

Benthic Boundary Layer Project

Kilo Nalu Observatory

Shore Server Administration Guide

Aug 30, 2010

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1. Server Administration Guide

1.1. Overview

The Kilo Nalu shore station server is the system that collects data from instrument data streams using the RBNB DataTurbine software. It is configured to accept the following connections in run-level 5:

- RBNB - DataTurbine streaming server on TCP port 3333
- HTTP - Tomcat WebDAV interface for the DataTurbine on TCP port 8080 (LAN or SSH tunnel only)
- NTP - Network Time Protocol daemon on UDP port 5168
- SSH - command line system administration on TCP port 22
- VNC - Virtual Network Computing server on port 5901 (LAN or SSH tunnel only)

1.1.1. Hardware Administration

1.1.1.1. Hardware description

The shore station server is a Penguin Computing Relion 1650 server with dual quad-core E5405 Xeon 2.0 GHz CPUs, 8 GB of RAM, and 1TB of disk storage. The server was purchased in May 2008 and is under next-day, on-site warranty for three years. It has dual Gigabit ethernet NICs, a Base Management Card for remote chassis administration, dual 650W PSUs, and an Adaptec 3405 PCIe RAID controller with 128MB of cache. There are 3 500GB 7200 RPM SATA2 drives in the RAID array. The serial number is P1238040129.

1.1.1.2. Internal RAID

The RAID array is a standard RAID level 5 configuration that exports one logical device. There is room for one more 500GB disk in the server since we only ordered three to cut costs.

1.1.1.3. Maintenance Notes

The server has been serviced three times under warranty.

- Replaced Failed Power Supply Unit.
- Replaced Power Distribution Unit that caused the above issue.
- Replaced a failed SATA2 disk.

1.1.2. Operating System Administration

The server is currently running CentOS 5.4 32-bit (to match the RHEL 5.4 32-bit BBL server installation). The BBL server has since been changed to the RHEL 5.4 64-bit OS. The following items need to be addressed for general management or for a system reinstall.

1.1.2.1. Filesystem

The main filesystem is `/dev/sda` and is formatted as ext3 and uses LVM for the `/var` and `/data` partitions. The main volume group is `vg01`, which contains two logical volumes, `var` and `data`, each of which are 385GB in size. The system partitions are shown below:

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/sda2	4.8G	1.9G	2.6G	43%	/
/dev/sda8	113G	8.1G	99G	8%	/home
/dev/sda6	19G	3.1G	15G	18%	/usr
/dev/sda1	99M	27M	68M	29%	/boot
tmpfs	4.0G	0	4.0G	0%	/dev/shm
/dev/mapper/vg01-var	385G	72G	294G	20%	/var
/dev/mapper/vg01-data	385G	16G	350G	5%	/data

The /data/kilonalu directory has been created and made writable to the kilonalu group:

```
# mkdir /data/kilonalu
# chown -R kilonalu:kilonalu /data/kilonalu
# chmod -R g+rwxs /data/kilonalu
```

1.1.2.2. User accounts and groups

Other than the standard system accounts, both a `kilonalu` user and a `kilonalu` group have been created and are used to run non-root processes associated with data management applications such as the DataTurbine. Other accounts include `cjones`, `jeff`, `pawlak`, and `brian`, which are all part of the `kilonalu` group. These four users are also added to the `wheel` group, and this group has been added to the `/etc/sudoers` file with `ALL=[ALL]` permissions.

1.1.2.3. Firewall

The internal iptables firewall is set to allow certain services. The current configuration is:

```
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
:RH-Firewall-1-INPUT - [0:0]
-A INPUT -j RH-Firewall-1-INPUT
-A FORWARD -j RH-Firewall-1-INPUT
-A RH-Firewall-1-INPUT -i lo -j ACCEPT
-A RH-Firewall-1-INPUT -p icmp --icmp-type any -j ACCEPT
#-A RH-Firewall-1-INPUT -p 50 -j ACCEPT
#-A RH-Firewall-1-INPUT -p 51 -j ACCEPT
#-A RH-Firewall-1-INPUT -p udp -m udp --dport 631 -j ACCEPT
#-A RH-Firewall-1-INPUT -p tcp -m tcp --dport 631 -j ACCEPT
-A RH-Firewall-1-INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT
# Allow ntp connections from anywhere
-A RH-Firewall-1-INPUT -m state --state NEW -m tcp -p tcp --dport 123 -j ACCEPT
-A RH-Firewall-1-INPUT -m state --state NEW -m udp -p udp --dport 123 -j ACCEPT
# Allow http connections from anywhere
-A RH-Firewall-1-INPUT -m state --state NEW -m tcp -p tcp --dport 80 -j ACCEPT
-A RH-Firewall-1-INPUT -m state --state NEW -m tcp -p tcp --dport 8080 -j ACCEPT
# Allow ssh connections from anywhere
-A RH-Firewall-1-INPUT -m state --state NEW -m tcp -p tcp --dport 22 -j ACCEPT
# Allow rbnb connections from the anywhere
-A RH-Firewall-1-INPUT -m state --state NEW -m tcp -p tcp --dport 3333 -j ACCEPT
-A RH-Firewall-1-INPUT -m state --state NEW -m tcp -p tcp --dport 33333 -j ACCEPT
# Allow ADAM module data to port 5168
-A RH-Firewall-1-INPUT -m state --state NEW -m udp -p udp --dport 5168 -j ACCEPT
-A RH-Firewall-1-INPUT -j REJECT --reject-with icmp-host-prohibited
COMMIT
```

1.1.2.4. Networking

The server's two Gigabit ethernet interfaces are `eth0` and `eth1`. The server's IP address on `eth0` is set to `192.168.100.60`, and has an WAN accessible address of `168.105.160.139` assigned. There is no IP assigned to `eth1`. Because there is no DNS server running on the internal Kilo Nalu network, there is no FQDN assigned to the server, however its internal hostname is `kilonalu`. The subnet mask is set to `255.255.255.0`, and the gateway address is `192.168.100.1`.

1.1.2.5. Backup

Due to budget constraints, an external backup system has not been installed on the server, and so a system meltdown would require a full reinstallation and reconfiguration of the server and the third party software installed on it. However, data files that are placed in the `/data` directory are mirrored to the BBL server on campus. See the section on Rsync Configuration.

1.1.2.6. Remote Management Card

The remote management card is configured on IP `192.168.100.63` and will respond to IPMI commands to control the server chassis in the event there is a problem communicating with the server via SSH, etc. The management username and password is set to `admin/[ask for password]`. Use `ipmitool` from another system to control the server.

1.1.2.7. System updates

Since this is a standard RHEL-type system, updates are handled using the `yum` system. To check for outstanding updates, as the root user use:

```
# yum -v check-update
```

To update the operating system packages, as the root user use:

```
# yum -v update
```

Kernel and other critical library updates that require a system reboot should be updated when system downtime has been scheduled.

1.1.3. Software Administration

The shore station server has certain pieces of software installed to enable the management of the data streams and files. Each software package needs to be configured appropriately. The following sections describe each of the required software packages.

1.1.3.1. DataTurbine Installation and Configuration

The RBNB DataTurbine software runs on Mac OS X, Windows, and Linux, and can be downloaded from <http://code.google.com/p/dataturbine>. The current version is 3.2b4. From a VNC desktop or the system console desktop, double click on the downloaded `.jar` file to install it. During the installation, choose `/usr/local/RBNB/[version]` as the installation directory. Change the ownership of the installation directory using:

```
# chown -R kilonalu:kilonalu /usr/local/RBNB
```

Likewise, when reinstalling or upgrading the DataTurbine software, change the 'current' symbolic link found in /usr/local/RBNB to point to the new installation. For instance:

```
# cd /usr/local/RBNB; ln -s V3.2B4 current
```

References to the location of the RBNB DataTurbine software should only use /usr/local/RBNB/current to avoid problems when the software is updated.

The DataTurbine software relies on two other directories. The /var/lib/rbnb directory has been created to store the RBNB ring buffer files, and /var/log/rbnb has been created to store the RBNB system log and the log files for each of the source drivers. These must be recreated during a system reinstall.

The DataTurbine is configured to startup in run levels 3 and 5. The following script is placed in /etc/init.d/rbnb and linked appropriately:

```
#!/bin/bash
# chkconfig: 345 98 98

if [ ! "${RBNB_HOME}" ]; then RBNB_HOME=/usr/local/RBNB/current; fi
RBNB_LOG='/var/log/rbnb/rbnb.log'
RBNB_PIDFILE='/var/run/rbnb.pid'
RBNB_ARCHIVE_LOC='/var/lib/rbnb'
RBNB_USER='kilonalu';
RBNB_SERVER='192.168.100.60';
RBNB_PORT='3333';
RBNB_MEM='2048' # Amount of memory in MB for the JVM running RBNB to use
RBNB_NAME='KNShoreStaionDataTurbine';
BBL_HOME='/usr/local/bbl/trunk';

start() {
    mkdir -p ${RBNB_ARCHIVE_LOC}
    cd ${RBNB_ARCHIVE_LOC}
    su - ${RBNB_USER} -c "java -Xms${RBNB_MEM}M -Xmx${RBNB_MEM}M -jar ${RBNB_HOME}/bin/rbnb.jar
-F -H ${RBNB_ARCHIVE_LOC} -a ${RBNB_SERVER}:${RBNB_PORT} -n ${RBNB_NAME} > ${RBNB_LOG} 2>&1 &"
    RBNB_PID=$(ps -ef | grep rbnb | grep java | tr -s " " " " | cut -d" " -f2)
    echo $RBNB_PID > ${RBNB_PIDFILE}
}

stop() {
    if [ -f ${RBNB_PIDFILE} ]; then
        kill -15 `cat ${RBNB_PIDFILE}`
        rm -f ${RBNB_PIDFILE}
    fi
}

case "$1" in
    'start')
        echo "Starting the RBNB server"
        start
        ;;
    'stop')
        echo "Stopping the RBNB server"
        stop
        ;;
    'restart')
        echo "Restarting the RBNB server"
        stop
        start
        ;;
    *)
        echo "Usage: $0 {start|stop|restart} "
        ;;
esac
```

1.1.3.2. DataTurbine WebDAV Configuration

The DataTurbine WebDAV interface needs to be configured and started in order for Source and Sink applications to access the data streams over HTTP in addition to the TCP port 3333 interface. To do so, change the `/usr/local/RBNB/current/apache-tomcat-6.0.18/conf/server.xml` file to listen on port 8080 rather than port 80:

```
<Connector port="8080" protocol="HTTP/1.1"
           connectionTimeout="20000" redirectPort="443" />
```

Also modify the `/usr/local/RBNB/current/apache-tomcat-6.0.18/webapps/RBNB/WEB-INF/web.xml` file to enable WebDAV write access to the server. In the `<servlet>` container, add:

```
<init-param>
  <param-name>readonly</param-name>
  <param-value>false</param-value>
</init-param>
```

Once these changes are made, as the `kilonalu` user start the Tomcat server provided with the RBNB software:

```
$ cd /usr/local/RBNB/current/bin
$ Start_Webserver.sh
```

To stop the WebDAV interface:

```
$ cd /usr/local/RBNB/current/bin
$ Stop_Webserver.sh
```

1.1.3.3. BBL software installation

The BBL software is maintained in a [Subversion](https://bbl.ancl.hawaii.edu/projects/bbl) repository at <https://bbl.ancl.hawaii.edu/projects/bbl>. On the shore server, the software is installed in the `/usr/local/bbl` directory. To install this software, issue the following commands as root:

```
# cd /usr/local
# svn checkout https://bbl.ancl.hawaii.edu/projects/bbl
# chown -R kilonalu:kilonalu bbl
```

To update the code, become the `kilonalu` user and issue:

```
$ cd /usr/local/bbl/trunk
$ svn update
$ ant compile
```

This will compile any newly changed Java-based driver code. Drivers that have changed code will need to be restarted on the command line as described in the [Kilo Nalu Realtime Operations Guide](#).

1.1.3.4. VNC Configuration

A VNC server is configured to start upon server reboot under the `kilonalu` user. The service configuration file in `/etc/sysconfig/vncservers` is as follows:

```
VNCSERVERS="1:kilonalu"  
VNCSERVERARGS[1]="-geometry 1280x720 -nohttpd -localhost -alwaysshared"
```

1.1.3.5. Rsync Configuration

Data files that are placed in the `/data` directory are mirrored to the BBL server on campus using `rsync`. The mirroring is handled by the `kilonalu` user via a shell script at `/home/kilonalu/mirror_kn_files.sh`. This file contains:

```
rsync -avt /data/kilonalu bbl.ancl.hawaii.edu:/data/raw
```

This script is run via the `kilonalu` user's crontab every hour.