Product Documentation

Pivotal™ Command Center

Version 2.3

User Guide

Rev: A03

Notice

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Chapter 1

PCC Overview

This section provides a brief overview of Pivotal Command Center.

About Pivotal Command Center

Pivotal Command Center (PCC) allows an administrative user to configure, deploy, monitor, and manage one or more Pivotal HD clusters. The Command Center has both a graphical user interface and command-line tools to deploy, configure, monitor, and administer Pivotal HD clusters.

- For UI operations, see *Using PCC* on page 30.
- For command-line tools, see *PHD Installation and Administration* .

Note: This release of Command Center allows administering and monitoring of only Pivotal HD Enterprise 2.x clusters.

PCC provides complete life cycle management for Pivotal HD Clusters by performing the following two main groups of functions:

- Cluster configuration and deployment
- Cluster monitoring and management

These functions are served through a set of RESTful web services that run as a web application on Jetty server on the Command Center admin host. This is called `gphdmgr-webservices`. This web application stores its metadata and cluster configuration for Pivotal HD cluster nodes and services in the Pivotal Command Center PostgreSQL database. It makes use of a Puppet Server to perform most of its HD cluster installation and configuration. It also has a polling service that retrieves Hadoop metrics from the cluster and stores them in the Command Center PostgreSQL Database at periodic intervals.

Pivotal Command Center UI and CLI

The PCC UI provides the user with a single web-based graphical user interface to configure, deploy, monitor, and manage one or more Pivotal HD cluster. This web application is hosted on a Ruby-on-Rails application which presents the status and metrics of the clusters. The system metrics data is gathered by the Performance Monitor (nmon) component. The Command Center UI invokes the APIs to retrieve all Hadoop-specific cluster metrics and status information. This includes the Hadoop metrics that was previously retrieved by the polling service.

PCC provides a command-line interface (CLI) for more advanced users to perform installation, configuration and uninstalls. This tool invokes the APIs to install and configure the various Pivotal HD services. The CLI also provides a way to perform other administrative actions such as starting and stopping clusters. For how to use this CLI, refer to *PHD Installation and Administration*.

Performance Monitor (nmon)

Pivotal Command Center comes with a Performance Monitor called `nmon` (for node monitor). This makes use of a highly scalable message passing architecture to gather performance metrics from each node that Command Center monitors. This consists of a master daemon that runs on the Command Center admin host and an daemon that runs on all the cluster nodes that report system metric information to the master. This includes metrics such as CPU, memory, disk I/O and network usage information.

The master on the admin host dumps the system metrics it receives from the agents on the cluster nodes into a PostgreSQL DB. This is then queried by the Command Center UI application to display its cluster analysis graphs.

The agents hosts are deployed throughout the cluster during Pivotal HD cluster deployment itself (see *Using PCC* on page 30 for details).

The agents are deployed as services on each host, including on the Pivotal Command Center admin host.

To stop or start the service run the following as `root`:

```
# service nmon stop
# service nmon start
```

PostgreSQL Database

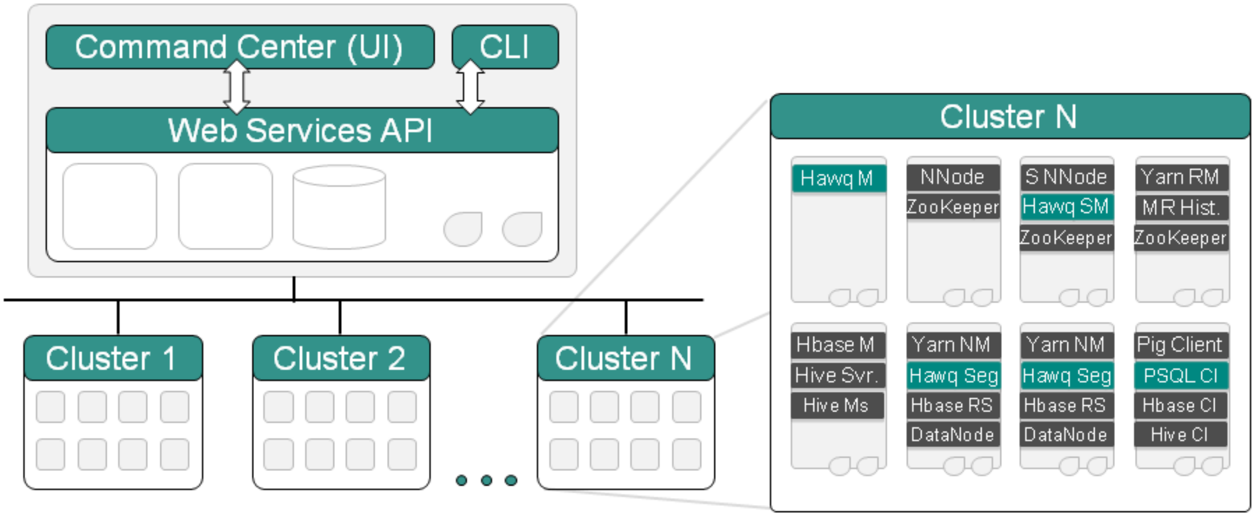
Pivotal Command Center makes use of a PostgreSQL Database to store the following:

- Cluster configurations
- Hadoop cluster metrics
- System metrics of the cluster
- Pivotal Command Center Metadata

Architectural Diagram

For more details about Pivotal HD Enterprise, see *PHD Installation and Administration*.

Pivotal Command Center - Architecture



Chapter 2

PCC Pre-Install

This section provides information you'll need, as well as tasks that must be completed, before you install PCC.

Before You Begin Installing PCC

Before you begin your installation, be sure to read the **PCC Release Notes** for information about the latest features, improvements, resolved and known issues; as well as the latest versioning and compatibility information.

We recommend you have a working knowledge of the following:

- **Yum:** Yum enables you to install or update software from the command line. For more information, see *http://yum.baseurl.org/*.
- **RPM (Redhat Package Manager):** For information on RPM, see *Managing RPM-Based Systems with Kickstart and Yum* (*http://shop.oreilly.com/product/9780596513825.do?sortby=publicationDate*).
- **NTP:** For information on NTP, see *http://www.ntp.org/*.
- **SSH (Secure Shell Protocol):** For information on SSH, see *http://www.linuxproblem.org/art_9.html*.

PCC Pre-Install Checklist

The following prerequisite tasks need to be completed before you begin your PCC installation.

Each task is explained in more detail in subsequent sections; click the task name to jump to those details.

Step	Task	Description	Completed

1	*PCC Pre-Install 1 - DNS Lookup* on page 11	Verify that hosts can reach each other using hostnames and IP addresses:
		`# ping -c 3 myhost.mycompany.com  // The return code should be 0`
		`# ping -c 3 192.168.1.2           // The return code should be 0`	

2	*PCC Pre-Install 2 - JAVA JDK* on page 11	Ensure you're running Oracle Java JDK Version 1.7 on the Admin node. Java version 1.7 is required; 1.7u45 is recommended. On the Admin node, as `root`, run: `# /usr/java/default/bin/java -version` If not, download and install the appropriate version from Oracle.	

Step	Task	Description	Completed
3	*PCC Pre-Install 3 - Verify Package Accessibility* on page 12	Verify that all hosts have yum access to an EPEL yum repository. On the Admin node, as `root`, run: `# yum list <LIST_OF_PACKAGES>` **Note:** This is not required if the required RPMs are accessible locally.	

4	*PCC Pre-Install 4 - Turn Off iptables* on page 14	On the Admin node, as `root`, run:
		`# chkconfig iptables off`
		`# service iptables stop`
		`# service iptables status`
		`iptables: Firewall is not running.`	

5	*PCC Pre-Install 5 - Disable SELinux* on page 14	On the Admin node, as `root`, run: `# echo 0 > /selinux/enforce`	

PCC Pre-Install 1 - DNS Lookup

Before you begin your PCC installation, verify the following:

Verify that the admin host (the host on which you will be installing PCC) is able to reach every host that will be part of your cluster using its hostname and IP address. We also recommend that every cluster node is able to reach every other cluster node using its hostname and IP address:

```
# ping -c 3 myhost.mycompany.com // The return code should be 0
# ping -c 3 192.168.1.2 // The return code should be 0
```

Next Task:

PCC Pre-Install 2 - JAVA JDK on page 11

PCC Pre-Install 2 - JAVA JDK

Before you begin your installation, ensure that you are running Oracle JAVA JDK version 1.7 on the Admin node and that you are not running OpenJDK as your default JDK.

Note: Version 1.7 is required; version 1.7u45 is recommended.

Verify JDK Version

Perform the following steps on the Admin node as both `root` and `gpadmin` users:

```
$ /usr/java/default/bin/java -version
```

The output of this command should contain 1.7 (version number) and JavaHotSpot(TM) (Java version). For example:

```
java version "1.7.0_45"
Java(TM) SE Runtime Environment (build 1.7.0_45-b18)
Java HotSpot(TM) 64-Bit Server VM (build 24.45-b08, mixed mode)
```

If you are not running the correct JDK, download a supported version from the Oracle site at *http://www.oracle.com/technetwork/java/javase/downloads/index.html*.

Note: If you have manually installed UnlimitedJCEPolicy files prior to upgrading your JDK, you will need to re-install them post upgrade.

Install the JDK on the admin node and add it to alternatives as follows:

```
# /usr/sbin/alternatives --install "/usr/bin/java" "java" "/usr/java/
jdk1.7.0_xx/bin/java" 3
# /usr/sbin/alternatives --install "/usr/bin/javac" "javac" "/usr/java/
jdk1.7.0_xx/bin/javac" 3
# /usr/sbin/alternatives --config java
```

OpenJDK

Make sure you are not running OpenJDK as your default JDK.

If you are running OpenJDK, we recommend you remove it.

To check for all versions of JDK that are running on your system, as `root` run:

```
yum list installed | grep jdk
```

An example output from this command is:

```
java-1.6.0-openjdk.x86_64
java-1.7.0-openjdk.x86_64
jdk.x86_64                    2000:1.7.0_45-fcs
```

This indicates that there are three versions of JDK installed, two of them are OpenJDK.

To remove all OpenJDK versions, as `root`, run:

```
yum erase *openjdk*
```

Next Task:

PCC Pre-Install 3 - Verify Package Accessibility on page 12

PCC Pre-Install 3 - Verify Package Accessibility

Verify that all packages are available in a local yum repository or that you have yum access to an EPEL yum repository.

Pivotal Command Center and Pivotal HD Enterprise expect some prerequisite packages to be pre-installed on each host, depending on the software that gets deployed on a particular host. In order to have a smoother installation, it is recommended that each host have yum access to an EPEL yum repository. If you have access to the Internet, you can configure your hosts to have access to the external EPEL repositories. However, if your hosts do not have Internet access (or you are deploying onto a large cluster), then having a local yum EPEL repo is highly recommended. This will also give you some control on the package versions you want to deploy on your cluster. See *EPEL Yum Repository* on page 15, for instructions on how to setup a local yum repository or point your hosts to an EPEL repository.

The following packages need to be either already installed on the admin host or be on an accessible yum repository:

- httpd
- mod_ssl
- postgresql
- postgresql-devel
- postgresql-server
- postgresql-jdbc
- compat-readline5
- createrepo
- sigar
- sudo
- python-ldap
- openldap
- openldap-clients
- openldap-servers
- pam_krb5
- sssd
- authconfig
- krb5-workstation
- krb5-libs
- krb5-server

Run the following command on the admin node to make sure that you are able to install the prerequisite packages during installation:

```
# yum list <LIST_OF_PACKAGES>
```

For example:

```
# yum list httpd mod_ssl postgresql postgresql-devel postgresql-server
 compat-readline5 createrepo sigar sudo
```

If any of them are not available, then you may have not correctly added the repository to your admin host.

For the cluster hosts (where you plan to install the cluster), the prerequisite packages depend on the software you will eventually install there, but you may want to verify that the following two packages are installed or accessible by yum on all hosts:

- nc
- postgresql-devel

For the cluster hosts, the following packages need to be accessible if you are deploying in secure mode (the default):

- krb5-libs
- krb5-workstation
- openldap
- openldap-clients
- pam_krb5
- sssd
- authconfig
- openssh-clients

- python-ldap

Next Task:

PCC Pre-Install 4 - Turn Off iptables on page 14

PCC Pre-Install 4 - Turn Off iptables

Before you begin your installation, verify that iptables is turned off:

As `root`:

```
# chkconfig iptables off
# service iptables stop
```

Next Task:

PCC Pre-Install 5 - Disable SELinux on page 14

PCC Pre-Install 5 - Disable SELinux

Before you being your installation, verify that SELinux is disabled.

As `root`, run:

```
# sestatus
```

If SELinux is disabled, one of the following is returned:

```
SELinuxstatus: disabled
```

or

```
SELinux status: permissive
```

Disabling SELinux Temporarily

If SELinux status is **enabled**, you can temporarily disable it or make it permissive (this meets requirements for installation) by running the following command:

As `root`:

```
# echo 0 > /selinux/enforce
```

Note: This only temporarily disables SELinux; once the host is rebooted, SELinux will be re-enabled. We therefore recommend permanently disabling SELinux (described below) while running PHD/HAWQ (however, this requires a reboot).

Disabling SELinux Permanently

You can permanently disable SELinux by editing the `/etc/selinux/config` file as follows:

Change the value for the SELINUX parameter to:

```
SELINUX=disabled
```

Then reboot the system.

Next Task:

If you need to set up an *EPEL Yum Repository* on page 15, do so now.

Otherwise, you have met all of the prerequisites and can proceed to *Installing PCC* on page 16.

EPEL Yum Repository

Pivotal Command Center and Pivotal HD Enterprise expect some prerequisite packages to be pre-installed on each host, depending on the software that gets deployed on a particular host. In order to have a smoother installation, we recommend that each host have yum access to an EPEL yum repository. If you have access to the Internet, then you can configure your hosts to have access to the external EPEL repositories. However, if your hosts do not have Internet access (or you are deploying onto a large cluster) or behind a firewall, then having a local yum EPEL repository is highly recommended. This also gives you some control on the package versions you want to deploy on your cluster.

Following are the steps to create a local yum repository from a RHEL or CentOS DVD:

1. Mount the RHEL/CentOS DVD on a machine that will act as the local yum repository.

2. Install a webserver on that machine (e.g. httpd), making sure that HTTP traffic can reach this machine.

3. Install the following packages on the machine:

```
yum-utils
createrepo
```

4. Go to the directory where the DVD is mounted and run the following command:

```
# createrepo ./
```

5. Create a repo file on each host with a descriptive filename in the /etc/yum.repos.d/ directory of each host (for example, CentOS-6.1.repo) with the following contents:

```
[CentOS-6.1]
name=CentOS 6.1 local repo for OS RPMS
baseurl=http://172.254.51.221/centos/$releasever/os/$basearch/
enabled=1
gpgcheck=1
gpgkey=http://172.254.51.221/centos/$releasever/os/$basearch/RPM-GPG-KEY-
CentOS-6
```

6. Validate that you can access the local yum repos by running the following command:

```
# yum list
```

You can repeat the above steps for other software. If your local repos don't have any particular rpm, download one from a trusted source on the internet, copy it to your local repo directory and rerun the `createrepo` step.

Chapter 3

Installing PCC

This section describes how to install PCC.

Supported Platforms and Browsers

The following platforms and browsers are supported:

Platforms

- RHEL 6.4 64-bit, 6.5 64-bit
- CentOS 6.4 64-bit, 6.5 64-bit

Browsers

(Minimum screen resolution: 1280 x 800)

- Firefox 23
- IE 10
- Chrome 33.0.1750.146

PCC Install Checklist

The table below briefly describes the steps you need to take to install a cluster; more detailed instructions are provided in *Installing PCC* on page 16.

Note that rows with "**Browser**" depict operations that you perform using the PCC UI.

Step	Task	Description	Completed

1	*PCC Install 1 - Installation Instructions* on page 18	On the Admin node, as `root`:
		1. Create a directory (`phd`) on the root home directory of the Admin node for your PCC installation:
		`# mkdir phd`
		2. Copy the tar file to your specified directory on the admin node. For example:
		`# scp ./PCC-2.3.x.`**`version.build.os`**`.x86_64.tar.gz host:/root/phd/`	

Step	Task	Description	Completed

		3. Log in as `root` and untar to that directory:
		`# cd /root/phd`
		`# tar --no-same-owner -zxvf PCC-2.3.x.`**`version.build.os`**`.x86_64.tar.gz`
		4. Run the installation script from the directory where it was extracted:
		`# ./install`
		5. As the rest of the installation is done as the `gpadmin` user, change to that user:
		`# su - gpadmin`
		6. If necessary, enable Secure Connections (see *Enabling Secure Connections* for details).	

2	*PCC Install 2 - Import the PHD Service Packages* on page 19	Download and copy the PHD packages to the Admin node, then import the packages, including a downloaded JDK package, to the Admin node:
		Copy:
		As `gpadmin`:
		1. Copy the Pivotal HD services - PHD, ADS (for HAWQ), etc. - tarballs from the initial download location to the `gpadmin` home directory (`home/user/gpadmin`).
		2. Change the owner of the packages to `gpadmin`, then untar the tarballs.
		For example:
		If the file is a `tar.gz` or `.tgz` file, use:
		`tar -zxf packagename.tgz`
		If the file is a `.tar` file, use:
		`tar -xf packagename.tar`
		Import:
		Deploy the downloaded JDK to the cluster nodes:
		`$ icm_client import -r <PATH_TO_JDK>`
		For each service (PHD, ADS, etc.) you are importing, run the following:
		`$ icm_client import -s <PATH_TO_EXTRACTED_PHD_SERVICE_TARBALL>`	

3	**Browser:** *Launch Pivotal Command Center UI*	Launch a browser and enter the host on which you installed PCC: `https://`**`<CommandCenterHost>`**`:5443` The Command Center login page is launched in your browser. The default username/password is `gpadmin`/`Gpadmin1` (case sensitive).	

Step	Task	Description	Completed
4	**Browser:** *Configure and Deploy a Cluster*	After you have logged in to Pivotal Command Center, the "Cluster Status" page appears. From here, if you are an administrative user, you are able to launch the **Add Cluster Wizard** that enables you to configure and deploy a Pivotal HD Cluster.	
5	**Browser:** *Start the Cluster*	In the PCC UI, start the cluster from the "Cluster Status" page.	

6	*Initialize and Configure HAWQ*	As `gpadmin`, `ssh` to the HAWQ master, then run the following:
		`$ source /usr/local/hawq/pivotal_path.sh`
		`$ /etc/init.d/hawq init`
		If you have a HAWQ standby master configured, initialize it:
		`$ gpinitstandby -s <STANDBY_HAWQ_MASTER_FQDN>`	

PCC Install 1 - Installation Instructions

Perform the following installation steps as the `root` user.

Note: Avoid using hostnames that contain capital letters because Puppet has an issue generating certificates for domains with capital letters.

Avoid using underscores, as they are invalid characters in hostnames.

1. Download the PCC package from *Pivotal Network*.
2. As `root` on the Admin node, create a directory (`phd`) for your PCC installation on the Admin node:

```
# mkdir phd
```

3. Copy the Pivotal Command Center tar file to the Admin node. For example:

```
# scp ./PCC-2.3.x.version.build.os.x86_64.tar.gz host:/root/phd/
```

4. As `root`, `cd` to the directory where the Command Center tar files are located and untar them. For example:

```
# cd /root/phd
# tar --no-same-owner -zxvf PCC-2.3.x.version.build.os.x86_64.tar.gz
```

5. Still as `root` user, run the installation script. This installs the required packages, configures Pivotal Command Center, and starts services.

   Important: You must run the installation script from the directory where it was extracted (e.g. `PCC-2.3.x.version`).

   For example:

```
# cd PCC-2.3.x.version
# ./install
```

   You will see installation progress information on the screen.

You are given the option via a prompt during installation to specify a custom home directory for `gpadmin`. Before you deploy a cluster make sure that this home directory is consistent across all cluster hosts.Once the installation successfully completes, you will receive an installation success message on your screen.

6. **(Optional)** Enable Secure Connections:

   Pivotal Command Center uses HTTPS to secure data transmission between the client browser and the server. By default, the PCC installation script generates a self-signed certificate.

   Alternatively, you can provide your own Certificate and Key by following these steps:

   a. Set the ownership of the certificate file and key file to `gpadmin`.

   b. Change the permission to owner read-only (mode 400).

   c. Edit the `/etc/httpd/conf.d/pcc-vhost.conf` file and change the following two directives to point to the location of the SSL certificate and key. For example:

   ```
   SSLCertificateFile:
   /usr/local/pivotal-cc/ssl/<servername>.cert

   SSLCertificateKeyFile:
   /usr/local/pivotal-cc/ssl/<servername>.key
   ```

   d. Restart PCC by running:

   ```
   # service commander restart
   ```

7. Verify that your PCC instance is running:

   ```
   # service commander status
   ```

The PCC installation you just completed includes a CLI (Command Line Interface tool: `icm_client`). You can now deploy and manage the cluster using this CLI tool.

You can switch to the `gpadmin` user (created during installation) for the rest of the installation process:

```
$ su - gpadmin
```

Note: If, during the installation of PCC, you receive a facter mismatch error such as the following:

```
PCC-2.3.0-175]# rpm -ev facter
error: Failed dependencies:
facter >= 1.5 is needed by (installed) puppet-2.7.9-1.el6.noarch
```

Remove facter using the command:

```
yum erase facter
```

Then run the PCC installation again.

Next Task:

PCC Install 2 - Import the PHD Service Packages on page 19

PCC Install 2 - Import the PHD Service Packages

Once you have Pivotal Command Center installed, you can use the `import` option in the `icm_client` tool to synchronize the PHD service RPMs and a downloaded JDK package from the specified source location into the Pivotal Command Center (PCC) local yum repository of the Admin Node. This allows the cluster nodes to access the packages during deployment.

If you need to troubleshoot this part of the installation process, see the log file located at: `/var/log/gphd/gphdmgr/gphdmgr-import.log`

Import JDK

Note that having JDK 1.7 running on the Admin node is a prerequisite. This step is to import a downloaded JDK package that will be deployed across the cluster.

1. Download a supported JDK package from *http://www.oracle.com/technetwork/java/javase/downloads/index.html*. PHD expects an RPM package. For example: `jdk-7u45-linux-x64.rpm`
2. Import the downloaded JDK package to the cluster nodes. As `gpadmin`, run:

```
$ icm_client import -r <PATH TO JDK>
```

Copy the PHD Service Packages

1. Download the PHD service packages (PHD, and optionally ADS for HAWQ and PRTS for GemFire XD) from the *Pivotal Network*.
2. Copy the Pivotal HD (and ADS and PRTS if downloaded) tarballs from your initial download location to the `gpadmin` home directory on the Admin node (`home/gpadmin`).
3. Change the owner of the packages to `gpadmin` and untar the tarballs. For example:

```
# For PHD: If the file is a tar.gz or tgz, use
$ tar zxf PHD-2.1.x-<BUILD>.tar.gz

# If the file is a tar, use
$ tar xf PHD-2.1.x-<BUILD>.tar

# For Pivotal ADS: If the file is a tar.gz or tgz file, use
$ tar zxf PADS-1.2.x-<BUILD>.tar.gz

# If the file is a tar, use
$ tar xf PADS-1.2.x-<BUILD>.tar

# For PRTS: If the file is a tar.gz or tgz file, use
$ tar zxf PRTS-1.x.x-<BUILD>.tar.gz

# If the file is a tar, use
$ tar xf PRTS-1.x.x-<BUILD>.tar
```

Import the PHD Service

1. As `gpadmin`, import the following tarball for Pivotal HD:

```
$ icm_client import -s <PATH_OF_EXTRACTED_PHD_PACKAGE>
```

For example:

```
$ icm_client import -s PHD-2.0.x-x/
```

Import the PADS (HAWQ/PXF) Services

[Optional for HAWQ/PXF users]

As `gpadmin`, import the following tarball for HAWQ and PXF:

```
$ icm_client import -s <PATH_OF_EXTRACTED_ADS_PACKAGE>
```

For example:

```
$ icm_client import -s PADS-1.2.x-x/
```

Import the PRTS (GemFire XD) Service

[Optional for GemFire XD users]

As gpadmin, import the following tarball for PRTS:

```
$ icm_client import -s <PATH_OF_EXTRACTED_PRTS_PACKAGE>
```

For example:

```
$ icm_client import -s PRTS-1.x.x-x/
```

Next Task:

PCC Install 3 - Launch PCC on page 21

PCC Install 3 - Launch PCC

To launch the PCC UI, start a browser and navigate to the host on which you installed Command Center.

For example: https://**CommandCenterHost:**5443

The Command Center login page is launched in your browser. The default username/password is gpadmin/Gpadmin1 (case sensitive).

Starting, Stopping, and Restarting Command Center Services

To start, stop, or restart Command Center services, as root, run the following commands on the Pivotal Command Center admin host:

```
# service commander stop

# service commander start

# service commander restart
```

Note: These commands mut be run as root.

Next Steps

See *Using PCC* on page 30 for details about using the application, including how to change the default password and how to deploy and configure a HD cluster via the Pivotal Command Center UI.

See *PHD Installation and Administration* for instructions for using the command-line interface (CLI) of Pivotal Command Center to deploy and configure a HD cluster.

Chapter 4

Uninstalling PCC

Follow the steps below to uninstall Pivotal Command Center and your Pivotal HD cluster:

1. As `gpadmin`, stop services on all your clusters (See the *Pivotal HD Installation and Administrator Guide* for detailed steps).
2. As `gpadmin`, uninstall all your clusters (See the *Pivotal HD Installation and Administrator Guide* for detailed steps).
3. From the directory where you untarred the Pivotal Command Center, run the uninstall script as `root`:

```
# cd /root/phd/PCC-2.x.x.version/
# ./uninstall
```

Chapter 5

Upgrading PCC

The following instructions are for upgrading Pivotal Command Center from version 2.2.x to 2.3.

Note: Upgrade Notes

- If you are upgrading to a new version of Pivotal Command Center, make sure you are running compatible versions of Pivotal HD and Pivotal ADS (optional).
- See the latest version of the Pivotal Command Center Release notes for Pivotal Interoperability Matrix.
- You don't have to stop your cluster to upgrade PCC, it can be either running or stopped.

Upgrading PCC should be performed as part of an overall PHD upgrade. You should refer to the *PHD Installation and Administrator Guide* for more comprehensive upgrade instructions including recommended housekeeping steps you should take prior to an upgrade, such as verifying the state of your cluster.

Follow the steps below to upgrade your PCC installation to a newer version:

1. Download the new PCC file from *Pivotal Network*.
2. Copy the new PCC tar file to your installation directory on the admin node. For example:

```
$ scp ./PCC-2.3.x.version.build.os.x86_64.tar.gz host:/root/phd/
```

3. Log in as `root` and untar to that directory:

```
$ cd /root/phd
$ tar --no-same-owner -zxvf PCC-2.3.x.version.build.os.x86_64.tar.gz
```

4. As `root`, run the PCC installation script from the directory where it is installed:

```
$ ./install
```

Note: There is no need to specify that this is an upgrade; the install utility (`./install`) detects whether it is a fresh install or an upgrade.

5. Make sure that `nmon` is running. To check `nmon` status:

```
# service nmon status
```

To start `nmon`:

```
# service nmon start
```

Note: Following an upgrade, the former contents of `/usr/local/config` can be found in `/usr/local/config.bak`.

Chapter 6

Configuring PCC for LDAP

This section describes how you can configure PCC to use an existing LDAP server for user authentication.

1. On the PCC Admin node, navigate to the `/usr/local/pivotal-cc/config` directory:

   ```
   cd /usr/local/pivotal-cc/config
   ```

2. Open the `ldap.yaml` file in an editor, for example:

   ```
   vi ldap.yaml
   ```

3. Add the following lines using values from your LDAP setup:

   ```
   enabled: true
   host: "ldap.yourdomain.com"
   port: 389
   username: "cn=Manager,dc=yourdomain,dc=com"
   password: "changeme"
   base_dn: "ou=Users,dc=yourdomain,dc=com"
   ```

   Where:

   - `host` = The domain name of your LDAP server
   - `port` = The port for your LDAP server
   - `username` = The common name (cn) user to search the LDAP server
   - `password` = The password associated with the username
   - `base_dn` = The Base Domain Name where user information is located
   - `cn` = Common Name
   - `ou` = Organizational Unit
   - `dc` = Domain Component

4. Save and close `ldap.yaml`
5. Restart PCC:

   ```
   # service commander restart
   ```

   Now, when you add a user to PCC (see *PCC UI User Management* on page 32), you can use the **Check username** link to select an LDAP-authenticated user. Once set up, this user can then log in to PCC using his/her LDAP username and password.

Chapter 7

Backing Up and Restoring the PCC Admin Node

You can back up data on the Admin node where PCC is installed. Having the backup allows you to restore the Admin node and PCC to a given state in case of failures or data corruption.

Note: Backup and restore operations should be performed as `root` and must be performed from the command line on the Admin node.

Backup

Run the backup script to copy all configuration files and all data in the PCC database into a backup file on a local disk. Once the tar file is created you should copy it off the admin node to a different storage to prevent it from being lost if the admin node fails.

Note: You should backup your data each time you make a configuration or topology change for your cluster or if you add or delete clusters. Trying to restore old backup on the admin node when the cluster topology or configuration has been changed since the backup will result in inconsistent configuration and potentially unusable cluster.

To perform the backup run the following script:

```
# /usr/lib/gphd/gphdmgr/bin/gphdmgr_backup.sh
```

The script does not require any input and produces the backup file `phdmgr_backup_[timestamp].tar.gz` in the current working directory, where `timestamp` is the number corresponding to the current system time.

Restore

Run the restore script to replace all configuration files and all data in the PCC database from a backup file on a local disk. There are two restore scenarios:

- **Restore data on a new node:** If you had a backup from the old admin node and you need to provision a new admin node, install PCC on the new admin node, then restore data from the backup produced on the old admin node. Hostnames, IP addresses and system configuration of the old and new nodes have to be identical.
- **Restore data on the same node:** You can restore data from the backup file on the same admin node where the backup was produced. Make sure the PCC version has not been updated since the backup was made.

Note: The restore procedure replaces all your configuration files and database data with the data from the backup file, so use with caution.

To perform the restore run the following script:

```
# /usr/lib/gphd/gphdmgr/bin/gphdmgr_restore.sh
 phdmgr_backup_[timestamp].tar.gz

Your data will be permanently removed. Do you want to continue? y
```

The script takes the name of the backup file as an argument and asks the user for the confirmation before proceeding with the restore. The script takes care of stopping the PCC services, performing the restore, and restarting the services.

Chapter 8

Using PCC

This section provides instructions for using the PCC UI.

PCC UI Overview

Pivotal Command Center UI is a browser-based application for configuring, deploying, administering, and monitoring Pivotal HD clusters. At a high level, the screens consist of:

- *Cluster Status Page* on page 34 - Provides status information about any clusters you have configured and deployed. Also provides access to the Add Cluster Wizard that allows you to configure and deploy clusters from the UI. See *Configuring and Deploying a Cluster* on page 34 for more details.
- *PCC UI Dashboard* on page 42 - Provides an overview of your Pivotal HD cluster. This screen shows at one glance the most important states and metrics that an administrator needs to know about the Pivotal HD cluster.
- *Cluster Analysis* on page 44 - Provides detailed information about various metrics of your Pivotal HD cluster. This provides cluster-wide metrics all the way down to host-level metrics.
- *MapReduce Job Monitor* on page 47 - Provides details about all, or a filtered set of MapReduce jobs.
- *Yarn App Monitor* on page 51 - Provides details about all, or a filtered set of YARN applications.
- *HAWQ Query Monitor* on page 52 - When HAWQ (a revolutionary MPP database on Hadoop solution) is deployed on the cluster, Command Center can show the progress of all actively running queries on HAWQ.
- *Topology* on page 52 - This screen shows you what roles have been installed on each host. You can also add and remove slaves to/from the cluster from this screen.
- *Logs* on page 54 - This screen displays system logs based on filter criteria you select such as log levels, host name, time period, and so on.

Status indicators

Throughout the user interface the following indicators are used to indicate the status of nodes:

- Green: Succeeded
- Blue: Running
- Grey: Stopped/Pending
- Red: Killed/Failed

Logging In

Launch a browser and navigate to the host on which you installed Command Center. For example:

```
https://CommandCenterHost:5443
```

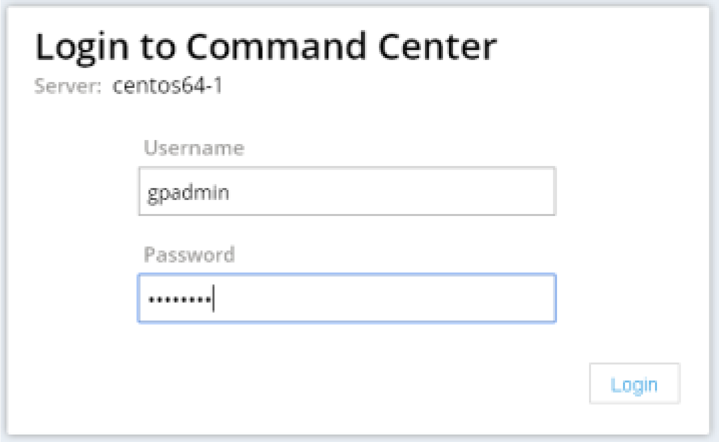
The Command Center login page is launched in your browser. The default username/password is `gpadmin`/`Gpadmin1` (case-sensitive).

To change the default port (5443), update the port settings in the following file:

```
/usr/local/pivotal-cc/config/app.yml
```

Login Screen

The first time you launch the Command Center UI, a login screen appears showing the hostname of this instance of Pivotal Command Center.



Login to Command Center

Server: centos64-1

Username: gpadmin

Password: ••••••••

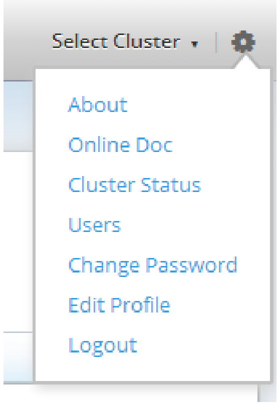
The default admin username/password is `gpadmin`/`Gpadmin1` (case-sensitive). You can change this password via the *Settings* menu.

Passwords are case-sensitive and must be at least 8 letters long and contain 1 upper-case letter and 1 number.

Once you have entered a valid username/password, click the **Login** button to launch the Command Center UI.

PCC UI Settings

Once you have logged in, you can click the gear icon in the upper right corner of the screen from any PCC page to display the **Settings** menu.



From the settings menu you can select one of:

- **About** - Select this to display version information about this instance of PCC
- **Online Doc** - Select this to link to Pivotal's product documentation home page.

- **Cluster Status** - Select this option to go back to the *Cluster Status* page to view the list of available clusters.
- **Users** - Select this option to add/edit user information. There are two types of users, administrative and non-administrative (read-only); you will only see the **Users** option if you are an administrative user. For more information, see *Users*.
- **Change Password** - Click this to change your password. For more information, see *Passwords*.
- **Edit Profile** - Click this to change your profile. For more information, see *Users*.
- **Logout** - Select this option to logout from this instance of PCC.

PCC UI User Management

There are two types of users:

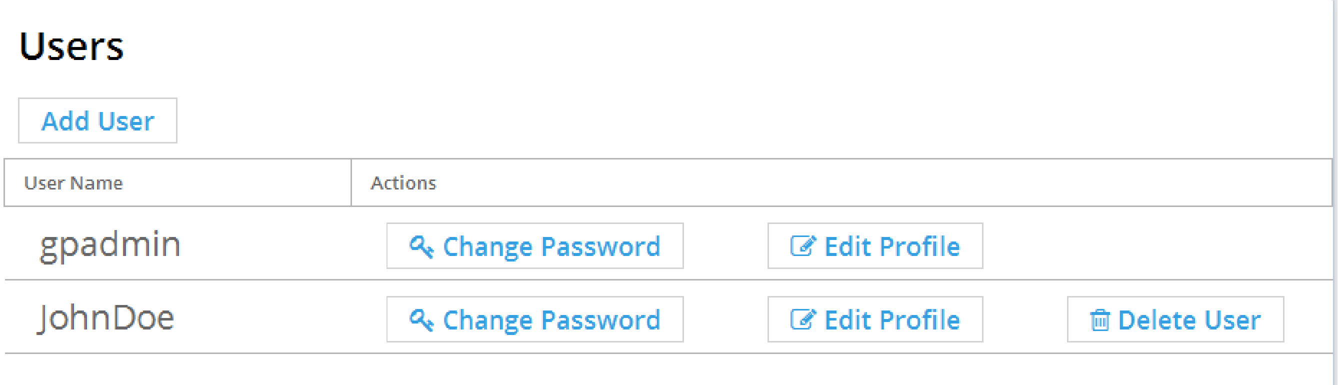
- Administrative (super user) - If you are an administrative user, you can add users, edit your own or other users' profiles, change your own or other users' passwords, and delete users.
- Non-administrative (read-only) - Non-administrative users are read-only users; their actions are limited to read-only actions.

Note: For many user management actions, you will be asked to **Re-authenticate to Continue**. In all cases, this means you need to enter the password of the current user performing the action to continue.

Users

Note: You will only see the **Users** option in the **Settings** menu if you are an administrative user.

Select **Users** from the **Settings** menu to see a list of all current users:



User Name	Actions		
gpadmin	Change Password	Edit Profile	
JohnDoe	Change Password	Edit Profile	Delete User

Adding a User

1. Click **Add User** to create a new user.A New User form appears. Enter the following information about the new user:
   - **First Name**.
   - **Last Name**.
   - ***User Name**. This must be a unique name. (For adding an LDAP user, see below.)
   - **Email**. Must be a valid email address.
   - **Administrator**. Check this box if the new user is to have administrative privileges.
   - **Password**. Enter a password for the new user. This must meet the minimum password requirements. Passwords are case-sensitive and must be at least 8 letters long and contain 1 upper-case letter and 1 number.

- **Confirm Password**. Confirm the new user's password.

2. Click **OK**.

   A dialog box appears asking you to **Re-authenticate to Continue**.
3. Enter the password of the current user (the administrative user who is creating the new user).
4. Click **OK**.

You are returned to the Users screen where you should now see your new user(s) in the list.

*Adding a New LDAP User

If your instance of PCC has been set up to use an existing LDAP server for user authentication (see *Configuring PCC for LDAP* on page 26), you will see a **Check username** link adjacent to the **Username** field. Click this link to see if the username you are attempting to add exists in the LDAP server; if it does, the rest of the fields, except the Password field, are populated with data from LDAP. Once this user has been added, he/she can log into PCC using their LDAP username and password.

Deleting a User

Only administrative users can delete users and the default `gpadmin` user can never be deleted. To delete a user:

1. Select **Users** from the **Settings** menu
2. Click the **Delete User** link adjacent to the user you want to delete.A dialog box appears asking you to Re-authenticate to Continue.
3. Enter the password of the current user (the administrative user who is deleting the user).
4. Click **OK**.

You are returned to the Users screen where the user you just deleted should no longer appear in the list.

Profiles

Your profile includes: First Name, Last Name, User Name, Email Address, and User Type (administrative or not); it does not include your password.

All users can edit their own profiles by selecting **Edit Profile** from the **Settings** menu.

Administrative users can edit their own passwords and also the profiles of other users by:

1. Selecting **Users** from the **Settings** menu.
2. Clicking the **Edit Profile** link adjacent to the user whose profile they wish to edit.

After making edits to any profile, a dialog box appears asking you to **Re-authenticate to Continue**. Enter the password of the current user making the edits to continue, then click **OK**.

Passwords

Passwords are case-sensitive and must be at least 8 letters long and contain 1 upper-case letter and 1 number.

All users can change their own passwords by selecting **Change Password** from the **Settings** menu.

Administrative users can change their own passwords and also the passwords of other users by:

1. Selecting **Users** from the **Settings** menu.
2. Clicking the **Change Password** link adjacent to the user whose password you wish to change.

After changing any password, a dialog box appears asking you to **Re-authenticate to Continue**. Enter the password of the current user making the edits to continue, then click **OK**.

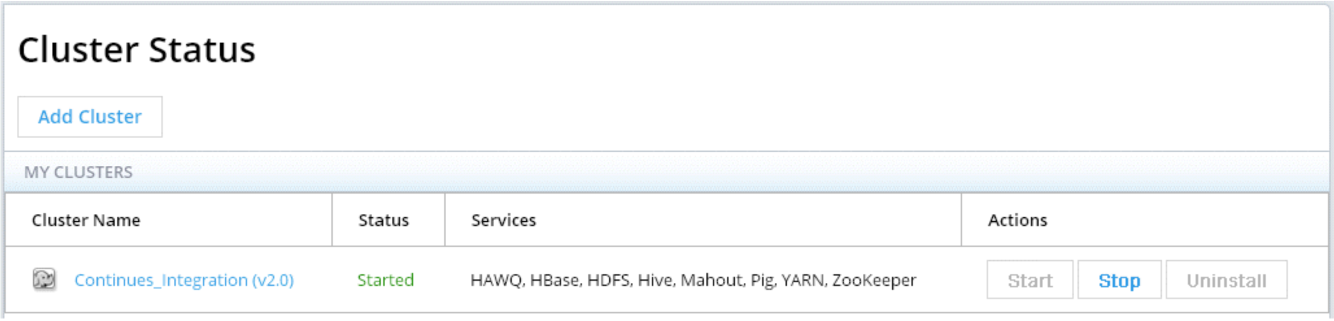
Note: LDAP Users

If you modify a password in PCC, the modified password is stored in PCC only. The password in LDAP is not changed.

Cluster Status Page

Once you have launched Command Center, the initial screen you see is the Cluster Status screen. This displays a list of available clusters to monitor, the status of each cluster (**started**, **stopped**), and a list of services running on that cluster (Hive, Mahout, and so on).

Note: The **Add Cluster** and **Actions** buttons are only visible to administrative users.



Cluster Status

Cluster Name	Status	Services	Actions
Continues_Integration (v2.0)	Started	HAWQ, HBase, HDFS, Hive, Mahout, Pig, YARN, ZooKeeper	Start Stop Uninstall

From this page you can:

- Click the cluster name in the table to view the Dashboard for that cluster.
- From any point within the Command Center UI, you can always select a different cluster by using the **Select Cluster** drop-down menu in the upper right corner of the screen.
- Administrative users only: Click **Add Cluster** to launch the *Add Cluster Wizard*.
- Administrative users only: You can either **Start**, **Stop**, or **Uninstall** a cluster. Depending on the state of the cluster, some of these buttons will be enabled while others are disabled.

Configuring and Deploying a Cluster

This section describes how to use the Add Cluster Wizard to configure and deploy a cluster.

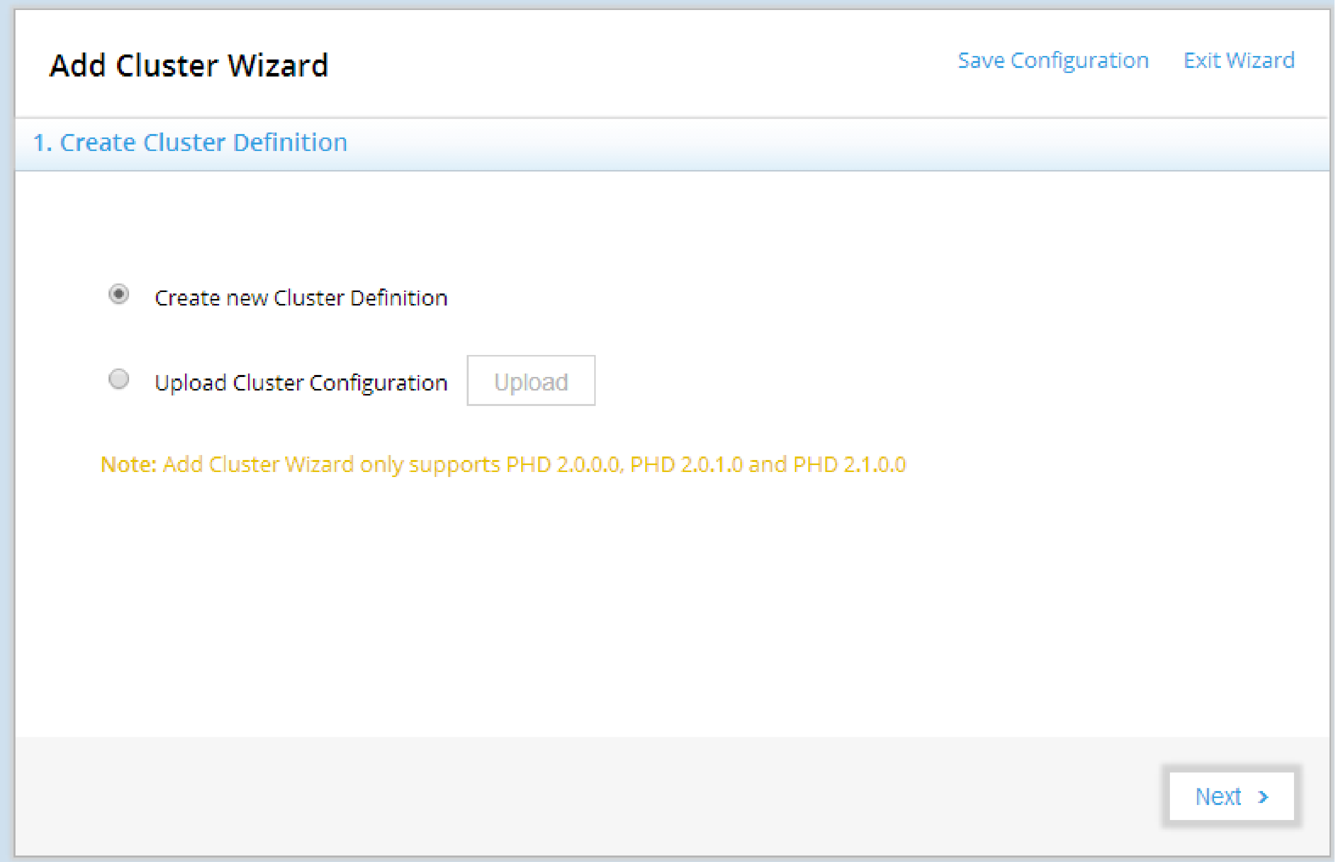
Launch the "Add Cluster" Wizard

Note: Before you can configure and deploy a cluster, make sure you have already installed the PHD Services using the CLI (`icm_client`). See *Installation Instructions* for details.

After you have logged in to Pivotal Command Center, the Cluster Status page appears. From here, if you are an administrative user, you are able to use the "Add Cluster" Wizard to configure and deploy a Pivotal HD Cluster.

Important: Clusters deployed via Pivotal Command Center are High Availability-enabled by default, and are not secured. You can manually disable High Availability or secure a cluster via the command line; refer to the *PHD Installation and Administrator Guide* for instructions.

Click **Add Cluster** to launch the Wizard. The Add Cluster Wizard screen opens.



Add Cluster Wizard

1. Create Cluster Definition

● Create new Cluster Definition

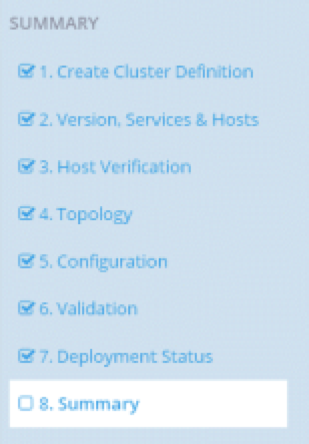
○ Upload Cluster Configuration

Note: Add Cluster Wizard only supports PHD 2.0.0.0, PHD 2.0.1.0 and PHD 2.1.0.0

As noted on the Add Cluster Wizard screen, the Wizard only supports PHD 2.0.x and PHD 2.1.

The Wizard allows you to create a new configuration from scratch or upload and edit any existing configuration.

As you move through the Wizard, the right hand pane displays where you are in the deployment process:



SUMMARY

- ☑ 1. Create Cluster Definition
- ☑ 2. Version, Services & Hosts
- ☑ 3. Host Verification
- ☑ 4. Topology
- ☑ 5. Configuration
- ☑ 6. Validation
- ☑ 7. Deployment Status
- □ 8. Summary

Next Step: *1. Create Cluster Definition* on page 35

1. Create Cluster Definition

In the Create Cluster Definition screen:

- If you are configuring a new cluster, select **Create a new Cluster Definition**, then click **Next**.
- If you want to edit an existing cluster:

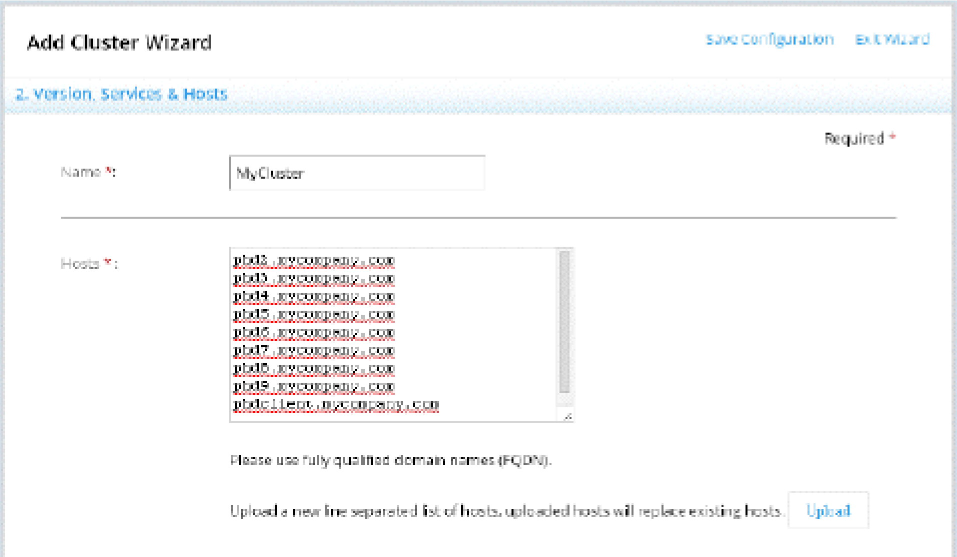
1. Select **Upload Cluster Configuration**
2. Click **Upload**, then navigate to the `clusterConfig.xml` file that you wish to edit.
3. Click **Next**. In this case, the fields in the Wizard will be populated with the cluster definition properties from the `clusterConfig.xml` file you just uploaded.

The following steps provide instructions for entering or editing the cluster definition properties depending on the option you selected.

Next Step: *2. Versions, Services, and Hosts* on page 36

2. Versions, Services, and Hosts

The Versions, Services & Hosts screen opens.



Name *: MyCluster

Hosts *:

```
pbd12.mycompany.com
pbd13.mycompany.com
pbd14.mycompany.com
pbd15.mycompany.com
pbd16.mycompany.com
pbd17.mycompany.com
pbd18.mycompany.com
pbd19.mycompany.com
pbdclient.mycompany.com
```

Please use fully qualified domain names (FQDN).

Upload a new line separated list of hosts, uploaded hosts will replace existing hosts.

Note:

- Hosts can be entered individually, newline-separated; or can be expressed in a range, for example `host[1-5].yourdomain.com`. They can also be expressed in multiple ranges, for example `host[1-3].subdomain[1-2].yourdomain.com`. Any hosts expressed in ranges are expanded during host verification. Hosts that do not exist within a specified range will be ignored, so you can specify a wide range and only those hosts that are available within that range will be added.
- If you are editing an existing configuration, some, if not all, of these fields will be pre-populated. Edit where appropriate.
- You need to scroll down to view all the fields on this screen. The **Next** button will not be active until you have entered all the required fields.

1. Enter the following information:

   - **Name**: Required. Enter a name for this cluster. Special characters are not supported.
   - **Hosts**: Required. Enter a new line-separated list of FQDN host names. You can also click **Upload** to use a text file containing a new line-separated list of host names.
   - **Root Password**: Required. Enter the root password.
   - **GP Admin Password**: Required. Enter the `gpadmin` user password. PCC creates this user on all nodes.
   - **JDK Path**: Enter the JDK filename (not the absolute path). For example:

     ```
     jdk-7u51-linux-x64.rpm
     ```

Note: JDK 1.7.0_45 (min) is a prerequisite.

If not already installed, you should download the required version of JDK and install it using `icm_client import -r`. See *PCC Install 2 - Import the PHD Service Packages* on page 19 for more details).

- **Setup NTP**: Check this box if you want to set up NTP (Network Time Protocol).
- **Disable SELinux**: Check this box if you want to disable SELinux. Recommended.
- **Disable IPTables**: Check this box if you want to disable IPTables. Recommended.
- **Run ScanHosts**: Leave this box checked if you want to run scanhosts. The scanhosts command verifies the prerequisites for the cluster node have been met and provides a detailed report of any missing prerequisites. Running this command ensures that clusters are deployed smoothly and is strongly recommended.

2. Click **Next**.

Next step: *3. Host Verification* on page 37

3. Host Verification

The Host Verification screen opens. This step may take a few minutes, it verifies connections to the hosts you just set up. Once the **Eligibilty** field changes from **Pending** to **Eligible** for all hosts, you can click **Next**. You will see any error and informational messages displayed in the comments fields.

Note: If you specified hosts using ranges, they will be expanded at this point.

Next Step: *4. Cluster Topology* on page 37

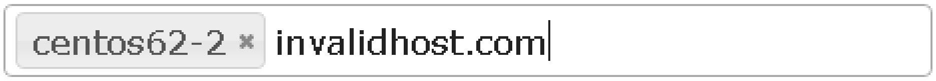
4. Cluster Topology

The Cluster Topology screen opens. This is the screen where you specify the roles to be installed on the hosts. For example, you can specify where your Hadoop NameNode, DataNode, and so on, should be installed. Note that all mandatory roles should have at least one host allocated.

Each service has its own section on this page; you can use the top menu options as shortcuts to those sections on the page, or simply scroll down to each section. Click **Clear** to clear your entries for each service.

Note:

- You need to click **Enter** or **Tab** before each field is accepted. Once you enter the text and click **Enter** or **Tab**, the text will change appearance and appear enclosed in a box, as shown in the figure below. The entry on the left has been accepted, the entry on the right has not.



centos62-2 × invalidhost.com

- Hosts can be specified in ranges. See the notes for *2. Versions, Services, and Hosts* on page 36 for more information.
- At any point during this stage, you can click **Save Configuration** at the top right of the page. This saves the configuration file and downloads it. Once saved, a link to the configuration file appears at the bottom of the page. Click that link to open and view the `clusterConfig.xml` file. You cannot edit this XML file directly.

These are the roles that need to have installation nodes defined:

- **CLIENTS**: The Pig, Hive, HBase, and Mahout libraries are installed on this host
- **HDFS**: Name Node, Standby Name Node, Journal Node, and Data Nodes
- **YARN**: Resource Manager, History Server, Node Managers

- **HBase**: Hbase Master, HBase Region Servers (note that you can click **Copy from HDFS** to copy the hosts you specified for HDFS)
- **Hive**: Hive Master, Hive Metastore
- **Zookeeper**: Zookeeper Server
- **HAWQ**: HAWQ Master Node, HAWQ Standby Node, HAWQ Segment Nodes (note that you can click **Copy from HDFS** to copy the hosts you specified for HDFS)
- **GFXD** (GemFire XD): GFXD Locator Node, GFXD Server Node
- **PXF**: PXF Server. PXF hosts should contains Name Node (both Active & Standby) and all the Data Nodes.
- **Mahout**: No hosts to configure. Installed on the client host. Click the checkbox to install.
- **Pig**: No hosts to configure. Installed on the client host. Click the checkbox to install.

Note: HAWQ and GFXD services are both memory intensive and it is best to configure these services to be deployed on different nodes.

Click **Next** once you have finished role-mapping.

Next Step: *5. Cluster Configuration* on page 38

5. Cluster Configuration

This page displays a list of all configuration files that define this cluster; the `clusterConfig.xml` (to edit service configuration global values) as well as the service specific configuration files. All these configuration files are already populated with the values you have already entered; or with default values.

Click any file name to open that configuration file in an editor and enter/edit values.

If you make any changes, click **Save** to return to the Cluster Configuration page.

Once you have completed all your edits, click **Next**.

Next Step: *6. Validation* on page 38

6. Validation

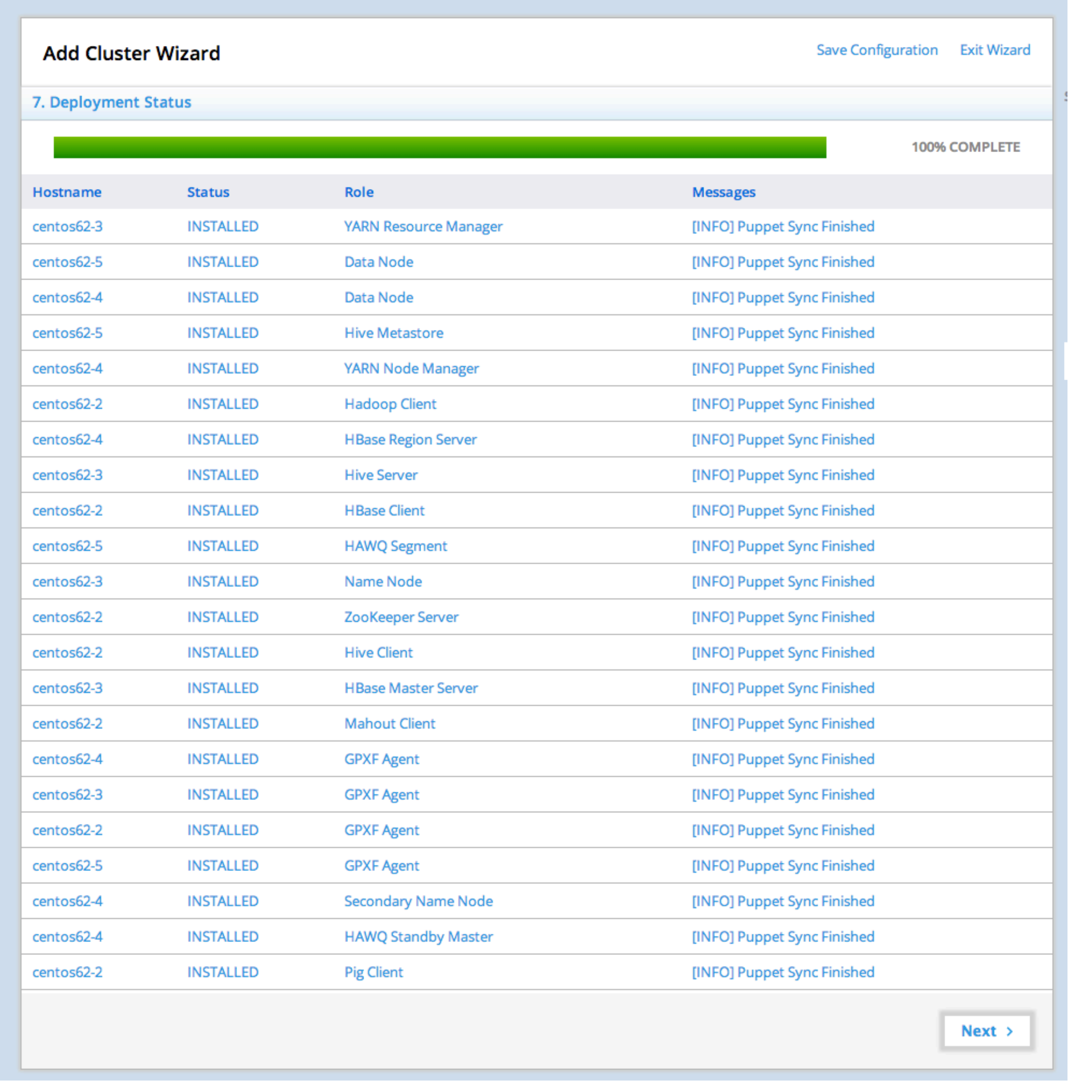
The Validation screen opens. If the configuration has errors they will be displayed here; otherwise you will see post-deployment instructions.

Click **Deploy**.

Next Step: *7. Deployment Status* on page 38

7. Deployment Status

The Deployment Status screen appears.



Add Cluster Wizard

7. Deployment Status

100% COMPLETE

Hostname	Status	Role	Messages
centos62-3	INSTALLED	YARN Resource Manager	[INFO] Puppet Sync Finished
centos62-5	INSTALLED	Data Node	[INFO] Puppet Sync Finished
centos62-4	INSTALLED	Data Node	[INFO] Puppet Sync Finished
centos62-5	INSTALLED	Hive Metastore	[INFO] Puppet Sync Finished
centos62-4	INSTALLED	YARN Node Manager	[INFO] Puppet Sync Finished
centos62-2	INSTALLED	Hadoop Client	[INFO] Puppet Sync Finished
centos62-4	INSTALLED	HBase Region Server	[INFO] Puppet Sync Finished
centos62-3	INSTALLED	Hive Server	[INFO] Puppet Sync Finished
centos62-2	INSTALLED	HBase Client	[INFO] Puppet Sync Finished
centos62-5	INSTALLED	HAWQ Segment	[INFO] Puppet Sync Finished
centos62-3	INSTALLED	Name Node	[INFO] Puppet Sync Finished
centos62-2	INSTALLED	ZooKeeper Server	[INFO] Puppet Sync Finished
centos62-2	INSTALLED	Hive Client	[INFO] Puppet Sync Finished
centos62-3	INSTALLED	HBase Master Server	[INFO] Puppet Sync Finished
centos62-2	INSTALLED	Mahout Client	[INFO] Puppet Sync Finished
centos62-4	INSTALLED	GPXF Agent	[INFO] Puppet Sync Finished
centos62-3	INSTALLED	GPXF Agent	[INFO] Puppet Sync Finished
centos62-2	INSTALLED	GPXF Agent	[INFO] Puppet Sync Finished
centos62-5	INSTALLED	GPXF Agent	[INFO] Puppet Sync Finished
centos62-4	INSTALLED	Secondary Name Node	[INFO] Puppet Sync Finished
centos62-4	INSTALLED	HAWQ Standby Master	[INFO] Puppet Sync Finished
centos62-2	INSTALLED	Pig Client	[INFO] Puppet Sync Finished

This screen shows the progression of the deployment. Information displayed includes:

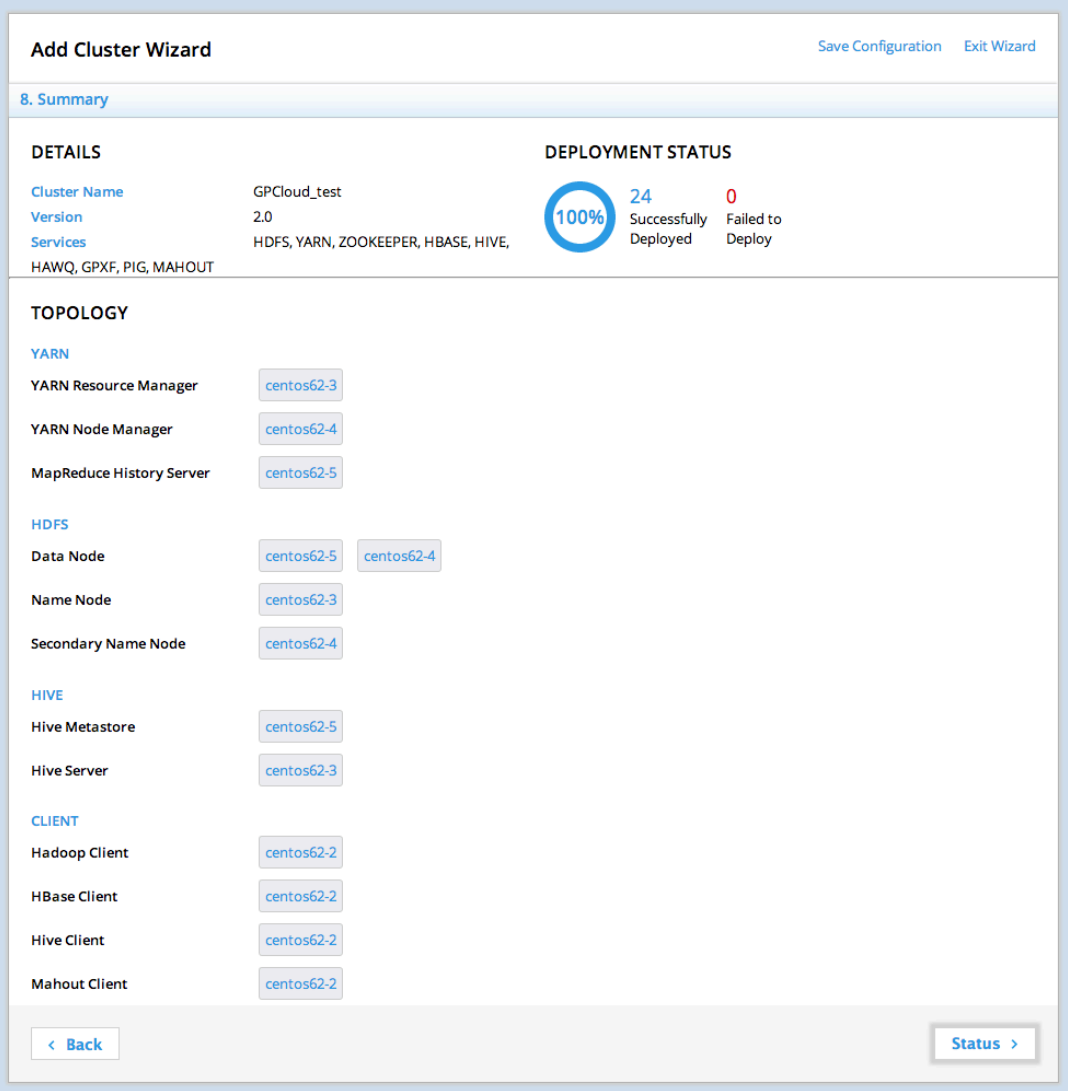
- **Hostname**
- **Status**
- **Role**
- **Messsages**

Once the deployment is complete, click **Next**.

Next Step: *8. Summary* on page 40

8. Summary

Once your cluster has successfully deployed, you can view a summary of the cluster, as shown here:



Add Cluster Wizard

8. Summary

DETAILS

Cluster Name	GPCloud_test
Version	2.0
Services	HDFS, YARN, ZOOKEEPER, HBASE, HIVE, HAWQ, GPXF, PIG, MAHOUT

DEPLOYMENT STATUS

100%

24 Successfully Deployed

0 Failed to Deploy

TOPOLOGY

YARN	
YARN Resource Manager	centos62-3
YARN Node Manager	centos62-4
MapReduce History Server	centos62-5
HDFS	
Data Node	centos62-5 centos62-4
Name Node	centos62-3
Secondary Name Node	centos62-4
HIVE	
Hive Metastore	centos62-5
Hive Server	centos62-3
CLIENT	
Hadoop Client	centos62-2
HBase Client	centos62-2
Hive Client	centos62-2
Mahout Client	centos62-2

Once you have reviewed this summary, click **Status**, to return to the Cluster Status page. Your new cluster will be listed on this page, with the status of **installed**.

Next Step: *Start the Cluster from the UI* on page 40

In addtion, if you are deploying HAWQ you need to initialize and configure HAWQ after you start the cluster. See *Initialize and Configure HAWQ* on page 40 .

Start the Cluster from the UI

To start your cluster; click **Actions**: **Start** on the Cluster Status page.

Initialize and Configure HAWQ

For HAWQ users:

1. `ssh` to the HAWQ master.

2. As `gpadmin`, run:

```
su - gpadmin
$ source /usr/local/hawq/greenplum_path.sh
$ /etc/init.d/hawq init
```

3. Add the IP address of your instance of Command Center to HAWQ's `pg_hba.conf` file. For example:

```
$ vi /data1/master/gpseg-1/pg_hba.conf
host     all         gpadmin         <Command_center host IP>/24
trust
```

4. Restart HAWQ:

```
$ /etc/init.d/hawq restart
```

You have now completed your cluster configuration and deployment.

Starting, Stopping, and Uninstalling a Cluster

These functions are only available to administrative users. In addtion, depending on the state of the cluster, some of these buttons will be enabled while others are disabled.

Starting

To start a cluster:

1. From the Cluster Status page, locate the cluster you want to start.
2. Click the **Actions**: **Start** button.

Stopping

To stop a running cluster:

1. From the Cluster Status page, locate the cluster you want to stop.
2. Click the **Actions**: **Stop** button.

Uninstalling

Only stopped clusters can be uninstalled.

To uninstall a cluster:

1. From the Cluster Status page locate the cluster you want to uninstall, then click the **Actions**: **Uninstall** button.
2. An Uninstall confirmation dialog appears. Click **Yes** to confirm you want to uninstall this cluster; **No** to cancel the operation and return to the Cluster Status page.
3. Once you confirm you want to continue with the uninstall operation, a Preserve Cluster State dialog appears. You need to specify whether you want to preserve the data for this cluster.

   Your options are:

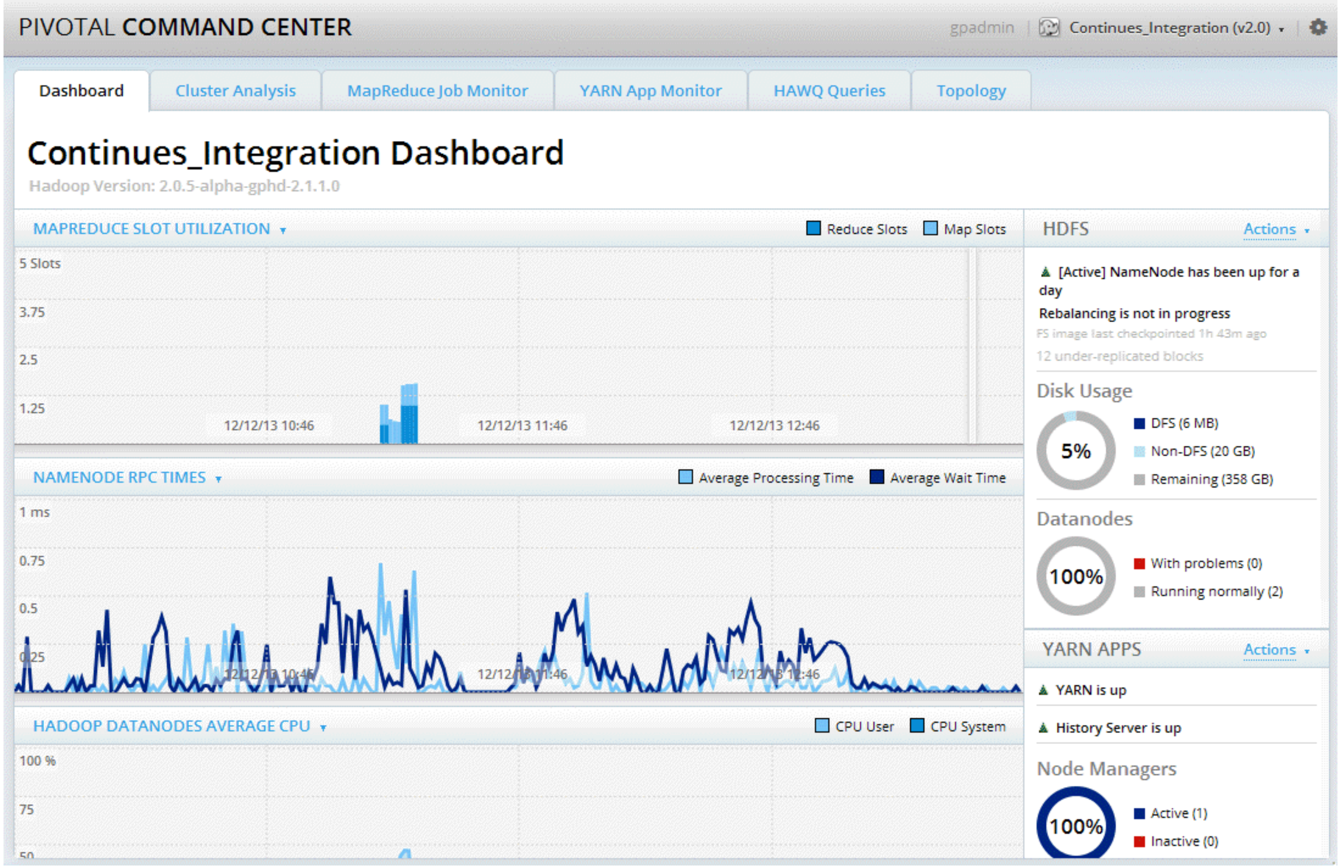
   - **Cancel** - This cancels the operation and returns you to the Cluster Status page.
   - **Yes** - This preserves the data for this cluster before uninstalling the cluster and returning you to the Cluster Status page.
   - **No** - This uninstalls the cluster without preserving the data; then returns you to the Cluster Status page.

PCC UI Dashboard

The dashboard gives you a high level view of a cluster at a glance.

You are able to view the status of the most important cluster services, such as HDFS and YARN, and can start and stop each service individually. It also shows you how the most important cluster metrics are trending in a visual way.

The graphs provide a unified view of the state of your system. They are also useful in detecting outliers and pinpointing specific problems that may be present in your system.



Continues_Integration Dashboard

Hadoop Version: 2.0.5-alpha-gphd-2.1.1.0

[Active] NameNode has been up for a day

Rebalancing is not in progress

FS image last checkpointed 1h 43m ago

12 under-replicated blocks

YARN is up

History Server is up

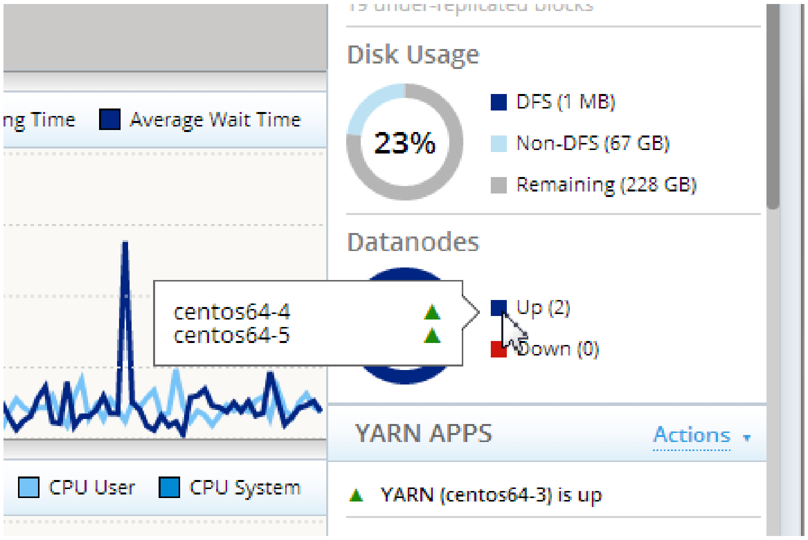
The main portion of the Dashboard displays graphs that provide metrics over time for:

- Mapreduce Slot Utilization
- Namenode RPC Times
- Hadoop Datanodes Average CPU
- Hadoop Datanodes Average Bandwidth
- Namenode Operations Per Second
- Hadoop Datanodes Average Disk Bandwidth
- Hadoop Datanodes Average Memory
- Mapreduce Jobs By Status

Hover over the timeline to see a snapshot of the metrics at that given time.

The right side of the Dashboard displays the state of the following services, provided they have been deployed for this cluster.

Hover over a role to see a list of the relevant nodes, and their statuses, for that role. For example in this cluster there are two datanodes, **centos64-4** and **centos64-5**, both have a status of **up** (running).



YARN (centos64-3) is up

The right status pane also displays what the host name for each role, appearing in parenthesis after the role name. For example, in the above screenshot, the hostname for YARN role is **centos64-3**.

HDFS

For HDFS, the dashboard provides the following information/functionality:

- The status of HDFS. You can use the **Actions** dropdown menu to **Start**/**Stop HDFS** depending on its status.
- When the last NameNode checkpoint occurred.
- The percentage of cluster storage being used by HDFS and how much is free.
- The number of DataNodes that are up and whether they are running normally or with problems (hover over to see list of nodes and their statuses)
- The **Actions** dropdown menu allows you to **Rebalance** (redistribute your data across the cluster) your cluster, and to **View Rebalancer Log**.

Note: The only Action option available to non-administrative users is to View Rebalancer Log.

Note: If High Availability (HA) is enabled for your cluster, you will see the status of two NameNodes here.

YARN

For YARN, the dashboard provides the following information:

- The status of YARN. You can use the **Actions** dropdown menu to **Start**/**Stop YARN** depending on its status (not available for non-administrative users).
- Whether or not the YARN History Server is running. Note: The History Server stores a history of the mapreduce jobs run on the cluster.
- The number of Node Managers that are running (hover over to see list of nodes and their statuses).

HBase

For HBase, the dashboard provides the following information:

- The status of the HBase master. You can use the **Actions** dropdown menu to **Start**/**Stop HBase** depending on its status (not available for non-administrative users).

- The number of Region Servers that are running (hover over to see list of nodes and their statuses).

Hive

For Hive, the dashboard provides the following information:

- The status of Hive. You can use the **Actions** dropdown menu to **Start**/**Stop Hive** depending on its status (not available for non-administrative users).

Zookeeper

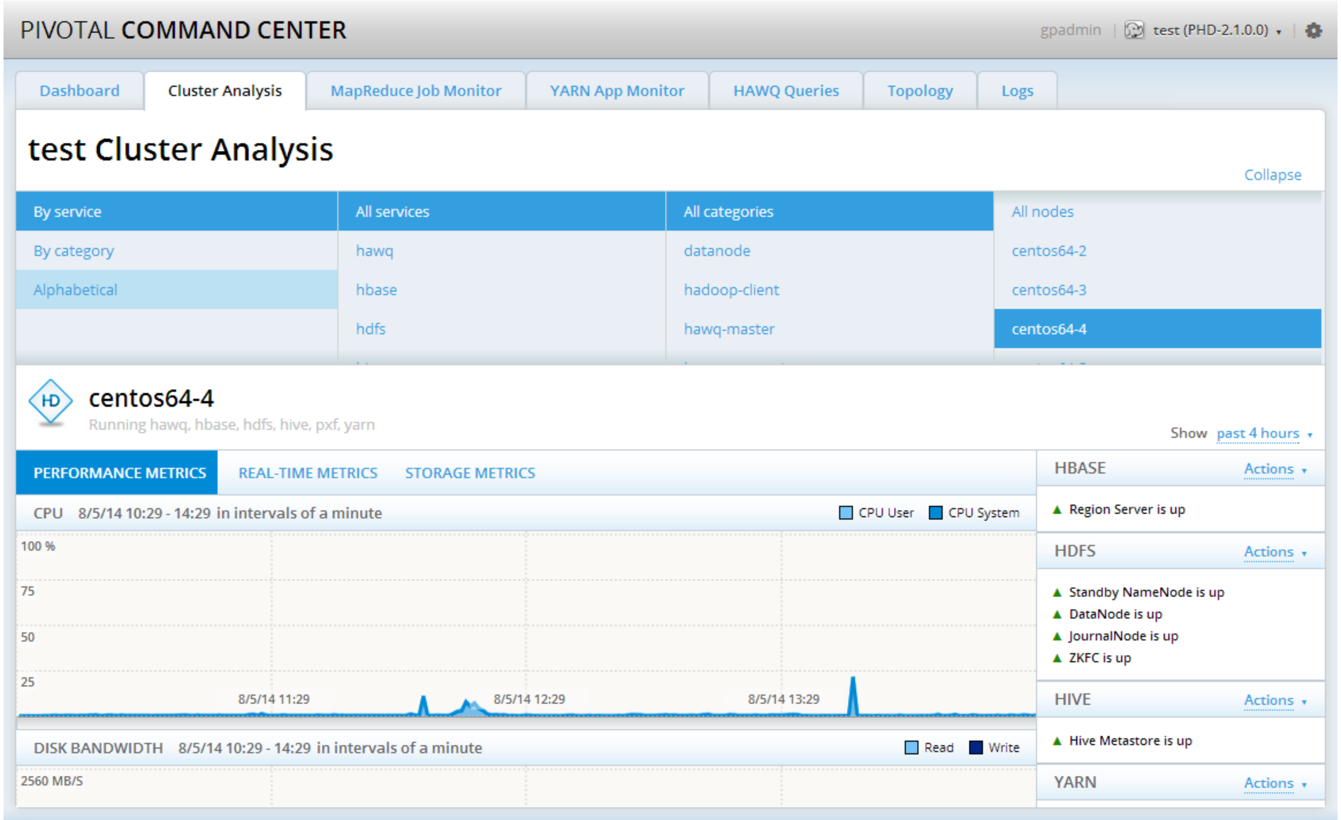
For Zookeeper, the dashboard provides the following information:

- The status of Zookeeper. You can use the **Actions** dropdown menu to **Start**/**Stop Zookeeper** depending on its status (not available for non-administrative users).
- The Status of the Zookeeper server host.

Cluster Analysis

The Cluster Analysis screen provides detailed metrics about your Pivotal HD cluster.

It provides cluster-wide metrics all the way down to host-level metrics. It provides Hadoop-specific metrics, as well as system metrics that you can drill down to if needed.



▲ Region Server is up

▲ Standby NameNode is up
▲ DataNode is up
▲ JournalNode is up
▲ ZKFC is up

▲ Hive Metastore is up

Filtering the Cluster Analysis Screen

By default the Cluster Analysis screen displays the metrics for all services, all categories, and all nodes. The top portion of the Cluster Analysis screen allows you to filter the information displayed by combinations of several filters. You can **Collapse** or **Expand** this portion of the screen to hide/show the filter selections.

- **By Service -** Metrics can be filtered by services. Select either **All services** (the default), or anyone of the listed services (hawq, hbase, hdfs, and so on). If you filter by one service, for example hawq, the subsequent categories filters are limited to those associated with the selected service (hawq). Once you have selected the services you want to filter by, you can further filter these results to show metrics from **All nodes** (the default), or by any specific node (only those nodes defined for the selected category are displayed).
- **By Category -** Metrics can be filtered by categories such as:
  - namenode
  - secondarynamenode
  - datanode
  - yarn-resourcemanager
  - yarn-nodemanager
  - mapreduce-historyserver
  - hawq-master
  - hawq-segment

  Once you have selected the category you want to filter by, you can further filter these results to show metrics from **All nodes** (the default), or by any specific node (only those nodes defined for the selected category are displayed).
- **Alphabetically -** Metrics can be filtered alphabetically, either for **All nodes** (the default), or for a selected node.

Cluster Metrics

The bottom half of the Cluster Analysis screen displays cluster metrics based on the filters you selected.

Filter by Time

You can further filter these metrics based on a time range. Use the **Show** dropdown menu to limit the metrics displayed here to a specifc time range, either over the **past 4 hours** (the default range); or any of the other available time ranges, from one hour to the past 8 weeks.

Performance Metrics

Select the **Performance Metrics** tab to display the cluster/node utilization over time.

You can see performance metrics over time for:

- CPU
- Disk Bandwidth
- Network Bandwidth
- Memory
- Load
- Swap Usage
- Swap I/O
- Network Operations
- Disk Operations

Hover over any one of the graphs to see a snap shot of those specific performance metrics at any given time.

Note: If your instance of Command Center is monitoring two clusters and if any of either cluster's Performance Metrics graphs shows **No Data Available**, restart `nmon` on the admin node to fix the problem:

```
service nmon restart
```

Real-time Metrics

Select the **Real-time Metrics** tab to display the current metrics in real-time.

Per node, you can see the following real-time metrics:

- CPU (User + System/Idle)
- Memory Used (MB)
- Disk Read Rate (MB/s)
- Disk Write Rate (MB/s)
- Net Read Rate (MB/s)
- Net Write Rate (MB/s)

Storage Metrics

Select **Storage Metrics** tab to display metrics about cluster storage.

Per node, you can see the following storage metrics:

- HDFS Used
- System Used
- Available
- Used %

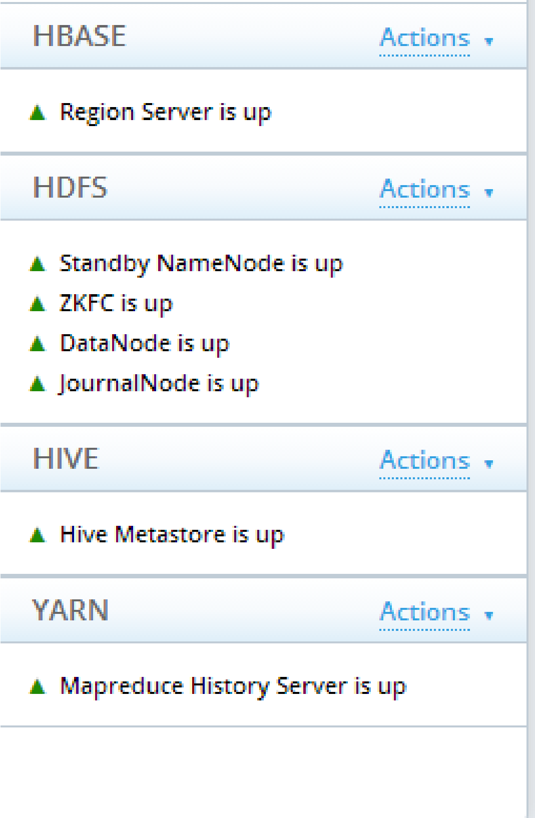
Note: Storage metrics are only displayed if the nodes in your cluster are identified by their FQDN.

Node Metrics

If you have selected to display cluster metrics by individual node, an additional panel of information is displayed on the right side of the cluster metrics.

This panel displays all services and roles defined for the selected node.

For each service, you can see the status of each role, and you can use the **Actions** dropdown menu to stop/start a specific role.



HBASE Actions ▾

▲ Region Server is up

HDFS Actions ▾

▲ Standby NameNode is up
▲ ZKFC is up
▲ DataNode is up
▲ JournalNode is up

HIVE Actions ▾

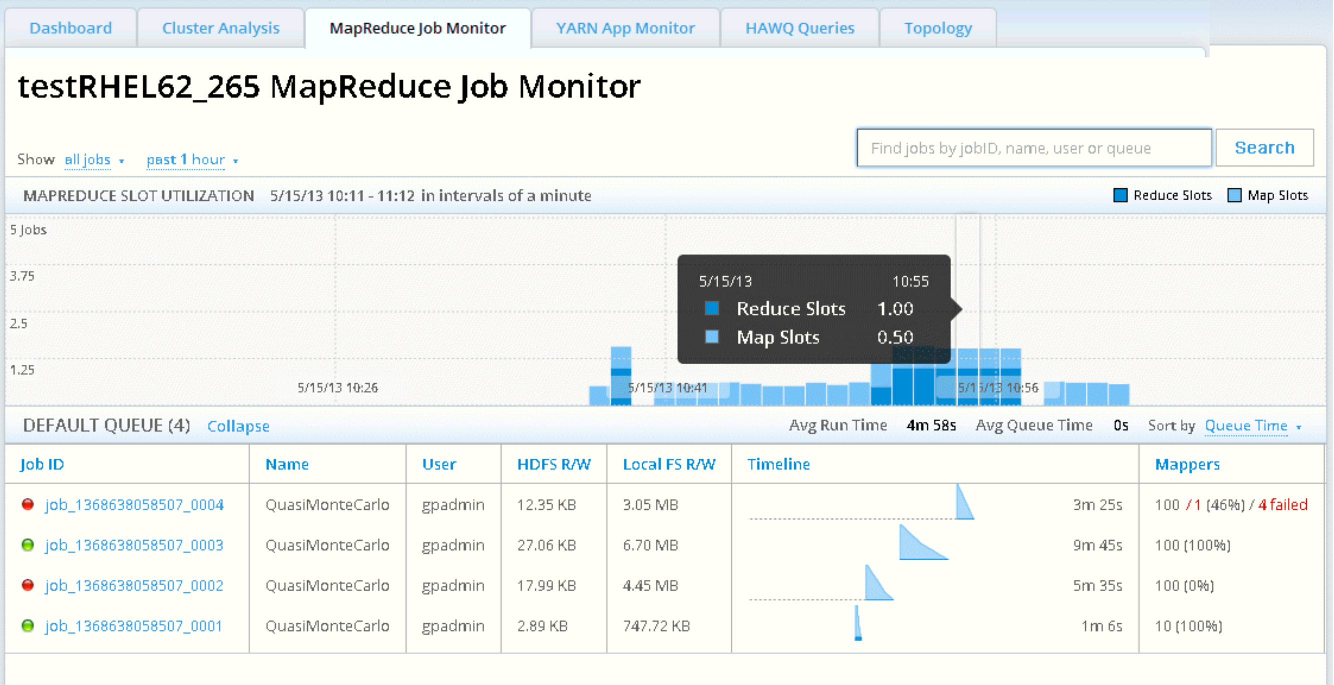
▲ Hive Metastore is up

YARN Actions ▾

▲ Mapreduce History Server is up

MapReduce Job Monitor

The Job Monitor screen tracks the MapReduce jobs that are executed in the Pivotal HD cluster when the YARN MapReduce service is running. It provides details about all, or a filtered set of MapReduce jobs.



testRHEL62_265 MapReduce Job Monitor

Show all jobs ▾ past 1 hour ▾

Find jobs by jobID, name, user or queue | Search

MAPREDUCE SLOT UTILIZATION 5/15/13 10:11 - 11:12 in intervals of a minute

DEFAULT QUEUE (4) Collapse Avg Run Time 4m 58s Avg Queue Time 0s Sort by Queue Time ▾

Job ID	Name	User	HDFS R/W	Local FS R/W	Timeline	Mappers
● job_1368638058507_0004	QuasiMonteCarlo	gpadmin	12.35 KB	3.05 MB	3m 25s	100 /1 (46%) / 4 failed
● job_1368638058507_0003	QuasiMonteCarlo	gpadmin	27.06 KB	6.70 MB	9m 45s	100 (100%)
● job_1368638058507_0002	QuasiMonteCarlo	gpadmin	17.99 KB	4.45 MB	5m 35s	100 (0%)
● job_1368638058507_0001	QuasiMonteCarlo	gpadmin	2.89 KB	747.72 KB	1m 6s	10 (100%)

The MapReduce jobs displayed can be filtered by state and/or time range:

- **By state:**
  - all jobs (set by default)
  - currently pending jobs
  - currently running jobs
  - succeeded jobs
  - failed jobs
  - killed jobs
  - error state jobs
- **By time range**: By selecting a preset time range in hours, weeks, months, year, or by specifying a custom time range.

The MapReduce jobs can also be filtered by searching for values for the following:

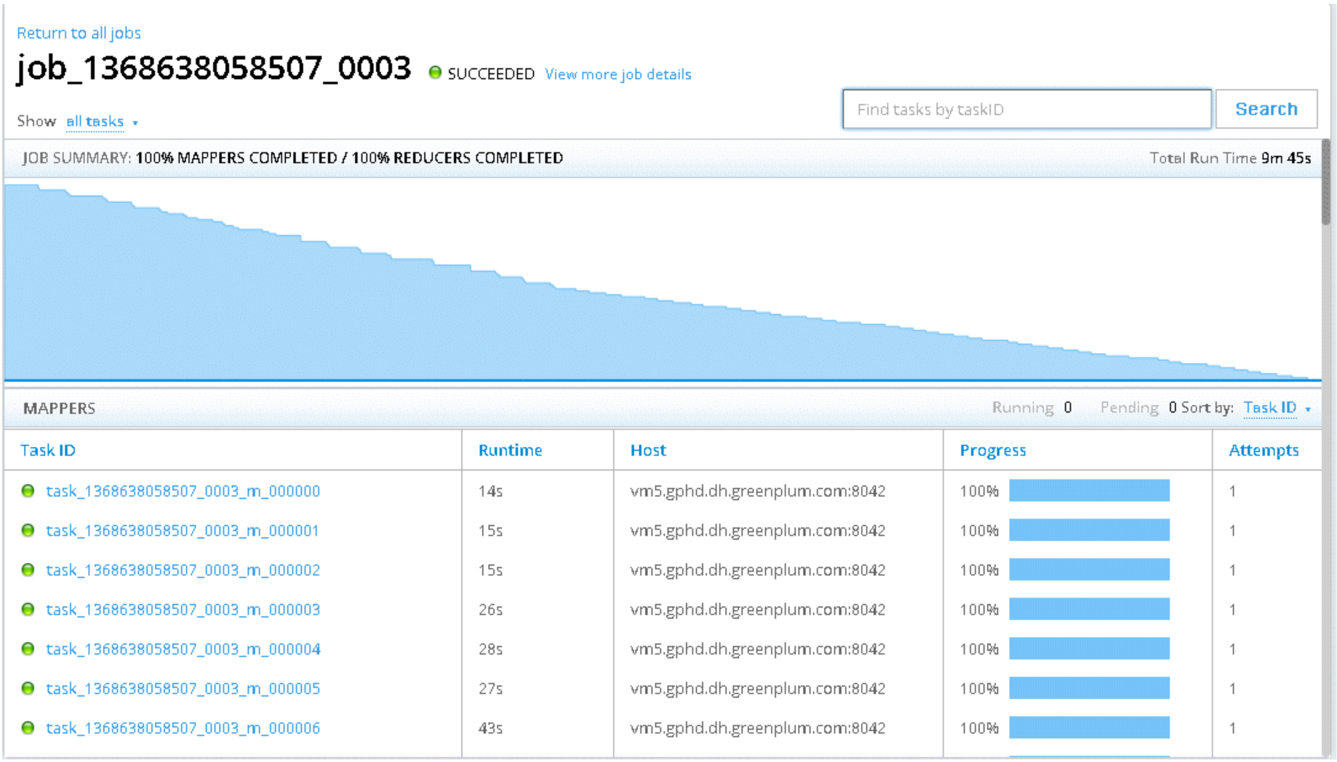
- jobID
- name
- user
- queue

Enter your search value in the search bar in the following format: searchKey=searchValue, where searchKey is one of **jobID**, **name**, **user**, or **queue**.

These are substring searches. For example: **jobID=1363920466130** will locate a job with **jobID=job_1363920466130_0002**

Job Details

When you click on any of the jobs in the Job Monitor more details of the job are shown.



job_1368638058507_0003 ● SUCCEEDED

JOB SUMMARY: 100% MAPPERS COMPLETED / 100% REDUCERS COMPLETED Total Run Time 9m 45s

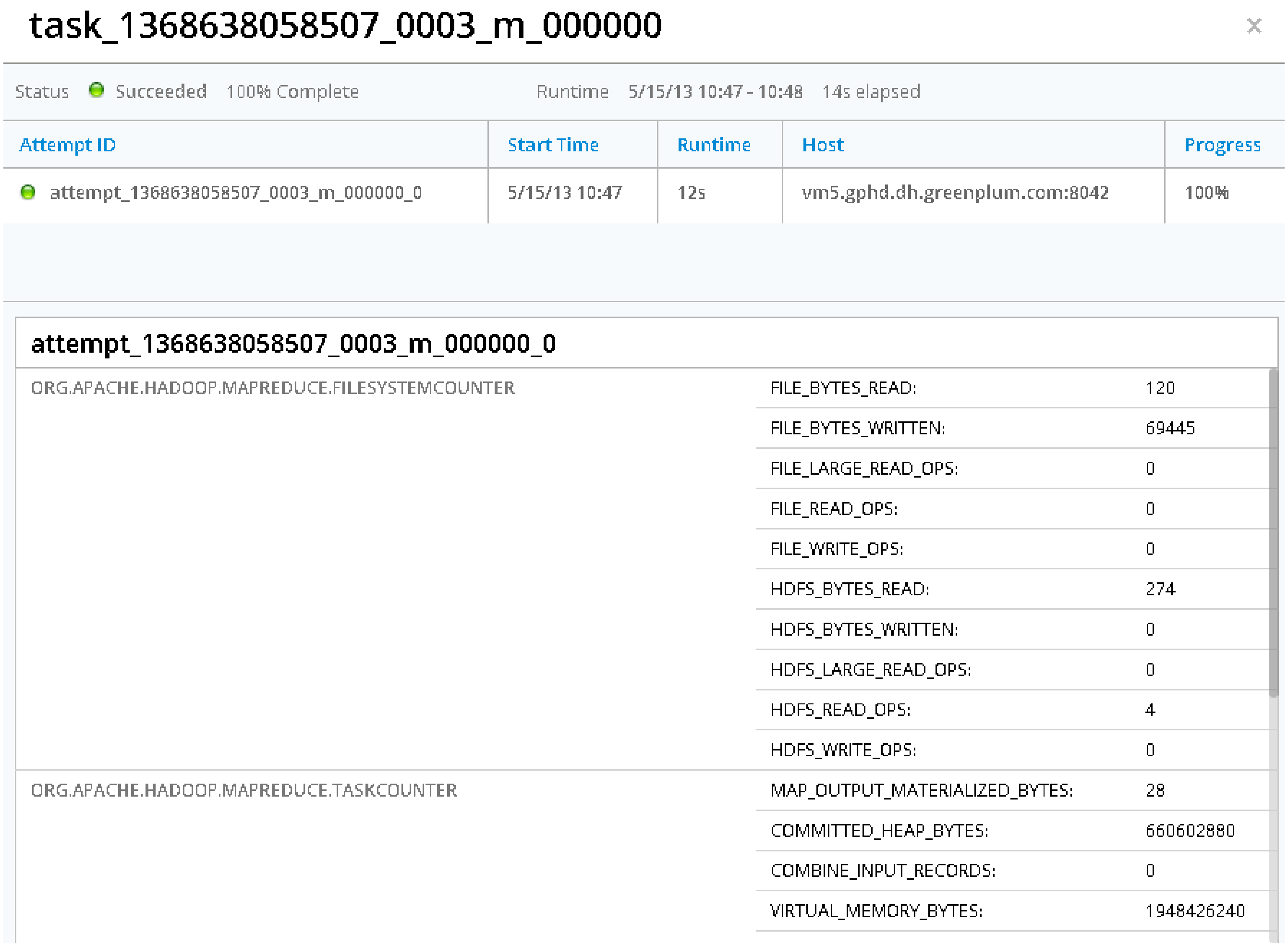
MAPPERS Running 0 Pending 0

Task ID	Runtime	Host	Progress	Attempts
● task_1368638058507_0003_m_000000	14s	vm5.gphd.dh.greenplum.com:8042	100%	1
● task_1368638058507_0003_m_000001	15s	vm5.gphd.dh.greenplum.com:8042	100%	1
● task_1368638058507_0003_m_000002	15s	vm5.gphd.dh.greenplum.com:8042	100%	1
● task_1368638058507_0003_m_000003	26s	vm5.gphd.dh.greenplum.com:8042	100%	1
● task_1368638058507_0003_m_000004	28s	vm5.gphd.dh.greenplum.com:8042	100%	1
● task_1368638058507_0003_m_000005	27s	vm5.gphd.dh.greenplum.com:8042	100%	1
● task_1368638058507_0003_m_000006	43s	vm5.gphd.dh.greenplum.com:8042	100%	1

This screen displays all the tasks that are have been allocated for the selected job and their progress. You can see the mapper and the reducer tasks separately. In the above screen capture, the bars in the JOB

SUMMARY section represent the two Mapper tasks that have run, one took 19 seconds, the other, 20 seconds.

Clicking on each task ID will show even more details about that particular task. You can also filter on a particular task ID in the search bar.



task_1368638058507_0003_m_000000

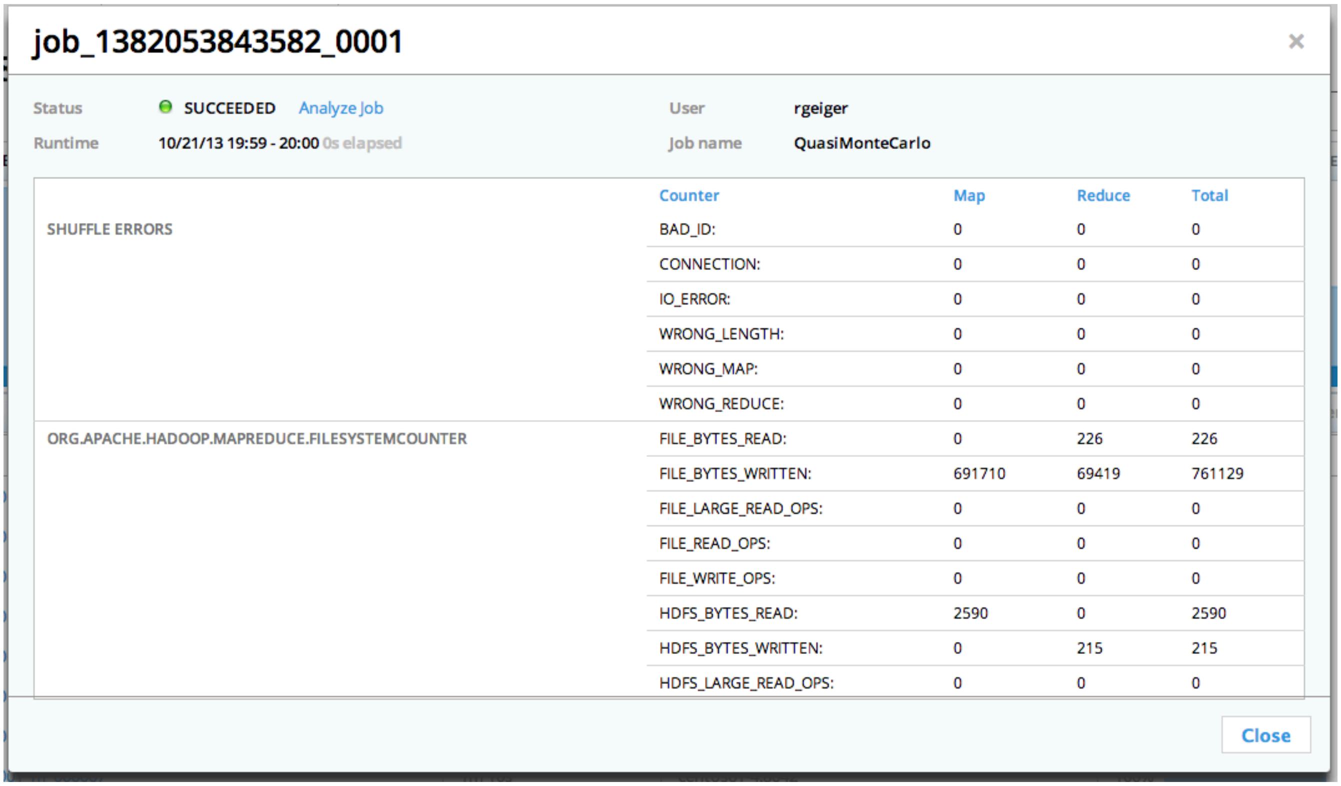
Status ● Succeeded 100% Complete Runtime 5/15/13 10:47 - 10:48 14s elapsed

Attempt ID	Start Time	Runtime	Host	Progress
● attempt_1368638058507_0003_m_000000_0	5/15/13 10:47	12s	vm5.gphd.dh.greenplum.com:8042	100%

attempt_1368638058507_0003_m_000000_0

ORG.APACHE.HADOOP.MAPREDUCE.FILESYSTEMCOUNTER	FILE_BYTES_READ:	120
	FILE_BYTES_WRITTEN:	69445
	FILE_LARGE_READ_OPS:	0
	FILE_READ_OPS:	0
	FILE_WRITE_OPS:	0
	HDFS_BYTES_READ:	274
	HDFS_BYTES_WRITTEN:	0
	HDFS_LARGE_READ_OPS:	0
	HDFS_READ_OPS:	4
	HDFS_WRITE_OPS:	0
ORG.APACHE.HADOOP.MAPREDUCE.TASKCOUNTER	MAP_OUTPUT_MATERIALIZED_BYTES:	28
	COMMITTED_HEAP_BYTES:	660602880
	COMBINE_INPUT_RECORDS:	0
	VIRTUAL_MEMORY_BYTES:	1948426240

To see job related counters click on View more job details next to the job ID:



job_1382053843582_0001

Status ● SUCCEEDED Analyze Job

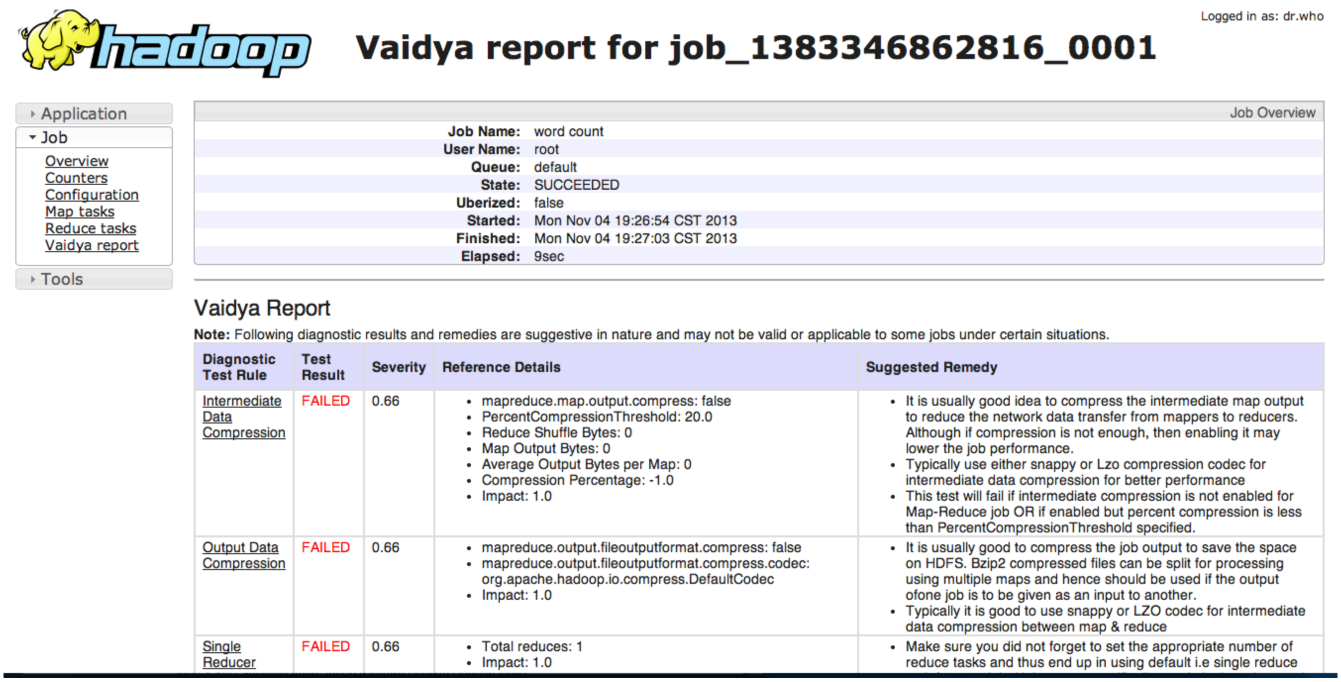
Runtime 10/21/13 19:59 - 20:00 0s elapsed

User rgeiger

Job name QuasiMonteCarlo

	Counter	Map	Reduce	Total
SHUFFLE ERRORS	BAD_ID:	0	0	0
	CONNECTION:	0	0	0
	IO_ERROR:	0	0	0
	WRONG_LENGTH:	0	0	0
	WRONG_MAP:	0	0	0
	WRONG_REDUCE:	0	0	0
ORG.APACHE.HADOOP.MAPREDUCE.FILESYSTEMCOUNTER	FILE_BYTES_READ:	0	226	226
	FILE_BYTES_WRITTEN:	691710	69419	761129
	FILE_LARGE_READ_OPS:	0	0	0
	FILE_READ_OPS:	0	0	0
	FILE_WRITE_OPS:	0	0	0
	HDFS_BYTES_READ:	2590	0	2590
	HDFS_BYTES_WRITTEN:	0	215	215
	HDFS_LARGE_READ_OPS:	0	0	0

Click the **Analyze Job** link adjacent to the Status field to open a Vaidya report about the selected job, as shown below:



Vaidya report for job_1383346862816_0001

Job Name:	word count
User Name:	root
Queue:	default
State:	SUCCEEDED
Uberized:	false
Started:	Mon Nov 04 19:26:54 CST 2013
Finished:	Mon Nov 04 19:27:03 CST 2013
Elapsed:	9sec

Vaidya Report

Note: Following diagnostic results and remedies are suggestive in nature and may not be valid or applicable to some jobs under certain situations.

Diagnostic Test Rule	Test Result	Severity	Reference Details	Suggested Remedy
Intermediate Data Compression	FAILED	0.66	• mapreduce.map.output.compress: false • PercentCompressionThreshold: 20.0 • Reduce Shuffle Bytes: 0 • Map Output Bytes: 0 • Average Output Bytes per Map: 0 • Compression Percentage: -1.0 • Impact: 1.0	• It is usually good idea to compress the intermediate map output to reduce the network data transfer from mappers to reducers. Although if compression is not enough, then enabling it may lower the job performance. • Typically use either snappy or Lzo compression codec for intermediate data compression for better performance • This test will fail if intermediate compression is not enabled for Map-Reduce job OR if enabled but percent compression is less than PercentCompressionThreshold specified.
Output Data Compression	FAILED	0.66	• mapreduce.output.fileoutputformat.compress: false • mapreduce.output.fileoutputformat.compress.codec: org.apache.hadoop.io.compress.DefaultCodec • Impact: 1.0	• It is usually good to compress the job output to save the space on HDFS. Bzip2 compressed files can be split for processing using multiple maps and hence should be used if the output ofone job is to be given as an input to another. • Typically it is good to use snappy or LZO codec for intermediate data compression between map & reduce
Single Reducer	FAILED	0.66	• Total reduces: 1 • Impact: 1.0	• Make sure you did not forget to set the appropriate number of reduce tasks and thus end up in using default i.e single reduce

Note: This capability is Beta and will be improved in coming releases.

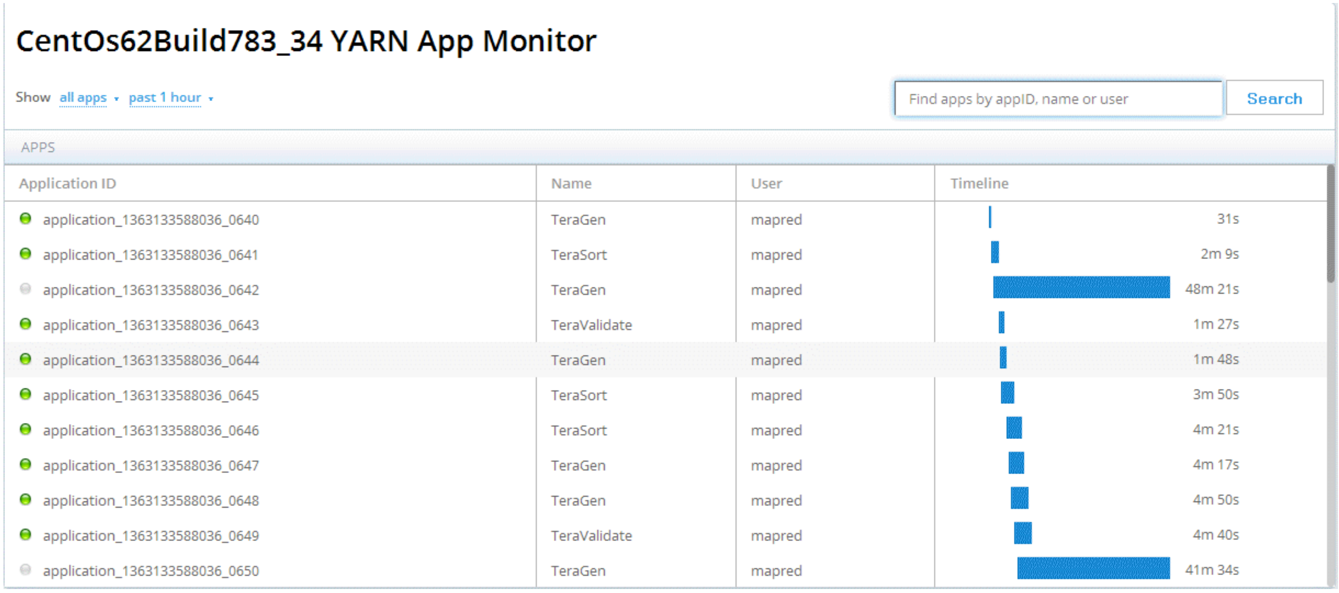
About Vaidya

Vaidya is a diagnostic tool installed with PHD for Map/Reduce jobs. After a job is executed successfully, it uses a job history log and job configuration information to identify any performance or scalability problems with the job. Upon execution, it provides a job analysis report indicating specific problems with the job along with the remedy to correct them.

For more information about Vaidya, see the *PHD Stack and Tool Reference*.

Yarn App Monitor

The YARN App Monitor screen tracks YARN applications that are executed in the Pivotal HD Cluster.



CentOs62Build783_34 YARN App Monitor

Application ID	Name	User	Timeline
● application_1363133588036_0640	TeraGen	mapred	31s
● application_1363133588036_0641	TeraSort	mapred	2m 9s
○ application_1363133588036_0642	TeraGen	mapred	48m 21s
● application_1363133588036_0643	TeraValidate	mapred	1m 27s
● application_1363133588036_0644	TeraGen	mapred	1m 48s
● application_1363133588036_0645	TeraSort	mapred	3m 50s
● application_1363133588036_0646	TeraSort	mapred	4m 21s
● application_1363133588036_0647	TeraGen	mapred	4m 17s
● application_1363133588036_0648	TeraGen	mapred	4m 50s
● application_1363133588036_0649	TeraValidate	mapred	4m 40s
○ application_1363133588036_0650	TeraGen	mapred	41m 34s

The YARN applications displayed can be filtered by category and/or time range:

- **By Category:**
  - all apps (set by default)
  - currently pending apps
  - currently running apps
  - succeeded apps
  - failed apps
  - killed apps
  - error state jobs
- **By Time Range:** By selecting a preset time range in hours, weeks, months, year, or by specifying a custom time range.

The YARN applications can also be filtered by the following fields by entering it in the search bar in the **searchKey=searchValue** format:

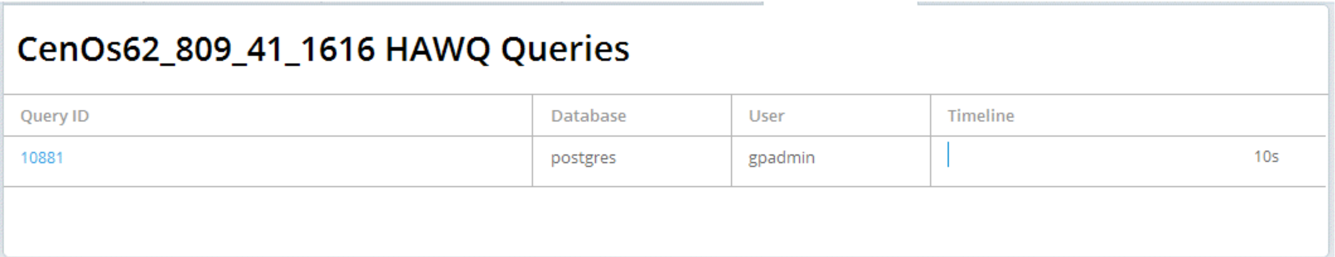
- appID
- name
- user

These are substring searches. For example: **appID=1363920466130** will locate the application with **appID=application_1363920466130_0002**.

HAWQ Query Monitor

The HAWQ Query monitor is only displayed when HAWQ is installed on the cluster.

This screen displays all active queries running on the HAWQ cluster:



CenOs62_809_41_1616 HAWQ Queries

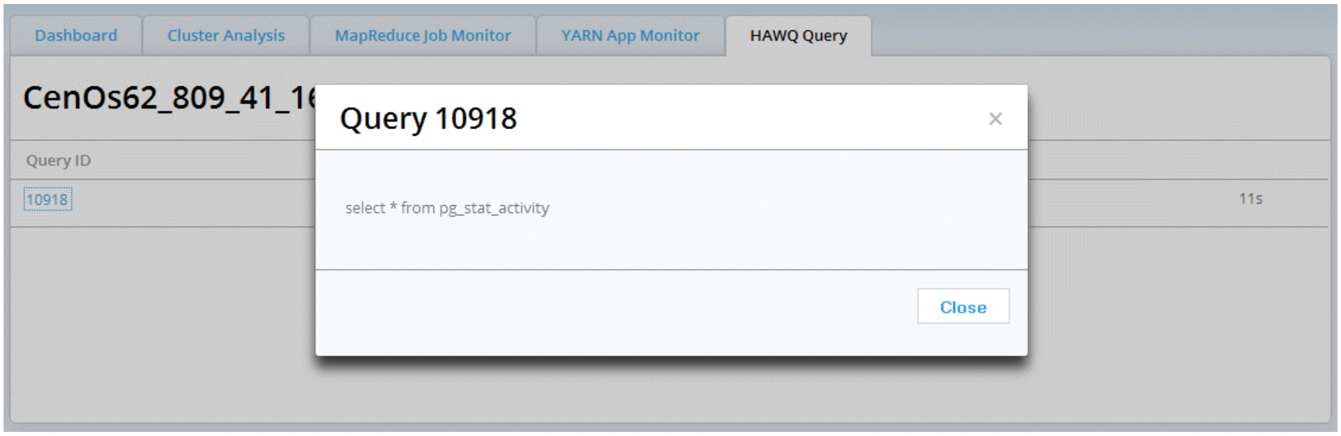
Query ID	Database	User	Timeline
10881	postgres	gpadmin	10s

In this release, this screen only displays active queries as can be seen when you run:

```
SELECT * FROM pg_stat_activity;
```

on the HAWQ cluster.

Click on a Query ID to get the syntax of that query:



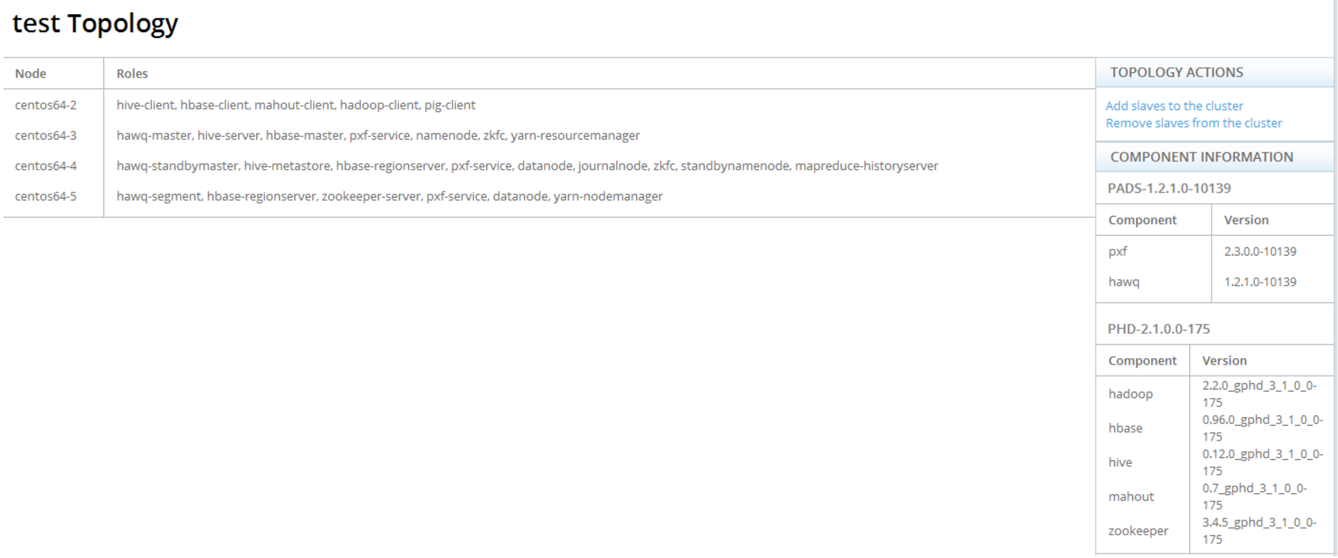
Query 10918

```
select * from pg_stat_activity
```

Topology

This screen shows you the basic topology of your cluster. You can also add/remove slaves to/from the cluster via this screen.

The main portion of this page displays a list of all the nodes in your cluster, and the roles that have been installed on each node.



test Topology

Node	Roles
centos64-2	hive-client, hbase-client, mahout-client, hadoop-client, pig-client
centos64-3	hawq-master, hive-server, hbase-master, pxf-service, namenode, zkfc, yarn-resourcemanager
centos64-4	hawq-standbymaster, hive-metastore, hbase-regionserver, pxf-service, datanode, journalnode, zkfc, standbynamenode, mapreduce-historyserver
centos64-5	hawq-segment, hbase-regionserver, zookeeper-server, pxf-service, datanode, yarn-nodemanager

PADS-1.2.1.0-10139

Component	Version
pxf	2.3.0.0-10139
hawq	1.2.1.0-10139

PHD-2.1.0.0-175

Component	Version
hadoop	2.2.0_gphd_3_1_0_0-175
hbase	0.96.0_gphd_3_1_0_0-175
hive	0.12.0_gphd_3_1_0_0-175
mahout	0.7_gphd_3_1_0_0-175
zookeeper	3.4.5_gphd_3_1_0_0-175

Component Information

The Component Information pane lists all the components and versions that are part of your PCC installation.

Topology Actions

You can add or remove slaves using the Topology Actions pane.

Note: This functionality is restricted to administrative users.

Note: A node is considered a slave if it contains the following services/roles: `datanode`, `hbase-regionserver`, `yarn-nodemanager`.

Additionally for HAWQ and PXF, a slave node contains the following services/roles: `hawq-segment`, `pxf-service`.

When you add a slave, these services/roles appear on the node. When you remove a slave node; all these services/roles are removed.

Adding Slaves to the Cluster

1. Click on the **Add Slaves to the Cluster** option from the **Topology Actions** menu. An **Add Slaves** dialog appears; this dialog lists all current nodes.
2. Enter the slave nodes you want to add either individually or as ranges; for example `Node[1-9]`.
3. Provide the `root` Password.
4. If you want to have services for your new slave nodes start automatically, check the **Start services automatically** box.

   If you do not choose to have the services start automatically, you can start them by returning to the Dashboard, navigating to the role defined for that node, then selecting **Action > Start <service_name>**. For example: **Action > Start Hive**.
5. Click **Add Slaves to Cluster**.

Note:

- If you type a node name twice, that name will flash yellow until one is deleted.
- If you type the name of a node that already exists, that name becomes highlighted and you are shown an error message warning you that:

```
Highlighted hosts are duplicates and will not be added.
```

- If you close the dialog before the operation is finished, it continues in the background. Refresh the Topology page to see if it has successfully completed.

Removing Slaves from a Cluster

1. Click on the **Remove Slaves from the Cluster** option from the **Topology Actions** menu. A **Remove Slaves** dialog appears; this dialog lists all current slave nodes.

   You are warned that prior to removal, services on slave nodes will be stopped.
2. Enter the slave nodes you want to remove either individually or as ranges; for example `Node[1-9]`.
3. Click **Remove Slaves from Cluster**.

Note:

- You do not need to provide a password to remove slave nodes.
- This text field auto-completes with nodes from the cluster.
- If you try and enter a node that does not exist, the text field does not become active and you are not able to perform the remove operation.
- If you close the dialog before the operation is finished, it continues in the background. Refresh the Topology page to see if it has successfully completed.

Logs

This screen displays all system logs. The log files are grouped by date, the most recent first. Use the **Prev** / **Next** buttons to jump to more pages of logs.

Filtering Logs

Use the upper left dropdown menus to filter the logs displayed based on:

- **Logs Levels**: You can select to display all logs (the default), or filter by one of the following log levels: debug, errors, fatal, info, trace, warnings.
- **Hosts**: You can select to display logs for all hosts (the default), including the Admin Host, or can filter by hostname.
- **Roles**: You can select to display logs for all roles (the default), or can filter by role name. Note that since the `gphdmgr-webservices` role is always on the Admin Host, if you select that role, you can no longer filter by host (in this case the Admin Host is automatically selected).

Use the upper right dropdown menu to filter the logs displayed based on:

- **Time**: You can select the time period over which you want to view logs; either for the **Past 1 hour**, or for one of the other time periods available (up to **Past 8 weeks**).

Search by Keyword

You can also further filter the logs displayed by searching the logs by keyword.

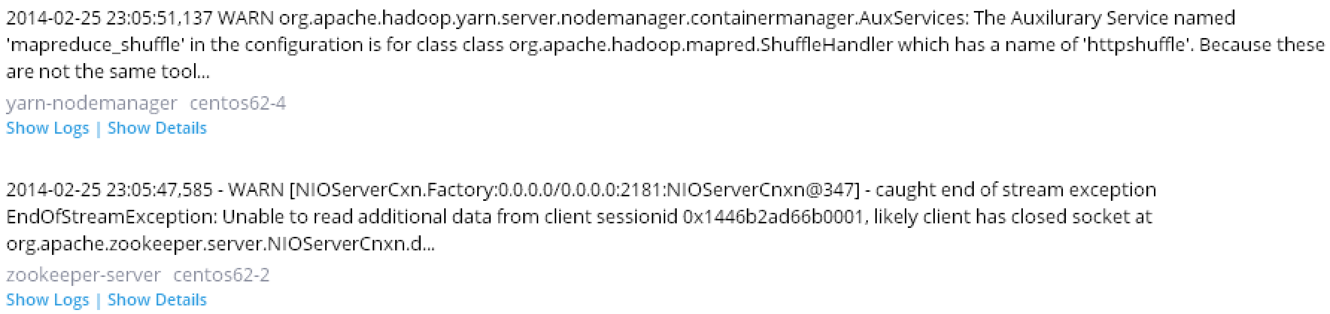
Enter any single keyword (any single string, including numbers) in the search box, then click **Search**.

Note that your keyword search is only applied to the set of logs displayed based on any filters you chose from the dropdown menus, described above.

Viewing Logs

The results of your filters, if any, are displayed on the screen. Often there will be too many to display on one page, use the **Prev**/**Next**/Page numbers at the top of the screen to navigate through them.

Each entry displays the time stamp, a log message, a time stamp, the host and the role. For example:



```
2014-02-25 23:05:51,137 WARN org.apache.hadoop.yarn.server.nodemanager.containermanager.AuxServices: The Auxilurary Service named
'mapreduce_shuffle' in the configuration is for class class org.apache.hadoop.mapred.ShuffleHandler which has a name of 'httpshuffle'. Because these
are not the same tool...
yarn-nodemanager  centos62-4
```

```
2014-02-25 23:05:47,585 - WARN [NIOServerCxn.Factory:0.0.0.0/0.0.0.0:2181:NIOServerCnxn@347] - caught end of stream exception
EndOfStreamException: Unable to read additional data from client sessionid 0x1446b2ad66b0001, likely client has closed socket at
org.apache.zookeeper.server.NIOServerCnxn.d...
zookeeper-server  centos62-2
```

If the log message is too long to display on the screen it is truncated and a **Show Details** link appears below the message; click to display the entire message.

Click **Show Logs** to display all contents of that log file based on the time stamp. You can see more log messages from before and after that time stamp by clicking the **Scroll Up To Fetch More Logs** / **Scroll Down to Fetch More Logs** links at the top and bottom of the page, respectively.