

ICT & Infra S3 AO-Week14: Kubernetes

Date: Sep 2020
Version 1.0

Class: CB01

Student number: 4961854

Student name: Heiko Morales

Introduction

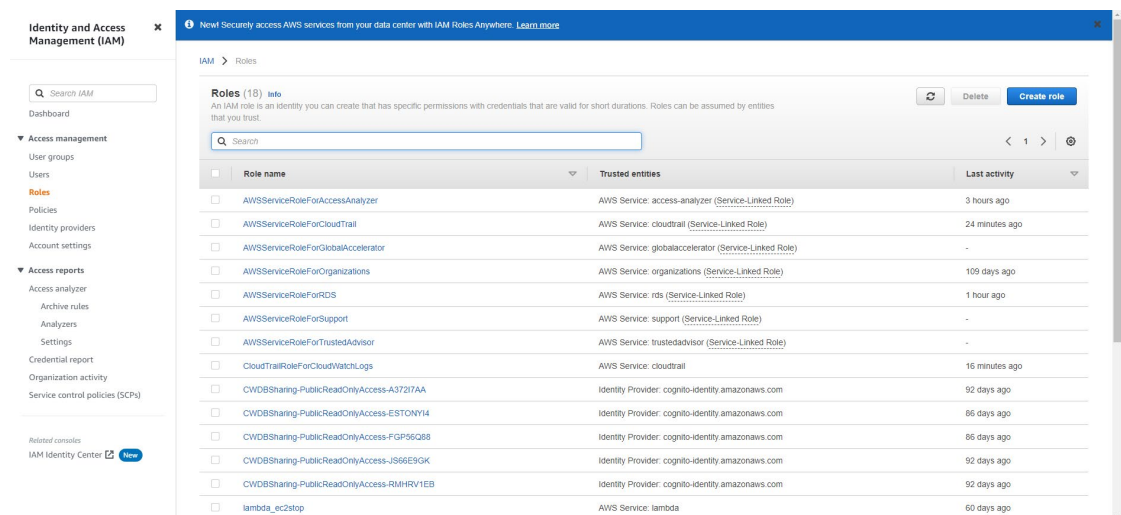
In week 14 you got an introduction to Kubernetes. Before executing the HW assignment, complete the “Learn Kubernetes Basics” tutorial at <https://kubernetes.io/docs/tutorials/kubernetes-basics/> Links to an external site. Try to read the tutorial and understand the commands you are executing. This will give you basic knowledge about Kubernetes.

Assignment 1: Create initial AWS Route53 setup.

- Deploy your own app (from S2 or S3) to the EKS Fargate cluster
- Enable Kubernetes Auto Scaling
- Test the deployment (can be done in week 15)
- Describe and submit here your results (can be done in week 15)
- (!) Remove the service/cluster if it will not be used anymore

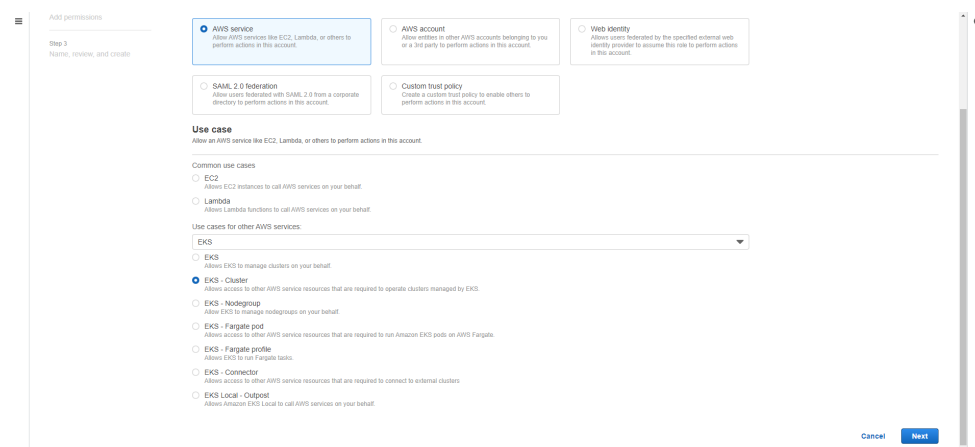
Solution:

We must first create a new role in IAM.



The screenshot shows the AWS IAM console 'Roles' page. The left sidebar contains navigation links for Identity and Access Management (IAM), including Dashboard, Access management, Users, Roles, Policies, Identity providers, Account settings, Access reports, and Related consoles. The main content area shows a list of roles with columns for Role name, Trusted entities, and Last activity. The roles listed include AWS service-linked roles like 'AWSServiceRoleForAccessAnalyzer', 'AWSServiceRoleForCloudTrail', and 'AWSServiceRoleForRDS', as well as custom roles like 'CognitoIdentityProviderRoleForAmazonCognito'. The 'Create role' button is located in the top right corner of the roles list.

we select the EKS use case and next



The screenshot shows the 'Add permissions' step in the AWS IAM console. The 'Use case' section is expanded, showing various AWS services and use cases. The 'EKS' use case is selected, which allows EKS to manage clusters on your behalf. The 'Next' button is visible at the bottom right of the page.

We will add the details

Role details

Role name

Enter a meaningful name to identify this role.

heikoeks

Maximum 64 characters. Use alphanumeric and '+,=,@,-,_' characters.

Description

Add a short explanation for this role.

Allows access to other AWS service resources that are required to operate clusters managed by EKS. Amazon EKS - Cluster role

Maximum 1000 characters. Use alphanumeric and '+,=,@,-,_' characters.

Step 1: Select trusted entities

```
1 {  
2   "Version": "2012-10-17",  
3   "Statement": [  
4     {  
5       "Effect": "Allow",  
6       "Principal": {  
7         "Service": [  
8           "eks.amazonaws.com"  
9         ]  
10      },  
11      "Action": "sts:AssumeRole"  
12    }  
13  ]  
14 }
```

and in the eks section we will add a new cluster and add the new role we have created.

EKS > Clusters > Create EKS cluster

Step 1
Configure cluster

Step 2
Specify networking

Step 3
Configure logging

Step 4
Select add-ons

Step 5
Configure selected add-ons settings

Step 6
Review and create

Configure cluster

Cluster configuration [Info](#)

Name
Enter a unique name for this cluster. This property cannot be changed after the cluster is created.

Type name

The cluster name should begin with letter or digit and can have any of the following characters: the set of Unicode letters, digits, hyphens and underscores. Maximum length of 100.

Kubernetes version [Info](#)
Select the Kubernetes version for this cluster.

1.24

Cluster service role [Info](#)
Select the IAM role to allow the Kubernetes control plane to manage AWS resources on your behalf. This property cannot be changed after the cluster is created. To create a new role, follow the instructions in the [Amazon EKS User Guide](#).

heikoeks

Secrets encryption [Info](#)

Once turned on, secrets encryption cannot be modified or removed.

☒ Turn on envelope encryption of Kubernetes secrets using KMS
Envelope encryption provides an additional layer of encryption for your Kubernetes secrets.

Tags (0) [Info](#)

This cluster does not have any tags.

Add tag

Remaining tags available to add: 50

Cancel

Next

Later, we will configure the networking section where our cluster will run.

Networking [Info](#)

These properties cannot be changed after the cluster is created.

VPC [Info](#)

Select a VPC to use for your EKS cluster resources. To create a new VPC, go to the [VPC console](#).

vpc-025b41945b783a001 | Default

Subnets [Info](#)

Choose the subnets in your VPC where the control plane may place elastic network interfaces (ENIs) to facilitate communication with your cluster. To create a new subnet, go to the corresponding page in the [VPC console](#).

Select subnets

subnet-01f1b55723562c262

subnet-00f1f8cbdf712f9f8

subnet-098c6f0ed18ccb993

Security groups [Info](#)

Choose the security groups to apply to the EKS-managed Elastic Network Interfaces that are created in your worker node subnets. To create a new security group, go to the corresponding page in the [VPC console](#).

Select security groups

sg-08d38fe5ad03a73bd

Choose cluster IP address family [Info](#)

Specify the IP address type for pods and services in your cluster.

☒ IPv4

☐ IPv6

☐ Configure Kubernetes service IP address range [Info](#)
Specify the range from which cluster services will receive IP addresses.

Cluster endpoint access [Info](#)

Configure access to the Kubernetes API server endpoint.

☒ Public
The cluster endpoint is accessible from outside of your VPC. Worker node traffic will leave your VPC to connect to the endpoint.

☐ Public and private
The cluster endpoint is accessible from outside of your VPC. Worker node traffic to the endpoint will stay within your VPC.

☐ Private
The cluster endpoint is only accessible through your VPC. Worker node traffic to the endpoint will stay within your VPC.

☐ Advanced settings

Cancel

Previous

Next

As we can see, the cluster has been created and we can create the first node to deploy our application in an ec2.

EKS > Clusters > heikokubernetes

heikokubernetes

⌵ Delete cluster

▼ Cluster info info

Kubernetes version info1.24

Status⌵Creating

ProviderEKS

OverviewResourcesComputeNetworkingAdd-onsAuthenticationLoggingUpdate historyTags

Details

API server endpoint⌵

Certificate authority⌵

OpenID Connect provider URL⌵

Cluster IAM role ARNarn:aws:iam:807013657668:role/heikokoeks

Created⌵6 minutes ago

Cluster ARNarn:aws:eks:eu-central-1:807013657668:cluster/heikokubernetes

Platform version info-

Secrets encryption info

Secrets encryptionoff

KMS key ID⌵

Enable

But before creating the node, an IAM with specific permissions must be generated.

IAM > Roles > heikonoderole

heikonoderole

Delete

Allows EC2 instances to call AWS services on your behalf.

Summary

Edit

Creation dateDecember 19, 2022, 17:01 (UTC+01:00)

ARNarn:aws:iam:807013657668:role/heikonoderole

Instance profile ARNarn:aws:iam:807013657668:instance-profile/heikonoderole

Last activityNone

Maximum session duration1 hour

PermissionsTrust relationshipsTagsAccess AdvisorRevoke sessions

Permissions policies (3) info

⌵ Simulate Remove Add permissions ▼

You can attach up to 10 managed policies.

🔍 Filter policies by property or policy name and press enter.

< 1 > ⌵

☐

Policy name ⓘ

▼

Type

▼

Description

☐

AmazonEKSWorkerNodePolicy

AWS managed

This policy allows Amazon EKS worker nodes to connect to Amazon EKS Clusters.

☐

AmazonEC2ContainerRegistryReadOnly

AWS managed

Provides read-only access to Amazon EC2 Container Registry repositories.

☐

AmazonEKS_CNI_Policy

AWS managed

This policy provides the Amazon VPC CNI Plugin (amazon-vpc-cni-k8s) the permissions it requires to modify the IP address configuration on your ...

Once created, we add it to the configuration of a new node and configure the automatic scaling.

Set compute and scaling configuration

Node group compute configuration

These properties cannot be changed after the node group is created.

AMI type [Info](#)

Select the EKS-optimized Amazon Machine Image for nodes.

Amazon Linux 2 (AL2_x86_64) ▼

Capacity type

Select the capacity purchase option for this node group.

On-Demand ▼

Instance types [Info](#)

Select instance types you prefer for this node group.

Select ▼

t3.micro

vCPU: 2 vCPUs Memory: 1 GiB Network: Up to 5 Gigabit Max ENI: 2 Max IPs: 4



Disk size

Select the size of the attached EBS volume for each node.

20

GiB

Node group scaling configuration

Desired size

Set the desired number of nodes that the group should launch with initially.

1

nodes

Minimum size

Set the minimum number of nodes that the group can scale in to.

1

nodes

Maximum size

Set the maximum number of nodes that the group can scale out to.

3

nodes

Later, we select the subnets.

Specify networking

Node group network configuration

These properties cannot be changed after the node group is created.

Subnets

Info

Specify the subnets in your VPC where your nodes will run.To create a new subnet, go to the corresponding page in the VPC console.

Select subnets

subnet-01f1b55723562c262

subnet-00f1f8cbdf712f9f8

subnet-098c6f0ed18ccb993

☐ Configure SSH access to nodes

Info

Cancel

Previous

Next

and we have already created a node which as we can see we have set a minimum of one ec2 and a maximum of 3.

EKS > Clusters > heikonkubernetes > Node group: heikonode

heikonode

Node group configuration

Info

Kubernetes version

1.24

AMI type

AL2_x86_64

Status

Active

AMI release version

1.24.7-20221112

Instance types

t3.micro

Disk size

20 GiB

Details

Nodes

Health issues

Kubernetes labels

Update config

Kubernetes taints

Update history

Tags

Details

Node group ARN

Autoscaling group name

Capacity type

Subnets

Finally, we can check that this node works by going to instances and seeing that one has been created automatically.

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	A...	Availabil...	Public IPv4 address	Elastic IP	Security group name	Key name
<input type="checkbox"/>	load_balancer	i-0941ddcd77fb18f6	Running	t2.micro	2/2 checks passed	+	eu-central-1a	3.74.73.9	-	launch-wizard-4	heiko_ubuntu_key
<input type="checkbox"/>	WebServer	i-097654c202233b0e	Running	t2.micro	2/2 checks passed	+	eu-central-1a	3.71.101.99	-	launch-wizard-10	freepasskey
<input type="checkbox"/>	Backup_Server	i-0d3a08288b5f8a0c	Running	t2.micro	2/2 checks passed	+	eu-central-1a	-	-	launch-wizard-12	freepasskey
<input type="checkbox"/>	-	i-0d32044e563bad4d	Running	t3.micro	2/2 checks passed	+	eu-central-1a	18.194.173.224	-	eks-cluster-sg-heikonkubernetes-2121085770	-
<input type="checkbox"/>	APIserver	i-0d70b146872737818	Running	t2.micro	2/2 checks passed	+	eu-central-1b	18.156.3.233	-	launch-wizard-7	APIserverkey
<input type="checkbox"/>	DBserver	i-0d5c84597c5274dbb	Running	t2.micro	2/2 checks passed	+	eu-central-1b	-	-	launch-wizard-15	freepasskey