Network LAB

10 January 2021 12:04

Demo

- If you were deploying on a Vmware environment NSX-T may be a good option.
 If you look at the play-with-k8s labs they use WeaveNet.
 In our demos in the course we used Calico.
 Depending on your environment and after evaluating the Pros and Cons of each of these, you may chose the right networking sol ution.

- Reset your cluster:

```
[root@k8s-master ~] # kubeadm init --apiserver-advertise-address=192.168.1.73 --pod-network-cidr=192.168.0.0/16
[init] Using Kubernetes version: v1.20.1
[preflight] Running pre-flight checks
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] You can also perform this action in beforehand using 'kubeadm config images pull'
[certs] Using certificateDir folder "/etc/kubernetes/pki"
[certs] Generating "ac" certificate and key
[certs] Generating "apiserver" certificate and key
[certs] siserver serving cert is signed for DNS names [k8s-master kubernetes.default kubernetes.default.svc kubernetes.default.svc.cluster.local] and IPs
[10.96.0.1 192.168.1.73]
[certs] Generating "apiserver-kubelet-client" certificate and key
[certs] Generating "front-proxy-ca" certificate and key
[certs] Generating "front-proxy-ca" certificate and key
[certs] Generating "front-proxy-client" certificate and key
[certs] Generating "etcd/ca" certificate and key
```

- Initialize Cluster

kube-system coredns-74ff55c5b-xqkt7 0/1 Pending 0 3m24 kube-system etcd-k8s-master 1/1 Running 0 3m37 kube-system kube-apiserver-k8s-master 1/1 Running 0 3m37 kube-system kube-controller-manager-k8s-master 1/1 Running 0 3m37 kube-system kube-proxy-v8wvk 1/1 Running 0 3m24	NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
kube-system etcd-k8s-master 1/1 Running 0 3m37 kube-system kube-apiserver-k8s-master 1/1 Running 0 3m37 kube-system kube-controller-manager-k8s-master 1/1 Running 0 3m37 kube-system kube-proxy-v8wvk 1/1 Running 0 3m24	kube-system	coredns-74ff55c5b-bt6lb	0/1	Pending	0	3m24s
kube-system kube-apiserver-k8s-master 1/1 Running 0 3m37 kube-system kube-controller-manager-k8s-master 1/1 Running 0 3m37 kube-system kube-proxy-v8wvk 1/1 Running 0 3m24	kube-system	coredns-74ff55c5b-xqkt7	0/1	Pending	0	3m24s
kube-system kube-controller-manager-k8s-master 1/1 Running 0 3m37 kube-system kube-proxy-v8wvk 1/1 Running 0 3m24	kube-system	etcd-k8s-master	1/1	Running	0	3m37s
kube-system kube-proxy-v8wvk 1/1 Running 0 3m24	kube-system	kube-apiserver-k8s-master	1/1	Running	0	3m37s
	kube-system	kube-controller-manager-k8s-master	1/1	Running	0	3m37s
lube avetem lube cabedules kie masten 1/1 Dunning 0 3m27	kube-system	kube-proxy-v8wvk	1/1	Running	0	3m24s
Rube-System Rube-Scheduler-Ros-Master 1/1 Ruming 0 Sms/	kube-system	kube-scheduler-k8s-master	1/1	Running	0	3m37s

- Join workers without installing CNI and notice status:

NAMESPACE	NAME	REA	ADY STATUS	RESTARTS	AGE
kube-system	coredns-74ff55c5b-bt61b	0/1	Pending	0	11m
kube-system	coredns-74ff55c5b-xqkt7	0/1	Pending	0	11m
kube-system	etcd-k8s-master	1/1	Running	0	11m
kube-system	kube-apiserver-k8s-master	1/1	Running	0	11m
kube-system	kube-controller-manager-k0s-mast	er 1/1	Running	0	11m
kube-system	kube-proxy-d2rcc	1/1	Running	0	4m44s
kube-system	kube-proxy-mkz62	1/1	Running	0	4m55s
kube-system	kube-proxy-v8wvk	1/1	Running	0	11m
kube-system	kube-scheduler-k8s-master	1/1	Running	0	11m
^C[root@k8s-	master ~]# kubectl get nodes				
NAME	STATUS ROLES	AGE	VERSION		
k8s-master	NotReady control-plane, master	11m	v1.20.1		
worker26	NotReady <none></none>	4m59s	v1.20.1		
worker6	NotReady <none></none>	4m48s	v1.20.1		

- Install network drivers

FLANNEL

- Kubernetes Scheduling:

[root@k8s-master ~]# kubectl get nodes

NAME	STATUS ROLES	AGE VER	SION						
k8s-master	Ready control-plane, master	29m v1.	20.1						
worker6	Ready <none></none>	22m v1.	20.1						
[root@k8s-ma:	ster ~] # kubectl get pods -A -o	wide							
NAMESPACE	NAME	REA	DY STATUS	RESTARTS	AGE	IP	NODE	NOMINATED NODE	READINESS GATES
default	net-test-dc8bf8666-2g4js	1/1	Running	0	10m	192.168.2.8	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-4plqc	1/1	Running	0	10m	192.168.2.5	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-9rbz4	1/1	Running	0	10m	192.168.2.6	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-bvbft	1/1	Running	0	10m	192.168.2.4	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-jcdtt	1/1	Running	0	10m	192.168.2.7	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-pmx49	1/1	Running	0	10m	192.168.2.3	worker6	<none></none>	<none></none>
kube-system	coredns-74ff55c5b-bt6lb	0/1	ContainerCreating	0	29m	<none></none>	worker26	<none></none>	<none></none>
kube-system	coredns-74ff55c5b-xqkt7	0/1	Running	0	29m	192.168.2.2	worker6	<none></none>	<none></none>
kube-system	etcd-k8s-master	1/1	Running	0	29m	192.168.1.73	k8s-master	<none></none>	<none></none>
kube-system	kube-apiserver-k8s-master	1/1		0	29m	192.168.1.73	k8s-master	<none></none>	<none></none>
kube-system	kube-controller-manager-k8s-mas	ter 1/1	Running	0	29m	192.168.1.73	k8s-master	<none></none>	<none></none>
kube-system	kube-flannel-ds-g7tgm	1/1	Running	1	16m	192.168.1.75	worker26	<none></none>	<none></none>
kube-system	kube-flannel-ds-hmjvs	1/1	Running	0	16m	192.168.1.73	k8s-master	<none></none>	<none></none>
kube-system	kube-flannel-ds-mjkfg	1/1		0	16m	192.168.1.89	worker6	<none></none>	<none></none>
kube-system	kube-proxy-d2rcc	1/1	Running	0	22m	192.168.1.89	worker6	<none></none>	<none></none>
kube-system	kube-proxy-mkz62	1/1	Running	1	22m	192.168.1.75	worker26	<none></none>	<none></none>
kube-system	kube-proxy-v8wvk	1/1	Running	0	29m	192.168.1.73	k8s-master	<none></none>	<none></none>
kube-system	kube-scheduler-k8s-master	1/1	Running	0	29m	192.168.1.73	k8s-master	<none></none>	<none></none>
[root@k8s-ma:	ster ~]# 📙								

				-, -	
[root@k8s-ma	aster ~]#	kubectl get nodes			
NAME	STATUS	ROLES	AGE	VERSION	V.
k8s-master	Ready	control-plane, master	31m	v1.20.1	L
worker26	Ready	<none></none>	104s	v1.20.1	L
worker6	Ready	<none></none>	24m	v1.20.1	L
froot@k8s-ma	ster ~1#	П			

```
[root@k8s-master ~]# kubectl scale deployment --replicas=8 net-test
deployment.apps/net-test scaled [root@k8s-master ~]# kubectl get pods -A -o wide
                    NAME
net-test-dc8bf8666-2g4js
                                                                                                                                       AGE
13m
                                                                                                                                                                       NODE
worker6
                                                                                         STATUS
                                                                                                                       RESTARTS
                                                                                                                                                IP
192.168.2.8
                                                                                                                                                                                           NOMINATED NODE
                                                                                                                                                                                                                    READINESS GATES
default
                                                                                         Running
                                                                             1/1
1/1
                                                                                                                                                                                            <none>
                                                                                                                                                                                                                      <none>
                                                                                                                                                192.168.2.5
192.168.2.6
192.168.2.4
<none>
                     net-test-dc8bf8666-4plqc
net-test-dc8bf8666-9rbz4
default
                                                                                         Running
                                                                                                                                       13m
                                                                                                                                                                        worker6
                                                                                                                                                                                            <none>
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default
                                                                                         Running
                                                                                                                                                                        worker6
                                                                                                                                                                                            <none>
                                                                                                                                                                                                                      <none>
                     net-test-dc8bf8666-bvbft
net-test-dc8bf8666-cq22t
net-test-dc8bf8666-fngls
default
default
                                                                                         Running
ContainerCreating
                                                                                                                                                                        worker6
worker26
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<none>
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default
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                                                                                                                                                                        worker26
                                                                                                                                                                                            <none>
                                                                                                                                                                                                                     <none>
default
                     net-test-dc8bf8666-jcdtt
                                                                             1/1
                                                                                         Running
                                                                                                                                       13m
                                                                                                                                                192.168.2.7
                                                                                                                                                                        worker6
                                                                                                                                                                                           <none>
                                                                                                                                                                                                                     <none>
default
kube-system
kube-system
                     net-test-dc8bf8666-pmx49
coredns-74ff55c5b-bt61b
coredns-74ff55c5b-xqkt7
                                                                                         Running
Running
                                                                                                                                       13m
32m
                                                                                                                                                192.168.2.3
192.168.3.2
                                                                                                                                                                       worker6
worker26
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                                                                                         Running
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kube-system
                     etcd-k8s-master
                                                                                         Running
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                                                                                                                                                                        k8s-master
                                                                                                                                                                                           <none>
                                                                                                                                                                                                                     <none>
                     kube-apiserver-k8s-master
kube-controller-manager-k8s-master
kube-flannel-ds-g7tgm
kube-flannel-ds-hmjvs
                                                                                                                                                192.168.1.73
192.168.1.73
192.168.1.75
192.168.1.73
                                                                                                                                                                        k8s-master
k8s-master
worker26
kube-system
kube-system
                                                                                         Running
Running
                                                                                                                                                                                           <none>
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<none>
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kube-system
                                                                                                                                                                                            <none>
                                                                                         Running
                                                                                                                                                                        k8s-master
kube-system
                                                                             1/1
                                                                                         Running
                                                                                                                                        18m
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                                                                                                                                                                                                                     <none>
kube-system
                     kube-flannel-ds-mjkfq
                                                                                         Running
                                                                                                                                       18m
                                                                                                                                                 192.168.1.89
                                                                                                                                                                        worker6
                                                                                                                                                                                           <none>
                                                                                                                                                                                                                     <none>
kube-system
kube-system
                     kube-proxy-d2rcc
kube-proxy-mkz62
kube-proxy-v8wvk
kube-scheduler-k8s-master
                                                                                         Running
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192.168.1.75
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worker26
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kube-system
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kube-system
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                                                                                                                                                192,168,1,73
                                                                                                                                                                        k8s-master
                                                                                                                                                                                           <none>
                                                                                                                                                                                                                     <none>
[root@k8s-master ~]#
```

Change the Network: CALICO

Delete flannel
 kubecti delete -f https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml
 Check status of pods

[root@k8s-master ~] # kubectl delete -f https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml podsecuritypolicy.policy "psp.flannel.unprivileged" deleted clusterrole.rbac.authorization.k8s.io "flannel" deleted clusterrolebinding.rbac.authorization.k8s.io "flannel" deleted serviceaccount "flannel" deleted configmap "kube-flannel-cfg" deleted daemonset.apps "kube-flannel-ds" deleted [root@k8s-master ~] # kubectl get pods -A -o wide NAMESPACE NAME READY NOMINATED NODE STATIL RESTARTS NODE net-test-dc8bf8666-2g4js net-test-dc8bf8666-4p1qc net-test-dc8bf8666-9rbz4 Running 192.168.2.8 worker6 <none> Running 14m 192.168.2.5 192.168.2.6 worker6 <none> Running 14m worker6 <none> Running 192.168.2.4 192.168.3.4 192.168.3.3 worker6 worker26 <none> none> Running worker26 <none>

<none> default <none> default <none> net-test-dc8bf8666-bvbft net-test-dc8bf8666-cq22t net-test-dc8bf8666-fngls net-test-dc8bf8666-jcdtt default <none> <none> default <none> default Running 14m 192.168.2.7 worker6 <none> <none> net-test-dc8bf8666-pmx49 coredns-74ff55c5b-bt61b coredns-74ff55c5b-xqkt7 192.168.2.3 192.168.3.2 192.168.2.2 default Running 14m worker6 worker26 <none> <none> kube-system kube-system <none> Running worker6 <none> coredis-fall-obs-maker kube-apiserver-k8s-master kube-controller-manager-k8s-master kube-flannel-ds-hmjvs kube-flannel-ds-mjkfg kube-system Running 33m 192.168.1.73 k8s-master <none> <none> kube-svstem Runnina 33m 192.168.1.73 k8s-master <none> <none> kube-system kube-system kube-system Running Terminating 192.168.1.73 192.168.1.73 k8s-master k8s-master <none> <none> 0/1 Terminating 20m 192.168.1.89 worker6 <none> <none> kube-system kube-proxy-d2rcc Running 26m 192.168.1.89 worker6 <none> <none> Running kube-proxy-mkz62 kube-proxy-v8wvk kube-scheduler-k8s-master kube-system kube-system 192.168.1.75 worker26 <none> <none> kube-system Running 33m 192.168.1.73 k8s-master <none> <none> [root@k8s-master ~]#

PEADINESS CATES

- Install Calico

[root@k8s-master ~]# ls calico.yaml calico.yaml
[root@k8s-master ~]# kubectl create -f calico.yaml Ignotek8s-master ~| # kubectl create -f calico.yaml
configmap/calico-config created
customresourcedefinition.apiextensions.k8s.io/bgpconfigurations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/bgpeers.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/blockaffinities.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/clusterinformations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/felixconfigurations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/dploalnetworkpolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/lostendpoints.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamblocks.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamblocks.crd.projectcalico.org created
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customresourcedefinition.apiextensions.k8s.io/ippools.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/iphocolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/iphocolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/hetworkpolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/hetworkpolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/hetworkpolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/calico-kube-controllers created clusterrole.inac.authorization.k8s.io/calico-kube-controllers created clusterrolebinding.ibac.authorization.k8s.io/calico-kube-controllers created clusterrolebinding.ibac.authorization.k8s.io/calico-node created clusterrolebinding.ibac.authorization.k8s.io/calico-node created daemonset.apps/calico-node created serviceaccount/calico-node created deployment.apps/calico-kube-controllers created serviceaccount/calico-kube-controllers created serviceaccount/calico-kube-controllers created poddisruptionbudget.policy/calico-kube-controllers created [root@k8s-master ~]# []

[root@k8s-master ~] # kubectl get pods -A -o wide ter -| # kubectl get pods -A -o wide NAME net-test-dc8bf8666-2g4js net-test-dc8bf8666-4gh2qc net-test-dc8bf8666-9rbz4 net-test-dc8bf8666-9rbz4 net-test-dc8bf8666-bvbft net-test-dc8bf8666-fngls net-test-dc8bf8666-fngls net-test-dc8bf8666-jcdtt net-test-dc8bf8666-pmx49 calico-node-bnj6m calico-node-bnj6m calico-node-ns99h NAMESPACE READY NOMINATED NODE READINESS GATI STATUS RESTARTS NODE 192.168.2.8 Running 16m worker6 <none> <none> 192.168.2.5 default 1/1 Running 16m worker6 <none> <none> default 1/1 Running 16m 192.168.2.6 worker6 <none> <none> Running worker6 worker26 default 16m 192.168.2.4 <none> <none> default default 192.168.3.4 192.168.3.3 <none> worker26 <none> Running 3m21s <none> 192.168.2.7 192.168.2.3 192.168.3.5 192.168.1.73 default Running 16m worker6 <none> <none> 16m 45s default Running worker6 <none> <none> kube-system kube-system k8s-master <none> Running <none> kube-system calico-node-ns99h 1/1 Running 455 192.168.1.89 worker6 <none> <none> kube-system kube-system kube-system calico-node-qrtbh coredns-74ff55c5b-bt6lb coredns-74ff55c5b-xqkt7 etcd-k8s-master PodInitializing 192.168.1.75 192.168.3.2 192.168.2.2 455 worker26 <none> <none> Running Running worker26 worker6 <none> <none> k8s-master kube-system Running 35m 192.168.1.73 <none> <none> etcd-kss-master kube-apiserver-k8s-master kube-controller-manager-k8s-master kube-proxy-d2rcc kube-proxy-mkz62 kube-system kube-system kube-system Running 35m 192.168.1.73 k8s-master <none> <none> Running Running 35m 28m <none> <none> worker6 worker26 kube-system Running 29m 192.168.1.75 <none> <none> kube-system kube-proxy-v0wvk
kube-system kube-scheduler-k0s-master
[root0k0s-master ~]# | Running 192.168.1.73 k8s-master <none> <none> Running 192.168.1.73 k8s-master <none>

Scale up your deployment Check IP address of new pods

-	scale up	your deproyment
_	Chack ID	address of now nod

[root@k8s-mas	ster ~] # kubectl get pods -A -	-o wide										
NAMESPACE	NAME		READY	STATUS	RESTARTS		IP		ODE	NOMINATED	NODE READI	NESS GATES
default	net-test-dc8bf8666-2g4js		1/1	Running	0	18m	192.168.2		orker6	<none></none>	<none< td=""><td></td></none<>	
default	net-test-dc8bf8666-4plqc		1/1	Running	0	18m	192.168.2		orker6	<none></none>	<none< td=""><td></td></none<>	
default	net-test-dc8bf8666-9rbz4		1/1	Running	0	18m	192.168.2		orker6	<none></none>	<none< th=""><th></th></none<>	
default	net-test-dc8bf8666-bvbft		1/1	Running	0	18m	192.168.2		orker6	<none></none>	<none< td=""><td></td></none<>	
default	net-test-dc8bf8666-cq22t		1/1	Running	0	4m54s			orker26	<none></none>	<none< th=""><th></th></none<>	
default	net-test-dc8bf8666-fngls		1/1	Running	0	4m54s			orker26	<none></none>	<none< th=""><th></th></none<>	
default	net-test-dc8bf8666-jcdtt		1/1	Running	0	18m	192.168.2		orker6	<none></none>	<none< th=""><th></th></none<>	
default	net-test-dc8bf8666-klmct		1/1	Running	0	16s 16s	192.168.1		orker26 orker26	<none></none>	<none< th=""><th></th></none<>	
default default	net-test-dc8bf8666-kmn9m net-test-dc8bf8666-pmx49		1/1	Running Running	0	18m	192.168.1		orkerze orker6	<none></none>	<none< th=""><th></th></none<>	
kube-system	calico-kube-controllers-744c	fdf676-71221	0/1	CrashLoopBackOf		2m18s			orker26	<none></none>	<none< th=""><th>X</th></none<>	X
kube-system	calico-node-bnj6m	1010/0-21221	1/1	Running	0	2m18s			8s-master	<none></none>	<none< th=""><th></th></none<>	
kube-system	calico-node-ns99h		1/1	Running	0	2m18s			orker6	<none></none>	<none< th=""><th></th></none<>	
kube-system	calico-node-grtbh		1/1	Running	0	2m18s			orker26	<none></none>	<none< th=""><th></th></none<>	
kube-system	coredns-74ff55c5b-bt61b		0/1	Running	0	36m	192.168.3		orker26	<none></none>	<none< th=""><th></th></none<>	
kube-system	coredns-74ff55c5b-xqkt7		0/1	Running	0	36m	192.168.2		orker6	<none></none>	<none< th=""><th>></th></none<>	>
kube-system	etcd-k8s-master		1/1	Running	0	37m	192.168.1		8s-master	<none></none>	<none< th=""><th>></th></none<>	>
kube-system	kube-apiserver-k8s-master		1/1	Running	0	37m	192.168.1	.73 k	8s-master	<none></none>	<none< th=""><th></th></none<>	
kube-system	kube-controller-manager-k8s-m	master	1/1	Running	0	37m	192.168.1	.73 k	8s-master	<none></none>	<none< td=""><td>></td></none<>	>
kube-system	kube-proxy-d2rcc		1/1	Running	0	30m	192.168.1	.89 W	orker6	<none></none>	<none< td=""><td>></td></none<>	>
kube-system	kube-proxy-mkz62		1/1	Running	0	30m	192.168.1		orker26	<none></none>	<none< td=""><td>></td></none<>	>
kube-system	kube-proxy-v8wvk		1/1	Running	0	36m	192.168.1		8s-master	<none></none>	<none< td=""><td>></td></none<>	>
kube-system	kube-scheduler-k8s-master		1/1	Running	0	37m	192.168.1	.73 k	8s-master	<none></none>	<none< td=""><td>></td></none<>	>
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	t-test-dc8bf8666-4plqc t-test-dc8bf8666-9rbz4	1/		nning nning			192.168.2.6	worker6	<none< td=""><td></td><td><none></none></td><td></td></none<>		<none></none>	
	t-test-dc8bf8666-bvbft	1/		nning			192.168.2.4	worker6	<none< th=""><th></th><th><none></none></th><th></th></none<>		<none></none>	
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default ne [root@k8s-master deployment.apps/ne [root@k8s-master deployment.apps/ne [root@k8s-master default net-	t-test-dc8bf8666-pmx49	1/ estreplicas= grep net-test 1/1 R	1 Ru 3 unning unning unning plicas=6 t-test 1 Co 1 Ru 1 Co 1 Ru	nning 0 0 0 0 0 ntainerCreating nning nning ntainerCreating nning	0 21m 192.1 21m 192.1 21m 192.1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	21m : : : : : : : : : : : : : : : : : : :	worker6 worker6 worker6 worker6 worker6 192.168.2.5 192.168.2.4 <none> 192.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2</none>	<pre>worker6 <none> <none> <none> <none> work work work work of worker 04 worker 02 worker 04 worker 05 worker 07 work 07 work 07 work 07 worker 07 worker</none></none></none></none></pre>	<pre></pre>	inone> none> none> none> none> none> none> none> none> none>	<none> <n< td=""><td></td></n<></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none>	
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default ne [root@k8s-master deployment.apps/ne froot@k8s-master default net- default net- default net- default net- default net- default net- groot@k8s-master Stale up replicas again [root@k8s-master default ne	t-test-dc8bf8666-pmx49	1/ estreplicas= grep net-test 1/1 R	1 Ru 3 plicas=6 t-test 1 Co 1 Ru 1 Co 1 Ru	nning 0 0 0 0 0 ntainerCreating nning nning ntainerCreating nning	0	21m : : : : : : : : : : : : : : : : : : :	worker6 worker6 worker6 worker6 worker6 192.168.2.5 192.168.2.4 <none> 192.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2</none>	<pre>worker6 <none> <none> <none> <none> work work work work 197 work 06 worker 04 worker 00 worker 00 worker 01 worker 03 worker 04 worker 05 worker 06 worker 07 worker 08 worker 09 worker</none></none></none></none></pre>	<pre></pre>	inone> none> none> none> none> none> none> none> none> none>	<none> <n< td=""><td></td></n<></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none>	
default ne [root@k8s-master deployment.apps/ne [root@k8s-master default net- de	t-test-dc8bf8666-pmx49	1/ estreplicas= grep net-test 1/1 R 1/1 R 1/1 R 1/1 R 1/1 R 1/2	1 Ru 3 plicas=6 t-test 1 Co 1 Ru 1 Co 1 Ru	nning o o o o o o o o o o o o o o o o o o	0	21m : : : : : : : : : : : : : : : : : : :	<pre>vorker6 worker6 worker6 worker6 <none> 192.168.2.5 192.168.2.4 <none> 192.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.187.2 92.168.35.1</none></none></pre>	<pre>worker6 <none> <none> <none> <none> work work work work 197 work 06 worker 04 worker 00 worker 00 worker 01 worker 03 worker 04 worker 05 worker 06 worker 07 worker 08 worker 09 worker</none></none></none></none></pre>	<pre></pre>	mone>	<none> <n< td=""><td></td></n<></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none></none>	

- Scale up to 15									
[root@k8s-m	aster ~]# kubectl get pods -A -o wi	de grep net-te	st						
default	net-test-dc8bf8666-71727	1/1	Running	0	100s	192.168.187.206	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-7zrsr	1/1	Running	0	20s	192.168.35.4	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-cgmdx	1/1	Running	0	100s	192.168.187.204	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-dz7zw	1/1	Running	0	4m12s	192.168.187.202	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-gr4d6	1/1	Running	0	4m12s	192.168.187.200	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-hg6sf	1/1	Running	0	20s	192.168.187.210	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-k6q42	1/1	Running	0	100s	192.168.35.1	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-mg5hz	1/1	Running	0	4m12s	192.168.187.201	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-mk6pw	1/1	Running	0	20s	192.168.187.208	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-pgmwg	1/1	Running	0	4m12s	192.168.187.203	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-qvzqr	1/1	Running	0	20s	192.168.35.3	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-tkx7m	1/1	Running	0	100s	192.168.187.207	worker26	<none></none>	<none></none>
default	net-test-dc8bf8666-v4hk5	1/1	Running	0	20s	192.168.187.209	worker26	<none></none>	<none></none>
default	<pre>net-test-dc8bf8666-w4kx1</pre>	1/1	Running	0	100s	192.168.35.2	worker6	<none></none>	<none></none>
default	net-test-dc8bf8666-zclww	1/1	Running	0	100s	192.168.187.205	worker26	<none></none>	<none></none>
[root@k8s-m	aster ~]# 🗌		_						

- Scaled down the deployment to 4

```
- Scaled down the deployment to 4

- And deployed one more deployment in different namespace

[root@k8s-master ~] # kubectl create ns my-net namespace/my-net created

[root@k8s-master ~] # kubectl get ns

NAME STATUS AGE

default Active 103m

kube-node-lease Active 103m

kube-public Active 103m

kube-system Active 103m

my-net Active 2s

[root@k8s-master ~] # |
```

- Scale up/down both the replicas so we get pods on both the workers -

```
[root@k8s-master ~]# kubectl
net-test-dc8bf8666-2xs26 1,
net-test-dc8bf8666-7zrsr 1,
                                                 get pods -o wide | grep net
                                                          Running
                                                                                                      192.168.35.14
                                                                                                                                     worker6
                                                                                                                                                                                   <none>
                                                                                                                                                       <none>
                                                                                                      192.168.35.4
192.168.35.1
192.168.187.252
                                                          Running
                                                                                             63m
                                                                                                                                     worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
       -test-dc8bf8666-k6g42
                                                          Running
                                                                                                                                     worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
       -test-dc8bf8666-n56pl
-test-dc8bf8666-phlhg
                                                          Running
                                                                                             62s
                                                                                                       192.168.35.13
                                                                                                                                     worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
       test-dc8bf8666-g8kzk
                                             1/1
                                                          Running
                                                                                             62s
                                                                                                       192.168.187.253
                                                                                                                                     worker26
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
  et-test debbis666 quzqr
et-test-dc8bf8666-qvzqr
et-test-dc8bf8666-r8kbj
et-test-dc8bf8666-w4kxl
                                                                                                      192.168.35.3
192.168.35.12
192.168.35.2
                                             1/1
                                                          Running
                                                                                             63m
                                                                                                                                     worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
                                                          Running
Running
                                                                                             62s
64m
                                                                                                                                    worker6
worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
                                                get pods -n my-net -o wide | grep net
Running 0 56s 192.168.35.15
Running 0 56s 192.168.187.195
Running 0 56s 192.168.35.16
Running 0 6m38s 192.168.187.211
 [root@k8s-master ~]# kubect1
mv-net-c9dc49cdd-7mgkw 1/1
                                                                                                                                     worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
       et-c9dc49cdd-8jk58
et-c9dc49cdd-9dlwz
                                                                                                                                    worker26
worker6
                                                                                                                                                                                   <none>
my
                                                                                                                                                        <none>
                                                                                                                                                                                   <none>
                                                                                                                                     worker26
my-
       et-c9dc49cdd-b87cl
                                         1/1
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
                                                                                                      192.168.35.19
192.168.187.212
192.168.35.17
192.168.187.255
       et-c9dc49cdd-ct4pk
                                         1/1
                                                       Running
                                                                       0
                                                                                          56s
                                                                                                                                     worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
                                                       Running
          t-c9dc49cdd-dfgv5
t-c9dc49cdd-fswbb
                                                                                                                                     worker26
worker6
                                                                                                                                                                                   <none>
                                                                                          6m38s
                                                       Running
                                                                                          56s
56s
          -c9dc49cdd-ggxzr
                                                                                                                                     worker26
my-
                                         1/1
                                                       Running
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
                                                                                                      192.168.187.194
192.168.35.18
192.168.187.193
192.168.187.254
          -c9dc49cdd-jszhn
                                         1/1
                                                       Running
                                                                       0
                                                                                          56s
                                                                                                                                     worker26
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
                                                       Running
Running
                                                                                                                                     worker6
worker26
                                                                                          568
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
my-net-c9dc49cdd-k91dw
my-net-c9dc49cdd-hq4zt
my-net-c9dc49cdd-nwwh8
                                                                                                                                                                                    <none>
                                          1/1
                                                       Running
                                                                                                                                     worker26
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
my-net-c9dc49cdd-zmfjz
[root@k8s-master ~1# |
                                         1/1
                                                       Running
                                                                                          3m53s
                                                                                                      192.168.35.11
                                                                                                                                     worker6
                                                                                                                                                       <none>
                                                                                                                                                                                   <none>
```

```
Check inter pod communication across namespaces:

o Pod from namespace default namespace are able
[root@k8s_master ~] # kubect1 q
net-test-dc8bf8666-2xs26 1/1
                                                                                                                                                                              [root@worker26 ~]# logout
                                                         get pods | grep net
                                                                                                                                                                              [rooteworkerze -]# loosed.
[rootek8rs-master -]# kubectl exec -it net-test-de0bf8666-2xs26 /bin/bas.
kubectl exec [POD] [COMMAND] is DEPRECATED and will be removed in a futu
ersion. Use kubectl exec [POD] -- [COMMAND] instead.
root@net-test-dc8bf8666-2xs26:/# hostname -i
                                                                   Running
                                                                                                            515
  et-test-dc8bf8666-7zrsr
                                                                   Running
                                                                                                             63m
       -test-dc8bf8666-k6q42
-test-dc8bf8666-n56p1
                                                                                                             64m
51s
                                                                    Running
 et-test-dc8bf8666-phlhq
                                                    1/1
                                                                   Running
                                                                                                             51s
  et-test-dc8bf8666-q8kzk
et-test-dc8bf8666-qvzqr
et-test-dc8bf8666-qvzqr
et-test-dc8bf8666-r8kbj
                                                                                                                                                                              192.168.35.14
root@net-test-do
<!DOCTYPE html>
                                                                    Running
                                                                                                             515
                                                                   Running
Running
                                                                                                                                                                                                         -dc8bf8666-2xs26:/# curl http://192.168.187.195
                                                                   Running
                                                                                                             64m
                                                                                                                                                                              <html>
[root@kBs-master ~] # kubect1
let-test-dc8bf8666-2xs26 1,
let-test-dc8bf8666-7zrsr 1,
let-test-dc8bf8666-k6q42 1,
                                                         get pods -o
                                                                                 wide | grep net
                                                                                                                                                                              <head>
<title>Welcome to nginx!</title>
                                                                   Running
Running
Running
                                                                                                                        192.168.35.14
192.168.35.4
192.168.35.1
                                                                                                             629
                                                                                                                                                                               <style>
                                                                                                             64m
                                                                                                                                                           worker6
                                                                                                                                                                                      body
  et-test-dc8bf8666-n56pl
                                                    1/1
                                                                   Running
                                                                                                             62s
                                                                                                                        192.168.187.252
                                                                                                                                                           worker26
                                                                                                                                                                                              width: 35em;
net-test-dc8bf8666-phlhg
net-test-dc8bf8666-q8kzk
net-test-dc8bf8666-q8vzqr
net-test-dc8bf8666-qvzqr
                                                                   Running
Running
Running
                                                                                                                        192.168.35.13
192.168.187.253
192.168.35.3
                                                                                                             625
                                                                                                                                                           workers
                                                                                                                                                                                              margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif;
                                                                                       0000
                                                                                                                                                           worker26
worker6
                                                                                                             63m
                                                                                                                        192.168.35.12
                                                                                                                                                                              </style>
</head>
<body>
<hl>Welcome to nginx!</hl>
                                                    1/1
                                                                   Running
                                                                                                             62s
                                                                                                                                                           worker6
  et-test-dc8bf8666-w4kxl
                                                                   Running
                                                                                       0
                                                                                                            64m
                                                                                                                        192.168.35.2
                                                                                                                                                           worker6
[root@k8s-master ~] # kube
ny-net-c9dc49cdd-7mgkw
                                                         get pods -r
Running
                                                                                                                         192.168.187.195
192.168.35.16
                                                               Running
                                                                                                         568
                                                                                                                                                           worker26
                                                                                                                                                                              f you see this page, the nginx web server is successfully installed working. Further configuration is required.
         et-c9dc49cdd-8jk58
et-c9dc49cdd-9d1wz
                                                                Running
                                                                                                         568
                                                                                                                                                           worker6
        et-c9dc49cdd-9d1w2
et-c9dc49cdd-b87cl
et-c9dc49cdd-ct4pk
et-c9dc49cdd-dfgv5
                                                                Running
Running
                                                                                                         6m38s
56s
6m38s
                                                                                                                        192.168.187.211
192.168.35.19
192.168.187.212
                                                                                                                                                           worker26
worker6
                                                                                                                                                                              for online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.
пу
                                                                Running
                                                                                                                                                           worker26
                                                                                                         56s
56s
56s
56s
        et-c9dc49cdd-fswbb
                                                                Running
                                                                                                                        192.168.35.17
                                                                                                                                                           worker6
                                                                                                                       192.168.35.17
192.168.187.255
192.168.187.194
192.168.35.18
192.168.187.193
192.168.187.254
           -c9dc49cdd-18wbb
-c9dc49cdd-ggxzr
-c9dc49cdd-jszhn
-c9dc49cdd-k9fdw
                                                                Running
Running
                                                                                                                                                           worker26
worker26
ny
                                                                                                                                                                              ny-
                                                1/1
                                                                Running
                                                                                                                                                           worker6
            -c9dc49cdd-ka4zt
                                                1/1
                                                                Running
                                                                                                         56s
                                                                                                                                                           worker26
ny-net-c9dc49cdd-nwwh8
ny-net-c9dc49cdd-zmfjz
[root@k8s-master ~]#
                                                                Running
                                                                                                                                                           worker26
                                                                Running
```

Calico now manages the networks and IPs in my nodes and assigns a different network address for each node.

Network Policy

```
Install calicoctl
```

```
[root@k8s-master ~] # kubectl create -f networkpolicy.yaml
error: unable to recognize "networkpolicy.yaml": no matches for kind "NetworkPolicy" in version "projectcalico.org/v3"
[root@k8s-master ~] # curl -O -L https://github.com/projectcalico/calico/calicotl/releases/download/v3.17.1/calicoctl
% Total % Received % Xferd Average Speed Time Time Current
Dload Upload Total Spent Left Speed
100 633 100 633 0 0 805 100 37.1M 0 0 291k [root@88s-master ~]# chmod +x calicoctl [root@k8s-master ~]# ]
                                                                0
                                                                                                                       0 0:02:10 0:02:10 --:-- 287k
```

copy command to /usr/local/bin

Scenario:

```
NAME
blue-66f9b45584-kxjxx
blue-66f9b45584-pkbgv
my-net-c9dc49cdd-7mgxx
my-net-c9dc49cdd-fswbb
my-net-c9dc49cdd-zmfjz
red-7748475b97-4jcz9
```

1) Apply policy within NS

ndpoints in the namespace: my-net with label app: red is allowed, only if it comes from a pod in the same namespace with app: blue, on port 80.

- Allow traffic within default NS from pods:
 - $\hfill\Box$ Incoming traffic coming to pods labeled "app: red"
 - □ Incoming traffic coming from pods labeled "app: blue"

```
[root0k8s-master networkpolicy]# cat networkpolicy.yaml
apiVersion: projectcalico.org/v3
kind: NetworkPolicy
metadata:
   name: allow-http-80-from-blue
   namespace: my-net
spec:
   selector: app == 'red'
   ingress:
   - action: Allow
   protocol: TCP
   source:
        selector: app == 'blue'
   destination:
        ports:
        - 80
   [root0k8s-master -|# calicott| create -f networkpolicy.yaml
Successfully created 1 'NetworkPolicy' resource(s)
```

Results: within NS

- Source - app: blue --> destination - app: red

- o Once policy is applied, only specific traffic is allowed
- Source app: my-net --> destination app: red

 Traffic NOT allowed

```
[root@k@s-master networkpolicy]# kubectl NAME READY STATUS RESTATUS SHOWN-net-c9dc49cdd-7mgkw 1/1 Running Ny-net-c9dc49cdd-fswbb 1/1 Running 0 5h30m 192.168.35.17 worker6 (none) (none) (none) (none) (none) (root@k@s-master networkpolicy]# [
```

```
[root@k8s-master ~] # kubectl exec -it my-net-c9dc49cdd-7mgkw -n my-net /bin/bash kubectl exec [F00] [COMMAND] is DEPRECATED and will be removed in a future version. Use kubectl exec [F00] -- [COMMAND] instead.

root@my-net-c9dc49cdd-7mgkw:/# curl http://192.168.35.23

curl (?) Failed to connect to 192.168.35.23 port 80: Connection timed out root@my-net-c9dc49cdd-7mgkw:/# []
```

2) Apply policy across NS

*** Previous policy has blocked traffic across NS

ingress traffic to endpoints in the namespace: my-net with label app: red is allowed, if it comes from a pod in the namespace with type: backend, on port 80.

- $\hfill\Box$ Allow traffic within default NS from pods:
 - ♦ Incoming traffic coming **to** pods labeled "app: red" in *my-net* NS
 - $\diamondsuit \ \ \text{Incoming traffic coming } \textbf{from } \textbf{pods labeled "app: database" in } \textbf{otherns NS}$

- o 2 pod app: database [NS otherns]
- o 2 pod app: red [NS my-net]

```
[root@k8s-master networkpolicy]#
NOMINATED NODE READINESS GATES
```

Results: across NS

Source - app: database (otherns) --> destination - app: red (my-net)
 Traffic IS ALLOWED allow NOW

```
nead>
title>Welcome to nginx!</title>
  yle?
body {
    width: 35em;
    margin: 0 auto;
    font-family: Tahoma, Verdana, Arial, sans-serif;
 eaco

Wy

Processes to nginx!</hl>
If you see this page, the nginx web server is successfully installed and
king. Further configuration is required.
>>For online documentation and support please refer to
href="http://nginx.org/">nginx.org/a>.<br/>
/mmercial support is available atd
href="http://nginx.com/">nginx.com</a>.
```

3) Apply deny all EGRESS policy on NS

```
| root@k8s-master networkpolicy| | kubect| get pods -n durgoing --show-labels -o wide | NODE | NODE | NOMINATED NODE | READINESS GATES | LABELS | NODE | NOD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     NOMINATED NODE READINESS GATES LABELS (none) app=blue,pod-template-hash=7bb46df96d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       app=myweb,pod-template-hash=855c667ff6
```

Now apply deny all egress policy on outgoing ns

```
[root@k8s-master networkpolicy]#
[root@k8s-master networkpolicy] \begin{tabular}{ll} kubectl create & -f denyall.yaml networkpolicy.networking.k8s.io/outgoing created \\ [root@k8s-master networkpolicy] \end{tabular} \label{eq:cooten}
```

Before the policy

```
t@k8s-master ~] # kubectl exec -it blue-7bb46df96d-95fk
ctl exec [POD] [COMMAND] is DEFRECATED and will be rem
-- [COMMAND] instead.
@blue-7bb46df96d-95fkh:/# curl http://192.168.187.216
CTYPE html>
                                      ]# kubectl exec -it blue-7bb46df96d-95fkh -n outgoing /bin/bash [COMMAND] is DEPRECATED and will be removed in a future version. Use kubectl exe
   les'
body {
    width: 35em;
    margin: 0 auto;
    font-family: Tahoma, Verdana, Arial, sans-serif;
 sadu-
dy>
NWelcome to nginx!</hl>
If you see this page, the nginx web server is successfully installed and
king. Further configuration is required.
>For online documentation and support please refer to
href="http://nginx.org/">nginx.org</a>.<br/>
href="http://nginx.org/">nginx.org</a>.
href="http://nginx.com/">nginx.com</a>.
```

After deny all policy:

```
root@blue-7bb46df96d-95fkh:/# curl http://192.168.187.216

curl: (7) Failed to connect to 192.168.187.216 port 80: Connection timed out root@blue-7bb46df96d-95fkh:/#
root@blue-7bb46df96d-95fkh:/#
```

......

Ingress rule present?	Egress rule present?	Value
No	No	Ingress
Yes	No	Ingress
No	Yes	Egress
Yes	Yes	Ingress, Egress