

Setting up a k8s cluster

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Background

This document is a walkthrough on getting a k8s cluster up a running.

Walkthrough

Installation of k8s requirements

System Requirements

	Requirements
1	2GB of more RAM
2	2 CPUs or more
3	Reachability between all machines in the cluster
4	Unique: <ul style="list-style-type: none">▪ Hostname▪ MAC address▪ product_uuid<ul style="list-style-type: none">▪ <code>cat /sys/class/dmi/id/product_uuid</code>
5	Open up ports for k8s
6	Disable swap. It appears to be a MUST .

Container runtime selection

kubeadm tries to detect the container runtime available. However, its best to install one that is validated and known.

	Runtime	Notes		
1	containerd	<p>https://containerd.io</p> <p><i>An industry-standard container runtime with an emphasis on simplicity, robustness and portability.</i></p> <p>https://containerd.io/docs/</p> <p>https://containerd.io/scope/</p> <p>https://containerd.io/releases/</p> <table border="1"><thead><tr><th>Path to Unix domain socket</th></tr></thead><tbody><tr><td><code>unix:///var/run/containerd/containerd.sock</code></td></tr></tbody></table>	Path to Unix domain socket	<code>unix:///var/run/containerd/containerd.sock</code>
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2	CRI-O	https://cri-o.io https://github.com/cri-o/cri-o
3	Docker Engine (using cri-dockerd)	

Container installation

- I selected containerd to be the container runtime. The documentation was clear enough and lifecycle ideas are in place.

	Notes	Link
1	The package lifecycle and k8s compatibility details.	https://containerd.io/releases/
2	Getting started with containerd	https://github.com/containerd/containerd/blob/main/docs/getting-started.md
3	containerd releases	https://github.com/containerd/containerd/releases
4	containerd systemd service file	https://github.com/containerd/containerd/blob/main/containerd.service
5	runc releases	https://github.com/opencontainers/runc/releases
6	CNI plugins releases	https://github.com/containernetworking/plugins/releases

Kubernetes packages

	Packages
1	kubeadm - the command to bootstrap the cluster
2	kubelet - the component that runs on all of the machines in the clusters. It help start pods and containers.
3	kubect1 - the CLI utility to talk to the cluster.

The packages needed to be managed by ansible .

Installing Kubernetes packages on Debian

```
apt-get update
apt-get install -y apt-transport-https ca-certificates curl
curl -fsSLo /usr/share/keyrings/kubernetes-archive-keyring.gpg https://packages.cloud.google.com/apt/doc/apt-key.gpg
echo "deb [signed-by=/usr/share/keyrings/kubernetes-archive-keyring.gpg] https://apt.kubernetes.io/ kubernetes-xenial main" | sudo tee /etc/apt/sources.list.d/kubernetes.list

apt-get update
apt-get install -y kubelet kubeadm kubect1
apt-mark hold kubelet kubeadm kubect1
```

Init a simple k8s cluster

```
kubeadm init --control-plane-endpoint=cluster-endpoint --pod-network-cidr=10.10.0.0/16
kubectl create -f https://projectcalico.docs.tigera.io/manifests/tigera-operator.yaml
kubectl create -f https://projectcalico.docs.tigera.io/manifests/custom-resources.yaml
kubectl apply -f https://projectcalico.docs.tigera.io/manifests/calico.yaml

kubectl taint nodes --all node-role.kubernetes.io/master-

watch kubectl get pods -n calico-system

kubeadm join cluster-endpoint:6443 --token a4eqfb.brg8i4gibz241gmi \
  --discovery-token-ca-cert-hash sha256:572154e49e5dd5458bea90b712f44281cb4ea15d2b97d93a24d8156b0c082954

kubeadm token list
# token will expire after 24h

kubeadm token create

#to generate the discovery-token-ca-cert-hash
openssl x509 -pubkey -in /etc/kubernetes/pki/ca.crt | openssl rsa -pubin -outform der 2>/dev/null | \
  openssl dgst -sha256 -hex | sed 's/^.* //'
```

Appendix

	Document	Link
1	Installing kubeadm	https://kubernetes.io/docs/setup/production-environment/tools/kubeadm/install-kubeadm/
2	Istio docs	https://istio.io/latest/docs/
3	Istio releases	https://github.com/istio/istio/releases