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Exercise 3.3: Finish Cluster Setup

1. View the available nodes of the cluster. It can take a minute or two for the status to change from `NotReady` to `Ready`. The `NAME` field can be used to look at the details. Your node name will be different. Note the `master` node says `NotReady`, which is due to a `taint`.

   ```
   student@lfs458-node-1a0a:~$ kubectl get node

   NAME                STATUS   ROLES     AGE      VERSION
   lfs458-node-1a0a    Ready    master    28m      v1.15.1
   lfs458-worker       Ready    <none>    50s      v1.15.1
   ```

2. Look at the details of the node. Work line by line to view the resources and their current status. Notice the status of `Taints`. The master won't allow non-internal pods by default for security reasons. Take a moment to read each line of output, some appear to be an error until you notice the status shows `False`.

   ```
   student@lfs458-node-1a0a:~$ kubectl describe node lfs458-node-1a0a

   Name:               lfs458-node-1a0a
   Roles:              master
   Labels:             beta.kubernetes.io/arch=amd64
                       beta.kubernetes.io/os=linux
                       kubernetes.io/hostname=lfs458-node-1a0a
                       node-role.kubernetes.io/master=
   Annotations:        kubeadm.alpha.kubernetes.io/cri-socket: /var/run/dockershim.sock
                       node.alpha.kubernetes.io/ttl: 0
                       projectcalico.org/IPv4Address: 10.142.0.3/32
                       volumes.kubernetes.io/controller-managed-attach-detach: true
   CreationTimestamp:  Mon, 07 Jan 2019 22:04:03 +0000
   Taints:             node-role.kubernetes.io/master:NoSchedule
   <output_omitted>
   ```

3. Allow the master server to run non-infrastructure pods. The master node begins tainted for security and performance reasons. Will will allow usage of the node in the training environment, but this step may be skipped in a production environment. Note the **minus sign (-)** at the end, which is the syntax to remove a taint. As the second node does not have the taint you will get a `not found` error.

   ```
   student@lfs458-node-1a0a:~$ kubectl describe node | grep -i taint

   Taints:             node-role.kubernetes.io/master:NoSchedule
   Taints:             <none>


   student@lfs458-node-1a0a:~$ kubectl taint nodes \
           --all node-role.kubernetes.io/master-


   node/lfs458-node-1a0a untainted
   error: taint "node-role.kubernetes.io/master:" not found
   ```

4. Now that the master node is able to execute any pod we **may** find there is a new taint. This behavior began with v1.12.0, requiring a newly added node to be enabled. View then remove the taint if present. It can take a minute or two for the scheduler to deploy the remaining pods.

   ```
   student@lfs458-node-1a0a:~$ kubectl describe node | grep -i taint

   Taints:             node.kubernetes.io/not-ready:NoSchedule
   Taints:             <none>
   ```

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```
student@lfs458-node-1a0a:~$ kubectl taint nodes \
        --all node.kubernetes.io/not-ready-
```

```
node/lfs58-node-1a0a untainted
error: taint "node.kubernetes.io/not-ready:" not found
```

5. Determine if the DNS and Calico pods are ready for use. They should all show a status of `Running`. It may take a minute or two to transition from `Pending`.

```
student@lfs458-node-1a0a:~$ kubectl get pods --all-namespaces
```

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
kube-system	calico-etcd-jlgwr	1/1	Running	0	6m
kube-system	calico-kube-controllers-74b888b647-wlqf5	1/1	Running	0	6m
kube-system	calico-node-tpvnr	2/2	Running	0	6m
kube-system	coredns-78fcdf6894-nc5cn	1/1	Running	0	17m
kube-system	coredns-78fcdf6894-xs96m	1/1	Running	0	17m
<output_omitted>					

6. **Only if** you notice the `coredns-` pods are stuck in `ContainerCreating` status you may have to delete them, causing new ones to be generated. Delete both pods and check to see they show a `Running` state. Your pod names will be different.

```
student@lfs458-node-1a0a:~$ kubectl get pods --all-namespaces
```

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
kube-system	calico-node-qkvzh	2/2	Running	0	59m
kube-system	calico-node-vndn7	2/2	Running	0	12m
kube-system	coredns-576cbf47c7-rn6v4	0/1	ContainerCreating	0	3s
kube-system	coredns-576cbf47c7-vq5dz	0/1	ContainerCreating	0	94m
<output_omitted>					

```
student@lfs458-node-1a0a:~$ kubectl -n kube-system delete \
    pod coredns-576cbf47c7-vq5dz coredns-576cbf47c7-rn6v4
```

```
pod "coredns-576cbf47c7-vq5dz" deleted
pod "coredns-576cbf47c7-rn6v4" deleted
```

7. When it finished you should see a new tunnel, `tun10`, interface. It may take up to a minute to be created. As you create objects more interfaces will be created, such as `cali` interfaces when you deploy pods, as shown in the output below.

```
student@lfs458-node-1a0a:~$ ip a
```

```
<output_omitted>
4: tun10@NONE: <NOARP,UP,LOWER_UP> mtu 1440 qdisc noqueue state
UNKNOWN group default qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
    inet 192.168.0.1/32 brd 192.168.0.1 scope global tun10
       valid_lft forever preferred_lft forever
6: calib0b93ed4661@if4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu
1440 qdisc noqueue state UP group default
    link/ether ee:ee:ee:ee:ee:ee brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet6 fe80::ecee:eeff:feee:eeee/64 scope link
       valid_lft forever preferred_lft forever
```