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Installing kubeadm and Its Dependencies

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Bridge Connection
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Lab Steps

1

Logging In to
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Introduction

kubeadm is a tool that allows you to easily create Kubernetes clusters that adhere to best practices. It can also perform a variety of cluster lifecycle functions, such as upgrading and downgrading the version of Kubernetes on nodes in the cluster. You will use kubeadm to create a Kubernetes cluster from scratch in this lab. Creating clusters with kubeadm is the recommended way for learning Kubernetes, creating small clusters, and as a piece of a more complex systems for more enterprise-ready clusters.

The Cloud Academy lab environment includes three EC2 instances running the Ubuntu 18.04 distribution of Linux. You will configure the instance named **instance-a** as a Kubernetes control-plane and the other instances as worker nodes in the cluster. In this lab step, you will install kubeadm and its dependencies, including containerd, on instance-a. The remaining nodes already have kubeadm installed to save you time.

Instructions

1. Enter the following command to update the system's apt package manager index and update packages required to install containerd:

[Copy code](#)

```
1 # Update the package index
2 sudo apt-get update
3 # Update packages required for HTTPS package repository access
4 sudo apt-get install -y apt-transport-https ca-certificates curl
```

2. Allow forwarding IPv4 by loading the br_netfilter module with the following commands:

[Copy code](#)

```
1 # Load br_netfilter module
2 sudo modprobe overlay
```

[Support](#)



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Instance Connect

3

Installing kubeadm and Its Dependencies



Initializing the Kubernetes Master Node



Joining a Worker Node to the Kubernetes Cluster

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3. Allow the Linux node's iptables to correctly view bridged traffic with the following commands:

Copy code

```
1 # sysctl params required by setup, params persist across reboots
2 cat <<EOF | sudo tee /etc/sysctl.d/99-kubernetes-cri.conf
3 net.bridge.bridge-nf-call-iptables = 1
4 net.ipv4.ip_forward = 1
5 net.bridge.bridge-nf-call-ip6tables = 1
6 EOF
7 # Apply sysctl params without reboot
8 sudo sysctl --system
```

4. Install containerd using the DEB package distributed by Docker with the following commands:

Copy code

```
1 # Add Docker's official GPG key
2 curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --
3 # Set up the repository
4 echo \
5 "deb [arch=amd64 signed-by=/usr/share/keyrings/docker-archive-
6 $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/
7 # Install containerd
8 sudo apt-get update
9 sudo apt-get install -y containerd.io=1.6.18-1
```

Note: This is only one way of installing containerd. Please refer [here](#) for the other options.

5. Configure the systemd cgroup driver with the following commands:

Copy code

```
1 # Configure the systemd cgroup driver
2 sudo mkdir -p /etc/containerd
3 containerd config default | sudo tee /etc/containerd/config.toml
4 sudo sed -i 's/SystemdCgroup = false/SystemdCgroup = true/' /etc
5 sudo systemctl restart containerd
```

This is required to mitigate the instability of having two cgroup managers. Please refer [here](#) for further explanation.

6. Install kubeadm, kubectl, and kubelet from the official Kubernetes package repository:

Copy code

```
1 # Add the Google Cloud packages GPG key
2 curl -s https://packages.cloud.google.com/apt/doc/apt-key.gpg |
3 # Add the Kubernetes release repository
4 sudo add-apt-repository "deb http://apt.kubernetes.io/ kubernetes
```

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7. Prevent automatic updates to the installed packages with the following command:

[Copy code](#)

```
1 | sudo apt-mark hold kubelet kubeadm kubectl
```

The version of all the packages is set to 1.28.1 for consistency in lab experiences, and so that you can perform a cluster upgrade in a later lab step.

8. Display the help page for kubeadm:

[Copy code](#)

```
1 | kubeadm
```

```
KUBEADM
Easily bootstrap a secure Kubernetes cluster

Please give us feedback at:
https://github.com/kubernetes/kubeadm/issues

Example usage:

Create a two-machine cluster with one control-plane node
(which controls the cluster), and one worker node
(where your workloads, like Pods and Deployments run).

On the first machine:
control-plane# kubeadm init

On the second machine:
worker# kubeadm join <arguments-returned-from-init>

You can then repeat the second step on as many other machines as you like.

Usage:
kubeadm [command]

Available Commands:
certs      Commands related to handling kubernetes certificates
completion Output shell completion code for the specified shell (bash or zsh)
config     Manage configuration for a kubeadm cluster persisted in a ConfigMap in the cluster
help       Help about any command
init       Run this command in order to set up the Kubernetes control plane
join       Run this on any machine you wish to join an existing cluster
kubeconfig Kubeconfig file utilities
reset      Performs a best effort revert of changes made to this host by 'kubeadm init' or 'kubeadm join'
token      Manage bootstrap tokens
upgrade    Upgrade your cluster smoothly to a newer version with this command
version    Print the version of kubeadm

Flags:
--add-dir-header      If true, adds the file directory to the header of the log messages
-h, --help            help for kubeadm
```

Read through the output to get a high-level overview of how a cluster is created and the commands that are available in kubeadm.

Summary

In this lab step, you installed kubeadm and its dependencies required for

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Installed kubeadm, kubectl, and kubelet

Check for kubeadm, kubectl, and kubelet installation.

Kubernetes

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