

# Cloud Native

A series of notes, how-tos, and more related to Cloud Native technologies.

- [Kubernetes](#)
  - [Deploy a Cluster with kubeadm](#)
- [Proxmox Kubernetes](#)
  - [Virtual Machine Setup](#)
- [Services](#)
  - [Apache Guacamole](#)

# Kubernetes

# Deploy a Cluster with kubeadm

“ **Note:** These instructions are based on the Computer Science Club of the University of Waterloo's OpenStack instance.

## Build image

The first step is to build an image using packer. This image will contain all of the tools required to run a Kubernetes node.

“ *TODO: Push packer build to a [git repository](#).*

```
# 0. Locate ourselves
cd $PACKER_DIR/kubernetes

# 1. Load openstack-rc
source ../openstack-rc

# 2. Update image

# 2.1. Update the image name (Kubernetes version and build date)
vim packer.json

# 2.2. Ansible deployment (update kubectl, kubelet and kubeadm version)
vim ansible/provision.yaml

# 3. Run build
```

```
# note: token generated with `openstack token issue`  
export OS_TOKEN="TOKEN_FROM_OPENSTACK"  
packer build packer.json
```

# Deploy infrastructure

“ *TODO: Document deploying infrastructure using Terraform* ”

# Initialize control plane

“ *TODO: Document initializing infrastructure* ”

# Proxmox Kubernetes

# Virtual Machine Setup

Download the `debian-12-generic-amd64.raw` file from

<https://cloud.debian.org/images/cloud/bookworm/latest/>.

1. Create the virtual machine
2. Add a cloud-init drive on the VM
3. Import the cloud image: `qm importdisk $VMID /mnt/pve/assets/template/iso/debian-12-generic-amd64.raw local-lvm --format qcow2`
4. Setup cloud-init: `qm set $VMID --ci-custom "user=cloud-init:snippets/user.yaml,network=cloud-init:snippets/network.yaml"`

Example config files:

user.yaml

```
#cloud-config
hostname: zsottvXX
manage_etc_hosts: true
fqdn: zsottvXX.zsnet.ca
user: zsadmin
ssh_authorized_keys:
  - ssh-rsa KEY COMMENT
chpasswd:
  expire: False
users:
  - default

# Setup ntp
ntp:
  enabled: true
  ntp_client: chrony
  servers: []
  pools:
    - time.zsnet.ca

# Add gnupg
```

```
bootcmd:
- DEBIAN_FRONTEND=noninteractive apt-get -yq update
- DEBIAN_FRONTEND=noninteractive apt-get -yq install gnupg

# Configure apt repositories
apt:
  primary:
    - arches: [default]
      uri: http://mirror.csclub.uwaterloo.ca/debian/
  security:
    - arches: [default]
      uri: http://mirror.csclub.uwaterloo.ca/debian-security/
  sources_list: |
    deb $PRIMARY $RELEASE main contrib
    deb $PRIMARY $RELEASE-updates main contrib
    deb $SECURITY $RELEASE-security main contrib

package_update: true
package_upgrade: true
package_reboot_if_required: true

# Install packages
packages:
- qemu-guest-agent
```

## network.yaml

```
version: 1
config:
- type: physical
  name: eth0
  mac_address: 'xx:yy:zz:aa:bb:cc'
  subnets:
    - type: dhcp4
    - type: ipv6_slaac
    - type: nameserver
      address:
        - '2602:815:9000::53'
        - '2602:815:9000:1::53'
  search:
```



# Services

# Apache Guacamole

## Process

## Install Dependencies

```
sudo apt install build-essential maven default-jdk default-jre libcairo2-dev libjpeg62-turbo-dev libpng-dev libtool-bin uuid-dev libvncserver-dev freerdp2-dev libssh2-1-dev libavcodec-dev libavformat-dev libavutil-dev libswscale-dev libpango1.0-dev libpulse-dev libvorbis-dev libwebp-dev
```

Download and setup Tomcat 9 manually until 10 or newer are supported.

## Download

<https://guacamole.apache.org/releases/>

```
curl -LO "https://apache.org/dyn/closer.lua/guacamole/1.6.0/source/guacamole-server-1.6.0.tar.gz?action=download"
curl -LO "https://apache.org/dyn/closer.lua/guacamole/1.6.0/source/guacamole-client-1.6.0.tar.gz?action=download"

tar xf guacamole-server-1.6.0.tar.gz
tar xf guacamole-client-1.6.0.tar.gz
```

## Server

```
./configure --with-systemd-dir=/usr/lib/systemd/system
make -j2
sudo make install

sudo ldconfig
```

```
sudo systemctl daemon-reload
sudo systemctl restart guacd
```

# Client

```
JAVA_HOME=/usr/lib/jvm/java-17-openjdk-amd64 mvn package
```

```
sudo rm /etc/guacamole/extensions/*
```

```
sudo cp guacamole/target/guacamole-1.6.0.war /opt/tomcat/webapps/ROOT.war
```

```
sudo cp extensions/guacamole-auth-jdbc/modules/guacamole-auth-jdbc-postgresql/target/guacamole-auth-jdbc-postgresql-1.6.0.jar /etc/guacamole/extensions/
```

```
sudo cp extensions/guacamole-auth-quickconnect/target/guacamole-auth-quickconnect-1.6.0.jar
/etc/guacamole/extensions
```

```
sudo cp extensions/guacamole-auth-sso/modules/guacamole-auth-sso-openid/target/guacamole-auth-sso-openid-1.6.0.jar /etc/guacamole/extensions
```

```
# If weird issues are encountered, clear the maven cache
```

```
rm -rf ~/.m2
```