

Kubernetes K8S

- CentOS 7.7 CentOS 7 64
- Docker

Kubernetes

- K8S
- <https://kubernetes.io/>
-



- Master Node

- Kubernetes 1.13

- 2C2G 2C4G
- 1.13 1.13
- kubeadm
- - issues <https://github.com/kubernetes/kubeadm>
 - <https://github.com/kubernetes/kubernetes/tree/master/cmd/kubeadm>
 - <https://kubernetes.io/docs/setup/independent/install-kubeadm/>
 - <https://kubernetes.io/docs/setup/independent/install-kubeadm/#before-you-begin>
 - <https://kubernetes.io/docs/setup/independent/install-kubeadm/#verify-the-mac-address-and-product-uuid-are-unique-for-every-node>
 - <https://kubernetes.io/docs/setup/independent/install-kubeadm/#check-required-ports>
 - **Docker** <https://kubernetes.io/docs/setup/release/notes/#sig-cluster-lifecycle>
- - `kubeadm`: the command to bootstrap the cluster.
 - `kubelet`: the component that runs on all of the machines in your cluster and does things like starting pods and containers.
 - Pod Docker
 - `kubectl`: the command line util to talk to your cluster.
 - k8s

- <https://kubernetes.io/docs/setup/independent/troubleshooting-kubeadm/>
- - <https://github.com/coreos/tectonic-installer>
 - <https://github.com/kubernetes-incubator/kubespray>
 - <https://github.com/apprenda/kismatic>

- Kubernetes 1.13.3

- - master-1 | 192.168.0.127 |
 - node-1 | 192.168.0.128 |
 - node-2 | 192.168.0.129 |
- <https://github.com/kubernetes/kubernetes/releases>
- 1.13 [change log https://github.com/kubernetes/kubernetes/blob/master/CHANGELOG-1.13.md](https://github.com/kubernetes/kubernetes/blob/master/CHANGELOG-1.13.md)
- **Docker 18.06**
 - `o(n_n)o`
 - `yum list docker-ce --showduplicates`
- | | |
|-----------------|-------------------------|
| kubernetes repo | Kubeadm Kubelet Kubectl |
|-----------------|-------------------------|
- | | | |
|---------|---------------------------------|------|
| Kubeadm | <code>--image-repository</code> | 1.13 |
|---------|---------------------------------|------|
- `systemctl start chronyd.service && systemctl enable chronyd.service`
- `selinux swap`

```
systemctl stop firewalld.service
systemctl disable firewalld.service
systemctl disable iptables.service

iptables -P FORWARD ACCEPT

setenforce 0 && sed -i 's/SELINUX=enforcing/SELINUX=disabled/g' /etc/selinux/config

echo "vm.swappiness = 0" >> /etc/sysctl.conf
swapoff -a && sysctl -w vm.swappiness=0
```

- `hostname hosts`

```
hostnamectl --static set-hostname k8s-master-1
hostnamectl --static set-hostname k8s-node-1
hostnamectl --static set-hostname k8s-node-2
```

```
vim /etc/hosts
192.168.0.127 k8s-master-1
192.168.0.128 k8s-node-1
192.168.0.129 k8s-node-2
```

- master

```
ssh-keygen -t rsa

cat /root/.ssh/id_rsa.pub >> /root/.ssh/authorized_keys

ssh localhost

ssh-copy-id -i ~/.ssh/id_rsa.pub -p 22 root@k8s-node-1      k8s-node-1
ssh-copy-id -i ~/.ssh/id_rsa.pub -p 22 root@k8s-node-2      k8s-node-2

ssh k8s-master-1
ssh k8s-node-1
ssh k8s-node-2
```

- yum

```
vim /etc/yum.repos.d/kubernetes.repo

[kubernetes]
name=Kubernetes
baseurl=https://mirrors.aliyun.com/kubernetes/yum/repos/kubernetes-el7-x86_64/
enabled=1
gpgcheck=1
repo_gpgcheck=1
gpgkey=https://mirrors.aliyun.com/kubernetes/yum/doc/yum-key.gpg
https://mirrors.aliyun.com/kubernetes/yum/doc/rpm-package-key.gpg

scp -r /etc/yum.repos.d/kubernetes.repo root@k8s-node-1:/etc/yum.repos.d/
scp -r /etc/yum.repos.d/kubernetes.repo root@k8s-node-2:/etc/yum.repos.d/
```

- master flannel

```
mkdir -p /etc/cni/net.d && vim /etc/cni/net.d/10-flannel.conflist
```

```
{
  "name": "cbr0",
  "plugins": [
    {
      "type": "flannel",
      "delegate": {
        "hairpinMode": true,
        "isDefaultGateway": true
      }
    },
    {
      "type": "portmap",
      "capabilities": {
        "portMappings": true
      }
    }
  ]
}
```

```
vim /etc/sysctl.d/k8s.conf
```

```
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-call-iptables = 1
net.ipv4.ip_forward=1
vm.swappiness=0
```

```
scp -r /etc/sysctl.d/k8s.conf root@k8s-node-1:/etc/sysctl.d/
```

```
scp -r /etc/sysctl.d/k8s.conf root@k8s-node-2:/etc/sysctl.d/
```

```
modprobe br_netfilter && sysctl -p /etc/sysctl.d/k8s.conf
```

```
yum install -y kubelet-1.13.3 kubeadm-1.13.3 kubectl-1.13.3 --disableexcludes=kubernetes
```

```
vim /etc/systemd/system/kubelet.service.d/10-kubeadm.conf
```

```
Environment="KUBELET_CGROUP_ARGS=- -cgroup-driver=cgroupfs"
```

```
systemctl enable kubelet && systemctl start kubelet
```

```
kubeadm version
kubectl version
```

- master

```
echo 1 > /proc/sys/net/ipv4/ip_forward
```

```
kubeadm init \
--image-repository registry.cn-hangzhou.aliyuncs.com/google_containers \
--pod-network-cidr 10.244.0.0/16 \
--kubernetes-version 1.13.3 \
--ignore-preflight-errors=Swap
```

```
10.244.0.0/16    flannel        ip
```

```
docker
```

```
[init] Using Kubernetes version: v1.13.3
[preflight] Running pre-flight checks
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] This might take a minute or two, depending on the speed of your internet
connection
[preflight] You can also perform this action in beforehand using 'kubeadm config images pull'
[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-
flags.env"
[kubelet-start] Writing kubelet configuration to file "/var/lib/kubelet/config.yaml"
[kubelet-start] Activating the kubelet service
[certs] Using certificateDir folder "/etc/kubernetes/pki"
[certs] Generating "front-proxy-ca" certificate and key
[certs] Generating "front-proxy-client" certificate and key
[certs] Generating "etcd/ca" certificate and key
[certs] Generating "etcd/server" certificate and key
[certs] etcd/server serving cert is signed for DNS names [k8s-master-1 localhost] and IPs
[192.168.0.127 127.0.0.1 ::1]
[certs] Generating "etcd/peer" certificate and key
[certs] etcd/peer serving cert is signed for DNS names [k8s-master-1 localhost] and IPs
[192.168.0.127 127.0.0.1 ::1]
```

```
[certs] Generating "etcd/healthcheck-client" certificate and key
[certs] Generating "apiserver-etcd-client" certificate and key
[certs] Generating "ca" certificate and key
[certs] Generating "apiserver-kubelet-client" certificate and key
[certs] Generating "apiserver" certificate and key
[certs] apiserver serving cert is signed for DNS names [k8s-master-1 kubernet
kubernetes.default kubernetes.default.svc kubernetes.default.svc.cluster.local] and IPs
[10.96.0.1 192.168.0.127]
[certs] Generating "sa" key and public key
[kubeconfig] Using kubeconfig folder "/etc/kubernetes"
[kubeconfig] Writing "admin.conf" kubeconfig file
[kubeconfig] Writing "kubelet.conf" kubeconfig file
[kubeconfig] Writing "controller-manager.conf" kubeconfig file
[kubeconfig] Writing "scheduler.conf" kubeconfig file
[control-plane] Using manifest folder "/etc/kubernetes/manifests"
[control-plane] Creating static Pod manifest for "kube-apiserver"
[control-plane] Creating static Pod manifest for "kube-controller-manager"
[control-plane] Creating static Pod manifest for "kube-scheduler"
[etcd] Creating static Pod manifest for local etcd in "/etc/kubernetes/manifests"
[wait-control-plane] Waiting for the kubelet to boot up the control plane as static Pods from
directory "/etc/kubernetes/manifests". This can take up to 4m0s
[apiclient] All control plane components are healthy after 19.001686 seconds
[uploadconfig] storing the configuration used in ConfigMap "kubeadm-config" in the "kube-
system" Namespace
[kubelet] Creating a ConfigMap "kubelet-config-1.13" in namespace kube-system with the
configuration for the kubelets in the cluster
[patchnode] Uploading the CRI Socket information "/var/run/dockershim.sock" to the Node API
object "k8s-master-1" as an annotation
[mark-control-plane] Marking the node k8s-master-1 as control-plane by adding the label "node-
role.kubernetes.io/master=''"
[mark-control-plane] Marking the node k8s-master-1 as control-plane by adding the taints
[node-role.kubernetes.io/master:NoSchedule]
[bootstrap-token] Using token: 8tpo9l.jlw135r8559kaad4
[bootstrap-token] Configuring bootstrap tokens, cluster-info ConfigMap, RBAC Roles
[bootstraptoken] configured RBAC rules to allow Node Bootstrap tokens to post CSRs in order
for nodes to get long term certificate credentials
[bootstraptoken] configured RBAC rules to allow the csrapprover controller automatically
approve CSRs from a Node Bootstrap Token
[bootstraptoken] configured RBAC rules to allow certificate rotation for all node client
certificates in the cluster
```

```
[bootstraptoken] creating the "cluster-info" ConfigMap in the "kube-public" namespace
```

```
[addons] Applied essential addon: CoreDNS
```

```
[addons] Applied essential addon: kube-proxy
```

Your Kubernetes master has initialized successfully!

To start using your cluster, you need to run the following as a regular user:

```
mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
```

You should now deploy a pod network to the cluster.

Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:

<https://kubernetes.io/docs/concepts/cluster-administration/addons/>

You can now join any number of machines by running the following on each node as root:

```
kubeadm join 192.168.0.127:6443 --token 8tpo9l.jlw135r8559kaad4 --discovery-token-ca-cert-hash sha256:d6594ccc1310a45cbebc45f1c93f5ac113873786365ed63efcf667c952d7d197
```

- master

```
mkdir -p $HOME/.kube
sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config
sudo chown $(id -u):$(id -g) $HOME/.kube/config
export KUBECONFIG=$HOME/.kube/config
```

- master

```
kubeadm token list
```

```
kubectl cluster-info
```

- master Flannel

```
cd /opt && wget https://raw.githubusercontent.com/coreos/flannel/master/Documentation/kube-flannel.yml
```

```
kubectl apply -f /opt/kube-flannel.yml
```

- node

```
echo 1 > /proc/sys/net/bridge/bridge-nf-call-iptables
```

```
kubeadm join 192.168.0.127:6443 --token 8tpo9l.jlw135r8559kaad4 --discovery-token-ca-cert-hash sha256:d6594ccc1310a45cbebc45f1c93f5ac113873786365ed63efcf667c952d7d197
```

```
[preflight] Running pre-flight checks
```

```
[discovery] Trying to connect to API Server "192.168.0.127:6443"
```

```
[discovery] Created cluster-info discovery client, requesting info from  
"https://192.168.0.127:6443"
```

```
[discovery] Requesting info from "https://192.168.0.127:6443" again to validate TLS against  
the pinned public key
```

```
[discovery] Cluster info signature and contents are valid and TLS certificate validates  
against pinned roots, will use API Server "192.168.0.127:6443"
```

```
[discovery] Successfully established connection with API Server "192.168.0.127:6443"
```

```
[join] Reading configuration from the cluster...
```

```
[join] FYI: You can look at this config file with 'kubectl -n kube-system get cm kubeadm-  
config -oyaml'
```

```
[kubelet] Downloading configuration for the kubelet from the "kubelet-config-1.13" ConfigMap  
in the kube-system namespace
```

```
[kubelet-start] Writing kubelet configuration to file "/var/lib/kubelet/config.yaml"
```

```
[kubelet-start] Writing kubelet environment file with flags to file "/var/lib/kubelet/kubeadm-  
flags.env"
```

```
[kubelet-start] Activating the kubelet service
```

```
[tlsbootstrap] Waiting for the kubelet to perform the TLS Bootstrap...
```

```
[patchnode] Uploading the CRI Socket information "/var/run/dockershim.sock" to the Node API  
object "k8s-node-1" as an annotation
```

This node has joined the cluster:

* Certificate signing request was sent to apiserver and a response was received.

* The Kubelet was informed of the new secure connection details.

Run 'kubectl get nodes' on the master to see this node join the cluster.

- node `kubeadm reset` join
- master `kubectl get cs`

NAME	STATUS	MESSAGE	ERROR
controller-manager	Healthy	ok	
scheduler	Healthy	ok	
etcd-0	Healthy	{"health": "true"}	
Healthy		`kubeadm reset`	

- master `kubectl get nodes`

```
NotReady      kubectl get pods --all-namespaces
Pending/ContainerCreating/ImagePullBackOff   Pod          Pod
kubectl describe pod <Pod Name> --namespace=kube-system
kubectl logs <Pod Name> -n kube-system
tail -f /var/log/messages
```

- Master
 - <https://kubernetes.io/docs/concepts/overview/components/>
 - kube-apiserver API
 - kube-scheduler
 - Kube-Controller-Manager
 - Etcd
 - Kube-proxy Service cluster
 - Kube-DNS DNS
- node
- `Pods`

PID	IPC	UTS
-----	-----	-----

- `Volumes`

Pod

– emptyDir, hostpath, gcePersistentDisk, awsElasticBlockStore, nfs, iscsi, glusterfs,

- `Labels`

Pod key/value

- `Replication Controllers`

Pod

- `Services`

Pod

IP DNS

DNS

– ClusterIP, NodePort, LoadBalancer

- `etcd`

Key/Value

apiserver

etcd

- `apiserver`

Kubernetes REST

- kube-scheduler

/ /

- kube-controller-manager

Replication controller
Endpoint controller
Namespace controller
Serviceaccount controller

- kubelet

Pod

- kube-proxy

Pod
TCP/UDP
Round Robin

-

DNS – kube2sky etcd skydns

-

Pod	IP
-----	----

-

kubelet	master
	kubelet
Etcd	

apiserver

Master kube-scheduler kube-controller-manager

- “ ” [Kubernetes](#)

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Revision #2

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