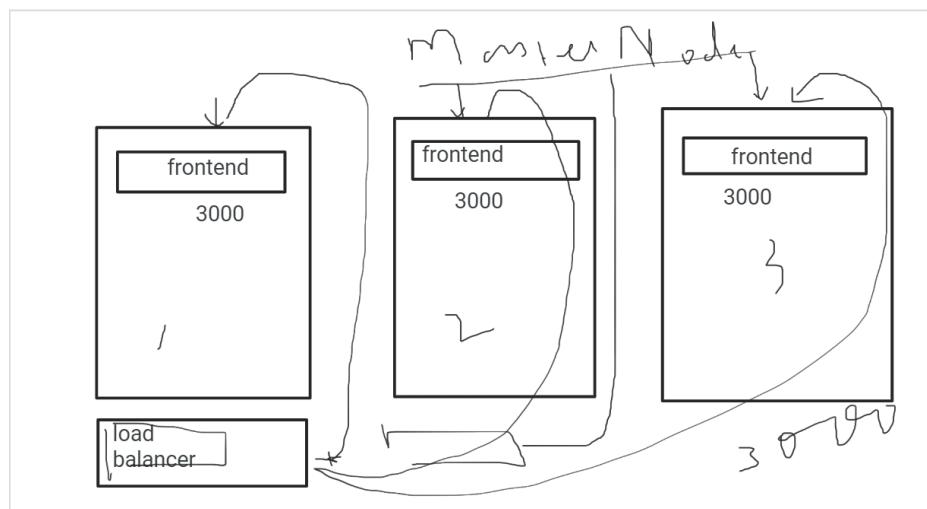


➤ Basic Overview:

- I. installations-aws cli,kubectl,eksctl
- II. permissions
- III. k8 cluster
- IV. pull docker image from docker hub and convert it into k8 deployment,pod are formed concurrently
- V. service--loadbalancer(public url)
- VI. expose (public url:3000)

➤ Detailed Overview:

- I. Installation (aws cli: so instance can communicate outside of its self and with aws services, kubectl: for master node, eksctl: aws service to use Kubernetes)
- II. Permissions: to the instance, aws roles, special permissions set to interact aws services, like giving admin rights to instance
- III. K8 cluster: making the instance master node and asking it to create worker nodes for itself
- IV. K8 deployment: converting docker images to k8 deployment, as deployment is formed, pods are formed concurrently with deployment
- V. K8 service: to make pod available to the external
- VI. EXPOSE: port binding



1. Launch ec2 instance. See security group settings in basic deployment documents.  
Connect to it

**Linux x86 (64-bit)** | **Linux ARM**

**Note**

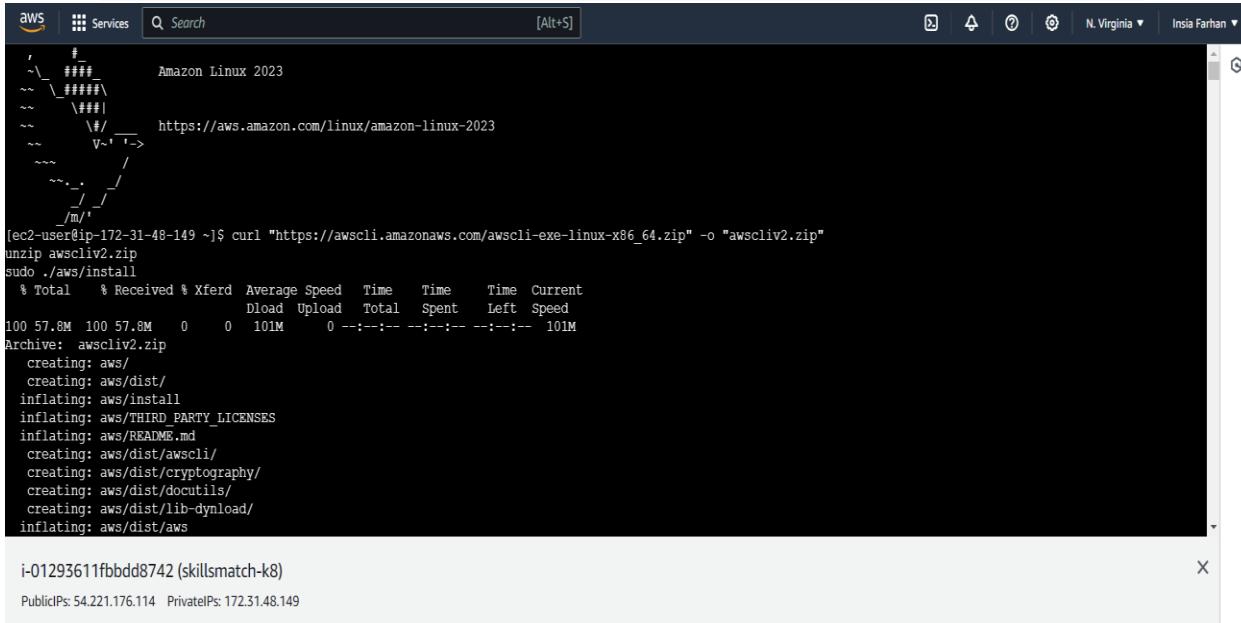
**(Optional)** The following command block downloads and installs the AWS CLI without first verifying the integrity of your download. To verify the integrity of your download, use the below step by step instructions.

**To install** the AWS CLI, run the following commands.

```
$ curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awscliv2.zip"
unzip awscliv2.zip
sudo ./aws/install
```

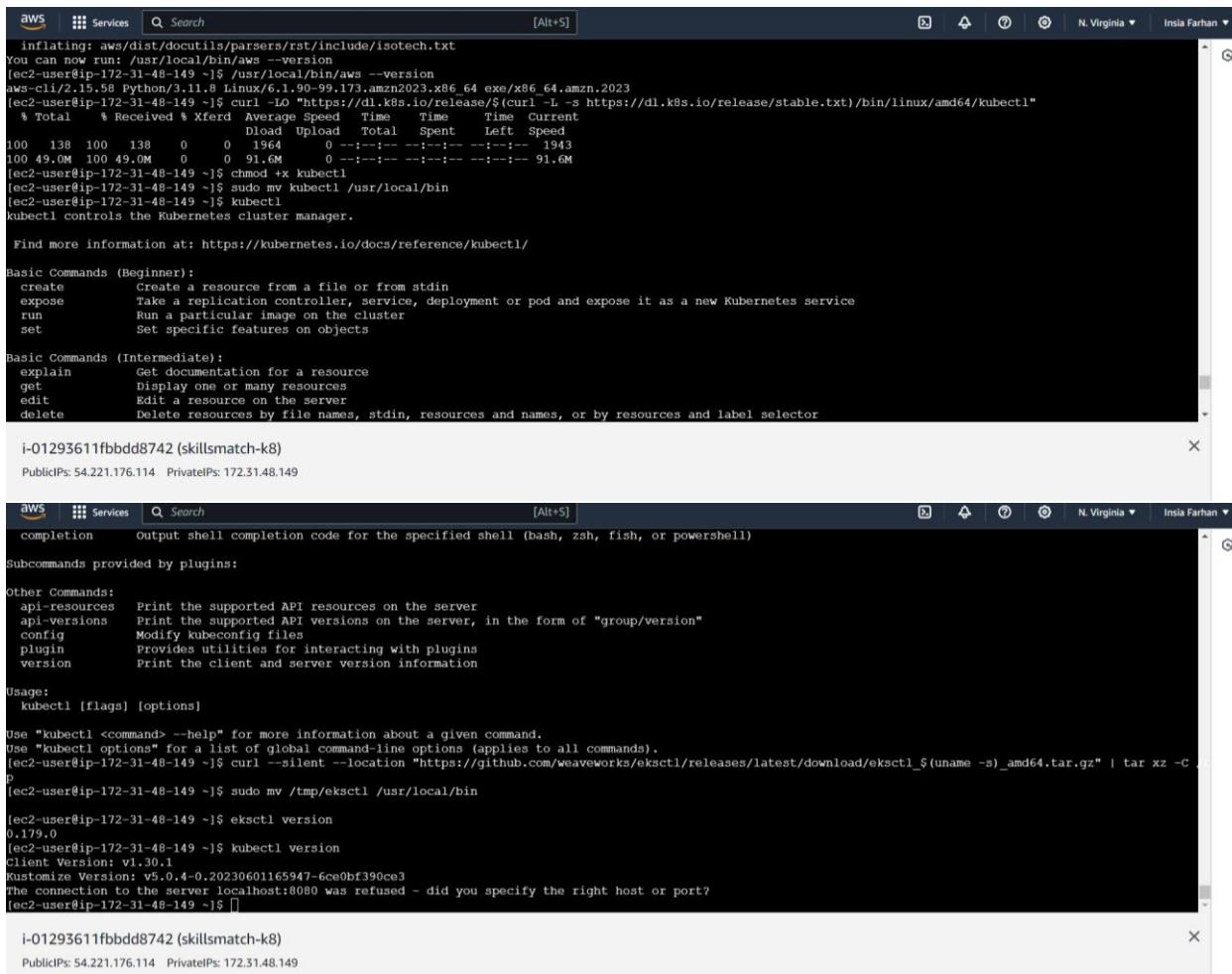
To update your current installation of the AWS CLI, add your existing symlink and installer information to construct the `install` command using the `--bin-dir`, `--install-dir`, and `--update` parameters. The following command block uses an example symlink of `/usr/Local/bin` and example installer location of `/usr/Local/aws-cli`.

2. Run the following command:  
`curl -LO "https://dl.k8s.io/release/$(curl -L -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"`



### 3. Run the following:

```
chmod +x kubectl
sudo mv kubectl /usr/local/bin
```



```
aws Services Search [Alt+S] N. Virginia Insia Farhan
inflating: aws/dist/docutils/parsers/rst/include/isotech.txt
You can now run: /usr/local/bin/aws --version
[ec2-user@ip-172-31-49-149 ~]$ /usr/local/bin/aws --version
aws-cli/2.15.58 Python/3.11.8 Linux/6.1.90-99.173.amzn2023.x86_64 exe/x86_64.amzn.2023
[ec2-user@ip-172-31-49-149 ~]$ curl -LO "https://dl.k8s.io/release/$(curl -I -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"
  % Total    % Received = Xferd  Average Speed   Time   Time  Current
                                 Dload  Upload Total Spent   Left Speed
100 138 100 138  0    0  1964  0  --:--:--:--:--:--:--:-- 1943
100 49.0M 100 49.0M  0    0  91.6M  0  --:--:--:--:--:--:--:-- 91.6M
[ec2-user@ip-172-31-49-149 ~]$ chmod +x kubectl
[ec2-user@ip-172-31-49-149 ~]$ sudo mv kubectl /usr/local/bin
[ec2-user@ip-172-31-49-149 ~]$ kubectl
kubectl controls the Kubernetes cluster manager.

Find more information at: https://kubernetes.io/docs/reference/kubectl/

Basic Commands (Beginner):
  create      Create a resource from a file or from stdin
  expose      Take a replication controller, service, deployment or pod and expose it as a new Kubernetes service
  run         Run a particular image on the cluster
  set         Set specific features on objects

Basic Commands (Intermediate):
  explain     Get documentation for a resource
  get         Display one or many resources
  edit        Edit a resource on the server
  delete     Delete resources by file names, stdin, resources and names, or by resources and label selector

i-01293611fbbdd8742 (skillsmatch-k8)
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

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completion  Output shell completion code for the specified shell (bash, zsh, fish, or powershell)
Subcommands provided by plugins:

Other Commands:
  api-resources  Print the supported API resources on the server
  api-versions   Print the supported API versions on the server, in the form of "group/version"
  config        Modify kubeconfig files
  plugin        Provides utilities for interacting with plugins
  version       Print the client and server version information

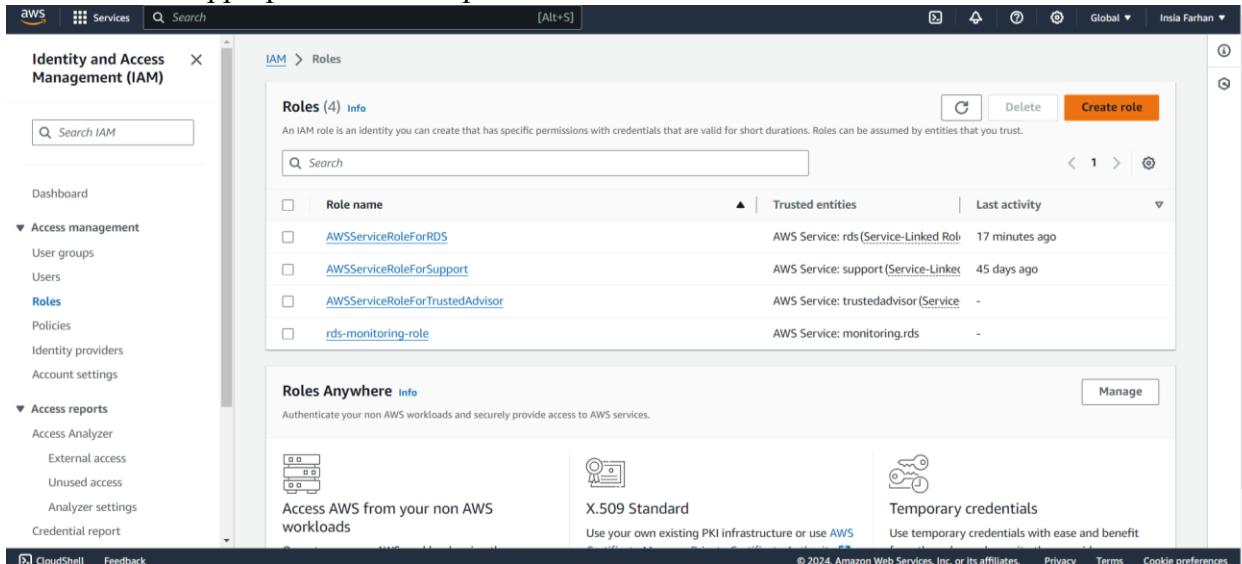
Usage:
  kubectl [flags] [options]

Use "kubectl <command> --help" for more information about a given command.
Use "kubectl options" for a list of global command-line options (applies to all commands).
[ec2-user@ip-172-31-49-149 ~]$ curl --silent --location "https://github.com/weaveworks/eksctl/releases/latest/download/eksctl_$(uname -s)_amd64.tar.gz" | tar xz -C /
[ec2-user@ip-172-31-48-149 ~]$ sudo mv /tmp/eksctl /usr/local/bin

[ec2-user@ip-172-31-48-149 ~]$ eksctl version
0.179.0
[ec2-user@ip-172-31-48-149 ~]$ kubectl version
Client Version: v1.30.1
Kustomize Version: v5.0.4-0.20230601165947-6ce0bf390ce3
The connection to the server localhost:8080 was refused - did you specify the right host or port?
[ec2-user@ip-172-31-48-149 ~]$ 
```

i-01293611fbbdd8742 (skillsmatch-k8)  
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

### 4. Create appropriate roles for permissions so that EC2 can act as master and form cluster.



Identity and Access Management (IAM)

IAM > Roles

Roles (4) Info

An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.

Role name	Trusted entities	Last activity
AWSServiceRoleForRDS	AWS Service: rds (Service-Linked Role)	17 minutes ago
AWSServiceRoleForSupport	AWS Service: support (Service-Linked Role)	45 days ago
AWSServiceRoleForTrustedAdvisor	AWS Service: trustedadvisor (Service-Linked Role)	-
rds-monitoring-role	AWS Service: monitoring.rds	-

Roles Anywhere Info

Authenticate your non AWS workloads and securely provide access to AWS services.

Manage

Access AWS from your non AWS workloads

X.509 Standard

Temporary credentials

Use your own existing PKI infrastructure or use AWS

Use temporary credentials with ease and benefit

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**Select trusted entity**

Step 2: Add permissions

Step 3: Name, review, and create

**Trusted entity type**

- AWS service**  
Allow AWS services like EC2, Lambda, or others to perform actions in this account.
- AWS account**  
Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
- Web identity**  
Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
- SAML 2.0 federation**  
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.
- Custom trust policy**  
Create a custom trust policy to enable others to perform actions in this account.

**Use case**  
Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

Service or use case: EC2

**Identity and Access Management (IAM)**

**k8-master-role**

Allows EC2 instances to call AWS services on your behalf.

**Summary**

Creation date May 28, 2024, 20:00 (UTC+05:00)	ARN arn:aws:iam::211125493694:role/k8-master-role	Instance profile ARN arn:aws:iam::211125493694:instance-profile/k8-master-role
Last activity -	Maximum session duration 1 hour	

**Permissions** | **Trust relationships** | **Tags** | **Access Advisor** | **Revoke sessions**

**Permissions policies (4)**

You can attach up to 10 managed policies.

Filter by Type: All types

Search	ARN	Policy name	Type	Attached entities
	arn:aws:iam::211125493694:policy/AmazonEC2FullAccess	AmazonEC2FullAccess	AWS managed	1
	arn:aws:iam::211125493694:policy/AmazonVPCFullAccess	AmazonVPCFullAccess	AWS managed	1
	arn:aws:iam::211125493694:policy/AWSCloudFormationFullAccess	AWSCloudFormationFullAccess	AWS managed	1
	arn:aws:iam::211125493694:policy/IAMFullAccess	IAMFullAccess	AWS managed	1

**Identity and Access Management (IAM)**

**Generate policy based on CloudTrail events**

You can generate a new policy based on the access activity for this role, then customize, create, and attach it to this role. AWS uses your CloudTrail events to identify the services and actions used and generate a policy. [Learn more](#)

**Generate policy**

No requests to generate a policy in the past 7 days.

Screenshot of the AWS IAM Policies page (Step 1: Specify permissions).

**Policies (1196) Info**  
A policy is an object in AWS that defines permissions.

**Filter by Type**  
Search: All types

Policy name	Type	Used as	Description
AccessAnalyzerService...	AWS managed	None	-
AdministratorAccess	AWS managed - job function	None	Provides full access to AWS services an...
AdministratorAccess-...	AWS managed	None	Grants account administrative permisi...
AdministratorAccess-...	AWS managed	None	Grants account administrative permisi...
AlexaForBusinessDevi...	AWS managed	None	Provide device setup access to AlexaFo...
AlexaForBusinessFullA...	AWS managed	None	Grants full access to AlexaForBusiness ...
AlexaForBusinessGate...	AWS managed	None	Provide gateway execution access to A...
AlexaForBusinessLifes...	AWS managed	None	Provide access to Lifesize AVS devices
AlexaForBusinessNet...	AWS managed	None	-
AlexaForBusinessDolu...	AWS managed	None	Provide access to AlexaForBusiness devices

Screenshot of the AWS IAM Create policy page (Step 1: Specify permissions).

**Step 1 Specify permissions**  
Add permissions by selecting services, actions, resources, and conditions. Build permission statements using the JSON editor.

**Policy editor**

```

1  {
2     "Version": "2012-10-17",
3     "Statement": [
4         {
5             "Sid": "eksadministrator",
6             "Effect": "Allow",
7             "Action": "eks:*",
8             "Resource": "*"
9         }
10    ]
11 }
12

```

**Edit statement**  
Select an existing statement in the policy or add a new statement.

**Add new statement**

Screenshot of the AWS IAM Create policy page (Step 2: Review and create).

**Step 1 Specify permissions**  
Review the permissions, specify details, and tags.

**Step 2 Review and create**

**Policy details**

**Policy name**  
Enter a meaningful name to identify this policy.  
k8-policy

Maximum 128 characters. Use alphanumeric and '+\_, @\_-' characters.

**Description - optional**  
Add a short explanation for this policy.

Maximum 1,000 characters. Use alphanumeric and '+\_, @\_-' characters.

**Permissions defined in this policy**  
Edit

Permissions defined in this policy document specify which actions are allowed or denied. To define permissions for an IAM identity (user, user group, or role), attach a policy to it.

**Search**

**Permissions defined in this policy** Info

Permissions defined in this policy document specify which actions are allowed or denied. To define permissions for an IAM identity (user, user group, or role), attach a policy to it.

**Allow (1 of 414 services)**

**Service** ▲ **Access level** ▼ **Resource** ▼ **Request condition**

<a href="#">EKS</a>	Full access	All resources	None
---------------------	-------------	---------------	------

**Add tags - optional** Info

Tags are key-value pairs that you can add to AWS resources to help identify, organize, or search for resources.

No tags associated with the resource.

**Add new tag**

You can add up to 50 more tags.

[Cancel](#) [Previous](#) [Create policy](#)

**Identity and Access Management (IAM)**

**Permissions policies (4)** Info

You can attach up to 10 managed policies.

**Filter by Type**

Policy name	Type	Attached entities
<a href="#">AmazonEC2FullAccess</a>	AWS managed	1
<a href="#">AmazonVPCFullAccess</a>	AWS managed	1
<a href="#">AWSCloudFormationFullAccess</a>	AWS managed	1
<a href="#">IAMFullAccess</a>	AWS managed	1

**Permissions boundary (not set)**

**Generate policy based on CloudTrail events**

You can generate a new policy based on the access activity for this role, then customize, create, and attach it to this role. AWS uses your CloudTrail events to identify the services and actions used and generate a policy. [Learn more](#)

<https://us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#roles/details/k8-master-role/attach-policies>

**Attach policy to k8-master-role**

**Current permissions policies (4)**

**Other permissions policies (1/923)**

**Filter by Type**

Policy name	Type	Description
<a href="#">k8-policy</a>	Customer managed	-

[Cancel](#) [Add permissions](#)

**Identity and Access Management (IAM)**

**k8-master-role** Info

Allows EC2 instances to call AWS services on your behalf.

**Summary**

**Permissions** **Trust relationships** **Tags** **Access Advisor** **Revoke sessions**

**Permissions policies (5)** Info

You can attach up to 10 managed policies.

**Actions**

**EC2** > **Instances** > **i-01293611fbbdd8742 (skillsmatch-k8)**

**Instance summary for i-01293611fbbdd8742 (skillsmatch-k8)** Info

Updated less than a minute ago

Instance ID	i-01293611fbbdd8742 (skillsmatch-k8)	Public IPv4 address	54.221.176.114   <a href="#">open address</a>	Private IPv4 address	172.31.48.149
IPv6 address	-	Instance state	Running	Public IPv4 DNS	
Hostname type	IP name: ip-172-31-48-149.ec2.internal	Private IP DNS name (IPv4 only)	ip-172-31-48-149.ec2.internal	Change security groups	
Answer private resource DNS name	IPv4 (A)	Instance type	t2.large	Get Windows password	
Auto-assigned IP address	54.221.176.114 [Public IP]	VPC ID	vpc-07434f0ceeb6f14c	Modify IAM role	
IAM Role	-	Subnet ID	subnet-0ca617bb2c8080a7f	Elastic IP addresses	-
IMDSv2	Required			AWS Compute Optimizer finding	<a href="#">Opt-in to AWS Compute Optimizer for recommendations.</a>
				Learn more	

**Modify IAM role** Info

Attach an IAM role to your instance.

**Instance ID**  
i-01293611fbbdd8742 (skillsmatch-k8)

**IAM role**  
Select an IAM role to attach to your instance or create a new role if you haven't created any. The role you select replaces any roles that are currently attached to your instance.

**k8-master-role** [Create new IAM role](#)

**Cancel** **Update IAM role**

Successfully attached k8-master-role to instance i-01293611fbbdd8742

Instances (1) **Info**

Find Instance by attribute or tag (case-sensitive)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
skillsmatch-k8	i-01293611fbbdd8742	Running	t2.large	2/2 checks passed	View alarms	us-east-1	ec2-54-187-181-144

Select an instance

CloudShell Feedback

## 5. Connect to ec2 instance and create cluster.

```

Amazon Linux 2023
https://aws.amazon.com/linux/amazon-linux-2023

Last login: Tue May 28 16:42:53 2024 from 18.206.107.27
[ec2-user@ip-172-31-48-149 ~]$ eksctl create cluster --name skillsmatchfinal --region us-east-1 --node-type t2.large --nodes 3

```

i-01293611fbbdd8742 (skillsmatch-k8)  
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

CloudFormation

CloudFormation > Stacks > eksctl-skillsmatchcluster-cluster

Stacks (2)

Stack ID: arn:aws:cloudformation:us-east-1:211125493694:stack/eksctl-skillsmatchcluster-cluster/86aeebe0-1d04-11ef-ae9f-0affed5ddac9

Status: CREATE\_COMPLETE

Description: EKS cluster (dedicated VPC: true, dedicated IAM: true) [created and managed by eksctl]

Stack info | Events | Resources | Outputs | Parameters | Template | Change sets

Overview

Stack ID: arn:aws:cloudformation:us-east-1:211125493694:stack/eksctl-skillsmatchcluster-cluster/86aeebe0-1d04-11ef-ae9f-0affed5ddac9

Status: DELETE\_COMPLETE

Status reason: -

Parent stack: -

Created time: 2024-05-28 20:11:14 UTC+0500

Updated time: -

CloudShell Feedback

## 6. Verify kubernetes nodes. Install docker.

```

Amazon Linux 2023
https://aws.amazon.com/linux/amazon-linux-2023

Last login: Tue May 28 16:42:53 2024 from 18.206.107.27
[ec2-user@ip-172-31-48-149 ~]$ kubectl get nodes
NAME           STATUS   ROLES      AGE   VERSION
ip-192-168-31-180.ec2.internal   Ready    <none>    72m   v1.29.3-eks-ae9a62a
ip-192-168-47-150.ec2.internal   Ready    <none>    72m   v1.29.3-eks-ae9a62a
ip-192-168-6-147.ec2.internal   Ready    <none>    72m   v1.29.3-eks-ae9a62a
[ec2-user@ip-172-31-48-149 ~]$ install docker
install: missing destination file operand after 'docker'
Try 'install --help' for more information.
[ec2-user@ip-172-31-48-149 ~]$ sudo yum install docker
Last metadata expiration check: 2:47:43 ago on Tue May 28 14:11:48 2024.
Dependencies resolved.

Package          Architecture Version       Repository      Size
installing:
  docker          x86_64      25.0.3-1.amzn2023.0.1  amazonlinux  44 M
  i-01293611fbbdd8742 (skillsmatch-k8)
  PublicIPs: 54.221.176.114  PrivateIPs: 172.31.48.149

```

## 7. Start docker. Pull docker images from the docker hub.

Sudo yum Docker login

Username, password

```

/var/run/docker.sock: connect: permission denied
[ec2-user@ip-172-31-48-149 ~]$ sudo su
[root@ip-172-31-48-149 ec2-user]# docker login
Authenticating with existing credentials...
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[root@ip-172-31-48-149 ec2-user]# docker pull insiafarhan/skillsmatch1:backendimage
backendimage: Pulling from insiafarhan/skillsmatch1
c6cf28de9a06: Extracting [=====] 47.71MB/49.50MB
991494355808: Download complete
6582c625b3ef: Download complete
bf2c3e352f3d: Download complete
2b542796ccab: Download complete
e785d3fb448: Download complete
8cd9e90782e6: Download complete
3b414c82700: Download complete
323a6242b9a5: Download complete
e6fe79b88754: Download complete
9f1daecd9d38: Download complete
ccca7877e7ece: Download complete
622e959d78c7: Download complete
b94b73df1484: Download complete
52ba5e635857: Download complete

i-01293611fbbdd8742 (skillsmatch-k8)
PublicIPs: 54.221.176.114  PrivateIPs: 172.31.48.149

```

aws Services Search [Alt+S] N. Virginia Insia Farhan

```

323a6242b9a5: Pull complete
e6fe79b88754: Pull complete
9f1daecd9d38: Pull complete
cca7877e7fece: Pull complete
622e959d78c7: Pull complete
b94b73df1484: Pull complete
52ba5e635857: Pull complete
Digest: sha256:dead765a47afe57a3cb15f9bf1f3d257527552f571c382d606692000c6486cb
Status: Downloaded newer image for insiafarhan/skillsmatch1:backendimage
docker.io/insiafarhan/skillsmatch1:backendimage
[root@ip-172-31-48-149 ec2-user]# docker pull insiafarhan/skillsmatch1:frontendimage
frontendimage: Pulling from insiafarhan/skillsmatch1
c6cf28de5a06: Already exists
891494355808: Already exists
6582c62583ef: Already exists
bf2c3e352f3d: Already exists
2b542796ccab: Already exists
e785d3fb9448: Already exists
8cd9c90782e6: Already exists
3b4414c82700: Already exists
b3b76e5eb2f6: Pull complete
4a006b7581cd: Pull complete
36917511f165: Pull complete
60035bd778eb: Pull complete
Digest: sha256:d550a0a35753785740e9f7b1301ded242540e49934da99e294a0da0b8fd83ef8
Status: Downloaded newer image for insiafarhan/skillsmatch1:frontendimage
docker.io/insiafarhan/skillsmatch1:frontendimage

```

i-01293611fbbdd8742 (skillsmatch-k8)

PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

aws Services Search [Alt+S] N. Virginia Insia Farhan

```

Release notes:
https://docs.aws.amazon.com/linux/al2023/release-notes/relnotes-2023.4.20240528.html

Installed:
containererd-1.7.11-1.amzn2023.0.1.x86_64 docker-25.0.3-1.amzn2023.0.1.x86_64
iptables-nft-1.8.8-3.amzn2023.0.2.x86_64 libcgroup-3.0-1.amzn2023.0.1.x86_64
libnfnetlink-1.0.1-19.amzn2023.0.2.x86_64 libnftnl-1.2.2-2.amzn2023.0.2.x86_64
runc-1.1.11-1.amzn2023.0.1.x86_64 iptables-libs-1.8.8-3.amzn2023.0.2.x86_64
libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64
pigz-2.5-1.amzn2023.0.3.x86_64

Complete!
[ec2-user@ip-172-31-48-149 ~]$ sudo systemctl start docker
[ec2-user@ip-172-31-48-149 ~]$ sudo su
[root@ip-172-31-48-149 ec2-user]# docker pull insiafarhan/skillsmatch1:jobimage
jobimage: Pulling from insiafarhan/skillsmatch1
09f376ebb190: Pull complete
276709cbdec1: Pull complete
e5c23cad80c0: Pull complete
a56c5f373d66: Pull complete
52a924435656: Pull complete
ef956dd9d2a8: Pull complete
80cfbdab2cc6: Pull complete
23f9ebbd2cb9: Pull complete
2820097076282: Downloading [=====] 1 689MB/760.2MB

```

i-01293611fbbdd8742 (skillsmatch-k8)

PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

## 8. Create and expose deployments on the accurate ports.

```

Last login: Tue May 28 17:11:23 2024 from 18.206.107.28
[ec2-user@ip-172-31-48-149 ~]$ kubectl create deployment jobdeploy --image=insiafarhan/skillsmatch1:jobimage --replicas=3
deployment.apps/jobdeploy created
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods -o wide
NAME           READY   STATUS    RESTARTS   AGE   IP          NODE          NOMINATED NODE   READINESS GATES
jobdeploy-57d96dd97b-2hbq8   0/1   ContainerCreating   0   16s   <none>   ip-192-168-6-147.ec2.internal   <none>   <none>
jobdeploy-57d96dd97b-86w2p   0/1   ContainerCreating   0   16s   <none>   ip-192-168-47-150.ec2.internal   <none>   <none>
jobdeploy-57d96dd97b-pjgkd   0/1   ContainerCreating   0   16s   <none>   ip-192-168-31-180.ec2.internal   <none>   <none>
[ec2-user@ip-172-31-48-149 ~]$ kubectl get nodes
-bash: kubectl: command not found
[ec2-user@ip-172-31-48-149 ~]$ kubectl get nodes
NAME           STATUS   ROLES   AGE   VERSION
ip-192-168-31-180.ec2.internal   Ready   <none>   97m   v1.29.3-eks-ae9a62a
ip-192-168-47-150.ec2.internal   Ready   <none>   97m   v1.29.3-eks-ae9a62a
ip-192-168-6-147.ec2.internal   Ready   <none>   97m   v1.29.3-eks-ae9a62a
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods -o wide
NAME           READY   STATUS    RESTARTS   AGE   IP          NODE          NOMINATED NODE   READINESS GATES
jobdeploy-57d96dd97b-2hbq8   1/1   Running   0   4m25s   192.168.26.127   ip-192-168-6-147.ec2.internal   <none>   <none>
jobdeploy-57d96dd97b-86w2p   1/1   Running   0   4m25s   192.168.35.69   ip-192-168-47-150.ec2.internal   <none>   <none>
jobdeploy-57d96dd97b-pjgkd   1/1   Running   0   4m25s   192.168.14.236   ip-192-168-31-180.ec2.internal   <none>   <none>
[ec2-user@ip-172-31-48-149 ~]$ kubectl expose deployment jobdeploy --port=2003 --type=LoadBalancer
service/jobdeploy exposed
[ec2-user@ip-172-31-48-149 ~]$ 

```

i-01293611fbbdd8742 (skillsmatch-k8)

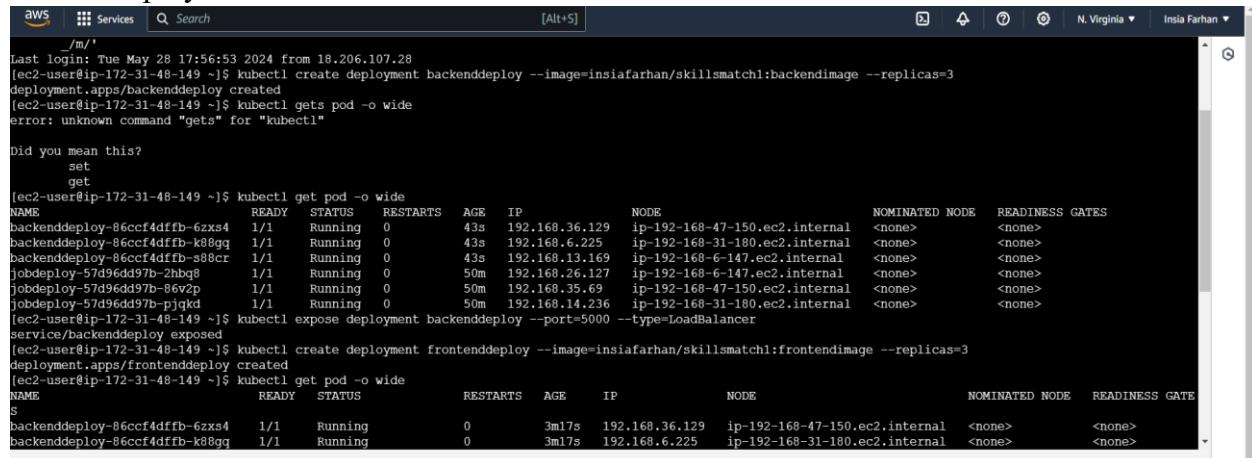
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

## 9. Verify deployment.



```
{
  "recommended_jobs": [
    {
      "company_email": "netfusiontechnologies@example.com",
      "company_name": "NetFusion Technologies",
      "education_required": "Intermediate",
      "job_location": "India",
      "job_title": "Big Data Engineer",
      "job_type": "Part-time",
      "skills_required": "Hadoop, Hadoop, Scala, Hive, Spark, big data",
      "soft_skills_required": "Communication, Problem Solving, Teamwork, Adaptability",
      "work_experience_required": 1,
      "work_type": "Remote"
    },
    {
      "company_email": "codecrafters@example.com",
      "company_name": "CodeCrafters",
      "education_required": "Masters",
      "job_location": "India",
      "job_title": "Big Data Engineer",
      "job_type": "Part-time",
      "skills_required": "Hadoop, Spark, big data, Scala, Hive, Scala",
      "soft_skills_required": "Communication, Adaptability, Teamwork, Problem Solving",
      "work_experience_required": 9,
      "work_type": "Remote"
    },
    {
      "company_email": "innonettechnologies@example.com",
      "company_name": "InnoNet Technologies",
      "education_required": "Bachelor's",
      "job_location": "Nasik,Maharashtra",
      "job_title": "Big Data Engineer",
      "job_type": "Part-time",
      "skills_required": "Scala, Spark, Hadoop, MapReduce, big data",
      "soft_skills_required": "Teamwork, Communication, Problem Solving, Adaptability",
      "work_experience_required": 1,
      "work_type": "Remote"
    },
    {
      "company_email": "techhive@example.com",
      "company_name": "TechHive",
      "education_required": "Intermediate",
      "job_location": "Pune",
      "job_title": "Big Data Engineer"
    }
  ]
}
```

## 10. Deploy backend and frontend as well.

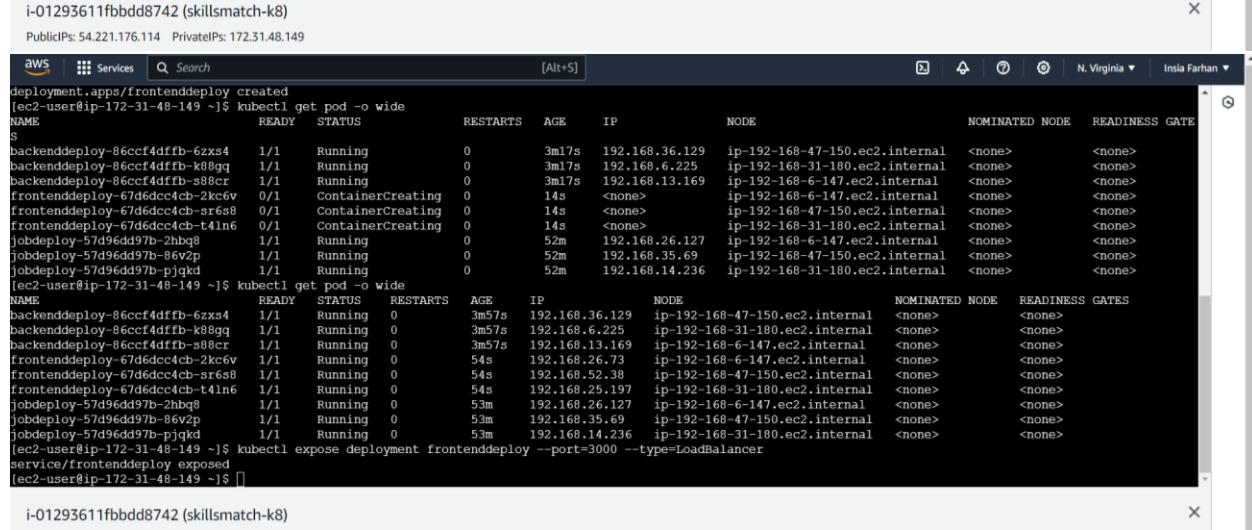


```

aws Services Search [Alt+S] N. Virginia Insia Farhan
/m/
Last login: Tue May 28 17:56:53 2024 from 18.206.107.28
[ec2-user@ip-172-31-48-149 ~]$ kubectl create deployment backenddeploy --image=insiafarhan/skillsmatch1:backendimage --replicas=3
deployment.apps/backenddeploy created
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pod -o wide
error: unknown command "get" for "kubectl"

Did you mean this?
  set
  get
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pod -o wide
NAME          READY   STATUS    RESTARTS   AGE     IP           NODE      NOMINATED NODE   READINESS GATES
backenddeploy-86ccf4dfb-6zxs4  1/1    Running   0          43s    192.168.36.129  ip-192-168-47-150.ec2.internal  <none>    <none>
backenddeploy-86ccf4dfb-k86gq  1/1    Running   0          43s    192.168.6.225  ip-192-168-31-180.ec2.internal  <none>    <none>
backenddeploy-86ccf4dfb-s86cr  1/1    Running   0          43s    192.168.13.169 ip-192-168-6-147.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-2hbq8    1/1    Running   0          50m   192.168.26.127 ip-192-168-6-147.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-86v2p     1/1    Running   0          50m   192.168.35.69  ip-192-168-47-150.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-pjgkqd   1/1    Running   0          50m   192.168.14.236 ip-192-168-31-180.ec2.internal  <none>    <none>
[ec2-user@ip-172-31-48-149 ~]$ kubectl expose deployment backenddeploy --port=5000 --type=LoadBalancer
service/backenddeploy exposed
[ec2-user@ip-172-31-48-149 ~]$ kubectl create deployment frontenddeploy --image=insiafarhan/skillsmatch1:frontendimage --replicas=3
deployment.apps/frontenddeploy created
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pod -o wide
NAME          READY   STATUS    RESTARTS   AGE     IP           NODE      NOMINATED NODE   READINESS GATES
S
backenddeploy-86ccf4dfb-6zxs4  1/1    Running   0          3m17s  192.168.36.129  ip-192-168-47-150.ec2.internal  <none>    <none>
backenddeploy-86ccf4dfb-k86gq  1/1    Running   0          3m17s  192.168.6.225  ip-192-168-31-180.ec2.internal  <none>    <none>

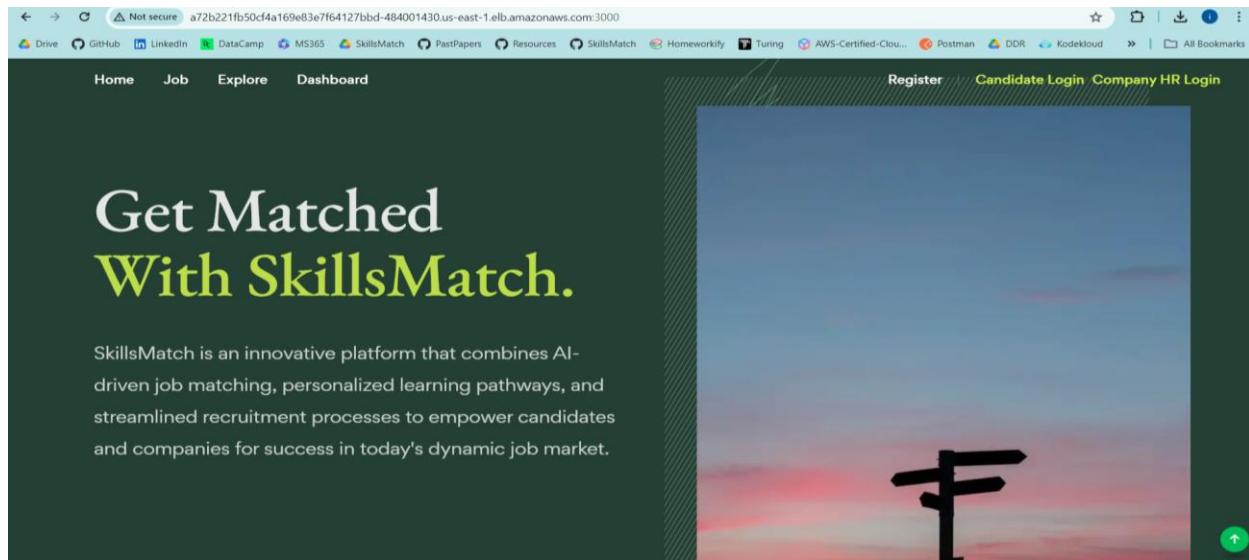
```



```

aws Services Search [Alt+S] N. Virginia Insia Farhan
deployment.apps/frontenddeploy created
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pod -o wide
NAME          READY   STATUS    RESTARTS   AGE     IP           NODE      NOMINATED NODE   READINESS GATES
S
backenddeploy-86ccf4dfb-6zxs4  1/1    Running   0          3m17s  192.168.36.129  ip-192-168-47-150.ec2.internal  <none>    <none>
backenddeploy-86ccf4dfb-k86gq  1/1    Running   0          3m17s  192.168.6.225  ip-192-168-31-180.ec2.internal  <none>    <none>
backenddeploy-86ccf4dfb-s86cr  1/1    Running   0          3m17s  192.168.13.169 ip-192-168-6-147.ec2.internal  <none>    <none>
frontenddeploy-67d6dcc4cb-2kc6v 0/1   ContainerCreating 0          14s    <none>        ip-192-168-6-147.ec2.internal  <none>    <none>
frontenddeploy-67d6dcc4cb-sr68s 0/1   ContainerCreating 0          14s    <none>        ip-192-168-47-150.ec2.internal  <none>    <none>
frontenddeploy-67d6dcc4cb-t4ln6 0/1   ContainerCreating 0          14s    <none>        ip-192-168-31-180.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-2hbq8     1/1    Running   0          52m   192.168.26.127 ip-192-168-6-147.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-86v2p     1/1    Running   0          52m   192.168.35.69  ip-192-168-47-150.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-pjgkqd   1/1    Running   0          52m   192.168.14.236 ip-192-168-31-180.ec2.internal  <none>    <none>
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pod -o wide
NAME          READY   STATUS    RESTARTS   AGE     IP           NODE      NOMINATED NODE   READINESS GATES
backenddeploy-86ccf4dfb-6zxs4  1/1    Running   0          3m57s  192.168.36.129  ip-192-168-47-150.ec2.internal  <none>    <none>
backenddeploy-86ccf4dfb-k86gq  1/1    Running   0          3m57s  192.168.6.225  ip-192-168-31-180.ec2.internal  <none>    <none>
backenddeploy-86ccf4dfb-s86cr  1/1    Running   0          3m57s  192.168.13.169 ip-192-168-6-147.ec2.internal  <none>    <none>
frontenddeploy-67d6dcc4cb-2kc6v 0/1   Running   0          54s    192.168.26.73  ip-192-168-6-147.ec2.internal  <none>    <none>
frontenddeploy-67d6dcc4cb-sr68s 0/1   Running   0          54s    192.168.52.38  ip-192-168-47-150.ec2.internal  <none>    <none>
frontenddeploy-67d6dcc4cb-t4ln6 0/1   Running   0          54s    192.168.25.197 ip-192-168-31-180.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-2hbq8     1/1    Running   0          53m   192.168.26.127 ip-192-168-6-147.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-86v2p     1/1    Running   0          53m   192.168.35.69  ip-192-168-47-150.ec2.internal  <none>    <none>
jobdeploy-57d96d97b-pjgkqd   1/1    Running   0          53m   192.168.14.236 ip-192-168-31-180.ec2.internal  <none>    <none>
[ec2-user@ip-172-31-48-149 ~]$ kubectl expose deployment frontenddeploy --port=3000 --type=LoadBalancer
service/frontenddeploy exposed
[ec2-user@ip-172-31-48-149 ~]$ 
```

i-01293611fbddd8742 (skillsmatch-k8)  
 PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149



## 11. Optional: Update image in k8s:

```

AWS Services Search [Alt+S] N. Virginia Inzia Farhan
/m/
Last login: Tue May 28 18:38:42 2024 from 18.206.107.27
[ec2-user@ip-172-31-48-149 ~]$ kubectl get services
NAME          TYPE      CLUSTER-IP      EXTERNAL-IP
backenddeploy  LoadBalancer  10.100.246.151  a5fc17b29b02841ce84a49e511820394-1637568402.us-east-1.elb.amazonaws.com
frontenddeploy LoadBalancer  10.100.64.20   a12b221fb50cf41a169e83e7f64127bbd-484001430.us-east-1.elb.amazonaws.com
jobdeploy     LoadBalancer  10.100.238.75  a8bebf311e9ac45ab93cf90c12edf9e6-88086542.us-east-1.elb.amazonaws.com
kubernetes   ClusterIP    <none>          443/TCP
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
backenddeploy-86ccf4dffb-6zxs4  1/1     Running   0          40m
backenddeploy-86ccf4dffb-k88q   1/1     Running   0          40m
backenddeploy-86ccf4dffb-s86cr  1/1     Running   0          40m
frontenddeploy-67d6dcc4cb-2kc6v 1/1     Running   0          37m
frontenddeploy-67d6dcc4cb-sr688 1/1     Running   0          37m
frontenddeploy-67d6dcc4cb-t41n6  1/1     Running   0          37m
jobdeploy-57d96dd97b-2hbg8    1/1     Running   0          90m
jobdeploy-57d96dd97b-86v2p    1/1     Running   0          90m
jobdeploy-57d96dd97b-pjgkd    1/1     Running   0          90m
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods backenddeploy-86ccf4dffb-6zxs4
Name:          backenddeploy-86ccf4dffb-6zxs4
Namespace:    default
Priority:     0
Service Account: default
Node:         ip-192-168-47-150.ec2.internal/192.168.47.150
Start Time:   Tue, 28 May 2024 18:02:29 +0000
Labels:       app-backenddeploy

i-01293611fbbdd8742 (skillsmatch-k8s)
PublicIPs: 54.221.176.114  PrivateIPs: 172.31.48.149
AWS Services Search [Alt+S] N. Virginia Inzia Farhan
Controlled By: ReplicaSet/backenddeploy-86ccf4dffb
Containers:
  skillsmatch1:
    Container ID:  containerd://1015deb078192622094e4589209073b7df484e28f6f63f3ff8d9b37a6df5a7d
    Image:         insiafarhan/skillsmatch1:backendimage
    Image ID:     docker.io/insiafarhan/skillsmatch1@sha256:dead8765a47afe57a3cb15f9bf1f3d257527552f571c382d606692000c6486cb
    Port:         <none>
    Host Port:   <none>
    State:       Running
    Started:    Tue, 28 May 2024 18:02:51 +0000
    Ready:       True
    Restart Count: 0
    Environment: <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-7t4gx (ro)
Conditions:
  Type          Status
  PodReadyToStartContainers  True
  Initialized   True
  Ready         True
  ContainersReady  True
  PodScheduled  True
Volumes:
  kube-api-access-7t4gx:
    Type:          Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:  kube-root-ca.crt
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods
PublicIPs: 54.221.176.114  PrivateIPs: 172.31.48.149

```

```

aws Services Search [Alt+S] N. Virginia Insia Farhan
PodReadyToStartContainers: True
Initialized: True
Ready: True
ContainersReady: True
PodsScheduled: True
Volumes:
  kube-api-access-7t4gx:
    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
  ----  ----   --   --   --
  Normal Scheduled  41m  default-scheduler  Successfully assigned default/backenddeploy-86ccf4dff-6zxs4 to ip-192-168-47-150.ec2.internal
  Normal Pulling   41m  kubelet         Pulling image "insiafarhan/skillsmatch1:backendimage"
  Normal Pulled    41m  kubelet         Successfully pulled image "insiafarhan/skillsmatch1:backendimage" in 21.263s (21.263s including waiting)
  Normal Created   41m  kubelet         Created container skillsmatch1
  Normal Started   41m  kubelet         Started container skillsmatch1
[ec2-user@ip-172-31-48-149 ~]$ kubectl set image deployment/backenddeploy skillsmatch1=insiafarhan/skillsmatch1:backend2
deployment.apps/backenddeploy image updated
[ec2-user@ip-172-31-48-149 ~]$ 
i-01293611fbbdd8742 (skillsmatch-k8)
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

```

## 12. When one is update, all get updated:

```

aws Services Search [Alt+S] N. Virginia Insia Farhan
Normal Scheduled 41m default-scheduler Successfully assigned default/backenddeploy-86ccf4dff-6zxs4 to ip-192-168-47-150.ec2.internal
Normal Pulling 41m kubelet Pulling image "insiafarhan/skillsmatch1:backendimage"
Normal Pulled 41m kubelet Successfully pulled image "insiafarhan/skillsmatch1:backendimage" in 21.263s (21.263s including waiting)
Normal Created 41m kubelet Created container skillsmatch1
Normal Started 41m kubelet Started container skillsmatch1
[ec2-user@ip-172-31-48-149 ~]$ kubectl set image deployment/backenddeploy skillsmatch1=insiafarhan/skillsmatch1:backend2
deployment.apps/backenddeploy image updated
[ec2-user@ip-172-31-48-149 ~]$ kubectl describe pod backenddeploy-86ccf4dff-k88gq
Error from server (NotFound): pods "backenddeploy-86ccf4dff-k88gq" not found
[ec2-user@ip-172-31-48-149 ~]$ kubectl get services
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)      AGE
backenddeploy   LoadBalancer  10.100.246.151  a5fc17b29b02841ce84a9e511820394-1637568402.us-east-1.elb.amazonaws.com  5000:31166/TCP  4m
frontenddeploy  LoadBalancer  10.100.64.20   a72b221fb50cf4a169e83e7f64127bbd-484001430.us-east-1.elb.amazonaws.com  3000:30241/TCP  42m
jobdeploy     LoadBalancer  10.100.238.75  a8befb311e9ac45ab93cf90c12edf9e6-880886542.us-east-1.elb.amazonaws.com  2003:32306/TCP  84m
kubernetes    ClusterIP   10.100.0.1   <none>          443/TCP      3h20m
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
backenddeploy-565787f957-bwz8z  1/1    Running   0          2m57s
backenddeploy-565787f957-cmpf   1/1    Running   0          2m51s
backenddeploy-565787f957-fbt4f  1/1    Running   0          3m2s
frontenddeploy-67d6dcc4cb-2kc6v 1/1    Running   0          44m
frontenddeploy-67d6dcc4cb-sr6s8 1/1    Running   0          44m
frontenddeploy-67d6dcc4cb-t4ln6  1/1    Running   0          44m
jobdeploy-57d96dd97b-2hbg8    1/1    Running   0          96m
jobdeploy-57d96dd97b-86v2p    1/1    Running   0          96m
jobdeploy-57d96dd97b-pjgkd    1/1    Running   0          96m
[ec2-user@ip-172-31-48-149 ~]$ 
i-01293611fbbdd8742 (skillsmatch-k8)
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

```

## Now frontend:

```

aws Services Search [Alt+S] N. Virginia Insia Farhan
[ec2-user@ip-172-31-48-149 ~]$ kubectl set image deployment/frontenddeploy skillsmatch1=insiafarhan/skillsmatch1:frontend2
deployment.apps/frontenddeploy image updated
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
backenddeploy-565787f957-bwz8z  1/1    Running   0          14m
backenddeploy-565787f957-cmpf   1/1    Running   0          13m
backenddeploy-565787f957-fbt4f  1/1    Running   0          14m
frontenddeploy-67d6dcc4cb-2kc6v 1/1    Running   0          55m
frontenddeploy-67d6dcc4cb-sr6s8 1/1    Running   0          55m
frontenddeploy-67d6dcc4cb-t4ln6  1/1    Running   0          55m
frontenddeploy-76cc6764f-fj48h  0/1    ContainerCreating   0          11s
jobdeploy-57d96dd97b-2hbg8    1/1    Running   0          107m
jobdeploy-57d96dd97b-86v2p    1/1    Running   0          107m
jobdeploy-57d96dd97b-pjgkd    1/1    Running   0          107m
[ec2-user@ip-172-31-48-149 ~]$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
backenddeploy-565787f957-bwz8z  1/1    Running   0          15m
backenddeploy-565787f957-cmpf   1/1    Running   0          14m
backenddeploy-565787f957-fbt4f  1/1    Running   0          15m
frontenddeploy-76cc6764f-fj48h  1/1    Running   0          67s
frontenddeploy-76cc6764f-xbong6 1/1    Running   0          47s
frontenddeploy-76cc6764f-xmsn2  1/1    Running   0          30s
jobdeploy-57d96dd97b-2hbg8    1/1    Running   0          108m
jobdeploy-57d96dd97b-86v2p    1/1    Running   0          108m
jobdeploy-57d96dd97b-pjgkd    1/1    Running   0          108m
[ec2-user@ip-172-31-48-149 ~]$ kubectl describe pods
Name:          backenddeploy-565787f957-bwz8z
i-01293611fbbdd8742 (skillsmatch-k8)
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149

```

```
aws Services Search [Alt+S] N. Virginia Insia Farhan
Events: <none>
[ec2-user@ip-172-31-48-149 ~]$ kubectl describe deployment frontenddeploy
Name: frontenddeploy
Namespace: default
CreationTimestamp: Tue, 28 May 2024 18:05:32 +0000
Labels: app=frontenddeploy
Annotations: deployment.kubernetes.io/revision: 2
Selector: app=frontenddeploy
Replicas: 3 desired | 3 updated | 3 total | 3 available | 0 unavailable
StrategyType: RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels: app=frontenddeploy
  Containers:
    skillsmatchl:
      Image: insiafarhan/skillsmatchl:frontend2
      Port: <none>
      Host Port: <none>
      Environment: <none>
      Mounts: <none>
      Volumes: <none>
      Node-Selectors: <none>
      Tolerations: <none>
  Conditions:
    Type Status Reason
    ---- ---- -
Conditions:
  Type Status Reason
  ---- ---- -
  Available True MinimumReplicasAvailable
  Progressing True NewReplicaSetAvailable
OldReplicaSets: frontenddeploy-67d6dcc4cb (0/0 replicas created)
NewReplicaSet: frontenddeploy-76c6c6764f (3/3 replicas created)
Events:
  Type Reason Age From Message
  ---- ---- - -
  Normal ScalingReplicaSet 57m deployment-controller Scaled up replica set frontenddeploy-67d6dcc4cb to 3
  Normal ScalingReplicaSet 114s deployment-controller Scaled up replica set frontenddeploy-76c6c6764f to 1
  Normal ScalingReplicaSet 94s deployment-controller Scaled down replica set frontenddeploy-67d6dcc4cb to 2 from 3
  Normal ScalingReplicaSet 94s deployment-controller Scaled up replica set frontenddeploy-76c6c6764f to 2 from 1
  Normal ScalingReplicaSet 77s deployment-controller Scaled down replica set frontenddeploy-67d6dcc4cb to 1 from 2
  Normal ScalingReplicaSet 77s deployment-controller Scaled up replica set frontenddeploy-76c6c6764f to 3 from 2
  Normal ScalingReplicaSet 61s deployment-controller Scaled down replica set frontenddeploy-67d6dcc4cb to 0 from 1
[ec2-user@ip-172-31-48-149 ~]$
```

```
i-01293611fbbdd8742 (skillsmatch-k8)
PublicIPs: 54.221.176.114 PrivateIPs: 172.31.48.149
aws Services Search [Alt+S] N. Virginia Insia Farhan
skillsmatchl:
  Image: insiafarhan/skillsmatchl:frontend2
  Port: <none>
  Host Port: <none>
  Environment: <none>
  Mounts: <none>
  Volumes: <none>
  Node-Selectors: <none>
  Tolerations: <none>
Conditions:
  Type Status Reason
  ---- ---- -
  Available True MinimumReplicasAvailable
  Progressing True NewReplicaSetAvailable
OldReplicaSets: frontenddeploy-67d6dcc4cb (0/0 replicas created)
NewReplicaSet: frontenddeploy-76c6c6764f (3/3 replicas created)
Events:
  Type Reason Age From Message
  ---- ---- - -
  Normal ScalingReplicaSet 57m deployment-controller Scaled up replica set frontenddeploy-67d6dcc4cb to 3
  Normal ScalingReplicaSet 114s deployment-controller Scaled up replica set frontenddeploy-76c6c6764f to 1
  Normal ScalingReplicaSet 94s deployment-controller Scaled down replica set frontenddeploy-67d6dcc4cb to 2 from 3
  Normal ScalingReplicaSet 94s deployment-controller Scaled up replica set frontenddeploy-76c6c6764f to 2 from 1
  Normal ScalingReplicaSet 77s deployment-controller Scaled down replica set frontenddeploy-67d6dcc4cb to 1 from 2
  Normal ScalingReplicaSet 77s deployment-controller Scaled up replica set frontenddeploy-76c6c6764f to 3 from 2
  Normal ScalingReplicaSet 61s deployment-controller Scaled down replica set frontenddeploy-67d6dcc4cb to 0 from 1
[ec2-user@ip-172-31-48-149 ~]$
```