

HPC in the cloud with StarCluster

Cluster in the Cloud

Some changes at Amazon require an update to the StarCluster article. *By Gavin W. Burris*

An astute reader pointed out that the code in the StarCluster article (*Linux Magazine* issue 144, pp. 16-20) is outdated. The material here replaces the “Build Log” box on page 19 and Listing 10 on page 20. Listing 11 is new. References to `ami-d3ce7bba` become `ami-d60185bf`; `starcluster-base-scientific-linux-6.2-x86_64-06` becomes `-6.2-x86_64-10`. Download the code from Linux Pro Magazine online [1]. ■■■

BUILD LOG

Listing 10 shows the build log for the `ami-d60185bf` SL6 AMI [2] `starcluster-base-scientific-linux-6.2-x86_64-10`. This image is based on Jamie Kinney’s `ami-e2a0058b` Scientific Linux 6.2 `x86_64` AMI [3]. You can use this log as a cookbook to craft your own compute node AMI with your chosen software stack pre-installed.

LISTING 10: Corrected AMI Build Log

```
$ starcluster start -s 1 foocluster -n ami-999d49f0
$ starcluster get foocluster /opt/sge6-fresh .
$ starcluster terminate foocluster
$ starcluster start -o -s 1 -i t1.micro
    -n ami-e2a0058b imagehost
$ starcluster listclusters --show-ssh-status imagehost
$ starcluster sshmaster imagehost -u ec2-user
$ sudo sed -i.bak
    -e's/\#PermitRootLogin\
        yes/PermitRootLogin\ without-password/g'
    /etc/ssh/sshd_config
$ sudo sed -i.bak -e's/\#UseDNS\ yes/UseDNS\ no/g'
    /etc/ssh/sshd_config
$ sudo cp -f /home/ec2-user/.ssh/authorized_keys /root/.ssh/
authorized_keys
$ sudo service sshd reload
$ exit
$ starcluster put imagehost ./sge6-fresh /opt/
$ rsync -e "ssh -i $HOME/starcluster/foocluster.rsa"
    -avP --delete sge6-fresh
    -l root
    ec2-23-23-64-53.compute-1.amazonaws.com:/opt/
$ starcluster sshmaster imagehost
# yum -y install yum-fastestmirror yum-conf-epel
# yum -y update
# yum -y install openmpi-devel nfs-utils-lib-devel
java-1.6.0-openjdk-devel tmux zsh ksh tcsh
unzip mysql-server mysql httpd emacs ntsysv freetype-devel
libpng-devel blas-devel lapack-devel atlas-devel lbzip2
bzip2-devel ncurses-devel sqlite-devel zlib-devel
libjpeg-devel mercurial
ipython python-imaging python-boto python-virtualenv
Cython python-nose python-gnutls python-pip ruby
# echo "exit 0" >> /etc/init.d/portmap
# chmod +x /etc/init.d/portmap
# yum -y groupinstall "Development Tools"

# yum -y install infinipath-psm-devel
# yumdownloader --source openmpi
# rpm --import
    https://www.redhat.com/security/fd431d51.txt
# yum-builddep openmpi-1.5.4-1.el6.src.rpm
# rpm -ivh openmpi-1.5.4-1.el6.src.rpm
# rpmbuild -bb --define 'configure_options
    --with-sge' /root/rpmbuild/SPECS/openmpi.spec
# rpm -Uhv
    /root/rpmbuild/RPMS/x86_64/openmpi-1.5.4-1.el6.x86_64.rpm
    /root/rpmbuild/RPMS/x86_64/
    openmpi-devel-1.5.4-1.el6.x86_64.rpm
# echo "exclude=openmpi*" >> /etc/yum.conf
# . /etc/profile.d/modules.sh
# module load openmpi-x86_64
# ompi_info | grep -i grid
    MCA ras: gridengine (MCA v2.0, API v2.0, Component v1.5.4)
# echo "module load openmpi-x86_64" >>
    /etc/profile.d/zzlocal.sh
# echo "module load openmpi-x86_64" >>
    /etc/profile.d/zzlocal.csh
# echo 'export
    PYTHONPATH=/usr/local/lib64/python2.6/
    site-packages:$PYTHONPATH' >>
    /etc/profile.d/zzlocal.sh
# echo
'setenv PYTHONPATH /usr/local/lib64/python2.6/
site-packages:$PYTHONPATH' >>
/etc/profile.d/zzlocal.csh
# chmod +x /etc/profile.d/zzlocal.*
# . /etc/profile.d/zzlocal.sh
# pip-python install
    --install-option="--prefix=/usr/local" mpi4py
# pip-python install
    --install-option="--prefix=/usr/local" numpy
```

LISTING 10: Corrected AMI Build Log (continued)

```
# pip-python install
--install-option="--prefix=/usr/local" scipy

# pip-python install
--install-option="--prefix=/usr/local" matplotlib

# chmod u=rwx,go= /root /home/ec2-user

# vim /etc/rc.local # see rc.local

# exit
$ starcluster listclusters
$ starcluster ebsimage i-xxxxxxx
starcluster-base-scientific-linux-6.2-x86_64-XX
>>> Your new AMI id is: ami-xxxxxxx
$ starcluster terminate imagehost
```

LISTING 11: rc.local

```
# update ec2-ami-tools
wget http://s3.amazonaws.com/ec2-downloads/
ec2-ami-tools.noarch.rpm &&
rpm -Uvh ec2-ami-tools.noarch.rpm

# reset root password
dd if=/dev/urandom count=50|md5sum|passwd --stdin root
dd if=/dev/urandom count=50|md5sum|passwd --stdin ec2-user

# update root ssh keys
sleep 40

if [ ! -d /root/.ssh ]; then
    mkdir -p /root/.ssh
    chmod 700 /root/.ssh
fi

wget http://169.254.169.254/latest/meta-data/
public-keys/0/openssh-key &&
cat openssh-key >>/root/.ssh/authorized_keys &&
chmod 600 /root/.ssh/authorized_keys

rm -f openssh-key
```

INFO

- [1] Article code:
<http://www.linuxpromagazine.com/Resources/Article-Code>
- [2] ami-d60185bf SL6 Amazon Machine Image:
<https://aws.amazon.com/amis/starcluster-base-scientific-linux-6-2-x86-64-10>
- [3] ami-e2a0058b Amazon Machine Image:
<https://aws.amazon.com/amis/scientific-linux-6-2-x86-64>

AUTHOR

Gavin W. Burris, a specialist in Linux and high-performance computing, enjoys enabling science by providing effective research computing resources. He has been involved in high-performance and research computing since 2001. Current projects find him working with HPC, big data, cloud computing, and grid technologies. Burris' favorite languages are Python and BASH. In his free time, he enjoys bad cinema, video editing, synthesizers, and bicycling. He maintains a blog at: <http://idolinux.blogspot.com>.

Expert Touch

Linux professionals stay productive at the Bash command line – and you can too. The Linux Shell special edition provides hands-on, how-to discussions of more than 300 command-line utilities for networking, troubleshooting, configuring, and managing Linux systems. Let this comprehensive reference be your guide for building a deeper understanding of the Linux shell environment.

You'll learn how to:

- Filter and isolate text
- Install software from the command line
- Monitor and manage processes
- Configure devices, disks, filesystems, and user accounts
- Troubleshoot network connections
- Schedule recurring tasks
- Create simple Bash scripts to save time and extend your environment

The best way to stay in touch with your system is through the fast, versatile, and powerful Bash shell. Keep this handy command reference close to your desk, and learn to work like the experts.

OR ORDER ONLINE AT
SHOP.LINUXNEWMEDIA.COM (SELECT SPECIAL EDITIONS)

