

Up and Running with Kubeflow Anywhere

Tim Van Steenburgh
Engineering Manager, Canonical
GTC 2019 - S9515

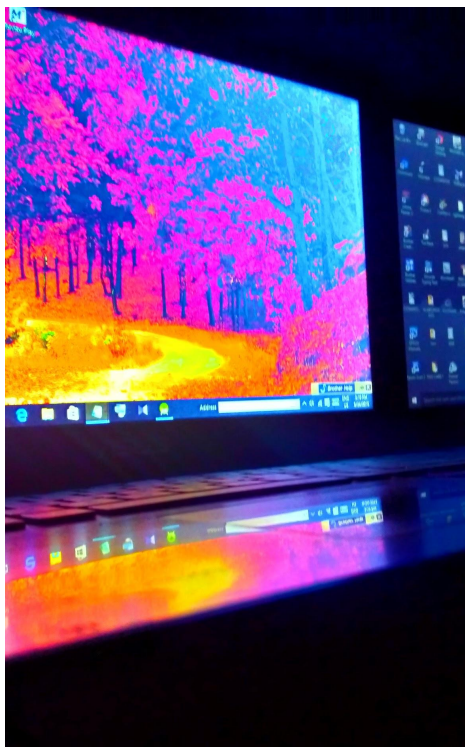


CANONICAL + ubuntu 

Zero to Kubeflow



- 01** Provision hardware. Physical or virtual. GPUs optional.
- 02** Deploy Kubernetes. Configure for GPUs.
- 03** Deploy Kubeflow.



On laptop and desktop...



...on-premise server
infrastructure...



...and the cloud.



Demo Material



Instructions

<https://jujucharms.com/u/kubeflow-charmers/kubeflow/>

Need help?

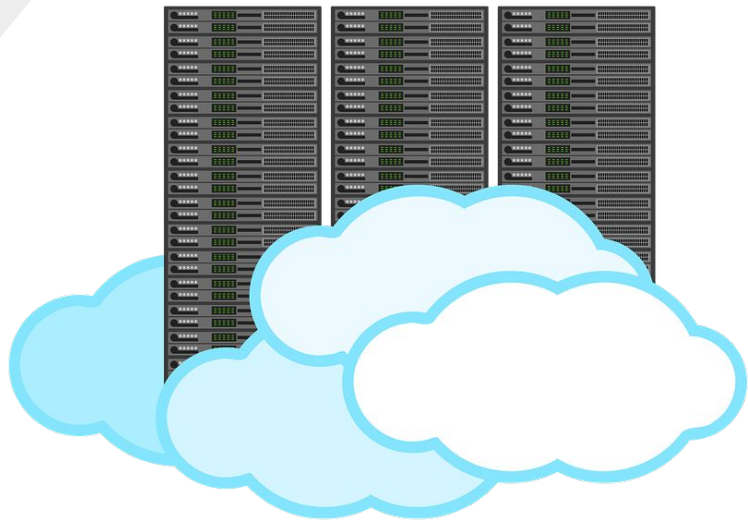
<http://slack.kubernetes.io/>

#cdk

#microk8s



Kubeflow on public cloud





Kubeflow on public cloud

Deploy Kubernetes

Deploy Kubernetes Cluster



```
# create your k8s cluster  
  
sudo snap install conjure-up --classic  
  
conjure-up kubernetes  
  
# after conjure-up finishes...  
  
watch -c juju status --color  
  
kubectl cluster-info
```



Kubeflow on public cloud

Add and enable GPUs

Add and Enable GPU



```
# add gpu machine and make it a k8s node  
juju add-machine --constraints instance-type=p2.xlarge  
juju add-unit kubernetes-worker --to <machine>  
  
# k8s is aware of the gpu  
kubectl get nodes -L gpu  
  
kubectl get ds --all-namespaces
```



Kubeflow on public cloud

Deploy Kubeflow

Deploy Kubeflow



```
juju add-k8s cdk  
juju add-model kubeflow cdk  
# create default storage class  
kubectl apply -f https://bit.ly/2ubqfcq  
juju deploy kubeflow  
juju config kubeflow-ambassador \  
juju-external-hostname=<node-ip>.xip.io  
juju expose kubeflow-ambassador
```

Using Kubeflow



Accessing the Kubeflow dashboards

`http://<node-ip>.xip.io/hub/` (Jupyterhub)

`http://<node-ip>.xip.io/tfjobs/ui/` (TF Job Dashboard)

Submitting a TensorFlow job to use the GPU

`kubectl apply -n kubeflow -f https://bit.ly/2FmA1xF`



Kubeflow on a laptop





Kubeflow on a laptop

Deploy Kubernetes

Deploy Single-node Kubernetes



```
# not on Linux? launch Ubuntu VM...  
multipass launch ubuntu  
  
multipass shell <vm-name>  
  
# ...then install Juju and MicroK8s  
snap install juju --classic --edge  
  
snap install microk8s --classic  
  
microk8s.status --wait-ready
```



Kubeflow on a laptop

Enable GPU in Kubernetes

Enable GPU



```
# ensure gpu drivers are installed...  
  
sudo add-apt-repository ppa:graphics-drivers/ppa  
  
sudo apt update  
  
sudo apt install nvidia-driver-418  
  
sudo reboot now  
  
# ...then enable gpu support in MicroK8s  
microk8s.enable gpu
```



Kubeflow on a laptop

Deploy Kubeflow

Deploy Kubeflow



```
microk8s.enable ingress storage  
microk8s.config | juju add-k8s microk8s  
juju bootstrap microk8s  
juju add-model kubeflow  
juju deploy kubeflow  
juju config kubeflow-ambassador \  
juju-external-hostname=<laptop-ip>.xip.io  
juju expose kubeflow-ambassador
```

Using Kubeflow



Accessing the Kubeflow dashboards

`http://<laptop-ip>.xip.io/hub/` (Jupyterhub)

`http://<laptop-ip>.xip.io/tfjobs/ui/` (TF Job Dashboard)

Submitting a TensorFlow job to use the GPU

`kubectl apply -n kubeflow -f https://bit.ly/2FmA1xF`

To learn more...



Snap: <https://snapcraft.io/>

Multipass: <https://github.com/CanonicalLtd/multipass>

MicroK8s: <https://microk8s.io>

Juju: <https://jujucharms.com/>

Charmed Kubernetes: <https://www.ubuntu.com/kubernetes>

Thank you. Questions?

