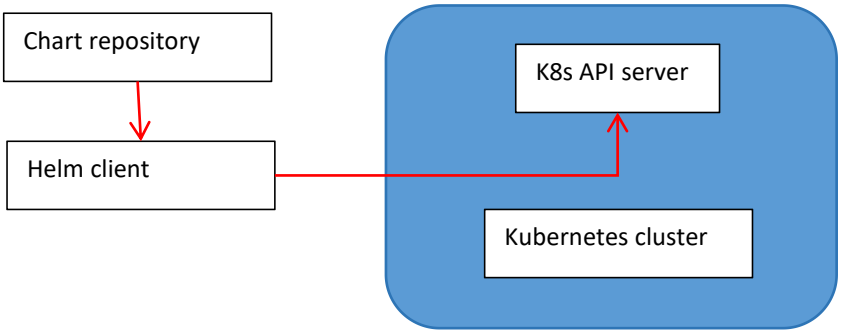
Kubernetes 5 notes
Helm charts
Promethues
Grafana
EFK Stack

To install in Amazon Linux VM -->
sudo yum install git
sudo yum install java
sudo yum install maven

Ubuntu Linux VM
sudo apt install git
sudo apt install maven

HELM
HELM is a package manager, which is used to install required softwares in Kubernetes cluster. With metrics-server, it is very complex and time-consuming. Similar to yum/apt package manager in Linux distribution, Helm allows us to install applications on Kubernetes cluster. Helm uses charts in order to achieve this. Charts refer to collection of configuration files (manifest yml)

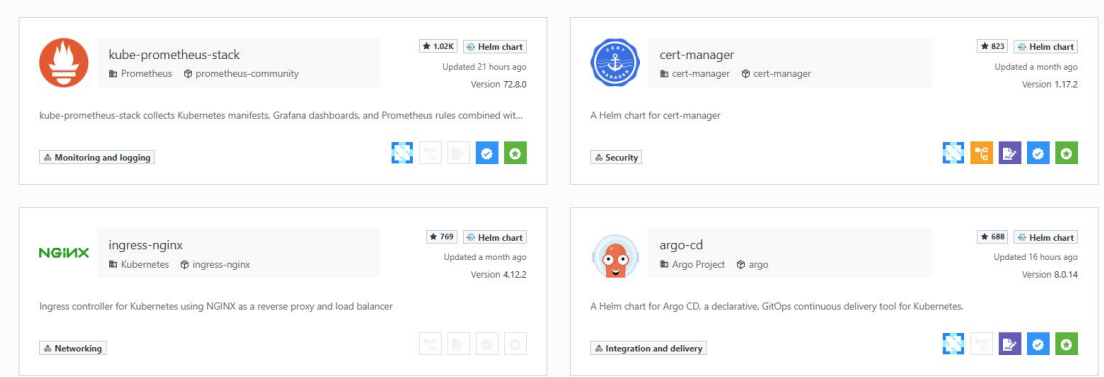


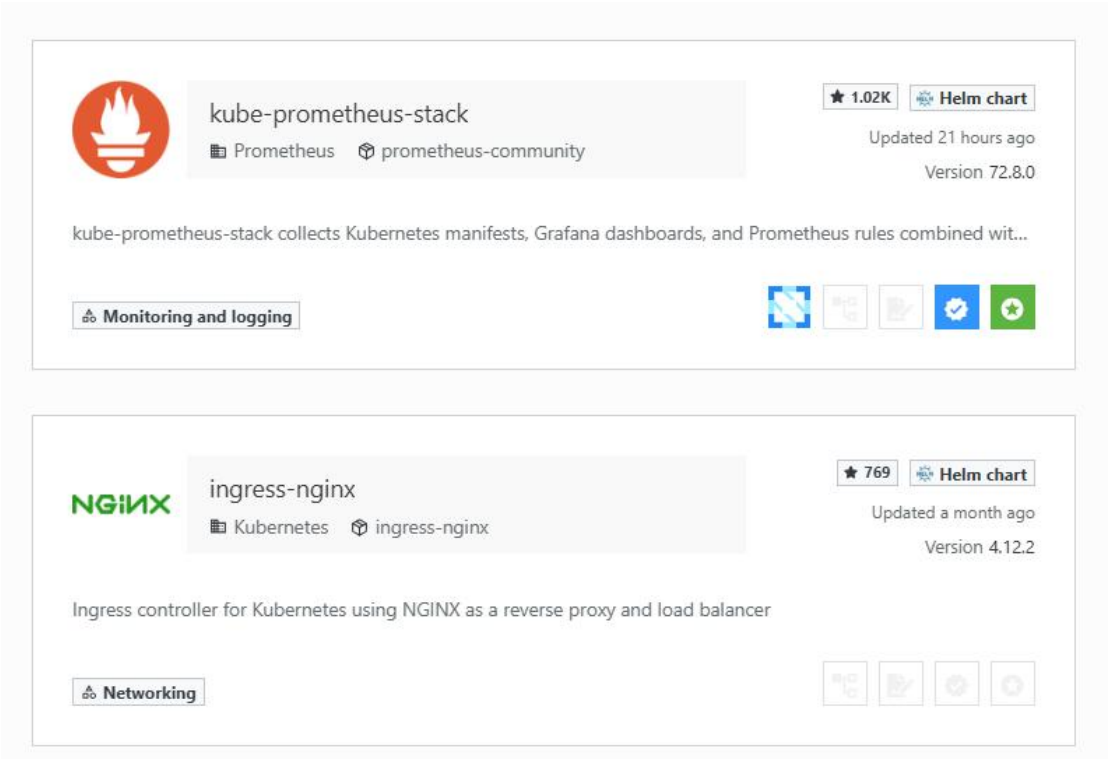
Helm talks to Kubernetes API server in order to install packages in the cluster
Chart repository is the collection of required configuration files (yaml files required to install specific software). With the help of Chart repository, Helm client will go and talk to K8s API server and install all required software specified in charts in Chart repository

Helm is the best way to find, share and use softwares built for Kubernetes

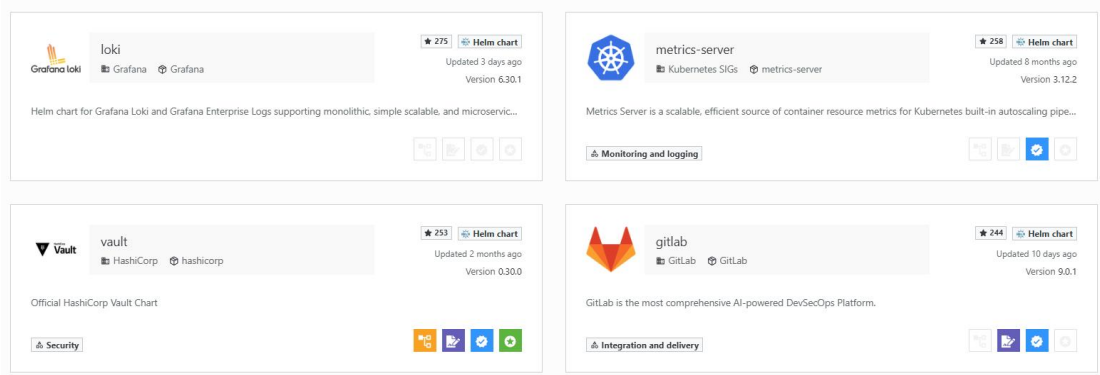
https://artifacthub.io/

https://artifacthub.io/packages/search





If you want 'metrics-server'



https://artifacthub.io/packages/helm/metrics-server/metrics-server

metrics-server Helm chart Monitoring and logging

Kubernetes SIGs metrics-server

Metrics Server is a scalable, efficient source of container resource metrics for Kubernetes built-in autoscaling pipelines.

SUBSCRIPTIONS: 182 WEBHOOKS: 19 PRODUCTION USERS: 7

Kubernetes Metrics Server

Metrics Server is a scalable, efficient source of container resource metrics for Kubernetes built-in autoscaling pipelines.

Installing the Chart

Before you can install the chart you will need to add the `metrics-server` repo to Helm.

```
helm repo add metrics-server https://kubernetes-sigs.github.io/metrics-server/
```

After you've installed the repo you can install the chart.

```
helm upgrade --install metrics-server metrics-server/metrics-server
```

If youo run this one command, it will take care of all metrics-server installation

```
helm repo add metrics-server https://kubernetes-sigs.github.io/metrics-server/
```

Helm charts --> Using Helm charts, we can install Prometheus server, Grafana server, Metrics server, Gitlab etc

What's Prometheus or Grafana server?
Monitoring tools

Prometheus is an open-source monitoring tool, which is used for altering purpose, it collects and stores metrics of the entire cluster. Grafana shows that visually. Grafana gives interactive visualization of what's happening. If you want to monitor specific application in this entire cluster, then EFK comes into picture. Actual tool that will monitor your entire cluster is Prometheus. Grafana will talk to Prometheus and Promotheus will talk to metrics-server and get the information. Grafana will again talk to Prometheus and visually show you how your entire Kubernetes cluster is behaving.

Prometheus -> it is an open-source system monitoring and alerting toolkit
It collects and stores its metrics as a time-series data
It provides out-of-box monitoring capabilities for k8s

Grafana
It is an analysis and monitoring tool, which provides visualization for monitoring of your k8s cluster
It provides graphs, charts and alerts for web when connected to supported data sources
Grafana connects with Prometheus for data source

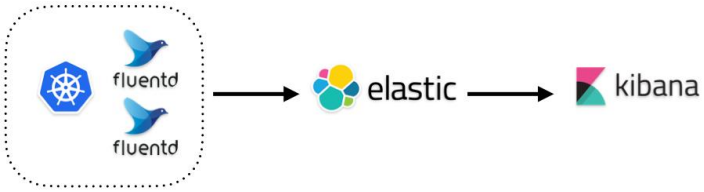
Which is the easiest way to install servers into Kubernetes cluster?
Helm

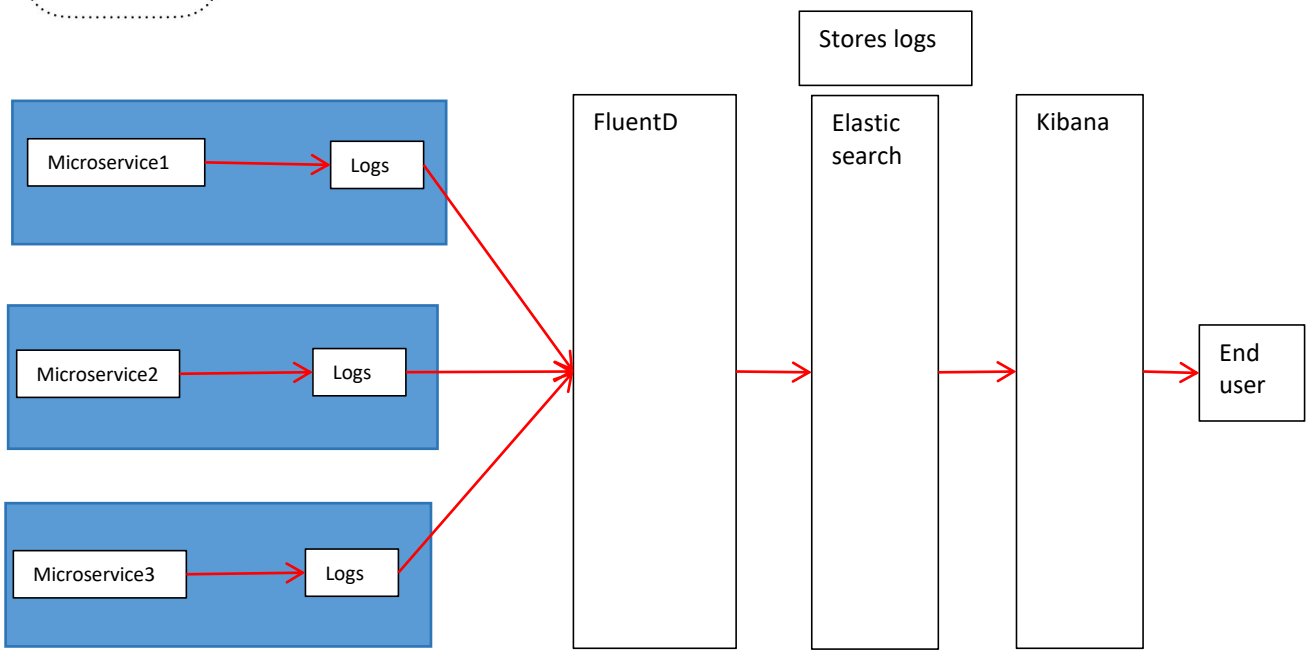
EFK refers to Elastic search, FluentD, Kibana --> all these are different products.

By using kubectl logs, could you get to know what's happening in a particular pod?

Splunk is an alternative for EFK. Splunk has upper edge without a doubt but it is paid

EFK stack provides centralized logging in order to identify problems with servers or applications. It will help us to search all the logs in a single place. Using FluentD, it will read all the logs and those logs will be stored within the Elastic search. Then if you want to see those logs, then we have something called as Kibana. Kibana provides UI for this Elastic search. We need to understand daemonset, statefulset, deployment.





FluentD will read logs and index into Elastic search, stores logs in Elastic search. How do we know these logs are stored here. What component is there to know the logs stored here? Kibana, it provides UI for clients

It will take all the logs and index those logs.
If you want to install or update these servers in the Kubernetes cluster, which component is used? HELM

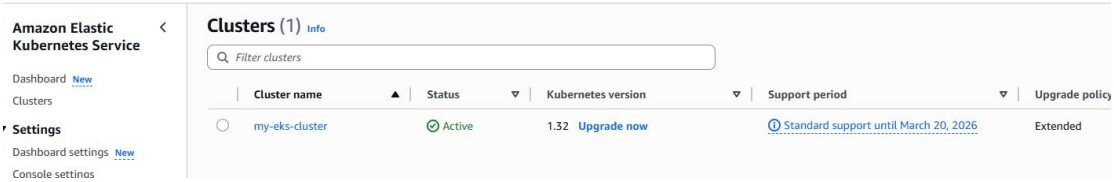
If you want to monitor the entire Kubernetes cluster, which tool is used? Prometheus

In order to display, cluster monitoring in graphical format? Grafana

If you want to monitor your application which are there, then EFK comes into picture

Create K8s cluster
eksctl create cluster --name my-eks-cluster --region ca-central-1 --node-type t2.medium --zones ca-central-1a,ca-central-1b

Go to EKS



Go into EKS host VM

HELM installation:
$ curl https://raw.githubusercontent.com/helm/helm/main/scripts/get-helm-3 | bash

Run this without bash
ubuntu@ip-172-31-9-165:~$ curl https://raw.githubusercontent.com/helm/helm/main/scripts/get-helm-3

ubuntu@ip-172-31-9-165:~$ curl -fsSl -o get_helm.sh https://raw.githubusercontent.com/helm/helm/main/scripts/get-helm-3

```
ubuntu@ip-172-31-9-165:~$ curl -fsSl -o get_helm.sh  https://raw.githubusercontent.com/helm/helm/main/scripts/get-helm-3
ubuntu@ip-172-31-9-165:~$ ls -l
total 34228
drwxr-xr-x 3 ubuntu ubuntu     4096 May 16 18:46 aws
drwxrwxr-x 2 ubuntu ubuntu     4096 May 26 02:46 blue-green-model
-rw-rw-r-- 1 ubuntu ubuntu      638 May 25 15:41 dep-svc.yml
-rw-rw-r-- 1 ubuntu ubuntu      449 May 25 03:47 deployment.yml
-rw-rw-r-- 1 ubuntu ubuntu 34958926 May 17 23:42 eksctl.tar.gz
-rw-rw-r-- 1 ubuntu ubuntu    11913 Jun  1 00:57 get_helm.sh
-rw-rw-r-- 1 ubuntu ubuntu      478 May 25 21:46 hpa-demo-deployment.yaml
-rw-rw-r-- 1 ubuntu ubuntu      170 May 25 22:44 hpa-demo-service.yaml
-rw-rw-r-- 1 ubuntu ubuntu      386 May 25 22:03 hpa-demo.yaml
drwxrwxr-x 2 ubuntu ubuntu     4096 May 25 21:19 k8s-metrics-server
drwxrwxr-x 2 ubuntu ubuntu     4096 May 25 21:26 k8s-metrics-server-1
-rw-rw-r-- 1 ubuntu ubuntu       76 May 24 20:19 k8s-namespace.yml
-rw-rw-r-- 1 ubuntu ubuntu      458 May 18 22:39 k8s-pod-manifest-new.yml
-rw-rw-r-- 1 ubuntu ubuntu      229 May 18 21:29 k8s-pod-manifest.yml
-rw-rw-r-- 1 ubuntu ubuntu      480 May 24 18:34 k8s-pod-svc-manifest-NodePort.yml
-rw-rw-r-- 1 ubuntu ubuntu      455 May 24 19:11 k8s-pod-svc-manifest-clusterIP.yml
-rw-rw-r-- 1 ubuntu ubuntu      550 May 24 20:48 k8s-pod-svc-ns.yml
-rw-rw-r-- 1 ubuntu ubuntu      541 May 24 20:52 k8s-pod-svc-ns1.yml
-rw-rw-r-- 1 ubuntu ubuntu      195 May 18 22:05 k8s-service-manifest.yml
-rw-rw-r-- 1 ubuntu ubuntu      138 May 25 18:40 metrics-api-server.yaml
-rw-rw-r-- 1 ubuntu ubuntu      406 May 25 02:21 replicaSet.yml
ubuntu@ip-172-31-9-165:~$
```

-rw-rw-r-- 1 ubuntu ubuntu 11913 Jun 1 00:57 get_helm.sh

We have read and write permission but not execute. So ‘chmod 700 get_helm.sh’ to give execute permission. To check it is is installed ‘helm’

ubuntu@ip-172-31-9-165:~$ chmod 700 get_helm.sh

-rwx------ 1 ubuntu ubuntu 11913 Jun 1 00:57 get_helm.sh
ubuntu@ip-172-31-9-165:~$ ./get_helm.sh
Helm v3.18.1 is already latest

Helm is successfully installed

```
ubuntu@ip-172-31-9-165:~$ helm
The Kubernetes package manager

Common actions for Helm:

- helm search:    search for charts
- helm pull:      download a chart to your local directory to view
- helm install:   upload the chart to Kubernetes
- helm list:      list releases of charts

Environment variables:

| Name                                | Description
|-------------------------------------|-----------------------------------------------------------
| $HELM_CACHE_HOME                    | set an alternative location for storing cached files.
| $HELM_CONFIG_HOME                   | set an alternative location for storing Helm configuration.
| $HELM_DATA_HOME                     | set an alternative location for storing Helm data.
| $HELM_DEBUG                         | indicate whether or not Helm is running in Debug mode
| $HELM_DRIVER                        | set the backend storage driver. Values are: configmap, secre
```

ubuntu@ip-172-31-9-165:~$ kubectl top pods
No resources found in default namespace.
ubuntu@ip-172-31-9-165:~$ kubectl top nodes

NAME	CPU(cores)	CPU(%)	MEMORY(bytes)	MEMORY(%)
ip-192-168-1-194.ca-central-1.compute.internal	30m	1%	535Mi	15%
ip-192-168-37-54.ca-central-1.compute.internal	31m	1%	533Mi	15%

If you want to install the metrics-server,
-> Execute manifest yml files
-> Use Helm charts
ubuntu@ip-172-31-9-165:~$ helm repo ls
Error: no repositories to show

ubuntu@ip-172-31-9-165:~$ helm repo add metrics-server https://kubernetes-sigs.github.com/metrics-server

ubuntu@ip-172-31-9-165:~$ helm repo add metrics-server https://kubernetes-sigs.github.io/metrics-server
"metrics-server" has been added to your repositories
ubuntu@ip-172-31-9-165:~$

ubuntu@ip-172-31-9-165:~$ helm repo update
Hang tight while we grab the latest from your chart repositories...
...Successfully got an update from the "metrics-server" chart repository
Update Complete. ⎈ Happy Helming!⎈
ubuntu@ip-172-31-9-165:~$ helm repo ls

NAME	URL
metrics-server	https://kubernetes-sigs.github.io/metrics-server

ubuntu@ip-172-31-9-165:~$ helm upgrade --install metrics-server metrics-server/metrics-server

ubuntu@ip-172-31-9-165:~$ helm upgrade --install metrics-server metrics-server/metrics-server
Release "metrics-server" does not exist. Installing it now.
Error: Unable to continue with install: ClusterRole "system:metrics-server-aggregated-reader" in namespace "" exists and cannot be imported into the current release: invalid ownership metadata; label validation error: key "app.kubernetes.io/managed-by" must equal "Helm": current value is "EKS"; annotation validation error: missing key "meta.helm.sh/release-name": must be set to "metrics-server"; annotation validation error: missing key "meta.helm.sh/release-namespace": must be set to "default"

These things are already there in the system so we delete one by one

```
ubuntu@ip-172-31-9-165:~$ kubectl delete deployment metrics-server -n kube-system
deployment.apps "metrics-server" deleted
ubuntu@ip-172-31-9-165:~$ kubectl delete clusterrole system:metrics-server-aggregated-reader
clusterrole.rbac.authorization.k8s.io "system:metrics-server-aggregated-reader" deleted
ubuntu@ip-172-31-9-165:~$ kubectl delete clusterrolebinding metrics-server:system:auth-delegator
clusterrolebinding.rbac.authorization.k8s.io "metrics-server:system:auth-delegator" deleted
ubuntu@ip-172-31-9-165:~$ kubectl delete apiservice v1beta1.metrics.k8s.io
apiservice.apiregistration.k8s.io "v1beta1.metrics.k8s.io" deleted
ubuntu@ip-172-31-9-165:~$ kubectl delete service metrics-server -n kube-system
service "metrics-server" deleted
ubuntu@ip-172-31-9-165:~$ kubectl delete serviceaccount metrics-server -n kube-systen
Error from server (NotFound): serviceaccounts "metrics-server" not found
ubuntu@ip-172-31-9-165:~$ kubectl delete serviceaccount metrics-server -n kube-system
serviceaccount "metrics-server" deleted

ubuntu@ip-172-31-9-165:~$ helm upgrade --install metrics-server metrics-server/metrics-server
Release "metrics-server" does not exist. Installing it now.
Error: Unable to continue with install: ClusterRole "system:metrics-server" in namespace "" exists and
cannot be imported into the current release: invalid ownership metadata; label validation error: key
"app.kubernetes.io/managed-by" must equal "Helm": current value is "EKS"; annotation validation
error: missing key "meta.helm.sh/release-name": must be set to "metrics-server"; annotation
validation error: missing key "meta.helm.sh/release-namespace": must be set to "default"


ubuntu@ip-172-31-9-165:~$ kubectl get clusterrole system:metrics-server -o yaml
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  creationTimestamp: "2025-05-31T23:51:10Z"
  labels:
    app.kubernetes.io/instance: metrics-server
    app.kubernetes.io/managed-by: EKS
    app.kubernetes.io/name: metrics-server
    app.kubernetes.io/version: 0.7.2
  name: system:metrics-server
  resourceVersion: "970"
  uid: 41670649-cfa2-404c-aa5a-32eea7cd85b3
rules:
- apiGroups:
  - ""
  resources:
  - nodes/metrics
  verbs:
  - get
- apiGroups:
  - ""
  resources:
  - pods
  - nodes
  - namespaces
  - configmaps
  verbs:
  - get
  - list
  - watch
```

apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  creationTimestamp: "2025-05-31T23:51:10Z"
  labels:
    app.kubernetes.io/instance: metrics-server
    app.kubernetes.io/managed-by: EKS
    app.kubernetes.io/name: metrics-server
    app.kubernetes.io/version: 0.7.2
  name: system:metrics-server
  resourceVersion: "970"
  uid: 41670649-cfa2-404c-aa5a-32eea7cd85b3
rules:
- apiGroups:
  - ""
  resources:
  - nodes/metrics
  verbs:
  - get
- apiGroups:
  - ""
  resources:
  - pods
  - nodes
  - namespaces
  - configmaps
  verbs:
  - get
  - list
  - watch

Change EKS to Helm

apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  creationTimestamp: "2025-05-31T23:51:10Z"
  labels:
    app.kubernetes.io/instance: metrics-server
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/name: metrics-server
    app.kubernetes.io/version: 0.7.2
  name: system:metrics-server
  resourceVersion: "32569"
  uid: 41670649-cfa2-404c-aa5a-32eea7cd85b3
rules:
- apiGroups:
  - ""
  resources:
  - nodes/metrics
  verbs:
  - get
- apiGroups:
  - ""
  resources:
  - pods
  - nodes

```
  - namespaces
  - configmaps
  verbs:
  - get
  - list
  - watch

ubuntu@ip-172-31-9-165:~$ helm upgrade --install metrics-server metrics-server/metrics-server
Release "metrics-server" does not exist. Installing it now.
Error: Unable to continue with install: ClusterRole "system:metrics-server" in namespace "" exists and
cannot be imported into the current release: invalid ownership metadata; annotation validation error:
missing key "meta.helm.sh/release-name": must be set to "metrics-server"; annotation validation
error: missing key "meta.helm.sh/release-namespace": must be set to "default"


kubectl patch clusterrole system:metrics-server --type='merge' -p '{
    "metadata": {
      “annotations”: {
        “meta.helm.sh/release-namespace”: “kube-system”
    }
    }
    }’
kubectl patch clusterrolebinding system:metrics-server --type=’merge’ -p {
  “metadata”: {
     “annotations”: {
       “meta.helm.sh/release-namespace”: “kube-system”
}
}
}’

ubuntu@ip-172-31-9-165:~$ kubectl patch clusterrole system:metrics-server --type='merge' -p '{
  "metadata": {
    "annotations": {
      "meta.helm.sh/release-namespace": "kube-system"
}
}
}'
kubectl patch clusterrolebinding system:metrics-server --type='merge' -p '{
  "metadata": {
    "annotations": {
      "meta.helm.sh/release-namespace": "kube-system"
}
}
}'
clusterrole.rbac.authorization.k8s.io/system:metrics-server patched (no change)
clusterrolebinding.rbac.authorization.k8s.io/system:metrics-server patched


apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  annotations:
    meta.helm.sh/release-name: metrics-server
    meta.helm.sh/release-namespace: kube-system
  creationTimestamp: "2025-05-31T23:51:10Z"
  labels:
    app.kubernetes.io/instance: metrics-server
```

```
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/name: metrics-server
    app.kubernetes.io/version: 0.7.2
  name: system:metrics-server
  resourceVersion: "35453"
  uid: 41670649-cfa2-404c-aa5a-32eea7cd85b3
rules:
- apiGroups:
  - ""
  resources:
  - nodes/metrics
  verbs:
  - get
- apiGroups:
  - ""
  resources:
  - pods
  - nodes
  - namespaces
  - configmaps
  verbs:
  - get
  - list
  - watch
```

Run this in case of error

```
eksctl delete addon --name metrics-server --cluster my-eks-cluster --region ca-central-1
eksctl create addon --name metrics-server --cluster my-eks-cluster --region ca-central-1 --force
```

```
ubuntu@ip-172-31-9-165:~$ helm upgrade --install metrics-server metrics-server/metrics-server --
namespace kube-system
Release "metrics-server" does not exist. Installing it now.
NAME: metrics-server
LAST DEPLOYED: Sun Jun  1 03:32:18 2025
NAMESPACE: kube-system
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
***********************************************************************
* Metrics Server                                                      *
***********************************************************************
  Chart version: 3.12.2
  App version:   0.7.2
  Image tag:     registry.k8s.io/metrics-server/metrics-server:v0.7.2
***********************************************************************
```

```
ubuntu@ip-172-31-9-165:~$ helm upgrade --install metrics-server metrics-server/metrics-server --namespace kube-system
Release "metrics-server" does not exist. Installing it now.
NAME: metrics-server
LAST DEPLOYED: Sun Jun  1 03:32:18 2025
NAMESPACE: kube-system
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
***********************************************************************
* Metrics Server                                                      *
***********************************************************************
  Chart version: 3.12.2
  App version:   0.7.2
  Image tag:     registry.k8s.io/metrics-server/metrics-server:v0.7.2
***********************************************************************
ubuntu@ip-172-31-9-165:~$
```

```
ubuntu@ip-172-31-9-165:~$ kubectl get pods -n kube-system
NAME                          READY   STATUS    RESTARTS   AGE
aws-node-p8twr                2/2     Running   0          3h44m
aws-node-rjz8f                2/2     Running   0          3h44m
coredns-86d7bdf-5fs7m         1/1     Running   0          3h45m
coredns-86d7bdf-fjd5h         1/1     Running   0          3h45m
kube-proxy-29q9j              1/1     Running   0          3h44m
kube-proxy-c9dhr              1/1     Running   0          3h44m
metrics-server-6fdb59879c-mjpbm   1/1     Running   0          4m29s
```

```
ubuntu@ip-172-31-9-165:~$ kubectl get pods -n kube-system
NAME                          READY   STATUS    RESTARTS   AGE
aws-node-p8twr                2/2     Running   0          3h44m
aws-node-rjz8f                2/2     Running   0          3h44m
coredns-86d7bdf-5fs7m         1/1     Running   0          3h45m
coredns-86d7bdf-fjd5h         1/1     Running   0          3h45m
kube-proxy-29q9j              1/1     Running   0          3h44m
kube-proxy-c9dhr              1/1     Running   0          3h44m
metrics-server-6fdb59879c-mjpbm   1/1     Running   0          4m29s
ubuntu@ip-172-31-9-165:~$
```

metrics-server is running

If required:

```
kubectl patch rolebinding metrics-server-auth-reader -n kube-system --type='merge' -p '{
 "metadata": {
   "labels": {
        "app.kubernetes.io/managed-by": "Helm"
   },
   "annotations" : {
      "meta.helm.sh/release-name": "metrics-server",
      "meta.helm.sh/release-namespace": "kube-system"
   }
   }
   }'
```

```
ubuntu@ip-172-31-9-165:~$ kubectl get nodes
NAME                                          STATUS   ROLES    AGE   VERSION
ip-192-168-1-194.ca-central-1.compute.internal   Ready    <none>   4h    v1.32.3-eks-473151a
ip-192-168-37-54.ca-central-1.compute.internal   Ready    <none>   4h    v1.32.3-eks-473151a
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$
```

ubuntu@ip-172-31-9-165:~$ kubectl get pods -n kube-system
NAME READY STATUS RESTARTS AGE
aws-node-p8twr 2/2 Running 0 4h
aws-node-rjz8f 2/2 Running 0 4h
coredns-86d7bdf-5fs7m 1/1 Running 0 4h2m
coredns-86d7bdf-fjd5h 1/1 Running 0 4h2m
kube-proxy-29q9j 1/1 Running 0 4h
kube-proxy-c9dhr 1/1 Running 0 4h
metrics-server-6fdb59879c-mjpbm 1/1 Running 0 21m

Deploy Grafana and Prometheus in K8s: --> Using Helm charts

helm repo add prometheus-community https://prometheus-community.github.io/helm-charts

ubuntu@ip-172-31-9-165:~$ helm repo add prometheus-community https://prometheus-community.github.io/helm-charts
"prometheus-community" has been added to your repositories

ubuntu@ip-172-31-9-165:~$ helm repo update
Hang tight while we grab the latest from your chart repositories...
...Successfully got an update from the "metrics-server" chart repository
...Successfully got an update from the "prometheus-community" chart repository
Update Complete. ⎈ Happy Helming!⎈

ubuntu@ip-172-31-9-165:~$ helm repo list
NAME URL
metrics-server https://kubernetes-sigs.github.io/metrics-server
prometheus-community https://prometheus-community.github.io/helm-charts

Both metrics-server and Prometheus are there

```
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$ helm repo add prometheus-community https://prometheus-community.github.io/helm-charts
"prometheus-community" has been added to your repositories
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$ helm repo update
Hang tight while we grab the latest from your chart repositories...
...Successfully got an update from the "metrics-server" chart repository
...Successfully got an update from the "prometheus-community" chart repository
Update Complete. *Happy Helming!*
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$ helm repo list
NAME                    URL
metrics-server          https://kubernetes-sigs.github.io/metrics-server
prometheus-community    https://prometheus-community.github.io/helm-charts
ubuntu@ip-172-31-9-165:~$
```

helm install prometheus prometheus-community/prometheus --namespace kube-system

ubuntu@ip-172-31-9-165:~$ helm install prometheus prometheus-community/prometheus --namespace kube-system

ubuntu@ip-172-31-9-165:~$ kubectl get pods -n kube-system
NAME READY STATUS RESTARTS AGE
aws-node-gzwnp 2/2 Running 0 80m
aws-node-p4qmb 2/2 Running 0 80m

coredns-86d7bdf-4mt5t 1/1 Running 0 81m
coredns-86d7bdf-5whrf 1/1 Running 0 81m
kube-proxy-79dk5 1/1 Running 0 80m
kube-proxy-jh7dr 1/1 Running 0 80m
metrics-server-d9fd456dc-ksgn2 1/1 Running 0 82m
metrics-server-d9fd456dc-n5fn9 1/1 Running 0 82m
prometheus-alertmanager-0 0/1 Pending 0 26s
prometheus-kube-state-metrics-5b9cfb448c-p8dzx 1/1 Running 0 26s
prometheus-prometheus-node-exporter-2f465 1/1 Running 0 26s
prometheus-prometheus-node-exporter-qj278 1/1 Running 0 26s
prometheus-prometheus-pushgateway-56d6b84f88-m2n88 1/1 Running 0 26s
prometheus-server-56d79479fc-ghbkz 0/2 Pending 0 26s

helm install kube-prometheus-stack prometheus-community/kube-prometheus-stack --namespace kube-system

ubuntu@ip-172-31-9-165:~$ helm install kube-prometheus-stack prometheus-community/kube-prometheus-stack --namespace kube-system

```
ubuntu@ip-172-31-9-165:~$ helm install kube-prometheus-stack prometheus-community/kube-prometheus-stack --namespace kube-system
NAME: kube-prometheus-stack
LAST DEPLOYED: Sun Jun  1 15:23:30 2025
NAMESPACE: kube-system
STATUS: deployed
REVISION: 1
NOTES:
kube-prometheus-stack has been installed. Check its status by running:
  kubectl --namespace kube-system get pods -l "release=kube-prometheus-stack"

Get Grafana 'admin' user password by running:

  kubectl --namespace kube-system get secrets kube-prometheus-stack-grafana -o jsonpath="{.data.admin-password}" | base64 -d ; e

Access Grafana local instance:

  export POD_NAME=$(kubectl --namespace kube-system get pod -l "app.kubernetes.io/name=grafana,app.kubernetes.io/instance=kube-p
  kubectl --namespace kube-system port-forward $POD_NAME 3000
```

ubuntu@ip-172-31-9-165:~$ kubectl get pods -n kube-system
NAME READY STATUS RESTARTS AGE
alertmanager-kube-prometheus-stack-alertmanager-0 2/2 Running 0 3m5s
aws-node-gzwnp 2/2 Running 0 86m
aws-node-p4qmb 2/2 Running 0 86m
coredns-86d7bdf-4mt5t 1/1 Running 0 87m
coredns-86d7bdf-5whrf 1/1 Running 0 87m
kube-prometheus-stack-grafana-67bb9f4bc6-8d2dd 3/3 Running 0 3m9s
kube-prometheus-stack-kube-state-metrics-77678594d6-kxt7h 1/1 Running 0 3m9s
kube-prometheus-stack-operator-5d8cc87fbb-bfc7x 1/1 Running 0 3m9s
kube-prometheus-stack-prometheus-node-exporter-5x2sr 0/1 Pending 0 3m9s
kube-prometheus-stack-prometheus-node-exporter-kgh94 0/1 Pending 0 3m9s
kube-proxy-79dk5 1/1 Running 0 86m
kube-proxy-jh7dr 1/1 Running 0 86m
metrics-server-d9fd456dc-ksgn2 1/1 Running 0 87m
metrics-server-d9fd456dc-n5fn9 1/1 Running 0 87m
prometheus-alertmanager-0 0/1 Pending 0 6m22s
prometheus-kube-prometheus-stack-prometheus-0 2/2 Running 0 3m5s
prometheus-kube-state-metrics-5b9cfb448c-p8dzx 1/1 Running 0 6m22s
prometheus-prometheus-node-exporter-2f465 1/1 Running 0 6m22s
prometheus-prometheus-node-exporter-qj278 1/1 Running 0 6m22s
prometheus-prometheus-pushgateway-56d6b84f88-m2n88 1/1 Running 0 6m22s
prometheus-server-56d79479fc-ghbkz 0/2 Pending 0 6m22s

For Grafana, see this
Get Grafana 'admin' user password by running:

kubectl --namespace kube-system get secrets kube-prometheus-stack-grafana -o jsonpath="{.data.admin-password}" | base64 -d ; echo

```
Get Grafana 'admin' user password by running:

  kubectl --namespace kube-system get secrets kube-prometheus-stack-grafana -o jsonpath="{.data.admin-password}" | base64 -d ; echo

Access Grafana local instance:

  export POD_NAME=$(kubectl --namespace kube-system get pod -l "app.kubernetes.io/name=grafana,app.kubernetes.io/instance=kube-prometheus-stack" -oname)
  kubectl --namespace kube-system port-forward $POD_NAME 3000

Visit https://github.com/prometheus-operator/kube-prometheus for instructions on how to create & configure Alertmanager and Prometheus instances using the
rator.
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$ kubectl get pods
No resources found in default namespace.
ubuntu@ip-172-31-9-165:~$ kubectl get pods -n kube-system
NAME                                                     READY   STATUS    RESTARTS   AGE
alertmanager-kube-prometheus-stack-alertmanager-0        2/2     Running   0          3m5s
aws-node-gzwnp                                           2/2     Running   0          86m
aws-node-p4gmb                                           2/2     Running   0          86m
```

$ helm install prometheus prometheus-community/kube-prometheus-stack --namespace default --> original command from Notes

```
ubuntu@ip-172-31-9-165:~$ kubectl get svc -n kube-system
NAME                                      TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)                    AGE
alertmanager-operated                     ClusterIP   None            <none>        9093/TCP,9094/TCP,9094/UDP   8m30s
eks-extension-metrics-api                 ClusterIP   10.100.156.120  <none>        443/TCP                    97m
kube-dns                                  ClusterIP   10.100.0.10     <none>        53/UDP,53/TCP,9153/TCP     93m
kube-prometheus-stack-alertmanager        ClusterIP   10.100.112.139  <none>        9093/TCP,8080/TCP          8m34s
kube-prometheus-stack-coredns             ClusterIP   None            <none>        9153/TCP                   8m34s
kube-prometheus-stack-grafana             ClusterIP   10.100.141.227  <none>        80/TCP                     8m34s
kube-prometheus-stack-kube-controller-manager   ClusterIP   None      <none>        10257/TCP                  8m34s
kube-prometheus-stack-kube-etcd           ClusterIP   None            <none>        2381/TCP                   8m34s
kube-prometheus-stack-kube-proxy          ClusterIP   None            <none>        10249/TCP                  8m34s
kube-prometheus-stack-kube-scheduler      ClusterIP   None            <none>        10259/TCP                  8m34s
kube-prometheus-stack-kube-state-metrics  ClusterIP   10.100.201.64   <none>        8080/TCP                   8m34s
kube-prometheus-stack-kubelet             ClusterIP   None            <none>        10250/TCP,10255/TCP,4194/TCP   8m30s
kube-prometheus-stack-operator            ClusterIP   10.100.148.166  <none>        443/TCP                    8m34s
kube-prometheus-stack-prometheus          ClusterIP   10.100.176.99   <none>        9090/TCP,8080/TCP          8m34s
kube-prometheus-stack-prometheus-node-exporter   ClusterIP   10.100.16.211   <none>   9100/TCP                   8m34s
metrics-server                            ClusterIP   10.100.138.211  <none>        443/TCP                    93m
prometheus-alertmanager                   ClusterIP   10.100.134.106  <none>        9093/TCP                   11m
```

prometheus-alertmanager-headless ClusterIP None <none> 9093/TCP
11m
prometheus-kube-state-metrics ClusterIP 10.100.22.2 <none> 8080/TCP
11m
prometheus-operated ClusterIP None <none> 9090/TCP
8m30s
prometheus-prometheus-node-exporter ClusterIP 10.100.160.247 <none> 9100/TCP
11m
prometheus-prometheus-pushgateway ClusterIP 10.100.67.241 <none> 9091/TCP
11m
prometheus-server ClusterIP 10.100.196.148 <none> 80/TCP
11m

Prometheus, Grafana ---> They are all using ClusterIP service, if you using ClusterIP service, we can access them within the Cluster

```
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$ kubectl get svc -n kube-system
NAME                                          TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)
alertmanager-operated                         ClusterIP   None             <none>        9093/TCP,9094/TCP,9094/UDP
eks-extension-metrics-api                     ClusterIP   10.100.156.120   <none>        443/TCP
kube-dns                                      ClusterIP   10.100.0.10      <none>        53/UDP,53/TCP,9153/TCP
kube-prometheus-stack-alertmanager            ClusterIP   10.100.112.139   <none>        9093/TCP,8080/TCP
kube-prometheus-stack-coredns                 ClusterIP   None             <none>        9153/TCP
kube-prometheus-stack-grafana                 ClusterIP   10.100.141.227   <none>        80/TCP
kube-prometheus-stack-kube-controller-manager ClusterIP   None             <none>        10257/TCP
kube-prometheus-stack-kube-etcd               ClusterIP   None             <none>        2381/TCP
kube-prometheus-stack-kube-proxy              ClusterIP   None             <none>        10249/TCP
kube-prometheus-stack-kube-scheduler          ClusterIP   None             <none>        10259/TCP
kube-prometheus-stack-kube-state-metrics      ClusterIP   10.100.201.64    <none>        8080/TCP
kube-prometheus-stack-kubelet                 ClusterIP   None             <none>        10250/TCP,10255/TCP,4194/TCP
kube-prometheus-stack-operator                ClusterIP   10.100.148.166   <none>        443/TCP
kube-prometheus-stack-prometheus              ClusterIP   10.100.176.99    <none>        9090/TCP,8080/TCP
kube-prometheus-stack-prometheus-node-exporter ClusterIP  10.100.16.211    <none>        9100/TCP
metrics-server                                ClusterIP   10.100.138.211   <none>        443/TCP
prometheus-alertmanager                       ClusterIP   10.100.134.106   <none>        9093/TCP
prometheus-alertmanager-headless              ClusterIP   None             <none>        9093/TCP
prometheus-kube-state-metrics                 ClusterIP   10.100.22.2      <none>        8080/TCP
prometheus-operated                           ClusterIP   None             <none>        9090/TCP
prometheus-prometheus-node-exporter           ClusterIP   10.100.160.247   <none>        9100/TCP
prometheus-prometheus-pushgateway             ClusterIP   10.100.67.241    <none>        9091/TCP
prometheus-server                             ClusterIP   10.100.196.148   <none>        80/TCP
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$
```

Expose these services with LoadBalancer: By default, Prometheus and Grafana services are ClusterIP (within Cluster we can access)

To access them externally, change their Type to LoadBalancer

ubuntu@ip-172-31-9-165:~$ helm uninstall kube-prometheus-stack --namespace kube-system

ubuntu@ip-172-31-9-165:~$ helm install prometheus prometheus-community/kube-prometheus-stack --namespace kube-system

```
Visit https://github.com/prometheus-operator/kube-prometheus for instructions on how to create & configure Alertmanager and Prometheus instan
rator.
ubuntu@ip-172-31-9-165:~$ kubectl get all -n kube-system | grep prometheus
pod/alertmanager-prometheus-kube-prometheus-alertmanager-0   2/2     Running   0          27s
pod/prometheus-grafana-9676cd6bf-s6zsw                       3/3     Running   0          30s
pod/prometheus-kube-prometheus-operator-6dfb4769bb-6gvqq     1/1     Running   0          30s
pod/prometheus-kube-state-metrics-f8fc86d54-r9t7c            1/1     Running   0          30s
pod/prometheus-prometheus-kube-prometheus-prometheus-0       2/2     Running   0          27s
pod/prometheus-prometheus-node-exporter-kvb7s                1/1     Running   0          30s
pod/prometheus-prometheus-node-exporter-qzzwm                1/1     Running   0          30s
service/kube-prometheus-stack-kubelet                        ClusterIP   None             <none>        10250/TCP,10255/TCP,4194/TCP   26m
service/prometheus-grafana                                   ClusterIP   10.100.152.212   <none>        80/TCP                         30s
service/prometheus-kube-prometheus-alertmanager              ClusterIP   10.100.89.174    <none>        9093/TCP,8080/TCP              30s
service/prometheus-kube-prometheus-coredns                   ClusterIP   None             <none>        9153/TCP                       30s
service/prometheus-kube-prometheus-kube-controller-manager   ClusterIP   None             <none>        10257/TCP                      30s
service/prometheus-kube-prometheus-kube-etcd                 ClusterIP   None             <none>        2381/TCP                       30s
service/prometheus-kube-prometheus-kube-proxy                ClusterIP   None             <none>        10249/TCP                      30s
service/prometheus-kube-prometheus-kube-scheduler            ClusterIP   None             <none>        10259/TCP                      30s
service/prometheus-kube-prometheus-kubelet                   ClusterIP   None             <none>        10250/TCP,10255/TCP,4194/TCP   27s
service/prometheus-kube-prometheus-operator                  ClusterIP   10.100.160.158   <none>        443/TCP                        30s
service/prometheus-kube-prometheus-prometheus                ClusterIP   10.100.180.84    <none>        9090/TCP,8080/TCP              30s
service/prometheus-kube-state-metrics                        ClusterIP   10.100.4.54      <none>        8080/TCP                       30s
service/prometheus-operated                                  ClusterIP   None             <none>        9090/TCP                       27s
service/prometheus-prometheus-node-exporter                  ClusterIP   10.100.88.48     <none>        9100/TCP                       30s
daemonset.apps/prometheus-prometheus-node-exporter   2         2         2       2            2           kubernetes.io/os=linux   30s
deployment.apps/prometheus-grafana                   1/1     1            1           30s
deployment.apps/prometheus-kube-prometheus-operator   1/1     1            1           30s
deployment.apps/prometheus-kube-state-metrics         1/1     1            1           30s
replicaset.apps/prometheus-grafana-9676cd6bf                    1         1         1       30s
replicaset.apps/prometheus-kube-prometheus-operator-6dfb4769bb   1         1         1       30s
replicaset.apps/prometheus-kube-state-metrics-f8fc86d54          1         1         1       30s
statefulset.apps/alertmanager-prometheus-kube-prometheus-alertmanager   1/1     27s
statefulset.apps/prometheus-prometheus-kube-prometheus-prometheus       1/1     27s
ubuntu@ip-172-31-9-165:~$
```

Now we edit the svc
ubuntu@ip-172-31-9-165:~$ kubectl edit svc -n kube-system prometheus-kube-prometheus-prometheus

In this file we can see type: ClusterIP

```
  - 10.100.180.84
  internalTrafficPolicy: Cluster
  ipFamilies:
  - IPv4
  ipFamilyPolicy: SingleStack
  ports:
  - name: http-web
    port: 9090
    protocol: TCP
    targetPort: 9090
  - appProtocol: http
    name: reloader-web
    port: 8080
    protocol: TCP
    targetPort: reloader-web
  selector:
    app.kubernetes.io/name: prometheus
    operator.prometheus.io/name: prometheus-kube-prometheus-prometheus
  sessionAffinity: None
  type: ClusterIP
status:
  loadBalancer: {}
  -- INSERT --
```

Change ClusterIP to LoadBalancer

```
  - 10.100.180.84
  internalTrafficPolicy: Cluster
  ipFamilies:
  - IPv4
  ipFamilyPolicy: SingleStack
  ports:
  - name: http-web
    port: 9090
    protocol: TCP
    targetPort: 9090
  - appProtocol: http
    name: reloader-web
    port: 8080
    protocol: TCP
    targetPort: reloader-web
  selector:
    app.kubernetes.io/name: prometheus
    operator.prometheus.io/name: prometheus-kube-prometheus-prometheus
  sessionAffinity: None
  type: LoadBalancer
status:
  loadBalancer: {}
```

ubuntu@ip-172-31-9-165:~$ kubectl edit svc -n kube-system prometheus-kube-prometheus-prometheus
service/prometheus-kube-prometheus-prometheus edited
ubuntu@ip-172-31-9-165:~$ kubectl get svc

```
ubuntu@ip-172-31-9-165:~$
ubuntu@ip-172-31-9-165:~$ kubectl get svc
NAME          TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
kubernetes    ClusterIP   10.100.0.1   <none>        443/TCP   120m
ubuntu@ip-172-31-9-165:~$ kubectl get svc -n kube-system
NAME                                                TYPE           CLUSTER-IP       EXTERNAL-IP
    PORT(S)                          AGE
alertmanager-operated                               ClusterIP      None             <none>
    9093/TCP,9094/TCP,9094/UDP       6m7s
eks-extension-metrics-api                           ClusterIP      10.100.156.120   <none>
    443/TCP                          121m
kube-dns                                            ClusterIP      10.100.0.10      <none>
    53/UDP,53/TCP,9153/TCP           116m
kube-prometheus-stack-kubelet                       ClusterIP      None             <none>
    10250/TCP,10255/TCP,4194/TCP     31m
metrics-server                                      ClusterIP      10.100.138.211   <none>
    443/TCP                          116m
prometheus-grafana                                  ClusterIP      10.100.152.212   <none>
    80/TCP                           6m10s
prometheus-kube-prometheus-alertmanager             ClusterIP      10.100.89.174    <none>
    9093/TCP,8080/TCP                6m10s
prometheus-kube-prometheus-coredns                  ClusterIP      None             <none>
    9153/TCP                         6m10s
prometheus-kube-prometheus-kube-controller-manager  ClusterIP      None             <none>
    10257/TCP                        6m10s
prometheus-kube-prometheus-kube-etcd                ClusterIP      None             <none>
    2381/TCP                         6m10s
prometheus-kube-prometheus-kube-proxy               ClusterIP      None             <none>
    10249/TCP                        6m10s
prometheus-kube-prometheus-kube-scheduler           ClusterIP      None             <none>
    10259/TCP                        6m10s
prometheus-kube-prometheus-kubelet                  ClusterIP      None             <none>
    10250/TCP,10255/TCP,4194/TCP     6m7s
prometheus-kube-prometheus-operator                 ClusterIP      10.100.160.158   <none>
    443/TCP                          6m10s
prometheus-kube-prometheus-prometheus               LoadBalancer   10.100.180.84    ad9bd6b88e37d4361be878eb6f0367cd-1007
m   9090:30663/TCP,8080:32353/TCP    6m10s
prometheus-kube-state-metrics                       ClusterIP      10.100.4.54      <none>
    8080/TCP                         6m10s
```

Changed to LoadBalancer

Spec:

---
  type: LoadBalancer

Next edit the Prometheus Grafana file

ubuntu@ip-172-31-9-165:~$ kubectl edit svc kube-system prometheus-grafana

ubuntu@ip-172-31-9-165:~$ kubectl edit svc -n kube-system prometheus-grafana

```
  - 10.100.152.212
  internalTrafficPolicy: Cluster
  ipFamilies:
  - IPv4
  ipFamilyPolicy: SingleStack
  ports:
  - name: http-web
    port: 80
    protocol: TCP
    targetPort: 3000
  selector:
    app.kubernetes.io/instance: prometheus
    app.kubernetes.io/name: grafana
  sessionAffinity: None
  type: LoadBalancer
status:
  loadBalancer: {}
```

ubuntu@ip-172-31-9-165:~$ kubectl edit svc -n kube-system prometheus-grafana
service/prometheus-grafana edited

ubuntu@ip-172-31-9-165:~$ kubectl get svc -n kube-system

```
ubuntu@ip-172-31-9-165:~$ kubectl get svc -n kube-system
NAME                                                  TYPE           CLUSTER-IP       EXTERNAL-IP
    PORT(S)                          AGE
alertmanager-operated                                 ClusterIP      None             <none>
    9093/TCP,9094/TCP,9094/UDP       13m
eks-extension-metrics-api                             ClusterIP      10.100.156.120   <none>
    443/TCP                          128m
kube-dns                                              ClusterIP      10.100.0.10      <none>
    53/UDP,53/TCP,9153/TCP           123m
kube-prometheus-stack-kubelet                         ClusterIP      None             <none>
    10250/TCP,10255/TCP,4194/TCP     39m
metrics-server                                        ClusterIP      10.100.138.211   <none>
    443/TCP                          124m
prometheus-grafana                                    LoadBalancer   10.100.152.212   a990e6b64f8274486ae8324542aadd99-86
    80:30757/TCP                     13m
prometheus-kube-prometheus-alertmanager               ClusterIP      10.100.89.174    <none>
    9093/TCP,8080/TCP                13m
prometheus-kube-prometheus-coredns                    ClusterIP      None             <none>
    9153/TCP                         13m
prometheus-kube-prometheus-kube-controller-manager    ClusterIP      None             <none>
    10257/TCP                        13m
prometheus-kube-prometheus-kube-etcd                  ClusterIP      None             <none>
    2381/TCP                         13m
prometheus-kube-prometheus-kube-proxy                 ClusterIP      None             <none>
    10249/TCP                        13m
prometheus-kube-prometheus-kube-scheduler             ClusterIP      None             <none>
    10259/TCP                        13m
prometheus-kube-prometheus-kubelet                    ClusterIP      None             <none>
    10250/TCP,10255/TCP,4194/TCP     13m
prometheus-kube-prometheus-operator                   ClusterIP      10.100.160.158   <none>
    443/TCP                          13m
prometheus-kube-prometheus-prometheus                 LoadBalancer   10.100.180.84    ad9bd6b88e37d4361be878eb6f0367cd-16
m   9090:30663/TCP,8080:32353/TCP    13m
prometheus-kube-state-metrics                         ClusterIP      10.100.4.54      <none>
```

LoadBalancer ports 80 and 9090 should be enabled in Security groups

sgr-0da30402ac201457d	Custom TCP	TCP	8181	Custom	0.0.0.0/0	Delete
sgr-0e5cef937ec2e0b52	All TCP	TCP	0 - 65535	Custom	0.0.0.0/0	Delete
sgr-07d1078f0fa10518a	HTTP	TCP	80	Custom	0.0.0.0/0	Delete
–	Custom TCP	TCP	9090	Anywh...	0.0.0.0/0	Delete

Add rule

Load balancers (1/2)

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Filter load balancers

Name	DNS name	State	VPC ID	Availability Zones
ad9bd6b88e37d4361be...	ad9bd6b88e37d4361be878eb6f0367cd-10...	–	vpc-0ff137ab61da01fc7	2 Availability Zones
a990e6b64f8274486ae...	a990e6b64f8274486ae8324542aadd99-86...	–	vpc-0ff137ab61da01fc7	2 Availability Zones

Load balancer: ad9bd6b88e37d4361be878eb6f0367cd

Details | Listeners | Network mapping | Security | Health checks | Target instances | Monitoring | Attributes | Tags

Security groups (1)

A security group is a set of firewall rules that control the traffic to your load balancer.

Security Group ID	Name	Description
sg-0489ada0ddca039ad	k8s-elb-ad9bd...	Security group for Kubernetes ELB ad9bd6b88e37d4361be878eb6f0367cd (kube-system/prometheus-kube-

sg-0489ada0ddca039ad - k8s-elb-ad9bd6b88e37d4361be878eb6f0367cd

Details

Security group name
k8s-elb-ad9bd6b88e37d4361be878eb6f0367cd

Security group ID
sg-0489ada0ddca039ad

Description
Security group for Kubernetes ELB ad9bd6b88e37d4361be878eb6f0367cd (kube-system/prometheus-kube-prometheus-prometheus)

Owner
577638386543

Inbound rules count
3 Permission entries

Outbound rules count
1 Permission entry

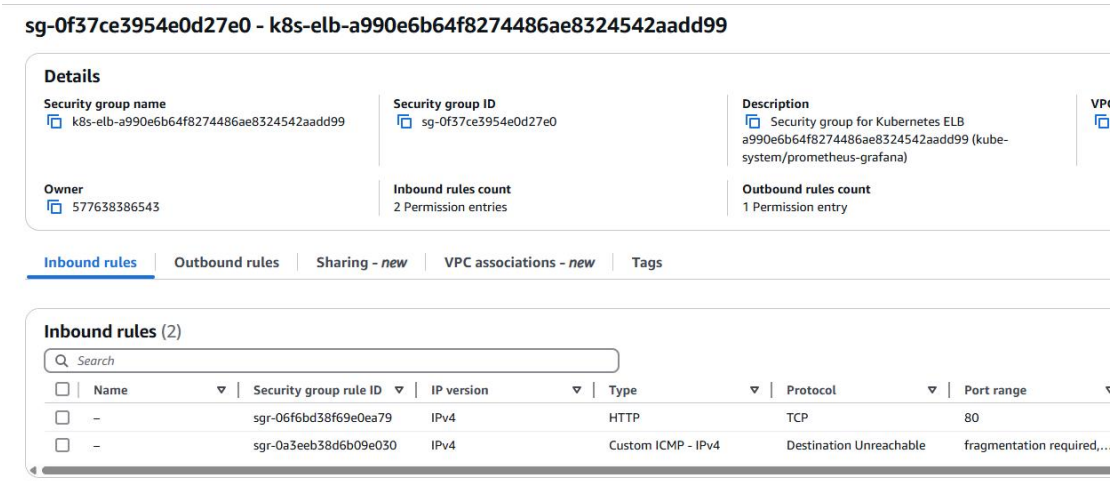
Inbound rules | Outbound rules | Sharing - *new* | VPC associations - *new* | Tags

Inbound rules (3)

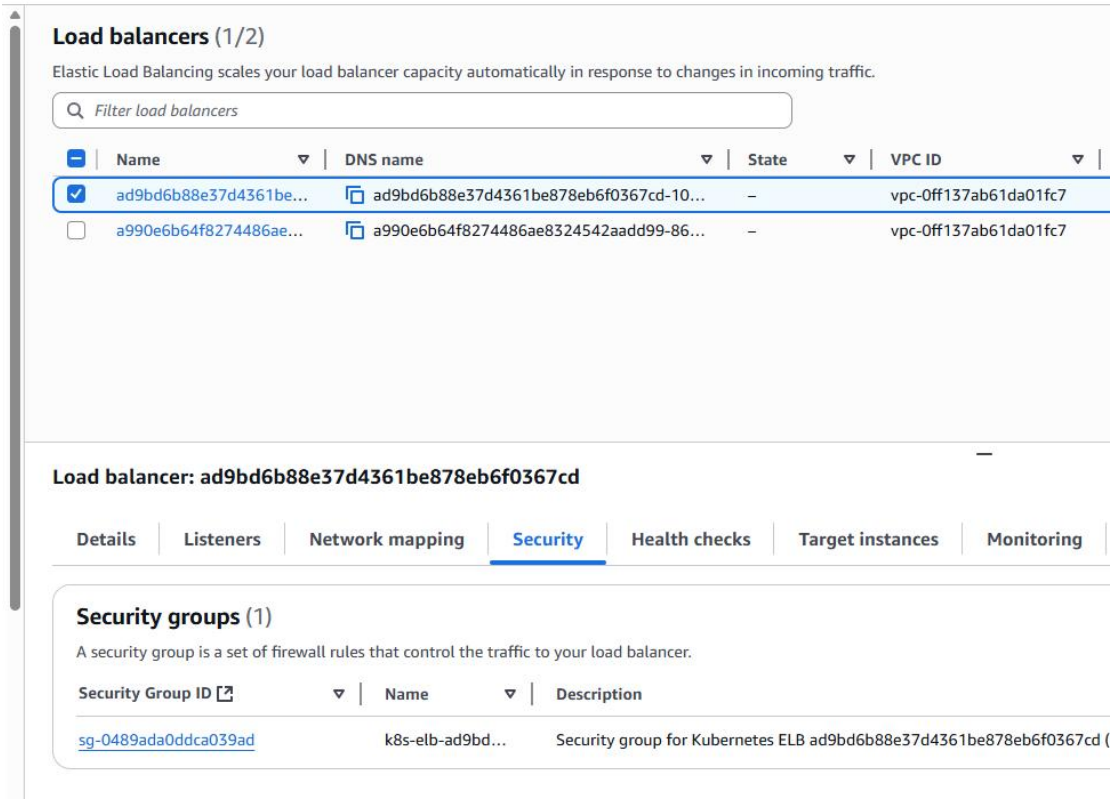
Search

Name	Security group rule ID	IP version	Type	Protocol	Port range
–	sgr-033ff021f12718f99	IPv4	Custom ICMP - IPv4	Destination Unreachable	fragmentatior
–	sgr-08d45d63b51f9a9ab	IPv4	Custom TCP	TCP	9090
–	sgr-00a343fe507bb049a	IPv4	Custom TCP	TCP	8080

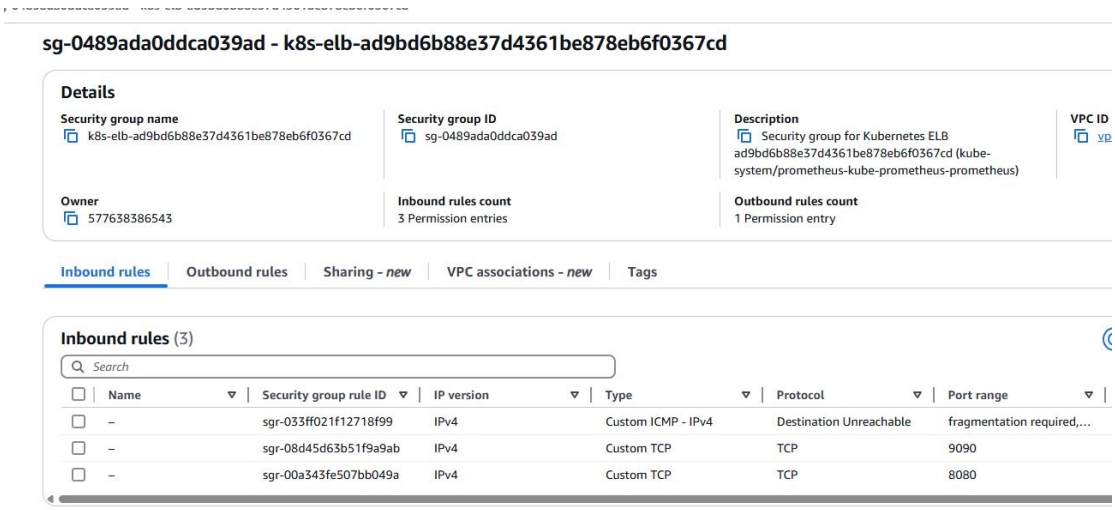
For the second LoadBalancer



Go back to Loadbalancer

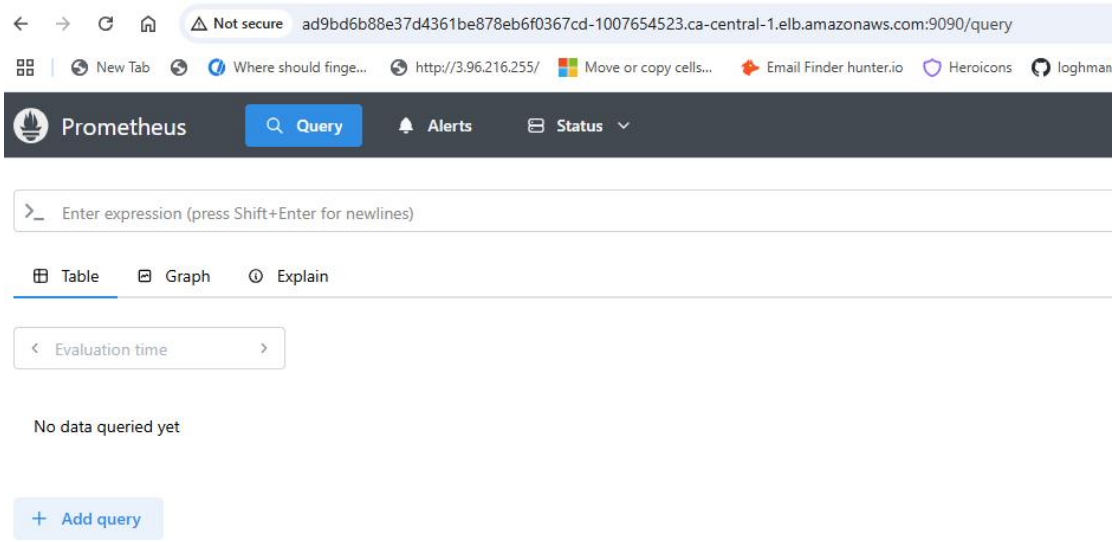


Go to its Security rules

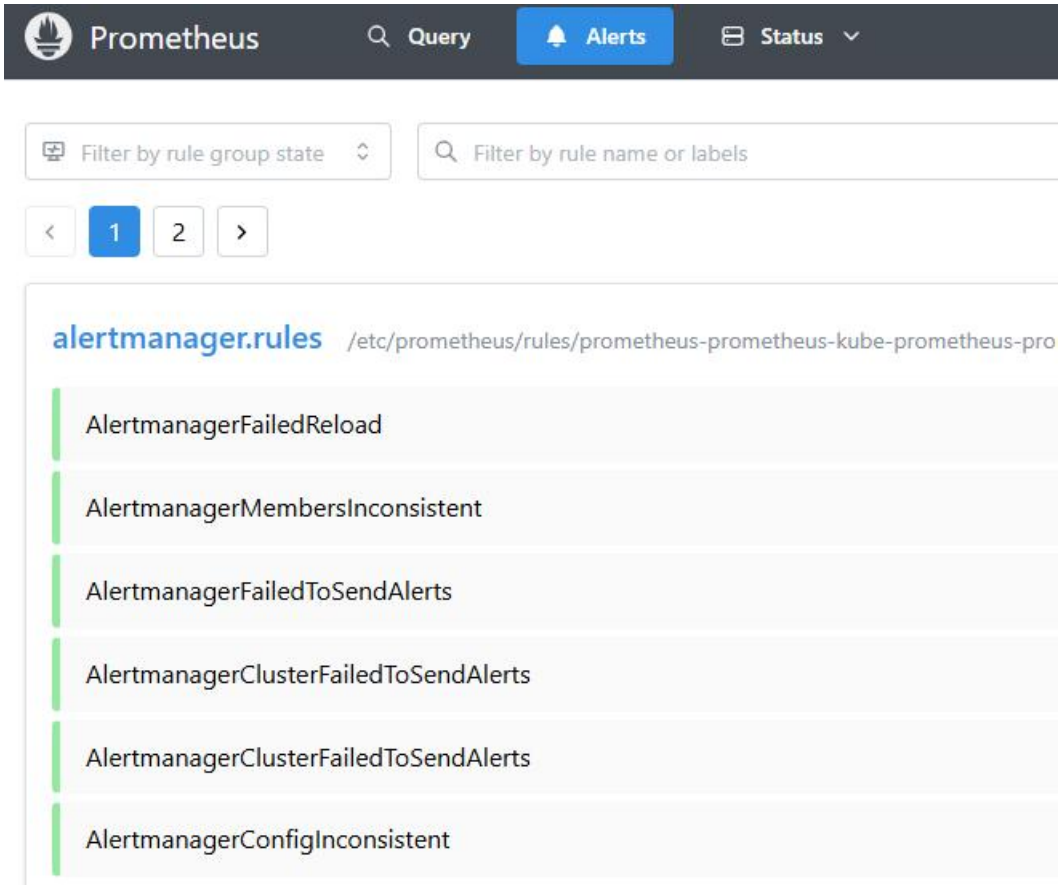


Port 9090 is already added in Inbound rules that means Prometheus is running on this LoadBalancer

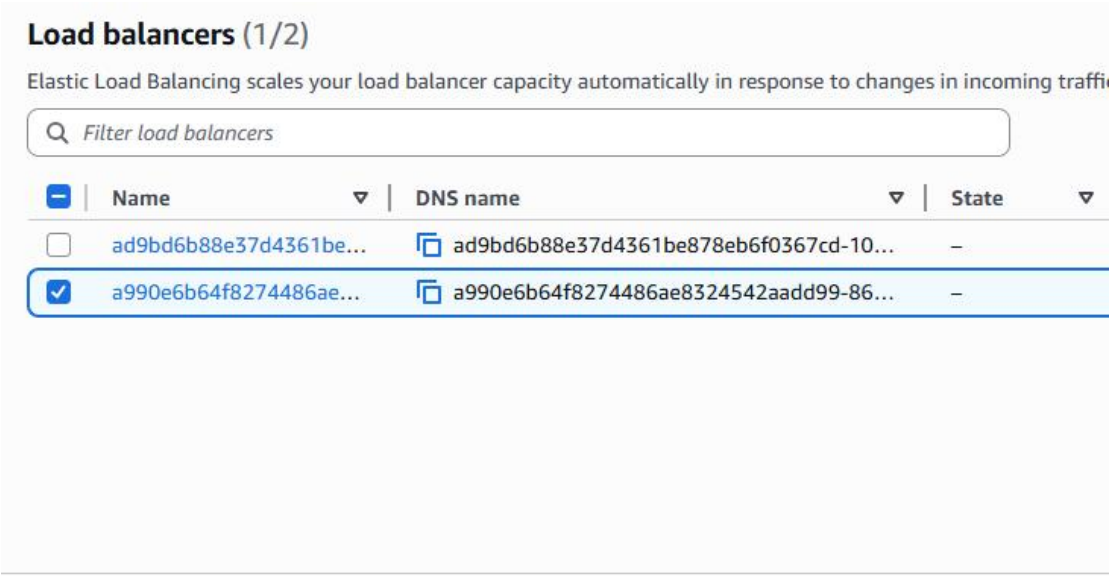
Copy DNS add 9090 to the end
http://ad9bd6b88e37d4361be878eb6f0367cd-1007654523.ca-central-1.elb.amazonaws.com:9090/query

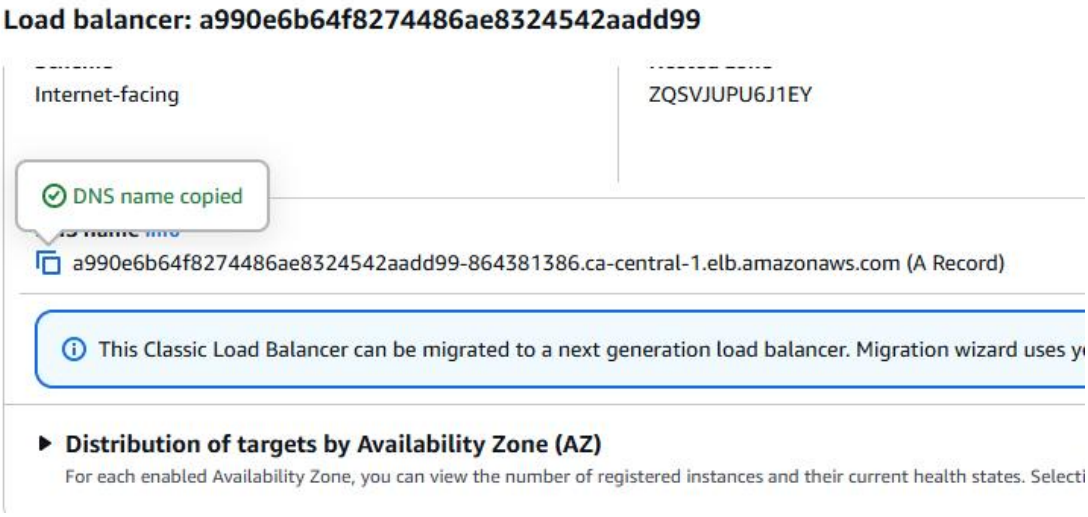


We can see Prometheus up and running

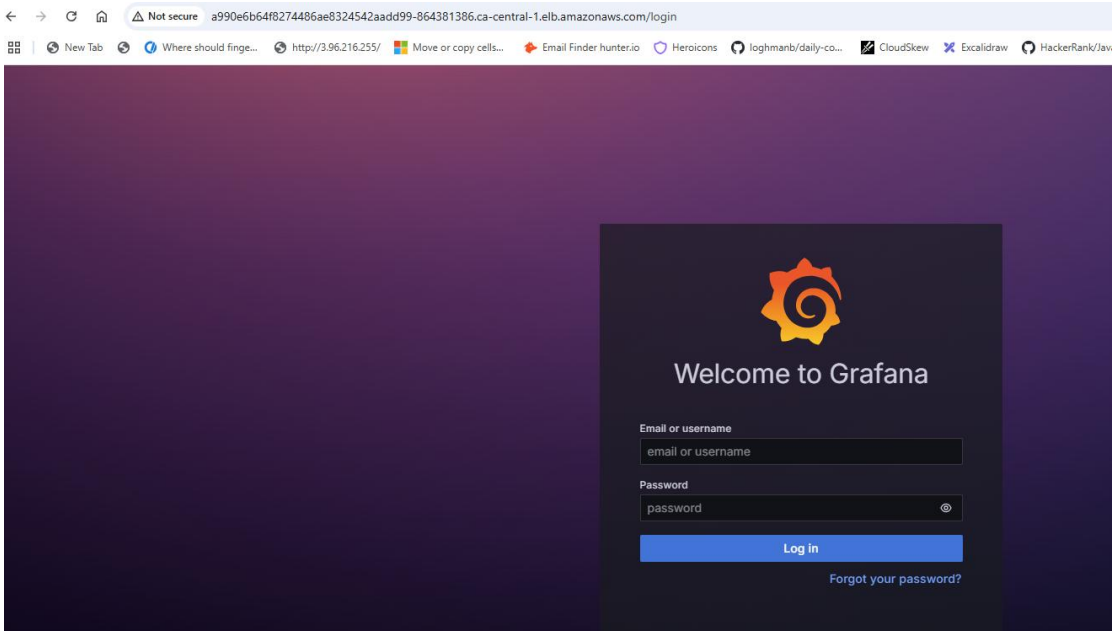


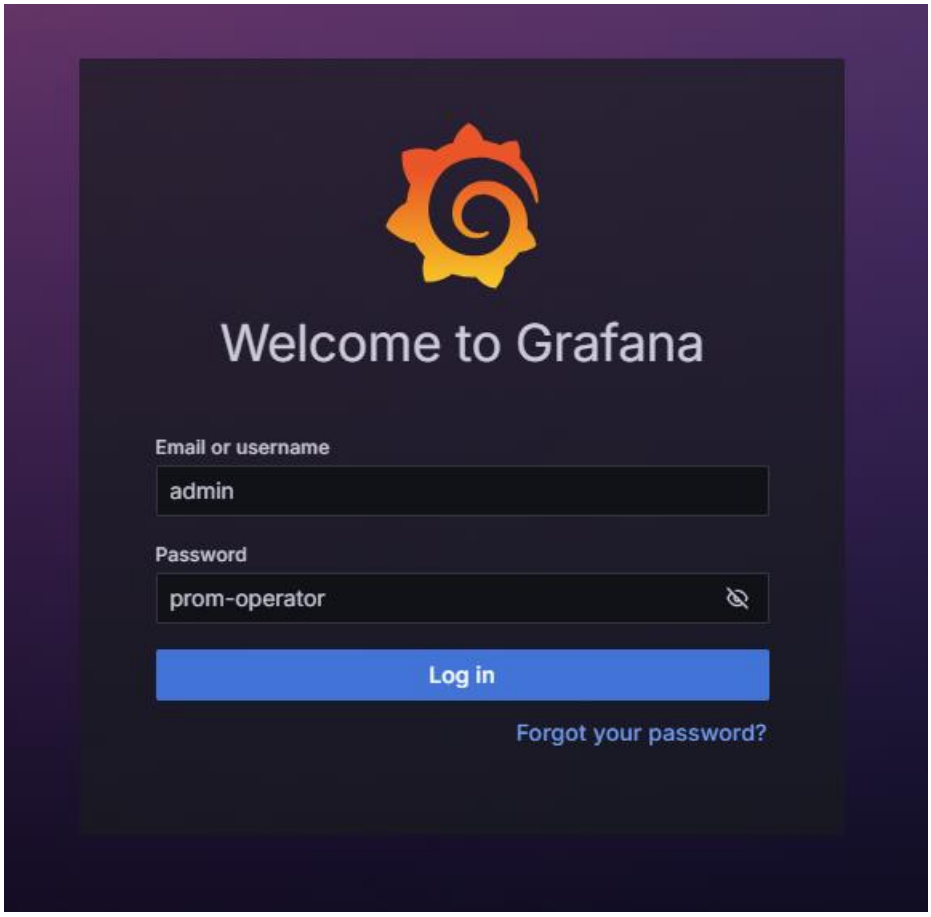
Go to the second LoadBalancer and copy DNS



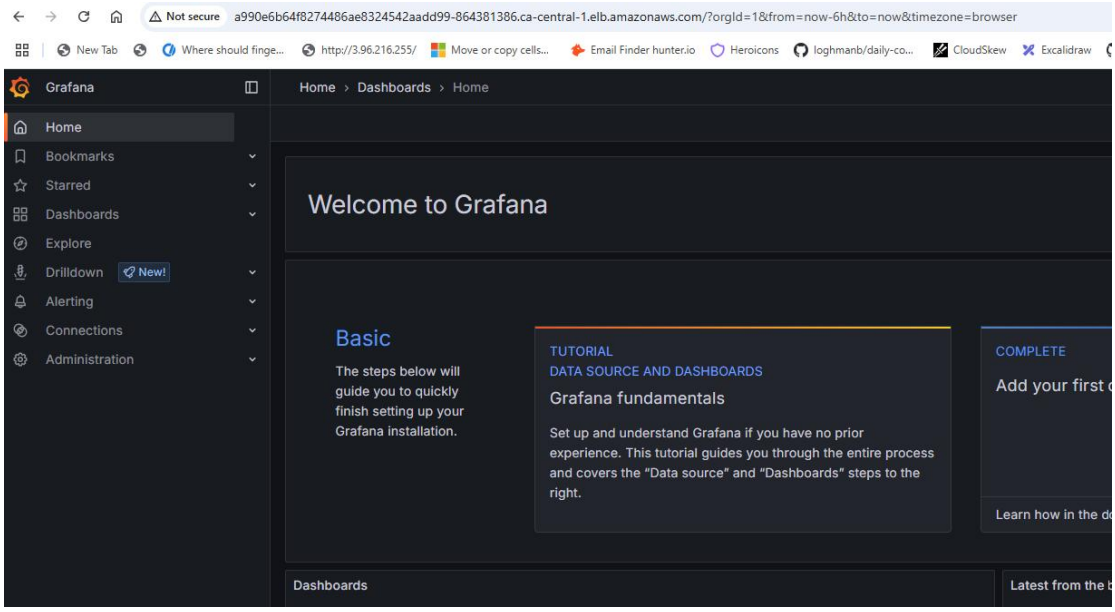


http://a990e6b64f8274486ae8324542aadd99-864381386.ca-central-1.elb.amazonaws.com/login

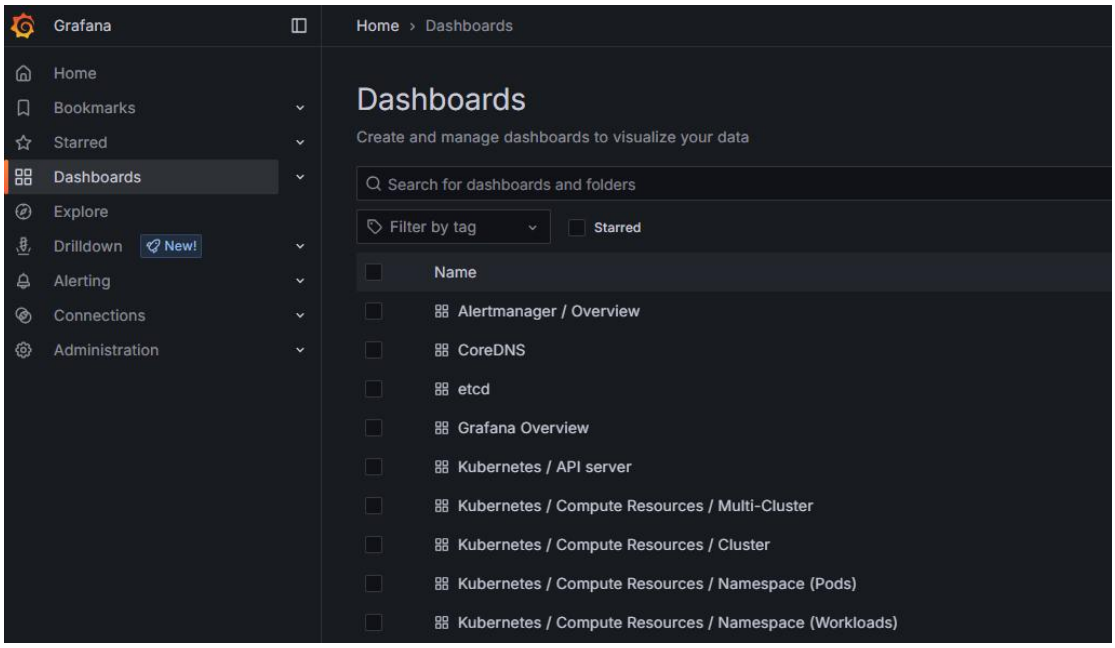

Not secure
a990e6b64f8274486ae8324542aadd99-864381386.ca-central-1.elb.amazonaws.com/login
New Tab
Where should finge...
http://3.96.216.255/
Move or copy cells...
Email Finder hunter.io
Heroicons
loghmanb/daily-co...
CloudSkew
Excalidraw
Welcome to Grafana
Email or username
email or username
Password
password
Log in
Forgot your password?


Welcome to Grafana
Email or username
admin
Password
prom-operator
Log in
Forgot your password?

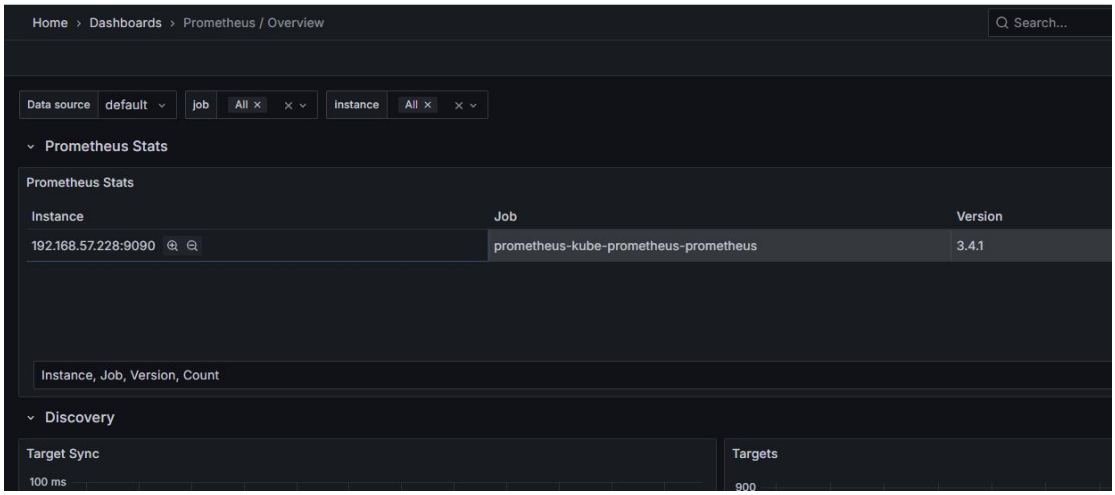
It Logs-in

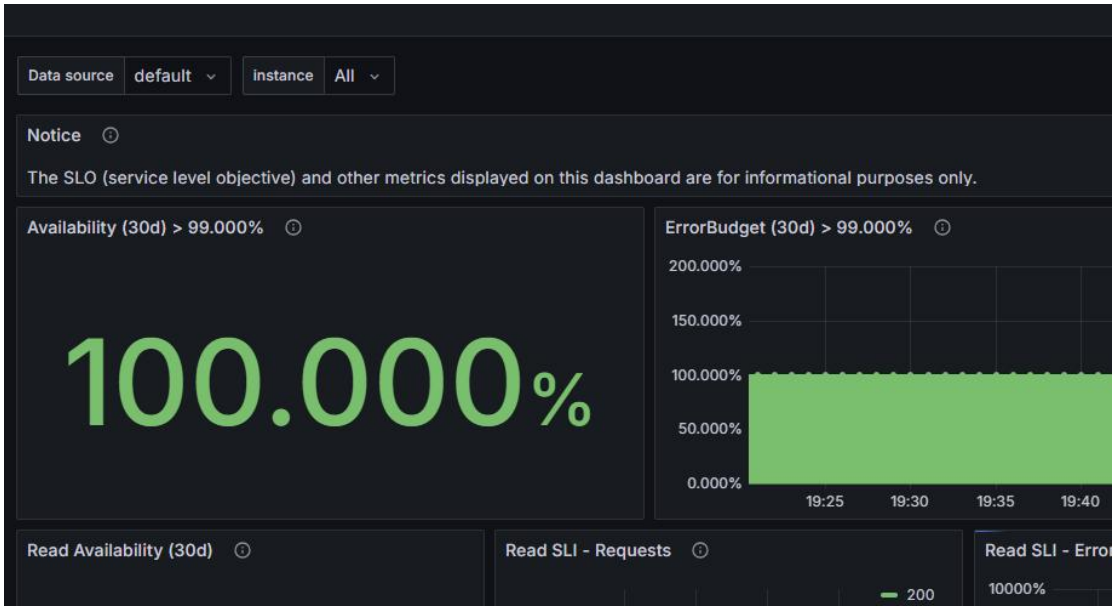


Go to Dashboard



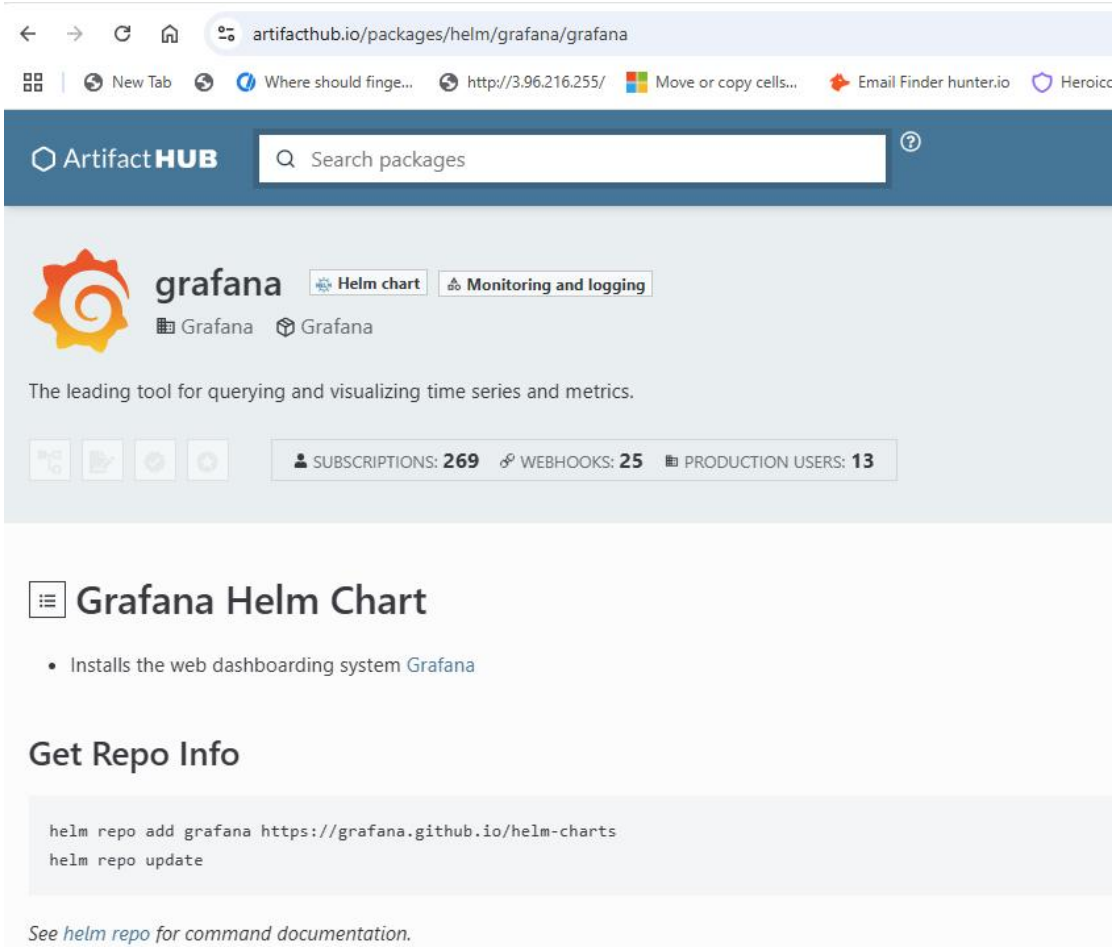
Prometheus overview





https://artifacthub.io/packages/helm/grafana/grafana

This page gives the charts



For Prometheus: https://artifacthub.io/packages/helm/prometheus-community/prometheus

Helm makes installation of K8s resources into K8s cluster easy

Access Prometheus Server: LBR_DNS:9090/
Access Grafana Server: LBR_DNS/

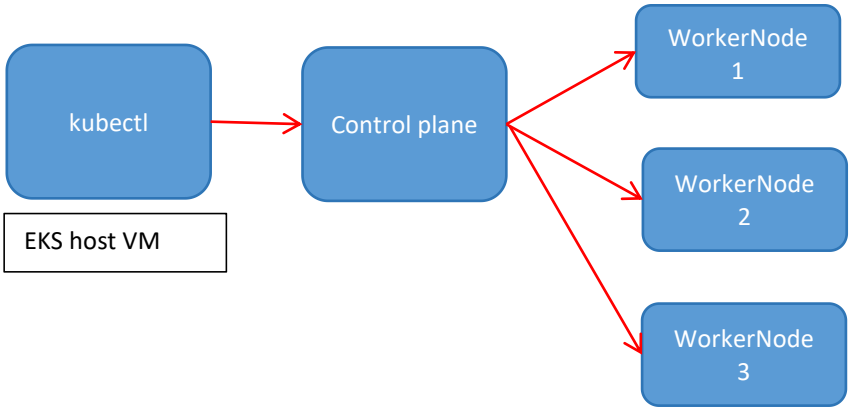
Use the below credentials to login into Grafana server
Username: admin, Password: prom-operator
After logging into Grafana, we can monitor our K8s cluster

EFK, DaemonSet, StatefulSet, ConfigMap and Secrets
PV & PVC
Ingress controller
Readiness and Liveness probe

https://kubernetes.io/docs/concepts/workloads/controllers/daemonset/

A *DaemonSet* ensures that all (or some) Nodes run a copy of a Pod. As nodes are added to the cluster, Pods are added to them. As nodes are removed from the cluster, those Pods are garbage collected. Deleting a DaemonSet will clean up the Pods it created.

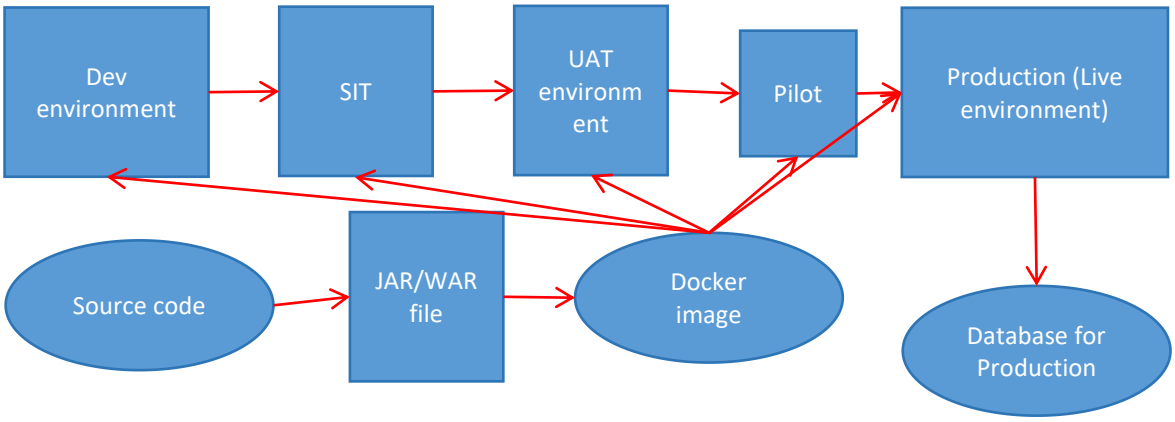
DaemonSet will make sure that if you have 10 worker nodes, your pods will be running in all the 10 worker nodes



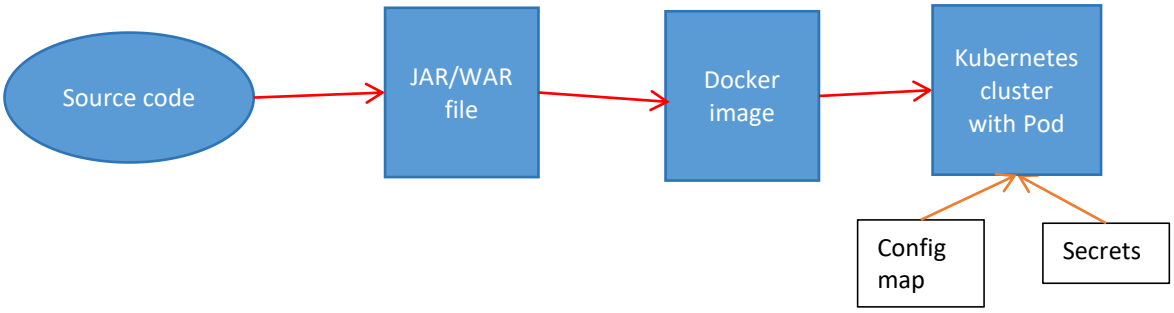
If there is a Pod, the copy has to be maintained in all the Worker nodes. If you want to make sure Pod copy is there in all the Worker nodes then DaemonSet comes into picture

When you remove the WorkerNode only then those pods will be deleted
Some typical uses of a DaemonSet are:

- running a cluster storage daemon on every node
- running a logs collection daemon on every node
- running a node monitoring daemon on every node



One Docker image is created and it is run on multiple environments
If different environments are using different databases, don't you think passwords and usernames will also be different? If an application is packaged with configuration details with the same database credentials that cannot be changed now. that's where we need the concept that allows you to add the credentials dynamically. Config map and secrets come into picture.



We are going to dynamically pass Secrets from Config map and Secrets
Config map will have data that's not sensitive

Secrets will have data that's sensitive

We are not going to hard-code the DB credentials.

Each environment usually has different configuration settings
Database properties
SMTP (email) settings
Kafka configurations
Redis settings
And more…

In this case, if we hard-code the properties it is a problem

Best practice:
Make your application loosely coupled, so it can run in any environment with minimal changes
Use Kubernetes Config Maps and Secrets to externalize environment-specific values like database credentials, URLs, and keys
ConfigMaps and Secrets allow us to separate application configuration from Docker image
This makes our application portable and environment-independent, meaning:

We can deploy the same Docker image into different environments (Dev, SIT, UAT, etc) without modifying the image itself

What's a ConfigMap?
Used to store non-sensitive configuration as key-value pairs
Example: API URLs, File paths, Environment names

What's a Secret?
Used to store sensitive data like passwords, tokens, API keys also in key-value format
Data is stored in base64-encoded form

With ConfigMap and Secrets, we can use the same Docker image into multiple environments

Environment is the basic-setup to run application

Hard-coded configuration (Not recommended)

```
spring:
  datasource:
    driver-class-name: com.mysql.cj.jdbc.Driver
    url: jdbc:mysql://mysqldb:3306/finisher
    username: root
    password: root123
  jpa:
    hibernate:
      ddl-auto: update
    show-sql: true
```

What's the problem?
Tied to a single environment (eg: development)
Passwords and sensitive info are exposed
You need to rebuild the Docker image to change configs

Environment-based configuration (Recommended)

```
spring:
  datasource:
    driver-class-name: ${DB_DRIVER:com.mysql.cj.jdbc.Driver}
    url: ${DB_URL:jdbc:mysql://mysqldb:3306/finisher}
    username: ${DB_USERNAME:root}
    password: ${DB_PASSWORD:root123}
  jpa:
    hibernate:
      ddl-auto: update
show-sql: true
```

Delete cluster

```
eksctl delete cluster --name my-eks-cluster --region ca-central-1
```