You need a few things.

1. An existing Kubernetes Cluster.
2. `kubectl` & `helm` binaries locally installed

Install Tiller (Helm server) on your cluster

Installing Tiller is a bit more in-depth as you need to secure it in production clusters. For the purposes of keeping it simple and playing around, we will install it with normal cluster-admin roles.

If you need to secure it for a production cluster: https://docs.helm.sh/using_helm/#tiller-and-role-based-access-control

Create the Tiller Service Account

Create a folder called `helm`. Here we will create all Kubernetes resources for tiller. Create a file called `helm/service-account.yml` and add the following content:

```
apiVersion: v1
kind: ServiceAccount
metadata:
  name: tiller
  namespace: kube-system
```

Then apply and test that the service account exists in the cluster.

```
$ kubectl apply -f helm/service-account.yml
$ kubectl get serviceaccounts -n kube-system
NAME                  SECRETS   AGE
[...]
tiller                1         30h
```

Create the service account role binding

For demo purpose we will create a role binding to **cluster-admin**.

DO NOT DO THIS IN PRODUCTION !!

See here for more information: https://docs.helm.sh/using_helm/#understanding-the-security-context-of-your-cluster

Create a file called `helm/role-binding.yml` in the `helm` folder with the content:

```
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  name: tiller
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: cluster-admin
subjects:
  - kind: ServiceAccount
    name: tiller
    namespace: kube-system
```

Apply and test that the role binding exists on the cluster

```
$ kubectl apply -f helm/role-binding.yml
$ kubectl get clusterrolebindings.rbac.authorization.k8s.io
NAME                                                   AGE
[...]
tiller                                                 30h
```

Deploy Tiller

```
$ helm init --service-account tiller --wait
```

The `--wait` flag makes sure that tiller is finished before we apply the next few commands to start deploying Prometheus and Grafana.

Apply and test tiller is deployed and running

```
$ kubectl get pods -n kube-system
NAME                                    READY    STATUS    AGE
[...]
tiller-deploy-dbb85cb99-st8lt           1/1      Running   30h
```

Done ! Tiller is deployed and now the real fun starts !

Photo by Katya Austin on Unsplash

Install Prometheus

We will separate our monitoring resources into a separate namespace to keep them together.

Create a folder called `monitoring`. Here we will create all our monitoring resources.

Create a file called `monitoring/namespace.yml` with the content.

```
kind: Namespace
apiVersion: v1
```

```
metadata:
  name: monitoring
```

Apply & Test the namespace exists.

```
$ kubectl get namespaces
NAME          STATUS   AGE
[...]
monitoring    Active   105m
```

Deploy Prometheus

Here is where the power of Helm steps in and makes life much easier.

First we need to update our local helm chart repo.

```
$ helm repo update
```

Next, deploy Prometheus into the monitoring namespace

```
$ helm install stable/prometheus \
    --namespace monitoring \
    --name prometheus
```

This will deploy Prometheus into your cluster in the `monitoring` namespace and mark the release with the name `prometheus`.

Prometheus is now scraping the cluster together with the node-exporter and collecting metrics from the nodes.

We can confirm by checking that the pods are running:

```
$ kubectl get pods -n monitoring
NAME                                             READY   STATUS
prometheus-alertmanager-5c5958dcb7-bq2fw         2/2     Running
prometheus-kube-state-metrics-76d649cdf9-v5qg5   1/1     Running
prometheus-node-exporter-j74zq                   1/1     Running
prometheus-node-exporter-x5xnq                   1/1     Running
```

```
prometheus-pushgateway-6744d69d4-27dxb          1/1     Running
prometheus-server-669b987bcd-swcxh              2/2     Running
```

Install Grafana

When deploying grafana, we need to configure it to read metrics from the right data sources.

Defining the grafana data sources.

Grafana takes data sources through yaml configs when it get provisioned.
For more information see
here: http://docs.grafana.org/administration/provisioning/#data sources

Kubernetes has nothing to do with importing the data. Kubernetes merely orchestrates the injection of these yaml files.

When the Grafana Helm chart gets deployed, it will search for any config maps that contain a `grafana_datasource` label.

Create a Prometheus data source config map

In the `monitoring` folder, create a sub-folder called `grafana` .

Here is where we will store our configs for the grafana deployment.

Create a file called `monitoring/grafana/config.yml` with the content:

```
apiVersion: v1
kind: ConfigMap
```

```
metadata:
  name: prometheus-grafana-datasource
  namespace: monitoring
  labels:
    grafana_datasource: '1'
data:
  datasource.yaml: |-
    apiVersion: 1
    datasources:
    - name: Prometheus
      type: prometheus
      access: proxy
      orgId: 1
      url: http://prometheus-server.monitoring.svc.cluster.local
```

Here is where we add the `grafana_datasource` label which will tell the grafana provisioner that this is a datasource it should inject.

```
labels:
    grafana_datasource: '1'
```

Apply & test the config

```
$ kubectl apply -f monitoring/grafana/config.yml
$ kubectl get configmaps -n monitoring
NAME                                DATA   AGE
[...]
grafana                             1      131m
```

Override Grafana value

When Grafana gets deployed and the provisioner runs, the data source provisioner is deactivated. We need to activate it so it searches for our config maps.

We need to create our own values.yml file to override the datasources search value, so when Grafana is deployed it will search our datasource.yml definition and inject it.

Create a file called `monitoring/grafana/values.yml` with the content:

```
sidecar:
  image: xuxinkun/k8s-sidecar:0.0.7
  imagePullPolicy: IfNotPresent
  datasources:
    enabled: true
    label: grafana_datasource
```

This will inject a sidecar which will load all the data sources into Grafana when it gets provisioned.

Now we can deploy Grafana with the overridden `values.yml` file and our datasource will be imported.

```
$ helm install stable/grafana \
    -f monitoring/grafana/values.yml \
    --namespace monitoring \
    --name grafana
```

Check that it is running:

```
$ kubectl get pods -n monitoring
NAME                                                  READY    STATUS
RESTARTS   AGE
[...]
grafana-5f4d8bcb94-ppsjq                              1/1      Running
```

Get the Grafana Password

Grafana is deployed with a password. This is good news. But whats the password ?

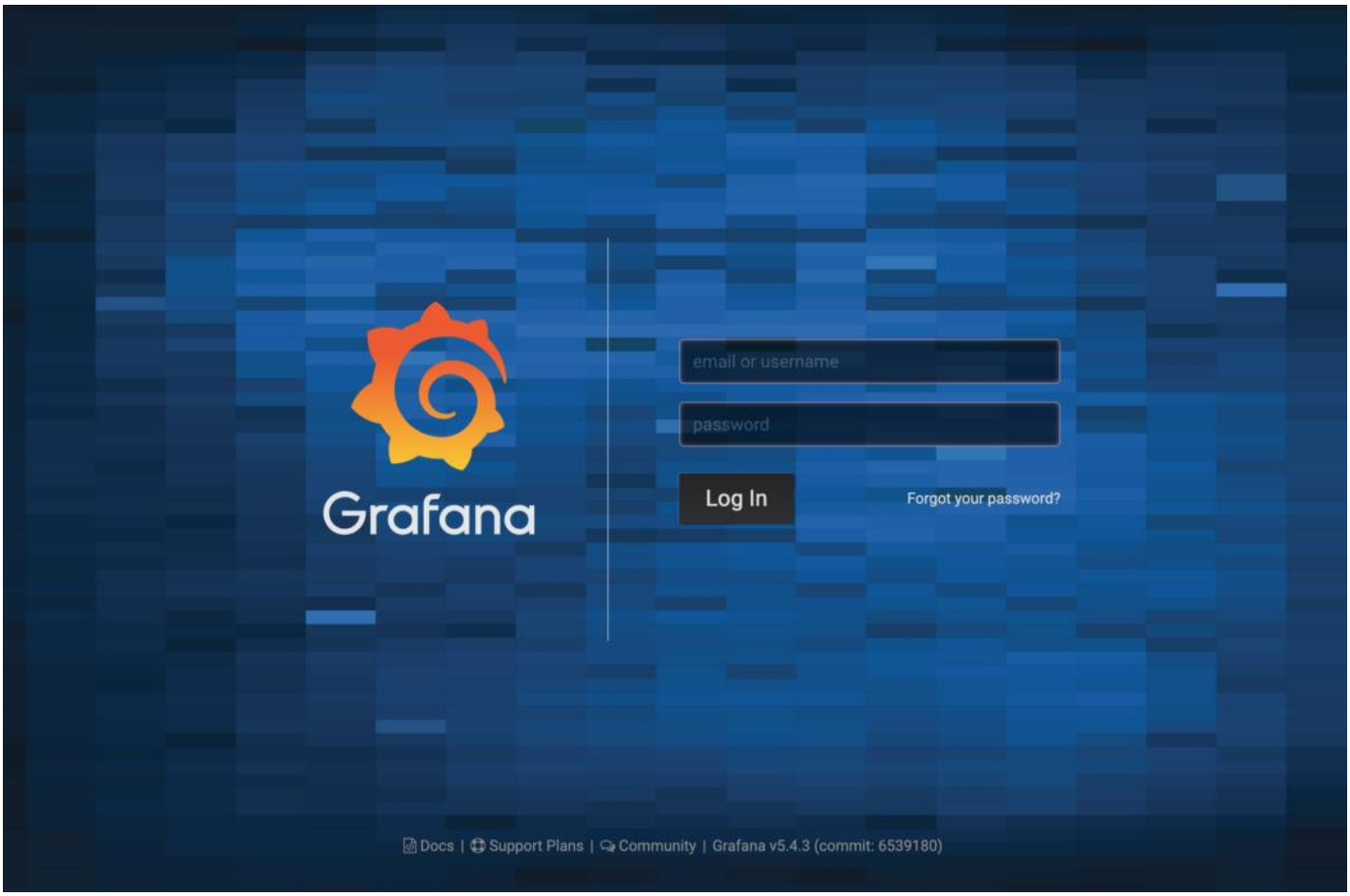
```
$ kubectl get secret \
    --namespace monitoring grafana \
    -o jsonpath="{.data.admin-password}" \
    | base64 --decode ; echo
```

This will spit out the password to your Grafana dashboard.
The username is `admin`

Port Forward the Grafana dashboard to see whats happening:

```
$ export POD_NAME=$(kubectl get pods --namespace monitoring -l
"app=grafana,release=grafana" -o
jsonpath="{.items[0].metadata.name}")
$ kubectl --namespace monitoring port-forward $POD_NAME 3000
```

Go to http://localhost:3000 in your browser. You should see the Grafana login screen:



Smashing login screen

Login with the username and password you have from the previous command.

Add a dashboard

Grafana has a long list of prebuilt dashboard here: https://grafana.com/dashboards

Here you will find many many dashboards to use. We will use this one as it is quite comprehensive in everything it tracks.

In the left hand menu, choose `Dashboards` > `Manage` > `+ Import`