Hortonworks Data Platform

Ranger Ambari Installation

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Hortonworks Data Platform: Ranger Ambari Installation

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

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

Please visit the Hortonworks Data Platform page for more information on Hortonworks technology. For more information on Hortonworks services, please visit either the Support or Training page. Feel free to contact us directly to discuss your specific needs.

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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 Apace 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 [2]
  - Configuring PostgreSQL for Ranger [3]
  - Configuring Oracle for Ranger [4]
- 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`.

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 [10]
3. Complete the Ranger Installation [36]

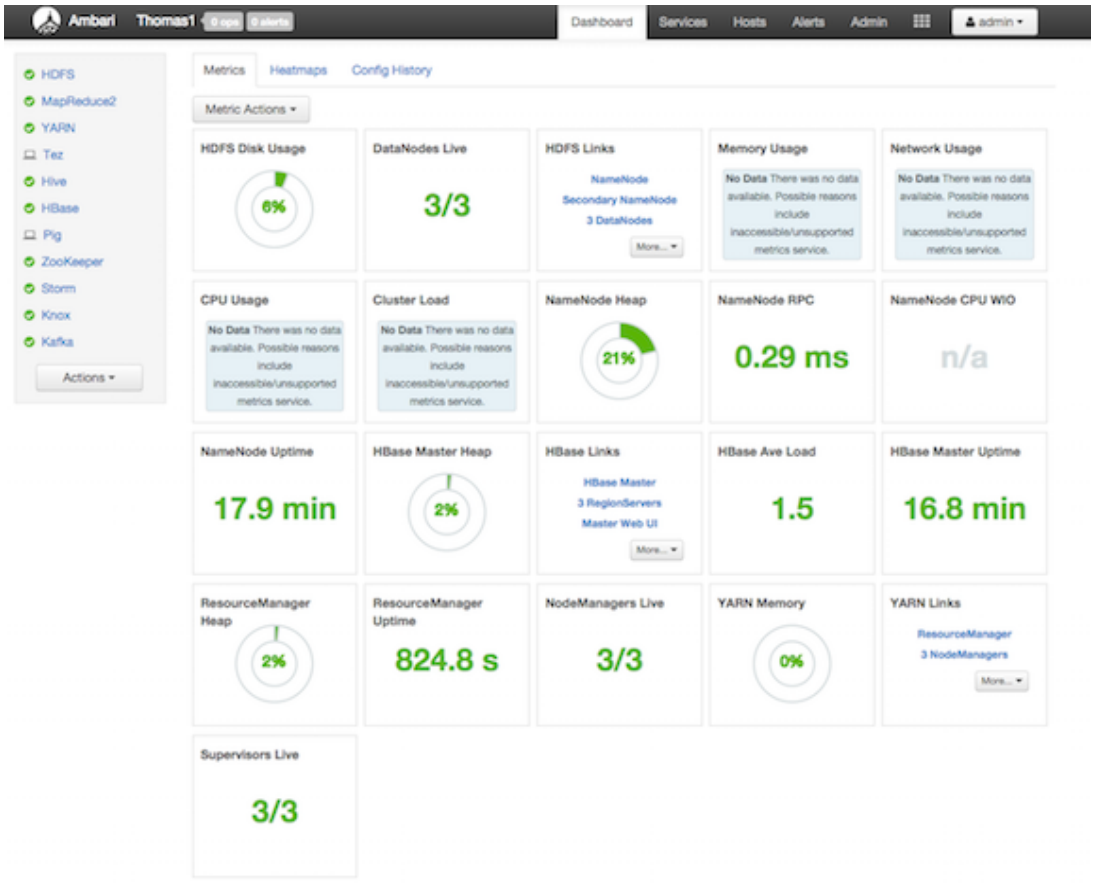
Related Topics

- Setting up Database Users Without Sharing DBA Credentials [37]
- Updating Ranger Admin Passwords [38]

3.1. Start the Installation

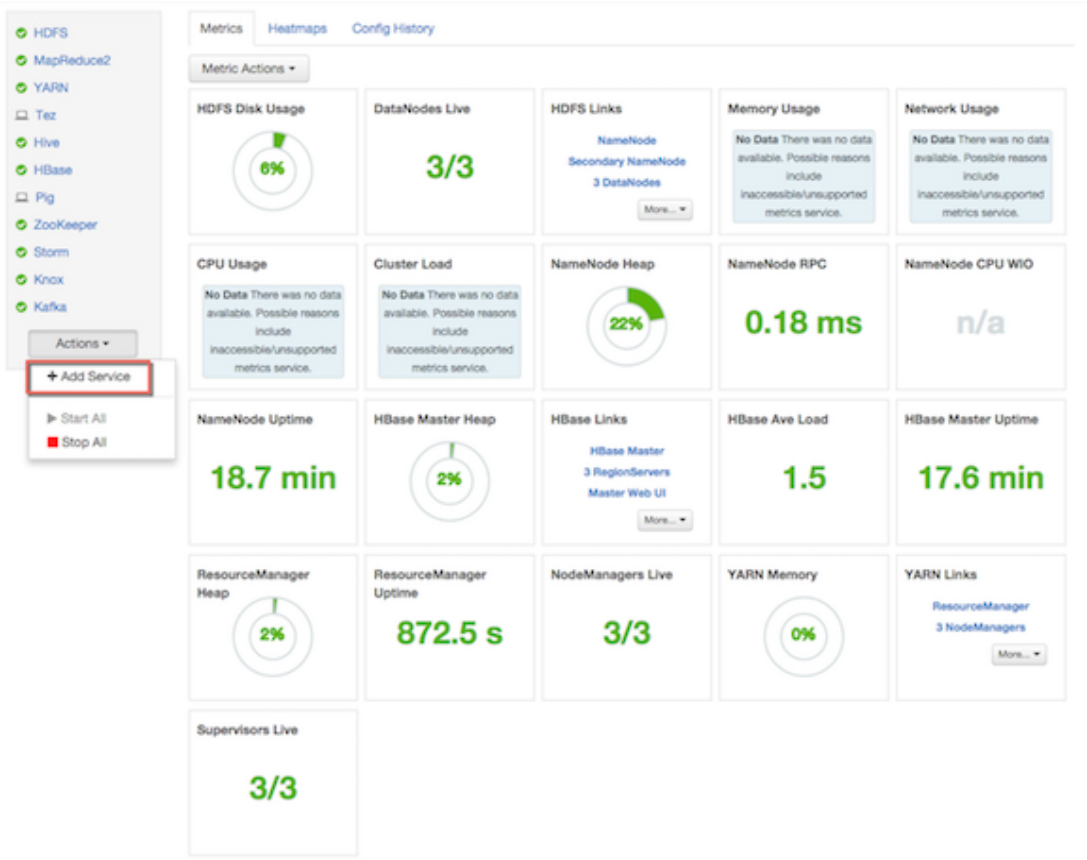
1. Log into your Ambari cluster with your designated user credentials. The main Ambari Dashboard page will be displayed.

Figure 3.1. Installing Ranger - Main Dashboard View



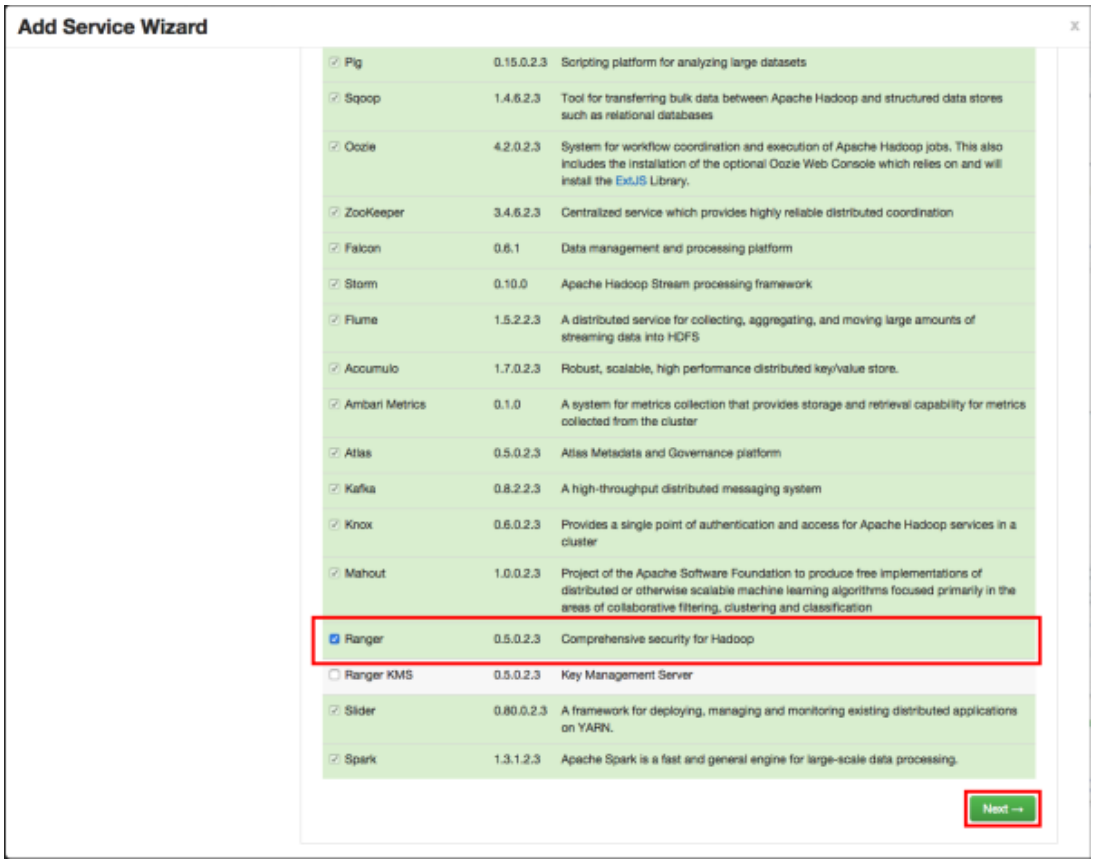
2. In the left navigation menu, click **Actions**, then select **Add Service**.

Figure 3.2. Installing Ranger - Add Service



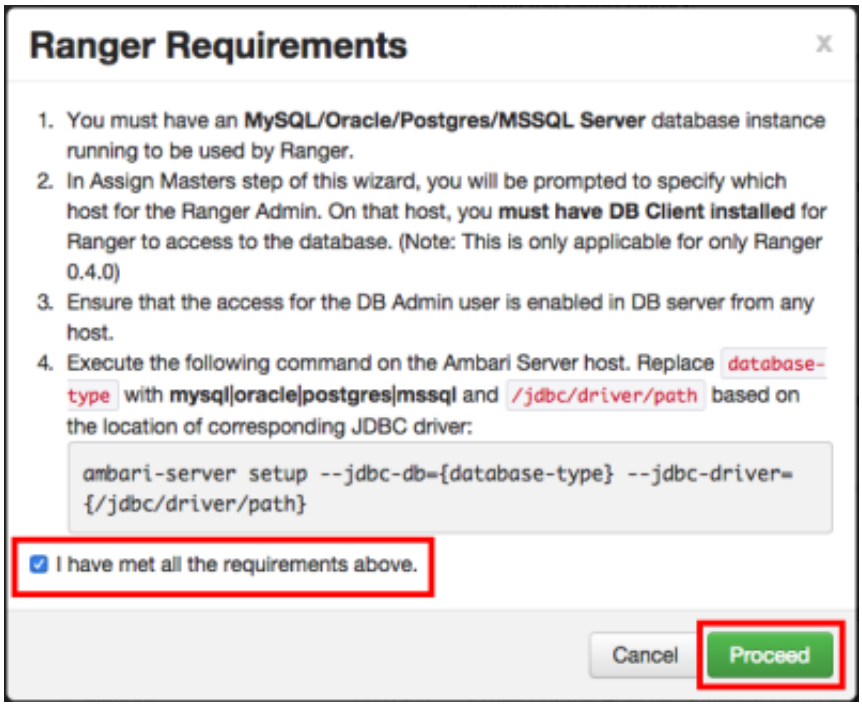
3. On the Choose Services page, select **Ranger**, then click **Next**.

Figure 3.3. Installing Ranger - Choose Service



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



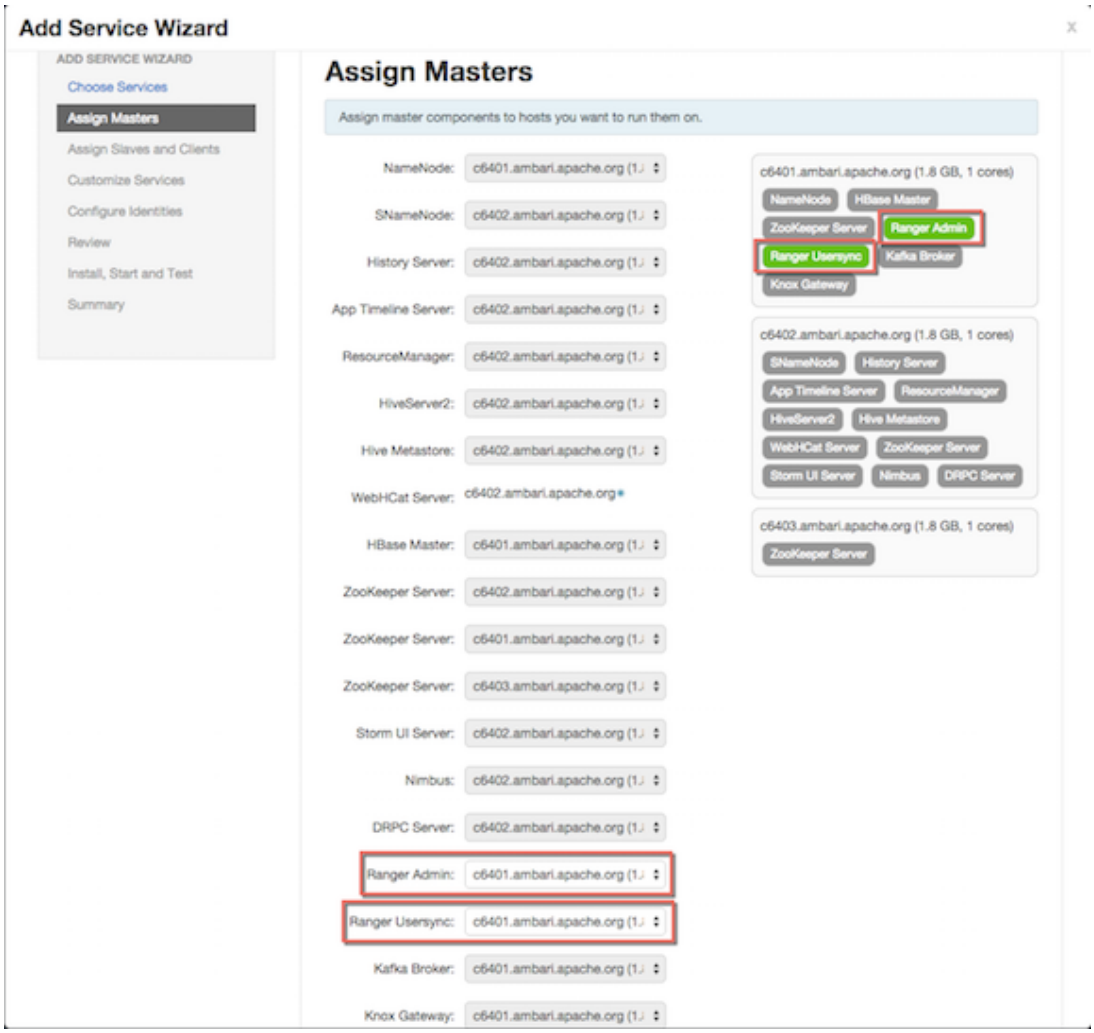
5. You are then prompted to select the host where Ranger Admin will be installed. This host should have DB admin access to the Ranger DB host and User Sync. Notice in the figure below that both the Ranger Admin and Ranger User Sync services will be installed on the primary node in the cluster (c6401.ambari.apache.org 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



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

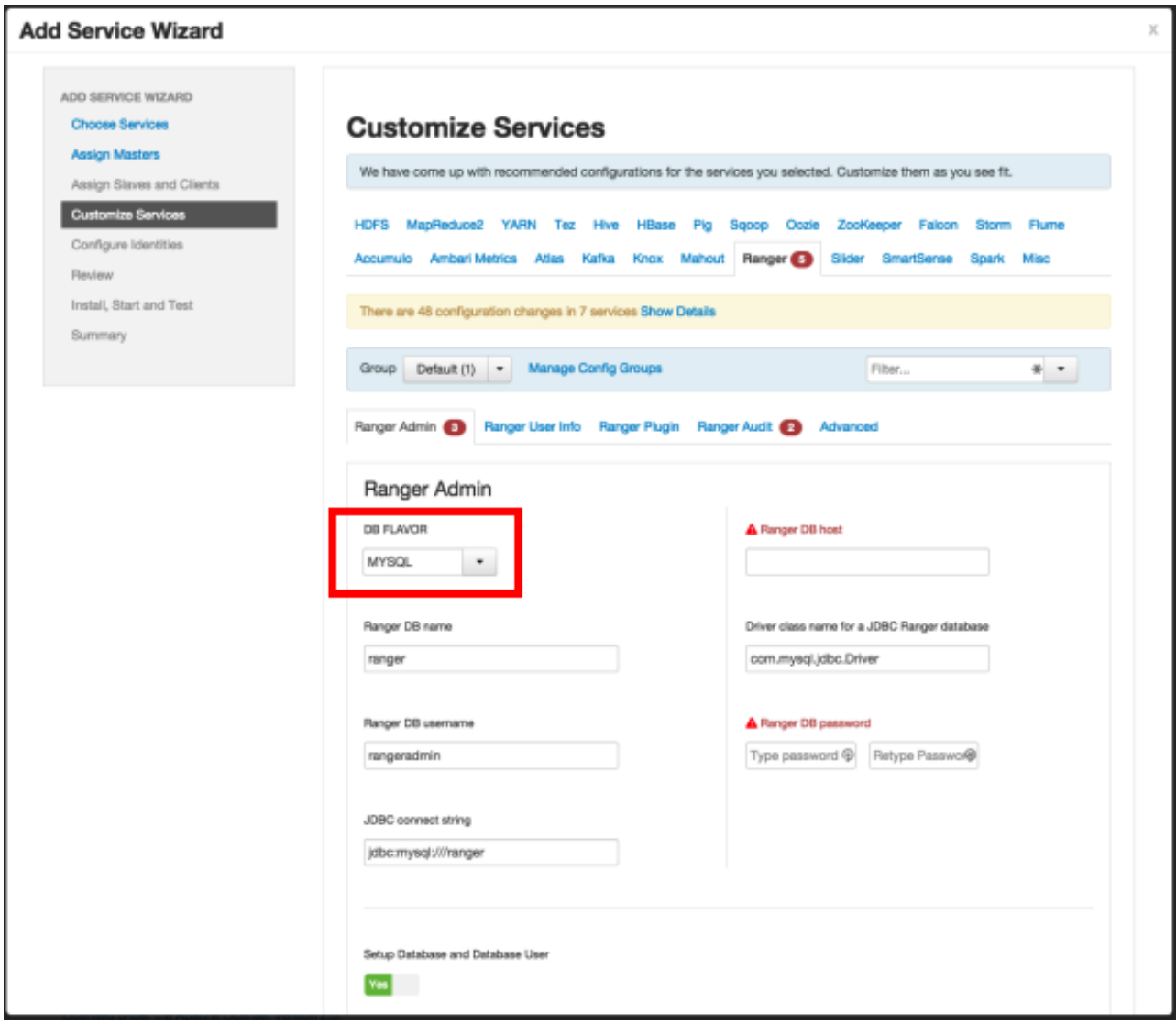
3.2. Customize Services

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

- Ranger Admin Settings [11]
- Ranger Audit Settings [20]
- Configure Ranger User Sync [21]
- Configure Ranger Authentication [28]

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.



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>	c6401.ambari.apache.org:1521:ORCL
	<HOST:PORT/Service>	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 not 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]	jdbc:oracle:thin:@//c6401.ambari.apache.org:1521/**XE**
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;database=db_name	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.

8. **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

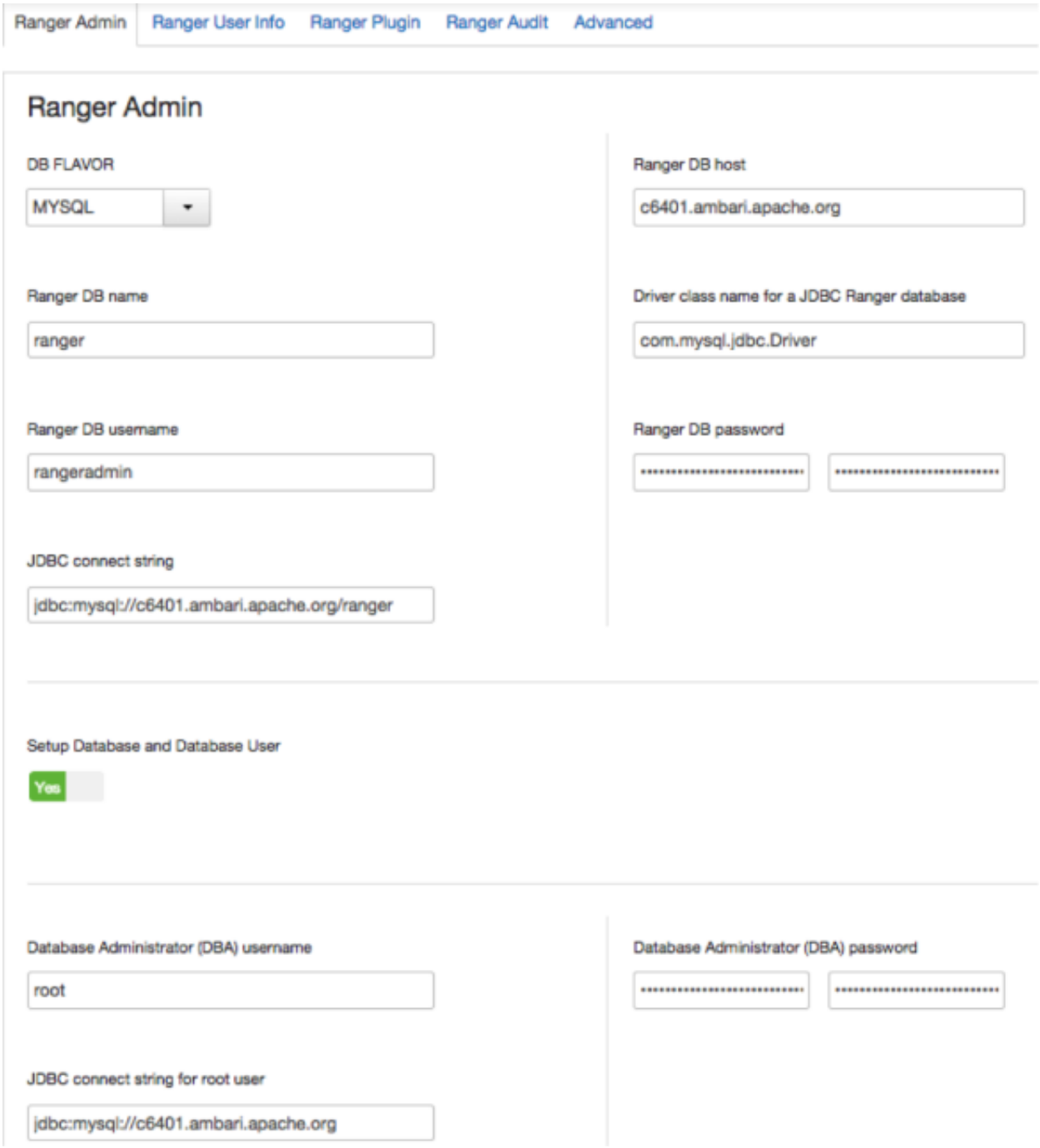
As mentioned in the note in the previous step, if **Setup Database and Database User** is set to **No**, a placeholder DBA username and password may still be required in order to continue with the Ranger installation.

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

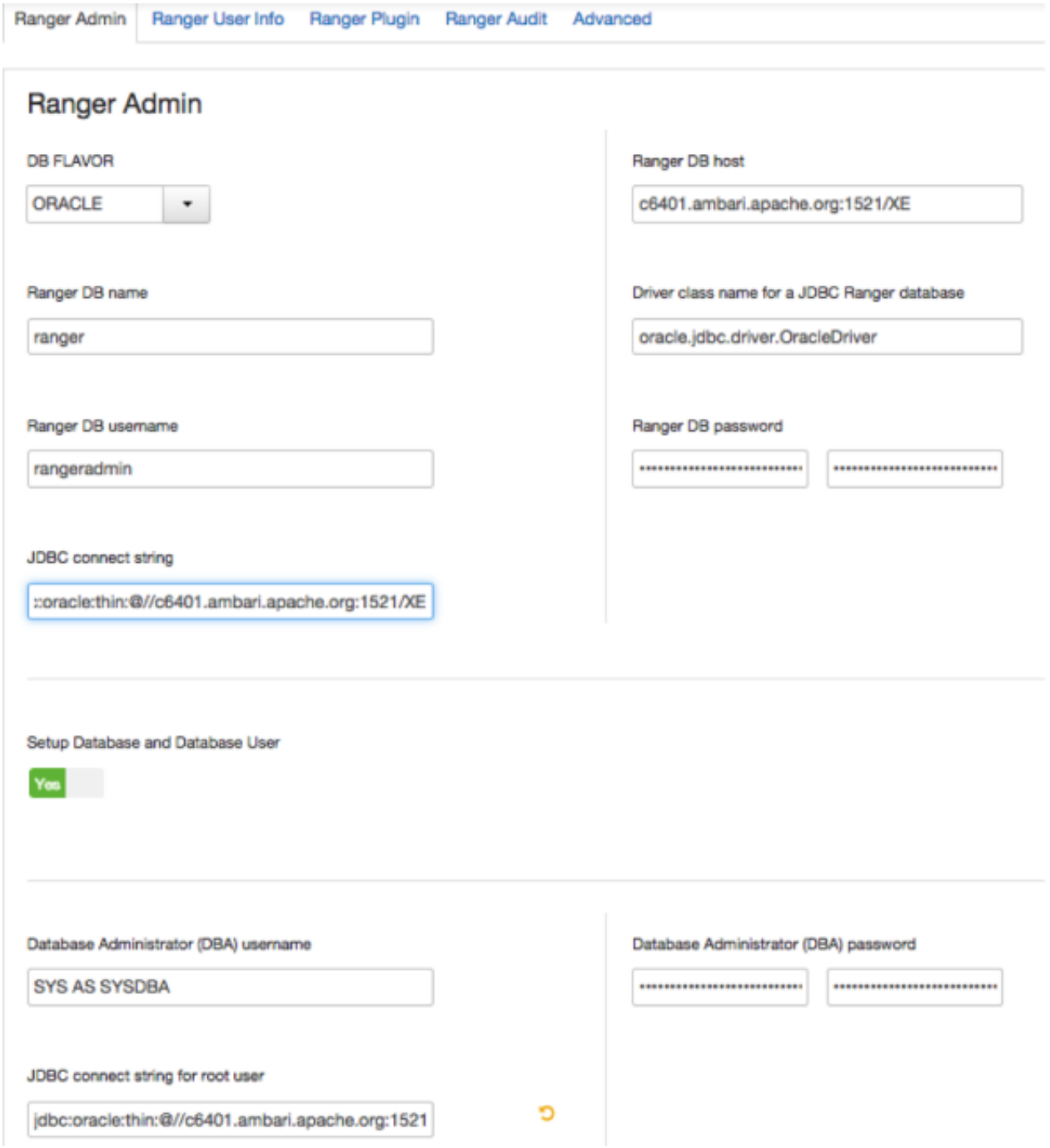
Note

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.

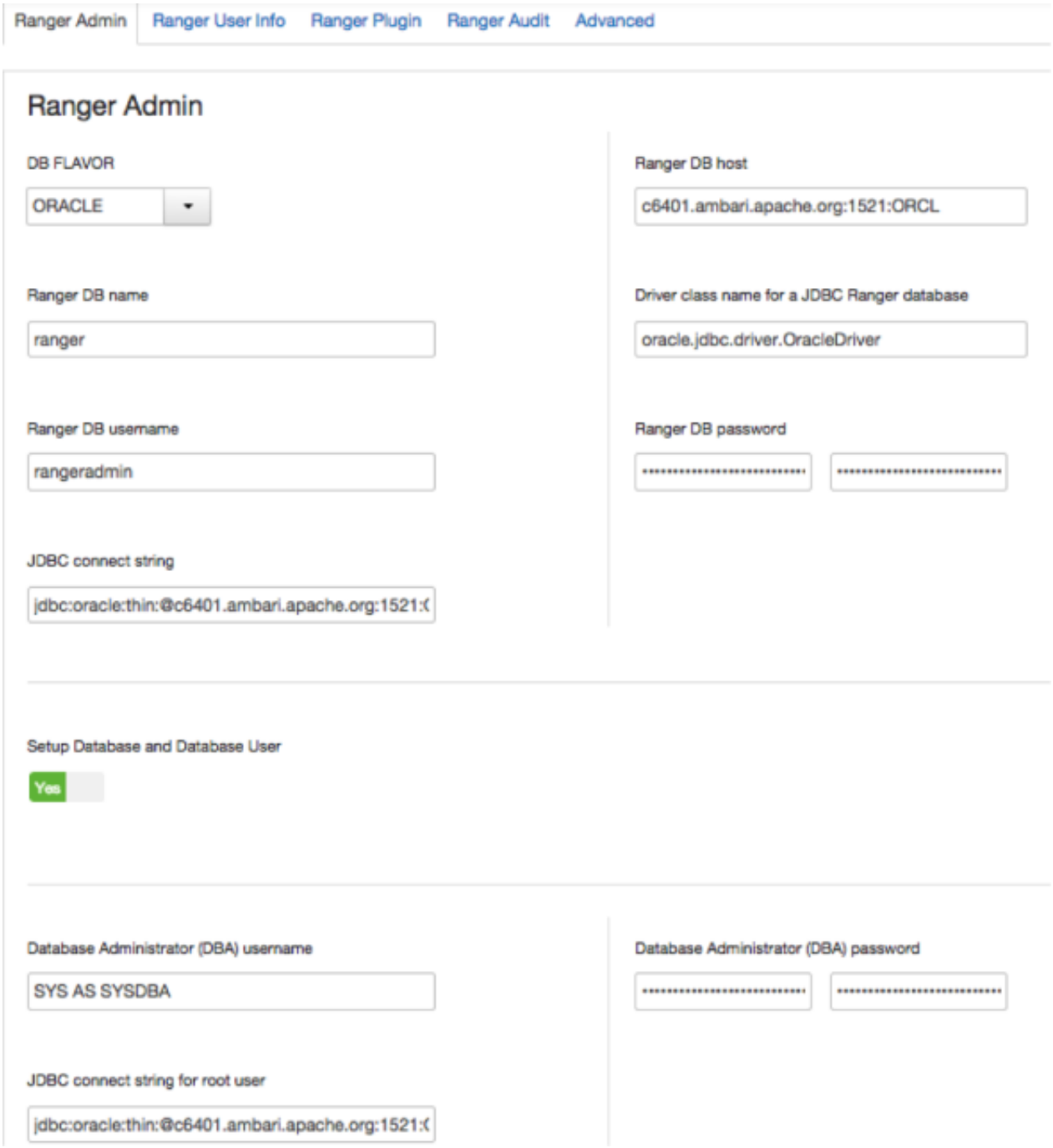
MySQL



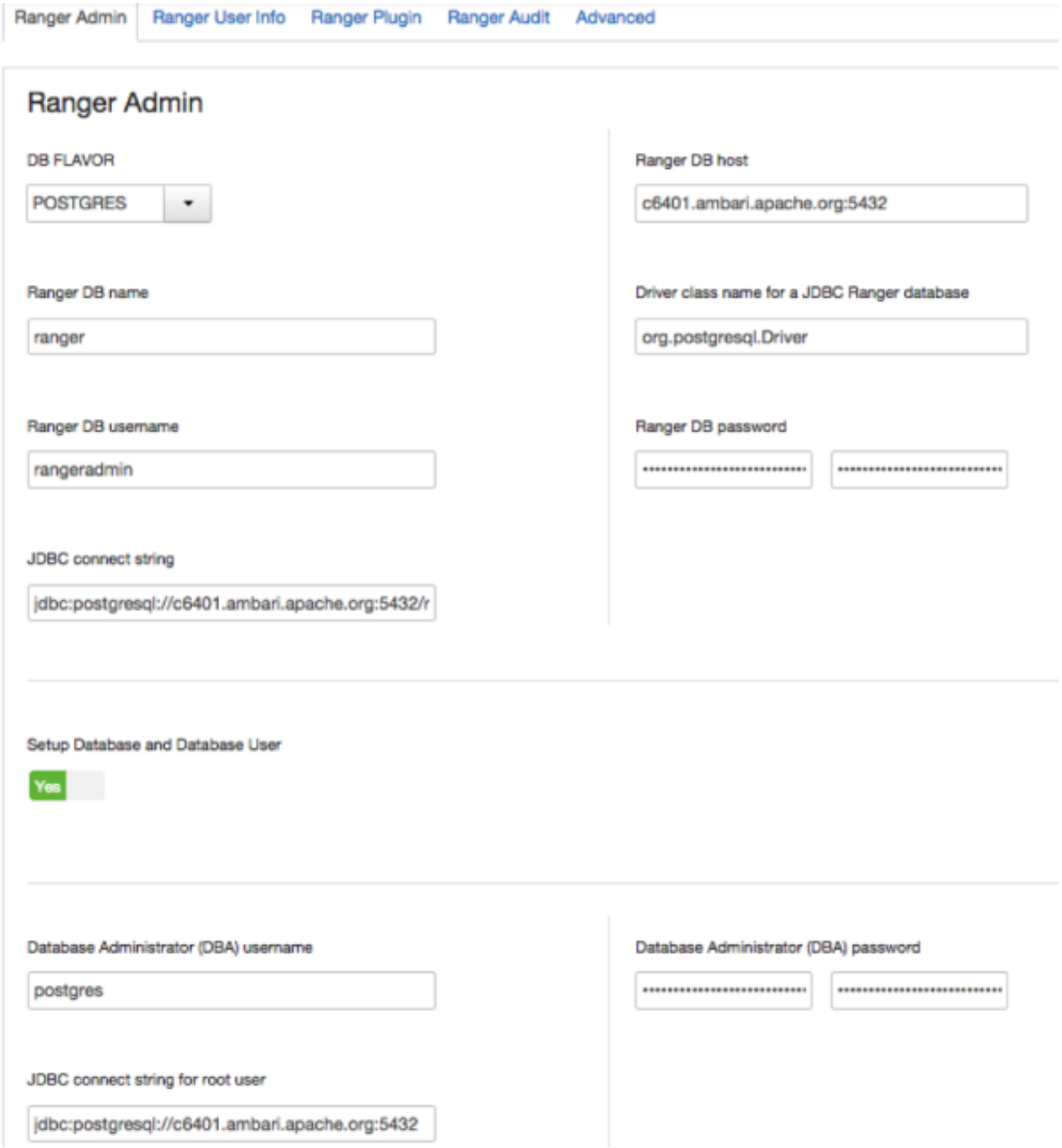
Oracle – if the Oracle instance is running with a Service name.



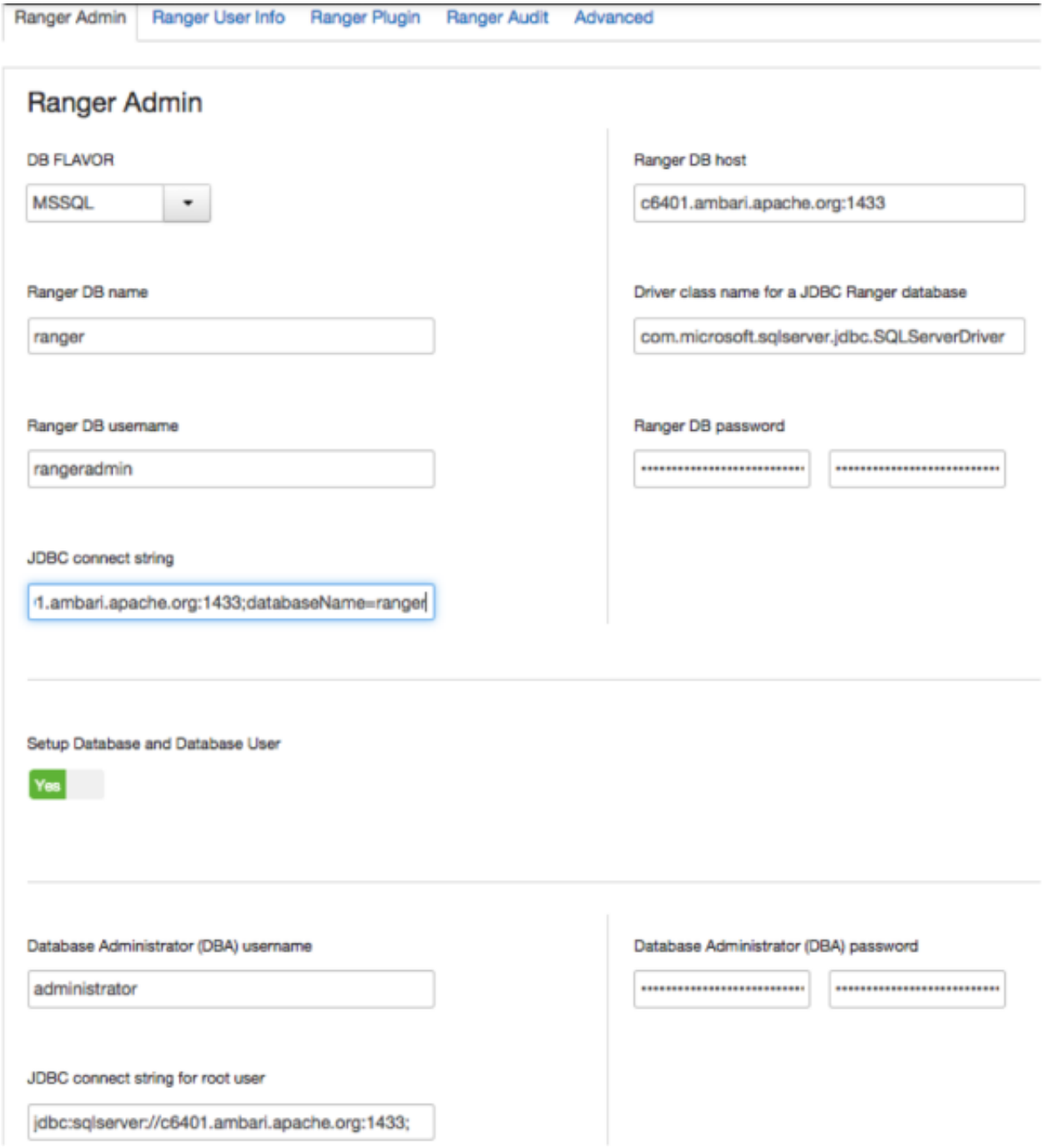
Oracle – if the Oracle instance is running with a SID.


Ranger Admin
Ranger User Info
Ranger Plugin
Ranger Audit
Advanced
Ranger Admin
DB FLAVOR
ORACLE
Ranger DB host
c6401.ambari.apache.org:1521:ORCL
Ranger DB name
ranger
Driver class name for a JDBC Ranger database
oracle.jdbc.driver.OracleDriver
Ranger DB username
rangeradmin
Ranger DB password
JDBC connect string
jdbc:oracle:thin:@c6401.ambari.apache.org:1521:(
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:(

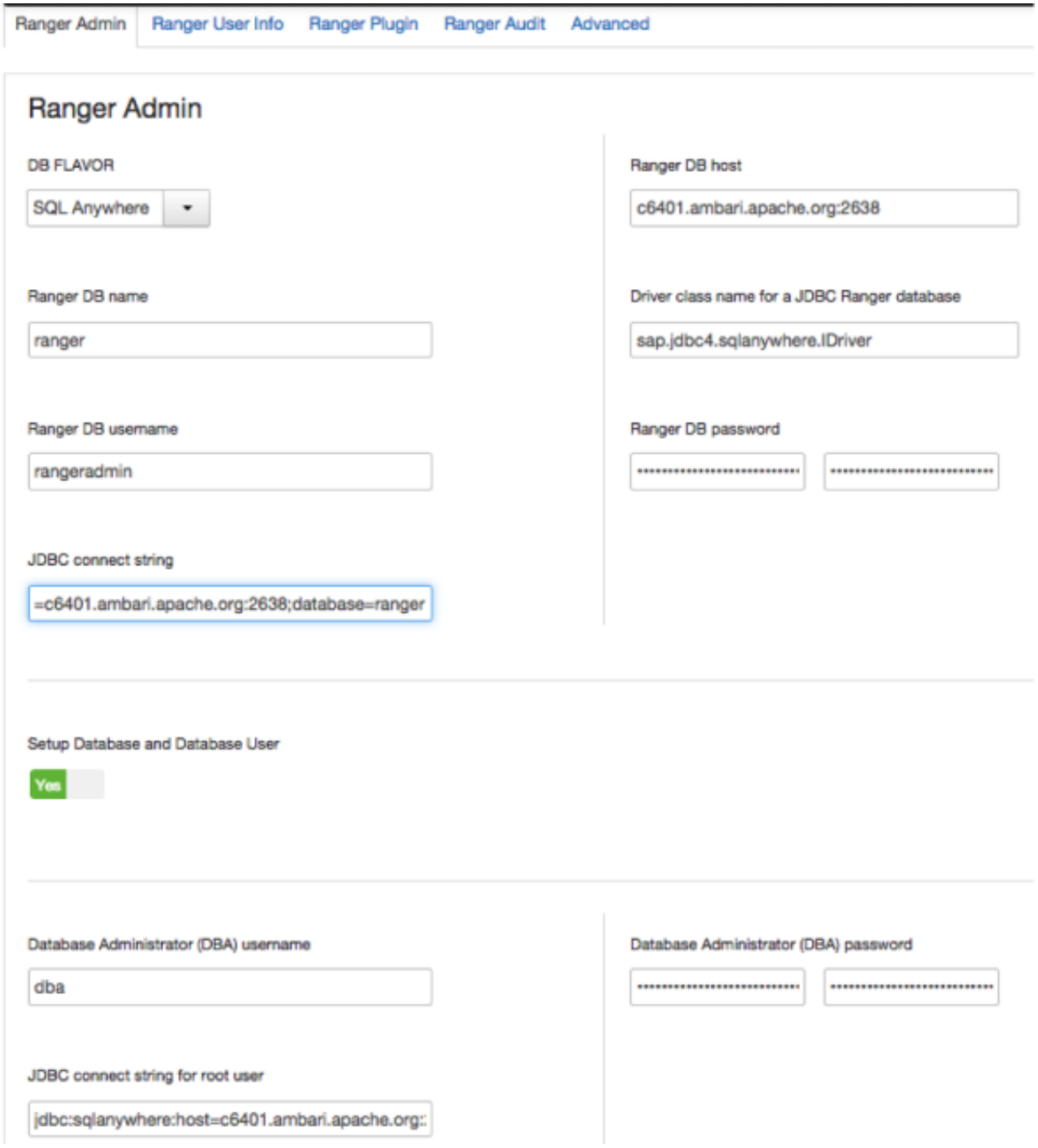
PostgreSQL


Ranger Admin
Ranger User Info
Ranger Plugin
Ranger Audit
Advanced
Ranger Admin
DB FLAVOR
POSTGRES
Ranger DB host
c6401.ambari.apache.org:5432
Ranger DB name
ranger
Driver class name for a JDBC Ranger database
org.postgresql.Driver
Ranger DB username
rangeradmin
Ranger DB password
JDBC connect string
jdbc:postgresql://c6401.ambari.apache.org:5432/r
Setup Database and Database User
Yes
Database Administrator (DBA) username
postgres
Database Administrator (DBA) password
JDBC connect string for root user
jdbc:postgresql://c6401.ambari.apache.org:5432

MS SQL



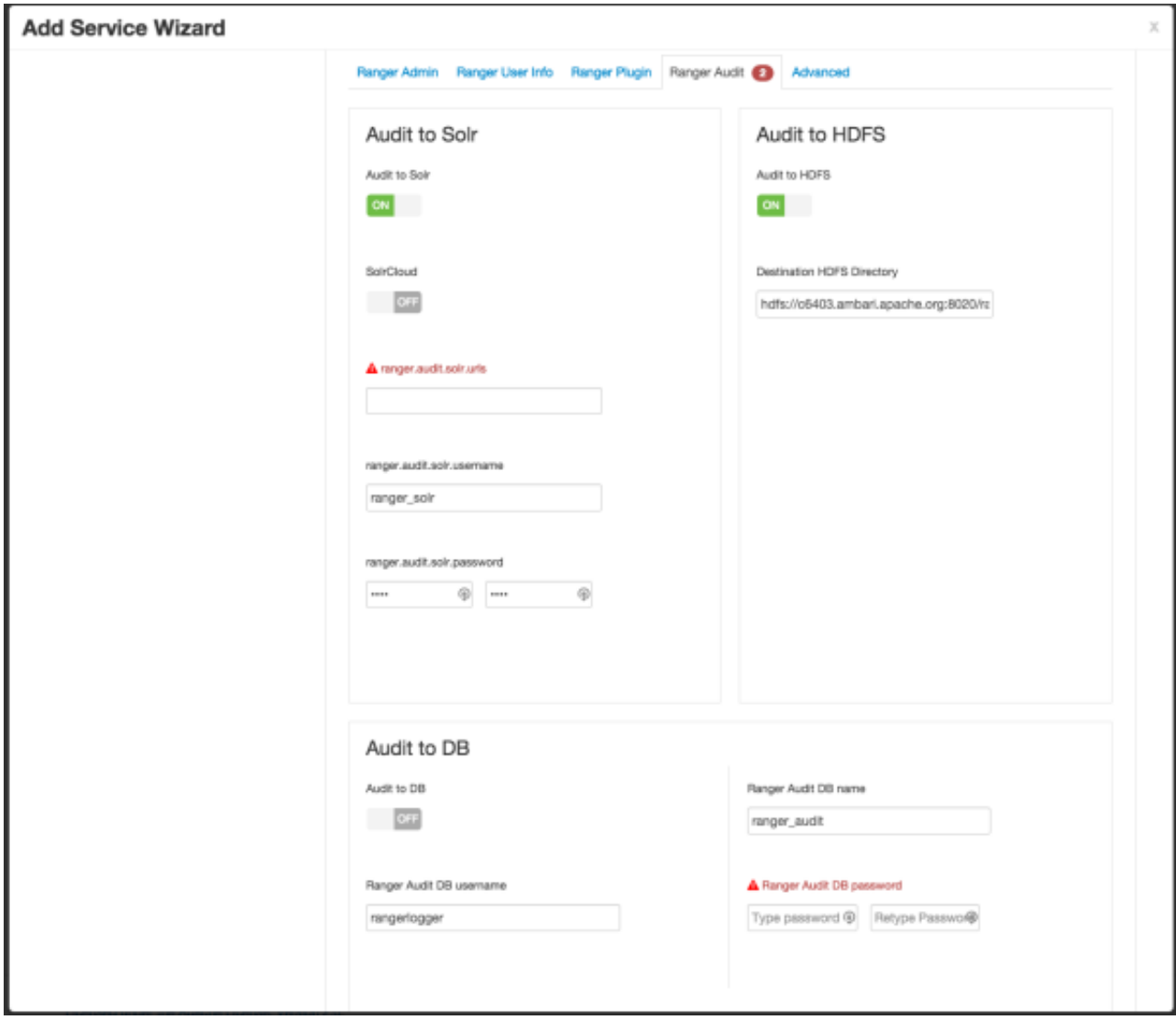
SQL Anywhere



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.



2. 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.

3. 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 [22]
- Configuring Ranger User Sync for LDAP/AD [23]

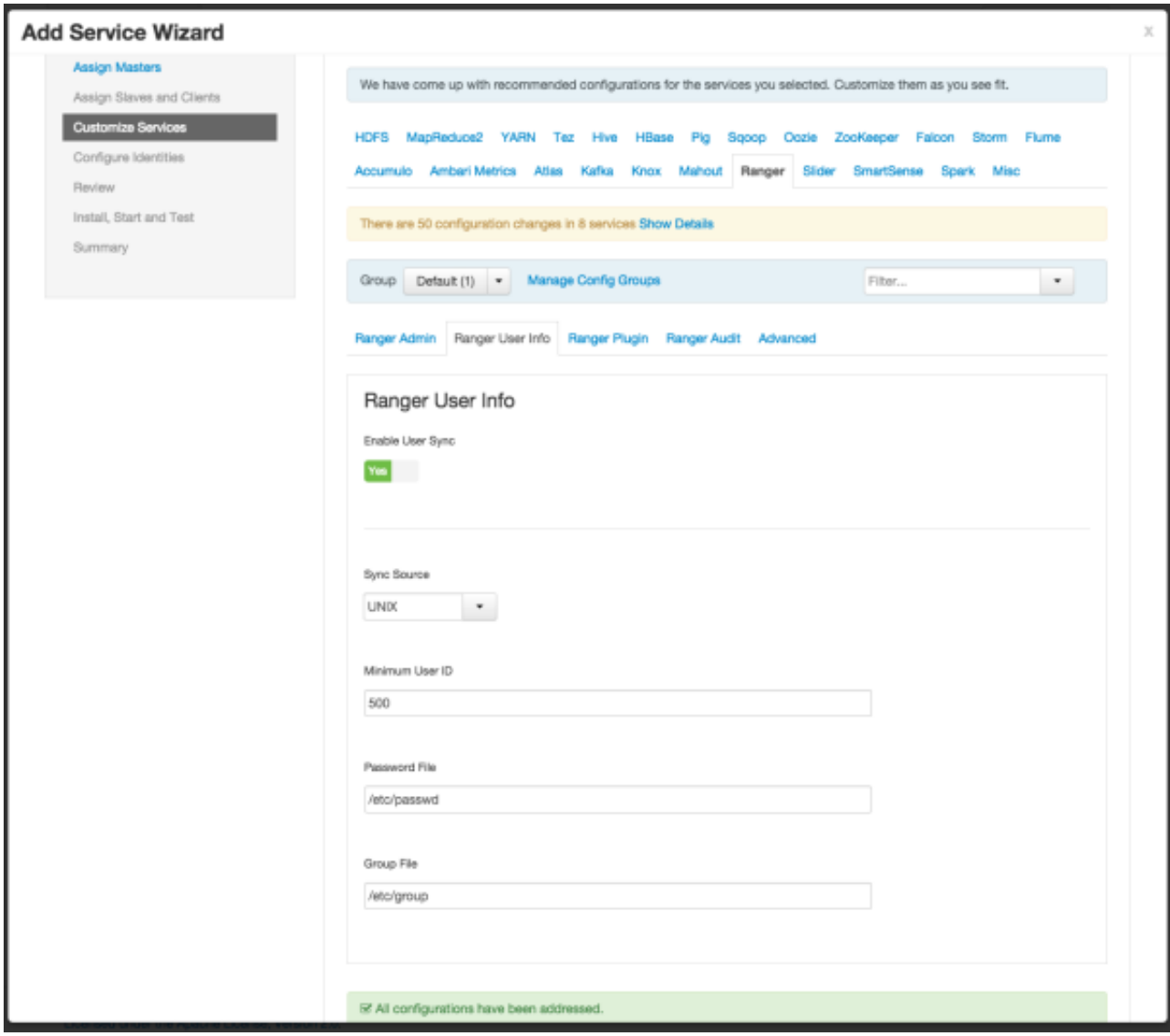
3.2.3.1. Configuring Ranger User Sync for UNIX

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



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.

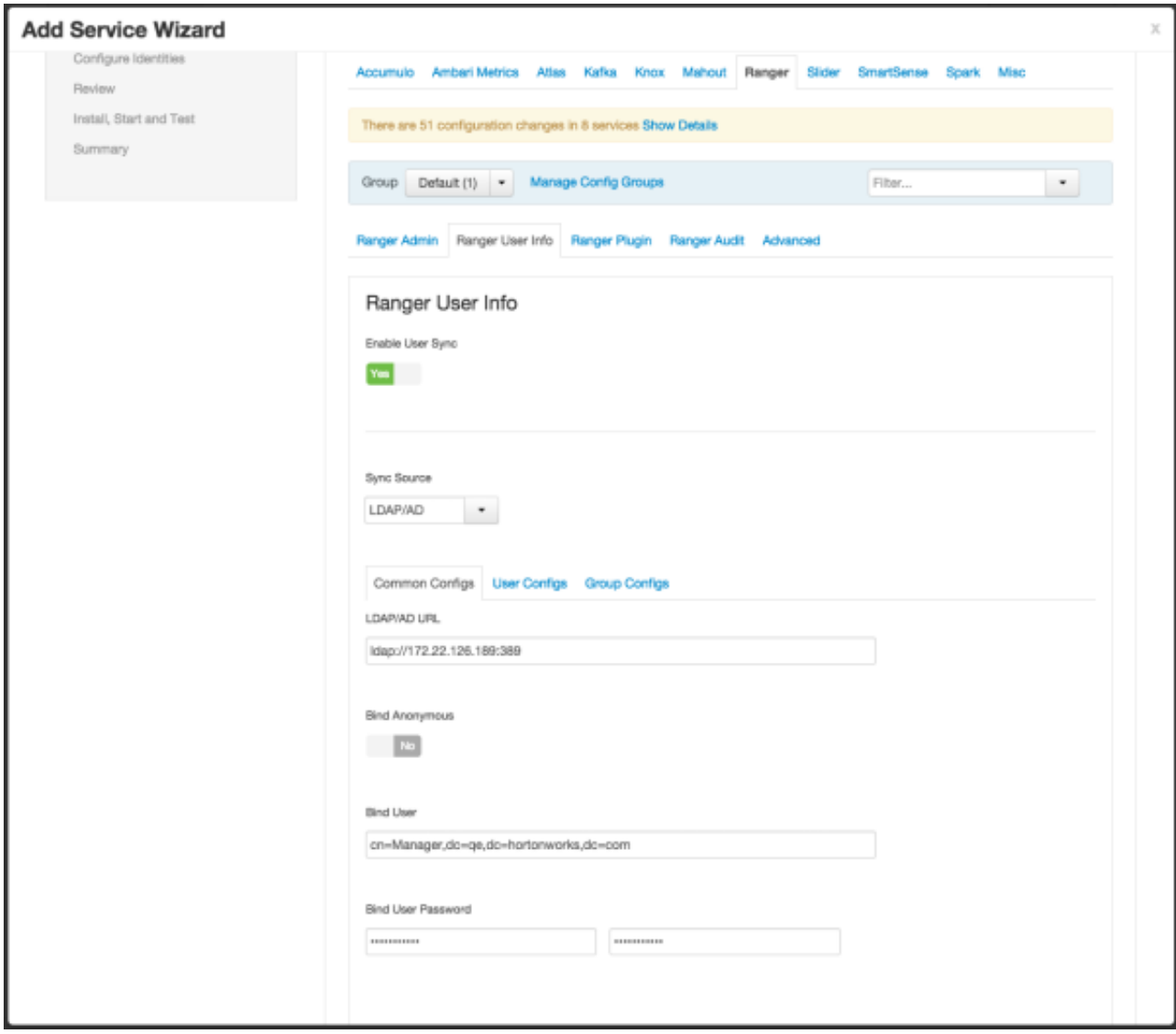
Use the following steps to configure Ranger User Sync for LDAP/AD.

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.		

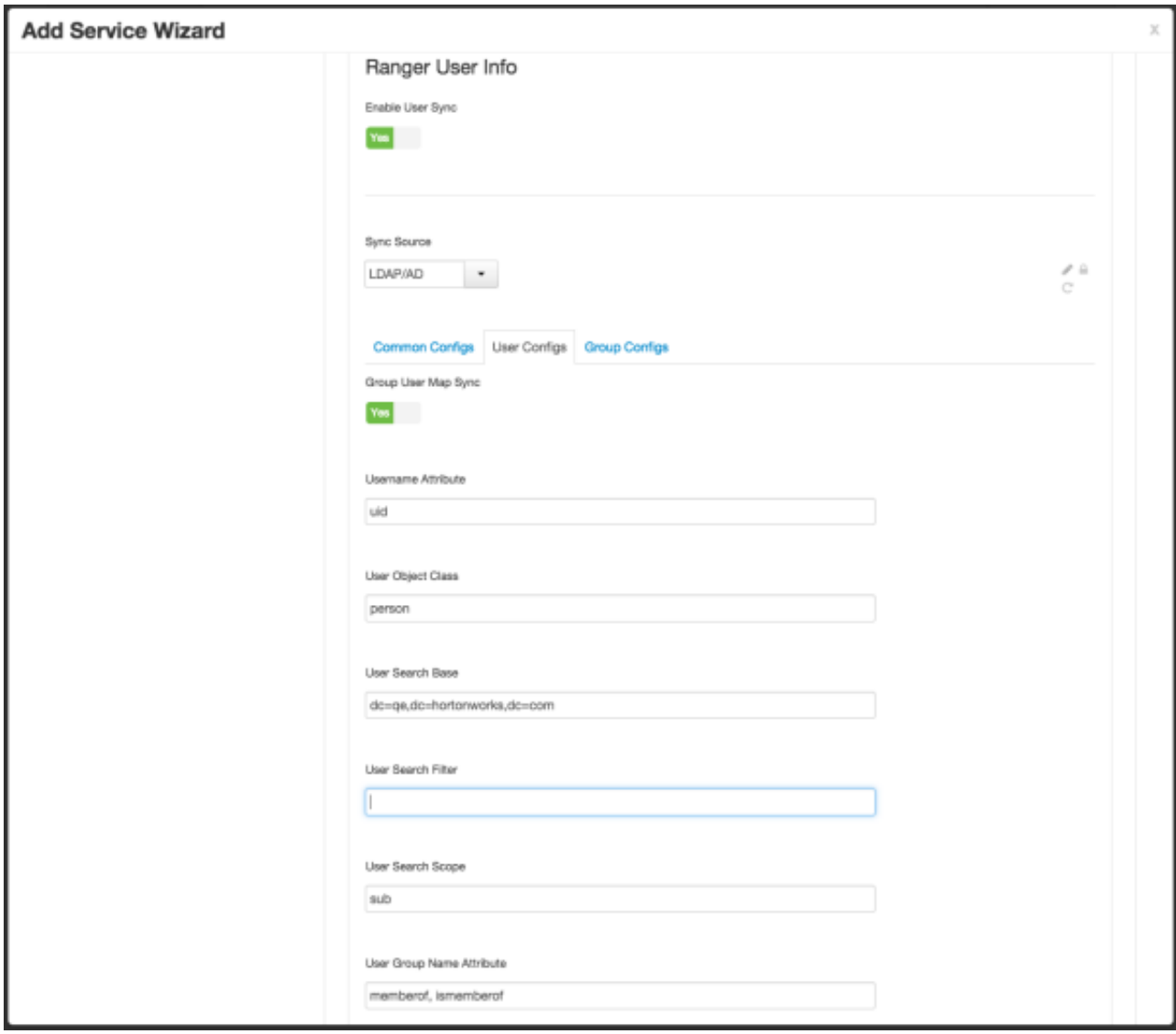


5. Set the following properties on the User Configs tab.

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

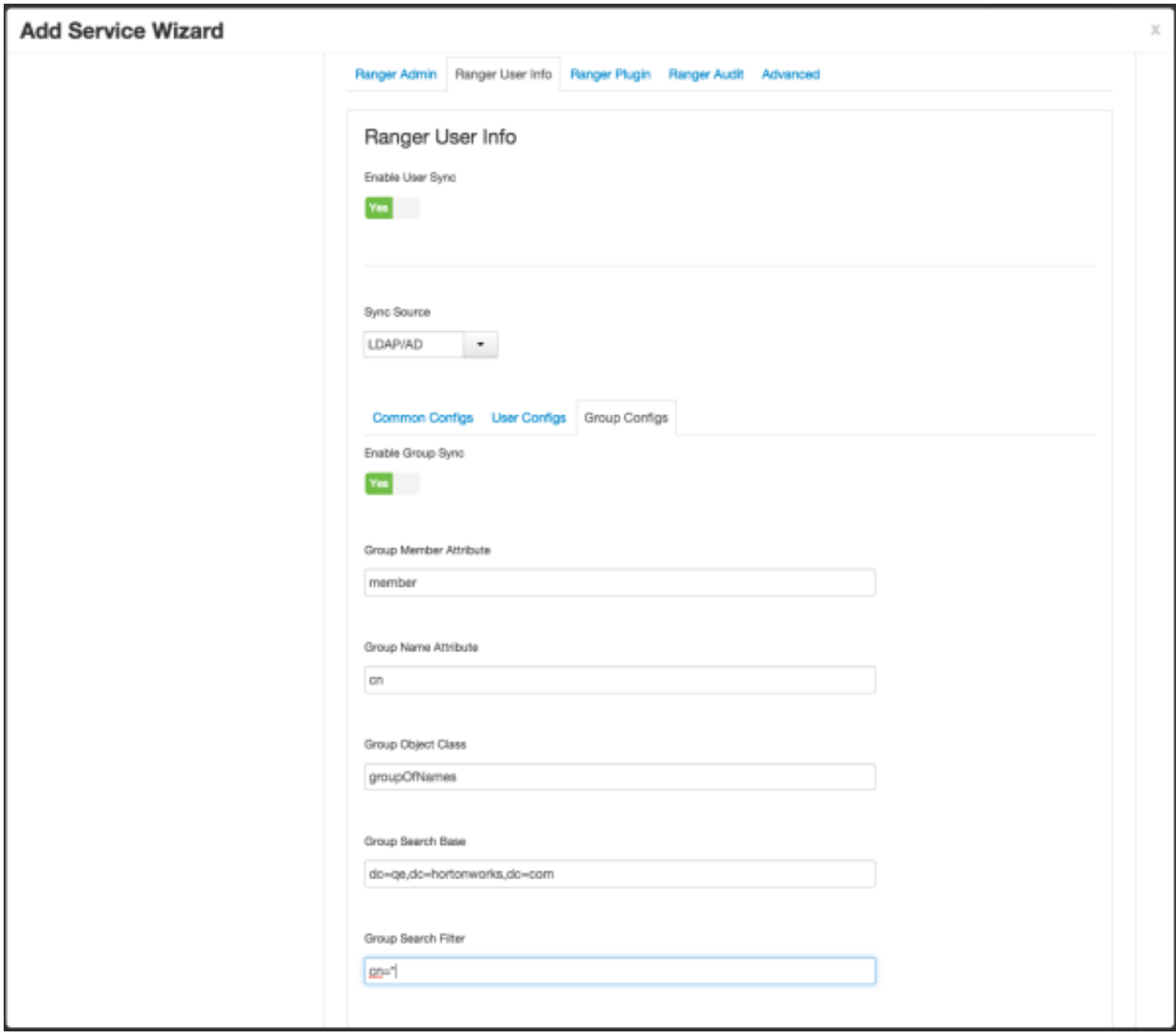
Property	Description	Default Value	Sample Values
			of groupA or groupB: (| (memberof=CN=GroupA,OU=groups,DC=example (memberof=CN=GroupB,OU=groups,DC=example
User Search Scope	This value is used to limit user search to the depth from search base.	sub	base, one, or sub
User Group Name Attribute	Attribute 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



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	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. 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.	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.		Sample filter to retrieve all groups: cn=* Sample filter to retrieve only the groups whose cn is Engineering or Sales: (|(cn=Engineering)(cn=Sales))



3.2.4. Configure Ranger Authentication

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

- Configuring Ranger UNIX Authentication [28]
- Configuring Ranger LDAP Authentication [30]
- Configuring Ranger Active Directory Authentication [33]

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.

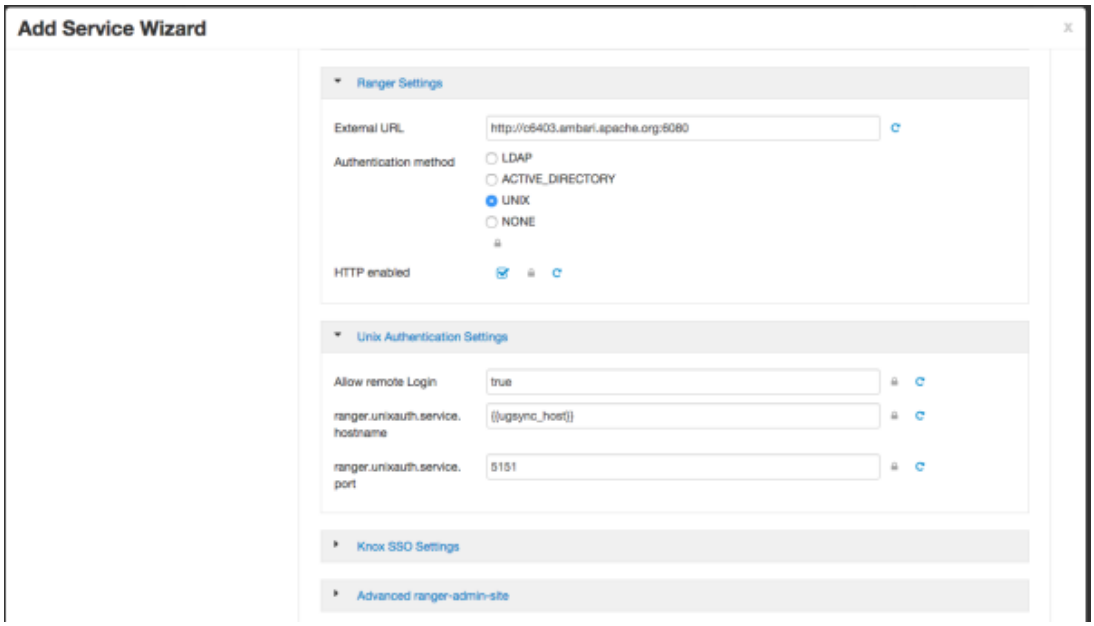
4. Under UNIX Authentication Settings, set the following properties.

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.



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}}

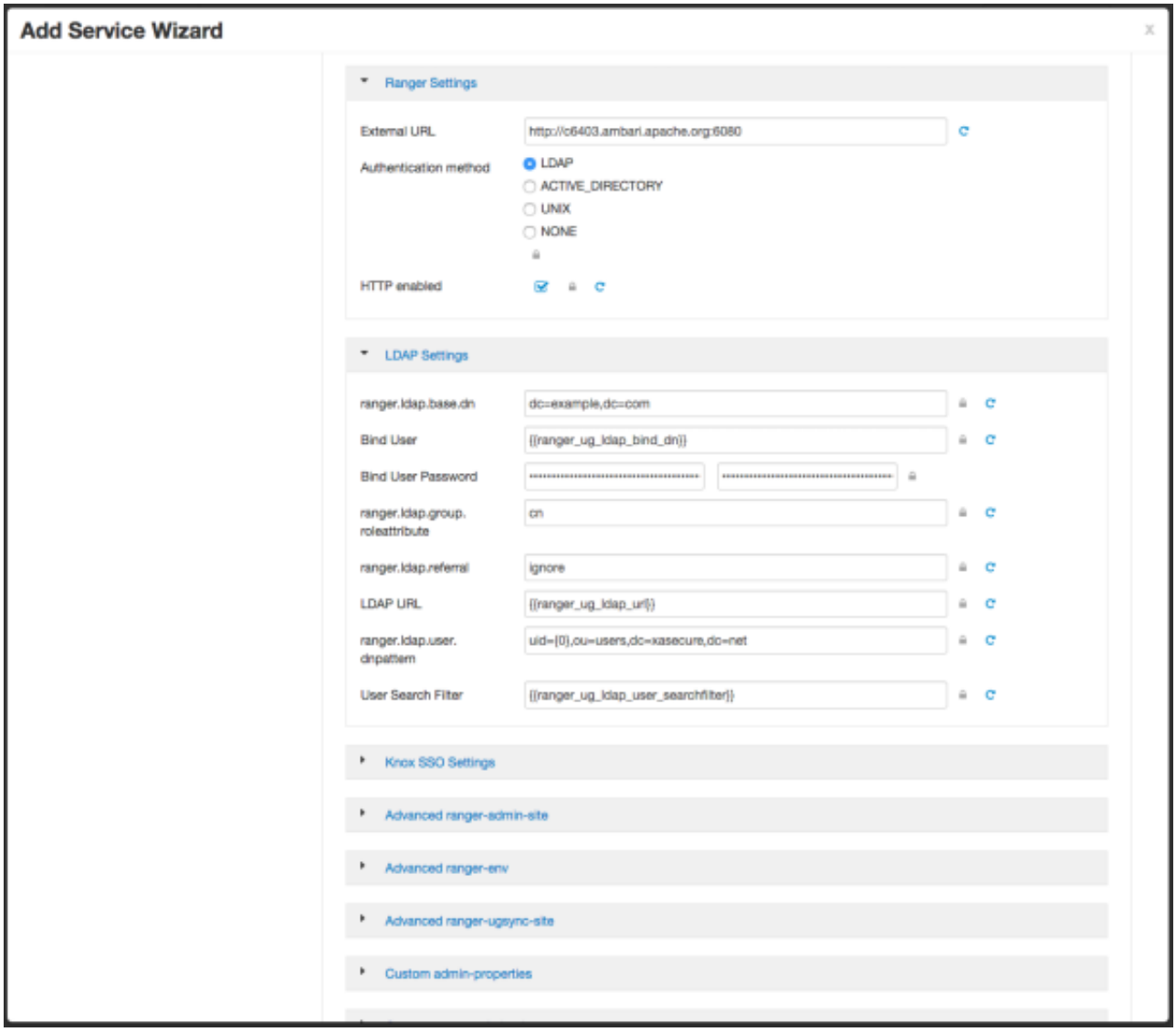
Note

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.



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.

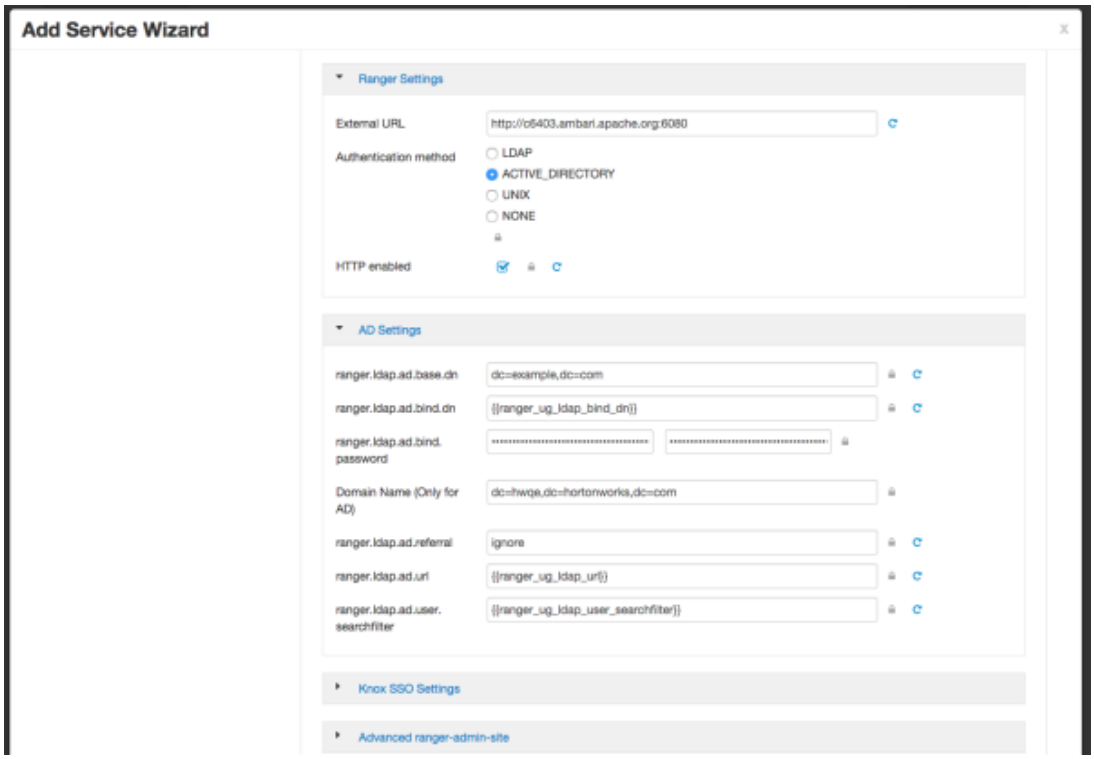
There are three possible values for `ranger.ldap.ad.referral`: `follow`, `throw`, and `ignore`. The recommended setting is `follow`.

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.

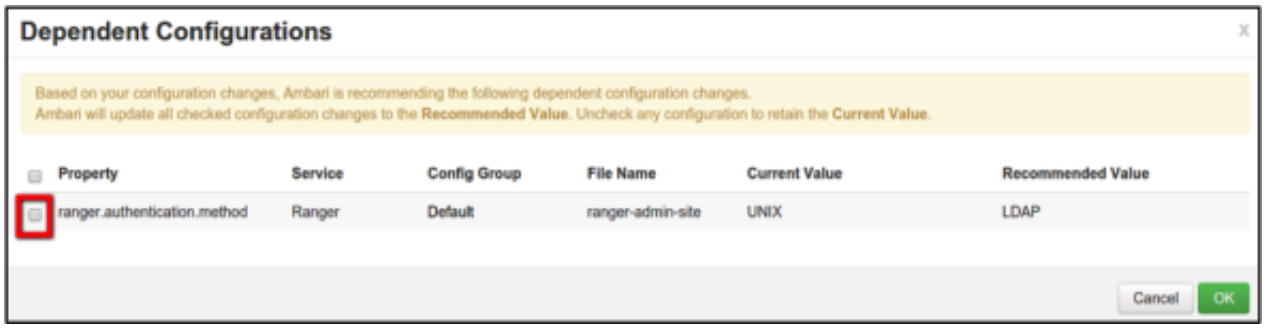
- When this property is set to `throw`, all of the normal entries are returned in the enumeration first, before the `ReferralException` is thrown. By contrast, a "referral" error response is processed immediately when this property is set to `follow` or `throw`.

- 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.



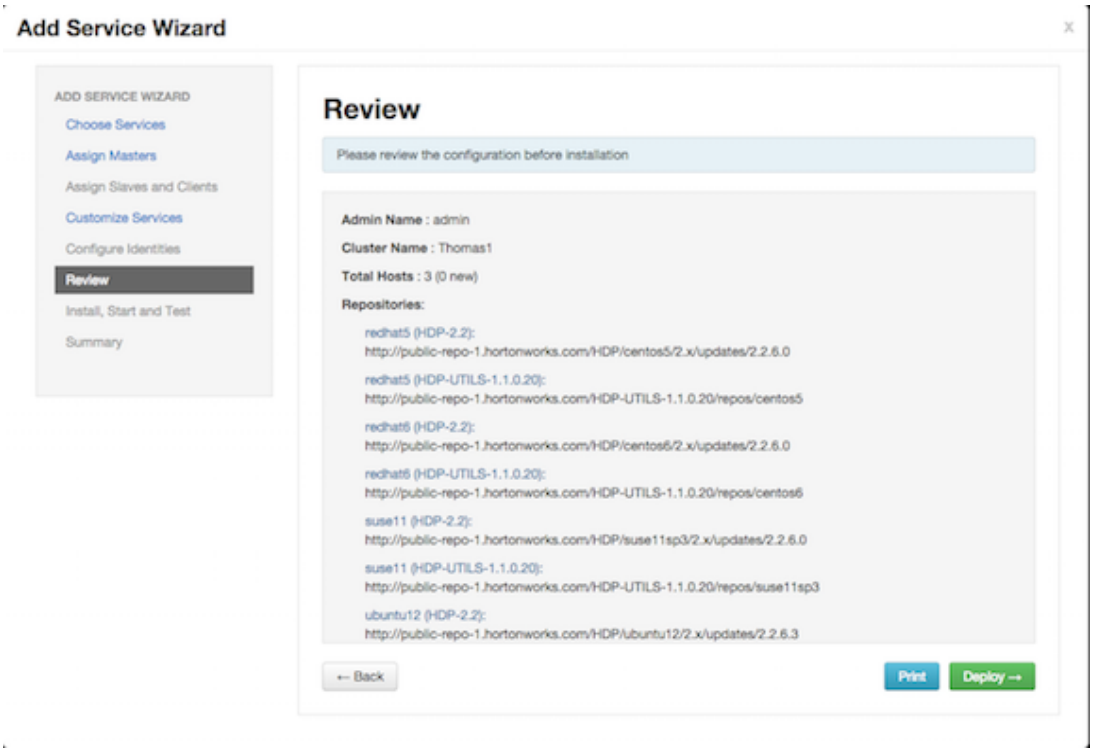
When you have finished configuring all of the Customize Services Settings, click **Next** at the bottom of the page to continue with the installation.

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**.

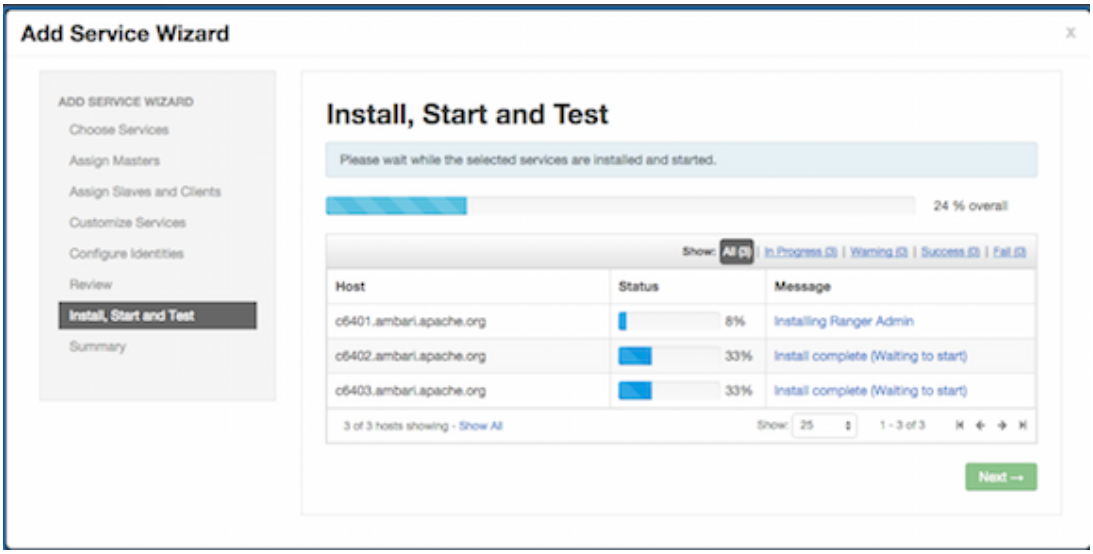


3.3. Complete the Ranger Installation

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.



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



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

3.4.1. Import the LDAP Cert into the Default Java TrustStore

1. If you are using a CA signed certificate for your LDAP authentication, the certificate should already be included in the default Java trustStore located at `$JAVA_HOME/jre/lib/security/cacerts` on all of your nodes, or at least on the NameNode and Ranger Admin/Usersync nodes.
2. There is no need to manually restart Ranger or perform any keytool imports.
3. If necessary you can import the CA cert to `$JAVA_HOME/jre/lib/security/cacerts`. If you are using a self-signed cert you can use the keytool to import it into `$JAVA_HOME/jre/lib/security/cacerts`.

3.4.2. Alternative Option

You can also use the following method when the self-signed cert is not in `$JAVA_HOME/jre/lib/security/cacerts`.

For Ranger Usersync:

1. Edit `/usr/hdp/current/ranger-usersync/ranger-usersync-services.sh`.
2. Add `java option > -Djavax.net.ssl.trustStore=/<path to the cacert>`.

For Ranger Admin:

1. Edit `/usr/hdp/current/ranger-admin/ews/ranger-admin-services.sh`.
2. Add parameter `-Djavax.net.ssl.trustStore=/<path to the cacert>` to the Java call in the script.

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.

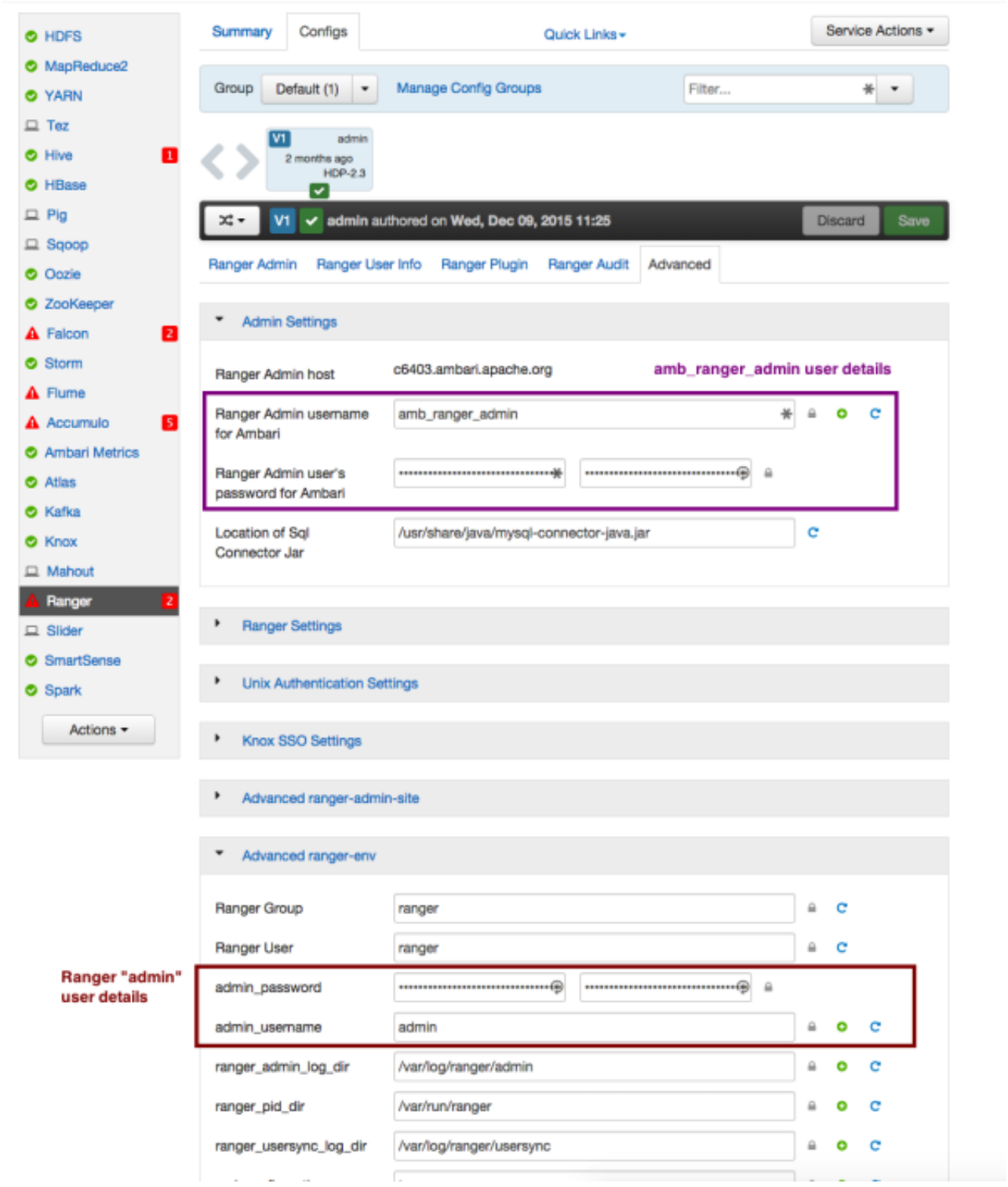
3.6. Updating Ranger Admin Passwords

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 > Admin Settings** in the field labeled **Ranger Admin username for Ambari**

(default value: `amb_ranger_admin`). The password for this user is set 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:



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:

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 followingn 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: `/usr/jdk64/jdk1.8.0_60`	Provide the path to the JDK install folder. For Hadoop, you can check `/etc/hadoop/conf/hadoop-env.sh` for the value of JAVA_HOME. As noted previously, Solr only supports JDK 1.7 and higher.
SOLR_USER	solr	The Linux user used to run Solr.
SOLR_INSTALL_FOLDER	/opt/lucidworks-hdpsearch/solr	The Solr installation directory.
SOLR_RANGER_HOME	/opt/lucidworks-hdpsearch/solr/ranger_audit_server	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: `/usr/jdk64/jdk1.8.0_40`	Provide the path to the JDK install folder. For Hadoop, you can check `/etc/hadoop/conf/hadoop-env.sh` for the value of JAVA_HOME. As noted previously, Solr only supports JDK 1.7 and higher.
SOLR_USER	solr	The Linux user used to run Solr.
SOLR_INSTALL_FOLDER	/opt/lucidworks-hdpsearch/solr	The Solr installation directory.
SOLR_RANGER_HOME	/opt/lucidworks-hdpsearch/solr/ranger_audit_server	The location where the Ranger-related configuration and schema files will be copied.
SOLR_RANGER_PORT	6083	The Solr port for Ranger.
SOLR_DEPLOYMENT	solrcloud	The deployment type.
SOLR_ZK	<ZooKeeper_host>:2181/ranger_audits	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	1	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	1	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	/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 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 [45]
- Hive [49]
- HBase [53]
- Kafka [56]
- Knox [60]
- YARN [63]
- Storm [67]

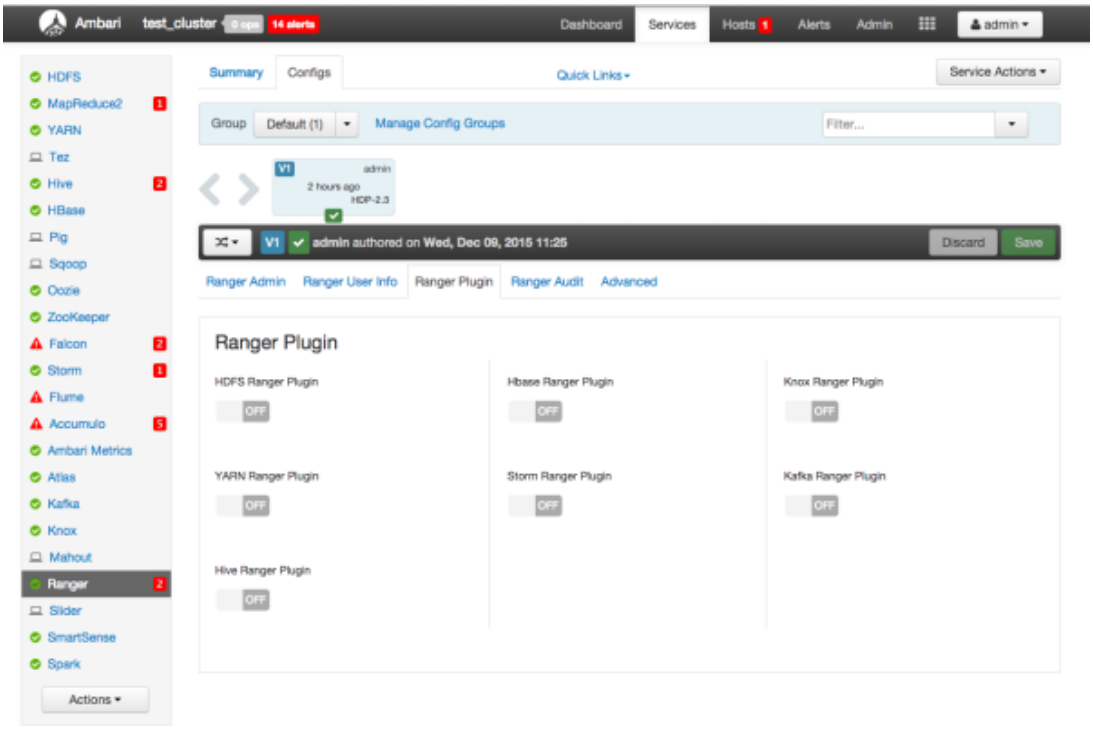
You can save Ranger audits to HDFS or Solr:

- Manually Updating HDFS Audit Settings [71]
- Manually Updating Solr Audit Settings [72]

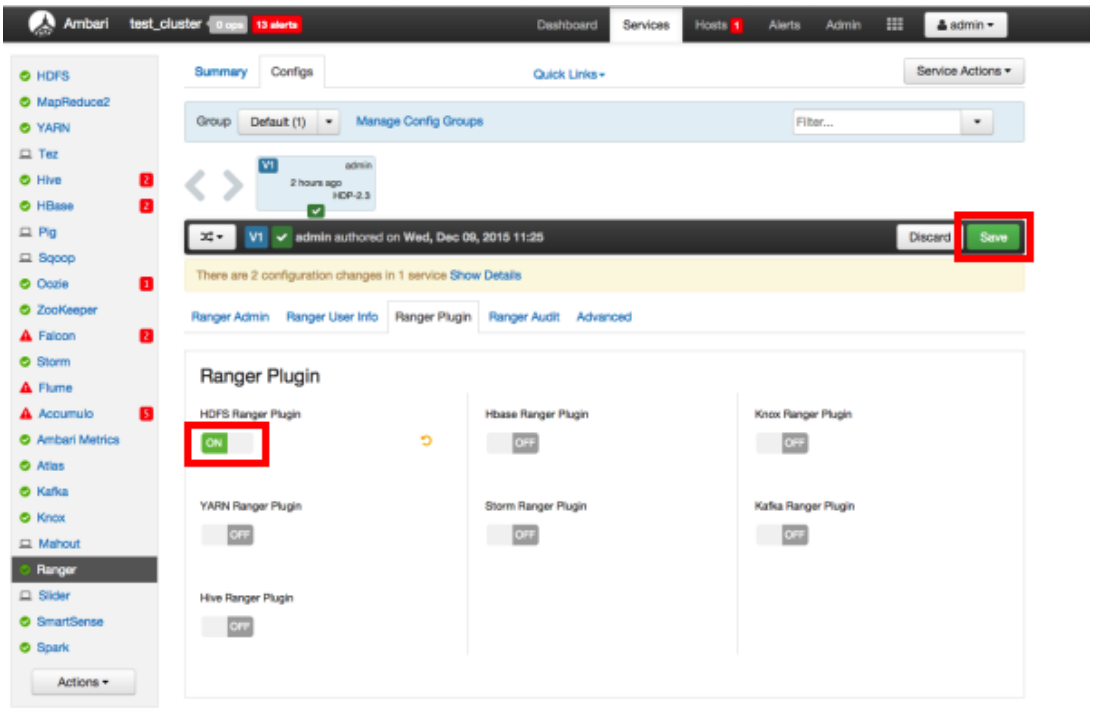
5.1. HDFS

Use the following steps to enable the Ranger HDFS plugin.

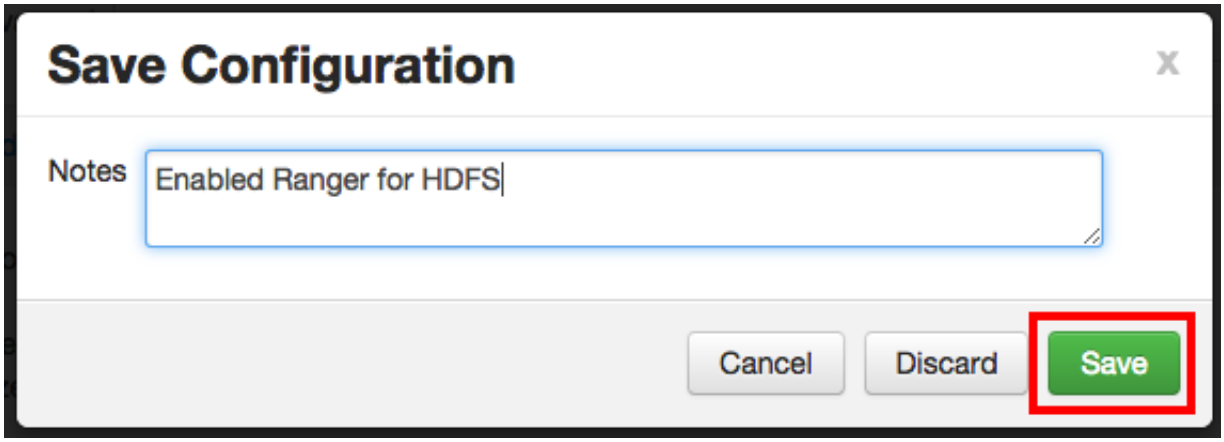
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



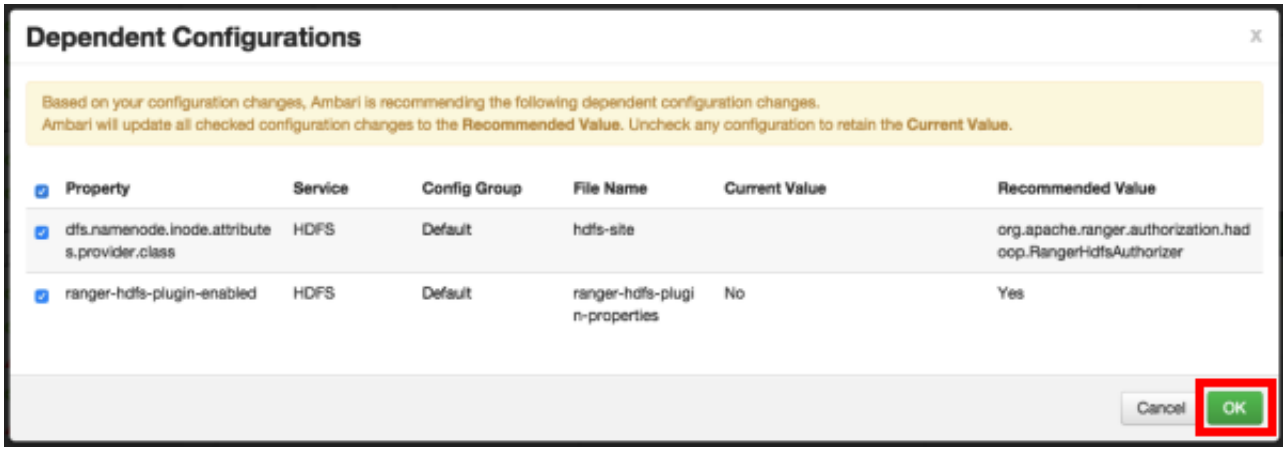
2. Under HDFS Ranger Plugin, select **On**, then click **Save** in the black menu bar.



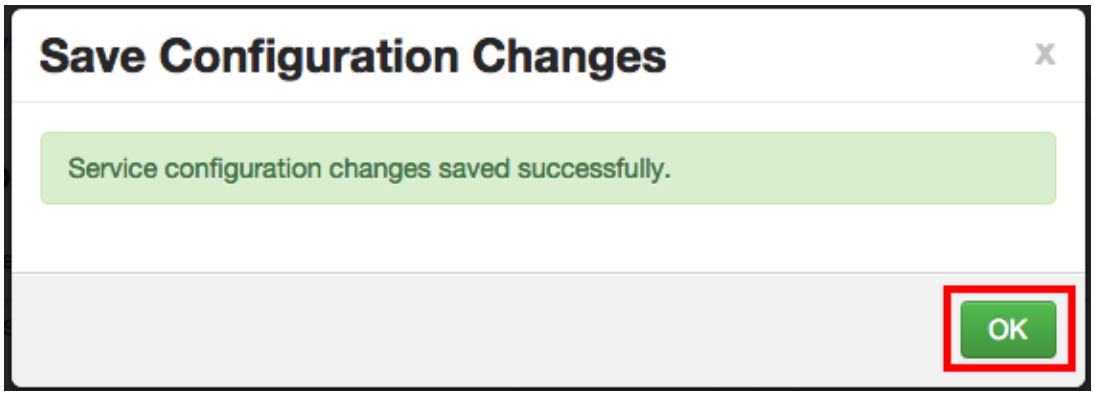
3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



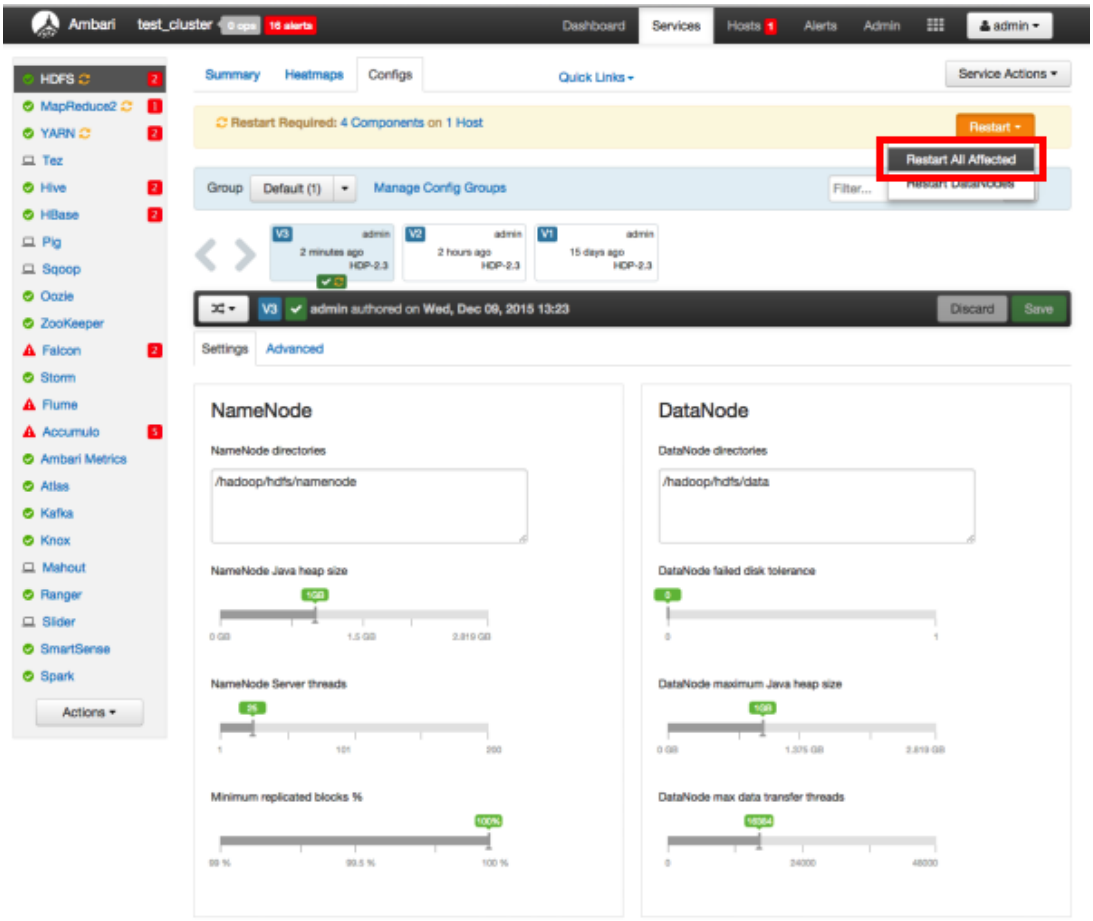
4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



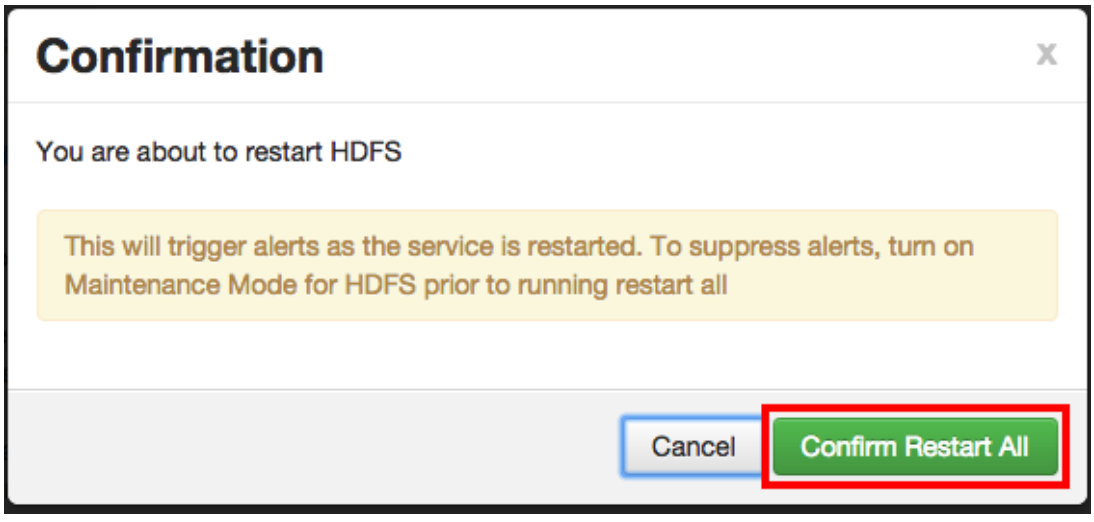
5. Click **OK** on the Save Configuration Changes pop-up.



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



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



8. After HDFS has restarted, the Ranger plugin for HDFS is enabled.

Note

In order to access HDFS folders in previous versions of HDP, access permissions also had to be granted in Ranger to the applicable parent folders. As of HDP-2.3, it is no longer required to grant access permissions to the parent folder.

For example, for the folder path `../customer/data/marketing`:

- In previous versions, to grant access to the `/customer/data/marketing` folder, you were required to grant Execute permission in Ranger for both the `/customer` and `/customer/data` folders, along with a Read or Write permission for the `/customer/data/marketing` folder.
- As of HDP-2.3, it is no longer necessary to grant Execute permission to the parent folders.

For more details, see RANGER-357.

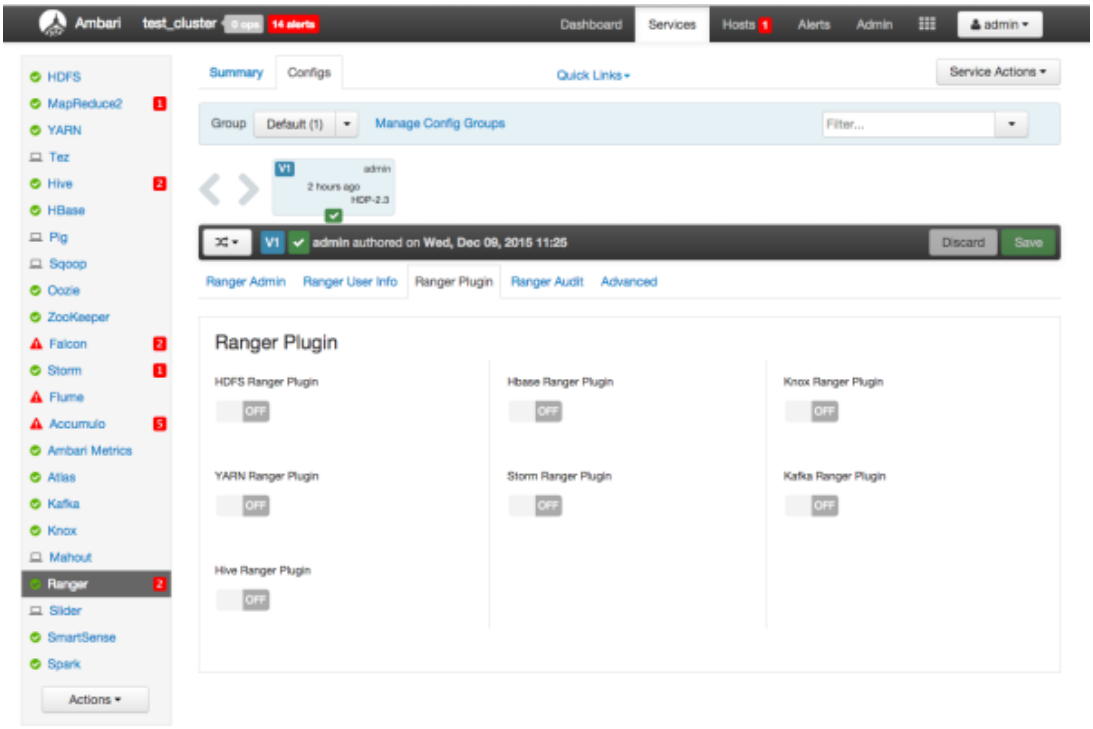
5.2. Hive

Important

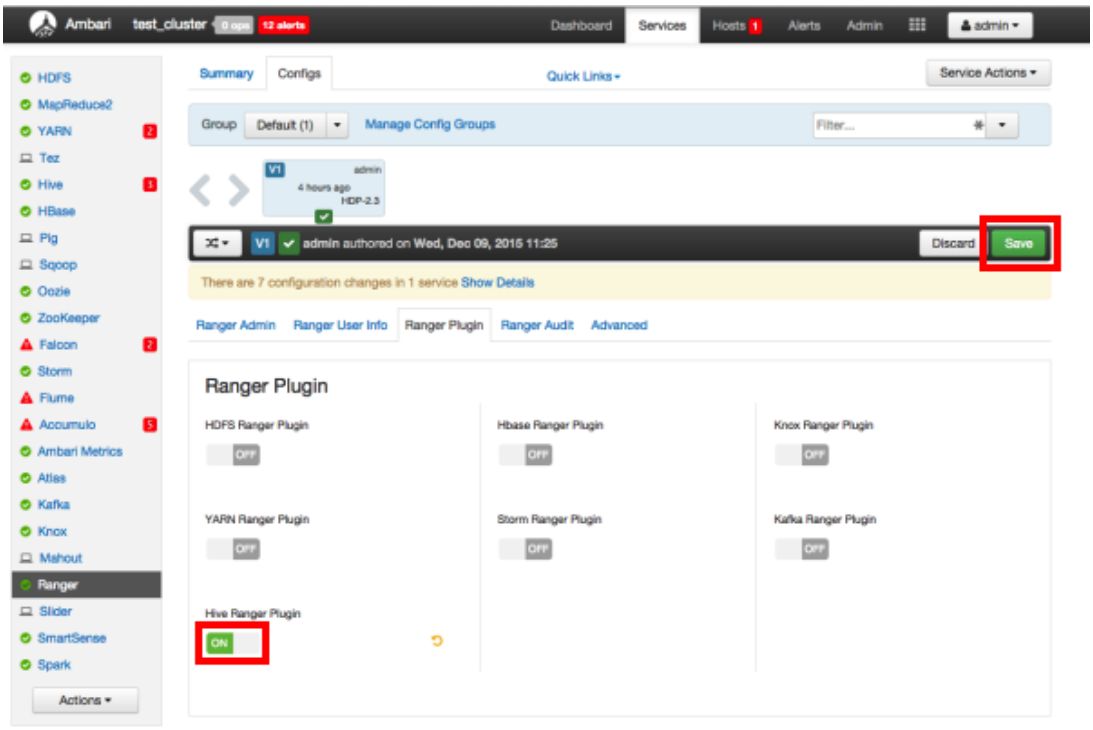
You should not use the Hive CLI after enabling the Ranger Hive plugin. The Hive CLI is not supported in HDP-2.2.0 and higher versions, and may break the install or lead to other unpredictable behavior. Instead, you should use the HiveServer2 Beeline CLI.

Use the following steps to enable the Ranger Hive plugin.

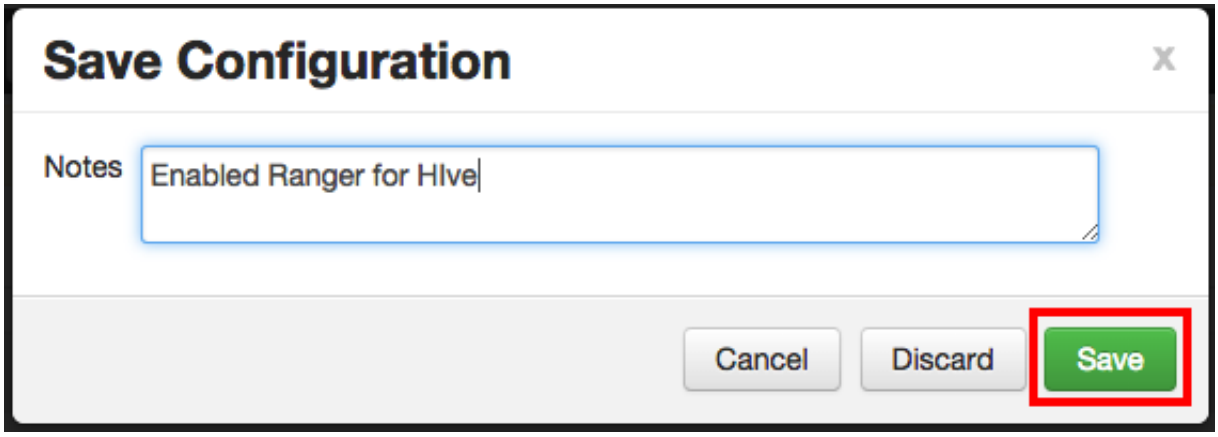
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



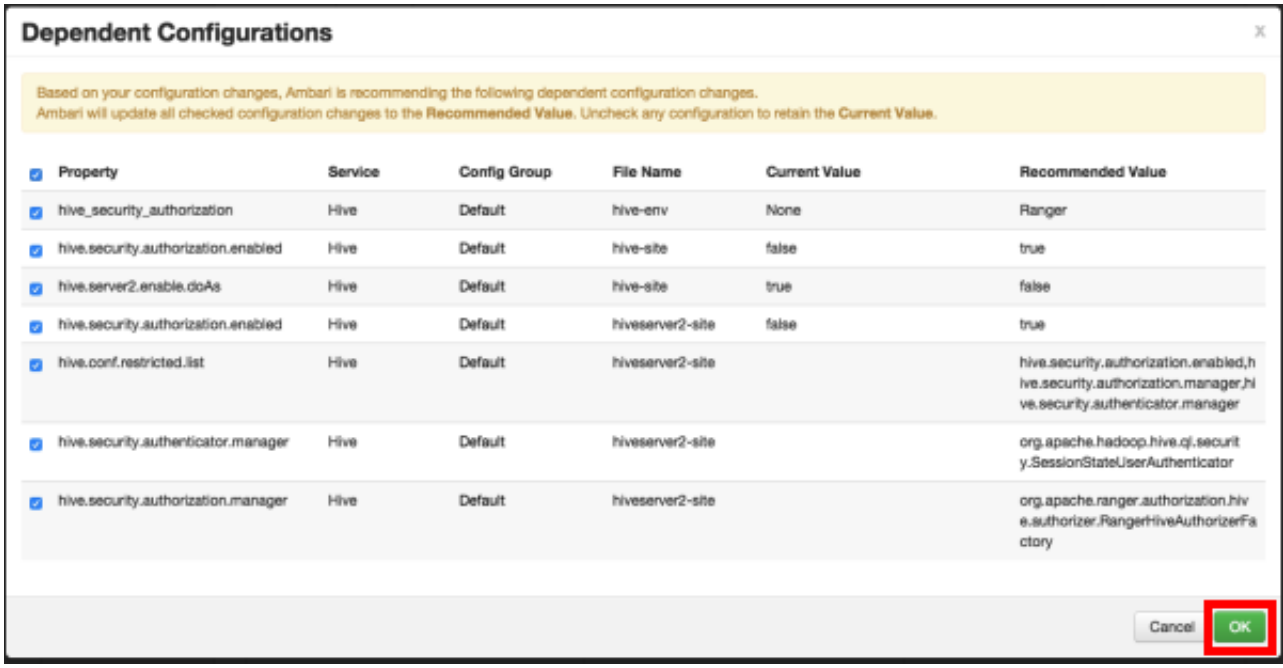
2. Under Hive Ranger Plugin, select **On**, then click **Save** in the black menu bar.



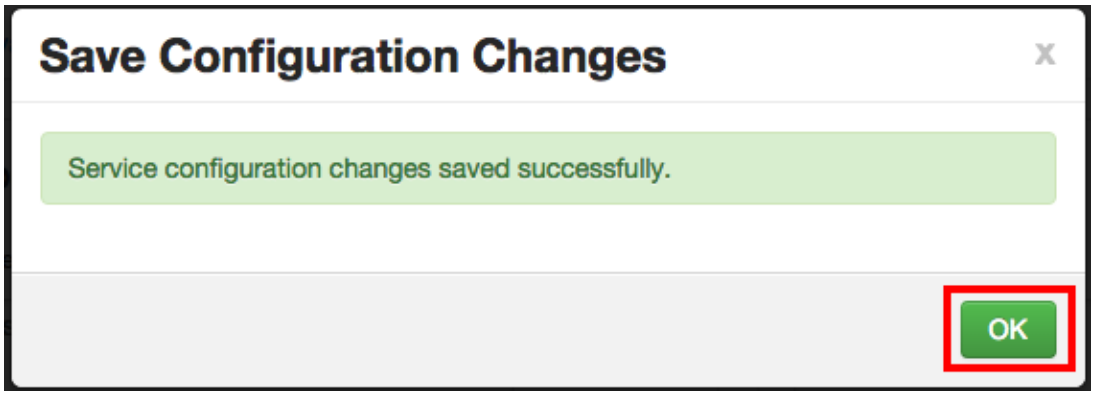
3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



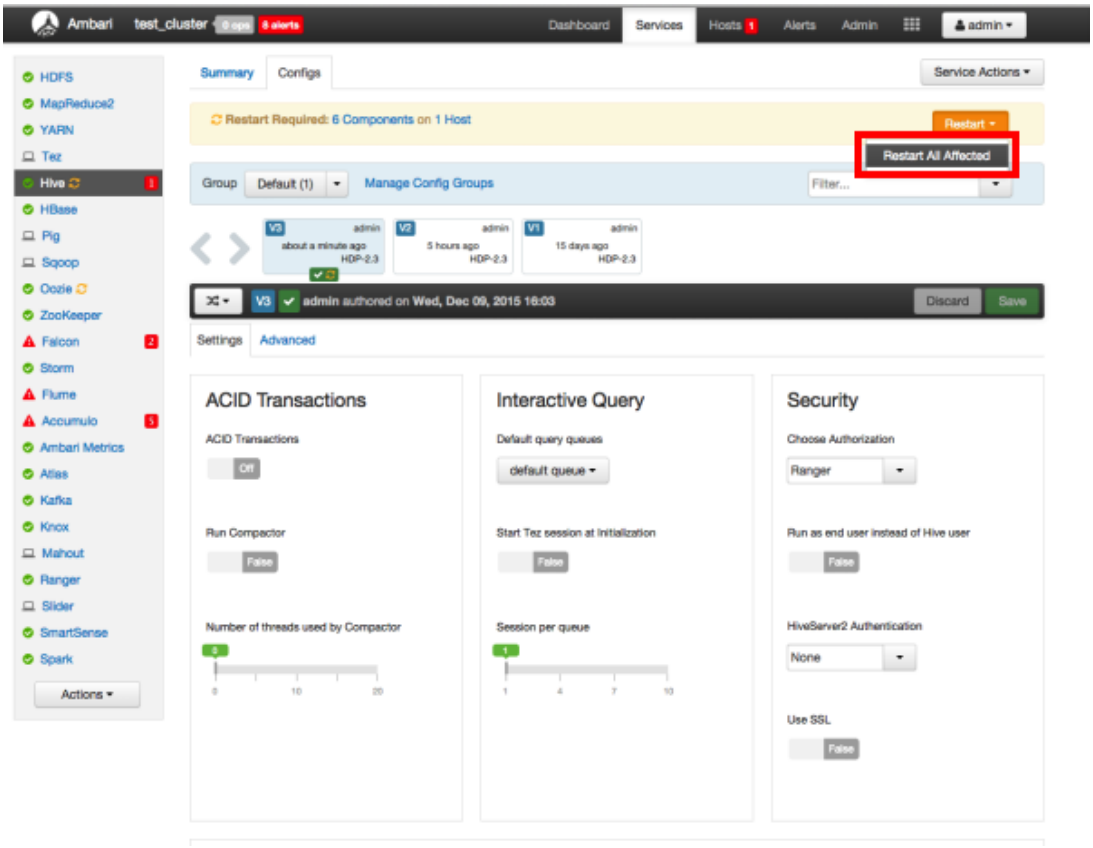
4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



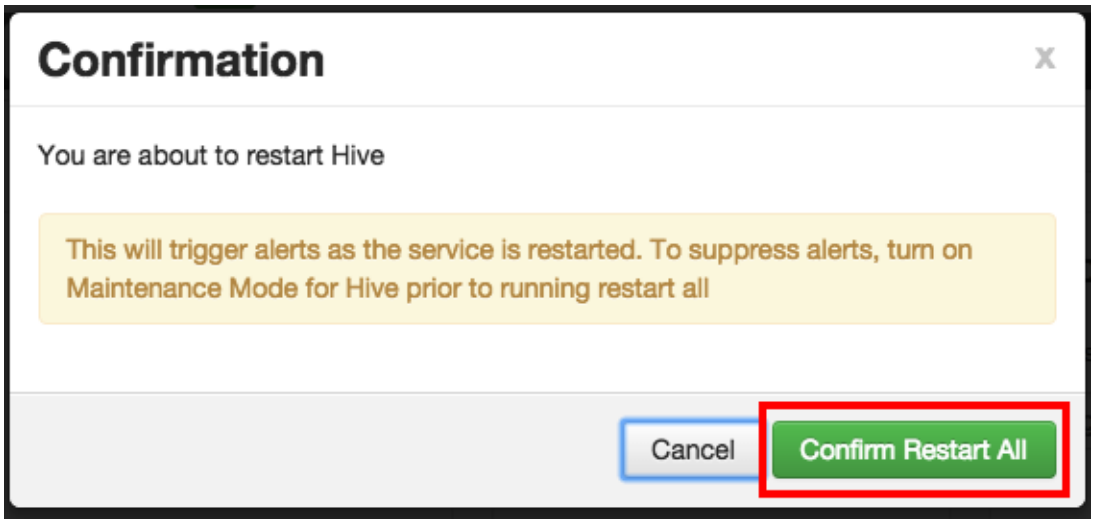
5. Click **OK** on the Save Configuration Changes pop-up.



6. 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.

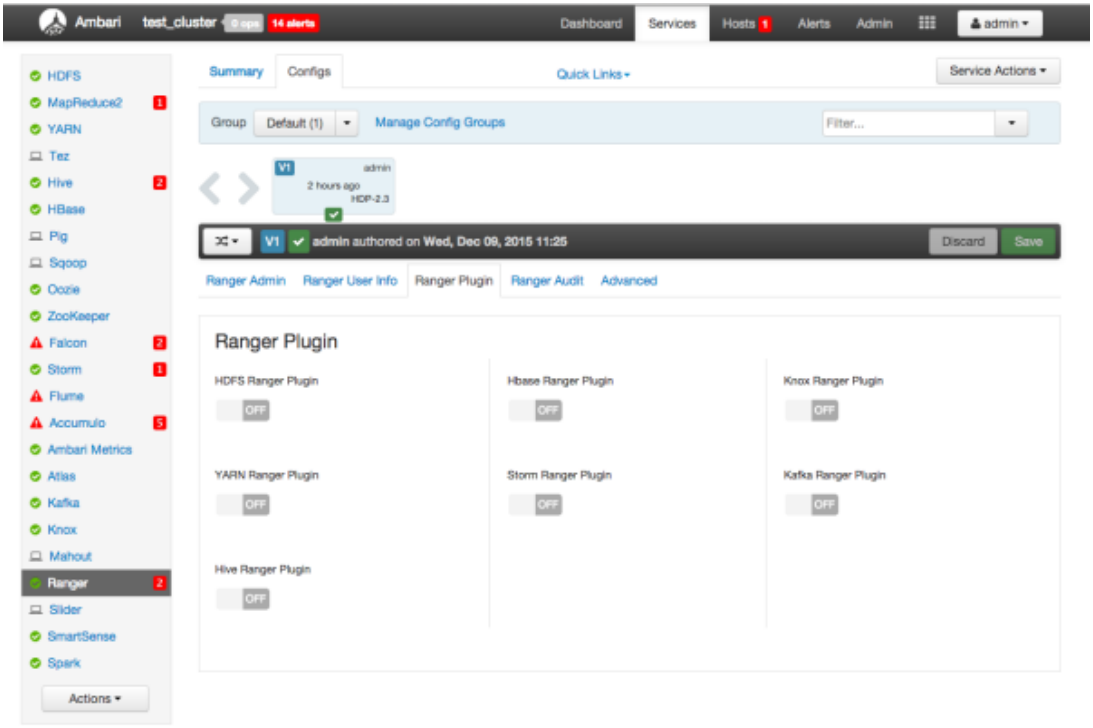
5.3. HBase

Note

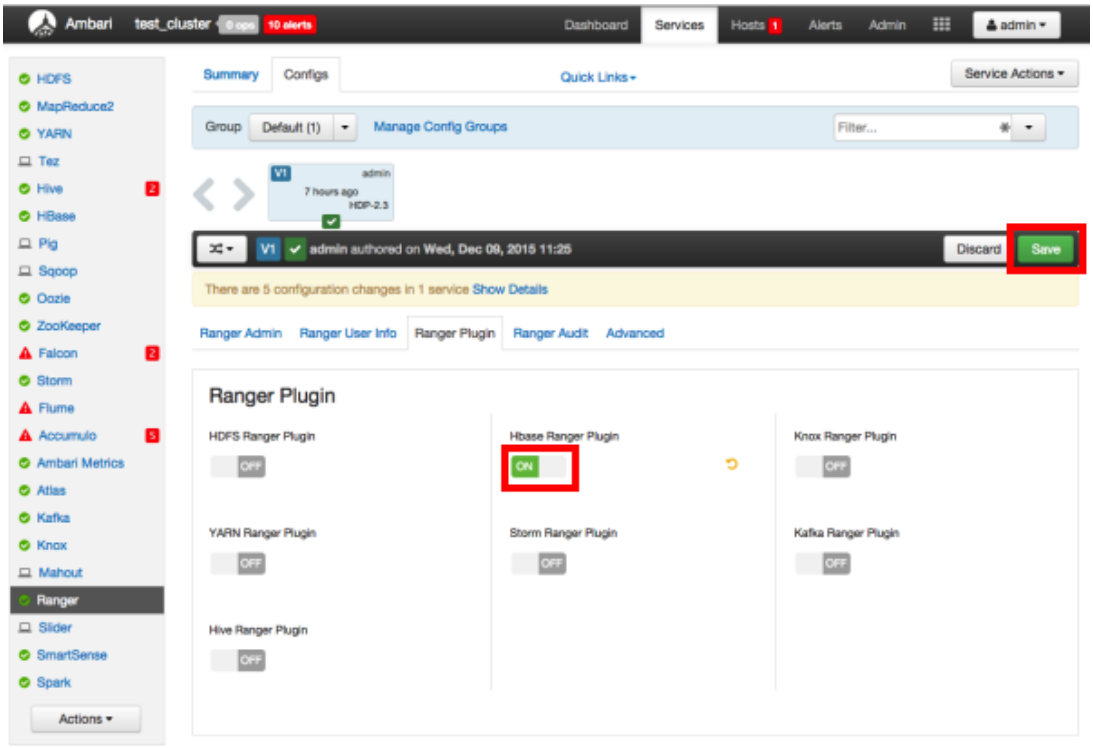
When HBase is configured with Ranger, and specifically XASecure Authorizer, you may only grant and revoke privileges.

Use the following steps to enable the Ranger HBase plugin.

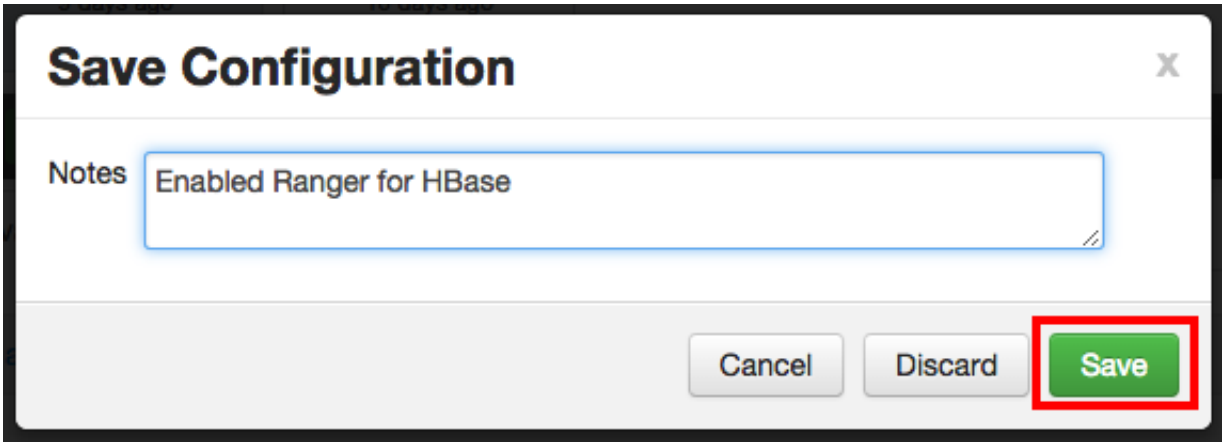
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



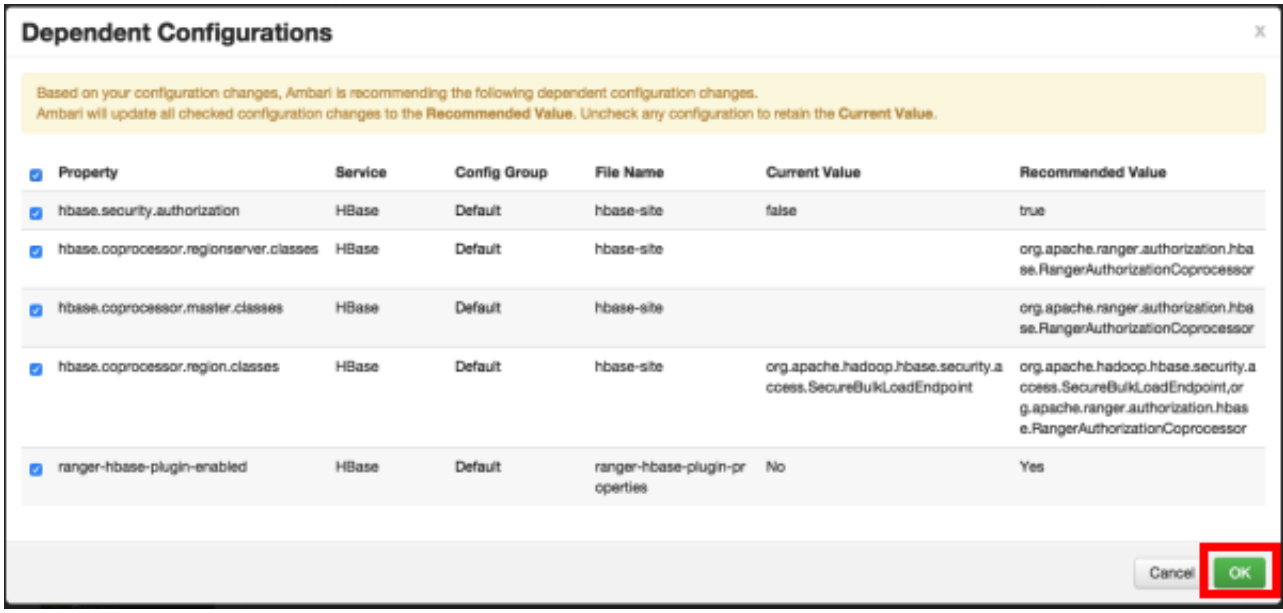
2. Under HBase Ranger Plugin, select **On**, then click **Save** in the black menu bar.



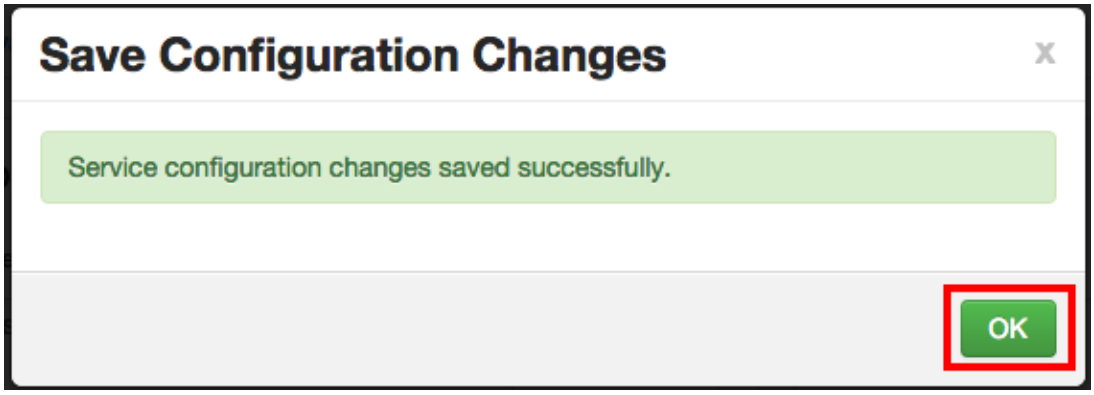
3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



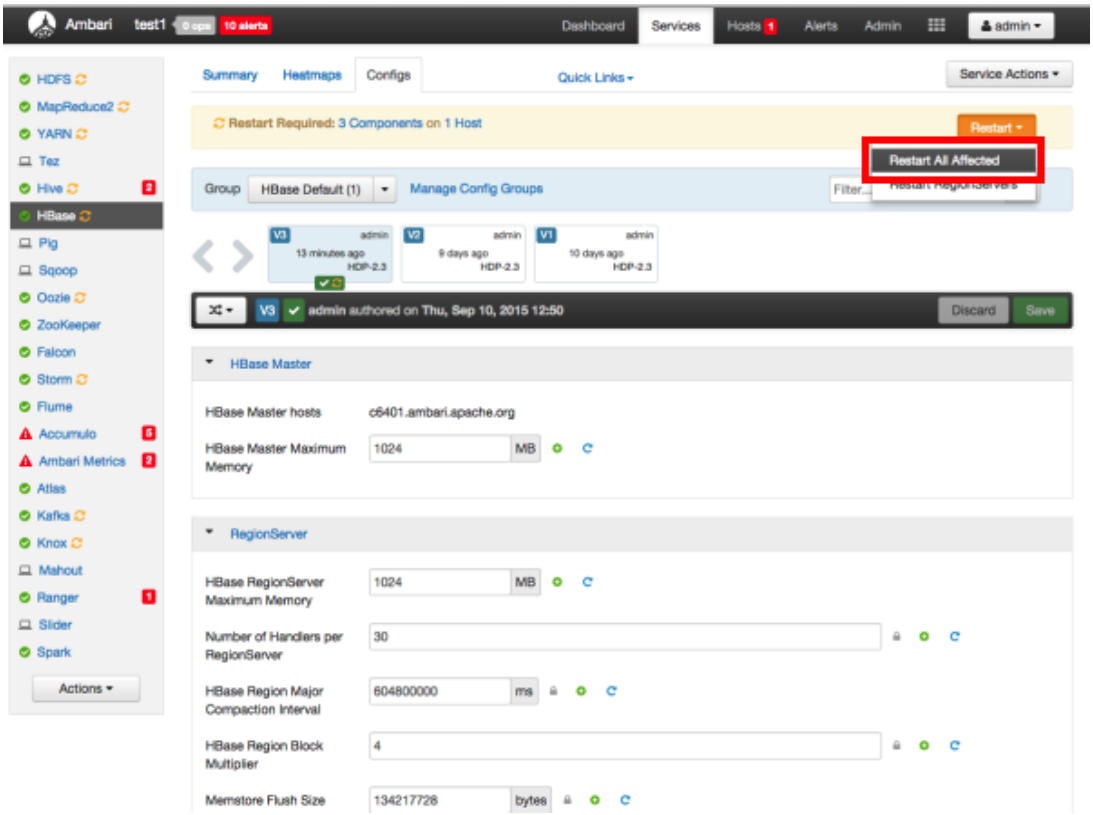
4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



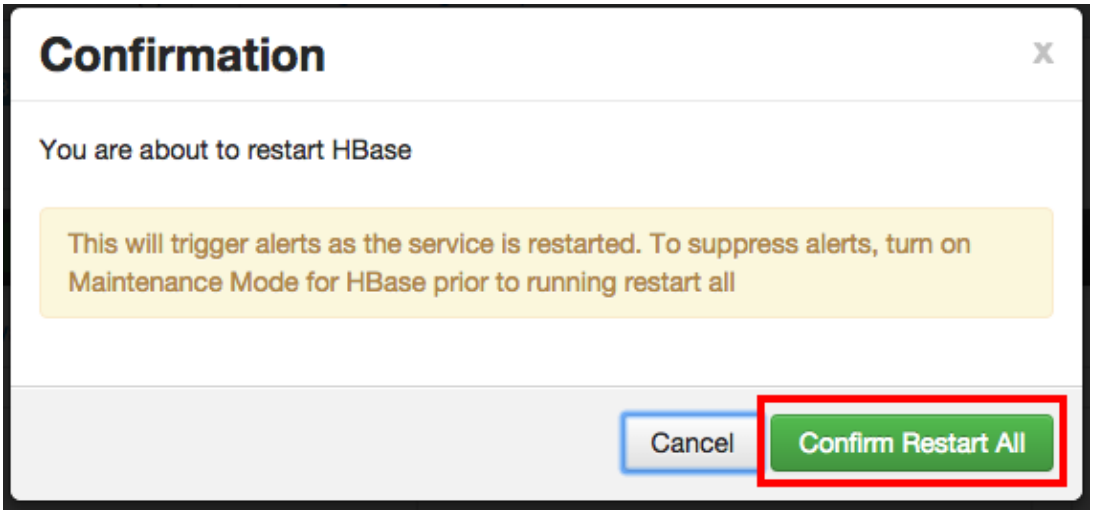
5. Click **OK** on the Save Configuration Changes pop-up.



6. 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.

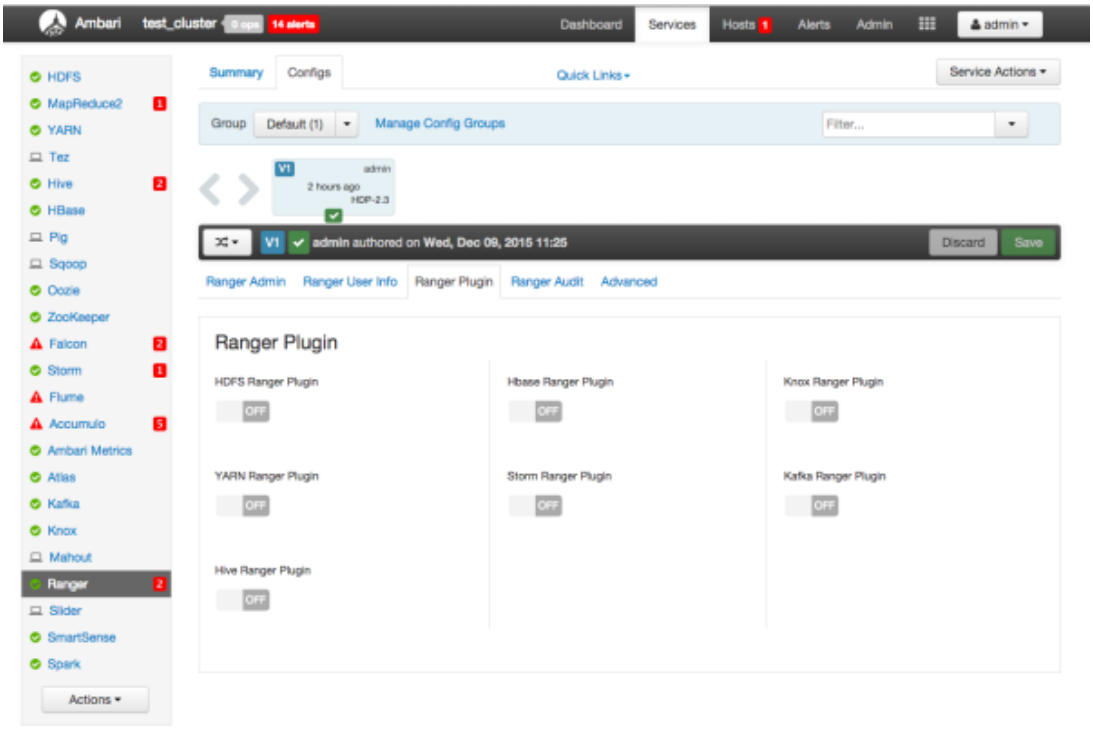


8. After HBase restarts, the Ranger plugin for HBase will be enabled.

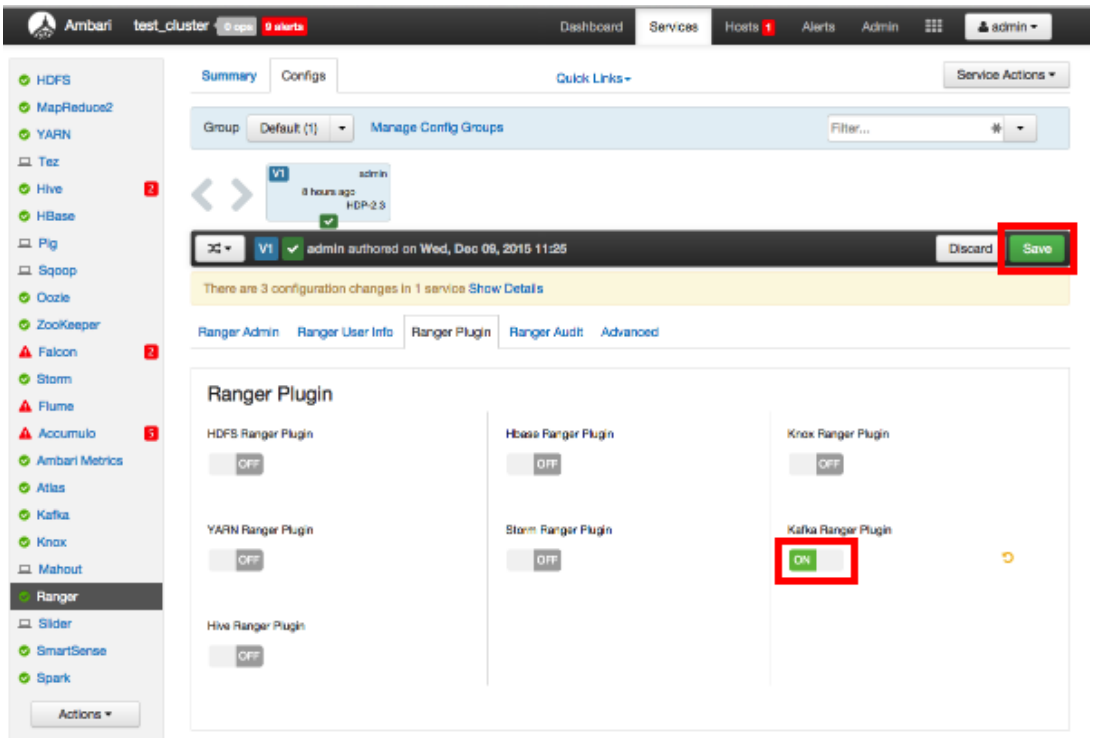
5.4. Kafka

Use the following steps to enable the Ranger Kafka plugin.

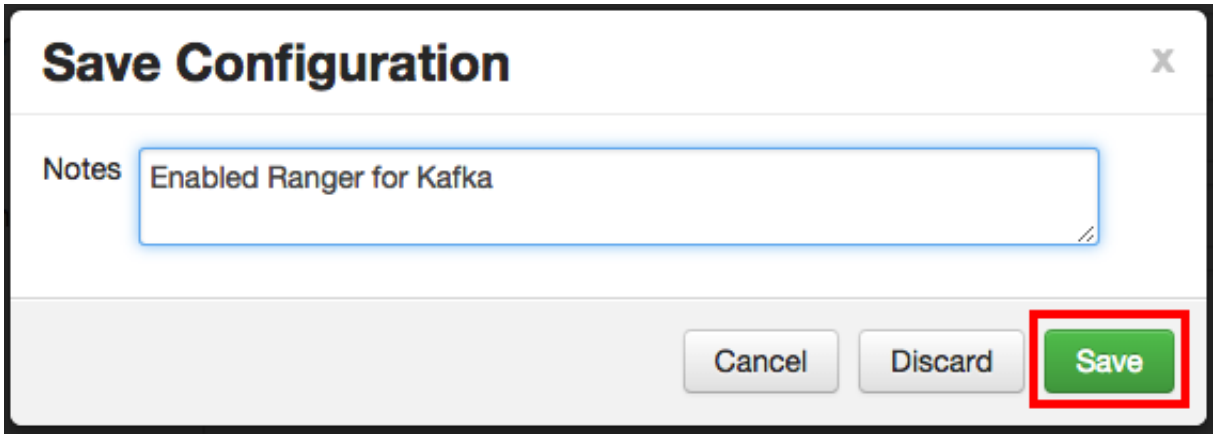
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



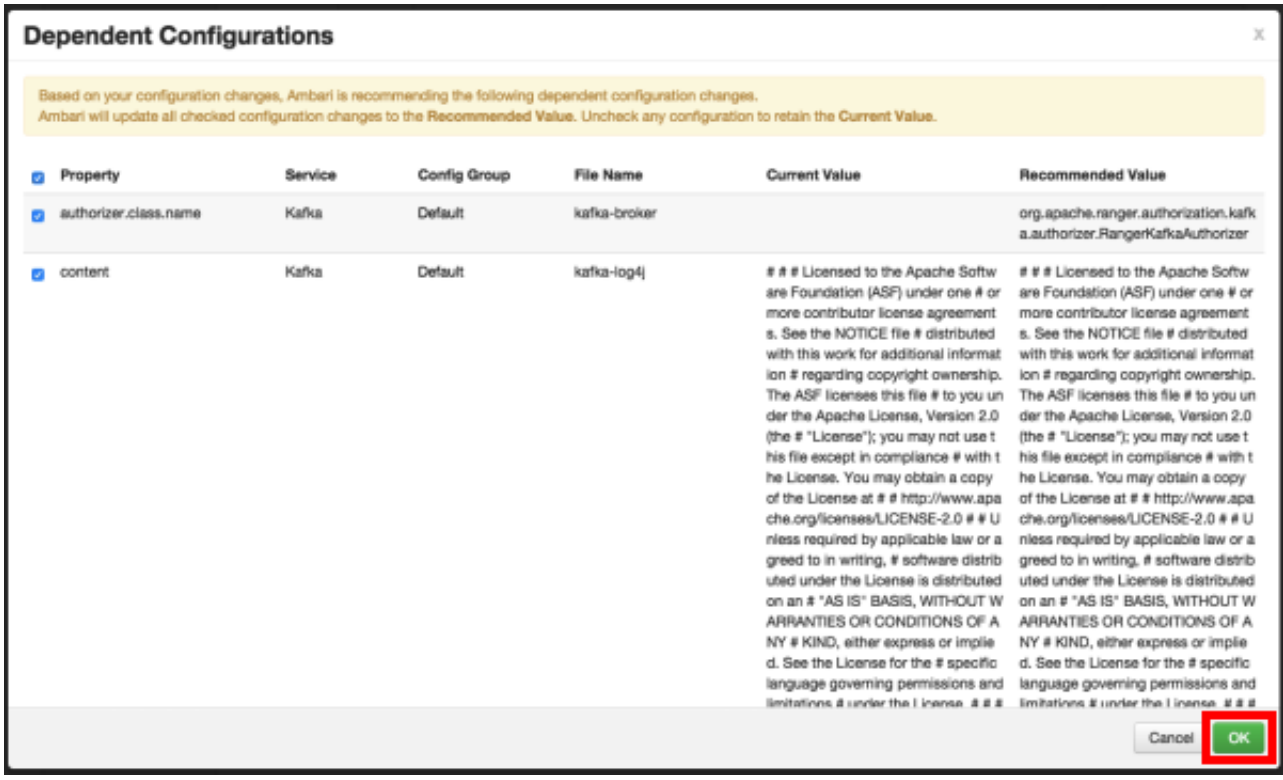
2. Under Kafka Ranger Plugin, select **On**, then click **Save** in the black menu bar.



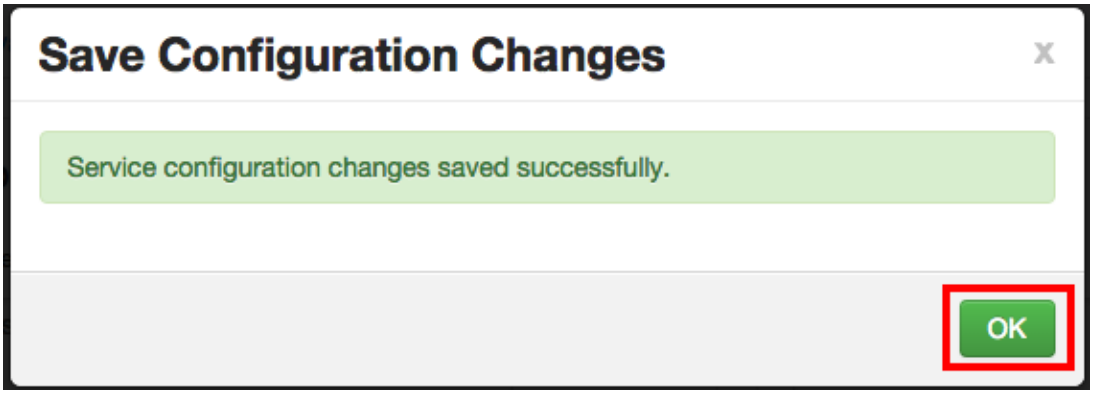
3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



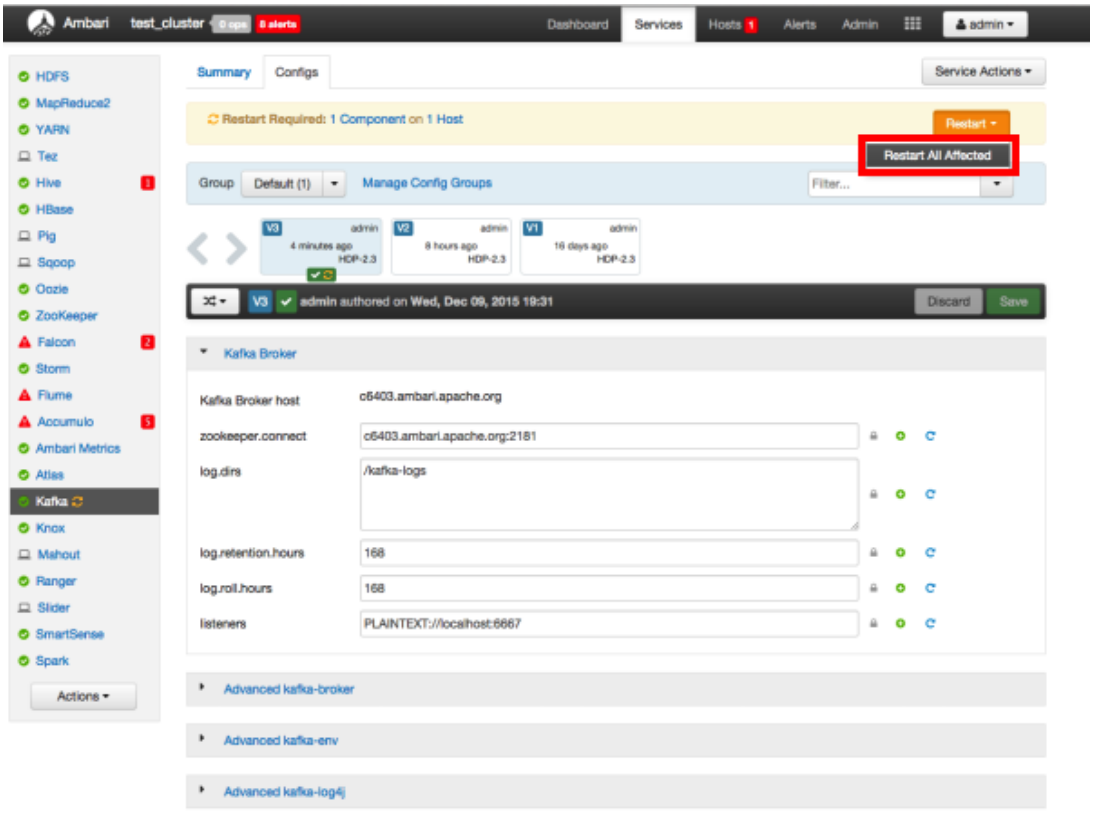
4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



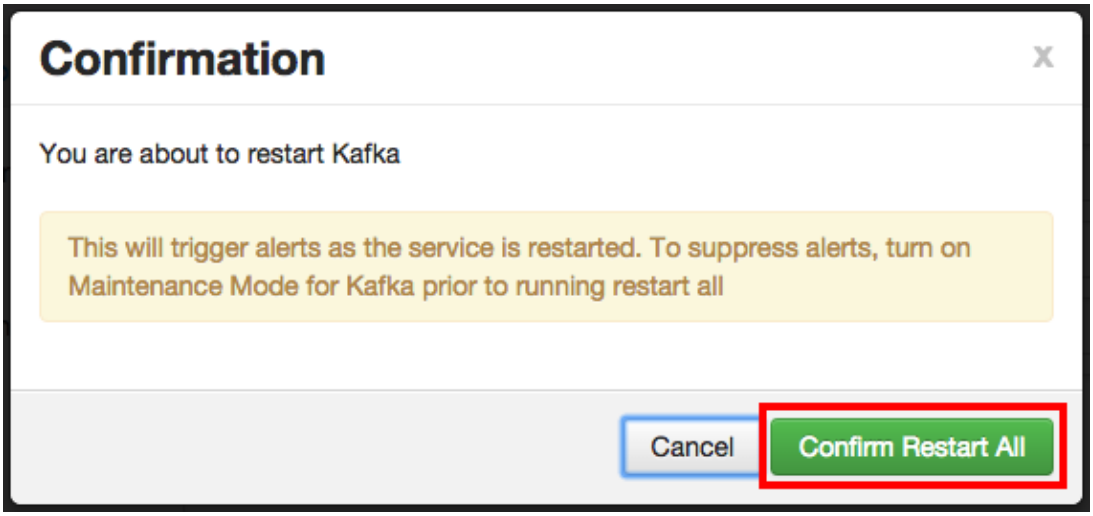
5. Click **OK** on the Save Configuration Changes pop-up.



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.

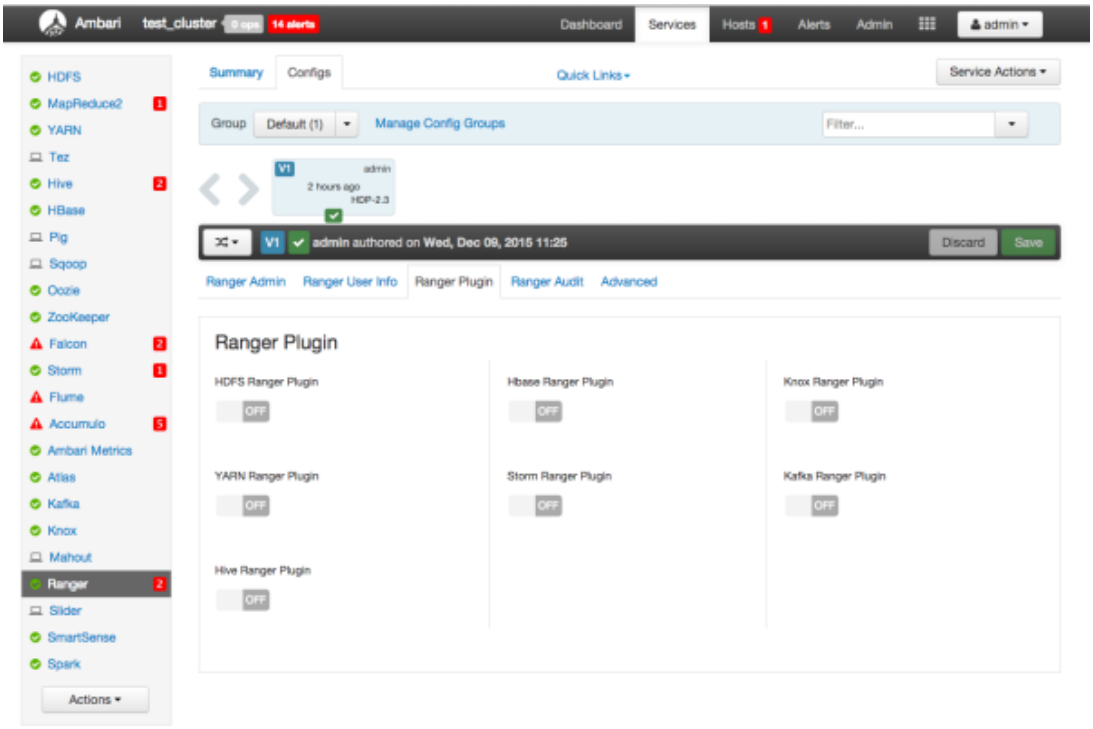


8. After Kafka restarts, the Ranger plugin for Kafka will be enabled.

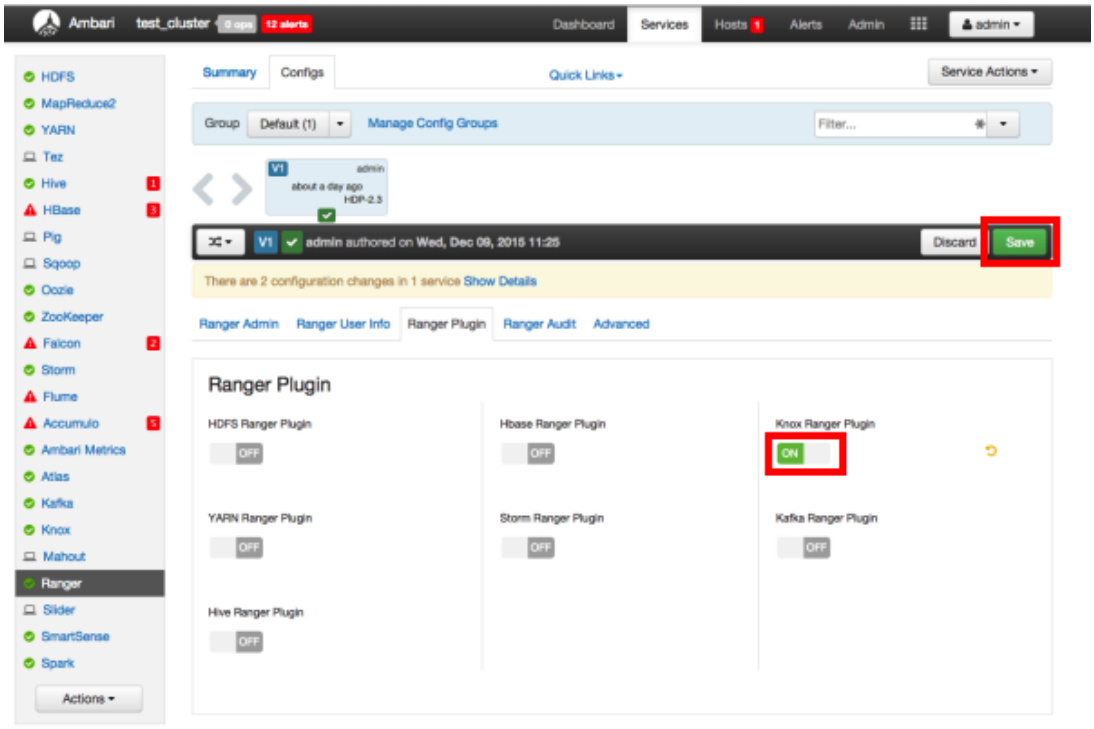
5.5. Knox

Use the following steps to enable the Ranger Knox plugin.

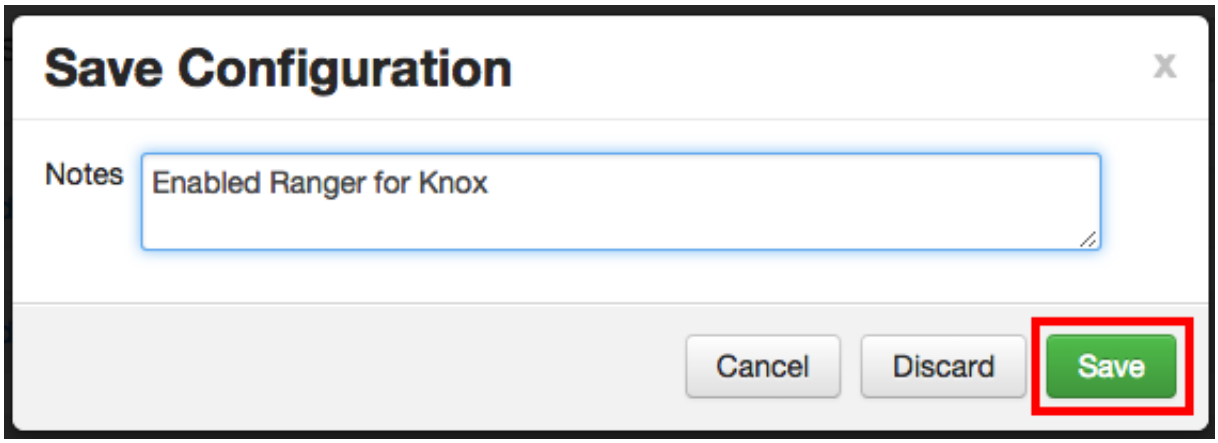
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



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

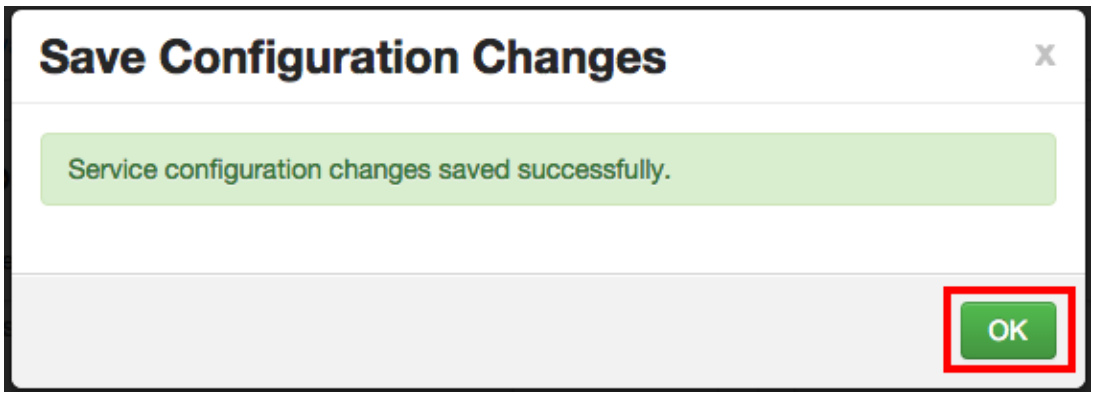


3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.

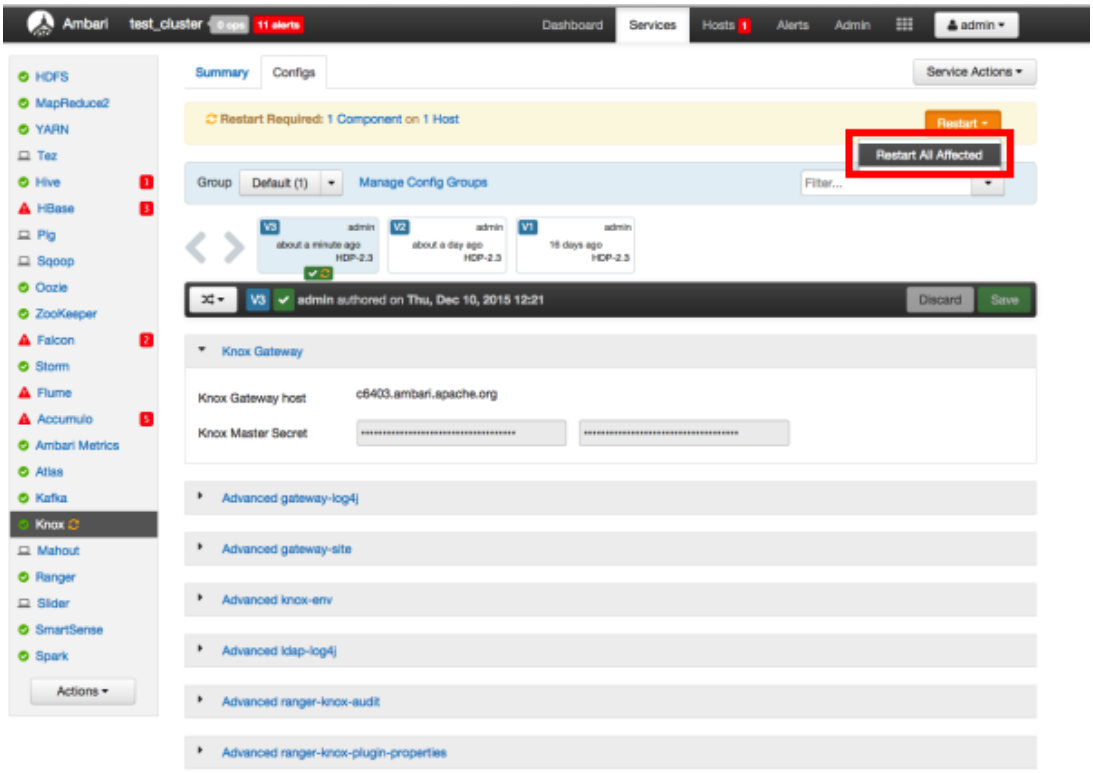


4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.

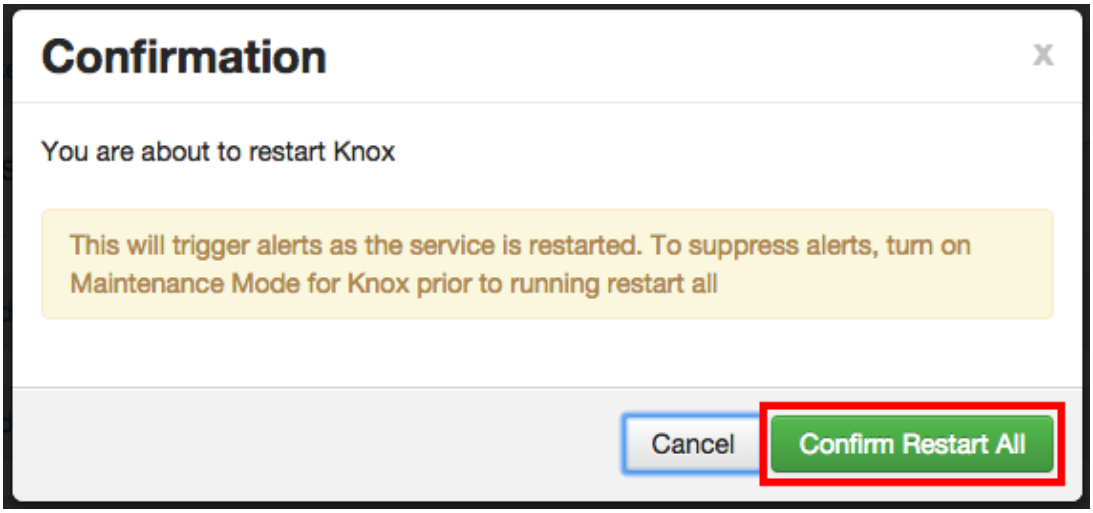
5. Click **OK** on the Save Configuration Changes pop-up.



6. 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.

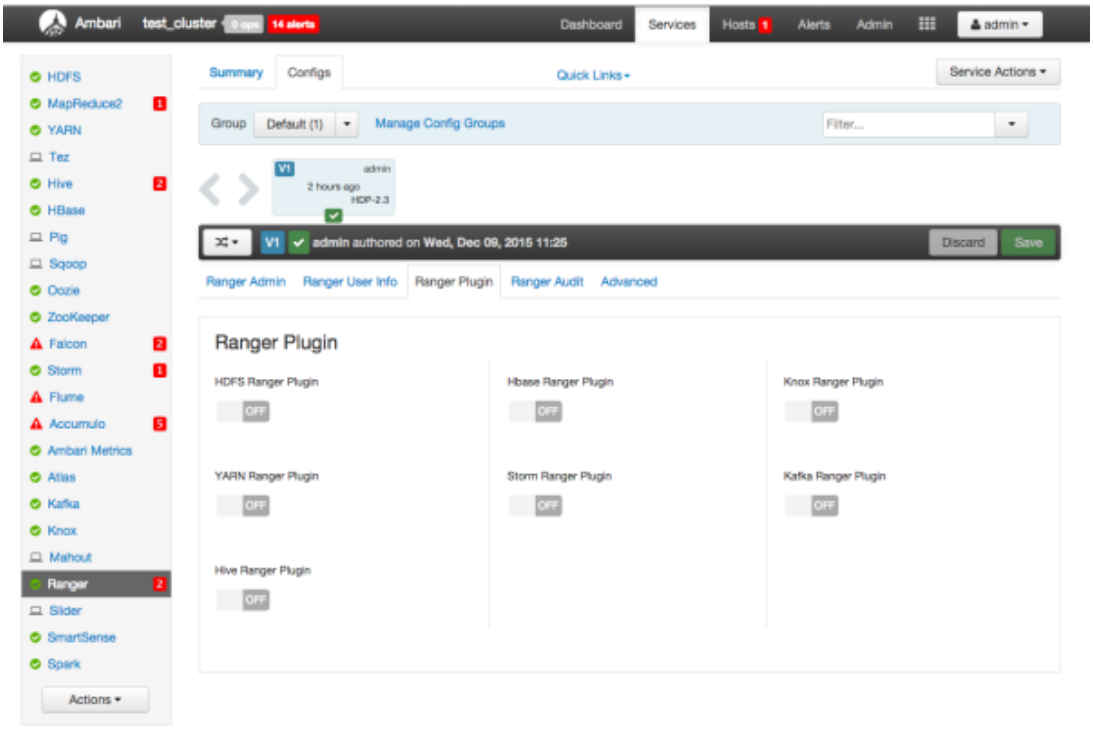


8. After Knox restarts, the Ranger plugin for Knox will be enabled.

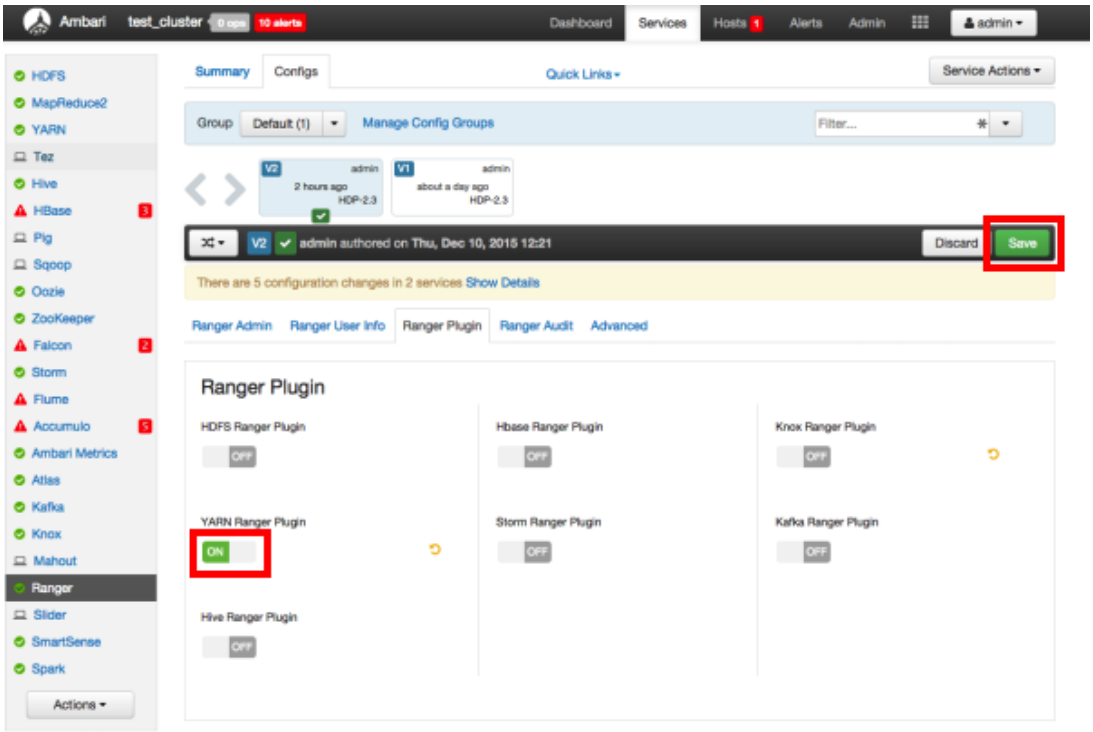
5.6. YARN

Use the following steps to enable the Ranger YARN plugin.

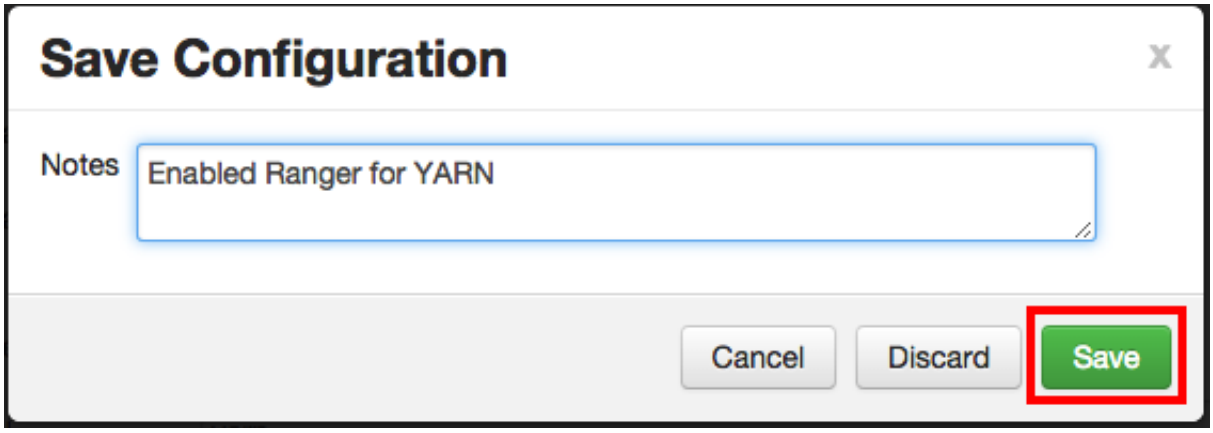
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



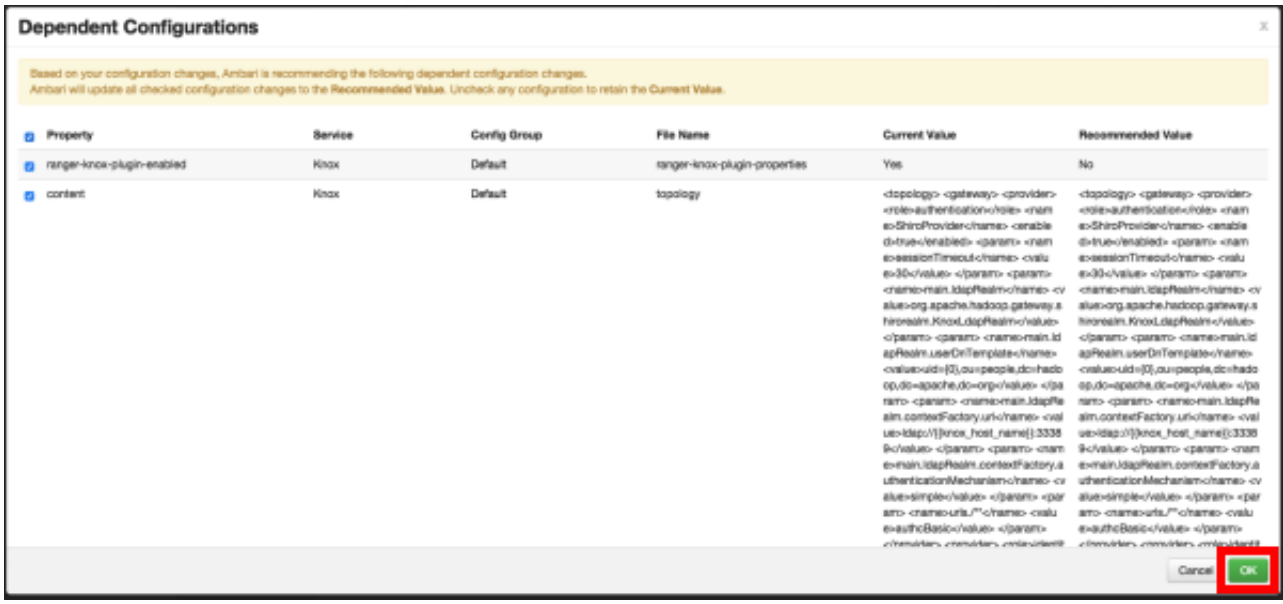
2. Under YARN Ranger Plugin, select **On**, then click **Save** in the black menu bar.



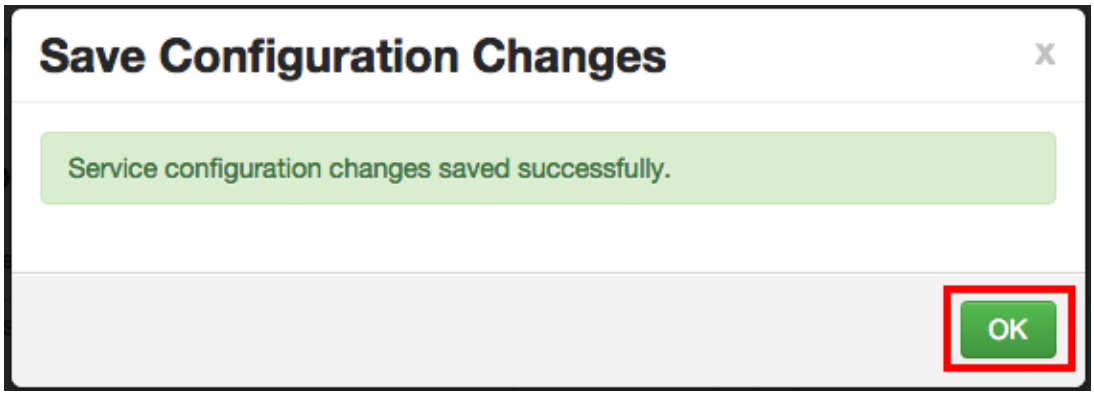
3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



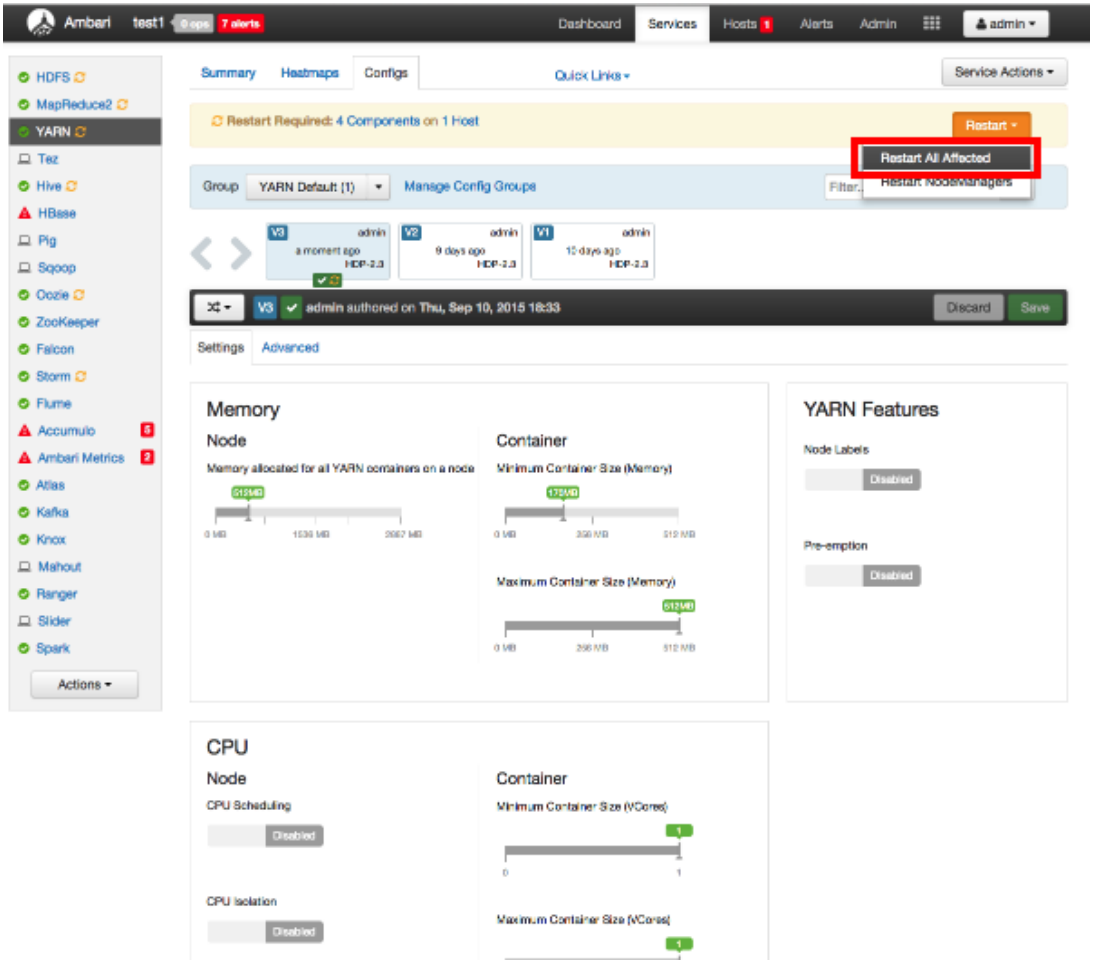
4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



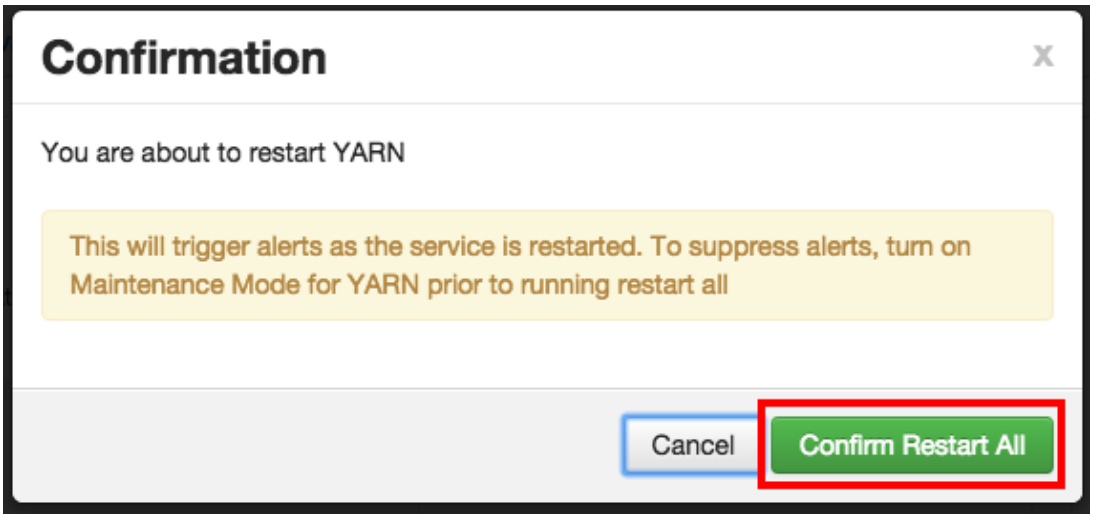
5. Click **OK** on the Save Configuration Changes pop-up.



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.



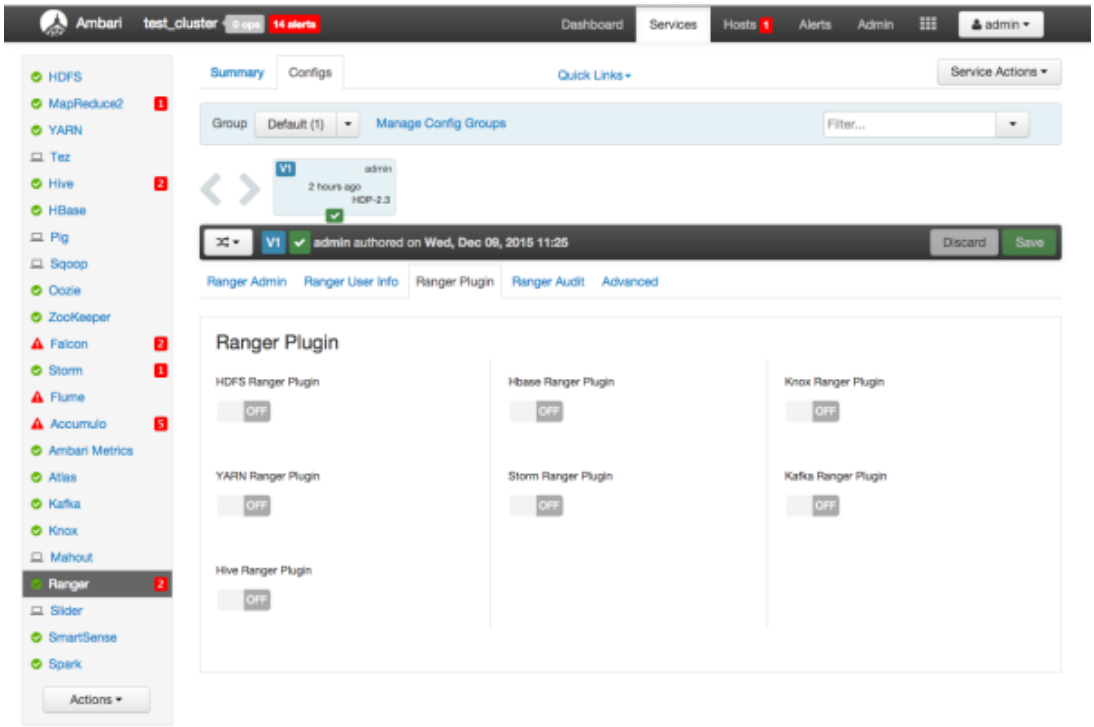
8. After YARN restarts, the Ranger plugin for YARN will be enabled. Other components may also require a restart.

5.7. Storm

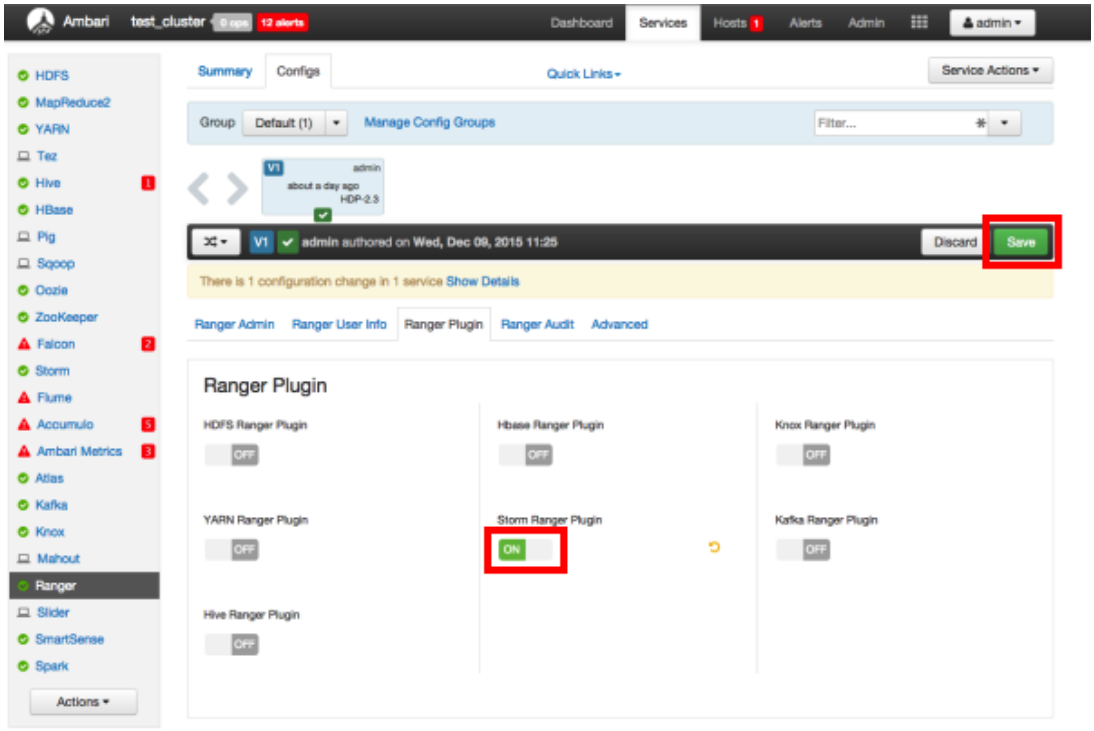
Before you can use the Storm plugin, you must first enable Kerberos on your cluster. To enable Kerberos on your cluster, see Enabling Kerberos Security in the Ambari Security Guide.

Use the following steps to enable the Ranger Storm plugin.

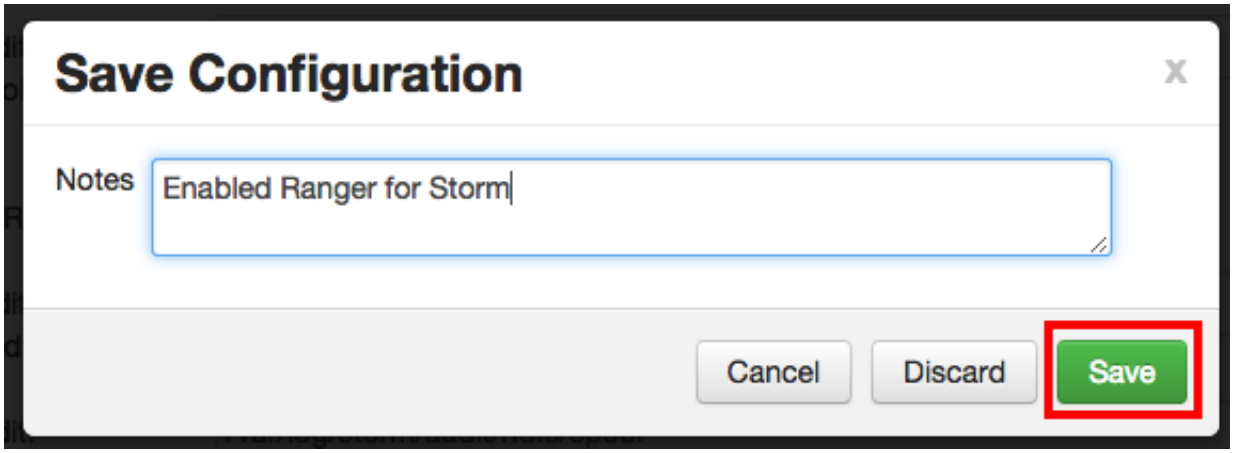
1. On the Ranger Configs page, select the **Ranger Plugin** tab.



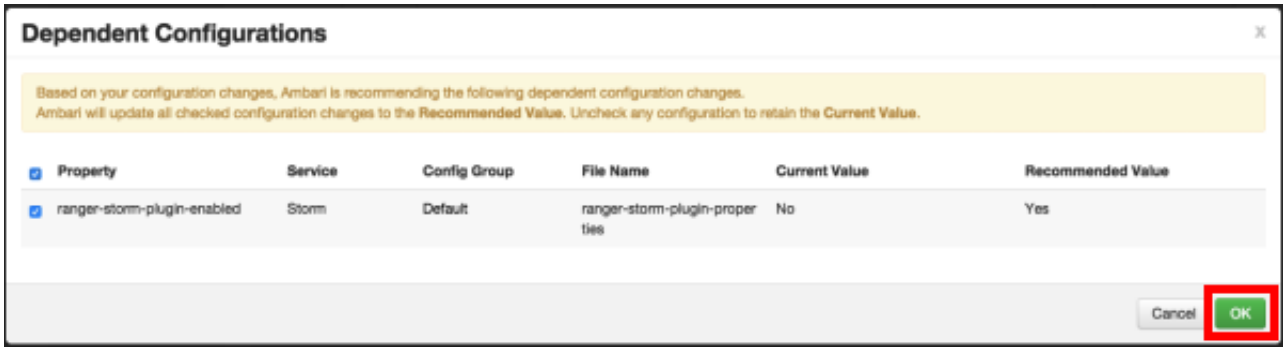
2. Under Storm Ranger Plugin, select **On**, then click **Save** in the black menu bar.



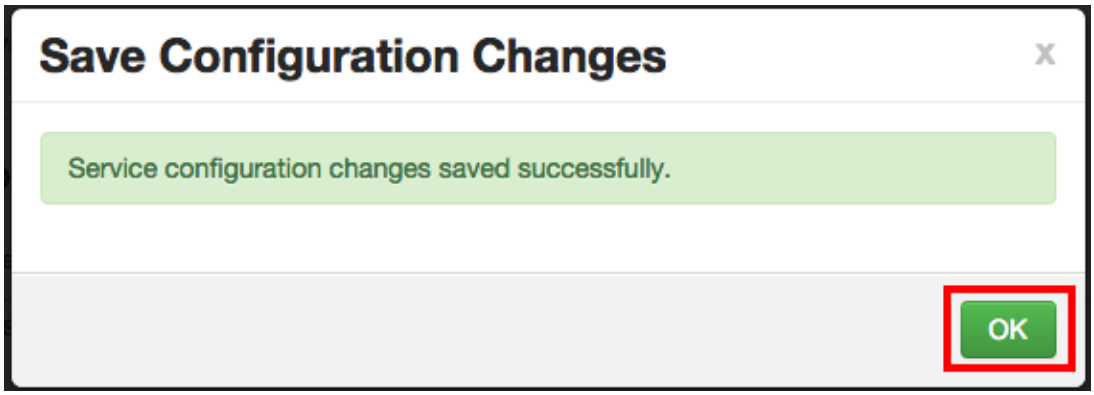
3. A Save Configuration pop-up appears. Type in a note describing the changes you just made, then click **Save**.



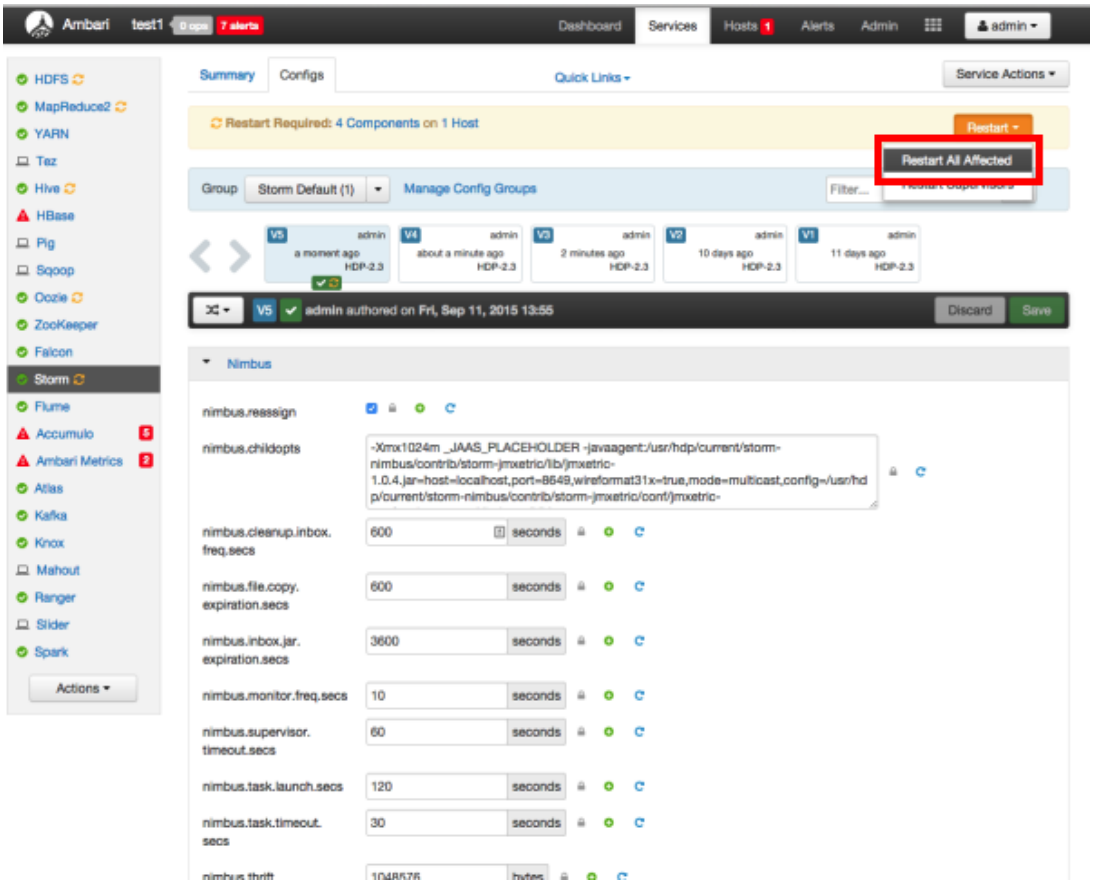
4. A Dependent Configuration pop-up appears. Click **OK** to confirm the configuration updates.



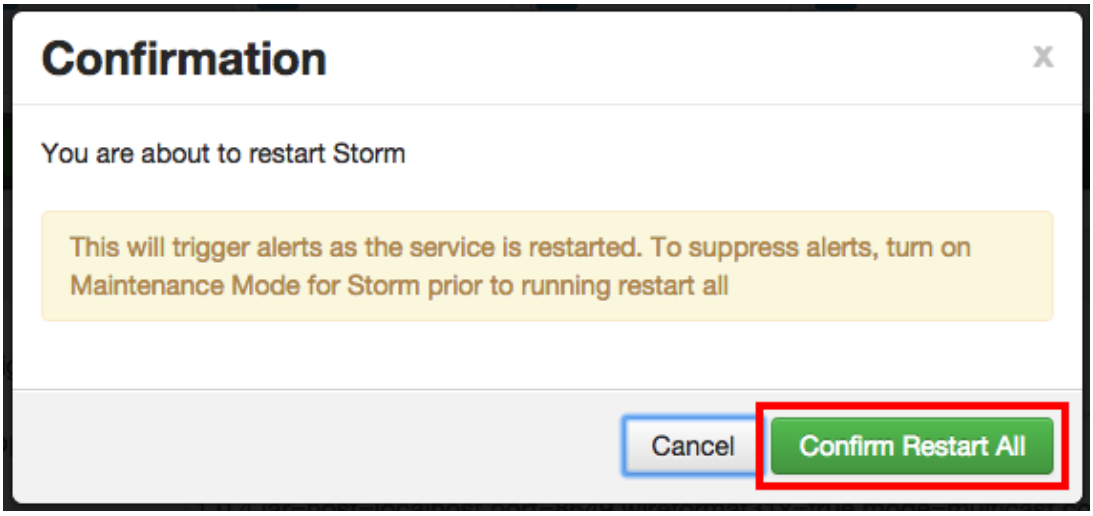
5. Click **OK** on the Save Configuration Changes pop-up.



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



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



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 HFDS 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 [74]
2. Hive [75]
3. HBase [75]
4. Knox [76]

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.

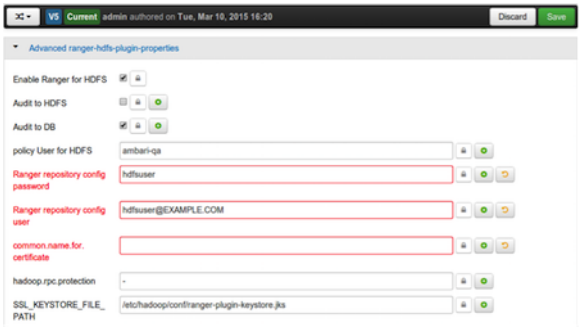


Table 6.1. HDFS Plugin Properties

Configuration Property Name	Value
Ranger repository config user	rangerhdfslookup@example.com

Configuration Property Name	Value
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

Important

You should not use the Hive CLI after enabling the Ranger Hive plugin. The Hive CLI is not supported in HDP-2.2.0 and higher versions, and may break the install or lead to other unpredictable behavior. Instead, you should use the HiveServer2 Beeline CLI.

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.

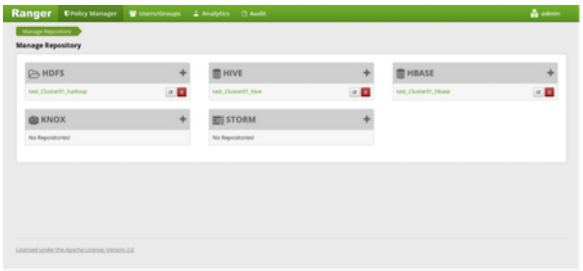
7. Open the Ranger Admin UI by entering the following information:

   - 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**.

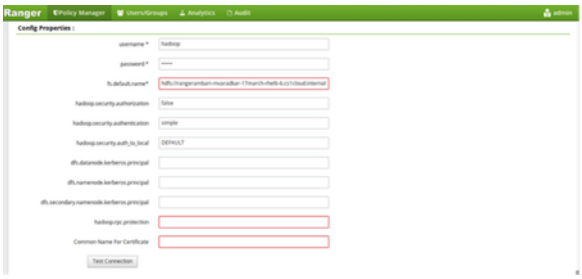
8. After you have successfully logged into the system, you will be redirected to the Policy Manager page.

Figure 6.1. Knox Policy Manager



9. Click on the repostory (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 boxappear.

12. Click **Save**.