

# **LifeScope™ Cluster**

## Quick Start Guide: From Crate to Prompt...



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## **1. Overview**

### **1.1 Introduction**

Thank you for purchasing a LifeScope™ Analysis Cluster (“LifeScope Cluster”).

This document is intended to help you setup and start up your cluster for the first time. It contains information on the LifeScope™ installation and testing, and general workstation settings.

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### **1.2 Cluster Front and Back**

Shown on the following page are images of a typical LifeScope cluster. Please note that the UPS and PDU are not shown – they are added to the cluster just prior to shipping and are country dependent.

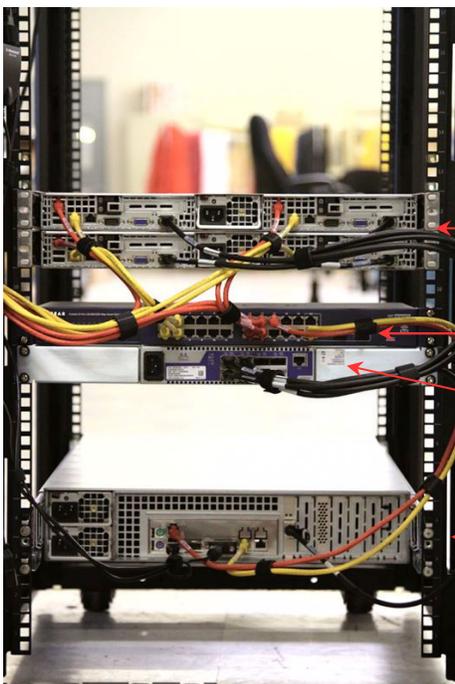
A typical UPS is shown in the following section, including how to plug the UPS in.



Avocent LCD Drawer

Compute Nodes

Head Node



Compute Nodes

Gigabit Switch

Infiniband Switch

Head Node

## 2. Unpacking and Placement

### 2.1 Overview

This chapter provides instructions on the unpacking and placement of your LifeScope Cluster. Though your LifeScope Cluster has already been fully configured and tested by Penguin Computing, some setup is required. Please read Chapter 2 carefully before proceeding with the installation outlined in Chapters 3 and 4.

Please review the You Tube resources on Penguin's channel at <http://www.youtube.com/user/PenguinComputingInc>. The videos provided are for the BioScope cluster but are still generally useful – the information in this manual is specific to the LifeScope cluster.

### 2.2 Unpacking the System

Uncrate your LifeScope Cluster and roll it to its location.

### 2.3 Preparing for Setup

Position your LifeScope Cluster so that there is at least 2 - 4ft of free space in front and behind the rack. This will ensure proper airflow and provide enhanced reliability. All the components in your LifeScope Cluster are all cooled from front to back. If there is an air conditioning unit in the room, it should face the front of your LifeScope Cluster rack. Please note that AC is not a requirement for this cluster.

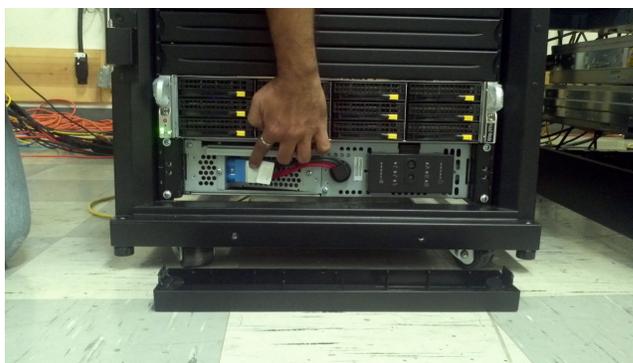
Use the key attached to the front and/or rear door of the rack to unlock the rack and access the equipment.

In addition to a normal server room environment, your LifeScope Cluster may also be installed in an office, lab, dedicated equipment room, service closet and the like provided that there is sufficient cooling and space.

### 3. Powering the Cluster ON

#### 3.1 System Power

Remove the front panel of the UPS Rack Unit (RU) 1 and connect the battery cord. The UPS is at the bottom of the rack. First, pull off the cover of the UPS. Then pull back the tape covering the plug and plug it into the UPS. Replace the UPS cover. Please see the images below:



Connect the UPS and PDU power cord to your facility's power outlets. Press the on button on the UPS. Lights should appear on the front panel.

Start the cluster nodes in the correct order:

- Storage server 2U (if installed). There may not be a separate storage server in your cluster. However, if there is a storage server, wait a minute or two after powering it up before booting the head node to avoid any timing issues.
- Head node 2U (above the UPS). Use the LCD in Rack Unit (RU) 22 to monitor the head node boot up process.
- Compute nodes 2 (or more) x 1U. Wait until a login prompt is displayed for the head node before powering up the compute nodes.

### 3.2 Logging In

Log into the cluster head node as root, using password: **Penguin**. You can check the status of your compute nodes using the `bpstat` command from a terminal:

```
[lifescope@scyld ~]$ bpstat
```

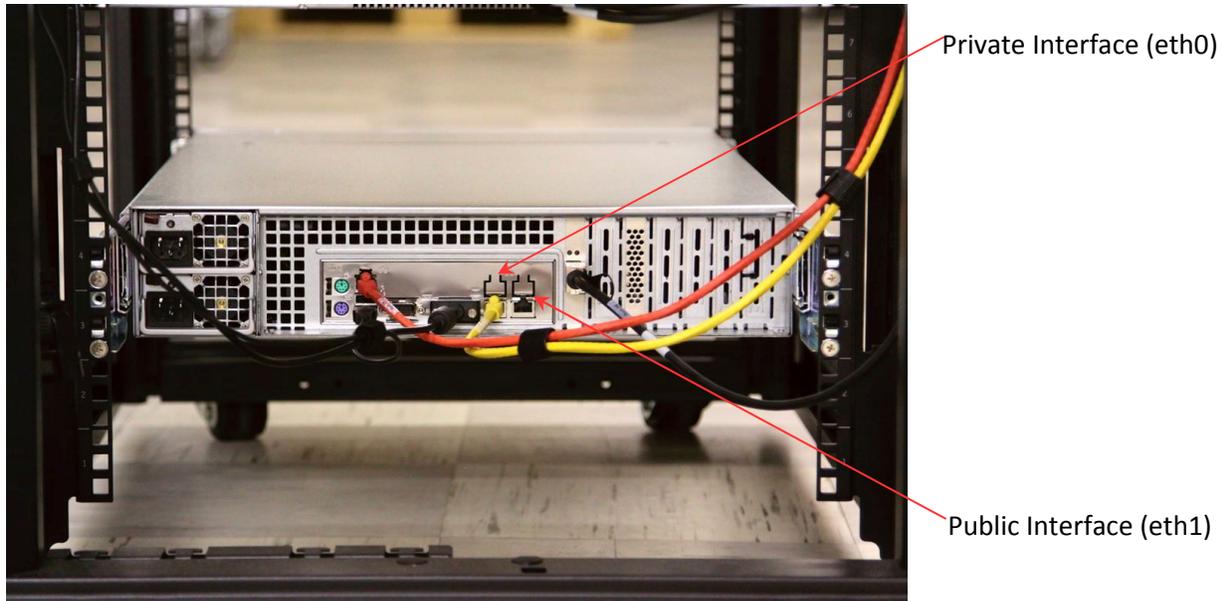
Node (s)	Status	Mode	User	Group
0-3	up	---x---x---x	root	root

If all nodes are not up, try rebooting the nodes that are down by manually resetting or power cycling each node. See trouble shooting section below for more detailed instructions, if needed.

## 4. Instructions for Configuring the Interfaces

### 4.1 Cluster Public Network Interface

The public interface is shown in the image below, showing the back of the master node.



The public network interface on the head node may be configured in the same way as a standard RedHat/CentOS system. Your LifeScope Cluster public interface is configured by default to receive its network parameters automatically via DHCP. If you want your public interface to have a single, static IP address, please consult your system administrator. Take care that your public network addressing does not interfere with the addresses for the private interface described below.

Your LifeScope requires the use of eth1 as a public network interface. Reconfiguring any other device as the public interface may cause your cluster to function improperly.

The following settings are typical for the public interface, but can vary depending on your local needs:

- The public network configuration interface is set to DHCP before shipment; change if needed.
- If your external network is set up to use static IP addresses, then you must configure the public network interface manually. Select and edit this interface, setting the IP address and netmask as provided by your Network Administrator.

- If you use a static IP address, the subnet must be different from that chosen for the private interface. You must set the hostname manually and also provide gateway and primary DNS IP addresses.
- You may use a firewall on the public interface, but take care to make the private interface a trusted device (see below.)

## 4.2 Cluster Private Network Interface

The private network interface (eth0) has been preconfigured and tested with the LifeScope software. There is no need to reconfigure or otherwise change this interface. Please see Section 5.2 and 5.3.

The private interface and its address are specified on the head node in the file `/etc/beowulf/config`.

## 4.3 CAUTION

Editing any of the address information in `/etc/beowulf/config` can cause your cluster to cease functioning.

Take care that you do not plug the private interface into a public (non-LifeScope cluster) network. Plugging the private interface into a public network will cause the cluster to cease functioning and may seriously disrupt your public network.

## 5. General System Information and Configuration

### 5.1 Default Passwords

root: Penguin

lifescope: lifescope

### 5.2 Default Head Node IP Addresses

#### eth0

IP address: 10.54.0.1

Subnet Mask: 255.255.0.0

#### eth1

By default, the address is acquired by DHCP and will vary depending on your public network.

### 5.3 Default Compute Node IP Address Range

If you have 4 compute nodes (Scyld compute nodes n0 through n3)

IP address range: 10.54.50.0 - 10.54.50.3

### 5.4 Setting the System Time

Run system-config-date utility as root to make any changes:

```
bash-3.2# system-config-date
```

## 6. Troubleshooting

### 6.1 Compute Nodes Don't Connect to the Head Node

#### 6.1.1 Check network connectivity

Check that the Ethernet cable for the LifeScope Cluster private interface is connected to the switch. A functional connection is indicated by flashing LEDs on the Ethernet port. Make sure that the proper Ethernet cable is connected to the switch. An arrow sticker indicates the public network interface.

#### 6.1.2 Check that the clustering service is running

You can restart your cluster service using the following command from a terminal:

```
bash-3.2# service beowulf restart
```

#### 6.1.3 Check that you are running the correct kernel

Your LifeScope Cluster requires a Linux kernel specially modified by Penguin Computing. Running the following command from a terminal should return a kernel name similar to 2.X.X-X.X.eIX.Xg0000.

```
bash-3.2# uname --kernel-release
```

returns:

```
2.6.18-275.3.1.e15.571g0000
```

#### 6.1.4 Manually power off the compute nodes, and then manually power them on.

Errors early in the node process will be noted in `/var/log/messages`. Errors later in the boot process will be logged to `/var/log/beowulf/node.0` (Where 0 is the node number.)

### 6.2 Not All Compute Nodes Connect

If the `bpstat` command indicates that not all of the nodes are connected, review the log files in 6.1.4 above and try power cycling the disconnected nodes.

### 6.3 Support

Penguin Computing strongly urges LifeScope Cluster customers to register with Penguin's online support portal. The portal contains important documentation and downloads. Visit <http://www.penguincomputing.com/support> to get access.

### 6.3.1 Contact Penguin Computing

If you have any questions, contact [support@penguincomputing.com](mailto:support@penguincomputing.com) , or call: 1-888-PENGUIN (hours 6am-5pm PST) or contact your LifeScope Cluster system administrator. ALWAYS REMEMBER TO USE [SUPPORT@PENGUINCOMPUTING.COM](mailto:SUPPORT@PENGUINCOMPUTING.COM) and provide the serial number off of your head node in your correspondence to Penguin. It may be tempting to contact a Penguin representative directly, but doing so can bypass the internal support process and result in delays.

### 6.3.2 System Serial Number and beosi

Timely support requires that the LifeScope Cluster customer provide Penguin with the system serial number the head node. You may obtain your system serial number using the following command:

```
bash-3.2# dmidecode -s system-serial-number
```

The serial number is also printed on the top panel of the head node. The serial number is in the format **PXXXXXXX**.

The beosi tool will take a snapshot of your system configuration. Run beosi as root from a terminal:

```
bash-3.2# beosi -m -n
```

This will create a conf-date.encoded file in the directory from which beosi was run. Providing this file to Penguin Computing will greatly assist in timely troubleshooting.

## 7. More Documentation

For more details on the instructions listed above, see the documents that are included with the cluster:

- Cluster Unpack Guide
- Cluster Power-on Guide
- Scyld ClusterWare Quick Start Guide
- Cluster Configuration Defaults (Class B Network)
- Cluster Configuration Defaults (Class C Network)
- Cluster Component Set-up Guide

The Scyld ClusterWare Installation Guide, and other Scyld ClusterWare manuals, and the release notes are available on the head node from <http://<hostname>/scyld-doc/index.html>, or </usr/share/doc/HTML/scyld-doc>, or in PDF format under </usr/share/doc/PDF/scyld-doc>.

## 8. Getting Started

### 8.1 Logging In

Once your LifeScope cluster is powered on and booted, you will be presented with a prompt from the CentOS 5 operating system GUI.

**Your default root user password is Penguin . Your default root user name is root .** Please log in. Confirm that you have a valid connection to the Internet by clicking on the Web browser icon and accessing the Life Technologies' website ([www.lifetechnologies.com](http://www.lifetechnologies.com)). LifeScope cannot be initialized without a valid Internet connection.

Once you check the internet connection, please log out from root user and log back in as the LifeScope user. **The LifeScope user is lifescape and the password is lifescape.** We strongly recommend changing all passwords.

### 8.2 LifeScope General Configuration Information

Your workstation comes with LifeScope™ build already present in /data/LifeScope. The reference data is installed in /data/LifeScopeDisk.

PBS/TORQUE/MAUI are pre-installed for handling job requests and managing workflow. The installed resource manager is Torque 3.01 or later. The installed job scheduler is Maui 3.3.1.

Java 1.6.0\_u12 or later has been installed, and the java plug-in has been enabled in the browser for GUI support.

### 8.3 Steps to set up LifeScope

- 1) Open a command shell from the GUI (Applications->Accessories->Terminal).
- 2) Change to the /data/LifeScope directory. Change the permission of install.sh script (chmod u+x install.sh). Run "install.sh" and choose the option (# 3) to "reconfigure" LifeScope. Accept all default values for all questions (hit enter) except enter the new IP address of the cluster when asked for the IP Address or Fully Qualified Domain Name of the server and license server. Your current IP address can be obtained by running "/sbin/ifconfig eth1" at the prompt and noting the IP address for eth1. Please note that you selected the default "cluster" option for Lifescape installation which is correct.
- 3) Once the above installation is done, refer to the LifeScope™ Genomic Analysis Software Command Shell User Guide for instructions on how to reconfigure settings for your site and how to set up the LifeScope license file. This guide is located on the cluster at

/data/LifeScope/4465697A\_Command\_Shell\_UG.pdf. Please refer to Chapter 2 “Activate the LifeScope software license key” section for details about LifeScope licenses. Install the activated license in /home/lifescopes/lifescopes/lifescopes/server/licenses/LifeScope.lic

- 4) Instruction to start the LifeScope services: Please refer Chapter 3 of the user guide for details of these.
  - a. As the LifeScope user, run the commands:
    - i. lscope-lmgrd.sh start
    - ii. lscope-server.sh start
  - b. or (as the root user):
    - i. service LifeScope start
- 5) Check Web server is running by “ps -ef | grep WebServer” (Details of this in Chapter 3 of user guide). If web server is running, than you are ready to launch the LifeScope analysis.
- 6) To access the GUI go to: <http://<IP address>:9998/LifeScope.html>

## 8.4 Running an Analysis

Please refer to LifeScope™ Genomic Analysis Software Command Shell User Guide for instructions of how to begin an analysis. To run the LifeScope demo examples from command line, refer to Chapter 4 “Run Demo analysis” section from user guide.