubernetes management
- ❖ Enhanced scalability and reliability
- ❖ A future-proofing solution in the digital landscape

Amazon: "The most trusted way to start, run, and scale Kubernetes"

Demonstration

Create Kubernetes cluster on Amazon EKS using eksctl

Questions?