

Lesson11 - Deploying Prometheus Monitoring

In previous lessons we deployed .NET core web application docker image and MSSQL docker image to Kubernetes cluster from scratch using secrets, persistent volume and ingress-nginx.

In this lesson we will learn how to deploy Prometheus monitoring tool to Kubernetes cluster. For this deployment the PC must have at least 8GB RAM.

Install Chocolatey

Open PowerShell with administrator and run the commands below:

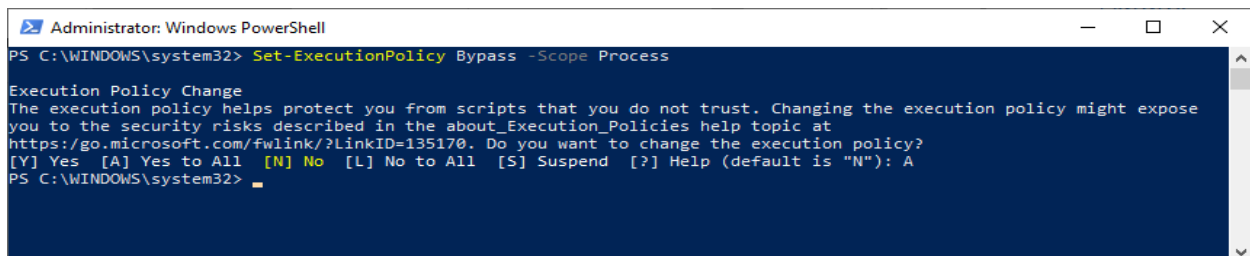
Get-ExecutionPolicy



```
Select Administrator: Windows PowerShell
PS C:\WINDOWS\system32> Get-ExecutionPolicy
Bypass
PS C:\WINDOWS\system32>
```

In case the command above return Restricted run the commands below to allow running scripts.

Set-ExecutionPolicy AllSigned and Set-ExecutionPolicy Bypass -Scope Process



```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> Set-ExecutionPolicy Bypass -Scope Process

Execution Policy Change
The execution policy helps protect you from scripts that you do not trust. Changing the execution policy might expose
you to the security risks described in the about_Execution_Policies help topic at
https://go.microsoft.com/fwlink/?LinkID=135170. Do you want to change the execution policy?
[Y] Yes [A] Yes to All [N] No [L] No to All [S] Suspend [?] Help (default is "N"): A
PS C:\WINDOWS\system32>
```

Run the command below to install Chocolatey:

```
ps Set-ExecutionPolicy Bypass -Scope Process -Force;
[System.Net.ServicePointManager]::SecurityProtocol =
[System.Net.ServicePointManager]::SecurityProtocol -bor 3072; iex ((New-Object
System.Net.WebClient).DownloadString('https://chocolatey.org/install.ps1'))
```

```

Administrator: Windows PowerShell

Forcing web requests to allow TLS v1.2 (Required for requests to Chocolatey.org)
Getting latest version of the Chocolatey package for download.
Not using proxy.
Getting Chocolatey from https://chocolatey.org/api/v2/package/chocolatey/0.10.15.
Downloading https://chocolatey.org/api/v2/package/chocolatey/0.10.15 to C:\Users\yaron\AppData\Local\Temp\chocolatey\chocoInstall\chocolatey.zip
Not using proxy.
Extracting C:\Users\yaron\AppData\Local\Temp\chocolatey\chocoInstall\chocolatey.zip to C:\Users\yaron\AppData\Local\Temp\chocolatey\chocoInstall
Installing Chocolatey on the local machine
Creating ChocolateyInstall as an environment variable (targeting 'Machine')
  Setting ChocolateyInstall to 'C:\ProgramData\chocolatey'
WARNING: It's very likely you will need to close and reopen your shell
  before you can use choco.
Restricting write permissions to Administrators
We are setting up the Chocolatey package repository.
The packages themselves go to 'C:\ProgramData\chocolatey\lib'
  (i.e. C:\ProgramData\chocolatey\lib\yourPackageName).
A shim file for the command line goes to 'C:\ProgramData\chocolatey\bin'
  and points to an executable in 'C:\ProgramData\chocolatey\lib\yourPackageName'.

Creating Chocolatey folders if they do not already exist.

WARNING: You can safely ignore errors related to missing log files when
  upgrading from a version of Chocolatey less than 0.9.9.
  'Batch file could not be found' is also safe to ignore.
  'The system cannot find the file specified' - also safe.
chocolatey.nupkg file not installed in lib.
  Attempting to locate it from bootstrapper.
PATH environment variable does not have C:\ProgramData\chocolatey\bin in it. Adding...
WARNING: Not setting tab completion: Profile file does not exist at
  'C:\Users\yaron\Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1'.
Chocolatey (choco.exe) is now ready.
You can call choco from anywhere, command line or powershell by typing choco.
Run choco /? for a list of functions.
You may need to shut down and restart powershell and/or consoles
  first prior to using choco.
Ensuring Chocolatey commands are on the path
Ensuring chocolatey.nupkg is in the lib folder
PS C:\WINDOWS\system32>

```

in case you get the error below run the command: **Remove-Item C:\ProgramData\chocolatey -Recurse** and run the command that install Choclaty again.

```

Administrator: Windows PowerShell

PS C:\WINDOWS\system32> ps Set-ExecutionPolicy Bypass -Scope Process -Force; [System.Net.ServicePointManager]::SecurityProtocol = [System.Net.ServicePointManager]::SecurityProtocol -bor 3072; iex ((New-Object System.Net.WebClient).DownloadString("https://chocolatey.org/install.ps1"))
Get-Process : A positional parameter cannot be found that accepts argument 'Bypass'.
At line:1 char:1
+ ~~~~~ ps Set-ExecutionPolicy Bypass -Scope Process -Force; [System.Net.Serv ...
+ ~~~~~
+ CategoryInfo          : InvalidArgument: (:) [Get-Process], ParameterBindingException
+ FullyQualifiedErrorId : PositionalParameterNotFound,Microsoft.PowerShell.Commands.GetProcessCommand

WARNING: An existing Chocolatey installation was detected. Installation will not continue.
For security reasons, this script will not overwrite existing installations.
Please use choco upgrade chocolatey to handle upgrades of Chocolatey itself.
PS C:\WINDOWS\system32>

```

Check that Choclaty is installed:

Choco

```

Administrator: Windows PowerShell

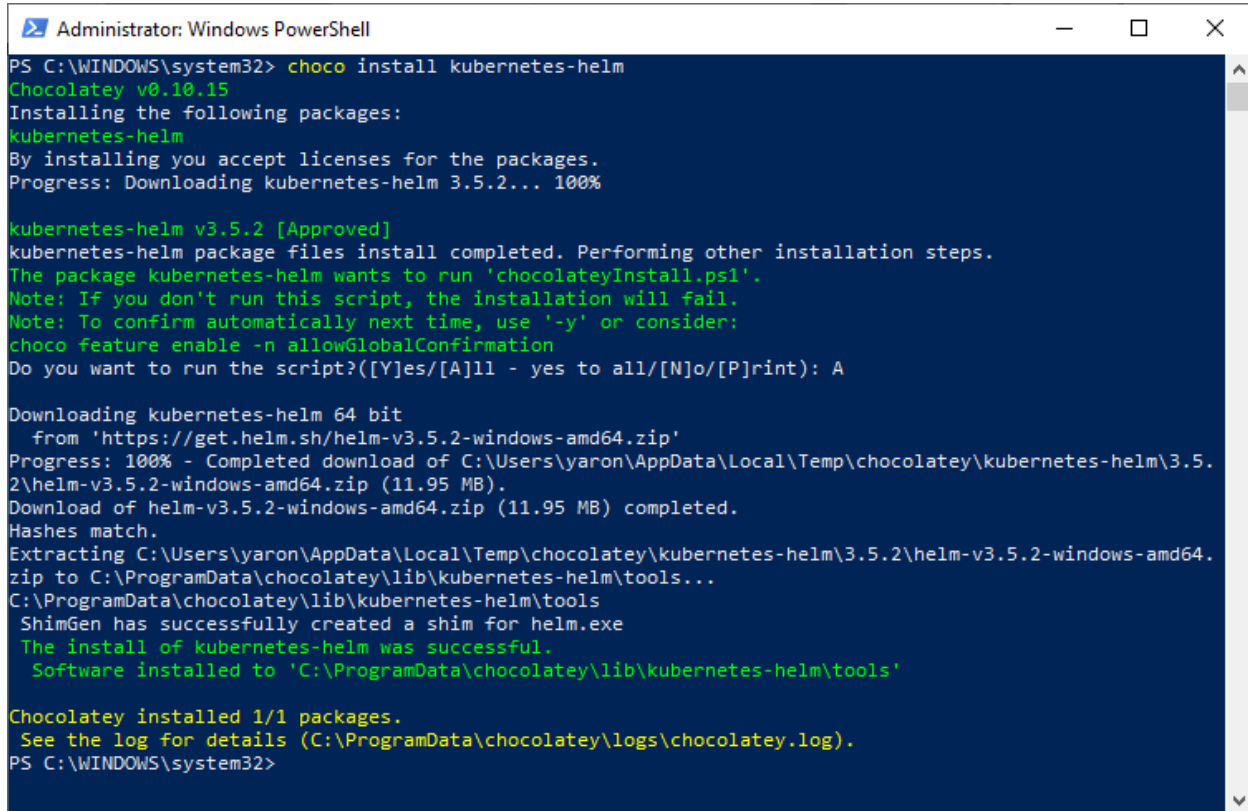
PS C:\WINDOWS\system32> choco
Chocolatey v0.10.15
Please run 'choco -?' or 'choco <command> -?' for help menu.
PS C:\WINDOWS\system32>

```

Install Kubernetes helm

Run the command below to install Kubernetes helm:

choco install kubernetes-helm



```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> choco install kubernetes-helm
Chocolatey v0.10.15
Installing the following packages:
kubernetes-helm
By installing you accept licenses for the packages.
Progress: Downloading kubernetes-helm 3.5.2... 100%

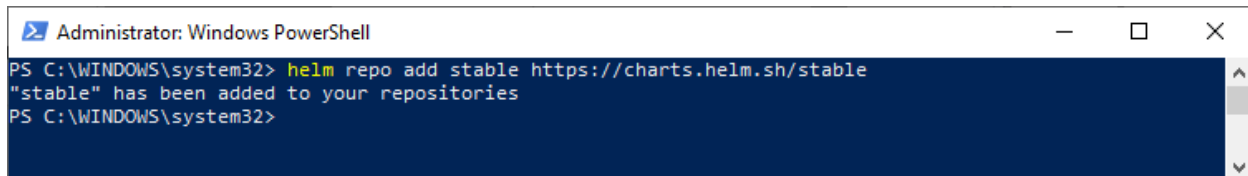
kubernetes-helm v3.5.2 [Approved]
kubernetes-helm package files install completed. Performing other installation steps.
The package kubernetes-helm wants to run 'chocolateyInstall.ps1'.
Note: If you don't run this script, the installation will fail.
Note: To confirm automatically next time, use '-y' or consider:
choco feature enable -n allowGlobalConfirmation
Do you want to run the script?([Y]es/[A]ll - yes to all/[N]o/[P]rint): A

Downloading kubernetes-helm 64 bit
from 'https://get.helm.sh/helm-v3.5.2-windows-amd64.zip'
Progress: 100% - Completed download of C:\Users\aron\AppData\Local\Temp\chocolatey\kubernetes-helm\3.5.2\helm-v3.5.2-windows-amd64.zip (11.95 MB).
Download of helm-v3.5.2-windows-amd64.zip (11.95 MB) completed.
Hashes match.
Extracting C:\Users\aron\AppData\Local\Temp\chocolatey\kubernetes-helm\3.5.2\helm-v3.5.2-windows-amd64.zip to C:\ProgramData\chocolatey\lib\kubernetes-helm\tools...
C:\ProgramData\chocolatey\lib\kubernetes-helm\tools
ShimGen has successfully created a shim for helm.exe
The install of kubernetes-helm was successful.
Software installed to 'C:\ProgramData\chocolatey\lib\kubernetes-helm\tools'

Chocolatey installed 1/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
PS C:\WINDOWS\system32>
```

Add stable repository to helm (helm search repo stable):

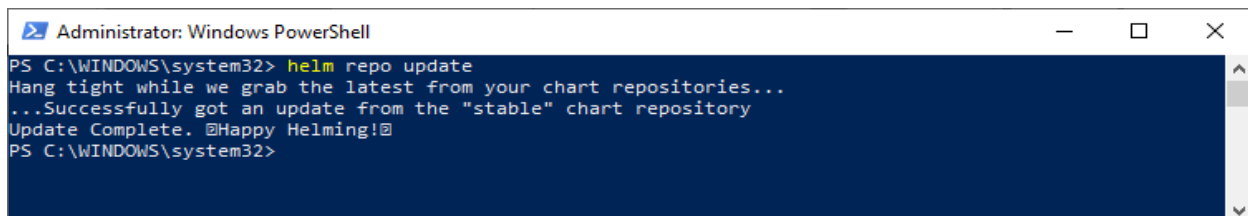
helm repo add stable https://charts.helm.sh/stable



```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> helm repo add stable https://charts.helm.sh/stable
"stable" has been added to your repositories
PS C:\WINDOWS\system32>
```

Update repository:

helm repo update



```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> helm repo update
Hang tight while we grab the latest from your chart repositories...
...Successfully got an update from the "stable" chart repository
Update Complete. @Happy Helming!@
PS C:\WINDOWS\system32>
```

Run the command below to install prometheus-operator:

helm install prometheus stable/prometheus-operator

```
Administrator: Windows PowerShell
figuration is deprecated in v1.16+, unavailable in v1.22+; use admissionregistration.k8s.io/v1 Validating
WebhookConfiguration
NAME: prometheus
LAST DEPLOYED: Wed Feb 17 12:20:59 2021
NAMESPACE: default
STATUS: deployed
REVISION: 1
NOTES:
*****
*** DEPRECATED ***
*****
* stable/prometheus-operator chart is deprecated.
* Further development has moved to https://github.com/prometheus-community/helm-charts
* The chart has been renamed kube-prometheus-stack to more clearly reflect
* that it installs the `kube-prometheus` project stack, within which Prometheus
* Operator is only one component.

The Prometheus Operator has been installed. Check its status by running:
  kubectl --namespace default get pods -l "release=prometheus"

Visit https://github.com/coreos/prometheus-operator for instructions on how
to create & configure Alertmanager and Prometheus instances using the Operator.
PS C:\WINDOWS\system32>
```

Open VS code and run in the terminal:

kubectl get all

```
PS C:\Kubernetes\EmployeesManagement> kubectl get all
NAME                                     READY   STATUS    RESTARTS   AGE
pod/alertmanager-prometheus-prometheus-oper-alertmanager-0  0/2     Pending   0           107s
pod/prometheus-grafana-76cbd744f-5fjwk  2/2     Running   0           2m54s
pod/prometheus-kube-state-metrics-95d956569-vv9rh            1/1     Running   0           2m54s
pod/prometheus-prometheus-node-exporter-f2qds                1/1     Running   0           2m54s
pod/prometheus-prometheus-oper-operator-6d9c4bdb9f-5dtxf     2/2     Running   0           2m54s
pod/prometheus-prometheus-prometheus-oper-prometheus-0      0/3     Pending   0           94s

NAME                                     TYPE          CLUSTER-IP   EXTERNAL-IP   PORT(S)                                     AGE
service/alertmanager-operated           ClusterIP      None         <none>         9093/TCP,9094/TCP,9094/UDP                107s
service/kubernetet                      ClusterIP      10.96.0.1    <none>         443/TCP                                   25d
service/prometheus-grafana              ClusterIP      10.106.165.250 <none>         80/TCP                                   2m54s
service/prometheus-kube-state-metrics    ClusterIP      10.109.2.163 <none>         8080/TCP                                   2m54s
service/prometheus-operated              ClusterIP      None         <none>         9090/TCP                                   94s
service/prometheus-prometheus-node-exporter ClusterIP      10.100.69.2  <none>         9100/TCP                                   2m54s
service/prometheus-prometheus-oper-alertmanager ClusterIP      10.101.18.77 <none>         9093/TCP                                   2m54s
service/prometheus-prometheus-oper-operator ClusterIP      10.103.38.151 <none>         8080/TCP,443/TCP 2m54s
service/prometheus-prometheus-oper-prometheus ClusterIP      10.110.188.115 <none>         9090/TCP                                   2m54s

NAME                                     DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
daemonset.apps/prometheus-prometheus-node-exporter 1          1         1         1             1           <none>          2m54s
```

kubectl --namespace default get pods -l "release=prometheus"

```
PS C:\Kubernetes\EmployeesManagement> kubectl --namespace default get pods -l "release=prometheus"
NAME                                     READY   STATUS    RESTARTS   AGE
prometheus-prometheus-node-exporter-f2qds 1/1     Running   0           5m20s
prometheus-prometheus-oper-operator-6d9c4bdb9f-5dtxf 2/2     Running   0           5m20s
PS C:\Kubernetes\EmployeesManagement>
```

kubectl get pods

```
PS C:\Kubernetes\EmployeesManagement> kubectl get pods
NAME                                                    READY   STATUS    RESTARTS   AGE
alertmanager-prometheus-prometheus-oper-alertmanager-0 2/2     Running   0           2m34s
prometheus-grafana-76cbbd744f-vh6mc                    2/2     Running   0           3m23s
prometheus-kube-state-metrics-95d956569-s9gns          1/1     Running   0           3m23s
prometheus-prometheus-node-exporter-8f65f              1/1     Running   0           3m23s
prometheus-prometheus-oper-operator-6d9c4bdb9f-488ts   2/2     Running   0           3m23s
prometheus-prometheus-prometheus-oper-prometheus-0    3/3     Running   1           113s
PS C:\Kubernetes\EmployeesManagement>
```

In case of problem with pod that cannot running open PowerShell and run the command below:

helm repo update and

helm uninstall prometheus stable/prometheus-operator

helm install prometheus stable/prometheus-operator

kubectl get pods (see that all pods are running)

kubectl get service prometheus-prometheus-oper-prometheus -o yaml

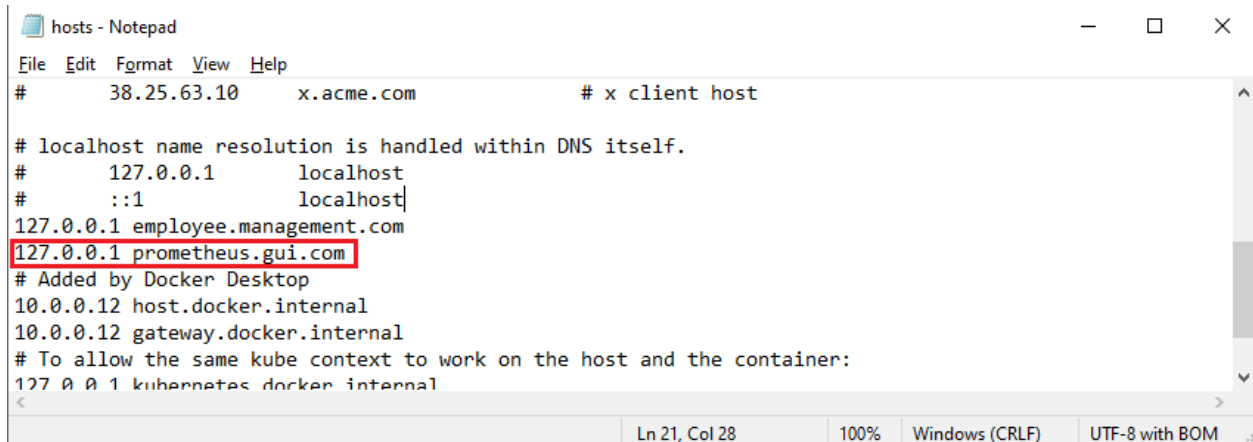
```
PS C:\Kubernetes\EmployeesManagement> kubectl get service prometheus-prometheus-oper-prometheus -o yaml
apiVersion: v1
kind: Service
metadata:
  annotations:
    meta.helm.sh/release-name: prometheus
    meta.helm.sh/release-namespace: default
  creationTimestamp: "2021-02-17T10:21:43Z"
  labels:
    app: prometheus-operator-prometheus
    app.kubernetes.io/managed-by: Helm
    chart: prometheus-operator-9.3.2
    heritage: Helm
    release: prometheus
    self-monitor: "true"
  managedFields:
```

Create ingress:

kubectl apply -f .\prometheus-ingress-controller.yml

```
PS C:\Kubernetes\EmployeesManagement\manifests> kubectl apply -f .\prometheus-ingress-controller.yml
Warning: networking.k8s.io/v1beta1 Ingress is deprecated in v1.19+, unavailable in v1.22+; use networking.k8s.io/v1 Ingress
ingress.networking.k8s.io/prometheus-ingress created
PS C:\Kubernetes\EmployeesManagement\manifests>
```

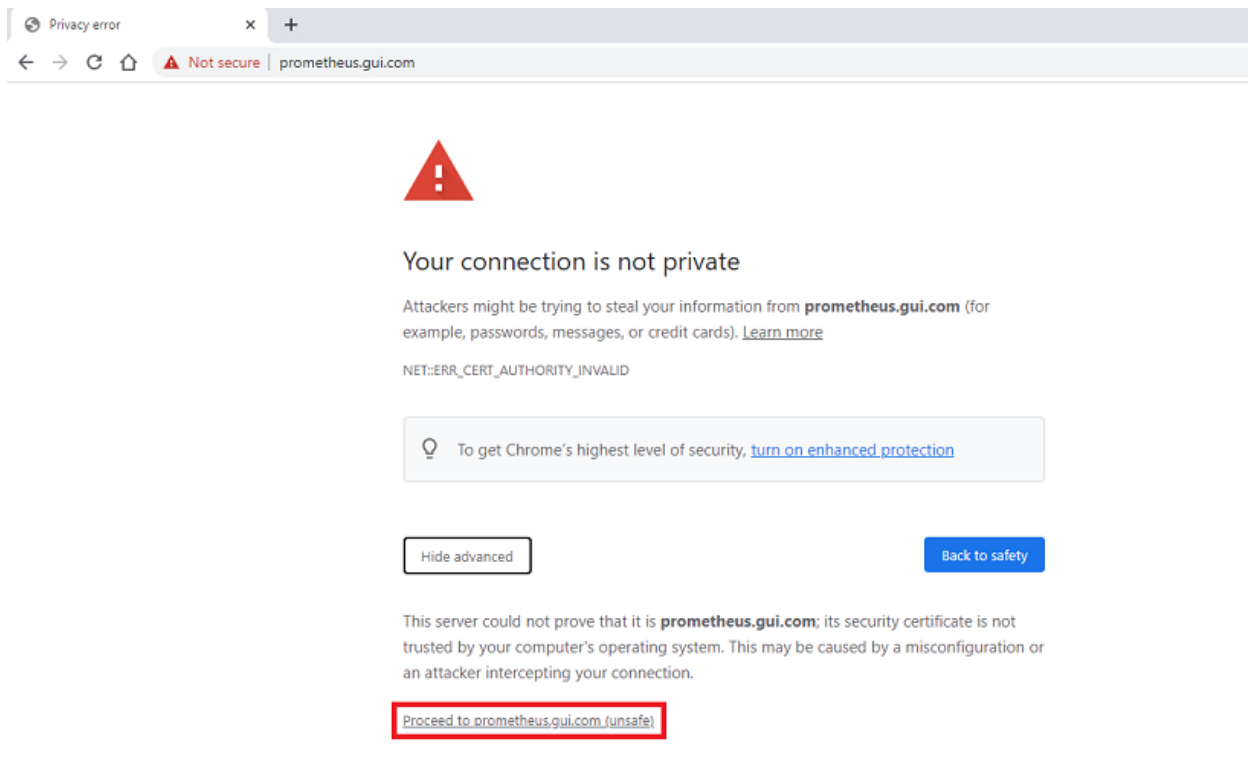
Add to C:\Windows\System32\drivers\etc\hosts: 127.0.0.1 prometheus.gui.com



```
hosts - Notepad
File Edit Format View Help
# 38.25.63.10 x.acme.com # x client host

# localhost name resolution is handled within DNS itself.
# 127.0.0.1 localhost
# ::1 localhost
127.0.0.1 employee.management.com
127.0.0.1 prometheus.gui.com
# Added by Docker Desktop
10.0.0.12 host.docker.internal
10.0.0.12 gateway.docker.internal
# To allow the same kube context to work on the host and the container:
127.0.0.1 kubernetes.docker.internal
```

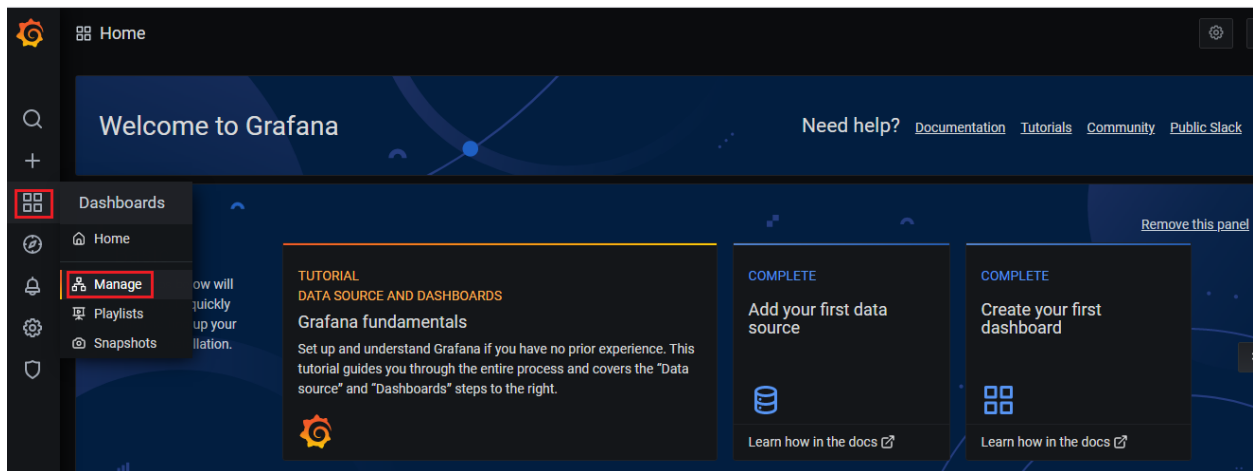
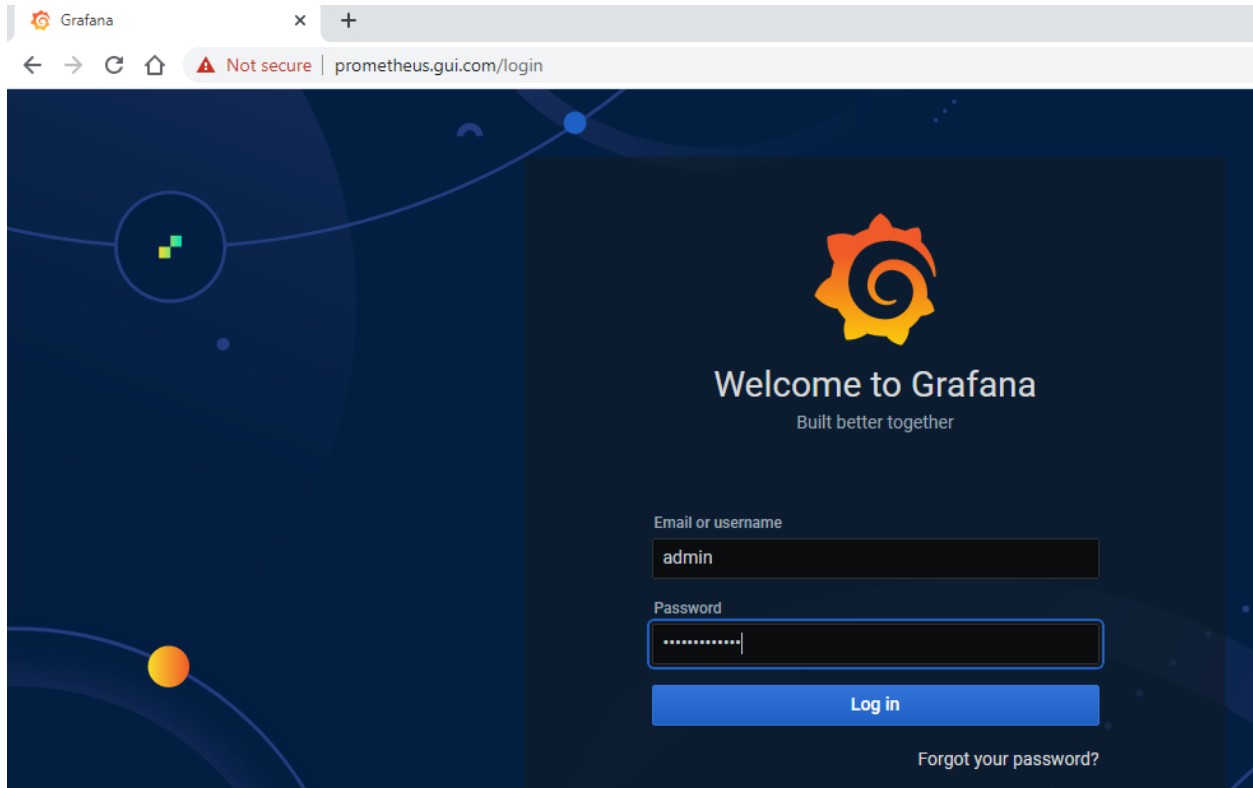
Open Chrome - <https://prometheus.gui.com>

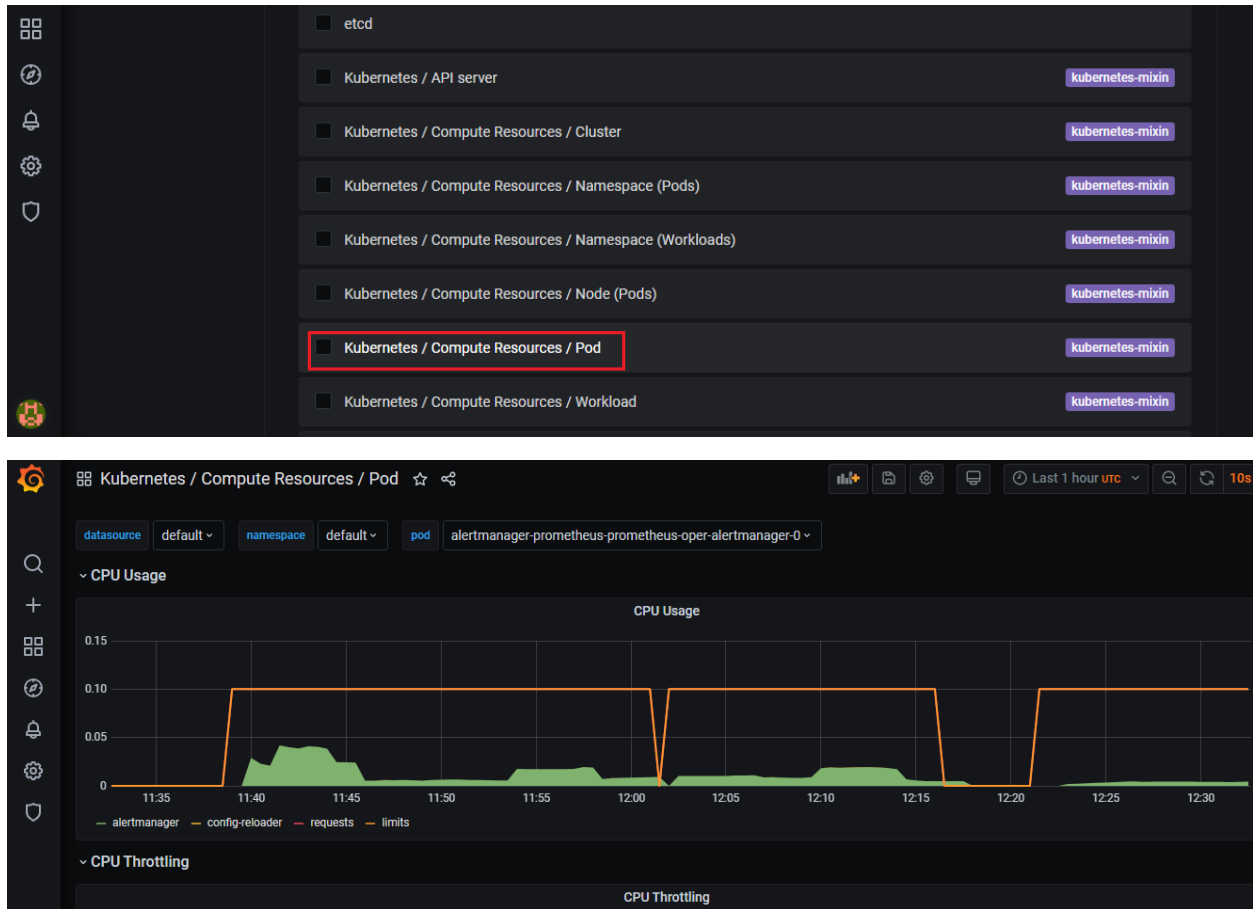


Login:

user: admin

password: prom-operator





Remove prometheus deployment:

helm uninstall prometheus stable/prometheus-operator

Done!