Kubernetes on OpenSuse Leap 15

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1. Summary

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2.1. Docker installation

```
sudo zypper ar -cf \
http://download.opensuse.org/repositories/home:/janhebler:/kubi/openSUSE_Leap_15.0/ Docker


sudo zypper in docker
sudo zypper in docker-bash-completion
```

2.2. Start & check docker

```
sudo systemctl start  docker
sudo systemctl status docker

# Add the current user to the docker group
sudo usermod -aG docker $USER

# Log out from the session or restart the OS in case you're using a VM

docker run hello-world
```

2.3. Create an image

```
touch Dockerfile

# Add
FROM node:7
ADD app.js /app.js
ENTRYPOINT ["node", "app.js"]

touch app.js

# Add
const http = require('http');
const os = require('os');
console.log("Kubia server starting...");
var handler = function(request, response) {
console.log("Received request from " + request.connection.remoteAddress);
response.writeHead(200);
response.end("You've hit " + os.hostname() + "\n");
};
var www = http.createServer(handler);
www.listen(8080);
```

2.4. Build the image

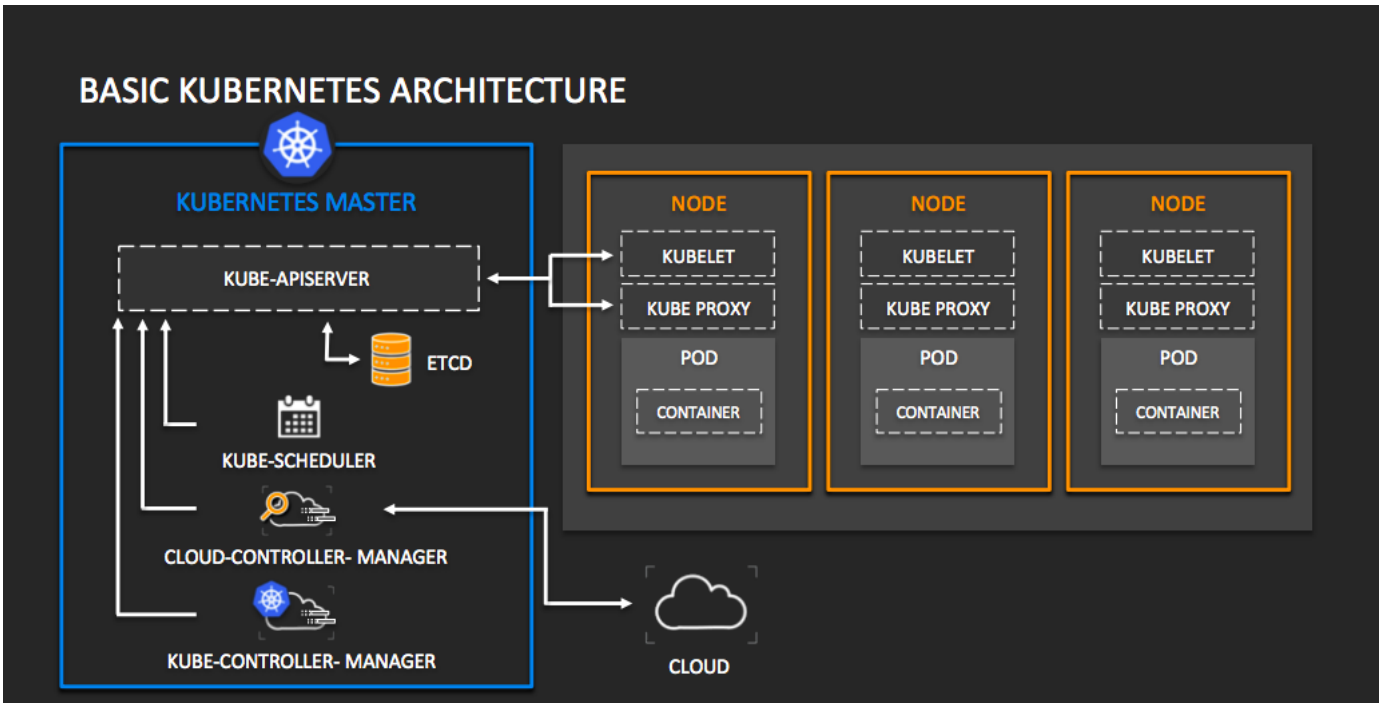
```
docker build -t image-name .
```

2.5. Run and test the buit image

```
docker run --name container-name -p 8080:8080 -d image-name
curl localhost:8080
```

3. Kubernetes

3.1. Basic Architecture



3.2. Requirement : Virtual Box installation

```
sudo zypper ar -cf  \
http://download.opensuse.org/update/leap/15.0/oss oss

sudo zypper in virtualbox
sudo usermod -aG vboxusers  $USER
# relog

sudo zypper install virtualbox-host-source kernel_devel
sudo /sbin/vboxconfig

sudo systemctl enable vboxdrv
sudo systemctl start  vboxdrv
sudo systemctl status vboxdrv
```

3.3. Minikube

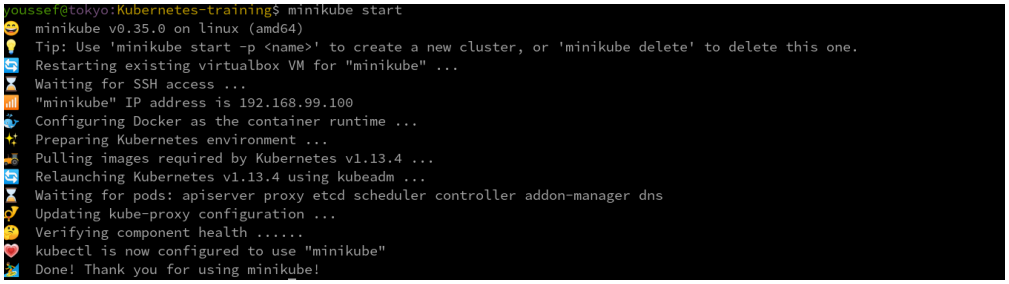
The simplest and quickest path to a fully functioning Kubernetes cluster is by using Minikube. Minikube is a tool that sets up a single-node cluster that's great for both testing Kubernetes and developing apps locally. Although we can't show certain Kubernetes features related to managing apps on multiple nodes, the single-node cluster should be enough for exploring most topics discussed in this book.

```
curl -Lo minikube https://storage.googleapis.com/minikube/releases/v0.35.0/minikube-linux-amd64 && chmod +x minikube
&& sudo mv minikube /usr/local/bin/
```

3.4. Kubectl

```
curl -LO https://storage.googleapis.com/kubernetes-release/release/$(curl -s
https://storage.googleapis.com/kubernetes-release/release/stable.txt)/bin/linux/amd64/kubectl   && chmod +x kubectl &&
sudo mv kubectl /usr/local/bin/
```

3.5. Starting Minikube



3.6. Configuration Sample

```
### kubia-manual.yaml
apiVersion : v1   # Version of the Kubernetes API
kind: Pod
metadata:
    name : kubia-manual  # The name of the Pod
spec:
    containers:
    - image : luksa/kubia
      name  : kubia
      ports :
      - containerPort : 8080   # The port the app is listening on
        protocol : TCP


# Specifying ports in the pod definition is purely informational.
```

3.7. Pod

3.7.1. Pod creation and logs

```
kubectl explain pods
kubectl explain pod.spec
kubectl create -f  kubia-manual.yaml

# Retrieving the deinition of a running pod
kubectl get po  kubia-manual -o yaml
kubectl get po  kubia-manual -o json

# List all pods
kubectl get pods

# Viewing the logs of pod
kubectl logs  kubia-manual

# Viewing logs  of a multi-container pod.
kubectl logs  kubia-manual -c kubia

# Port forwarding
kubectl port-forward kubia-manual 8888:8080
curl localhost:8888
```

3.7.2. Pods deletion

```
kubectl delete po kubia-gpu

# Delete Pods using labels.
kubectl delete po -l creation_method=manual

# Deleting pods by namespace deletion.
kubectl delete ns custom-namespace

# Deleting all namespaces.
kubectl delect po --all

# Deleting all resources, ReplicationController, Pods and Services.
kubectl delete all --all
```

3.7.3. Organizing pods with labels

```
### kubia-manual-v2.yaml
apiVersion : v1
kind: Pod
metadata:
    name: kubia-manual
    lables:         # Adding two lables to the Pod
        creation_method: kubia-manual
        env: prod
spec:
    containers:
    - image : luksa/kubia
      name  : kubia
      ports :
      - containerPort : 8080
        protocol : TCP
```

3.7.4. Display and filter lables

```
kubectl get po --show-labels

# Display the two lables as columns
kubectl get po -L creation_method,env

# Add the label  creation_method with value manual to the Pod kubia-manual
kubectl lable po kubia-manual  creation_method=manual

# Change existing Pod value
kubectl label po kubia-manual-v2  env=debug  --overwrite

# Filter pods with label  creation_method=manual
kubectl get po  -l creation_method=manual

# Pods with label named env
kubectl get po  -l env

# Pods that does not have env label
kubectl get po  -l '!env'

kubectl get po -l creation_method!=manual

# Pod with label env and value in (prod,devel)
kubectl get po -l env in (prod,devel)

kubectl get po -l env notin (prod,devel)

# Selection with two lables.
kubectl get po -l env=prod,creation_method=manual
```

3.8. Node

3.8.1. Categorizing nodes

```
# Adding label gpu to the node  gke-kubia-85f6-node-0rrx
kubectl label node gke-kubia-85f6-node-0rrx gpu=true

# List all nodes with label gpu = true
kubectl get node -l gpu=true
```

3.8.2. Sheduling pods to specific nodes.

If you need to deploy a new pod that needs GPU, you can use nodeSelector.

```
apiVersion: v1
kind:Pod
metadata:
    name: kubia
    labels:
        env: devel
spec:
    nodeSelector:
        gpu : "true"
    containers:
    - image: luksa/kubia
      name: kubia
      ports:
      - containerPort: 8080
        protocol: TCP
```

3.9. Annotation

annotations can hold much larger pieces of information and are primarily meant to be used by tools. Certain annotations are automatically added to objects by Kubernetes, but others are added by users manually.

```
kubectl annotation pod kubia-label  mycompany.com/someannotation="foo bar"
kubectl describe pod kubia-manual
```

3.10. Namespace

The need to split objects into two groupes.

```
# Lists all the namespaces
kubectl  get ns

# Gets the pods belonging to the namespace kube-system.
kubectl get po --namespace  kube-system
```

3.10.1. Creating a namespace

3.10.1.1. From YAML

```
apiVersion: v1
kind: Namespace
metadata:
    name:custom-namespace
```

```
kubectl create -f custom-namespace.yaml
```

3.10.1.2. From command line

```
kubectl create namespace  custom-namespace
```

3.10.2. Managing objects in other namespaces.

```
kubectl create -f kubia-manual.yaml  -n custom-namespace
```

Example 1. TIP

kcd='kubectl config set-context $(kubectl config currentcontext) --namespace '

use the new alias to switch to another namespace kcd some-namespace.

4. Ansible

In computing, Ansible is an open-source software provisioning, configuration management, and application deployment tool. It runs on many Unix-like systems, and can configure both Unix-like systems as well as Microsoft Windows.

4.1. Installation

```
sudo zypper in ansible
```

4.2. Clients Configuration

4.2.1. Clients Access by names

```
# You have three VMs
# 127.0.10.1      ouarzazate
# 127.0.10.2      marrakech
# 127.0.10.3      casa

sudo vi /etc/hosts

# Add the following entries
127.0.10.1      ouarzazate
127.0.10.2      marrakech
127.0.10.3      casablanca
```

4.3. Ssh key-based access

```
# Generate RSA key pair
ssh-keygen
ssh-copy-id  -i ~/.ssh/id_rsa.pub  user1@ouarzazate   # user1 is optionnal if is the same user
ssh-copy-id  -i ~/.ssh/id_rsa.pub  user1@marrakech
ssh-copy-id  -i ~/.ssh/id_rsa.pub  user1@casablanca
```

4.4. Escalate without password

```
sudo visudo
# Add
youssef ALL=(ALL) NOPASSWD: ALL
```

4.5. Set the ansible inventory

```
sudo vi /etc/ansible/hosts
# Two groups grp1   and  grp2
[gui]
ouarzazate
marrakech

[nogui]
casablanca  ansible_user=admin

# Group lab using range
[lab]
127.10.0.[1:6]
```

4.6. Run ansible module (-m)

```
ansible -m ping all
```