

Hortonworks Data Platform

Ranger Ambari Installation

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Hortonworks Data Platform: Ranger Ambari Installation

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1. 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](#).

2. Installation Prerequisites

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

- It is recommended that you store audits in both HDFS and Solr, so you should [install Apache Solr](#).
- To ensure that LDAP/AD group level authorization is enforced in Hadoop, you should [set up Hadoop group mapping](#) for LDAP.
- A MySQL, Oracle, PostgreSQL, MS SQL, or SQL Anywhere database instance must be 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).

- Configuration of the database instance for Ranger is described in the following sections for some of the databases supported by Ranger.
 - [Configuring MySQL for Ranger](#)
 - [Configuring PostgreSQL for Ranger](#)
 - [Configuring Oracle for Ranger](#)
- If you choose not to provide system Database Administrator (DBA) account details to the Ambari Ranger installer, you can use the `dba_script.py` Python script to create Ranger DB database users without exposing DBA account information to the Ambari Ranger installer. You can then run the normal Ambari Ranger installation without specifying a DBA user name and password. For more information see [Setting up Database Users Without Sharing DBA Credentials](#).

2.1. Configuring MySQL for Ranger

1. The MySQL database administrator should be used to create the Ranger databases.

The following series of commands could be used to create the `rangerdba` user with password `rangerdba`.

- a. Log in as the root user, then use the following commands to create the `rangerdba` user and grant it adequate privileges.

```
CREATE USER 'rangerdba'@'localhost' IDENTIFIED BY 'rangerdba';

GRANT ALL PRIVILEGES ON *.* TO 'rangerdba'@'localhost';

CREATE USER 'rangerdba'@'%' IDENTIFIED BY 'rangerdba';

GRANT ALL PRIVILEGES ON *.* TO 'rangerdba'@'%';

GRANT ALL PRIVILEGES ON *.* TO 'rangerdba'@'localhost' WITH GRANT OPTION;

GRANT ALL PRIVILEGES ON *.* TO 'rangerdba'@'%' WITH GRANT OPTION;
```

```
FLUSH PRIVILEGES;
```

- b. Use the `exit` command to exit MySQL.
- c. You should now be able to reconnect to the database as `rangerdba` using the following command:

```
mysql -u rangerdba -prangerdba
```

After testing the `rangerdba` login, use the `exit` command to exit MySQL.

2. Use the following command to confirm that the `mysql-connector-java.jar` file is in the Java share directory. This command must be run on the server where Ambari server is installed.

```
ls /usr/share/java/mysql-connector-java.jar
```

If the file is not in the Java share directory, use the following command to install the MySQL connector .jar file.

RHEL/CentOS/Oracle Linux

```
yum install mysql-connector-java*
```

SLES

```
zypper install mysql-connector-java*
```

3. Use the following command format to set the `jdbc/driver/path` based on the location of the MySQL JDBC driver .jar file. This command must be run on the server where Ambari server is installed.

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

For example:

```
ambari-server setup --jdbc-db=mysql --jdbc-driver=/usr/share/java/mysql-connector-java.jar
```

2.2. Configuring PostgreSQL for Ranger

1. On the PostgreSQL host, install the applicable PostgreSQL connector.

RHEL/CentOS/Oracle Linux

```
yum install postgresql-jdbc*
```

SLES

```
zypper install -y postgresql-jdbc
```

2. Confirm that the .jar file is in the Java share directory.

```
ls /usr/share/java/postgresql-jdbc.jar
```


3. Change the access mode of the .jar file to 644.

```
chmod 644 /usr/share/java/postgresql-jdbc.jar
```

4. The PostgreSQL database administrator should be used to create the Ranger databases.

The following series of commands could be used to create the rangerdba user and grant it adequate privileges.

```
echo "CREATE DATABASE $dbname;" | sudo -u $postgres psql -U postgres
echo "CREATE USER $rangerdba WITH PASSWORD '$passwd';" | sudo -u $postgres
psql -U postgres
echo "GRANT ALL PRIVILEGES ON DATABASE $dbname TO $rangerdba;" | sudo -u
postgres psql -U $postgres
```

Where:

- \$postgres is the postgres user
- \$dbname is the name of your PostgreSQL database

5. Use the following command format to set the jdbc/driver/path based on the location of the PostgreSQL JDBC driver .jar file. This command must be run on the server where Ambari server is installed.

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

For example:

```
ambari-server setup --jdbc-db=postgres --jdbc-driver=/usr/share/java/
postgresql.jar
```

6. Run the following command:

```
export HADOOP_CLASSPATH=${HADOOP_CLASSPATH}:${JAVA_JDBC_LIBS}:/connector jar
path
```

7. Add allow access details for Ranger users:

- change listen_addresses='localhost' to listen_addresses='*' ('*' = any) to listen from all IPs in postgresql.conf.
- Make the following changes to the Ranger db user and Ranger audit db user in pg_hba.conf.

```
# TYPE DATABASE USER CIDR-ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all postgres,rangeradmin,rangerlogger trust
# IPv4 local connections:
host all postgres,rangeradmin,rangerlogger 0.0.0.0/0 trust
# IPv6 local connections:
host all postgres,rangeradmin,rangerlogger ::/0 trust
"/var/lib/pgsql/data/pg_hba.conf" 74L, 3445C
```

2.3. Configuring Oracle for Ranger

1. On the Oracle host, install the appropriate JDBC .jar file.

- Download the Oracle JDBC (OJDBC) driver from <http://www.oracle.com/technetwork/database/features/jdbc/index-091264.html>.
- For **Oracle Database 11g**: select Oracle Database 11g Release 2 drivers > ojdbc6.jar.
- For **Oracle Database 12c**: select Oracle Database 12c Release 1 driver > ojdbc7.jar.
- Copy the .jar file to the Java share directory. For example:

```
cp ojdbc7.jar /usr/share/java
```



Note

Make sure the .jar file has the appropriate permissions. For example:

```
chmod 644 /usr/share/java/ojdbc7.jar
```

2. The Oracle database administrator should be used to create the Ranger databases.

The following series of commands could be used to create the RANGERDBA user and grant it permissions using SQL*Plus, the Oracle database administration utility:

```
# sqlplus sys/root as sysdba
CREATE USER $RANGERDBA IDENTIFIED BY $RANGERDBAPASSWORD;
GRANT SELECT_CATALOG_ROLE TO $RANGERDBA;
GRANT CONNECT, RESOURCE TO $RANGERDBA;
QUIT;
```

3. Use the following command format to set the jdbc/driver/path based on the location of the Oracle JDBC driver .jar file. This command must be run on the server where Ambari server is installed.

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

For example:

```
ambari-server setup --jdbc-db=oracle --jdbc-driver=/usr/share/java/ojdbc6.jar
```

3. Ranger Installation

To install Ranger using Ambari:

1. [Start the Installation](#)
2. [Customize Services](#)
3. [Complete the Installation](#)

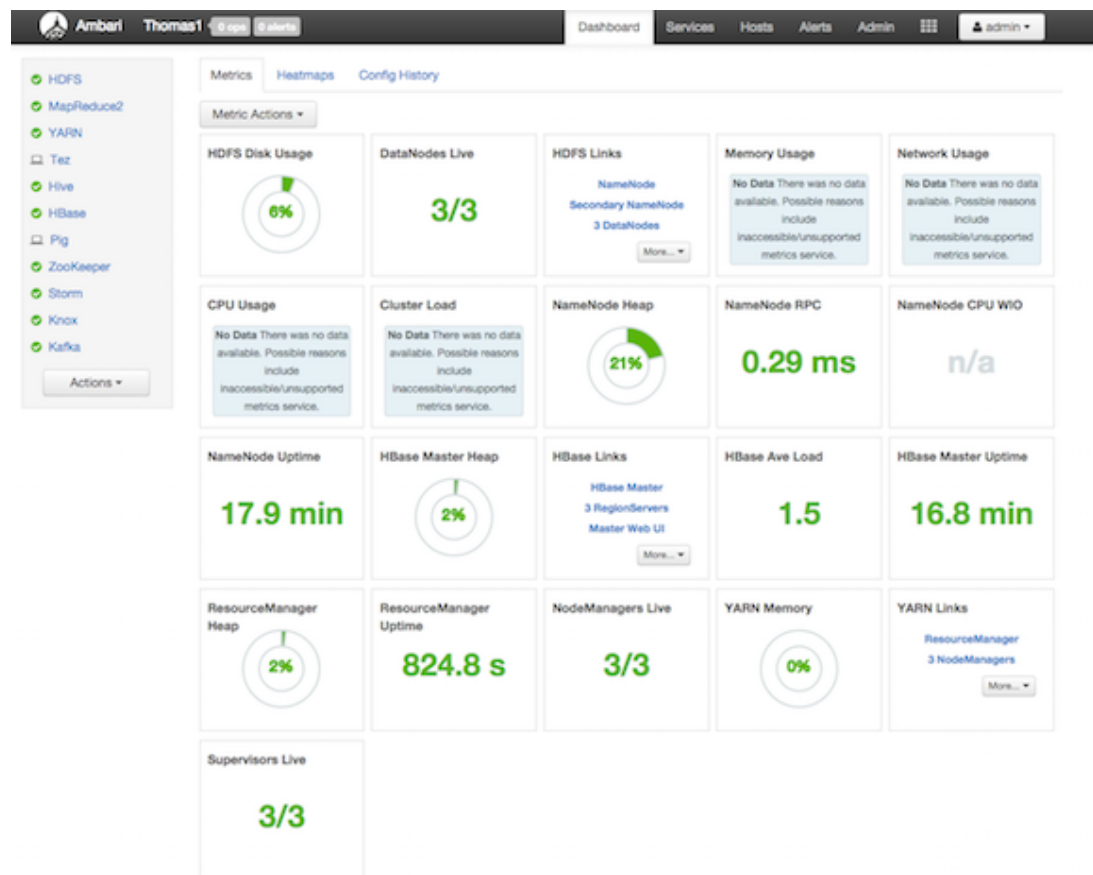
Related Topics

- [Setting up Database Users Without Sharing DBA Credentials](#)
- [Updating Ranger Admin Passwords](#)

3.1. Start the Installation

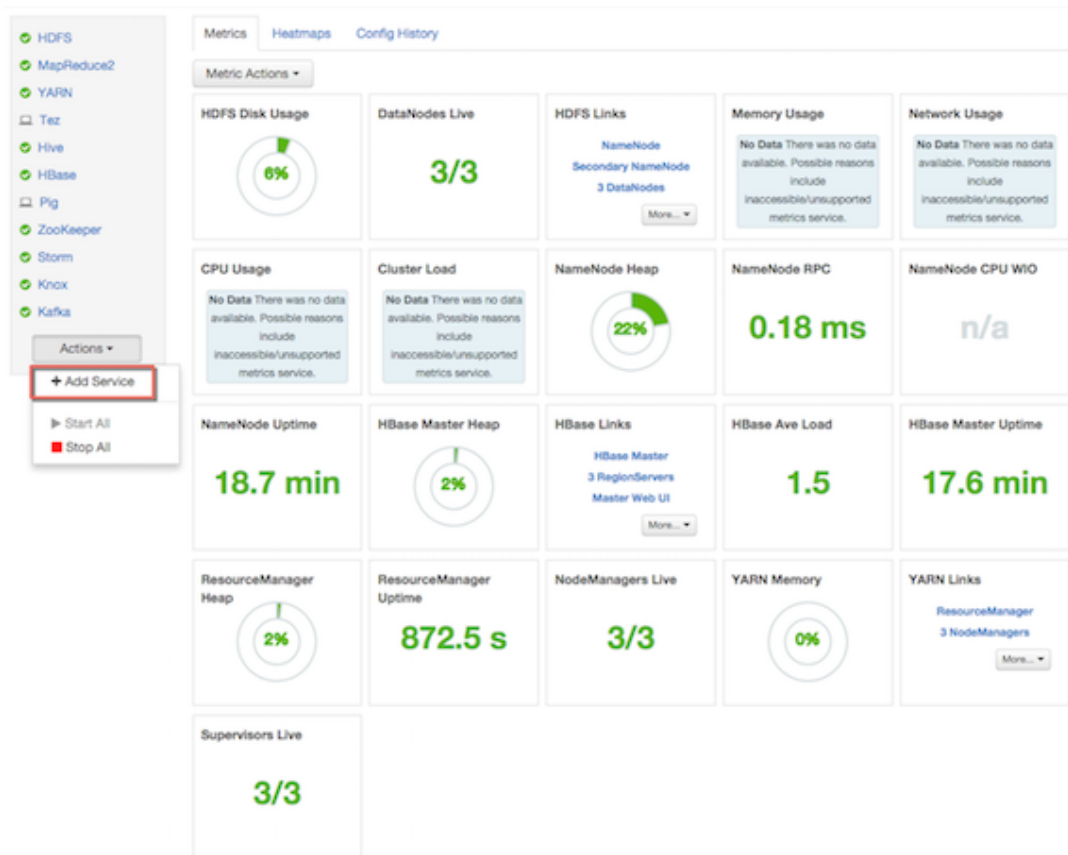
1. Log into your Ambari cluster with your designated user credentials. The main Ambari Dashboard page will be displayed.

Figure 3.1. Installing Ranger - Main Dashboard View



2. In the left navigation menu, click **Actions**, then select **Add Service**.

Figure 3.2. Installing Ranger - Add Service



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

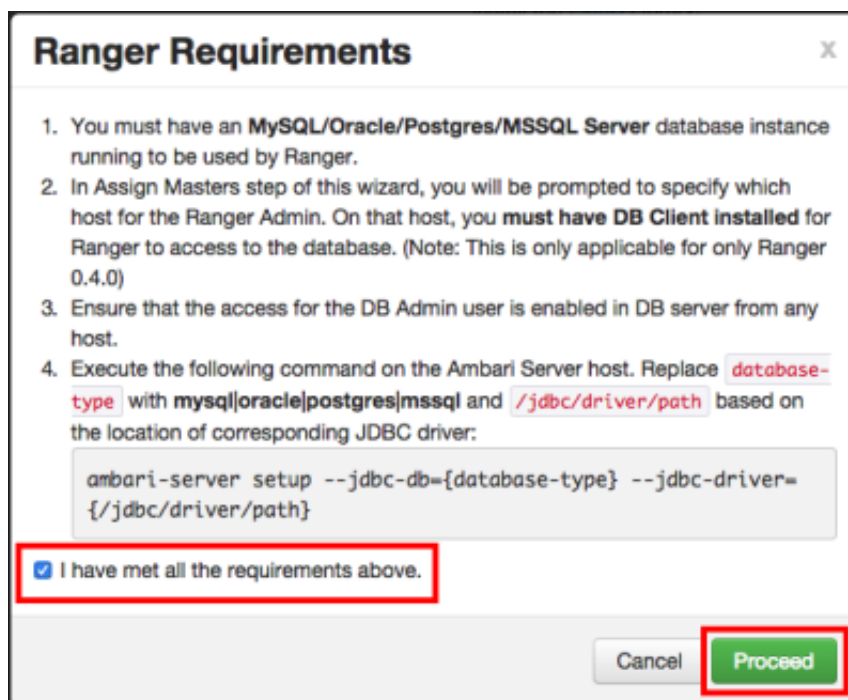
Figure 3.3. Installing Ranger - Choose Service

Add Service Wizard

<input checked="" type="checkbox"/> Pig	0.15.0.2.3	Scripting platform for analyzing large datasets
<input checked="" type="checkbox"/> Sqoop	1.4.6.2.3	Tool for transferring bulk data between Apache Hadoop and structured data stores such as relational databases
<input checked="" type="checkbox"/> Oozie	4.2.0.2.3	System for workflow coordination and execution of Apache Hadoop jobs. This also includes the installation of the optional Oozie Web Console which relies on and will install the ExtJS Library.
<input checked="" type="checkbox"/> ZooKeeper	3.4.6.2.3	Centralized service which provides highly reliable distributed coordination
<input checked="" type="checkbox"/> Falcon	0.6.1	Data management and processing platform
<input checked="" type="checkbox"/> Storm	0.10.0	Apache Hadoop Stream processing framework
<input checked="" type="checkbox"/> Flume	1.5.2.2.3	A distributed service for collecting, aggregating, and moving large amounts of streaming data into HDFS
<input checked="" type="checkbox"/> Accumulo	1.7.0.2.3	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 checked="" type="checkbox"/> Atlas	0.5.0.2.3	Atlas Metadata and Governance platform
<input checked="" type="checkbox"/> Kafka	0.8.2.2.3	A high-throughput distributed messaging system
<input checked="" type="checkbox"/> Knox	0.6.0.2.3	Provides a single point of authentication and access for Apache Hadoop services in a cluster
<input checked="" type="checkbox"/> Mahout	1.0.0.2.3	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	0.5.0.2.3	Comprehensive security for Hadoop
<input type="checkbox"/> Ranger KMS	0.5.0.2.3	Key Management Server
<input checked="" type="checkbox"/> Slider	0.80.0.2.3	A framework for deploying, managing and monitoring existing distributed applications on YARN.
<input checked="" type="checkbox"/> Spark	1.3.1.2.3	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**.

Figure 3.4. Installing Ranger - Ranger Requirements

The image shows a 'Ranger Requirements' dialog box with a title bar and a close button. It contains four numbered instructions for installing Ranger. Below the instructions is a text area with a command to run on the Ambari Server host. At the bottom, there is a checkbox labeled 'I have met all the requirements above.' which is checked. To the right of the checkbox are 'Cancel' and 'Proceed' buttons. The 'Proceed' button is highlighted with a red rectangle.

Ranger Requirements

1. You must have an **MySQL/Oracle/Postgres/MSSQL 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 only 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** 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

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 User Sync. Notice in the figure below that both the Ranger Admin and Ranger User Sync services will be installed on the primary node in the cluster (c6401.ambari.apache.org in the example shown below).

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 User Sync services must be installed on the same cluster node.

Figure 3.5. Installing Ranger Assign Masters

Add Service Wizard

ADD SERVICE WIZARD

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

Assign Masters

Assign master components to hosts you want to run them on.

NameNode: c6401.ambari.apache.org (1.)

SNameNode: c6402.ambari.apache.org (1.)

History Server: c6402.ambari.apache.org (1.)

App Timeline Server: c6402.ambari.apache.org (1.)

ResourceManager: c6402.ambari.apache.org (1.)

HiveServer2: c6402.ambari.apache.org (1.)

Hive Metastore: c6402.ambari.apache.org (1.)

WebHCat Server: c6402.ambari.apache.org *

HBase Master: c6401.ambari.apache.org (1.)

ZooKeeper Server: c6402.ambari.apache.org (1.)

ZooKeeper Server: c6401.ambari.apache.org (1.)

ZooKeeper Server: c6403.ambari.apache.org (1.)

Storm UI Server: c6402.ambari.apache.org (1.)

Nimbus: c6402.ambari.apache.org (1.)

DRPC Server: c6402.ambari.apache.org (1.)

Ranger Admin: c6401.ambari.apache.org (1.)

Ranger Usersync: c6401.ambari.apache.org (1.)

Kafka Broker: c6401.ambari.apache.org (1.)

Knox Gateway: c6401.ambari.apache.org (1.)

Hosts and Services:

c6401.ambari.apache.org (1.8 GB, 1 cores)

- NameNode
- HBase Master
- ZooKeeper Server
- Ranger Admin**
- Ranger Usersync**
- Kafka Broker
- Knox Gateway

c6402.ambari.apache.org (1.8 GB, 1 cores)

- SNameNode
- History Server
- App Timeline Server
- ResourceManager
- HiveServer2
- Hive Metastore
- WebHCat Server
- ZooKeeper Server
- Storm UI Server
- Nimbus
- DRPC Server

c6403.ambari.apache.org (1.8 GB, 1 cores)

- ZooKeeper Server

6. The Customize Services page appears. These settings are described in the next section.

3.2. Customize Services

The next step in the installation process is to specify Ranger settings on the Customize Services page.

- [Ranger Admin Settings](#)
- [Ranger Audit Settings](#)
- [Configure Ranger User Sync](#)
- [Configure Ranger Authentication](#)

3.2.1. Ranger Admin Settings

1. On the Customize Services page, select the Ranger Admin tab, then use the **DB Flavor** drop-down to select the database type that you are using with Ranger.

Add Service Wizard

ADD SERVICE WIZARD

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

Customize Services

We have come up with recommended configurations for the services you selected. Customize them as you see fit.

HDFS MapReduce2 YARN Tez Hive HBase Pig Sqoop Oozie ZooKeeper Falcon Storm Flume
Accumulo Ambari Metrics Atlas Kafka Knox Mahout **Ranger** Slider SmartSense Spark Misc

There are 48 configuration changes in 7 services [Show Details](#)

Group: Default (1) Manage Config Groups Filter...

Ranger Admin **3** Ranger User Info Ranger Plugin Ranger Audit **2** Advanced

Ranger Admin

DB FLAVOR

MYSQL

Ranger DB name
ranger

Ranger DB username
rangeradmin

JDBC connect string
jdbc:mysql://ranger

Ranger DB host

Driver class name for a JDBC Ranger database
com.mysql.jdbc.Driver

Ranger DB password

Type password Retype Password

Setup Database and Database User

Yes

2. Enter the database server address in the **Ranger DB Host** box.

Table 3.1. Ranger DB Host

DB Flavor	Host	Example
MySQL	<HOST[:PORT]>	c6401.ambari.apache.org or c6401.ambari.apache.org:3306
Oracle	<HOST:PORT:SID> <HOST:PORT/Service>	c6401.ambari.apache.org:1521:ORCL c6401.ambari.apache.org:1521/XE
PostgreSQL	<HOST[:PORT]>	c6401.ambari.apache.org

DB Flavor	Host	Example
		or c6401.ambari.apache.org:5432
MS SQL	<HOST[:PORT]>	c6401.ambari.apache.org or c6401.ambari.apache.org:1433
SQLA	<HOST[:PORT]>	c6401.ambari.apache.org or c6401.ambari.apache.org:2638

3. **Ranger DB name** – The name of the Ranger Policy database, i.e. ranger_db. Please note that if you are using Oracle, you must specify the Oracle tablespace name here.
4. **Driver class name for a JDBC Ranger database** – the driver class name is automatically generated based on the selected DB Flavor. The table below lists the default driver class settings. Currently Ranger does not support any third party JDBC driver.

Table 3.2. Driver Class Name

DB Flavor	Driver class name for a JDBC Ranger database
MySQL	com.mysql.jdbc.Driver
Oracle	oracle.jdbc.driver.OracleDriver
PostgreSQL	org.postgresql.Driver
MS SQL	com.microsoft.sqlserver.jdbc.SQLServerDriver
SQLA	sap.jdbc4.sqlanywhere.IDriver

5. **Ranger DB username and Ranger DB Password** – Enter the user name and passwords for your Ranger database server. The following table describes these settings in more detail. You can use the MySQL database that was installed with Ambari, or an external MySQL, Oracle, PostgreSQL, MS SQL or SQL Anywhere database.

Table 3.3. Ranger DB User Name Settings

Property	Description	Default Value	Example Value	Required?
Ranger DB username	The username for the Policy database.	rangeradmin	rangeradmin	Yes
Ranger DB password	The password for the Ranger Policy database user.		PassWORD	Yes

6. JDBC connect string



Important

Currently the Ambari installer generates the JDBC connect string using the `jdbc:oracle:thin:@//host:port/db_name` format. You must replace the connection string as described in the following table:

Table 3.4. JDBC Connect String

DB Flavor	Syntax	Example Value
MySQL	jdbc:mysql://DB_HOST:PORT/ db_name	jdbc:mysql:// c6401.ambari.apache.org:3306/ ranger_db
Oracle	For Oracle SID: jdbc:oracle:thin:@DB_HOST:PORT:SID	jdbc:oracle:thin:@c6401.ambari.apache.org:1521:ORCL
	For Oracle Service Name: jdbc:oracle:thin:@//DB_HOST[:PORT] [/ServiceName]	
PostgreSQL	jdbc:postgresql://DB_HOST/ db_name	jdbc:postgresql:// c6401.ambari.apache.org:5432/ ranger_db
MS SQL	jdbc:sqlserver:// DB_HOST;databaseName=db_name	jdbc:sqlserver:// c6401.ambari.apache.org:1433;databaseName=ranger_db
SQLA	jdbc:sqlanywhere:host=DB_HOST;data	jdbc:sqlanywhere:host=c6401.ambari.apache.org:2638;data

7. Setup Database and Database User

- If set to **Yes** – The Database Administrator (DBA) user name and password will need to be provided as described in the next step.



Note

Ranger does not store the DBA user name and password after setup. Therefore, you can clear these values in the Ambari UI after the Ranger setup is complete.

- If set to **No** – A **No** indicates that you do not wish to provide Database Administrator (DBA) account details to the Ambari Ranger installer. Setting this to No continues the Ranger installation process without providing DBA account details. In this case, you must perform the system database user setup as described in [Setting up Database Users Without Sharing DBA Credentials](#), and then proceed with the installation.



Note

If **No** is selected and the UI still requires you to enter a user name and password in order to proceed, you can enter any value – the values do not need to be the actual DBA user name and password.

- Database Administrator (DBA) username and Database Administrator (DBA) password** – The DBA username and password are set when the database server is installed. If you do not have this information, contact the database administrator who installed the database server.

Table 3.5. DBA Credential Settings

Property	Description	Default Value	Example Value	Required?
Database Administrator (DBA) username	The Ranger database user that has administrative	root	root	Yes

Property	Description	Default Value	Example Value	Required?
	privileges to create database schemas and users.			
Database Administrator (DBA) password	The root password for the Ranger database user.		root	Yes

If the Oracle DB root user Role is SYSDBA, you must also specify that in the **Database Administrator (DBA) username** parameter. For example, if the DBA user name is `orcl_root` you must specify `orcl_root AS SYSDBA`.



Note

As mentioned in the note in the previous step, if **Setup Database and Database User** is set to **No**, a placeholder DBA username and password may still be required in order to continue with the Ranger installation.

The following images show examples of the DB settings for each Ranger database type.



Note

To test the DB settings, click **Test Connection**. If a Ranger database has not been pre-installed, **Test Connection** will fail even for a valid configuration.

MySQL

[Ranger Admin](#) [Ranger User Info](#) [Ranger Plugin](#) [Ranger Audit](#) [Advanced](#)

Ranger Admin

DB FLAVOR	Ranger DB host
<div>MYSQL</div>	<div>c6401.ambari.apache.org</div>
Ranger DB name	Driver class name for a JDBC Ranger database
<div>ranger</div>	<div>com.mysql.jdbc.Driver</div>
Ranger DB username	Ranger DB password
<div>rangeradmin</div>	<div>.....</div> <div>.....</div>
JDBC connect string	
<div>jdbc:mysql://c6401.ambari.apache.org/ranger</div>	

Setup Database and Database User

☒ Yes

Database Administrator (DBA) username	Database Administrator (DBA) password
<div>root</div>	<div>.....</div> <div>.....</div>
JDBC connect string for root user	
<div>jdbc:mysql://c6401.ambari.apache.org</div>	

Oracle – if the Oracle instance is running with a Service name.


[Ranger Admin](#) [Ranger User Info](#) [Ranger Plugin](#) [Ranger Audit](#) [Advanced](#)

Ranger Admin

DB FLAVOR <div>ORACLE ▾</div>	Ranger DB host <div>c6401.ambari.apache.org:1521/XE</div>
Ranger DB name <div>ranger</div>	Driver class name for a JDBC Ranger database <div>oracle.jdbc.driver.OracleDriver</div>
Ranger DB username <div>rangeradmin</div>	Ranger DB password <div>.....</div> <div>.....</div>
JDBC connect string <div> :oracle:thin:@//c6401.ambari.apache.org:1521/XE</div>	

Setup Database and Database User

☒ Yes ☐

Database Administrator (DBA) username <div>SYS AS SYSDBA</div>	Database Administrator (DBA) password <div>.....</div> <div>.....</div>
JDBC connect string for root user <div>jdbc:oracle:thin:@//c6401.ambari.apache.org:1521</div>	

Oracle – if the Oracle instance is running with a SID.

[Ranger Admin](#) [Ranger User Info](#) [Ranger Plugin](#) [Ranger Audit](#) [Advanced](#)

Ranger Admin

DB FLAVOR

ORACLE ▼

Ranger DB name

ranger

Ranger DB username

rangeradmin

JDBC connect string

jdbc:oracle:thin:@c6401.ambari.apache.org:1521:?

Ranger DB host

c6401.ambari.apache.org:1521:ORCL

Driver class name for a JDBC Ranger database

oracle.jdbc.driver.OracleDriver

Ranger DB password

.....

.....

Setup Database and Database User

Yes

Database Administrator (DBA) username

SYS AS SYSDBA

Database Administrator (DBA) password

.....

.....

JDBC connect string for root user

jdbc:oracle:thin:@c6401.ambari.apache.org:1521:?

PostgreSQL

[Ranger Admin](#) [Ranger User Info](#) [Ranger Plugin](#) [Ranger Audit](#) [Advanced](#)

Ranger Admin

DB FLAVOR <div>POSTGRES ▾</div>	Ranger DB host <div>c6401.ambari.apache.org:5432</div>
Ranger DB name <div>ranger</div>	Driver class name for a JDBC Ranger database <div>org.postgresql.Driver</div>
Ranger DB username <div>rangeradmin</div>	Ranger DB password <div>.....</div> <div>.....</div>
JDBC connect string <div>jdbc:postgresql://c6401.ambari.apache.org:5432/r</div>	

Setup Database and Database User

☒ Yes ☐

Database Administrator (DBA) username <div>postgres</div>	Database Administrator (DBA) password <div>.....</div> <div>.....</div>
JDBC connect string for root user <div>jdbc:postgresql://c6401.ambari.apache.org:5432</div>	

MS SQL

[Ranger Admin](#) [Ranger User Info](#) [Ranger Plugin](#) [Ranger Audit](#) [Advanced](#)

Ranger Admin

DB FLAVOR	Ranger DB host
<div>MSSQL</div>	<div>c6401.ambari.apache.org:1433</div>
Ranger DB name	Driver class name for a JDBC Ranger database
<div>ranger</div>	<div>com.microsoft.sqlserver.jdbc.SQLServerDriver</div>
Ranger DB username	Ranger DB password
<div>rangeradmin</div>	<div>.....</div> <div>.....</div>
JDBC connect string	
<div>r1.ambari.apache.org:1433;databaseName=ranger</div>	

Setup Database and Database User

☒ Yes

Database Administrator (DBA) username	Database Administrator (DBA) password
<div>administrator</div>	<div>.....</div> <div>.....</div>
JDBC connect string for root user	
<div>jdbc:sqlserver://c6401.ambari.apache.org:1433;</div>	

SQL Anywhere

[Ranger Admin](#) [Ranger User Info](#) [Ranger Plugin](#) [Ranger Audit](#) [Advanced](#)

Ranger Admin

DB FLAVOR

SQL Anywhere ▼

Ranger DB name

ranger

Ranger DB username

rangeradmin

JDBC connect string

=c6401.ambari.apache.org:2638;database=ranger

Ranger DB host

c6401.ambari.apache.org:2638

Driver class name for a JDBC Ranger database

sap.jdbc4.sqlanywhere.IDriver

Ranger DB password

.....

.....

Setup Database and Database User

☒ Yes ☐

Database Administrator (DBA) username

dba

JDBC connect string for root user

jdbc:sqlanywhere:host=c6401.ambari.apache.org::

Database Administrator (DBA) password

.....

.....

3.2.2. Ranger Audit Settings

1. On the Customize Services page, select the Ranger Audit tab.

It is recommended that you store audits in Solr and HDFS, and disable Audit to DB.

- Under Audit to Solr, enter the Solr audit URL in the **ranger.audit.solr.urls** box using the following format:

```
http://<solr_host>:6083/solr/ranger_audits
```



Note

Audits to Solr requires that you have already [installed Solr](#).

- Under Audit to DB, enter a password in the **Ranger Audit DB password** boxes. Audit to DB is set to **Off** by default. (The password must be entered to preserve backward compatibility)

3.2.3. Configure Ranger User Sync

This section describes how to configure Ranger User Sync for either UNIX or LDAP/AD.

- [Configuring Ranger User Sync for UNIX](#)
- [Configuring Ranger User Sync for LDAP/AD](#)

3.2.3.1. Configuring Ranger User Sync for UNIX

Use the following steps to configure Ranger User Sync for UNIX.

1. On the Customize Services page, select the Ranger User Info tab.
2. Click **Yes** under Enable User Sync.
3. Use the Sync Source drop-down to select UNIX, then set the following properties.

Table 3.6. UNIX User Sync Properties

Property	Description	Default Value
Sync Source	Only sync users above this user ID.	500
Password File	The location of the password file on the Linux server.	/etc/passwd
Group File	The location of the groups file on the Linux server.	/etc/group

The screenshot shows the 'Add Service Wizard' interface. On the left is a sidebar with navigation links: 'Assign Masters', 'Assign Slaves and Clients', 'Customize Services' (highlighted), 'Configure Identities', 'Review', 'Install, Start and Test', and 'Summary'. The main area has a header with a message: 'We have come up with recommended configurations for the services you selected. Customize them as you see fit.' Below this is a horizontal list of services: HDFS, MapReduce2, YARN, Tez, Hive, HBase, Pig, Sqoop, Oozie, ZooKeeper, Falcon, Storm, Flume, Accumulo, Ambari Metrics, Atlas, Kafka, Knox, Mahout, Ranger (selected), Slider, SmartSense, Spark, and Misc. A yellow banner states: 'There are 50 configuration changes in 8 services Show Details'. Below the banner is a 'Group' dropdown set to 'Default (1)' and a 'Manage Config Groups' link. A 'Filter...' dropdown is also present. The 'Ranger' section is expanded, showing tabs for 'Ranger Admin', 'Ranger User Info' (selected), 'Ranger Plugin', 'Ranger Audit', and 'Advanced'. The 'Ranger User Info' section contains the following fields: 'Enable User Sync' with a 'Yes' toggle, 'Sync Source' with a dropdown set to 'LDAP', 'Minimum User ID' with a text input containing '500', 'Password File' with a text input containing '/etc/passwd', and 'Group File' with a text input containing '/etc/group'. At the bottom, a green banner states: 'All configurations have been addressed.'

3.2.3.2. Configuring Ranger User Sync for LDAP/AD



Important

To ensure that LDAP/AD group level authorization is enforced in Hadoop, you should [set up Hadoop group mapping for LDAP/AD](#).



Note

You can use the [LDAP Connection Check tool](#) to determine User Sync settings for LDAP/AD.

Use the following steps to configure Ranger User Sync for LDAP/AD.

1. On the Customize Services page, select the Ranger User Info tab.

2. Click **Yes** under Enable User Sync.
3. Use the Sync Source drop-down to select LDAP/AD.
4. Set the following properties on the Common Configs tab.

Table 3.7. LDAP/AD Common Configs

Property	Description	Default Value	Sample Values
LDAP/AD URL	Add URL depending upon LDAP/AD sync source	ldap://{host}:{port}	ldap:// ldap.example.com:389 or ldaps:// ldap.example.com:636
Bind Anonymous	If Yes is selected, the Bind User and Bind User Password are not required.	NO	
Bind User	The location of the groups file on the Linux server.	The full distinguished name (DN), including common name (CN), of an LDAP/AD user account that has privileges to search for users. The LDAP bind DN is used to connect to LDAP and query for users and groups.	cn=admin,dc=example,dc=com or admin@example.com
Bind User Password	The password of the Bind User.		

Add Service Wizard

Configure Identities
Review
Install, Start and Test
Summary

Accumulo Amberl Metrics Atlas Kafka Knox Mahout **Ranger** Slider SmartSense Spark Misc

There are 51 configuration changes in 8 services [Show Details](#)

Group: **Default (1)** Manage Config Groups Filter...

Ranger Admin Ranger User Info Ranger Plugin Ranger Audit Advanced

Ranger User Info

Enable User Sync
☒ Yes

Sync Source
LDAP/AD

Common Configs User Configs Group Configs

LDAP/AD URL
ldap://172.22.125.189:389

Bind Anonymous
☐ No

Bind User
cn=Manager,dc=qe,dc=hortonworks,dc=com

Bind User Password
[password field] [password field]

5. Set the following properties on the User Configs tab.

Table 3.8. LDAP/AD User Configs

Property	Description	Default Value	Sample Values
Group User Map Sync	Sync specific groups for users.	No	Yes
Username Attribute	The LDAP user name attribute.		sAMAccountName for AD, uid or cn for OpenLDAP
User Object Class	Object class to identify user entries.	person	top, person, organizationalPerson, user, or posixAccount
User Search Base	Search base for users.		cn=users,dc=example,dc=com
User Search Filter	Optional additional filter constraining the users selected for syncing.		Sample filter to retrieve all the users: cn=*
			Sample filter to retrieve all the users who are members

Property	Description	Default Value	Sample Values
			of groupA or groupB: ((memberof=CN=GroupA,OU=groups,DC=example.com) (memberof=CN=GroupB,OU=groups,DC=example.com)
User Search Scope	This value is used to limit user search to the depth from search base.	sub	base, one, or sub
User Group Name Attribute	Attribute from user entry whose values would be treated as group values to be pushed into the Policy Manager database. You can provide multiple attribute names separated by commas.	memberof,ismemberof	memberof, ismemberof, or gidNumber

Add Service Wizard

Ranger User Info

Enable User Sync

☒ Yes

Sync Source

LDAP/AD

Common Configs User Configs Group Configs

Group User Map Sync

☒ Yes

Username Attribute

uid

User Object Class

person

User Search Base

dc=qe,dc=hortonworks,dc=com

User Search Filter

User Search Scope

sub

User Group Name Attribute

memberof, ismemberof

6. Set the following properties on the Group Configs tab.

Table 3.9. LDAP/AD Group Configs

Property	Description	Default Value	Sample Values
Enable Group Sync	<p>If Enable Group Sync is set to No, the group names the users belong to are derived from "User Group Name Attribute". In this case no additional group filters are applied.</p> <p>If Enable Group Sync is set to Yes, the groups the users belong to are retrieved from LDAP/AD using the following group-related attributes.</p>	No	Yes
Group Member Attribute	The LDAP group member attribute name.		member
Group Name Attribute	The LDAP group name attribute.		distinguishedName for AD, cn for OpenLdap
Group Object Class	LDAP Group object class.		group, groupofnames, or posixGroup
Group Search Base	Search base for groups.		ou=groups,DC=example,DC=com
Group Search Filter	Optional additional filter constraining the groups selected for syncing.		<p>Sample filter to retrieve all groups: cn=*</p> <p>Sample filter to retrieve only the groups whose cn is Engineering or Sales: ((cn=Engineering)(cn=Sales))</p>

Add Service Wizard

Ranger Admin Ranger User Info Ranger Plugin Ranger Audit Advanced

Ranger User Info

Enable User Sync

Sync Source
LDAP/AD

Common Configs User Configs Group Configs

Enable Group Sync

Group Member Attribute
member

Group Name Attribute
cn

Group Object Class
groupOfNames

Group Search Base
dc=qe,dc=hortonworks,dc=com

Group Search Filter
cn=*

3.2.4. Configure Ranger Authentication

This section describes how to configure Ranger authentication for UNIX, LDAP, and AD.

- [Configuring Ranger UNIX Authentication](#)
- [Configuring Ranger LDAP Authentication](#)
- [Configuring Ranger Active Directory Authentication](#)

3.2.4.1. Configuring Ranger UNIX Authentication

Use the following steps to configure Ranger authentication for UNIX.

1. Select the Advanced tab on the Customize Services page.

2. Under Ranger Settings, specify the Ranger Policy Manager host address in the **External URL** box in the format `http://<your_ranger_host>:6080`.
3. Under Ranger Settings, select **UNIX**.

HTTP is enabled by default – if you disable HTTP, only HTTPS is allowed.

4. Under UNIX Authentication Settings, set the following properties.

Table 3.10. UNIX Authentication Settings

Property	Description	Default Value	Example Value
Allow remote Login	Flag to enable/disable remote login. Only applies to UNIX authentication.	true	true
ranger.unixauth.service.hostname	The address of the host where the UNIX authentication service is running.	{{ugsync_host}}	{{ugsync_host}}
ranger.unixauth.service.port	The port number on which the UNIX authentication service is running.	5151	5151



Note

Properties with value `{{xyz}}` are macro variables that are derived from other specified values in order to streamline the configuration process. Macro variables can be edited if required – if you need to restore the original value, click the Set Recommended symbol at the right of the property box.

The screenshot shows the 'Add Service Wizard' window. It has two main sections: 'Ranger Settings' and 'Unix Authentication Settings'. In 'Ranger Settings', the 'External URL' is set to 'http://c6403.ambari.apache.org:6080', 'Authentication method' is set to 'UNIX' (selected with a radio button), and 'HTTP enabled' is checked. In 'Unix Authentication Settings', 'Allow remote Login' is set to 'true', 'ranger.unixauth.service.hostname' is set to '{{ugsync_host}}', and 'ranger.unixauth.service.port' is set to '5151'. Each setting has a 'Set Recommended' icon (a blue circle with a white 'c') to its right. Below these sections are links for 'Knox SSO Settings' and 'Advanced ranger-admin-site'.

3.2.4.2. Configuring Ranger LDAP Authentication



Note

You can use the [LDAP Connection Check tool](#) to determine authentication settings for LDAP.

Use the following steps to configure Ranger authentication for LDAP.

1. Select the Advanced tab on the Customize Services page.
2. Under Ranger Settings, specify the Ranger Policy Manager host address in the **External URL** box in the format `http://<your_ranger_host>:6080`.
3. Under Ranger Settings, select **LDAP**.
4. Under LDAP Settings, set the following properties.

Table 3.11. LDAP Authentication Settings

Property	Description	Default Value	Example Value
ranger.ldap.base.dn	The Distinguished Name (DN) of the starting point for directory server searches.	dc=example,dc=com	dc=example,dc=com
Bind User	The full Distinguished Name (DN), including Common Name (CN) of an LDAP user account that has privileges to search for users. This is a macro variable value that is derived from the Bind User value from Ranger User Info > Common Configs .	{ {ranger_ug_ldap_bind_dn} }ranger_ug_ldap_bind_dn}}	
Bind User Password	Password for the Bind User. This is a macro variable value that is derived from the Bind User Password value from Ranger User Info		

Property	Description	Default Value	Example Value
	> Common Configs.		
ranger ldap.group.roleattribute	The LDAP group role attribute.	cn	cn
ranger ldap.referral	See description below.	ignore	follow ignore throw
LDAP URL	The LDAP server URL. This is a macro variable value that is derived from the LDAP/AD URL value from Ranger User Info > Common Configs.	{{ranger_ug_ldap_url}}	{{ranger_ug_ldap_url}}
ranger ldap.user.dnpattern	The user DN pattern is expanded when a user is being logged in. For example, if the user "ldapadmin" attempted to log in, the LDAP Server would attempt to bind against the DN "uid=ldapadmin,ou=users,dc=example,dc=com" using the password the user provided>	uid={0},ou=users,dc=xasecure,dc=net	cn=ldapadmin,ou=Users,dc=example,dc=com
User Search Filter	The search filter used for Bind Authentication. This is a macro variable value that is derived from the User Search Filter value from Ranger User Info > User Configs.	{{ranger_ug_ldap_user_searchfilter}}	{{ranger_ug_ldap_user_searchfilter}}



Note

Properties with value `{{xyz}}` are macro variables that are derived from other specified values in order to streamline the configuration process. Macro variables can be edited if required – if you need to restore the original value, click the Set Recommended symbol at the right of the property box.

There are three possible values for `ranger.ldap.referral`: `follow`, `throw`, and `ignore`. The recommended setting is `follow`.

When searching a directory, the server might return several search results, along with a few continuation references that show where to obtain further results. These results and references might be interleaved at the protocol level.

- When this property is set to `follow`, the LDAP service provider processes all of the normal entries first, and then follows the continuation references.
- When this property is set to `throw`, all of the normal entries are returned in the enumeration first, before the `ReferralException` is thrown. By contrast, a "referral" error response is processed immediately when this property is set to `follow` or `throw`.
- When this property is set to `ignore`, it indicates that the server should return referral entries as ordinary entries (or plain text). This might return partial results for the search.

The screenshot shows the 'Add Service Wizard' window with the following settings:

- Ranger Settings**
 - External URL: `http://c6403.ambari.apache.org:6080`
 - Authentication method: ☒ LDAP, ☐ ACTIVE_DIRECTORY, ☐ UNIX, ☐ NONE
 - HTTP enabled: ☒
- LDAP Settings**
 - ranger ldap base dn: `dc=example,dc=com`
 - Bind User: `{{ranger_ug_ldap_bind_dn}}`
 - Bind User Password: (masked)
 - ranger ldap group role attribute: `cn`
 - ranger ldap referral: `ignore`
 - LDAP URL: `{{ranger_ug_ldap_url}}`
 - ranger ldap user dn pattern: `uid=[0],ou=users,dc=xasecure,dc=net`
 - User Search Filter: `{{ranger_ug_ldap_user_searchfilter}}`
- Other Settings (collapsed)**
 - Knox SSO Settings
 - Advanced ranger-admin-site
 - Advanced ranger-env
 - Advanced ranger-ugsync-site
 - Custom admin-properties

3.2.4.3. Configuring Ranger Active Directory Authentication



Note

You can use the [LDAP Connection Check tool](#) to determine authentication settings for Active Directory.

Use the following steps to configure Ranger authentication for Active Directory.

1. Select the Advanced tab on the Customize Services page.
2. Under Ranger Settings, specify the Ranger Policy Manager host address in the **External URL** box in the format `http://<your_ranger_host>:6080`.
3. Under Ranger Settings, select **ACTIVE_DIRECTORY**.
4. Under AD Settings, set the following properties.

Table 3.12. AD Settings

Property	Description	Default Value	Example Value
ranger.ldap.ad.base.dn	The Distinguished Name (DN) of the starting point for directory server searches.	dc=example,dc=com	dc=example,dc=com
ranger.ldap.ad.bind.dn	The full Distinguished Name (DN), including Common Name (CN) of an LDAP user account that has privileges to search for users. This is a macro variable value that is derived from the Bind User value from Ranger User Info > Common Configs .	{{ranger_ug_ldap_bind_dn}}	{{ranger_ug_ldap_bind_dn}}
ranger.ldap.ad.bind.password	Password for the bind.dn. This is a macro variable value that is derived from the Bind User Password value from Ranger User Info > Common Configs .		
Domain Name (Only for AD)	The domain name of the AD Authentication service.		dc=example,dc=com
ranger.ldap.ad.referral	See description below.	ignore	follow ignore throw
ranger.ldap.ad.url	The AD server URL. This is a macro variable value that is derived from the LDAP/AD URL value from Ranger User Info > Common Configs .	{{ranger_ug_ldap_url}}	{{ranger_ug_ldap_url}}
ranger.ldap.ad.user.searchfilter	The search filter used for Bind Authentication. This is a macro variable value that is derived from the User Search Filter value from Ranger User Info > User Configs .	{{ranger_ug_ldap_user_searchfilter}}	{{ranger_ug_ldap_user_searchfilter}}

**Note**

Properties with value `{{xyz}}` are macro variables that are derived from other specified values in order to streamline the configuration process. Macro variables can be edited if required – if you need to restore the original value, click the Set Recommended symbol at the right of the property box.

There are three possible values for `ranger.ldap.ad.referral`: `follow`, `throw`, and `ignore`. The recommended setting is `follow`.

When searching a directory, the server might return several search results, along with a few continuation references that show where to obtain further results. These results and references might be interleaved at the protocol level.

- When this property is set to `follow`, the AD service provider processes all of the normal entries first, and then follows the continuation references.

- When this property is set to `throw`, all of the normal entries are returned in the enumeration first, before the `ReferralException` is thrown. By contrast, a "referral" error response is processed immediately when this property is set to `follow` or `throw`.
- When this property is set to `ignore`, it indicates that the server should return referral entries as ordinary entries (or plain text). This might return partial results for the search. In the case of AD, a `PartialResultException` is returned when referrals are encountered while search results are processed.

The screenshot shows the 'Add Service Wizard' dialog box. It has two main sections: 'Ranger Settings' and 'AD Settings'.

Ranger Settings:

- External URL: `http://06403.ambari.apache.org:6080`
- Authentication method: ☒ LDAP, ☒ ACTIVE_DIRECTORY, ☐ UNIX, ☐ NONE
- HTTP enabled: ☒

AD Settings:

- ranger.idap.ad.base.dn: `dc=example,dc=com`
- ranger.idap.ad.bind.dn: `{{ranger_ug_ldap_bind_dn}}`
- ranger.idap.ad.bind.password: (password field)
- Domain Name (Only for AD): `dc=hwqe,dc=hortonworks,dc=com`
- ranger.idap.ad.referral: `ignore`
- ranger.idap.ad.url: `{{ranger_ug_ldap_url}}`
- ranger.idap.ad.user.searchfilter: `{{ranger_ug_ldap_user_searchfilter}}`

Below the AD Settings section, there are links for 'Knox SSO Settings' and 'Advanced ranger-admin-site'.

When you have finished configuring all of the Customize Services Settings, click **Next** at the bottom of the page to continue with the installation.

5. When you save the authentication method as Active Directory, a Dependent Configurations pop-up may appear recommending that you set the authentication method as LDAP. This recommended configuration should not be applied for AD, so you should clear (un-check) the **ranger.authentication.method** check box, then click **OK**.

The screenshot shows the 'Dependent Configurations' dialog box. It contains a table with the following columns: Property, Service, Config Group, File Name, Current Value, and Recommended Value.

Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/> ranger.authentication.method	Ranger	Default	ranger-admin-site	UNIX	LDAP

At the bottom right of the dialog, there are 'Cancel' and 'OK' buttons.

3.3. Complete the Ranger Installation

1. On the Review page, carefully review all of your settings and configurations. If everything looks good, click **Deploy** to install Ranger on the Ambari server.

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

Admin Name : admin

Cluster Name : Thomas1

Total Hosts : 3 (0 new)

Repositories:

- redhat5 (HDP-2.2):
http://public-repo-1.hortonworks.com/HDP/centos5/2.x/updates/2.2.6.0
- redhat5 (HDP-UTILS-1.1.0.20):
http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/centos5
- redhat6 (HDP-2.2):
http://public-repo-1.hortonworks.com/HDP/centos6/2.x/updates/2.2.6.0
- redhat6 (HDP-UTILS-1.1.0.20):
http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/centos6
- suse11 (HDP-2.2):
http://public-repo-1.hortonworks.com/HDP/suse11sp3/2.x/updates/2.2.6.0
- suse11 (HDP-UTILS-1.1.0.20):
http://public-repo-1.hortonworks.com/HDP-UTILS-1.1.0.20/repos/suse11sp3
- ubuntu12 (HDP-2.2):
http://public-repo-1.hortonworks.com/HDP/ubuntu12/2.x/updates/2.2.6.3

← Back Print Deploy →

2. When you click **Deploy**, Ranger is installed on the specified host on your Ambari server. A progress bar displays the installation progress.

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.

24 % overall

Show: All (3) | In Progress (3) | Warning (0) | Success (0) | Fail (0)

Host	Status	Message
c6401.ambari.apache.org	6%	Installing Ranger Admin
c6402.ambari.apache.org	33%	Install complete (Waiting to start)
c6403.ambari.apache.org	33%	Install complete (Waiting to start)

3 of 3 hosts showing - Show All Show: 25 1 - 3 of 3 Next →

3. When the installation is complete, a Summary page displays the installation details. You may need to restart services for cluster components after installing Ranger.



Note

If the installation fails, you should complete the installation process, then reconfigure and reinstall Ranger.

3.4. Configuring Ranger for LDAP SSL

You can use the following steps to configure LDAP SSL using self-signed certs in the default Ranger User Sync TrustStore.

1. The default location is `/usr/hdp/current/ranger-usersync/conf/mytruststore.jks` for the `ranger.usersync.truststore.file` property.
2. Alternatively, copy and edit the self-signed ca certs.
3. Set the `ranger.usersync.truststore.file` property to that new cacert file.

```
cd /usr/hdp/<version>/ranger-usersync
service ranger-usersync stop
service ranger-usersync start
```

Where `cert.pem` has the LDAPS cert.

3.5. Setting up Database Users Without Sharing DBA Credentials

If do not wish to provide system Database Administrator (DBA) account details to the Ambari Ranger installer, you can use the `dba_script.py` Python script to create Ranger DB database users without exposing DBA account information to the Ambari Ranger installer. You can then run the normal Ambari Ranger installation without specify a DBA user name and password.

To create Ranger DB users using the `dba_script.py` script:

1. Download the Ranger rpm using the `yum install` command.

```
yum install ranger-admin
```

2. You should see one file named `dba_script.py` in the `/usr/hdp/current/ranger-admin` directory.
3. Get the script reviewed internally and verify that your DBA is authorized to run the script.
4. Execute the script by running the following command:

```
python dba_script.py
```

5. Pass all values required in the argument. These should include `db flavor`, `JDBC jar`, `db host`, `db name`, `db user`, and other parameters.

- If you would prefer not to pass runtime arguments via the command prompt, you can update the `/usr/hdp/current/ranger-admin/install.properties` file and then run:

```
python dba_script.py -q
```

When you specify the `-q` option, the script will read all required information from the `install.properties` file

- You can use the `-d` option to run the script in "dry" mode. Running the script in dry mode causes the script to generate a database script.

```
python dba_script.py -d /tmp/generated-script.sql
```

Anyone can run the script, but it is recommended that the system DBA run the script in dry mode. In either case, the system DBA should review the generated script, but should only make minor adjustments to the script, for example, change the location of a particular database file. No major changes should be made that substantially alter the script – otherwise the Ranger install may fail.

The system DBA must then run the generated script.

6. Run the Ranger Ambari install procedure, but set **Setup Database and Database User** to **No** in the Ranger Admin section of the Customize Services screen.

3.6. Updating Ranger Admin Passwords

For the following users, if you update the passwords on the Ranger Configs page, you must also update the passwords on the Configs page of each Ambari component that has the Ranger plugin enabled. Individual Ambari component configurations are not automatically updated – the service restart will fail if you do not update these passwords on each component.

- Ranger Admin user – The credentials for this user are set in **Configs > Advanced ranger-env** in the fields labeled **admin_username** (default value: `admin`) and **admin_password** (default value: `admin`).
- Admin user used by Ambari to create repo/policies – The user name for this user is set in **Configs > Advanced ranger-env** in the field labeled **ranger_admin_username** (default value: `amb_ranger_admin`). The password for this user is set in **Configs > Admin Settings** in the field labeled **Ranger Admin user's password for Ambari**. This password is specified during the Ranger installation.

The following image shows the location of these settings on the Ranger Configs page:

The screenshot shows the Ranger Admin Settings page. On the left is a sidebar with navigation links: ZooKeeper, Storm, Ambari Metrics, Kafka, Knox, Ranger (highlighted), and Ranger KMS. Below these is an 'Actions' button. The main content area has several expandable sections: Admin Settings, DB Settings, Ranger Settings, Unix Authentication Settings, AO Settings, LDAP Settings, Advanced ranger-admin-site, Advanced ranger-env, Advanced ranger-ugsync-site, and Custom admin-properties. The 'Admin Settings' section is expanded, showing fields for 'Ranger Admin user's password for Ambari' (with a red arrow pointing to it from the 'amb_ranger_admin user details' label) and 'Location of Sql Connector Jar' (set to /usr/share/java/mysql-connector-java.jar). The 'Advanced ranger-env' section is also expanded, showing fields for 'admin_password', 'Setup DB and DB user', 'admin_username' (set to admin, with a red arrow pointing to it from the 'Ranger 'admin' user details' label), 'ranger_admin_log_dir' (set to /var/log/ranger/admin), 'ranger_admin_username' (set to amb_ranger_admin, with a red arrow pointing to it from the 'amb_ranger_admin user details' label), 'ranger_pid_dir' (set to /var/run/ranger), 'ranger_ugsync_log_dir' (set to /var/log/ranger/ugsync), and 'xml_configurations_supported' (set to true).

Ranger 'admin' user details

amb_ranger_admin user details

4. 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.



Important

Solr must be installed and configured before installing RangerAdmin or any of the Ranger component plugins.

It is recommended that Ranger audits be written to both Solr and HDFS. Audits to Solr are primarily used to enable search queries from the Ranger Admin UI. HDFS is a long-term destination for audits – audits stored in HDFS can be exported to any SIEM system, or to another audit store.

Configuration Options

- **Solr Standalone** – Solr Standalone is only recommended for testing and evaluation. Solr Standalone is a single instance of Solr that does not require ZooKeeper.
- **SolrCloud** – This is the recommended configuration for Ranger. [SolrCloud](#) is a scalable architecture that can run as single node or as a multi-node cluster. It includes features such as replication and sharding, which are useful for high availability (HA) and scalability. With SolrCloud, you need to plan the deployment based on the cluster size.

The following sections describe how to install and configure Apache Solr for Ranger Audits:

- [Prerequisites](#)
- [Installing Solr](#)
- [Configuring Solr Standalone](#)
- [Configuring SolrCloud](#)

4.1. Prerequisites

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.

SolrCloud Prerequisites

- SolrCloud supports replication and sharding. It is highly recommended that you use SolrCloud with at least two Solr nodes running on different servers with replication enabled.

- SolrCloud requires Apache Zookeeper.

4.2. Installing Solr

Use the following command to install Solr:

```
yum install lucidworks-hdpsearch
```

The HDP Search installer installs Solr in the `/opt/lucidworks-hdpsearch/solr` directory.

4.3. Configuring Solr Standalone

Use the following procedure to configure Solr Standalone.

1. Download the `solr_for_audit_setup_v3` file to the `/usr/local/` directory:

```
wget https://issues.apache.org/jira/secure/attachment/12761323/solr_for_audit_setup_v3.tgz -O /usr/local/solr_for_audit_setup_v3.tgz
```

2. Use the following commands to switch to the `/usr/local/` directory and extract the `solr_for_audit_setup_v3` file.

```
cd /usr/local
tar xvf solr_for_audit_setup_v3.tgz
```

The contents of the `.tgz` file will be extracted into a `/usr/local/solr_for_audit_setup_v3` directory.

3. Use the following command to switch to the `/usr/local/solr_for_audit_setup_v3` directory.

```
cd /usr/local/solr_for_audit_setup
```

4. Use the following command to open the `install.properties` file in the vi text editor.

```
vi install.properties
```

Set the following property values, then save the changes to the `install.properties` file.

Table 4.1. Solr install.properties Values

Property Name	Value	Description
JAVA_HOME	<path_to_jdk>, for example: <code>/usr/jdk64/jdk1.8.0_60</code>	Provide the path to the JDK install folder. For Hadoop, you can check <code>/etc/hadoop/conf/hadoop-env.sh</code> for the value of <code>JAVA_HOME</code> . As noted previously, Solr only supports JDK 1.7 and higher.
SOLR_USER	<code>solr</code>	The Linux user used to run Solr.
SOLR_INSTALL_FOLDER	<code>/opt/lucidworks-hdpsearch/solr</code>	The Solr installation directory.
SOLR_RANGER_HOME	<code>/opt/lucidworks-hdpsearch/solr/ranger_audit_server</code>	The location where the Ranger-related configuration and schema files will be copied.

Property Name	Value	Description
SOLR_RANGER_PORT	6083	The Solr port for Ranger.
SOLR_DEPLOYMENT	standalone	The deployment type.
SOLR_RANGER_DATA_FOLDER	/opt/lucidworks-hdpsearch/solr/ranger_audit_server/data	The folder where the index data will be stored. The volume for this folder should have at least 1 TB free space for the index data, and should be backed up regularly.
SOLR_LOG_FOLDER	/var/log/solr/ranger_audits	The folder for the Solr log files.
SOLR_MAX_MEM	2g	The memory allocation for Solr.

5. Use the following command to run the Solr for Ranger setup script.

```
./setup.sh
```

6. To start Solr, log in as the `solr` or `root` user and run the following command.

```
/opt/lucidworks-hdpsearch/solr/ranger_audit_server/scripts/start_solr.sh
```

When Solr starts, a confirmation message appears.

```
Started Solr server on port 6083 (pid=). Happy searching!
```

7. You can use a web browser to open the Solr Admin Console at the following address:

```
http:<solr_host>:6083/solr
```



Note

You can use the following command to stop Solr:

```
/opt/lucidworks-hdpsearch/solr/ranger_audit_server/scripts/  
stop_solr.sh
```

4.4. Configuring SolrCloud

Use the following procedure to configure SolrCloud.

1. Download the `solr_for_audit_setup_v3` file to the `/usr/local/` directory:

```
wget https://issues.apache.org/jira/secure/attachment/12761323/  
solr_for_audit_setup_v3.tgz -O /usr/local/solr_for_audit_setup_v3.tgz
```

2. Use the following commands to switch to the `/usr/local/` directory and extract the `solr_for_audit_setup_v3` file.

```
cd /usr/local  
tar xvf solr_for_audit_setup_v3.tgz
```

The contents of the `.tgz` file will be extracted into a `/usr/local/solr_for_audit_setup_v3` directory.

3. Use the following command to switch to the `/usr/local/solr_for_audit_setup_v3` directory.

```
cd /usr/local/solr_for_audit_setup
```

4. Use the following command to open the `install.properties` file in the vi text editor.

```
vi install.properties
```

Set the following property values, then save the changes to the `install.properties` file.

Table 4.2. Solr install.properties Values

Property Name	Value	Description
JAVA_HOME	<path_to_jdk>, for example: <code>/usr/jdk64/jdk1.8.0_40</code>	Provide the path to the JDK install folder. For Hadoop, you can check <code>/etc/hadoop/conf/hadoop-env.sh</code> for the value of <code>JAVA_HOME</code> . As noted previously, Solr only supports JDK 1.7 and higher.
SOLR_USER	<code>solr</code>	The Linux user used to run Solr.
SOLR_INSTALL_FOLDER	<code>/opt/lucidworks-hdpsearch/solr</code>	The Solr installation directory.
SOLR_RANGER_HOME	<code>/opt/lucidworks-hdpsearch/solr/ranger_audit_server</code>	The location where the Ranger-related configuration and schema files will be copied.
SOLR_RANGER_PORT	<code>6083</code>	The Solr port for Ranger.
SOLR_DEPLOYMENT	<code>solrcloud</code>	The deployment type.
SOLR_ZK	<ZooKeeper_host>:2181/ <code>ranger_audits</code>	The Solr ZooKeeper host and port. It is recommended to provide a sub-folder to create the Ranger Audit related configurations so you can also use ZooKeeper for other Solr instances. Due to a Solr bug, if you are using a path (sub-folder), you can only specify one ZooKeeper host.
SOLR_SHARDS	<code>1</code>	If you want to distribute your audit logs, you can use multiple shards. Make sure the number of shards is equal or less than the number of Solr nodes you will be running.
SOLR_REPLICATION	<code>1</code>	It is highly recommend that you set up at least two nodes and replicate the indexes. This gives redundancy to index data, and also provides load balancing of Solr queries.
SOLR_LOG_FOLDER	<code>/var/log/solr/ranger_audits</code>	The folder for the Solr log files.
SOLR_MAX_MEM	<code>2g</code>	The memory allocation for Solr.

5. Use the following command to run the set up script.

```
./setup.sh
```

6. Run the following command **only once** from any node. This command adds the Ranger Audit configuration (including `schema.xml`) to ZooKeeper.

```
/opt/lucidworks-hdpsearch/solr/ranger_audit_server/scripts/  
add_ranger_audits_conf_to_zk.sh
```

7. Log in as the `solr` or `root` user and run the following command to start Solr on each node.


```
/opt/lucidworks-hdpsearch/solr/ranger_audit_server/scripts/start_solr.sh
```

When Solr starts, a confirmation message appears.

```
Started Solr server on port 6083 (pid=). Happy searching!
```

8. Run the following command **only once** from any node. This command creates the Ranger Audit collection.

```
/opt/lucidworks-hdpsearch/solr/ranger_audit_server/scripts/  
create_ranger_audits_collection.sh
```

9. You can use a web browser to open the Solr Admin Console at the following address:

```
http:<solr_host>:6083/solr
```



Note

You can use the following command to stop Solr:

```
/opt/lucidworks-hdpsearch/solr/ranger_audit_server/scripts/  
stop_solr.sh
```

5. Ranger Plug ins Overview

Ranger plugins can be enabled for several HDP services. This section describes how to enable each of these plugins. For performance reasons, it is recommended that you store audits in Solr and HDFS, and not in a database.

If you are using a Kerberos-enabled cluster, there are a number of additional steps you must follow to ensure that you can use the Ranger plugins on a Kerberos cluster.

The following Ranger plugins are available:

- [HDFS](#)
- [Hive](#)
- [HBase](#)
- [Kafka](#)
- [Knox](#)
- [YARN](#)
- [Storm](#)

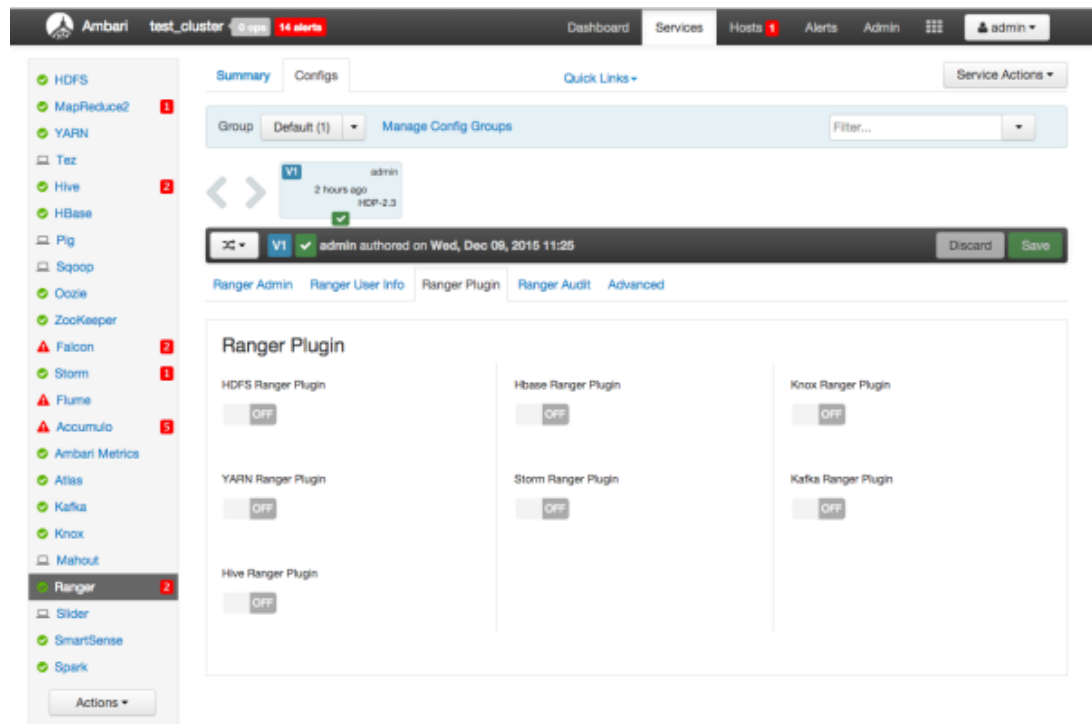
You can save Ranger audits to HDFS or Solr:

- [Save Audits to HDFS](#)
- [Save Audits to Solr](#)

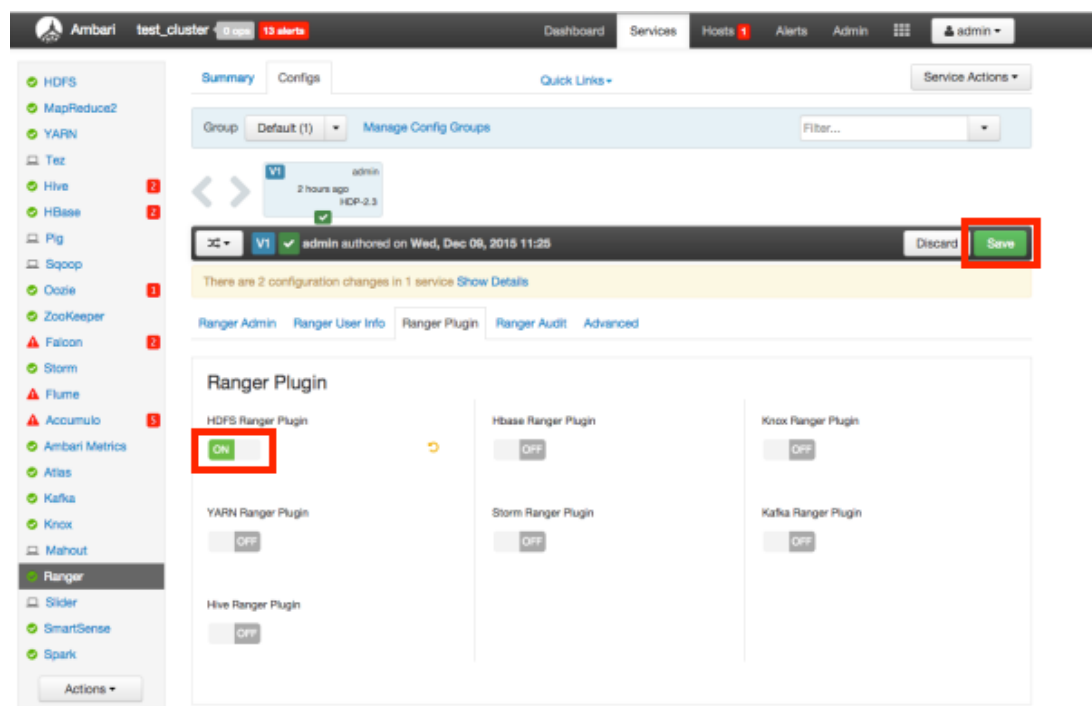
5.1. HDFS

Use the following steps to enable the Ranger HDFS plugin.

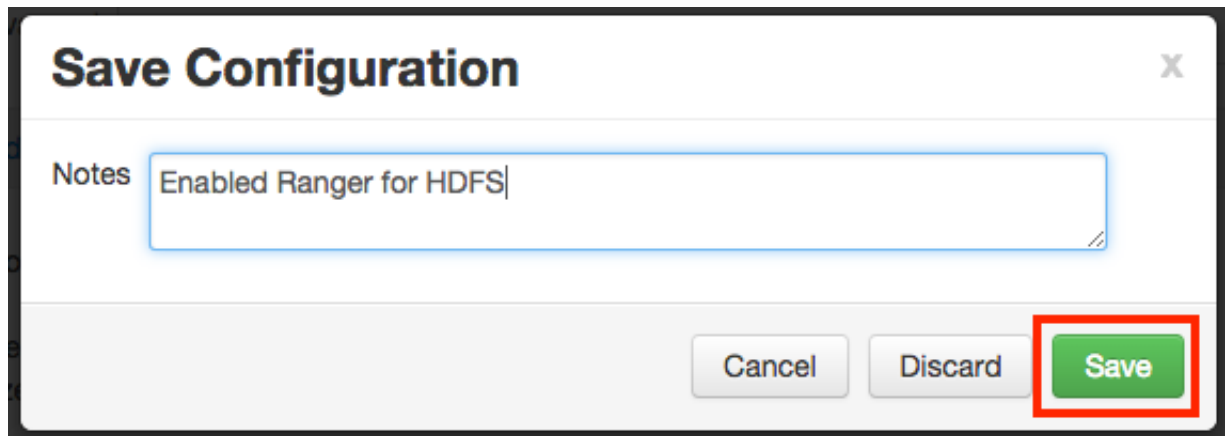
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



2. Under HDFS Ranger Plugin, select **On**, then click **Save** in the black menu bar.



3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.

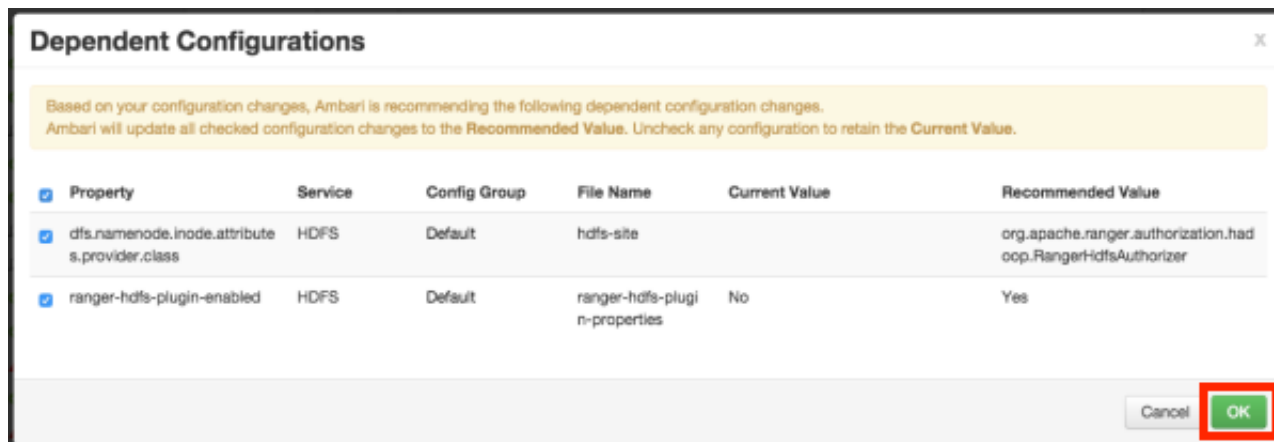


Save Configuration

Notes: Enabled Ranger for HDFS

Buttons: Cancel, Discard, **Save**

4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



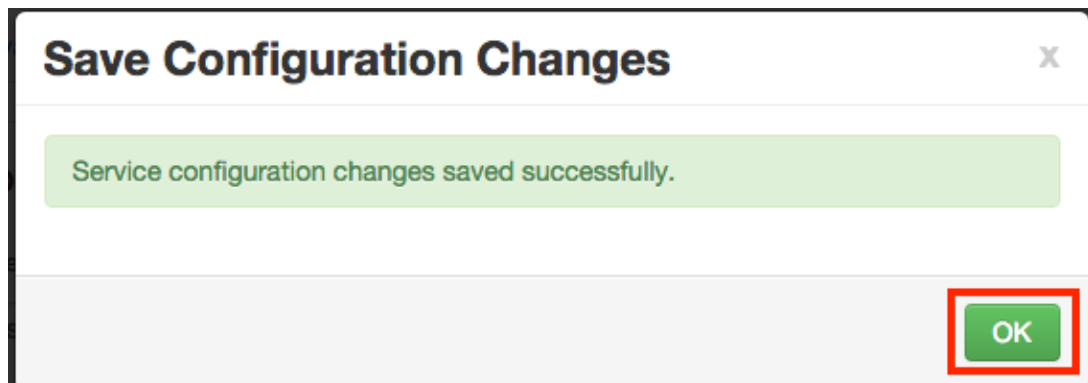
Dependent Configurations

Based on your configuration changes, Ambari is recommending the following dependent configuration changes. Ambari will update all checked configuration changes to the Recommended Value. Uncheck any configuration to retain the Current Value.

<input checked="" type="checkbox"/>	Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/>	dfs.namenode.inode.attributes.provider.class	HDFS	Default	hdfs-site		org.apache.ranger.authorization.hadoop.RangerHdfsAuthorizer
<input checked="" type="checkbox"/>	ranger-hdfs-plugin-enabled	HDFS	Default	ranger-hdfs-plugin-properties	No	Yes

Buttons: Cancel, **OK**

5. Click **OK** on the Save Configuration Changes pop-up.



Save Configuration Changes

Service configuration changes saved successfully.

Button: **OK**

6. Select **HDFS** in the navigation menu, then select **Restart > Restart All Affected** to restart the HDFS service and load the new configuration.

The screenshot shows the Ambari interface for a cluster named 'test_cluster'. The 'Services' tab is active, displaying a list of services on the left and configuration details for HDFS on the right. A yellow banner at the top indicates 'Restart Required: 4 Components on 1 Host'. Below this, there are buttons for 'Restart', 'Restart All Affected', and 'Restart All'. The 'Restart All Affected' button is highlighted with a red box. The configuration details for HDFS are shown in two columns: 'NameNode' and 'DataNode'. The 'NameNode' column includes settings for 'NameNode directories', 'NameNode Java heap size', 'NameNode Server threads', and 'Minimum replicated blocks %'. The 'DataNode' column includes settings for 'DataNode directories', 'DataNode failed disk tolerance', 'DataNode maximum Java heap size', and 'DataNode max data transfer threads'. The 'Restart All Affected' button is highlighted with a red box.

7. Click **Confirm Restart All** on the confirmation pop-up to confirm the HDFS restart.

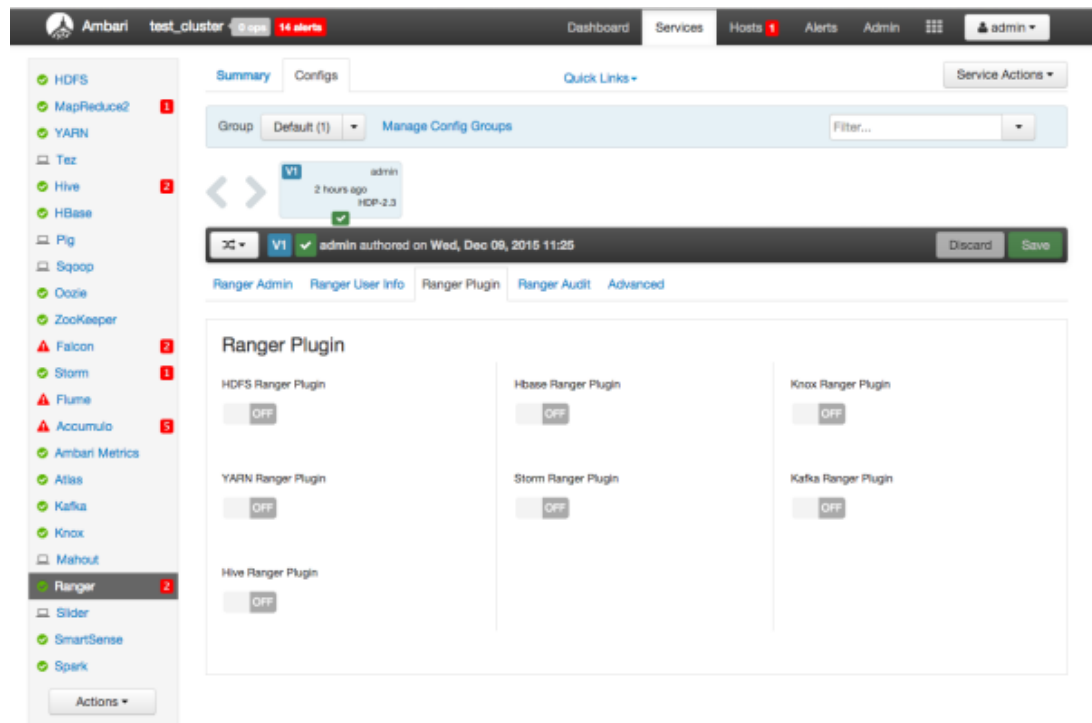
The screenshot shows a 'Confirmation' dialog box with the title 'Confirmation'. The text inside reads: 'You are about to restart HDFS'. Below this, a yellow box contains the warning: 'This will trigger alerts as the service is restarted. To suppress alerts, turn on Maintenance Mode for HDFS prior to running restart all'. At the bottom of the dialog, there are two buttons: 'Cancel' and 'Confirm Restart All'. The 'Confirm Restart All' button is highlighted with a red box.

8. After HDFS restarts, the Ranger plugin for HDFS will be enabled. Other components may also require a restart.

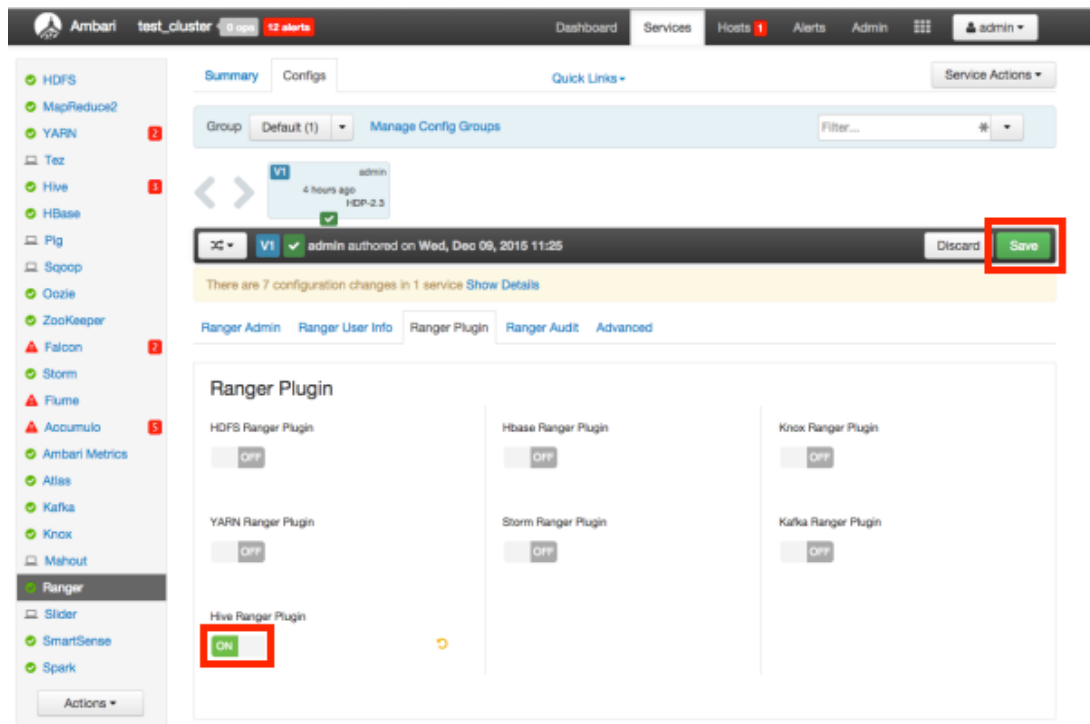
5.2. Hive

Use the following steps to enable the Ranger Hive plugin.

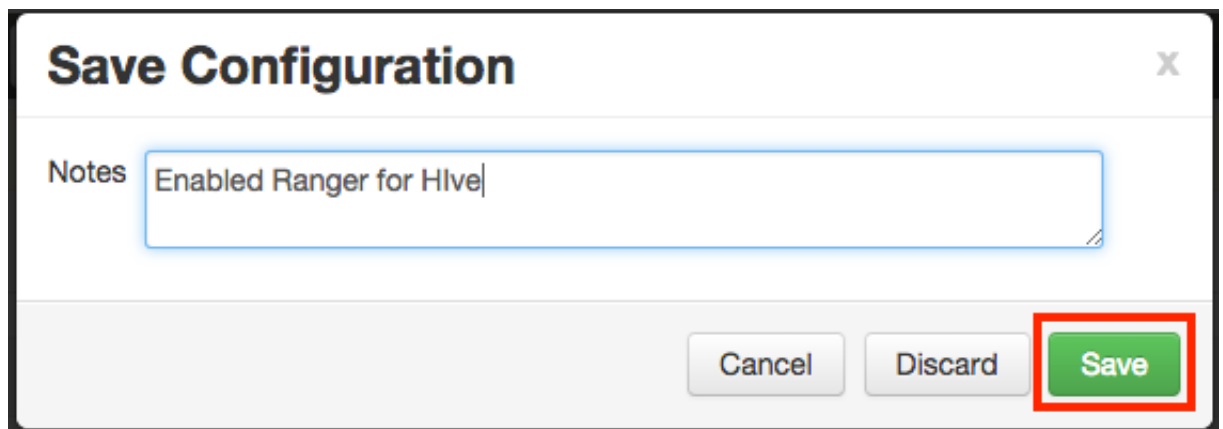
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



2. Under Hive Ranger Plugin, select **On**, then click **Save** in the black menu bar.



3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.

Dependent Configurations

Based on your configuration changes, Ambari is recommending the following dependent configuration changes.
Ambari will update all checked configuration changes to the Recommended Value. Uncheck any configuration to retain the Current Value.

<input checked="" type="checkbox"/> Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/> hive_security_authorization	Hive	Default	hive-env	None	Ranger
<input checked="" type="checkbox"/> hive.security.authorization.enabled	Hive	Default	hive-site	false	true
<input checked="" type="checkbox"/> hive.server2.enable.doAs	Hive	Default	hive-site	true	false
<input checked="" type="checkbox"/> hive.security.authorization.enabled	Hive	Default	hiveserver2-site	false	true
<input checked="" type="checkbox"/> hive.conf.restricted.list	Hive	Default	hiveserver2-site		hive.security.authorization.enabled,hive.security.authorization.manager,hive.security.authenticator.manager
<input checked="" type="checkbox"/> hive.security.authenticator.manager	Hive	Default	hiveserver2-site		org.apache.hadoop.hive.qj.security.SessionStateUserAuthenticator
<input checked="" type="checkbox"/> hive.security.authorization.manager	Hive	Default	hiveserver2-site		org.apache.ranger.authorization.hive.authorizer.RangerHiveAuthorizerFactory

Cancel OK

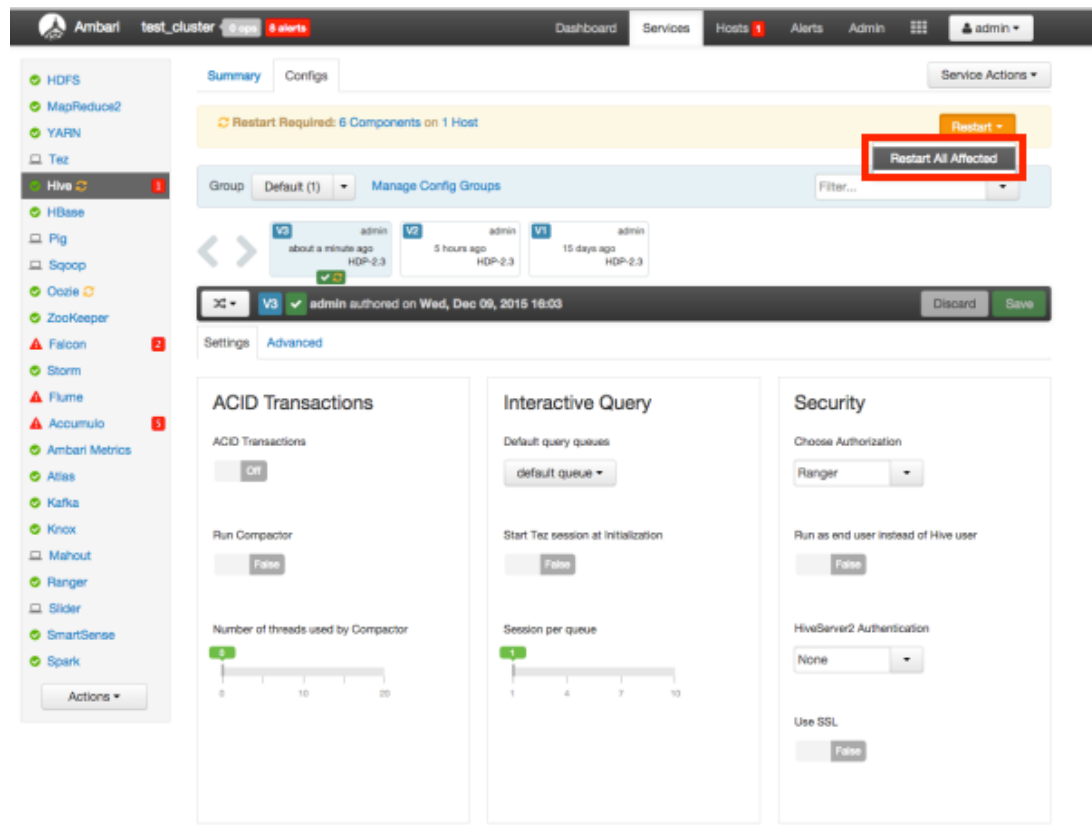
- Click **OK** on the Save Configuration Changes pop-up.

Save Configuration Changes

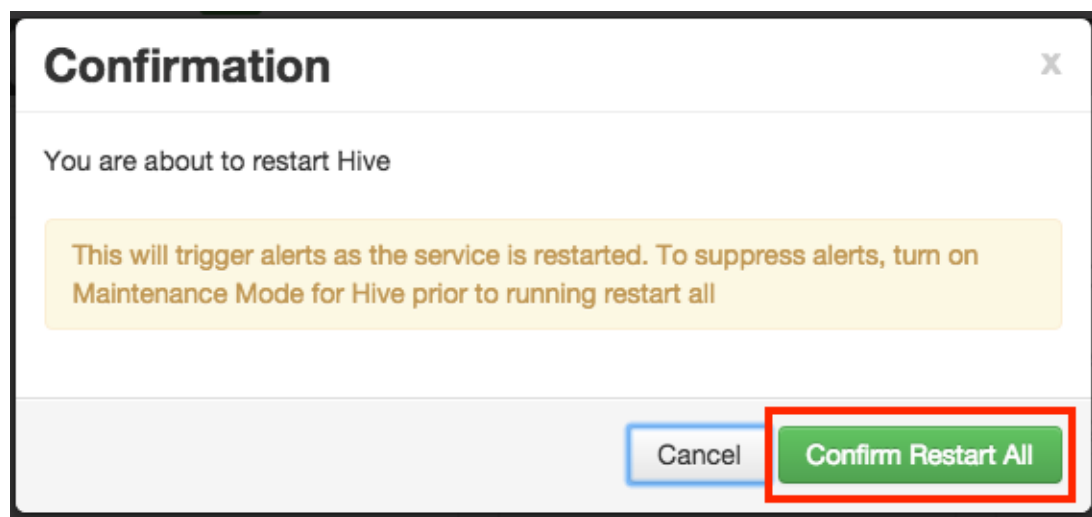
Service configuration changes saved successfully.

OK

- Select **Hive** in the navigation menu, then select **Restart > Restart All Affected** to restart the Hive service and load the new configuration.



7. Click **Confirm Restart All** on the confirmation pop-up to confirm the Hive restart.



8. After Hive restarts, the Ranger plugin for Hive will be enabled.

5.3. HBase

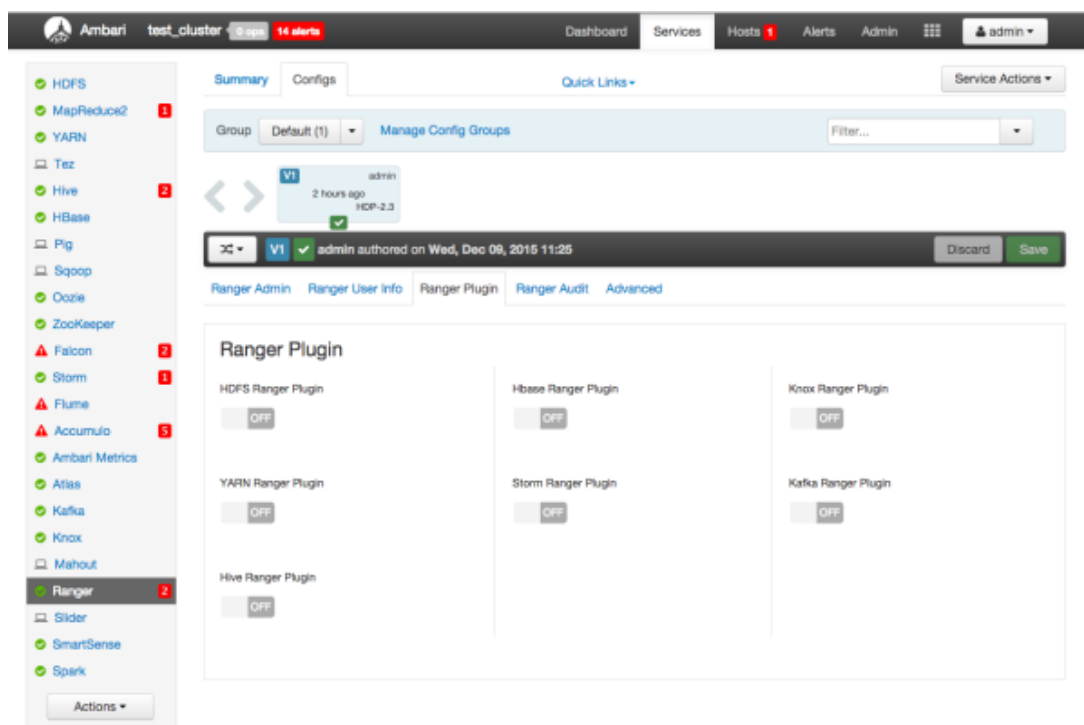


Note

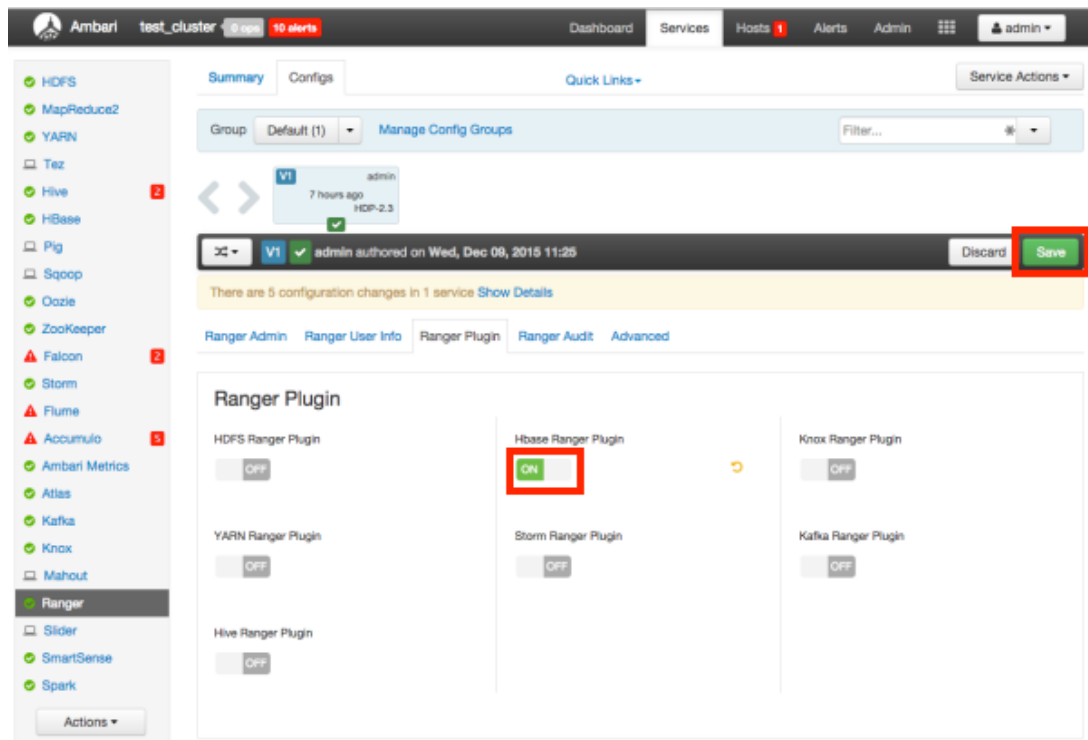
When Hive is configured with Ranger, and specifically XASecure Authorizer, you may only grant and revoke privileges.

Use the following steps to enable the Ranger HBase plugin.

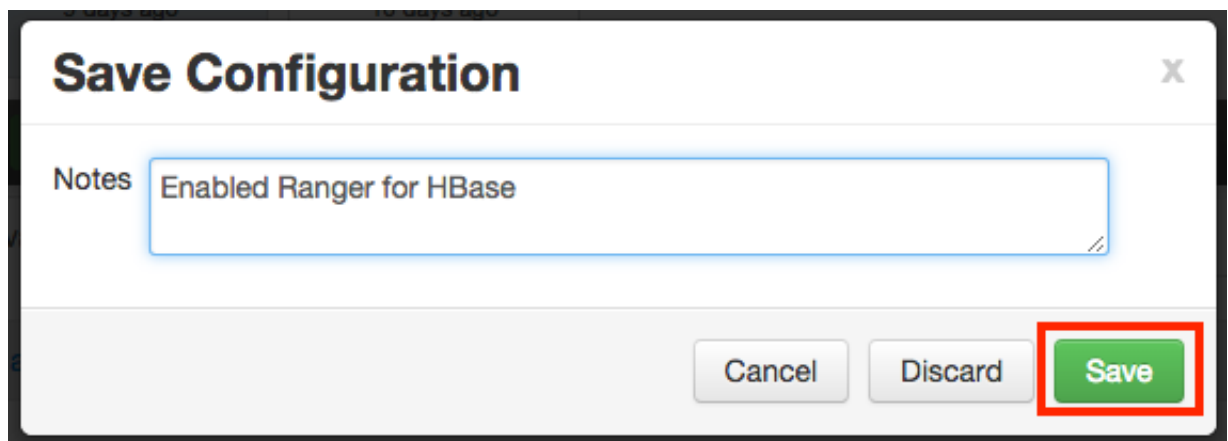
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



2. Under HBase Ranger Plugin, select **On**, then click **Save** in the black menu bar.



3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.

Dependent Configurations

Based on your configuration changes, Ambari is recommending the following dependent configuration changes.
Ambari will update all checked configuration changes to the **Recommended Value**. Uncheck any configuration to retain the **Current Value**.

<input checked="" type="checkbox"/> Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/> hbase.security.authorization	HBase	Default	hbase-site	false	true
<input checked="" type="checkbox"/> hbase.coprocessor.regionserver.classes	HBase	Default	hbase-site		org.apache.ranger.authorization.hbase.RangerAuthorizationCoproces
<input checked="" type="checkbox"/> hbase.coprocessor.master.classes	HBase	Default	hbase-site		org.apache.ranger.authorization.hbase.RangerAuthorizationCoproces
<input checked="" type="checkbox"/> hbase.coprocessor.region.classes	HBase	Default	hbase-site	org.apache.hadoop.hbase.security.access.SecureBulkLoadEndpoint	org.apache.hadoop.hbase.security.a ccess.SecureBulkLoadEndpoint,or g.apache.ranger.authorization.hbas e.RangerAuthorizationCoproces
<input checked="" type="checkbox"/> ranger-hbase-plugin-enabled	HBase	Default	ranger-hbase-plugin-pr operties	No	Yes

Cancel
OK

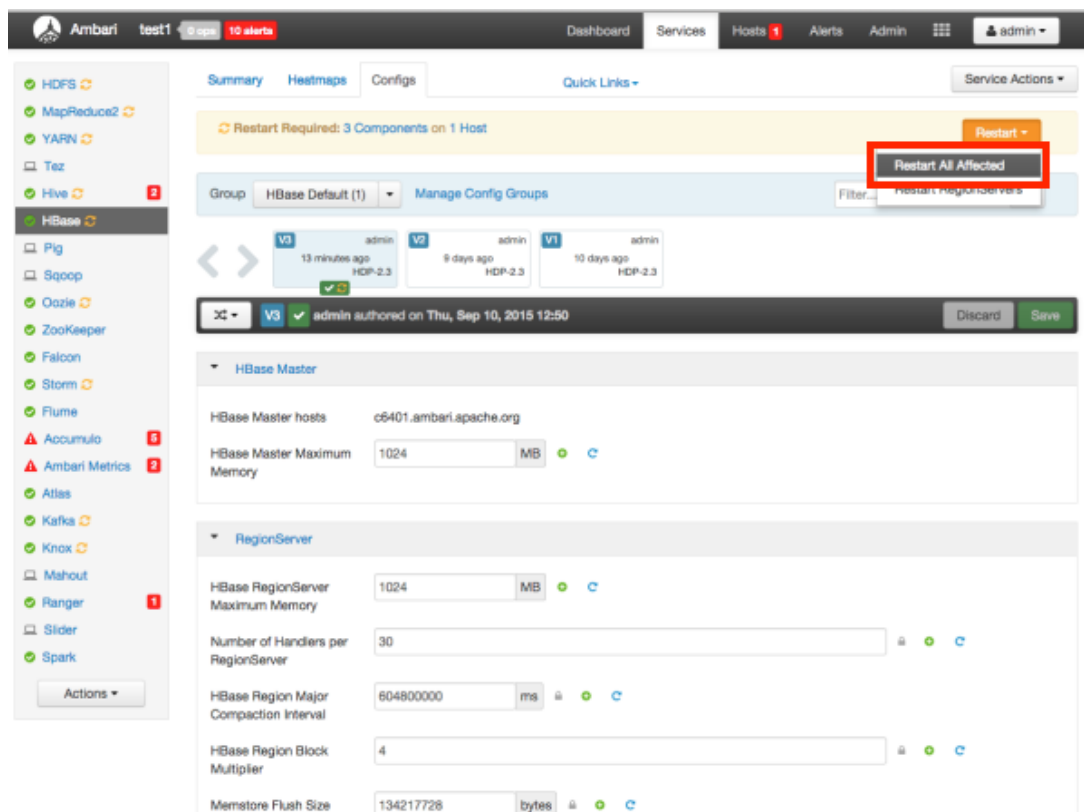
- Click **OK** on the Save Configuration Changes pop-up.

Save Configuration Changes

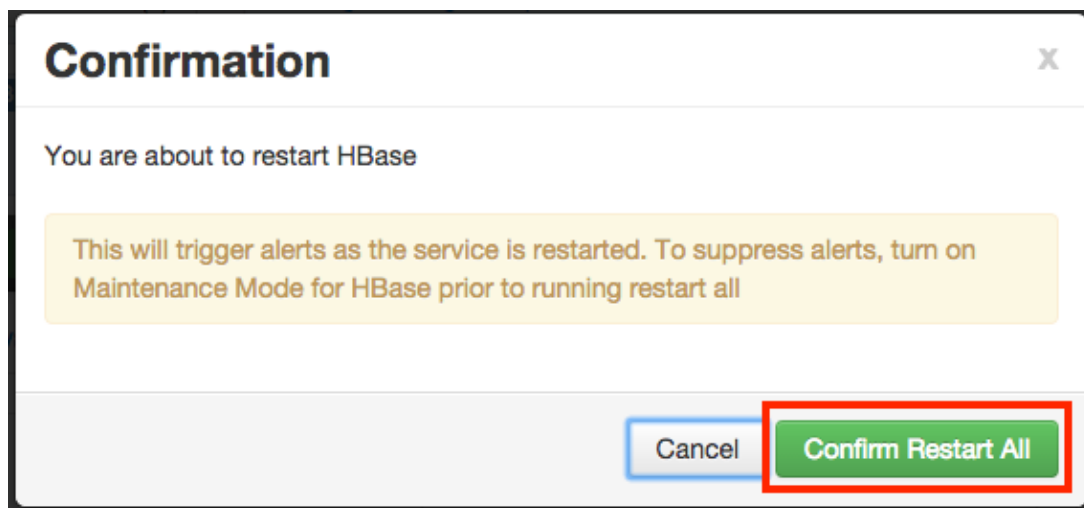
Service configuration changes saved successfully.

OK

- Select **HBase** in the navigation menu, then select **Restart > Restart All Affected** to restart the HBase service and load the new configuration.



7. Click **Confirm Restart All** on the confirmation pop-up to confirm the HBase restart.

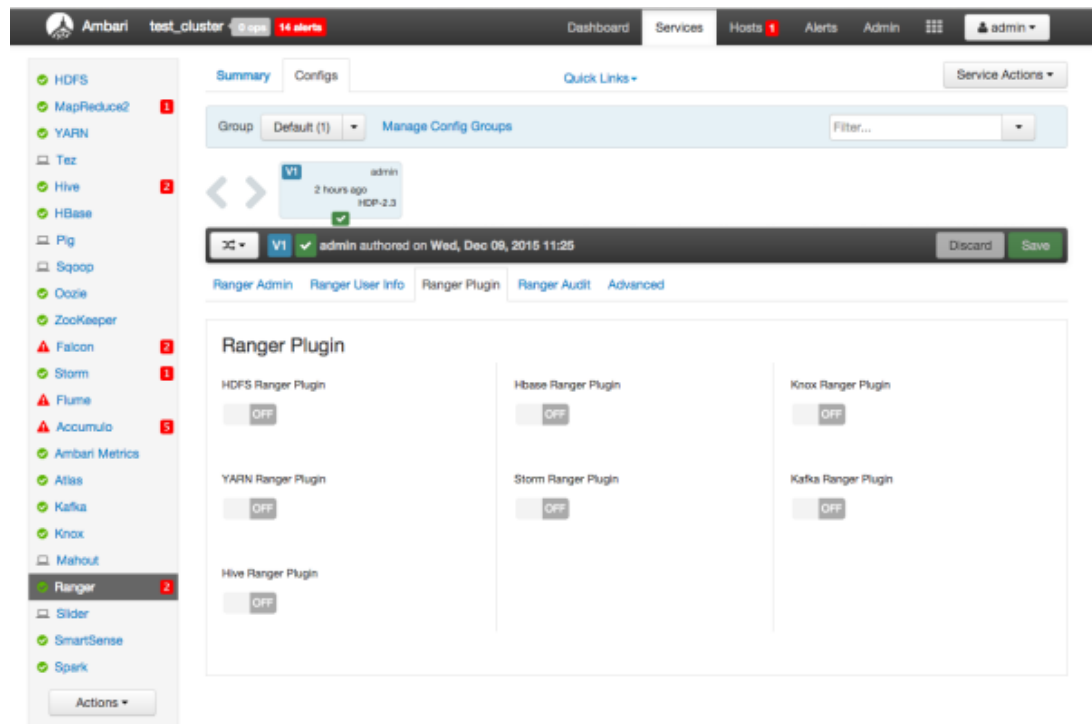


8. After HBase restarts, the Ranger plugin for HBase will be enabled.

5.4. Kafka

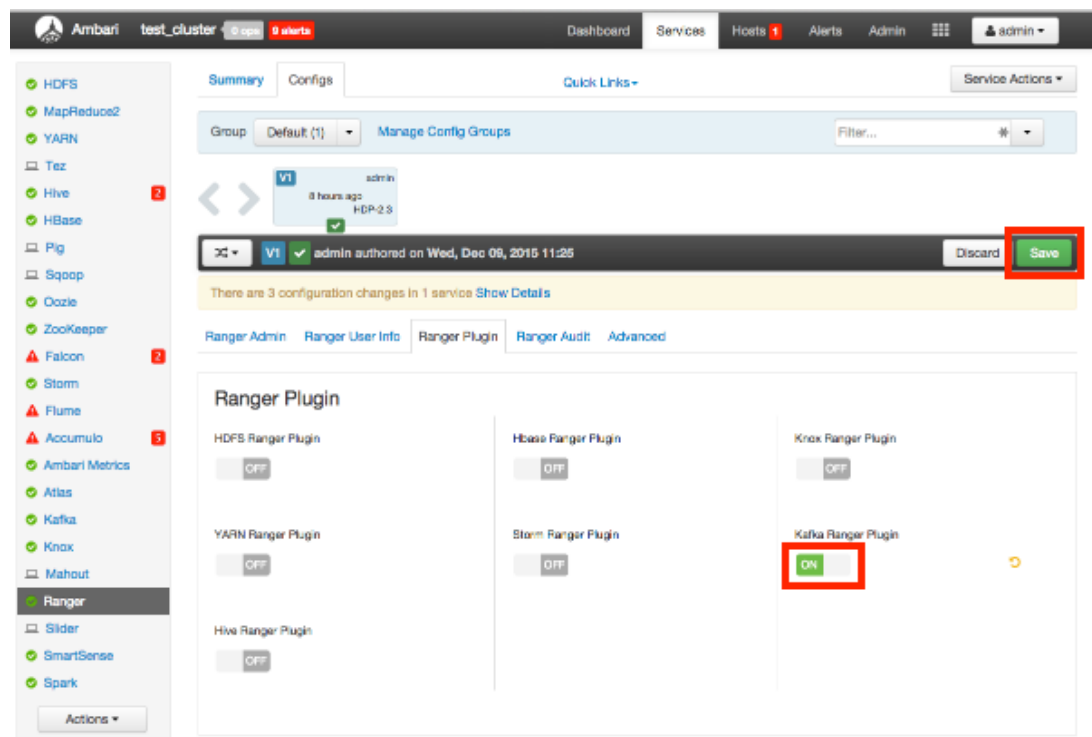
Use the following steps to enable the Ranger Kafka plugin.

1. On the Ranger Configs page, select the **Ranger Plugin** tab.



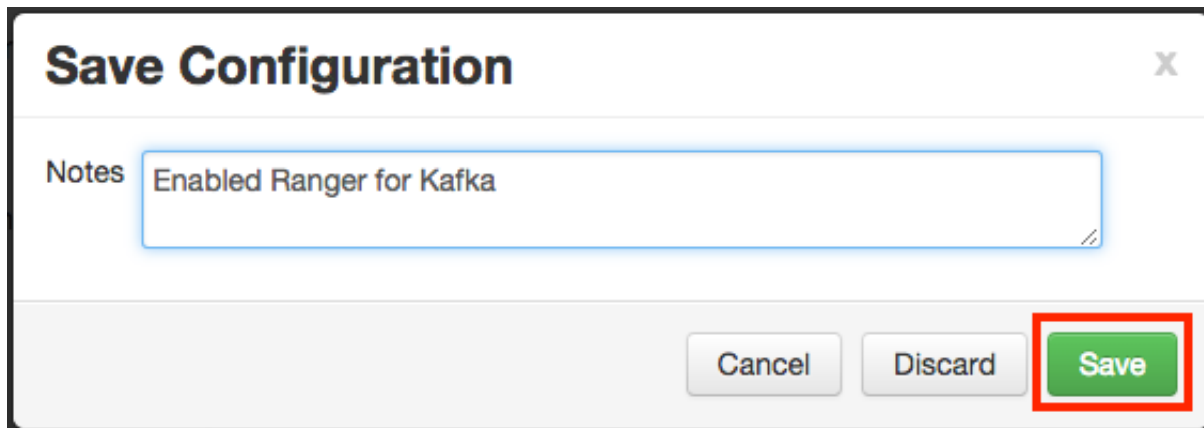
The screenshot shows the Ambari interface for the 'test_cluster'. The 'Services' tab is active, displaying a list of services on the left sidebar. The 'Ranger' service is highlighted. The main content area shows the 'Ranger Plugin' configuration page. The 'Kafka Ranger Plugin' is currently set to 'OFF'. The 'Save' button in the top right corner is highlighted in red.

2. Under Kafka Ranger Plugin, select **On**, then click **Save** in the black menu bar.



The screenshot shows the Ambari interface for the 'test_cluster'. The 'Services' tab is active, displaying a list of services on the left sidebar. The 'Ranger' service is highlighted. The main content area shows the 'Ranger Plugin' configuration page. The 'Kafka Ranger Plugin' is now set to 'ON'. The 'Save' button in the top right corner is highlighted in red.

3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.

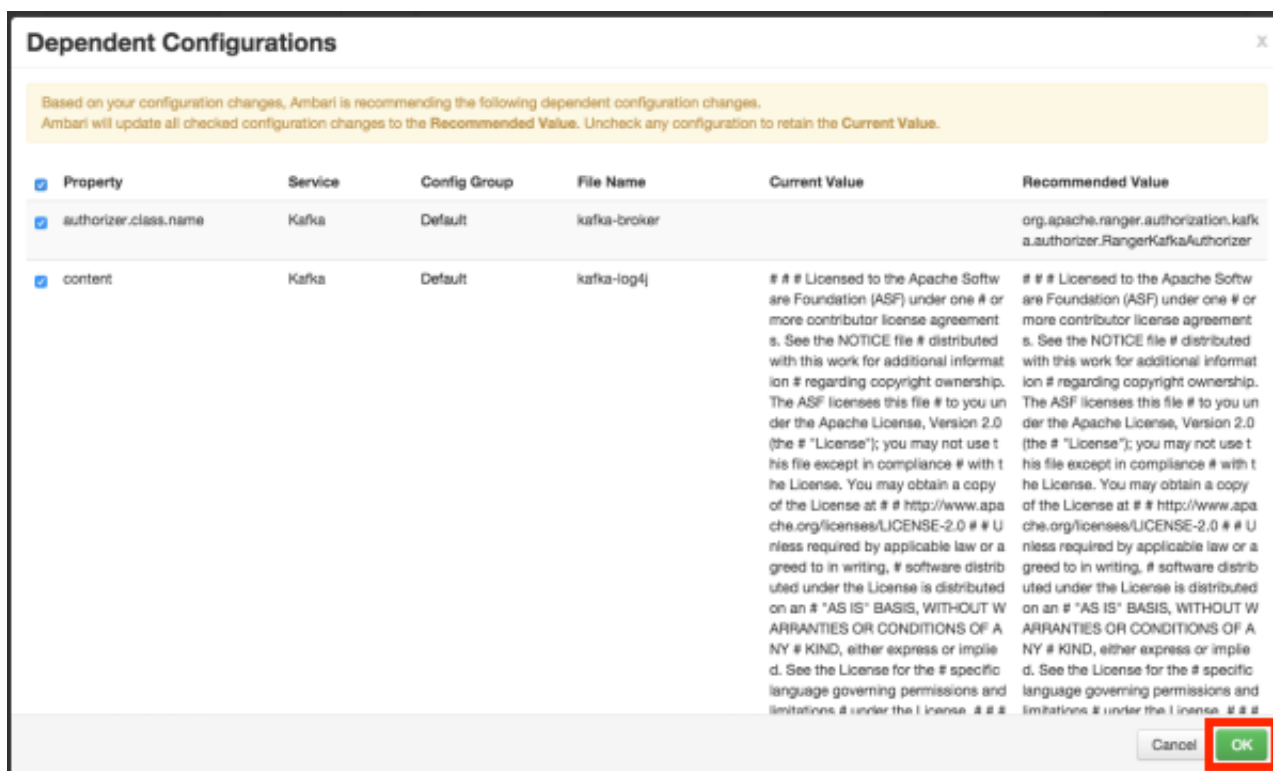


Save Configuration

Notes: Enabled Ranger for Kafka

Buttons: Cancel, Discard, **Save**

4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



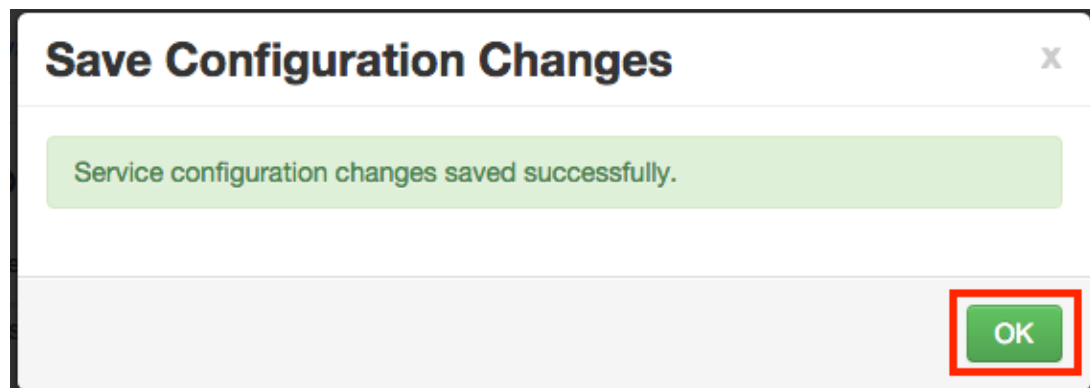
Dependent Configurations

Based on your configuration changes, Ambari is recommending the following dependent configuration changes. Ambari will update all checked configuration changes to the Recommended Value. Uncheck any configuration to retain the Current Value.

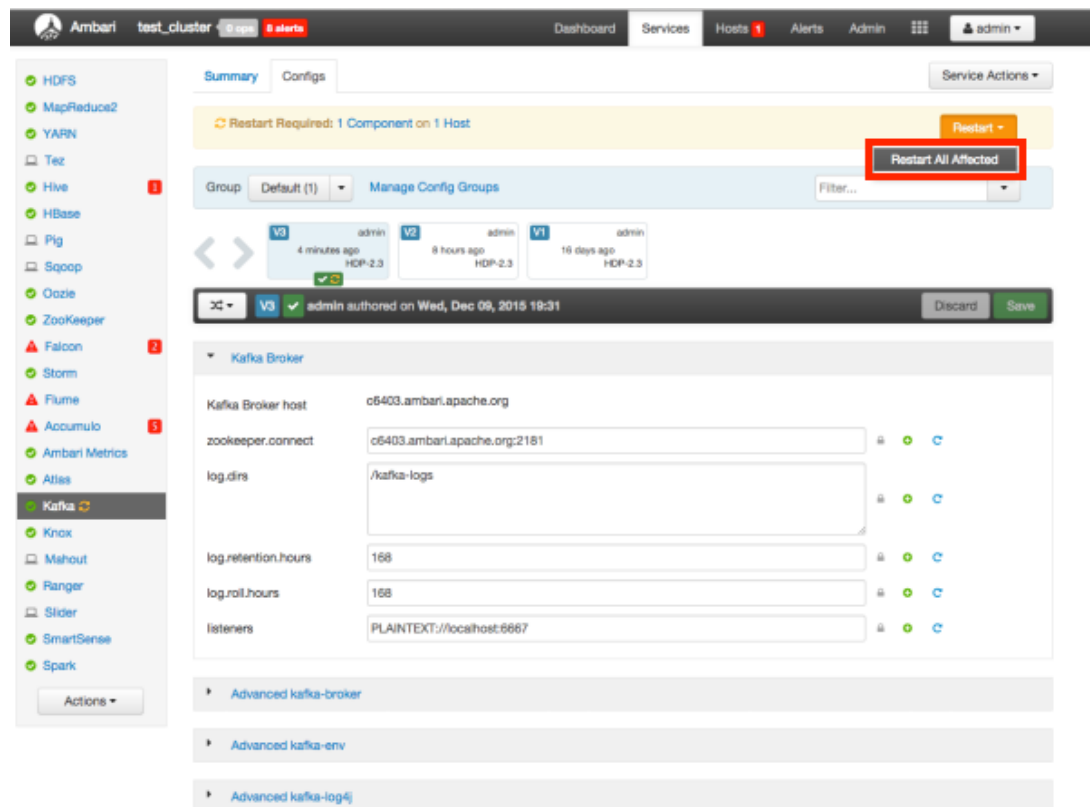
Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/> authorizer.class.name	Kafka	Default	kafka-broker		org.apache.ranger.authorization.kafka.authorizer.RangerKafkaAuthorizer
<input checked="" type="checkbox"/> content	Kafka	Default	kafka-log4j	### Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at http://www.apache.org/licenses/LICENSE-2.0. Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. ###	### Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at http://www.apache.org/licenses/LICENSE-2.0. Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. ###

Buttons: Cancel, **OK**

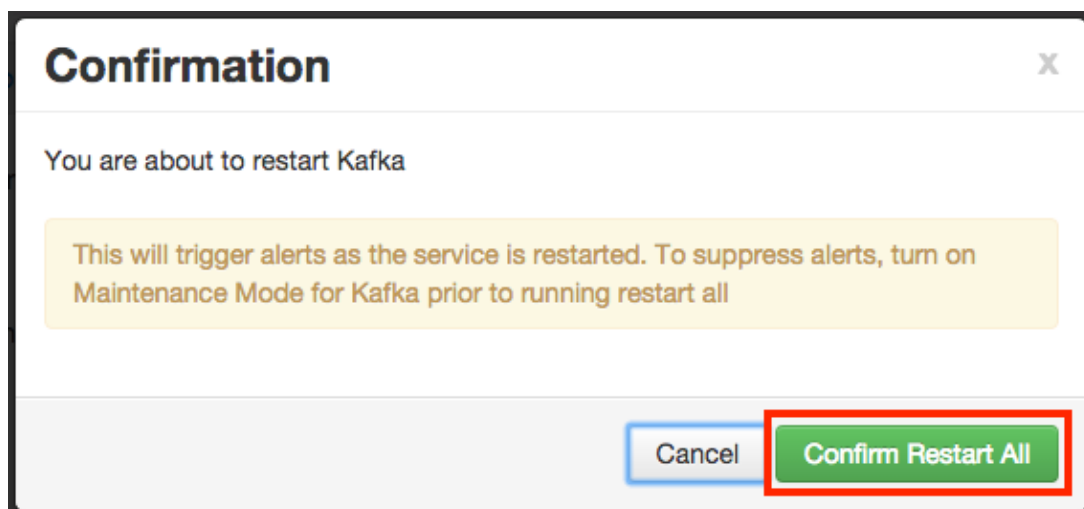
5. Click **OK** on the Save Configuration Changes pop-up.



6. Select **Kafka** in the navigation menu, then select **Restart > Restart All Affected** to restart the Kafka service and load the new configuration.



7. Click **Confirm Restart All** on the confirmation pop-up to confirm the Kafka restart.

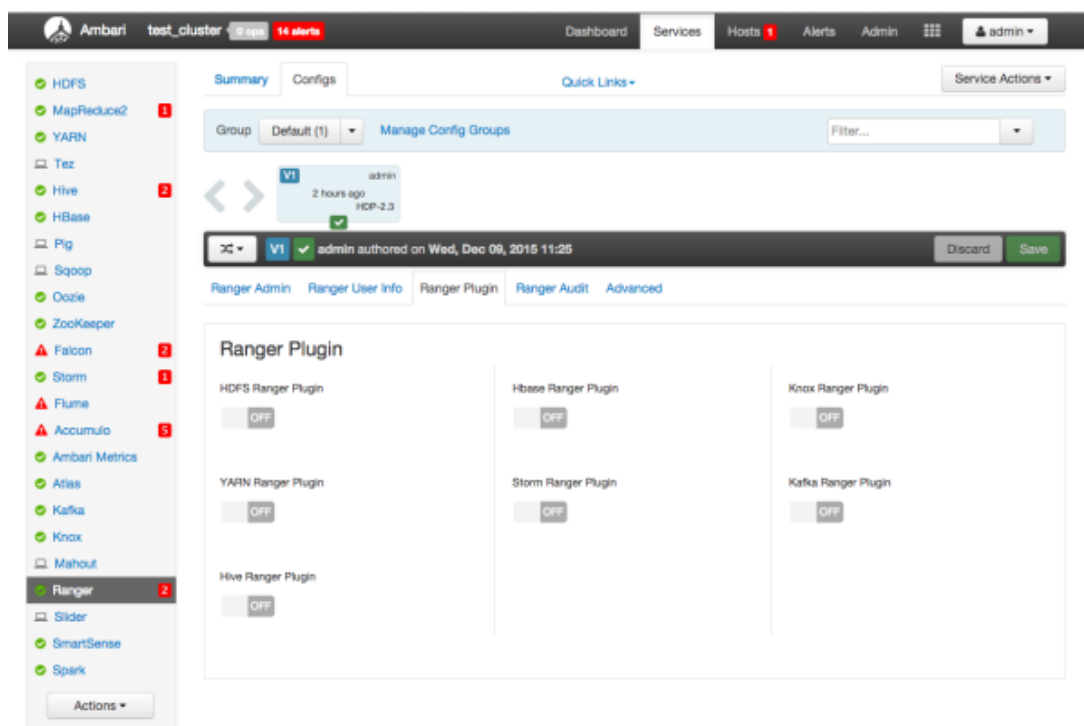


8. After Kafka restarts, the Ranger plugin for Kafka will be enabled.

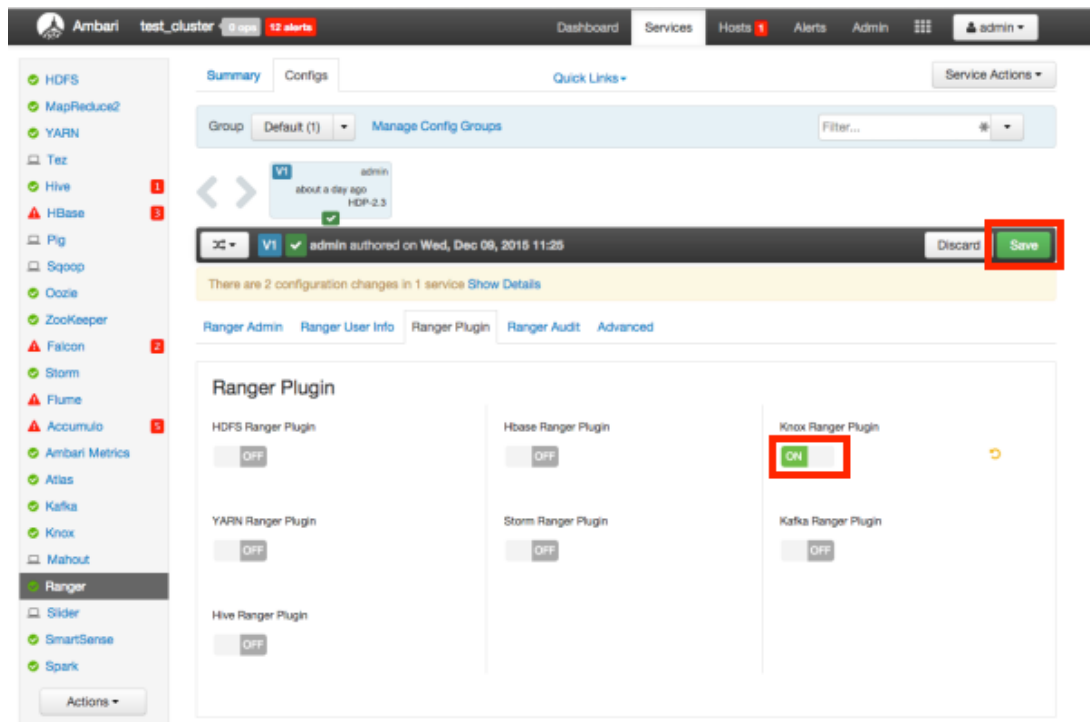
5.5. Knox

Use the following steps to enable the Ranger Knox plugin.

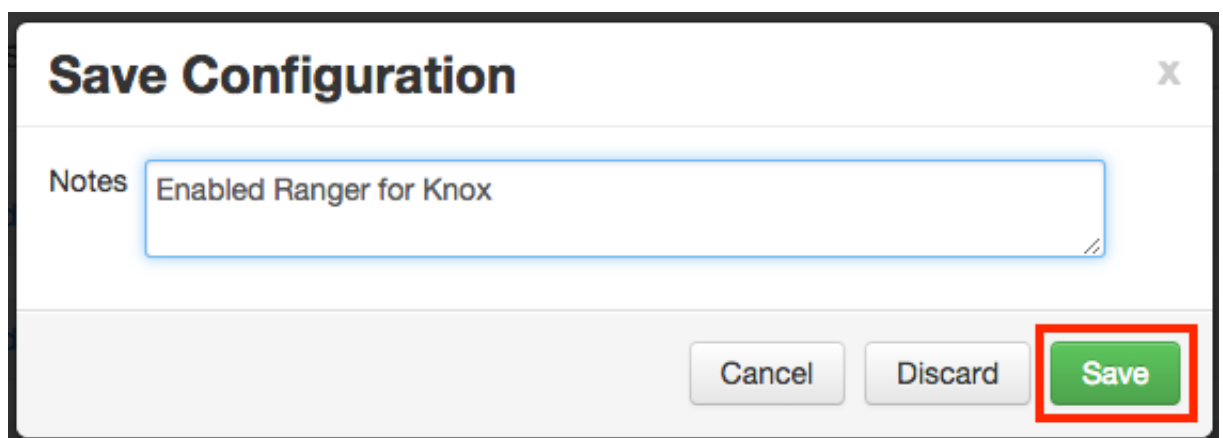
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



2. Under Knox Ranger Plugin, select **On**, then click **Save** in the black menu bar.



3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.

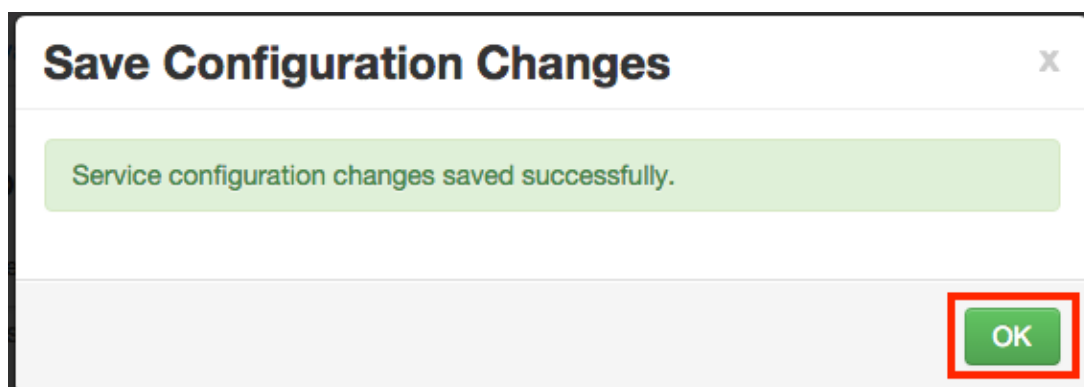
Dependent Configurations

Based on your configuration changes, Ambari is recommending the following dependent configuration changes. Ambari will update all checked configuration changes to the Recommended Value. Uncheck any configuration to retain the Current Value.

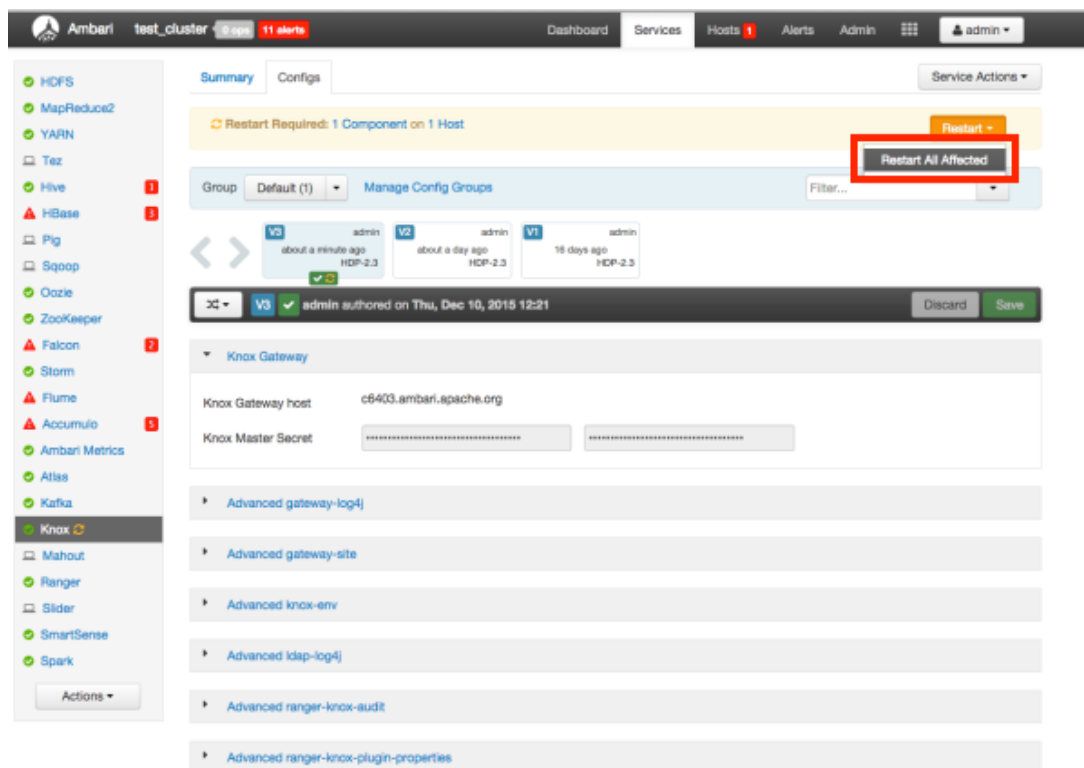
Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/> ranger-knox-plugin-enabled	Knox	Default	ranger-knox-plugin-properties	No	Yes
<input checked="" type="checkbox"/> content	Knox	Default	topology	<pre><topology> <gateway> <provider> <role>authentication</role> <name> a5ShiroProvider</name> <enable> d=true</enable> </param> <name> a5SessionTimeout</name> <valu e=30</value> </param> </param> </name> main.idapRealm</name> <v alue=org.apache.hadoop.gateway.s hiroRealm.KnoxIdapRealm</value> </param> </param> <name>main.id apRealm.userDnTemplate</name> <value=uid=[/]/ou=people,dc=had op,dc=apache,dc=org</value> </pa ram> </param> <name>main.idapRe alm.contextFactory.uri</name> <val ue=idap://knox_host_name[:3338] /</value> </param> </param> <name> a5main.idapRealm.contextFactory.a uthenticatorMechanism</name> <v alue=simple</value> </param> </pa ram> <name>url,/</name> <valu e=a5shiro</value> </param> </provider> </provider> </role> authentication</role></pre>	<pre><topology> <gateway> <provider> <role>authentication</role> <name> a5ShiroProvider</name> <enable> d=true</enable> </param> <name> a5SessionTimeout</name> <valu e=30</value> </param> </param> </name> main.idapRealm</name> <v alue=org.apache.hadoop.gateway.s hiroRealm.KnoxIdapRealm</value> </param> </param> <name>main.id apRealm.userDnTemplate</name> <value=uid=[/]/ou=people,dc=had op,dc=apache,dc=org</value> </pa ram> </param> <name>main.idapRe alm.contextFactory.uri</name> <val ue=idap://knox_host_name[:3338] /</value> </param> </param> <name> a5main.idapRealm.contextFactory.a uthenticatorMechanism</name> <v alue=simple</value> </param> </pa ram> <name>url,/</name> <valu e=a5shiro</value> </param> </provider> </provider> </role> authentication</role></pre>

Cancel **OK**

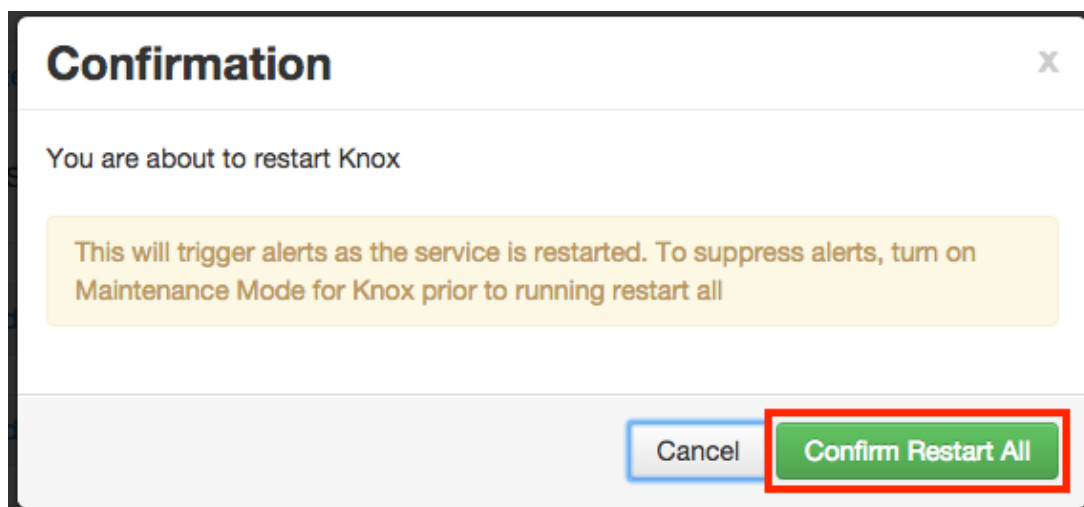
- Click **OK** on the Save Configuration Changes pop-up.



- Select **Knox** in the navigation menu, then select **Restart > Restart All Affected** to restart the Knox service and load the new configuration.



7. Click **Confirm Restart All** on the confirmation pop-up to confirm the Knox restart.



8. After Knox restarts, the Ranger plugin for Knox will be enabled.

5.6. YARN

Use the following steps to enable the Ranger YARN plugin.

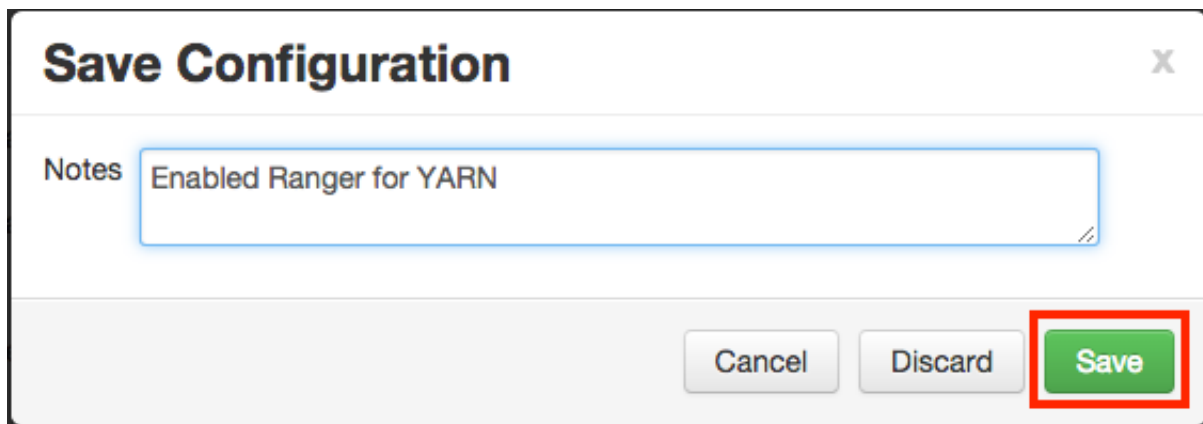
1. On the Ranger Configs page, select the **Ranger Plugin** tab.

The screenshot shows the Ambari Ranger Plugin configuration page. The left sidebar lists various services, with Ranger selected. The main panel shows the 'Ranger Plugin' configuration for 'HDFS Ranger Plugin', 'Hbase Ranger Plugin', 'Knox Ranger Plugin', 'YARN Ranger Plugin', 'Storm Ranger Plugin', 'Kafka Ranger Plugin', and 'Hive Ranger Plugin'. All plugins are currently set to 'OFF'. The 'YARN Ranger Plugin' is the focus of the next step. The top right shows a 'Save' button.

2. Under YARN Ranger Plugin, select **On**, then click **Save** in the black menu bar.

The screenshot shows the Ambari Ranger Plugin configuration page after the YARN Ranger Plugin has been set to 'ON'. The 'ON' button is highlighted with a red box. The 'Save' button in the top right is also highlighted with a red box. The interface shows a configuration group 'Default (1)' and a version 'V2' with a timestamp 'admin authored on Thu, Dec 10, 2015 12:21'. The 'YARN Ranger Plugin' is now set to 'ON'.

3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.

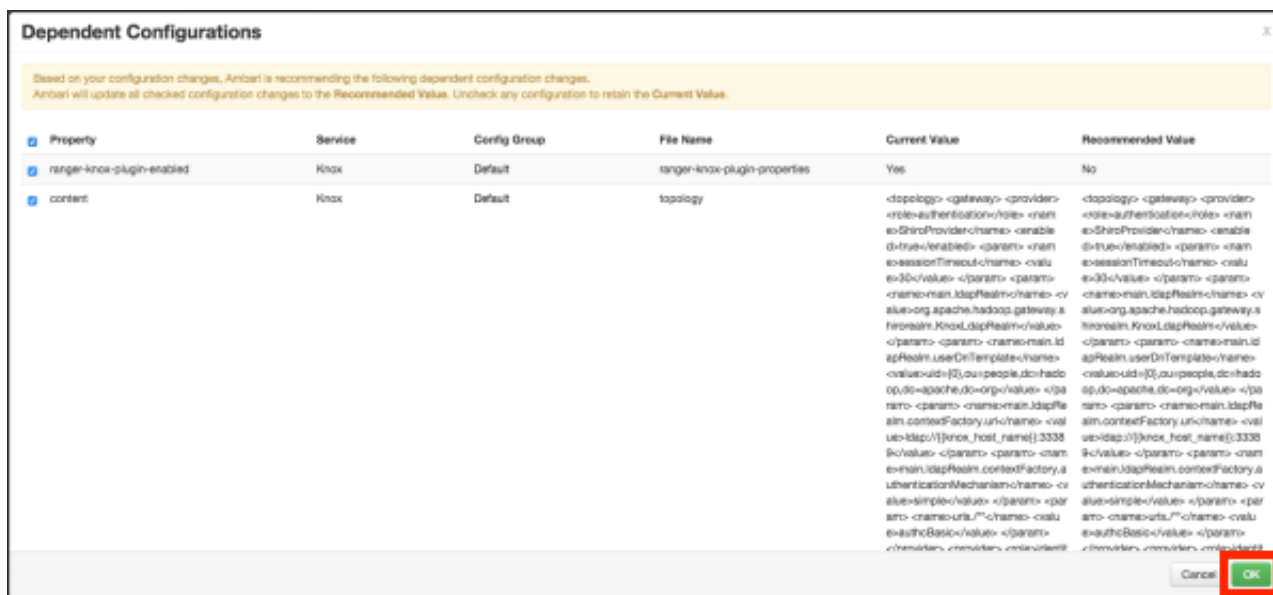


Save Configuration

Notes: Enabled Ranger for YARN

Buttons: Cancel, Discard, **Save**

4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



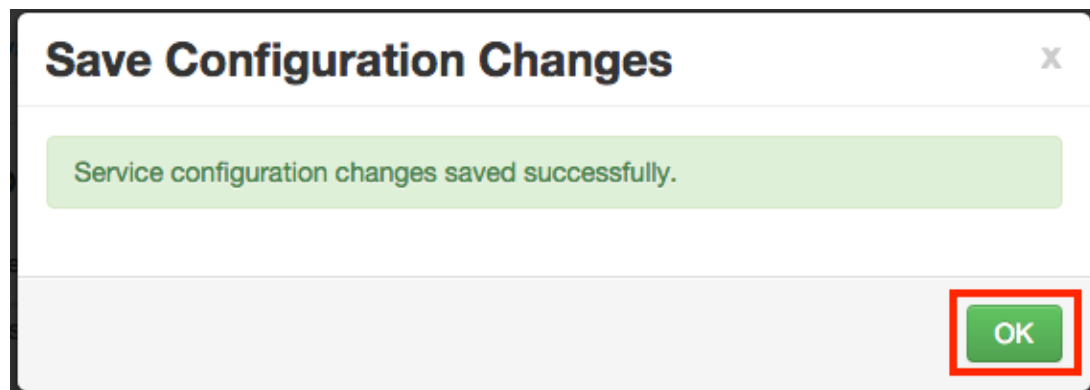
Dependent Configurations

Based on your configuration changes, Ambari is recommending the following dependent configuration changes. Ambari will update all checked configuration changes to the Recommended Value. Uncheck any configuration to retain the Current Value.

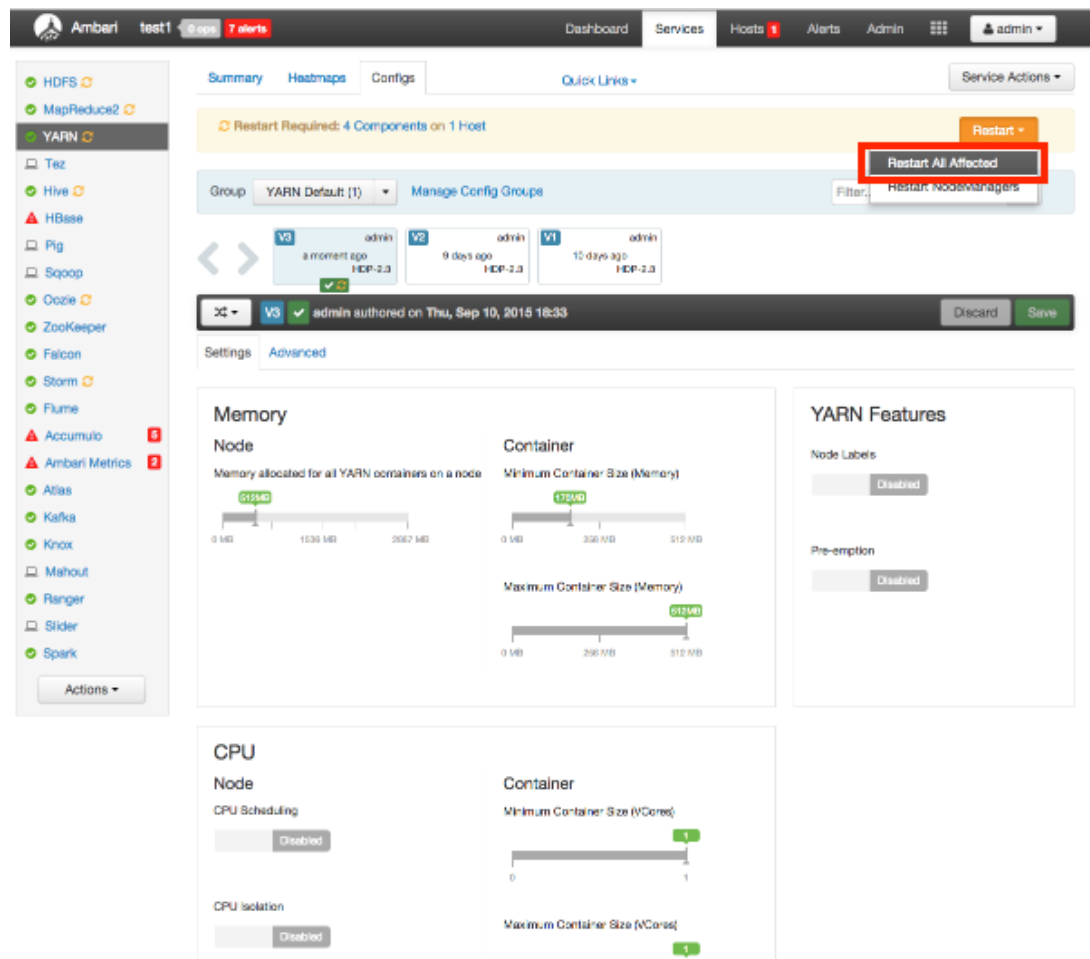
Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/> ranger-knox-plugin-enabled	Knox	Default	ranger-knox-plugin-properties	Yes	No
<input checked="" type="checkbox"/> content	Knox	Default	topology	<pre><topology> <gateway> <provider> <role>authentication</role> <nam e>ShiroProvider</name> <enable d>true</enabled> <param> <nam e>sessionTimeout</name> <valu e>30</value> </param> <param> <name>main.idapRealm</name> <v alue>org.apache.hadoop.gateway.s hiroRealm.KnoxIdapRealm</value> </param> <param> <name>main.id apRealm.useOnTemplate</name> <value>uid=[2],ou=people,dc=hado op,dc=apache,dc=org</value> </pa ram> <param> <name>main.idapRe alm.contextFactory.uri</name> <val ue>ldap://[knox_host_name]:3338 /</value> </param> <param> <nam e>main.idapRealm.contextFactory.a uthenticationMechanism</name> <v alue>simple</value> </param> <par am> <name>url/</name> <valu e>authBasic</value> </param> </reminders> </reminders> </topology></pre>	<pre><topology> <gateway> <provider> <role>authentication</role> <nam e>ShiroProvider</name> <enable d>true</enabled> <param> <nam e>sessionTimeout</name> <valu e>30</value> </param> <param> <name>main.idapRealm</name> <v alue>org.apache.hadoop.gateway.s hiroRealm.KnoxIdapRealm</value> </param> <param> <name>main.id apRealm.useOnTemplate</name> <value>uid=[0],ou=people,dc=hado op,dc=apache,dc=org</value> </pa ram> <param> <name>main.idapRe alm.contextFactory.uri</name> <val ue>ldap://[knox_host_name]:3338 /</value> </param> <param> <nam e>main.idapRealm.contextFactory.a uthenticationMechanism</name> <v alue>simple</value> </param> <par am> <name>url/</name> <valu e>authBasic</value> </param> </reminders> </reminders> </topology></pre>

Buttons: Cancel, **OK**

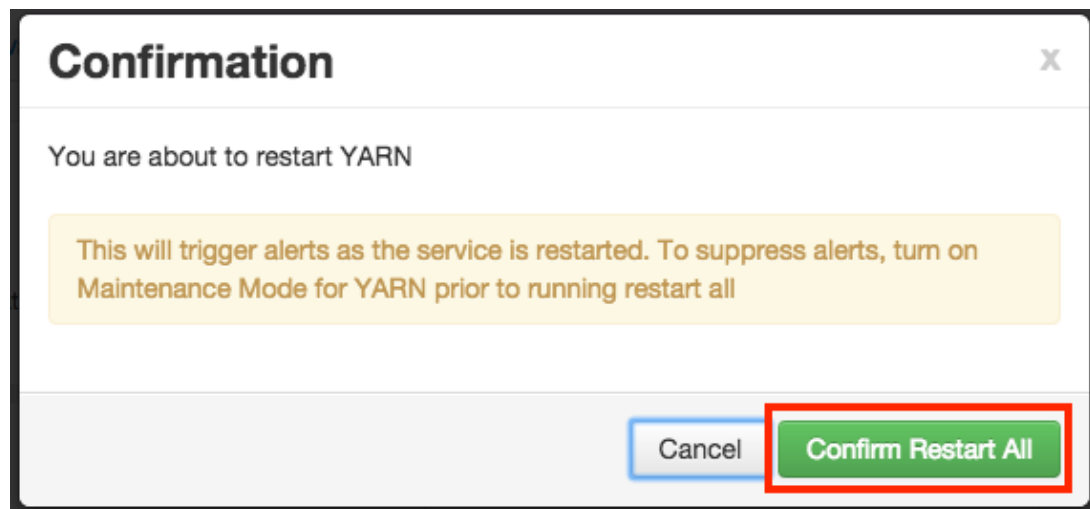
5. Click **OK** on the Save Configuration Changes pop-up.



6. Select **YARN** in the navigation menu, then select **Restart > Restart All Affected** to restart the YARN service and load the new configuration.



7. Click **Confirm Restart All** on the confirmation pop-up to confirm the YARN restart.



8. After YARN restarts, the Ranger plugin for YARN will be enabled. Other components may also require a restart.

5.7. Storm

Before you can use the Storm plugin, you must first enable Kerberos on your cluster. To enable Kerberos on your cluster, see [Enabling Kerberos Security](#) in the [Ambari Security Guide](#).

Use the following steps to enable the Ranger Storm plugin.

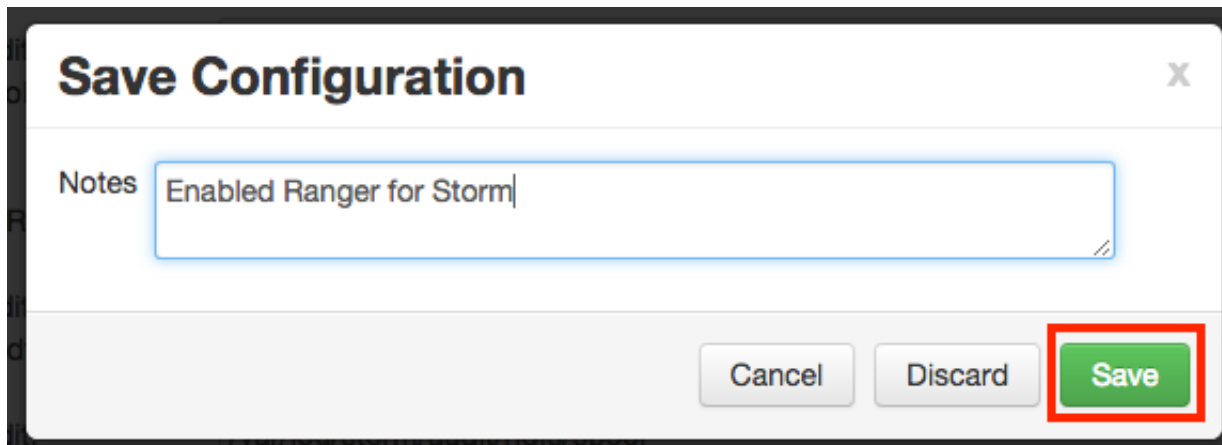
1. On the Ranger Configs page, select the **Ranger Plugin** tab.

The screenshot shows the Ambari interface for the 'test_cluster'. The 'Services' tab is selected, and the 'Ranger' service is highlighted in the left sidebar. The 'Ranger Plugin' configuration page is displayed, showing various plugins (HDFS, YARN, Hbase, Storm, Knox, Kafka, Hive) all set to 'OFF'. A black menu bar at the top of the configuration area contains a 'Save' button. A notification bar at the top of the configuration area shows a successful update by 'admin' on Dec 09, 2015.

2. Under Storm Ranger Plugin, select **On**, then click **Save** in the black menu bar.

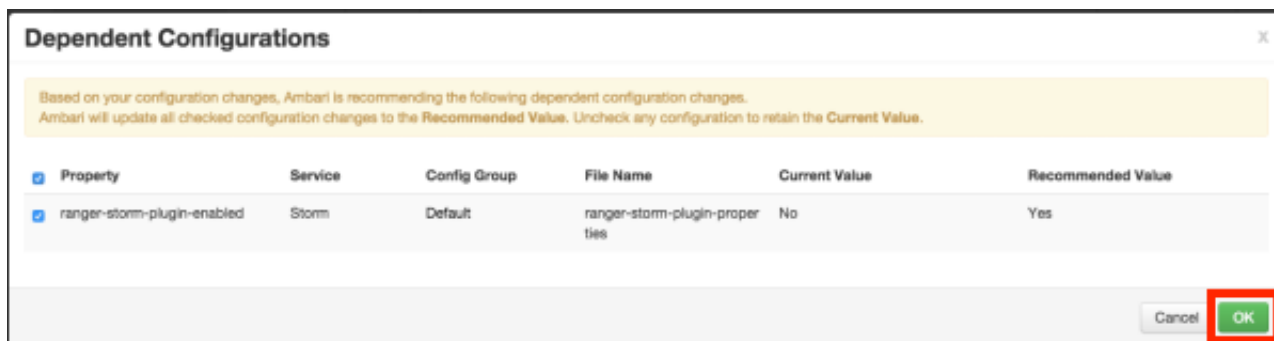
The screenshot shows the Ambari interface for the 'test_cluster'. The 'Services' tab is selected, and the 'Ranger' service is highlighted in the left sidebar. The 'Ranger Plugin' configuration page is displayed. The 'Storm Ranger Plugin' is now set to 'ON', which is highlighted with a red box. The 'Save' button in the black menu bar is also highlighted with a red box. A notification bar at the top of the configuration area shows a successful update by 'admin' on Dec 09, 2015.

3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



The 'Save Configuration' dialog box has a title bar with a close button (X). Below the title is a 'Notes' label and a text input field containing 'Enabled Ranger for Storm'. At the bottom right, there are three buttons: 'Cancel', 'Discard', and 'Save'. The 'Save' button is highlighted with a red rectangle.

4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.

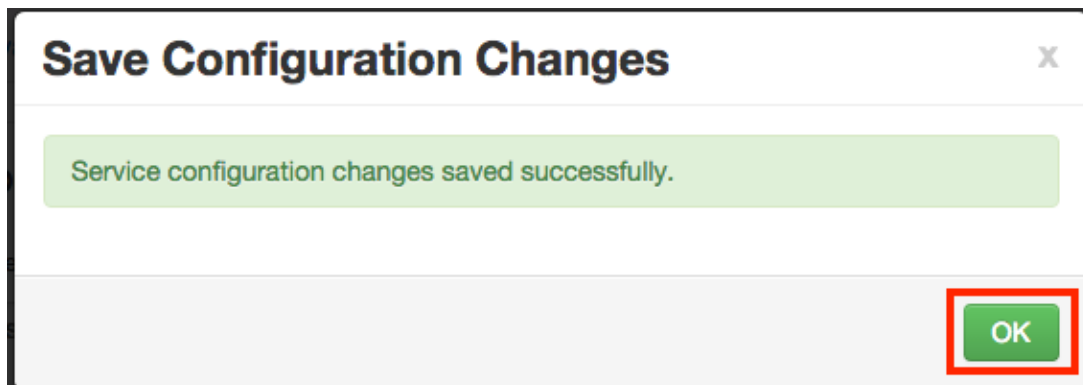


The 'Dependent Configurations' dialog box has a title bar with a close button (X). Below the title is a yellow informational box stating: 'Based on your configuration changes, Ambari is recommending the following dependent configuration changes. Ambari will update all checked configuration changes to the Recommended Value. Uncheck any configuration to retain the Current Value.' Below this is a table with the following data:

<input checked="" type="checkbox"/>	Property	Service	Config Group	File Name	Current Value	Recommended Value
<input checked="" type="checkbox"/>	ranger-storm-plugin-enabled	Storm	Default	ranger-storm-plugin-properties	No	Yes

At the bottom right, there are two buttons: 'Cancel' and 'OK'. The 'OK' button is highlighted with a red rectangle.

5. Click **OK** on the Save Configuration Changes pop-up.



The 'Save Configuration Changes' dialog box has a title bar with a close button (X). Below the title is a green success message box: 'Service configuration changes saved successfully.' At the bottom right, there is an 'OK' button highlighted with a red rectangle.

6. Select **Storm** in the navigation menu, then select **Restart > Restart All Affected** to restart the Storm service and load the new configuration.

The screenshot shows the Ambari interface for the Storm service. On the left is a sidebar with various services like HDFS, MapReduce2, YARN, Tez, Hive, HBase, Pig, Sqoop, Oozie, ZooKeeper, Falcon, Storm, Flume, Accumulo, Ambari Metrics, Atlas, Kafka, Mahout, Ranger, Slider, and Spark. The main panel is titled 'Storm' and has tabs for 'Summary' and 'Configs'. A yellow banner at the top says 'Restart Required: 4 Components on 1 Host'. Below this, there's a 'Restart' button and a 'Restart All Affected' button (highlighted with a red box). A table shows the status of components: V5 (admin, a moment ago, HDP-2.3), V4 (admin, about a minute ago, HDP-2.3), V3 (admin, 2 minutes ago, HDP-2.3), V2 (admin, 10 days ago, HDP-2.3), and V1 (admin, 11 days ago, HDP-2.3). Below the table is a 'Confirm Restart' dialog box with a 'Confirm Restart All' button (highlighted with a red box). The 'Configs' tab is active, showing a list of configuration properties for the Nimbus component, such as nimbus.reassign, nimbus.childopts, nimbus.cleanup.inbox.freq.secs, nimbus.file.copy.expiration.secs, nimbus.inbox.jar.expiration.secs, nimbus.monitor.freq.secs, nimbus.supervisor.timeout.secs, nimbus.task.launch.secs, nimbus.task.timeout.secs, and nimbus.thrift.

7. Click **Confirm Restart All** on the confirmation pop-up to confirm the Storm restart.

The screenshot shows a 'Confirmation' dialog box with the title 'Confirmation' and a close button (X). The text inside says 'You are about to restart Storm'. Below this is a yellow box with the text: 'This will trigger alerts as the service is restarted. To suppress alerts, turn on Maintenance Mode for Storm prior to running restart all'. At the bottom right, there are two buttons: 'Cancel' and 'Confirm Restart All' (highlighted with a red box).

8. After Storm restarts, the Ranger plugin for Storm will be enabled.

5.8. Manually Updating HDFS Audit Settings



Note

HDFS audits are enabled by default in the standard Ranger Ambari installation procedure, and are activated automatically when Ranger is enabled for a plugin.

The following steps show how to save Ranger audits to HDFS for HBase. You can use the same procedure for other components.

1. From the Ambari dashboard, select the HBase service. On the Configs tab, scroll down and select **Advanced ranger-hbase-audit**. Select the **Audit to HDFS** check box.
2. Set the HDFS path where you want to store audits in HDFS:

```
xasecure.audit.destination.hdfs.dir = hdfs://  
$NAMENODE_FQDN:8020/ranger/audit
```

Refer to the `fs.defaultFS` property in the **Advanced core-site** settings.



Note

For NameNode HA, `NAMENODE_FQDN` is the cluster name. In order for this to work, `/etc/hadoop/conf/hdfs-site.xml` needs to be linked under `/etc/<component_name>/conf`.

3. Enable the Ranger plugin for HBase.
4. Make sure that the plugin sudo user should has permission on the HDFS Path:

```
hdfs://NAMENODE_FQDN:8020/ranger/audit
```

For example, we need to create a Policy for Resource : `/ranger/audit`, all permissions to user `hbase`.

5. Save the configuration updates and restart HBase.
6. Generate some audit logs for the HBase component.
7. Check the HDFS component logs on the NameNode:

```
hdfs://NAMENODE_FQDN:8020/ranger/audit
```



Note

For a secure cluster, use the following steps to test audit to HDFS for STORM/KAFKA/KNOX:

- In `core-site.xml` set the `hadoop.proxyuser.<component>.groups` property with value `" * "` or service user.

- For the Knox plugin there is one additional property to add to core-site.xml. Add `hadoop.proxyuser.<component>.users` property with value `" * "` or service user (i.e. `knox`).
- Link to `/etc/hadoop/conf/core-site.xml` under `/etc/<component_name>/conf`.
- Verify the service user principal.
- Make sure that the component user has permissions on HDFS.

5.9. Manually Updating Solr Audit Settings

You can save and store Ranger audits to Solr if you have installed and configured the Solr service in your cluster.

It is recommended that Ranger audits be written to both Solr and HDFS. Audits to Solr are primarily used to enable queries from the Ranger Admin UI. HDFS is a long-term destination for audits – audits stored in HDFS can be exported to any SIEM system, or to another audit store.



Note

If you enabled Solr Audits as part of the standard Ambari installation procedure, audits to Solr are activated automatically when Ranger is enabled for a plugin.

To save Ranger audits to Solr:

1. From the Ambari dashboard, select the Ranger service. On the Configs tab, scroll down and select **Advanced ranger-admin-site**. Set the following property values:
 - `ranger.audit.source.type = solr`
 - `ranger.audit.solr.urls = http://solr_host:6083/solr/ranger_audits`
 - `ranger.audit.solr.username = ranger_solr`
 - `ranger.audit.solr.password = NONE`
2. Restart the Ranger service.
3. After the Ranger service has been restarted, you will then need to make specific configuration changes for each plugin to ensure that the plugin's data is captured in Solr.
4. For example, if you would like to configure HBase for audits to Solr, perform the following steps:
 - Select the Audit to Solr checkbox in Advanced ranger-hbase-audit.
 - Enable the Ranger plugin for HBase.

- Restart the HBase component.
5. Verify that the Ranger audit logs are being passed to Solr by opening one of the following URLs in a web browser:

`http://{RANGER_HOST_NAME}:6080/index.html#!/reports/audit/bigData`

`http://{SOLR_HOST}:6083/solr/ranger_audits`

6. Ranger Plugins - Kerberos Overview

If you are using a Kerberos-enabled cluster, there are a number of steps you need to follow to ensure you can use the different Ranger plugins on a Kerberos cluster. These plugins are:

1. [HDFS](#)
2. [Hive](#)
3. [HBase](#)
4. [Knox](#)

6.1. HDFS

To enable the Ranger HDFS plugin on a Kerberos-enabled cluster, perform the steps described below.

1. Create the system (OS) user `rangerhdfslookup`. Make sure this user is synced to Ranger Admin (under *users/groups* tab in the Ranger Admin User Interface).
2. Create a Kerberos principal for `rangerhdfslookup` by entering the following command:

```
• kadmin.local -q 'addprinc -pw rangerhdfslookup  
rangerhdfslookup@example.com'
```



Note

A single user/principal (e.g., `rangerrepouser`) can also be created and used across services.

3. Navigate to the HDFS service.
4. Click on the **Config** tab.
5. Navigate to *advanced ranger-hdfs-plugin-properties* and update the properties listed in the table shown below.

The screenshot shows the 'Advanced ranger-hdfs-plugin-properties' configuration page in the Ranger Admin interface. The page has a header with 'Current' and 'admin authored on Tue, Mar 10, 2015 16:20'. The main content area contains several configuration options:

- Enable Ranger for HDFS**: A checkbox that is checked.
- Audit to HDFS**: A checkbox that is checked.
- Audit to DB**: A checkbox that is checked.
- policy User for HDFS**: A text field with the value 'ambari-qa'.
- Ranger repository config password**: A text field with the value 'hdfsuser'.
- Ranger repository config user**: A text field with the value 'hdfsuser@EXAMPLE.COM'.
- common name for certificate**: A text field that is empty.
- hadoop.rpc.protection**: A text field with the value 'authentication'.
- SSL_KEYSTORE_FILE_PATH**: A text field with the value '/etc/hadoop/conf/ranger-plugin-keystore.jks'.

Table 6.1. HDFS Plugin Properties

Configuration Property Name	Value
Ranger repository config user	rangerhdfslookup@example.com
Ranger repository config password	rangerhdfslookup
common.name.for.certificate	blank

6. After updating these properties, click **Save** and restart the HDFS service.

6.2. Hive

To enable the Ranger HBase plugin on a Kerberos-enabled cluster, perform the steps described below.

1. Create the system (OS) user `rangerhivelookup`. Make sure this user is synced to Ranger Admin (under *users/groups* tab in the Ranger Admin UI).
2. Create a Kerberos principal for `rangerhivelookup` by entering the following command:
 - `kadmin.local -q 'addprinc -pw rangerhivelookup rangerhivelookup@example.com'`
3. Navigate to the Hive service.
4. Click on the **Config** tab and navigate to *advanced ranger-hive-plugin-properties*.
5. Update the following properties with the values listed in the table below.

Table 6.2. Hive Plugin Properties

Configuration Property Name	Value
Ranger repository config user	rangerhivelookup@example.com
Ranger repository config password	rangerhivelookup
common.name.for.certificate	blank

6. After updating these properties, click **Save** and then restart the Hive service.

6.3. HBase

To enable the Ranger HBase plugin on a Kerberos-enabled cluster, perform the steps described below.

1. Create the system (OS) user `rangerhbaselookup`. Make sure this user is synced to Ranger Admin (under *users/groups* tab in the Ranger Admin UI).
2. Create a Kerberos principal for `rangerhbaselookup` by entering the following command:
 - `kadmin.local -q 'addprinc -pw rangerhbaselookup rangerhbaselookup@example.com'`

3. Navigate to the HBase service.
4. Click on the **Config** tab and go to *advanced ranger-hbase-plugin-properties*.
5. Update the following properties with the values listed in the table below.

Table 6.3. HBase Plugin Properties

Configuration Property Name	Value
Ranger repository config user	rangerhbaselookup@example.com
Ranger repository config password	rangerhbaselookup
common.name.for.certificate	blank

6. After updating these properties, click **Save** and then restart the HBase service.

6.4. Knox

To enable the Ranger Knox plugin on a Kerberos-enabled cluster, perform the steps described below.

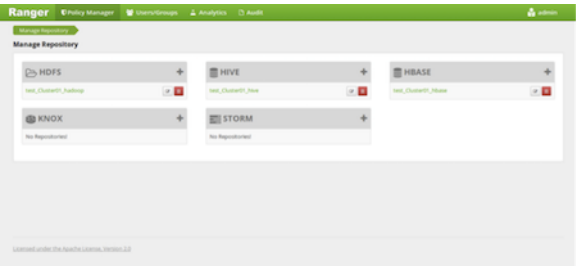
1. Create the system (OS) user `rangerknoxlookup`. Make sure this user is synced to Ranger Admin (under *users/groups* tab in the Ranger Admin UI).
2. Create a Kerberos principal for `rangerknoxlookup` by entering the following command:
 - `kadmin.local -q 'addprinc -pw rangerknoxlookup rangerknoxlookup@example.com'`
3. Navigate to the Knox service.
4. Click on the **Config** tab and navigate to *advanced ranger-knox-plugin-properties*.
5. Update the following properties with the values listed in the table below.

Table 6.4. Knox Plugin Properties

Configuration Property Name	Value
Ranger repository config user	rangerknoxlookup@example.com
Ranger repository config password	rangerknoxlookup
common.name.for.certificate	blank

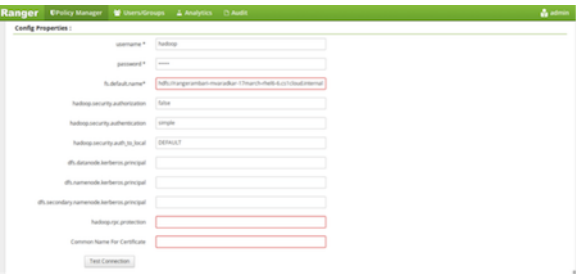
6. After updating these properties, click **Save** and then restart the Knox service.
7. Open the Ranger Admin UI by entering the following information:
 - `http://ranger-host>:6080`
 - **username/password** - `admin/admin`. or use *username* as shown in *advanced ranger-env* under the **Config** tab of the Ranger service, and *password* as shown in **Admin Settings**.
8. After you have successfully logged into the system, you will be redirected to the Policy Manager page.

Figure 6.1. Knox Policy Manager



9. Click on the repository (clusterName_hadoop) **Edit** option under the HDFS box.

Figure 6.2. Knox Repository Edit



10.Update the following properties listed in the table below under the Config Properties section:

Table 6.5. Knox Configuration Properties

Configuration Property Name	Value
fs.default.name	hdfs
hadoop.rpc.protection	blank
common.name.for.certificate	blank

11.Click on **Named Test Connection**. You should see a *Connected Successfully* dialog box appear.

12.Click **Save**.