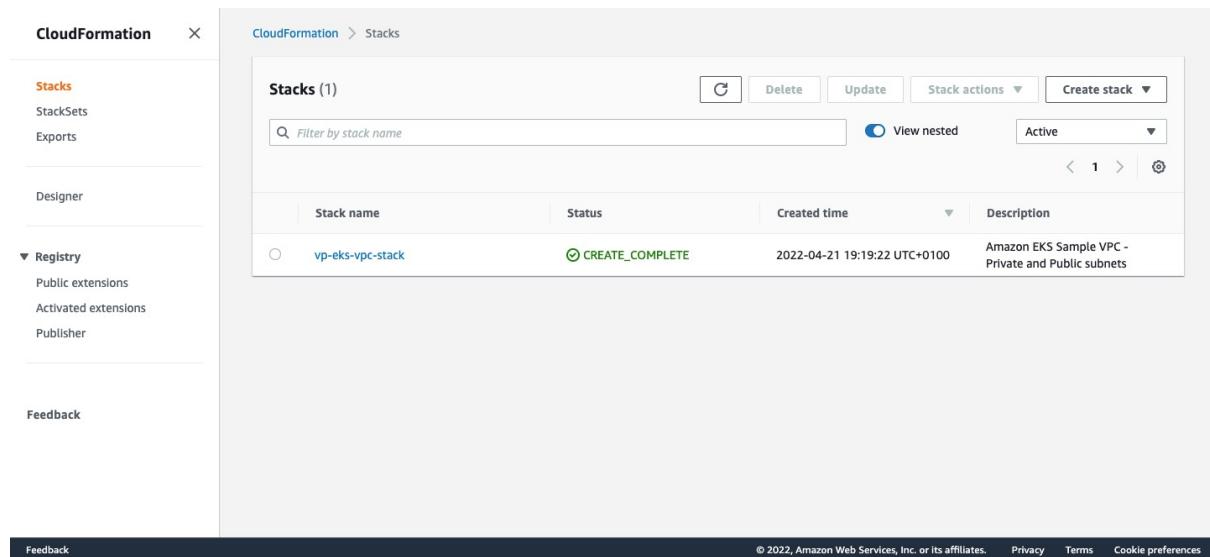


Project Implementation Steps

Step 1:

Create a VPC stack with private and public subnets in AWS CloudFormation; that meets the AWS EKS Cluster requirements.

```
aws cloudformation create-stack --region eu-west-2 --stack-name vp-eks-vpc-stack --template-url  
https://s3.us-west-2.amazonaws.com/amazon-eks/cloudformation/2020-10-29/amazon-eks-vpc-private-subnets.yaml
```



The screenshot shows the AWS CloudFormation console interface. On the left, there's a sidebar with navigation links: Stacks, StackSets, Exports, Designer, Registry (with sub-links for Public extensions, Activated extensions, and Publisher), and Feedback. The main area is titled 'CloudFormation > Stacks' and shows a table of stacks. The table has columns for Stack name, Status, Created time, and Description. One stack is listed: 'vp-eks-vpc-stack' with a status of 'CREATE_COMPLETE' (indicated by a green circle icon), created on '2022-04-21 19:19:22 UTC+0100', and a description 'Amazon EKS Sample VPC - Private and Public subnets'. At the bottom of the page, there's a footer with links for 'Feedback', '© 2022, Amazon Web Services, Inc. or its affiliates.', 'Privacy', 'Terms', and 'Cookie preferences'.

Step 2:

Create a JSON File with the required policies for the IAM Service Role for the AWS EKS.

```
{  
  "Version": "2012-10-17",  
  "Statement": [  
    {  
      "Effect": "Allow",  
      "Principal": {  
        "Service": "eks.amazonaws.com"  
      },  
      "Action": "sts:AssumeRole"  
    }  
  ]  
}
```

Step 3:

Create an IAM Service Role by attaching the above JSON policy document.

```
aws iam create-role --role-name VP_EKS_Service_Role --assume-role-policy-document file://"vp-cluster-role-trust-policy.json"
```

Step 4:

Attach the required AWS EKS managed IAM Policy to the IAM service role created.

```
aws iam attach-role-policy --role-name VP_EKS_Service_Role --policy-arn arn:aws:iam::aws:policy/AmazonEKSClusterPolicy
```

Step 5:

View the attached EKS IAM policy to the AWS Service Role.

```
aws iam list-attached-role-policies --role-name VP_EKS_Service_Role
```

Output:

```
{
  "AttachedPolicies": [
    {
      "PolicyName": "AmazonEKSClusterPolicy",
      "PolicyArn": "arn:aws:iam::aws:policy/AmazonEKSClusterPolicy"
    }
  ]
}
```

Step 6:

Create and add a new AWS EKS Cluster.

The screenshot shows the AWS EKS Cluster configuration page for 'vp-eks-cluster'. The cluster is currently 'Creating' (indicated by a progress bar). The 'Networking' tab is selected. Key details include:

- Kubernetes version: 1.21
- Platform version: eks.6
- VPC: [vpc-0c4e01fc6f64184a6](#)
- Subnets: [subnet-001da9b132413a4b3](#), [subnet-0b7091f9e825ff147](#), [subnet-0791f6b8abf4f4902](#), [subnet-0e2a2fcf3e64fb18a](#)
- Cluster security group: [sg-049710354133a8dff](#)
- API server endpoint access: Public
- Service IPv4 range: 10.100.0.0/16
- Cluster IP address family: IPv4
- Additional security groups: [sg-049710354133a8dff](#)
- Public access source allowlist: 0.0.0.0/0 (open to all traffic)

The screenshot shows the AWS EKS Cluster configuration page for 'vp-eks-cluster'. The cluster is now 'Active'. A notification indicates that a new Kubernetes version is available. The 'Logging' tab is selected. Key details include:

- Kubernetes version: 1.21
- Platform version: eks.6
- Control Plane Logging:
 - API server: Disabled
 - Audit: Disabled
 - Authenticator: Disabled
 - Controller manager: Disabled
 - Scheduler: Disabled

Step 7:

Create or Update kubeconfig file for the newly created EKS Cluster.

```
aws eks update-kubeconfig --region eu-west-2 --name vp-eks-cluster
```

Step 8:

Testing the kube configuration

Kubectl get svc

Output:

```
NAME      TYPE      CLUSTER-IP  EXTERNAL-IP  PORT(S)  AGE
kubernetes  ClusterIP  10.100.0.1 <none>    443/TCP  10m
```

Step 9:

Create AWS Fargate Profile – Create a JSON File with pod execution policies

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Condition": {
        "ArnLike": {
          "aws:SourceArn": "arn:aws:eks:eu-west-2:<account_id>:fargateprofile/VP_EKS_Cluster/*"
        }
      },
      "Principal": {
        "Service": "eks-fargate-pods.amazonaws.com"
      },
      "Action": "sts:AssumeRole"
    }
  ]
}
```

Step 10:

Create a pod execution IAM Role by attaching the above json policy file

```
aws iam create-role --role-name VP_Fargate_Pod_Execution_Service_Role --assume-role-policy-document file:///vp-pod-execution-role-trust-policy.json"
```

Step 11:

Attach the AWS EKS managed IAM policy to the above role created

```
aws iam attach-role-policy --policy-arn
arn:aws:iam::aws:policy/AmazonEKSFargatePodExecutionRolePolicy --role-name
VP_Fargate_Pod_Execution_Service_Role
```

Step 12:

View the attached EKS Fargate Pod Execution Role IAM policy to the AWS Service Role.

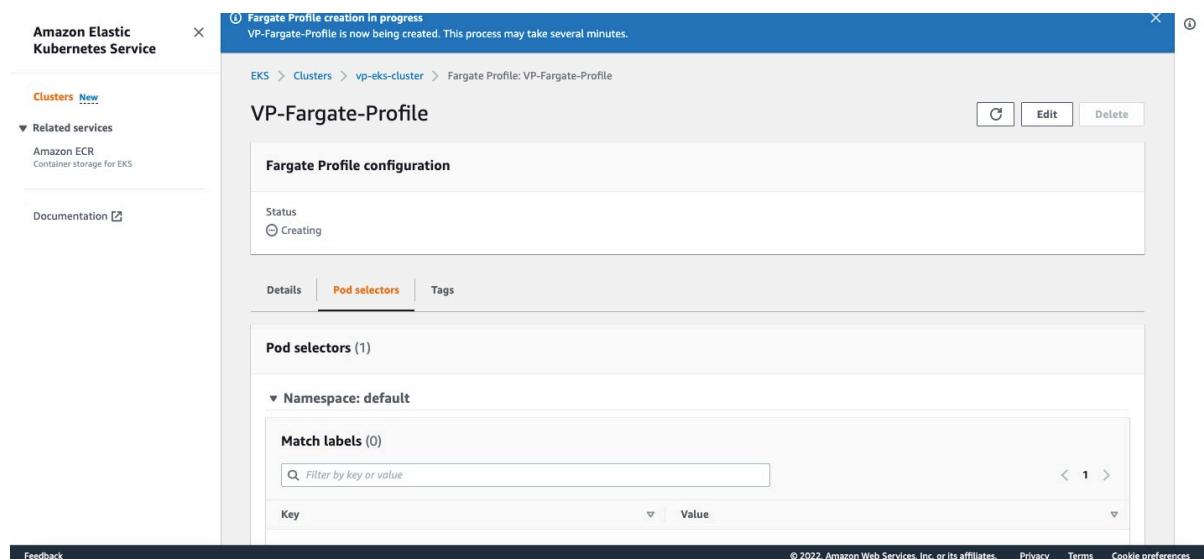
```
aws iam list-attached-role-policies --role-name VP_Fargate_Pod_Execution_Service_Role
```

Output:

```
{  
    "AttachedPolicies": [  
        {  
            "PolicyName": "AmazonEKSFargatePodExecutionRolePolicy",  
            "PolicyArn": "arn:aws:iam::aws:policy/AmazonEKSFargatePodExecutionRolePolicy"  
        }  
    ]  
}
```

Step 13:

Adding and Configuring the Fargate Profile to the AWS EKS Cluster; with private subnets and default namespace.



Kubernetes version [Info](#)
1.21

Platform version [Info](#)
eks.6

Compute

No Node Groups

This cluster does not have any Node Groups.

Nodes that are not part of an Amazon EKS Managed Node Group are not shown in the AWS console.

Add Node Group

Fargate Profiles (1) [Info](#)

Profile name	Namespaces	Status
VP-Fargate-Profile	default	Active

CoreDNS Fargate Profile Creation

EKS > Clusters > vp-eks-cluster > Fargate Profile: CoreDNS

CoreDNS

CoreDNS

Status
Creating

Pod selectors (1)

Namespace: kube-system

Match labels (1)

Key	Value
k8s-app	kube-dns

Step 14:

Execute the below command to remove the default `eks.amazonaws.com/compute-type : ec2` annotation from the CoreDNS pods.

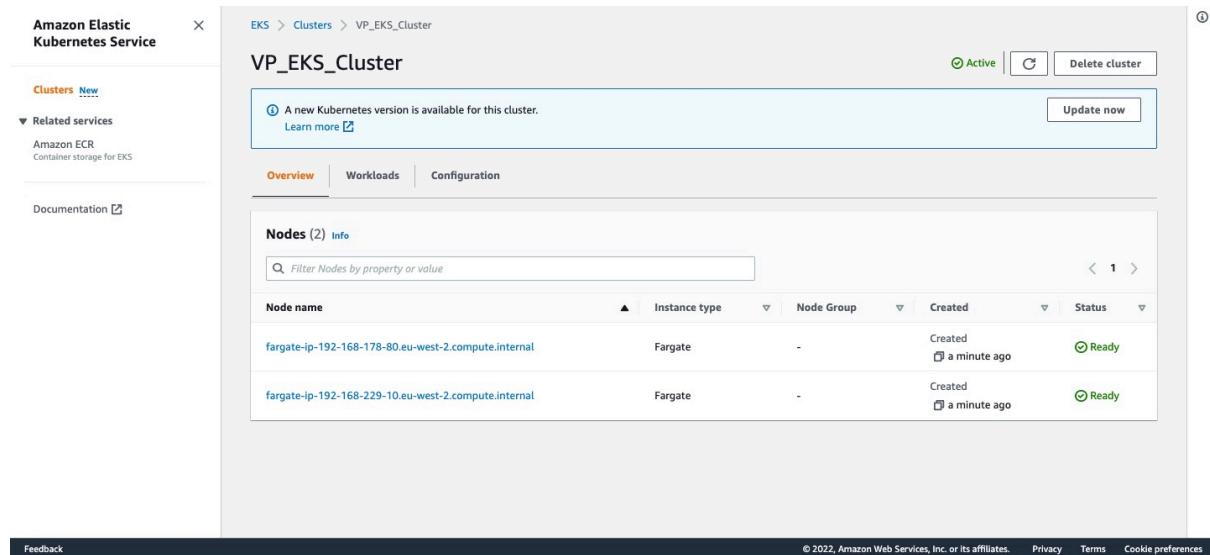
```
kubectl patch deployment coredns -n kube-system --type json -p='[{"op": "remove", "path": "/spec/template/metadata/annotations/eks.amazonaws.com~1compute-type"}]'
```

Output:

```
deployment.apps/coredns patched
```

Step 15:

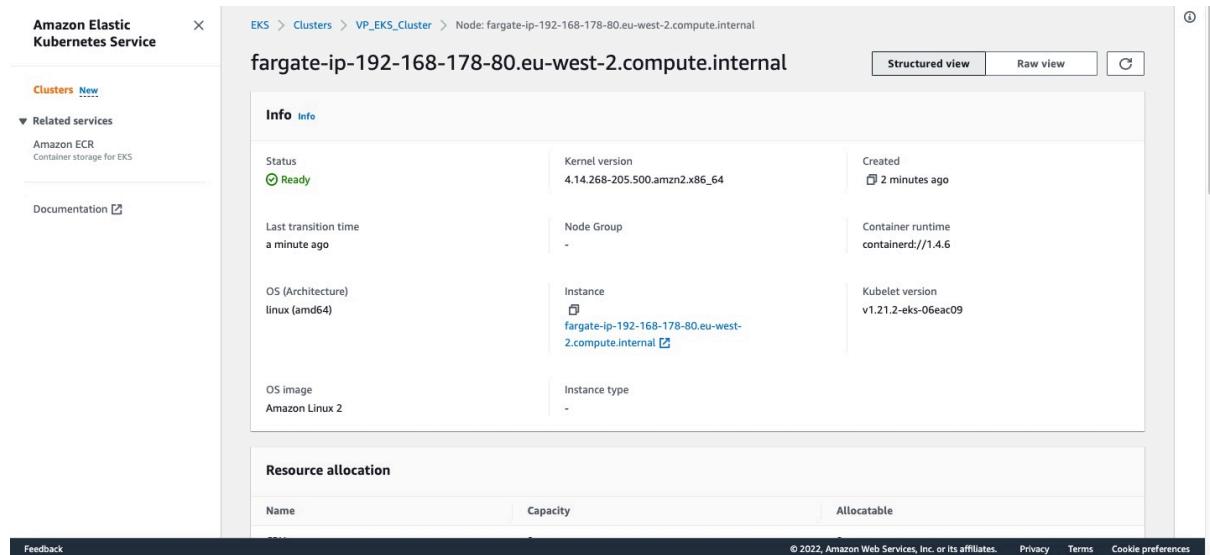
We can see 2 AWS Fargate nodes created in the AWS EKS Cluster as per the Fargate Profile Configured in the cluster.



The screenshot shows the AWS EKS Cluster Overview page for 'VP_EKS_Cluster'. It displays two Fargate nodes:

Node name	Instance type	Node Group	Created	Status
fargate-ip-192-168-178-80.eu-west-2.compute.internal	Fargate	-	Created a minute ago	Ready
fargate-ip-192-168-229-10.eu-west-2.compute.internal	Fargate	-	Created a minute ago	Ready

1st Fargate Node



The screenshot shows the AWS EKS Node details page for the first Fargate node, 'fargate-ip-192-168-178-80.eu-west-2.compute.internal'. The node is in a 'Ready' state, created 2 minutes ago. It runs on Amazon Linux 2 with an instance type of Fargate and a Kubelet version of v1.21.2-eks-06eac09.

Status	Kernel version	Created
Ready	4.14.268-205.500.amzn2.x86_64	2 minutes ago

Last transition time	Node Group	Container runtime
a minute ago	-	containerd://1.4.6

OS (Architecture)	Instance	Kubelet version
linux (amd64)	fargate-ip-192-168-178-80.eu-west-2.compute.internal	v1.21.2-eks-06eac09

OS image	Instance type
Amazon Linux 2	-

Amazon Elastic Kubernetes Service

- Clusters** [New](#)
- Related services
 - Amazon ECR Container storage for EKS
- Documentation [\[?\]](#)

Resource allocation

Name	Capacity	Allocatable
CPU	2	2
Memory	3976984Ki	3874584Ki
Pods	1	1

Pods (1) [Info](#)

Name	Status	Created
coredns-7464cd6c7d-zg86r	Running	2 minutes ago

Conditions

Name	Status	Message
MemoryPressure	False	kubelet has sufficient memory available
DiskPressure	False	kubelet has no disk pressure
PIDPressure	False	kubelet has sufficient PID available

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Amazon Elastic Kubernetes Service

- Clusters** [New](#)
- Related services
 - Amazon ECR Container storage for EKS
- Documentation [\[?\]](#)

Conditions

Name	Status	Message
MemoryPressure	False	kubelet has sufficient memory available
DiskPressure	False	kubelet has no disk pressure
PIDPressure	False	kubelet has sufficient PID available
Ready	True	kubelet is posting ready status

Taints (1)

Filter by key, value or effect		
Key	Value	Effect
eks.amazonaws.com/compute-type	fargate	NoSchedule

Labels (10)

Filter by key or value		
Key	Value	
beta.kubernetes.io/arch	amd64	
beta.kubernetes.io/os	linux	
eks.amazonaws.com/compute-type	fargate	
failure-domain.beta.kubernetes.io/region	eu-west-2	
failure-domain.beta.kubernetes.io/zone	eu-west-2a	

Annotations (2)

Filter by key or value		
Key	Value	
node.alpha.kubernetes.io/ttl	0	
volumes.kubernetes.io/controller-managed-attach-detach	true	

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Amazon Elastic Kubernetes Service

- Clusters** [New](#)
- Related services
 - Amazon ECR Container storage for EKS
- Documentation [\[?\]](#)

PIDPressure	Status	Message
Ready	True	kubelet is posting ready status

Taints (1)

Filter by key, value or effect		
Key	Value	Effect
eks.amazonaws.com/compute-type	fargate	NoSchedule

Labels (10)

Filter by key or value		
Key	Value	
beta.kubernetes.io/arch	amd64	
beta.kubernetes.io/os	linux	
eks.amazonaws.com/compute-type	fargate	
failure-domain.beta.kubernetes.io/region	eu-west-2	
failure-domain.beta.kubernetes.io/zone	eu-west-2a	

Annotations (2)

Filter by key or value		
Key	Value	
node.alpha.kubernetes.io/ttl	0	
volumes.kubernetes.io/controller-managed-attach-detach	true	

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

2nd Fargate Node

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster > Node: fargate-ip-192-168-229-10.eu-west-2.compute.internal

fargate-ip-192-168-229-10.eu-west-2.compute.internal

Structured view Raw view C

Info Info

Status	Kernel version	Created
Ready	4.14.268-205.500.amzn2.x86_64	3 minutes ago
Last transition time	Node Group	Container runtime
3 minutes ago	-	containerd://1.4.6
OS (Architecture)	Instance	Kubelet version
linux (amd64)	-	v1.21.2-eks-06eac09
OS image	Instance type	
Amazon Linux 2	Fargate	

Pods (1) Info

Name	Status	Created
coredns-7464cd6c7d-lfgmp	Running	4 minutes ago

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster > Pod: coredns-7464cd6c7d-lfgmp

Pods (1) Info

Name	Status	Created
coredns-7464cd6c7d-lfgmp	Running	4 minutes ago

Conditions

Name	Status	Message
MemoryPressure	False	kubelet has sufficient memory available
DiskPressure	False	kubelet has no disk pressure
PIDPressure	False	kubelet has sufficient PID available
Ready	True	kubelet is posting ready status

Taints (1)

Key	Value	Effect
eks.amazonaws.com/compute-type	fargate	NoSchedule

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

The screenshot shows the AWS EKS Cluster details page for a specific node. It includes sections for PIDPressure, Taints (1), Labels (10), Annotations (2), and a table of node metrics.

Key	Value	Effect
eks.amazonaws.com/compute-type	fargate	NoSchedule

Key	Value
beta.kubernetes.io/arch	amd64
beta.kubernetes.io/os	linux
eks.amazonaws.com/compute-type	fargate
failure-domain.beta.kubernetes.io/region	eu-west-2
failure-domain.beta.kubernetes.io/zone	eu-west-2b

Key	Value
node.alpha.kubernetes.io/ttl	0
volumes.kubernetes.io/controller-managed-attach-detach	true

Step 16:

Viewing the Workloads created in the AWS EKS Cluster

The screenshot shows the AWS EKS Cluster Workloads page for the VP_EKS_Cluster. It displays three system pods: aws-node, coredns, and kube-proxy.

Name	Namespace	Type	Created	Last transition time	Pod count	Status
aws-node	kube-system	DaemonSet	39 minutes ago	-	0	-
coredns	kube-system	Deployment	39 minutes ago	4 minutes ago	2	2 Ready 0 Failed 2 Desired
kube-proxy	kube-system	DaemonSet	39 minutes ago	-	0	-

Workload 1

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster > DaemonSet: kube-system/aws-node

aws-node

Info Info

Status: 0 Desired | 0 Scheduled | 0 Available | 0 Ready

Created: 39 minutes ago

Add-on: -

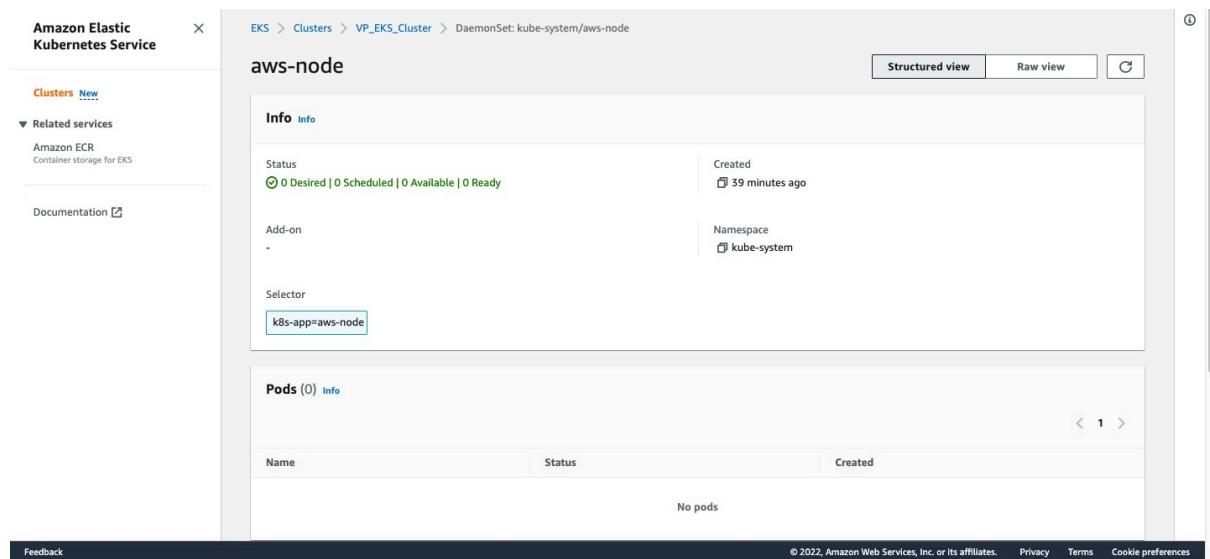
Namespace: kube-system

Selector: k8s-app=aws-node

Pods (0) Info

No pods

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences



Amazon Elastic Kubernetes Service

Clusters New

Related services: Amazon ECR

Documentation

Selector: k8s-app=aws-node

Pods (0) Info

No pods

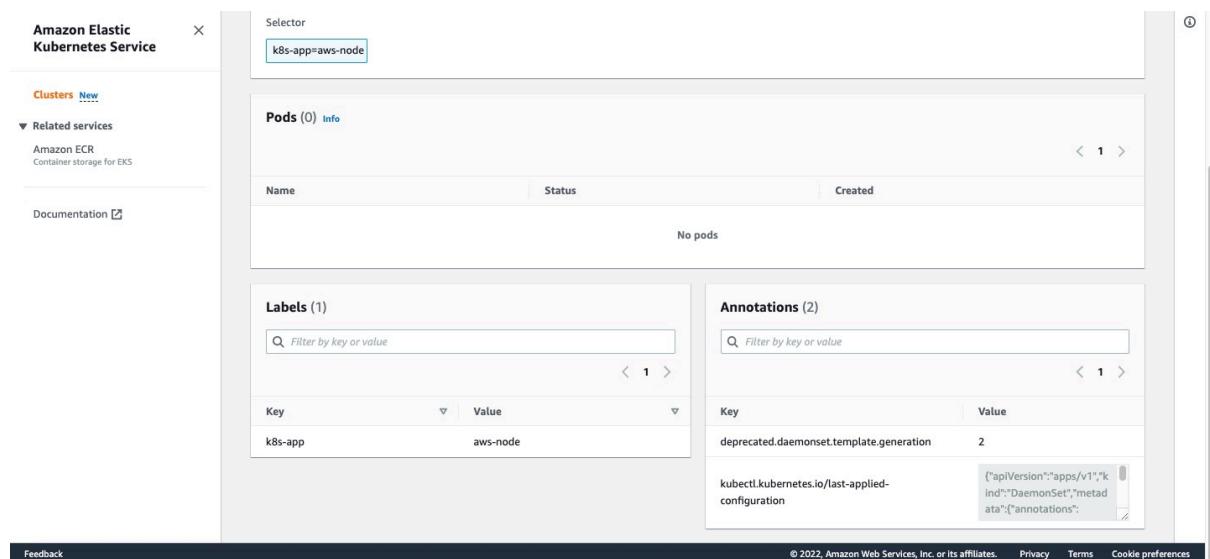
Labels (1)

Key	Value
k8s-app	aws-node

Annotations (2)

Key	Value
deprecated.daemonset.template.generation	2
kubectl.kubernetes.io/last-applied-configuration	{"apiVersion":"apps/v1","kind":"DaemonSet","metadata":{"annotations":{}}}

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences



Workload 2

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster > Deployment: kube-system/coredns

coredns

Info

Status	Created 2 Desired 2 Available 2 Ready	40 minutes ago
Add-on	coredns	Namespace kube-system
Selector	eks.amazonaws.com/component=coredns k8s-app=kube-dns	Strategy type RollingUpdate
Last transition time	5 minutes ago	

Pods (2)

Name	Status	Created
coredns-7464cd6c7d-lfgmp	Running	6 minutes ago
coredns-7464cd6c7d-zg86r	Running	6 minutes ago

Conditions

Name	Status	Message
Available	True	Deployment has minimum availability.
Progressing	True	ReplicaSet "coredns-7464cd6c7d" has successfully progressed.

Labels (3)

Key	Value
eks.amazonaws.com/component	coredns
k8s-app	kube-dns

Annotations (2)

Key	Value
deployment.kubernetes.io/revision	2
kubectl.kubernetes.io/last-applied-configuration	{"apiVersion":"apps/v1","kind":"Deployment","metadata":{},"spec":{},"status":{}}

Feedback

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster > Deployment: kube-system/coredns

coredns

Info

Status	Created 2 Desired 2 Available 2 Ready	40 minutes ago
Add-on	coredns	Namespace kube-system
Selector	eks.amazonaws.com/component=coredns k8s-app=kube-dns	Strategy type RollingUpdate
Last transition time	5 minutes ago	

Pods (2)

Name	Status	Created
coredns-7464cd6c7d-lfgmp	Running	6 minutes ago
coredns-7464cd6c7d-zg86r	Running	6 minutes ago

Conditions

Name	Status	Message
Available	True	Deployment has minimum availability.
Progressing	True	ReplicaSet "coredns-7464cd6c7d" has successfully progressed.

Labels (3)

Key	Value
eks.amazonaws.com/component	coredns
k8s-app	kube-dns

Annotations (2)

Key	Value
deployment.kubernetes.io/revision	2
kubectl.kubernetes.io/last-applied-configuration	{"apiVersion":"apps/v1","kind":"Deployment","metadata":{},"spec":{},"status":{}}

Feedback

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster > Deployment: kube-system/coredns

coredns

Info

Status	Created 2 Desired 2 Available 2 Ready	40 minutes ago
Add-on	coredns	Namespace kube-system
Selector	eks.amazonaws.com/component=coredns k8s-app=kube-dns	Strategy type RollingUpdate
Last transition time	5 minutes ago	

Pods (2)

Name	Status	Created
coredns-7464cd6c7d-lfgmp	Running	6 minutes ago
coredns-7464cd6c7d-zg86r	Running	6 minutes ago

Conditions

Name	Status	Message
Available	True	Deployment has minimum availability.
Progressing	True	ReplicaSet "coredns-7464cd6c7d" has successfully progressed.

Labels (3)

Key	Value
eks.amazonaws.com/component	coredns
k8s-app	kube-dns

Annotations (2)

Key	Value
deployment.kubernetes.io/revision	2
kubectl.kubernetes.io/last-applied-configuration	{"apiVersion":"apps/v1","kind":"Deployment","metadata":{},"spec":{},"status":{}}

Feedback

Workload 3

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster > DaemonSet: kube-system/kube-proxy

kube-proxy

Info Info

Status: 0 Desired | 0 Scheduled | 0 Available | 0 Ready

Created: 41 minutes ago

Add-on: kube-proxy

Namespace: kube-system

Selector: k8s-app=kube-proxy

Pods (0) Info

Name	Status	Created
No pods		

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

This screenshot shows the AWS EKS console interface for a specific DaemonSet named 'kube-proxy' within a cluster. The sidebar on the left lists the cluster and related services like Amazon ECR. The main panel displays the 'Info' tab for the DaemonSet, which is currently empty with 0 pods. The 'Selector' field is set to 'k8s-app=kube-proxy'. The 'Annotations' section shows two annotations: 'deprecated.daemonset.template.generation' with value '1' and 'kubectl.kubernetes.io/last-applied-configuration' with a JSON object representing the last applied configuration.

Amazon Elastic Kubernetes Service

Clusters New

Related services

Amazon ECR Container storage for EKS

Documentation

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Selector: k8s-app=kube-proxy

Pods (0) Info

Name	Status	Created
No pods		

Labels (2)

Key	Value
eks.amazonaws.com/component	kube-proxy
k8s-app	kube-proxy

Annotations (2)

Key	Value
deprecated.daemonset.template.generation	1
kubectl.kubernetes.io/last-applied-configuration	{"apiVersion":"apps/v1","kind":"DaemonSet","metadata":{"annotations":{},"name":"kube-proxy","namespace":"kube-system","uid":"..."},

This screenshot shows the AWS EKS console interface for the same 'kube-proxy' DaemonSet. The 'Labels' section lists 'eks.amazonaws.com/component' with value 'kube-proxy' and 'k8s-app' with value 'kube-proxy'. The 'Annotations' section shows the same two annotations as the previous screenshot, with the 'kubectl.kubernetes.io/last-applied-configuration' annotation containing a JSON object representing the last applied configuration.

Step 17:

For this business case; we will be deploying a Bank Note Authentication Machine Learning Python Flask Application that predicts a bank note either as Label 0 (Fake Bank Note) or as Label 1 (Genuine Bank Note).

The application is packaged into a Docker Container, private repository is created in the AWS ECR and the docker image is pushed into this AWS ECR Registry for further deployment into AWS Kubernetes EKS Fargate Cluster.

The screenshot shows the Amazon ECR interface. On the left, there's a sidebar with options like 'Private registry', 'Public registry', 'Repositories', 'Summary', **Images** (which is selected), 'Permissions', 'Lifecycle Policy', and 'Tags'. Below that are links for 'Getting started', 'Documentation', and 'Public gallery'. The main area shows a repository named 'bank-note-auth-ml-app-repo'. Underneath it, there's a table titled 'Images (1)'. The table has columns for 'Image tag', 'Pushed at', 'Size (MB)', 'Image URI', 'Digest', 'Scan status', and 'Vulnerabilities'. A single row is present with the 'latest' tag, pushed on '21 April 2022, 21:46:48 (UTC+01)', size '776.10 MB', and a long digest starting with 'sha256:285e81572111c3...'. There are buttons for 'View push commands', 'Edit', 'Delete', and 'Scan' at the top right of the table.

Creating the “eks-sample-deployment.yaml” file configured with the replica of pods as 1, container path of the AWS ECR Private Repository of the application image and namespace set as “default”.

Executing the “eks-sample-deployment.yaml” file using the below command.

```
kubectl apply -f eks-sample-deployment.yaml
```

Output:

```
deployment.apps/eks-bank-note-auth-ml-app-deployment created
```

Step 18:

Verifying the Deployments.

```
kubectl get deployments
```

Output:

```
(base) VidhyalakshmiAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$ kubectl get deployments
NAME                      READY   UP-TO-DATE   AVAILABLE   AGE
eks-bank-note-auth-ml-app-deployment   0/1     1           0           52s
(base) VidhyalakshmiAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$
```

```
(base) VidhyalakshmiAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$ kubectl get deployments
NAME                      READY   UP-TO-DATE   AVAILABLE   AGE
eks-bank-note-auth-ml-app-deployment   1/1     1           1           5m54s
(base) VidhyalakshmiAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$
```

Step 19:

Viewing the Pods.

```
kubectl get pods
```

```
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4  1/1     Running   0          7m10s
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$
```

As we have requested to spin only one replica of the pod in the “eks-sample-deployment.yaml”; we can see only one pod is enabled at the backend EC2 Fargate Instance by the AWS EKS Cluster.

Step 20:

Describing the Pod Details

```
kubectl describe pod eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4
```

```
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$ kubectl describe pod eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4
Name:           eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4
Namespace:      default
Priority:       2000001000
Priority Class Name: system-node-critical
Node:          fargate-ip-192-168-231-6.eu-west-2.compute.internal/192.168.231.6
Start Time:     Fri, 22 Apr 2022 02:33:42 +0100
Labels:         appmeks-bank-note-auth-ml-app
                eks.amazonaws.com/fargate-profile=VP_Fargate_Profile
                pod-template-hash=7dc6ff55dc
Annotations:   CapacityProvisioned: 0.28vCPU 0.5GB
                Logging: LoggingDisabled: LOGGING_CONFIGMAP_NOT_FOUND
                kubernetes.io/psp: eks.privileged
Status:        Running
IP:            192.168.231.6
IPs:
  IP:          192.168.231.6
  IP:          192.168.231.6
Containers:
  bank-note-auth-ml-app-repo:
    Container ID:  containerd://93dd1490daa7172fcfcbb841daa0140fdf02bd362f9d5ada330171a146dc458
    Image:         146871189787.dkr.ecr.eu-west-2.amazonaws.com/bank-note-auth-ml-app-repo:latest
    Image ID:     146871189787.dkr.ecr.eu-west-2.amazonaws.com/bank-note-auth-ml-app-repo@sha256:285e81572111c308afcb62a4f1eaac6910a0e1dd4bd8b831eb5cb55af86e862
    Port:         8080/TCP
    Host Port:   8/TCP
    State:       Running
    Started:    Fri, 22 Apr 2022 02:38:26 +0100
    Ready:       True
    Restart Count: 0
    Environment:
      PORT: 8080
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-fft8g (ro)
Conditions:
  Type        Status
  Initialized  True
  Ready       True
  ContainersReady  True
  PodScheduled  True
Volumes:
  kube-api-access-fft8g:
    Type:           Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:  kube-root-ca.crt
    ConfigMapOptional: <nil>
    DownwardAPI:   true
QoS Class:      BestEffort
Node-Selectors: <none>
Tolerations:
  node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
  node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type  Reason     Age   From           Message
  ----  ----      --   --            --
  Warning  LoggingDisabled 15m   fargate-scheduler  Disabled logging because aws-logging configmap was not found. configmap "aws-logging" not found
  Normal   Scheduled  14m   fargate-scheduler  Successfully assigned default/eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4 to fargate-ip-192-168-231-6.eu-west-2.compute.internal
  Normal   Pulling    14m   kubelet        Pulling image "146871189787.dkr.ecr.eu-west-2.amazonaws.com/bank-note-auth-ml-app-repo:latest"
  Normal   Pulled    9m30s  kubelet        Successfully pulled image "146871189787.dkr.ecr.eu-west-2.amazonaws.com/bank-note-auth-ml-app-repo:latest" in 4m42.841547977s
  Normal   Created    9m30s  kubelet        Created container bank-note-auth-ml-app-repo
  Normal   Started    9m30s  kubelet        Started container bank-note-auth-ml-app-repo
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$
```

```
Volumes:
  kube-api-access-fft8g:
    Type:           Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:  kube-root-ca.crt
    ConfigMapOptional: <nil>
    DownwardAPI:   true
QoS Class:      BestEffort
Node-Selectors: <none>
Tolerations:
  node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
  node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type  Reason     Age   From           Message
  ----  ----      --   --            --
  Warning  LoggingDisabled 15m   fargate-scheduler  Disabled logging because aws-logging configmap was not found. configmap "aws-logging" not found
  Normal   Scheduled  14m   fargate-scheduler  Successfully assigned default/eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4 to fargate-ip-192-168-231-6.eu-west-2.compute.internal
  Normal   Pulling    14m   kubelet        Pulling image "146871189787.dkr.ecr.eu-west-2.amazonaws.com/bank-note-auth-ml-app-repo:latest"
  Normal   Pulled    9m30s  kubelet        Successfully pulled image "146871189787.dkr.ecr.eu-west-2.amazonaws.com/bank-note-auth-ml-app-repo:latest" in 4m42.841547977s
  Normal   Created    9m30s  kubelet        Created container bank-note-auth-ml-app-repo
  Normal   Started    9m30s  kubelet        Started container bank-note-auth-ml-app-repo
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$
```

Step 21:

Now we can see that a 3rd Fargate Instance and another Workload created based on the successful execution of the “eks-sample-deployment.yaml” file.

New Fargate Instance/Node Created for Deployment

The screenshot shows the EKS console interface. The top navigation bar includes 'Clusters New' and 'Related services' (Amazon ECR). The main cluster 'VP_EKS_Cluster' is active. A message indicates a new Kubernetes version is available. The 'Nodes (3)' section lists three Fargate nodes, each with its name, instance type, node group, creation time, and status (Ready). The third node, 'fargate-ip-192-168-231-6.eu-west-2.compute.internal', is highlighted with a red box.

The screenshot shows the detailed view for the selected Fargate node. It displays node-specific information such as status, kernel version, and container runtime. Below this, a 'Pods (1)' section shows one pod named 'fargate-ip-192-168-231-6.eu-west-2.compute.internal'. The pod table includes columns for Name, Status, and Created.

Amazon Elastic Kubernetes Service

Clusters New

Related services: Amazon ECR

Documentation

Pods (1) Info

Name	Status	Created
eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4	Running	38 minutes ago

Conditions

Name	Status	Message
MemoryPressure	False	kubelet has sufficient memory available
DiskPressure	False	kubelet has no disk pressure
PIDPressure	False	kubelet has sufficient PID available
Ready	True	kubelet is posting ready status

Taints (1)

Key	Value	Effect
eks.amazonaws.com/compute-type	fargate	NoSchedule

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Amazon Elastic Kubernetes Service

Clusters New

Related services: Amazon ECR

Documentation

Labels (10)

Key	Value
beta.kubernetes.io/arch	amd64
beta.kubernetes.io/os	linux
eks.amazonaws.com/compute-type	fargate
failure-domain.beta.kubernetes.io/region	eu-west-2
failure-domain.beta.kubernetes.io/zone	eu-west-2b

Taints (1)

Key	Value	Effect
eks.amazonaws.com/compute-type	fargate	NoSchedule

Annotations (2)

Key	Value
node.alpha.kubernetes.io/ttl	0
volumes.kubernetes.io/controller-managed-attach-detach	true

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

New Workload Created for Deployment

Amazon Elastic Kubernetes Service

EKS > Clusters > VP_EKS_Cluster

VP_EKS_Cluster

A new Kubernetes version is available for this cluster. Learn more

Workloads (4) Info

Name	Namespace	Type	Created	Last transition time	Pod count	Status
aws-node	kube-system	DaemonSet	an hour ago	-	0	-
coredns	kube-system	Deployment	an hour ago	an hour ago	2	2 Ready 0 Failed 2 Desired
eks-bank-note-auth-ml-app-deployment	default	Deployment	35 minutes ago	30 minutes ago	1	1 Ready 0 Failed 1 Desired
kube-proxy	kube-system	DaemonSet	an hour ago	-	0	-

Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

The screenshot shows two views of the AWS EKS console. The top view displays the deployment details for 'eks-bank-note-auth-ml-app-deployment'. It shows a status of 'Created' (1 Desired | 1 Available | 1 Ready), an add-on of 'None', a namespace of 'default', and a selector of 'app=eks-bank-note-auth-ml-app'. The bottom view shows the single pod 'eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4' in a 'Running' state, created 37 minutes ago. It also lists conditions: 'Available' (True) and 'Progressing' (True). The labels for the pod are 'app: eks-bank-note-auth-ml-app'. Annotations include 'deployment.kubernetes.io/revision: 1' and 'kubectL.kubernetes.io/last-applied-configuration' with a JSON object.

Step 22:

Verifying the Logs of the Pods

```
kubectl logs eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4
```

```
(base) VidhyalakshmiAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$ kubectl logs eks-bank-note-auth-ml-app-deployment-7dc6ff55dc-4fgg4
 * Serving Flask app "flask_api" (lazy loading)
 * Environment: production
WARNING: This is a development server. Do not use it in a production deployment.
Use a production WSGI server instead.
* Debug mode: off
/opt/conda/lib/python3.6/site-packages/sklearn/base.py:318: UserWarning: Trying to unpickle estimator DecisionTreeClassifier from version 0.24.2 when using version 0.22.1. This
might lead to breaking code or invalid results. Use at your own risk.
UserWarning)
/opt/conda/lib/python3.6/site-packages/sklearn/base.py:318: UserWarning: Trying to unpickle estimator RandomForestClassifier from version 0.24.2 when using version 0.22.1. This
might lead to breaking code or invalid results. Use at your own risk.
UserWarning)
* Running on http://0.0.0.0:8000/ (Press CTRL+C to quit)
(base) VidhyalakshmiAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$
```

Step 23:

Exposing the deployed application to the end-user access by creating and applying the “eks-sample-service.yaml” file.

```
kubectl apply -f eks-sample-service.yaml
```

Output:

```
service/eks-bank-note-auth-ml-app-service created
```

Step 24:

Viewing the status of the services.

```
kubectl get services
```

```
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$ kubectl get services
NAME          TYPE        CLUSTER-IP      EXTERNAL-IP    PORT(S)        AGE
eks-bank-note-auth-ml-app-service   ClusterIP   10.100.78.20    <none>        80/TCP       3m28s
kubernetes     ClusterIP   10.100.0.1     <none>        443/TCP      102m
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$
```

```
(base) VidhyalshmisAir:Deployment_of_Bank_Notes_Authentication_App_into_Kubernetes_using_AWS_EKS_CloudFormation vidhyalakshmi.parthasarathy$ kubectl get services
NAME          TYPE        CLUSTER-IP      EXTERNAL-IP    PORT(S)        AGE
eks-bank-note-auth-ml-app-service   ClusterIP   10.100.78.20    1.2.3.140    80/TCP       39m
kubernetes     ClusterIP   10.100.0.1     <none>        443/TCP      138m
```

As we can see from the above results; the application is served to the end-user by assigning a public cluster IP Address as 10.100.78.20 and Public IP Address as 1.2.3.140 with Port as 80 as configured in the “eks-sample-service.yaml” file.

Step 25:

Verifying the Output of the Deployed Application in AWS EKS Cluster.

```
Welcome to the Bank Notes Authentication Application...
```

Label 0 (Fake Bank Note) Prediction

The Authentication Status of the given Bank Note is [0]

Label 1 (Genuine Bank Note) Prediction

The Authentication Status of the given Bank Note is [1]