# Hortonworks Data Platform

## Ambari User's Guide

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# Hortonworks Data Platform : Ambari User's Guide



The Hortonworks Data Platform, powered by Apache Hadoop, is a massively scalable and 100% open source platform for storing, processing and analyzing large volumes of data. It is designed to deal with data from many sources and formats in a very quick, easy and cost-effective manner. The Hortonworks Data Platform consists of the essential set of Apache Hadoop projects including MapReduce, Hadoop Distributed File System (HDFS), HCatalog, Pig, Hive, HBase, Zookeeper and Ambari. Hortonworks is the major contributor of code and patches to many of these projects. These projects have been integrated and tested as part of the Hortonworks Data Platform release process and installation and configuration tools have also been included.

Unlike other providers of platforms built using Apache Hadoop, Hortonworks contributes 100% of our code back to the Apache Software Foundation. The Hortonworks Data Platform is Apache-licensed and completely open source. We sell only expert technical support, training and partner-enablement services. All of our technology is, and will remain free and open source.

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# 1. Overview: Ambari User's Guide

Hadoop is a large-scale, distributed data storage and processing infrastructure using clusters of commodity hosts networked together. Monitoring and managing such complex distributed systems is a non-trivial task. To help you manage the complexity, Apache Ambari collects a wide range of information from the cluster's nodes and services and presents it to you in an easy-to-read and use, centralized web interface, Ambari Web.

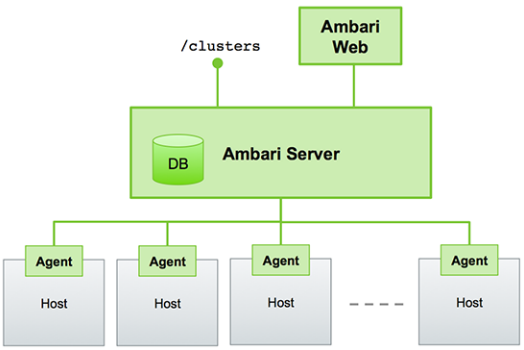
Ambari Web displays information such as service-specific summaries, graphs, and alerts. You use Ambari Web to create and manage your HDP cluster and to perform basic operational tasks such as starting and stopping services, adding hosts to your cluster, and updating service configurations. You also use Ambari Web to perform administrative tasks for your cluster, such as managing users and groups and deploying Ambari Views.

For more information on administering Ambari users, groups and views, refer to the Ambari Administration Guide.

## 1.1. Architecture

The Ambari Server serves as the collection point for data from across your cluster. Each host has a copy of the Ambari Agent - either installed automatically by the Install wizard or manually - which allows the Ambari Server to control each host.

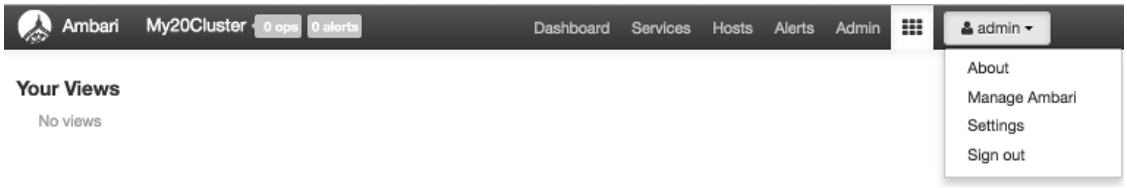
Figure - Ambari Server Architecture




### 1.1.1. Sessions

Ambari Web is a client-side JavaScript application, which calls the Ambari REST API (accessible from the Ambari Server) to access cluster information and perform cluster operations. After authenticating to Ambari Web, the application authenticates to the Ambari Server. Communication between the browser and server occurs asynchronously via the REST API.

Ambari Web sessions do not time out. The Ambari Server application constantly accesses the Ambari REST API, which resets the session timeout. During any period of Ambari Web inactivity, the Ambari Web user interface (UI) refreshes automatically. You must explicitly sign out of the Ambari Web UI to destroy the Ambari session with the server.




# 1.2. Accessing Ambari Web

Typically, you start the Ambari Server and Ambari Web as part of the installation process. If Ambari Server is stopped, you can start it using a command line editor on the Ambari Server host machine. Enter the following command:

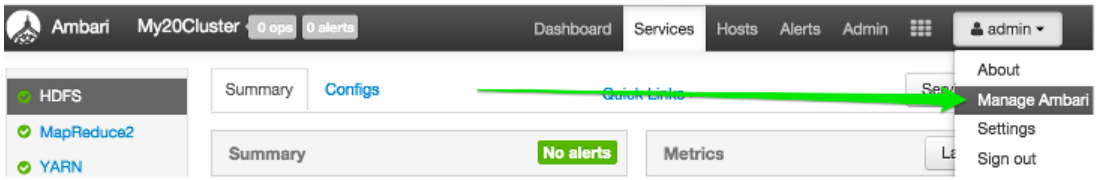
```
ambari-server start
```

To access Ambari Web, open a supported browser and enter the Ambari Web URL:

```
http://<your.ambari.server>:8080
```

Enter your user name and password. If this is the first time Ambari Web is accessed, use the default values, `admin/admin`.

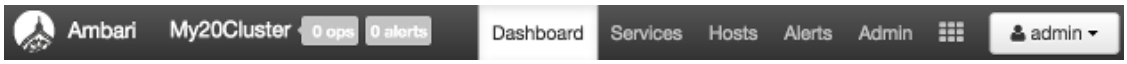
These values can be changed, and new users provisioned, using the `Manage Ambari` option.




For more information about managing users and other administrative tasks, see Administering Ambari.

# 2. Monitoring and Managing your HDP Cluster with Ambari

This topic describes how to use Ambari Web features to monitor and manage your HDP cluster. To navigate, select one of the following feature tabs located at the top of the Ambari main window. The selected tab appears white.




- Viewing Metrics on the Dashboard
- Managing Services
- Managing Hosts
- Managing Service High Availabilty
- Managing Configurations
- Administering the Cluster

## 2.1. Viewing Metrics on the Dashboard

Ambari Web displays the **Dashboard** page as the home page. Use the **Dashboard** to view the operating status of your cluster in the following three ways:

- Scanning System Metrics
- Scanning Status
- Viewing Heatmaps

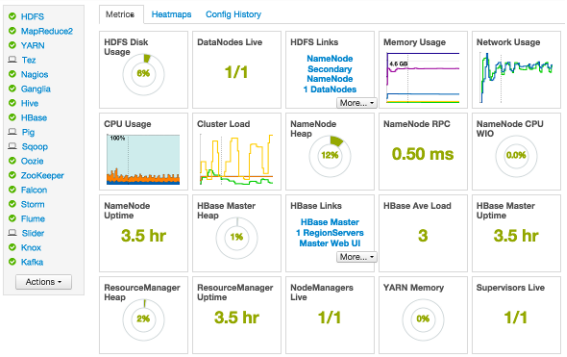
## 2.2. Scanning System Metrics

View **Metrics** that indicate the operating status of your cluster on the Ambari Dashboard. Each metrics widget displays status information for a single service in your HDP cluster. The Ambari Dashboard displays all metrics for the HDFS, YARN, HBase, and Storm services, and cluster-wide metrics by default.

### Note

Metrics data for Storm is buffered and sent as a batch to Ambari every five minutes. After adding the Storm service, anticipate a five-minute delay for Storm metrics to appear.

You can add and remove individual widgets, and rearrange the dashboard by dragging and dropping each widget to a new location in the dashboard.




Status information appears as simple pie and bar charts, more complex charts showing usage and load, sets of links to additional data sources, and values for operating parameters such as uptime and average RPC queue wait times. Most widgets display a single fact by default. For example, HDFS Disk Usage displays a load chart and a percentage figure. The Ambari Dashboard includes metrics for the following services:

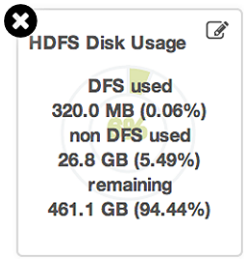
**Ambari Service Metrics and Descriptions**

| Metric: | Description: |
|---|---|
| **HDFS** | |
| HDFS Disk Usage | The Percentage of DFS used, which is a combination of DFS and non-DFS used. |
| Data Nodes Live | The number of DataNodes live, as reported from the NameNode. |
| NameNode Heap | The percentage of NameNode JVM Heap used. |
| NameNode RPC | The average RPC queue latency. |
| NameNode CPU WIO | The percentage of CPU Wait I/O. |
| NameNode Uptime | The NameNode uptime calculation. |
| **YARN (HDP 2.1 or later Stacks)** | |
| ResourceManager Heap | The percentage of ResourceManager JVM Heap used. |
| ResourceManager Uptime | The ResourceManager uptime calculation. |
| NodeManagers Live | The number of DataNodes live, as reported from the ResourceManager. |
| YARN Memory | The percentage of available YARN memory (used vs. total available). |
| **HBase** | |
| HBase Master Heap | The percentage of NameNode JVM Heap used. |
| HBase Ave Load | The average load on the HBase server. |
| HBase Master Uptime | The HBase Master uptime calculation. |
| Region in Transition | The number of HBase regions in transition. |
| **Storm (HDP 2.1 or later Stacks)** | |
| Supervisors Live | The number of Supervisors live, as reported from the Nimbus server. |

# 2.3. Drilling Into Metrics for a Service

- To see more detailed information about a service, hover your cursor over a Metrics widget.

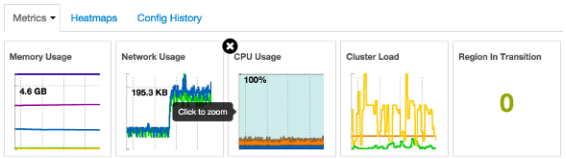
  More detailed information about the service displays, as shown in the following example:




- To remove a widget from the mashup, click the white X.
- To edit the display of information in a widget, click the pencil icon. For more information about editing a widget, see Customizing Metrics Display.

# 2.4. Viewing Cluster-Wide Metrics

Cluster-wide metrics display information that represents your whole cluster. The Ambari Dashboard shows the following cluster-wide metrics:

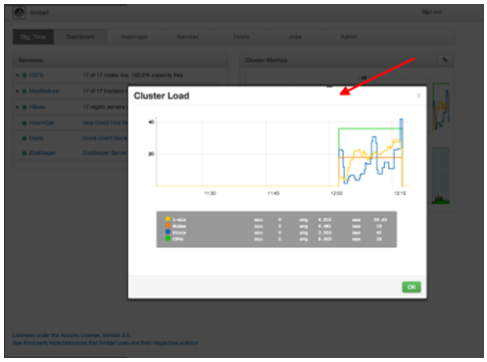



**Ambari Cluster-Wide Metrics and Descriptions**

| Metric: | Description: |
|---|---|
| Memory Usage | The cluster-wide memory utilization, including memory cached, swapped, used, shared. |
| Network Usage | The cluster-wide network utilization, including in-and-out. |
| CPU Usage | Cluster-wide CPU information, including system, user and wait IO. |
| Cluster Load | Cluster-wide Load information, including total number of nodes. total number of CPUs, number of running processes and 1-min Load. |

- To remove a widget from the dashboard, click the white X.
- Hover your cursor over each cluster-wide metric to magnify the chart or itemize the widget display.
- To remove or add metric items from each cluster-wide metric widget, select the item on the widget legend.
- To see a larger view of the chart, select the magnifying glass icon.

  Ambari displays a larger version of the widget in a pop-out window, as shown in the following example:



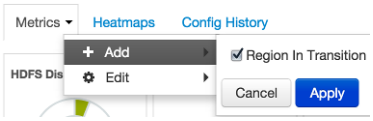

Use the pop-up window in the same ways that you use cluster-wide metric widgets on the dashboard.

To close the widget pop-up window, choose OK.

## 2.5. Adding a Widget to the Dashboard

To replace a widget that has been removed from the dashboard:

1. Select the Metrics drop-down, as shown in the following example:

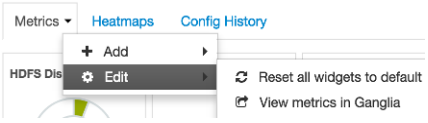



2. Choose Add.
3. Select a metric, such as Region in Transition.
4. Choose Apply.

## 2.6. Resetting the Dashboard

To reset all widgets on the dashboard to display default settings:

1. Select the Metrics drop-down, as shown in the following example:



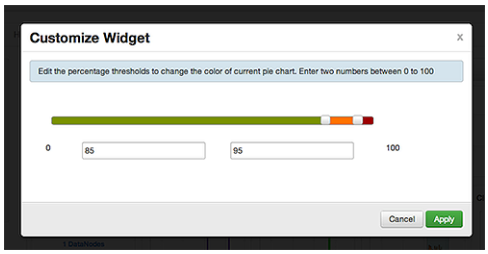

2. Choose Edit.
3. Choose Reset all widgets to default.

## 2.7. Customizing Metrics Display

To customize the way a service widget displays metrics information:

1. Hover your cursor over a service widget.
2. Select the pencil-shaped, edit icon that appears in the upper-right corner.

   The Customize Widget pop-up window displays properties that you can edit, as shown in the following example.




3. Follow the instructions in the Customize Widget pop-up to customize widget appearance.

   In this example, you can adjust the thresholds at which the HDFS Capacity bar chart changes color, from green to orange to red.

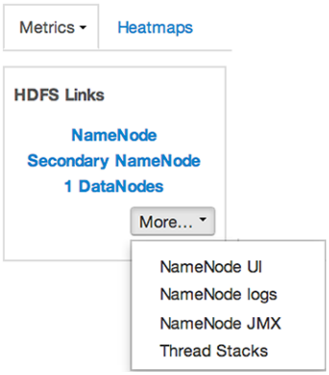
4. To save your changes and close the editor, choose `Apply`.
5. To close the editor without saving any changes, choose `Cancel`.

**Note**

Not all widgets support editing.

# 2.8. Viewing More Metrics for your HDP Stack

The HDFS Links and HBase Links widgets list HDP components for which links to more metrics information, such as thread stacks, logs and native component UIs are available. For example, you can link to NameNode, Secondary NameNode, and DataNode components for HDFS, using the links shown in the following example:



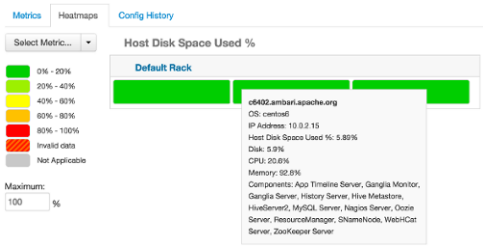

Choose the `More` drop-down to select from the list of links available for each service. The Ambari Dashboard includes additional links to metrics for the following services:

**Links to More Metrics for HDP Services**

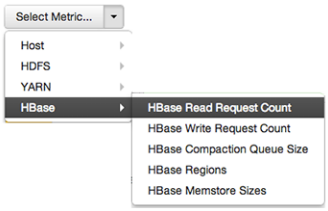
| Service: | Metric: | Description: |
|---|---|---|
| **HDFS** | | |
| | NameNode UI | Links to the NameNode UI. |
| | NameNode Logs | Links to the NameNode logs. |
| | NameNode JMX | Links to the NameNode JMX servlet. |
| | Thread Stacks | Links to the NameNode thread stack traces. |
| **HBase** | | |
| | HBase Master UI | Links to the HBase Master UI. |
| | HBase Logs | Links to the HBase logs. |
| | ZooKeeper Info | Links to ZooKeeper information. |
| | HBase Master JMX | Links to the HBase Master JMX servlet. |
| | Debug Dump | Links to debug information. |
| | Thread Stacks | Links to the HBase Master thread stack traces. |

# 2.9. Viewing Heatmaps

**Heatmaps** provides a graphical representation of your overall cluster utilization using simple color coding.




A colored block represents each host in your cluster. To see more information about a specific host, hover over the block representing the host in which you are interested. A pop-up window displays metrics about HDP components installed on that host. Colors displayed in the block represent usage in a unit appropriate for the selected set of metrics. If any data necessary to determine state is not available, the block displays "Invalid Data". Changing the default maximum values for the heatmap lets you fine tune the representation. Use the Select Metric drop-down to select the metric type.




**Heatmaps** supports the following metrics:

| Metric | Uses |
|---|---|
| Host/Disk Space Used % | disk.disk_free and disk.disk_total |
| Host/Memory Used % | memory.mem_free and memory.mem_total |
| Host/CPU Wait I/O % | cpu.cpu_wio |

| Metric | Uses |
|---|---|
| HDFS/Bytes Read | dfs.datanode.bytes_read |
| HDFS/Bytes Written | dfs.datanode.bytes_written |
| HDFS/Garbage Collection Time | jvm.gcTimeMillis |
| HDFS/JVM Heap MemoryUsed | jvm.memHeapUsedM |
| YARN/Garbage Collection Time | jvm.gcTimeMillis |
| YARN / JVM Heap Memory Used | jvm.memHeapUsedM |
| YARN / Memory used % | UsedMemoryMB and AvailableMemoryMB |
| HBase/RegionServer read request count | hbase.regionserver.readRequestsCount |
| HBase/RegionServer write request count | hbase.regionserver.writeRequestsCount |
| HBase/RegionServer compaction queue size | hbase.regionserver.compactionQueueSize |
| HBase/RegionServer regions | hbase.regionserver.regions |
| HBase/RegionServer memstore sizes | hbase.regionserver.memstoreSizeMB |

# 2.10. Scanning Status

Notice the color of the dot appearing next to each component name in a list of components, services or hosts. The dot color and blinking action indicates operating status of each component, service, or host. For example, in the Summary View, notice green dot next to each service name. The following colors and actions indicate service status:

### Status Indicators

| Color | Status |
|---|---|
| Solid Green | All masters are running |
| Blinking Green | Starting up |
| Solid Red | At least one master is down |
| Blinking Red | Stopping |

Click the service name to open the **Services** screen, where you can see more detailed information on each service.

# 3. Managing Hosts

Use Ambari Hosts to manage multiple HDP components such as DataNodes, NameNodes, NodeManagers and RegionServers, running on hosts throughout your cluster. For example, you can restart all DataNode components, optionally controlling that task with rolling restarts. Ambari Hosts supports filtering your selection of host components, based on operating status, host health, and defined host groupings.

## 3.1. Working with Hosts

Use Hosts to view hosts in your cluster on which Hadoop services run. Use options on **Actions** to perform actions on one or more hosts in your cluster.

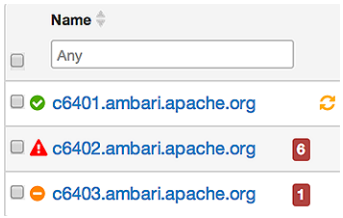
View individual hosts, listed by fully-qualified domain name, on the Hosts landing page.


## 3.2. Determining Host Status

A colored dot beside each host name indicates operating status of each host, as follows:

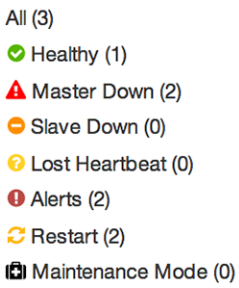
- Red - At least one master component on that host is down. Hover to see a tooltip that lists affected components.
- Orange - At least one slave component on that host is down. Hover to see a tooltip that lists affected components.
- Yellow - Ambari Server has not received a heartbeat from that host for more than 3 minutes.
- Green - Normal running state.

A red condition flag overrides an orange condition flag, which overrides a yellow condition flag. In other words, a host having a master component down may also have other issues. The following example shows three hosts, one having a master component down, one having a slave component down, and one healthy. Warning indicators appear next to hosts having a component down.



# 3.3. Filtering the Hosts List

Use Filters to limit listed hosts to only those having a specific operating status. The number of hosts in your cluster having a listed operating status appears after each status name, in parenthesis. For example, the following cluster has one host having healthy status and three hosts having Maintenance Mode turned on.




For example, to limit the list of hosts appearing on Hosts home to only those with Healthy status, select Filters, then choose the Healthy option. In this case, one host name appears on Hosts home. Alternatively, to limit the list of hosts appearing on Hosts home to only those having Maintenance Mode on, select Filters, then choose the Maintenance Mode option. In this case, three host names appear on Hosts home.

Use the general filter tool to apply specific search and sort criteria that limits the list of hosts appearing on the Hosts page.

# 3.4. Performing Host-Level Actions

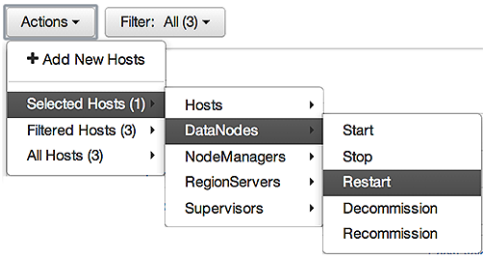
Use Actions to act on one, or multiple hosts in your cluster. Actions performed on multiple hosts are also known as bulk operations.

Actions comprises three menus that list the following option types:

- Hosts - lists selected, filtered or all hosts options, based on your selections made using Hosts home and Filters.
- Objects - lists component objects that match your host selection criteria.
- Operations - lists all operations available for the component objects you selected.

For example, to restart DataNodes on one host:

1. In Hosts, select a host running at least one DataNode.
2. In Actions, choose `Selected Hosts > DataNodes > Restart`, as shown in the following image.




3. Choose OK to confirm starting the selected operation.

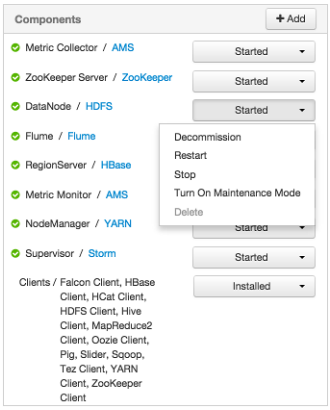
4. Optionally, use Monitoring Background Operations to follow, diagnose or troubleshoot the restart operation.

# 3.5. Viewing Components on a Host

To manage components running on a specific host, choose a FQDN on the Hosts page. For example, choose c6403.ambari.apache.org in the default example shown. Summary-Components lists all components installed on that host.


Choose options in `Host Actions`, to start, stop, restart, delete, or turn on maintenance mode for all components installed on the selected host.

Alternatively, choose action options from the drop-down menu next to an individual component on a host. The drop-down menu shows current operation status for each component, For example, you can decommission, restart, or stop the DataNode component (started) for HDFS, by selecting one of the options shown in the following example:




# 3.6. Decommissioning Masters and Slaves

Decommissioning is a process that supports removing a component from the cluster. You must decommission a master or slave running on a host before removing the component or host from service. Decommissioning helps prevent potential loss of data or service disruption. Decommissioning is available for the following component types:

- DataNodes
- NodeManagers
- RegionServers

Decommissioning executes the following tasks:

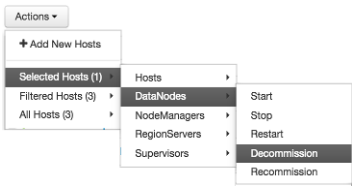
- For DataNodes, safely replicates the HDFS data to other DataNodes in the cluster.
- For NodeManagers, stops accepting new job requests from the masters and stops the component.
- For RegionServers, turns on drain mode and stops the component.

## 3.6.1. How to Decommission a Component

To decommission a component using Ambari Web, browse **Hosts** to find the host FQDN on which the component resides.

Using **Actions**, select **HostsComponent Type**, then choose **Decommission**.

For example:



The UI shows "Decommissioning" status while steps process, then "Decommissioned" when complete.


# 3.7. How to Delete a Component

To delete a component using Ambari Web, on `Hosts` choose the host FQDN on which the component resides.

1. In `Components`, find a decommissioned component.
2. Stop the component, if necessary.

   **Note**

   A decommissioned slave component may restart in the decommissioned state.

3. For a decommissioned component, choose **Delete** from the component drop-down menu.

   **Note**

   Restarting services enables Ambari to recognize and monitor the correct number of components.

   Deleting a slave component, such as a DataNode does not automatically inform a master component, such as a NameNode to remove the slave component from its exclusion list. Adding a deleted slave component back into the cluster presents the following issue; the added slave remains decommissioned from the master's perspective. Restart the master component, as a work-around.

# 3.8. Deleting a Host from a Cluster

Deleting a host removes the host from the cluster. Before deleting a host, you must complete the following prerequisites:

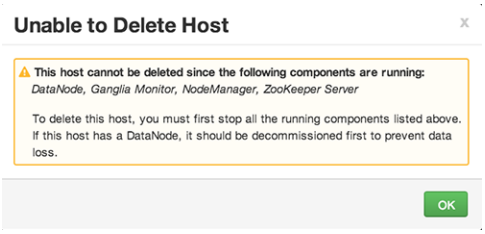
- Stop all components running on the host.
- Decommission any DataNodes running on the host.
- Move from the host any master components, such as NameNode or ResourceManager, running on the host.

- Turn Off Maintenance Mode, if necessary, for the host.

### 3.8.1. How to Delete a Host from a Cluster

1. In Hosts, click on a host name.
2. On the Host-Details page, select Host Actions drop-down menu.
3. Choose Delete.

If you have not completed prerequisite steps, a warning message similar to the following one appears:




## 3.9. Setting Maintenance Mode

Maintenance Mode supports suppressing alerts and skipping bulk operations for specific services, components and hosts in an Ambari-managed cluster. You typically turn on Maintenance Mode when performing hardware or software maintenance, changing configuration settings, troubleshooting, decommissioning, or removing cluster nodes. You may place a service, component, or host object in Maintenance Mode before you perform necessary maintenance or troubleshooting tasks.

Maintenance Mode affects a service, component, or host object in the following two ways:

- Maintenance Mode suppresses alerts, warnings and status change indicators generated for the object
- Maintenance Mode exempts an object from host-level or service-level bulk operations

Explicitly turning on Maintenance Mode for a service implicitly turns on Maintenance Mode for components and hosts that run the service. While Maintenance Mode On prevents bulk operations being performed on the service, component, or host, you may explicitly start and stop a service, component, or host having Maintenance Mode On.

### 3.9.1. Setting Maintenance Mode for Services, Components, and Hosts

For example, examine using Maintenance Mode in a 3-node, Ambari-managed cluster installed using default options. This cluster has one data node, on host c6403. This example describes how to explicitly turn on Maintenance Mode for the HDFS service, alternative procedures for explicitly turning on Maintenance Mode for a host, and the implicit effects of turning on Maintenance Mode for a service, a component and a host.

## 3.9.2. How to Turn On Maintenance Mode for a Service

1. Using Services, select HDFS.
2. Select Service Actions, then choose `Turn On Maintenance Mode`.
3. Choose OK to confirm.

   Notice, on Services Summary that Maintenance Mode turns on for the NameNode and SNameNode components.

## 3.9.3. How to Turn On Maintenance Mode for a Host

1. Using Hosts, select c6401.ambari.apache.org.
2. Select `Host Actions`, then choose `Turn On Maintenance Mode`.
3. Choose OK to confirm.

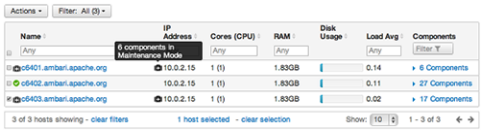
   Notice on Components, that Maintenance Mode turns on for all components.

## 3.9.4. How to Turn On Maintenance Mode for a Host (alternative using filtering for hosts)

1. Using Hosts, select c6403.ambari.apache.org.
2. In `Actions > Selected Hosts > Hosts` choose `Turn On Maintenance Mode`.
3. Choose OK to confirm.

   Notice that Maintenance Mode turns on for host c6403.ambari.apache.org.

Your list of Hosts now shows Maintenance Mode On for hosts c6401 and c6403.




- Hover your cursor over each Maintenance Mode icon appearing in the Hosts list.
  - Notice that hosts c6401 and c6403 have Maintenance Mode On.
  - Notice that on host c6401; HBaseMaster, HDFS client, NameNode, and ZooKeeper Server have Maintenance Mode turned On.
  - Notice on host c6402, that HDFS client and Secondary NameNode have Maintenance Mode On.
  - Notice on host c6403, that 15 components have Maintenance Mode On.
- The following behavior also results:
  - Alerts are suppressed for the DataNode.

- DataNode is skipped from HDFS Start/Stop/Restart All, Rolling Restart.
- DataNode is skipped from all Bulk Operations except Turn Maintenance Mode ON/ OFF.
- DataNode is skipped from Start All and / Stop All components.
- DataNode is skipped from a host-level restart/restart all/stop all/start.

## 3.9.5. Maintenance Mode Use Cases

Four common Maintenance Mode Use Cases follow:

1. You want to perform hardware, firmware, or OS maintenance on a host.

   You want to:

   - Prevent alerts generated by all components on this host.
   - Be able to stop, start, and restart each component on the host.
   - Prevent host-level or service-level bulk operations from starting, stopping, or restarting components on this host.

   To achieve these goals, turn On Maintenance Mode explicitly for the host. Putting a host in Maintenance Mode implicitly puts all components on that host in Maintenance Mode.

2. You want to test a service configuration change. You will stop, start, and restart the service using a rolling restart to test whether restarting picks up the change.

   You want:

   - No alerts generated by any components in this service.
   - To prevent host-level or service-level bulk operations from starting, stopping, or restarting components in this service.

   To achieve these goals, turn on Maintenance Mode explicitly for the service. Putting a service in Maintenance Mode implicitly turns on Maintenance Mode for all components in the service.

3. You turn off a service completely.

   You want:

   - The service to generate no warnings.
   - To ensure that no components start, stop, or restart due to host-level actions or bulk operations.

   To achieve these goals, turn On Maintenance Mode explicitly for the service. Putting a service in Maintenance Mode implicitly turns on Maintenance Mode for all components in the service.

4. A host component is generating alerts.

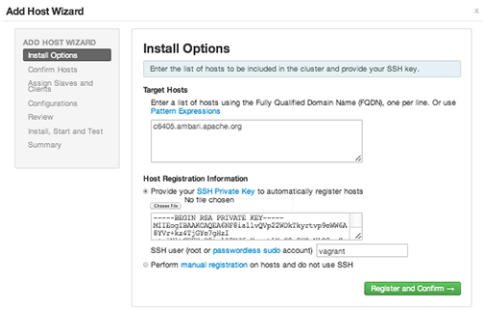
   You want to:

   - Check the component.
   - Assess warnings and alerts generated for the component.
   - Prevent alerts generated by the component while you check its condition.

To achieve these goals, turn on Maintenance Mode explicitly for the host component. Putting a host component in Maintenance Mode prevents host-level and service-level bulk operations from starting or restarting the component. You can restart the component explicitly while Maintenance Mode is on.

# 3.10. Adding Hosts to a Cluster

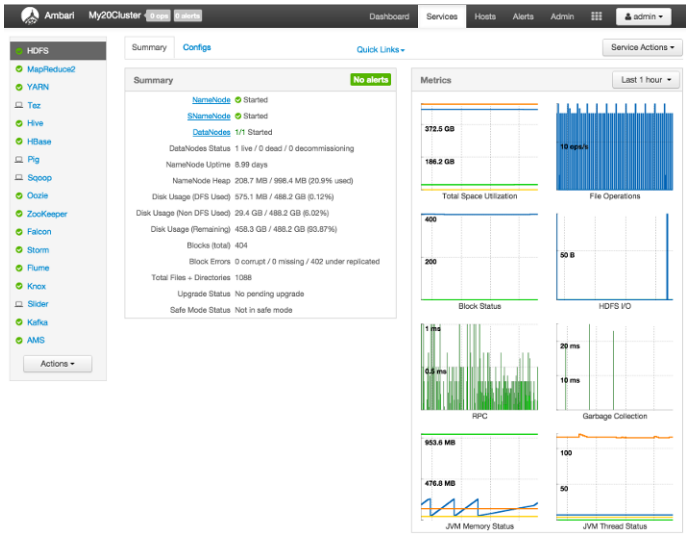
To add new hosts to your cluster, browse to the Hosts page and select `Actions >+Add New Hosts`. The `Add Host Wizard` provides a sequence of prompts similar to those in the Ambari Install Wizard. Follow the prompts, providing information similar to that provided to define the first set of hosts in your cluster.



# 4. Managing Services

Use `Services` to monitor and manage selected services running in your Hadoop cluster.

All services installed in your cluster are listed in the leftmost `Services` panel.

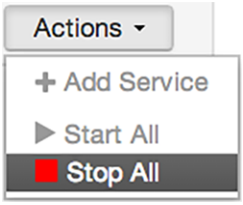



Services supports the following tasks:

- Starting and Stopping All Services
- Selecting a Service
- Adding a Service to your Hadoop cluster
- Editing Service Config Properties
- Viewing Summary, Alert, and Health Information
- Performing Service Actions
- Monitoring Background Operations
- Using Quick Links
- Rolling Restarts
- Refreshing YARN Capacity Scheduler
- Rebalancing HDFS

## 4.1. Starting and Stopping All Services

To start or stop all listed services at once, select `Actions`, then choose `Start All` or `Stop All`, as shown in the following example:




## 4.2. Selecting a Service

Selecting a service name from the list shows current summary, alert, and health information for the selected service. To refresh the monitoring panels and show information about a different service, select a different service name from the list.

Notice the colored dot next to each service name, indicating service operating status and a small, red, numbered rectangle indicating any alerts generated for the service.

## 4.3. Adding a Service to your Hadoop cluster

The Ambari install wizard installs all available Hadoop services by default. You may choose to deploy only some services initially, then add other services at later times. For example, many customers deploy only core Hadoop services initially. `Add Service` supports deploying additional services without interrupting operations in your Hadoop cluster. When you have deployed all available services, `Add Service` displays disabled.

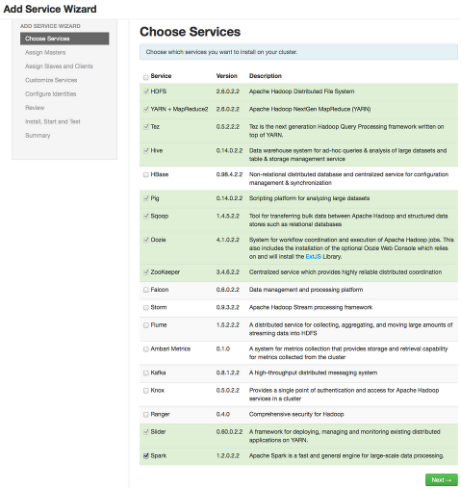
For example, if you are using HDP 2.2 Stack and did not install Falcon or Storm, you can use the `Add Service` capability to add those services to your cluster.

To add a service, select `Actions > Add Service`, then complete the following procedure using the Add Service Wizard.

This example shows the Falcon service selected for addition.

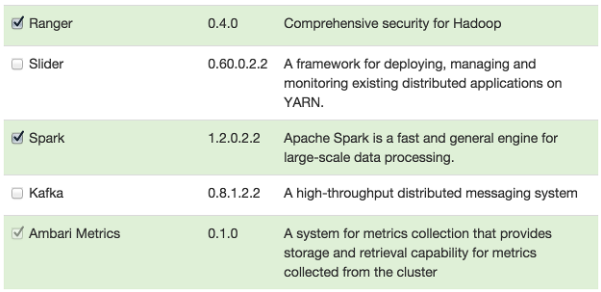
1. Choose `Services`.

   Choose an available service. Alternatively, choose all to add all available services to your cluster. Then, choose Next. The Add Service wizard displays installed services highlighted green and check-marked, not available for selection.




## Note

Ambari 2.0 supports adding Ranger and Spark services, using the Add Services Wizard.



| | | |
|---|---|---|
| ☑ Ranger | 0.4.0 | Comprehensive security for Hadoop |
| ☐ Slider | 0.60.0.2.2 | A framework for deploying, managing and monitoring existing distributed applications on YARN. |
| ☑ Spark | 1.2.0.2.2 | Apache Spark is a fast and general engine for large-scale data processing. |
| ☐ Kafka | 0.8.1.2.2 | A high-throughput distributed messaging system |
| ☑ Ambari Metrics | 0.1.0 | A system for metrics collection that provides storage and retrieval capability for metrics collected from the cluster |

For more information about installing Ranger, see Installing Ranger.

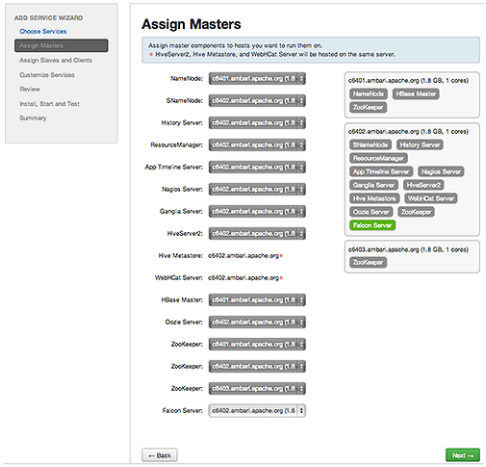
For more information about Installing Spark, see Installing Spark.

2. In `Assign Masters`, confirm the default host assignment. Alternatively, choose a different host machine to which master components for your selected service will be added. Then, choose Next.

   The Add Services Wizard indicates hosts on which the master components for a chosen service will be installed. A service chosen for addition shows a grey check mark.

   Using the drop-down, choose an alternate host name, if necessary.

   - A green label located on the host to which its master components will be added, or
   - An active drop-down list on which available host names appear.



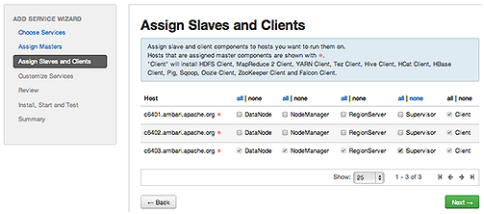

3. In `Assign Slaves and Clients`, accept the default assignment of slave and client components to hosts. Then, choose Next.

   Alternatively, select hosts on which you want to install slave and client components. You must select at least one host for the slave of each service being added.

   **Host Roles Required for Added Services**

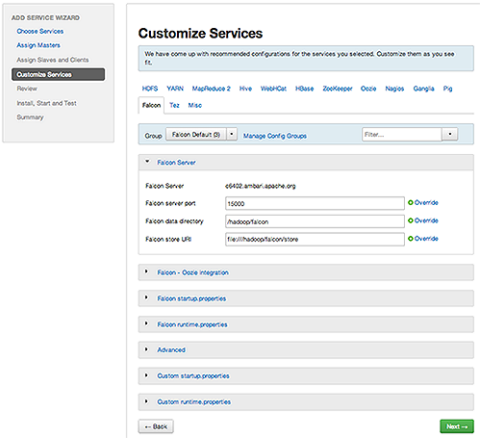
| Service Added | Host Role Required |
|---|---|
| YARN | NodeManager |
| HBase | RegionServer |

   The Add Service Wizard skips and disables the Assign Slaves and Clients step for a service requiring no slave nor client assignment.

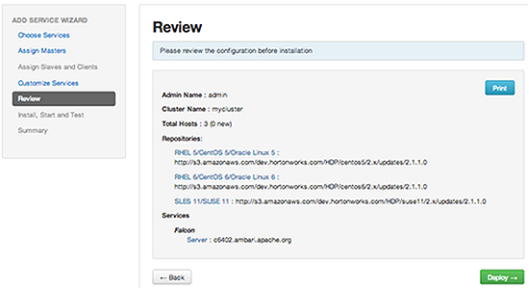



4. In `Customize Services`, accept the default configuration properties.

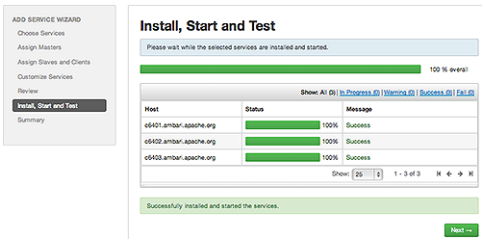
   Alternatively, edit the default values for configuration properties, if necessary. Choose Override to create a configuration group for this service. Then, choose Next.



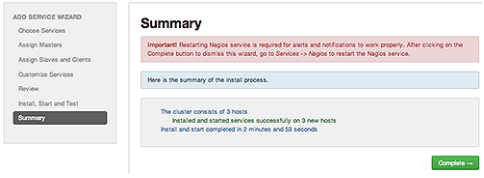

5. In Review, make sure the configuration settings match your intentions. Then, choose Deploy.




6. Monitor the progress of installing, starting, and testing the service. When the service installs and starts successfully, choose Next.



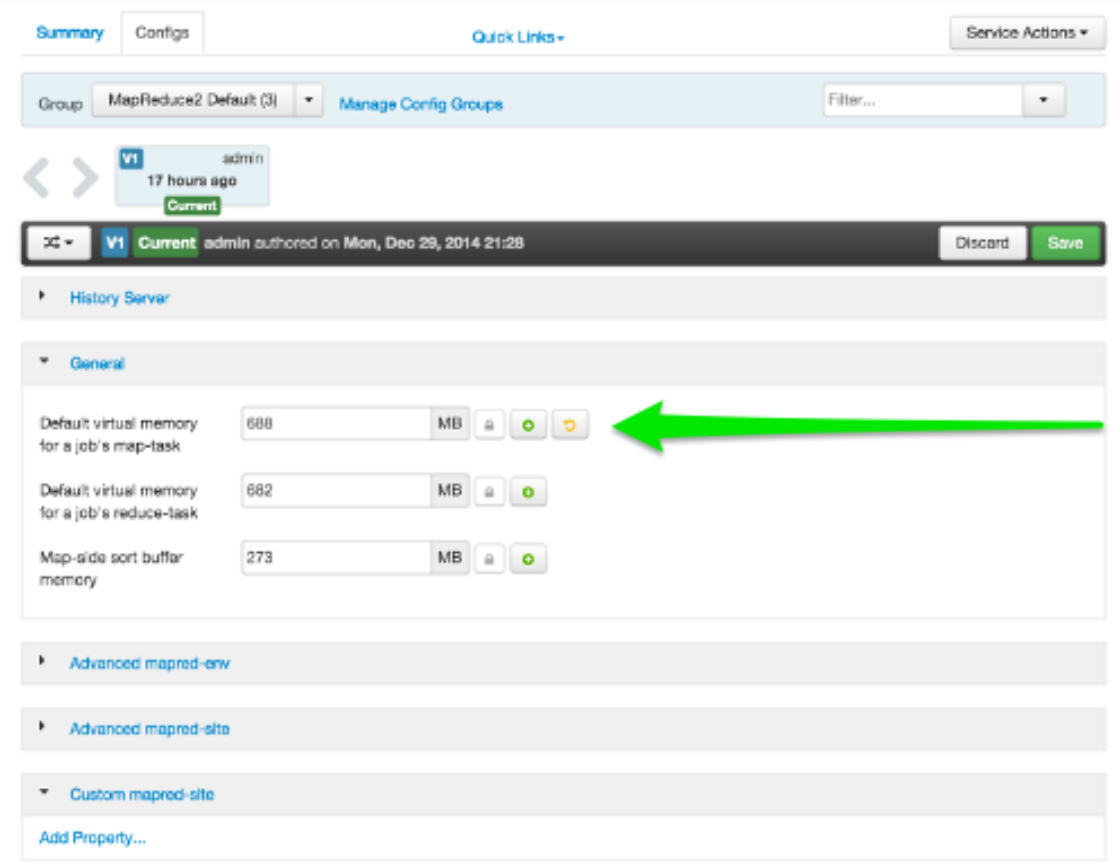

7. Summary displays the results of installing the service. Choose Complete.




8. Restart any other components having stale configurations.

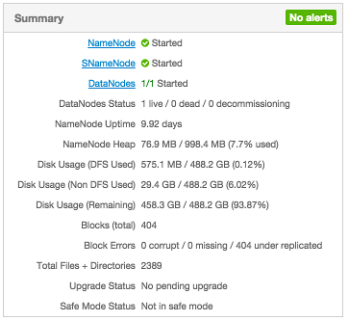
# 4.4. Editing Service Config Properties

Select a service, then select `Configs` to view and update configuration properties for the selected service. For example, select MapReduce2, then select Configs. Expand a config category to view configurable service properties. For example, select General to configure Default virtual memory for a job's map task.

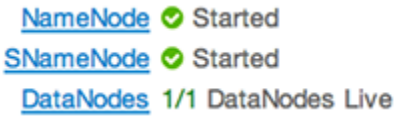



# 4.5. Viewing Summary, Alert, and Health Information

After you select a service, the `Summary` tab displays basic information about the selected service.

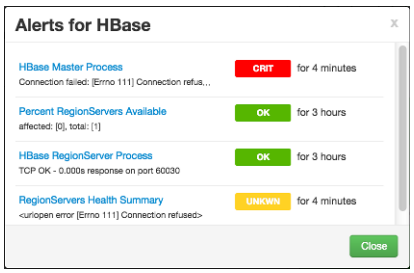


Select one of the `View Host` links, as shown in the following example, to view components and the host on which the selected service is running.




### 4.5.1. Alerts and Health Checks

On each Service page, in the Summary area, click `Alerts` to see a list of all health checks and their status for the selected service. Critical alerts are shown first. Click the text title of each alert message in the list to see the alert definition. For example, On the HBase > Services, click Alerts. Then, in Alerts for HBase, click HBase Master Process.

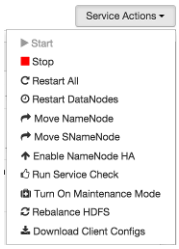



### 4.5.2. Analyzing Service Metrics

Review visualizations in `Metrics` that chart common metrics for a selected service. `Services > Summary` displays metrics widgets for HDFS, HBase, Storm services. For more information about using metrics widgets, see Scanning System Metrics.

## 4.6. Performing Service Actions

Manage a selected service on your cluster by performing service actions. In `Services`, select the `Service Actions` drop-down menu, then choose an option. Available options depend on the service you have selected. For example, HDFS service action options include:



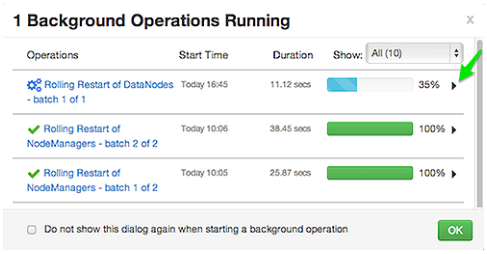

Optionally, choose `Turn On Maintenance Mode` to suppress alerts generated by a service before performing a service action. Maintenance Mode suppresses alerts and status indicator changes generated by the service, while allowing you to start, stop, restart, move, or perform maintenance tasks on the service. For more information about how Maintenance Mode affects bulk operations for host components, see Setting Maintenance Mode.

# 4.7. Monitoring Background Operations

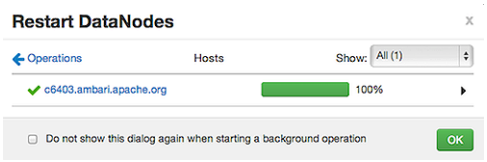
Optionally, use Background Operations to monitor progress and completion of bulk operations such as rolling restarts.

Background Operations opens by default when you run a job that executes bulk operations.

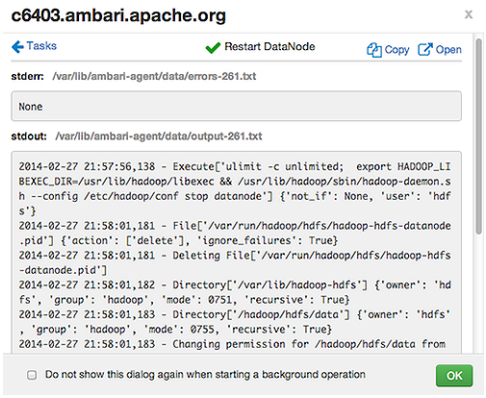
1. Select the right-arrow for each operation to show restart operation progress on each host.




2. After restarts complete, Select the right-arrow, or a host name, to view log files and any error messages generated on the selected host.




3. Select links at the upper-right to copy or open text files containing log and error information.

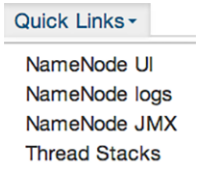



Optionally, select the option to not show the bulk operations dialog.

# 4.8. Using Quick Links

Select `Quick Links` options to access additional sources of information about a selected service. For example, HDFS Quick Links options include the native NameNode GUI,

NameNode logs, the NameNode JMX output, and thread stacks for the HDFS service. Quick Links are not available for every service.




# 4.9. Rolling Restarts

When you restart multiple services, components, or hosts, use rolling restarts to distribute the task; minimizing cluster downtime and service disruption. A rolling restart stops, then starts multiple, running slave components such as DataNodes, NodeManagers, RegionServers, or Supervisors, using a batch sequence. You set rolling restart parameter values to control the number of, time between, tolerance for failures, and limits for restarts of many components across large clusters.

To run a rolling restart:

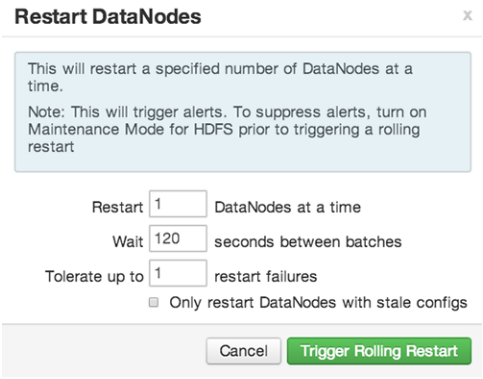
1. Select a Service, then link to a lists of specific components or hosts that Require Restart.
2. Select Restart, then choose a slave component option.
3. Review and set values for Rolling Restart Parameters.
4. Optionally, reset the flag to only restart components with changed configurations.
5. Choose Trigger Restart.

Use Monitor Background Operations to monitor progress of rolling restarts.

## 4.9.1. Setting Rolling Restart Parameters

When you choose to restart slave components, use parameters to control how restarts of components roll. Parameter values based on ten percent of the total number of components in your cluster are set as default values. For example, default settings for a rolling restart of components in a 3-node cluster restarts one component at a time, waits two minutes between restarts, will proceed if only one failure occurs, and restarts all existing components that run this service.

If you trigger a rolling restart of components, Restart components with stale configs defaults to true. If you trigger a rolling restart of services, Restart services with stale configs defaults to false.



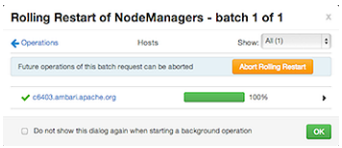

Rolling restart parameter values must satisfy the following criteria:

**Validation Rules for Rolling Restart Parameters**

| Parameter | Required | Value | Description |
|---|---|---|---|
| Batch Size | Yes | Must be an integer > 0 | Number of components to include in e |
| Wait Time | Yes | Must be an integer > = 0 | Time (in seconds) to wait between que |
| Tolerate up to x failures | Yes | Must be an integer > = 0 | Total number of restart failures to tole halting the restarts and not queuing b |

## 4.9.2. Aborting a Rolling Restart

To abort future restart operations in the batch, choose Abort Rolling Restart.




# 4.10. Refreshing YARN Capacity Scheduler

After you modify the Capacity Scheduler configuration, YARN supports refreshing the queues without requiring you to restart your ResourceManager. The “refresh” operation is valid if you have made no destructive changes to your configuration. Removing a queue is an example of a destructive change.

## 4.10.1. How to refresh the YARN Capacity Scheduler

This topic describes how to refresh the Capacity Scheduler in cases where you have added or modified existing queues.

- In Ambari Web, browse to `Services > YARN > Summary`.
- Select `Service Actions`, then choose `Refresh YARN Capacity Scheduler`.
- Confirm you would like to perform this operation.

  The refresh operation is submitted to the YARN ResourceManager.

**Important**

The Refresh operation will fail with the following message: “Failed to re-init queues” if you attempt to refresh queues in a case where you performed a destructive change, such as removing a queue. In cases where you have made destructive changes, you must perform a ResourceManager restart for the capacity scheduler change to take effect.

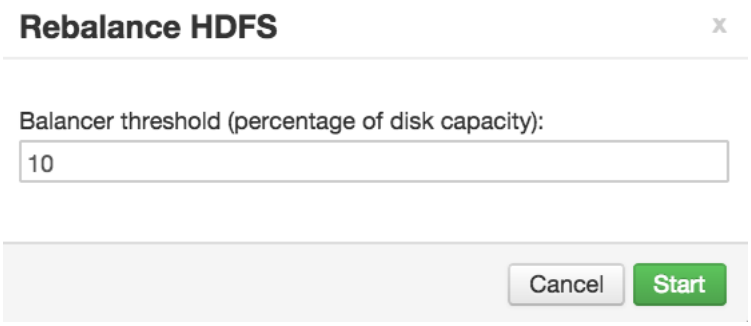
# 4.11. Rebalancing HDFS

HDFS provides a “balancer” utility to help balance the blocks across DataNodes in the cluster.

## 4.11.1. How to rebalance HDFS

This topic describes how you can initiate an HDFS rebalance from Ambari.

1. . In Ambari Web, browse to `Services > HDFS > Summary`.
2. Select `Service Actions`, then choose `Rebalance HDFS`.
3. Enter the Balance Threshold value as a percentage of disk capacity.




4. Click `Start` to begin the rebalance.
5. You can check rebalance progress or cancel a rebalance in process by opening the Background Operations dialog.

# 5. Managing Service High Availability

Ambari provides the ability to configure the High Availability features available with the HDP Stack services. This section describes how to enable HA for the various Stack services.

- NameNode High Availability
- ResourceManager High Availability
- HBase High Availability
- Hive High Availability
- Oozie High Availability

## 5.1. NameNode High Availability

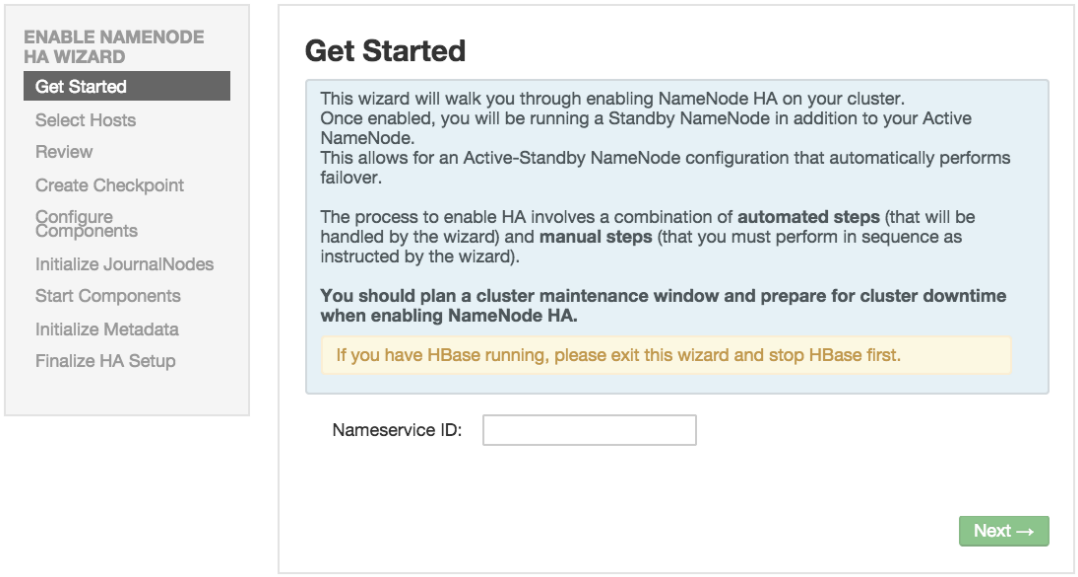
To ensure that a NameNode in your cluster is always available if the primary NameNode host fails, enable and set up NameNode High Availability on your cluster using Ambari Web.

Follow the steps in the Enable NameNode HA Wizard.

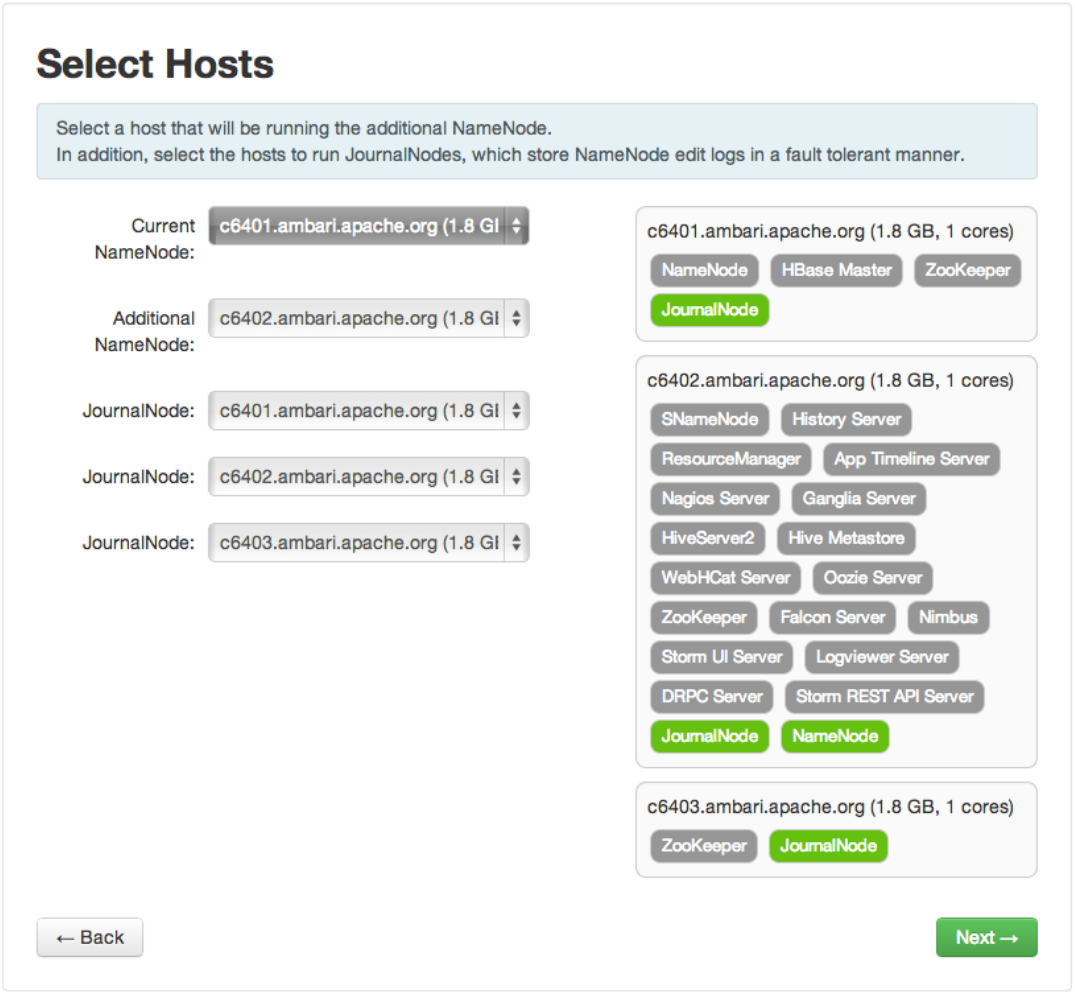
For more information about using the Enable NameNode HA Wizard, see How to Configure NameNode High Availability.

### 5.1.1. How To Configure NameNode High Availability

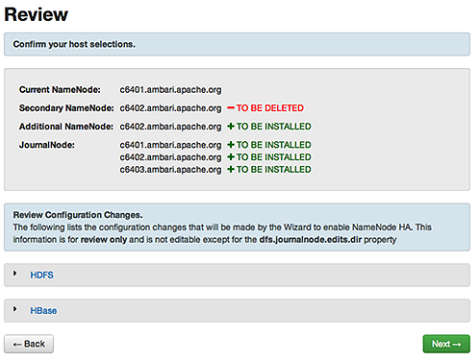
1. Check to make sure you have at least three hosts in your cluster and are running at least three ZooKeeper servers.
2. In Ambari Web, select `Services > HDFS > Summary`.
3. Select **Service Actions** and choose **Enable NameNode HA**.
4. The Enable HA Wizard launches. This wizard describes the set of automated and manual steps you must take to set up NameNode high availability.
5. **Get Started** : This step gives you an overview of the process and allows you to select a Nameservice ID. You use this Nameservice ID instead of the NameNode FQDN once HA has been set up. Click `Next` to proceed.



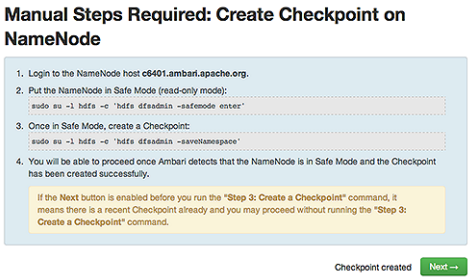

6. **Select Hosts** : Select a host for the additional NameNode and the JournalNodes. The wizard suggest options that you can adjust using the drop-down lists. Click `Next` to proceed.



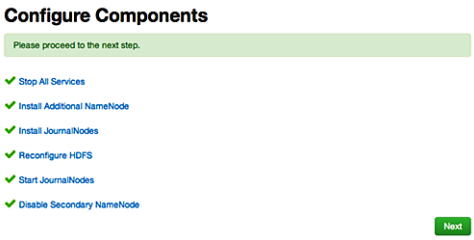

7. **Review** : Confirm your host selections and click `Next`.



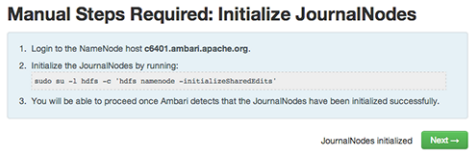

8. **Create Checkpoints** : Follow the instructions in the step. You need to log in to your **current** NameNode host to run the commands to put your NameNode into safe mode and create a checkpoint. When Ambari detects success, the message on the bottom of the window changes. Click `Next`.



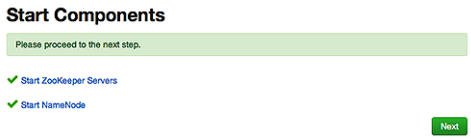

9. **Configure Components** : The wizard configures your components, displaying progress bars to let you track the steps. Click `Next` to continue.



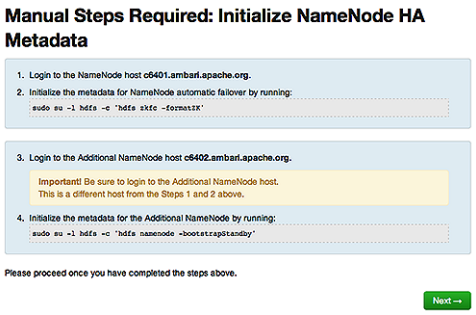

10. **Initialize JournalNodes** : Follow the instructions in the step. You need to login to your **current** NameNode host to run the command to initialize the JournalNodes. When Ambari detects success, the message on the bottom of the window changes. Click **Next**.



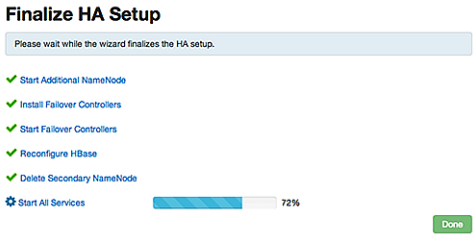

11. **Start Components** : The wizard starts the ZooKeeper servers and the NameNode, displaying progress bars to let you track the steps. Click `Next` to continue.




12. **Initialize Metadata** : Follow the instructions in the step. For this step you must log in to both the **current** NameNode and the **additional** NameNode. Make sure you are logged in to the correct host for each command. Click `Next` when you have completed the two commands. A **Confirmation** pop-up window displays, reminding you to do both steps. Click OK to confirm.




13. **Finalize HA Setup** : The wizard the setup, displaying progress bars to let you track the steps. Click Done to finish the wizard. After the Ambari Web GUI reloads, you may see some alert notifications. Wait a few minutes until the services come back up. If necessary, restart any components using Ambari Web.




14. If you are using Hive, you must manually change the Hive Metastore FS root to point to the Nameservice URI instead of the NameNode URI. You created the Nameservice ID in the Get Started step.

    a. Check the current FS root. On the Hive host:

    ```
    hive --config /etc/hive/conf.server --service metatool -
    listFSRoot
    ```

    The output looks similar to the following: `Listing FS Roots... hdfs://<namenode-host>/apps/hive/warehouse`

    b. Use this command to change the FS root:

    ```
    $ hive --config /etc/hive/conf.server --service metatool -
    updateLocation <new-location><old-location>
    ```
    For example, where the Nameservice ID is mycluster:
    ```
    $ hive --config /etc/hive/conf.server --
    service metatool -updateLocation hdfs://mycluster/apps/hive/
    warehouse hdfs://c6401.ambari.apache.org/apps/hive/warehouse
    ```

    The output looks similar to the following:

    ```
    Successfully updated the following locations...Updated X
    records in SDS table
    ```

15. Adjust the ZooKeeper Failover Controller retries setting for your environment.

    - Browse to `Services > HDFS > Configs >core-site.`

- Set `ha.failover-controller.active-standby-elector.zk.op.retries=120`

## 5.1.2. How to Roll Back NameNode HA

To roll back NameNode HA to the previous non-HA state use the following step-by-step manual process, depending on your installation.

1. Stop HBase
2. Checkpoint the Active NameNode
3. Stop All Services
4. Prepare the Ambari Host for Rollback
5. Restore the HBase Configuration
6. Delete ZooKeeper Failover Controllers
7. Modify HDFS Configurations
8. Recreate the standby NameNode
9. Re-enable the standby NameNode
10. Delete All JournalNodes
11. Delete the Additional NameNode
12. Verify the HDFS Components
13. Start HDFS

### 5.1.2.1. Stop HBase

1. From Ambari Web, go to the Services view and select HBase.
2. Choose `Service Actions > Stop`.
3. Wait until HBase has stopped completely before continuing.

### 5.1.2.2. Checkpoint the Active NameNode

If HDFS has been in use **after** you enabled NameNode HA, but you wish to revert back to a non-HA state, you must checkpoint the HDFS state before proceeding with the rollback.

If the `Enable NameNode HA` wizard failed and you need to revert back, you can skip this step and move on to Stop All Services.

- If Kerberos security has **not** been enabled on the cluster:

On the Active NameNode host, execute the following commands to save the namespace. You must be the HDFS service user to do this.

```
sudo su -l <HDFS_USER> -c 'hdfs dfsadmin -safemode enter' sudo su
-l <HDFS_USER> -c 'hdfs dfsadmin -saveNamespace'
```

- If Kerberos security **has** been enabled on the cluster:

```
sudo su -l <HDFS_USER> -c 'kinit -kt /etc/security/keytabs/
nn.service.keytab nn/<HOSTNAME>@<REALM>;hdfs dfsadmin -safemode
enter' sudo su -l <HDFS_USER> -c 'kinit -kt /etc/security/
keytabs/nn.service.keytab nn/<HOSTNAME>@<REALM>;hdfs dfsadmin -
saveNamespace'
```

Where <HDFS_USER> is the HDFS service user; for example hdfs, <HOSTNAME> is the Active NameNode hostname, and <REALM> is your Kerberos realm.

### 5.1.2.3. Stop All Services

Browse to `Ambari Web > Services`, then choose `Stop All` in the Services navigation panel. You must wait until all the services are completely stopped.

### 5.1.2.4. Prepare the Ambari Server Host for Rollback

Log into the Ambari server host and set the following environment variables to prepare for the rollback procedure:

| Variable | Value |
|---|---|
| export AMBARI_USER=AMBARI_USERNAME | Substitute the value of the administrative user for Ambari Web. The default value is admin. |
| export AMBARI_PW=AMBARI_PASSWORD | Substitute the value of the administrative password for Ambari Web. The default value is admin. |
| export AMBARI_PORT=AMBARI_PORT | Substitute the Ambari Web port. The default value is 8080. |
| export AMBARI_PROTO=AMBARI_PROTOCOL | Substitute the value of the protocol for connecting to Ambari Web. Options are http or https. The default value is http. |
| export CLUSTER_NAME=CLUSTER_NAME | Substitute the name of your cluster, set during the Ambari Install Wizard process. For example: mycluster. |
| export NAMENODE_HOSTNAME=NN_HOSTNAME | Substitute the FQDN of the host for the non-HA NameNode. For example: nn01.mycompany.com. |
| export ADDITIONAL_NAMENODE_HOSTNAME=ANN_HOSTNAME | Substitute the FQDN of the host for the additional NameNode in your HA setup. |
| export SECONDARY_NAMENODE_HOSTNAME=SNN_HOSTNAME | Substitute the FQDN of the host for the standby NameNode for the non-HA setup. |
| export JOURNALNODE1_HOSTNAME=JOUR1_HOSTNAME | Substitute the FQDN of the host for the first Journal Node. |
| export JOURNALNODE2_HOSTNAME=JOUR2_HOSTNAME | Substitute the FQDN of the host for the second Journal Node. |
| export JOURNALNODE3_HOSTNAME=JOUR3_HOSTNAME | Substitute the FQDN of the host for the third Journal Node. |

Double check that these environment variables are set correctly.

### 5.1.2.5. Restore the HBase Configuration

If you have installed HBase, you may need to restore a configuration to its pre-HA state.

1. To check if your current HBase configuration needs to be restored, on the Ambari Server host:

   ```
   /var/lib/ambari-server/resources/scripts/configs.sh -u
   <AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> get localhost
   <CLUSTER_NAME> hbase-site
   ```

   Where the environment variables you set up in Prepare the Ambari Server Host for Rollback substitute for the variable names.

   Look for the configuration property `hbase.rootdir`. If the value is set to the NameService ID you set up using the `Enable NameNode HA` wizard, you need to revert the `hbase-site` configuration set up back to non-HA values. If it points instead to a specific NameNode host, it does not need to be rolled back and you can go on to Delete ZooKeeper Failover Controllers.

   For example:

   `"hbase.rootdir":"hdfs://<name-service-id>:8020/apps/hbase/data"` The hbase.rootdir property points to the NameService ID and the value needs to be rolled back `"hbase.rootdir":"hdfs://<nn01.mycompany.com>:8020/apps/hbase/data"` The hbase.rootdir property points to a specific NameNode host and not a NameService ID. This does not need to be rolled back.

2. If you need to roll back the `hbase.rootdir` value, on the Ambari Server host, use the `config.sh` script to make the necessary change:

   ```
   /var/lib/ambari-server/resources/scripts/configs.sh -
   u <AMBARI_USER> -p<AMBARI_PW> -port <AMBARI_PORT> set
   localhost <CLUSTER_NAME> hbase-site hbase.rootdir hdfs://
   <NAMENODE_HOSTNAME>:8020/apps/hbase/data
   ```

   Where the environment variables you set up in Prepare the Ambari Server Host for Rollback substitute for the variable names.

3. Verify that the `hbase.rootdir` property has been restored properly. On the Ambari Server host:

   ```
   /var/lib/ambari-server/resources/scripts/configs.sh -u
   <AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> get localhost
   <CLUSTER_NAME> hbase-site
   ```

   The `hbase.rootdir` property should now be set to the NameNode hostname, not the NameService ID.

### 5.1.2.6. Delete ZooKeeper Failover Controllers

You may need to delete ZooKeeper (ZK) Failover Controllers.

1. To check if you need to delete ZK Failover Controllers, on the Ambari Server host:

```
curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari"
-i <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/v1/clusters/
<CLUSTER_NAME>/host_components?HostRoles/component_name=ZKFC
```

If this returns an empty `items` array, you may proceed to Modify HDFS Configuration. Otherwise you must use the following DELETE commands:

2. To delete all ZK Failover Controllers, on the Ambari Server host:

```
curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari"
-i -X DELETE <AMBARI_PROTO>://localhost:<AMBARI_PORT>/
api/v1/clusters/<CLUSTER_NAME>/hosts/<NAMENODE_HOSTNAME>/
host_components/ZKFC curl -u <AMBARI_USER>:<AMBARI_PW> -
H "X-Requested-By: ambari" -i -X DELETE <AMBARI_PROTO>://
localhost:<AMBARI_PORT>/api/v1/clusters/<CLUSTER_NAME>/hosts/
<ADDITIONAL_NAMENODE_HOSTNAME>/host_components/ZKFC
```

3. Verify that the ZK Failover Controllers have been deleted. On the Ambari Server host:

```
curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari"
-i <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/v1/clusters/
<CLUSTER_NAME>/host_components?HostRoles/component_name=ZKFC
```

This command should return an empty `items` array.

### 5.1.2.7. Modify HDFS Configurations

You may need to modify your `hdfs-site` configuration and/or your `core-site` configuration.

1. To check if you need to modify your `hdfs-site` configuration, on the Ambari Server host:

```
/var/lib/ambari-server/resources/scripts/configs.sh -u
<AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> get localhost
<CLUSTER_NAME> hdfs-site
```

If you see **any** of the following properties, you must delete them from your configuration.

- `dfs.nameservices`
- `dfs.client.failover.proxy.provider.<NAMESERVICE_ID>`
- `dfs.ha.namenodes.<NAMESERVICE_ID>`
- `dfs.ha.fencing.methods`
- `dfs.ha.automatic-failover.enabled`
- `dfs.namenode.http-address.<NAMESERVICE_ID>.nn1`
- `dfs.namenode.http-address.<NAMESERVICE_ID>.nn2`

- dfs.namenode.rpc-address.<NAMESERVICE_ID>.nn1
- dfs.namenode.rpc-address.<NAMESERVICE_ID>.nn2
- dfs.namenode.shared.edits.dir
- dfs.journalnode.edits.dir
- dfs.journalnode.http-address
- dfs.journalnode.kerberos.internal.spnego.principal
- dfs.journalnode.kerberos.principal
- dfs.journalnode.keytab.file

  Where <NAMESERVICE_ID> is the NameService ID you created when you ran the **Enable NameNode HA** wizard.

2. To delete these properties, execute the following **for each property** you found. On the Ambari Server host:

   ```
   /var/lib/ambari-server/resources/scripts/configs.sh -u
   <AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> delete
   localhost <CLUSTER_NAME> hdfs-site property_name
   ```

   Where you replace property_name with the name of **each** of the properties to be deleted.

3. Verify that all of the properties have been deleted. On the Ambari Server host: /var/lib/ambari-server/resources/scripts/configs.sh -u <AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> get localhost <CLUSTER_NAME> hdfs-site

   None of the properties listed above should be present.

4. To check if you need to modify your core-site configuration, on the Ambari Server host: /var/lib/ambari-server/resources/scripts/configs.sh -u <AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> get localhost <CLUSTER_NAME> core-site

5. If you see the property ha.zookeeper.quorum, it must be deleted. On the Ambari Server host:

   ```
   /var/lib/ambari-server/resources/scripts/configs.sh -u
   <AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> delete
   localhost <CLUSTER_NAME> core-site ha.zookeeper.quorum
   ```

6. If the property fs.defaultFS is set to the NameService ID, it must be reverted back to its non-HA value. For example:

   "fs.defaultFS":"hdfs://<name-service-id>" The property fs.defaultFS needs to be modified as it points to a NameService ID "fs.defaultFS":"hdfs://<nn01.mycompany.com>" The property

`fs.defaultFS` does not need to be changed as it points to a specific NameNode, not to a NameService ID

7. To revert the property `fs.defaultFS` to the NameNode host value, on the Ambari Server host:

```
/var/lib/ambari-server/resources/scripts/configs.sh -u
<AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> set localhost
<CLUSTER_NAME> core-site fs.defaultFS hdfs://<NAMENODE_HOSTNAME>
```

8. Verify that the `core-site` properties are now properly set. On the Ambari Server host:

```
/var/lib/ambari-server/resources/scripts/configs.sh -u
<AMBARI_USER> -p <AMBARI_PW> -port <AMBARI_PORT> get localhost
<CLUSTER_NAME> core-site
```

The property `fs.defaultFS` should be set to point to the NameNode host and the property `ha.zookeeper.quorum` should not be there.

### 5.1.2.8. Recreate the Standby NameNode

You may need to recreate your standby NameNode.

1. To check to see if you need to recreate the standby NameNode, on the Ambari Server host:

```
curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By:
ambari" -i -X GET <AMBARI_PROTO>://localhost:<AMBARI_PORT>/
api/v1/clusters/<CLUSTER_NAME>/host_components?HostRoles/
component_name=SECONDARY_NAMENODE
```

If this returns an empty `items` array, you must recreate your standby NameNode. Otherwise you can go on to Re-enable Standby NameNode.

2. Recreate your standby NameNode. On the Ambari Server host: `curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari" -i -X POST -d '{"host_components" : [{"HostRoles": {"component_name":"SECONDARY_NAMENODE"}] }' <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/v1/clusters/<CLUSTER_NAME>/hosts?Hosts/host_name=<SECONDARY_NAMENODE_HOSTNAME>`

3. Verify that the standby NameNode now exists. On the Ambari Server host:

```
curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By:
ambari" -i -X GET <AMBARI_PROTO>://localhost:<AMBARI_PORT>/
api/v1/clusters/<CLUSTER_NAME>/host_components?HostRoles/
component_name=SECONDARY_NAMENODE
```

This should return a non-empty `items` array containing the standby NameNode.

### 5.1.2.9. Re-enable the Standby NameNode

To re-enable the standby NameNode, on the Ambari Server host:

```
curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari" -i -
X '{"RequestInfo":{"context":"Enable Secondary NameNode"},"Body":
{"HostRoles":{"state":"INSTALLED"}}}'<AMBARI_PROTO>://
localhost:<AMBARI_PORT>/api/v1/clusters/<CLUSTER_NAME>/hosts/
<SECONDARY_NAMENODE_HOSTNAME}/host_components/SECONDARY_NAMENODE
```

- If this returns 200, go to Delete All JournalNodes.
- If this returns 202, wait a few minutes and run the following command on the Ambari Server host:

  ```
  curl -u <AMBARI_USER>:${AMBARI_PW -H "X-Requested-By:
  ambari" -i -X "<AMBARI_PROTO>://localhost:<AMBARI_PORT>/
  api/v1/clusters/<CLUSTER_NAME>/host_components?HostRoles/
  component_name=SECONDARY_NAMENODE&fields=HostRoles/state"
  ```

  When `"state" : "INSTALLED"` is in the response, go on to the next step.

### 5.1.2.10. Delete All JournalNodes

You may need to delete any JournalNodes.

1. To check to see if you need to delete JournalNodes, on the Ambari Server host:

   ```
   curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By:
   ambari" -i -X GET <AMBARI_PROTO>://localhost:<AMBARI_PORT>/
   api/v1/clusters/<CLUSTER_NAME>/host_components?HostRoles/
   component_name=JOURNALNODE
   ```

   If this returns an empty `items` array, you can go on to Delete the Additional NameNode. Otherwise you must delete the JournalNodes.

2. To delete the JournalNodes, on the Ambari Server host:

   ```
   curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari"
   -i -X DELETE <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/
   v1/clusters/<CLUSTER_NAME>/hosts/<JOURNALNODE1_HOSTNAME>/
   host_components/JOURNALNODE curl -u <AMBARI_USER>:<AMBARI_PW>
   -H "X-Requested-By: ambari" -i -X DELETE <AMBARI_PROTO>://
   localhost:<AMBARI_PORT>/api/v1/clusters/<CLUSTER_NAME>/hosts/
   <JOURNALNODE2_HOSTNAME>/host_components/JOURNALNODE
   curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari"
   -i -X DELETE <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/
   v1/clusters/<CLUSTER_NAME>/hosts/<JOURNALNODE3_HOSTNAME>/
   host_components/JOURNALNODE
   ```

3. Verify that all the JournalNodes have been deleted. On the Ambari Server host:

   ```
   curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By:
   ambari" -i -X GET <AMBARI_PROTO>://localhost:<AMBARI_PORT>/
   api/v1/clusters/<CLUSTER_NAME>/host_components?HostRoles/
   component_name=JOURNALNODE
   ```

   This should return an empty `items` array.

### 5.1.2.11. Delete the Additional NameNode

You may need to delete your Additional NameNode.

1. To check to see if you need to delete your Additional NameNode, on the Ambari Server host:

   ```
   curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari" -i
   -X GET <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/v1/clusters/
   <CLUSTER_NAME>/host_components?HostRoles/component_name=NAMENODE
   ```

   If the `items` array contains two NameNodes, the Additional NameNode must be deleted.

2. To delete the Additional NameNode that was set up for HA, on the Ambari Server host:

   ```
   curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari"
   -i -X DELETE <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/v1/
   clusters/<CLUSTER_NAME>/hosts/<ADDITIONAL_NAMENODE_HOSTNAME>/
   host_components/NAMENODE
   ```

3. Verify that the Additional NameNode has been deleted:

   ```
   curl -u <AMBARI_USER>:<AMBARI_PW> -H "X-Requested-By: ambari" -i
   -X GET <AMBARI_PROTO>://localhost:<AMBARI_PORT>/api/v1/clusters/
   <CLUSTER_NAME>/host_components?HostRoles/component_name=NAMENODE
   ```

   This should return an `items` array that shows only one NameNode.

### 5.1.2.12. Verify the HDFS Components

Make sure you have the correct components showing in HDFS.

1. Go to `Ambari Web UI > Services`, then select HDFS.
2. Check the Summary panel and make sure that the first three lines look like this:
   - NameNode
   - SNameNode
   - DataNodes

   You should **not** see any line for JournalNodes.

### 5.1.2.13. Start HDFS

1. In the `Ambari Web UI`, select `Service Actions`, then choose `Start`.

   Wait until the progress bar shows that the service has completely started and has passed the service checks.

   If HDFS does not start, you may need to repeat the previous step.

2. To start all of the other services, select `Actions > Start All` in the `Services` navigation panel.

# 5.2. ResourceManager High Availability

### Note

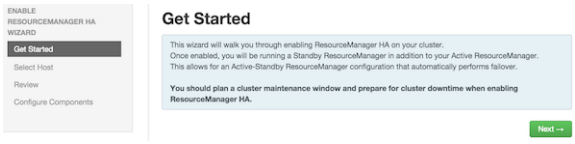
This feature is available with HDP Stack 2.2 or later.

1. Check to make sure you have at least three hosts in your cluster and are running at least three ZooKeeper servers.

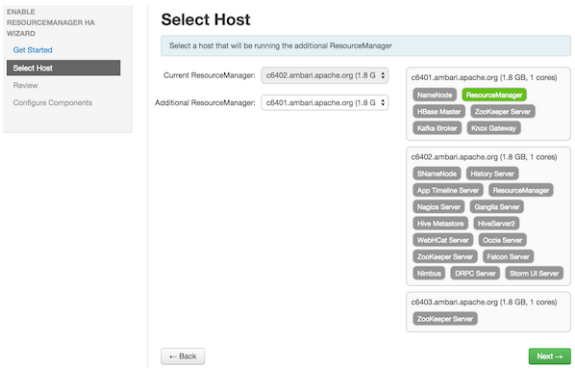
2. In Ambari Web, browse to `Services > YARN > Summary`. Select `Service Actions` and choose `Enable ResourceManager HA`.

3. The Enable ResourceManager HA Wizard launches. The wizard describes a set of automated and manual steps you must take to set up ResourceManager High Availability.

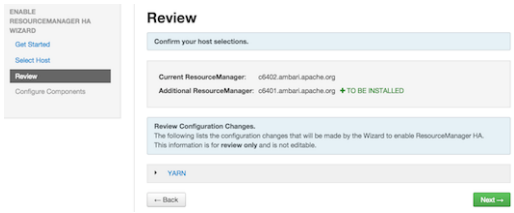
4. **Get Started**: This step gives you an overview of enabling ResourceManager HA. Click `Next` to proceed.



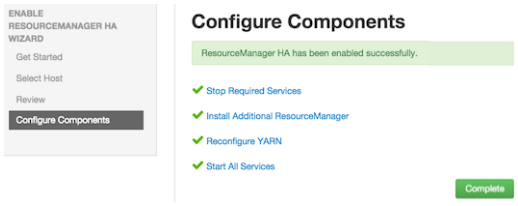

5. **Select Host**: The wizard shows you the host on which the current ResourceManager is installed and suggests a default host on which to install an additional ResourceManager. Accept the default selection, or choose an available host. Click `Next` to proceed.




6. **Review Selections**: The wizard shows you the host selections and configuration changes that will occur to enable ResourceManager HA. Expand YARN, if necessary, to review all the YARN configuration changes. Click `Next` to approve the changes and start automatically configuring ResourceManager HA.




7. **Configure Components**: The wizard configures your components automatically, displaying progress bars to let you track the steps. After all progress bars complete, click `Complete` to finish the wizard.




# 5.3. HBase High Availability

During the HBase service install, depending on your component assignment, Ambari installs and configures one HBase Master component and multiple RegionServer components. To setup high availability for the HBase service, you can run two or more HBase Master components by adding an HBase Master component. Once running two or more HBase Masters, HBase uses ZooKeeper for coordination of the active Master.

## 5.3.1. Adding an HBase Master Component

1. In Ambari Web, browse to `Services > HBase`.

2. In Service Actions, select the `+ Add HBase Master` option.

3. Choose the host to install the additional HBase Master, then choose Confirm Add.

Ambari installs the new HBase Master and reconfigure HBase to handle multiple Master instances.

# 5.4. Hive High Availability

The Hive service has multiple, associated components. The primary Hive components are: Hive Metastore and HiveServer2. To setup high availability for the Hive service, you can run two or more of each of those components.

### Note

This feature is available with HDP 2.2 Stack.

**Important**

The relational database that backs the Hive Metastore itself should also be made highly available using best practices defined for the database system in use.

### 5.4.1. Adding a Hive Metastore Component

1. In Ambari Web, browse to `Services > Hive`.
2. In Service Actions, select the `+ Add Hive Metastore` option.
3. Choose the host to install the additional Hive Metastore, then choose Confirm Add.
4. Ambari installs the component and reconfigures Hive to handle multiple Hive Metastore instances.

### 5.4.2. Adding a HiveServer2 Component

1. In Ambari Web, browse to the host where you would like to install another HiveServer2.
2. On the Host page, choose +Add.
3. Select `HiveServer2` from the list.
4. Ambari installs the new HiveServer2.

Ambari installs the component and reconfigures Hive to handle multiple Hive Metastore instances.

## 5.5. Oozie High Availability

To setup high availability for the Oozie service, you can run two or more instances of the Oozie Server component.

**Note**

This capability is available with HDP 2.2 Stack.

**Important**

The relational database that backs the Oozie Server should also be made highly available using best practices defined for the database system in use. Using the default installed Derby database instance is not supported with multiple Oozie Server instances and therefore, you must use an existing relational database. When using Derby for the Oozie Server, you will not have an option to add Oozie Server components to your cluster.

**Important**

High availability for Oozie requires the use of an external Virtual IP Address or Load Balancer to direct traffic to the Oozie servers.

## 5.5.1. Adding an Oozie Server Component

1. In Ambari Web, browse to the host where you would like to install another Oozie Server.
2. On the Host page, click the "+Add" button.
3. Select "Oozie Server" from the list and Ambari will install the new Oozie Server.
4. After configuring your external Load Balancer, update the oozie configuration.
5. Browse to Services > Oozie > Configs and in oozie-site add the following:

| Property | Value |
|---|---|
| oozie.zookeeper.connection.string | List of ZooKeeper hosts with ports. For example:<br><br>c6401.ambari.apache.org:2181,c6402.ambari.apache.org:2181,c6403.ambari.apach |
| oozie.services.ext | org.apache.oozie.service.ZKLocksService,org.apache.oozie.service.ZKXLogStreamin |
| oozie.base.url | http://<loadbalancer.hostname>:11000/oozie |

6. In oozie-env, uncomment OOZIE_BASE_URL property and change value to point to the Load Balancer. For example:

```
export OOZIE_BASE_URL="http://<loadbalance.hostname>:11000/
oozie"
```

7. Restart Oozie service for the changes to take affect.
8. Update HDFS configs for the Oozie proxy user. Browse to Services > HDFS > Configs and in core-site update the hadoop.proxyuser.oozie.hosts property to include the newly added Oozie Server host. Hosts should be comma separated.
9. Restart all needed services.

# 6. Managing Configurations

Use Ambari Web to manage your HDP component configurations. Select any of the following topics:

- Configuring Services
- Using Host Config Groups
- Customizing Log Settings
- Downloading Client Configs
- Service Configuration Versions

## 6.1. Configuring Services

Select a service, then select `Configs` to view and update configuration properties for the selected service. For example, select MapReduce2, then select Configs. Expand a config category to view configurable service properties.

### 6.1.1. Updating Service Properties

1. Expand a configuration category.
2. Edit values for one or more properties that have the Override option.

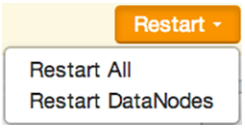
   Edited values, also called stale configs, show an Undo option.
3. Choose Save.

### 6.1.2. Restarting components

After editing and saving a service configuration, Restart indicates components that you must restart.

Select the Components or Hosts links to view details about components or hosts requiring a restart.

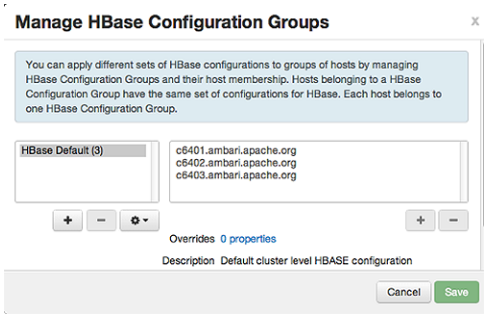
Then, choose an option appearing in Restart. For example, options to restart YARN components include:




## 6.2. Using Host Config Groups

Ambari initially assigns all hosts in your cluster to one, default configuration group for each service you install. For example, after deploying a three-node cluster with default

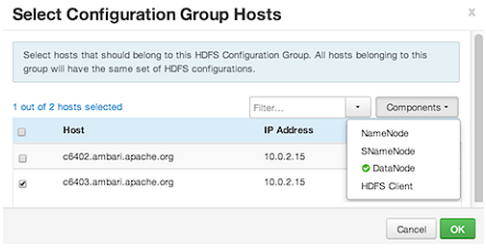
configuration settings, each host belongs to one configuration group that has default configuration settings for the HDFS service. In Configs, select `Manage Config Groups`, to create new groups, re-assign hosts, and override default settings for host components you assign to each group.




To create a Configuration Group:

1. Choose `Add New Configuration Group`.
2. Name and describe the group, then choose Save.
3. Select a Config Group, then choose Add Hosts to Config Group.
4. Select Components and choose from available Hosts to add hosts to the new group.

   Select Configuration Group Hosts enforces host membership in each group, based on installed components for the selected service.

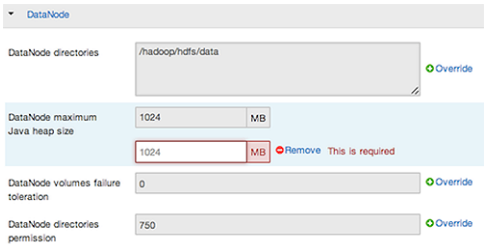



5. Choose OK.
6. In Manage Configuration Groups, choose Save.

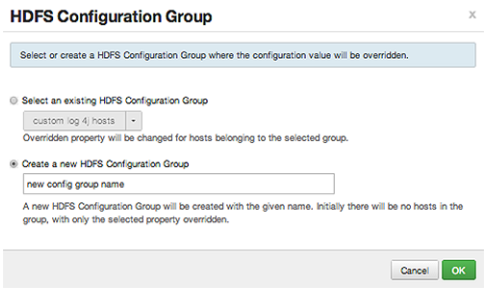
To edit settings for a configuration group:

1. In Configs, choose a Group.
2. Select a Config Group, then expand components to expose settings that allow Override.
3. Provide a non-default value, then choose Override or Save.

   Configuration groups enforce configuration properties that allow override, based on installed components for the selected service and group.




4. Override prompts you to choose one of the following options:




   a. Select an existing configuration group (to which the property value override provided in step 3 will apply), or

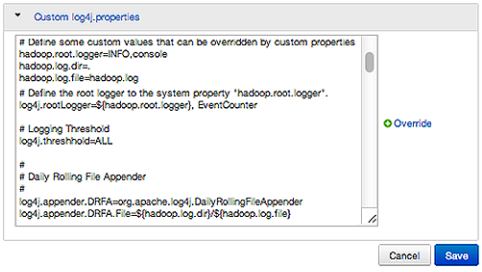
   b. Create a new configuration group (which will include default properties, plus the property override provided in step 3).

   c. Then, choose 0K.

5. In Configs, choose Save.

# 6.3. Customizing Log Settings

Ambari Web displays default logging properties in `Service Configs > Custom log 4j Properties`. Log 4j properties control logging activities for the selected service.



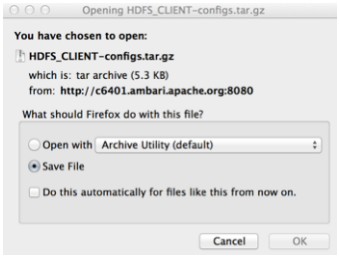

Restarting components in the service pushes the configuration properties displayed in Custom log 4j Properties to each host running components for that service. If you have customized logging properties that define how activities for each service are logged, you will see refresh indicators next to each service name after upgrading to Ambari 1.5.0 or higher. Make sure that logging properties displayed in Custom log 4j Properties include any customization. Optionally, you can create configuration groups that include custom logging

properties. For more information about saving and overriding configuration settings, see Updating Service Config Properties.

# 6.4. Downloading Client Configs

For Services that include client components (for example Hadoop Client or Hive Client), you can download the client configuration files associated with that client from Ambari.

- In Ambari Web, browse to the Service with the client for which you want the configurations.
- Choose `Service Actions`.
- Choose `Download Client Configs`. You are prompted for a location to save the client configs bundle.




- Save the bundle.

# 6.5. Service Configuration Versions

Ambari provides the ability to manage configurations associated with a Service. You can make changes to configurations, see a history of changes, compare + revert changes and push configuration changes to the cluster hosts.

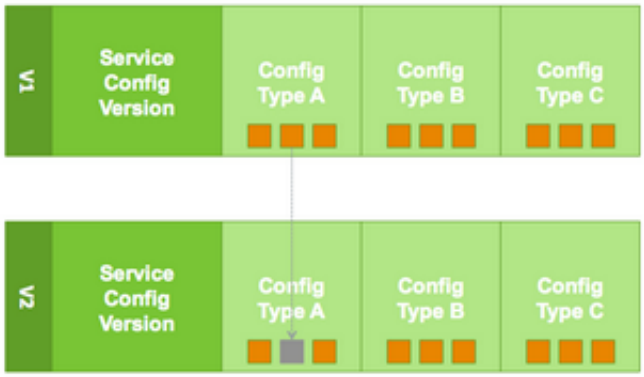
- Basic Concepts
- Terminology
- Saving a Change
- Viewing History
- Comparing Versions
- Reverting a Change
- Versioning and Host Config Groups

## 6.5.1. Basic Concepts

It's important to understand how service configurations are organized and stored in Ambari. Properties are grouped into Configuration Types (config types). A set of config types makes up the set of configurations for a service.

For example, the HDFS Service includes the following config types: hdfs-site, core-site, hdfs-log4j, hadoop-env, hadoop-policy. If you browse to `Services > HDFS > Configs`, the configuration properties for these config types are available for edit.

Versioning of configurations is performed at the service-level. Therefore, when you modify a configuration property in a service, Ambari will create a Service Config Version. The figure below shows V1 and V2 of a Service Configuration Version with a change to a property in Config Type A. After making the property change to Config Type A in V1, V2 is created.



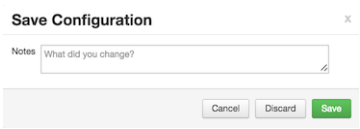

## 6.5.2. Terminology

The following table lists configuration versioning terms and concepts that you should know.

| Term | Description |
|---|---|
| Configuration Property | Configuration property managed by Ambari, such as NameNode heapsize or replication factor. |
| Configuration Type<br><br>(Config Type) | Group of configuration properties. For example: hdfs-site is a Config Type. |
| Service Configurations | Set of configuration types for a particular service. For example: hdfs-site and core-site Config Types are part of the HDFS Service Configuration. |
| Change Notes | Optional notes to save with a service configuration change. |
| Service Config Version (SCV) | Particular version of configurations for a specific service. Ambari saves a history of service configuration versions. |
| Host Config Group<br><br>(HCG) | Set of configuration properties to apply to a specific set of hosts. Each service has a default Host Config Group, and custom config groups can be created on top of the default configuration group to target property overrides to one or more hosts in the cluster. See Managing Configuration Groups for more information. |

## 6.5.3. Saving a Change

1. Make the configuration property change.
2. Choose Save.
3. You are prompted to enter notes that describe the change.



4. Click Save to confirm your change. Cancel will not save but instead returns you to the configuration page to continuing editing.

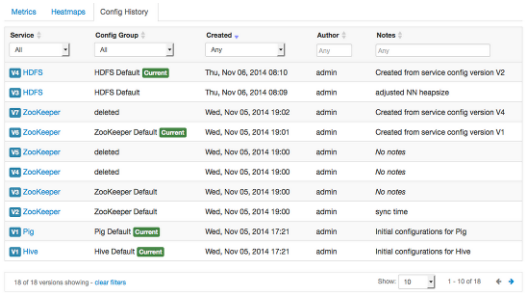
   To revert the changes you made and not save, choose Discard.

   To return to the configuration page and continue editing without saving changes, choose Cancel.

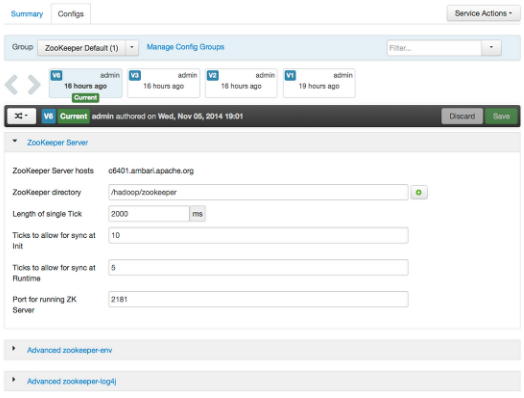
## 6.5.4. Viewing History

Service Config Version history is available from Ambari Web in two places: On the Dashboard page under the Config History tab; and on each Service page under the Configs tab.

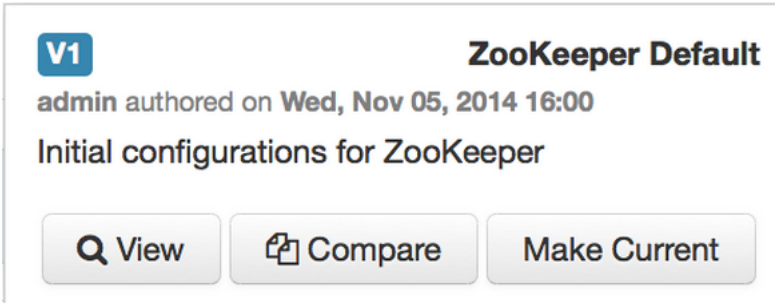
The `Dashboard > Config History` tab shows a list of all versions across services with each version number and the date and time the version was created. You can also see which user authored the change with the notes entered during save. Using this table, you can filter, sort and search across versions.




The most recent configuration changes are shown on the `Service > Configs` tab. Users can navigate the version scrollbar left-right to see earlier versions. This provides a quick way to access the most recent changes to a service configuration.

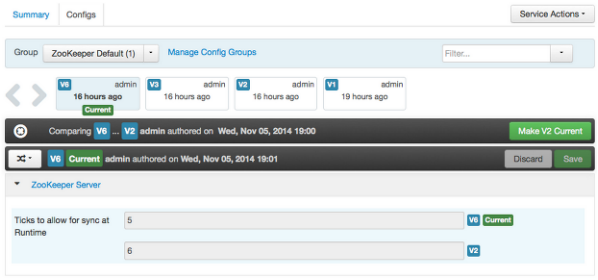



Click on any version in the scrollbar to view, and hover to display an option menu which allows you compare versions and perform a revert. Performing a revert makes any config version that you select the current version.



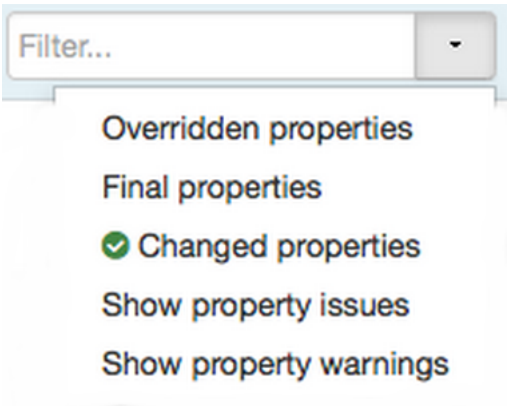

## 6.5.5. Comparing Versions

When navigating the version scroll area on the `Services > Configs` tab, you can hover over a version to display options to view, compare or revert.



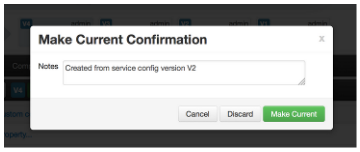

To perform a compare between two service configuration versions:

1. Navigate to a specific configuration version. For example “V6”.
2. Using the version scrollbar, find the version would you like to compare against “V6”. For example, if you want to compare V6 to V2, find V2 in the scrollbar.
3. Hover over the version to display the option menu. Click “Compare”.
4. Ambari displays a comparison of V6 to V2, with an option to revert to V2.
5. Ambari also filters the display by only “Changed properties”. This option is available under the Filter control.



## 6.5.6. Reverting a Change

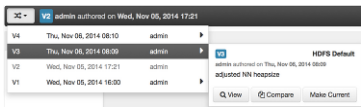
You can revert to an older service configuration version by using the “Make Current” feature. The “Make Current” will actually create a new service configuration version with the configuration properties from the version you are reverting – it is effectively a “clone”. After initiating the Make Current operation, you are prompted to enter notes for the new version (i.e. the clone) and save. The notes text will include text about the version being cloned.




There are multiple methods to revert to a previous configuration version:

- View a specific version and click the “Make V* Current” button.


- Use the version navigation dropdown and click the “Make Current” button.



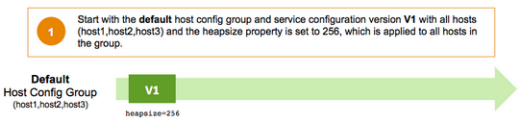
- Hover on a version in the version scrollbar and click the “Make Current” button.

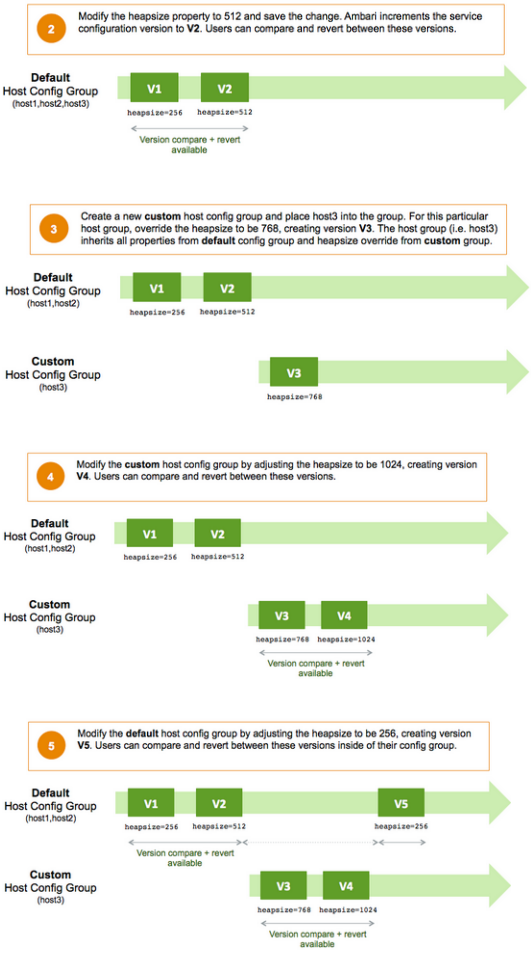

- Perform a comparison and click the “Make V* Current” button.

## 6.5.7. Versioning and Host Config Groups

Service configuration versions are scoped to a host config group. For example, changes made in the default group can be compared and reverted in that config group. Same with custom config groups.

The following example describes a flow where you have multiple host config groups and create service configuration versions in each config group.




2
Modify the heapsize property to 512 and save the change. Ambari increments the service configuration version to V2. Users can compare and revert between these versions.
Default
Host Config Group
(host1,host2,host3)
V1
V2
heapsize=256
heapsize=512
Version compare + revert available
3
Create a new custom host config group and place host3 into the group. For this particular host group, override the heapsize to be 768, creating version V3. The host group (i.e. host3) inherits all properties from default config group and heapsize override from custom group.
Default
Host Config Group
(host1,host2)
V1
V2
heapsize=256
heapsize=512
Custom
Host Config Group
(host3)
V3
heapsize=768
4
Modify the custom host config group by adjusting the heapsize to be 1024, creating version V4. Users can compare and revert between these versions.
Default
Host Config Group
(host1,host2)
V1
V2
heapsize=256
heapsize=512
Custom
Host Config Group
(host3)
V3
V4
heapsize=768
heapsize=1024
Version compare + revert available
5
Modify the default host config group by adjusting the heapsize to be 256, creating version V5. Users can compare and revert between these versions inside of their config group.
Default
Host Config Group
(host1,host2)
V1
V2
V5
heapsize=256
heapsize=512
heapsize=256
Version compare + revert available
Custom
Host Config Group
(host3)
V3
V4
heapsize=768
heapsize=1024
Version compare + revert available

# 7. Administering the Cluster

From the cluster dashboard, use the Admin options to view information about Managing Stack and Versions, Service Accounts, and to Enable Kerberos security.

### Note

For more information about administering your Ambari Server, see the Ambari Administration Guide.

## 7.1. Managing Stack and Versions

The **Stack** section includes information about the Services installed and available in the cluster Stack. Browse the list of Services and click **Add Service** to start the wizard to install Services into your cluster.

The **Versions** section shows what version of software is currently running and installed in the cluster. This section also exposes the capability to perform an automated cluster upgrade for maintenance and patch releases for the Stack. This capability is available for HDP 2.2 Stack only. If you have a cluster running HDP 2.2, you can perform Stack upgrades to later maintenance and patch releases. For example: you can upgrade from the GA release of HDP 2.2 (which is HDP 2.2.0.0) to the first maintenance release of HDP 2.2 (which is HDP 2.2.4.2).

### Note

For more details on upgrading from HDP 2.2.0.0 to the latest HDP 2.2 maintenance release, see the Ambari Upgrade Guide.

The process for managing versions and performing an upgrade is comprised of three main steps:

1. Register a Version into Ambari
2. Install the Version into the Cluster
3. Perform Upgrade to the New Version

## 7.2. Register a Version

Ambari can manage multiple versions of Stack software.

To register a new version:

1. On the Versions tab, click `Manage Versions`.
2. Proceed to register a new version by clicking `+ Register Version`.
3. Enter a two-digit version number. For example, enter **4.2**, (which makes the version HDP-2.2.4.2).


4. Select one or more OS families and enter the respective Base URLs.

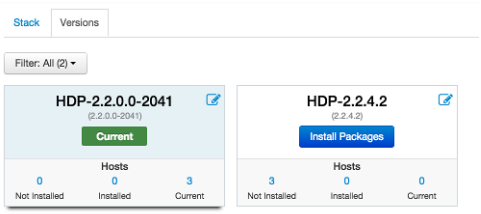
5. Click `Save`.

6. You can click "Install On..." or you can browse back to `Admin > Stack` and `Versions > Versions` tab. You will see the version current running and the version you just registered. Proceed to Install the Version.

# 7.3. Install the Version

To install a version in the cluster:

1. On the versions tab, click `Install Packages`.




2. Click OK to confirm.

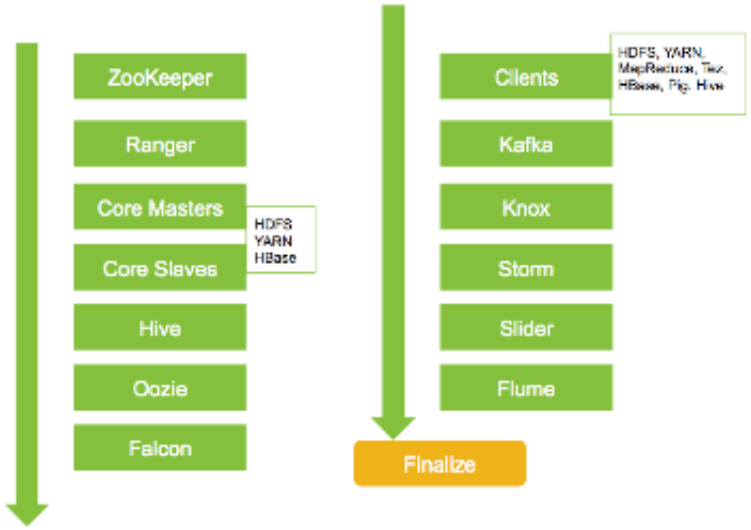
3. The Install version operation will start and the new version will be installed on all hosts.

4. You can browse to Hosts and to each `Host > Versions` tab to see the new version is installed. Proceed to Perform Upgrade.

# 7.4. Perform Upgrade

Once your target version has been registered into Ambari, installed on all hosts in the cluster and you meet the Prerequisites you are ready to perform an upgrade.

The perform upgrade process switches over the services in the cluster to a new version in a rolling fashion. The process follows the flow below. Starting with ZooKeeper and the Core Master components, ending with a Finalize step. To ensure the process runs smoothly, this process includes some manual prompts for you to perform cluster verification and testing along the way. You will be prompted when your input is required.




**Important**

This process can take some time to complete. You should validate the upgrade process in a dev/test environment prior to performing in production, as well, plan a block of time to monitor the progress. And as always, be sure to perform backups of your service metadata (you will be prompted during the first-stages of the upgrade process).

## 7.4.1. Upgrade Prerequisites

To perform an automated cluster upgrade from Ambari, your cluster must meet the following prerequisites:

| Item | Requirement | Description |
|---|---|---|
| Cluster | Stack Version | Must be running HDP 2.2 Stack. This capability is not available for HDP 2.0 or 2.1 Stacks. |
| Version | New Version | All hosts must have the new version installed. |
| HDFS | NameNode HA | NameNode HA must be enabled and working properly. See Configuring NameNode High Availability in the Ambari User's Guide for more information. |
| HDFS | Decommission | No components should be in Decommissioning or Decommissioned state. |
| YARN | YARN WPR | Work Preserving Restart must be configured. |
| Hosts | Heartbeats | All Ambari Agents must be heartbeating to Ambari Server. Any hosts that are not heartbeating must be in Maintenance Mode. |
| Hosts | Maintenance Mode | Any hosts in Maintenance Mode must not be hosting any Service master components. |
| Services | Services Started | All Services must be started. |
| Services | Maintenance Mode | No Services can be in Maintenance Mode. |

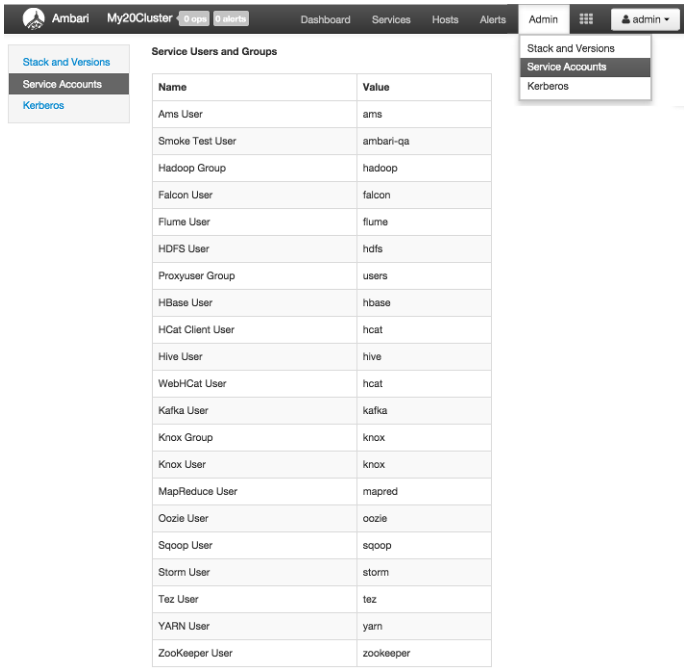
To perform an upgrade to a new version.

1. On the versions tab, click `Perform Upgrade` on the new version.

2. Follow the steps on the wizard.

# 7.5. Service Accounts

To view the list of users and groups used by the cluster services, choose `Admin > Service Accounts`.




# 7.6. Kerberos

If Kerberos has not been enabled in your cluster, click the Enable Kerberos button to launch the Kerberos wizard. For more information on configuring Kerberos in your cluster, see the Ambari Security Guide. Once Kerberos is enabled, you can:

- Regenerate Keytabs
- Disable Kerberos

## 7.6.1. How To Regenerate Keytabs

1. Browse to `Admin > Kerberos`.
2. Click the `Regenerate Kerberos` button.
3. Confirm your selection to proceed.
4. Optionally, you can regenerate keytabs for only those hosts that are missing keytabs. For example, hosts that were not online/available from Ambari when enabling Kerberos.
5. Once you confirm, Ambari will connect to the KDC and regenerate the keytabs for the Service and Ambari principals in the cluster.
6. Once complete, **you must restart all services for the new keytabs to be used**.

### Note

Ambari requires the Kerberos Admin credentials in order to regenerate the keytabs. If the credentials are not available to Ambari, you will be prompted to enter the KDC Admin username and password. For more information on configuring Kerberos in your cluster, see the Ambari Security Guide.

## 7.6.2. How To Disable Kerberos

1. Browse to `Admin > Kerberos`.
2. Click the `Disable Kerberos` button.
3. Confirm your selection to proceed. Cluster services will be stopped and the Ambari Kerberos security settings will be reset.
4. To re-enable Kerberos, click Enable Kerberos and follow the wizard steps. For more information on configuring Kerberos in your cluster, see the Ambari Security Guide.

# 8. Monitoring and Alerts

Ambari monitors cluster health and can alert you in the case of certain situations to help you identify and troubleshoot problems. You manage how alerts are organized, under which conditions notifications are sent, and by which method. This section provides information on:

- Managing Alerts
- Configuring Notifications
- List of Predefined Alerts

## 8.1. Managing Alerts

Ambari predefines a set of alerts that monitor the cluster components and hosts. Each alert is defined by an **Alert Definition**, which specifies the checking interval and thresholds (which are dependent on the **Alert Type**). When a cluster is created or modified, Ambari reads the Alert Definitions and creates **Alert Instances** for the specific components to watch.

### 8.1.1. Terms and Definitions

The following basic terms help describe the key concepts associated with Ambari Alerts:

**Terminology**

| Term | Definition |
|---|---|
| Alert Definition | Defines the alert including the description, check interval, type and thresholds. |
| Type | The type of alert, such as PORT or METRIC. |
| State | Indicates the state of an alert definition. Enabled or disabled. When disabled, no alert instances are created. |
| Alert Instance | Represents the specific alert instances based on an alert definition. For example, the alert definition for DataNode process will have an alert instance per DataNode in the cluster. |
| Status | An alert instance status is defined by severity. The most common severity levels are OK, WARN, CRIT but there are also severities for UNKNOWN and NONE. See “Alert Instances” for more information. |
| Threshold | The thresholds assigned to each status. |
| Alert Group | Grouping of alert definitions, useful for handling notifications targets. |
| Notification | A notification target for when an alert instance status changes. Methods of notification include EMAIL and SNMP. |

### 8.1.2. Alert Definitions and Instances

An Alert Definition includes name, description and check interval, as well as configurable thresholds for each status (depending on the Alert Type).

The following table lists the types of alerts, their possible status and if the thresholds are configurable:

**Alert Types**

| Type | Description | Status | Thresholds Configurable | Units |
|---|---|---|---|---|
| PORT | Watches a port based on a configuration property as the URI. Example: Hive Metastore Process | OK, WARN, CRIT | Yes | seconds |
| METRIC | Watches a metric based on a configuration property. Example: ResourceManager RPC Latency | OK, WARN, CRIT | Yes | variable |
| AGGREGATE | Aggregate of status for another alert definition. Example: percentage NodeManagers Available | OK, WARN, CRIT | Yes | percentage |
| WEB | Watches a Web UI and adjusts status based on response. Example: App Timeline Web UI | OK, WARN, CRIT | No | n/a |
| SCRIPT | Uses a custom script to handle checking. Example: NodeManager Health Summary | OK, CRIT | No | n/a |

### 8.1.3. How To Change an Alert

1. Browse to the Alerts section in Ambari Web.
2. Find the alert definition to modify and click to view the definition details.
3. Click to Edit the description, check interval or thresholds.
4. Changes will take effect on all alert instances at the next interval check.

### 8.1.4. How To View a List of Alert Instances

1. Browse to the Alerts section in Ambari Web.
2. Find the alert definition and click to view the definition details.
3. The list of alert instances is shown.
4. Alternatively, you can browse to a specific host via the Hosts section of Ambari Web to view the list of alert instances specific to that host.

### 8.1.5. How To Enable or Disable an Alert

1. Browse to the Alerts section in Ambari Web.
2. Find the alert definition. Click to enable/disable.
3. Alternatively, you can click to view the definition details and click to enable/disable.
4. When disabled, not alert instances are in effect, therefore no alerts will be reported or dispatched for the alert definition.

## 8.2. Configuring Notifications

With Alert Groups and Notifications, you can create groups of alerts and setup notification targets for each group. This way, you can notify different parties interested in certain sets of alerts via different methods. For example, you might want your Hadoop Operations team to receive all alerts via EMAIL, regardless of status. And at the same time, have your System Administration team receive all RPC and CPU related alerts that are Critical only via SNMP. To achieve this scenario, you would have an Alert Notification that handles Email

for all alert groups for all severity levels, and you would have a different Alert Notification group that handles SNMP on critical severity for an Alert Group that contains the RPC and CPU alerts.

Ambari defines a set of default Alert Groups for each service installed in the cluster. For example, you will see a group for HDFS Default. These groups cannot be deleted and the alerts in these groups are not modifiable. If you choose not to use these groups, just do not set a notification target for them.

1. **Creating or Editing Notifications**

2. Browse to the Alerts section in Ambari Web.

3. Under the Actions menu, click Manage Notifications.

4. The list of existing notifications is shown.

5. Click + to "Create new Alert Notification". The Create Alert Notification is displayed.

6. Enter the notification name, select that groups the notification should be assigned to (all or a specific set), select the Severity levels that this notification responds to, include a description, and choose the method for notification (EMAIL or SNMP).

   - For EMAIL: you will need to provide information about your SMTP infrastructure such as SMTP Server, Port, To/From address and if authentication is required to relay messages through the server. You can add custom properties to the SMTP configuration based on the Javamail SMTP options.

   - For SNMP: you will need to select the SNMP version, OIDs, community and port.

7. After completing the notification, click Save.

1. **Creating or Editing Alert Groups**

2. Browse to the Alerts section in Ambari Web.

3. From the Actions menu, choose Manage Alert Groups

4. The list of existing groups (default and custom) is shown.

5. Choose + to "Create Alert Group". Enter the Group a name and click Save.

6. By clicking on the custom group in the list, you can add or delete alert definitions from this group, and change the notification targets for the group.

# 8.3. List of Predefined Alerts

- HDFS Service Alerts
- NameNode HA Alerts
- YARN Alerts
- MapReduce2 Alerts

- HBase Service Alerts
- Hive Alerts
- Oozie Alerts
- ZooKeeper Alerts
- Ambari Alerts

## 8.3.1. HDFS Service Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **NameNode Blocks health** | This service-level alert is triggered if the number of corrupt or missing blocks exceeds the configured critical threshold. | Some DataNodes are down and the replicas that are missing blocks are only on those DataNodes.<br><br>The corrupt/missing blocks are from files with a replication factor of 1. New replicas cannot be created because the only replica of the block is missing. | For critical data, use a replication of 3.<br><br>Bring up the failed DataNodes wi missing or corrupt blocks.<br><br>Identify the files associated with t missing or corrupt blocks by runn Hadoop fsck command.<br><br>Delete the corrupt files and recov from backup, if it exists. |
| **NameNode process** | This host-level alert is triggered if the NameNode process cannot be confirmed to be up and listening on the network for the configured critical threshold, given in seconds. | The NameNode process is down on the HDFS master host.<br><br>The NameNode process is up and running but not listening on the correct network port (default 8201). | Check for any errors in the logs (/ log/hadoop/hdfs/)and restart th NameNode host/process using th Manage Services tab.<br><br>Run the netstat-tuplpn command check if the NameNode process is to the correct network port. |
| **DataNodeStorage** | This host-level alert is triggered if storage capacity is full on the DataNode (90% critical). It checks the DataNode JMX Servlet for the Capacity and Remaining properties. | Cluster storage is full.<br><br>If cluster storage is not full, DataNode is full. | If cluster still has storage, use Bal distribute the data to relatively le datanodes.<br><br>If the cluster is full, delete unnece data or add additional storage by either more DataNodes or more disks to the DataNodes. After ad more storage run Balancer. |
| **DataNode process** | This host-level alert is triggered if the individual DataNode processes cannot be established to be up and listening on the network for the configured critical threshold, given in seconds. | DataNode process is down or not responding.<br><br>DataNode are not down but is not listening to the correct network port/ address. | Check for dead DataNodes in Am Web.<br><br>Check for any errors in the DataN logs (/var/log/hadoop/hdfs) and the DataNode, if necessary.<br><br>Run the netstat-tuplpn command check if the DataNode process is to the correct network port. |
| **DataNode Web UI** | This host-level alert is triggered if the DataNode Web UI is unreachable. | The DataNode process is not running. | Check whether the DataNode pr running. |
| **NameNode host CPU utilization** | This host-level alert is triggered if CPU utilization of the NameNode exceeds certain thresholds (200% warning, 250% critical). It checks the NameNode JMX Servlet for the SystemCPULoad property. This information is only available if you are running JDK 1.7. | Unusually high CPU utilization: Can be caused by a very unusual job/query workload, but this is generally the sign of an issue in the daemon. | Use the top command to determ which processes are consuming e CPU.<br><br>Reset the offending process. |

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **NameNode Web UI** | This host-level alert is triggered if the NameNode Web UI is unreachable. | The NameNode process is not running. | Check whether the NameNode p running. |
| **Percent DataNodes with Available Space** | This service-level alert is triggered if the storage if full on a certain percentage of DataNodes (10% warn, 30% critical). It aggregates the result from the check_datanode_storage.php plug-in. | Cluster storage is full.<br><br>If cluster storage is not full, DataNode is full. | If cluster still has storage, use Bal distribute the data to relatively le DataNodes.<br><br>If the cluster is full, delete unnece data or add additional storage by either more DataNodes or more disks to the DataNodes. After ad more storage run Balancer. |
| **Percent DataNodesAvailable** | This alert is triggered if the number of down DataNodes in the cluster is greater than the configured critical threshold. It uses the check_aggregate plug-in to aggregate the results of Data node process checks. | DataNodes are down<br><br>DataNodes are not down but are not listening to the correct network port/ address. | Check for dead DataNodes in Am Web.<br><br>Check for any errors in the DataN logs (/var/log/hadoop/hdfs) and the DataNode hosts/processes.<br><br>Run the netstat-tuplpn command check if the DataNode process is to the correct network port. |
| **NameNode RPC latency** | This host-level alert is triggered if the NameNode operations RPC latency exceeds the configured critical threshold. Typically an increase in the RPC processing time increases the RPC queue length, causing the average queue wait time to increase for NameNode operations. | A job or an application is performing too many NameNode operations. | Review the job or the application potential bugs causing it to perfo many NameNode operations. |
| **NameNode Last Checkpoint** | This alert will trigger if the last time that the NameNode performed a checkpoint was too long ago or if the number of uncommitted transactions is beyond a certain threshold. | Too much time elapsed since last NameNode checkpoint.<br><br>Uncommitted transactions beyond threshold. | Set NameNode checkpoint.<br><br>Review threshold for uncommitte transactions. |
| **Secondary NameNode Process** | If the Secondary NameNode process cannot be confirmed to be up and listening on the network. This alert is not applicable when NameNode HA is configured. | The Secondary NameNode is not running. | Check that the Secondary DataN process is running. |
| **NameNode Directory Status** | This alert checks if the NameNode NameDirStatus metric reports a failed directory. | One or more of the directories are reporting as not healthy. | Check the NameNode UI for info about unhealthy directories. |
| **HDFS capacity utilization** | This service-level alert is triggered if the HDFS capacity utilization exceeds the configured critical threshold (80% warn, 90% critical). It checks the NameNode JMX Servlet for the CapacityUsed and CapacityRemaining properties. | Cluster storage is full. | Delete unnecessary data.<br><br>Archive unused data.<br><br>Add more DataNodes.<br><br>Add more or larger disks to the DataNodes.<br><br>After adding more storage, run B |
| **DataNode Health Summary** | This service-level alert is triggered if there are unhealthy DataNodes. | A DataNode is in an unhealthy state. | Check the NameNode UI for the dead DataNodes. |

## 8.3.2. NameNode HA Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **JournalNode process** | This host-level alert is triggered if the individual JournalNode process cannot be established to be up and listening on | The JournalNode process is down or not responding. | Check if the JournalNode process |

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| | the network for the configured critical threshold, given in seconds. | The JournalNode is not down but is not listening to the correct network port/ address. | |
| **NameNode High Availability Health** | This service-level alert is triggered if either the Active NameNode or Standby NameNode are not running. | The Active, Standby or both NameNode processes are down. | On each host running NameNode check for any errors in the logs (/ log/hadoop/hdfs/) and restart th NameNode host/process using A Web.<br><br>On each host running NameNode the netstat-tuplpn command to c the NameNode process is bound correct network port. |
| **ZooKeeper Failover Controller process** | This alert is triggered if the ZooKeeper Failover Controller process cannot be confirmed to be up and listening on the network. | The ZKFC process is down or not responding. | Check if the ZKFC process is runni |

## 8.3.3. YARN Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **Percent NodeManagersAvailable** | This alert is triggered if the number of down NodeManagers in the cluster is greater than the configured critical threshold. It aggregates the results of DataNode process alert checks. | NodeManagers are down.<br><br>NodeManagers are not down but are not listening to the correct network port/ address. | Check for dead NodeManagers.<br><br>Check for any errors in the NodeI logs (/var/log/hadoop/yarn) and the NodeManagers hosts/proces necessary.<br><br>Run the netstat-tuplpn command check if the NodeManager proce bound to the correct network po |
| **ResourceManager Web UI** | This host-level alert is triggered if the ResourceManager Web UI is unreachable. | The ResourceManager process is not running. | Check if the ResourceManager pr running. |
| **ResourceManager RPC latency** | This host-level alert is triggered if the ResourceManager operations RPC latency exceeds the configured critical threshold. Typically an increase in the RPC processing time increases the RPC queue length, causing the average queue wait time to increase for ResourceManager operations. | A job or an application is performing too many ResourceManager operations. | Review the job or the application potential bugs causing it to perfo many ResourceManager operatio |
| **ResourceManager CPU utilization** | This host-level alert is triggered if CPU utilization of the ResourceManager exceeds certain thresholds (200% warning, 250% critical). It checks the ResourceManager JMX Servlet for the SystemCPULoad property. This information is only available if you are running JDK 1.7. | Unusually high CPU utilization: Can be caused by a very unusual job/query workload, but this is generally the sign of an issue in the daemon. | Use the top command to determ which processes are consuming e CPU.<br><br>Reset the offending process. |
| **NodeManager Web UI** | This host-level alert is triggered if the NodeManager process cannot be established to be up and listening on the network for the configured critical threshold, given in seconds. | NodeManager process is down or not responding.<br><br>NodeManager is not down but is not listening to the correct network port/ address. | Check if the NodeManager is run<br><br>Check for any errors in the NodeI logs (/var/log/hadoop/yarn) and the NodeManager, if necessary. |
| **NodeManager health** | This host-level alert checks the node health property available from the NodeManager component. | Node Health Check script reports issues or is not configured. | Check in the NodeManager logs log/hadoop/yarn) for health che and restart the NodeManager, a restart if necessary. |

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| | | | Check in the ResourceManager U var/log/hadoop/yarn) for health errors. |

## 8.3.4. MapReduce2 Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **HistoryServer Web UI** | This host-level alert is triggered if the HistoryServer Web UI is unreachable. | The HistoryServer process is not running. | Check if the HistoryServer proces running. |
| **HistoryServer RPC latency** | This host-level alert is triggered if the HistoryServer operations RPC latency exceeds the configured critical threshold. Typically an increase in the RPC processing time increases the RPC queue length, causing the average queue wait time to increase for NameNode operations. | A job or an application is performing too many HistoryServer operations. | Review the job or the application potential bugs causing it to perfo many HistoryServer operations. |
| **HistoryServer CPU utilization** | This host-level alert is triggered if the percent of CPU utilization on the HistoryServer exceeds the configured critical threshold. | Unusually high CPU utilization: Can be caused by a very unusual job/query workload, but this is generally the sign of an issue in the daemon. | Use the top command to determ which processes are consuming e CPU.<br><br>Reset the offending process. |
| **HistoryServer process** | This host-level alert is triggered if the HistoryServer process cannot be established to be up and listening on the network for the configured critical threshold, given in seconds. | HistoryServer process is down or not responding.<br><br>HistoryServer is not down but is not listening to the correct network port/ address. | Check the HistoryServer is runnin<br><br>Check for any errors in the Histor logs (/var/log/hadoop/mapred) restart the HistoryServer, if neces |

## 8.3.5. HBase Service Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **Percent RegionServers live** | This service-level alert is triggered if the configured percentage of Region Server processes cannot be determined to be up and listening on the network for the configured critical threshold. The default setting is 10% to produce a WARN alert and 30% to produce a CRITICAL alert. It aggregates the results of RegionServer process down checks. | Misconfiguration or less-than-ideal configuration caused the RegionServers to crash.<br><br>Cascading failures brought on by some workload caused the RegionServers to crash.<br><br>The RegionServers shut themselves own because there were problems in the dependent services, ZooKeeper or HDFS.<br><br>GC paused the RegionServer for too long and the RegionServers lost contact with Zookeeper. | Check the dependent services to sure they are operating correctly.<br><br>Look at the RegionServer log files (usually /var/log/hbase/*.log) fo information.<br><br>If the failure was associated with particular workload, try to under the workload better.<br><br>Restart the RegionServers. |
| **HBase Master process** | This alert is triggered if the HBase master processes cannot be confirmed to be up and listening on the network for the configured critical threshold, given in seconds. | The HBase master process is down.<br><br>The HBase master has shut itself down because there were problems in the dependent services, ZooKeeper or HDFS. | Check the dependent services.<br><br>Look at the master log files (usua log/hbase/*.log) for further infor<br><br>Look at the configuration files (/ hbase/conf).<br><br>Restart the master. |
| **HBase Master Web UI** | This host-level alert is triggered if the HBase Master Web UI is unreachable. | The HBase Master process is not running. | Check if the Master process is run |
| **HBase Master CPU utilization** | This host-level alert is triggered if CPU utilization of the HBase Master exceeds certain thresholds (200% warning, 250% | Unusually high CPU utilization: Can be caused by a very unusual job/query | Use the top command to determ which processes are consuming e CPU |

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| | critical). It checks the HBase Master JMX Servlet for the SystemCPULoad property. This information is only available if you are running JDK 1.7. | workload, but this is generally the sign of an issue in the daemon. | Reset the offending process. |
| **RegionServer process** | This host-level alert is triggered if the RegionServer processes cannot be confirmed to be up and listening on the network for the configured critical threshold, given in seconds. | The RegionServer process is down on the host.<br><br>The RegionServer process is up and running but not listening on the correct network port (default 60030). | Check for any errors in the logs (/ log/hbase/) and restart the Regio process using Ambari Web.<br><br>Run the netstat-tuplpn command check if the RegionServer process bound to the correct network po |

## 8.3.6. Hive Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **HiveServer2 Process** | This host-level alert is triggered if the HiveServer cannot be determined to be up and responding to client requests. | HiveServer2 process is not running.<br><br>HiveServer2 process is not responding. | Using Ambari Web, check status HiveServer2 component. Stop an restart. |
| **HiveMetastore Process** | This host-level alert is triggered if the Hive Metastore process cannot be determined to be up and listening on the network for the configured critical threshold, given in seconds. | The Hive Metastore service is down.<br><br>The database used by the Hive Metastore is down.<br><br>The Hive Metastore host is not reachable over the network. | Using Ambari Web, stop the Hive and then restart it. |
| **WebHCat Server status** | This host-level alert is triggered if the WebHCat server cannot be determined to be up and responding to client requests. | The WebHCat server is down.<br><br>The WebHCat server is hung and not responding.<br><br>The WebHCat server is not reachable over the network. | Restart the WebHCat server using Web. |

## 8.3.7. Oozie Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **Oozie status** | This host-level alert is triggered if the Oozie server cannot be determined to be up and responding to client requests. | The Oozie server is down.<br><br>The Oozie server is hung and not responding.<br><br>The Oozie server is not reachable over the network. | Restart the Oozie service using A Web. |

## 8.3.8. ZooKeeper Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **Percent ZooKeeper ServersAvailable** | This service-level alert is triggered if the configured percentage of ZooKeeper processes cannot be determined to be up and listening on the network for the configured critical threshold, given in seconds. It aggregates the results of Zookeeper process checks. | The majority of your ZooKeeper servers are down and not responding. | Check the dependent services to sure they are operating correctly.<br><br>Check the ZooKeeper logs (/var/l hadoop/zookeeper.log) for furth information.<br><br>If the failure was associated with particular workload, try to under the workload better.<br><br>Restart the ZooKeeper servers fr Ambari UI. |

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **ZooKeeper Server process** | This host-level alert is triggered if the ZooKeeper server process cannot be determined to be up and listening on the network for the configured critical threshold, given in seconds. | The ZooKeeper server process is down on the host.<br><br>The ZooKeeper server process is up and running but not listening on the correct network port (default 2181). | Check for any errors in the ZooKe logs (/var/log/hbase/) and restar ZooKeeper process using Ambari<br><br>Run the netstat-tuplpn commanc check if the ZooKeeper server pr bound to the correct network po |

## 8.3.9. Ambari Alerts

| Alert | Description | Potential Causes | Possible Remedies |
|---|---|---|---|
| **Ambari Agent Disk Usage** | This host-level alert is triggered if the amount of disk space used on a host goes above specific thresholds. The default values are 50% for WARNING and 80% for CRITICAL. | The host is running out of disk space. | Check logs and temporary directc items to remove.<br><br>Add more disk space. |