## Manage Kubernetes Resources via Terraform - macOs

- install/open docker
- install kubectl/minikube

```
brew install kind
```

• touch kind-config.yaml and put the following config file in it

```
kind: Cluster
apiVersion: kind.x-k8s.io/vlalpha4
nodes:
- role: control-plane
  extraPortMappings:
- containerPort: 30201
  hostPort: 30201
  listenAddress: "0.0.0.0"
```

• curl https://raw.githubusercontent.com/hashicorp/learn-terraform-deploy-nginx-kubernetes-provider/master/kind-config.yaml --output

```
GMN21:terraform grand$ kind create cluster --name terraform-learn --config kind-config.yaml

"Creating cluster "terraform-learn" ...

Ensuring node image (kindest/node:v1.20.2)

Preparing nodes

Writing configuration

Starting control-plane

Installing CNI

Installing StorageClass

Set kubectl context to "kind-terraform-learn"

You can now use your cluster with:

kubectl cluster-info --context kind-terraform-learn

Thanks for using kind!
```

kind get clusters

```
GMN21:terraform grand$ kind get clusters
terraform—learn
```

- mkdir learn-terraform-deploy-nginx-kubernetes
- cd learn-terraform-deploy-nginx-kubernetes

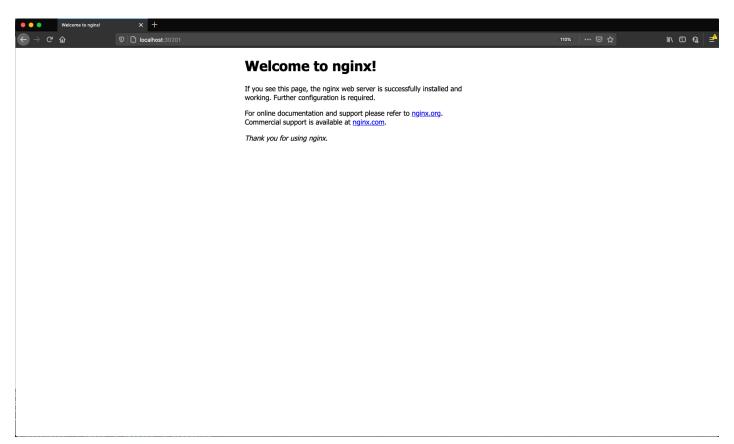
```
touch kubernetes.tf add the following config file

terraform {
    required_providers {
        kubernetes = {
            source = "hashicorp/kubernetes"
        }
     }
     provider "kubernetes" {
        config_path = "~/.kube/config"
     }
}
```

- touch terraform.tfvars/ vim terraform.tfvars
- terraform init
- Add the following to a file kubernetes.tf

```
resource "kubernetes deployment" "nginx" {
  metadata {
  name = "scalable-nginx-example"
  labels = {
    App = "ScalableNginxExample"
  }
  spec {
  replicas = 2
   selector {
    match_labels = {
      App = "ScalableNginxExample"
    }
   template {
     metadata {
      labels = {
   App = "ScalableNginxExample"
     }
     spec {
       container {
        image = "nginx:1.7.8"
        name = "example"
         port {
          container_port = 80
         resources {
          limits = {
    cpu = "0.5"
            memory = "512Mi"
          requests = {
            cpu = "250m"
            memory = "128Mi"
       }
   }
resource "kubernetes_service" "nginx" {
 metadata {
  name = "nginx-example"
  spec {
  selector = {
    App = kubernetes_deployment.nginx.spec.0.template.0.metadata[0].labels.App
  }
  port {
    node_port = 30201
port = 80
    target_port = 80
   }
   type = "NodePort"
}
```

- terraform apply
- http://localhost:30201/



MN21 · learn	torrafor	m-deplov-nginx-ku	hernetes as	ndt kubestl	not-s		rraform-deploy-n	ginx-kubernetes	— -bash — 178	3×37	
AMESPACE	Lerraior	NAME	bernetes gra	nus kubeccc	yet a	ccacc-nai	READY	STATUS	RESTA	RTS AGE	
efault		pod/scalable-ngi	nx-example-6	c5d9f4854-n	4inn		1/1	Running		73m	
efault		pod/scalable-ngi					1/1	Running		73m	
ube-system		pod/coredns-74ff			, -		1/1	Running		4h19m	
ube-system		pod/coredns-74ff					1/1	Running		4h19m	
ube-system		pod/etcd-terrafo		trol-plane			1/1	Running	0	4h19m	
ube-system		pod/kindnet-985s					1/1	Running	0	4h19m	
ube-system		pod/kube-apiserv	er-terraform	-learn-cont	rol-pl	ane	1/1	Running	0	4h19m	
ube-system		pod/kube-control	ler-manager-	terraform-l	earn-c	ontrol-plan	e 1/1	Running	0	4h19m	
ube-system		pod/kube-proxy-s	-proxy-s7jxl				1/1	Running	0	4h19m	
ube-system pod/kube-sche			duler-terraform-learn-control-plane			ane	1/1	Running	0	4h19m	
ocal-path-s	torage	pod/local-path-p	rovisioner-7	8776bfc44-9	ppc4		1/1	Running	0	4h18m	
AMESPACE	NAME		TYPE	CLUSTER-IP	E	XTERNAL-IP	PORT(S)			AGE	
efault	service/kubernetes		ClusterIP 10.96.0.1		<none></none>		443/TCP		4h19m		
efault	ult service/nginx-example		NodePort 10.96.205.7			none>	80:30201	/TCP		73m	
ube-system	servi	e/kube-dns	ClusterIP	10.96.0.10	<	none>	53/UDP,5	3/TCP,915	3/TCP	4h19m	
AMESPACE	NAME		DESIRED	CURRENT	READ	Y UP-TO-DA	ATE AVAI	LABLE N	ODE SELE	CTOR	AGE
ube-system	daemor	set.apps/kindnet	1	1	1	1	1	<	none>		4h19m
ube-system	daemor	set.apps/kube-pro	xy 1	1	1	1	1	k	ubernete	s.io/os=linux	4h19m
AMESPACE		NAME			READ	Y UP-TO-DA	ATE AVAI	LABLE A	GE		
efault		<pre>deployment.apps/scalable-nginx-example</pre>			2/2	2	2	7	'3m		
ube-system		deployment.apps/coredns 2/				2	2	4	h19m		
ocal-path-storage		deployment.apps/	local-path-p	rovisioner	1/1	1	1	4	h18m		
AMESPACE		NAME				DESI	RED CURR	ENT REA	DY AGE		
efault ube-system		replicaset.apps/scalable-nginx-example-6c5d9f4854 2 replicaset.apps/coredns-74ff55c5b 2					2	2	73m		
							2	2	4h1	9m	
ocal-path-storage		replicaset.apps/	local <mark>-path-p</mark> bernetes gra	rovisioner-	78776b	fc44 1	1	1	4h1	8m	

Scale the deployment replica = 4

terraform apply

```
I21:learn-terraform-deploy-nginx-kubernetes grand$ terraform app
kubernetes_deployment.nginx: Refreshing state... [id=default/scalable-nginx-example]
kubernetes_service.nginx: Refreshing state... [id=default/nginx-example]
An execution plan has been generated and is shown below.
Resource actions are indicated with the following symbols:
   ~ update in−place
Terraform will perform the following actions:
   # kubernetes_deployment.nginx will be updated in-place
   ~ resource "kubernetes_deployment" "nginx" {
                                        = "default/scalable-nginx-example"
             id
             # (1 unchanged attribute hidden)
         ~ spec {
                                                             = "2" -> "4"
                ~ replicas
                   # (4 unchanged attributes hidden)
                   # (3 unchanged blocks hidden)
             # (1 unchanged block hidden)
Plan: 0 to add, 1 to change, 0 to destroy.
Do you want to perform these actions?
   Terraform will perform the actions described above.
   Only 'yes' will be accepted to approve.
   Enter a value:
 MN21:learn-terraform-deploy-nginx-kubernetes grand$ kubectl get all --all-namespaces
NAMESPACE
                          NAME
                                                                                                      READY
                                                                                                                             RESTARTS
                                                                                                                Running
default
                          pod/scalable-nginx-example-6c5d9f4854-f4c2r
                          pod/scalable-nginx-example-6c5d9f4854-n4jnp
pod/scalable-nginx-example-6c5d9f4854-t2trl
default
                                                                                                      1/1
                                                                                                                                           95m
                                                                                                                Running
                                                                                                                                           23s
default
                                                                                                      1/1
                                                                                                                Runnina
default
                          pod/scalable-nginx-example-6c5d9f4854-zdrjd
                                                                                                                Running
kube-system
                          pod/coredns-74ff55c5b-2584c
                                                                                                                Running
                                                                                                                                           4h41m
kube-system
                          pod/coredns-74ff55c5b-9tcsx
                                                                                                      1/1
                                                                                                                Running
                                                                                                                                           4h41m
                          pod/etcd-terraform-learn-control-plane
                                                                                                                                           4h41m
kube-system
                                                                                                      1/1
                                                                                                                Runnina
                          pod/kindnet-985sd
kube-system
kube-system
                          pod/kube-apiserver-terraform-learn-control-plane
                                                                                                                Running
                                                                                                                                           4h41m
                          pod/kube-controller-manager-terraform-learn-control-plane
kube-system
                                                                                                      1/1
                                                                                                                Running
                                                                                                                                           4h41m
                          pod/kube-proxy-s7jxl
pod/kube-scheduler-terraform-learn-control-plane
                                                                                                                                           4h41m
kube-system
                                                                                                      1/1
                                                                                                                Running
kube-system
                                                                                                                Running
local-path-storage
                          pod/local-path-provisioner-78776bfc44-9ppc4
                                                                                                                                           4h41m
NAMESPACE
                                                                                  EXTERNAL-IP
                                                                                                   PORT(S)
                                                               CLUSTER-IP
                                                                                                                                   AGE
                                                ClusterIP
default
                 service/kubernetes
                                                               10.96.0.1
                                                                                  <none>
                  service/nginx-example
                                                               10.96.205.70
                                                                                                    80:30201/TCP
                                                                                                                                   4h41m
                                                ClusterIP
                                                                                                   53/UDP,53/TCP,9153/TCP
kube-system
                 service/kube-dns
                                                               10.96.0.10
                                                                                  <none>
NAMESPACE
                                                     DESIRED
                                                                 CURRENT
                                                                              READY
                                                                                        UP-TO-DATE
                                                                                                        AVAILABLE
                                                                                                                       NODE SELECTOR
                 daemonset.apps/kindnet
kube-system
kube-system
                 daemonset.apps/kube-proxy
                                                                                                                        kubernetes.io/os=linux
NAMESPACE
                                                                              READY
                                                                                        UP-TO-DATE
                                                                                                        AVAILABLE
                          deployment.apps/scalable-nginx-example
kube-system
                          deployment.apps/coredns
                                                                                                                        4h41m
local-path-storage
                          deployment.apps/local-path-provisioner
                                                                                                                        4h41m
NAMESPACE
                                                                                            DESIRED
                                                                                                        CURRENT
                                                                                                                     READY
                                                                                                                               AGE
                          NAME
default
                          replicaset.apps/scalable-nginx-example-6c5d9f4854
                                                                                                                               95m
                         replicaset.apps/coredns-74ff55c5b
replicaset.apps/local-path-provisioner-78776bfc44
                                                                                                                               4h41m
kube-system
local-path-storage
                                                                                                                               4h41m
GMN21:learn-terraform-deploy-nginx-kubernetes grand$
                                           grand$ kubectl get events --sort-by=.metadata.creationTimestam
                                       OBJECT replicaset/scalable-nginx-example-6c5d9f4854 deployment/scalable-nginx-example pod/scalable-nginx-example-6c5d9f4854-f4c2r replicaset/scalable-nginx-example-6c5d9f4854-f4c2r pod/scalable-nginx-example-6c5d9f4854-t2rl pod/scalable-nginx-example-6c5d9f4854-t2rl pod/scalable-nginx-example-6c5d9f4854-f4c2r pod/scalable-nginx-example-6c5d9f4854-f4c2r pod/scalable-nginx-example-6c5d9f4854-f4c2r
                     EASON
uccessfulCreate
calingReplicaSet
cheduled
uccessfulCreate
ulled
cheduled
                                                                                   MESSAGE
Created pod: scalable-nginx-example-6c5d9f4854-t2trl
Scaled up replica set scalable-nginx-example-6c5d9f4854 to 4
Successfully assigned default/scalable-nginx-example-6c5d9f4854-f4c2r to terraform-learn-control-plane
Created pod: scalable-nginx-example-6c5d9f4854-f4c2r
Container image "nginx:1.7.8" already present on machine
Successfully assigned default/scalable-nginx-example-6c5d9f4854-t2trl to terraform-learn-control-plane
Container image "nginx:1.7.8" already present on machine
```

- terraform destroy
- $\bullet$  kind delete cluster --name terraform-learn

Wallah! you have successfully managed kubernetes resources via Terraform!