

Cloudera Runtime 7.0.2

Configuring Advanced Security Options for Apache Ranger

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The Cloudera logo is displayed in a bold, orange, sans-serif font. The word "CLOUDERA" is written in all caps, with a stylized 'E' that has a horizontal bar extending to the right.

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Configure Kerberos authentication for Apache Ranger

How to configure Kerberos Authentication for Apache Ranger

About this task

Kerberos authentication for Apache Ranger is automatically configured when HDFS Kerberos authentication is configured in Cloudera Manager (typically using the Cloudera Manager Kerberos Wizard). In this way, the actions that Ranger authorizes are sure to be requested by authenticated users.

Specifically, Ranger depends on the HDFS `hadoop.security.authentication` property to enable or disable Kerberos authentication. When the `hadoop.security.authentication` property is updated, the Ranger service gets a restart indicator for the `core-site.xml` file that resides inside the Ranger service conf directory generated by Cloudera Manager.

Ranger Kerberos authentication is automatically enabled when HDFS Kerberos authentication is enabled.

Related Information

[Enabling Kerberos Authentication for CDP](#)

Configure TLS/SSL for Apache Ranger

How to configure TLS/SSL for Apache Ranger

About this task

Procedure

1. In Cloudera Manager, select Ranger, then click the Configuration tab.
2. Under Category, select Security.
3. Set the following properties.

Table 1: Apache Ranger TLS/SSL Settings

Configuration Property	Description
Enable TLS/SSL for Ranger Admin <code>ranger.service.https.attrib.ssl.enabled</code>	Select this check box to encrypt communication between clients and Ranger Admin using Transport Layer Security (TLS) (formerly known as Secure Socket Layer (SSL)).
Ranger Admin TLS/SSL Server JKS Keystore File Location <code>ranger.https.attrib.keystore.file</code>	The path to the TLS/SSL keystore file containing the server certificate and private key used for TLS/SSL. Used when Ranger Admin is acting as a TLS/SSL server. The keystore must be in JKS format.
Ranger Admin TLS/SSL Server JKS Keystore File Password <code>ranger.service.https.attrib.keystore.pass</code>	The password for the Ranger Admin JKS keystore file.
Ranger Admin TLS/SSL Client Trust Store File <code>ranger.truststore.file</code>	The location on disk of the trust store, in .jks format, used to confirm the authenticity of TLS/SSL servers that Ranger Admin might connect to. This is used when Ranger Admin is the client in a TLS/SSL connection. This trust store must contain the certificate(s) used to sign the connected service(s). If this parameter is not provided, the default list of well known certificate authorities is used.

Configuration Property	Description
Ranger Admin TLS/SSL Client Trust Store Password ranger.truststore.password	The password for the Ranger Admin TLS/SSL Certificate trust store file. This password is not required to access the trust store; this field can be left blank. This password provides optional integrity checking of the file. The contents of trust stores are certificates, and certificates are public information.
Enable TLS/SSL for Ranger Tagsync	Select this check box to encrypt communication between clients and Ranger Tagsync using Transport Layer Security (TLS) (formerly known as Secure Socket Layer (SSL)).
Ranger Tagsync TLS/SSL Server JKS Keystore File Location xasecure.policymgr.clientsssl.keystore	The path to the TLS/SSL keystore file containing the server certificate and private key used for TLS/SSL. Used when Ranger Tagsync is acting as a TLS/SSL server. The keystore must be in JKS format.
Ranger Tagsync TLS/SSL Server JKS Keystore File Password xasecure.policymgr.clientsssl.keystore.password	The password for the Ranger Tagsync JKS keystore file.
Ranger Tagsync TLS/SSL Client Trust Store Password xasecure.policymgr.clientsssl.truststore.password	The password for the Ranger Tagsync TLS/SSL Certificate trust store file. This password is not required to access the trust store; this field can be left blank. This password provides optional integrity checking of the file. The contents of trust stores are certificates, and certificates are public information.
Ranger Usersync TLS/SSL Client Trust Store File ranger.usersync.truststore.file	The location on disk of the trust store, in .jks format, used to confirm the authenticity of TLS/SSL servers that Ranger Usersync might connect to. This is used when Ranger Usersync is the client in a TLS/SSL connection. This trust store must contain the certificate(s) used to sign the connected service(s). If this parameter is not provided, the default list of well known certificate authorities is used.
Ranger Usersync TLS/SSL Client Trust Store Password ranger.usersync.truststore.password	The password for the Ranger Usersync TLS/SSL certificate trust store File. This password is not required to access the trust store; this field can be left blank. This password provides optional integrity checking of the file. The contents of trust stores are certificates, and certificates are public information.

4. Click Save Changes.

5. In order for services to communicate successfully with Ranger, you must set the following properties in each service that has Ranger authorization enabled to ensure that the Ranger Admin certificate is imported into the trust store.

- TLS/SSL Client Trust Store File
- TLS/SSL Client Trust Store Password

For example, for HDFS select HDFS > Configuration in Cloudera Manager, then search for "HDFS NameNode TLS/SSL Client Trust Store", or use the Security Category to find and set the following properties:

- HDFS NameNode TLS/SSL Client Trust Store File
- HDFS NameNode TLS/SSL Client Trust Store Password



Important: Repeat this procedure for all services that have Ranger authorization enabled.

Cluster 1

HDFS-1 Actions

Feb 9, 9:18 PM UTC

Status Instances **Configuration** Commands File Browser Charts Library Cache Statistics Audits NameNode Web UI Quick

Q HDFS NameNode TLS/SSL Client Trust Store Filters Role Groups History and Rollback

Filters

SCOPE

HDFS-1 (Service-Wide)	0
Balancer	0
DataNode	0
Gateway	0
HttpFS	0
JournalNode	0
NFS Gateway	0
NameNode	2
SecondaryNameNode	0
Fallover Controller	0

CATEGORY

Advanced	0
Checkpointing	0
Cloudera Navigator	0
Erasure Coding	0
High Availability	0
Logs	0
Main	0
Monitoring	0
Performance	0
Ports and Addresses	0
Proxy	0
Replication	0
Resource Management	0
Security	2
Stacks Collection	0

STATUS

Error	0
Warning	0
Edited	2
Non-default	2
Has Overrides	0

HDFS NameNode TLS/SSL Client Trust Store File NameNode Default Group Undo

/etc/hadoop/conf/ranger-plugin-truststore.jks

HDFS NameNode TLS/SSL Client Trust Store Password NameNode Default Group Undo

.....

Per Page 25 1 - 25 of 461

2 Edited Values Reason for change: Modified HDFS NameNode TLS/SSL Client Trust Store File, HDFS NameNode Save Changes (CTRL+S)

6. Click Save Changes.

Configuring Apache Ranger High Availability

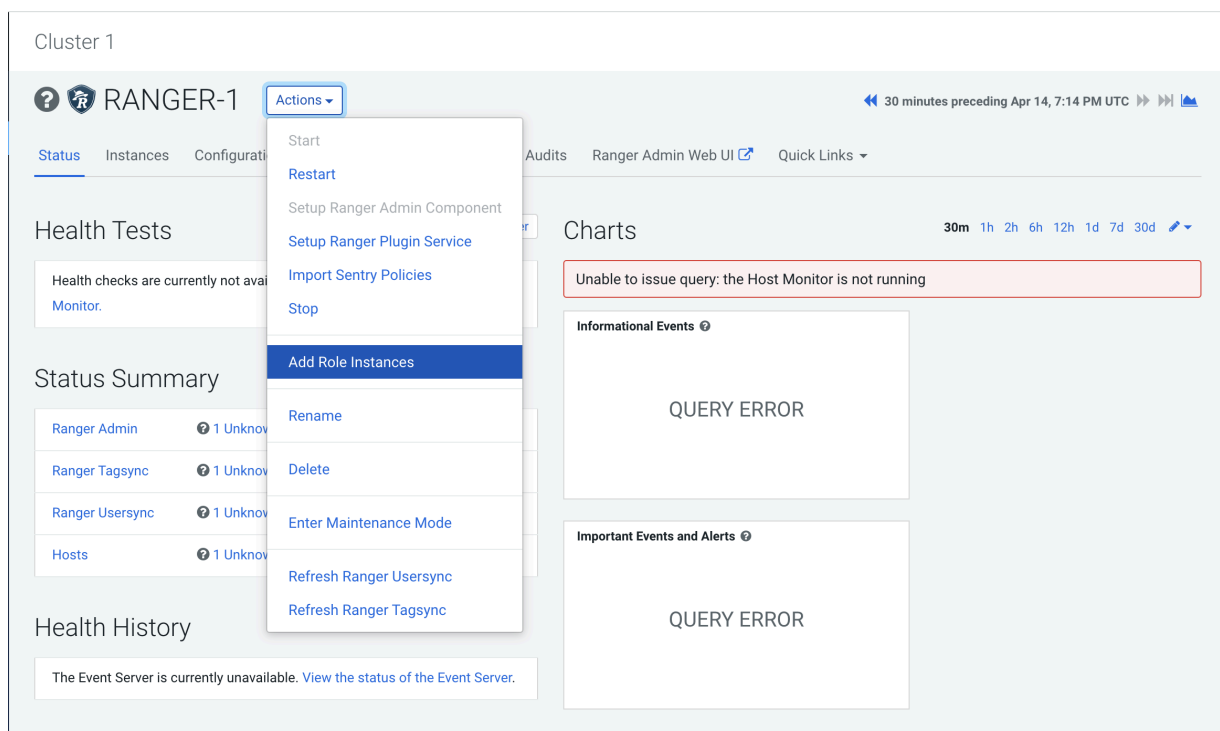
How to configure High Availability (HA) for Apache Ranger.

Configure Ranger Admin High Availability

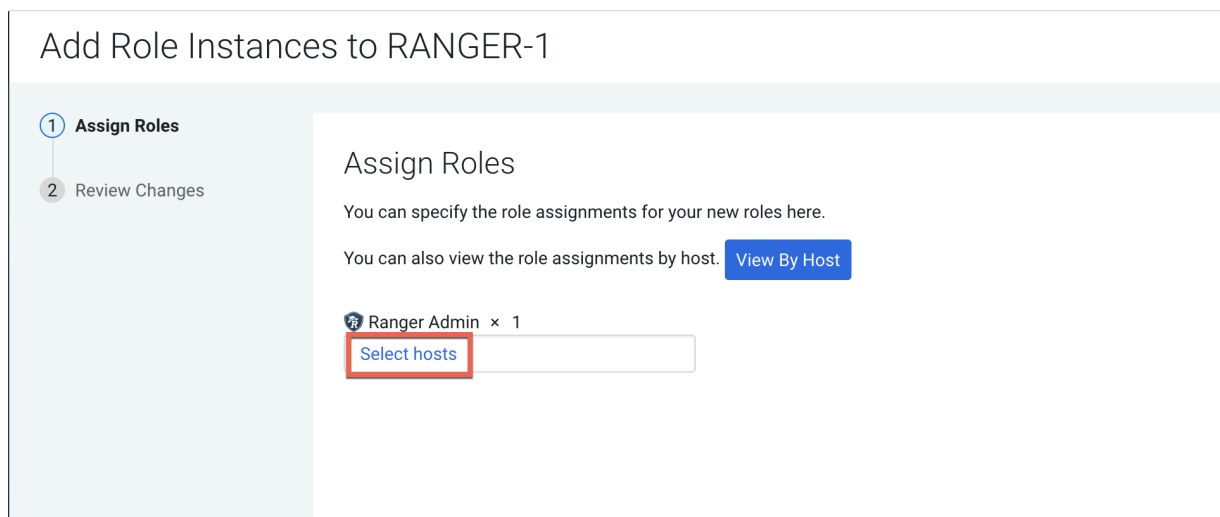
How to configure Ranger Admin High Availability (HA) by adding additional Ranger Admin role instances.

Procedure

1. In Cloudera Manager, select Ranger, then select Actions > Add Role Instances.



2. On the Add Role Instances page, click Select hosts.



- On the selected hosts page, the primary Ranger Admin host is selected by default. Select a backup Ranger host. A Ranger Admin (RA) icon appears in the Added Roles column for the selected backup host. Click OK to continue.

2 Hosts Selected ✕

Select hosts for a new or existing role. The host list is filtered to remove hosts that are not valid candidates; these include hosts that are unhealthy, members of other clusters, or have an incompatible version of the software installed on them.

Enter hostnames: host01, host[01-10], IP addresses or rack. Search

Tip: Click the first checkbox, hold down the Shift key and click the last checkbox to select a range.

<input type="checkbox"/>	Hostname ↑	IP Address	Rack	Cores	Physical Memory	Existing Roles	Added Roles
<input checked="" type="checkbox"/>	dhost-001 1 dhost-001 3 dhost-001.site	172.27.114.133	/default	88	251.6 GiB	AS G HB... RS DN G G G G	ID KB KG M LS RA RT
<input checked="" type="checkbox"/>	dhost-002 2 dhost-002 3 dhost-002.site	172.27.12.201	/default	32	251.6 GiB	M B NN NF... SNN G HMS G	RA
<input type="checkbox"/>	dhost-003 3 dhost-003 3 dhost-003.site	172.27.109.135	/default	88	251.6 GiB	RS DN G G ID G KB TS	

1 - 3 of 3

Cancel OK

- The Add Role Instances page is redisplayed with the new backup host. Click Continue.

Add Role Instances to RANGER-1

1 Assign Roles

2 Review Changes

Assign Roles

You can specify the role assignments for your new roles here.

You can also view the role assignments by host. View By Host

Ranger Admin × (1 + 1 New)

dhost-001-2.dhost-001.site...

Back Continue

5. Review the settings on the Review Changes page, then click Continue.

Add Role Instances to RANGER-1

Assign Roles

2 Review Changes

Review Changes

<p>Maximum Shards for Solr Collection of Ranger Audits ranger.audit.solr.max.shards.per.node</p>	<p>Ranger Admin Default Group</p> <input type="text" value="1"/>	?
<p>Replicas for Solr Collection of Ranger Audits ranger.audit.solr.no.replica</p>	<p>Ranger Admin Default Group</p> <input type="text" value="1"/>	?
<p>Shards for Solr Collection of Ranger Audits ranger.audit.solr.no.shards</p>	<p>Ranger Admin Default Group</p> <input type="text" value="1"/>	?
<p>Ranger Database Host ranger_database_host</p>	<p>Ranger Admin Default Group ↩</p> <input type="text" value="cloudera.com:22211:cloudera.com:22211:cloudera.com:22211"/>	?
<p>Ranger Database Name ranger_database_name</p>	<p>Ranger Admin Default Group ↩</p> <input type="text" value="ranger1"/>	?
<p>Ranger Database User Password ranger.jpa.jdbc.password</p>	<p>Ranger Admin Default Group ↩</p> <input type="password" value="....."/>	?
<p>Ranger Database Type ranger_database_type</p>	<p>Ranger Admin Default Group</p> <p> <input type="radio"/> MySQL <input type="radio"/> Oracle <input checked="" type="radio"/> PostgreSQL <input type="radio"/> MsSQL <input type="radio"/> SQLA </p>	?
<p>Ranger Database User ranger.jpa.jdbc.user</p>	<p>Ranger Admin Default Group</p> <input type="text" value="rangeradmin"/>	?
<p>Ranger Admin TLS/SSL Client Trust Store File ranger.truststore.file</p>	<p>Ranger Admin Default Group</p> <input type="text"/>	?
<p>Ranger Admin TLS/SSL Client Trust Store Password ranger.truststore.password</p>	<p>Ranger Admin Default Group</p> <input type="text"/>	?
<p>Enable TLS/SSL for Ranger</p>	<p><input type="checkbox"/> Ranger Admin Default Group</p>	?

6. Restart the stale Ranger configuration, then click Finish.

Cluster 1 CDEP Deployment from 2020-Apr-28 09:23

RANGER-1 Actions

Stale Configuration: Restart Command needed

Status Instances Configuration Audits Ranger Admin Web UI Quick Links

Health Tests Show 3 Good

Status Summary

Ranger Admin	1 Good Health	1 Stopped
Ranger Tagsync	1 Good Health	
Ranger Usersync	1 Good Health	
Hosts	2 Good Health	

Charts

Informational Events

Important Events and Alerts

7. After restart you will see two URLs for the Ranger Admin Web UI.

- Requests are distributed to the multiple Ranger Admin instances in a round-robin fashion.
- If a connection is refused (indicating a failure), requests are automatically rerouted to the alternate Ranger Admin instance. However, you must manually switch to the alternate Ranger Admin Web UI.
- For all services that have the Ranger plugin enabled, the value of the `ranger.plugin.<service>.policy.rest.url` property changes to `http://<RANGER-ADMIN-1>:6080,http://<RANGER-ADMIN-2>:6080`.

Cluster 1 CDEP Deployment from 2021-Feb-17 09:37

RANGER-1 Actions

Web UI Quick Links

Ranger Admin Web UI (c...-2-1)

Ranger Admin Web UI (c...-2)

Health Tests Show 3 Good

Status Summary

Ranger Admin	2 Good Health	
Ranger Tagsync	1 Good Health	
Ranger Usersync	1 Good Health	
Hosts	2 Good Health	

Health History

3 Became Good	7:24:28 PM
3 Became Disabled	7:23:37 PM
2 Became Bad	7:23:32 PM
Ranger Admin Health Good	7:14:09 PM
1 Became Good	
Ranger Admin Health Concerning	

Informational Events

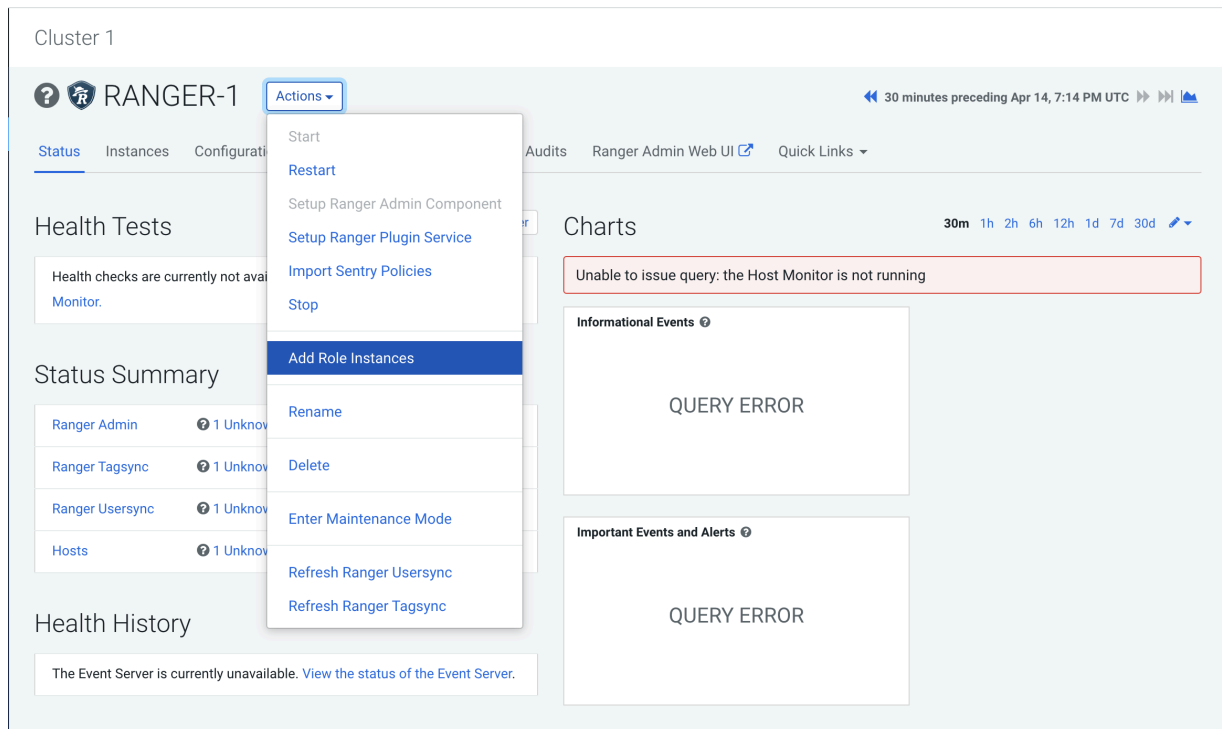
Important Events and Alerts

Configure Ranger Admin High Availability with a Load Balancer

For clusters that have multiple users and production availability requirements, you may want to configure Ranger high availability (HA) with a load-balancing proxy server to relay requests to and from Ranger.

Procedure

1. Configure an external load balancer to use with Ranger HA.
2. In Cloudera Manager, select Ranger, then select Actions > Add Role Instances.

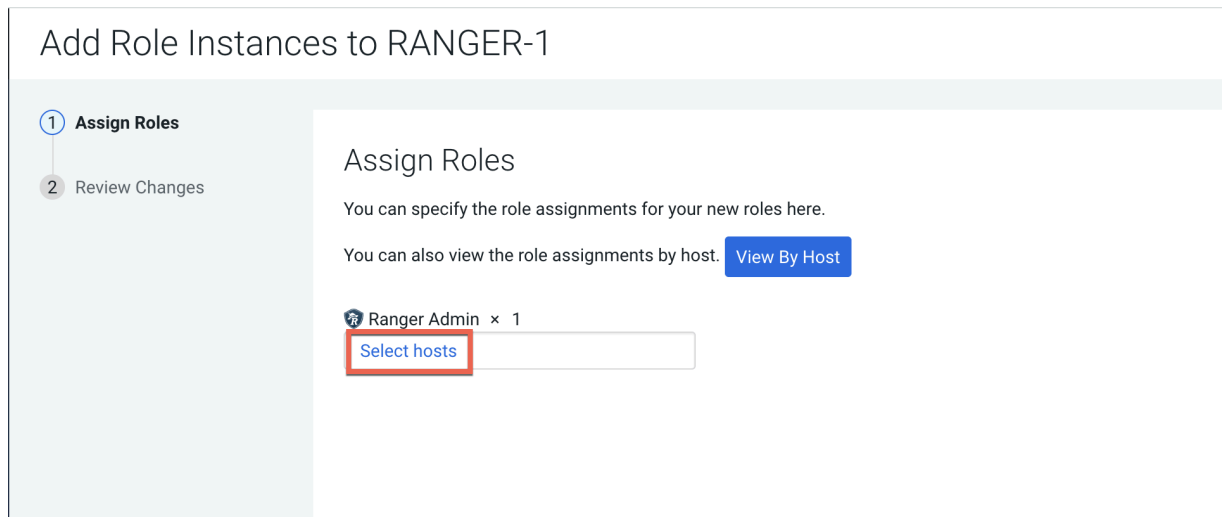


The screenshot shows the Cloudera Manager interface for Cluster 1, specifically the Ranger Admin configuration page. The 'Actions' dropdown menu is open, and 'Add Role Instances' is highlighted. The page displays various status indicators, including 'Health Tests' and 'Status Summary'. The 'Status Summary' section shows the following roles and their status:

Role	Status
Ranger Admin	1 Unknown
Ranger Tagsync	1 Unknown
Ranger Usersync	1 Unknown
Hosts	1 Unknown

The 'Health Tests' section indicates that health checks are currently not available for the Monitor. The 'Health History' section shows that the Event Server is currently unavailable. The 'Charts' section displays a 'QUERY ERROR' message.

3. On the Add Role Instances page, click Select hosts.



The screenshot shows the 'Add Role Instances to RANGER-1' page in Cloudera Manager. The 'Assign Roles' section is active, showing the role 'Ranger Admin' with a count of 1. The 'Select hosts' button is highlighted.

Assign Roles

You can specify the role assignments for your new roles here.

You can also view the role assignments by host. [View By Host](#)

Ranger Admin × 1

[Select hosts](#)

- On the selected hosts page, the primary Ranger Admin host is selected by default. Select your configured backup Ranger host (ranger-host2-fqdn). A Ranger Admin (RA) icon appears in the Added Roles column for the selected backup host. Click OK to continue.

2 Hosts Selected ✕

Select hosts for a new or existing role. The host list is filtered to remove hosts that are not valid candidates; these include hosts that are unhealthy, members of other clusters, or have an incompatible version of the software installed on them.

Search

Tip: Click the first checkbox, hold down the Shift key and click the last checkbox to select a range.

<input type="checkbox"/>	Hostname ↑	IP Address	Rack	Cores	Physical Memory	Existing Roles	Added Roles
<input checked="" type="checkbox"/>	dhost-001 1 dhost-001 3 dhost-001.site	172.27.114.133	/default	88	251.6 GiB	AS G HB... RS DN G G G	RA RT
<input checked="" type="checkbox"/>	dhost-002 2 dhost-002 3 dhost-002.site	172.27.12.201	/default	32	251.6 GiB	M B NN NF... SNN G HMS G	RA
<input type="checkbox"/>	dhost-003 3 dhost-003 3 dhost-003.site	172.27.109.135	/default	88	251.6 GiB	RS DN G G G ID G KB TS	

1 - 3 of 3

Cancel OK

- The Add Role Instances page is redisplayed with the new backup host. Click Continue.

Add Role Instances to RANGER-1

1 Assign Roles

2 Review Changes

Assign Roles

You can specify the role assignments for your new roles here.

You can also view the role assignments by host. View By Host

Ranger Admin × (1 + 1 New)

dhost-001-2.dhost-001.site...

Back
Continue

6. Review the settings on the Review Changes page, then click Continue.

Add Role Instances to RANGER-1

Assign Roles

Review Changes

Review Changes

Maximum Shards for Solr Collection of Ranger Audits <small>ranger.audit.solr.max.shards.per.node</small>	Ranger Admin Default Group <input type="text" value="1"/>	?
Replicas for Solr Collection of Ranger Audits <small>ranger.audit.solr.no.replica</small>	Ranger Admin Default Group <input type="text" value="1"/>	?
Shards for Solr Collection of Ranger Audits <small>ranger.audit.solr.no.shards</small>	Ranger Admin Default Group <input type="text" value="1"/>	?
Ranger Database Host <small>ranger_database_host</small>	Ranger Admin Default Group <input type="text" value="cloudera.com:22211:cloudera.com:22211:cloudera.com:22211"/>	?
Ranger Database Name <small>ranger_database_name</small>	Ranger Admin Default Group <input type="text" value="ranger1"/>	?
Ranger Database User Password <small>ranger.jpa.jdbc.password</small>	Ranger Admin Default Group <input type="password" value="....."/>	?
Ranger Database Type <small>ranger_database_type</small>	Ranger Admin Default Group <input type="radio"/> MySQL <input type="radio"/> Oracle <input checked="" type="radio"/> PostgreSQL <input type="radio"/> MsSQL <input type="radio"/> SQLA	?
Ranger Database User <small>ranger.jpa.jdbc.user</small>	Ranger Admin Default Group <input type="text" value="rangeradmin"/>	?
Ranger Admin TLS/SSL Client Trust Store File <small>ranger.truststore.file</small>	Ranger Admin Default Group <input type="text"/>	?
Ranger Admin TLS/SSL Client Trust Store Password <small>ranger.truststore.password</small>	Ranger Admin Default Group <input type="text"/>	?
Enable TLS/SSL for Ranger	<input type="checkbox"/> Ranger Admin Default Group	?

- Update the Ranger Load Balancer Address property (ranger.externalurl) with the load balancer host URL and port, then click Save Changes.



Note: Do not use a trailing slash in the the load balancer host URL when updating the Ranger Load Balancer Address property.

- If Kerberos is configured on your cluster, use SSH to connect to the KDC server host. Use the `kadmin.local` command to access the Kerberos CLI, then check the list of principals for each domain where Ranger Admin and the load-balancer are installed.



Note: This step assumes you are using an MIT KDC (and `kadmin.local`). This step will be different if you are using AD or IPA.

```
kadmin.local
kadmin.local: list_principals
```

For example, if Ranger Admin is installed on `<host1>` and `<host2>`, and the load-balancer is installed on `<host3>`, the list returned should include the following entries:

```
HTTP/ <host3>@EXAMPLE.COM
HTTP/ <host2>@EXAMPLE.COM
HTTP/ <host1>@EXAMPLE.COM
```

If the HTTP principal for any of these hosts is not listed, use the following command to add the principal:

```
kadmin.local: addprinc -randkey HTTP/<host3>@EXAMPLE.COM
```



Note:

This step will need to be performed each time the Spnego keytab is regenerated.

9. If Kerberos is configured on your cluster, complete the following steps to create a composite keytab.



Note: These steps assume you are using an MIT KDC (and kadmin.local). These steps will be different if you are using AD or IPA.

- a) SSH into the Ranger Admin host, then create a keytabs directory.

```
mkdir /etc/security/keytabs/
```

- b) Copy the ranger.keytab from the current running process.

```
cp /var/run/cloudera-scm-agent/process/<current-ranger-process>/ranger.keytab /etc/security/keytabs/ranger.ha.keytab
```

- c) Run the following command to invoke kadmin.local.

```
kadmin.local
```

- d) Run the following command to add the SPNEGO principal entry on the load balancer node.

```
ktadd -norandkey -kt /etc/security/keytabs/ranger.ha.keytab HTTP/load-balancer-host@EXAMPLE.COM
```



Note:

As shown above, the domain portion of the URL must be in capital letters. You can use `list_principals *` to view a list of all of the principals.

- e) Run the following command to add the SPNEGO principal entry on the node where the first Ranger Admin is installed.

```
ktadd -norandkey -kt /etc/security/keytabs/ranger.ha.keytab HTTP/ranger-admin-host1@EXAMPLE.COM
```

- f) Run the following command to add the SPNEGO principal entry on the node where the second Ranger Admin is installed.

```
ktadd -norandkey -kt /etc/security/keytabs/ranger.ha.keytab HTTP/ranger-admin-host2@EXAMPLE.COM
```

- g) Run the following command to exit kadmin.local.

```
exit
```

- h) Run the following command to verify that the `/etc/security/keytabs/ranger.ha.keytab` file has entries for all of the required SPNEGO principals.

```
klist -kt /etc/security/keytabs/ranger.ha.keytab
```

- i) On the backup (ranger-admin-host2) Ranger Admin node, run the following command to create a keytabs folder.

```
mkdir /etc/security/keytabs/
```

- j) Copy the ranger.ha.keytab file from the primary Ranger Admin node (ranger-admin-host1) to the backup (ranger-admin-host2) Ranger Admin node.

```
scp /etc/security/keytabs/ranger.ha.keytab root@ranger-host2-fqdn:/etc/security/keytabs/ranger.ha.keytab
```

- k) Run the following commands on all of the Ranger Admin nodes.

```
chmod 440 /etc/security/keytabs/ranger.ha.keytab
```

```
chown ranger:hadoop /etc/security/keytabs/ranger.ha.keytab
```

10. Update the following ranger-admin-site.xml configuration settings using the Safety Valve.

```
ranger.spnego.kerberos.keytab=/etc/security/keytabs/ranger.ha.keytab
ranger.spnego.kerberos.principal=*
```

The screenshot displays the Ranger Admin console for instance RANGER-1. The 'Configuration' tab is active, and a search for 'Safety Valve' is performed. The configuration editor shows two snippets:

- Ranger Service Environment Advanced Configuration Snippet (Safety Valve)**: Contains the key `ranger.spnego.kerberos.keytab` with the value `/etc/security/keytabs/ranger.ha.keytab`.
- Ranger Admin Advanced Configuration Snippet (Safety Valve) for conf/ranger-admin-site.xml**: Contains the key `ranger.spnego.kerberos.principal` with the value `*`.

The status bar at the bottom indicates that 1 value has been edited and provides a 'Save Changes(CTRL+S)' button.

11. Restart all cluster services that require a restart, then click Finish.

Cluster 1 CDEP Deployment from 2020-Apr-28 09:23

RANGER-1 Actions Stale Configuration: Restart Command needed Charts Library Audits Ranger Admin Web UI Quick Links

Health Tests Create Trigger Show 3 Good

Status Summary

Ranger Admin	1 Good Health	1 Stopped
Ranger Tagsync	1 Good Health	
Ranger Usersync	1 Good Health	
Hosts	2 Good Health	

Charts

Informational Events

Important Events and Alerts

12. Use a browser to check the load-balancer host URL (with port). You should see the Ranger Admin page.

Ranger

Username:

Password:

Sign In