Docker and Friends

What we'll review tonight

- Container-optimized operating systems
- Using Docker with CoreOS
- Using Docker with OpenStack Heat
- Using Docker with fleet

Resources for following along

The GitHub repo for this session contains some useful resources for following along:

- Sample systemd unit files for use both with and without fleet
- Sample cloud-config file for deploying CoreOS on both OpenStack and Vagrant
- Sample OpenStack Heat templates for deploying a CoreOS cluster as well as for deploying Docker containers
- This presentation's source

Container-optimized operating systems

Following the rise of Docker, a number of *container-optimized operating systems* have emerged. They include:

- CoreOS Linux
- Project Atomic
- Snappy Ubuntu Core

Using Docker with CoreOS

CoreOS (typically) uses systemd unit files to deploy Docker containers

```
[Unit]
Description=Nginx web front-end
After=docker.service
Requires=docker.service

[Service]
TimeoutStartSec=0
ExecStartPre=/usr/bin/docker pull nginx
ExecStart=/usr/bin/docker run --rm --name sa-nginx -p 80:80 nginx
ExecStop=/usr/bin/docker stop sa-nginx
```

Demo: Docker with CoreOS

Using Docker with OpenStack Heat

- Heat is an orchestration service for OpenStack
- Heat allows you to orchestrate the deployment/creation of networks, network topologies, instances, volumes
- Heat can orchestrate Docker containers if the Docker plug-in is installed

Docker+Heat Caveats

- In Icehouse, Docker plugin was essentially broken (newer releases are better)
- Docker endpoints must be reachable from the Heat server
- Docker has to be configured to listen on a network port instead of only a local socket
- No intelligent placement of Docker containers

Demo: Docker with OpenStack Heat

Using Docker with fleet

- CoreOS offers a rudimentary scheduler called fleet
- Ties together systemd and etcd (distributed key-value store)
- Requires the presence of an etcd cluster
- Uses systemd unit files to deploy containers onto the cluster

Sample systemd unit file for fleet

```
[Unit]
Description=Nginx web front-end
After=docker.service
Requires=docker.service

[Service]
TimeoutStartSec=0
ExecStartPre=/usr/bin/docker pull nginx
ExecStart=/usr/bin/docker run --rm --name nginx-01 -p 80:80 nginx
ExecStop=/usr/bin/docker stop nginx-01

[X-Fleet]
Conflicts=nginx-*.service
```

Demo: Docker with fleet

Q&A

More resources: OpenStack Heat

- An Introduction to OpenStack Heat - http://blog.scottlowe.org/2014/05/01/an-introduction-to-openstack-heat/
- Another Look at an OpenStack Heat Template - http://blog.scottlowe.org/2014/05/02/another-look-at-an-openstack-heat-template/
- Deploying CoreOS on OpenStack Using Heat - http://blog.scottlowe.org/2014/08/13/deploying-coreos-on-openstack-using-heat/

More resources: CoreOS, etcd, Fleet

- CoreOS Continued: etcd - http://blog.scottlowe.org/2014/08/18/coreos-continued-etcd/
- CoreOS Continued: Fleet and Docker - http://blog.scottlowe.org/2014/08/20/coreos-continued-fleet-and-docker/

More resources: Heat+Docker

- Installing the Docker Plugin for Heat - http://blog.scottlowe.org/2014/07/31/installing-the-docker-plugin-for-heat/
- A Heat Template for Docker Containers - http://blog.scottlowe.org/2014/08/22/a-heat-template-for-docker-containers/

Thank you!

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Life: Colossians 3:17