Pivotal

PRODUCT DOCUMENTATION

Pivotal Command Center

Version 2.1

User Guide

Rev: A02

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Revised November 2013

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1 Pivotal Command Center Overview

This document is a User Guide for the Pivotal Command Center (PCC) User Interface.

This section provides a brief overview of Pivotal Command Center, including:

1.1 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 and configure, monitor, and administer Pivotal HD clusters.

- For UI operations, see Using Pivotal Command Center.
- For command line operations, see the *Pivotal HD Enterprise Installation and Administrator Guide*.

This release of Command Center allows administering and monitoring of only Pivotal HD Enterprise 1.1.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 . 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.

1.1.1 Pivotal Command Center UI and CLI

The PCC UI provides the user with a single web-based graphical user interface to configure and 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, please refer to the *Pivotal HD Enterprise Installation and Administrator Guide*.

1.1.2 Performance Monitor (nmon)

Pivotal Command Center comes with a Performance Monitor called (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 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
```

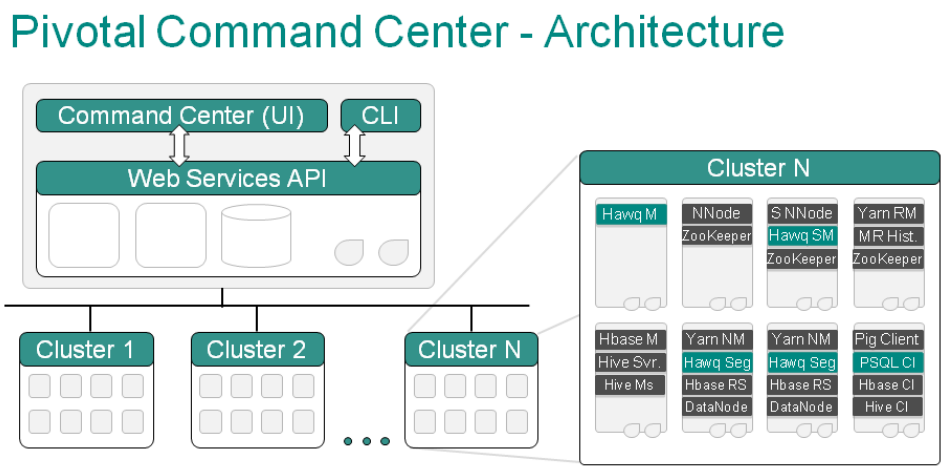
1.1.3 PostgreSQL Database

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

1.2 Architectural Overview

For more details about Pivotal HD Enterprise, refer to the *Pivotal HD Installation and Administrator Guide*.



2 Installing Pivotal Command Center

This section describes how to install Pivotal Command Center and then use PCC to deploy and configure a Pivotal HD cluster.

2.1 Quick Start

Below is an *Quick Start* Guide intended for users who are familiar with the product and various prerequisites; more detailed instructions are provided later in this section.

Task	Sub-Task

Requirements
 	
See Requirements for more details.
	Check JDK version
	
	`(as root)`
	
	`# java -version`
	
	Ensure you're running Oracle Java JDK Version 1.7.
	
	If not, download the appropriate version from Oracle.

	Check Yum accessibility (as `root`) Verify that all hosts have yum access to an EPEL yum repository. `# sudo yum list <LIST OF PACKAGES>`

Install Pivotal Command Center
 	
See Installing PCC for more details.
	(as `root`)
	
	1. Copy tar file to your specified directory on the admin node, for example:
	`# scp ./PCC-2.1.x. version.build.os .x86_64.tar.gz host:/root/phd/`
	2. Login as root and untar to that directory:
	`# cd /root/phd`
	`# tar --no-same-owner -zxvf PCC-2.1.x. version.build.os .x86_64.tar.gz`
	3. Run the installation script from the directory where it is installed:
	`# ./install`
	4. As the rest of the installation is done as the gpadmin user, change to that user:
	`# su - gpadmin`
	5. Enable Secure Connections

Import the PHD Services packages to the Admin Node
See Installing PHD Services for more details.
	(as gpadmin)
	
	1. Copy the Pivotal HD services (PHD, ADS (HAWQ), and PHDTools (optional for USS), tarballs from the initial download location to the gpadmin home directory.
	2. Change the owner of the packages to gpadmin and untar the tarballs.
	
	For example: If the file is a tar.gz or tgz, use:
	
	`tar zxf packagename.tgz`
	
	If the file is a tar, use:
	
	`tar xf packagename.tar`

Enable the PHD services See Enabling PHD Services for more details.	(as gpadmin) For each service (PHD, ADS, PHDTools) you are enabling, run the following: `# icm_client import -s < PATH TO EXTRACTED PHD SERVICE TAR BALL >`
Launch Pivotal Command Center UI See Launching PCC for more details.	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).

Configure and deploy a cluster See Configuring and Deploying a Cluster for more details.	After logging into PCC, click **Add Cluster** from the Cluster Status page. Navigate through the Add Cluster Wizard to configure and deploy a cluster.

Post-Installation for HAWQ
 	
See Post Installation for HAWQ for more details
	(as gpadmin)
	
	Exchange keys between HAWQ master and segment hosts:
	
	Create a hostfile (`HAWQ_Segment_Hosts.txt`) that contains the hostnames of all your HAWQ segments, then:
	
	`# ssh < HAWQ_MASTER >`
	
	`# source /usr/local/hawq/greenplum_path.sh`
	
	`# /usr/local/hawq/bin/gpssh-exkeys -f ./HAWQ_Segment_Hosts.txt`

Start the cluster See Starting the Cluster for more details.	Return to the PCC UI and start the cluster from the Cluster Status page.

Initialize HAWQ
See Initializing HAWQ for more details.
	(as gpadmin)
	ssh to the HAWQ master, the run the following:
	
	`# source /usr/local/hawq/greenplum_path.sh`
	
	`# /etc/init.d/hawq init`

2.2 Supported Platforms and Browsers

2.2.1 Platforms

- RHEL 6.1 64-bit, 6.2 64-bit
- CentOS 6.1 64-bit, 6.2 64-bit

2.2.2 Browsers

- Firefox 16, 19
- IE 8, IE 9, both with Google Chrome Frame
- Chrome 25.0.1364.172

2.3 Requirements

2.3.1 Prerequisites

- Installation of Pivotal Command Center assumes the user has a working knowledge of the following:
  - **Yum**: Enables you to install or update software from the command line. See http://yum.baseurl.org/.
  - **RPM** (Redhat Package Manager).
  - **NTP**. See http://www.ntp.org
  - **SSH** (Secure Shell Protocol). See http://www.linuxproblem.org/art_9.html
- **DNS lookup**. Verify that the admin host is be able to reach every cluster node using its hostname and IP address. Verify that every cluster node is able to reach every other cluster node using its hostname and IP address:

```
ping -c 2 myhost.mycompany.com
```
The return code should be 0

```
ping -c 2 192.168.1.2
```
The return code should be 0

- **JAVA JDK**. Ensure that you are running Oracle JAVA JDK version 1.7:

As root:

```
# java -version
```

If you are not running the correct JDK, you can download a supported version from the Oracle site here:

http://www.oracle.com/technetwork/java/javase/downloads/index.html

> **Notes**
>
> Oracle does not seem to be shipping self extracting JDK packages as of release 7. The current release of Pivotal Command Center expects a self extracting (`.bin`) package. So restrict the Java version to one that has a `.bin` package

Once you have installed Pivotal Command Center, you can use the following command to install a downloaded JDK:

As gpadmin, run:

```
# icm_client import -f <PATH TO JDK>
```

- **YUM**. Verify that all hosts have yum access to an EPEL yum repository. See Package Accessibility for more details.

- **Internet Connectivity**. You will need an active internet connection to install PCC. This is required to pull the software dependencies for the UI.

2.3.2 Product Downloads

The following packages are required:

```
PCC-2.1.x.*.version_build_OS.x86_64.tar.gz
```

2.3.3 Package Accessibility

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 would 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), then having a local yum EPEL repo is highly recommended. This will also give you some control on the package versions you want deployed on your cluster. See for instructions on how to setup a local yum repository or point your hosts to an EPEL repository.

For Pivotal Command Center 2.1.x, here is a list of prerequisites that need to either already be installed on the Command Center admin host or on an accessible yum repository:

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

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

```
$ sudo yum list <LIST OF PACKAGES>
```

For example:

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

If any of them are not available or not already installed, then you may have not added the repository correctly 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`

2.4 Installation Instructions

Once you have met the prerequisites, you are ready to begin the installation. Perform the following installation steps as a root user.

> ⚠ Avoid using hostnames that contain capital letters because Puppet has an issue generating certificates for domains with capital letters. Also avoid using underscores as they are invalid characters in hostnames.

If you are upgrading from an earlier version of Pivotal Command Center, see Upgrading PCC.

2.4.1 Installing Pivotal Command Center

1. Copy the Command Center tar file to your host. For example:
   ```
   # scp ./PCC-2.1.x.version.build.os.x86_64.tar.gz host:/root/phd/
   ```
2. Log into the Command Center admin host as root user. to the directory where the Command Center tar files are located and untar. For example:
   ```
   # cd /root/phd
   # tar --no-same-owner -zxvf PCC-2.1.x.version.build.os.x86_64.tar.gz
   ```

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

   > **Important**
   >
   > You must run the installation script from the directory where it is installed, for example: For example: `PCC-2.1.x.version`

   For example:

   ```
   # ls
   PCC-2.1.x.version
   PCC-2.1.x.version.build.os.x86_64.tar.gz
   # cd PCC-version
   # ./install
   ```

   You will see installation progress information on the screen. Once the installation successfully completes, you will receive an installation success message on your screen.
   Once you have configured and deployed a cluster, you can view your cluster status here:
   `https://<CommandCenterHost>:5443/status`
4. Enable Secure Connections:
   Pivotal Command Center uses HTTPS to secure data transmission between the client browser and the server. By default, the installation script generates a self-signed certificate. Alternatively you can provide your own Certificate and Key by following these steps:
   1. Edit `/etc/httpd/conf.d/pcc- vhost.conf` file and change following two directives to point to location of ssl certificate and key:
      `SSLCertificateFile`: `/usr/local/greenplum-cc/ssl/sfo-w1.ic.cert`
      `SSLCertificateKeyFile`: `/usr/local/greenplum-cc/ssl/sfo-w1.ic.key`
   2. Make sure that file permissions are set to 400 and owner to `gpadmin`.
   3. Restart PCC with the following command:
      `service commander restart`
5. Verify that your PCC instance is running by executing the following command:
   `$ service commander status`
6. From now on you can switch to the gpadmin user. You should no longer need to be root for anything else.
   `su - gpadmin`

Next Steps: Installing PHD Services then Enabling PHD Services.

Starting, Stopping, and Restarting Command Center Services

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

```
$ service commander stop
$ service commander start
$ service commander restart
```

2.4.2 Installing PHD Services

1. Copy the Pivotal HD, ADS, and PHDTools tarballs from the initial download location to the gpadmin home directory.
2. Change the owner of the packages to and untar the tarballs. For example:

For PHD, if the file is a `tar.gz` or `tgz`, use:

```
tar zxf PHD-1.1.x-x.tgz
```

If the file is a `tar`, use:

```
tar xf PHD-1.1.x-x.tar
```

For Pivotal ADS, if the file is a `tar.gz` or `tgz`, use

```
tar zxf PADS-1.1.x-x.tgz
```

If the file is a `tar`, use:

```
tar xf PADS-1.1.x-x.tar
```

For PHDTools, if the file is a `tar.gz` or `tgz`, use

```
tar zxf PHDTools-1.1.x-x.tgz
```

If the file is a `tar`, use:

```
tar xf PHDTools-1.1.x-x.tar
```

2.4.3 Enabling PHD Services

1. As gpadmin, extract the following tarball for Pivotal HD:
   `# icm_client import -s <PATH TO EXTRACTED PHD TAR BALL>`
   For example:
   `# icm_client import -s PHD-1.1.x-x/`
2. Optional for HAWQ/PXF: As gpadmin, extract the following tar ball for HAWQ and PXF: `# icm_client import -s <PATH TO EXTRACTED ADS TAR BALL>`
   For example:
   `# icm_client import -s PADS-1.1.x-x/`
   For more information, see the log file located at:
   `/var/log/gphd/gphdmgr/gphdmgr-import.log`

3. Optional for USS: As gpadmin, extract the following tar ball for USS: `# icm_client import -s <PATH TO EXTRACTED PHDTools TAR BALL>`
   For example:
   `# icm_client import -s PHDTools-1.1.x-x/`
   For more information, see the log file located at:
   `/var/log/gphd/gphdmgr/gphdmgr-import.log`

You are now ready to configure and deploy a cluster from the Pivotal Command Center UI.

2.4.4 Launching Pivotal Command Center

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

`https://CommandCenterHost:5443`

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

Next Steps

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

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

2.5 Uninstalling Pivotal Command Center

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

1. Stop services on all your clusters (See the *Pivotal HD Enterprise Installation and Administrator Guide* for detailed steps).
2. Uninstall all your clusters (See the *Pivotal HD Enterprise Installation and Administrator Guide* for detailed steps).
3. From the directory where you untarred the Pivotal Command Center, run the uninstall script:
   ```
   # cd /root/phd/PCC-2.1.x.version/
   # ./uninstall
   ```

2.6 Upgrading Pivotal Command Center

The following instructions are for upgrading Pivotal Command Center from version 2.0.1 to 2.1.

Upgrade Notes

- If you are upgrading to a new version of Pivotal Command Center, make sure you are also upgrading to compatible versions of Pivotal HD and Pivotal ADS (optional).
- See the latest version of the Pivotal Command Center Release notes for Pivotal Interoperability Matrix.
- We recommend that you always back up any critical data before performing any upgrades.
- As of PCC 2.1.1, there is a new default password, `Gpadmin1`, and new password rules are being enforced (minimum 8 characters, case-sensitive, 1 uppercase letter, one number). However if you are upgrading to this version of PCC, your original password (by default `gpadmin`) is maintained.

Follow the steps below to upgrade your Pivotal CC to a newer version:

1. [Optional] As `gpadmin`, stop the cluster:
   ```
   # icm_client -l CLUSTERNAME stop
   ```
2. As `root`, stop the Command Center services:
   ```
   # service commander stop
   ```
3. Download the new PCC tarball and untar.
4. Run the installer from the new PCC location:
   ```
   # ./install
   ```
5. Enable Secure Connections.
   Pivotal Command Center uses HTTPS to secure data transmission between the client browser and the server. By default, the installation script generates a self-signed certificate. Alternatively you can provide your own Certificate and Key; to do this, follow the instructions provided in the installation instructions, here: Enable Secure Connections.
6. Check `nmon` status:
   ```
   # service nmon status
   ```
   If the status anything other than `running`, stop and restart nmon as follows:
   ```
   # service nmon stop
   # service nmon start
   ```

3 Using Pivotal Command Center

This section provides an overview of the Pivotal Command Center 2.1 user interface and details about using the application to configure and deploy a Pivotal HD Cluster:

3.1 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—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 for more details.
- Dashboard—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—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—Provides details about all, or a filtered set of MapReduce jobs.
- YARN App Monitor—Provides details about all, or a filtered set of YARN applications.
- HAWQ Queries—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—This screen shows you what roles have been installed on each host. You can also add and remove slaves to the cluster from this screen.

3.1.1 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

3.2 Logging In

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

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

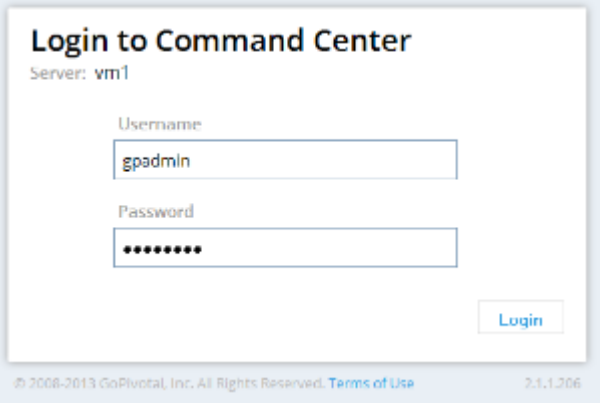
The Command Center login page is launched in your browser. The default username/password is `gpadmin`/`Gpadmin1` (case-sensitive).

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

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

3.2.1 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.



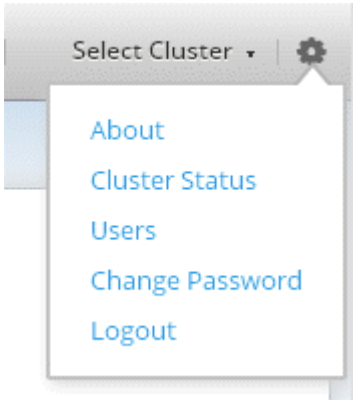
The default admin username/password is `gpadmin`/`Gpadmin1` (case-sensitive). You can change this password via the **Settings** menu.

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.

3.3 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.



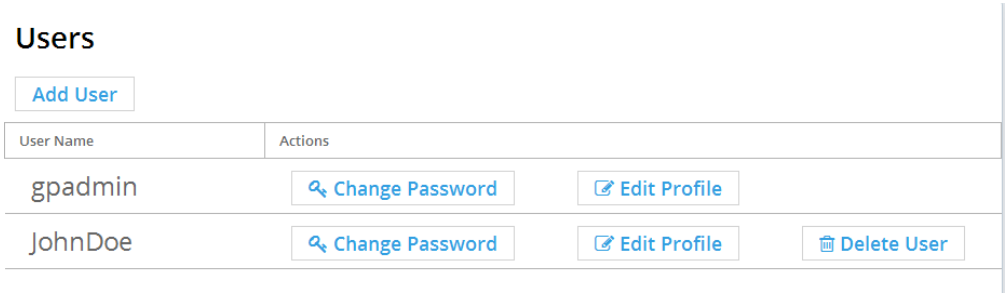
From the settings menu you can select one of:

- **About**. Select this to display version information about this instance of PCC
- **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. See **Users** below.
- **Change Password**. Click this to change your password. See Passwords below.
- **Logout**. Select this option to logout from this instance of PCC.

3.3.1 Users

Your options here depend upon whether you are an administrative user (super user) or not. An admin user can add users, delete users, edit any user profiles, and change any user password. Non-admin users can only edit their own details/passwords.

Once you have selected **Users** from the **Settings** menu, a screen listing all current users appears:



From this screen, *depending upon your permissions*, you can add users, edit your own or other users' profiles, change your own or other users' passwords, and delete users.

Adding a User

If you have the appropriate permissions, click **Add User** to create a new user.

> ⚠ The **Add User** is only displayed if you have admin privileges.

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.
- **Email**. Must be a valid email address.
- **Password**. 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.
- **Your Password**. The password of the person creating the new user.

All the above fields are required.

3.3.2 Passwords

You can change your own password in one of two ways:

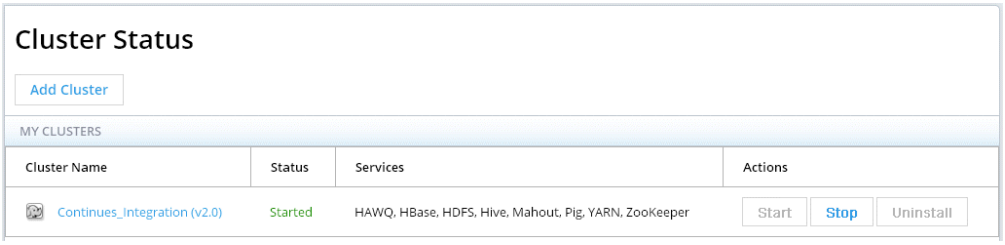
- Select **Change Password** from the **Settings** menu.
- Select **Users** from the **Settings** menu, then click the **Change Password** link adjacent to your User Name.

If you have admin privileges you can change the passwords of others:

- Select **Users** from the **Settings** menu, then click the **Change Password** link adjacent to the User Name whose password you want to change.

3.4 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).



From this page you can:

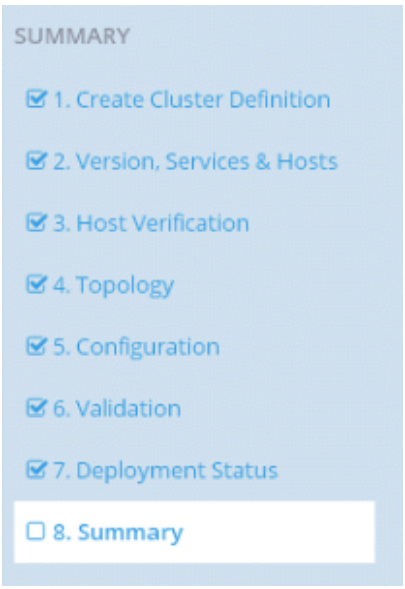
- Click **Add Cluster** to launch the Add Cluster Wizard.
- Click the cluster name in the table to view the Dashboard for that cluster.
- From any point within Command Center UI, you can always select a different cluster by using the **Select Cluster** drop-down menu in the upper right corner of the screen.
- 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.

3.5 Configuring and Deploying a Cluster

> ⚠ Before you can configure and deploy a cluster, make sure you have already installed and enabled the PHD Services (see Install PHD Services and Enable the PHD Services).

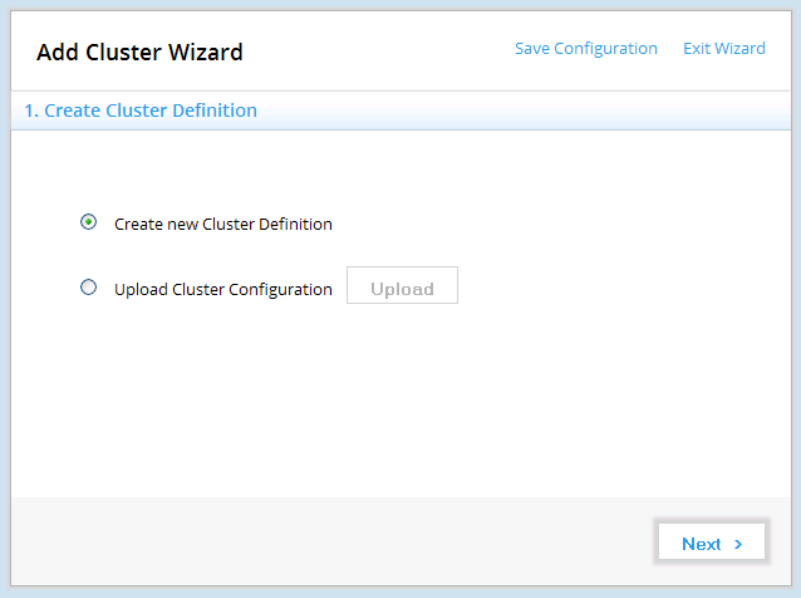
After you have logged in to Pivotal Command Center, the Cluster Status page appears. From here, you are able to launch the **Add Cluster Wizard** that enables you to configure and deploy a Pivotal HD Cluster.

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



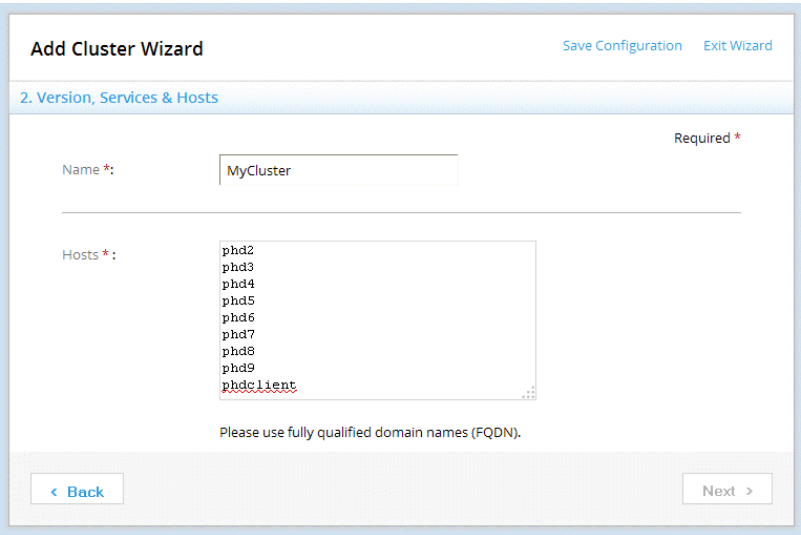
3.5.1 Adding a Cluster

1. Click **Add Cluster**. The Add Cluster Wizard opens:



   The Wizard allows you to create a new configuration from scratch or upload and edit any existing configuration. The Summary panel along the right shows you the progress of your configuration and deployment.

2. **Create Cluster Definition**. Either:
   1. If you are configuring a new cluster, select **Create a new Cluster Definition** then click **Next**.
   2. If you want to edit an existing cluster; select **Upload Cluster Configuration**,click **Upload**, then navigate to the `clusterConfig.xml` file that you wish to edit; then click **Next**. In this case, the following fields in the Wizard will be populated with the cluster definition properties of that `clusterConfig.xml` file you just uploaded. Follow the instructions below to edit those values.
3. **Versions, Services and Hosts**:



> **Notes**
>
> - 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 prepopulated. 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.

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-6u26-linux-x64-rpm.bin`.

Note: JDK 1.7 is a prerequisite. If not already installed, you can install using `icm_client import -f`

- **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**: Check this box if you want to run scanhosts. The scanhosts command verifies that prerequisites for the cluster node and provides a detailed report of any missing prerequisites. Running this command ensures that clusters are deployed smoothly.

Click **Next**.

4. **Host Verification**:

The Host Verification page 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.

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

5. **Topology**:
   This is the section where you specify the roles to be installed on the hosts. For example, you can specify where your hadoop namenode, data node 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.

   Notes

   - 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.

   - Hosts can be specified in ranges, see the notes for **Versions, Services and Hosts** , 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.

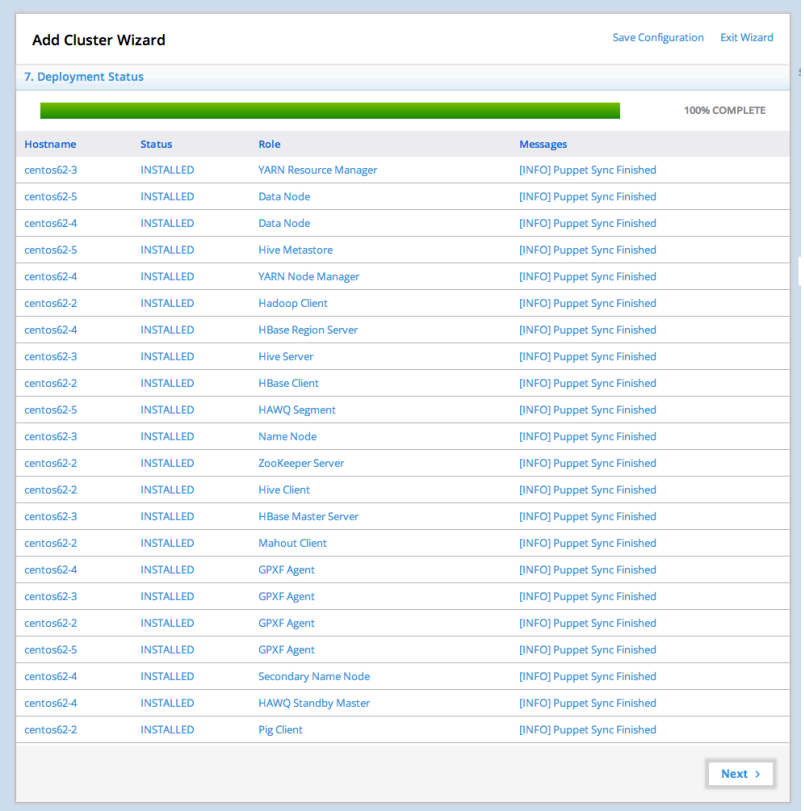
   These are the roles that need to have installation nodes defined:
   - **CLIENT**: ICM installs Pig, Hive, HBase, and Mahout libraries on this host.
   - **HDFS**: Name Node, Secondary Name Node, Data Nodes
   - **YARN**: Resource Manager, History Server, Node Managers
   - **Zookeeper**: Zookeeper Server
   - **HBase**: Hbase Master, HBase Region Servers.
   - **Hive**: Hive Master, Hive Metastore
   - **HAWQ**: Primary Node, Secondary Node, HAWQ Segment Nodes
   - **USS**: Name Node and Catalog
   - **PXF**: No hosts to configure. Installed on the client host.
   - **Mahout**: No hosts to configure. Installed on the client host.
   - **Pig**: No hosts to configure. Installed on the client host.

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

6. **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**.
7. **Validation**:
   If the configuration has errors they will be displayed here; otherwise you will see post-deployment instructions.
   Click **Deploy**

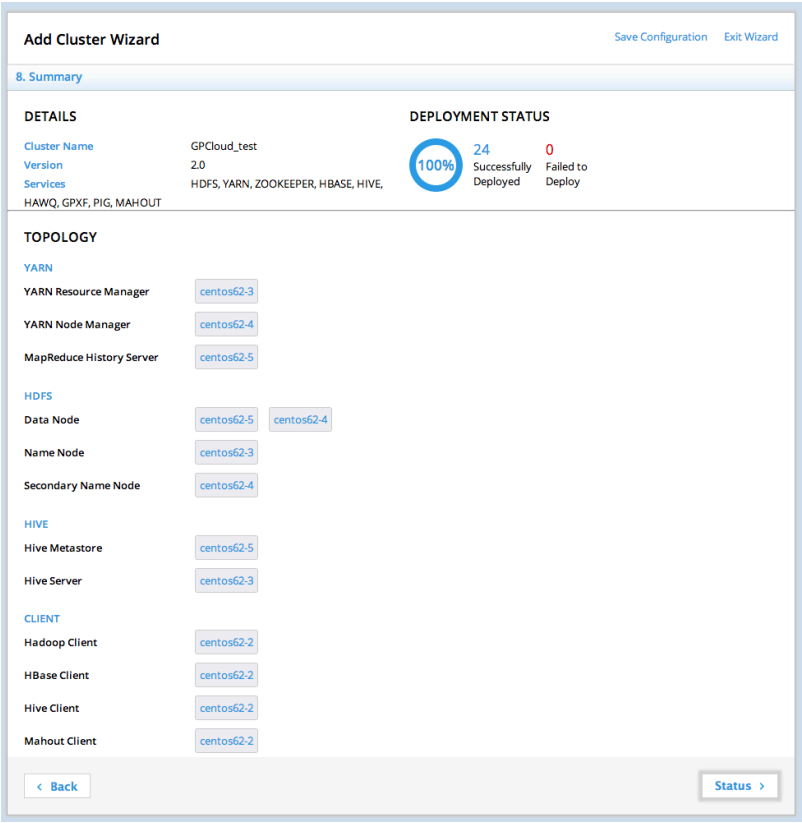
8. **Deployment Status**:



   This screen shows the progression of the deployment. Information displayed includes:
   - **Hostname**
   - **Status**
   - **Role**
   - **Messsages**

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

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



10. Return to the Cluster Status page:
    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**.
    If you are deploying HAWQ there is one more manual step you need to take before you can start the cluster, see Post Installation for HAWQ, below.

3.5.2 Post Installation for HAWQ

You need to exchange SSH keys between HAWQ Master and Segment Nodes to complete HAWQ installation.

1. Create a hostfile (`HAWQ_Segment_Hosts.txt`) that contains the hostnames of all your HAWQ segments.
2. As gpadmin, execute the following commands from the HAWQ Master.

```
# ssh <HAWQ_MASTER>
# source /usr/local/hawq/greenplum_path.sh
# /usr/local/hawq/bin/gpssh-exkeys -f ./HAWQ_Segment_Hosts.txt
```

Next steps: Starting the Cluster then Initializing HAWQ.

3.5.3 Starting the Cluster

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

3.5.4 Initializing HAWQ

As gpadmin ssh to the HAWQ master, the run the following:

```
# source /usr/local/hawq/greenplum_path.sh
```

```
# /etc/init.d/hawq init
```

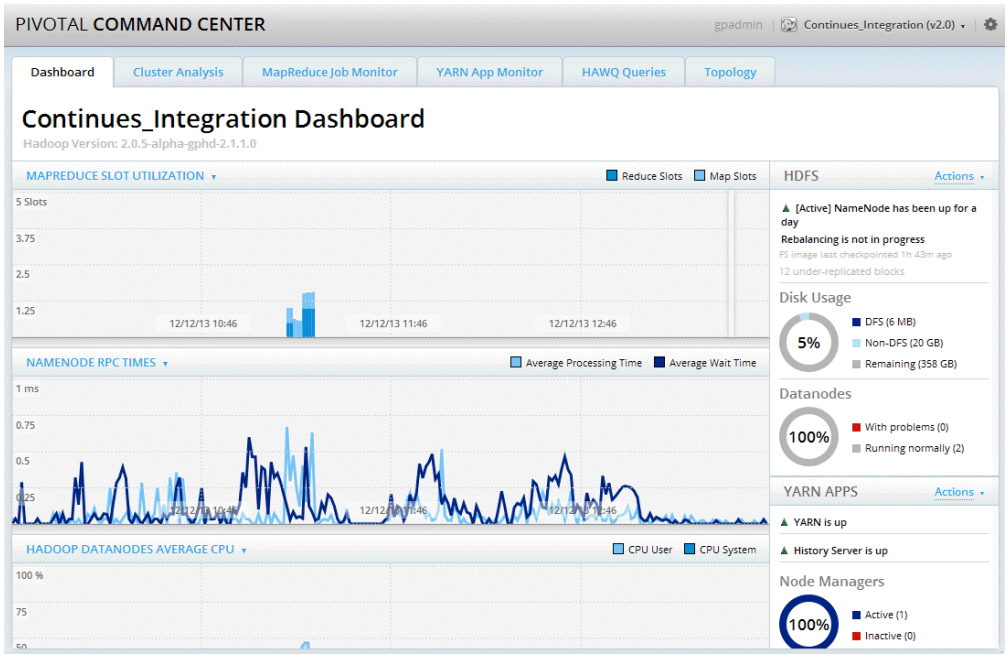
You have now completed your cluster configuration and deployment.

See the following sections of this document for details about using the PCC UI to administer and monitor your cluster.

3.6 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 allows you to 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.



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

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.
- The **Actions** dropdown menu allows you to **Rebalance** (redistribute your data across the cluster) your cluster, and to **View Rebalancer Log**.

 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.
- 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 NodeManagers that are running.

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.

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.
- The Status of the Zookeeper server host.

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.

The Dashboard also provides metrics about:

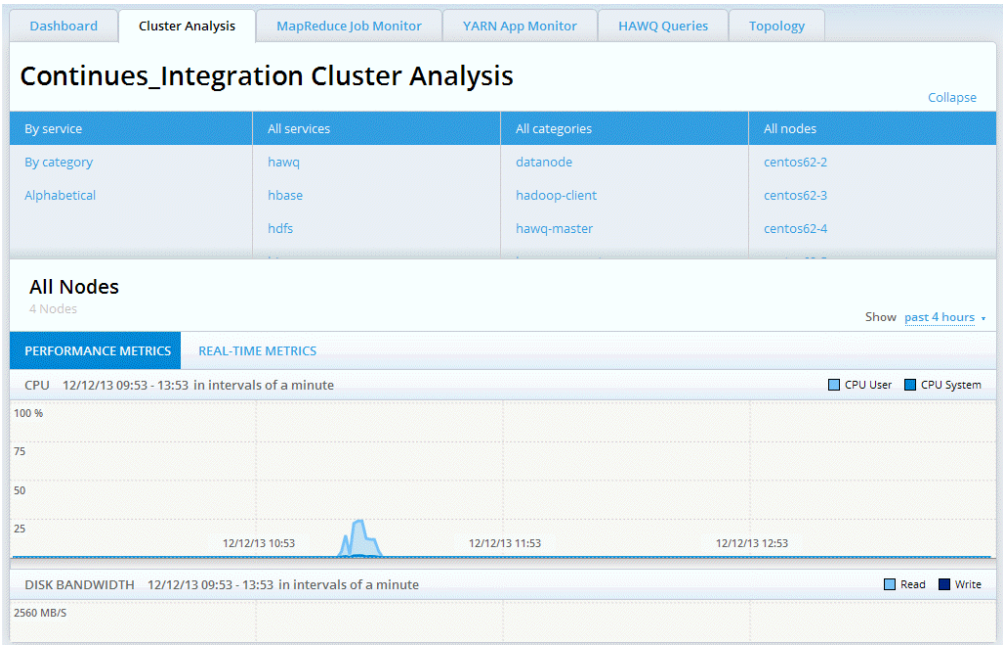
- Mapreduce Slot Utilization
- Namenode RPC Times
- Hadoop Datanodes Average CPU
- Hadoop Datanodes Average Bandwidth
- Namenode Operations Per Second
- Hadoop Datanodes Average Disk Bandwidth
- Hadoop Datanodes Average Memory
- Mapreduce Jobs By Status

3.7 Cluster Analysis

The Cluster Analysis screen provides detailed metrics on 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.

The Cluster Analysis screen displays the same data that is shown in the dashboard but in greater detail.



By default the Cluster Analysis screen displays the metrics for all services, all categories, and all nodes. You can filter the information displayed by combinations of the following filters:

By Service. Metrics can be filtered by services such as HDFS, YARN, or HAWQ.

By Category. Metrics can be filtered by categories such as:

- namenode
- secondarynamenode
- datanode
- yarn-resourcemanager
- yarn-nodemanager
- mapreduce-historyserver
- hawq-master
- hawq-segment

Alphabetically. Metrics can be filtered alphabetically.

Based on the filters you select, the lower part of the Cluster Analysis screen provides detailed graphs that display data related to:

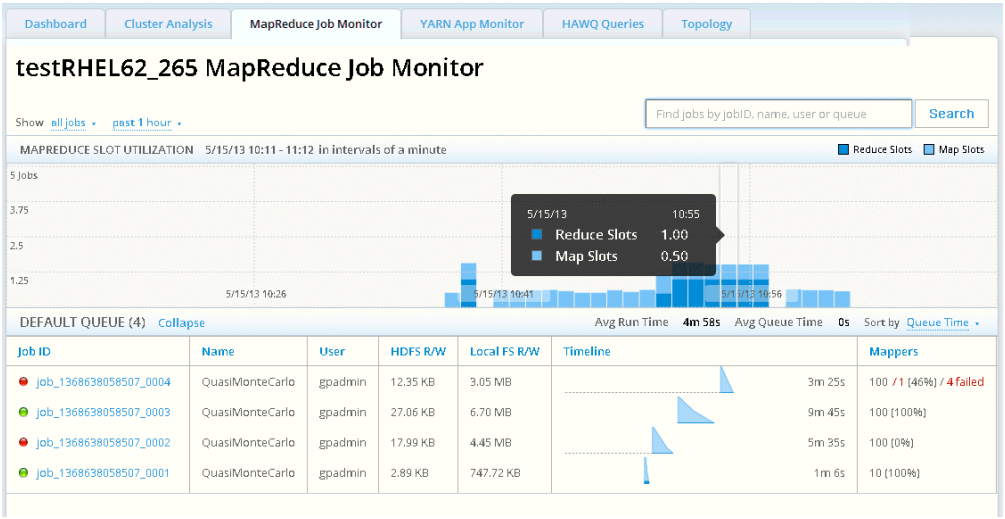
- CPU
- Disk Bandwidth
- Network Bandwidth
- Memory
- Load
- Swap Usage
- Swap I/O
- Network Operations
- Disk Operations

You can view either the **Performance Metrics**, which show the cluster/node utilization over-time, the **Real-time Metrics** which show the current metrics in real-time, or **Storage Metrics**, which show metrics about cluster storage.

If you select Cluster Analysis for **All Nodes** (the default), the Trending Metrics graph for the cluster is displayed.

3.8 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.



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

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:

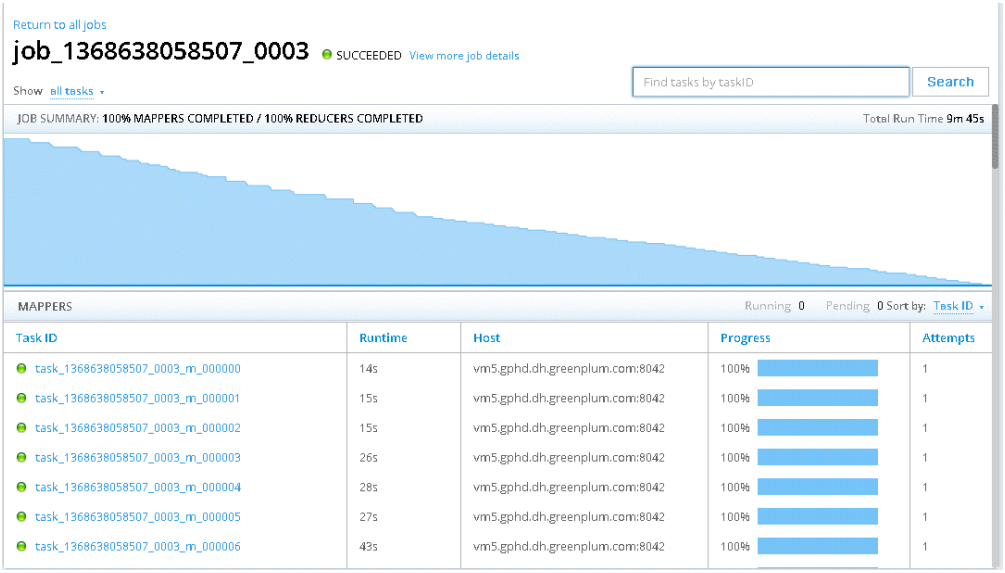
- jobID
- name
- user
- queue

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**

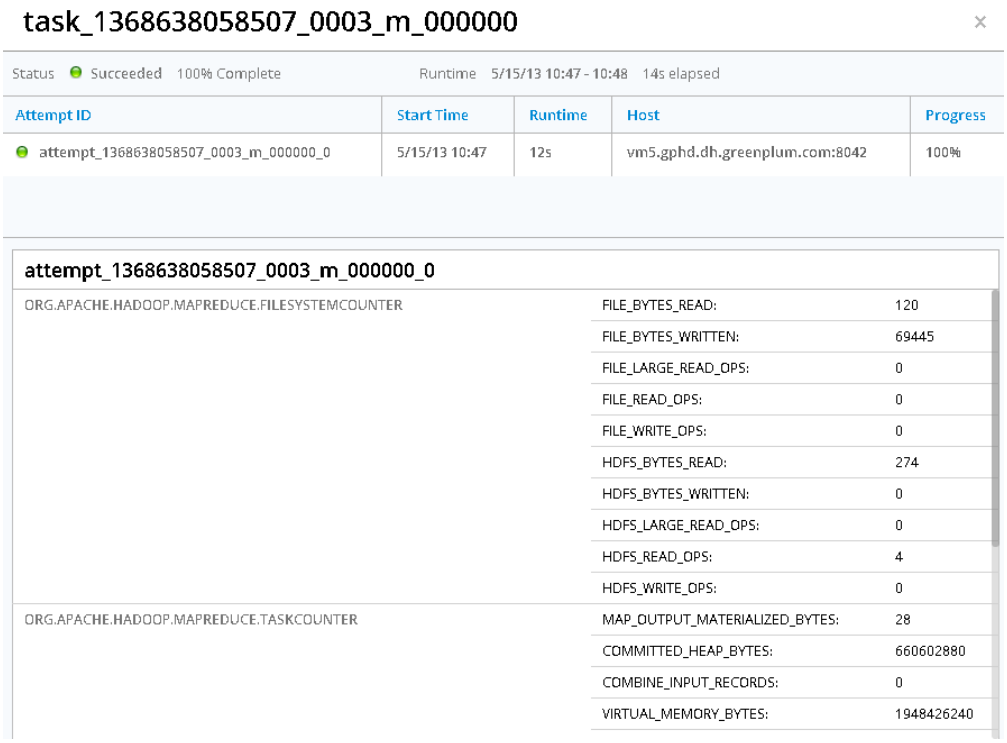
3.8.1 Job Details

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

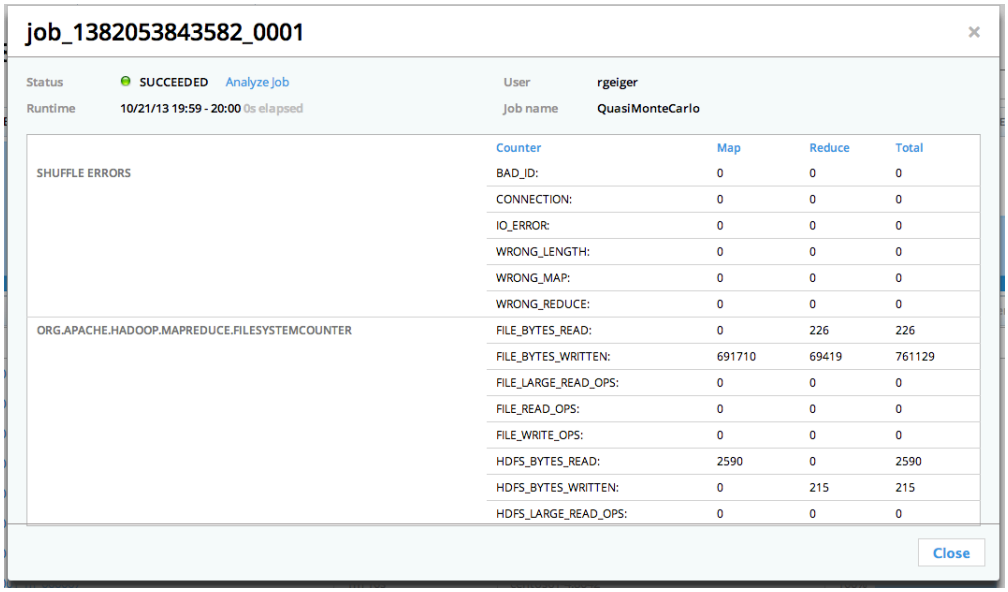


This screen displays all the tasks that are have been allocated for the selected job and their progress. You can see the mapper and the reducer tasks separately. In the above screen capture, the bars in the JOB SUMMARY section represent the two Mapper tasks that have run, one took 19 seconds, the other, 20 seconds.

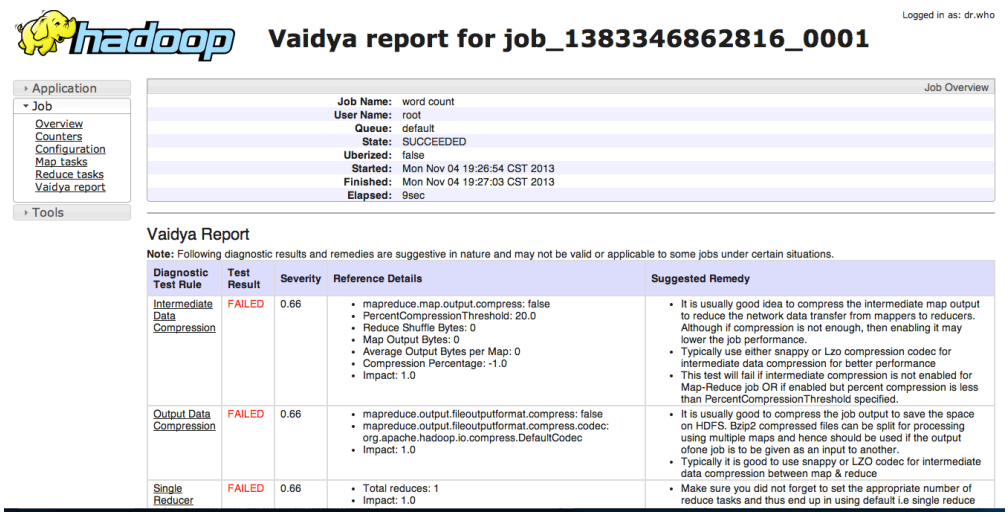
Clicking on each task ID will show even more details about that particular task. You can also filter on a particular task ID in the search bar.



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



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



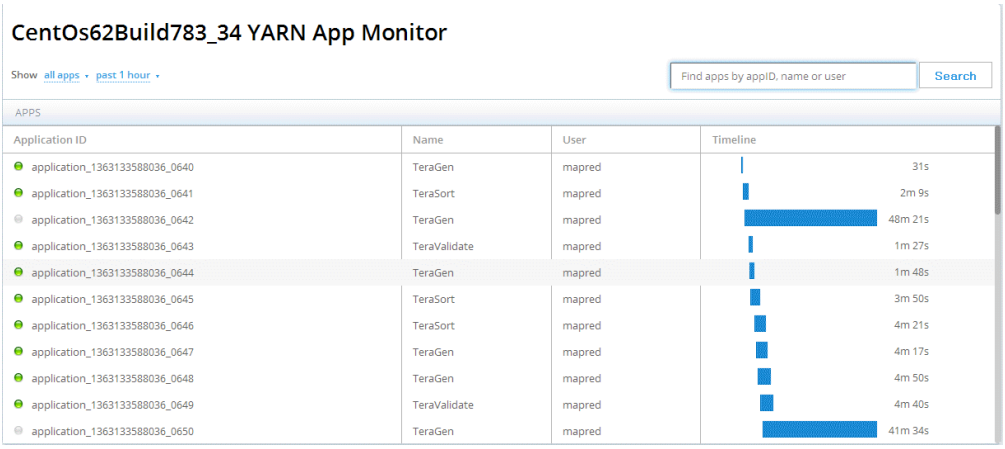
About Vaidya

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 Enterprise Stack and Tool Reference Guide*.

3.9 YARN App Monitor

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



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
- 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 following format: searchKey=searchValue:

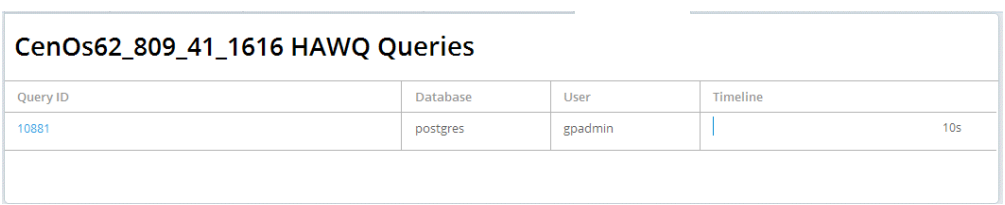
- appID
- name
- user

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

3.10 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:

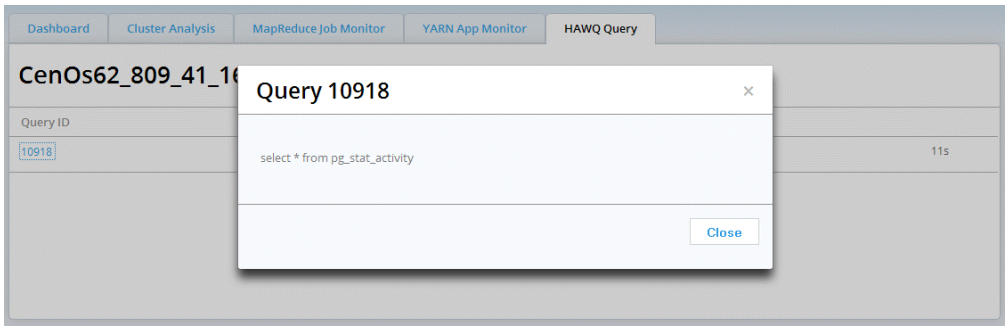


In this release, this screen only displays active queries as can be seen when you run:

```
SELECT * FROM pg_stat_activity;
```

on the HAWQ cluster.

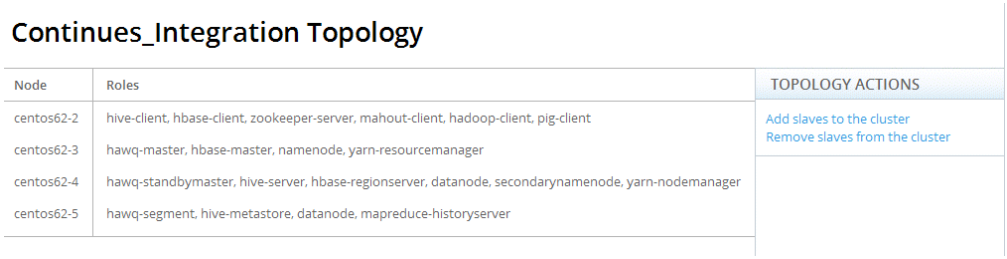
Click on a Query ID to get the syntax of that query:



3.11 Topology

This screen shows you what roles have been installed on each host. You can also add and remove slaves to the cluster from this screen.

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



3.11.1 Adding Slaves to the Cluster

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. Enter the slave nodes you want to add either individually, or as ranges, for example `Node[1-9]`, then click **Add Slaves to Cluster**.

- You have to provide the root password to add slave nodes.
- 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.

3.11.2 Removing Slaves from a Cluster

Click on the **Remove Slaves from the Cluster** option from the **Topology Actions** menu. A **Remove Slaves** dialog appears .

This dialog lists all current nodes. Enter the slave nodes you want to remove either individually, or as ranges, for example `Node[1-9]`, then click **Remove Slaves from Cluster**.

- 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.

4 Creating a YUM EPEL 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 would 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), then having a local yum EPEL repo would be highly recommended. This will also give you some control on the package versions you want deployed on your cluster.

Following are the steps to create a local yum repo:

1. Mount the RHEL/CentOS DVD on a machine that will act as the local yum repo.
2. Install a webserver on that machine (for example. httpd), making sure that HTTP traffic can reach this machine.
3. Install the following packages on the machine:
   `yum-utilscreaterep`
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-Ce
   ```
6. Validate that you can access the local yum repos by running the following command:
   `Yum list`

5 Command Line Reference

This section provides descriptions and syntax for the command line operations you can perform.

You need to perform command line command on the Admin node.

5.1 Backup and Restore

You can backup 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.

Backup and restore operations should be performed as `root`.

5.1.1 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.

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.

5.1.2 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.

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.