Hydra WWTorqueNode

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Objective

To describe how to provision a Torque execution node using Warewulf on the Hydra Cluster.

Assumes working setup of WW Master and Toruqe Master servers.

NOTE: Most changes to the chroot environment require rebuild of VNFS and reboot of provisioned node:

```
$ wwvnfs --chroot /var/chroots/hydraex-centos-7
```

Reboot provisioned node.

Setup

Setup VNFS

```
$ wwmkchroot centos-7 /var/chroots/hydraex-centos-7
```

Update packages:

```
$ rpm --root /var/chroots/hydraex-centos-7 -ivh /root/rpm/epel-release-7-5.noarch.rpm
$ yum --tolerant --installroot /var/chroots/hydratm-centos-7 update
```

NTP

```
$ yum --tolerant --installroot /var/chroots/hydraex-centos-7 install ntp
$ chroot /var/chroots/hydraex-centos-7
$ systemctl enable ntpd
$ exit
```

Root SSH Key

```
$ chmod 700 /var/chroots/hydraex-centos-7/root/.ssh
$ cp ~/.ssh/authorized_keys /var/chroots/hydraex-centos-7/root/.ssh/
```

Mount SAN Filesystems

```
$ vi /var/chroots/hydraex-centos-7/etc/fstab
192.168.13.10:/mnt/KLEINMAN_BACKUP /mnt/KLEINMAN_BACKUP nfs defaults,async,_netdev 0 0
192.168.13.10:/mnt/GREENWOOD_BACKUP /mnt/GREENWOOD_BACKUP nfs defaults,async,_netdev 0 0
192.168.13.10:/mnt/KLEINMAN_SCRATCH /mnt/KLEINMAN_SCRATCH nfs defaults,async,_netdev 0 0
192.168.13.10:/mnt/GREENWOOD_SCRATCH /mnt/GREENWOOD_SCRATCH nfs defaults,async,_netdev 0 0

$ mkdir /var/chroots/hydraex-centos-7/mnt/KLEINMAN_BACKUP /var/chroots/hydraex-
centos-7/mnt/GREENWOOD_BACKUP /var/chroots/hydraex-centos-7/mnt/KLEINMAN_SCRATCH
/var/chroots/hydraex-centos-7/mnt/GREENWOOD_SCRATCH
```

Warewulf

Setup of node has been scripted into `~/wwscripts/wwconfig-torquenode.sh`:

```
#!/bin/sh

NODE=$1
GE_IPADDR=$2
XE_IPADDR=$3
GE_HWADDR=$4
XE_HWADDR=$5

echo $NODE ${GE_IPADDR} ${XE_IPADDR} ${GE_HWADDR} ${XE_HWADDR}

wwsh -y node new ${NODE} --netdev=eth0 --hwaddr=${GE_HWADDR} --ipaddr=${GE_IPADDR} --
groups=HYDRAEX --domain=ldi.lan --netmask 255.255.255.0

wwsh -y provision set --lookup groups HYDRAEX --vnfs=hydraex-centos-7 --
bootstrap=3.10.0-229.14.1.el7.x86_64

wwsh -y provision set --fileadd passwd,group,shadow ${NODE}

wwsh -y node set ${NODE} --netdev=eth3 --ipaddr=${XE_IPADDR} --netmask=255.255.255.0
--hwaddr=${XE_HWADDR}

wwsh -y provision set --fileadd=ifcfg-eth3.ww ${NODE}

wwsh -y provision set --fileadd=resolv.conf.ww ${NODE}

wwsh -y provision set --fileadd=network.ww ${NODE}

wwsh -y file sync \* ${NODE}

systemctl restart dhcpd

sleep 5
```

Torque

RPMs

Assumes RPMs are build according to documentation in TorqueMaster and that RPMs are here:

```
$ cd ~/src/
$ rpmbuild -ta torque-6.0.0.tar.gz
# RPMs in /root/rpmbuild/RPMS/x86_64/
```

Install RPMs

This will install into `/var/chroots/hydraex-centos-7`:

```
yum --tolerant --installroot /var/chroots/hydraex-centos-7 install torque-5.1.1.2-
1.adaptive.el7.centos.x86_64.rpm torque-client-5.1.1.2-
1.adaptive.el7.centos.x86_64.rpm
```

Remove server lock if exists:

```
$ rm /var/chroots/hydraex-centos-7/var/spool/torque/mom_priv/mom.lock
```

Edit server name:

```
$ vi /var/chroots/hydraex-centos-7/var/spool/torque/server_name
D1P-HYDRATM01.ldi.lan
```

Add path to profile:

```
$ cp ~/wwtemplates/ww-profile.d-hydra.sh /var/chroots/hydraex-centos-
7/etc/profile.d/hydra.sh
```

Configure mom_priv:

```
$ vi /var/chroots/hydraex-centos-7/var/spool/torque/mom_priv/config
  $pbsserver D1P-HYDRATM01.ldi.lan
  $logevent 225
```

Local Storage

Format

Create node partition layout, store somewhere on NFS mounted partition so node can see it:

```
$ vi /home/node-partitions
# This will create 2 partitions on device. First is a swap of about 16Gb,
# and the second is the remainder of the filesystem
,2034,82
,,83
```

Partition local disk on node:

```
pdsh -w D1P-HYDRARS01 'cat /home/node-partitions | sfdisk /dev/sda'
```

Create filesystems:

```
$ pdsh -w D1P-HYDRARS01 'mkswap /dev/sda1'
$ pdsh -w D1P-HYDRARS01 'mkfs.ext4 /dev/sda2'
```

Add filesystems to mount on boot of node:

```
$ vi /var/chroots/hydrars-centos-7/etc/fstab
# LOCAL DISK
/dev/sda2 /scratch ext4 defaults 0 0
/dev/sda1 none swap defaults 0 0
```

Rebuild VNFS, reboot node(s). Make sure mounts are active.

Packages

```
$ yum --tolerant --installroot /var/chroots/hydraex-centos-7 install atlas
environment-modules gsl pandoc libcurl-devel.x86_64 libxml2-devel.x86_64 numpy scipy
python-matplotlib ipython python-pandas sympy python-nose docker R ruby zsh
```

Disable SELinux, because Docker re-enables it:

```
# vi /var/chroots/hydraex-centos-7/etc/selinux/config

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=disabled
# SELINUXTYPE= can take one of three two values:
#     targeted - Targeted processes are protected,
#     minimum - Modification of targeted policy. Only selected processes are
protected.
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

Rebuild VNFS, reboot nodes(s).