My github link: https://github.com/HungNguyen235/k8s.git

In the POC1:

- Create instance on AWS and start minikube in this Instance
- Use jenkins pipline install ISTIO, Deploy application
- Monitoring by Prometheus and Grafana
- **Test CI/CD**

There are the steps:

Step1: Create an Instance Ubuntu on AWS

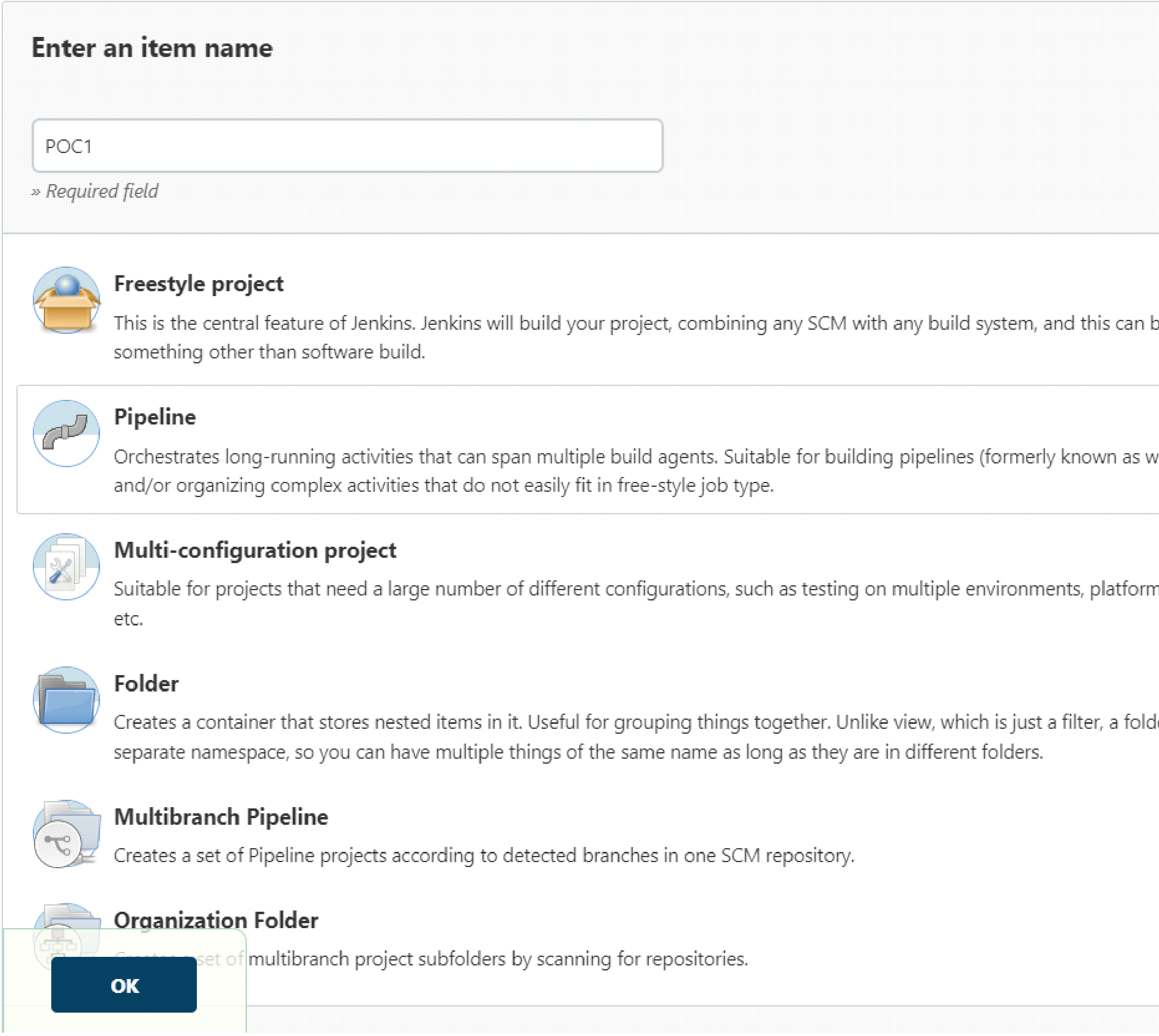
Step 2: Install minikube, jenkins, helm, docker, maven, git in this Instance.

Step 3: Start Jenkins and Minkube by command line:

- *Start jenkins: sudo systemctl start jenkins*
- *Start minikube: minikube start –driver=none –kubernetes-version=v1.23.8*

Step 4: Create a Jenkins pipline job to build docker images for both front-end and back-end application.

- Create job jenkins pipline:



Enter an item name

POC1

» Required field

Freestyle project

This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can b something other than software build.

Pipeline

Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as w and/or organizing complex activities that do not easily fit in free-style job type.

Multi-configuration project

Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform etc.

Folder

Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folde separate namespace, so you can have multiple things of the same name as long as they are in different folders.

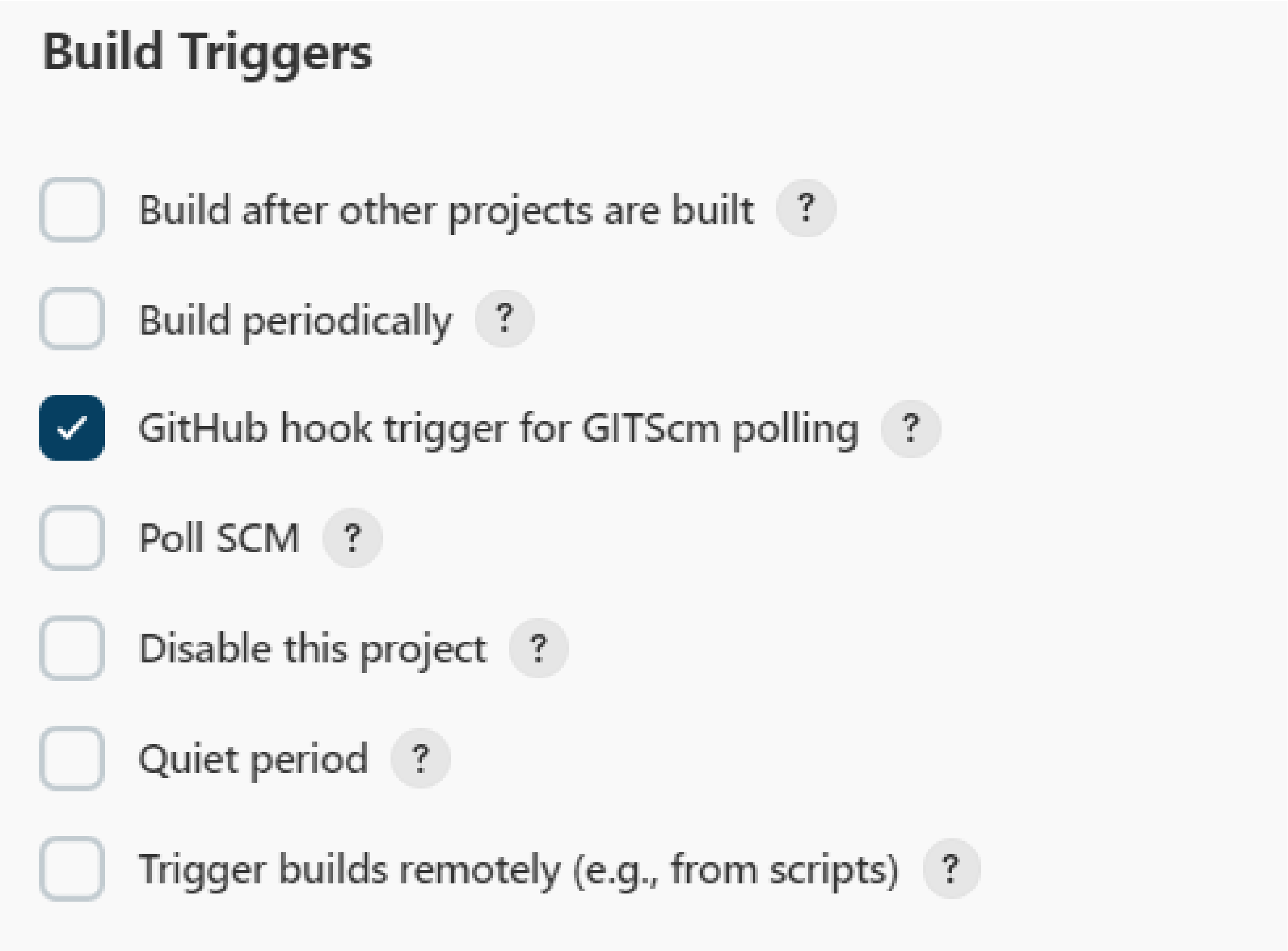
Multibranch Pipeline

Creates a set of Pipeline projects according to detected branches in one SCM repository.

Organization Folder

Creates a set of multibranch project subfolders by scanning for repositories.

- In config jenkins pipline: use github hook trigger to auto build job when there is a code change on github



Build Triggers

☐ Build after other projects are built ?

☐ Build periodically ?

☑ GitHub hook trigger for GITScm polling ?

☐ Poll SCM ?

☐ Disable this project ?

☐ Quiet period ?

☐ Trigger builds remotely (e.g., from scripts) ?

- Create pipline using Dockerfile, maven to build docker images and push them to my dockerhub account.

```
dir("react-student-management-web-app"){
        stage("Docker build"){
            sh 'docker build -t hungnguyen23/student-app-client .'
            sh 'docker tag hungnguyen23/student-app-client hungnguyen23/student-app-client:1.0.10'
        }
    }

    dir("spring-boot-student-app-api"){
        stage("Build porm file"){
            sh ' mvn package '
        }
    }

    stage("login dockerhub"){
        withCredentials([string(credentialsId: 'docker', variable: 'PASSWORD')]) {
            sh 'docker login -u hungnguyen23 -p $PASSWORD'
        }
    }
    stage("Push Image to Docker Hub"){
      sh 'docker push  hungnguyen23/student-app-client:1.0.10'
      dir("spring-boot-student-app-api"){
        sh 'mvn dockerfile:push'
      }
    }
```

Step 5: download ISTIO using helm chart by command line:

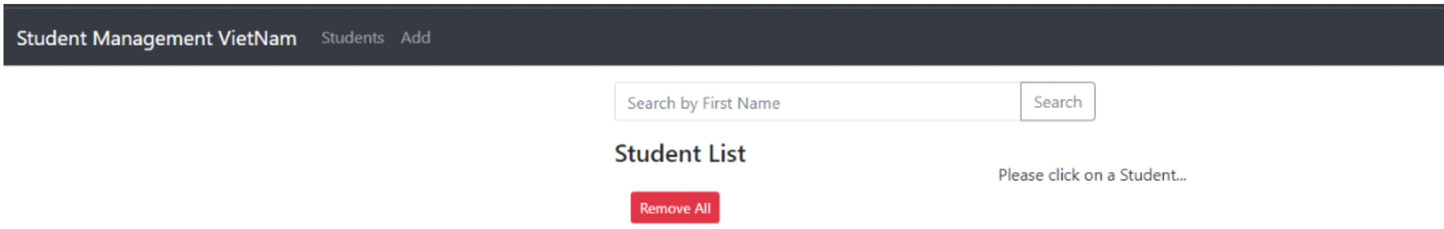
- Use file istio-gateway.yaml to create VitualService and gateway

```
apiVersion: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: gateway
spec:
  selector:
    istio: ingress
  servers:
  - port:
      number: 80
      name: http
      protocol: HTTP
    hosts:
    - "*"
---
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: ingress
spec:
  hosts:
    - "*"
  gateways:
    - gateway
  http:
    - match:
      - uri:
          prefix: '/api'
      rewrite:
        uri: '/'
      route:
      - destination:
          host: student-app-api.default.svc.cluster.local
          port:
            number: 8080

    - route:
      - destination:
          host: student-app-client.default.svc.cluster.local
          port:
            number: 80
```

Step 6: use helm to deploy front-end, back-end and mongo-db on Kubernetes cluster.

- Convert manifest files present in the repository to helm charts and use them to deploy front-end, back-end and mongo-db using images present in my docker-hub account.



Student List

Please click on a Student...

Step 7: Download Prometheus and graffana helm charts

- Access to website (artifacthub) to add repo and install prometheus-stack:

  kube-prometheus-stack 38.0.2 · prometheus/prometheus-community (artifacthub.io)

- Command line:

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

Install: helm install my-kube-prometheus-stack prometheus-community/kube-prometheus-stack --version 38.0.2

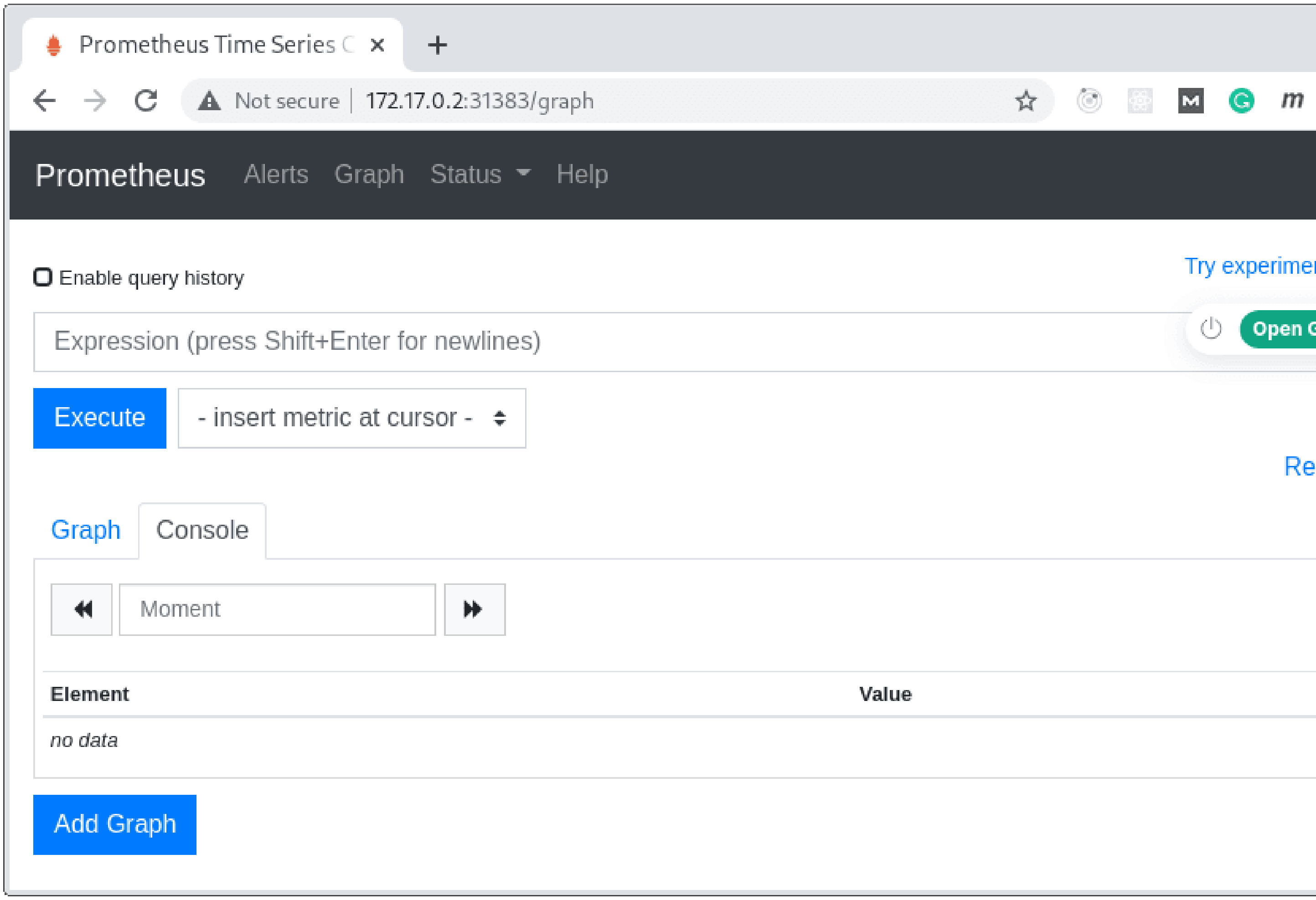
- In Prometheus-stack already contains: Prometheus and Grafana

Step 8: Expose service Promethus-stack and grafana-stack

- Prometheus:

```
kubectl expose service prometheus-stack --type=NodePort --target-port=9090 --name=prometheus-server-np
```

```
minikube service prometheus-server-np
```

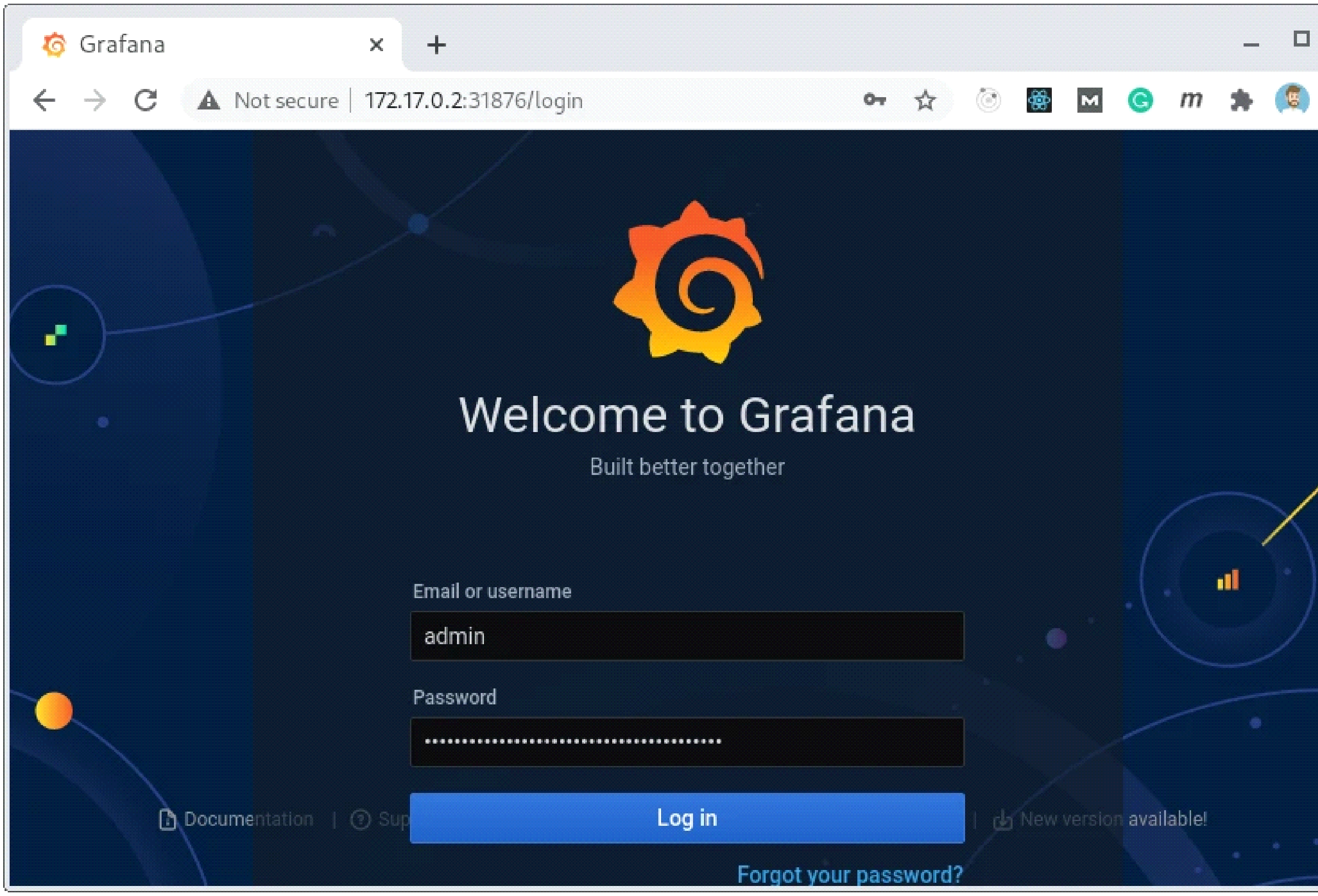


- Grafana:

kubectl expose service grafana-stack --type=NodePort --target-port=3000 --name=grafana-np

minikube service grafana-np

Prometheus-grafana already have default username: admin and password: prome-operator

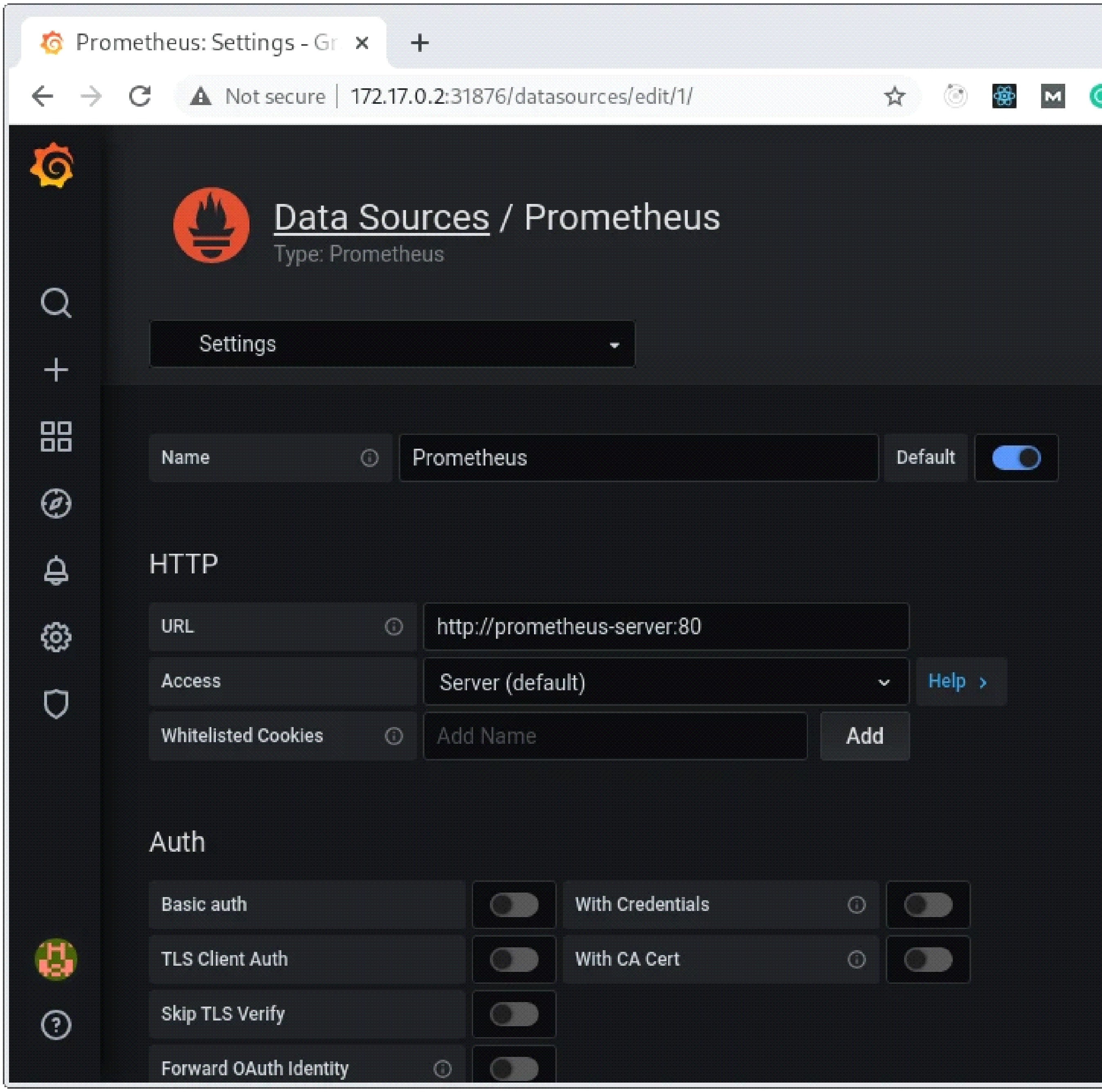


Welcome to Grafana

Built better together

Email or username: admin

Password: ••



Prometheus: Settings - Gr
Not secure
172.17.0.2:31876/datasources/edit/1/

Data Sources / Prometheus

Type: Prometheus

Name: Prometheus

Default: on

HTTP

URL: http://prometheus-server:80

Access: Server (default)

Whitelisted Cookies: Add Name

Auth

Basic auth: off

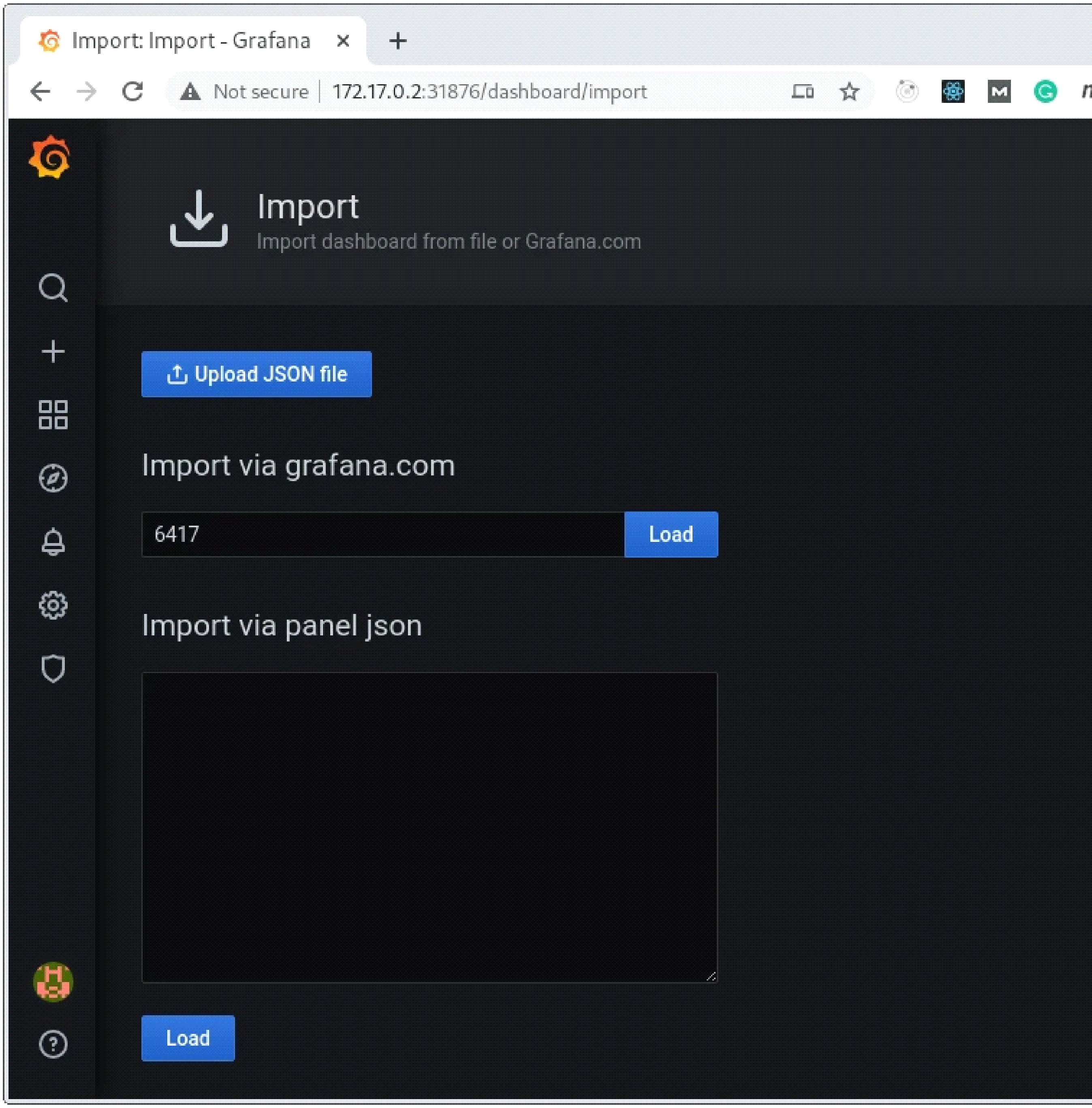
With Credentials: off

TLS Client Auth: off

With CA Cert: off

Skip TLS Verify: off

Forward OAuth Identity: off



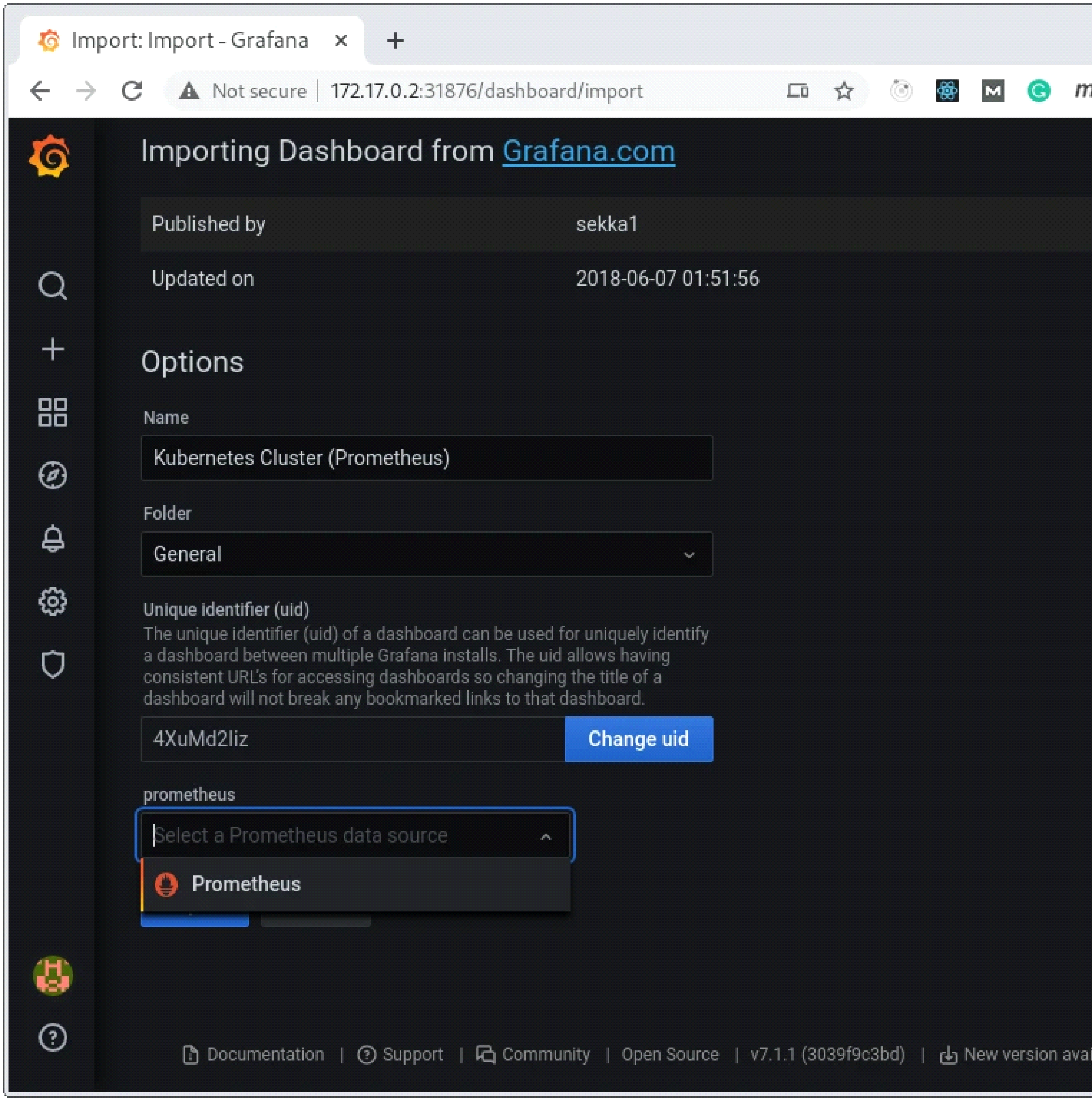
Import

Import dashboard from file or Grafana.com

Import via grafana.com

6417

Import via panel json



Importing Dashboard from Grafana.com

Published by sekka1

Updated on 2018-06-07 01:51:56

Options

Name: Kubernetes Cluster (Prometheus)

Folder: General

Unique identifier (uid)

The unique identifier (uid) of a dashboard can be used for uniquely identify a dashboard between multiple Grafana installs. The uid allows having consistent URL's for accessing dashboards so changing the title of a dashboard will not break any bookmarked links to that dashboard.

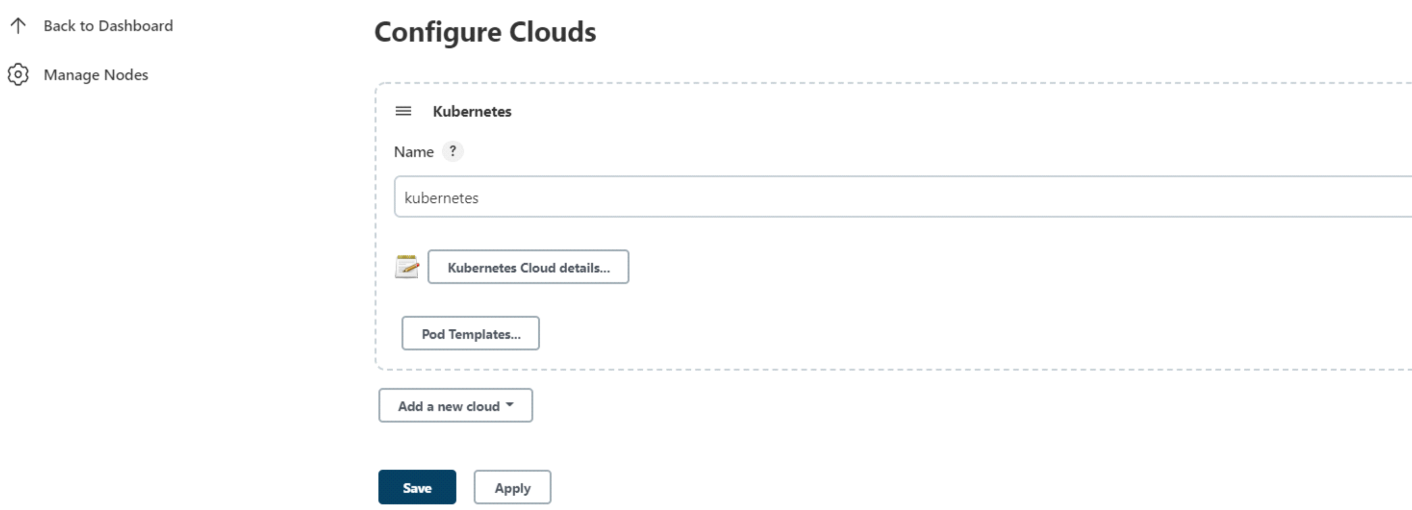
4XuMd2liz

prometheus: Select a Prometheus data source

Prometheus
Documentation | Support | Community | Open Source | v7.1.1 (3039f9c3bd) | New version avai

Step 9: connect jenkins with kubernetes cluster

Manage jenkins --> Manage Node and cloud --> Configure cloud:



Configure Clouds

Kubernetes

Name ?

kubernetes

Step 10: Use jenkins pipline to run all of step above

Step 11: add webhook on my github account

Step 12: test CI/CD clone the personal repository and make changes to the file kubernetes-full-stack-example/react-student-management-web-app/src/App.js