

Engineering Excellence J1

(Hadoop Cluster Setup – Ranger Setup)

Ranger installation and Configuration

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APACHE RANGER

Comprehensive security for Enterprise Hadoop

Apache Ranger delivers a comprehensive approach to security for a Hadoop cluster. It provides central security policy administration across the core enterprise security requirements of authorization, authentication, audit and data protection.

Apache Ranger offers a centralized security framework to manage fine-grained access control over Hadoop data access components like Apache Hive and Apache HBase. Using the Apache Ranger console, security administrators can easily manage policies for access to files, folders, databases, tables, or column. These policies can be set for individual users or groups and then enforced within Hadoop.

Security administrators can also use Apache Ranger to manage audit tracking and policy analytics for deeper control of the environment. The solution also provides an option to delegate administration of certain data to other group owners, with the aim of securely decentralizing data ownership.

Apache Ranger currently supports authorization, authentication, auditing, data encryption and security administration for the following HDP components:

- Apache Hadoop HDFS
- Apache Hive
- Apache HBase
- Apache Storm
- Apache Knox
- Apache Solr
- Apache Kafka
- YARN

Overview

Apache Ranger can be installed either manually using the Hortonworks Data Platform (HDP) or the Ambari 2.1 User Interface (UI). Unlike the manual installation process, which requires you to perform a number of installation steps, installing Ranger using the Ambari UI is simpler and easier. The Ranger service option will be made available through the Add Service wizard after the HDP cluster is installed using the installation wizard.

Once Ambari has been installed and configured, you can use the Add Service wizard to install the following components:

- Ranger Admin
- Ranger UserSync
- Ranger Key Management Service

After these components are installed and started, you can enable Ranger plugins by navigating to each individual Ranger service (HDFS, HBase, Hiveserver2, Storm, Knox, YARN, and Kafka) and modifying the configuration under advanced ranger-<service>-plugin-properties.

Note that when you enable a Ranger plugin, you will need to restart the component.

Note

Enabling Apache Storm or Apache Kafka requires you to enable Kerberos. To enable Kerberos on your cluster, see [Enabling Kerberos Security](#) in the [Ambari Security Guide](#).

Installation Prerequisites

Before you install Ranger, make sure your cluster meets the following requirements:

- A MySQL, Oracle, or PostgreSQL database instance is running and available to be used by Ranger.

The Ranger installation will create two new users (default names: rangeradmin and rangerlogger) and two new databases (default names: ranger and ranger_audit).

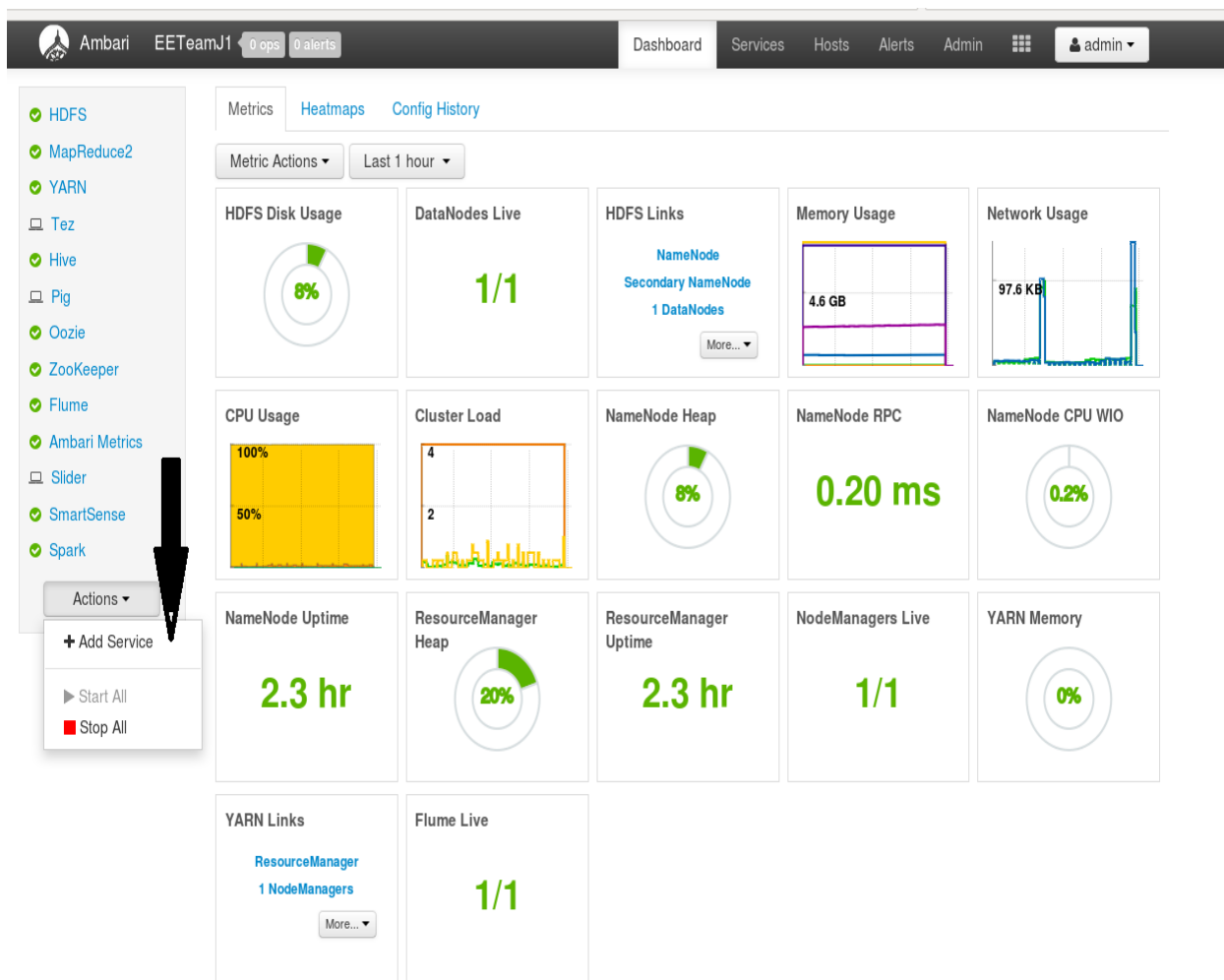
- Configure the database instance for Ranger as described in the following sections.
 - [Configuring MySQL for Ranger](#)
 - [Configuring PostgreSQL for Ranger](#)
 - [Configuring Oracle for Ranger](#)

Ranger Installation

Use the following steps to install Ranger using Ambari.

Start the Installation

1. Log into your Ambari cluster with your user credentials. The main Ambari Dashboard page will be displayed.
2. In the left navigation menu, click **Actions**, then select **Add Service**.



3. On the Choose Services page, select Ranger, then click Next

<input type="checkbox"/> Falcon	0.6.1.2.4	Data management and processing platform
<input type="checkbox"/> Storm	0.10.0.2.4	Apache Hadoop Stream processing framework
<input checked="" type="checkbox"/> Flume	1.5.2.2.4	A distributed service for collecting, aggregating, and moving large amounts of streaming data into HDFS
<input type="checkbox"/> Accumulo	1.7.0.2.4	Robust, scalable, high performance distributed key/value store.
<input checked="" type="checkbox"/> Ambari Metrics	0.1.0	A system for metrics collection that provides storage and retrieval capability for metrics collected from the cluster
<input type="checkbox"/> Atlas	0.5.0.2.4	Atlas Metadata and Governance platform
<input type="checkbox"/> Kafka	0.9.0.2.4	A high-throughput distributed messaging system
<input type="checkbox"/> Knox	0.6.0.2.4	Provides a single point of authentication and access for Apache Hadoop services in a cluster
<input type="checkbox"/> Mahout	0.9.0.2.4	Project of the Apache Software Foundation to produce free implementations of distributed or otherwise scalable machine learning algorithms focused primarily in the areas of collaborative filtering, clustering and classification
<input checked="" type="checkbox"/> Ranger	0.5.0.2.4	Comprehensive security for Hadoop
<input type="checkbox"/> Ranger KMS	0.5.0.2.4	Key Management Server
<input checked="" type="checkbox"/> Slider	0.80.0.2.4	A framework for deploying, managing and monitoring existing distributed applications on YARN.
<input checked="" type="checkbox"/> SmartSense	1.2.2.0-460	SmartSense - Hortonworks SmartSense Tool (HST) helps quickly gather configuration, metrics, logs from common HDP services that aids to quickly troubleshoot support cases and receive cluster-specific recommendations.
<input checked="" type="checkbox"/> Spark	1.6.x.2.4	Apache Spark is a fast and general engine for large-scale data processing.

Next →

4. The Ranger Requirements page appears. Ensure that you have met all of the installation requirements, then select the "I have met all the requirements above" check box and click **Proceed**.

Ranger Requirements

X

1. You must have an **MySQL/Oracle/Postgres/MSSQL/SQL Anywhere Server** database instance running to be used by Ranger.

2. In Assign Masters step of this wizard, you will be prompted to specify which host for the Ranger Admin. On that host, you **must have DB Client installed** for Ranger to access to the database. (Note: This is applicable for only Ranger 0.4.0)

3. Ensure that the access for the DB Admin user is enabled in DB server from any host.

4. Execute the following command on the Ambari Server host. Replace `database-type` with `mysql|oracle|postgres|mssql|sqlanywhere` and `/jdbc/driver/path` based on the location of corresponding JDBC driver:

`ambari-server setup --jdbc-db={database-type} --jdbc-driver={/jdbc/driver/path}`

☐

I have met all the requirements above.

Cancel

Proceed

Run the below command using root or postgres user on **impetus-i0161.impetus.co.in** as that's where ambari is running. Once you get the setup successful message then we can proceed to the next step.

```
# ambari-server setup --jdbc-db=postgres --jdbc-driver=/usr/lib/ambari-server/postgresql-9.3-1101-jdbc4.jar
Using python /usr/bin/python
Setup ambari-server
Copying /usr/lib/ambari-server/postgresql-9.3-1101-jdbc4.jar to
/var/lib/ambari-server/resources
JDBC driver was successfully initialized.
Ambari Server 'setup' completed successfully.
```

5. You are then prompted to select the host where Ranger Admin will be installed. This host should have DB admin access to the Ranger DB host and UserSync. Notice in the figure below that both the Ranger Admin and Ranger Usersync services will be installed on the host **impetus-i0161.impetus.co.in** as postgres is already configured on that host.

Make a note of the Ranger Admin host for use in subsequent installation steps. Click **Next** when finished to continue with the installation.

Note : The Ranger Admin and Ranger Usersync services must be installed on the same cluster node.

The screenshot displays the Ranger installation configuration interface. On the left, a list of services is shown with dropdown menus for selecting the host. On the right, three host cards are visible, each showing the services assigned to it. The host **impetus-i0161.impetus.co.in** (7.7 GB, 4 cores) is highlighted with a yellow background and contains the **Ranger Usersync** and **Ranger Admin** services, which are marked with green checkmarks. A yellow warning box below the host cards states "1 hosts not running master services". Two large black arrows point to the **Ranger Usersync** and **Ranger Admin** dropdown menus, both of which are set to **impetus-i0161.impetus.co.in**.

Service	Host
SNameNode	impetus-i0095.impetus.co.in (7.7 GB, 4 cores)
NameNode	impetus-i0095.impetus.co.in (7.7 GB, 4 cores)
History Server	impetus-i0163.impetus.co.in (7.7 GB, 4 cores)
ResourceManager	impetus-i0161.impetus.co.in (7.7 GB, 4 cores)
App Timeline Server	impetus-i0163.impetus.co.in (7.7 GB, 4 cores)
Hive Metastore	impetus-i0161.impetus.co.in (7.7 GB, 4 cores)
WebHCat Server	impetus-i0161.impetus.co.in*
HiveServer2	impetus-i0161.impetus.co.in (7.7 GB, 4 cores)
Oozie Server	impetus-i0161.impetus.co.in (7.7 GB, 4 cores)
ZooKeeper Server	impetus-i0095.impetus.co.in (7.7 GB, 4 cores)
ZooKeeper Server	impetus-i0161.impetus.co.in (7.7 GB, 4 cores)
ZooKeeper Server	impetus-i0163.impetus.co.in (7.7 GB, 4 cores)
Ranger Usersync	impetus-i0161.impetus.co.in (7.7 GB, 4 cores)
Spark History Server	impetus-i0095.impetus.co.in (7.7 GB, 4 cores)
Grafana	impetus-i0095.impetus.co.in (7.7 GB, 4 cores)
Ranger Admin	impetus-i0161.impetus.co.in (7.7 GB, 4 cores)
SmartSense HST Server	impetus-i0095.impetus.co.in (7.7 GB, 4 cores)

Customize Services

The next step in the installation process is to specify Ranger settings on the Customize Services page. You must specify all of the following settings on the Customize Services page before clicking Next at the bottom of the page to continue with the installation.

Admin Settings

1. Under Admin Settings on the Customize Services page, type in the password for the user account used by Ambari(This setting is only on a non-ambari host) . This password will only be used by the Ambari Agent, and will be used with the user name specified in the Ranger configuration asranger_admin_username under "Advanced ranger-env".

Use **postgres** as DB_Flavour and enter the Ranger DB host as **impetus-i0161.impetus.co.in** and set the Ranger DB password as "**ranger**"

Ranger Admin 1

Ranger User Info

Ranger Plugin

Ranger Audit 2

Advanced

Ranger Admin

DB FLAVOR

POSTGRES

Ranger DB name

ranger

Ranger DB username

rangeradmin

JDBC connect string

jdbc:postgresql://impetus-i0161.impetus.co.in

Ranger DB host

impetus-i0161.impetus.co.in

Driver class name for a JDBC Ranger database

org.postgresql.Driver

Ranger DB password

.....

.....

Setup Database and Database User

Yes

Database Administrator (DBA) username

postgres

Database Administrator (DBA) password

.....

.....

JDBC connect string for root user

mpetus-i0161.impetus.co.in:5432/postgres

Test Connection

Connection OK

If you get error while testing connection saying postgres password is wrong then run the following on the box **impetus-i0161.impetus.co.in**

```
# sudo su - postgres
# psql
postgres=# ALTER USER postgres with encrypted password 'postgres';
```

Leave default settings for **Ranger User info** and enable all available plugins under **Ranger Plugin** tabs. In **Ranger Audits** and **advance** tabs change only those show in the figure leave others default.

Ranger.audit.solr.username = http://impetus-i0161.impetus.co.in:6083/solr/ranger_audits

Ranger Audit DB password = ranger

The screenshot displays the Ranger configuration interface with the following settings:

- SolrCloud:** ☒ ON
- Destination HDFS Directory:**
- ranger.audit.solr.urls:** (indicated by a black arrow)
- ranger.audit.solr.username:**
- ranger.audit.solr.password:**
- Audit to DB:** ☐ OFF
- Ranger Audit DB name:**
- Ranger Audit DB username:**
- Ranger Audit DB password:** (indicated by a black arrow)

Using Apache Solr for Ranger Audits : Apache Solr is an open-source enterprise search platform. Apache Ranger can use Apache Solr to store audit logs, and Solr can also to provide a search capability of the audit logs through the ranger Admin UI

Solr Prerequisites

- Ranger supports Apache Solr 5.2 or higher.
- Apache Solr requires the Java Runtime Environment (JRE) version 1.7 or higher.
- 1 TB free space in the volume where Solr will store the index data.
- 32 GB RAM.

Admin Settings

Ranger Admin host

impetus-i0161.impetus.co.in

Ranger Admin username for Ambari

amb_ranger_admin

Ranger Admin user's password for Ambari

.....

.....

Location of Sql Connector Jar

/usr/share/java/postgresql.jar

Ranger Settings

External URL

http://impetus-i0161.impetus.co.in:6080

Authentication method

☐ LDAP

☐ ACTIVE_DIRECTORY

☒ UNIX

☐ NONE

HTTP enabled

☒

Unix Authentication Settings

Allow remote Login

true

ranger.unixauth.service.hostname

{{ugsync_host}}

ranger.unixauth.service.port

5151

Knox SSO Settings

SSO browser useragent

Mozilla,chrome

SSO cookiename

hadoop-jwt

Enable Ranger SSO

false

SSO provider url

SSO public key

SSO query param originalurl

originalUrl

Advanced ranger-admin-site

Advanced ranger-env

Advanced ranger-ugsync-site

Review and Finalize installation

The screenshot shows the Ambari web interface in a Mozilla Firefox browser. The address bar shows the URL `172.26.60.16:8080/#main/service/add/step6`. The page title is "Add Service Wizard". On the left, a sidebar lists the steps of the wizard: "Choose Services", "Assign Masters", "Assign Slaves and Clients", "Customize Services", "Configure Identities", "Review" (selected), "Install, Start and Test", and "Summary". The main content area is titled "Review" and contains a message: "Please review the configuration before installation". Below this, a scrollable list of repository URLs is shown for various operating systems and Hortonworks Distribution Platform (HDP) versions. The "Services" section lists the "Ranger" service with its "Admin" and "Usersync" components. At the bottom of the wizard, there are "Back", "Print", and "Deploy" buttons. The footer of the page states "Licensed under the Apache License, Version 2.0. See third-party tools/resources that Ambari uses and their respective authors". The Windows taskbar at the bottom shows the search bar and several open applications, including Google Chrome, Outlook, File Explorer, Adobe Reader, Notepad, Word, and Xmanager.

Add Service Wizard

ADD SERVICE WIZARD

- Choose Services
- Assign Masters
- Assign Slaves and Clients
- Customize Services
- Configure Identities
- Review**
- Install, Start and Test
- Summary

Review

Please review the configuration before installation

`http://public-repo-1.hortonworks.com/HDP/centos7/2.x/updates/2.4.2.0`
`redhat7 (HDP-UTILS-1.1.0.20):`
`http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/centos7`
`suse11 (HDP-2.4):`
`http://public-repo-1.hortonworks.com/HDP/suse11sp3/2.x/updates/2.4.2.0`
`suse11 (HDP-UTILS-1.1.0.20):`
`http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/suse11sp3`
`ubuntu12 (HDP-2.4):`
`http://public-repo-1.hortonworks.com/HDP/ubuntu12/2.x/updates/2.4.2.0`
`ubuntu12 (HDP-UTILS-1.1.0.20):`
`http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/ubuntu12`
`ubuntu14 (HDP-2.4):`
`http://172.26.60.16/hdp/HDP/ubuntu14/2.x/updates/2.4.2.0/`
`ubuntu14 (HDP-UTILS-1.1.0.20):`
`http://172.26.60.16/hdp/HDP-UTILS-1.1.0.20/repos/ubuntu14/`

Services:

Ranger
`Admin` : `impetus-0161.impetus.co.in`
`Usersync` : `impetus-0161.impetus.co.in`

[Back](#) [Print](#) [Deploy](#)

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Ambari - EETeamJ1 - Mozilla Firefox

Ambari - EETeamJ1

172.26.60.16:8080/#main/service/addstep7

Ambari EETeamJ1

Dashboard Services Hosts Alerts Admin

Add Service Wizard

ADD SERVICE WIZARD

- Choose Services
- Assign Masters
- Assign Slaves and Clients
- Customize Services
- Configure Identities
- Review
- Install, Start and Test**
- Summary

Install, Start and Test

Please wait while the selected services are installed and started.

100 % overall

Host	Status	Message
impetus-i0095.impetus.co.in	100%	Success
impetus-i0161.impetus.co.in	100%	Success
impetus-i0163.impetus.co.in	100%	Success
impetus-i0203.impetus.co.in	100%	Success

4 of 4 hosts showing - [Show All](#)

Successfully installed and started the services.

Next -->

1 NodeManagers 1/1

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Search the web and Windows

Google... Inbox - s... File Exp... Adobe R... Notepad Word 20... Comput... Multi Pu... root@L... Xmanag... C:\Wind... Paint

12:24 AM 6/1/2016

Ambari - EETeamJ1 - Mozilla Firefox

Ambari - EETeamJ1

172.26.60.16:8080/#main/service/addstep8

Ambari EETeamJ1


Dashboard Services Hosts Alerts Admin

Add Service Wizard

ADD SERVICE WIZARD

- Choose Services
- Assign Masters
- Assign Slaves and Clients
- Customize Services
- Configure Identities
- Review
- Install, Start and Test
- Summary**

Summary

Important: You may also need to restart other services for the newly added services to function properly (for example, HDFS and YARN-MapReduce need to be restarted after adding Oozie). After closing this wizard, please restart all services that have the restart indicator  next to the service name.

Here is the summary of the install process.

The cluster consists of 4 hosts
Installed and started services successfully on 4 new hosts
Install and start completed in 2 minutes and 7 seconds

Complete -->

YARN Links
ResourceManagers
1 NodeManagers
1/1

Flume Live

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