Scalable JupyterHub deployment on bare-metal Kubernetes

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JupyterHub Prototype

- Prototype running on
  http://130.246.212.44/escape
- Openstack running bare-metal Kubernetes cluster
- Helm based JupyterHub deployment
- Dynamic persistent storage with NFS
- ESCAPE IAM auth integration example here
- Custom user environments
- DEMO

	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status		Availability Zone	Task	Power State	Age	Actions	
☐	kubernetes-worker-3	Ubuntu-Bionic-NoGui	192.168.50.78	c2.large	RohiniAENEASUIMachine	Active	☐	ceph	None	Running	3 weeks, 3 days	CREATE SNAPSHOT	▾
☐	kubernetes-worker-2	Ubuntu-Bionic-NoGui	192.168.50.29	c3.medium	RohiniAENEASUIMachine	Active	☐	ceph	None	Running	1 month, 1 week	CREATE SNAPSHOT	▾
☐	kubernetes-worker-1	Ubuntu-Bionic-NoGui	192.168.50.61	c3.medium	RohiniAENEASUIMachine	Active	☐	ceph	None	Running	1 month, 1 week	CREATE SNAPSHOT	▾
☐	kubernetes-head-01	Ubuntu-Bionic-NoGui	192.168.50.44, 130.246.212.44	c3.large	RohiniLaptop	Active	☐	ceph	None	Running	1 month, 1 week	CREATE SNAPSHOT	▾

Lessons learnt

Start small, adding a variable at a time

Persistent volumes are hard!

Magnum clusters or another cluster orchestration service will simplify things

Kubernetes

- Double check yaml file for misconfigs

- Lots of things can change between versions

- K8s documentation, blog posts are your friend

More useful monitoring strategy probably after testing the prototype

Custom user environments: Be careful of permissions of the default jovyan user

ssh tunnels used initially. Exposed port 80 needed for IAM auth to work

Next steps

Documenting how to query the JupyterHub REST API. Gitlab issue

Custom environment for Rucio to interact with the data lake from a notebook

Using auth tokens and propagation of auth tokens

Find and document how to query JHub API

| ☰ | Collinson, James | ESCAPEES |

Identified   SPO-793

Reproduce and develop a JupyterHub custom environment for Rucio

| ☰ | Collinson, James | ESCAPEES |

Identified   SPO-786

Useful Links

- Small self-contained deployment
  https://medium.com/@georgepaw/jupyterhub-with-kubernetes-on-single-bare-metal-instance-tutorial-67cbd5ec0b00
- Zero to JupyterHub
  https://zero-to-jupyterhub.readthedocs.io/en/latest/
- Customisation Guide
  https://zero-to-jupyterhub.readthedocs.io/en/latest/customizing/index.html
- Current deployment documentation
  https://github.com/rohinijoshi06/jupyterhub-on-k8s
- Stelios' previous tech talk
  https://github.com/stvoutsin/escape-wp5-dev/blob/master/doc/20200608-ESCAPEWP5.pdf