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

Kubernetes

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 ourserlves
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 virtaul 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 --cicustom "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
```

```yaml
  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

```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:
      - 'zsnet.ca'
```